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Popular Science

WOMEN SCIENTISTS IN INDIA

LIVES, STRUGGLES & ACHIEVEMENTS

ANJANA CHATTOPADHYAY

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Introduction

The *Women Scientists in India: Lives, Struggles and Achievements* has been designed to include collection of biographies of women scientists in India in a readily available single volume reference book. It provides reflection of scientific temper of great minds of women through their factual biographical details and landmark achievements.

The author has tried to gather essence of their scientific spirit, new innovations and their impact upon society. Precisely it shows how science advanced in India over the years, especially during late 19th Century and early 20th Century, when the society started realizing the need to involve their women folks in the area of public health to improve the quality of life by providing safe child birth and prevent rampant neonatal mortality.

Rapid expansion in health care services for women has been recorded during this period across the world. It was the age of social transformation after industrial revolution, which created various employment opportunities due to socio-economic development. It slowly opened new avenues and acceptance for women participation in different fields of education and services.

Usually, women patients used to feel uncomfortable and embarrassed while being examined and treated by male doctors for women related diseases. Although female patients always expressed their gender preference, they had no other alternatives. Initially, women were involved as assistant or helper to their male family members in imparting medical service. They served as alchemical assistants, operation theatre assistants, drug preparation experts, etc. They also served as midwives and untrained healers of women related diseases. With the advancement of education and economy, the status of women

started changing in the society. Women started realizing their potential to manage health care services. They started seeking recognition and economic benefit for their service. In order to prevent medical practice of quacks, the Royal College of Surgeons, UK became licensing body from 1800. The Society for Apothecary also started licensing Apothecary from 1815. Licensing from these bodies was granted only to qualified medical students. From there the system of having license for medical practice started. Women had no opportunity to avail formal medical education and license for medical practice, though the health care services best suited to the needs and aptitude of women. They started making demands for proper medical education and recognition. The 'Women's Health Movement' started to establish their professional identity. There are sufficient exciting historical events available to show that there was a gender-based professional conflict when women tried to enter into the male dominated medical profession.

There is a fascinating story of the first woman doctor who practiced medicine in British Army, Dr. James Miranda Stuart Barry. She disguised herself as a man so that she could study medicine and get licensed by authorized licensing body to practice medicine. Born and brought up in Britain, she posed as a male in 1809 to get admission to Edinburgh University and received MD degree in 1812. This was long before women had acceptance to get admission to medical schools. After graduation, Dr. Barry joined British Army as a male doctor and earned reputation of an eminent surgeon. In 1857, Dr. Barry was appointed as Inspector General of Hospitals for Upper and Lower Canada. Dr. Barry practiced medicine for more than forty years and served in England, Canada, India and Cape Town, South Africa. In 1859, she had to return to England as she caught bronchitis, and refused to be examined by physicians. Barry's long kept secret of her gender identity was disclosed when she died of dysentery on 25th July 1865, and was laid out for burial (James Barry Biography, Dictionary of Canadian Biography; www.thecanadianencyclopedia.ca/en/article/james-barry/; [https://en.wikipedia.org/wiki/James_Barry_\(surgeon\)](https://en.wikipedia.org/wiki/James_Barry_(surgeon))) (Accessed on 01.08.16).

In 1869, five women students Sophia Jex-Blake, Edith Pechey, Matilda Chaplin, Helen Evans and Isabel Thorne applied for admission

to Medical School at the University of Edinburgh. They had to pay double fees for separate class for women. One of the students, Miss Edith Pechey earned brilliant result in chemistry and became entitled to avail Hope Scholarship. But the same could not be possible as male students, a section of teachers and press organized themselves against women's admission to medical courses and tried to establish that women's admission to medical school was not legal. The strong conflict in academic world resulted into a well-known episode of 'Edinburgh Riot of 1870' and the 'Riot of Surgeons Hall in 1871'. Finally, the Hope Scholarship was awarded to the second best male student on the plea that the scholarship was meant for regular medical students. These women then proceeded abroad to the Universities of Ireland, Bern, Dublin and Switzerland to earn recognized medical degrees. Subsequently, Dr. Elizabeth Garrett Anderson helped to start the 'London School of Medicine for Women' in 1874, which provided fair chance to the aspiring women candidates to get admission to the medical school. Even after qualifying medical education with great difficulties, women could not get their dues in clinical practice in their homeland. They remained confined to subordinate positions in small health centres and dispensaries. It was very rare for women doctors to get regular prestigious position in government hospitals. Professional suppression of women doctors by their male colleagues and unfavourable professional competition forced women doctors to search for alternative suitable places, where they could establish their practice.

In India, with the practice of *Purdah* culture, women were not allowed to be treated by male doctors. Women preferred to die in pain rather than treated by male doctors. Mishandling of maternity cases by untrained *dais* and frequent death of women and children during child labour was a serious concern. The chaotic condition of health of women and children created a wave of sympathy for Indian women. The poor health conditions and high mortality rate needed immediate attention of authorities.

The situation got more sensitive by the message of Maharani of Panna to the Queen of England through Miss Elizabeth Bielby, who was a health worker and had come to India in 1876 with some medical training. Miss Bielby had the chance of treating Maharani of Panna, who was suffering

from a prolonged illness. The Maharani made magical recovery from the treatment of Miss Beilby, and she became a close friend of hers. Miss Beilby established a small dispensary at Panna, about 100 miles away from Lucknow. Subsequently, she decided to return to England to equip herself with a formal medical degree. When she met Maharani before her departure, the Maharani made her a personal request to convey her message to the Queen of England to send some medical help to save women of India from pain and suffering. In return to her request, the Queen of England directed Lady Harriot Dufferin, Vicereine of the then Viceroy Lord Dufferin of India from 1885-88 to do something for Indian sisters. Lady Dufferin upon her arrival to India started the ambitious Dufferin Fund (National Association for Supply of Female Medical Aids to Women of India) in August 1885. The Dufferin Fund was the most systematic programme to support medical facilities for Indian women and children. It was a turning point in the history of medical science in India, which opened the door for foreign missionary women doctors to enter India.

The educated women missionary doctors from Britain, Australia, Canada and America started visiting India. They came from different socio-economic background, food habit and different languages. Despite their diversity, the qualified women doctors from developed countries were ready to sacrifice their comfortable lifestyle and ambitions in their homeland for the expectation of following professional advantages:

1. To establish themselves in medical profession and to earn vast clinical experience.
2. They earned high salary and were allowed to conduct private practice.
3. They earned high position in hospitals, high status in the society and established close contact with people and high class society including royal families.
4. They got a chance for independent leadership in profession, tried their hand in difficult surgeries to gain clinical experience and job satisfaction.

They started training local women to assist them in their dispensaries and hospitals. But the native trained women were confined to lower grade jobs and to assist their foreign missionaries. The medical missionaries also had a dual purpose to heal human sufferings and spread the love of God through the teachings of Christ and achieve evangelical motive.

Medical missionaries had an advantage over other missionaries because they relieved people from pain, suffering and clinical emergencies. Women medical missionaries could penetrate more easily into the orthodox household of Hindus and Muslims. It was easy for them to convince and make gospel acceptable through medical missions. In due course of time, medical mission became an important channel to reach the mass for missionary activities. It was able to gain confidence and acceptance of the people (It helped them spread and propagate message of God). It was also defined as a media of Clinical Christianity. Time and again doors closed for ordinary missionaries had been gladly opened for clinical healers and preachers. Where many missionary initiatives failed to achieve success, the efforts of medical missionaries could break the glass ceiling and became very successful in establishing missionary stations in difficult terrains and remote corners of India. **Appendix I** provide the details of achievements made by the Foreign Missionary Women doctors in India.

Being motivated by the foreign missionaries, Indian women also started desiring to become qualified doctors. They started their difficult struggle to earn medical qualification and license either from India or abroad. The society also felt an urgent need for indigenous female doctors to manage the situation. Although the male dominated social system was not very comfortable with the idea, even then the movement to admit women students across the world picked up momentum as shown in the Table-I.

Table-I: Chronology of Medical College/Institution which Started Admission for Women Students

S No.	Year	Medical College/Institution
1.	1850	Women's Medical College of Pennsylvania, USA
2.	1874	London School of Medicine for Women, UK
3.	1875	Madras Medical College (India)
4.	1883	Calcutta Medical College (India)
5.	1884	Bombay University (India) (Grant Medical College)
6.	1886	Edinburgh School of Medicine for Women, UK

S No.	Year	Medical College/Institution
7.	1888	Campbell Medical School (Sealdah, Calcutta)
8.	1895	Christian Medical College for Women, Ludhiana, India
9.	1916	Lady Hardinge Medical College, New Delhi

In India, the Madras Medical College played the pioneering role to start admission for women candidates for medical courses in 1875. The first batch of four white students including Mary Scharlieb qualified LMS (Licentiate of Medicine & Surgery) (three years course) in 1878. Many Indian women aspirants tried their luck in India as well as in foreign countries through the acquaintance of foreign missionary doctors.

Kadambini Ganguly was the first qualified doctor of India, who studied medicine in Calcutta Medical College, which started admission to women candidates in 1883. She completed GBMC (Graduate of Bengal Medical College) in 1886 and became one of the two Indian doctors to qualify for medical practice along with Dr. Anandibai Joshi. In fact Dr. Kadambini Ganguly could not be granted MB (Bachelor of Medicine), because Professor R C Chandra failed her in medicine. It was believed to be a vindictive action by him, because he vehemently opposed the inclusion of female students for admission to medical degree in the Calcutta Medical College.

The other woman doctor, Anandibai Joshi gave birth to a baby boy at the age of 14, but the baby did not survive due to lack of required medical facility in the village. The tragic incident motivated her to become a doctor, so that villagers may not face such tragedy in future. She completed medical degree in 1886 from the Women's Medical College, Pennsylvania, USA. Upon her return to India, she was offered the job of Resident Physician at Kohlapur, but she died of tuberculosis in 1887 and could not join her duty.

There is a story of a prolonged legal battle in the life of Dr. Rukmabai, who was married at the age of eleven to Dadaji Bhikaji of 20 years of age. Her husband was poor and uneducated and it was agreed at the time of marriage that Dadaji will acquire education and become a good man and take back Rukmabai to her in-laws home,

when she reaches puberty. However, Dadaji was not interested in education, but Rukmabai attended school and developed into an intelligent young woman. She refused to go to her in-laws house and the family dispute turned into a bitter legal battle against the miseries of evil child marriage custom of India. Rukmabai boldly faced the challenges, and she took the scholarship and earned medical degree from London School of Medicine for Women in 1894. She also obtained M.D. from Brussels and achieved great success in practicing medicine in India.

Dr. Haimabati Sen was an extraordinary personality, who was married at the age of nine and a half to a groom of the age of 45 years. She was child widow at the age of ten. She was deprived of her property and shelter from her parental and in-law's house. She had to take refuge in Brindavan for her survival. She took education there and became a school teacher. Later, she converted herself into Brahmo Samaji (a group of social reformers in Calcutta) to get remarried. The second marriage also did not bring any solace to her. She joined the Campbell Medical College (with her first baby in her hand) to avail Rs. 7 per month scholarship to maintain her family. She secured highest marks in the final examination in 1894. She was awarded Gold Medal for her achievement, but the boys of her college went on strike against her achievement. The issue got momentum, when local public and press also came forward to stand against her. Finally, the Gold Medal was snatched from her and was given to the second best male student of the class.

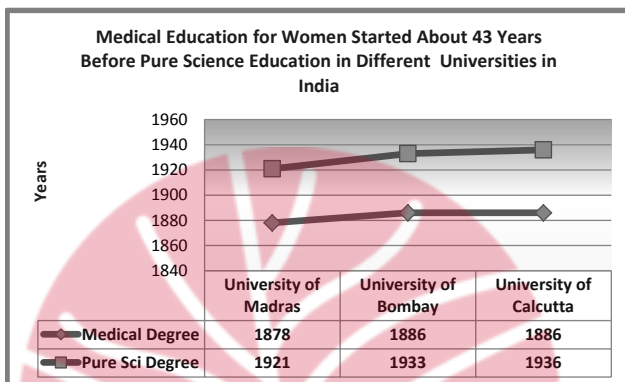
Table-II: Chronology of Indian Women Achievers in Medicine

S. No.	Year	Name	Degree	Name of Medical College
1.	1886	Kadambini Ganguly	GBMS (Graduate of Bengal Medical College)	Calcutta Medical College, Calcutta
2.	1886	Ananadibai Joshi	Graduate in Medicine	Women's Medical College, Pennsylvania, Philadelphia, USA

3.	1892	Gurubai Karmarkar,	M D	Women's Medical College, Pennsylvania, Philadelphia, USA
4.	1894	Rukmabai	M D	London School of Medicine for Women, London.
5.	1894	Haimabati Sen	Graduate in Medicine	Campbell Medical School, Calcutta
6.	1901	Dora Chatterjee	M D	Women's Medical College, Pennsylvania, Philadelphia, USA
7.	1905	Alice Maude Sorabji Pennell	MBBS	London School of Medicine for Women
8.	1912	Muthulakshmi Reddy	M B	Madras Medical College, Madras
9.	1915	Poonen Lucos	MBBS	London University, London
10.	1916	Jacob Jerusha Jhirad,	1. Graduate in Medicine 2. M D	1. Grant Medical College, Bombay 2. London School of Medicine for Women, London.
11.	—	Lazarus, Hilda Mary	MBBS	Madras Medical College, Madras

The education for women in the field of medical sciences expanded more rapidly as compared to other pure science subjects. Women preferably allied to biological sciences and medicine. There was a great demand for job in these fields, which attracted several women. Data reflects that the participation of women remain limited to clinical job prior to 1920s as shown in Fig. 1. Opportunities in other fields of science expanded only in the post-1920s, when many universities and colleges opened their doors for the admission of female students in different pure science courses as shown in Table III.

Fig-1. Medical education for women started about 43 years before pure science education in different universities.



Women faced great challenges to get education in science subjects, as there was no college or university in those days to provide science education to female students. They had to request from college to college and university to university to get admission to BSc, MSc, and PhD courses. Table III provides the list of lady crusaders, who could achieve their endeavour despite several hurdles.

Table-III: Chronology of Indian Women Achievers in Science and Technology

S. No.	Year	Name	Degree/Achievement	Name Institute/Organization
1.	1921	E K Janaki Ammal	BSc(Honours) (Botany)	Presidency College, Madras
2.	1931	E K Janaki Ammal	DSc	University of Michigan, Ann Arbor, USA
3.	1933	Kamala Sohoni	BSc	Bombay University, Bombay
4.	1934	Radha Pant	BSc	University of Delhi, Delhi

S. No.	Year	Name	Degree/Achievement	Name Institute/Organization
5.	1935	E K Janaki Ammal	First Woman Fellow	Indian Academy of Sciences.
6.	1936	Asima Chatterjee	BSc (Chemistry)	Scottish Church College, Calcutta
7.	1939	Anna Mondiyal	BSc(Honours)	Presidency College, Madras
8.	1939	Kamala Sohoni	PhD	Cambridge University, Cambridge
9.	1944	Asima Chatterjee	DSc	Calcutta University, Calcutta
10.	1945	Radha Pant	First Woman Faculty Member	Science Department, Allahabad University, Allahabad
11.	1947	Urmil Eulie Chowdhury	B Arch	University of Sydney, Australia
12.	1948	Rajeshwari Chatterjee	MS (Electrical Engineering)	University of Michigan, Ann Arbor, USA
13.	1953	-do-	First Woman Faculty Member	Engineering Department, Indian Institute of Science, Bangalore
14.	1953	Shakuntala Bhagat	BTech (Civil)	Veer mata Jeejabai Technical Institute, Bombay
15.	1957	E K Janaki Ammal	First Woman Elected Fellow	Indian National Science Academy (INSA)
16.	1961	Asima Chatterjee	First Woman to get Shanti Swarup Bhatnagar Award (Chemical Sciences)	CSIR, India

S. No.	Year	Name	Degree/Achievement	Name Institute/Organization
17.	1968	Hiriyakkamavar Ilah	PhD	Indian Institute of Technology, Kanpur
18.	1968	Priti Shankar	First Woman Graduate	Indian Institute of Technology, New Delhi
19.	1975	Asima Chatterjee	First Woman General President	Indian Science Congress Association.
20.	1983	Sudipta Sengupta	First Woman Member	The Indian Antarctic Expedition
21.	1984	Sneh Bhargava	First Woman Director	All India Institute of Medical Sciences, New Delhi
22.	1985	Urmil Eulie Chowdhury	First Asian woman to get her name registered to IAWA, USA	Academy to International Archive of Women Architecture (IAWA), Virginia Tech., USA.
23.	1990	Bimla Buti	First Indian Woman Fellow	Third World Academy of Sciences (TWAS), Trieste, Italy
24.	1994	Satyavati, Gawdagere Vedanti	First Woman Director General	Indian Council of Medical Research (ICMR), New Delhi.
25.	2005	Raman Parimala	First woman to be awarded in Mathematics and Physics	Third World Academy of Sciences (TWAS), Trieste, Italy

There has been visible gender discrimination across the globe to accept the participation of women in the field of science and technology. Table IV shows the time it took to get admission of women in the scientific community. Initially, women were denied membership and fellowship in the scientific academies. However, the situation improved when women gained admission to higher education.

Table-IV: Year of First Woman Fellow/Member admitted to Scientific Academies in the world:

S. No.	Name of Academy	Year of Foundation	Year and the Name of First woman Fellow/Member
1.	The Royal Society of London	1660	1945: 1. Kathleen Lonsdale 2. Marjory Stephenson
2.	Academie des Sciences of Paris	1666	1962: First Corresponding Member: Marguerite Perey 1979: First Full Member: Yvonne Choquet-Bruhat
3.	American National Academy of Sciences	1863	1925: Florance Rana Sabin
4.	Indian Academy of Sciences	1934	1935: Edavaleth Kakkat Janaki Ammal
5.	Indian National Science Academy	1935	1957: Edavaleth Kakkat Janaki Ammal

Source: 1. www.theguardian.com/science/2010/nov/21/royal-society-lost-women-scientists

2. <http://www.thefamouspeople.com/profiles/janaki-ammal-6543.php>

The Academie des Sciences of Paris was founded in 1666, but it elected its First Female Fellow only in 1962. Even though Madame Marie Curie received the individual Noble Prize in 1911, she was denied the Membership in 1911. Similarly, the Royal Society of London which was founded in 1660, elected its First Female Fellow only in the year 1945.

The Indian Academy of Sciences is the oldest academy of India founded by Professor C V Raman, Noble Laureate in 1934, and it elected its First Woman Fellow in 1935. Whereas National Institute of Sciences in India which was renamed as Indian National Science Academy (India) took several years to elect its First Female Fellow in 1957. The National Institute of Sciences in India started in Calcutta in January 1935. The Headquarter of the institute shifted to Delhi in May 1946. The name of the National Institute of Sciences in India was changed to Indian National Science Academy in February 1970.

The book has covered almost all pure science subjects including mathematics, physics, chemistry, botany, zoology, geology, engineering (all streams), and medicine. Many entries show that their coverage is of interdisciplinary nature.

The document provides the biographical account of women scientists arranged alphabetically from A to Z. 152 Black and White portrait sketches have been provided with biographical details to record images of posteriority and keep them alive among future generations. The coverage of biographies begins from late 19th century to current times. It includes Indian as well as Foreign Missionary Women, who spent valuable period of their lives in India and contributed considerably to shape modern India.

Selection Criteria of Scientists

The decision as to whom to include or exclude has been made by the author on the basis of following criterion, including:

1. All national and international level awardees.
2. Pioneering scientists, who made outstanding contributions in the development of specialized and super-specialized subjects.
3. Scientists, who made new theories, discoveries and innovations, implementation of which made visible impact upon the society.
4. Those who established Unit, Division, Department and Institution in the field of science.
5. The document followed a set of fields for biographical details. It included only those entries, where 80-90 per cent information of each field could be completed. Incomplete entries have been excluded.
6. Due precaution has been taken to maintain the accuracy of information by cross-checking numerous references related to each entry.

If we consider the national and international level awards as one of the standard parameters to judge the achievements of a scientist, then the review of historical records reveals that there is very less representation of women scientists in these awards.

Women constitute more than half of the world's population, yet in most developed countries the achievements of women in science are

invisible. The Noble Prize for different categories is being awarded since 1901. It is considered as the ultimate mark of scientific achievements, where the women achievers in the science categories i.e. Physics, Chemistry and Physiology/Medicine are only 17 out of 575 prizes given till 2014. It followed the same pattern since its inception. The highest number of ten Noble Prizes has been awarded to women scientists in the field of Physiology and Medicine. Four awards have been won in the field of Chemistry and only two awards have been won in the field of Physics. The author recorded the following gender gap in Noble Prize awarding criteria as shown in Table V:

**Table-V: Noble Prize Awardees Women from 1901 till date.
(*in association with other scientist(s)).**

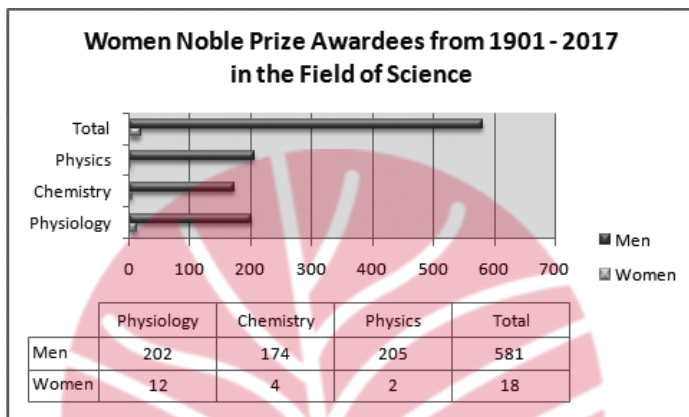
S. No.	Year	Name	Country	Physics	Chemistry	Physiology/ Medicine
1.	1903	Marie Curie *	Poland & France	01	—	—
2.	1911	Marie Curie	Poland & France	—	01	—
3.	1935	Irene Joliot Curie *	France	—	01	—
4.	1947	Gerty Theresa Cori *	USA	—	—	01
5.	1963	Maria Goeppert Mayer *	USA	01	—	—
6.	1964	Dorothy Crowfoot Hodgkin	UK	—	01	—
7.	1977	Rosalyn Sussman Yalow *	USA	—	—	01
8.	1983	Barbara McClintock	USA	—	—	01

S. No.	Year	Name	Country	Physics	Chemistry	Physiology/ Medicine
9.	1986	Rita Levi Montalcini *	Italy & USA	—	—	01
10.	1988	Gertrude B Elion *	USA	—	—	01
11.	1995	Christiane Nusslein-Volhard *	Germany	—	—	01
12.	2004	Linda B Buck *	USA	—	—	01
13.	2008	Francoise Barre-Sinoussi *	France	—	—	01
14.	2009	Elizabeth Blackburn *	Australia & USA	—	—	01
15.	2009	Carol W Greider *	USA	—	—	01
16.	2009	Ada E Yonath *	Israel	—	01	—
17.	2014	May-Britt Moser*	Norway	—	—	01
18.	2015	Tu Youyou	China	—	—	01
		Total		02	04	12

Table-VI: Women Noble Prize Awardees from 1901-2017 in the Field of Science.

S. No.	Field	Women	Men	Total no. of Awardees
1.	Physiology	12 (5.6%)	202 (94.4%)	214
2.	Chemistry	04 (2.2%)	174 (97.8%)	178
3.	Physics	02 (1.0%)	205 (99.0%)	207
Total		18 (3.0%)	581 (97.0%)	599

Fig-2 Women Noble Prize Awardees from 1901-2017 in the Field of Science



Author has made thorough scanning of all national level awards given in India in the field of science, technology and medicine.

Padma Award which was started in 1954 is the highest civilian award in the country. The award is given in three categories, namely: Padma Vibhushan, Padma Bhushan and Padma Shri. These awards are given in various disciplines in the field of science including Science & Engineering and Medicine. The women awardees of the highest civilian Award 'Padma Award' has been listed in Table VII.

Table-VII: Chronological List of Women Padma Awardees in Medicine from 1954-1999

(PS - Padma Shri, PB - Padma Bhushan & PV- Padma Vibhushan)

S. No.	Year	Name	Award
1.	1956	Muthulakshmi Reddi	PB
2.	1961	Hilda Mary Lazarus	PS
3.	1966	Jarusha Jhirad	PS
4.	1967	S Iyer Padmavati	PB
5.	1967	Edith Helen Paull	PS

S. No.	Year	Name	Award
6.	1972	C J Chacko	PS
7.	1972	Vatsala Sammant Chowdhry	PS
8.	1972	Sant Kaur	PS
9.	1972	Mary P Verghese	PS
10.	1975	Mary Poonan Lukos	PS
11.	1976	Durga Deulkar	PS
12.	1976	Amy Dhunjibhoy Engineer	PS
13.	1977	Lucy Oommen	PS
14.	1981	Bakulben Motibai Patel	PS
15.	1981	Claire Marie Jeanne Vellut	PS
16.	1982	Kamal Jayasing Ranadive	PB
17.	1983	Raj Baveja	PS
18.	1984	Archana Sharma	PB
19.	1984	Veera Hingorani	PS
20.	1984	Basantibala Jena	PS
21.	1985	Usha Sharma	PS
22.	1989	Banoo Jehangir Coyaji	PB
23.	1991	Sneh Bhargava	PS
24.	1991	Shiela Mehra	PS
25.	1992	S Iyer Padmavati	PV
26.	1992	Usha Kehar Luthra	PS
27.	1992	Amrit Tiwari	PS
28.	1998	Hem Lata Gupta	PB
29.	1998	Laxmi Sahgal	PV
30.	1999	Rehmath Begum Sailaniyoda	PS

Table-VIII: Chronological List of Women Padma Awardees in Science & Engineering from 1954-1999

(PS - Padma Shri, PB - Padma Bhushan& PV - Padma Vibhushan)

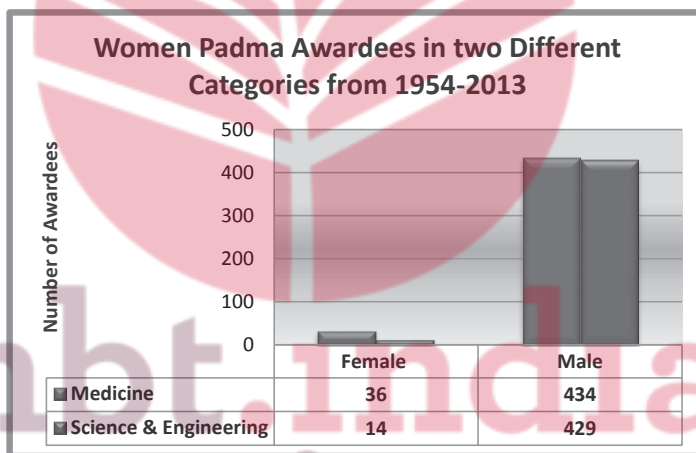
S. No.	Year	Name	Award
1.	1969	Savitri Sahni	PS
2.	1975	Asima Chatterjee	PB
3.	1977	Edavalesh Kakkat Janaki Ammal	PS
4.	1982	Grace L McCann Morley	PB
5.	1984	Maria Renee Cura	PS
6.	1998	Priyambada Mohanty-Hejmadi	PS
7.	1999	Indira Nath	PS

Table-IX: Women Padma Awardees in two Different Categories (i.e. Medicine and Science & Engineering) from 1954-2013

S. No.	Year	Medicine			Science & Engineering		
		Male	Female	Total	Male	Female	Total
1.	1954-99	250	30	280	253	07	260
2.	2000	10	--	10	12	01	13
3.	2001	11	02	13	19	01	20
4.	2002	12	--	12	19	--	19
5.	2003	10	--	10	22	--	22
6.	2004	10	--	10	12	--	12
7.	2005	13	--	13	12	01	13
8.	2006	13	01	14	12	--	12
9.	2007	19	--	19	12	01	13
10.	2008	17	01	18	09	01	10
11.	2009	19	--	19	10	--	10
12.	2010	16	--	16	09	01	10

S. No.	Year	Medicine			Science & Engineering		
		Male	Female	Total	Male	Female	Total
13.	2011	09	01	10	07	01	08
14.	2012	13	--	13	10	--	10
15.	2013	12	01	13	11	--	11
	Total	434	36 (7.6%)	468	429	14 (3.1%)	443

Fig-3: Women Padma Awardees in two Different Categories (Medicine and Science & Engineering) from 1954-2013.



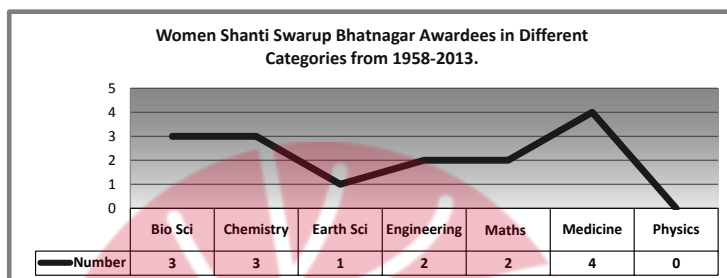
Shanti Swarup Bhatnagar Award is given annually by the Council of Scientific and Industrial Research (India) to honour outstanding scientists in the field of biosciences, chemistry, earth sciences, engineering, mathematics, medical sciences and physics. The award has been started in 1958 in the name of the Founder Director of Council of Scientific and Industrial Research (India), Dr. Shanti Swarup Bhatnagar. It is considered the most prestigious achievement in science in the country. Only 15 women could achieve the status of being Bhatnagar Awardee since its inception.

Table-X: Shanti Swarup Bhatnagar Awardees (Women) from 1958 till date.

S. No.	Year	Name	BioSci	Chemistry	Earth Sci.	Engineering	Mathematics	Medical Sci	Physics
1.	1961	Asima Chatterjee	—	01	—	—	—	—	—
2.	1975	Archana Sharma	01	—	—	—	—	—	—
3.	1983	Indira Nath	—	—	—	—	—	01	—
4.	1987	Raman Parimala	—	—	—	—	01	—	—
5.	1989	Manju Ray	01	—	—	—	—	—	—
6.	1991	Sudipta Sengupta	—	—	01	—	—	—	—
7.	1991	Shashi Wadhwa	—	—	—	—	—	01	—
8.	1996	Vijaylakshmi Ravindranath	—	—	—	—	—	01	—
9.	2004	Sujatha Ramadurai	—	—	—	—	01	—	—
10.	2007	Rama Govindarajan	—	—	—	01	—	—	—
11.	2009	Charusita Chakravarty	—	01	—	—	—	—	—
12.	2010	Mitali Mukerjee	—	—	—	—	—	01	—
13.	2010	Sanghamitra Bandopadhyay	—	—	—	01	—	—	—
14.	2010	Subha Tole	01	—	—	—	—	—	—
15.	2013	Yamuna Krishnan	—	01	—	—	—	—	—
			03	03	01	02	02	04	—

Source: *Current Science*, 99 no.10 (November 25 2010):1306.

Fig-4: Women Shanti Swarup Bhatnagar Awardees in Different Categories from 1958-2013



Structure of Each Entry

Content of each entry provides details of date and place of birth and death; field of specialization; education; career; membership and fellowship of learned societies, associations and academies; outstanding achievements and awards; and major contributions including pioneering work, inventions, innovations, establishment of new Division, Department, Institution, etc. details of publications including number of books, research articles, conference papers, patents, etc. have also been provided.

References

Content of biographies have been collected from published autobiographies, biographies, national who's who, obituaries, history of science books, articles from journals and newspapers, etc. E-mail correspondence to the leading living scientists also enriched the collection. Author has made extensive research to collect content for maximum fields of each entry and it included only those entries, where 80-90 per cent fields could be completed. Author had consulted all publications, newsletters, bulletins and list of fellows, awards, and prizes of national level scientific learned bodies such as Indian National Science Academy (New Delhi), National Academy of Sciences (Allahabad), Indian Academy of Sciences (Bangalore) and Indian National Science Congress. It explored publications of all professional associations. Thorough search of Open Access digital archives related to the subject

available through public domain have been consulted. Regular checking and counter checking has been done to ensure accuracy of the data. Combined bibliographic reference has been provided at the end to promote further research on the subject.

It has provided various indexes such as (i) List of scientists by name and subject. (ii) Selected list of their outstanding contributions, etc., to facilitate multi-dimensional search.

It is an indispensable reference tool having wide spectrum of audience starting from school children to University level research scholars. It is useful to any layman, who is interested to know about the scientific accomplishments of women in India. It is an excellent source book of history of science and gender studies. It will be very useful to the press and media. It will be an authentic source document to Government Organizations, Academic Institutions, Scientific and Professional centres to measure, compare and evaluate their scientific achievements of the past and framing their future plan to achieve target of excellence in advance. It will serve as a readily available consultation tool to planners and policy makers to measure the resources provided for the development in the past and improve the scenario in future. It is bound to be an essential reference tool for any library. It can also be used as scientific roster for various purposes. It is a subject area which is widely read and consulted. It will be an essential title for the collection of the Office of High Commissioners representing India in abroad. The subject has good national and international appeal. The document has been especially designed to fill up the gap of literature related to the subject, which was long overdue.

Conclusion

The document reveals the vivid picture of evolution of Indian women from 'Purdanasheen State' to self-sufficient and determined individuals, occupying prestigious positions of several national/international scientific institutions today. It is a painful commentary on traditional prejudice against women, where their identity and rights have been marginalized in every country and at every level of society. It is a story of changing status of women in the modern world. The work is a fascinating blend of history, biography, science and gender studies.

It will serve as a platform to showcase the glory of Women Scientists in India. It will serve as a source of inspiration to younger generation to be more creative and innovative. Author sincerely hopes that the document will be able to initiate passion and spark for future budding scientists to transform their dreams in to reality.

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Acharya, Sita
(b.1918)

Dr. Sita Acharya was a well-known Obstetrician and Gynaecologist of early years. She was born on 14th July 1918. She graduated in Medicine and obtained Diploma in Obstetrics and Gynaecology (DGO) and MS (Obstetrics and Gynaecology). She qualified as a Fellow of Royal College of Surgery (FRCS) from England. She was an outstanding medical practitioner and teacher who served as the Dean, Faculty of Medical Sciences, University of Delhi. She made significant contributions in the policy making of medical system in the country during her tenure as the Deputy Director at the Directorate General of Health Services, Ministry of Health and Family Welfare, New Delhi. She also served as the Principal, Lady Hardinge Medical College and Hospital, New Delhi.

Dr. Sita Acharya devoted her life for the betterment of public health and family planning services for the rural women and children. She provided extensive clinical and teaching service for more than three decades. She contributed original research articles in the reputed medical journals. She remained associated with the prime scientific and professional advisory bodies in the field of medicine in India. She was an active member of many professional societies and associations. She made valuable contributions in the field of medical education in earlier years as the President of the Anatomical Society of India; Member of the Academic Council of Delhi University and Member of

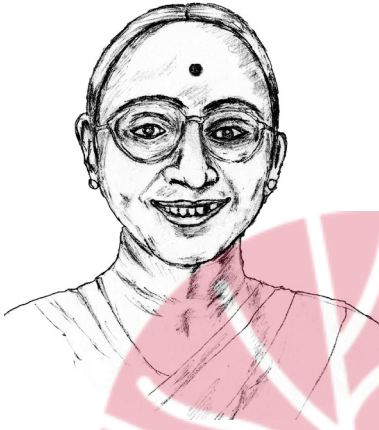
the Executive Committee of the Indian Association of Advancement of Medical Education.

Her pioneering contributions have been recognized by conferring on her the Sowdarya Bai Govindaraju Medal in 1933; John Stone Gold Medal; Bharathi Lakshmi Gold Medal; Viceroy's Medal; Raja Sir Salvaloar Ramaswami Mudaliar Gold Medal; Lady Grant Dufferin Gold Medal; Dr. Nair Memorial Gold Medal; Dr. Rangachari Gold Medal and the Queen's Empress Medal.

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Acharya, Vidya Narayan
(1938–2014)

The first woman Nephrologist of India, Dr. Vidya Narayan Acharya, was born on 8th January 1938 at Chickballapur, Mysore, Karnataka to G N A Acharya and Jaya. She was a brilliant student. She developed special interest in the study of medicine from her childhood. She qualified MBBS in 1960 and then received MD (Medicine) in 1964 from Seth G S Medical College and K E M Hospital, Mumbai. Subsequently, she completed FISN, FICP and training in nephrology from the University of Leeds, UK.

She started her illustrious career from K E M Hospital, Mumbai as a Resident Medical Officer from 1960-67. She served in various faculty positions in the Department of Medicine at K E M Hospital, Mumbai from 1967-78. She was the Professor and Head of the Department of Nephrology at Seth G S Medical College and K E M Hospital, Mumbai from 1986-96, till she retired. She assumed the position of Professor and Advisor at the Mumbai Institute for Prevention and Control of Kidney Disease from 1996 onwards. She was deeply involved in the development of nephrology and nephrologists in India. She established Department of Nephrology in K E M Hospital in 1967 and started the first Post Graduate Course in Nephrology in western India. She was the first to introduce dialysis and kidney transplantation facility in K E M Hospital and western Maharashtra. She conceptualized and founded the Indian Society of Nephrology. She took initiative

to start Indian Society of Nephrology and Transplantations. She was the Founder Member and former President of Hypertension Society of India. She had been an active member of various national and international professional learned bodies including Indian Society of Gastroenterology; International Federation of Kidney Foundation (IFKF); International Society of Nephrology; Asia-Pacific Society for Biomaterials and Artificial Organs. She was a Founder Fellow of Indian College of Physician and an Elected Fellow of the National Academy of Medical Sciences (India).

Dr. Vidya Narayan Acharya made significant contributions in the field of medicine and nephrology. She was a world recognized nephrologist, educator and consultant. She earned patent for her discovery of herbal extract for renal disorders. She prepared standardized extract of *Tinosporacordifolia* (*Guduchi* or *Giloy*) as an immune-adjuvant in the treatment of renal disorders such as nephrotic syndrome and chronic recurrent urinary tract infections. She was an advocate of kidney donation for transplantation. She organised various educational programmes and workshops for prevention of kidney disease through National Kidney Foundation. She was an active member to prepare draft and getting approved the 'Human Transplant Act (1994)' through Indian Parliament. She also advocated holistic approach towards the management of Chronic Kidney Disease (CKD) through the use of medicinal plant, music and Yoga therapy.

She was one of the pioneering researchers in the field of nephrology and contributed over 250 research publications including research articles, book chapters and conference papers. She made landmark contributions through her book *Medical Nutrition Therapy: Renal Diseases and Related Disorders; Recent Advances – Indian Perspective*. She was an Associate Editor of *API Textbook of Medicine VII Edition* and was a valuable member of Editorial Board of the *Journal of Association of Physicians of India*. In recognition to her valuable contributions, Indian Society of Nephrology instituted 'Dr. Vidya N Acharya Oration' in 2006. She received numerous laurels including Nuffield Foundation Travelling Fellowship; B L Kuller Oration and Gold Medal in Nephrology; Dr. Sonawala Oration; A K Banerjee Oration; Lifetime Achievement Award from Indian Society for Nephrology; South Asian Region Pioneer

Award from International Society of Nephrology; Woman of the Year 2000 from American Biographical Institute and Outstanding Woman of 20th Century and the Pioneer Award from International Society of Nephrology, etc.

She was an excellent doctor, enthusiastic researcher, a popular teacher, friend, philosopher, mentor and guide to many renowned specialists in the field of nephrology. Her untiring devotion and inspiring force resulted in to grooming of over 200 nephrologists, who achieved prestigious positions in India and abroad. She has been affectionately known as the 'Mother of Nephrology' in India. She passed away on 5th May 2014 from Infective Endocarditis (IE) in the ICU of Hinduja Hospital, Mumbai at the age of 76.

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Agarwal, Padam Kumari
(b.1937)

Dr. Padam Kumari Agarwal is a renowned Physician and Pathologist. She was born on 27th February 1937 at Bulandshar, Uttar Pradesh to Triveni Sahai and Radha Rani Agarwal.

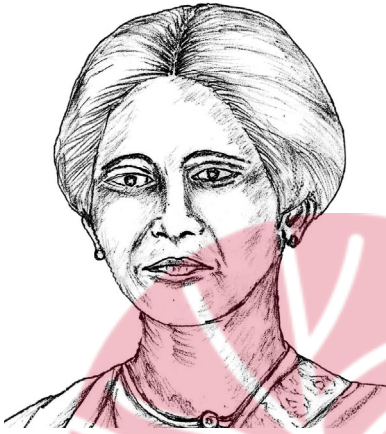
She received MBBS degree from S N Medical College, Agra in 1964. Subsequently, she qualified MD (Pathology) from King George's Medical College, Lucknow in 1969. She qualified as the Member of International Academy of Cytology (MIAC), USA in 1979. She won Commonwealth Medical Fellowship from 1977-78. She started her service career as an Intern at the Sree Narayana Medical College, Agra in 1964. She worked as Resident from 1965-68 in the same institute. She joined King George Medical College, Lucknow as Demonstrator in 1966. Later on, she served as Lecturer from 1970-75; Reader from 1975-86; and Professor of Pathology from 1986-97 till her supernumeration. Afterwards, she worked as the Consultant Pathologist of Vivekanand Polyclinic and Institution of Medical Science, Lucknow. She simultaneously served as the Visiting Professor of Post Graduate Institute of Medical Education and Research, Chandigarh in 1996 and Visiting Scientist, Cytology Laboratory of St. Bertholomew's Hospital, London during 1977-78. She developed national and international links with high level professionals in the field of her specialisation. She became Emeritus Member of International Academy of Cytology and Member of the New York Academy of Sciences in 1995. She

served as President (2000) and Life Member of Indian Academy of Cytology. She is a distinguished Life Member of the Indian Association of Pathologists and Microbiologists and Indian Society of Oncology.

Dr. Padam Kumari Agarwal has worked extensively on the early detection of cervical cancer by colposcopy and cytology. She made important findings on histopathology and set standards for laboratory technicians in pathology and bacteriology. She also established Cytology Division in the Department of Pathology at the King George's Medical College, Lucknow in 1973. She took initiative to include cytology in the undergraduate medical studies including MBBS and BDS. Currently, she is engaged in establishing Cytology Service in the Department of Pathology at the Vivekananda Polyclinic and Institute of Medical Sciences, Lucknow. She has also served as an examiner to the undergraduate and postgraduate examinations in pathology to Banaras Hindu University, Aligarh Muslim University, Post Graduate Institute at Chandigarh, All India Institute of Medical Sciences, University College of Medical Sciences in Delhi, Nagpur and Kashmir University. She has guided over 56 research theses. She has worked on various research schemes and projects of Indian Council of Medical Research (ICMR), Department of Science and Technology, India and Ministry of Health & Family Welfare, India. She has contributed over 85 research articles and co-authored two laboratory manuals including *Histopathology Manual for Medical Students* and *Laboratory Technician's Manual of Pathology and Bacteriology*. She serves as a Member of the Editorial Board of *Indian Journal of Cytology*, 1990-2004. The Indian Academy of Cytology conferred on her the Ernest Fernandes Prize in 1982. She was awarded CIPLA Gold Medal and Oration Award in 1990. In 2010, she received International Hippocrates Award from the International Biological Centre, Cambridge.

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Albuquerque, M C
(1891–1959)

M C Albuquerque was born in 1891 in the province of Mysore, India. She travelled overseas to study Medicine and obtained Licentiate of Royal College of Physicians (LRCP). She qualified as a Member of Royal College of Surgeons, England (MRCS) and Member of the Royal College of Obstetrics and Gynecology (MRCOG). She also obtained the Licentiate of Midwifery (LM) from Dublin.

After completion of her education, Dr. Albuquerque joined the post of Medical Resident in the provincial town of England when many posts of doctors were being vacated by the young medical doctors, to take up the job of War Service duty during the First World War. In 1919, she returned to India and joined the Mysore Medical Service in the post of Assistant Surgeon at the Maternity Hospital, Bangalore and became the in charge of the hospital in 1925. Soon she realized the fact that the hospital was very small to meet the local requirement of health services. She made a proposal to train new doctors and nurses and took an initiative to collect money for the expansion of the hospital to meet future challenges. She received encouraging response from Sir Mirza Ismail, Dewan of Mysore and from the government. She collected Rupees two lakh to realize her dream to open the new women's hospital, known as the 'Vani Vilas Hospital' in 1935, having the capacity of 200 beds. Dr. Albuquerque at first joined as Lecturer at the Bangalore Medical School for teaching diploma course in medicine

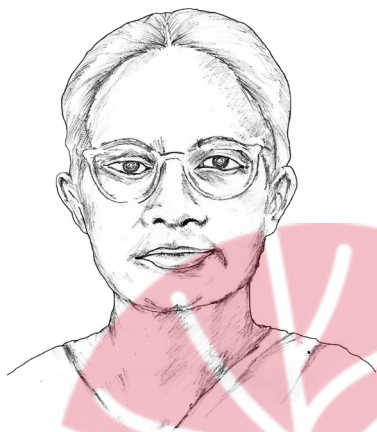
and was later promoted to the post of Principal. In 1940, she was made the Chief Lady Medical Officer of the Mysore State to supervise women's hospitals and medical women's service in the state. This post was specially created for her in recognition to her outstanding clinical and administrative capabilities. During her tenure, she established a chain of maternity homes and child welfare centers across the state. The post was then abolished on her retirement from the government service. Apart from her professional life, she also took an active part in the betterment and upliftment of status of women in the society. She was the well known guiding spirit for women in the royal family as well as ordinary masses. She was a Life Member of the Association of Medical Women in India. She served as the office bearer of many women's organisations in the state. In 1945, Maharaja of Mysore conferred the title of *Shastravidya Pravina* to her in recognition to her significant clinical service and dedication for the people of Mysore. The members of Mysore State Women's Conference honoured her and presented her Rs 25,000/-, which she donated for the construction of a new ward at the Vani Vilas Hospital, Mysore. She died on 19th December 1959 after a brief illness at the age of 68.

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Anna, Modayil Mani
(1918–2001)

Dr. Anna Modayil Mani was born on 23rd August 1918 in a Syrian Christian family of Travancore, Kerala. She was the seventh child of eight children of a rich civil engineer. From her early age, she showed her interest in education, when it was very unusual for an Indian woman to get higher education. She is highly regarded as a woman scientist of early years. She completed her BSc (Honors) from Presidency College of Madras in 1939.

She worked as a Research Scholar (on government scholarship) under the Noble Laureate Sir C V Raman at the Indian Institute of Science (IISc), Bangalore in 1940. She faced several difficulties at the institute where she had to work under as Sir C V Raman who did not encourage interaction between women colleagues with their male counterparts. At the IISc, she completed her PhD dissertation and submitted it for the award of degree. But she was never granted a doctoral degree and her document remained in the library of Raman Research Institute. The Madras University, which was the degree awarding authority of the IISc, claimed that she did not have MSc degree and therefore, she cannot be granted a PhD. Thenafter, she won government scholarship and became Research Scholar to study meteorological instruments at the Meteorological Office, Harrow, UK, 1946-48. She returned to India in 1948 and joined the Instruments Division of the Indian Meteorological Department, Pune as scientist. She rose to the level of

the Deputy Director General of the Institute (1953-76) and retired from her service in 1976. In 1967, she served the World Meteorological Organisation (WMO) in Pune. In 1975, she acted as WMO Advisor in Egypt on radiation research.

After her retirement from IMD, she became Scientist Emeritus of the Raman Research Institute, Bangalore. She was Elected Fellow of the Indian National Science Academy, New Delhi in 1976 and Fellow of the Indian Academy of Sciences, Bangalore.

She took keen interest in the development of the profession and served as the Member of the Indian Meteorological Society. Anna Mani remained closely associated with the activities of World Meteorological Organisation and International Association for Meteorology and Atmospheric Physics. She was also the Member of the American Meteorological Society and Royal Meteorological Society. She received K R Ramanathan Medal of Indian National Science Academy, New Delhi in 1987.

Anna Mani was a distinguished Indian meteorologist, who made outstanding contributions in the field of meteorological instrumentation and did pioneering research in the area of solar radiation, ozone and wind energy measurements. She had the opportunity to conduct research on the optical properties of ruby and diamond under the able guidance of Sir C V Raman. After retirement, she continued to pursue her research at the Raman Research Institute, Bangalore. She conducted extensive research work on the study of radiation, ozone and atmospheric electricity both in the surface and the upper air with special sounding techniques. She also organised and established infrastructure to manufacture most of the instruments required for her research. Because of her initiative to develop modern instruments for meteorological measurements, Central Radiation Laboratory, Pune and National Ozone Centre in New Delhi could get recognition as the Regional Centre of the World Meteorological Organisation. She also collected huge meteorological data of India and made analysis of them. She published three volumes on Solar Radiation Data and Wind Energy Data of India. She wished to make India self-sufficient in the production of weather instruments. Anna Mani standardized the drawing for nearly 100 different weather instruments and initiated

their production in India. In 1960s, she studied about ozone and its characteristics. Her remarkable contribution was recognized by making her Member of the International Ozone Commission. Her two books *Handbook of Solar Radiation Data of India, 1980* and *Solar Radiation over India, 1981* have become standard reference guides in solar and thermal system of India. She died on 16th August 2001 at Thiruvananthapuram due to stroke, which paralyzed her life before death.

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Balakrishnan, Kamala (Lieutenant Colonel)
(b.1930)

Lieutenant Colonel Kamala Balakrishnan is a well-known Immunologist who took initiative to establish the first Histocompatibility Testing Laboratory in the country at the All India Institute of Medical Sciences (AIIMS). She was born on 16th January 1930. She qualified MBBS degree from Christian Medical College, Vellore and obtained Diploma in Clinical Pathology from Armed Forces Medical College, Pune. She was the first Indian woman to complete MSc in Immunology from the University of Birmingham, UK, 1967-68.

In 1963, she joined as Officer In charge to a Hospital Laboratory in Allahabad. She then proceeded to the Armed Forces Medical College, Pune, and worked there as Reader in Pathology from 1964-67. She was instrumental in establishing the first Histocompatibility Testing Laboratory at AIIMS which provided the facility of HLA Typing and Cross Matching services for renal transplantation. She served as the Immunologist In charge of the Tissue Typing Laboratory, (Defence Immunology Laboratory), AIIMS, New Delhi. She was also Faculty Member for the World Health Organisation's courses conducted at the AIIMS. She was appointed as the Lieutenant Colonel, Army Medical Corps, Director General of Armed Forces Medical Sciences, Ministry of Defence, New Delhi.

Dr. Kamala Balakrishnan has played a leading role in the field of her specialization. After working in leading government and defence

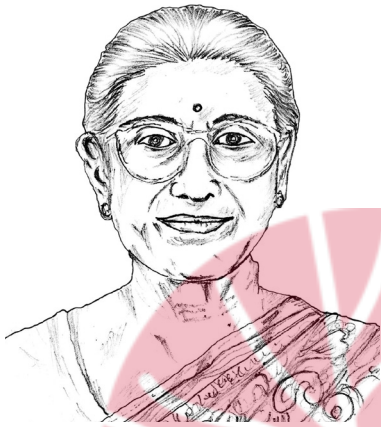
organisations in India, she moved to USA for advance research opportunity. She worked as the Scientific Director at the American Red Cross, Toledo, Ohio; Director, Histocompatibility Laboratory and Faculty Member, Department of Pathology, Medical College Toledo, Ohio; Director, Histocompatibility Laboratory, University of Cincinnati, USA; Director, Blood Centre of Indiana and Blood Centre of Dayton. She became Emeritus Professor of Transfusion Medicine, University of Cincinnati, USA. She also worked in different faculty positions for about 19 years. She joined Genomics, USA (Genus) Corporate in their R&D Team as an Advisor from 2009- till date.

Dr. Kamala Balakrishnan has been made Fellow of the College of Allergy and Applied Immunologist, USA. She has served as the Founder Member and Secretary, Indian Immunological Society; Elected Member from India, International Transplantation Society; Former President and Chairman of the Accreditation Committee, American Society for Histocompatibility and Immunogenetics (ASHI). She has also participated and chaired several international committees and commissions on immunology, pathology and transplantation medicine. She has published several original research papers in the areas of immunology.

Dr. Kamala Balakrishnan's valuable research contribution has been acknowledged by conferring her Shakuntala Devi Amirchand Award and Colonel Amirchand Award of the Indian Council of Medical Research, New Delhi in 1971 and 1973.

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Bamji, Mahtaab Sohrab
(b.1934)

Dr. Mahtaab Sohrab Bamji is an eminent Biochemist of India. She was born on 5th October 1934 to Sohrab R Bamji, in a Parsi family settled in Bombay, Maharashtra. She completed her school education in 1951 at Vachha Wadia High School, Bombay. She graduated in 1955 from Ramnarain Ruia College, Bombay and obtained her post graduation in 1957 and doctorate degree in 1961 in the field of biochemistry from the Bombay University. She visited overseas for Post-doctoral Research Fellowship at the School of Medicine, Tufts University, Boston, USA, from 1962-64. She also served as the Post-doctoral Research Fellow at the Johns Hopkins University, Baltimore, USA, from 1962-65.

She started her career as Research Staff at the Indian Institute of Science, Bangalore (1959-61). She joined National Institute of Nutrition, Hyderabad in 1965 as a Research Officer. She was elevated to the post of Senior Research Officer in 1969; Assistant Director in 1974; Deputy Director in 1977; and Director-Grade-Scientist in 1984. She retired from her regular service in 1994. She worked as Indian Council of Medical Research (ICMR) Emeritus Scientist, Dangoria Charitable Trust, Hyderabad from 1994 to 1999. She has been serving as Indian National Science Academy (INSA) Honorary Scientist since June 2008. She played an important role as Co-chairperson, Health Panel for Vision 2020 Report, TIFAC. She was the Member of Planning Commission,

10th and 11th Planning Groups and Steering Committee for Science and Technology, Government of India.

She is a Fellow and was the Vice-President of Indian National Science Academy, New Delhi (1990 and 2009-11); Fellow, National Academy of Agricultural Sciences (India), New Delhi (1991); Fellow, National Academy of Medical Sciences (India) (1995); Honorary Fellow of Andhra Pradesh Academy of Sciences (2003).

She has been an active member of many professional associations including Society of Biological Chemists, India and Indian Women Scientists' Association. She served as the Joint Secretary and Vice-President, Nutrition Society of India from 1983-86 and 1990-94. She started valuable mass movement as the Honorary President of Jana Vignana Vedica, People's Science Movement for Community Initiatives for Improving Health, Nutrition, Environment and Livelihood Security since 2012.

Dr. Bamji has received several honours and awards including Shakuntala Devi Amir Chand Prize of Indian Council of Medical Research in 1971; Patwardhan Prize in 1973; WHO Visiting Scientist Fellowship in 1973; Member, Guha Research Conference from 1977; National Science Foundation (USA) Travel Award in 1983; Amrut Modi Research Award in 1985; Dr. B C Guha Lecture Award of Indian National Science Academy in 1987; Honour of Federation of Parsi Zoroastrian Association of India, 1987; Dr. B C Guha Lecture Award from Indian Science Congress in 1997; Jawaharlal Nehru Birth Centenary Lecture in 1998; Srikanta Memorial Oration Award in 1999; National Award for Women Scientist, Department of Biotechnology, India in 2000; Rustom Ranji Rotary Lecture Award in 2004; Distinguished Women Scientist Honour of the Academy of Science Technology and Communication, Hyderabad in 2004; Sir C V Raman Medal from Indian National Science Academy, 2005; Kamala Puri Sabharwal Lecture Award in 2008; Centenary Distinguished Scientist Award of Indian Institute of Science, Bangalore in 2008; Dr. Rajammal Devdas Memorial Award from Nutrition Society of India in 2010; Dr. Archana Sharma Memorial Lecture Award of National Academy of Sciences (India), Bangalore in 2012. She has been honoured as an outstanding Woman Performer and Agricultural

Scientists Award from the Farm and Rural Science Foundation & Society in 2012.

Dr. Bamji's contribution in the field of nutrition and biochemistry is significant. She discovered a new enzyme for carotenoid metabolism in *Euglena*. She developed a biochemical test for the early detection of riboflavin (Vitamin B2) deficiency and used it for determining the riboflavin nutrition status of the population and riboflavin requirement of Indians. She elucidated the biochemical and molecular basis of skin lesions of riboflavin and pyridoxine deficiency (impaired collagen cross-linking). She demonstrated the etiological role of respiratory infections in riboflavin deficiency and its biochemical basis and adverse effects of riboflavin deficiency on psychomotor performance and wound healing. Her research has shown metabolic safety of hormonal contraceptives in malnourished women and elucidated the biochemical mechanisms behind some of the changes observed. She also showed the biochemical basis of increased demand for vitamins, associated with antibiotics use and demonstrated the vitamin like role of Carotene, which is synthesized from the essential amino acid Lysine. Dr. Bamji developed the laboratory techniques to assess the nutrition status of women and children in both rural and urban areas and showed the high magnitude of micronutrient deficiencies particularly riboflavin deficiency, besides anaemia and vitamin A deficiency. She has carried out community health and nutrition projects such as rural women's workload and its effects on health and nutrition status of mother and child.

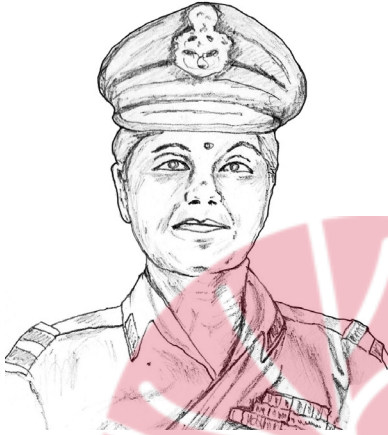
Currently, she is working on assessing vitamin and nutritional requirement of the villagers of Medak District of Andhra Pradesh and improving their health conditions by providing food security to villagers through scientifically processed locally available food products. She initiated various programmes for food processing-cum-training centre for the self empowerment of villagers. She also took initiative to start Indian Women Scientists Association and Jana Vignana Vedika. She has served as the Chairperson for committee on 'Science Career for Indian Woman' and the 'National Task Force for Women in Science' of Indian National Science Academy. She has published more than 160 research papers and eight review articles

in professional journals. She has contributed nine chapters in the books, published government reports and manuals. Dr. Bamji has edited three books in the field of her specialization.

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**Bandopadhyay,
Padmavati**
(b.1944)

Air Marshal Padmavati Bandopadhyay is the first woman doctor to become aviation medicine specialist. She was born on 4th November 1944 to V Swaminathan and Alamelu at Tirupathi, Andhra Pradesh. She was a brilliant student and won many prizes for her academic excellence during her school days. She joined Kirorimal College, Delhi for her pre-medical studies and completed her graduation in medicine (MBBS) from the Armed Force Medical College, Pune, 1968.

Dr. Padmavati joined Indian Air Force (IAF) in 1968 to become a pilot, but she could not fulfill her dream due to some problem in her eyes.

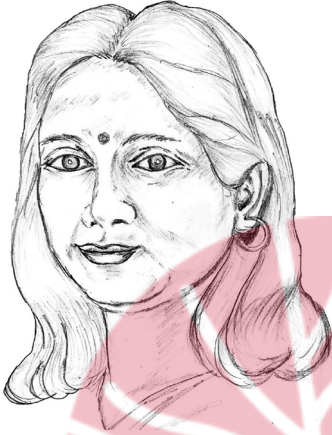
She is the first woman Army Medical Corps who successfully completed Defence Services Staff College Course in 1978. She was responsible to command IAF's Central Medical Establishment (CME), which is a premier facilitator in the field of aviation medicine and provides treatment to aircrew of the Indian Air Force, Navy and Coast Guard as well as civilian pilots. She specialized in aviation medicine in 1975, which was then a new field of specialization. She served as Associate Professor of Aviation Medicine at the Bangalore University. She was the Group Captain, Indian Air Force in Bangalore. She worked as Additional Director General, Armed Force Medical Services. She became the First Lady Air Vice Marshal, Indian Air Force in 2002 and then the First Lady Air Marshal and Director General of Medical Services (Air) on 1st October 2004.

She is the first woman Fellow of the Aero Medicine Society of India and Aerospace Medical Society of India. International Medical Sciences Academy also recognized her outstanding contributions by making her the Fellow of the Academy. She is honoured to be a Member of New York Academy of Sciences, USA.

Dr. Padmavati Bandopadhyay was awarded Vishistha Seva Medal, along with her husband Flight Lt. Satinath Bandopadhyay for their meritorious service during the 1971 Indo-Pak War. Subsequently, she received Ati Visistha Seva Medal in 2002 from Indian Air Force for her research work in the field of high altitude climatic conditions. She is the first woman to have conducted scientific research at the North Pole. She was awarded Indira Priyadarshini Award, on her return from the North Pole expedition for her outstanding research contribution. She joined an Indo-Russian scientific experimentation station to research human physiological adaptation to extreme Arctic climatic conditions. She went with the team of the Defence Institute of Physiology and Allied Sciences and spent four months at the North Pole between November 1989 and February 1990. She specialized in High Altitude Pulmonary and Cerebral Odema and framed a new acclimatization schedule for Indian soldiers posted at high altitude. Her guidelines provided preventive measures to HAPO (High Altitude Pulmonary Odema) and HACO (High Altitude Cerebral Odema). She has published 27 papers in reputed medical journals and completed 23 research projects in the field of her specialization.

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**Bandopadhyay,
Sanghamitra**
(b.1968)

Dr. Sanghamitra Bandopadhyay was born on 17th April 1968 in Calcutta, West Bengal. She passed higher secondary school examination from highly reputed Bethune College, Calcutta in 1985. She completed her graduation in physics from the prestigious Presidency College in Calcutta in 1988. In 1992, she did BTech in Computer Science from Calcutta University. She qualified MTech(Computer Science) from Indian Institute of Technology, Kharagpur in 1994. She joined Indian Statistical Institute, Calcutta and completed PhD in 1998.

She joined teaching profession and taught genetic algorithm at the University of Texas, USA. Currently, she is serving as Director of Indian Statistical Institute, Kolkata. She has delivered several lectures at various universities and institutions across the world. She has chaired work sessions of several international seminars and conferences. She is a Fellow of the National Academy of Engineering (2012) and National Academy of Sciences (India), Allahabad (2010). She is a Senior Member of the Institute of Electrical and Electronic Engineering (IEEE).

Dr. Bandopadhyay received many prestigious recognitions and awards including A K Chowdhury Memorial Award, 1991; Dr. Shankar Dayal Sharma Gold Medal, Indian Institute of Technology, Kharagpur, 1994; Young Scientist Award, Indian National Science Academy, 2000; Young Engineer Award, Indian National Academy of Engineering, 2002; Swarna Jayanti Fellowship, Department of Science and Technology,

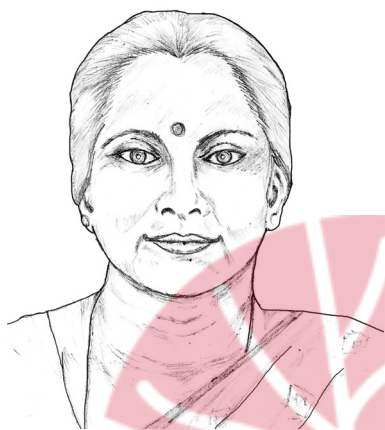
India, 2007; Humboldt Von Fellowship, Germany, 2009; Shanti Swarup Bhatnagar Award in Engineering Sciences, 2010; National Women Bioscientist Award (Young), Department of Biotechnology, India, 2012. She has been honoured as Senior Associate, ICTP (International Centre for Theoretical Physics), Italy, 2013.

Dr. Sanghamitra Bandopadhyay has made pioneering contributions to the theory and algorithms in evolutionary computation, pattern recognition and bioinformatics. Her computational studies on mRNA and their involvement in cancer provide deeper insight into the functioning of these bio-molecules, critical for developing new lines of therapy. Her research specialization are in the field of computational biology, genetic algorithms and evolutionary computation, pattern recognition and data mining, neural network, image processing, machine learning and computer vision. She has authored and co-authored over 200 research articles in international journals. She has co-authored five books published by Springer-Verlag, World Scientific and Wiley Interscience. She has edited special issues of journals in the area of soft computing, data mining, and bioinformatics.

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एकः सूते सकलम्



Banerjee, Rintu
(b.1963)

Professor Rintu Banerjee is a distinguished and promising Enzymologist working in the field of food biotechnology and bioenergy. She was born on 21st May 1963 at Rourkela, West Bengal. She attended local school and obtained BSc from SK DAV College, Rourkela in 1985. She did her MSc (Botany) from Sambalpur University, Sambalpur in 1992. She received JSPS Fellowship from Japan and completed PhD from Indian Institute of Technology, Kharagpur in 2002. She started her career as a Visiting Lecturer, Indian Institute of Technology, Kharagpur in 1993. She was promoted to the position of Assistant Professor of the Biotechnology Unit, Department of Chemical Engineering in the same institute in 1995. Subsequently, she held the position of Associate Professor of the Agricultural and Food Engineering Department from 1999-2003 and then, Professor of Applied Botany in the Agricultural and Food Engineering Department of the same institute from 2003. Presently, she is holding the position of MNRE (Ministry of Non-Renewable Energy, India) Chair Professorship in P K Sinha Centre for Bioenergy at the Indian Institute of Technology, Kharagpur.

Prof. Rintu Banerjee has made valuable research contributions in the field of enzyme technology. She is currently engaged in the field of food biotechnology, bioenergy, enzymology, protein chemistry and their biotechnological applications. She made innovative research

findings, which facilitated production of cost-effective enzymes and their industrial utilization in tannery industries, ethanol/biobutanol production from non-edible lignocellulosics (plant biomass). She used enzymes for rice polishing, debittering of juices, enzymatic peeling of potato, bottling of sugarcane juice, extending shelf life of palm jaggery, etc. She introduced the concept of biogas production from cow dung through novel microbial process. She made ground breaking research on oleaginous fungi/yeast for the production of algal biofuel.


Her research work has been recognized by awarding her Young Scientist Project Award in 1994; Young Scientist Award, Department of Science and Technology, India in 1994; Award from Association of Food Scientists and Technologists, India in 1995; Late Sinha Roy Memorial Award in 1999; Best Woman Bioscientist's Award, Biotech Research Society of India in 2003; Louis Pasture Award from Association of Microbiologists, India in 2009; Recognition Award from National Academy of Agricultural Sciences, New Delhi in 2010; Punjabrao Deshmukh Award from Indian Council of Agricultural Research in 2013; Ahmed Kidwai Award, Indian Council of Agricultural Research, 2014 and the Most Inspiring Woman Engineer/Scientist of the Year Award by Engineering Watch in 2014.

She has been honoured by being nominated as Fellow of Biotech Research Society of India in 2004; Elected Fellow, National Academy of Agricultural Sciences (India) in 2006 and Fellow of International Forum on Industrial Bioprocesses (IFI Biop) in 2012. She has published over 128 research papers and contributed 22 book chapters and authored a book entitled *Environmental Biotechnology*. She has been an Editorial Board Member of prestigious national and international journals including *The Scientific World Journal*, *International Journal of Food and Fermentation Technology*, *Open Systems' Biology Journal*, *Research Journal of Agricultural and Biological Sciences* and *Bioresearch Technology Journal* (2005-08). She is an Associate Editor of *Biotechnology and Applied Biochemistry Journal* and *Bioinformatic Journal* since 2013. She has guided 23 PhD scholars. She has also earned three international and seven national patents. She has played a significant role in translating laboratory research into industrial production by transferring eight patents for industrial application.

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Baveja, Raj
(b.1934)

An eminent Obstetrician and Gynaecologist, Dr.(Miss) Raj Baveja was born on 24th November 1934. She was a brilliant student and took her MBBS degree and Diploma in Gynaecology and Obstetrics. She also did MS in Obstetrics and Gynaecology. She conducted extensive research on 'The Human Endometrium and Extra Placental Membranes' and obtained PhD on this subject. She proceeded to Oxford, UK on Commonwealth Fellowship and did her research work on immunological aspects (HLA antibodies) of pregnancy, abortion and sterility. She visited many countries including Australia, Japan, etc. to present lectures on human endometrium and extra placental membranes, and their role in fetomaternal exchange process.

She started her career as Resident Doctor at Gandhi Memorial Hospital, Lucknow. She was appointed as the Registrar of All India Institute of Medical Sciences, New Delhi. She joined Motilal Nehru Medical College, Allahabad as Lecturer in 1966. She worked there for over three decades as Reader from 1971-74 and Professor from 1974 until her retirement. She also served as the Director of the Kamala Nehru P G Institute, Allahabad. She started the Post Partum Programme at the Sarup Ram Nehru (SRN) Hospital, Allahabad in 1978. She was the First Head of the Department of the Post Partum Centre, Motilal Nehru Medical College, Allahabad. She is an outstanding teacher,

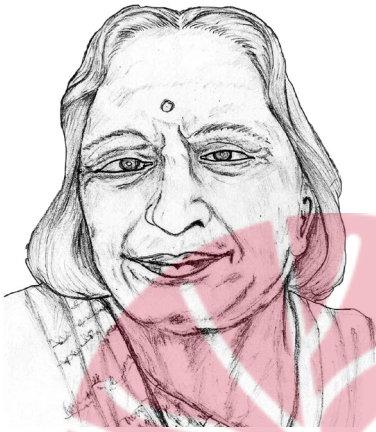
who spent over three decades in teaching and training latest surgical techniques to young doctors in the field of obstetrics and gynaecology.

An Obstetrician and Gynaecologist of international repute, Dr. Baveja's contribution to the field of family planning was on the use of Betamethasone for safe midtrimester abortion and its effect on intra-uterine life of fetus. She has performed a large number of mini lab tubectomy operations and was in charge of the WHO sponsored Contraceptive Unit at the S R N Hospital in Allahabad. In 1980-81, she organised extensive mobile camps and her team conducted about 23,000 laparoscopic sterilizations by November 1982. She is highly respected for her valuable contributions through her active involvement with the Federation of Obstetrics and Gynaecologists of India and Indian Medical Association. She was conferred with Indumati Jhaveri Prize in 1973 for her Best Paper on 'Endometrial glycogen in sterility and habitual abortion' at the XVI All India Obstetrics and Gynaecological Congress, New Delhi, 1973. She was awarded Padma Shri in 1983. She has delivered several lectures and presented papers in a number of conferences in India and abroad. She has contributed over 100 research articles in reputed national and international medical journals.

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एकः सूते सकलम्



Bhagat, Shakuntala
(1933–2012)

Shakuntala Bhagat was born on 6th February 1933 to S B Joshi—a renowned civil engineer and ‘Father of Bridge Engineering in India’. She developed interest in science from her childhood. She was the first woman to obtain BTech(Civil) from Veermata Jeejabai Technological Institute, Bombay in 1953. She commenced her further studies and completed Postgraduate Degree in Civil and Structural Engineering from the University of Pennsylvania, Pennsylvania, USA.

She joined Structural Engineering Works Ltd. as Engineer from 1953-54. She served as engineer in several other construction firms in West Germany and UK, from 1954-56; Assistant Professor, Department of Civil Engineering, Indian Institute of Technology, Bombay, 1960-63, 1964-69; Engineer to design bridge in Philadelphia, 1963-64. Her husband, Anirudh Shivprasad Bhagat, who is also a civil engineer, established his own firm Bhagat Engineering Co. Pvt. Ltd. in 1970. Shakuntala Bhagat worked there as the Works Director. She specialized in design and development of Quadricon modular steel bridges of prefabricated modules for which she obtained World Patent rights. She designed steel structures and constructed concrete highway bridges in association with several firms in West Germany. She designed over 200 Quadricon steel bridges of spans ranging from 18 m to 138 m. She developed the concept of designing Bhagat Unishear Connectors

and formulated design of the capacity of Unishear Connector from 20T to 500T in tension. She also conducted research in the Cement and Concrete Association of London in 1956. She served as in charge of Heavy Structures Laboratory at the Indian Institute of Technology, Bombay from 1960-69. Her firm Bhagat Engineering Co. Pvt. Ltd. has designed and constructed many bridges and heavy structures of urban development. She along with her husband, established Quadricon Pvt. Ltd. The firm stands as the most innovative and reputed corporate firm in the bridge construction sector. It has the credit of six patents in 11 different countries.

She served as a member of ISI Committee for Composite Construction and developed standardized prefabricated component for bridges. She is a distinguished member of Indian Road Congress and Indian National Group, International Association of Bridges and Structural Engineering. She was the Fellow of the Institution of Engineers, India. She received the Award for Invention of Unishear Connectors from the Invention Promotion Board of India in 1972. She received the Woman Engineer of the Year Award in 1993. She passed away on 14th October 2012.

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एकः सूते सकलम्



Bhargava, Sneh
(b.1930)

Dr. Sneh Bhargava has made distinct contribution as an outstanding medical scientist and educationist. Born on 23th June 1930 at Ferozpur Cantonment, Punjab to the family of YL Taneja, Dr. Bhargava obtained MBBS from Delhi University, Delhi in 1953; DMRD, RCP (Royal College of Physician) (London), RCS (Royal College of Surgery), UK in 1957; FRCR (Fellow of Royal College of Radiology), London. She received MD (Radiology) from All India Institute of Medical Sciences, New Delhi in 1963. She has been honoured with DSc (Honoris Causa) from Jabalpur University and Sanjay Gandhi Post Graduate Institute, Lucknow.

Dr. Sneh Bhargava is a distinguished radiologist of India. She started her career as Assistant Radiologist, Irwin Hospital, Delhi in 1958 and served as Lecturer, Lady Hardinge Hospital and College, New Delhi, 1959-61. She joined All India Institute of Medical Sciences (AIIMS) as Assistant Professor of Radiology in 1961 and continued to serve as Associate Professor, 1965-70; Professor and Chairman, Radiodiagnosis, 1971-84; Director and Professor of Radiology, 1984-90; Chairman, Hospital Management Board, 1990. She remained associated with AIIMS as Professor Emeritus after her retirement in 1990. She had the honour of being the radiologist to President of India, 1978-90. She trained several medical students in research in various aspects related to radiology. She has been providing

consultancy service as Senior Consultant and Head, Department of Imaging Services, Dharamshila Hospital for Cancer, Delhi and Senior Consultant to the Sitaram Bharatiya Hospital, New Delhi. She served AIIMS for more than three decades. She was the first woman Director to hold the highest position of the premier medical institute of the country. She served as Director for six years till she retired in October 1990. She was instrumental in developing one of the most modern departments of Radiology and Imaging in India. She pioneered the CT and ultrasound investigations in India. She introduced latest techniques for effective patient-care service including a lithotripsy machine for non-surgical removal of stones and computerization for patient care services. She also took initiative to reorient medical education and develop need- based curriculum relevant to our population.

In appreciation of her outstanding contributions, she has been elected as the Vice President, National Academy of Medical Sciences; Fellow, National Science Academy (India), Allahabad; Fellow, Indian College of Radiology and Imaging; and Fellow, Royal College of Radiologists, London.

Dr. Bhargava is a member of many academic societies including Indian Association of Radiology and Imaging (President); Indian Oncological Society; Neurological Society of India. She has been actively associated with several national level committees/commissions of the country as an office bearer or chairman. She has made valuable contributions to the Environment Research Committee, Ministry of Environment, Government of India; Chairman of the Advisory Committee for Core Books in Medicine of National Book Trust, India and Chairman of DST (Department of Science & Technology, Government of India) Committee for Science and Technology for Women. She served as the Chairperson for the National Knowledge Commission for Medical Education. She has been appointed as the Chairperson of the Ethics Committee on Drugs Trial of the Medical Council of India. She has been providing consultancy services to institutions and government hospitals desirous to introduce latest technology related to radiology. She has contributed over 250 scientific papers and seven chapters in books.

Dr. Bhargava has been honoured with a number of awards like MM Sen Oration Award; Glaxo Oration Award; Kumar Memorial Oration Award; and Padma Shri in 1991 and Lifetime Achievement Award, Prime Minister of India, 2014.

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Bhatia, Sharayu Nee' (Sharayu Pandit)

Dr. Sharayu Bhatia was a pioneering Obstetrician and Gynaecologist of India. She was a very well-recognized Medical Officer of Women's Medical Service (WMS) in India. She qualified MBBS and MD in obstetrics and gynaecology. She served as the Advisor of the Ministry of Health, Government of India from 1947-61. She provided extensive service to promote Maternity and Child Welfare activities in various states, ensuring that each state had one or more Maternity and Child Health Officer (MCHO). Her extraordinary administrative skills and sincere efforts provided a firm footing for the Maternity and Child Health (MCH) programme in each state. She served as Secretary to the National Association for Supplying Female Medical Aid to the Women of India under the Countess of Dufferin Fund. The Association provided remarkable assistance to the hospitals and medical staffs working in India. She took a keen interest in facilitating medical education, scholarship, prizes and financial aid for female students studying medicine abroad and their proper service utilization on their return to India. She also developed course of study for female students in Calcutta, Bombay, Madras, Agra and Lahore Medical Colleges and Schools. As Secretary of the Countess of Dufferin's Fund, she had the arduous task of winding up the Women's Medical Service (WMS) in India and absorption of the WMS officers into the state medical service. It was a difficult task to ensure that the officers were granted proper emoluments and status. The same could be achieved due to

her initiatives and persuasions. She served as the Secretary of the Sub-Committee of the Maternity and Child Welfare of Indian Council of Medical Research, where she made valuable proposals and had been responsible for framing several memoranda that were implemented from time-to-time. She served as in charge of Maternity and Child Welfare Branch of the Red Cross (Central). She worked in close association with WHO and UNICEF under different responsible official capacity. She served as the Honorary Secretary of the Association of Medical Women in India in 1948 and became the youngest President of the Association in 1957.

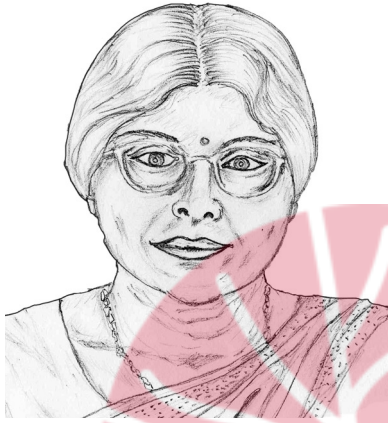
Dr. Bhatia was a good administrator and understood the problems of medical women in India very well. She was a crusader and took several steps to promote women to join medical profession for the benefit of the society. She gave important recommendations to make medical career sustainable for Indian women along with the pressure of responsibilities towards their family and children. She made immense contributions in the field of medical education for women in India during its formative years of early 1900s.

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एकः सूते सकलम्



**Bhattacharyya,
Archana**
(b.1948)

A leading physicist, Dr. Archana Bhattacharyya is noted for her pioneering contributions in the field of theoretical condensed matter physics. She was born on 1st June 1948 at Allahabad, Uttar Pradesh. She was a brilliant scholar and obtained BSc(Honours) (Physics) in 1967 and MSc (Physics) in 1969 from University of Delhi. She proceeded for her research to the Northwestern University and completed her PhD degree in 1975.

Dr. Archana Bhattacharyya travelled widely abroad and undertook various scientific assignments in prestigious institutes including Research Scientist in the Laboratory of Prof. K C Yeh, University of Illinois, Urbana-Champaign, USA from 1986-87. She also worked as Senior Research Associate of NRC, National Academy of Sciences, USA at the Air Force Research Laboratory, Massachusetts, USA, 1998-2000. She started her career as Scientist, Indian Institute of Geomagnetism (IIG), Mumbai, 1978 and became the Director of the Institute in 2005.

Dr. Archana Bhattacharyya conducted extensive research work on plasma instabilities in the equatorial ionosphere, probing the ionosphere with radio waves, effects of space weather on ionosphere and spatio-temporal variations of geomagnetic field. She is engaged in advanced research work on theoretical condensed matter physics and has made a breakthrough by developing a method for solving the fourth moment equation for ionospheric scintillations during her research studentship

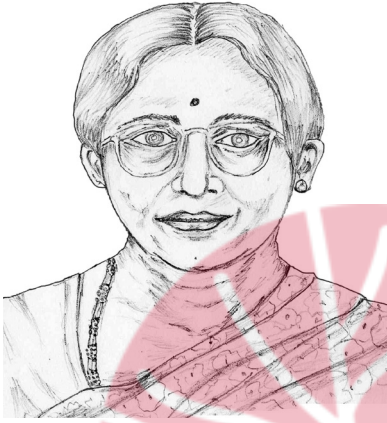
at the University of Illinois, Urbana-Campaign. At IIG, she made valuable research on the study of ionospheric scattering by ionospheric irregularities. She was the first in India to utilize the digital data of amplitude and phase scintillations on VHF radio waves transmitted from the geostationary satellite ATS-6 for studying these irregularities. She explored the study of dynamics and evolution of irregularities produced due to magnetic storms. She propounded a new theory for the development of equatorial plasma bubbles associated with magnetic field fluctuations. She also pioneered the research on geodynamics in India. She played a leading role in the establishment of a new Regional Centre of IIG, namely Dr. K S Krishnan Geomagnetic Research Laboratory at Allahabad to study upper atmospheric as well as palaeomagnetic research.

For her outstanding contributions on theoretical condensed matter physics and plasma instabilities in the equatorial ionosphere, she has been honoured with several awards including Dr. K S Krishnan Gold Medal, University of Delhi, 1969 and Professor Ramanathan Memorial Lecture & Medal, Indian Geographical Union, 2008. She has the distinction being the Elected Fellow of Indian National Science Academy, New Delhi in 2009; Fellow, Indian Academy of Sciences, Bangalore and Fellow of National Academy of Sciences (India), Allahabad. She is a Member and Office Bearer of various scientific associations and bodies such as Member, International Association of Geomagnetism and Aeronomy; Member and Chairperson of Interdivisional Commission for Developing Countries. Currently, she is Emeritus Scientist and J C Bose National Fellow in the same institute.

She has published over 50 research articles in peer-reviewed journals. She served as a Member of the Editorial Board of *Journal of Geophysical Research-Space Physics* (American Geophysical Union), *Pramana* 2008-11 and *Indian Journal of Radio and Space Physics* 2005-2010. She had edited a book in the field of her specialization.

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Bhisey, Rajani Avinash
(b.1941)

Dr. Rajani Avinash Bhisey is a distinguished Biochemist and Social Worker in the field of carcinogenic impact of *pan masala* and other chewing products in India. She was born on 20th January 1941 in Bombay, Maharashtra. She did her BSc from the University of Bombay. She joined Indian Cancer Research Centre (ICRC), University of Bombay, and obtained MSc degree. Later, she opted for advanced research and earned PhD from the University of Bombay. She had the opportunity to work in the Laboratory of Dr. Jerome J Freed, Institute for Cancer Research, Philadelphia, USA as a Research Assistant where she gained vast research experience to work in an ultra modern laboratory set up. Initially, she worked as the Research Fellow at the Indian Cancer Research Centre, Bombay. After returning from abroad, she was appointed as the Head of the Carcinogenesis Division, Cancer Research Institute, Bombay. She did a remarkable job in reshaping and nurturing the Institute into an excellent laboratory set up to conduct advance carcinogenic research in the country. She continued her service as an Adjunct Professor in the University of Pune after her retirement.

Dr. Rajani Bhisey's mission of life is to create awareness and reform society for the prevention of oral cancer caused due to extensive use and addiction of *pan masala*, and other traditional chewing products. She explored carcinogenicity of *pan masala* and genetic hazard upon professional *bidi* rollers and tobacco processors. She conducted extensive

biochemical studies of these materials on experimental mouse. She made notable achievement by developing a highly sensitive hairless mouse model at ICRC to study tumor promoting action of environmental agents. This novel model system demonstrated carcinogenic action of *pan masala*, a chewing product without tobacco on different organs. She analyzed the effect of dry *pan masala*—powdered chewing mixture of areca nut, catechu, lime, spices and flavouring agents.

She took initiative to establish a Genetic Toxicology Laboratory at the Cancer Research Institute to test mutagenic potential of mutagens, conduct toxicological investigations and monitor genetic hazards of environmental agents. Her laboratory studied that the impact of high level of tobacco dust cause genetic damage to the professional *bidi rollers* and tobacco processors. Her study revealed that mutagenic action of tobacco dust and production of oxidative stress contributes to its carcinogenic action. She declared the population as the high-risk group of cancer.

She has the distinction of being the Elected Fellow of Indian National Science Academy, New Delhi, 1998; Fellow, Maharashtra Academy of Sciences and Indian Academy of Sciences, Bangalore. She is an active Member of the Association of Zoologists of India.

In recognition to her service for the noble cause of prevention of oral cancer in the country, she has been bestowed with the Young Scientist Fellowship, UICC; and Lifetime Achievement Award of the Association of Zoologists of India in 2007.

She encouraged many young scientists to promote research on oral carcinogenesis. She started a course in Cancer Biology and Genetic Toxicology for MSc students at the Cancer Research Institute, Bombay. She organised several workshops, public lectures and counseling programmes for the poor and under privileged communities, who develop dependence and addiction to the chewing of tobacco and *pan masala*. She has made immense contributions in finding a solution for the eradication of oral carcinogenic problems peculiar to our country. She has published over 70 original research papers in reputed medical journals.

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Bielby, Elizabeth
(d.1929)

Elizabeth Bielby was the First Woman Doctor to be employed by the government under the Dufferin Fund.

She joined London School of Medicine for Women in its early days and left the school at the end of 1875, on being discouraged by the prospects of women ever being able to get license and registered into the Medical Register to practice medicine. She was trained with a private course to serve as medical missionary in India. She sailed to Lucknow in 1876 and started her service as a missionary health worker at Panna, about 100 miles away from Lucknow. She served six years in dispensary and *zenanas*. She had the chance of treating the wife of Maharaja of Panna, who was suffering from prolonged illness. The Maharani made magical recovery from the treatment of Miss Bielby, and she became a close friend of her. Miss Bielby established a small dispensary at Panna. Her sister, who was a trained nurse also joined to help her provide clinical service to the needy rural natives of the area. Her sister died after a few months due to enteric fever. Miss Bielby realized that India needed trained women doctors to establish suitable medical facility for women. She felt that the formal medical degree and clinical training are essential to provide quality health service. She became critique of medical missionary training. She wrote a paper on 'Zanana Medical Missions' published in *Indian Female Evangelist* and summarised in many other places. In her writing, she asserted that, "It is wrong for any woman to call herself medical missionary unless she

has a full and thorough knowledge of her profession and has proved that she has such knowledge by passing requisite examination". Further she mentioned that, "Female Medical Missionaries were given doctor's job to do (without due qualification), was cruel and wicked". In 1881, she resigned from the Medical Missionary Service in India. Subsequently, she decided to return to England to take formal medical degree.

When she met Maharani of Panna before her departure, Maharani made her a personal request to convey her message to the Queen of England to send some medical help to save women of India from pain and suffering. She insisted Miss Bielby to write the message and put it into her locket and wear it, so that she may not forget to convey the important message. In return to her request, the Queen of England directed Lady Dufferin to do something for Indian sisters. Lady Dufferin upon her arrival to India started the Dufferin Fund, the most systematic programme to support medical facilities for Indian women and children. Dufferin Fund (National Association for Supply of Female Medical Aids to Women of India) was started in August 1885 by Lady Harriot Dufferin, wife of the then Viceroy Lord Dufferin of India from 1885-88. It was a turning point in the history of medical science in India, which opened the door for foreign missionary women doctors to India.

After obtaining license from Kings and Queens College of Physicians, Ireland in summer 1885 and medical degree MD from Bern, Switzerland Dr. Bielby returned to India. She was posted at Lahore for missionary medical service. It was during this time, the Dufferin Fund was initiated in India. She was made the in charge of the hospital for women opened by the Lahore Municipal Corporation Committee. The hospital was named as the Lady Aitchison Hospital and was started by the Dufferin's Fund on 15th November, 1888. She worked there for fifteen years. She also took charge of Catherine's Hospital founded by Dr. McLaren in Rawalpindi in 1910. She served as the Professor of Midwifery at the Lahore Medical School. She used to teach nursing, midwifery and diseases of women four times a week in English and Hindustani medium. Later, she carried on private practice. She retired in 1927 after spending 52 years with the women of India. She died in 1929 after a brief illness.

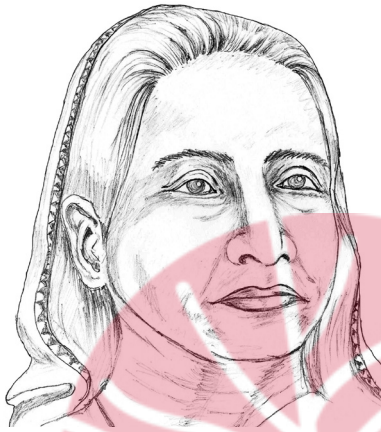
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एकः सूते सकलम्



Bose, Abala
(1864–1951)

An eminent Social Reformer and Scientist, Madam Abala Bose was born on 8th April 1864 at Barisal, East Bengal. She belonged to the illustrious Das family of Telirbagh, Dhaka (now Bangladesh). She was the daughter of Durgamohan Das, the founder of the Sadharan Brahmo Samaj and wife of renowned scientist of international standing, Sir Jagadish Chandra Bose.

From her childhood, she developed interest in science. She passed her entrance exam from Bethune School with scholarship in 1881 and took admission to the Madras Medical College, but she could not complete her studies due to ill health.

Madam Abala Bose was an eminent personality of Bengal who campaigned strongly to improve the status of women in the society. She worked for the abolition of *Sati Pratha* and child marriage. She also supported remarriage of young widows, education and empowerment of women in the society. She opposed stringent social isolation and prejudice related to young widowhood in Bengal. Her father was a highly respected personality; he made valuable contribution for widow-remarriage and empowerment of women through education. He founded Banga Mahila Vidyalaya for girls. Abala and her sister Sarala were among the first women to be admitted to the Calcutta University. She married renowned physicist Sir Jagadish Chandra Bose in 1887. She assisted and worked with J C Bose throughout her life.

for his scientific research. She always accompanied him in his tour to Europe and other parts of the world. Her participation, whether creative or routine has been taken up as a supporting effort in the scientific achievements of her husband. She established Brahma Samaj Girl's School, Nari Shiksha Samiti in 1919, Home for Widows in 1925, Bengal Women's Education League in 1928 and started Industrial Cooperative Training Centers for empowering young widows. She founded Sister Nivedita Adult Education Fund and Sadhana Ashram. She established Vidyasagar Bani Bhaban, Mahila Shilpa Bhaban and opened over 200 schools in rural areas of Bengal. Several maternity and child health centers were started in remote areas with her initiative and financial support. She died on 26th August 1951 after a brief illness. She is highly regarded as a great educationist and social reformer of Bengal.

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एकः सूते सकलम्



Brown,
Dame Edith Mary
(1864–1956)

Dr. Dame Edith Mary Brown has pioneered the field of obstetrics and gynaecology in India. She established the Medical School for Christian Women, Ludhiana and the first medical education school for women in Asia. She was born on 24th March 1864 at Whitehaven, Cumberland, England.

Her initial education started in Manchester High School and Corydon High School. She took Science degree from Girton College, Cambridge, 1882-85; she completed medical education from London School of Medicine for Women and Royal Free Hospital, London, 1886-91. She qualified as the Licentiate of Royal College of Physicians and Surgeons, Edinburgh in 1891. She did MD with specialization in Obstetrics and Gynaecology from Brussels in 1891. She received prestigious distinction of being FRCSE (Fellow of the Royal College of Surgery, England) and MRCOG (Member of the Royal College of Obstetrics and Gynaecologists).

Dame E Mary Brown started her career as a teacher in Exeter High School from 1885-86. Then she was sent to India under the Baptist Missionary Society to India, 1891. She became Doctor In charge of a small Charlotte Hospital in Ludhiana, Punjab, 1891-92. She served as the doctor in villages near Delhi, India from 1892-94. She started North Indian Medical School for Christian Women, Ludhiana in 1894. Later, the small medical school developed into the Women's

Christian Medical College, Ludhiana and she served as the Founder Principal from 1895-1931, when she retired, she assumed the duty of Dame Commander, British Empire, 1931-42. She worked as Principal Emeritus, Honorary Treasurer and Lecturer in surgery from 1942-48.

After obtaining medical education, Dr. Dame Edith Brown came to India in 1891. She was saddened to see the poor health condition of Indian women, where men doctors were not allowed to attend any obstetrics and gynaecological cases due to social prejudice. She was determined to take up the issue of requirement of trained women medical doctors to ensure safe child birth for Indian women. She organised a Medical Missionary Conference in Ludhiana, Punjab in 1894 and forwarded the need for a medical school to train local women doctors. She also raised a request for donation to start such a medical school, which did not exist in the entire Eastern world. With earnest efforts, she collected sufficient financial assistance for building and annual budget to start the Women's Christian Medical College, Ludhiana in 1895 with four students and three staffs. Soon the College earned its reputation and increased the number of students and staff. The government raised its budget in 1904 and made the college open to the Christian and non-Christian women in 1909. The college expanded under the able leadership of Dr. Brown, who conducted extensive surgical and obstetrical services in the hospital. In due course of time, the medical college and hospital became the largest training centre for medical students, nurses, midwives and dispensers. The hospital was well known as the 'Miss Brown's Hospital' throughout Northern India. Trained medical doctors, nurses, dispensers and midwives from the Christian Medical College (CMC), Ludhiana spread to all over India as well as to Burma and the Persian Gulf. The Central Midwives Board for the Punjab was created in 1917 with her and Dr. Jessica Carleton's effort. There were 21 mission hospitals in Punjab, out of which 17 were for women. In recognition to her service in India to establish firm footing of medical education for women, she was honoured with the Kaiser-i-Hind Silver Medal in 1911 and Kaiser-i-Hind Gold Medal in 1922. She wrote a *Handbook for Midwives*, which was translated into Hindi, Urdu and Punjabi. In 1931, Dr. Brown

was elevated to the designation of 'Dame Commander of the British Empire'. In 1941, the Golden Jubilee of her glorious service to India was celebrated. She retired in 1942 and was succeeded by Dr. Aileen Pollock. Afterwards, she went to Kashmir and lived near the river Jhelum. Even after her retirement, she took all round effort for development and welfare of CMC, Ludhiana. She also celebrated the day, when the CMC, Ludhiana started full-fledged MBBS course and made the college co-educational. She was very fond of variety of flora and fauna of India. She developed a beautiful garden at her residence in Srinagar. She died on 6th December 1956 at the age of 92 in Srinagar, after a brief illness.

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Buckshee, Kamal
(b.1941)

Dr. Kamal Buckshee is an outstanding Obstetrician and Gynaecologist, who has made an immense contribution in standardization and handling of difficult gynaecological techniques. She was born on 31st March 1941 to the family of Arjun Das Bhasin in Peshawar (now in Pakistan). She qualified MBBS and MD (Obstetrics and Gynaecology) from the premier medical college in the country—All India Institute of Medical Sciences, New Delhi in 1962 and 1965. She was awarded FRCOG (Fellow, Royal College of Obstetrics and Gynaecologists, London); FICMCH (Fellow, Indian College of Maternity & Child Health) and FICS (Fellow, International College of Surgeons). She also received prestigious Fellowship in the country including FNAMS (Fellow, National Academy of Medical Sciences, India); and Fellow, Indian College of Obstetrics & Gynaecology.

She served as the Professor and Head of the Department of Obstetrics and Gynaecology, All India Institute of Medical Sciences (AIIMS), New Delhi. She worked as the Senior Consultant to Indraprastha Apollo Hospitals, Fortis La Femme and Medical Director to Women Clinic, New Delhi. She continued her research as Emeritus Professor, National Academy of Medical Sciences (India) after her retirement. She has been conferred with the rare honour of being Former President, Indian Society of Perinatology and Reproductive Biology; Member, Delhi Medical Council and Former secretary, Obstetrics & Gynaecological

Society of Delhi; and Former Vice President Federation of Obstetrics & Gynaecological Society of India(FOGSI). She has the distinction of being the Fellow of American Fertility Research Society.

Professor Buckshee has been actively engaged in teaching and clinical research for over three decades in the field of Obstetrics and Gynaecology at All India Institute of Medical Sciences. She is the first obstetrician in India to develop and standardize inutero fetal skin biopsy technique, cordocentesis for fetal diagnosis and inutero blood transfusion, and uterine balloon therapy in patients with dysfunctional uterine bleeding. She has also devised a novel method of terminating pregnancy associated with large and multiple fibroids—reported for the first time in the world. Her work on zona antibodies cytotoxic drug sensitivity test to predict tumor response to chemotherapy in genital tract malignancies are also reported for the first time in India. She has conducted extensive research work on PCOS (Polycystic Ovary Syndrome), Hyperandrogenism, Plastic Reconstructive Surgery of the vagina and cervix, Microsurgery, Infertility, Adolescent Gynaecology, Oncology and High Risk Pregnancy. Dr. Buckshee has developed and standardized various techniques including the microsurgical technique for plastic reconstructive surgery of the uterus, Fallopian tubes, ovary and lower reproductive tract; the technique for the repair of congenital procidentia, vaginal agenesis and cervical atresia; innovative treatment modalities for hirsute females and standardized the technique of percutaneous ovum pick up of mature graffian follicles for first time at AIIMS. She has also designed a metal jet washer for the collection of human ova and endometrial washing; fetal skin biopsy forceps and vaginal moulds. She is a gifted teacher and has trained several students, many of whom are now recognized practitioners of obstetrics and gynaecology.

Her notable contributions have been acknowledged by awarding her Dr. B C Roy National Award of ‘Emeritus Medical Teacher’; Norwegian Academy Senior Scientist Award for Training in In Vitro Fertilization (IVF) and Embryo Transfer (ET), Oslo, Norway, 1984; Lifetime Achievement Award, Federation of Obstetrics & Gynaecological Society of India and Association of Obstetrics & Gynaecologists of Delhi; Woman of the Year Award, ABI-USA, 1998; and Bharat Jyoti

Award; Indo-Norwegian Scientist Award, INSA-IVF. She has also served as the examiner for DM in endocrinology, DM in genetics, PhD and MD (Obst. and Gynae) in India, Nepal, Dhaka and Sri Lanka. She has published over 250 research articles and 25 book chapters in the area of her specialization. She has contributed as Editor of *OBGY Clinics*. She also served as the Member of Editorial Board of *Obstetrics and Gynaecology Today*, *National Neonatology Forum* and she is a Member of the Journal Committee of 'Federation of Obstetrics and Gynaecological Societies of India'.

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Buti, Bimla

(b.1933)

Dr. Bimla Buti, an eminent Physicist of international repute was born on 19th September 1933 at Multan, now in Pakistan. She took her school education from a government school in Delhi. She received BSc (Honours) (Physics) and MSc (Physics) from the University of Delhi. She visited USA to obtain PhD from the University of Chicago in 1962. She had the opportunity to join National Academy of Sciences, Goddard Space Flight Centre, NASA, USA as Resident Research Associate, where she worked under the guidance of internationally acclaimed Plasma Physicist T G Northrop. After her return to India, she joined University of Delhi as a Postdoctoral Research Scholar for two years. She served as the Senior Scientific Officer, Indian Institute of Technology, Delhi from 1968-70. She rendered meritorious service as Associate Professor to Senior Professor and Dean of Faculty at the Physical Research Laboratory, Ahmedabad from 1970-93 till she retired. She continued her research work as Professor Emeritus, National Physical Laboratory, New Delhi, 1993-97. She also assumed the responsibility of Visiting Scientist at the Jet Propulsion Laboratory, Pasadena, USA, 1993; Director of Plasma Physics, International Centre for Theoretical Physics, Trieste, Italy, 1985-2003 and Visiting Scientist, University of California, Los Angeles, 1986-87.

Dr. Bimla Buti has been conferred the honour of being nominated as Elected Fellow and Council Member of the Indian National Science

Academy, 1982 and 1991-93; Fellow of the Third World Academy of Sciences, Trieste, 1990; Fellow, National Academy of Sciences (India), Allahabad and Fellow of American Physical Society, USA. She is the Member and Office bearer of several societies and associations including Member, Sigma XI Society; Vice-President and President, International Astronomical Union, 1988-91 and 1991-94; Member, Indian Physics Association; Member, Astronomical Society of India; Founder Member and President, Plasma Science Society of India, 1992-93.

Dr. Bimla Buti has made valuable pioneering contributions in the development of plasma physics in India. During her PhD research studentship at the Department of Physics, University of Chicago, she had the opportunity to work under Noble Laureate Professor S Chandrasekhar. On her return to India, Vikram Sarabhai, the then Director of the Physical Research Laboratory (PRL), Ahmedabad invited her to join PRL. She started the experimental Plasma Physics group at PRL. Eventually, the group developed into an independent institute namely the Institute of Plasma Research under the Department of Atomic Energy, Government of India. Dr. Buti served as a teacher and mentor for a large number of students, who are working in different prestigious scientific organisations around the world. She also instituted many awards through various academic institutions and associations to encourage young scientists in the field of plasma physics. She worked in different NASA centers, including Ames Research Centre and Jet Propulsion Laboratory and California Institute of Technology. She served as Member of the Governing Council of Nuclear Physics Centre, New Delhi from 1996-98 and Inter University Centre for Astronomy and Astrophysics from 1997-99. She was member of the Physics Panel of the University Grants Commission, New Delhi from 1997-99. She also faced the problem of gender bias from male-dominated scientific community in India and suffered at different levels, whenever her candidature was proposed for any senior position.

Dr. Bimla Buti is the recipient of many awards and laurels including Vikram Sarabhai Award for Space and Planetary Science, 1977; Jawaharlal Nehru Birth Centenary Lecturer, 1993; INSA-Vainu-Bappu Memorial Medal for Astronomy and Astrophysics, 1994; and

Professional Achievement Citation Award, University of Chicago, USA, 1996.

She has contributed several research papers and edited four books. She has also worked as Associate Editor of *IEEE Transactions on Plasma Physics*, USA 1977-83. She founded Plasma Science Society of India in 1992. She played an important role in organising Plasma Physics College at the International Centre for Theoretical Physics (ICTP) Trieste, Italy. She remained unmarried. After her retirement, she founded Buti Foundation in 2003 (www.butifoundation.org) to continue with her research activities for the benefit of the society.

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Campbell, Gertrude Jane (1877–1956)

Dr. Gertrude Jane Campbell has made phenomenal contributions for the development of medical education for women in India. Dr. Campbell was a Medical Missionary of Free Church of Scotland. She was born in 1877 at Glasgow. Her father, Rev. George Campbell, was a well-known Minister of the then Free Church of Scotland. She grew up in a rich aristocratic family. She carried out her MB, ChB Graduate (Bachelor of Medicine and Bachelor of Chemistry) from Langside Academy and Glasgow University in 1900. She did MD in Obstetrics and Gynaecology in 1914.

Dr. Campbell was appointed as Medical Missionary by Free Church of Scotland to work in Madras. She reached Madras in 1901 and started medical service in a small dispensary. She was made in charge of Christina Rainy Hospital in Madras in 1914. She took initiative to make the hospital, a training centre for Indian nurses. She was made Assistant to the Inspector General of Hospitals in the United Provinces of India during the First World War (1914-18). She became the Principal of the Lady Lyall Hospital and Medical College at Agra and worked there for one year. In 1921, she became the Principal and Professor of the Department of Obstetrics and Gynaecology in the newly started Lady Hardinge Medical College, New Delhi and worked there for nine years. Afterwards she practiced medicine at Marden, North West Frontier Province of India. She

provided medical service for women and children of remote areas for about twenty years.

Dr. Gertrude Jane Campbell was a renowned medical missionary, who devoted her lifetime to serve needy women and children of India. Besides being an extraordinary doctor, she also had an inborn talent to learn different languages. She learned Tamil, Telugu, Bangla, Pashto and Urdu during her service in India. Because of her language proficiency she could interact with local people to understand their problems and provide efficient medical service. Government appointed her as the examiner for clinical courses to different parts of the country.

When she reached Madras in 1901, she realized that a small dispensary is not sufficient to serve the population of Madras. In 1907, she took initiative to raise funds and selected a new site for building a hospital. She designed the new hospital and in 1914, the new building was opened by Lord Pentland, the Governor of Madras. It was named as the Christina Rainy Hospital (as a memorial to a famous Scotswoman-Principal Rainy). She worked hard to establish the hospital and develop it into an excellent health care centre for women and children of all classes of people in and around Madras. Soon the hospital started a training course for nurses and played a leading role to raise standard and status of nursing profession throughout India. She gained high level of clinical and administrative experience during her tenure as Assistant to the Inspector General of Hospitals in United Province. Later she was invited to succeed Dr. Kate Platt as the Principal and Professor of the Obstetrics and Gynaecology at the Lady Hardinge Medical College, New Delhi. It was an excellent medical college imparting MBBS degree to women and running 220 bed hospital exclusively for women. She worked there for more than nine years and earned high reputation and esteem for her administrative skills, teaching proficiency and exceptional knowledge for surgery and clinical work.

She had a god gifted impulse for diagnosis and therapy. She was very sharp, humorous, and a magical personality, who made indelible impact upon students, colleagues, patients and friends around her. She loved to take up new challenges in her life. She moved to Marden on the North West Frontier Province of India to carry out her desire to serve

poor and needy women and children settled in difficult terrain. She worked under Danish Mission and raised a residence-cum-hospital with small staff of Indian nurses. She checked indoor and outdoor patients of all ranks including royalty and poor. She also conducted surgery with limited infrastructure and facilities. Because of her devotion, linguistic skills and sense of humour, she gained great popularity among Pathans and other tribesmen. She served there for twenty years. In 1952, she had to return to her homeland due to illness. During last few years of her life, she became deaf and almost lost her sight. When she came to know about her blindness, she immediately requested for megaphone to teach her Braille. She was informed that people of her age will find it difficult to learn Braille, but to the astonishment of her teacher, she mastered Braille without any difficulty. She died at the Watford Peace Memorial Hospital on 6th May 1956. She was 78.

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Carleton, Jessica R
(1862–1940)

Jessica R Carleton was born on 7th February 1862 at Ambala to Dr. Marcus Barnard Carleton and Celestia, who were the Third Missionaries of the Presbyterian Board in India. She left India when she was a child. She revisited India in 1886 in summer and spent six weeks by visiting different medical centers of North India and investigated their method of work as per the advice of her father. Having gained valuable experience, she settled down at Anni in the Himalayas, about 60 km away from Simla (District Kullu) where her parents were in Missionary Service for last 10 years. Here she acquainted herself with the local language with the help of her brother Dr. Marcus B Carleton. Her brother was a distinguished physician who started Leper Asylum at Sabathu. She studied Indian/tropical diseases there. She went to USA and earned MD degree from the Women's Medical College, Pennsylvania in 1886.

Dr. Jessica Carleton returned to India on Punjab Missionary Service. She started her practice in Ambala in 1887. She started a small dispensary and took shelter in the old bungalow of the Mission's compound in the same house, where she was born. She established Philadelphia Hospital of Women in Ambala, which received its name from the Presbyterians Church women of the city of Philadelphia in USA, who had contributed the fund for the building of the hospital erected in 1901. The hospital was built in 16 acres of land, it had a

doctor's room, compounder's and nurse's room coupled with four single rooms of six bedded wards. Dr. Carleton used to attend 150 to 160 patients daily. She worked for forty years in this hospital and she gave her heart and soul for the development and expansion of the hospital. Soon the Philadelphia hospital became known across India under the leadership of Dr. Jessica Carleton. She added and expanded many departments. She also looked after the Ambala Asylum for Lepers. She not only cured people of the disease but also used to teach the value and love of Christ and provided solace to sick and distressed. Everyday before starting her clinical work she and the hospital staff used to have prayer with their patients. Her brother Dr. M. B. Carleton did splendid service for many years as in charge of the large Leper Asylum at Sabathu. Her brother received Kaiser-i-Hind Gold Medal for his service in 1914. Dr. Jessica was awarded Kaiser-i-Hind Gold medal for her public service in 1926. She passed away on 23rd October 1940 in Miraj Mission, India.

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**Chacko,
Dorothy Dunning**
(1904–1993)

A renowned missionary Physician and Humanitarian, Dr. Dorothy Dunning Chacko was born on 4th February 1904 at Osaka, Japan to American missionary couple, Morton Dexter and Mary Ward Dunning working in Japan.

She spent her first 16 years in different cities of Japan. Then she returned to New England and completed her secondary education and graduated from Smith College. She did MD from College of Physicians and Surgeons, Columbia University, 1929. In 1932, she completed DTM and H from the School of Tropical Medicine and Hygiene, London. She was the first woman Resident in Medicine and Surgery at the Metropolitan Hospital, New York.

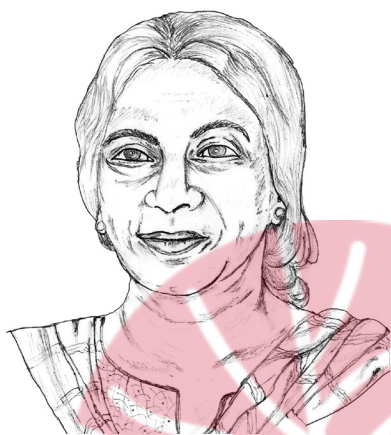
She married Bishop C Joseph Chacko in 1931, after they met at the International Centre in New York. He visited United States to work on his doctorate in International Law at the Columbia University. Two years later, in 1932, the couple returned to Joseph Chacko's native place Kerala in India. Her husband became Indian bishop and worked as a faculty member in Delhi University. Dr. Chacko took Indian nationality in 1947, when India became independent. She devoted her life for social and philanthropic work for poor and needy. She practiced medicine in India and worked as Physician, Kinnairad and Fateh Chand College, Lahore from 1936-42; Physician, Miranda House, University of Delhi, 1943-44; Teacher, Woodstock School, London, 1945-50;

Lecturer, Delhi School of Social Work and Senior Physician, Methodist Mission Clinics, Ganaur and Bahadurgarh, 1952-67; Chief Medical Officer for the World Council of Churches Meeting in Delhi, 1962; and served as President of the Chester YWCA, 1974-76. She provided free medical service to the poor and destitute community of Delhi University and Kingsway Camp area in Delhi. She was the organiser and Director of Bethany Village Treatment and Rehabilitation Colony for Leprosy patients, Ganaur. She also organised several workshops and camps for public health and hygiene. She remained in India for 35 years and left when her husband retired from Delhi University.

Dr. Chacko returned to the United States in 1967 with her family and moved to Chester, when her husband joined the Pennsylvania Military College (now Widener University) as a Visiting Professor. After her return to USA, Dr. Chacko continued to provide medical service at the Crozer-Chester Medical Centre. She also served as the Co-founder of Chester Arts Guild, an initiative taken by her to motivate and promote budding artists of Chester. She was closely associated with many societies and philanthropic bodies as the Fellow of Community Medicine, Crozer-Chester Medical Centre; President of Chester, YWCA; and President, Women's Association for the Church of the East India. Her multifaceted clinical pursuit had won her several laurels including Smith College Medal in 1970; Padma Shri for establishing Bethany Village Treatment and Rehabilitation Colony for Leprosy patients, Ganaur in 1972; Her name was included in the Hall of Fame in 1996; DCWC, Delaware County Women's Hall of Fame, USA. She enjoyed playing basketball in school and her basketball team at Massachusetts Prep School won Championship several times. She died at her residence at Chester in January 1993 at the age of 88.

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Chakravarty, Charusita
(1964–2016)

Professor Charusita Chakravarty has been acknowledged as a reputed scholar of theoretical chemistry. She was born on 5th May 1964 at Cambridge, Massachusetts, USA. She was the only daughter of Professor Sukhomoy Chakravarty (former Member, Planning Commission, India and economist of international repute) and Lalita. She married Ramakrishna Ramaswamy on 12th November 1992. Her daughter Krithi was born in 2000. She completed BSc(Honours) (Chemistry) from St. Stephen's College, University of Delhi with a Gold Medal in 1985. She did her BA(Honours)(Natural Science Tripose) studies from Queen's College, University of Cambridge, UK in 1987. She studied PhD (Chemistry) under the guidance of Professor Davis Clary of University of Cambridge, UK in 1990. She also performed Research Studentship, Churchill College, Cambridge, UK during 1987-90. She joined as Postdoctoral Research Associateship with Prof. Horia Metiu, Department of Chemistry, University of California, USA from 1991-92. Dr. Charusita Chakravarty left her U.S. Citizenship and returned to India in 1992 and joined the post of Scientist in the Department of Physics, Indian Institute of Technology, New Delhi from 1992. She became Gulbenkin Research Fellow, Churchill College, University of Cambridge, UK during 1993-94. She resumed her duty in India and served as Assistant Professor in the Department of Chemistry, Indian Institute of Technology, New Delhi in 1994 and became Associate

Professor in 2002. Subsequently, she was promoted to the position of Professor in 2006. She served as a Visiting Fellow to the Department of Chemical Engineering, Princeton University, USA (January-June 2005) and as a Visiting Professor to Atomistic Simulation Group, The Queen's University, Belfast, UK (May-June 1998).

She conducted extensive research work on theoretical chemistry and chemical physics, classical and quantum Monte Carlo, molecular dynamics, structure and dynamics of liquids, water and hydration, nucleation, self-assembly, etc. She made significant contributions in the development of path integral methods for studying quantum effects in chemical systems, and for applications of classical and quantum simulations to the study of physiochemical properties of liquids. She worked on the atomic level reorganisations associated with phase transitions and self-assembly processes. She made outstanding research work on path integral Monte Carlo simulations, classical clusters and liquids; quantum and classical simulation studies of adsorption and diffusion in zeolites. She made valuable research findings on application of quantum scattering techniques to study spectroscopy of Van der Waals complexes.

Owing to her brilliant research work she was felicitated by Young Scientist Award, Indian National Science Academy, 1996; A K Bose Memorial Award, Indian National Science Academy, 1999; B M Birla Science Award, 1999; Bronze Medal, Chemical Research Society of India, 2004; Swarnajayanti Fellowship, Department of Science and Technology, India, 2004; Stree Shakti Science Samman, 2009; Shanti Swarup Bhatnagar Award in Chemical Sciences, 2009. She had the privilege to be a Member of the Royal Society of Chemistry, London. She was an Associate Member, Centre for Computational Material Science, JNCASR, Bangalore and Associate Member of the Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, from 1996-2003. She served as a Life Member of the Chemical Research Society of India. She had been honoured as a Fellow and Associate of the Indian Academy of Sciences, Bangalore in 2006 and Elected Fellow of Indian National Science Academy in 2015.

She had published over 90 research articles in reputed peer reviewed journals. She served as a Member of Editorial Board of many leading

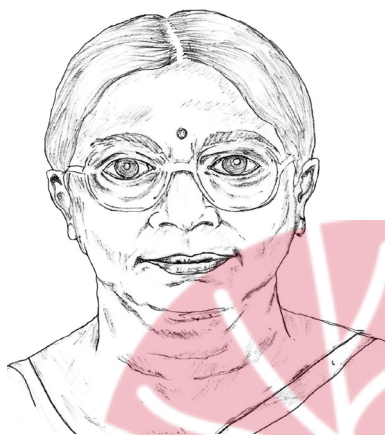
journals including *Pramana - Journal of Physics* (2006-08); *Journal of Chemical Sciences* (2008-11) and *Physical Chemistry and Chemical Physics* (2012 onwards).

She died on 29th March 2016 in Delhi after her prolonged fight against breast cancer. She left behind her husband Professor Ramakrishna Ramaswamy of Jawaharlal Nehru University (and former Vice Chancellor, University of Hyderabad) and her only daughter Krithi. She was an endearing personality, who left a lasting impression on her students, friends and people around her. Her values and ideals will continue to inspire young scientists to pursue their dreams.

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Chakravorty, Maharani
(1937–2015)

Dr. Maharani Chakravorty was an eminent Botanist and Molecular Biologist in India. She was born on 2nd February 1937 at Bhagalpur, Bihar. She married her PhD guide and fellow scientist Professor Debi Prosad Burma.

She did her BSc from Presidency College, Calcutta and MSc from Calcutta University. In 1961, she obtained PhD from Bose Institute, Calcutta. She proceeded to USA for Postdoctoral Research Training in enzyme chemistry at the Laboratory of Professor B L Horecker, New York University School of Medicine, USA. She took advanced training in bacterial genetics and virology from Cold Spring Harbor Laboratory, Long Island, USA. She continued her research studies and obtained DPhil and DSc from Calcutta University. She is the first Indian to be trained in the DNA-RNA hybridization technique (from Professor S Spiegelman, the Father of the technique), at the International Cell Research Organisation (ICRO), Naples, Italy.

She started her scientific career as Research Scientist at the Laboratory of Professor Myron Levine, Department of Human Genetics, Ann Arbor, Michigan, USA, 1968-69. After returning to India she joined Bose Institute, Calcutta as a Council of Scientific and Industrial Research (CSIR) Pool Officer. She rendered meritorious service as a Senior Research Officer to the Department of Biochemistry, Institute of Medical Sciences, Banaras Hindu University, Varanasi,

1969 and rose to the position of Reader. In 1972, she became Professor in-charge of the Molecular Biology Unit and continued till she retired. Afterwards she worked as the Indian National Science Academy (INSA) Senior Scientist, INSA Honorary Scientist, Indian Council of Medical Research (ICMR) Emeritus Scientist and then Honorary Scientist at the National Institute of Cholera and Enteric Diseases, Calcutta.

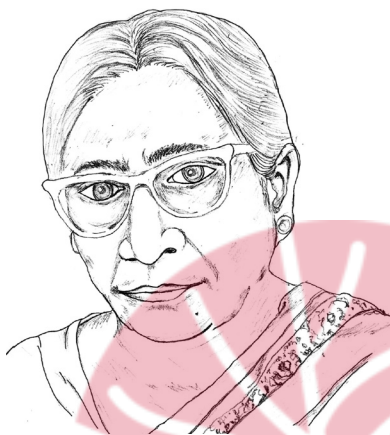
Dr. Maharani Chakravorty was actively associated with various scientific/educational bodies and associations. She had the honour of being an Elected Fellow of Indian National Science Academy, New Delhi, 1993; Fellow, National Academy Sciences, Allahabad; Fellow, National Academy of Medical Sciences (India); and Fellow, Indian Virological Society. She was also an active Founder Member of Guha Research Conference; Life Member, Society of Biological Chemists, India; Member, Association of Microbiologists of India; Member, Indian Biophysical Society; Founder Member, Indian Women Scientists' Association; Member, International Women Bio-scientists' Association; Founder Member, Association of Clinical Biochemists of India; and Member, Third World Organization of Women in Science.

Dr. Maharani Chakravorty's major scientific contribution has been in the field of host-virus interaction and genetic engineering. She conducted pioneering research work on the enzyme synthesis and microbial protein synthesis. She along with Dr. Mike at the Department of Human Genetics, Ann Arbor, established that the membrane complex of *S typhimurium*, having a sedimentation constant of 1000s, is the site of not only DNA synthesis but also of RNA synthesis. When the understanding of protein synthesis was very obscure, at that time she along with her teacher Dr. Debi Prosad Burma could demonstrate cell-free protein synthesis with a particular preparation of *Azotobacter vinelandi*. She conducted extensive research work on the regulation of metabolism in unicellular organism. Her work suggested that in following viral infection protein synthesis is controlled at the level of translation. She made significant research findings in the field of ribosomes and protein synthesis in *S typhimurium*. On exploring the physiological role of gene m3 of bacteriophage P22, she showed that the phage infection causes change in cellular transport system.

During her tenure at the Banaras Hindu University (BHU), she with the cooperation of her husband, who was also the Faculty Member of BHU established the Molecular Biology Unit. She also started the first laboratory course on 'Recombinant DNA Technique' popularly known as 'Genetic Engineering' in Asia and Far East in 1981. Her research has been well received by the scientific community in India and abroad. Her extensive research work in the field of her specialization resulted into the publication of several original research articles in international journals. She has edited two books. She served as the member of many expert and advisory committees such as National Programme Committee of the XV International Congress of Genetics, National Committee of the International Union of Biochemistry, Scientific Advisory Committee of National Institute of Virology, Pune, etc. Dr. Maharani Chakravorty won several awards for her research work, including Best Research Award, Institute of Medical Sciences, Banaras Hindu University, Varanasi, 1979; Kshanika Oration Award, Indian Council of Medical Research, 1979; YS Narayan Rao Award, Indian Council of Medical Research, 1981; Hari Om Ashram Alembic Research Award, Medical Council of India, 1981; J C Sengupta Memorial Award, Indian National Science Academy, 2007; Professor Darshan Ranganathan Memorial Award, Indian National Science Academy, 2007. She passed away on 16th January 2015.

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Chatterjee, Asima
(1917–2006)

Dr. Asima Chatterjee was one of the leading scientists of the country who made pioneering contributions in the field of organic chemistry. She was born on 23rd September 1917 in Calcutta, West Bengal to the family of Dr. Indra Narayan Mukherjee. She received early inspiration from her family to pursue higher education. She joined Scottish Church College, Calcutta and graduated in Chemistry with Honours in 1936. She pursued MSc (Organic Chemistry) from Calcutta University in 1938. She joined DSc at Calcutta University and completed her research in 1944. She visited USA to conduct Postdoctoral Research at the University of Wisconsin, USA, 1947-48. She was awarded DSc (Honoris Causa) for her significant research contributions in the field of her specialization from University of Burdwan and Banaras Hindu University.

Dr. Asima Chatterjee worked in various capacities and held prestigious teaching positions. She was Professor and Head of the Chemistry Department, Lady Brabourne College, Calcutta, 1940-54; Reader, Department of Pure Chemistry, University College of Science, Calcutta University, 1954-61; Head of Chemistry Department, Calcutta University, 1969-79; Khaira Professor of Chemistry, University of Calcutta, 1962-82; Professor of Pure Chemistry, University College of Science and Technology, Calcutta, 1962-82; and Nominated Member of Rajya Sabha, 1982-90.

Dr. Chatterjee conducted immense research work in the field of natural products, specially alkaloids, polyphenolics, terpenoids and coumarins derived from Indian medicinal plants. She imbibed the interest in Indian medicinal plants from her father Indra Narayan Mukherjee, a doctor having interest in making use of traditional medicinal herbs. She had an opportunity to work under Professor L M Parks at the University of Wisconsin, USA in 1947. She worked in the association of Prof. L Zechmeister at the California Institute of Technology, Pasadena, USA during 1948-49. At the N L University of Zurich during 1949-50, she worked under Prof. Paul Karrer. During her research studies abroad, she gained extensive research experience on naturally occurring glycosides, carotinoids and provitamines and biologically active alkaloids, which became her life long passion for research. During her MSc course at the Calcutta University she studied under the able guidance of renowned scientist Dr. Prafulla Chandra Roy and Dr. P K Bose.

She made notable contributions in the field of medicinal chemistry, analytical chemistry and mechanistic organic chemistry. Her research findings on hydramine fission reaction has been included in standard textbooks in chemistry. She isolated a number of physiologically active compounds from Indian plants such as the anti-epileptic drug, Ayush-56 from *Marsilia minuta* and the anti-malarial drug from *Alstonia scholaris*, *Swertia chirata*, *Picrorhiza kurroa* and *Ceasalpinna crista*. The patented drugs have been marketed by several companies. Through her untiring efforts, Dr. Chatterjee could establish a Regional Research Institute, Central Council for Research in Ayurveda and Siddha in Salt Lake City, Calcutta for carrying out research on Indian medicinal plants for the development of Ayurvedic drugs along with an Ayurvedic Hospital for systematic clinical trials under the control of the Ministry of Health and Family Welfare. As the Honorary Principal coordinator, she nurtured the Institute till the end of her life.

Dr. Chatterjee was the first woman to be conferred with the Doctorate Degree by an Indian University, Calcutta University in 1944. She was the first woman General President of the Indian Science Congress Association in 1975. She was also the first woman scientist to be nominated as the Rajya Sabha Member in 1982. She served in

various capacities for national level commissions and committees set up by Department of Science and Technology (India), Department of Biotechnology (India), Council of Scientific and Industrial Research, University Grants Commission, etc. Recognizing her brilliant academic career, she had been honoured as Elected Fellow of National Institute of Sciences (India), Allahabad; Fellow, Indian Academy of Sciences, Bangalore; Fellow, Bangiya Bijnan Parishad, Calcutta. She was the first woman Elected Fellow of Indian National Science Academy, New Delhi in 1961. She held important position of office bearer of several national and international societies including Member, Sigma XI, USA; Life Member, Indian Chemical Society; Life Member, Indian Association for the Cultivation of Science; General President, Indian Science Congress Association, 1975; and Member, Chemical Society (London).

She is recipient of various prestigious laurels including Nagarjuna Prize and Gold Medal, Calcutta University, 1940; Mouat Medal, Calcutta University, 1944; Watumull Fellowship, USA, 1948-49; first woman receipt of Shanti Swarup Bhatnagar Prize, 1961; Sir PC Roy Award, Indian Chemical Society, 1974; Elected Woman of the Year Silver Medal, Bengal Chamber of Commerce, 1975; Padma Bhushan, 1975; Bhuban Mohini Das Gold Medal, Calcutta University, 1981; Sir C V Raman Award, University Grants Commission, 1982; Sisir Kumar Mitra Memorial Award, Indian National Science Academy, 1984; Prof. PK Bose Award, Indian Chemical Society, 1988; Sir Ashutosh Mukherjee Memorial Gold Medal, Indian Science Congress Association, 1989; and Goyal Foundation Gold Medal, 1992.

She had authored *Bharater Banushadi*, *Saral Madhyamic Rasayana* in three volumes, *Treatise on Indian Medicinal Plants* in six volumes (CSIR). She published over 400 research papers and worked as the Editor of the *Journal of the Indian Chemical Society* and served as Member of the Editorial Board of *Indian Journal of Chemistry*. She delivered over 15 honorary memorial lectures at different universities and institutions. She always credited her husband Professor Baradananda Chatterjee, a renowned Physical Chemist, former Vice-Principal of Bengal Engineering College, Sibpur, West Benagal for her success and

achievements. She was fond of vocal music since her childhood and was trained in Indian classical music. She received numerous awards for her public performances. She died on 22nd November 2006 in Calcutta at the age of 89.

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Chatterjee, Dora

Dora was the youngest of the five siblings (one son and four daughters) of Dr. Kalicharan Chatterjee and Mary. Dr. Kalicharan was a Hindu Brahmin and a great scholar of Hindu philosophy. He was a Kulin Brahmin of Radhhiya class and belonged to the highest Hindu prince family of India. He opted for Christianity and was baptized on 8th November 1854. His family was lowered in the rank in consequence of transformation of his Hindu faith to Christianity. Dora was educated by missionaries. She decided to serve missionary service like her parents. She opted to take up medical education, which she thought would be beneficial for her missionary service in India. Her only brother Dr. Golaknath had a brilliant career, he was educated at the University of Cambridge and served as the Professor of Mathematics in the Government College, Lahore. He was also one of the Directors of the Former Christian College and provided admirable missionary service in Punjab. He died in early age.

Dora went to Philadelphia in 1886 and stayed there for six years. She was the third Indian member to graduate from the Women's Medical College, Pennsylvania in 1901. It was for the first time in the history of the Women Medical College, Pennsylvania, where 37 students appeared for the degree of Doctor of Medicine (MD) exam, and the entire class of 37 students passed the exam successfully. Dora

spoke fluent English, but always wore native Hindu dress. On the 49th Convocation, she refused to don the cap and gown of degree award ceremony, which was held at the Academy of Music on 14th May 1901. She returned to her native town Hoshiarpur, Punjab in 1902. She established Denny Hospital for Women and Children in Hoshiarpur. The hospital was funded by Miss Anna Denny of New York. She and her parents worked for Presbyterian Church, as missionaries in Hoshiarpur. She was the in charge of the hospital and rendered most valuable service along with her parents and sister. The government provided liberal grant for the development and expansion of the hospital. She worked there up to 1910 and at the age of 33 years she got married to Rai Sahab Mangat Ram, a member of Provincial Civil Service in the North West Frontier Province. Then she moved to Rawalpindi, India with her husband.

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एकः सूते सकलम्



Chatterjee, Rajeswari
(1922–2010)

A distinguished Electrical and Electronic Engineer, Dr. Rajeswari Chatterjee was born on 24th February 1922 in Mysore to B M Shivaramaiah, an advocate. She was an eminent scientist in the field of microwave engineering. She took her school education from Special English School in Basavanagudi, Bangalore set up by her grandmother Kamalamma Dasappa, who was widowed at the age of 20. Kamalamma's father moved from Mysore to Madras, so that his daughter could be educated and lead an independent life. Kamalamma passed BA examination and became one of the first women graduates in the erstwhile Mysore State. She devoted her life to elevate status and education of women in Mysore. She founded the Mahila Seva Samaj. Rajeswari grew up in a well-educated and broad minded family. She inherited courage and mental power from her grandmother.

Prof. Chatterjee was a very brilliant and highly disciplined student. After completing her school education she studied BSc (Honours) from Central College, Bangalore, 1942 and MSc (Mathematics and Physics), Maharani's College, Mysore University, Mangalore, 1943. She won the Mummadi Krishnaraja Wodeyar Award for securing first position in BSc (Honours) examination. She also won the M T Narayana Iyengar Prize and the Walters Memorial Prize for obtaining

first position in the MSc examination. Initially, she was refused to get admission to MSc Degree by Noble Laureate Sir C V Raman, because she did not have physics as a subject in her graduation. She went abroad for higher studies in July 1947. She did MS (with scholarship) from the Department of Electrical Engineering, University of Michigan, Ann Arbor, USA, 1948. She also received advance training for eight months from the Division of Radio Frequency Measurements, National Bureau of Standards, Washington DC, 1949. She rejoined Electrical and Electronic Engineering Department, University of Michigan, Ann Arbor, USA and completed her PhD under the guidance of renowned scientist Professor William G Dow in 1953. She was the first woman engineer of the Karnataka state. On her return to India in 1953, she started her teaching career as Assistant Professor, at the Department of Electrical Communication Engineering, Indian Institute of Science, Bangalore. Later, she was promoted to the level of Professor and Chairman, and served the same institute until her retirement in 1982.

She married Dr. Sisir Kumar Chatterjee, whom she knew for some years. As both of them were in the same department, they dedicated their service to build up the well-equipped Microwave Laboratory for the first time in India. Professor Chatterjee played a pioneering role to initiate teaching and research in the field of microwave engineering. She was the first woman professor of engineering at the Indian Institute of Science, Bangalore. She conducted teaching and research in electromagnetic theory, electron tube circuits, etc. She received many awards for her research work including Lord Mountbatten Prize, Institute of Electrical and Radio Engineering, UK; J C Bose Memorial Prize, Institute of Engineer's India; Ramlal Wadhwa Award, Institute of Electronics and Telecommunication Engineers; and Meghnad Saha Award, Institute of Engineers (Karnataka).

She published over 100 research papers and seven books on microwave engineering and antennae. She authored the book *A Thousand Streams: A Personal History* narrating sociological plight of Indian women facing gender and cast discrimination. She made outstanding research contributions in the field of antennae, mainly for aircraft and space craft applications. She died on 3rd September 2010.

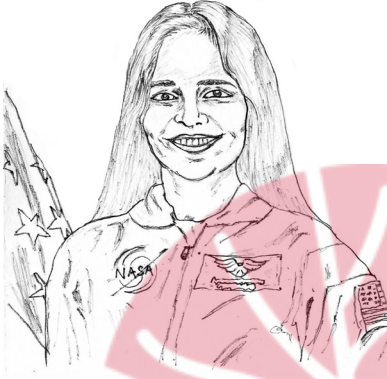
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एकः सूते सकलम्



Chawla, Kalpana (1962–2003)

Kalpana Chawla was born on 17th March 1962 at Karnal, Haryana. She was the daughter of Bansi Lal Chawla and Sanyogita and the youngest of the four children in the family.

She completed her school education from the Tagore Bal Niketan School, Karnal. She obtained (BTech) (Aeronautics) from the Punjab Engineering College, Chandigarh in 1982. To realize her ambitious dream, she moved to USA and joined Postgraduate Studies in the University of Texas, USA in 1984; Doctoral Studies in Aerospace Engineering, University of Colorado, USA, 1988. She took Commercial Pilot's Training and became Flight Instructor with airplane and glider ratings. She obtained Commercial Pilot's License for single and multiple engine, land and sea planes, and gliders.

She was determined to achieve something different and new from her counterparts in India. She had a great fascination for sky, stars and planets. Quite often she opted for making models related to outer space and heavenly bodies in her school projects. She was the first woman to be enrolled for Aeronautical Engineering in the Punjab Engineering College, Chandigarh. In September 1982, she travelled to USA for higher education. She married Jean-Pierre Harrison, a Frenchman and flying instructor in 1983. She became naturalized citizen of America in April 1991. She worked as Research Scientist at MCAT Institute (San Jose, California) to support research in the

area of powered lift at NASA Ames Research Centre, California in 1988. She was responsible for simulation and analysis of flow physics pertaining to the operations of powered-lift air craft such as the Harrier in ground effect. At Oversight Methods Inc., California, she worked on simulation of moving multiple body problems. She was responsible for the development and implementation of efficient techniques to perform aerodynamic optimization, and smooth take off.

She was selected by NASA as an astronaut in 1994. She was one of the 19 finalist candidates from 2962 applications at the Johnson Space Centre, NASA. She had to go through rigorous training including learning to fly a supersonic jet, parachute jump, ejection seat operations, week long survival course, etc. She was trained in simulated microgravity operations at a long swimming pool described as neutral density tank. But she could not pass the extra-vehicular activity in space, because she was found too small for space suit meant for extra vehicular activity—commonly known as a Space Walk. She was assigned the job on technical issues for astronaut office EVA/Robotics and Computer branches. She was finally included as a mission specialist on the crew of the fourth US Microgravity Payload Flight-Mission STS-87. The Columbia Mission started on 10th November 1997 and returned successfully on 5th December 1997.

Thirteen years later, she was again given an opportunity by the NASA as a crew member for STS-107. The space shuttle was originally scheduled to be launched on 11th May 2000, but due to various reasons it was delayed and it launched on 16th January 2003. On the morning of 1st February, 2003, the space shuttle returned to Earth and it was due to land at the Kennedy Space Centre. At launch, a briefcase-size piece of insulation had broken off and damaged the thermal protection system of the shuttle's wing, the shield that protects it from heat during re-entry. The shuttle could not overcome the damage and it broke up over the Texas and Louisiana and plunged to the ground. The space shuttle, *Columbia* and the seven crew members' including Rick Husband, William McCool, Laurel Clark, Kalpana Chawla, Iian Ramen, Michael Anderson and David Brown were killed in the shuttle crash. The Columbia Mission lasted for 15 days, 16 hours and 33 minutes.

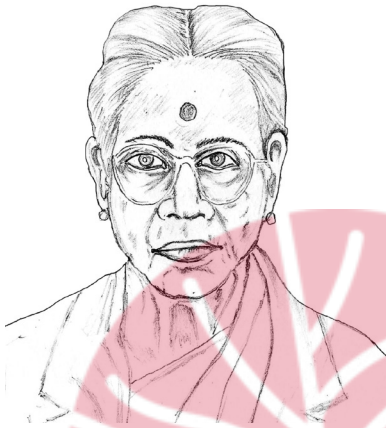
During her two space missions, Kalpana spent 30 days, 14 hours and 54 minutes in space. She was the first Indian born American woman to enter space in 1997. Kalpana's death certificate mentioned the place of death as 'Airspace over Texas'. She was dressed in a blue NASA flight suit before cremation. She was a simple and humble Indian born American, who always remained closely attached to her motherland, relatives and friends. She invited her former school principal, Ms Vimla Raheja to witness the great event of the launch of Columbia. She also took a souvenir of her school along with her in the space mission. Her story of the bravest woman of India became an inspiring legend for younger generation. She has been posthumously awarded the Congressional Space Medal of Honour; NASA Space Flight Medal; and the NASA Distinguished Service Medal. Though she is physically not present with us, even then her courage and dream will continue to inspire many young children back home to achieve something different and special in their life.

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एकः सूते सकलम्



Chintala, Sita Devi
(1929–2009)

Dr. Sita Devi Chintala is one of the leading Clinical Biochemist of India. She earned reputation of international standing through her research on scorpion venom poisoning. She was born on 21st April 1929 in Andhra Pradesh. She did her graduation in Medicine from the Guntur Medical College, Guntur and MD in Biochemistry from Andhra Medical College, Visakhapatnam. She had the honour of being FAMS; FIMSA TMC Fellow, University of Minnesota, 1961-62. She conducted extensive research as a World Health Organization Fellow, Sarafimer Hospital Karolinska Institute, Stockholm during 1971-72. She held important faculty positions during her service career as Tutor, Department of Biochemistry, Andhra Medical College, Visakhapatnam, 1954-55; Tutor, Guntur Medical College, Guntur, 1955-58; Assistant Professor, Department of Biochemistry, Gandhi Medical College, Secunderabad, 1958; Lecturer of Biochemistry, Kurnool Medical College, 1959-61; Professor, 1961-70; Professor of Biochemistry, Andhra Medical College, Visakhapatnam, 1970; Vice-Principal, 1978-81; Principal, 1981-84 (retired), Consultant in Biochemistry, Laboratory Services, CDR Hospitals, Hyderabad (worked for 13 years); Advisor and Senior Consultant in Biochemistry, Department of Laboratory Medicine, CARE Hospital, Institute of Medical Sciences, Hyderabad, 2001-05.

Dr. Sita Devi Chintala rendered notable research work in the field of scorpion venom, dracontiasis and lipids. She made a detailed

study on defibrination syndrome which occurs due to the scorpion venom poisoning. Her studies proved that the sting of scorpion often proved fatal in the children and adults within 24 to 48 hours. Examination carried out on effected human showed congestion in all the organs including subendocardial haemorrhages, neural thrombosis and haemorrhage of cerebral cortex. It showed thrombi in the heart, lung, brain, kidney and adrenals causing intravascular coagulation resulting into defibrination and consequent haemorrhages. She served as an examiner to undergraduate and postgraduate courses of several universities. She held significant positions of several professional academies. She was Fellow and Council Member of National Academy of Medical Sciences (India), New Delhi, 2001-03; Fellow and President, Association of Clinical Biochemists of India, 1980; Fellow and President, Association of Medical Biochemists of India, 1993-94; Elected Founder Fellow, International Medical Sciences Academy, 1981; FAMS, 1975. She took keen interest in the professional development of biochemists through her active participation in professional societies and associations such as being a Member of Association of Clinical Biochemists of India; Vice-President and President, Indian Association of Physiologists and Pharmacologists, 1977 and 1980; Organizing Secretary, VI Annual Conference of Association of Clinical Biochemists of India; Member, Department of Science and Technology for Accreditation of Clinical Laboratories, 1997-98; Member, Andhra Pradesh Medical Council, 1997-2001.

She was felicitated as the most distinguished student of Andhra Medical College, Old Students' Association in 1981. She received Silver Jubilee Oration Award, Trivandrum Medical College, 1982; Dr. Gurumurthy Memorial Oration Award, 1983. Dr. B C Roy Award for Eminent Teacher, Medical Council of India, 1986; Meritorious Teacher's Award, Andhra Pradesh State, 1985; Brigadier Sinha Oration Award, Indian Medical Association; Dr. Gopalkrishnan Association Oration, Association of Medical Biochemists of India, 2003; Award of Eminent Woman Scientist, Academy of Science, Technology and Communications, 2004. Association of Clinical Biochemists of India initiated Professor Sita Devi C Award from 1985 for best research work on clinical biochemistry. Andhra

Pradesh Academy of Sciences started Dr. Sita Devi C Endowment Lecture annually. The CARE Foundation also started Dr. Sita Devi C Annual Oration.

She published over 52 research articles in the field of clinical biochemistry and toxicology in reputed journals. She worked as a Member of Editorial Board of *Journal of Association of Clinical Biochemists of India*. She passed away on 6th March 2009.

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**Chowdhry,
Vatsala Samant**
(1910–2010)

Dr. Samant Vatsala Chowdhry is noted for her pioneering contributions in the field Obstetrics and Gynaecology. She was born on 19th January 1910 at Bassein, Bombay. She did her MBBS and MD from Bombay University in 1936 and 1938. She received Hansraj Pragji Fellowship from Bombay University and gained research experience in the field of her specialization.

She started her medical practice as Honorary Obstetrician and Gynaecologist at Cama Albless Hospital, Bombay, 1936-42. She married an Indian Airforce Officer, Kunwar Chowdhry in 1943. She came to Allahabad on the request of Dr. Jeevraj Mehta (Chairman of the Managing Committee of Kasturba Nehru Memorial Hospital) and from 1942-73, she served as Medical Superintendent, Kamala Nehru Memorial Hospital, Allahabad. She joined as Professor and Head of the Department of Obstetrics and Gynaecology, Motilal Nehru Medical College, Allahabad, 1963-67. She became Chief Investigator, Indian Council of Medical Research at Kamala Nehru Memorial Hospital, Allahabad in 1967. She was an outstanding practitioner, She worked tirelessly and her paramount interest was in women and children's welfare. She was the President of Association of Obstetrician and Gynaecologists, Allahabad.

Dr. Chowdhry was a dedicated physician and freedom fighter. She joined Salt Satyagraha Movement of Mahatma Gandhi in 1929- 30 and severed two months jail term. She visited USA under various medical

programmes during 1950s. She provided free of charge clinical services to the needy and poor women and children for prenatal and postnatal medical care. She was a prolific writer and contributed several articles in medical journals. She wrote popular write-ups in the magazines and delivered talks through radio to create awareness about good health and hygiene among general public. She focused on proper nutrition for mother and child to keep them healthy. She received Shirvalkar Gold Medal in Surgery; Prince of Wales Gold Medal and Padma Shri in 1972 for providing excellent health care services in the field of obstetrics and gynaecology. She died in 2010 at the age of 100.

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एकः सूते सकलम्



**Chowdhury,
Urmil Eulie**
(1923–1995)

An eminent woman Architect of international repute, Urmil Eulie Chowdhury was born on 4th October 1923 at Shahjehanpur, Uttar Pradesh. Her father was in Diplomatic service; therefore she visited many countries. She did her schooling from Kobe, Japan. She married Jugal Kishore Chowdhury, a consulting architect with the Government of Punjab.

She did her BArch from University of Sydney in 1947; Diploma in Ceramics, Englewood, New Jersey, USA; FRIBA (Fellow of the Royal Institute of British Architects); and FIIA.

Before returning to India, she worked as a Senior Architect in USA; then, Senior Architect, Le Corbusier's New Project to build the capital city of Punjab, Chandigarh, 1951-63; Principal, Delhi School of Architecture and Planning, New Delhi, 1963-65; Senior Architect, Chandigarh Project, 1968-70; Chief Architect, Haryana Government, 1970-71; Chief Architect, Chandigarh Government, 1971-76; Chief Architect, Punjab Government, 1976-81, when she retired from public service.

Urmil Eulie Chowdhury was a pioneering architect and designer. According to IAWA (International Archive of Women in Architecture) established in 1985 by the College of Architecture and Urban Studies of Virginia Polytechnic Institution and State University, Virginia Tech., USA, she was the first woman to qualify as an architect in

Asia. She was the first Indian woman to become the Elected Fellow of the Royal Institute of British Architects (London) and the Indian Institute of Architects. She designed and executed more than hundred architectural designs for public buildings including railway stations hostel buildings. Besides she was involved in landscaping, interior designing and furniture designing etc. She was actively involved in building the modern model city of Chandigarh. She remained deeply associated to build Chandigarh right from the designing, planning and laying the foundation stone to completion of new buildings of the city. She was awarded President's Medal for her meritorious contributions and designing low cost furniture in 1964.

She authored books entitled: *Architecture, Town Planning and Interior Design, Man, Science and Society, Memoire of Le Corbusier*. Le Corbusier was a Swiss-French architect, who designed the country's most well-planned city—Chandigarh. She also translated books from French to English. She took initiative to establish Alliance Française de Chandigarh in 1983. She was a profound painter and a very talented stage actor. She died on 20th September 1995 in Chandigarh after a brief illness.

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एकः सूतं सकलम्



Coyaji, Banoo Jehangir
(1917–2004)

Dr. Banoo Jehangir Coyaji was an internationally renowned Gynaecologist. She was born on 17th September 1917 in Bombay, Maharashtra and was the daughter and only child of Bapaimai and Pestonji Kapadia. Pestonji was a rich Parsee civil engineer, architect and Vastu specialist by profession. He was also a well-known Gujarati poet, writer and musician. Banoo married Jehangir Coyaji, an engineer from Purdue University on 24th February 1941.

She completed her school education from the Convent of Jesus & Mary School, Poona. She obtained MBBS and MD (Obstetrics and Gynaecology) from Grant Medical College, Bombay in 1940 and 1945.

She served as Medical Officer, King Edward Memorial Hospital, Pune, 1941-47; Chief Medical Officer, 1947; Nominated Non-Official Member, Central Council of Health and Family Welfare, 1948-64; and Professor Emeritus, Pune University.

Sardar Srinivas Moodliar started a small charitable hospital with four maternity beds in the Memory of King Edward VII on his own land in 1912. On the request of Sardar Moodliar, Dr. Coyaji Banoo joined King Edward Memorial Hospital, Poona when it was of 40 beds capacity in 1944. Under her able administration and clinical skills, the hospital grew from 40 beds in 1944 to 550 beds in 1999. For 55 years she remained at the helm, nurturing her beloved KEM Hospital to grow into a modern and well-equipped medical centre for education and research. Over the years, KEM and Dr. Banoo became inseparable

in people's minds. Dr. Coyaji started primary health services in villages at Vadu Vudruk of Sirur taluka of Maharashtra in 1977. This project initially included health services to 17 villages. Now the project has spread into 300 villages with a population of over three lakh people in the Sirur and Maval talukas of the district in addition to the slums in Pune city. The significance of Dr. Coyaji's achievement lies in her ability to surpass the institutional limitations and reach out to a wider population. For six years, she was the member of the Scientific and Technical Group in Human Reproduction, WHO. She served as Consultant to Government of Maharashtra, Government of India, World Bank, Ford Foundation, UNFPA, etc. She was also the Director of United Socio-economic Development and Research Programme (UNDARP); she worked as the Director Incharge of the SAKAL group of papers which works for social up-liftment and to provide better health for poor. She introduced Family Planning Programme in KEM Hospital in 1947.

Dr. Coyaji was a hardworking and dedicated doctor. She always remained punctual to her duties. She was awarded Padma Bhushan in 1989; Rameshwardas Birla Award in 1992 and Magasaysay Award, 1993 for her dedicated service to the poor and under privileged. She will be remembered for spending hours late at night simply observing critically ill patients under her care. She had a great sense of humour. She liked to dress well and loved to have a graceful appearance. Her husband, Jehangir Coyaji was an electrical engineer. Both of them were accomplished dancers and always graced and entertained the gathering at the party they attended. She was proficient in western classical music and an expert piano player. She died on 15th July 2004 after prolonged illness. She was 86.

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Dadabhoy, Dosibai J R (1881–1960)

Dr. Dosibai J R Dadabhoy was the most famous Gynaecologist for being the first Indian woman to qualify MD degree of the London University. She was born on 16th October 1881 to a broad-minded Parsi family of Bombay, Maharashtra. She graduated in Medicine from Grant Medical College, Bombay. She proceeded to London for specialization in medicine. She did MD from London University in 1904. She also underwent advanced training and obtained MRCP (Member of the Royal College of Physicians), London; LRCP (Licentiate of the Royal College of Physicians), London; MD (Tropical Medicine), London, 1912. She took advanced medical training and residency in Royal Free Hospital, London. She was also one of the first Indian women to take up MRCP (London).

After returning from abroad she started private practice and established Parsi Lying In Hospital and Nursing Home in Obstetrics and Gynaecology in Bombay. She also provided antenatal child welfare clinical service in her nursing home. She worked as an Honorary Consultant, Maternity Homes, Lady Willington Hospital, Bombay, 1923-36; Honorary Obstetrician, Cama Albless Hospital for organizing antenatal clinics, Bombay, 1924-36 (until she retired). She served as Honorary Gynaecologist, KEM Hospital, Bombay from 1926 to 1928.

She involved herself in various social services in her own community. She took great interest in uplifting the status of women

in Indian society. She took interest in rehabilitating poor and destitute women and worked as the Secretary of the Women Rescue Home run by B P Women's Council. Dr. Dadabhoy was the first doctor to order and bring Radium in the city of Bombay in early twenties. She used it carefully for cancer cases both at the KEM and Cama Albless Hospital on the basis of priority of clinical need irrespective of caste, creed and status. Many women across the country approached her and got treated by her from cancer, the dreadful disease. Her nursing home and clinics had loyal support from Dr. G N Vazifdar, a popular philanthropist of Bombay. She took great interest for the better service provisions for women doctors in India. She played a vital role in the establishment of the Association of Medical Women in India (AMWI).

Dr. Dadabhoy and Dr. Jerbanoo Mistri presented a notable paper at the All India Social Service Conference on maternity and infant mortality, training of nurses, midwives and doctors. She also raised the issue of maternity benefits for working women and recommended that it should be obligatory for all employees of labour. The paper further contended that 70 per cent of infant deaths could be prevented by providing proper training to *dais* and midwives. She was the member of the Bhore Committee, which made landmark decision for the modernisation of medical practice in India. She participated in conducting All India Survey made by the Bhore Committee for preparing guidelines and standard of medical practice in the country. She was an active member and office bearer of many societies and associations including Member, Bombay Presidency Infant Welfare Society; President, Association of Medical Women in India (Bombay Branch), 1937; Founder Member and Joint Secretary and then President, Maharashtra Obstetrics and Gynaecologists Society (MOGS); President, Federation of Obstetrics and Gynaecology Society of India. In fact, the MOGS was founded in 1934 at a small informal meeting at the residence of Dr. Dadabhoy.

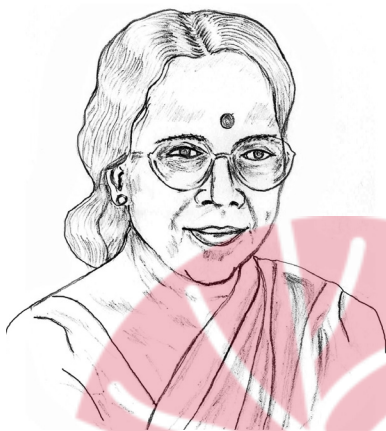
She endowed two scholarships at the Seth G S Medical College, Bombay in the memory of Avabai and Rattanshow Dadabhoy to encourage students to achieve excellence in the field of medicine. She was a unique combination of dignity, administrative skill and clinical

proficiency. She always wore dignified dress made up of fine rich clothes of choicest material and in best style. She had an exceptional gracious personality and always walked straight. She died on 16th January 1960 at the age of 79.

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Datta, Kasturi
(b.1943)

Dr. Kasturi Datta is a leading scientist; she is the daughter of Shri M M Bose and wife of internationally acclaimed biologist Professor Asis Datta. She was born on 14th March 1943 in West Bengal. She qualified MSc and PhD from Calcutta University in 1964 and 1968. She visited New York to pursue Postdoctoral Fellowship at the State Research Institute for Neurochemistry.

She started her career as Biochemist, Department of Biochemistry, University of Los Angeles, USA. Upon her return to India, she joined Council of Scientific and Industrial Research as Pool Officer, from 1975-77. She joined newly established School of Environmental Sciences, Jawaharlal Nehru University as Assistant Professor in 1977. She was elevated to the position of Associate Professor in 1985 and then Professor and Dean from 1993-2000. She served as Adjunct Professor, Special Centre for Molecular Medicine, Jawaharlal Nehru University, 2000-08. She was bestowed with the honour of being Indian National Science Academy (INSA) Senior Scientist, School of Environmental Sciences, 2008-2010 and Department of Biotechnology (DBT) Distinguished Biotechnology Professor, 2010. She held teaching assignments as Visiting Professor, Roche Institute of Molecular Biology, Nutley, New Jersey and Max Planck Martinsried, Munich.

She has the distinction of being an Elected Fellow of Indian National Science Academy, New Delhi, 1994; Fellow, National

Academy of Sciences (India), Allahabad; Fellow, Indian Academy of Sciences, Bangalore; Fellow, Third World Academy of Sciences; and INSA-German Exchange Fellow, 1997.

She is an active member of many professional societies and associations including Elected Member, American Society of Biological Chemistry and Molecular Biology; and President, Environmental Science Section, Indian Science Congress, 2002.

Professor Datta contributed extensively in the field of cell biology, extra cellular matrix and molecular oncology. She has conducted significant research on Cellular, Molecular and Biotechnology to unravel the molecular mechanism of several mammalian physiological processes. Her studies on the biogenesis of cardiac cells in relation to the expression of cardiac muscle specific genes e.g. myosin heavy chain and myosin light chain is well acclaimed. She made significant investigation on understanding the molecular basis of cell matrix and cell-cell interaction during signal transduction cascade in transformed cells and in sperm-oocyte interaction. Her outstanding contribution in this area includes identification and purification of a novel cell surface glycoprotein, which binds specifically to hyaluronic acid (HA), a complex polysaccharide present in extra cellular matrix (ECM) and involved in cellular differentiation and various pathological conditions. The work of Prof. Datta's laboratory has established the physiological significance of this protein, since it expresses differentially on transformed cells, promotes cell adhesion and regulates tumor formation and sperm function. She has further reported the localization of hyaluronic acid binding protein (HABP1) on human chromosome 17p12-p13. This work has been recognized internationally by Human Genome Project Nomenclature Committee and included in the draft of human genome map (2002). She has successfully completed many research projects of Department of Environment, Department of Science and Technology, Department of Biotechnology, Council of Scientific and Industrial Research, and Indian Council of Medical Research, Government of India.

Her valuable contributions has been recognized by awarding her Ranbaxy Award, 1999; Professor MRN Prasad Memorial Lecture Award, Indian National Science Academy, 2000; Chemito Award for Life

Sciences, 2000; Senior Woman Bioscientist Award, Department of Biotechnology, India, 2001; Professor Darshan Ranganathan Memorial Lecture Award, Indian National Science Academy, 2003; FICCI Award, 2004; Basanti Devi Amir Chand Award, Indian Council of Medical Research, 2005; J C Bose Award of Hari Om Trust, University Grants Commission, 2005; 25th G P Chatterjee Award, Indian Science Congress, 2005; and Prof. Archana Sharma Memorial Lecture Award, NASI, 2010.

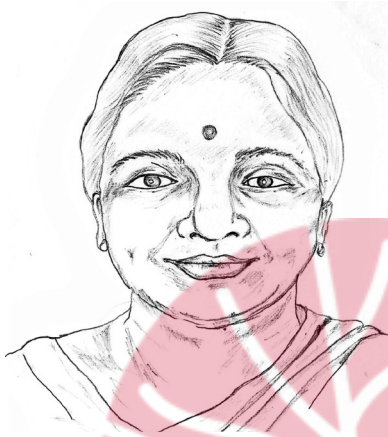
She has contributed over 101 research articles in reputed national and international journals.

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एकः सूते सकलम्



**Deshmukh,
Snehlata Shanrao**
(b.1938)

Dr. Snehlata Shanrao Deshmukh is an excellent Pediatric Surgeon, veteran educationist and social worker. She was born on 30th December 1938 in Bombay, Maharashtra to the family of Shri SV Joglekar.

She obtained MBBS and MS and then proceeded abroad for super specialization in pediatric surgery. She received FRCS (Fellow of Royal College of Surgery), London; FNAMS (Fellow of National Academy of Medical Sciences); FIC & ACS (Fellow of International College and American College of Surgery); and FIAP (Fellow of Indian Academy of Paediatrics).

Upon her return to India she joined Seth GS Medical College and KEM Hospital, Bombay as a Professor of Paediatric Surgery. She served as Dean, Lokmanya Tilak Municipal Medical College and Hospital, Sion, Bombay. She made notable pioneering contributions in the field of paediatric surgery and medical education. She established an outstanding reputation as an educationist during her tenure of Vice-Chancellorship in the Bombay University from 1995-2000.

She has been honoured as the Fellow of Maharashtra Academy of Paediatrics. She also served as an active member of various professional societies including Member, British Association of Paediatric Surgeons; Member, Pacific Association of Paediatric Surgeons; Member and Secretary, Indian Association of Paediatric Surgeons, 1979-80; Member, Indian Medical Association; Member, Liver Study Group of India; Member,

Asian Association of Paediatric Surgeons; Member, World Congress of Paediatric Surgery, 1980; Treasurer, III Asian Congress of Paediatric Surgery, 1976; President, Indian Academy of Paediatrics, 1978-80; President, Association of Surgeons of India; Chairman, King George Infirmary; and Member, Economic Development Council, Maharashtra.

Dr. Snehlata has been an eminent pioneering pediatric surgeon of India, who has established Paediatric Surgery Unit at the KEM Hospital and trained many young doctors, who were desirous to take up this as super specialization. Besides her achievements in the field of medicine, she has contributed immensely in the field of literature. She is a renowned author of Marathi literature, and has published books on various subjects such as *Janiv and Jokhim* (a translation of P C Alexander's *Perils of Democracy*), *Bimba-Pratibimba*, *Shadaphuley* and *Snehamayi*. She has published over 150 research articles in reputed medical journals and published eight books. She has also contributed a chapter on India in the book entitled *History of Surgical Pediatrics* published by World Scientific Publishing Co. She served as a Member of Editorial Section of *Indian Journal of Surgery* and as a Member of Editorial Board of *Indian Paediatrics*, *Journal of Postgraduate Medicine* 1979; *Bulletin of Indian Medical Association*. She served as a member and office bearer of several national level committees and commissions and advisory bodies on higher and medical education. Dr. Snehlata is a well-known social worker, who works for generating awareness to save girl child and create sensitivity about female foeticide. She has also authored a CD, *Garbh Sanskar Aami Mantra* in Marathi. She has delivered over 35 prestigious memorial orations.

Recognizing her exceptional talent in different fields, she has been awarded Dr. B C Roy National Award, Medical Council of India, 1998; Dhanwantari Award; Woman of the Year Award, 2000; Shri Sai Leelavathy Mata Award, 2003; Dr. B N Purandave Award, 2004; Medscape India Award for Excellence in Surgery, 2012.

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**Dinshaw,
Ketayun Ardeshir**
(1943–2011)

Dr. Ketayun Ardeshir Dinshaw was an eminent medical personality in the field of oncology. She was born on 16th November 1943 in Calcutta, West Bengal to a Parsi family of Ardeshir and Alamai Dinshaw.

She had very brilliant academic pursuit and obtained MBBS from Christian Medical College and Hospital, Vellore in 1966. She specialized in medical radio therapy by completing DMRT (Diploma in Medical Radio Therapy) from London, 1971. She also qualified FRCR (Fellow of the Royal College of Radiologists) from Addenbrookes's Hospital, Cambridge, UK, 1973.

She joined Tata Memorial Hospital, Mumbai in 1974 as Assistant Radiotherapist, after she returned from abroad. She rose to the position of Head, Department of Radiology and Oncology in 1981 and Director in 1995. She served as Director, Tata Memorial Centre (Tata Memorial Hospital and Cancer Research Institute), Mumbai, 1997-2008 (till retirement). She served TMC for over 35 years.

Dr. (Miss) Dinshaw was a renowned cancer specialist, who made phenomenal contributions in the field of radiation oncology. She specialized in cancer of the cervix, breast, head and neck, esophagus and lymphnodes. She was instrumental in major upgradation of the Tata Memorial Hospital. Her visionary and foresightedness as Director of TMC, led to the establishment of the new ACTREC Centre (Advanced Centre for Treatment, Research and Education

in Cancer) at Navi Mumbai with the technical support of DAE (Department of Atomic Energy). She served in various capacities to many national and international Expert and Scientific Advisory Committees. She served as Visiting Consultant and Advisor to various medical institutions in India and abroad on matters related to oncology and radiology. She made valuable contributions as WHO Advisor and IAEA Consultant for radiotherapy in developing countries. She was very keen to adopt ultra modern technology for efficient and accurate diagnosis and therapy of cancer including 3DCRT, SRT, IMRT and IGRT in the country. She developed the first Brachytherapy programme in India. She was the team leader for the development of indigenous tele cobalt machine now called as 'Bhabhatron', installed in about 20 oncology centers across the country through the donation of IAEA.

She had the distinction of being the Fellow of Royal College of Radiology, Cambridge, U.K. She was a very active member of her profession. She played a leading role by being the President of Association of Radiation Oncologists of India, 1995-96; Vice-President and President, International Society for Radiation Oncology, 1995-97 and 1997-2001; Elected and Council Member, UICC (International Union Against Cancer), 1998-2006.

She received many honours and awards for her lifetime achievements such as Indo-American Ulrich Henschke Memorial Award, 1993; Roll of Honour, UICC (International Union Against Cancer), 1996; Excellence in Professional Competence, Federation of Parsi Zoroastrian Anjumans of India, 1997; National Award for Outstanding Contributions to Medicine, FIE Foundation, 1999; Lifetime Achievement Award, Brest Cancer Foundation of India, 2000; Padma Shri, 2001.

She published over 100 original research articles in peer reviewed journals. She also served as a Member, Editorial Board of *Indian Journal of Radiology*, 1981; *Indian Journal of Cancer*, 1981; *International Journal of Endocurietherapy/Hyperthermia Oncology*, 1986; *Journal of Clinical Radiotherapy and Oncology*, 1989; *Journal of Radiotherapy and Oncology*, 1996-98. She was an outstanding doctor, administrator and a courageous personality, who always motivated people around her

(including her patients) to live a happy and dignified life. She died of cancer on 26th August 2011 at the age of 67.

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एकः सूते सकलम्



Dureja, Prem
(1947–2015)

A leading Agricultural Scientist, Dr. Prem Dureja was born on 11th March 1947 to the family of G D Dureja.

She graduated in science from Banasthali Vidya Pith, Jaipur in 1967. She did her MSc and PhD from Meerut University in 1970 and 1974. She visited USA to join as Postdoctoral Fellow at the University of California, Berkeley from 1981-83.

She started her career as a Scientist S1 at Division of Agricultural Chemicals, Indian Agricultural Research Institute, New Delhi, 1976-81. She was promoted to Senior Scientist, 1982-97; Principal Scientist, 1998-2006; Head, Division of Agricultural Chemicals, Indian Agricultural Research Institute, New Delhi, 2006-09. She continued her research after her retirement as Emeritus Scientist, Indian Agricultural Research Institute, New Delhi, 2009-11.

She was honoured as Elected Fellow of National Academy of Agricultural Sciences in 1998; Fellow, Society of Pesticide Sciences, India. She was Life Member of the National Academy of Sciences (India), Allahabad.

She also held the position of Vice President (1995-97), Editor (1999-2002), General Secretary (2002-05) and President of the Society of Pesticide Sciences, India

Dr. Prem Dureja worked on novel biomolecules in plant disease management. The use of chemicals are always a threat to the environment. Therefore, she proposed that new bio-molecules of

plant origin, microbes and green dry metabolites should be used. She also worked on the analytical techniques such as chromatography for metabolomics. She worked on the analysis and standardization of 217 pesticides registered in India as on date. She served as an expert and advisor to several committees related to hazardous use of pesticides and environmental pollution. She co-authored a book entitled *Pesticide, and Their Classification Based on WHO and Global Status of Hazardous Pesticides* published by NCIPM in 2009. She contributed over 250 research articles in reputed journals, 29 book chapters, 13 patents and seven books. She also served as a Member of the Editorial Board of *Pesticide Research Journal*. She was also the Editor of the National Academy of Agricultural Sciences, India.

She had been bestowed with many laurels and awards including Dr. K C Mehta Award, National Academy of Agricultural Sciences, 1995; Best Teacher Award, Indian Agricultural Research Institute, New Delhi, 1995; Best Woman Agricultural Scientist Award, Indian Council of Agricultural Research, 1996; Recognition Award, National Academy of Agricultural Sciences, 1999-2000; Recognition Award in Plant Protection, National Academy of Agricultural Sciences, 2001; Rafi Ahmad Kidwai Award, 2003-04; Bharat Ratna Dr. Subramanian Award for Outstanding Teacher, Indian Council of Agricultural Research, 2006-07; Dr. K C Mehta Memorial Award, 2007-08.

She died on 17th May 2015 after a brief illness. At the time of her demise, she was a consultant at the Energy Resource Institute, New Delhi.

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**Engineer,
Amy Dhunjibhoy
(b.1915)**

A leading Gynaecologist, Dr. Amy Dhunjibhoy Engineer was born on 10th October 1915 in Bombay, Maharashtra to a rich Parsi family of Dhunjibhoy Khorshed.

She did her graduation in medicine from Grant Medical College, Bombay. She proceeded to UK for higher education and did her MD in Obstetrics and Gynaecology. She obtained MRCOG (Member of Royal College of Obstetrics and Gynaecologists), London, 1943; FRCOG (Fellow of Royal College of Obstetrics and Gynaecologists), London and FRCS (Fellow of Royal College of Surgery), Edinburgh.

After her return to India she joined J J Group of Hospitals, Bombay as Medical Officer and worked there from 1939-44. She became Reader in Obstetrics and Gynaecology, KG Medical College, Lucknow, 1945-49. She served as Professor of Medical College, Agra from 1949-53. In 1953, she returned to KG Medical College, Lucknow as Professor and worked there up to 1976, until she retired. She continued her research in the same medical college as Emeritus Professor of Obstetrics and Gynaecology from 1976-88. She also served as the Officer In-charge, Human Reproduction Research Centre, Indian Council of Medical Research from 1971-88.

She had the distinction of being a Fellow of Indian Academy of Medical Sciences (India); Founder Life Member and President, Association of Obstetrics and Gynaecologist, Lucknow; Vice-President

and President, Federation of Obstetrics and Gynaecologists Society of India (FOGSI), 1977; Member and Chairman, Northern Zone Reference, Royal College of Obstetrics and Gynaecologists, London, 1963-71; Member, Indian Medical Association; Member, Family Planning Programme, Indian Council of Medical Research (ICMR), 1961-88; Inspector, Medical Council of India.

Dr. Engineer taught in various medical colleges since 1945. She has conducted valuable research in the field of gynaecology and contraceptives, which has provided great impact in the promotion of family planning programme in India. She did pioneering job in the field of family planning, when the concept of family planning was new in the country. It was a great challenge for gynaecologists to make the concept of contraceptive acceptable to the Indian society. She had been a member of the Advisory Committee on Family Planning of Ministry of Health and Family Welfare and ICMR. She practiced application and trial of different methods of contraceptives and family planning. She developed a simple method of sterilization in females. She conducted extensive family planning camps in rural areas. She presented over 50 research papers in various international conferences. She contributed over 70 papers in reputed international journals on contraception, maternity and child health. She was a member of the Research Committee on Contraceptive Technology of Indian Council of Medical Research.

She received Dr. BC Roy National Award in 1975 and Padma Shri in 1976 for her tireless efforts to make Family Planning Programme workable in its initial stages.

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Farrer, Ellen Margaret
(1865–1959)

Dr. Ellen Margaret Farrer was a pioneer foreign missionary woman doctor, who served and practiced medicine in India for over 40 years. She was born on 29th September 1865 in London, United Kingdom, to Rev. William Farrer and Hannah Maria Biddle. She was educated in the South Hampstead High School, London. She graduated from Bedford College, London; and obtained MBBS from London School of Medicine for Women, London, 1890.

After graduation in medicine, she joined Elizabeth Garrett Anderson Hospital as a Medical Officer. She was the first woman doctor who was sent to India under the service of Baptist Missionary Society to work in Bhiwani, Hissar district of Punjab in 1891. She spent over 40 years of her life in Bhiwani, Raval and Dholpur until she retired from her service in 1933. Initially, she started a small dispensary in a small rented house in Bhiwani.

She faced strong resistance and prejudice for the acceptance of European medical system in India. She performed her first surgery in an open courtyard with the assistance of a small boy of ten years of age. The operation was successful, which helped her gain confidence of the local people and gain ground for Foreign Medical Missions in India. During the First World War, she returned to England on sick leave and held an appointment at the Rosa Morison House, a branch of the Elizabeth Garrett Anderson Hospital. She returned to India in

1918, and for a year she worked as a surgeon at the Lady Hardinge Hospital, Rajputana. In 1920, she returned to Bhiwani.

Her hard work and devotion helped her to draw attention of the local administration to come forward to collect donation to develop a new health care centre. Eventually, a hospital named as New Farrer Hospital was built and opened to the public in 1923. During her early days of clinical service to India, she faced the challenges of periodic epidemics of plague, cholera and small pox. Her painstaking service to save her patients won the confidence of people. Locals and villagers from nearby areas flocked her hospital for inoculation. She made special efforts to educate people to take precautions for the prevention and spread of epidemics. She learned Urdu and Punjabi to communicate with locals and understand their clinical problems without any difficulty. She became so proficient in Urdu language, that she was included in the regular panel of translation for textbooks for training nurses and midwives. She also took interest in the social reform and upliftment of women in the society. She played a leading role in the establishment of the Association of Medical Women in India and served as the Secretary of the Association for six years.

In recognition to her service, the government awarded her the Silver Medal of Kaiser-i-Hind and then Gold Medal of the Kaiser-i-Hind in 1928. During the second World War, she was over 70 years of age. She returned to England and extended her clinical service to the sick and wounded. In her late life she enjoyed painting, which was her most favourite hobby. She died on 14th October 1959 in Hertfordshire, England at the age of 94.

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**Fullerton,
Anna Martha**
(1853–1938)

Anna Martha Fullerton was born in 1853 in Agra, United Provinces in India, where her father Robert Stewart Fullerton was an outstanding pioneer of missionary service in North Indian Mission. Her father and mother, Martha White Fullerton sailed to India in August 1852 on Farukhabad Missionary Service. Anna was the eldest of seven children. The family faced difficulties during Indian Mutiny in 1857, where Mr and Mrs Fullerton were kept in confinement in some unknown place in Agra. Their children were kept at a safe place in the mountain side. Agra held out successfully against mutineers, but all the missionaries in Fatehgarh were killed.

After the Mutiny, Mr Fullerton remained hidden and his whereabouts were not known to his family. During this period he tried to reorganize the Mission of Fatehgarh and recollect scattered Christians in the area. He went through very hard life and was preparing to return to USA on furlough, but he scummed to his deteriorating health and died on 4th October 1865. He was an excellent manager having very good proficiency in local languages. He used to be regarded as the liaison coordinator between Indians and fellow Christians. His death was a great loss to the Missionary Mission to India. His wife and children returned to USA after his death. They had to face lots of difficulties during the voyage of four months for the settlement of the family in Philadelphia after their return. Mrs M W Fullerton

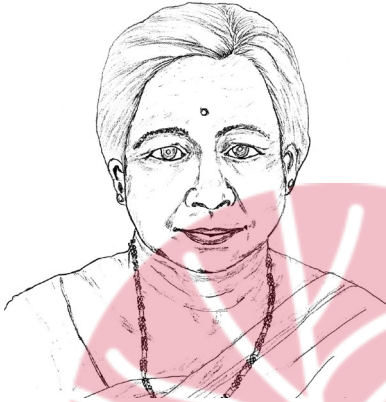
educated and groomed her children with undaunting courage and determination within the limited means of finance and other resources available to her.

Being the eldest sibling in the family, Anna had to take the responsibility of the family. She took education and qualified herself as a teacher. She started her service as a teacher, but she could not come out of the memory of her childhood, when she wanted to serve sick and poor women in India. During her service, she studied medicine in the Women's Medical School of Philadelphia and graduated MD in 1882. She joined faculty of the same institute and served as professor and in charge of Women's Hospital from September 1886 to September 1896. From 1896 to 1899 she did private practice in Philadelphia.

In October 1899, she sailed to India and became the faculty member of the Medical School for Women in Ludhiana. She also provided clinical service with great devotion and served as the Supervisor of the hospital attached to the medical school. In 1902, after three years, she joined her sister Mary, who was a teacher in Fatehgarh. Both the sisters worked tirelessly to open many dispensaries in rural areas and a big hospital in Fatehgarh in 1904, which later developed into the Memorial Hospital. The Fullerton Memorial Dispensary for Women and Children was established by the two sisters, in 1907. Then she returned to the Medical School for Women at Ludhiana as a faculty member and served there for some time. She authored many popular textbooks on obstetrics and gynaecology for doctors and nurses including *A Handbook of Obstetric Nursing for Nurses, Students and Mothers* published in London in 1903. She returned to USA in 1909 and died on 10th December 1938.

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Gadgil, Sulochana
(b.1944)

Dr. Sulochana Gadgil, a renowned Meteorologist was born on 7th June 1944 at Pune, Maharashtra. She is the third child of four siblings to Veshwant and Indumati Pathak. She developed interest to study science from her father, who was a physician. She did her schooling in Pune. She married Dr. Madhav Gadgil, an ecologist in 1965.

She received her BSc and MSc (Mathematics) from University of Poona, in 1963 and 1965. She visited USA and did PhD in Applied Mathematics from Harvard University, USA, in 1970. She worked as a Postdoctoral Fellow and worked under the supervision of Professor Chamy at the Massachusetts Institute of Technology (MIT), USA, 1971.

She started her service career as a Council of Scientific and Industrial Research (CSIR) Pool Officer, Indian Institute of Tropical Meteorology (IITM), Pune, 1971-73. She served as Assistant Professor, at Centre for Theoretical Studies, Indian Institute of Sciences, Bangalore from 1973-81. She rose to the position of Associate Professor, 1981-86; Professor, 1986-89; Chairman, Centre for Atmospheric Sciences (in 1990, the Centre was renamed as the Centre for Atmospheric and Oceanic Sciences), Indian Institute of Sciences, Bangalore, 1989-2006. She is Honorary Professor at Centre for Atmospheric and Oceanic Sciences, Indian Institute of Sciences, Bangalore, since 2006.

She has been honoured as Fellow, Indian Meteorological Society; Fellow, Indian Academy of Sciences, Bangalore, 1985; and Fellow, Indian National Science Academy, New Delhi, 1995.

Professor Sulochana Gadgil has done immense research work in the field of monsoon and ocean dynamics, climate variability, agriculture and evolutionary biology. Her significant contributions include discovery of the northward propagations of the equatorial cloud band which maintain the rain belt over the monsoon zone, and threshold of 28 degree Celsius for sea surface temperature above which there is a high propensity of organised cloud systems over the tropical oceans. Her research findings have shown important link of the drought and excess rainfall seasons of the Indian monsoon with the equatorial Indian Ocean oscillation. She made valuable contributions to the formulation of the Indian Climate Research Programme (ICRP), with its component Bay of Bengal Monsoon Experiment (BOBMEX), the Arabian Sea Monsoon Experiment (ARMEX) and the Continental Tropical Convergence Zone (CTCZ) programme.

She worked in close collaboration with agricultural scientists and farmers, to set up a farmers' network in order to identify acceptable strategies for enhanced production in a variable climate, particularly in rain-fed areas on which climate variability is known to have a larger impact. Dr. Sulochana and her collaborators have worked to develop decision-support systems, based on information and prediction of climate variability, for the rain-fed belt. She found that involvement of farmers is necessary for the development of such a model.

She has served as the Member, Advisory Board of almost all the meteorological institutions in the country. She served as the Member of the Scientific Committee of the World Climate Research Programme (WCRP), 1990-98. She was involved in WCRP monsoon activities and the Atmospheric Model Intercomparison Project (AMIP). She participated in the WCRP International Conference on Monsoon Variability and Prediction in Trieste, Italy (May 1994) and in the International AMIP Scientific Conference in Monterey, Mexico (May 1995). She played an important role in the Global Change System for Analysis, Research and Training (START), Climate Prediction and Agriculture (CLIMAG) project. At present, she is a co-chair of

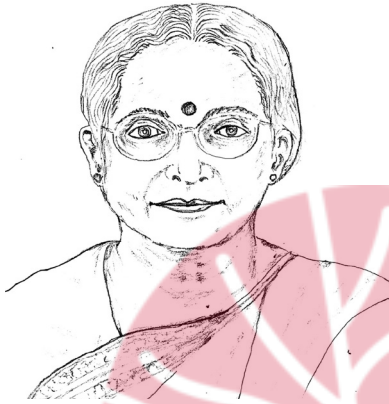
the START Scientific Steering Committee. She has published over 68 research articles and edited two books.

Dr. Sulochana Gadgil has been awarded B N Desai Award, Indian Meteorological Society, 1982; Vasvik Award, 1986; Hari Om Ashram Prerit Vikram Sarabhai Award, 1989; Norman Borlaug Award, 1996; Astronomical Society Award, 1996; National Award for Lifetime Achievement in Atmospheric Science and Technology, Ministry of Earth Sciences, India, 2008 for her meritorious service in the field of meteorology.

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एकः सूते सकलम्



**Gangal,
Sudha Gajanan**
(b.1934)

Dr. Sudha Gajanan Gangal is a renowned Zoologist and a leading Oncologist. She was born on 25th August 1934. She did BSc (Zoology) from Bombay University, Bombay, 1954. She completed her MSc and PhD from the Indian Cancer Research Centre (ICRC), Bombay in 1959 and 1963. She took US Public Health Service Fellowship and conducted short-term research in USA from 1964-65; Postdoctoral Research Grant, University of Michigan, Ann Arbor, USA, 1966-69; Travel Fellowship to Visit American and European Laboratories, International Agency for Research on Cancer, 1971.

She began her career as Research Scientist at Cancer Research Institute, Bombay in 1954. Later, she became Postgraduate Faculty Member in Applied Biology, Bombay University, Bombay from 1969; Senior Research Scientist, Cancer Immunology Division (established by her), Cancer Research Institute (CRI), Mumbai; Research Director, Wadia Children's Hospital, Mumbai; Emeritus Professor, Rajiv Gandhi Institute of Biotechnology, Bharatiya Vidya Peeth, Pune from 1994.

She has been the Fellow and Council Member of the Indian National Science Academy, New Delhi, She has also been an active Member of Indian Immunology Society; Member, European Group of Cell Tissue and Organ Culture; Joint Secretary and President, Indian Women Scientist's Association (IWSA); Member, Indian Association for Cancer Research; Member, International Cell Research Association.

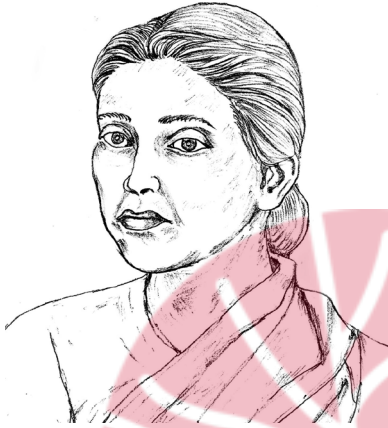
Dr. Sudha Gangal pioneered the oncological research in India. She completed her postdoctoral research at the University of Michigan, Ann Arbor under the guidance of Dr. D J Merchant and Dr. Don Shreffler, where she conducted research on expression of H-2 antigens in mouse cell lines grown *in vitro* for several years. She also conducted collaborative projects with Germany, France and China under the Scientific Exchange Visitor's Programme. She played a significant role in the establishment and development of important biomedical research laboratories in the country. The Cancer Immunology Division at the Cancer Research Institute in Mumbai was established by her. She also established the Genetic Clinic for Prenatal Diagnosis of Thalassemia at the Wadia Children's Hospital, Mumbai.

She made active participation in ICRC antileprosy vaccine project as Co-Principal Investigator. She was also invited to conduct immunological investigation on victims of MIC exposure during Bhopal Gas Tragedy in Pittsburg, USA. She made valuable contributions to several aspects of cellular immune responses in oral cancer patients to autologous and allogeneic tumor cells. In 1980, she started Hybridoma Laboratory at CRI. She developed monoclonal antibodies of oral cancer cells, alfa-feto-protein and myeloid leukemia cells. She contributed over 150 research articles in journals of national and international reputation. She also served as Member of the Editorial Board of *American Scientific Journal In Vitro* (USA), *British Journal of Cancer-Oral Oncology* and *Indian Journal of Medical Research*. She authored the book *Principles and Practice of Animal Tissue Culture*.

Her innovative scientific contribution has been acclaimed by awarding her Raja Ravi Sher Singh of Khalsa Memorial Cancer Research Award, Indian Council of Medical Research, 1974; Commonwealth Fellowship, 1974 and Ranbaxy Foundation Award, 1981.

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Ganguly, Kadambini (1861–1923)

Dr. Kadambini Ganguly was the first woman physician of India. She was born on 18th July 1861 at Bhagalpur, Bihar. She was the daughter of Braja Kishore Basu, a Bramho Samaj reformer and Head Master of Bhagalpur School. The family origin was from Chandsi, in Barisal, now in Bangladesh. Her father and Abhay Charan Mallick started the movement for women emancipation at Bhagalpur.

Kadambini started her education at the Banga Mahila Vidyalaya, Ballyganj and then studied at the Bethune School. In 1871, she became the first woman to pass the University of Calcutta Entrance Examination. The Bethune College started FA (First Arts) course for women and then graduation courses in 1883. She and Chandramukhi Basu (a Bengali Christian from United Provinces) became the first female graduates from Bethune College in the entire British Empire in 1883. After her graduation, she married Brahma Samaj reformer, a widower and leader of women's empowerment, Dwarkanath Ganguly in 1883. He was also her teacher at the Banga Mahila Vidyalaya and was twenty years older to her at the time of their marriage. The decision of their marriage was not acceptable to the Brahma community and finally, they got married at an unknown place in Calcutta. Her husband, supporter of Women Liberation Movement encouraged her to join medical college and complete her study of medicine.

Kadambini studied medicine at the Calcutta Medical College, which started admission of women in 1883. She completed Graduate

of Bengal Medical College (GBMC) in 1886 and became one of the two Indian women doctors to qualify for medical practice along with Anandi Gopal Joshi. She was not granted MB (Bachelor of Medicine) degree because she failed in one part of her final practical examinations. Professor R C Chandra failed her in medicine. It was believed to be a vindictive action because he opposed the inclusion of women students in Calcutta Medical College. The government also announced scholarship of Rs 20 to every female student of medicine. Kadambini received the scholarship with retrospective effect from July 1883. Then she went to United Kingdom in 1892 and qualified as LRCP (Licentiate of the Royal College of Physicians) (Edinburgh), LRCS (Licentiate of the Royal College of Surgeons) (Glasgow) and GFPS (Dublin). After her return to India, she worked for a short period at the Lady Dufferin Hospital, Calcutta with a salary of Rs 300/- month. Then she started her own practice in obstetrics and gynaecology.

She was the most accomplished and liberated Brahmo woman of her time. She kept balance between her duties towards her family as a mother and wife along with the busy schedule of the duty of a lady doctor. She had five children of her own and three children from the earlier marriage of her husband. She had two children during her studies at the Medical College, but she took minimum leave so that her medical studies were not adversely affected. She was the first woman practicing physician of South East Asia in European medicine. She was one of the six female delegates to the Fifth Session of the Indian National Congress in 1889. She took initiative to organise the First Women's Conference in Calcutta in 1906. She was equally interested in national politics and served as one of the first women delegates to the Indian National Congress. She set an example of a 'model woman professional' for working women today. She died on 3rd October 1923 in Calcutta at the age of 62.

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**Godbole, Rohini
Madhusudan**
(b.1952)

Dr. Rohini Madhusudan Godbole is an outstanding Theoretical Physicist. She was born on 12th November 1952 in Pune, Maharashtra. She obtained BSc degree from University of Poona in 1972. She received her MSc (Physics) from Indian Institute of Technology, Bombay in 1974 and PhD from State University of New York, Stony Brook, USA in 1979.

She gained wide experience in fundamental and theoretical research in physics. Upon her return to India, she joined as the Faculty Member at the Tata Institute of Fundamental Research, Bombay from 1979-82. Later on, she became Lecturer and Reader at University of Bombay from 1982-88 and 1988-95. She joined the Centre for Theoretical Studies, Indian Institute of Science, Bangalore as an Associate Professor from 1995-98 and has been serving as Professor at the Centre since 1998. She has also served as the Chairperson, Centre for High Energy Physics, Indian Institute of Science, Bangalore, 1996-2002. She held various teaching assignments such as Visiting Faculty and Adjunct Faculty, Tata Institute of Fundamental Research, Bombay, 2005-08 and Visiting Scientist, University of Dortmund, CERN (European organisation for Nuclear Research), Geneva and DESY, Humburg 2002-03; CERN Scientific Associate, 2010-11; Staff Associate of the International Centre for Theoretical Physics (ICTP), 2013-16.

Dr. Rohini Godbole has rendered outstanding research contributions in the field of theoretical high energy physics. She worked extensively on different aspects of particle phenomenology over the past three decades. The work regarding hadronic structure of high energy (real and virtual) photons outlined a variety of ways to study it. This work also has had implications for the design of next generation electron position colliders due to the possible large hadronic backgrounds that they can cause. She has suggested innovative ways to search for the top quark, Higgs bosons and other new particles at the Large Hadron Collider (LHC) and the future International Linear Colliders (ILC). She is a great teacher, who has inspired and motivated many young scientists and provided vibrant environment for new innovations.

Dr. Rohini Godbole has been honoured by J C Bose Fellowship, 2006; Sheel Memorial Lecture Award, 2000; Lifetime Achievement Award, Indian Institute of Technology, Bombay, 2004; Jawaharlal Nehru Birth Centenary Visiting Fellow, Indian National Science Academy, 2005; Rustam Choksi Award for Research, Indian Institute of Science, Bangalore, 2006; Meghnad Saha Gold Medal, Asiatic Society, Kolkata, 2008; Satyendranath Bose Medal, Indian National Science Academy, 2009; Meghnad Saha Memorial Gold Medal Asiatic Society of Kolkata, 2007 and TIFR Alumni Association's Excellence and Research Award, 2010.

She has won much acclaim for her contributions to various scientific academies as an Elected Fellow of Indian Academy of Sciences, Bangalore, 1992; Fellow, National Academy of Sciences (India), Allahabad, 2007; Elected Fellow, Indian National Science Academy, New Delhi, 2003; and Fellow, Third World Academy of Sciences, Trieste, Italy, 2009.

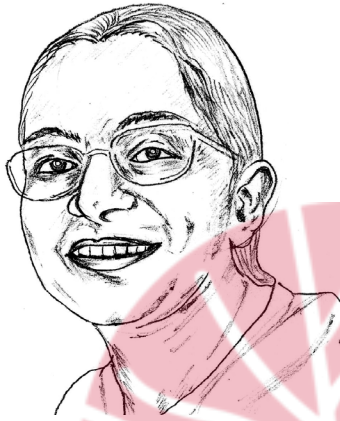
She is the Chief Editor of *Pramana*, journal of physics, 2008 onwards. She is also the co-editor of the most widely acclaimed volume on Indian women scientists entitled *Lilavati's Daughters*. She has contributed over 200 research articles in reputed journals. She has been serving with distinction as Member of Scientific Advisory Committee to the Cabinet, Government of India; Member of Standing Committee of Government of India on Women in Science; Member of the Project WiS (Women in Science) initiated by the Indian Academy

of Sciences, Bangalore; Member, Editorial Board of TRAILS Series of text books in physics in India from 2000-2010 and Member of Editorial Board of *Current Science*, 1997-2008.

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Govindarajan, Rama
(b.1962)

Dr. Rama Govindarajan is a promising young Chemical Engineer. She was born on 26th August 1962. She took B'Tech (Chemical Engineering) from the Indian Institute of Technology, New Delhi in 1984. She did her MS from Drexel University, Philadelphia, USA in 1986. She completed her PhD from Indian Institute of Science, Bangalore in 1994. She carried her Postdoctorate Research from the California Institute of Technology (CalTech), Pasadena, 1994.

She started her career as Scientist at Computational and Theoretical Dynamics Division, National Aerospace Laboratory, Bangalore from 1988-98. She worked as Associate Professor and Professor of Engineering (Mechanics Unit) at the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore from 1998-2012. Presently, she is serving as Professor at TCIS, Centre for Interdisciplinary Sciences, Hyderabad since 2012. She has travelled widely abroad and held various positions of visiting faculty including Visiting Professor at Weizmann Institute of Science, Israel, 2001 and 2002; Visiting Professor, University of California, Santa Barbara, among others. She is the Fellow of the National Academy of Sciences (India), Allahabad, 2004 and the Indian Academy of Sciences, Bangalore, 2010. Recently, she became the Fellow of the American Physical Society.

Dr. Govindarajan has made phenomenal research contributions in the field of flow of instabilities, vortex dynamics, cloud flow and

other multiphase flows and flows with interfaces. Her research group is currently working on instability driven or suppressed by density and viscosity stratification, and by change in geometry. Understanding cloud flows is a long-term aim of the research team. Owing to her ground-breaking research on understanding instabilities in fluid flows, shear and non-parallel flows, flow entrainment, turbulent transition and small-scale hydraulic jumps, she has been awarded the Shanti Swarup Bhatnagar Award in Engineering Sciences in 2007. She is also a recipient of Outstanding Scientist of the Year Award by the National Aerospace Laboratory, Bangalore in 1996; Young Scientist of the Year Award in 1987; and C N R Rao Oration Award, JNCASR in 2004.

She has published over 90 research articles in journals of national and international reputation. She has been invited to write and review paper on 'Instabilities in viscosity-stratified flows' for Annual Reviews of Fluid Mechanics in 2014. She is a Member of Editorial Board of *Sadhana*. She is an enthusiastic teacher and mentor for many budding scientists and engineers. She has the distinction of being external examiner for PhD theses at IIT, Kanpur; IIT, Chennai and K H Stockholm.

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Guha-Mukherjee, Sipa
(1938–2007)

Prof. Sipa Guha-Mukherjee was a well-known Botanist and Molecular Biologist. She was born on 13th July 1938 in Calcutta, West Bengal. She took her BSc (Botany) (Honors) and MSc from University of Delhi in 1957 and 1959 respectively. She did PhD from the same university under the guidance of Prof. B M Johri, an eminent personality in the field of botany in 1960s. She was Postdoctoral Fellow in the University of Delhi under the guidance of another stalwart in the field, Prof. S C Maheshwari, from 1964-66.

In 1966, she proceeded to USA and joined Michigan State University, Ann Arbor as Research Associate. In 1968, she returned to India and worked as Pool Officer, Indian Agricultural Research Institute, New Delhi for an year. She again went to USA and worked there as a Faculty Member, West Virginia State University for one year in 1970. Afterwards, she started her scientific career as Assistant Professor in the School of Life Sciences of the newly established Jawaharlal Nehru University, New Delhi in 1970. She was elevated to the position of Associate Professor in 1972 and Professor in 1979. She served as an Emeritus Professor in the same school after her retirement.

Prof. Guha-Mukherjee was an internationally acclaimed plant geneticist. She performed outstanding research work on plant tissue and protoplast culture and on regulation of enzyme synthesis in higher plants. She investigated the physiology and biochemistry of cell division

and regeneration in tissue culture. A team of scientists headed by her reported the presence of an enzyme glyoxalase-1 in plants for the first time. This enzyme was found to control cell division in *Datura callus*. She also conducted extensive research work on various aspects of protoplast culture, fusion of protoplasts and mutation in cultured cells. Her research helped to understand the biochemistry and differentiation of plant cells in tissue culture. It further helped in understanding and controlling regeneration of cells and protoplasts which is a major problem in genetic engineering. Her contributions in the production of haploids in tissue culture had an impact on genetics and agriculture across the world, which has been commercially exploited for plant breeding purpose in many countries. She was a great teacher and a source of inspiration to younger generation of scientists working in the field of molecular biology and tissue culture.

She was honoured as Elected Fellow of Indian Academy of Sciences, Bangalore, 1988. She received numerous laurels and awards including Om Prakash Bhasin Award in Biotechnology, 1989; Kanishka Award of the Lions Club; Senior National Women Bioscientist Award, Department of Biotechnology, India, 2002. She also contributed several research articles in national and international journals. She died on 15th September 2007 after prolonged illness.

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एकः सूते सकलम्



Gupta, Hemlata

(1943–2006)

Dr. (Miss) Hemlata Gupta, born on 25th June 1943 in Delhi, was known for her notable contributions in the areas of neurology.

She graduated in medicine from Lady Hardinge Medical College, Delhi in 1965. She did her postgraduate studies (MD) from the University Delhi in 1969.

She joined, Lady Hardinge Medical College, Delhi in 1965 as lecturer. Subsequently, she was promoted to Associate Professor and Professor in 1965. She became Professor and Head of the Department of Medicine, Lady Hardinge Medical College in 1998.

Dr. Hemlata Gupta served as a faculty member at the Lady Hardinge Medical College for over 30 years. She actively participated in the development of administrative as well as academic activity of the oldest medical college established in Delhi. She conducted valuable research on neurology. Her work on 'Symptoms of Parkinson's Disease' and 'Tubercular Meningitis' received international acclaim. She made extensive research investigation on neurological problems related to children. She was an active member of Delhi Medical Association; and Indian Medical Association.

Dr. Hemlata Gupta is recipient of many awards and honours. She received Hari Om Ashram Alembic Research Award; DMA Appreciation Award; Eminent Teacher Award; President's Award, Indian Medical

Association (LHSP Branch); Padma Bhushan, 1998; and Woman of the Year, American Biographical Institute, 1999.

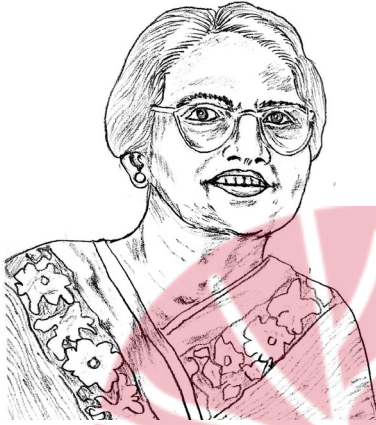
She published over 126 scientific papers in various national and international journals and contributed 14 chapters in various books. She also reviewed several books of foreign and Indian authors. She chaired several scientific sessions of national and international conferences. She remained spinster and lived alone. She was murdered brutally for unknown reasons at her residence in Delhi on 13th May 2006.

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Gupta, Malti
(b.1941)

Dr. Malti Gupta is a reputed specialist of Plastic and Burn Surgery. She was born on 21st May 1941 in Delhi. She graduated in medicine from SMS Medical College, Jaipur. She did specialization MS (Surgery) from the Post Graduate Institute of Medical Education and Research, Chandigarh. She pursued further super specialization by obtaining MCh (Plastic and Burn Surgery) from the Post Graduate Institute of Medical Education and Research, Chandigarh in 1973. Presently, she is serving as Professor and Head, Burn and Plastic Surgery Department, SMS Medical College, Jaipur.

She has the honour of being Honorary Fellow and First Woman President of the International College of Surgeons, Indian Section, 1997; Fellow, National Academy of Medical Sciences (India). She has the distinction of being the President, of Association of Plastic Surgeons of India, 2004. She is an active member of several professional associations including Indian Society for Surgery of Hand; Indian Science Congress Association; Burn Association of India and International Confederation of Plastic Surgeons, USA.

Professor Malti is a pioneer in the field of plastic burn surgery in India. She is a specialist of cosmetic, reconstructive and burn plastic surgery. She established and developed the Department of Plastic Surgery at the SMS Medical College, Jaipur. She has organised various professional and academic activities to bring the department to achieve

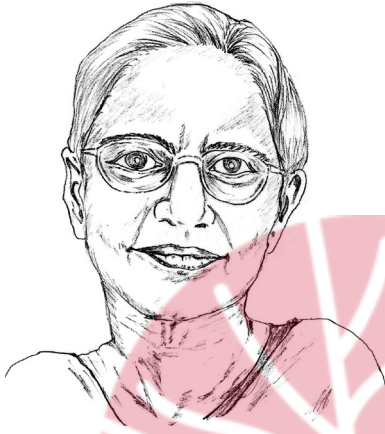
excellence in the specialization of burn surgery. She is known as the 'Honey Girl' for the innovative technique she developed in the seventies for the preservation of skin grafts in honey. She was the first woman surgeon of Rajasthan and the first person from the state to have achieved super specialty in her field. She holds the distinction of being the First Woman President of the Indian Section of the International College of Surgeons in 1997. She trained and acted as mentor for many young doctors to achieve proficiency and to popularize the concept of microsurgery in India. She also has a great passion for learning languages. She achieved advanced proficiency in German, French and Russian languages.

Her pioneering contributions have been felicitated by awarding her Ethicon Travel Fellowship, 1974; Gold Medal for German Language Proficiency, 1979-80; Gulbarga Travel Fellowship, 1983; Best Paper Award, 1985; Best Paper Award, Czechoslovakia, 1991. She has published several articles in reputed journals.

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**Hans-Gill,
Rajinder Jeet**
(b.1943)

Professor Rajinder Jeet Hans-Gill is a well-known personality in the field of mathematics. She was born on 29th August 1943 at Mohie, Ludhiana, Punjab. She is the daughter of Gursheer Singh Hans. She obtained BA(Honours)(Mathematics) from the Government College for Women, Ludhiana, and MA (Mathematics) from Panjab University, Ludhiana in 1962. She worked as Research Scholar under the guidance of Prof. Ram Prakash Bambah in the Punjab University for sometime. Thereafter, she went abroad for higher education and obtained PhD from Ohio State University, Columbus, USA in 1965.

She started her career as a Faculty Member at the Ohio State University, Columbus and University of Wisconsin, Madison, USA, 1966-67. She returned to India in 1967 and joined the Department of Mathematics, Panjab University, Chandigarh as Reader and was promoted to the position of Professor during 1967-2005 (until she retired). She also served as the Dean and University Instructor at Panjab University, Chandigarh, 2002-04. Owing to her brilliant research work, she was made Emeritus Professor, Panjab University, Chandigarh in 2007 and Senior Scientist, Indian National Science Academy in 2009. She was a Visiting Professor, (Sponsored by National Board of Higher Education) at Panjab University and Ohio State University, Columbus, Ohio, USA during 1986-88.

Prof. Hans-Gill completed her post graduate studies from the Panjab University, where she was fortunate to be a student of world renowned mathematician, Prof. R P Bambah. In 1964, Prof. Bambah decided to proceed to USA, he took three of his research students with him. Prof. Hans-Gill was one of them. She completed her PhD at the Ohio University in 1965 and worked there for two years and returned to India in 1967. She has made valuable research contributions in the field of geometry of numbers, discrete geometry and Dophantine approximations. She has made extensive research on View Obstruction Problems and Billiard Ball Motion Problem. Her research work included determining the smallest expansion of a given closed body containing 'O', so that it is translated through the points with odd integral coordinates then the view is obstructed along all trajectories through the origin which do not lie in the coordinate hyper planes. Her studies obtained several important results for spheres and the boxes. Recently, she along with colleagues, Raka and Sehmi has given a proof of a conjecture of Minkowski on product of seven non-homogenous linear forms in seven variables.

Dr. Rajinder Jeet Hans-Gill has been a Fellow, Indian Academy of Sciences, Bangalore, 1982; Elected Fellow, Council Member and Vice President, Indian National Science Academy, New Delhi, 1993, 2003-04, and 2004-05; Fellow, National Academy of Sciences (India), Allahabad, 1998; Fellow, Third World Academy of Sciences, Trieste, Italy, 2006.

She has made valuable contributions as a Member of National Board for Higher Mathematics, (2003-06) and 'WiS' (Women in Science) Project of the Indian Academy of Sciences.

She received several awards and felicitations including Narasinga Rao Gold Medal, Indian Mathematical Society, 1971; Srinivasa Ramanujan Birth Centenary Gold Medal, ISCA, 2010 for her significant research work and proficiency in the field of mathematics. Over 60 research papers authored by Prof. Hans-Gill have been published.

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Hinduja, Indira
(b.1943)

Dr. Indira Hinduja was born on 18th December 1943 at Shikarpur, Pakistan. Her parents migrated from Pakistan, when she was just a few months old. Initially, her family settled in Belgaun, and then shifted to Bombay in 1963. Dr. Hinduja took her school education at Mahila Vidyalaya, Belgaun and obtained MBBS from Topiwala National Medical College and B Y L Nair Hospital, Bombay in 1967. Later she obtained DGO (Diploma in Obstetrics and Gynaecology), College of Physicians and Surgeons, Bombay in 1969; DFP (Diploma in Family Planning), College of Physicians and Surgeons, Bombay in 1970; MD (Obstetrics and Gynaecology), University of Bombay, Bombay in 1972. She also did PhD in Applied Biology from University of Bombay, Bombay in 1988 where she presented her thesis on Human In Vitro Fertilization (IVF) and Embryo Transfer. She started her career as Clinical Faculty Member of the Seth G S Medical College and KEM Hospital. She joined BYL Nair Charitable Hospital, Topiwala National Medical (TNM) College, Bombay as House Physician in Department of Pediatrics in 1967. Then served as House Surgeon at the Department of Obstetrics and Gynaecology of the hospital from 1967-68. She became the Registrar of the Preventive and Social Medicine at the hospital (1968-69) and then Registrar of the Department of Obstetrics and Gynaecology from 1969-72. Later, she became the Senior Registrar of the Department of Obstetrics and Gynaecology, King Edward Memorial

(KEM) Hospital and Seth GS Medical College, Bombay, 1972-73; Tutor, 1973-76; Reader (Assistant Professor), 1976-87; and Reader in charge of the Department of Post Partum Programme, 1977-79.

She was Professor, Department of Obstetrics and Gynaecology, KEM Hospital, Seth GS Medical College Bombay from 1987-91; Honorary Obstetrician and Gynaecologist (IVF and Infertility specialist), Department of Obstetrics and Gynaecology, Jaslok Hospital and Research Centre, Bombay, 1991-till date; Honorary Obstetrician and Gynaecologist (IVF specialist) at Department of Obstetric & Gynaecology, PD Hinduja National Hospital & Research Centre, Mumbai; Scientific Director and Co-founder of INKUS IVF Centre, Bombay.

Dr. Hinduja won many laurels from India and abroad for her outstanding research contributions. In 1986, the Greater Bombay conferred on her the Mayor's Award. She was also awarded Young Indian Award, 1987; Outstanding Lady Citizen of Maharashtra State Jaycee Award, 1987; Rotary International Public Vocational Excellence Trophy, 1994; Bharat Nirman Award, 1994; International Women's Day Award by the Mayor of Mumbai, 1995 and 2000; Lifetime Achievement Award, Federation of Obstetrics and Gynaecological Society of India, 1999; Dhanwantri Award, Government of Maharashtra, 2000; Indira Appreciation Memento, 2001; and Padma Shri, 2011.

She made the ground-breaking achievement on 6th August 1986 by handing over the first ever, scientifically documented 'Test Tube Baby' in the country. The credible achievement was the fruit of the collaborated efforts of the KEM Hospital and the National Institute for Research in Reproductive Health (NIRRH), Indian Council of Medical Research. She also developed indigenous techniques in embryology and cell biology, which was first standardized by her and then used on human cells. She is the pioneer in the Gamete Intra-Fallopian Transfer Technique (GIFT) resulting in the birth of India's first 'GIFT Baby' on 4th January 1988, and developed an oocyte donation technique on 24th January 1991. In fact, she has contributed extensively in the different branches of reproductive medicine. She has made valuable contributions in the newer human reproductive technologies to prevent birth defects human oocyte structure, male infertility, unexplained

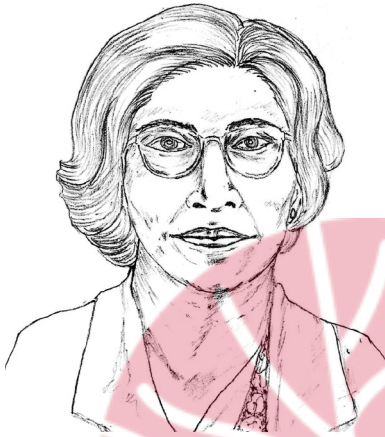
infertility and failed IVF research and somatic cell nuclear transfer, popularly known as cloning. She has established two embryonic stem cell lines in collaboration with the NIRRH. She has contributed over 100 research papers. She has delivered several orations and presented over 50 papers in international seminars and conferences. She has been the Best Paper Award winner on several occasions. She has successfully delivered more than 1,244 test tube babies in India.

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एकः सूते सकलम्



Hingorani, Veera

(b.1924)

Dr. Veera Hingorani, a well established name in the field of gynaecology, was born on 23rd December 1924 at Bubak, Sind Dist., Pakistan. She is the daughter of Tekchand Hotchand and Lilavati.

She took MBBS degree from Lady Hardinge Medical College, New Delhi in 1947. She visited abroad for higher education and specialized in obstetrics and gynaecology. She received advanced training and completed prestigious fellowships and memberships including FACOG (Fellow of American College of Obstetrician and Gynaecologist)(1977); CFP; DRCOG.; MRCOG.(Member, Royal College of Obstetricians and Gynaecologists); FICS (Fellow, International College of Surgeons); FACS (Fellow, American College of Surgeons); FRCOG (Fellow, Royal College of Obstetricians and Gynaecologists)(1966); FAMS; FNAMS(Fellow, National Academy of Medical Sciences, (India).

She started her medical practice as Gynaecologist at Lady Hardinge Medical College, New Delhi, 1947-48. She served as Gynaecologist, Clara Swain Mission Hospital, Bareilly, 1948-49; Senior Resident in Hospitals in UK, USA and Canada, 1955-57. She joined as Assistant Professor of Obstetrics and Gynaecology to All India Institute of Medical Sciences (AIIMS), New Delhi from 1959-66. Subsequently, she was promoted to the position of Associate Professor from 1966-72; Associate Professor and Head from 1972-75; Professor and Head, Department of Obstetrics and Gynaecology, AIIMS from 1975-87 until she retired.

She also held the honour of being Honorary Physician to the President of India, 1981, 1982-85, 2010-12 and Gynaecologist to Late Prime Minister of India, Mrs. Indira Gandhi. She made significant contributions as the Clinical Director of Gynaecology, World Health Organization. She was Chairman, Representative Committee of the Northern Zone of India, Royal College of Obstetricians and Gynaecologists, London. She made valuable contributions as the Principal Investigator and Officer-in-Charge of the Human Reproduction Research Centre of the Indian Council of Medical Research, New Delhi. She served as the Head of the Department of Obstetrics and Gynaecology at Batra Hospital and Medical Research Centre, New Delhi from 1987-96. Subsequently, she joined AIIMS as a Consultant from 1997.

Dr. Hingorani worked on description of a new sign for different diagnosis of ovarian cyst with pregnancy from Hydramnios, popularly referred as 'Hingorani Sign'. She conducted outstanding research on description of operation technique for vaginal reconstruction and designing of a module for the above technique, design of post partum IUCD inserter, and studies on etiological factors of foetal wastage, studies on prostaglandins, evaluation on antiplacental vaccine, etc. She was selected as an examiner for MORCOG Examination by Royal College of Obstetricians and Gynaecologists, London, 1982. She started the Association of Obstetricians and Gynaecologists of Delhi (AOGD) in 1960 and served as its Founder Secretary for five years and then as President from 1979-87.

She has been bestowed with Lord Hardinge Bursary in Physiology; Annie Mackenzie Prize for Best Student at the Lady Hardinge Medical College, New Delhi. American College of Obstetrics and Gynaecology conferred honorary fellowship to her (for the first time to an Asian and for the first time to a woman in the world). She received Dr. BL Kapur's Oration Award, Delhi Medical Association, 1981; Padma Shri, 1984 for her achievements in the field of obstetrics and gynaecology. She received Life Time Achievement Award, Federation of Obstetrics and Gynaecology Society of India (FOGSI), 1999. She has attended many national and international conferences and workshops and contributed over 300 research papers in reputed journals.

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एकः सूते सकलम्



Houlton, Charlotte Leighton

(1882–1956)

Dr. Charlotte Leighton Houlton was a British missionary doctor, who visited India in 1913 under the Countess of Dufferin Fund. She was born at Hull, United Kingdom on 23rd October 1882.

She obtained her MBBS from London School of Medicine of Women, London in 1911. She did Medical Training at the Royal Free Hospital, London; MD, London, 1917; CBE (Commander Order of the British Empire); and FRCOG (Fellow of Royal College of Obstetrics and Gynaecology), London.

She started her medical practice as Obstetric Assistant and then worked as Assistant Pathologist at Elizabeth Garrett Anderson Hospital, London, in 1912. She was the First House Surgeon under Aldrich Blake and Miss Chadburn, 1912. She reached India in 1913 and joined as Surgeon and Obstetrician at Lady Lyall Hospital and Medical College, Agra, which was attached to a Medical College to train women sub-assistant surgeons (under the Countess of Dufferin Fund Council). She became Professor of Obstetrics and Gynaecology at newly opened Lady Hardinge Medical College, Delhi in 1918. She had to return to England in 1919 due to ill health. After her recovery, she joined Gynaecology Unit, Royal Free Hospital for Pathological Research, London. She returned to India and joined Women's Medical Service, Simla, as Medical Superintendent, 1924-28; Medical Superintendent, St. Stephen's Hospital, Delhi under the Cambridge Mission to Delhi

Programme, 1927-32. She served as Principal and Professor of Obstetrics and Gynaecology, Lady Hardinge Medical College, Delhi, 1932-35; Chief Medical Officer, Women's Medical Service and Secretary, Countess of Dufferin Fund, India, Delhi, 1935-39.

Dr. Houlton realized the need for women doctors in India for the treatment of women in *purdah*, who were not allowed to be treated by male doctors even if they were dying of the lack of medical treatment. When she was posted at Simla, she took initiative to establish new Women's Hospital and Medical College, which was built under the Presidentship of Lady Reading, wife of the Viceroy, who took great interest in the work. Dr. Houlton worked there as Medical Superintendent and the hospital became very popular under her able administration. She was also involved in the planning of the All India Institute of Medical Sciences.

She was a person of strong religious belief. She joined Anglican Order of the Holy Paraclets and lived within the Covent at Whitley. In 1939, she resigned from her service to devote herself to the Society for the Propagation of the Gospel. Then, she returned to London and provided untiring medical service throughout the Second World War years in London and devoted herself for the cause of medical emergencies and casualty of the sick and wounded. She also continued to work for the welfare of women through the Women Medical Organization in India. She resigned from her clinical and administrative duties in 1947 due to her ill health.

She received Kaisar-i-Hind Medal in 1927 for her meritorious and dedicated clinical service to India. She was awarded MBE on her retirement in 1961 by the British Government. Last six years of her life were quite painful as she suffered from Parkinson's disease, and at the last two years she was helpless and unable to read, write and communicate. She made indelible impression on her colleagues, students and friends by her efficiency, integrity and sense of duty for her patients and students. She died on 13th December 1956 at Whitley. She was 74.

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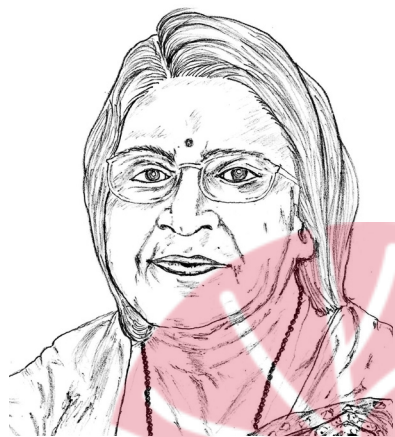
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Ila, Hiriya Kanavar
(b. 1944)

Professor Hiriya Kanavar Ila is a highly respected personality in the field of chemistry for her notable contributions on heterocyclic chemistry. She was born on 11th September 1944 at Mathura, Uttar Pradesh. She received BSc from Gorakhpur University in 1962 and MSc (Chemistry) from DAV College, Kanpur in 1964. She was the first woman to receive PhD from the Indian Institute of Technology, Kanpur in 1968. She went abroad to conduct Postdoctoral Research at Purdue University, La Fayette, USA, 1969. She received Alexander von Humboldt Fellowship and worked at the Ludwig Maximilian University, Munich from 1984-85.

She worked as Scientist, Medicinal Chemistry Division, Central Drug Research Institute, Lucknow, 1970-76. She was Founder Faculty Member, North Eastern Hill University (NEHU), Shillong from 1977-95. She was appointed as Professor, Indian Institute of Technology, Kanpur in 1995 and continued to serve until her retirement in 2006. She joined Jubilant Biosys Ltd., Bangalore in 2007 as Principal Advisor (Chemistry). She was INSA Senior Scientist and Honorary Professor, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore, 2010-14. She also worked on various academic and scientific assignments including Marie-Curie Visiting Fellow, University of Cambridge, Cambridge in 1995; Visiting Professor, Loker Hydrocarbon Research Institute, USC, Los Angeles in 2002; Visiting Professor,

Institute de Investigations, Sovilla, Spain and Kuwait University in 2007 and INSA-Royal Society Visiting Scientist.

Prof. Hiriyakkanavar focused her research on heterocyclic chemistry to develop novel, general and efficient methods for biologically important heterocyclic scaffolds by utilizing polarized ketone S, S-and N, S-acetals as versatile building blocks. Her hard work and dedication made it possible to develop a state-of-art Chemistry Department having modern laboratory instruments and other infrastructures and a library. Her husband Prof. Junjappa provided her all round support during her tenure at NEHU for building the Chemistry Department of the newly established University.

In recognition to her outstanding contributions in teaching and research, she received honour of being the Elected Fellow of Indian Academy of Sciences, Bangalore and Elected Fellow of Indian National Science Academy, New Delhi in 1991 and 2002. Her research efforts has been acclaimed by conferring her with A V Rama Rao Prize in 2001; Acharya J C Ghosh Memorial Lecture and Silver Medal of Chemical Research Society of India in 2002; P C Datta Memorial Lectureship, Indian Association for the Cultivation of Sciences, Kolkata in 2006; T R Seshadri Memorial Lecture, University of Delhi, 2003; Astrazeneca Innovation Award in Science and Technology, Astrazeneca Foundation, Bangalore, 2003. She has published over 250 research papers under individual as well as co-authorship. She served as a member of the Advisory Board of Eurasian Conference of Heterocyclic Chemistry 2000. She was the member of the Editorial Board of *Arkivoc* journal, 2004 and Journal of Indian Academy of sciences (chemical sciences), Bangalore, 2001 onwards. She also served in various capacities at numerous national and international committees related to her subject specialization.

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Indira Bai, Katherlsetl
(1927–2013)

Dr. Katherlsetl Indira Bai was a noted Pediatrician and Neurologist. She was born on 30th August 1927 at Srikakulam, Andhra Pradesh. She is the daughter of Venkata Rao. She received MD;.CH; FIAP; and FICP with the specialization in pediatrics.

She started her service career as Civil Assistant Surgeon, King George Hospital, Visakhapatnam, 1957-58; Tutor of Pediatrics, Andhra Medical College, 1958-63; Assistant Professor of Pediatrics, 1963-67; Professor and Head, Department of Pediatrics, SV Medical College and Paediatrician, SVRR. Hospital, 1967-71; Associate Professor, Osmania Medical College and Pediatrician, Osmania General Hospital, Hyderabad, 1971-72; Professor, 1972; Professor of Pediatrics, Raja Muthiah Medical College, Annamalai Nagar, 1987.

She made indelible contributions in the development of the subject pediatrics in India through teaching, implementing various improvements in pediatrics departments in various hospitals and her leadership in the development of professional academies and associations. She played an important role in the development of Indian Academy of Pediatrics and served as its President in 1982. She was also an active member of the Indian Association for Advancement of Medical Education and International Society for Twin Studies. She served as Fellow of UNICEF and WHO projects related to child development. She received the honour of being Fellow of American Academy of

Pediatrics; Fellow of International Medical Sciences Academy and Fellow of National Academy of Medical Sciences (India). She made significant contributions related to mental diseases and cerebral dysfunction in children. She made extensive research work on Minimal Brain Damage (MBD) therapy with 'mental syrup' and evaluated the performance of new drug and its field level trial. Her research on the new drug has shown beneficial effects upon various behavioral disorders in children like hyperkinetic stress, enuresis, language and learning disabilities, stress disorders, etc. She contributed over 100 research articles in highly reputed international medical journals. She served as the member of many committees and working groups in the field of her specialization. Indian Association of Pediatrics instituted Indira Bai Prize for best MD (Pediatrics) student and Trainee Fellowship in the field of Paediatrics. She won prestigious Dr. BC Roy National Award for her multifaceted clinical pursuit. She died on 19th June 2013. She will be remembered as a source of inspiration to many young doctors.

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एकः सूते सकलम्



**Janaki Ammal,
Edavaleth Kakkat**
(1897–1984)

Professor (Miss) Edavaleth Kakkat Janaki Ammal was a highly reputed figure in the field of botany in India.

She was born on 4th November 1897 at Tellichery, Kerala. She was the daughter of Diwan E K Krishnan of Chettiam Kunnu, a sub-judge in Madras Presidency, having a family of 12 siblings. She was fortunate to have a broad-minded family set up, which encouraged her to pursue higher studies, when the Indian society was prejudiced against women's education at the beginning of the 20th Century.

She did her BSc (Honours) (Botany) from Presidency College, Madras in 1921. She proceeded to USA for higher studies and obtained Master's Degree from University of Michigan, USA, 1925; DSc, University of Michigan, (under the First Oriental Barbour Fellowship), 1931.

She started her career as a Teacher in Women's Christian College (WCC), Madras, 1921. From 1932-34, she joined Maharaja's College of Science, Trivandrum as the Professor of Botany. She was appointed as Geneticist, Sugarcane Research Station, Coimbatore, 1934-39. In 1940, she visited UK and served as Assistant Cytologist at John Innes Horticultural Institute, London, 1940-45. Later, she worked as Cytologist at Royal Horticultural Society, London from 1945-51. She joined as Officer on Special Duty and In-charge for the reorganization of the Botanical Survey of India, Calcutta in 1952. She was elevated

to the position of Director, Central Botanical Laboratory, Botanical Survey of India, Allahabad and served up to 1959 until she retired. She became Emeritus Scientist, Regional Research Laboratory, Jammu, and Kashmir, 1959-69 and Emeritus Scientist, Bhabha Atomic Research Centre, Bombay, 1970. She served as Honorary Professor, University of Jammu and Kashmir, 1970-75; UGC Fellow and Emeritus Scientist, Council of Scientific and Industrial Research (CSIR), 1976 onwards; Consultant Geneticist, Central Indian Medicinal Plants Organization; Emeritus Scientist, Centre for Advanced Studies on Botany, 1969-70; and worked in the Centre's Field Laboratory at Maduravoyal until her death in February 1984.

Prof. Janaki Ammal earned international recognition as a botanist of high order by her outstanding contributions in India and abroad through her extensive research and writings. She made significant investigations on cytogenetical studies of sugarcane and egg-plant and traced the evolution of these crops. Ammal worked on some of the most important genera: *Solanum*, *Datura*, *Mentha*, *Cymbopogon* and *Dioscorea*, besides a range of medicinal and other plants. She traced the evolution of these crops. 'Jammu Mint' is one of her major contributions. She made several intergeneric hybrids: *Saccharum* \times *Zea*, *Saccharum* \times *Erianthus*, *Saccharum* \times *Imperata* and *Saccharum* \times *Sorghum* plants. Her pioneering work on the cytogenetics of *Saccharum officinarum* (sugarcane) and interspecific and intergeneric hybrids involving sugarcane and related grass species and *Bambusa* (bamboo) is outstanding. She also created a new variety of sugarcane SG6332 through experimental breeding. Her studies on chromosome facilitated better understanding of the evolution of species and varieties.

She developed a garden of medicinal plants around her residence with great passion. She was the first woman to be elected to the Fellowship of Indian Academy of Sciences in 1935. Janaki Ammal National Award of Taxonomy was instituted by the Ministry of Environment and Forestry, Government of India in 2000. The Janaki Ammal Herbarium in the Indian Institute of Integrative Medicine, Jammu has also been created in her honour. She published several research articles and co-authored *Chromosome Atlas of the Cultivated Plants* jointly with C D Darlington in 1945.

She was an Elected Fellow, Indian National Science Academy, 1957; Fellow, Linnean Society, UK; Fellow, Royal Geographical Society, London; Fellow, Genetic Society of England; Fellow, Genetic Society of America; Fellow, Royal Horticultural Society, London; President and Secretary, Botanical Society of India, Elected Fellow and Vice-President, Indian Academy of Science, Bangalore.

She was closely associated with various educational bodies and associations including Member, Sigma XI; Member, British Association of Advancement of Science; President, Indian Society of Genetics and Plant Breeding, 1961.

Owing to her brilliant research contributions in the field of botany, she was awarded LLD.(Honoris Causa), University of Michigan, USA, 1956; Birbal Sahni Medal, 1961; Padma Shri, 1977; The Ministry of Environment and Forestry, India instituted the National Award for Taxonomy in her name in 2000. She was the first Indian woman to get DSc from University of Michigan, USA in 1931. She died on 7th February 1984 at Maduravoyal near Madras after brief illness. She will continue to remain an unlimited source of courage and inspiration to the younger generation of scientists.

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Jena, Basantibala
(b. 1926)

Dr. Basantibala Jena is a well-known Physician in the field of Family Planning in Odisha. She was born on 3rd June 1926. She obtained MBBS degree from Madras University in 1949.

She held various prestigious positions in the Health Department of Odisha state. She started her career as Assistant Surgeon, Government of Odisha, 1951-67; Principal, Health and Family Welfare Training Centre, Odisha, 1967-75; Deputy Director, Health Department, Government of Odisha, 1975-79; Joint Director, Health Services, Odisha, 1979-80; Director of Family Welfare, Government of Odisha from 1980 until she retired.

Dr. Basantibala Jena made phenomenal contributions in theoretical as well as field work in the area of family planning. Her studies helped government of Odisha in policy making, planning and development of programmes in the health sector. Her untiring efforts for overall success of the family welfare programme in Odisha achieved remarkable success in sterilization. With her pioneering efforts she achieved the target of conducting mini-laproctomy operations in rural hospitals and dispensaries. She trained group of medical and para-medical personnel and made them conversant with the technique of mini-laproctomy in rural areas with due consideration to the social needs and the resources. She also trained medical personnel and doctors from other states. She served as coordinator between Central Government and

Odisha Government. She was a leading member of the Task Force for Injectable Contraceptive, Government of India. Council for Tribal and Rural Development was founded by her in August 1982 in Odisha. Under her dynamic leadership, the organisation made groundbreaking achievements. She closely observed the plight of social, cultural and economic problems of aboriginal population.

Recognizing her untiring efforts to achieve success of Family Welfare Programme in the state of Odisha, she was awarded Padma Shri in 1984. She published several research articles providing important health statistics and field studies. For over three decades, she served as the prominent leader to advocate benefits of family planning and birth control.

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एकः सूते सकलम्



Jhirad, Jacob Jerusha
(1891–1984)

Dr. Jacob Jerusha Jhirad was the first Indian Jewish Physician and a distinguished Gynaecologist. She was born on 21st March 1891.

She completed her High School Examination from Matree High School for Indian Girls, Poona, 1907. She obtained MBBS degree from Grant Medical College, Bombay. She won Tata Scholarship for Women and proceeded to UK and obtained MD (Obstetrics and Gynaecology) from London School of Medicine for Women, London, 1916. She completed Internship at Garrett Anderson Hospital, London, 1925. After a short stint as House Surgeon at Garrett Anderson Hospital, London, she returned to India.

She started her service in India as Medical Officer, Lady Hardinge Medical College and Hospital, New Delhi. Later, she worked as Senior Surgeon, Bangalore Maternity Hospital for a short period. She became the First Medical Officer at the Cama and Albless Hospital for Women and Children, Bombay in 1925. She was promoted to Medical Superintendent in the same hospital in 1928, where she continued to serve until 1949. She was the first Indian woman to be awarded the Government Scholarship to study medicine in UK.

In the early years of her life, her sister suffered from serious illness, this motivated her to pursue the profession of medicine. She was highly impressed by the clinical treatment that her sister received from Dr. Benson at Cama Hospital, Bombay. When she joined Cama

and Alless Hospital in Bombay, her childhood dream came true. Under her able guidance the Cama Hospital expanded and started undergraduate and postgraduate studies in medicine for women. She contributed several write-ups for the development of medical profession, especially for the improvement of hospital administration, facilities, performance of doctors and statistical data related to women doctors in India. She believed that large number of maternal and infant deaths could be prevented by providing proper education to *Dais* and Midwives; and by setting right standard of health for women and children. She also emphasized for public awareness to avoid superstition and ignorance. She also highlighted the need to create a social culture for the acceptance of the benefits of modern medicine. Her contact with clinical professionals, her knowledge and experience related to several institutions in India and abroad were valuable assets for the future planning and development of medical profession in India. She made several recommendations for the facility of women doctors and proposed special Medical Service Programme having flexible duty schedule for newly married women and mothers in the profession, who were forced to leave their service due to the responsibility of their married life and inconvenient hospital duty hours.

She had close connection with the Association of Medical Women in India (AMWI) as its Founder Member, Vice President, and President. Her close connection with well-known personalities in the field of biomedical sciences in India and abroad helped the association to grow into an international body under her able guidance. The association benefited extensively from her wisdom and knowledge as a member of its governing body under different capacities. She was a silent worker having outstanding administrative capability and clinical skills. She conducted extensive field work in obstetrics and gynaecology to ensure safe child birth for Indian women. She did valuable clinical investigation to eradicate Puerperal Sepsis.

She was a pioneer and a consistent defender for women doctors' rights in the profession. She was closely associated with many societies and associations in India and abroad to remove prejudice against female doctors. She was the Founder Member and President, Federation of Obstetrical and Gynecological Society of India (FOGSI), 1948-50;

Founder Member and President, Association of Medical Women of India; Chairperson, Maternity and Child Welfare Committee of the Indian Council of Medical Research, 1954; Member, Mother and Child Welfare Society, Bombay. She was also a Fellow and Member, Syndicate of Bombay University, Bombay. She received MBE (Member of British Empire (Civil)) from British government in 1945. She was awarded Padma Shri in 1966. International Association of Medical Women conferred her with Golden Jubilee Membership Award in 1974.

She published several research papers in medical journals. She also served as Editor of *All India Journal of Obstetrics and Gynaecology* and the *Bulletin of the Association of Medical Women in India*. She died in 1984. The AMWI established a 'Jerusha Jhirad Medical Research Library' and an 'Oration Fund' with a Plaque of Silver for best medical research scholar at the AMWI, Mumbai to commemorate her contribution in the field of medicine.

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एकः सूते सकलम्



Joshi, Anandibai
(1865–1887)

Dr. Anandibai Joshi was one of the two Indian women doctors to qualify for medical practice in 1886. She was born on 31st March 1865 in Kalyan, Maharashtra. She obtained MD in Medicine from Women's Medical College of Pennsylvania, Philadelphia, USA, 1886.

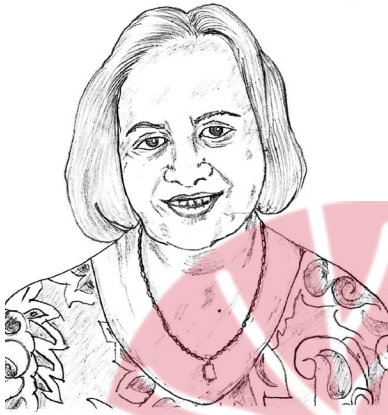
Anandibai Joshi was born to an orthodox Brahmin family and she was named as Yamuna. She got married at the age of nine to Gopalrao Joshi, a postal clerk at Kalyan, who was a widower and about 20 years elder to her. She was renamed as Anandi by her husband. Gopalrao was highly ambitious and a believer of empowering women through education. He also helped Anandi to acquire education and helped her learn Sanskrit and English. At the age of fourteen, Anandi gave birth to a baby boy, but the baby did not survive due to lack of required medical treatment for the mother and newborn in the village. The tragic incident motivated Anandibai to make up her mind for medical education, which became the turning point in her life.

The couple took the help of Mrs. Carpenter, a Philadelphian missionary to send Anandibai to America to study medicine. She gave a public speech at Serampore College Hall and emphasized that there was an urgent need for female doctors in India. She also pledged that she would not convert to Christianity. The Viceroy of India contributed Rupees Two Hundred to fund her education in abroad. The following year she went to USA to study medicine at the Women's Medical

College of Pennsylvania. She used to remain sick and found it very difficult to adjust with the cold weather of America. She completed her MD on 11th March 1886, but she was not well at that time and was admitted to a hospital in Philadelphia, where she was diagnosed with tuberculosis. The topic of her theses was 'Obstetrics among the Aryan Hindoos'. She was advised to return to India. Gopalrao reached Philadelphia before the convocation of Anandibai. In 1886, she returned to India along with her husband. Upon her return, she was offered the post of Physician-in-Charge of the Female Ward of Albert Edward Hospital at Kolhapur, but she could never join the hospital as she died on 26th February 1887 at the age of 22. She was one of the two Indian women doctors to qualify medicine along with the Kadambini Ganguly, being the other woman in 1886. But she could not practice medicine; therefore, she is not the first practicing woman doctor of India. She became the icon of women of courage, which motivated many Indian women to follow her foot step. Actor-Director Anant Mahadevan made Marathi biopic entitled *Mee Sindhutai Sapkal* on the biography of Doctor Anandi Gopal Joshi. The film won four national awards in 2011.

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Joshi, Anjali

Anjali Joshi is a well-known personality in the field of IT services in India and abroad. She did BTech (Electrical) from Indian Institute of Technology, Kanpur in 1981. She completed her MS (Computer Science) from State University of New York, USA and Masters in Engineering Management, from Stanford University, USA.

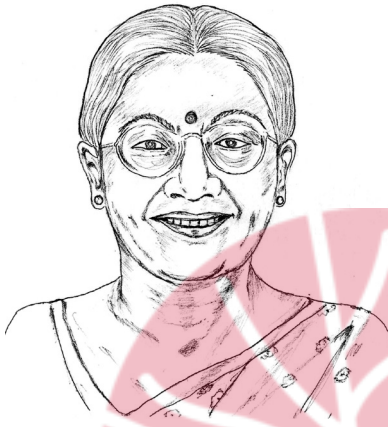
She has worked as President, Reliance Broad Band, USA; High Speed Data In charge, AT&T Bell Laboratories, USA (1989-98) where she worked in the areas of voice and high speed data communications. She served as Executive Vice-President of Engineering, Covad Communications USA, 1998-2004. She has worked as a board member of TiE, Silicon Valley, USA. Currently, she is working as the Director of Product Management at Google. She received Distinguished Alumnus Award, Indian Institute of Technology, Kanpur; West Coast Alumni Leadership Award, 2007 and Honour of Golden Jubilee Alumni Convention of IIT, Kanpur, 2010.

Anjali Joshi held significant leadership positions in high growth companies. She was the Executive Vice President of Engineering at Covad Communication, the first DSL competitive carrier in the US, and helped the company to grow from a start up to a public company. She managed the planning, design and implementation of several services including AT & Ts Inter Span ATM service at the Bell-Lab. Ms Joshi

joined Covad in 1998 and worked for bringing extensive experience in the design of carrier class networking solutions for voice and data. She was instrumental in architecting Covad's network that has proven to be the most cost-effective and reliable in the industry. She is recognized as an expert in the area of DSL networks and has influenced Federal Communications Commission and state PUC policies in the areas of DSL deployment, live-sharing and spectrum management. She was invited by Federal Communications Commission to serve on the Network Reliability and Interoperability which advises the Commission on matters related to the deployment of DSL networks. She is currently the leader of Product Management Groups of Google, 2006 onwards. Initially she led Product Management Team of Google Maps, Global Infrastructure and Google.org. Besides, she is leading a team focused on new search products such as Health Search, Image Search, and Mobile Vision. She is managing Google's fibre to community's effort, which will bring very high speed broadband access to people across US. She is also an active member of Indian Institute of Technology, Kanpur Foundation, she has made valuable contributions in drafting the mission statement and structure for the foundation. She is the only woman out of 52 IIT, Kanpur alumni chosen for the Honour of Golden Jubilee Alumni Convention of IIT, Kanpur, 2010.

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Kalevar, Vasundhara
(b. 1936)

Dr. Vasundhara Kalevar was born on 15th April 1936 at Indore, Madhya Pradesh. She is the daughter of Keshavrao and Shalinibai. She studied MBBS and MS in Ophthalmology. She pursued Postdoctoral Fellowship, NCCB Inc., New York, USA, 1966.

She started her service career as an Assistant Professor at M J Institute of Ophthalmology from 1967-70. Subsequently, she assumed the position of Associate Professor from 1970-72 and Professor from 1972-79 and served as Professor of Ophthalmology, Eye Bank and Keratoplasty, B J Medical College and Institute of Ophthalmology, Ahmedabad from 1972-79. She rose to the position of Head of Eye Department, Choithram Hospital and Research Centre, Indore and worked there from 1990-96. She was a Visiting Consultant, Gita Bhawan Eye Hospital, Indore, 1979-89. She qualified as a Fellow of National Institute of Health, USA in 1970. She became Fellow of National Academy of Medical Sciences (India) in 1980. She remained closely associated with professional academies and associations. She served as the President of Madhya Pradesh Ophthalmic Society, 1987-88 and President of All India Ophthalmological Society, 1997-98.

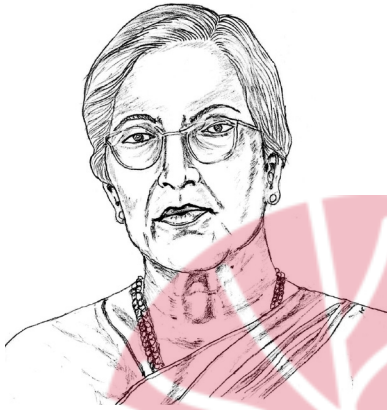
Dr. Vasundhara Kalevar is the first woman cornea surgeon in the country. She pioneered research work and initiated the movement for the establishment of eye bank and keratoplasty across the country. She also practiced radial keratoplasty technique and modified

dissection technique for safe removal and preservation of cornea from donor's eye. Her procedure has been successfully used for corneal preservation and grafting operation in the Eye Bank of the Institute of Ophthalmology, Ahmedabad, Gujarat. She has received numerous laurels for her pioneering contributions such as Oration Gold Medal, Bihar Ophthalmic Society, 1974; Oration Gold Medal, Andhra Pradesh Ophthalmic Society, 1979; Dhanda Award, 1990; Wagle Oration Medal, 1992; Lifetime Achievement Award from All India Ophthalmological Society (AIOS) and Life Time Achievement Award from Indore Division of Ophthalmological Society (IDOS) in 2012. She has published over 66 research articles in the field of her specialization in reputed medical journals. She also edited proceedings of All India Ophthalmological Society, 1987-93 and co-authored books on clinical ophthalmology and corneal surgery.

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Kalra, Veena
(b. 1946)

A Pediatrician of international reputation, Dr. Veena Kalra is known for her noble work in pediatric neurology. She was born in 1946.

She obtained MBBS from Maulana Azad Medical College, New Delhi, 1968 and MD (Pediatrics), All India Institute of Medical Sciences (AIIMS), New Delhi, 1972. She went for WHO Training Grant (Worked at MRC), Cambridge University, UK and WHO Laboratory, Geneva in 1981.

She began her career as Faculty Member and reached to the position of Professor and Head, Department of Pediatrics at AIIMS, New Delhi. She initiated many innovative modernizations during her service tenure of over three decades in AIIMS. Currently, she is serving as a Senior Consultant, Pediatric Neurology at Indraprastha Apollo Hospital, New Delhi.

Dr. Veena Kalra conducted valuable research on child neurology. She established services for electrophysiology, blood lead estimation, neurometabolic tests, neonatal screening and psychometric evaluation. She has been instrumental in establishing pediatric neurology, a super-specialty in India. She started DM course in Child Neurology at AIIMS and took interest to promote programmes for child neurology education in India. She made extensive research work on CNS infections, epilepsy, febrile convulsions, neurocysticercosis, neurometabolic disorders, malnutrition and brain development, neuro muscular disorders, learning

disabilities, etc. She worked on genetic and inborn error metabolism. She pioneered research on stem cell for the treatment of children with genetic disorders. She also developed computer based kit for children with learning disabilities.

She served with distinction as the member of various national and international committees and commissions including Expert Group of SAARC Pediatricians for Reducing of Childhood Neurological Morbidity (2000 & 2002), International Child Neurology Education Conference (2000), Asian & Oceanian Congress on Child Neurology (2004), etc. She implemented more than 60 research projects in child neurology, liver diseases, genetics and inborn errors.

She has been a Fellow of Indian Academy of Pediatrics; Fellow, National Academy of Medical Sciences (India); Fellow, National Academy of Sciences (India), Allahabad, 1989; and Fellow, Indian Academy of Science, Bangalore, 1978.

She represented many national and international professional bodies as the Founder Member of Indian Academy of Pediatrics, Neurology Chapter; Executive Board Member, International Child Neurology Association; President, Asian and Oceanic Child Neurology Association; Member, Child Neurology Society, USA; and Member, Indian Epilepsy Society.

In recognition to her valuable contributions, she has been awarded ST Achar Endowment Award for Best Clinical Research, Indian Academy of Pediatrics, 1983; Kanishka Award, Indian Council of Medical Research; Research Award from JCN (Japan); Zee News Health Award, 2007; Sorell Katherine Research Award; Pfizer Gold Medal; Swasth Bharat Samman, Zee News and LIC, 2010.

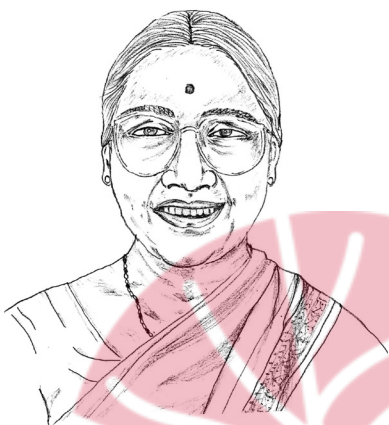
She has published over 200 research papers in the field of child neurology, hepatic and neurogenetic disorders of children. She has authored 45 chapters for Indian and foreign books. She has also authored two textbooks entitled *Practical Pediatric Neurology*, 2002 and *Development through Activity*, 2004. She serves as the Member of the Editorial Board of *Journal of Child Neurology*, USA; *Pediatric Neurology*, USA; *Journal of Pediatric Neurology*, Turkey; *Indian Journal of Pediatrics*; *Indian Journal of Medical Research* and *Pediatrics Today*. She has been an active resource person for technical

advice to the National Board of Examination, Ministry of Health and Family Welfare, Department of Science and Technology and Indian Council of Medical Research. Her extensive research work in field of her specialization led to the inclusion of her achievements in the 'Who is Who in Medicine in the World'.

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Kameswaran, Lalitha
(1930–2002)

Dr. Lalitha Kameswaran was an eminent personality in the field of pharmacology. She was born on 27th July 1930, in Madurai, Tamil Nadu. She was daughter of Navalur Somusundara Bharathi and Vasumathy and wife of renowned physician Padmashree Dr. S Kameswaran.

She completed her school education from St. Joseph's Girls High School, Madurai and took MBBS degree from Stanley Medical College, Madras, 1952. In 1962, she completed PhD from the Institute of Pharmacology, London University, UK.

She returned to India in 1962 and joined as Assistant Professor, Department of Pharmacology, Madurai Medical College for a short stint. Soon, she was promoted to the position of Reader and then to Professor in 1966. She served as Professor and Head of the Department of Pharmacology, Madurai Medical College, Madurai from 1972-82. She became the first woman Dean of Madurai Medical College in 1982. She also became the first woman Director, Medical Education, Government of Tamil Nadu in 1983. Subsequently, she worked as the First Vice-Chancellor, Dr. MGR Medical University, Madras from 1988-92. She also served as the Member, Tamil Nadu State Planning Commission.

Dr. Lalitha Kameswaran was a great pharmacologist, teacher and administrator, who contributed immensely for the medical education and research in India. She always remained firm for the cause of high

quality medical education. She occupied very important positions in the field for over three decades. Dr. L Kameswaran was Head of the Department and was designated as the 'First Director of Pharmacology', when the Department of Pharmacology, Madurai Medical College was upgraded in 1980. The starting of a new concept of the Department of Experimental Medicine (DEM) was the brainchild of Dr. Lalitha Kameswaran. She focused her research on HIV/AIDS, tuberculosis and malnutrition as the thrust areas of research and education at DEM. She felt the need for educational programme and diagnostic and clinical services to combat the spread of diseases. She always worked for the poor and destitute who were unable to afford medical expenses.

She was the Foundation Fellow, International Medical Sciences Academy, 1980; Fellow, National Academy of Medical Sciences (India), 1983; Fellow, College of Allergy and Applied Immunology, 1968; Fellow and Treasurer, Tamil Nadu Academy of Sciences, 1977; and Fellow, Indian Association of Biomedical Scientists, 1986.

She held important positions in the national level professional bodies including President, Indian Pharmacological Society, 1976; Member, Association of Physiologists and Pharmacologists of India; Member, Medical Council of India; Member, Indian Society of Endocrinologists; and President, Women Doctor's Association of Tamil Nadu.

She received many awards and laurels for her outstanding achievements such as Achari Award for Best Paper, Indian Pharmacological Society, 1978; Hari Om Ashram Alembic Award, Indian Council of Medical Research, 1979; Dr. B C Roy National Award, 1983; Mother of Medical Education Award, Indian Radiological and Imaging Association, 1987; Pharma Ratna, Association of Chemists and Druggists of Tamil Nadu, 1987; Shiromani National Award, 1990; Prominent Personality Award, 1990; Nagendranath Dutta Award for Best Paper; Distinguished Women Dignitary Award, Lion's Club of Madras Midtown, 1991; Gem of India Award-All Achievers Conference, 1992; and Doctor's Day Award, Indian Medical Association, 1994.

She published over 100 research papers. She was also a great social reformer and philanthropist, who donated all her jewellery to Mahatma Gandhi at a 'non-cooperation rally' in Madurai. To acknowledge her contribution Dr. MGR Medical University started

'Dr. Lalitha Kameswaran Felicitation Endowment Oration Award and Gold Medal' for excellence in medical research from 2011. She died on 24th November 2002 at the age of 72.

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Karmarkar, Gurubai
(1862–1932)

Gurubai Karmarkar was born on 10th October 1862. She was the wife of Rev. Sumantrao Karmarkar. She went to USA along with her husband, who attended the Hartford Theological Seminar during 1888s. Gurubai took admission to Women's Medical College, Pennsylvania and graduated MD in 1892. They returned to India in 1893. Upon her return to India she worked with American Marathi Mission, the oldest missionary in the Bombay Presidency, as In charge of the Goodwill Dispensary. She worked and served people of Bombay for forty years. The woman of Bohra Community (a strict sect of Mohammadans) frequently attended and benefitted the service of her dispensary. They attended in *purdah* and long thick veil reaching from head to foot. Besides clinical work, she regularly visited Parel Orphanage, the Mission Boarding School in Byculla and the Widows' Home. She became well known and popular for her devotion and dedication to serve poor and sick. She worked as clinical expert and evangelistic. She also served as Christian sympathizer and confident adviser to women in grief. She worked hard for social awakening on important social issues related to socio-economic condition of women in India. She tried to improve condition of women in the society by preventing child marriage and social evil against child widows. She opened many schools for girls and boys and also adopted many children. She made outstanding contributions to save famine struck children. She played crucial role

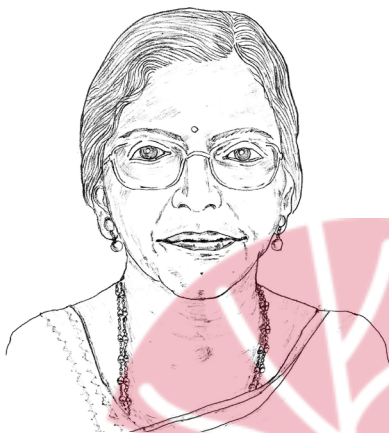
during plague epidemic during 1916 in Bombay. Her adopted son Dr. Viswas Karmarkar died in Philadelphia in the service of people of USA while serving them during the flu epidemic of 1918.

After her retirement, she shifted to Belgaum, her native town. She opened a dispensary with her contribution of Rs 60,000/-, which she donated to the American Marathi Mission. The dispensary was named as Dr. Gurubai Karmarkar Wing at Lincoln House, Nagapada. She participated and represented India in important national and international forums such as Young Women's Christian Association (YWCA) meeting at Paris in 1906 and Stockholm in 1914. She also represented the first International Conference of Women Physicians held at YWCA Head Quarter in New York and the American Board of Commissioner for Foreign Mission in October 1917 at Columbus, Ohio. She died in 1932.

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Karunasagar, Indrani
(b. 1952)

Dr. Indrani Karunasagar is an eminent Microbiologist, who specialized in fisheries. She was born at Jabalpur, Madhya Pradesh on 25th June 1952.

She took her MSc (Microbiology) and PhD (Microbiology) from Kasturba Medical College, Manipal in 1975 and 1985. She did her postdoctoral research as a British Council Study Fellow from the University of Copenhagen, Denmark, 1993. She won UNESCO Biotechnology Fellow from University of Maryland, USA, 1995. She received Department of Biotechnology Overseas Fellowship, Centre for Marine Biotechnology, Baltimore USA, in 1999.

She served Kasturba Gandhi Medical College, Manipal as a Lecturer of Microbiology from 1976-77. She became Senior Resident, Department of Microbiology, Jawaharlal Nehru Institute of Postgraduate Medical Education and Research, Pondicherry in 1977. She was promoted to Assistant Professor in the same department in 1982-92. In 1992, she became Associate Professor, Karnataka Veterinary, Animal and Fisheries Sciences, University of Mangalore and subsequently promoted to Professor in the same university in 2000. She visited many research institutions in India and abroad and served as Visiting Professor, University of Wurzburg, Germany, 2002-06. Currently, she is serving as the Head of NUCSER (Nitte University Centre for Science Education and Research). She has been nominated by UNESCO as the Director of the Microbiological Resources Centre (MIRCEN) in

Marine Biotechnology, which is centred at NUCSER. She has been nominated as the only Indian Member of the International Jury for the UNESCO Life Sciences Prize for research and social relevance for the period of six years from 2014 onwards.

Professor Indrani Karunasagar conducted extensive research work on molecular methods for rapid detection, pathogenicity and pathogenesis of microorganisms of public significance. She conducted investigation on pathogens of fish and shellfish vaccines for aquatic animal's phage therapy, marine toxins and toxic dinoflagellates. She also worked on aquaculture biotechnology including health and environmental management, and functional genomics of shrimps. Dr. Indrani's research has led to the development of recombinant protein vaccines for Indian major carps. This vaccine is seen to protect fish specifically against a common warm-water fish pathogen, *Aeromonas hydrophila*. In the area of shrimp disease management, the pioneering work of Dr. Indrani on the isolation and characterization of several bacteriophages (viruses) against luminous vibriosis disease of shrimps has led to the development of phage therapy. It is for the first time in the world that phage therapy is being advocated in shrimp hatcheries on commercial scale and is now being popularized in several countries where shrimp is cultured. This has the potential to prevent the losses due to luminous bacterial disease. The added advantage is that this eco-friendly approach will reduce the application of antibiotics in aquaculture and thus, prevent the development and spread of antibiotic resistance in the environment and prevent antibiotic residues in shrimp meat. She serves as the Member of FAO/NACA Regional Working Group and Aquatic Animal Science, Sweden. She also played a valuable role as the Member of the Task Force for Aquaculture and Marine Biotechnology, Government of India.

She has received several honours and laurels for her outstanding research work including Young Scientist Award, Karnataka Association of Advancement of Science, 1986; Distinguished Alumnus Award, Kasturba Medical College, Manipal, 1990; Outstanding Women Scientist Award, Indian Council of Agricultural Research, 1997; Laljee Godhoo Smarak Nidhi Award, Association of Food Scientists and Technologists, 1997; Prof. S R Vyas Memorial Lecture Award,

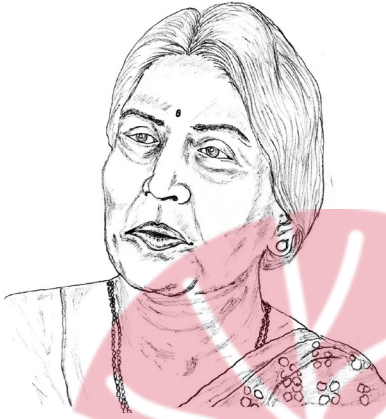
Association of Microbiologists of India, 2002; Lifetime Achievement, National Women Bioscientist Award, Department of Biotechnology, India, 2003; M S Swaminathan Award, Professional Fisheries Graduate Forum, Mumbai, 2004 and 2009; Rafi Ahmad Kidwai Award, Indian Council of Agricultural Research, 2006; TVR National Award, All India Fisheries Forum, 2008; Three Gold Medals (Incentive Awards) for innovative research, Karnataka Veterinary Animal and Fisheries Sciences, University of Bidar, 2009; Prof. J U Bhat Endowment Oration Award, University of Manipal, 2013. She has been conferred with the National Technology Development Award, Ministry of Science and Technology, India, 2015. She has been a Fellow of National Academy of Agricultural Sciences since 2011.

She served as Member, Editorial Board of *Molecular and Cellular Probes* and *Indian Journal of Microbiology*, Subject Editor of *Indian Journal of Virology* and Associate Editor of *Journal of World Aquaculture Society*. She has contributed over 240 research papers and approved eight patents. She is also a Regional Resource Expert of NACA (Network of Aquaculture Centers in Asia Pacific).

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Kashyap, Geeta Vemuganti

An eminent Ophthalmic Pathologist, Dr. Geeta Vemuganti Kashyap was born at Karimnagar, Uttar Pradesh. She qualified MBBS from Jawaharlal Nehru Medical College, Ajmer in 1985. She did Diploma (Clinical Pathology) from Osmania Medical College, Hyderabad in 1991. She obtained DNB (Pathology) (1994) and MD (Pathology) from Nizam's Institute of Medical Sciences, Hyderabad. She took a Short Course on Ophthalmic Pathology, Doheny Eye Institute, Wills Eye Hospital, Philadelphia and Armed Forces Institute of Pathology (AFIP), Washington DC, USA.

She rendered medical practice as Consultant Pathologist, Medwin Hospital, Hyderabad, 1994-98. She was the Member Secretary and Head, Ophthalmic Pathology Services, L V Prasad Eye Institute, Hyderabad, 1998. She made meritorious contributions as a Scientist of Sudhakar and Sreekanth Rao Stem Cell Biological Laboratory of L V Prasad Eye Institute, Hyderabad, 1999-2010. From 2010 onwards, she worked as Professor and Dean, School of Medical Sciences, University of Hyderabad. She has widely traveled abroad and held various positions including Visiting Pathologist, Eye and Ear Infirmary and Department of Pathology, University of Illinois, Chicago, USA and Life Patron, Al Shifa Trust Eye Hospital, Rawalpindi, Pakistan.

Dr. Vemuganti's area of research interest are stem cell, ocular tumours, corneal dystrophies and infections, culturing limbal and

conjunctival epithelium for clinical application and transdifferentiation of bone marrow stromal cells to neurological and retinal lineage. She is also working on the pathogenesis and apoptotic cell of the corneal infections, genotype phenotype correlation in retinoblastoma, and isolation and characterization of bone marrow derived stromal cells and evaluating the stem cells in ocular tumors. She earned international recognition for making outstanding research in the stem cell technique to restore vision in patients suffering from limbal stem cell deficiency. She applied the stem cell technique to recover 500 patients suffering from the deficiency caused due to chemical burns, allergic reactions to drug and auto-immune disease. The stem cell technique involves harvesting a small amount of limbal tissue from the healthy eye for transplantation into the diseased eye. This was also the first kind of adult stem cell therapy in India and the largest trial in the world. The highlights of this technique were that, it was simple, cost-effective, feeder cell free, xeno free and submerged technique of generating a sheet of corneal epithelium within 10-14 days of culture. She was invited to submit a proposal from International Atomic Energy Agency, that could potentially alleviate radiation-induced damage through stem cell therapy. In response to that, she established for the first time, the cultures of human lacrimal gland that showed evidence of stem cells, duct like formation and also secreted thin film substances. This could possibly pave way for potential cell therapy for severe dry eye syndrome due to various conditions including radiation induced damage.

She covered wide range of research area and gained vast experience of clinical practice in the field of ophthalmic pathology, which enabled her to be a Fellow of National Academy of Medical Sciences (India), 2007; Fellow, Indian College of Pathology and Elected President of Indian Association for Ophthalmic Pathologists.

Her achievements in the field of her specialization has been felicitated by awarding her Col. Rangachari Gold Medal, All India Ophthalmic Society, 2002; National Bioscience Award for Career Development, 2004; CHEMTECH PHARMABIO outstanding Contribution Award (Biotech), 2005; Achievement Award, American Academy of Ophthalmology, USA, 2006; Best Oral Presentation Award, Stem Cell Research Forum, 2007; Biotech Products and Process Development and Commercialization Award,

2007; Outstanding Woman Achiever of the Year, International Lions Club, 2008; Shri Shyamlal Saksena Memorial Award, National Academy of Medical Sciences, India, 2010.

She has published over 180 publications including research articles, proceedings and book chapters with the record of Citation Index of 1751. She served as the reviewer of several journals and project granting agencies. She is the Member, Advisory Board of Limbal Stem Cell Project Hospital, Kuala Lumpur and IMR Malaysia; Member, Stem Cell Unit, Baroda and Stem Cell Research & Therapy, Apollo Hospital, Hyderabad.

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Kaur, Sant
(b. 1917)

Dr. Sant Kaur was an eminent medical personality, who made pioneering contributions in the field of family planning and contraceptives. She was born in Lyallpur, Punjab on 15th November 1917.

She qualified LSMF (Honours) (Licentiate in Medicine and Surgery), Medical College, Amritsar, 1942. She took Family Planning Training, Bombay in 1961. She visited UK to avail Family Planning Certificate Training, London, 1963. She also took PPA (Family Planning Training) from Michigan University, Chicago, 1968.

She worked in various capacities in Government Health and Family Planning Department of Northern Indian states. She started her career as a practicing medical doctor in the field of Family Planning; Medical Officer, State Hospital, Jammu and Kashmir, 1942-45; Medical Officer, Refugee Camps, 1948-57; Medical Officer, Rescue Home for Women, 1957-61; and from 1961 onwards, she served as the Medical Officer, Family Planning Health Centre, Chandigarh.

Dr. Kaur was a pioneer in propagating Policy of Family Planning in India. She influenced and motivated over 1000 women to use conventional contraceptives. She had inserted loops (IUDC) to over 6000 eligible women. She had done over 1000 sterilizations. She had made remarkable contribution to popularize oral pills. She was entrusted to carry out experiments in contraceptive injections of Depo-Provera. She imparted training to lady doctors, nurses and paramedical staff on

behalf of the Government of Punjab, Haryana and Chandigarh. She also did considerable social work in the slum areas. Record reveals that during her time, the birth rate of these areas came down remarkably. She published many pamphlets and propaganda materials to educate general mass and make the Family Planning Mission of the government more effective. Her prominent publications are *Coagulation Phenomenon in IUCD-cases in Punjab*; *New Methods of Family Planning and Tubectomy: Follow up in Ropar District*.

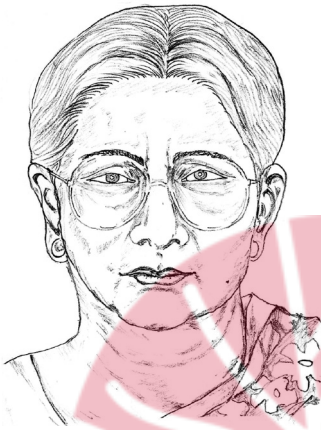
She was an active member of various scientific bodies and associations including Member, Family Planning Association of India; Member, Family Planning Association of Great Britain; Life Member, Red Cross Society; Life Member, Family Planning Association of Punjab and Haryana.

For her dedicated clinical service and brilliant performance, she was awarded Silver Medal, Governor of Punjab, 1963 and Padma Shri in 1972.

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Kaur, Surrinder
(1933–2004)

Dr. Surrinder Kaur was a renowned Dermatologist, born on 7th March 1933 at Datewal, Ferozpur District, Punjab. She was daughter of G S Talib and Lal Kaur. Her father was a great scholar and was perhaps the first to translate the *Guru Granth Sahib* into English.

She did MBBS with brilliant academic record. She earned MD (Internal Medicine) and MD (Dermatology), Panjab University in 1964 and 1967. She also won Commonwealth Fellowship to England in 1978.

She joined Government Medical College, Patiala as Research Assistant, and worked there from 1958-62. She joined the Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh as Registrar in 1962. She was promoted to the post of Lecturer in 1965, then Assistant Professor in 1972, Associate Professor in 1979 and Professor in 1984. She served as the Professor and Head, Department of Dermatology, Post Graduate Institute of Medical Education and Research, Chandigarh from 1985-93. She made immense contributions to the establishment and advancement of the Department of Dermatology in the PGIMER for over three decades.

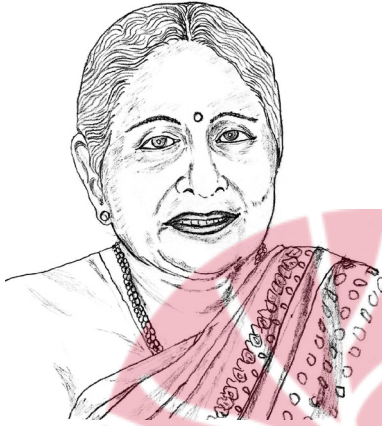
Dr. Surinder Kaur made pioneering contributions in the field of dermatology, venereology and leprosy. She started the Department of Dermatology, Venereology and Leprosy at the PGIMER, Chandigarh and worked there as the lone faculty member until 1975. She was one

of the first few who were instrumental in bringing dermatology to its rightful place. She was one of the most renowned dermatologists of India. She made valuable research contributions in systematic involvement in leprosy cure with her added knowledge of internal medicine. She was a brilliant clinical dermatologist and a compassionate teacher, who mentored several of her juniors and students to achieve the prestigious positions in reputed institutions both in India and abroad. She was honoured as a Fellow, National Academy of Medical Sciences (India) and Member, Indian Association of Dermatology, Venereology and Leprosy; Member, Indian Association of Leprology and Member, International Leprosy Association. She was awarded Khanika Oration Award, Indian Council of Medical Research, 1981 and Hari Om Ashram Award, Medical Council of India, 1982 for her dedication and hard work to plan, execute and organise a new Department in PGIMER, Chandigarh. She died on 12th October 2004, after a long battle with brain tumour.

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**Khanduja,
Sudesh Kaur**
(b. 1951)

A distinguished Mathematician, Professor Sudesh Kaur Khanduja, daughter of Sardar Kesar Singh was born on 1st January 1951 at Nasirpur village, District Ambala, Haryana. She got admission in Dev Samaj College for Girls, Chandigarh and completed graduation in mathematics in 1970. She did MA (Mathematics) and PhD from Department of Mathematics, Panjab University, Chandigarh in 1973 and 1976.

She joined the Department of Mathematics, Panjab University, Chandigarh as Research Assistant in 1974. She was raised to the position of Lecturer in 1978 and then Reader in 1986. In 1998, she became Professor and served the department until she retired in 2011. She assumed the responsibility of Chairperson of the same department from 2003-06. She also served as Coordinator, Centre for Advanced Study in Mathematics, Panjab University, Chandigarh from 2004-2010. Currently, she is serving as Professor of Mathematics, Indian Institute of Science Education and Research (IISER), Mohali since 2011.

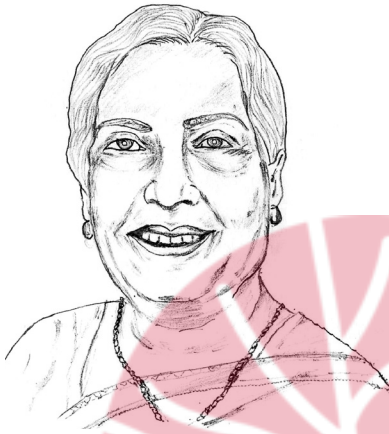
Prof. Sudesh Kaur Khanduja has done commendable work on theory of valuations, function field theory and algebraic number theory. She along with her collaborators used the prolongations to generalize the Eisenstein-Dumas Irreducibility Criterion, Schönemann Irreducibility Criterion, Hensel's Lemma and Ehrenfeucht's Irreducibility Criterion. She has generalized the Classical Theorem of Dedekind dealing with

'different' extensions of algebraic number fields and ramification of prime ideals to finite extensions of Henselian valued fields. She has also extended the Dedekind Criterion as well as the Theorem of Dedekind Characterization. In her doctoral work, she proved an analogue of the classical Brauer-Siegel theorem. Her work and research findings received international acclaim in the area of her specialization. She has published over 66 research articles in reputed journals. She has earned vast experience of teaching mathematics for over three decades. She has made efforts to rejuvenate mathematics education in Indian universities and tried to motivate many good scholars to join the subject. She has encouraged and guided generations of PhD scholars in mathematics. Her dedicated research work in the field of mathematics has been acclaimed by awarding her the distinction of being an Elected Fellow, Indian National Science Academy, New Delhi, 2005; Fellow, National Academy of Sciences (India), Allahabad, 2010; and Fellow, Indian Academy of Sciences, Bangalore, 2010.

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**Khanna-Chopra,
Renu**
(b. 1940)

A renowned Botanist, Dr. Renu Khanna-Chopra was born in Delhi on 24th September 1940. She completed her school education from Lady Irwin School, Delhi in 1965. She did her graduation in science from Kamala Raje Girl's College, Gwalior, 1968. She completed MSc and PhD from Indian Agricultural Research Institute, New Delhi, 1970 and 1974.

She began her career as Scientist at Water Technology Centre (Agricultural Research Science), Indian Agricultural Research Institute, New Delhi in 1978. She became Principal Scientist and National Fellow, Indian Council of Agricultural Research, 1995-2011. She has been continuing her research as an Emeritus Scientist since 2011.

Dr. Khanna-Chopra conducted valuable research in the areas of abiotic stress physiology and photosynthesis in relation to crop productivity, mechanism of heterosis and drought resistance in crop plants. She also provided a physiological, biochemical and genetical explanation of heterosis, which has been recognized internationally using molecular tools. She is a pioneering scientist to report the change from C₄ to C₃ pathway in sorghum. She has successfully hybridized drought-tolerant and high-yielding wheat varieties and obtained F₂ segregates overcoming hybrid necrosis barrier. She has been promoting study and research in the field of physiological genetics and established a School of Stress Physiology. She also had an opportunity to work

with Prof. C B Osmond at Australian National University, Canberra and Dr. D W Lauer at Rothamsted Experimental Station, Harpenden, on various aspects of photosynthesis as a Visiting Scientist.

Her immense contributions in the field of plant physiology has been acknowledged by awarding her Young Scientist Award, Indian National Science Academy, 1978; Homi Bhabha Fellowship, 1980-82; R D Asana Endowment Award, 1983; INSA-Royal Society Exchange Fellowship, 1982-83; Biotechnology Overseas Research Associateship, 1989-90; First Outstanding Woman Scientist Award, Indian Council of Agricultural Research, 1995; and Platinum Jubilee Lecture Award, ICSA, 1998.

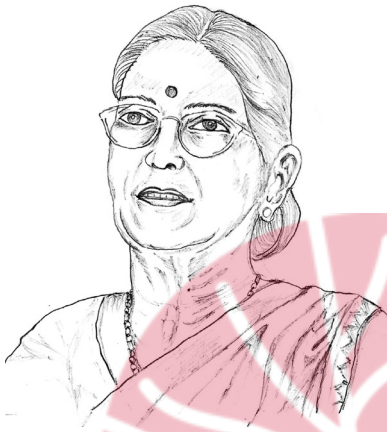
She has played a vital role in the development of professional societies and associations. She is the Founder Member and Secretary of Society for Plant Physiology and Biochemistry. She has been a Fellow and Council Member, Indian National Science Academy, New Delhi, 1994, 2009-2011; Fellow and Member of Executive Council, National Academy of Agricultural Sciences (India), 1992; and Fellow, National Academy of Sciences (India), Bangalore, 1986.

She has contributed over 125 research articles in the field of her specialization. She has also served as a Member of the Editorial Board of *Journal of Biosciences*.

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एकः सूत सकलम्



Kola, Rajyalakshmi
(1931–2011)

Dr. Rajyalakshmi Kola is an eminent medical personality. She was born on 27th September 1931 in Pattiputtur village of Chittoor District, Andhra Pradesh in a lower middle class agricultural family. She took school education in village and then moved to Hyderabad to study medicine. She received MBBS and MD (Microbiology) from Andhra University.

She started her medical career as a Tutor at Guntur Medical College, Guntur, 1955-56. In 1961, she moved to Kakatiya Medical College as Lecturer. Subsequently, she was promoted to Professor of Microbiology, Kakatiya and Osmania Medical College in 1963 and served there until 1973, when she was appointed as the Director, Institute of Preventive Medicine, 1973-81. She assumed the responsibility of Director, Institute of Preventive Medicine, Public Health Laboratories and Food (Health) Authority, 1981-86. She became the Vice-Chancellor of Sri Padmavati Mahila Vishwa Vidyalayam (SPMVV), Tirupati and served there from 1986-90. She was also a leading personality of Andhra Pradesh State Congress Committee. She was the President of Mahila Congress, Andhra Pradesh, 1990-93; Medical Consultant to Chief Minister of Andhra Pradesh, N T Rama Rao; Nominated Member of Legislative Assembly (MLA) by Governor of Andhra Pradesh, 2007; and Scientist, A P Pharmacy Council, 1983-86.

She took great interest in the development of professional societies and associations. She remained actively associated with various organisations as Member of Indian Association of Medical Microbiologists, Indian Association of Pathologists and Microbiologists, Indian Public Health Association, Indian Society of Blood Transfusion and Immunohaematology and Indian Association of Communicable Diseases.

Due to her leadership quality and self confidence, she came into the notice of the then Chief Minister of Andhra Pradesh, Shri NT Rama Rao, who selected her to be the Vice Chancellor of the newly instituted Sri Padmavati Mahila Vishwa Vidyalayam, Tirupati, the only women university of Andhra Pradesh. She nurtured the university with her hard work and dedication. She introduced many departments in science and technology. She provided voluntary service through Indian Red Cross for over 50 years. In 2001, she was elected as the Secretary of the Andhra Pradesh Branch of Indian Red Cross. She organised blood donation camps, and created awareness for women's cause in rural Andhra Pradesh. She also worked for proper education and health for women of Red Light areas. She organised immunization camps, schools for the handicapped and created awareness of HIV/AIDs under the banner of Red Cross. She made target to start independent blood bank for the each of 29 districts of Andhra Pradesh. She also arranged rehabilitation work after Tsunami, and organised many training camps of disaster management.

She made leading contributions in several state, national and international level medical programmes as a Member of Vaccine Production Board, Ministry of Health, Government of India from 1976-86. She was a Member, A P State Board of Technical Commission for Prevention and Control of Water Pollution, 1983-86; Member, Central Commission for Food Standards, Ministry of Health, Government of India, 1983-86. She was awarded Indian Water Works Association Award, 1982; Maj. KN Rao Memorial Gold Medal in 1989 and Sushruta Award in 1989 in recognition to her outstanding contributions.

She published over 45 research papers, attended and contributed many papers in several national and international conferences and

seminars. She set a unique example of her professional interest varying from a medical expert to a politician and a dedicated social worker. She was a follower of the humble motto, 'Helping a human being is serving god'. She died on 3rd March 2011 after a brief illness. Andhra Pradesh lost a great physician, a great leader and a passionate human being.

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Krishan, Vinod
(b. 1946)

Professor Vinod Krishan was born on 14th October 1946, she excelled in astrophysics. She did her BSc and MSc (Physics) from University of Delhi in 1966 and 1968. She joined University of Tennessee, USA and earned PhD in 1971. She spent two years at the University of Alberta, Edmond, Canada as a Postdoctoral Fellow from 1971-73.

She started her career as a Pool Officer, Centre for Theoretical Studies, Indian Institute of Science, Bangalore in 1973. From 1975-77, she served as an UGC Research Associate. She worked as Visiting Scientist, Indian Institute of Astrophysics, Bangalore from 1977-78. She became Fellow, Indian Institute of Astrophysics, Bangalore in 1978. Subsequently, she was promoted to the post of Reader in 1981, Associate Professor in 1986 and Professor from 1991-98. She took up the responsibility of Senior Professor and Dean of Sciences, Indian Institute of Astrophysics, Bangalore from 1998. She established herself as an outstanding woman astrophysicist, which enabled her to serve Abdus Salam Institute for Theoretical Physics, Trieste, Italy (1994-2002) as Senior Associate, and Visiting Professor, Raman Research Institute, Bangalore.

She has been honoured as the Fellow of National Academy of Sciences (India), Allahabad in 1996. She has been an active member of many societies and associations including Associate Member, International Centre for Theoretical Physics, Trieste, Italy 1987-94;

Member, Astronomical Society of India; Member, International Astronomical Union; and Member, Council Member and Secretary, Plasma Science Society of India, 1987, 1991.

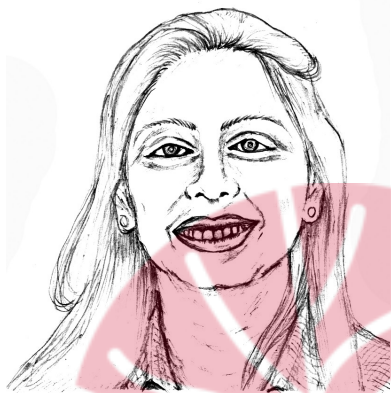
Prof. Vinod Krishan has made significant research contributions in the field of astrophysical plasmas, modelling of solar coronal loops, solar granulation, extragalactic plasmas and structure formation through hydrodynamics. She has conducted valuable research on coronal loops which link magnetically active regions. They also suffer continuous turning and twisting in the convection zone. She provided theoretical argument for the existence of force-free magnetic field and evolution of these loops. She proposed a new model for the entire solar granulation, which is based on the possibility of making large eddies from the small eddies in a helically turbulent medium through the mechanism of inverse cascade of energy. She has made valuable research studies on stimulated Raman and Compton scattering and parametric decay instabilities.

Her research work has been acclaimed by awarding her Vikram Sarabhai Award for Space Science, 1992.

She has published over 100 research articles and a book. She served as the Editor of the *Bulletin of Astronomical Society of India*, 1995 and Associate Editor of *African Review of Physics*.

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Krishnan, Yamuna
(b. 1974)

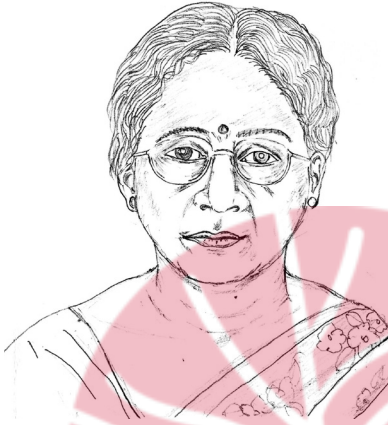
Professor Yamuna Krishnan is the youngest woman scientist in India to receive the prestigious Shanti Swarup Bhatnagar Award in the field of chemical sciences in 2013. She was born on 25th May 1974 at Parapanangadi in Malappuram district of Kerala. She is the daughter of an architect PT Krishnana and a literary mother Mini. Her grandparents were doctors and well-known editors. She grew up in rich academic environment and broader outlook. She completed BSc(Chemistry) from Women's Christian College, Chennai in 1994. She did her MS (Chemical Science) in 1997 and PhD (Organic Chemistry) in 2002 from the Department of Chemical Sciences, Indian Institute of Sciences, Bangalore.

She worked as Post-doctoral Research Fellow to the Department of Chemistry, University of Cambridge, U K from 2001-02. She was 1851 Research Fellow in the same department from 2002-04. Then after she returned to India and served as Fellow E (Jr. Assistant Professor) at the National Centre of Biological Sciences, Tata Institute of Fundamental Research, Bangalore from 2005-09. Subsequently she became Reader F from 2009 and then Associate Professor in 2013. She moved to the University of Chicago, USA as Professor of Chemistry in August 2014. Currently, she is serving as Professor and Brain Foundation Fellow of Chemistry at the Grossman Institute of Neurosciences, University of Cambridge.

She has conducted extensive research work in the area of structure and dynamics of nucleic acids, nucleic acid nanotechnology, cellular and subcellular technology. Her work has facilitated the understanding of structure and functions of biological devices and their utilization in advancing science and engineering. Nature has produced a large number and variety of biological devices that function at the nanoscale or molecular level. Her current research findings have explored better understanding of the structure and dynamics of unusual forms of DNA and translating their knowledge to create DNA based nanodevices and their applications in bio-nanotechnology. Her work has received universal acknowledgement. She has received several awards and recognitions including Helen Miller Award for Best outgoing student of Women's Christian College, Chennai, 1994; SK Ranganathan Scholarship for the topper in MS (PhD) Sciences, Indian Institute of Sciences, Bangalore, 1995-96; 1851 Research Fellowship, Royal Commission for the Exhibition of 1851, 2002; Innovative Young Biotechnologist Award, Department of Biotechnology, India in 2006; Young Scientist Medal, Indian National Science Academy, 2009; B.K. Bachawat International Grant for Young Scientist, 2010; Wellcome Trust DBT Alliance Senior Research Fellowship, 2010-15; YIM Boston Young Scientist Award, 2012 and Shanti Swarup Bhatnagar Award in 2013. She is recipient of AVRA Young Scientist Award, 2014 and Chemical Science Lectureship Award of the Royal Society of Chemistry in 2015. She is serving as a Council Member, Chemistry Biology Interface, Royal Society of Chemistry, 2016. She has contributed over 40 research articles, three book chapters and one patent. She is Associate Editor to *Nanoscale RSC Journals*, 2013. She is a Member of the Editorial Advisory Board of *Bioconjugate Chemistry*, ACS, 2013.

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**Krishnaswamy,
Kamala**
(b. 1940)

Dr. Kamala Krishnaswamy made phenomenal contributions in the field of nutrition and pharmacology. She was born on 4th April 1940, in Hyderabad, Telangana.

She received MBBS and MD (Internal Medicine) from Osmania University, Hyderabad in 1964 and 1968. She won WHO Fellowship and visited Karolinska Institute, Stockholm to undergo advanced training in Clinical Pharmacology, from 1977-78.

She served as Assistant Research Officer at National Institute of Nutrition, Hyderabad from 1964-92; Senior Deputy Director Incharge of Drug Division, Food and Drug Toxicology Research Centre, 1992-97; Director, National Institute of Nutrition, Hyderabad, 1997-2002; Emeritus Medical Scientist, National Institute of Nutrition, Hyderabad, 2002-05.

Dr. Kamala Krishnaswamy has conducted valuable research on diet-cancer interactions, nutrient-drug interactions, environmental toxicology, non-communicable chronic diseases and vitamin B-complex deficiencies. Her outstanding research studies on clinical impact of nutrition and cancer received wide acknowledgement. She worked for several international projects related to nutrition for the poor. She has also established the Advanced Centre for Pre-clinical Toxicology at the Food and Drug Toxicology Centre of National Institute of Nutrition, Hyderabad. She has served under different capacities to several Scientific

Committees. She has also served as Member of the Governing Body of Nutrition Federation of India, New Delhi. 'The Dietary Guidelines for Indians' was prepared under her recommendation and guidance. The document is used across the country as the basic reference tool by all concerned.

She held Fellowship of several prestigious academies such as Fellow, National Academy of Medical Sciences (India); Fellow, Indian National Science Academy, 1998; Fellow, Indian Academy of Sciences, Bangalore; Fellow, National Academy of Sciences (India), Allahabad; Fellow, Andhra Pradesh Academy of Sciences; Fellow, International Union of Nutritional Sciences; Fellow, National Academy of Agricultural Sciences (India), 2003; and Fellow, Third World Academy of Sciences.

She held the Office Bearing position of Elected President (twice), Nutrition Society of India; Executive Committee Member, International Union on Nutritional Sciences, 2005-09; and Member, Federation of Asian Nutrition Society, 2008-11.

Dr. Kamala Krishnaswamy has been a dynamic woman specialist of nutrition and pharmacology. Her achievements and proficiency in the subject made valuable impact upon pharma business as well as in clinical field. She has received a series of prestigious awards of national level for her achievements including Shakuntala Amirchand Prize, Indian Council of Medical Research; Dr. V N Patwardhan Prize, Indian Council of Medical Research; Dr. Kamala Menon Medical Research Award, Indian Council of Medical Research; Basanti Devi Amirchand Prize, Indian Council of Medical Research; Shakuntala Dasgupta Oration Award, Indian Physiological Society; B C Guha Memorial Lecture, Indian National Science Academy, 1999; Sita Mahalakshmi Memorial Oration, Andhra Pradesh Academy of Sciences; Best Medical Person Award, Andhra Pradesh Academy of Sciences; S G Srikantia Memorial Lecture Award, Nutrition Society of India; ASTC-Eminent Women Scientist Award, 2004; Dr. Rajammal P Devdas Ammal Oration Award, Avinashilingam Deemed University, Coimbatore, 2005; Eminent Pharmacologist Award, Indian Pharmacological Society, 2007; Leading Woman Scientist, Mother Teresa Women's University, 2009; Glaxo Oration, National Academy of Medical Sciences (India); Chopra Oration, Indian Pharmacological Society; Dr. Kirloskar Oration Award

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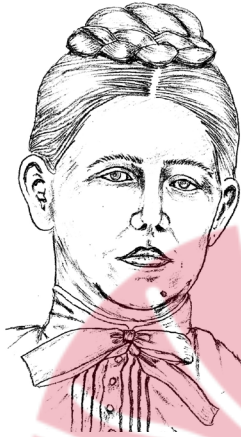
She has published over 250 research articles, reviews and book chapters in the field of her specialization. She has authored two books entitled *Turmeric: The Salt of Orient is the Spice of Life* (Allied Publishers) and *Paliolithic Diets: A Perspective Approach for Current Chronic Ailments* (International Life Sciences Institute).

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Kugler, Anna Sarah
(1856–1930)

Dr. Anna Sarah Kugler was born on 19th April 1856, in Ardmore, Montgomery County, Pennsylvania, USA to Charles Kugler and Harriet S Sheaff. She attended private school in Bryn Mawr and graduated from Friend's Central High School, Philadelphia. She graduated in medicine from Women's Medical College, Philadelphia in 1879. She completed her internship for two years in Norristown State Hospital from 1880-82. She later joined Norristown State Asylum as Assistant Physician and worked for a few months until August 1883.

From the very beginning, she wished to work as a missionary doctor to serve poor and destitute in the less developed countries of the world. She offered her services for medical mission to the Foreign Board of Executive Committee of Women's Home and Foreign Missionary Society of Lutheran Church (Baltimore). At that time, the Society was not willing to start medical missionary service in a foreign land. Therefore, she took her own decision to serve India. She sailed to India and reached there on 29th November 1883 and started her service in Guntur, Andhra Pradesh for raising schools and *zenana* medical service with her own resources. In 1884, she became the Director of Hindu Girls' School. After two years of her service in India, she was appointed as a medical missionary in December 1885. During her two years of clinical service, she earned

high rapport with the serving missionaries and natives of the place. After her appointment, she opened a dispensary in a small rented building. She served tirelessly with full devotion for the treatment and care of the sick and destitute. She always envisioned developing the small dispensary into a full fledged hospital at Guntur.

After ten years of her devoted service, the building for First Dispensary came up on 23rd June 1897. Then after four years the hospital building of 'Jubilee Medical Home' was formally opened for public health service. Her clinical skill and expertise developed great influence around the region. She served as a doctor, teacher and mentor for doctors, nurses and paramedical staff. She was looked after and regarded as a 'Saint' and 'Living Messenger of God' upon her friends and patients. She was awarded Kaiser-i-Hind Silver and Gold Medals in 1905 and 1917 for her distinguished public service in India. Subsequently, the hospital came to be known as Evangelical Lutheran Mission Hospital, Guntur, which became the epicenter for reliable surgical, maternity and paediatric treatment. It also started a nursing school. It was the first women's hospital in the coastal area of Andhra Pradesh. She served India for 47 years. She was the First Medical Missionary of Lutheran Church of USA. She returned to USA during 1899 to 1891, on furlough where she took postgraduate training for hospital building and equipment. On her return, she built a fully developed hospital with the fund that she collected from USA and India. In 1895, she was relieved from regular mission duties, but she continued to serve Indian people and opened many other dispensaries for villagers across the South Indian states. In 1925, she fell ill and returned to USA for two years. She came back to India after her recovery and started her clinical service with full enthusiasm and gesture. She died in Guntur on 26th July 1930 and was buried in Guntur. The hospital in Guntur was renamed as 'Dr. Kugler Hospital' after her death. Her memorial has been made in the Saint Paul's Lutheran Cemetery in Ardmore, Pennsylvania. She authored a book (autobiography) *Guntur Mission Hospital* in 1927.

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Kulshrestha, Gita

(b.1944)

Dr. Gita Kulshrestha is a renowned Chemist, known for her immense contributions on pesticides. She was born on 8th November 1944 in Karnal, Haryana. She completed her school education at N L High School, Bombay. She did BSc (Chemistry) (Honors) in 1965. She obtained MSc and PhD from Indian Agricultural Research Institute, New Delhi in 1968 and 1972, respectively. She continued her career in the same institute and served as Junior Chemist from 1973-75; Scientist S-1, 1975-79; Scientist S-2, 1980-81; Scientist S-3, 1982-85; Principal Scientist, Division of Agricultural Chemicals, Indian Agricultural Research Inst

itute, New Delhi, 1986-98; Professor, 1998-2004, 2006-07; Head, Division of Agricultural Chemicals, Indian Agricultural Research Institute, New Delhi, 2005-06 and Emeritus Scientist, from 2007-09.

She held several prestigious positions of office bearer in many professional academies and associations including Elected Fellow, National Academy of Agricultural Sciences (India), 1996; Fellow, Society of Pesticide Science, India; Fellow, Indian Society of Weed Science, 2005-06. She was Vice President of the Society of Pesticide Science (India) from 1992-95 and Member of Society of Plant Protection Science (India).

Dr. Gita Kulshrestha has done notable research on pesticide residue chemistry, environmental impact of pesticide, bioremediation of safety impacts. She in association with Dr. Shashi Bala Singh have innovated a process of preparing an herbicidal composition against Phalaris minor from neem and the herbicidal composition has been proposed for commercial use. They also patented the process and the product. Her research led to prevent the practice of indiscriminate use of pesticide and environmental protection.

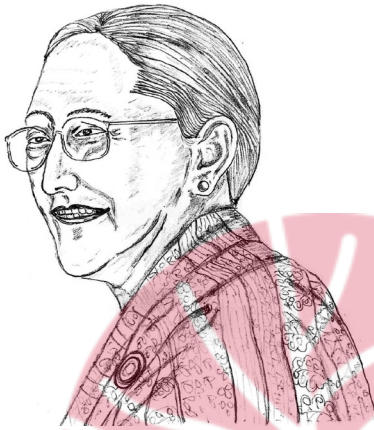
Dr. Gita Kulshrestha received many awards and recognitions for her brilliant research work including Hexamer Foundation Award, 1994; Dr. P B Sarkar Memorial Endowment Lecture Award, 2002; Best Teacher Award, Indian Agricultural Research Institute, 2004; Punjab Rao Deshmukh Women Agricultural Scientist Award, 2005; Lifetime Achievement Award, Indian Society of Weed Science, 2008; and Dr. K C Mehta Memorial Award, 2011-12.

She contributed several research articles. She served as Member of Editorial Board of *Indian Journal of Weed Science*, 1999-2001, 2007-10. She served as a Member, Board of Management, Bisra Agricultural University, Ranchi, 2009-12 and Advisor to the ICAR-NAIP on 'Design and studying mode of action and biosafety of nanopesticides', 2009-12.

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एकः सूते सकलम्



Landol, Tsering
(b. 1945)

Dr. Tsering Landol is the first Ladakhi woman to get Padma Shri in medicine. Her field of specialization is obstetrics and gynaecology. She was born on 13th October 1945. She qualified MBBS and MD in 1972 and 1977. She visited UK and obtained MCh from Liverpool School of Tropical Medicine, UK. She attended super-specialization training in leproscopy from Medical College and Hospital, Srinagar, 1983; Training in Neonatology, Aurangabad Medical College, Aurangabad; Prenatal Care Course in Developing Countries, 1984.

She started her career in the Department of Obstetrics and Gynaecology, Government Medical College Hospital, Srinagar as House Job. She worked as Registrar in the same department from 1977-79. She shifted to S N M Hospital, Leh-Ladakh in 1977 as Gynaecologist and served there up to 2003. Currently, she is serving as Gynaecologist at Mahabodhi Karuna Charitable Hospital which was established by Guruji Ven Sanghasesna Mahanayaka at Jammu and Kashmir in 1996.

She has been serving the state of Jammu and Kashmir for about three decades. Ladakh is the biggest district of India, but there is only one hospital in its capital Leh. The health care facility is very poor and rare in Ladakh. Facility for modern diagnosis and therapy are not available in the state. The cost of medical treatment is beyond the reach of the common man. She organised many camps and workshops under

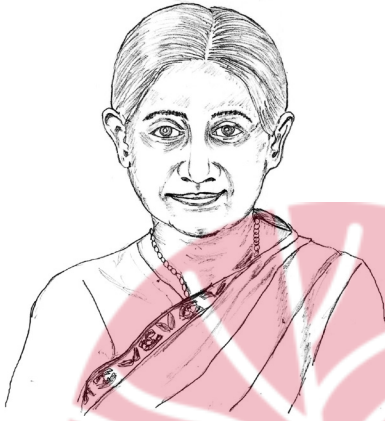
the banner of Asoka Mission to provide free medical service for public health and family planning. She is a well-known gynecologist in the state providing specialized service for difficult gynecological cases. She is playing a leading role in conducting field level health care programme for villagers and educating women in Ladakh to lead a healthy life by adopting healthy lifestyle. She also served as member of various state level committees involved in family welfare and public health. She has been an active member of the Obstetrical and Gynecological Society of India and Member of Lion's Club International, Leh-Ladakh.

She has been awarded People's Service Award by the Doctor's Association of Kashmir in 2003 for her courage to face local challenges of prejudice against female doctors. She received Padma Shri in 2006 for her dedicated service to resolve health problem of women and newborn in difficult terrain.

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Lazarus, Hilda Mary
(1890–1978)

Dr. Hilda Mary Lazarus was born on 23rd January 1890 in Visakhapatnam, Andhra Pradesh. She was one of the nine children of her parents, Daniel Lazarus and Eliza.

She took primary education from CBM School (Canadian Baptist Mission). She passed BA, University of Madras, Madras. She took MBBS degree from Madras Medical College, Madras. She went abroad to obtain Advance Medical Training from London and Dublin, UK. She was awarded MRCS (Member, Royal College of Surgery) from London.

Dr. Hilda Mary Lazarus was the first Indian woman medical officer of Women's Medical Service (WMS) in India. She was appointed from London to join the Service in India, when she completed her medical education there. She worked for Government Medical Service from 1917 to 1947, and earned the position of Lieutenant Colonel. During her three decades of government service, she worked in various parts of India under the posting from Women's Medical Service. She served in prestigious positions of Superintendent and Principal of various leading medical colleges in the country. She assumed leading positions in different institutions such as: 1. The first Indian Woman to hold the post of Superintendent in the Government Victoria Hospital for Women and Children in Madras. There is a Lazarus Ward, named after her legacy in the Victoria Hospital for Women and Children.

2. She worked as Superintendent of Lady Willington Medical School for Women in Madras. 3. She was the first Indian principal of the Lady Hardinge Medical College in New Delhi in 1940. 4. She was the first chief medical officer (Indian woman) of the Women's Medical Service in India. 5. She rose to the position of Assistant Director General of the Women's Medical Service. 6. She served as the first Indian principal of the Christian Medical College, Vellore from 1948-54. 7. She also worked as the Honorary Director and Principal of the Institute of Obstetrics and Gynaecology at the Andhra Medical College, Visakhapatnam. 8. She served as the Superintendent of the King George's Hospital. 9. She worked as the Member of Legislative Council and Municipal Council of Madras. She also played a significant role as a Member of Zila Parishad.

She was felicitated as Honorary Fellow, National Academy of Medical Sciences, (India). She made valuable contributions as the President, Christian Medical College Association; President, Association of Medical Women in India, 1918 and Member of Red Cross, India.

She was a reputed physician of international standing for her pioneering contributions. She was awarded Gold Medal in Midwifery, Madras Medical College (during MBBS course); Silver Medal, Kaisar-i-Hind Award; Gold Medal, Kaisar-i-Hind Award; Medal for Serving Sister of the Order of St. John; Padma Shri, 1961; and awarded CEB (Commander Order of the British Empire).

She worked extensively for the improvement of quality of government medical service for medical and paramedical professionals. She made impressive contributions to medical and nursing education during her tenure as Principal of various prestigious medical colleges. She emphasized for improvement of working facilities for women doctors. She adopted various innovative changes to improve medical service for women and children in government general hospitals. She had a great concern for poor and underprivileged. She always helped them by providing medical as well as financial help. She was also a great philanthropist and worked as social reformer and mobilized community service for the cause of women in Indian society.

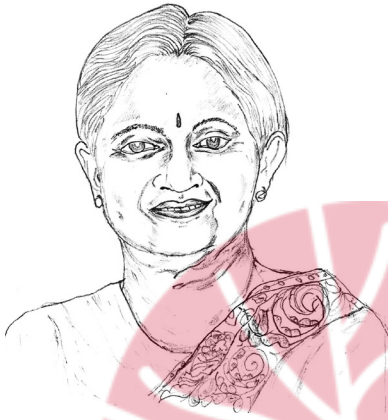
She was closely associated with the CBM High School in Madras, where she also served as the President of the Managing Board. She

donated large portion of her property for the development of the society. She was closely associated with the Visakhapatnam Branch of the Bible Society of India. She was a member of the Sir Joseph Bhore Committee on Health Development conducted by the Government of India to bring standardization and improvement in Indian Medical Service during 1943-45. She always wore Khadi saree and regarded Gandhiji as an ideal nationalist. She is recognized as an eminent medical professional, a deeply committed teacher, highly skilled clinician and a dedicated Christian. She died in 1978.

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Lohia, Anuradha
(b.1956)

Dr. Anuradha Lohia has conducted extensive research work in the field of molecular and cellular biology towards understanding the cell cycle of *Entamoeba histolytica*, a protozoan parasite responsible for causing death of over 500 million people across the world. She was born on 11th June 1956 to a Marwari business family in Calcutta.

She completed her schooling from Modern High School for Girls in 1972. She did BSc (Physiology) and MSc (Physiology) from Presidency College, Calcutta in 1975 and 1977 respectively. She completed her PhD (Biochemistry) from Indian Institute of Cell Biology, Calcutta in 1986. She went to USA for postdoctoral research work at the New York University Medical Centre, USA, 1986-88. She won Fogarty Special Fellowship in 1991 and Rockefeller Foundation Biotechnology Fellowship in 1992-94.

She occupied leading position in various prestigious institutions. She served as CSIR Pool Officer, Department of Biochemistry, Bose Institute, Calcutta, 1988-89; Lecturer, 1989-92; Senior Lecturer, 1993-97; Reader, 1997-2003; Professor, 2007; Senior Professor, 2007 onwards. Currently, she is the Vice Chancellor of Presidency University, Kolkata, since 2014. She served as CEO, Wellcome Trust/Department of Biotechnology Indian Alliance (an independent public charitable trust created in 2008 by partnership between Wellcome Trust (UK) and the Department of Biotechnology (India), 2009-12. She has been an Adjunct Faculty of the Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad, since 2011.

Her meritorious service has been acknowledged by conferring her with Outstanding Young Person (Science), Chamber of Commerce, 1992; Rockefeller Foundation Biotechnology Career Fellowship, 1992-94; UNESCO Molecular and Cell Biology Network Award, 1996; National Award for Young Woman Bio scientist, 2001; Stree Shakti Science Samman, 2005; Zee Network Astitva Award, 2005. She has been a Fellow of the Indian Academy of Sciences, Bangalore, 2007.

Her research focused on regulation of cell cycle progression and differentiation of the human pathogen *E. histolytica*. This is an organism which is very difficult to grow in the laboratory and where standard microbiological/genetic methods cannot be used to study this organism. She has demonstrated significant differences in the cell cycle of *Entamoeba histolytica*, such as the lack of checkpoints, so that the amoeba genome re-duplicates in the absence of mitosis. She was the first to clone *Entamoeba* cell cycle genes and to demonstrate the presence of introns in amoeba. She also identified the annotated homologs required for checkpoint function in the eukaryotic cell cycle. Her research team has also established a *SiRNA* based method to down-regulate expression of specific genes in stable transformants and are using this to identify gene function in *E. histolytica*. She served as Associate Editor of *Journal of Biosciences* and PLoS NTD. She was the Secretary of the All Indian Cell Biology Society, 2005-07. She was an Elected Member of the Guha Research Conference, India, 1997. She is a Fellow of the Indian Academy of Sciences, Allahabad, 1998. She has published several research papers in high impact national and international journals. She has been conducting research work supported by various international research grant provider such as Wellcome Trust (UK) and grant from Molecular and Cellular Biology Network of UNESCO. She earned high reputation for her path breaking research. She is a proficient Indian Kuchipudi dancer and profound classical musician. She enjoys trekking and has conducted many trips to high altitude.

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Lukose, Mary Poonen
(1886–1976)

Dr. Mary Poonen Lukose was a pioneering Obstetrician and Gynaecologist of India. She was born on 2nd August 1886 at Travancore, Kerala. She was the daughter of Dr. T E Poonen, the first medical graduate of Kerala, who did his MBBS from Aberdeen University, UK. He was a well-known ENT doctor and well connected to the royal family. Due to some health problem, Mary's mother stayed at her parental home. Mary was brought up by a British governesses. Her father, Dr. Poonen was family physician and quite close to Royal Palace of Maharaja Sreemoolam Tirunal.

Dr. Mary Poonen completed her matriculation from Holy Angel's Convent High School, Thiruvananthapuram. Though she topped in her matriculation examination, she could not get admission to the Maharaja's College due to gender prejudice prevailed in the society at that time. She passed FA Exam from the same school. Finally with lots of pressure from her father and his political influence, she got admission to BA (History and Economics) at the Maharaja's College. She passed BA Exam in 1909 and became the first woman graduate of the Madras University. She wanted to join medical profession like her father, but it was not possible for a woman to get admission to any medical college in India. Therefore, she proceeded to London to get admission to MBBS at London University. She was the First Indian Woman Student (that too from Arts Graduate stream) to get admission

to the London University. She successfully completed graduation in medicine in 1915 and started postgraduate studies in obstetrics and gynaecology at the Rotunda Hospital in Dublin, from where she passed MRCOG (Member of Royal College of Obstetrics and Gynaecology). She also passed LM from Rotunda Hospital, Dublin. There after, she joined Advanced Training in Paediatrics at the Children's Hospital, Ormond Street, London (one of the first teaching centre for pediatrics in the world).

During her stay in UK, the First World War broke and she continued her stay in London up to 1916. She worked as Medical Officer to different military hospitals in London. Things were not very pleasant back home as her father died after sometime, when she left for UK. She decided to stay in Thiruvananthapuram after her return from London in 1916, because she came to know that there was a vacancy of Obstetrician at the Women and Children's Hospital at Thycaud (which was vacated by Mrs. Austin, who had to leave India after her marriage). But the post was reserved for white people and therefore, her application was rejected. She received lots of support from the royal family and Maharaja, who made it possible for her to join the post in 1916 at the age of 30, where she continued to serve till 1938. She became the First Woman Surgeon General in the World in 1938. She was incharge of 32 government hospitals, 40 government dispensaries and 20 private institutions.

In 1924, she was promoted to the post of Acting Surgeon General of Travancore. Then she became the First Lady Member of the Legislative Council of Travancore in 1922-37. She was made the Incharge of the State Health Department of Travancore in 1924. In 1917, she married advocate Mr. K K Lukos, who later became a judge of the High Court of Travancore. She also served as the Chief Commissioner of the Girl's Guide Movement in India during 1942.

Dr. Mary Poonan Lukose made outstanding contributions to the health care system of Travancore. She developed the Women and Children's Hospital at Thycaud into a well equipped modern hospital having facility for treatment of all the departments of medicine. She also started two years Nursing Training Course in the hospital. She played leading role to start Radium Ward and the Deep X-Ray Unit

and the Radium Institute in Thiruvananthapuram. She also established a TB Hospital at Nagercoil. She opened a number of free dispensaries for poor and the destitute in different parts of the rural areas of the state. She established the Thiruvananthapuram Branch of YWCA and served as the Founder President for over 50 years. She also served as an active Member of the Indian Medical Association and the Indian Obstetrical Association. She had a great passion for music and she passed London Music Examination at the age of 18 years.

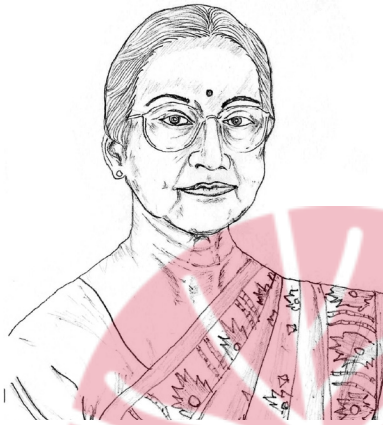
In recognition to her phenomenal contributions, she was awarded Vaidya Sastra Kusala by Chithira Thirunal in 1935; King George Medal in 1939; Medal from Girl's Guide Headquarter, London, and Padma Shri in 1975.

She had a very tragic personal life. She had two children. Her husband died in 1947. Her daughter, who was a doctor passed away in a tragic accident. Her son, who was in Indian Foreign Service also died of heart attack. Dr. Lukose died on 2nd October 1976 at the age of 90.

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Luthra, Usha Kehar
(b.1932)

Dr. Usha Kehar Luthra was an eminent Pathologist. She was daughter of ND Kehar and Krishna. She was born on 21st September 1932 at Lahore, Pakistan. She attended Lady Hardinge Medical College, New Delhi and completed her MBBS in 1954. She specialized in MD (Pathology and Bacteriology) and PhD (Pathology) from Sarojini Naidu Medical College, Agra in 1959 and 1964. She did Postdoctoral Training in Cytology, Pathology and Cancer Research from New England Deaconess Hospital and Cancer Research Centre, Harvard University, Boston, USA, 1961. She had the opportunity to work under internationally acclaimed scientists including Professor Shields Warren and Olive Gates during her postdoctoral training. She took Advanced Training in Cytology from Chicago University, Chicago, USA.

She started her career as a Lecturer of Pathology, Sarojini Naidu Medical College, Agra 1959-60; Reader, Surgical and Experimental Pathology, 1960-68; Professor and Head, Postgraduate Department of Pathology and Bacteriology, 1968-71; Deputy Director General, Indian Council of Medical Research, 1970-76; Director, Cytology Research Centre; Senior Deputy Director-General; Indian Council of Medical Research, New Delhi.

She is a Founder Fellow, Indian Academy of Medical Sciences (India); Elected Fellow, Indian National Science Academy, New Delhi, 1977; Fellow, International Academy of Cytology, USA; Fellow, Royal College

of Pathologists, London; Fellow, Indian College of Pathologists. She is an active member of many professional associations including Member, International Academy of Pathology; Emeritus Member, American Association of Cancer Research, USA; Member, British Society of Clinical Cytology; Member, European Association for Cancer Research; Member, Indian National Science Congress Association; Member, Indian Association of Pathologists and Microbiologists; President, Indian Association of Cytologists, 1977-78; and Honorary Member, International Association of Cancer Registries, Lyon, France, 1994.

Dr. Luthra contributed immensely in the field of cancer research including epidemiological, experimental and morphologic aspects of oral and cervical cancer. She was responsible for setting up the cytology laboratory and initiating diagnostic service and screening programmes for cervical cancer in urban and rural population in the state of Uttar Pradesh in India.

Dr. Luthra is the Founder Director of the Institute of Cytology and Preventive Oncology, New Delhi. She worked on pre-cancer and cancer of uterine cervix and role of specific Human Papilloma Viruses (HPV). Based on her work, the preparation and trial of HPV vaccine was started. She also served as the Project Director of National Cancer Registry Project to create authentic data on problems of cancer in India. She also worked as the Head of the Cytopathology Unit, Mubarak Al Kabeer Hospital.

She is also responsible for introducing the Bethesda System of form for gynaecological exfoliative cytology in Kuwait in 1993. She was the technical co-ordinator of the First National Workshop in Exfoliative Cytology, held in Kuwait in December, 1993 and the technical advisor and faculty member of several workshops on Basic Course in Exfoliative Cytology held in Kuwait from time to time. She served as the faculty member for over four decades in different medical colleges in India and abroad. She introduced innovative methods of teaching pathology through experimentation. She served as a Member, WHO Expert Advisory Panel on Cancer, Geneva and Director of WHO International Reference Center on Oral and Oropharyngeal Tumors.

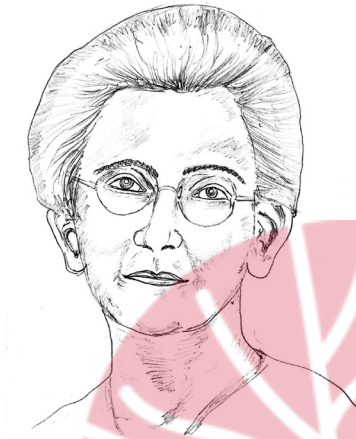
She received many prestigious awards including Shakuntala Devi Amir Chand Prize, 1964; Raja Ravi Sher Singh of Kalsia Memorial

Cancer Research Award, 1967; Dr. P.N. Raju Oration Award, 1969; Sandoz Award for Cancer Research, 1971; Basanti Devi Amir Chand Prize, 1973; Hari Om Ashram Alembic Research Award, 1981; Dr. K.N. Rao Oration Award, 1981; Shri Ram Memorial Oration Award, 1981; Dr. Borges Memorial Oration Cancer Award, 1985; Smt Vimla Shah Cancer Award, 1985; Professor Prem Nath Wahi Award, 1991; Erica Wachtel Memorial Oration Award, British Society of Clinical Cytology, 1991; Padma Shri, 1992; Jamee W Reagan Lecture in Clinical Cytology Award, International Academy of Cytology, 2001.

She has contributed over 186 research papers, conference proceedings and government reports in the field of her specialization. She served as the Associate Editor of *Journal of Clinical Cytology and Cytopathology*, *Cytologica*, *Journal of the International Academy of Cytology*, USA and Member of the Editorial Board of the *Journal of Biomedicine and Biotechnology*, USA, 2000.

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MacKellar, Margaret
(1861–1941)

Margaret MacKellar was one of the most famous Canadian woman medical missionaries. She was born on 3rd October 1861, in the Island of Mull at the West Coast of Scotland. She was the second child of Peter Mackellar and Mary MacLeod. Her father was a sailor by profession and was a captain of a ship. He used to make long voyages to distant lands. He visited India a number of times and narrated fascinating stories about India to his family. Margaret heard these tales from her elder sister and wished to visit India one day.

Margaret's family immigrated to Canada in 1863, when she was two years old. Her family first settled in St. Catharine, Ontario. Later, they shifted to the County of Bruce, where they built their own house and farm. Margaret started going to school at the age of five. She was a good student and a fearless girl who was fond of climbing, riding and travelling. She also learnt all techniques of sailing from her father. Her mother suffered a stroke of paralysis and died in autumn of 1877. Her father was very careful to give good education to his six children. She got good grades in town school and proceeded for high school studies. In 1874, despite strong objections from her father, she left school and started working for a dress-maker. In 1882, she left home to take a position in a wholesale millinery establishment in Ontario.

Margaret was greatly influenced by missionary services and dedicated herself to evangelical activities in 1884. She started approaching for foreign women missionary services. Soon she realized that she is not even a high school qualified, when there is a high demand for well-qualified missionary women doctors for foreign services. In summer of 1884, she returned to Ingersoll High School and resumed her school education. Initially, she faced certain challenges and then she shifted to the Public School of Bruce County at the age of twenty-two. In 1886, she qualified Matriculation Examination of Queen's University and registered herself for medical course at the Queen's University, Kingston. She completed her M D degree without any difficulty and attended the Convocation Ceremony in 1890. She received her license to practice medicine in Ontario on 22 May 1890. She also developed close association with the Women's Foreign Missionary Society (WFMS), which sponsored her school and medical studies. She was a bold and intelligent student, who always offered her dedicated service for missionary work. In her second year of medical studies, she became President of YWCA. She also learnt riding to facilitate her missionary service more efficiently in difficult terrain. Subsequently, she was selected for foreign missionary service to India. She completed four months post-graduate training in England before proceeding to India. She sailed from Halifax on 3 May 1890 to London. There she took special training in midwifery, eye diseases, chest and skin diseases, mental diseases, and diseases of children and women. She attended six hospitals in London and visited Edinburgh and Scotland.

On 4th October 1890, she sailed for India and reached Bombay on 26th October. She was received by the officials of Canada Mission and travelled by train with them to reach her first posting in Indore. She had heard about the generous gift of land in 1888 by the Dowager Maharani of Indore for building a hospital for women and children, but she was disappointed to see that the building was still under construction. She started working in a small dispensary and devoted her hard work for the rescue of poor and helpless from pain and suffering. In recognition to her devoted service, she was promoted to take charge of a new medical workstation in 1892 in a small village, Neemuch, some 200 kilometers away from Indore. Initially, she stayed

in a small bungalow and used it as residence as well as dispensary for visiting patients. In due course of time, fourteen acres of land was purchased to build two dispensaries, a church, an orphanage and a well-equipped two-storeyed 45 bed hospital. Gradually, she increased the strength of staffs by appointing a Canada trained nurse, Indian nurses (trained from Ludhiana Medical School for Women), compounder, dresser, etc. During 1899-1890, Central India faced severe famine and spread of plague epidemic. Dr. Margaret served boldly to rescue villages with very limited resources. With her management and clinical skills, she handled the situation successfully. She served as Honorary Secretary of the Governing Body of the Ludhiana Medical School for Women for seventeen years. She was the Chairman of the Governing Body of the same institute for five years. She was conferred with the honour of Kaiser-i-Hind Medal at the time of the King Emperor's Coronation Durbar in December 1912. The occasion also coincided with the completion of twenty years of her service in India. During First World War, she was with Royal Army Medical Corps at Freeman Thomas Hospital, Bombay. She was entrusted with a task to train twelve Indian women doctors for war service. She also worked as an expert to select suitable medical women for war service. In 1929, Queen's University bestowed on her the degree of LLD (Doctor of Laws). She served as the President of the Association of Medical Women in India, 1924.

She retired from her hospital service in India in 1930 and returned to Ontario, Canada. During her service career, she made valuable contributions as a member of the Editorial Board of the *Journal for Medical Women in India*. She was also an editorial staff of the *United Church Review*, North India. She was a prolific writer and published many articles related to Indian culture, public health, women issues, Indian tourist places in popular magazines and journals. After her retirement, she returned to Canada and lived as a resident of the United Church House, Jarvis Street, Ontario. She died on 24th August 1941 at the age of 79 at Toronto General Hospital. She was a member of Old St. Andrew's United Church, where the body lay in state. She was buried at Port Elgin.

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**MacKenzie,
Jemima (Mina)**
(1872–1957)

Jemima MacKenzie was born on 18th August 1872 at Waterside, Pictou County, Canada. She was the youngest of fourteen children of Simon and Ann Mackenzie. Her father was a farmer and Jemima had to bear the responsibility of the large family and her ailing parents. Various family problems delayed her early education and she could clear her Grade 12 schooling at the age of 26. During her childhood she heard of pathetic health condition of women and children in India. She was highly moved by the story of maternal mortality that prevailed in India due to lack of education and social prejudice, under which women preferred to die during child labour, instead of being treated by male doctors. As a child she took vow to become a doctor and serve women of India.

She graduated from the Dalhousie Medical School in Halifax in 1904. Her elder sister Molly also graduated in medicine from the same school after two years. After her graduation, she worked for a short time in Boston and then moved to Cawnpur (now known as Kanpur, Uttar Pradesh) in India in 1904 through the Women's Union Missionary Society of America. She started her clinical service in Northern India near the river side of Ganges. At that time she was the sole doctor serving in the rural area of Cawnpur. She had a dog 'Laddie', who always accompanied her in a small medical cart, which provided mobile roadside clinical service to rural poor. At times, she

travelled about 80, km per day. She also carried a revolver with her for personal safety. She single-handedly performed her first operation on a dressing table in the open air. After two years, her sister Molly also joined her in India and they moved to Fatehpur, where they established the Broadwell Christian Hospital in 1909. The two sisters worked there for six years, until Molly got married to Rev. A A Smith and returned to Ontario, Canada, where her husband became a Minister of the Canadian Government.

In 1920, Jemima had to return to her homeland to attend her ailing father, who died on 31st October 1922 at the age of 94. On 22nd May 1923, Jemima returned to India to resume her duty. Her brother Simmon heard about the poor living conditions of rural community in India, especially about the scarcity of drinking water in northern India. In order to help his sister, he carefully transported a nitro-glycerin dynamite in the trunk of Jemima while her return, to India. Jemima successfully used the dynamite for underground blast to create a well for drinking water for rural natives. After her return, she was posted to Hat Pipla, 35 miles away from Indore, Madhya Pradesh under the service of Presbyterian Foreign Mission Board of Canada. The hospital was a two story brick building having good facility for indoor and outdoor patients. While in Madhya Pradesh, she worked in different places including Hat Pipla, Indore, Ratlam, Dhar and Neemuch. They were not very far away from each other by car. Her last Mission post was in Neemuch, where she worked for about 10 years between 1929-39.

She was very popular for her dedicated clinical service to the poor and needy. She initiated various services to educate children and social upliftment of the women in the community. She provided financial support to the poor and destitute women and children. She sheltered 44 children at her home and many of them were girls who were rejected and abandoned by their parents due to gender prejudice in the society. She legally adopted 10 of the 44 children she sheltered. She stipulated conditions for adoption that the adopted children should be educated and ready to learn and know the value and faith of Bible. She spent over 32 years in India and treated over 20,000 patients in northern India. Once, she prevented the outbreak of Cholera epidemic

during the 1917 Kumbh Mela pilgrimage. She inoculated people day and night, at the risk of her own life. She conducted several cataract operations and many emergency surgeries to save life in 1918. She earned high regards and respect from rural public.

In 1923, she received Kaiser-I-Hind Gold Medal, the highest award for public service in India from the King George V for risking her own life to prevent Cholera epidemic. She received Honorary LLD Degree from Dalhousie Medical School in 1940. She was made Life Member of the Federation of Medical Women of Canada in 1954. In 1939, she returned to Canada and opened a little hospital in her house in Pictou. On 27th January 1957 she died at Pictou at the age of 84. She remained unmarried. She was buried in a Community Cemetery near Caribou River. Even today the Broadwell Christian Hospital at Fatehpur renders valuable clinical service and stands as a symbol of indelible contributions made by Mackenzie sisters from Canada.

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एकः सूते सकलम्



Majumdar, Abha

Abha Majumdar is a well-known name in the field of gynaecology in India. Many childless parents benefited from her expert service to become successful parents of babies born from the In Vitro Fertilization (IVF) technique. She studied medicine and completed her MBBS in 1974 from S N Medical College, Agra. She did specialization in obstetrics and gynaecology and obtained MS degree in 1978 from the same medical college in Agra. She proceeded for super specialization and served as Fellow of International College of Surgeons (FICS) in 1994. She received advanced training in endoscopy for pelvic and uterine resurrection and intravenous fertilization. She was a brilliant student and was recipient of seven gold medals, and certificate of honour in nine subjects and President's medal for being the best medical graduate of the S N Medical College, Agra for the year 1975.

She started her professional career as Consultant in the Department of Obstetrics and Gynaecology at the Sir Ganga Ram Hospital in New Delhi in 1987. She served as an active member of leading medical doctors, who made valuable innovative achievements in the field of IVF, artificial insemination, frozen oocyte research, etc. Currently, she is serving as the Director of the Centre for IVF and Human Reproduction at Sir Ganga Ram Hospital. She has conducted valuable research related to infertility with special interest on reproductive endocrinology, laparoscopic and hysteroscopic corrective surgery, open microsurgery and macrosurgery for gynaecological disorders

causing infertility and assisted reproductive techniques. She has been associated to the Centre for IVF and Human Reproduction since its inception in 1990. She was in the team of doctors responsible for the first IVF baby born in the hospital in 1991. The team also successfully researched the first baby born from frozen oocyte technique in January 2009. She is also involved in academics as a faculty member of the department conducting Postgraduate Diploma of National Board (DNB) Examination in the field of her specialization. She has been an Executive Committee member related to various committees on infertility and other gynecological problems.

She received Dr. B C Roy Award in 1999; National Vikas Ratna Award by the National Economic Development and Growth Society in 2002. She has also been honoured with the Cikitsa Ratna Award in 2007. She has been awarded certificate for conducting basic Training in Infertility and IUI by the FOGSI. She has also received award for achieving excellence in the field of gynaecology by the S N Medical College's Alumnus Association in 2006.

She took various initiatives to facilitate medical education in super specialization for young doctors in India. She served as the first Vice President and the founder member of the Indian Fertility Society from 2005-08. She has been the President of the same society since 2008. She is a Member of the National Association of Reproductive and Child Health of India (NARCHI). She is a core member of the Federation of Obstetrics and Gynaecological Society of India (FOGSI) and the European Society of Human Reproduction and Endocrinology (ESHRE). She has published many research articles in medical journals of national and international reputation. She served as Editor and Associate Editor of leading medical journals in the field of her specialization. She is one of the peer reviewers of the *Journal of Human Reproductive Sciences*. She is highly esteemed as a specialist of high risk pregnancies and infertility treatment.

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**Mathan, Minnie
Mariam**
(b.1937)

Dr. Minnie Mariam Mathan is a leading Pathologist, who has made significant contributions in the field of electron microscopy and gastrointestinal pathology. She was born to Chempakanallore and Mariam (George) on 16th December 1937 at Thiruvananthapuram, Kerala. She entered Christian Medical College, Vellore and completed her MBBS (1961), MD (Pathology) (1967), and PhD (1983). She visited UK and obtained FRCP (Fellow Royal College of Pathology) from London; and Ultrastructural Pathology Training from Boston University, Boston, 1970-71.

She started service career as a Faculty Member, Christian Medical College, Vellore. She served as Professor and Head, Department of Gastrointestinal Sciences, Christian Medical College, Vellore, 1993-97 (till she retired). She served as the Senior Scientist of Indian National Science Academy (INSA) in 1997. She held the position of First Career Research Chair, Christian Medical College, Vellore, 1981-until her retirement. She served as Visiting Professor, Flinders University, Adelaide, Australia, 1985-86 and University College London, 1993. She rendered valuable contributions as Consultant Pathologist, International Centre for Diarrhoeal Disease Research, Dhaka, Bangladesh. She has been a Fellow of National Academy of Medical Sciences (India), 1993; Founder Fellow, Indian College of Pathologists, 1993; Fellow, Royal College of Pathologists, London, 1996; Elected Fellow, Indian

National Science Academy, New Delhi, 1999. She has been a Member, International Academy of Pathology (Indian Division).

Dr. Minnie M Mathan was trained in Ultrastructural Pathology by Professor Jerry Trier at the University of Boston during 1970-71. She became a skilled specialist to study structure and functional relationship in gastrointestinal tract with the use of electron microscope. She developed a rare combination with the Department of Pathology and Gastrointestinal Sciences to develop a model of the pathogenesis of the intestinal lesion in tropical sprue, combining technique of electron microscopy in vitro organ culture and immunological studies. She also established the role of rotavirus as an important pathogen of acute diarrhoea in children in India, a major health problem. Working closely with clinical colleagues, she showed that an endotoxin-induced vascular lesion in the internal lamina propria is a major determinant of clinical severity in patients with acute diarrhoea including cholera. Her work on rotavirus has been recognized by the WHO by inviting her to serve as a member of their steering group on viral diarrhoea. She received Wellcome Research Grant for her research.

She received many awards and laurels for her brilliant research findings including National Academy of Medical Sciences Award; Hoechst Om Prakash Award, 1977; Boots Gastroenterology Award, 1988; Kshanika Oration Award, Indian Council of Medical Research, 1995; Amrut Mody Unichem Prize, 1996; Parke Davis Oration Award, Indian Society of Gastroenterology, 1996; Basanti Devi Amirchand Award for Eminent Women Scientists, 1997; and Ranbaxy Science Foundation Award for Clinical Research, 1997.

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Mathur, Asha
(b.1938)

Dr. (Miss) Asha Mathur, a well-known medical Virologist was born on 13th June 1938 in Bijnore, Uttar Pradesh. She was the second daughter of an engineer, Jagadish Narain and Bindeshwari. She received her early inspiration to study medicine from her grandfather, who was a former civil surgeon. She attended Agra Medical College and completed MBBS in 1965. She did her post graduate studies from King George Medical College, Lucknow, and completed her DCP (Diploma in Clinical Pathology) and MD (Pathology) in 1966 and 1969. She also took Training in Basic Techniques in Virology from the National Institute of Virology, Pune, 1970.

She gained wider experience in the field of her specialization through her extensive work assignments in various institutions in India and abroad including Lecturer, King George Medical College, Lucknow, 1969; WHO Fellowship, Common Cold Unit, Salisbury, UK, 1971-72 (where she had the opportunity to work with Dr. DAJ Tyrrell and Sir John Andrews on respiratory viruses). She availed WHO Fellowship, Medical Research Centre, London, UK in 1978; Deutscher Akademischer Austauschdienst Fellowship, Hamburg, Germany in 1981 and British Council Fellowship from 1981-82. She served as a Scientist, Laboratory of Professor Gardner, New Castle Upon Tyne, UK in 1985. She assumed the position of Professor and Head of the Department of Virology, King George Medical College (KGMC),

Lucknow, 1998-2000; Emeritus Scientist, Central Drug Research Institute, Lucknow, 2000-03; Professor and Head, Department of Pathology and Microbiology, Saraswati Dental and Medical College, Lucknow.

She had the honour of being a Fellow, National Academy of Sciences (India), Allahabad, 1989; National Academy of Medical Sciences (India), 1992; Indian Academy of Sciences, Bangalore, 1993; Elected Fellow, Indian National Science Academy, New Delhi, 1990 and Fellow, Third World Academy of Sciences, Italy, 2001.

She made outstanding contributions as a member of Indian Association of Pathologists and Microbiologists, Indian Immunology Society and Association of Microbiologists of India.

Dr. Asha Mathur has made significant contributions in the field of virology including discovery of transplacental transmission of the Japanese Encephalitis Virus (JEV) in human beings. She made extensive research on Common Cold and took initiative to develop laboratory for research on respiratory viruses at KGMC, Lucknow. She discovered that the phenomenon of persistence; latency and reactivation of JEV are of far reaching consequences in the context of human illness. Her research findings have shown that Japanese Encephalitis (JE) is an important cause of acute childhood encephalopathy in the Lucknow area, where it is probably endemic. She was the first to develop a quick immuno-fluorescent technique for early diagnosis of JE in patients. She was instrumental in developing 'IgM capture ELISA-Kit' for the diagnosis of JE. Her findings also proved that JE viral infection during pregnancy may be transmitted to fetus, resulting into abortion or fetal abnormality. Her findings captured international attention and she was invited to present her research findings in London in 1980 and in several international conferences on virology. Her contributions on respiratory viruses, congenital malformation, and acute haemorrhagic conjunctivitis and dengue virus infections received global recognition. She has published over 190 research articles in reputed medical journals.

She has carved herself in to a leading place in the medical virology by receiving several awards and recognitions including Dr. JB Srivastav Oration Award, Indian Council of Medical Research, 1983; Hari Om Ashram Research Award, Medical Council of India, 1984; Dr. YS

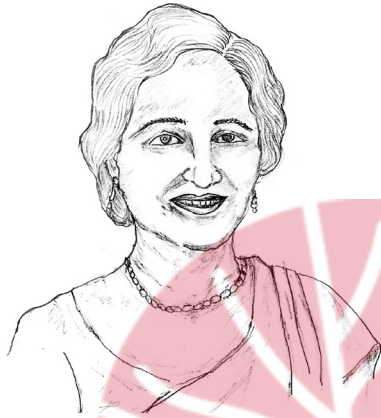
Narayana Rao Oration Award, Indian Council of Medical Research, 1987; First Senior National Women Bio-scientist Award, Department of Biotechnology, India, 1999; Om Prakash Bhasin Award, 1994; Indian Council of Medical Research Awards, 1983, 1987, 1996; Medical Council of India Awards, 1984 and 2004; Kshanika Oration Award for Women Scientists, 1997 and Glaxo Oration Award, National Academy of Medical Sciences (India), 2004.

Her mother Bindeshwari, was a housewife having interest in artistic work and art appreciation. Dr. Asha Mathur imbibed her flair for performing art. She grew up into a proficient Kathak dancer, painter and embroider.

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Mehra, Sheila
(b.1937)

Dr. Sheila Mehra is an eminent medical personality of international repute. She was born on 12th January 1937 in Bhadarwah, Jammu and Kashmir. She married Dr. M K Mehra, a well-known ophthalmologist. She graduated in medicine from Lady Hardinge Medical College, New Delhi in 1959. She proceeded to UK for higher studies and earned DRGOG (Diploma of Royal College of Obstetricians and Gynaecologists), London in 1962; MRGOG (Member of Royal College of Obstetricians and Gynaecologists), London in 1966; FRCOG (Fellow of Royal College of Obstetricians and Gynaecologists) in 1981. She did FICOG (Fellow of Indian College of Obstetricians and Gynaecologists) in 1985. She started her career as Gynaecologist, at Safderjung Hospital, New Delhi in 1966. She joined as Consultant, Ganga Ram Hospital and Moolchand K R Hospital, New Delhi in 1967; She served as Professor, Federation of Obstetrics and Gynaecological Society of India (FOGSI), 1985; Senior Consultant and Coordinator, Obstetrics and Gynaecology Department and Project Director, Post-Preterm Unit for Family Welfare, Moolchand K R Hospital, New Delhi. She also served as Visiting Consultant to Batra and Escorts Heart Institute, New Delhi.

Dr. Sheila Mehra has made significant contributions in the field of gynaecology, endoscopy and family welfare. She has over 40 years of experience in handling high-risk pregnancies and normal deliveries.

She has set up a well-trained and well-equipped hospital with best possible facilities to perform high risk pregnancies, where woman give birth to premature babies. She is also highly consulted for the treatment of Polycystic Ovarian Syndrome (PCOS) or management of thyroid during pregnancies. She is one of the few gynaecologists of India performing extensive endoscope operative surgical procedure (key hole surgery). She is one of the first doctors to start organising hospital-based family planning camps in northern India. She is proficient in microsurgery, laser treatment and In Vitro Fertilization (IVF) procedure. She performed the first Laparoscopic Hysterectomy in India at the Moolchand Hospital in 1990. She pioneered in many new surgical techniques in the field of obstetrics and gynecology.

She made leading contributions in the profession as a Member and Office Bearer of several associations including President, Delhi Gynaecological Endoscopists Society; Member of American Association of Gynaecological Endoscopists, Indian Medical Association, Delhi Medical Association and Gynae Endocrine Society of India. Dr. Sheila Mehra's multifaceted clinical pursuit has won her many laurels such as Delhi Administration Award for Best Performance for Urban Family Welfare, 1985, 1989; Mahila Mangal Award, Delhi Government; Padma Shri, 1991; Radha Raman Award, Government of India, 1998; Human Care Award, Punjab & Sindh Bank, 1999; Swastha Ratna, Indian Medical Association, 2002; Lifetime Achievement Award, Indian Medical Association, 2006. She published the first book on gynaecological endoscopy in India. She is a mentor to many leading obstetricians and gynaecologists across the country. She has published several research articles in reputed medical journals. She also served as Consultant Editor of *J K Science: Journal of Medical Education and Research* and Editor Emeritus of *Indian Journal of Gynecological Endoscopy*.

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Mehta, Kumudben A (1902–1959)

Kumudben A Mehta is acknowledged as a pioneer lady doctor, who took significant initiatives for the training and education of Indian women in the field of medicine. She was a constant defender for improving service conditions for women doctors in India. She was born in January 1902 in a well-established Gujarati family. She was the eldest daughter of the well-known medical practitioner, Dr. Amrit Lal Mehta. She was the wife of Dr. Pravin Mehta, an eminent surgeon and a great philanthropist.

She passed her matriculation examination from Chanda Ramji High School in 1918. From the very beginning she aspired to follow the profession of her father, though there were lots of objections from her orthodox Gujarati family. She passed MBBS degree in 1925. She visited United Kingdom and completed her MRCP (Member of Royal College of Physicians) from Edinburgh in 1927. She was the first Gujarati woman to acquire post graduation in medicine. She also passed LM (Licentiate in Midwifery) from England.

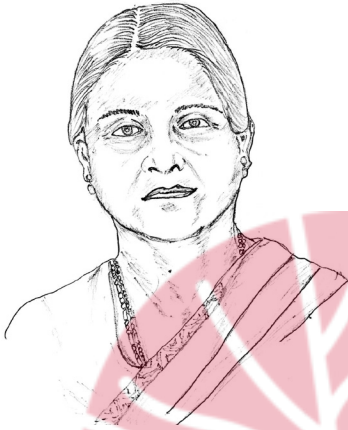
She returned to India in 1927 and started her own clinic and maternity home. She associated with well-known doctors of that time such as Dr. T O Shah (FRCS, England) and Dr. P T Patel (MD, London) to establish the well-known polyclinic at the Queen's Road, Bombay. She remained attached to the polyclinic and nursing home until her death in 1959. She also worked as Consultant at

the Cama and Albless Hospital, Harkinsondas Hospital and Bhatia General Hospital in Bombay. Besides being in medical profession, she took great interest in women's affairs in the society. She was an active member of many Gujarati women welfare societies such as the Bhagini Samaaj, Gujarati Stree Mandal, Balkanji Bari, Suniti Girl's High School, Sanskar Shiksha Sangh and several other social welfare organisations. She was a great philanthropist, who contributed for poor students and needy patients. She also gave scholarship grant for foreign studies to several Indian students. She and her husband had a busy thriving medical practice in Bombay, yet they devoted two days of a week for conducting free surgical and medical camps in rural areas of Gujarat, Rajasthan and other places. They founded several NGOs and adopted over 100 schools in Gujarat and Rajasthan. People around her including patients, colleagues, friends and relatives adored and worshipped her for her outstanding dedication and charitable clinical service. She also established a school at Udwada for girls of backward classes in the memory of her mother as the 'Naniben Mehta Kanya Chhatralaya'. She was popularly known as 'Kumudben' among her near and dear ones. She died on 6th December 1959 at the age of 57.

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Mittal, Aruna
(b.1948)

Dr. Aruna Mittal is an eminent Pathologist. She was born on 15th October 1948. She did her BSc and MSc from University of Delhi in 1969 and 1971. She obtained PhD from Vallabhbhai Patel Chest Institute, Delhi, 1977. She completed Biotechnology Overseas Long-term Associateship at the Centre for Disease Control, Atlanta, USA, 1988-89. She took advance training at the Rockefeller University, New York, USA (under Indo-US SSP Programme), 1984.

She joined as Senior Research Fellow, Lady Hardinge Medical College, New Delhi from 1977-78. She served as Research Officer, National Institute of Allergy from 1978-79. Later, she joined RMR Institute of Medical Sciences as Research Associate, and worked there from 1979-80. She served as Research Associate, All India Institute of Medical Sciences, New Delhi from 1980-81. Thereafter, she served as Senior Research Officer at Institute of Pathology, New Delhi from 1986-91. Subsequently, she was promoted to Assistant Director, 1992-97; Deputy Director, 1997-2002; Deputy Director (Senior Grade), 2002 till date. She earned high reputation and international links which enabled her to serve as Visiting Scientist, B D Biosciences, San Jose, California, USA, 2001; Visiting Scientist, Roswell Park Cancer Institute, Buffalo, USA, 2005; Visiting Scientist, Dartmouth Medical School, Hanover, USA, 2005.

Dr. Aruna Mittal has done significant research work on sexually transmitted infections including *Chlamydia trachomatis* infection

in India. She developed indigenous diagnostic assay for *Chlamydia* and identification of biomarker (both pathogen and host) involved in *Chlamydia* pathogenesis. For the first time in India, the species-specific monoclonal antibodies to *C. trachomatis* from an isolate of Indian patient was developed by her. The method is currently used for diagnosis of *Chlamydia infection*. She has also identified the site of high pathogenicity in the female genital tract of Indian women by genotyping. Her studies with cervical lymphocytes have revealed various mechanisms involved in the pathogenesis of *Chlamydial infections*. Currently, she is working to develop a vaccine which could induce a protective mucosal immune response in female reproductive tract. Her laboratory developed cost-effective diagnostic assays for diagnosis of *C. trachomatis*. Ultimate goal of her research is to develop a vaccine which could induce protective mucosal immune response in female reproductive tract. She was the first in India to establish culture for *Chlamydia* from endocervical swabs of female patients, which is being maintained at the Institute of Pathology. Research for the development of DOT Eliza for detection of antibodies to *Chlamydial* heat shock protein 60 (a unique protein that has been identified in Indian strain) is in progress. Her laboratory was the first in India to report and publish the morphological criterion for localization of intracellular *C. trachomatis* inclusions in cervical smears stained with Giemsa in 1993. She referred this technique for easy diagnosis of *C. trachomatis* instead of elaborate culture method.

She has been honoured as Fellow, Indian College of Allergy and Applied Immunology, 1976; Fellow, Indian Immunology Society, 1990. She is closely associated as Member of Indian Association of Pathologists and Microbiologists and International Union against Sexually Transmitted Infections (Asia-Pacific).

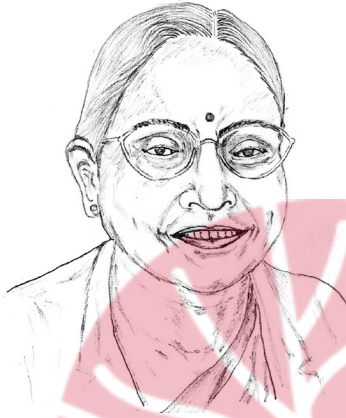
She has been bestowed with various awards including Shakuntala Devi Amir Chand Prize, Indian Council of Medical Research, 1984. She was awarded the title of '*Chlamydia Farmer*' by the Centre of Disease Control, USA, 1989. She received D N Ranganathan Award, 1990; Kshanika Award, Indian Council of Medical Research, 2003; Lala Ramchand Kandhari Award, Indian Council of Medical Research, 2006. She has published over 75 original research papers in reputed

medical journals, contributed over six book chapters and presented more than 69 papers in conference proceedings.

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Mohanty, Dipika
(b.1942)

Renowned Haematologist and Pathologist, Dr. Dipika Mohanty was born on 9th April 1942 in Cuttack, Odisha.

She did MBBS from Utkal University and also qualified MD and PhD from Post Graduate Institute of Medical Education and Research, Chandigarh in 1972 and 1975. She did Postdoctoral Commonwealth Fellowship from 1978-79; FRCP (Fellow of Royal College of Pathology), London in 1998; FACP (Fellow of American College of Physicians) in 2001 and FNAMS (Fellow of National Academy of Medical Sciences, India). She took Advance Training in Haematology from Hammersmith Hospital and Afford Hemophilia Centre, UK.

She served as the faculty member and reached to the position of Additional Professor and Head of the Department of Haematology, Postgraduate Institute of Medical Education and Research, Chandigarh. She was the Director of Institute of Immunology, Mumbai till her retirement. At present, she is the leading Consultant at Apollo Hospital in Bhubaneshwar.

Dr. Dipika Mohanty has made exceptional achievements in the field of haemoglobinopathy. She made extensive research studies in prenatal diagnosis of thalassemia, sickle cell disease, hemophilia A and B families and Von Willebrand's disease (VWD). She focused her research on newborn screening for sickle cell anaemia and hypothyroidism, iron deficiency and cognitive function of infants. Her research revealed that the sickle

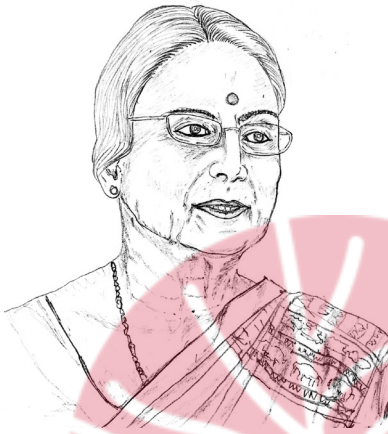
cell anaemia (approximately 14 both heterozygous and homozygous) is highly prevalent in western part of Odisha. By calculating gene frequency, sickle cell anaemia in newborn can be detected. Their quality of life can be improved by avoiding exposure to extreme temperature, etc. Prenatal diagnosis is possible in the same way for the detection of thalassemia by chorionic villi biopsy, PCR of DNA and testing mutation in the beta haemoglobin gene. But sickle cell anaemia is not that much severe as thalassemia is. Hypothyroidism is done to rule out whether it is transitory or congenital. Therefore, prenatal detection in newborns can improve their quality of life in future. Her research also highlighted that iron deficiency and iron deficiency anaemia can hamper cognitive function and brain. It is found that supplement of iron is beneficial before the anaemia starts its destructive procedure. Haemoglobinopathy is one of the major problems worldwide. Beta thalassemia and sickle cell anaemia are two types of haemoglobinopathy found mostly in Rajasthan, Gujarat, Tamil Nadu, Maharashtra, Madhya Pradesh and Chhattisgarh in India.

She distinguished herself as a Fellow of International Society of Thrombosis and Haemostasis; and Fellow, International Society of Haematology (Pacific Division). She rendered leadership in the profession as a Member of Indian Society of Haematology and Blood Transfusion and Indian Society of Nuclear Medicine.

Her lifetime professional achievements helped her to receive S S Mishra Gold Medal, 1978-79; Manorama Sapre Oration Award, 1982; BGRC Oration Award, 1985; Award from International Society of Thrombosis and Haemostasis, 2002; National Senior Women Bioscientist's Award, Department of Biotechnology, India, 2003; Kamala Menon Award, Indian Council of Medical Research; Biju Patnaik Award for Excellence, 2007. Dr. Mohanty has published over 200 research articles and survey reports in reputed medical journals. She serves as the Member of the Editorial Board of *Indian Journal of Haematology*.

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**Mohanty-Hejmadi,
Priyambada**
(b.1939)

Dr. Priyambada Mohanty-Hejmadi is a distinguished Zoologist, Environmentalist and Dancer. She was born on 18th November 1939. She went abroad for higher studies and took MS and PhD from Michigan University, Ann Arbor in 1970.

She served as Professor, Department of Zoology, Utkal University, Odisha. Besides, she was Vice Chancellor, Sambhalpur University, Odisha.

Dr. Mohanty-Hejmadi is an eminent naturalist and highly respected academican in Odisha. She made significant contributions on developmental biology and conservation in the field of herpetology. She has done extensive research on olive ridley turtles of various beach areas of Odisha. She traced the earliest account of olive ridley turtles (*Lepidochelys olivacea*) made by Captain Alexander Hamilton, who travelled between Cape of Good Hope and Japan (Hamilton 1727) and included his detailed observations in the book entitled *A New Account of the East Indies* Volume I in the Chapter 'Treats of the Sea-Coast and Some Inland Countries in the Ancient Kingdom of Orixa..... Jagarynat'. Here the author provided details of his observations on his travel from Ganjam to Ballasore by land in 1708. This is the earliest record of documentation of the behaviour of nesting of olive ridley turtles from the coastal districts of Orixa (at present Odisha). She has published several research articles and popular scientific articles on the environment and fauna of Odisha.

She has been honoured as Fellow of Indian Academy of Sciences, Bangalore, 1993 and Orissa Bigyan Academy.

She has been bestowed with various awards including Pitamber Pant National Environment Fellowship; Justice Raj Kishore Das Memorial Award; Senior Scientist of Orissa Award; Prankushna Parija Award; Padma Shri, 1998; Orissa Bigyan Academy Award, 2008-09. She has also published several original research articles in reputed medical journals.

Dr. Mohanty-Hejmadi is an excellent Odissi dance exponent and has received Sangeet Natak Academy Award and Sarangdev Fellowship for her contributions to Odissi dance. In 2013, she was honoured with Odissi Nritya Samman.

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Moolgaokar, Leela
(1916–1992)

Dr. Leela Moolgaokar was a great Haematologist, who was the fountain head of the concept of Blood Bank Movement in India. She was born on 10th October 1916.

She served as a Radiologist, St. George's Hospital, Bombay from 1947-54; Honorary Organiser, Blood Bank Scheme, Government of Maharashtra, 1954-70, 1975- until her death in 1992. She was Officer on Special Duty for Blood Transfusion Service, Directorate General of Health Services, New Delhi, 1964-65. Subsequently she was promoted to Assistant Director General for Blood Transfusion Service, 1965. She became Sheriff of Bombay, 1975-76 and Member of National Leprosy Commission in 1984.

She was a pioneer in community medicine and social welfare activities. She was associated with various high level government bodies in her capacity as Chairman, IIIrd All India Conference, Indian Society of Blood Transfusion and Immunohaematology, 1975; President, Karve Institute of Social Service, 1976; Patron, Indian Society of Blood Transfusion and Immunohaematology, 1976; Patron, Bombay Haematology Group, 1977; Member, Board of Management, Acworth Leprosy Hospital, Bombay, 1977; Chairman, Federation of Bombay Blood Banks, 1980; Vice-Chairman and Secretary, Blood Bank Association, 1985; President, Society for the Eradication of Leprosy.

Dr. Leela Moolgaonkar pioneered the Voluntary Transfusion Service in India. She started the Blood Bank Movement in India. She was appointed as the Honorary Organiser for the Blood Bank Scheme of the Government of Maharashtra. In recognition to her selfless service to the noble cause, she was appointed as the Special Officer on Duty for Blood Transfusion Service of the Directorate General of Health Services, New Delhi in 1964. She was instrumental in starting the Federation of Bombay Blood Bank in 1980 with the idea of evolving a uniform code of conduct as regards to collection, utilization and benefits to be extended to voluntary blood donors and to carry out research in blood transfusion. She was highly moved by the plight of people suffering from leprosy and she managed through the good offices of the former Prime Minister of India, Smt Indira Gandhi to revoke the Indian Lepers Act 1898 in Maharashtra. She prepared the blue print for the eradication of leprosy in India during her tenure as a Member of the National Leprosy Commission. She also served as the Chairman of the Tata Relief Committee in 1961 at the time of Panshet Dam Disaster. She actively participated and contributed for the relief work during various natural disasters such as Koyna earthquake in 1967, Flood in Bihar, Maharashtra drought in 1972, Tidal Wave Disaster in Andhra Pradesh in 1977 and Flood in Raigad District in 1992. She was a great philanthropist, who worked for social reform related to the conditions of women and children in the Indian society.

She received Padma Shri, 1963; Acharya Atre Foundation Award, 1976; Grants International Award, 1982; Citizen of Bombay Award, 1986 and Rotary Club Award. Leela Moolgaonkar Foundation for Transfusion Medicine has been established in her honour.

She died on 20th May 1992 at the age of 76. Indian Red Cross instituted Annual Leela Moolgaonkar Oration Award for eminent Haematologists of India and the Annual Leela Moolgaonkar Memorial Oration has been set up by the Association of Voluntary Blood Donors of West Bengal.

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Morris, Elsie M

Elsie M Morris was an American missionary doctor, who faced strong opposition from her family for education. Since the age of 17 years, she faced several difficulties like ill health, lack of resources and overall discouragement. She completed undergraduate studies from Elnira College, New York. Later, she did MD from Women's Medical College, Philadelphia in 1926 and internship at the Women's Hospital, Philadelphia.

She was appointed as Assistant Physician at Vassar College, Poughkeepsie, New York in 1926. She was sent to Nellore, South India in 1930s by American Baptist Foreign Mission Society. She was appointed as Superintendent at the Women's and Children's Hospital, Nellore, South India. The Women's and Children's Hospital at Nellore provided medical and religious services to the neglected women. Once she handled a case of an Indian mother (only twelve-years old) and her son, who perhaps would have faced irreparable damage of health or premature death, had she been left under the care of local midwives. She took care of the mother and child with great devotion and helped them recover from the dangerous health condition and saved their life. The mother and child returned to their home happily.

She had a great clinical burden of large number of villagers as she was the only qualified doctor in the city of Nellore. She lost her one eye during her first term of service in India. While conducting

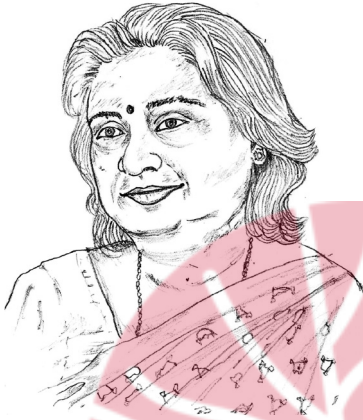
an operation, pus from her patient got into her eye and caused severe infection, which resulted into loss of her eye. She was a dedicated physician, who contributed her service despite such crucial loss of her sensitive body part. After first term she returned to her hometown on furlough and got an artificial eye fixed into the socket of her damaged eye. She returned to India for her second term despite the fact that quite often she faced problem of adjustment with the artificial eye. Once she broke her artificial eye, then immediately she had to go back to her home in USA to get another piece as this facility was not available in India.

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Mukerji, Mitali
(b.1967)

Dr. Mitali Mukerji has made outstanding research contributions in the field of human genetics. She was born on 13th November 1967 in Madhya Pradesh. She completed her BSc from University of Allahabad in 1988 and MSc from Indian Agricultural Research Institute, New Delhi in 1991. She earned PhD from the Indian Institute of Science, Bangalore in 1997. She joined the Institute of Genomics and Integrated Biology, Delhi as Scientist in 1997. Currently, she is serving as the Principal Scientist at the same institute. She is also the Programme Director of CSIR-Ayurgenomic Unit.

Dr. Mitali Mukerji has conducted significant research work on genomics, particularly in deciphering the genomic underpinning of some important neurological disorders. She has also provided leadership insight into the genomic diversity of the people of India, with profound implications on disease-associated studies. She has pioneered integration of Ayurveda and Genomics and termed it as 'Ayurgenomics'. Her broad area of research is genomic variation and its effect on human phenotype and susceptibility to diseases. She has been actively involved in Indian Genome Variation Consortium. She is combining genomics with phenotyping principles of Ayurveda and objective parameters of modern medicine for identifying molecular enophenotypes. Team of scientists' working in her group is studying the role of Alu elements in evolution of novel regulatory networks through functional genomic approaches.

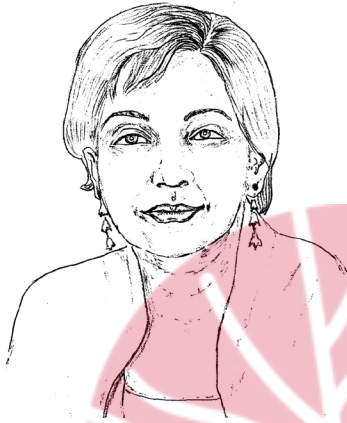
Her innovative research findings have been acknowledged by awarding her Young Scientist Award, Council of Scientific and Industrial Research, 2001; Young National Women Bioscientist Award, Indian National Science Congress, 2004 and Shanti Swarup Bhatnagar Award in Medical Sciences in 2010; S.S. Katiyar Oration Lecture, Indian National Science Congress, 2011; Pandit Shiv Nath Sharma Sodh Puraskar for research in Ayurveda, 2012. She has been honoured as Fellow, Indian Academy of Sciences in 2014. She has contributed several research papers in scientific journals of national and international repute.

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Murthy, Jayathi Y

Jayathi Y Murthy is the first woman engineer to hold the Department Chair and Ernest Cockrell Jr. Memorial Chair in Engineering at the University of Texas, Austin, USA. She completed BTech (Mechanical) from Indian Institute of Technology, Kanpur in 1979 and moved to USA for postgraduate studies. She earned MS from Washington State University, USA in 1981 and PhD from University of Minnesota, Minneapolis in 1984.

She started her service career as a Scientist at the Fluent Inc., USA, a leading developer of computational fluid dynamics (CFD) software, from 1988-98. She served as Associate Professor at the Department of Mechanical Engineering, Carnegie Mellon University, USA from 1998-2001. In 2001 she joined as Professor, Department of Mechanical Engineering, Purdue University, Lafayette, USA. She was designated as Robert V. Adams Professor Mechanical Engineering, Purdue University, Lafayette, USA, from 2008-2011. She served as Director of PRISM (Prediction of Reliability, Integrity and Survivability of Microsystem), an organisation of National Nuclear Security Administration (NNSA) during 2008-14. She served as the first woman Chair of Department of Mechanical Engineering and Ernest Cockrell Jr. Memorial Chair in Engineering at the University of Texas, Austin, USA from 2012-15. She has been appointed as the Dean of UCLA's Henry Samueli School of Engineering and Applied Sciences (HSSEAS) in January 2016.

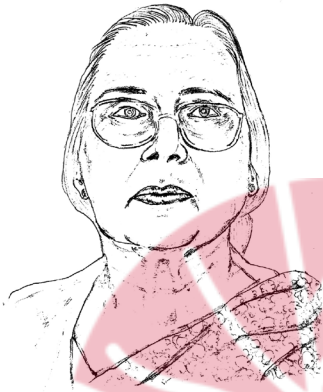
Dr. Murthy's research interest includes computational heat transfer and fluid mechanics, with an emphasis on the development of unstructured, solution-adaptive finite volume methods for industrial applications. Recently, her work has focused on the analysis of microscale heat transfer, particularly in emerging microelectronics applications. Prof. Murthy serves the K-16 and K-20 Committee on the American Society of Mechanical Engineers (ASME).

Her brilliant academic and industrial field level performance has been acclaimed by awarding her IBM Faculty Partnership Award, 2003-05; Journal of Electronics Packaging Best Paper Award, 2008; ASME Interpack Best Paper Award, 2009; ASME EPPD Woman Engineer of the Year, 2009; Purdue University Team Excellence Award, 2009; Purdue ACORN Award, 2006-11; Distinguished Alumni Award, IIT, Kanpur, 2012 and ASME EPPD Clock Award, 2012.

She has authored over 280 research papers and reports and two book chapters on numerical methods. She is an editor of the second edition of two volumes on Heat Transfer and CDF. She has also co-edited a book entitled *The Hand Book of Numerical Heat Transfer*, published by Wiley, New York in 2004. She serves as the Member of Editorial Board of *Numerical Heat Transfer* and *International Journal of Thermal Sciences*. She is Associate Editor of *ASNE Journal of Heat Transfer*.

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Nag, Devika
(b.1938)

An eminent Neurosurgeon, Devika Nag was born on 28th December 1938 in London, United Kingdom. She was daughter of Sukumar Nag, a doctor under Indian Medical Service.

Dr. Devika Nag passed Senior Cambridge from Loreto Convent, Lucknow in 1954 with two years merit scholarship. She completed Intermediate in science from Isabella Thoburn College in 1957. She took her MBBS in 1962 (with eight gold and two silver medals) and MD (Medicine) from King George Medical College, Lucknow. She attended Postgraduate Training at National Hospital, Queen's Square, London in 1972. She was motivated by the work of Dr. N N Gupta to join neurology.

She joined as a Specialist in Neurology, Vivekanand Polytechnic, Lucknow, 1970-73. Later, she served as Reader in Medicine (Neurology), King George Medical College, Lucknow. She assumed the position of Head of the Unit of Neurosurgery of the college from 1973-78. In 1977, she became Professor and First Head of the Neurology Department and served until 1999, when she retired. She was endowed as Professor Emeritus, King George's Medical University, Lucknow, since 1999. She also worked as Honorary Consultant in Neurology, Armed Medical Forces in India from 2001-05 and Consultant Neurologist, Mayo Medical Centre, Lucknow.

Dr. Devika Nag is a distinguished neurologist of India. She served the King George Medical College for about thirty years. The Neurology

Department of KGMC was created in 1975 having the capacity of 32 beds with the effort of Prof. N N Gupta. Dr. Devika Nag nurtured the this department into an excellent center of neurological research. The D.M. (Super specialization) in Neurology was started by her in 1981. She conducted valuable research on the impact of environmental pollution and toxic effect on neurology. She investigated pesticide toxic effect and environmental stress conditions encountered by defense personnel. She started the first Neurotoxicology unit in Uttar Pradesh in 1978 at the KGMC, in collaboration with Industrial Toxicology Research Centre, Lucknow.

She made outstanding contributions as Dean and President, Indian Academy of Neurosciences, 1994-96 and 2000-2001; Fellow, National Academy of Sciences (India), 1994; Founder Fellow and President, Indian Academy of Neurology, 1999-2000.

She played a leading role as the President of Indian Epilepsy Association, 1998-99; Vice President, Indian Epilepsy Society, 1999-2000; President, U P Neuroscience Society, 1995-96. She represented many prestigious professional associations in India and abroad including Member, American Academy of Neurology; Member, Association of Physicians of India; Member, National Multiple Sclerosis Society of India; Member, Indian Science Congress Association; Member, American Academy of Clinical Neurophysiology; Member, Asian Federation of Clinical Pharmacologists; and Member, New York Academy of Sciences.

Owing to her brilliant research work, she has been awarded Vice-Chancellor's Gold Medal during academic career; API and IMA National Oration Award; Best Teacher Award, King George Medical College, Lucknow, 1991; U P Ratna Award, 2007; and B K Bachawat Lifetime Achievement Award, Indian Academy of Neurology, 2011.

She served as an editor and contributor of several chapters in medical textbooks. She made preliminary epidemiological study in the outbreak of paralysis in some villages in Unnao district of Uttar Pradesh. She also published books and monographs entitled *Status Report on Neurotoxins in the Environment*, 1986; *Neurotoxicity of Heavy Metals in India*, 1988; *Biological Neurotoxins in the Environment*, 1989. She has published over 182 research papers and articles in different journals. She has also contributed eight book chapters. She has been an examiner for DM Examination at AIIMS, GB Pant Hospital and SGPGI, Lucknow.

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Narasimhan, Shobhana
(b.1963)

Dr. Shobhana Narasimhan is a highly talented Physicist, who has made significant contributions in the field of theoretical condensed matter physics and computational materials science. She was born in 1963 in Bangalore, Karnataka. She did her BSc from St. Xavier's College, University of Bombay, in 1983; MSc, Indian Institute of Technology, Bombay, 1985; AM, Harvard University, USA, 1988; PhD, Harvard University, USA, 1991; and Postdoctoral Research Associate, Condensed Matter Theory Group, Brookhaven National Laboratory, USA, 1991-94.

For a short stint she served as Visiting Scientist and Max-Planck Fellow, Fritz-Haber Institute of the Max-Planck Society, Berlin, Germany, 1994-96. Subsequently, she became Professor and Chairman, Theoretical Sciences Unit, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore in 1996 and continues till date. She also served as Visiting Professor, University of Paris, France, 2004 and Visiting Scientist, Department of Chemistry, University of Cambridge, UK, 2004-05.

Dr. Shobhana Narasimhan has conducted extensive research work on the use of theoretical techniques to explore novel physics and chemistry at the nano scale. Her team of scientists is working on examining how properties (structural, mechanical, electric, magnetic and chemical) change upon lowering dimensionality and/or reducing

size. Currently, she is working on different issues including mixing and magnetism on surfaces, the rational design of catalysts, size dependent properties of nano systems, gas storage, etc. She explored using the tools of density function theory to understand how the arrangement of atoms in a material governs the properties of that material. She studied that such structural property relationships can be exploited in the rational design of materials for specific applications in the fields such as catalysts for clean environment, on board gas storage in automobiles and magnetic memory devices. She worked on technological relevance for pressing problems of day to day life.

She has been awarded the prestigious position of Associate, Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, 1999-2007. She is a Fellow of National Academy of Sciences (India), Allahabad since 2011. She has received many honours such as Institute Silver Medal, Indian Institute of Technology, Bombay; Robert L Wallace Prize Fellowship, Harvard University, Harvard; Young Researcher Award, International Union of Materials Research Societies, 1998; Medal, Materials Research Society of India (MRSI), 2002; Kalpana Chawla Young Woman Scientist Award, Karnataka State, 2010 and Streeshakti Samman Science Award, 2010. She has published over 54 research articles in reputed journals of her subject interest. She is a Member of the Task Force of 'Women in Science' constituted by the Government of India.

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Nath, Indira
(b.1938)

Dr. Indira Nath is a world renowned scientist on leprosy. She was born on 14th January 1938, in Guntur, Andhra Pradesh and is the eldest daughter of Shri N V Rao, a CPWD engineer.

She obtained MBBS and MD from All India Institute of Medical Sciences, New Delhi in 1963 and 1969. She went abroad to join Nuffield Fellowship, UK, 1970. She took MRCP (Pathology), Royal College of Pathologists, UK, 1983. She gained valuable research experience with Prof. John Turk at the Royal College of Surgeons and Dr. RJW Rees at National Institute for Medical Research, London. She received DSc(Honouris Causa) from Pierre & Marie Curie University, Paris, 2002.

She started her medical career as a Junior Resident, East Suffolk Hospital, London, 1963-64; Senior Resident, Cardiff Medical School, Cardiff, 1964; Senior Resident, National Heart Hospital, London, 1965; Registrar, St. Andrews Hospital, London, 1965-66.

Upon her return to India, she joined All India Institute of Medical Sciences, New Delhi as a Faculty Member in the Department of Biochemistry. She shifted to the Department of Pathology of the same institute in 1980. She was the Founder Head of the Department of Biotechnology, All India Institute of Medical Sciences from 1986-98 until her retirement. She continued her research work as INSA-S N Bose Research Professor in the same institute after her retirement. She served as Dean, School of Medicine, Asian Institute of Medicine, Engineering

and Technology, Malaysia. She also made valuable contributions as Member, Scientific Advisory Committee, Union Cabinet, Government of India; Raja Rammohan Fellow and Emeritus Professor, Institute of Pathology, Indian Council of Medical Research; and Director, LEPRA-Blue Peter Research Centre, Hyderabad.

Dr. Indira Nath is an international authority on leprosy. Her research has explored the creation of tools for diagnosis, immunotherapy and antigens for clinical control of the leprosy disease. She has made valuable contributions by identifying two *M Leprae* proteins which are potential for easy diagnosis of leprosy and identifying individuals with high risk. Numerous people may contract the leprosy bacillus, but not all of them develop the same form of disease. She identified a deficiency in the immune response system among those who develop lepromatous leprosy in its serious form. She has also identified a mechanism associated with the triggering of the pathology — a deficiency in the immune response system. She has shown that the genetically engineered gamma-interferon breaks into fragments and clears the lepra bacilli within three to six weeks, a feature that is not ever achieved by the best drugs.

Currently, Dr. Nath is working as the Director of the LEPRA-Blue Peter Research Centre, Hyderabad, which is researching on significant advancement towards the development of treatments and vaccines for leprosy. Her research achieved significant step towards the development of vaccines for leprosy. During 1970s, India had the largest number of leprosy patients in the world, which measured to the population of 4.5 million. Her ground-breaking research and their field level implementation has helped to witness that the figure has fallen to less than one million today. She developed new ways of early detection and better modes of treatment of the disease, which has made remarkable change in the treatment and management of leprosy in India. Her professional recognition has been acclaimed by designating her as Fellow of Indian Academy of Sciences, Bangalore; 1990; Elected Fellow, National Academy of Sciences, Allahabad. 1988; Fellow, Indian National Science Academy, 1992; Fellow, Royal College of Pathology, UK, 1992; Fellow, Academy of Sciences for Developing World (TWAS), 1995; Elected Fellow, College of Allergy and Applied Immunology; Fellow, National Academy of Medical Sciences (India); Secretary, International Leprosy Association; Trustee, Immunology Foundation.

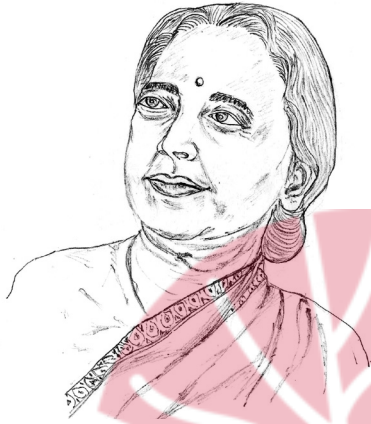
She is actively associated with various societies such as Indian Immunology Society; Indian Association of Pathologists and Microbiologists; and Indian Association of Leprologists.

She has received several awards and laurels including ICMR-JALMA Trust Fund Oration Award, 1981; Shanti Swarup Bhatnagar Prize, 1983; Kshanika Oration Award, Indian Council of Medical Research, 1985; Nitya Anand Endowment Lecture, 1987; Shri Om Prakash Bhasin Foundation Award, 1990; Basanti Devi Amirchand Award, 1994; Cochrane Research Award, UK, 1995; Indian Council of Medical Research; Rameshwar Das Birla Smarak Kosh Annual Award, 1995; Padma Shri, 1999; L'Oreal-UNESCO Award for Women in Science in Asia Pacific Region, 2002; Chevalier Odre National du Merite Grant of France, 2003; Silver Banner, Tuscany, Italy, 2003; Professor R C Mehrotra Memorial Lifetime Achievement Award, Indian Science Congress Association, 2012 for her outstanding research findings.

She has published over 130 research articles in reputed medical journals. She worked as the Associate Editor of *Indian Journal of Leprosy* and *Asian Pacific Journal of Allergy and Immunology*. She was also the Chairperson of the Editorial Board of AIIMS's publications.

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Nayar, Sushila
(1914–2000)

Dr. Sushila Nayar was a renowned Physician, committed freedom fighter, an active political leader and a great philanthropist. She was born to an educated family of Shri Brindaban Nayar and Tara Devi on 26th December 1914 at Kunjah, Gujarat.

She qualified MBBS from Lady Hardinge Medical College, New Delhi. She visited USA for higher studies and completed her MD from John Hopkins University, USA.

She started her medical service as the Chief Medical Officer, Baddshah Khan Hospital, Faridabad, 1950-52. She served as Secretary, Advisory Medical Board, Kasturba Gandhi National Trust, 1945-52; Director, Mahatma Gandhi Institute of Medical Sciences, Wardha. She was Health Minister of Delhi, 1952-55; Speaker, Delhi Vidhan Sabha, 1955-56; Member, Lok Sabha, 1957-71; India's Representative on Social Commission of United Nations, 1955-58; Union Health Minister, 1962-67; President, Indian Council of Medical Research, 1962-67; President, All India Institute of Medical Sciences, 1964-67; and Chairman, Indian Red Cross Society, 1964-67.

She was bestowed with Honorary Fellow, National Academy of Medical Sciences (India). She took keen interest in professional development and served as President, Kasturba Health Society; President, National Society for Prevention of Blindness; Member, Public Health Association; President, Tuberculosis Association of India, 1964-67.

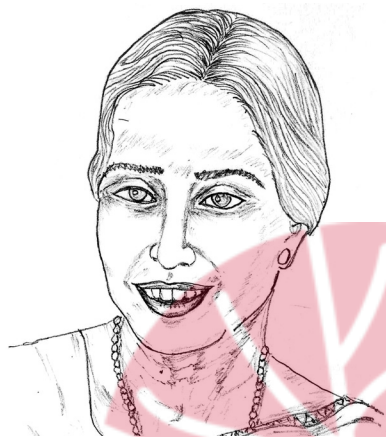
Dr. Sushila Nayar remained unmarried and devoted her life for public service. She was a devoted health service provider and distinguished freedom fighter. She was an active member of Mahatma Gandhi and Kasturba Gandhi's ideologies. She was imprisoned along with prominent Gandhians in 1942-44 in the Aga Khan Palace Jail.

After independence, she dedicated her service for the improvement of public health, especially for poor women and children. In 1950, she set up a tuberculosis sanatorium in Faridabad. She contributed many innovative plans and health policies during her tenure as the Minister of Health in Delhi Government from 1952-55 and the Union Minister of Health from 1962-67. She also made valuable contributions through popular articles, books, pamphlets and radio talks on public health and family planning. Her love for Mahatma Gandhi and Kasturba Gandhi resulted into the publication of three books namely *Kaaravas ki Kahani*, *Hamari Ba Kasturba*, *Wife of Gandhi*.

Dr. Sushila Nayar was the younger sister of Gandhiji's secretary, Shri Pyare Lal Nayar. While studying at the Lady Hardinge Medical College, she used to visit Wardha Ashram during vacations. After completion of medical education she became personal physician of Kasturba and Mahatma Gandhi. In 1944, she set up a small dispensary at Sewagram, which in due course of time developed into 'Kasturba Hospital' and later to the Mahatma Gandhi Institute of Medical Sciences. In Wardha, she started the Kasturba Memorial Hospital. She received President's Award for her book entitled *Karavas Ki Kahani* in 1952. She passed away on 3rd January, 2000

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Nayar, Usha
(b.1937)

Dr. Usha Nayar is a leading Physician in the field of muscle physiology and neurophysiology. She was born on 9th January 1937 in New Delhi. She did MBBS from Lady Hardinge Medical College, New Delhi in 1959 and MD from All India Institute of Medical Sciences (AIIMS), New Delhi. She obtained PhD (Physiology) from University of Delhi. She was awarded Postdoctoral Fellowship to work in USA. In 1962, she joined All India Institute of Medical Sciences, New Delhi as a Research Officer. She shifted to the Department of Physiology, Lady Hardinge Medical College, New Delhi as a Lecturer in 1964. Later she became Assistant Professor, Department of Physiology, All India Institute of Medical Sciences, New Delhi in 1967 and was elevated to the position of Professor in the same department. Currently, she is serving as Faculty Member, Department of Physiology, Arabian Gulf University, Bahrain. She is also a Visiting Faculty Member to Mahidol University, Thailand.

Dr. Usha Nayar made pioneering investigations on muscle physiology. She served as the Joint Secretary to Scientific Programme Committee of XXVI International Congress of Physiological Sciences, 1972-74. She is an eminent Alumni of the Lady Hardinge Medical College, who played a vital role in the development of 'Physiology' as a subject discipline for undergraduate and postgraduate courses in medical colleges. She has been actively involved in starting Department

of Physiology in different medical colleges across the country. She actively contributed in education, planning, and framing syllabus, etc. for the subject 'Physiology'. She also served as Member of the Ad-Hoc Committee of Indian Council of Medical Research on 'Air Pollution'. She played a crucial role in establishing Centre for Medical Education and Technology (CMET) at AIIMS, of which she was Chairperson from 1989-96. She has been acclaimed as Elected Fellow, Indian Academy of Medical Sciences (India), 1970. She has made immense contributions in the development of the profession as a Member, International Brain Research Organization; Member, Indian Science Congress Association; Member, Physiologists and Pharmacologists Association of India and Indian Association for the Advancement of Medical Education. She was a British Council Fellow for Training in Medical Education at Dundee, United Kingdom, 1981.

She received many prestigious laurels such as Lady Willingdon Medal, 1958-59; B K Anand Medal, 1976 and 1983; Professor M Gupta Oration Award, 1984; Hari Om Ashram Alembic Award, 1985; Major General S L Bhatia Oration Award, Association of Physiologists and Pharmacologists of India, 1989; Professor Baldev Singh Oration Award, Association of Physiologists and Pharmacologists of India, 2004. She also worked as the Visiting Professor and Examiner for postgraduate medical examinations in India.

She has published several original research articles in reputed medical journals. She has also contributed extensively in many textbooks of physiology published in India including the most popular title *Understanding Medical Physiology* edited by Professor R L Bijlani. She made outstanding contributions as the Executive Editor of *Indian Journal of Physiology and Pharmacology* from April 1988 to March 1994. She is an excellent mentor of many leading physiologists across the country.

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O'Hara, Margaret
(1855–1940)

Margaret O'Hara was one of the best known Presbyterian medical missionary from Canada, who spent over three decades working in India. She campaigned to collect fund and resources to establish dispensaries and hospitals for her missions. She took the courage of practicing medical profession in unknown foreign land at the time when relatively few women took such venture.

She was born at Port Elmsley, Ontario near Smith's Falls on 11th April 1855. She was daughter of William O'Hara and Mary McTavish. She desired to work as missionary worker in India since her childhood. She was the first woman to graduate in medicine from Queen's University in 1891. Soon after her education, she left for India and arrived in Bombay in December 1891. On 8th July, she began her service in Dhar as the first resident missionary and gave 36 years of hospital service at Dhar. Maharaja of Dhar was a forward looking ruler, who started girls' schools and dispensaries for the benefit of natives. She rendered exceptional management and clinical skills to handle great famines of India and saved life of many poor and destitute. She established a home for children orphaned by famine. She provided valuable medical service for the treatment and rehabilitation of leprosy patients. She worked in very hard weather and challenging conditions, without adequate trained staffs, equipment, and very limited resources. She opened a school for educating poor and orphans. Children educated

from her school became nurses, teachers, medical students and respected individuals in the society.

She made extensive efforts to collect fund for her missionary activities in India. She travelled throughout United States and Canada, giving lectures to explain the impact of two devastating famines that struck Central India in 1897 and 1899. She published several articles in magazines, newspapers and clinical journals to present vivid picture of the environmental disaster. She attended over 800 to 1000 people in her dispensary during emergency. She also raised her voice against the prejudice of cast system in India, which she saw during famine where higher cast people preferred to die rather than accepting food, water and medicine from some lower cast persons. They even refused to take medical service from her as an outcast person. She had to hire Brahmin people to distribute food and medicine during famine so that they may not run away. She explained in her writings that the devastating famine literally erased human establishment and turned the vast areas into ghost towns. Population of one village went down from 25,000 to 15,000. She used to make round on buggy to collect small starving babies who had been abandoned due to the death of their parents. She rescued many old-aged widows, boys and about 150 girls. She made continuous correspondence with church in Massachusetts to avail resources to support food, education and shelter for the needy. Unfortunately, she also faced the tragic epidemic of plague in 1917. She handled all these tragedies during her career with great courage and wisdom.

She nurtured very close relation with local communities including the royal family. Maharaja of Dhar was highly impressed by her confidence and devotion. He presented her a site (of her choice) for building a hospital. He himself paid one thousand rupees compensation to the owner and handed over the land as a gift to the mission. Dr. O'Hara retired from her service in 1927 and returned to Canada. She published *Leaf of the Lotus*, collection of her letters from 1891-1914. In 1932, the British monarch awarded her Kaiser-i-Hind silver medal for her service to India. In the same year, she received LLD Honorary degree from Queen's University. Dr. Margaret O'Hara passed away on 28th August 1940 at the age of 85 at Smith's Fall. She earned wide popularity for her service and writings in United States, Canada and India. She

was a famous member of Westminster Presbyterian Church of Canada and a valuable member of Women's Missionary Society.

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Oliver, Belle Chone (1875–1947)

Dr. Belle Chone Oliver was a medical missionary with Presbyterian Church of Canada. She was born in 1875 in Ontario, Canada of a Scottish parentage. Her father Adam Oliver was the first mayor of Ingersoll and a liberal member of the provincial legislature. Her father died in early age and her mother sent Chone and her two brothers under the care of Presbyterian minister, where she started involving herself in missionary services from her childhood. She was highly fascinated by the personality and achievements of Dr. MacKellar, who studied medicine and became one of the pioneers of foreign medical missionary services. Although Oliver was an outstanding student even then her education was frequently interrupted due to her family circumstances. After completing her school education, she joined Women's Medical College in Toronto and completed her internship in Philadelphia. In 1900, she completed her MB with first class honours in medicine, surgery, applied anatomy and pathology. She earned her MDCM from Trinity University, Toronto in 1901. She became a Member of Physicians and Surgeons of Ontario in the same year.

In 1902, she sailed to India as a medical missionary doctor with the Presbyterian Church of Canada. Her first workstation was Indore, a princely state of Central India and the largest station of the mission. Initially, the service of women teachers and doctor missionaries were discouraged by the Prince of Indore and the natives. However with

the passage of time, they realized the value of Western medicine and accepted it especially in the interest of women and children. They eagerly opened the door for women missionary doctors. Dr. Oliver developed friendly liaison with women of royal family as well as poor population. She was a proficient doctor and earned high reputation for her devotion and hard work for clinical services and educating local women for their well-being. She was a social reformer who brought women out of the shadow of traditional superstitions regarding cast, untouchability and following of unscientific customs of child birth. Initially, she started providing clinical service from her bungalow, and then shifted to a small dispensary. She served her apprenticeship in Indore, where a women's hospital was constructed in 1891. The structure and operational design were made to conform to *pardah* traditions and cast distinctions in the hospital services.

During 1907-08, Dr. Oliver visited Canada on furlough, which rejuvenated her physical and mental health. After her return from holidays, she was made in charge of the mission hospitals located in small cities including Neemuch and Dhar. Her new duties included evangelical work, supervision of construction work of mission's buildings, local administration and sorting out of problems related to missionary services. She was also entrusted with the responsibility of missionary orphanage at Neemuch, where orphans and destitute of devastating famine were rescued and sheltered. At Neemuch, she had an opportunity to work with her role model, Dr. Margaret MacKellar. Their partnership could bring visible improvement in the system and earned due regards for missionary lady doctors in the society. They also realized that the quality of clinical service cannot be achieved through the approach of evangelization of patients. They interacted openly with local people to come out of their fear and prejudice against women missionaries as converter of patients.

In 1915, she went on furlough to Canada and upon her return; she was assigned the job of the first medical missionary station to Banswara, where she served till 1929. There she constructed a dispensary building in 1920 and then established a well-equipped hospital in 1922. It was the most fruitful posting for her, where she had the opportunity to serve aboriginal Bhil Tribes, who were

very poor, oppressed, innocent and un-Hinduized community. Here the condition for mass evangelization was quite smooth. It was the happiest posting in her career, though it was a very remote station, even then she kept herself abreast by reading latest medical literature. In 1920, she attended a short course on venereal diseases conducted by the Government of India's Medical Service. In 1924, she presented a paper entitled 'Do We Need a Survey of Medical Missions?' at the Conference of Medical Missionary Association. Following this, she and an American Presbyterian colleague Dr. Robert Goheen, were given the task of conducting investigation of medical mission works in India. In 1928, they published the report entitled *Survey of Medical Mission in India (including Ceylon)*. In the same year, she was sent to the International Medical Council's Conference (Jerusalem) along with Dr. Christian Frimedt-Moller. They focused their paper on the quality of medical professional services, rather than following Mission's old agenda of giving priority to evangelism/preaching of Christianity. Here for the first time it was discussed on an official platform that quality of medical profession gets overshadowed by the practice of promoting evangelism through the media of missionary women doctors.

She left hospital job in 1929 for the world of mission bureaucracy, and she was made the full-time Secretary of the Christian Medical Association of India (CMAI). She served this post for the rest of her working life. She stayed in Nagpur, the base of CMAI. She took the responsibility of editing and publishing the CMAI's Journal. She made valuable contributions as an Editor of the *Journal of Association of Medical Women of India*. She conducted several seminars, workshops and projects under her leadership. She earnestly worked and arranged resources to establish a fully professional Christian Medical College for Women. The project was still under progress, when she retired in 1944. She provided more than 40 years of clinical service to India and returned to Canada after retirement. Her initiative gave momentum to the establishment of medical colleges for women in India. In the meanwhile the missionary Christian Medical College in Ludhiana (Punjab) and Vellore (Tamil Nadu) came up for the exclusive training of Christian women in India.

In 1945, owing to shortage of medical women she was recalled to India. In 1946, she had to return to Canada due to serious illness of Hodgkin's disease. She stayed with her sister-in-law, Joli Oliver until her death on 21st May 1947 at Fort William (Thunder Bay), Ontario.

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Oommen, Lucy
(1920–2002)

Dr. (Miss) Lucy Oommen was the First Indian Medical Director/ Superintendent of the St. Stephen's Hospital, Delhi. She was born on 16th April 1920 to the family of Kochappi Kizhakavedu Oommen and Kochannamma C Poovathur.

She obtained LSMF (Licentiate in Medicine and Surgery) from Christian Medical College, Ludhiana, 1942 with Gold Medal and Distinction. She took MBBS from Christian Medical College, Vellore in 1951 and MD (Obstetrics and Gynaecology) from KEM Medical College and Hospital, Bombay, 1959.

She joined St. Stephen's Hospital, Delhi as a Junior House Surgeon in 1942. Subsequently, she became Senior Doctor, and later Registrar at St. Stephen's Hospital in 1951 and 1954 respectively. She became the First Indian Medical Director/Superintendent of St. Stephen's Hospital, in 1961 when Dr. Morris retired. She devoted over four decades of dedicated service to nurture the St. Stephen's Hospital into an excellent hospital and biomedical research center. She retired from her service in 1988. She served as a personal physician of former Prime Minister of India, Smt. Indira Gandhi.

Dr. Lucy Oommen provided selfless service to expand and add many specialized departments in the St. Stephen's Hospital. She made remarkable changes in the hospital to modernize and improve facilities for patients. She focused on maternal and child health and promoted

Family Planning Programmes. Her vision and wisdom developed the hospital into a well-equipped modern hospital to provide better health facilities to the people of Delhi. She served as a member of various national level committees related to the family planning and child health programmes. She also opened rural and urban community health and family planning workshops to educate and increase awareness about the subject among general public. The St. Stephen's Hospital served as an important health facility center for citizens of Delhi and neighbouring states. On 27th October 2005, Dr. APJ Abdul Kalam, President of India renamed the Mother and Child Block of the hospital as 'Dr. Lucy Oommen Mother and Child Block' in her honour. Dr. Lucy Oommen Award for Excellence in Mother and Child Care has been instituted 2005 by the St. Stephen's Hospital. Dr. Oommen was conferred with Padma Shri in 1977 in recognition to her outstanding contributions for mother and child health care. She passed away in March 2002.

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**Padmavati,
Sivaramakrishna Iyer**
(b.1919)

Dr. (Miss) Sivaramakrishna Iyer Padmavati is a doyen among cardiologists in the country. She was born on 20th June 1919 at Magwe, Burma (Myanmar). Her father and elder brother were barristers. During World War II, Japan invaded Burma, which caused emergency in Burma. Her family had to migrate to Tamil Nadu and then they brought a house in Coimbatore and settled there.

She studied MBBS at the Rangoon Medical College, Rangoon. She went abroad for higher specialization and obtained MRCP (Member of Royal College of Physicians), London; FRCP (Fellow of Royal College of Physicians), Edinburgh. She also obtained FAMS and FACC.

She started her medical career as a Lecturer, Lady Hardinge Medical College, New Delhi in 1953; she was promoted to Professor of Medicine in the same college. She also served as Professor and Heart Specialist, G B Pant Hospital, Delhi, 1964-77 and Professor, Director and Principal, Maulana Azad Medical College, New Delhi, 1967-78 (till she retired). She established and became the Founder Director of National Heart Institute, New Delhi in 1981 and leading the institute till date. She has also served as a Member, Expert Committee, WHO and Emeritus Professor of Medicine and Cardiology, University of Delhi.

Dr. Padmavati is an eminent cardiologist having national and international recognition. She has conducted research on various

aspects of the cardiac disease, especially rheumatic fever, corpulmonale, cardiovascular epidemiology and internal thrombophlebitis. In 1949, she went to England to avail postgraduate studies in medicine. There she worked at the National Heart Hospital, National Chest Hospital and National Hospital, Queen Square, London. She also worked as Fellow of Johns-Hopkins Hospital, USA with Dr. Helen Taussig, who is internationally acclaimed for conducting the first heart operation on blue babies. In 1952, she moved to Harvard University and worked at the Harvard Medical School under Professor Paul Dudley White, the father of modern cardiology. After finishing her studies in England she went to Sweden and worked there in the Southern Hospital for three months.

Dr. Padmavati was instrumental in opening the first heart clinic in Northern India in 1954 at the Lady Hardinge Medical College, New Delhi. She developed a well-equipped Cardiology Department from 1964-1977 at the G B Pant Hospital. In 1981, she established the first heart institute in India. As a member of Medical Council of India she started first DM course in Cardiology in Maulana Azad Medical College. She started Rheumatic Fever/ Rheumatic Heart Disease (RF/RHD) Registration for poor children since 1977, which includes a free health checking service provided to slum children. She is the founder of the All India Heart Foundation in 1962.

She held prestigious position of Office Bearers of several associations such as Founder President, All India Heart Foundation, 1962; President, Cardiovascular Society of India; Secretary General, World Congress of Cardiology; Vice-President, Asia Pacific Society of Cardiology; Member, International Society of Cardiology; Member, World Hypertension League; Member, British Cardiac Society; Secretary General, IV World Congress of Cardiology, 1966.

Notable among the numerous awards and honours conferred on her include Padma Bhushan, 1967; Rajaji Ratna Award; Tapan Kumar Basu Oration Award; Lok Bandhu Dr. Bhuwaneshwar Barua Memorial Oration; Uma Rani Banerjee Memorial Oration; Glaxo Oration; Dr. B C Roy National Award; Kamala Puri Sabrawal Memorial Oration; Kamala Menon Research Award; Kanishka Award; Padma Bibhushan, 1992; Indira Gandhi Priyadarshini Award, 2002; Harvard Medical

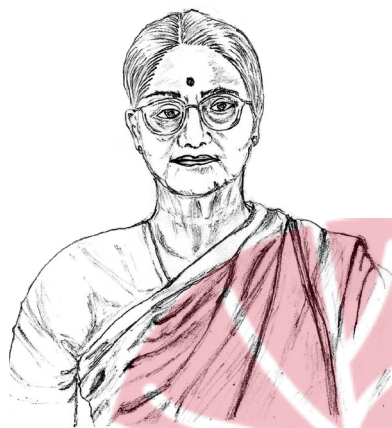
International Award, 2003; FICCI Ladies Organisation Award, 2005; Sullivan University Eurasia Award, 2006. She also received DSc (Honoris Causa) from Madras University.

She has contributed over 300 research articles in many Indian and foreign journals. She has also contributed many chapters in Indian medical textbooks. She has worked as Visiting Professor to many foreign universities. She is fond of swimming and is proficient in many languages including Burmese, Hindi, Tamil, Telugu, Malayalam, German and French. She maintains her own library containing rich collection of very rare books in the field of medicine. She is universally regarded for her dedication and benevolence. She is accepted as an international authority on cardiology.

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Pant, Radha
(1916–2003)

Dr. Radha Pant has been described as a ‘rare gem’ of biochemistry by the members of London Biochemist’s Group. She was born on 5th september 1916 at Kalpathi village, Palghat, Kerala. She was born in a South Indian Brahmin family of K S Sivaramakrishna Iyer and Subbalakshmi Ammal. She married Professor Divya Darshan Pant, a renowned botanist and Head of the Department of Botany, Allahabad University. Her mother never attended any school, but she encouraged and motivated Radha for education. Her father moved to Poona in 1920, when she was four years old. She was the first in her family and community to receive formal education from a boarding school. She studied at Karve’s Mahila Ashram, the pioneering institution for girls established by Maharishi Dhondokashav Karve (1858-1962), who was one of the leading crusader of women’s education in India, at Hingue near Poona (now Pune).

After having primary education at Poona, she moved to Delhi’s Indraprastha High School, from where she completed her high school education with flying colours in 1930. There was no college in Delhi University during those days to provide science education for women. Dr. Radha Pant’s father had to request from college to college to get her daughter admitted to BSc course. Finally in 1932, the Hindu College of Delhi University came forward to accept a woman as a science student for the BSc course. She was the first woman to graduate in science from

Delhi University in 1934. She also achieved the highest marks in her class. She received MSc (Chemistry) degree from St. Xavier's College, Bombay under the Bombay University in 1936. She completed her PhD from Bombay University from 1936-40. She went abroad to do Postdoctoral Research under British Council Fellowship, University of London, 1954-56. She also won the Deutsche For-Schungsgemeinschaft stipend from 1960-62.

She started her career as a Research Fellow and served Seth G S Medical College, Bombay from 1940-42 and as Research Assistant from 1943-45. She joined Haffkin Institute, Bombay in 1945 (June-October) as a Senior Research Fellow in Nutritional Biochemistry. She became the First Woman Lecturer in the Science Faculty of the Allahabad University in 1945. She was promoted to Reader and Head in 1967-78 until she retired. She served as Scientist, Department of Chemistry, Allahabad Agricultural Institute, Allahabad since 1978. She also went abroad as Visiting Professor, University of Halle, East Germany. She has also been honoured as Fellow of Royal Chemical Society, UK. She made valuable contributions as a Member of Current Science Association, Society of Biological Chemists, Biochemical Society, UK and Life Member, Society of Developmental Biologists, UK.

Dr. Radha Pant was a pioneer scientist of Indian plant, insect and nutrition biochemistry. She conducted her PhD research by synthesizing 2, 4-dimethoxy-isophthalic acid and 2, 6-dihydroxy-isothalic acid for the first time. She also succeeded in formulation of number of phenol carboxylic acids by the hexomethylene tetramine glacial acetic acid method under the guidance of Professor R C Shah. She conducted valuable research work on the nutritive value of the soya beans and proved that the Bengal gram (*Cicer arietinum*) protein was superior to that of the soya bean during her research project at the Haffkin Institute, Bombay. She also worked with Professor Earnest Baldwin at the University College of London on the isolation of lombricine and its enzyme phosphorylation. She made significant research work in developing a single method for extracting and detoxifying protein from the non-edible wild leguminous seeds that grow abundantly in various parts of India. Her research made landmark contribution towards combating famine in developing world.

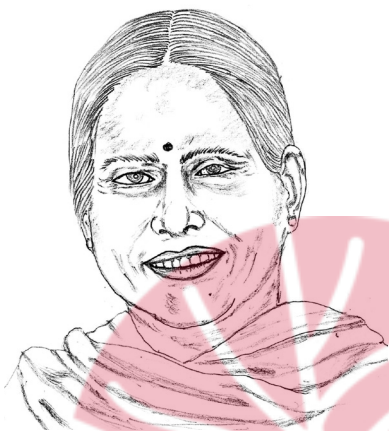
During 1980's, she conducted research on silk worm. Her research findings were published in *Sericologia*, a new journal, which was started by her. She developed the Biochemistry Department and laboratory during 1960-1970 at the Allahabad University. In 1968, she introduced the postgraduate course in the department. Dr. Radha Pant was an extraordinary personality, who never compromised with the quality of work. She was a great scientist, educationist and mentor of several research scientists in India and abroad. She published several research papers in reputed journals. She also narrated her life story in her autobiographical memoir *Ever a Fighter*. She died on 19th December 2003.

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Parimala, Raman
(b.1948)

An eminent Mathematician, Professor Raman Parimala, daughter of K Srinivasan was born on 21st November 1948 at Mayuram, Thanjavur District of Tamil Nadu. She completed her school education from Saradha Vidyalaya Girl's High school. She did her BSc and MSc from Stella Maris College, Madras, 1968 and 1970. She obtained PhD from Bombay University in 1976; Honorary Doctorate, University of Lausanne, 1999 and Postdoctoral Research, Ramanujan Institute, Madras; Honorary Doctorate from the University of Lausanne, 1999. She has been honoured as the Noether Lecturer by the Association for Women Mathematician, 2013.

She started her service as a Research Fellow at the Tata Institute of Fundamental Research, Bombay (Mumbai) and rose to the position of Reader and Professor. She became Asha Griggs Candler Professor of Mathematics, Emory University, Atlanta, Georgia, USA since 2005. She has also served as Visiting Professor to Swiss Federal Institute of Technology (ETH) (Zurich), University of Lousanne, University of California (Berkeley), University of Chicago (Ohio State) and University of Paris. Her research work has been acclaimed by awarding her Fellow of Indian Academy of Sciences, Bangalore; Fellow, National Academy of Sciences (India), Allahabad; Fellow, Indian National Science Academy, New Delhi, 1990 and Fellow, American Mathematical Society.

She has received several awards including Shanti Swarup Bhatnagar Prize, 1987; Srinivasa Ramanujan Birth Centenary Award, Indian National Science Academy, 2006; Jawaharlal Nehru Birth Centenary Lecture Award, 2004; and Third World Academy of Science Prize in Mathematics, 2006.

Dr. Raman Parimala has been internationally designated as the 'supreme and powerful algebraist'. Her major areas of interest have been on tools from number theory, algebraic geometry and topology. Early in her career, she published the first example of a nontrivial quadratic space over an affine plane. This result surprised many experts and has since led to further developments in the field. She conducted a study on homogeneous spaces under linear algebraic groups which is rich both from the perspective of arithmetic and geometry. The arithmetic aspect includes classification of interesting algebraic structures like quadratic and hermitian forms, division algebras octonion and Albert algebras. The Third World Academy of Science (TWAS) for the first time awarded a woman for her achievements in the field of either mathematics or physics in 20 years history of its inception. She has been awarded the TWAS Award for her work on quadratic analogue of Serra's conjecture, the triviality of principal homogeneous spaces of classical groups. She was an invited speaker at the International Congress of Mathematicians (ICM) in Zurich in 1994. She has published numerous research articles in mathematical journals. Her biography has been included in *Mathematics Genealogy Project*, which includes information regarding 160000 eminent women mathematical scientists, who contributed in 'Research Level Mathematics' across the world.

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Patel, Amrita
(b.1943)

Dr. Amrita Patel has made an indelible mark in the field of Indian dairy industry. She was born on 13th November 1943 at Vidyanagar Village, Kheda District of South Gujarat. She is the youngest daughter in a family of five daughters. Her father Shri H M Patel, was an ICS-Officer turned politician and former Finance Minister of India.

She completed her schooling from the Convent of Jesus Mary School, Delhi in 1958. She studied Bachelor of Veterinary Science from Bombay Veterinary College in 1965. She visited abroad to avail FAO Fellowship for the advanced training in animal nutrition at the Rowett Research Institute, UK, 1968.

She started her career as a Scientist at the Kaira District Cooperative Milk Producer's Union Ltd., 1965 where she worked under the able guidance of the Father of White Revolution in India, Dr. Verghese Kurien; she also served as Scientist, National Dairy Development Board (NDDDB), Anand, 1971. She became Administrative and Commercial Director in 1975 and Managing Director in 1989. She took over the charge of Chairman from the Founder Director Late Verghese Kurien in 1998. She was reappointed (after her retirement) in 2003 and 2008. She relinquished the position of Chairman in August, 2013. She also served as Assistant Director, International Dairy Congress during 1972 and Secretary General from 1973-75.

She actively participated in several animal husbandry and environmental organisations in India and abroad. She served as the Founder and Chairman, Foundation for Ecological Security (FES). Her contributions have been recognized internationally by designating her as a Member, Board of Trustee, International Livestock Research Institute, Nairobi. She played a leading role in environmental advocacy as Trustee, World Wild Fund for Nature, India. She is the first Indian and the first woman to be elected to the Board of International Dairy Federation (IDF).

She received several awards for her lifetime contributions including Borlaug Award, 1992; Sahakarita Bandhu Award, Indian Farmers Fertilizer Cooperative, 1995-96; XLRI Fellow in Management and International Dairy Person, World Dairy Expo Inc., Madison, USA, 1997; Jawaharlal Nehru Birth Centenary Award for Nation Building, 1999-2000; D.Phil.(Honoris Causa), Gujarat Agricultural University, Bawaskantha, 1999; Padma Bhushan, 2001; Lifetime Achievement Award, Gujarat Chamber of Commerce and Industries (GCCCI); Gandhi Paryavaran Puraskar, 2008; Women Achievement Award, All India Women's Conference; and Sardar Patel Award, Bharatiya Vidya Bhawan, 2013.

Dr. Amrita Patel made significant changes in the performance of dairy industries and its financial turn over in India. She took keen interest in every aspect of dairy development including research and development, finance, environment, rural health education, animal nutrition and implementation of modern technology. Her dedication and hard work through its innovative research and management has enhanced the performance of NDDDB. She was instrumental in setting up the largest Foot and Mouth Disease vaccine plant in Hyderabad. She served as the Mission Director of the Technology Mission for Dairy Development. She played an important role in planning and implementation of 'Operation Flood', the world's largest dairy development programme which included welfare of over 13 million small farmers to promote finance and efficient delivery of dairy products through National Cooperative Dairy Structure. She was Secretary General of the International Dairy Congress held in India in 1974. She also served as the Chairperson of the Board of National Tree

Growers' Cooperative Federation. She made valuable effort towards increasing rural health, wealth and empowering village farmers. She developed the power of cooperative farming to create and support farmer-owned sustainable livelihoods. It was Dr. Patel's vision to set up Foundation of Ecological Security (FES) to ensure restoration of ecological balance and biological productivity of land and improve living condition of village poor. Recognizing the achievement made by her in transforming the lives of millions of milk producers and secure their livelihood, the NDDDB was selected for the 'Agriculture Leadership Award' for 2009 by the magazine *Agriculture Today*.

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Pathak, Leelawati Vinayak
(b.1914)

Dr. Leelawati Vinayak Pathak was a well-known Physician and a pioneering Gynaecologist, born in Poona(Pune), Maharashtra on 23 July 1914.

She completed MBBS from Bombay in 1936. She went abroad for higher studies and received her FRCS (Fellow of Royal College of Surgery), Edinburgh in 1940. Subsequently, she obtained FRCP (Fellow of Royal College of Physicians) and Training under Colombo Plan in Canada and USA.

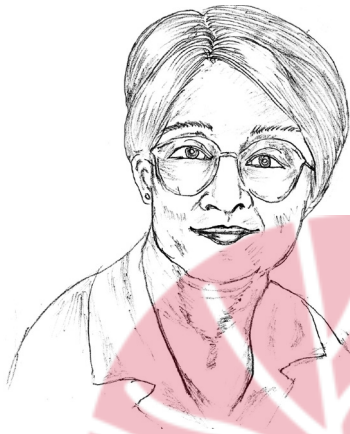
She joined Medical Service in Gwalior State as medical officer and worked there for 20 years. She started G R Medical College and Hospital, Gwalior in 1946. She served as the Founder Professor and Head of the Department of Obstetrics and Gynaecology, G R Medical College and Hospital. Thereafter, she moved to New Delhi and occupied very senior positions in various medical colleges and hospitals including Senior Staff Surgeon, Safderjung Hospital, New Delhi in 1960; Professor and Head, Department of Obstetrics and Gynaecology, Lady Hardinge Medical College, New Delhi; Principal and Superintendent, Lady Hardinge Medical College, New Delhi in 1961; Senior Consultant, Department of Family Planning, Safderjung Hospital, New Delhi, 1966; Principal, Maulana Azad Medical College, New Delhi, 1968-70; Commissioner of Family Planning, Ministry of Health and Family Planning, 1970-75; Founder and Honorary Director, Birla Institute

of Medical Research, Gwalior, 1978-85; Director, Irwin and G B Pant Hospital, Delhi; Director, International Post-Partum Programme of Population Council; Dean, Faculty of Medicine, University of Delhi. She took great initiatives in establishing many societies and associations in the field of obstetrics and gynaecology. She served as the Founder Secretary and President of the Obstetrics and Gynaecological Society of Madhya Pradesh; President, Association of Obstetrics and Gynaecology, Delhi; and Member, Association of Surgeons.

Dr. Leelawati Pathak participated in the planning and development of many medical institutions that were established after independence. She played valuable role in the development of Department of Obstetrics and Gynaecology in the Lady Harding Medical College, Maulana Azad Medical College, Irwin and G B Pant Hospital in New Delhi and G R Medical College and Hospital at Gwalior. She served as the Committee and Commission Member of Government of India related to Health and Family Planning. She actively associated herself with the work of orphanage, blind, mental asylum as well as welfare extension programme conducted by the Population Council. She contributed several articles and reports in medical journals. She conducted extensive camps and workshops to promote practice of Family Planning in the country. Owing to her pioneering contributions, she was awarded Padma Shri in 1972; Dr. B C Roy Gold Medal; Copper Plaque, All India Student's Association, Gwalior, 1975.

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Paull, Edith Helen
(b.1902)

Edith Helen Paull was born in 1902. She was the first qualified registered nurse of the Indian Red Cross Society. She was one of the pioneers to be awarded the Florence Nightingale Scholarship for the study at Bedford College of Nursing, London. The Florence Nightingale Scholarship was awarded by the Florence Nightingale Foundation initiated by Mrs. Bedford Fenwick, who advocated the introduction of laws to control practice of nursing through the enforcement of Nurses Registration Act (London) 1919. It was essential to avoid clinical mistakes and endanger life of patients (especially women and children) in the hands of untrained midwives. Miss Paull completed her Nursing and Midwifery training in London and Chicago, USA. Her nursing career started in 1928. She occupied various nursing posts including Matron of Lady Hardinge Medical College, New Delhi; Civil Hospital, Allahabad; G T Hospital, Bombay; Jahangir Nursing Home, Poona and Belle Vue Clinic, Calcutta. She also served as the Staff Officer (Nursing), Indian Red Cross Society's Head Quarter, New Delhi, 1959-67.

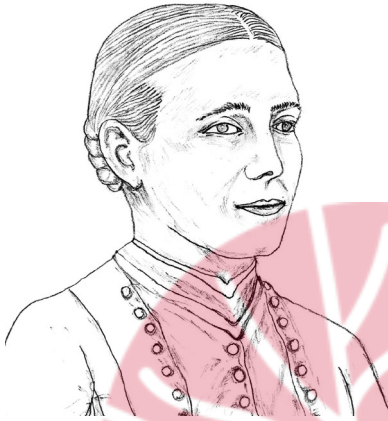
Miss Paull was closely associated with a number of national and international nursing organisations. She represented the International Council of Nurses at the XIXth Plenary Assembly of the World Federation of United Nations Association held in New Delhi in January 1965. She also represented the Indian Red Cross Societies in May-June, 1965 and International Council of Nurses at the XIXth Session of

WHO Regional Committee for South Asia held in New Delhi in 1966. She was the President of the Trained Nurses Association of India for six years. Her service to the nursing profession received wide recognition, she was awarded the Nineteenth Award of the Florence Nightingale Medal by the International Committee of Red Cross, Geneva in 1963. She received Padma Shri in 1967 for her outstanding contributions to the profession of nursing. She presented several papers on nursing services in hospitals. She presented very popular paper under the title of 'Communication with the Local Community' at the Congress of International Council of Nurses held in Frankfurt, Germany in June 1965. Miss Paull's devotion and benevolence has inspired many young girls to join nursing profession in India. She was a role model for them.

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Pechey, Edith
(1845–1908)

Edith Pechey was a crusader, who stood for equal educational rights for women. Her movement resulted into the constitution of a committee to secure a Complete Medical Education for Women in Edinburgh. She was born on 7th October 1845 in the village of Langham, Essex, England to Baptist Minister William Pechey and his wife Sarah. Her father was a well-known John Ward Scholar at the University of Edinburgh, from where he qualified MA degree. Initially she took education from her father, and then she did her matriculation with honours in 1869 from Edinburgh University.

In October 1869, Edith Pechey, along with four other women students Sophia Jex-Blake, Matilda Chaplin, Helen Evans and Isabel Thorne applied for admission to Medical School at the University of Edinburgh. They had to pay four times the regular tuition fees for separate classes for five women only. At that time, the fees were paid directly to the professors and not to the university. Miss Pechey achieved brilliant result in chemistry and qualified for Hope Scholarship worth two hundred pounds. But the same could not become possible as male students, a section of teachers and press organised themselves against women's admission to medical courses and tried to establish that women's admission to medical school was not legal. The strong conflict in the academic world resulted into a well-known episode of 'Edinburgh Riot of 1870' and the 'Riot of Surgeons Hall in 1871'. Finally, the

Hope Scholarship was awarded to the second best male student on the plea that the Hope Scholarship was meant for regular medical students. After this episode, the group of women students decided to continue their education and requested the College of Physician in Ireland to allow them to appear for the examination of Licensure in Midwifery. Then she and Sophia Jex-Blake proceeded abroad to the University of Bern, and passed MD in German in January 1877. By that time the Irish college also decided to allow women students for the Licensing examination at Dublin. She qualified the examination and received license to practice medicine, with the seal of the Royal College of Physicians of Ireland in May 1877.

She started private practice at Leeds and served there for six years. She also worked in Vienna for additional practice in surgery. She was invited for the inaugural lecture at the opening ceremony of the London School of Medicine for Women. She took initiative to establish Medical Women's Federation of England in 1882 and served as its Founder President. She received the invitation to join as Senior Medical Officer at the Cama Hospital for Women and Children at Bombay started by a well-known Parsi philanthropist P H Cama. She sailed to India and reached Bombay on 12th December 1883. She joined Cama Hospital, the first hospital in the world to be staffed entirely by women. Pending the completion of the Cama Hospital building, she was given the charge of the Jaffer Silleman Dispensary for Women. She learnt Hindi and started training course for nursing. She served as a social reformer and worked for the overall improvement and socio-economic development of Indian women. She advocated reforms to prevent practice of social evil against women, such as sexual discrimination, child marriage, dowry system, hard social life for widows, illiteracy and non-availability of medical facility to women, etc. She took keen interest in the case of Rukmabai, who fought bitter court case against orthodox child marriage system and refused to live with her husband. She provided all possible help to her to fight the court case and get her admission to London School of Medicine for Women. She also helped her to get Chief Medical Officer's job in Rajkot after her return to India. Dr. Pechey became the first invited member of the Senate of University of Bombay and Royal Asiatic Society. She

was actively involved with schools and social organisations working for girls in India.

She married Herbert Musgrave Phipson, a British wine merchant and naturalist living in Bombay in March, 1889. He played a significant role in the establishment of Bombay Natural History Society. He served as the Honorary Secretary and the Editor of the Journal of the Society for several years. In 1891, they established Pechey-Phipson Sanatorium for Women and Children at Nasik, Maharashtra, which continued to serve until 1964.

She became ill and was hospitalized for the treatment of breast cancer. In 1906, she along with her husband returned to England for her treatment. Soon after her return, she joined National Union of Women's Suffrage Societies of Leeds and played a leading role at the Mud March demonstration organised by the society in 1907.

She also developed Diabetes and was under the treatment of surgeon Dr. May Thorne, daughter of Isabel Thorne, a close friend of Pechey-Phipson. On 14th April 1908, she died of cancer in a diabetic coma at her home in Folkestone, Kent. Her husband instituted an annual scholarship in her name at the London School of Medicine for Women, which continued until 1948. Her life is an inspiring story for younger generation and she will be remembered as a role model of courage of a woman who raised her fearless voice against age-old tradition of barriers created against women across the world.

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Pennell, Alice Maude Sorabji

(1874–1951)

Dr. Alice Maude Sorabji Pennell was born on 17th July 1874 at Belgaum, India. She was the youngest of six daughters of Kharsedji Sorabji, an eminent Parsi of Bombay, and the first of his community to embrace Christianity. Her mother Franscina Sorabji ran the Victoria High School at Poona. Daughters of Sorabji family achieved distinctions as pioneers in feminism. Alice received BSc from Bombay University and MBBS from London School of Medicine for Women in 1905. Cornelia Sorabji (elder sister of Dr. Pennell) was the first woman to be admitted to the English Bar as Bar-at-Law, Lincoln's Inn and was the only woman to hold an important position in the Government of India at that time.

Dr. Alice Sorabji Pennell started working at Zanana Hospital in Bahawalpur, where she met the British Missionary doctor Theodore Leighton Pennell in 1906. She married Dr. Theodore Pennell in 1908. Later, she assumed the post of In charge of the Victoria Hospital in Delhi. She was one of the women doctors who treated men during the First World War, 1914-18 at the Bombay Presidency, Mahableshtar. Dr. Theodore Pennell was working with the Bannu Medical Mission. He was a Christian Missionary doctor, who lived among the tribes of Afghanistan. He founded a Missionary Hospital in Bannu with his mother's money in the North-West-Frontier of British India (now Pakistan). Dr. Alice Pennell shifted to North-West-Frontier in

Afghanistan after her marriage. She worked as Physician and Incharge of the Bannu Hospital at North-West-Frontier Province and retired from the Bannu Hospital.

Dr. Alice M Pennell was a lively student and dedicated herself to medical profession. She along with her husband worked together and won the hearts of hardy Pathans and Pushtus. Both of them learned Urdu and Pushtu languages to understand the clinical problems of Frontier Afghan tribesmen and their women folks. Their names are legends amongst the inhabitants of Bannu and its surroundings. Unfortunately, Dr. Theodore Pennell died of blood poisoning at the age of 44. After the tragic death of her husband, she continued to live and serve the people of Bannu and worked in the Women and Children's Hospital at Bannu. She was generous and warm-hearted and had given her best for the treatment of patients and friends. After her retirement from the service of Bannu, she lived in Delhi and did social work. She was awarded Kaiser-i-Hind Gold medal for her service to the North West Frontier Province, Bannu. She took a leading part in many social movements including medico-social service. She served as a Member of the governing body of the Lady Hardinge Medical College and Hospital as a representative of the Association of Medical Women in India. She was held at high esteem for her independent view. She was the First Indian Woman Doctor to keep up direct liaison with the International Association of Medical Women. She was also a writer and published several books including the famous book *A Hero of the Afghan Frontier: Dr. Pennell's Life for Boys*, on the life and achievements of her husband. When the second World War broke, she returned to England and lived in London. She led a quite life there and her health was gradually deteriorating. In 1949, she visited India and her old house in Pakistan to collect some of her old possessions. She returned to England after a brief visit to her old acquaintance. She was in very poor health and died on 7th March 1951 at the Holy Rood, Findon, Sussex.

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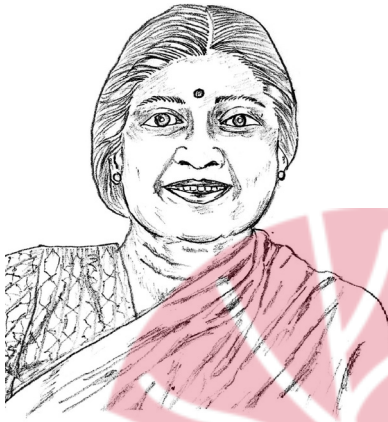
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एकः सूते सकलम्



**Ramachandran,
T S Soundaram**
(1904–1984)

Dr. T S Soundaram was born on 18th August 1904. She was an eminent gynaecologist, a social reformer and a politician. She was born to a rich family of South India. Her father Soundaram Iyengar and her mother Lakshmi Ammal were progressive minded and always encouraged their daughter to help poor and provide community services. She was married at the very young age of 12 in 1917 to her cousin, Dr. Soundararajan, a physician who died in his twenties, while treating plague affected villagers of Madurai District in 1926. He wished that his wife should fulfill his dream to become a doctor and also remarry for security of her future.

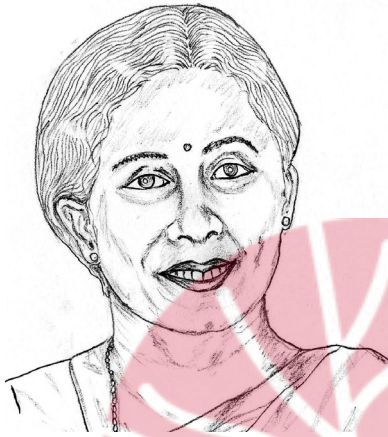
Parents of T S Soundaram admitted her to the Lady Hardinge Medical College (LHMC), New Delhi, where she completed her medical education MBBS and met G Ramachandran. They had an inter-cast marriage in 1940. Subsequently she did specialization and received Diploma in Gynaecology and Obstetrics (DGO). She also met Dr. Sushila Nayar at the LHMC and became a great follower of Mahatma Gandhi and Kasturba. Gandhi ji appointed her as the representative of the Kasturba Gandhi National Memorial Trust in South India. In 1947, Dr. Soundaram started Kasturba Hospital as a two-bedded clinic in Chinnalapatti, a small town near Madurai. Under her leadership and dedication, the small clinic developed into the Kasturba Gandhi Hospital and medical research center having

220 bed capacities. She also developed the Avvi Ashram in Sivasailam in Tirunelveli district. She was elected twice as the Member of the Legislative Assembly (from Athoor Constituency in 1952 and from Vedasandur Constituency from 1957) and she was also a Member of Parliament in 1962. She served as the Director and Correspondent, Gandhi Gram Complex; Chairman, Institute of Rural Health and Family Planning; Honorary Project Executive Officer, Periyar Project, Government of India; Deputy Minister, Ministry of Education, Government of India, 1962-67; MLA (Member Legislative Assembly), Government of Tamil Nadu.

She was a dedicated social worker, a qualified doctor and provided medical and clinical support to poor villagers, especially women and children. The first Prime Minister of India, Pandit Jawaharlal Nehru picked her to be the Union Deputy Minister of Education. She played a leading role to introduce Compulsory Primary Education during her tenure. She also adopted five poor children and educated, married and settled them in their life. She continued to provide clinical service to the sick and needy. She covered long distance by road and bullock cart to attend emergency cases and deliveries. She established many roadside dispensaries for poor villagers. Dr. Soundaram was a very good veena player. She also designed Khadi sarees for herself and her friends. She was a remarkable personality, truly selfless, affectionate, compassionate, and extraordinary. She was a genuine Gandhinian and she always wore Khadi. She received highest civil award, Padma Bhushan in 1962. She died on 21st October 1984. A commemoration stamp had been issued in 2005 in her honour.

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Ramadorai, Sujatha
(b.1962)

Dr. Sujatha Ramadorai, born on 23rd May 1962, is an internationally acclaimed algebraic number theorist. She received BSc from St. Joseph College, Bangalore, 1982; MSc (Mathematics) from Annamalai University in 1985 and PhD from Tata Institute of Fundamental Research, Bombay in 1992. She joined the School of Mathematics, Tata Institute of Fundamental Research, Bombay in 1985 as Assistant Professor. Subsequently, she was elevated to Associate Professor and then Professor in the same institute. She also served as a Research Assistant, Regensburg University, 1991-92; Assistant Professor, Ohio State University, Ohio, 1993-94; Associate, Indian Academy of Sciences, Bangalore, 1994-97; Member, National Knowledge Commission, 2007-09. She held the position of a Member of Prime Minister's Scientific Advisory Council, Government of India. She occupies a succession of senior positions including Vaidyanathaswamy Visiting Chair Professor, Chennai Mathematical Institute, 2008-11; Adjunct Faculty, Indian Institute of Scientific Education and Research, Pune. She worked as Visitor, Max-Planck Institute, Bonn, 2003 and Visiting Professor, Chennai Mathematical Institute, 2007-08. She is a Member of National Innovation Council since 2009. Presently, she is serving as the Professor of Mathematics at the Tata Institute of Fundamental Research.

She has been a Fellow, Indian Academy of Sciences, Bangalore, 2004; Fellow, National Academy of Sciences (India), Allahabad, 2005;

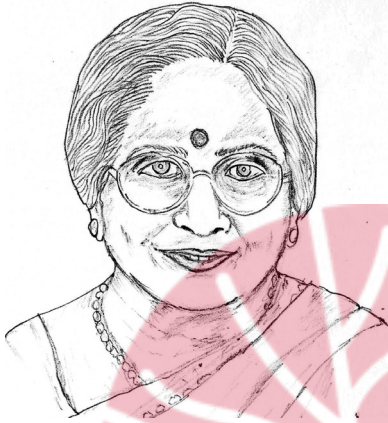
Fellow, Indian National Science Academy, New Delhi, 2009. Professor Sujatha Ramdorai's work on Iwasawa theory is widely acclaimed. Besides, she has made significant contributions in the areas of Witt Groups and levels of varieties, unramified Cohomology at quadrics, Hasse principles and Iwasawa theory of p-adic representations. She received the 2006 Srinivasa Ramnujan Prize in recognition to her contribution on the arithmetic of algebraic varieties and her substantial contributions to non-commutative Iwasawa theory from International Centre for Theoretical Physics (ICTP), Trieste. Further, in collaboration with Coats, Fukaya, Kato and Venjakob, she formulated a non-commuting version of the main conjecture of Iwasawa theory, which now derives much work on this important subject. She received many awards for her brilliant research achievements including Young Scientist Award, Indian National Science Academy, 1993; Alexander Von Humboldt Fellow, 1997-98; Shanti Swarup Bhatnagar Award in the field of mathematics, 2004. She is the first and only Indian to win the prestigious Ramanujan Prize for Mathematics, International Centre for Theoretical Physics (ICTP) (Trieste), 2006.

She has published several research articles in international journals. She serves as the Managing Editor of *International Journal of Number Theory* and Editor of *Journal of Ramanujan Mathematical Society*.

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एकः सूते सकलम्



**Ramakrishnan,
Karimpat Mathangi**
(b.1934)

Dr. Karimpat Mathangi Ramakrishnan is an eminent personality in the field of plastic surgery. She was born on 5th November 1934 at Madras (Chennai), Tamil Nadu. She studied MBBS from Madras Medical College in 1957. She visited abroad to avail advanced training in the field of surgery. She obtained FRCS (Fellow of Royal College of Surgeons), England and Edinburgh. She received MCh (Plastic Surgery) from USA in 1967. She also did PhD (Plastic Surgery) from Madras Medical College in 1979 and DSc from MGR Medical University in 1992.

She served as Arnott Lecturer at Royal College of Surgeons, England in 1992. She retired as Professor and Head of Plastic Surgery, Kilpauk Medical College, Chennai. She has been working as the Chief of Paediatric Intensive Burn Care Unit and Plastic Surgery, Kanchi Kamakoti Child's Trust Hospital, Chennai. She has been honoured as Distinguished Professor of Plastic Surgery, Dr. MGR Medical University, Chennai, 2010.

Dr. Karimpat Ramakrishnan has made outstanding research contributions by making the use of Amniotic membrane as burn wound cover. This noble technique in plastic surgery is recognized as the Prof. Mathangi Ramakrishnan of Burns Therapy Fame. She is the first woman plastic surgeon to obtain DSc from the Dr. MGR Medical

University. She singularly dedicated her life for the rehabilitation of burn crippled for over last four decades.

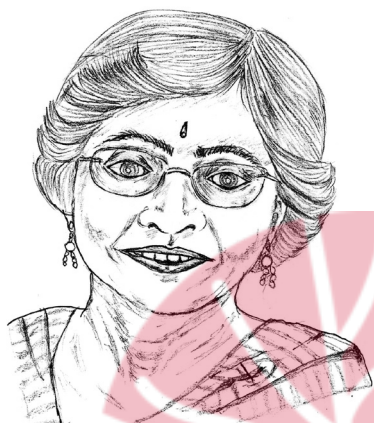
Notable among the numerous awards and honours conferred on her include Jhonstone Gold Medal, Madras Medical College, Madras, 1957; Sushruta Gold Medal and Oration, Association of Surgeons of India, 1976; Hari Om Ashram Award and Oration, Association of Surgeons of India, 1977; Maneckshaw Award, Afro-Asian Burn Congress, 1982; Dr. B C Roy National Award, 1989; Verma Award, Banaras Hindu University, Varanasi, 1990; Dhanwantri Award of Excellence, International Conference of Alternative Medicine, Chennai, 1990; Phoolan Devi Award for Lifetime Achievement in the field of Burn and Reconstructive Surgery, National Academy of Burns, 1999; Lifetime Achievement Award, Sun City, Madras, 2000; Padma Shri, 2002; Professor Krishnamurthy Commemoration Award, Association of Surgeons of India, 2007; and Lifetime Achievement Award, Dr. MGR Medical University, 2010.

She has published over 50 research publications in reputed medical journals. She also served as Editor of the *Manual of Burn Care*, which is widely used as a standard reference tool. Dr. MGR Medical University instituted Dr. Karimpat Ramakrishnan Endowment Gold Medal for best MCh student in the field of plastic and reconstructive surgery.

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Ramasesha, Sheela K
(b.1955)

Dr. Sheela K Ramasesha was born on 28th April 1955. She has made notable contributions in the field of chemistry and material science.

She earned MSc (Chemistry) from Bangalore University; PhD (Solid State Chemistry), Indian Institute of Sciences, Bangalore, 1980. She went abroad for higher studies as a Postdoctoral Fellow, University of Oxford, UK, 1979-81; Postdoctoral Fellow, Louisiana State University, USA, 1982; and Postdoctoral Fellow, Princeton University, USA, 1982-84.

She started her career as a Council of Scientific and Industrial Research (CSIR) Pool Officer, Department of Physics, Indian Institute of Science (IISc), Bangalore, 1984-87. She shifted to the Department of Metallurgy of the same institute as a Research Associate from 1988-89. She became the University Grants Commission (UGC) Research Scientist Cat-B (Assistant Prof), Material Science Division, National Aerospace Laboratory, Bangalore from 1989-94. Later, she was elevated to UGC Research Scientist Cat-C (Professor) from 1992-2001. Subsequently, she worked as the Metal Scientist at GE John F Welch Technology Centre (GE-JFWTC), Bangalore, 2001-03 and then Manager Ceramics, since 2003 in the same organisation. Since 2009 she has been serving as a Visiting Faculty, Divecha Centre for Climate Change, IISc, Bangalore.

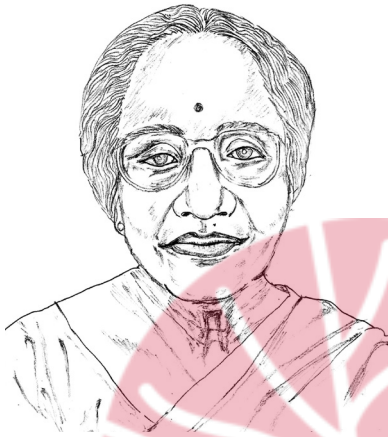
She is a Fellow of Indian Academy of Sciences, Bangalore. She has made valuable contributions in the field of her specialization as a Life

Member, Material Research Society of India (MRSI); Life Member, Indian Ceramic Society; Life Member, Chemical Research Society of India; Life Member, Indian Society for Advancement of Materials and Processing Engineering (ISAMPE) and Life Member of Third World Organization of Women in Science.

Dr. Sheela K Ramasesha has made immense contributions dealing with all the aspects of ceramics and high pressure studies of materials. Her research defined the traditional use of ceramics in household and modern use of functional ceramics and their use in building materials, automobile and aerospace industries. Her research also developed understanding that most of the structural ceramics have lower densities than the alloys, which increased the potential use of ceramics for different functions all over the world. However, there are many problems associated with ceramics. One of the major drawback is that they cannot be used for machine parts as they are hard and brittle. She also explored innovative use of various forms of glass and ceramics for electrical industries. According to her, a new era of modern technology has started, which can change the properties of materials (including ceramics). The substitution of new elements during ceramic processing can improve the properties of ceramics which can be utilized in processes. Dr. Sheela has received several awards and prizes in recognition to her brilliant research findings including UNESCO Certificate of Recognition, 1990; C V Raman Young Scientist Award, Karnataka State Council of Science and Technology, 1999; Medal, Materials Research Society of India (MRSI), 2001. She holds eleven US patents, and has published over 85 research articles in reputed scientific journals. She also has served as a Member, Editorial Advisory Board of *Journal of Active and Passive Electronic Components*.

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**Ranadive, Kamal
Jaysing**
(1917–2001)

An eminent personality in the field of cell and molecular biology, Dr. Kamal Jaysing Ranadive was born on 8th November 1917 at Poona (Pune), Maharashtra to Dinkar Dattatreya Samrath and Shantabai. She completed her schooling from HHCP Girl's High School, Poona. She did her BSc (Botany) from Fergusson College, Bombay in 1934. She obtained MSc from Agricultural College, Poona in 1943 and PhD from Bombay University in 1950. She completed her research under Dr. V R Khanolkar, the founder of Indian Cancer Research Centre (ICRC), Bombay. She won Rockefeller Foundation for Postdoctoral Research Fellowship and worked under Professor George Gey at the John's Hopkins University, Baltimore, USA.

She started her scientific career as a Research Scholar, Tata Memorial Hospital Laboratory, Bombay, 1943; Head of the Department of Experimental Biology, Indian Cancer Research Centre, Bombay, 1952-62; Acting Director, 1962-66; Head, Biology Division, Cancer Research Institute, Tata Memorial Centre, Bombay, 1966-77 (when she retired); and Emeritus Medical Scientist, Indian Council of Medical Research in 1977.

She had the honour of being the Fellow and Council Member of Indian National Science Academy, New Delhi, 1977 & 1985-87 and the Founder Fellow, of Maharashtra Academy of Sciences. She took initiatives for the development of women scientists in India. She was the

Core Foundation Member and President of Indian Women Scientists' Association, 1977-79. She was actively involved with several professional associations by being a Member of American Tissue Culture Association; Japanese Tissue Culture Association; British Cancer Research Association and Member of International Society of Cell Biology.

Dr. Kamal Jaysing Ranadive made significant contributions in the field of experimental biology and cell biology including cancer research and leprosy research. She conducted extensive field studies on the etiology and mechanism of carcinogenesis at cell and systematic levels. She worked on breast cancer, oral cancer and experimental carcinogens specific to India. She also focused on the tissue, cell and organ cultures of mouse tumours, human tumours and embryonic cell. She also worked on the isolation and cultivation of 'ICRC bacillus' from lepromatous leprosy. She conducted pioneering research on cancer and leprosy and organised many workshops and study groups to educate tribal folks and general public about cancer, leprosy, nutrition and healthy lifestyle. She started the First Tissue Culture Laboratory in 1960s in India at the Indian Cancer Research Center, Bombay. Her extensive research resulted in the development of three more divisions including carcinogenesis, cell biology and immunology in addition to the tissue culture laboratory at the ICRC. Her research findings developed insight into patho-physiology of cancer. She was the first to identify the link between cancer susceptibility and interaction between hormones and tumour virus. Her experimental specimen 'mouse' provided a perfect model for the research on leukemia, breast cancer and cancer of esophagus. Her research on leprosy bacteria resulted into the development of a leprosy vaccine, for which she has been acknowledged by Padma Bhushan in 1982. She also started a new Faculty of Applied Biology at Bombay University. She had assisted Professor V R Khanolkar in establishing Indian Cancer Research Centre in Bombay.

Owing to her phenomenal contributions, she was endowed with several prestigious awards such as Basanti Devi Amirchand Award, Indian Council of Medical Research, 1958; G J Watumull Memorial International Award, 1964; First Silver Jubilee Research Award, Medical Council of India, 1964; Sandoz Oration Award, 1976; Distinguished

Woman Award, Banaras Hindu University Mahavidyalaya, 1982; Sandoz Gold Medal, 1982; and Padma Bhushan, 1982.

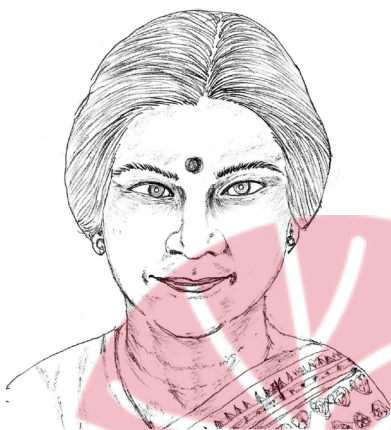
She contributed over 280 research articles in medical journals. She served as a coordinator and committee member of various national level committees and study groups related to the subject specialization. She also served as the Member of Editorial Board of *Indian Journal of Cancer*, *Indian Journal of Experimental Biology*, *International Journal of Cancer*, *Indian Journal of Medical Research* and *Yearbook of Cancer*. She died in 2001.

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एकः सूते सकलम्



**Ranganathan,
Darshan**
(1941–2001)

Dr. Darshan Ranganathan was a notable personality of scientific community. She was the daughter of Shanti Swarup and Vidyawati Markan, born on 4th June 1941 in New Delhi. She did her BSc, MSc and PhD from the University of Delhi in 1961, 1963 and 1966 respectively. She attended the Postdoctoral Fellowship at the Imperial College, London.

She served as Lecturer, Department of Chemistry, Miranda College, Delhi, 1967. She moved to Kanpur after her marriage to Professor S Ranganathan and joined Indian Institute of Technology, Kanpur, as a Research Scientist, in 1970. She served as a Scientist, Regional Research Laboratory (now National Institute of Interdisciplinary Science and Technology), Thiruvananthapuram from 1993-98. In 1998, she joined, Indian Institute of Chemical Technology, Hyderabad as a Research Fellow.

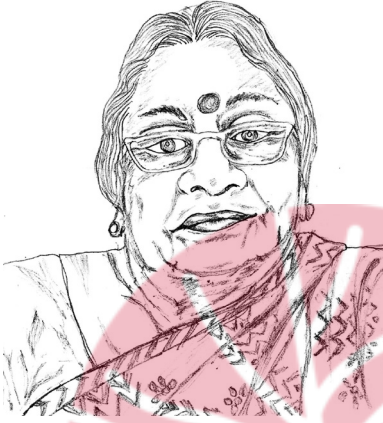
She was an Elected Fellow of Indian National Science Academy, New Delhi, 1995 and Fellow of Indian Academy of Sciences, Bangalore, 1991.

She was the recipient of Science Research Scholarship of Royal Commission for the Exhibition of 1851; Professor K Venkataraman Lectureship, 1996; Third World Academy of Science Award in Chemistry, 1999 and Jawaharlal Nehru Birth Centenary Visiting Fellowship, 2000.

Dr. Darshan Ranganathan conducted significant research on understanding the biological process at a molecular level through the design of simple and elegant chemical models. She conducted pioneering work on design of chemical nucleases that showed specificity with respect to the site of DNA scission. Her research provided new direction in the crafting of new molecules with potential applications in chemical, biological and material sciences. Her research revealed that a small peptide molecule could be designed to self-assemble into a high molecular weight macromolecule by incorporating into its backbone, a self-complementary bi-directional hydrogen bonding motif, a supramolecular synthon. She along with her husband Professor S Ranganathan started *Current Organic Chemistry Highlights*, a monthly journal which continued from 1971-79. She was a brilliant scientist in the field of organic chemistry in India. She had great warmth and was recognized by her gentleness, dignity, self confidence and overcoming all challenges she faced with great courage. She was an outstanding personality and was the most promising organic chemist of India. Unfortunately, she could not achieve permanent faculty position at IIT, Kanpur and continued to shift from one project to another to keep the family together at the station of her husband's job. On 4th June 2001, she died of cancer, on the very day that she was born sixty years ago and the same day she was married 31 years ago. The Indian National Science Academy instituted 'Professor Darshan Ranganathan Memorial Lecture Award' in honour of the great organic scientist of India.

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Rao, Padma V
(1926–2011)

Dr. Padma V Rao, born on 23rd July 1926, was an outstanding Obstetrician and Gynaecologist. Her name is synonymous with maternal and child care in Udupi.

She qualified MBBS from Madras University, in 1949. She did DGO (Diploma in Gynaecology and Obstetrics) from the same university in 1952. She obtained MD (Obstetrics and Gynaecology), Andhra University, 1958 and availed the Commonwealth Medical Fellowship in 1968.

She held very senior positions including Director, Professor and Head, Department of Obstetrics and Gynaecology, Kasturba Medical College and Hospital, Manipal, up to 1985 until she retired. She continued in the same organisation as an Emeritus Professor since 1985.

She served as a Fellow of Indian College of Maternal and Child Health, Calcutta. She was a very active member of many societies and associations including Vice President, Family Planning Association of India; Secretary and Treasurer, Cancer Society of India; Secretary, Udupi Branch, Indian Medical Association; Senior President, Federation of Obstetrics and Gynaecological Society of India (FOGSI), 1978-79; President, Manipal Obstetrics and Gynaecological Society, 1973-95.

Her dedicated hard work has been acknowledged by awarding her Dr. Ida Scudder Oration, Christian Medical College, Vellore, 1985;

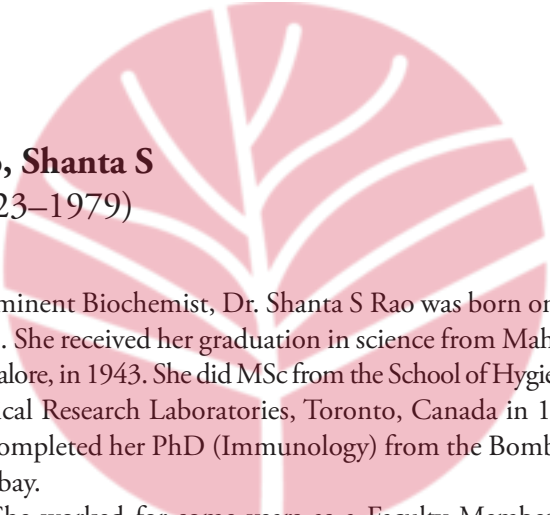
Lifetime Achievement Millennium Award, Federation of Obstetrics and Gynaecologists of India, Lucknow, 1999.

Dr. Padma Rao was well known for the noble service provided by her in the field of maternal and child care. She served Kasturba Gandhi Hospital for more than four decades and played a significant role in establishing the Obstetrics and Gynaecology Department at the hospital. She also took initiative for the construction of new building and modernization of the hospital. She was a great visionary, who made remarkable improvement in the medical service of Udupi. She along with her husband Dr. K N Rao founded Salem Polyclinic in 1962. The hospital has the most modern facilities including neonatal Intensive Care Unit, Haemato-Diod-Microbiology and Pathology Labs, Image Intensifier, 4D USG, 2D ECG-Colour Doppler, Automated Biochemical Analysis, etc. The doctor couple dedicated their lives for the development of the hospital into a most successful pioneer health service provider for the past four decades.

She was the first to perform laparoscopic sterilization in India in 1971 and provided simplified technique of laparoscopy. She served as the first representative of American Association of Gynaecologists and Laparoscopists (AAGL) of Los Angeles, California from 1972-76. She contributed several research articles and chapters in books. She also extensively contributed to 'WHO Bibliography Special Supplements' on different subjects of her specialization. She was a passionate doctor and a dedicated teacher and mentor of several young doctors, who would cherish memory of her association with them. She died on 3rd November 2011 at her residence in Manipal, she was 85.

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Rao, Shanta S (1923–1979)

An eminent Biochemist, Dr. Shanta S Rao was born on 23rd January 1923. She received her graduation in science from Maharani College, Bangalore, in 1943. She did MSc from the School of Hygiene Connaught Medical Research Laboratories, Toronto, Canada in 1949. In 1953, she completed her PhD (Immunology) from the Bombay University, Bombay.

She worked for some years as a Faculty Member of Pathology and Pharmacology at Bombay University. She joined Contraceptive Test Unit (CTU), Indian Cancer Research Centre, Bombay as a Biochemist in 1956. The institute was renamed as the Reproductive Physiology Unit (RPU) in 1963. Under her able guidance, the Unit was expanded into the Institute for Research in Reproduction (IRR) in 1970. Dr. Shanta S Rao became the Founder Director of the IRR and continued until her premature death on 3rd December 1979 at the age of 56.

She was the Founder Secretary, Indian Society for Study of Reproduction and Endocrinology; Executive Committee Member, Society of Biological Chemists, India; Member, Society for Study of Reproduction, USA; Member, Endocrine Society, USA; and Nominated Member, International Planned Parenthood Federation.

Dr. Shanta S Rao was a distinguished scientist and a respected teacher. She specialized in immunology, biochemistry of gonadotropins, sperm antigen, and standardization of diagnostic reagents for hormones,

prophylactic antigens and fertility control. With her foresightedness and earnest effort, her brain child IRR earned the permanent status of an institution under the umbrella of the Indian Council of Medical Research. She became the Founder Director of the most modern institute in the country in the field of Reproductive Biology. Dr. Indira Hinduja conducted Gamete Intra-Fallopian Transfer Technique (GIFT) for the production of India's First GIFT baby on 4th January 1988 in the laboratory of this institute. In 2002, the IRR was rechristened as the National Institute of Research for Reproductive Health (NIRRH). Dr. Shanta S Rao's research work in the field of contraceptive and Follicle Stimulant Hormone (FSH) is a landmark research in the field of male fertility. Her immunological research led to the establishment of the relation between blood serum antigen and the secretion of the reproductive tract. She was one of the first researchers to establish the presence of antibodies to spermatozoa as a cause of infertility in human male and female.

She received several prestigious awards including Guha Research Conference Award; Shakuntala Devi Amirchand Prize, Indian Council of Medical Research, 1960; Honourable Mention of her achievements from American Medical Association, 1960; G S Watumull Award, 1963; and Metchnikoff Medal, Bulgaria, 1971. She contributed over 150 research articles in the field of her specialization. She served as the Editor of the journal *Contraception*. She had been a Member of the World Health Organization's Committee on Immunological Aspects of Human Reproduction. She also served as the Economic Correspondent of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).

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**Ravindranath,
Vijayalakshmi**
(b.1953)

Dr. Vijayalakshmi Ravindranath is a highly respected personality in the field of neurology. She was born in Chennai, Tamil Nadu on 18th October 1953.

She studied BSc and MSc from Andhra University, Hyderabad. She completed her PhD (Biochemistry) in 1981 from Mysore University. She won the Fogarty International Fellowship in 1982. She also did Postdoctoral Fellowship from National Cancer Institute, National Institute of Health, USA, 1982-85.

She started her career from Central Food Technology Research Institute as a Scientist. She also worked as Scientist at National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore from 1985-2000. In 2000, she became the Founder Director of the National Brain Research Centre, Manesar and served there until 2009. She assumed the position of Chairperson and Professor, Centre for Neuroscience, Indian Institute of Science, Bangalore since 2009. Professor Ravindranath served as the Founder Director of the National Brain Research Centre (NBRC), an autonomous institute of the Department of Biotechnology. She made pioneering research work in understanding the metabolism of psychoactive drugs at the site of action in brain. She was the first to demonstrate the capability of human brain to metabolize psychoactive drugs to pharmacologically active and inactive metabolites by pathways, which are different from those that occur

in liver, the major organ involved in drug metabolism. She has made detailed investigation in identifying drug that may help to slow down the progression of the Parkinson's disease and Alzheimer's disease. She made use of extract of the *Ashwagandha* (*Withania somnifera*) root on genetically modified mice with Alzheimer's disease and found that they could reverse memory loss. She also found a reduction of amyloid plaques in their brain and improvement in their cognitive ability. Her research findings have been acclaimed by designating her as a Fellow of Indian National Science Academy, New Delhi, 2005; Fellow, Indian Academy of Sciences, Bangalore, 2001; Fellow, National Academy of Sciences (India), Allahabad; Fellow, Third World Academy of Sciences; Fellow, National Academy of Medical Sciences (India), 2005; and Fellow, Indian Academy of Neurosciences.

Dr. Vijayalakshmi received Shanti Swarup Bhatnagar Award for Medical Sciences in 1996 for her brilliant research in the field of neurosciences. She has been felicitated with many other awards including Om Prakash Bhasin Award for Science and Technology, 2001; K P Bhargava Medal, Indian National Science Academy, 2001; J C Bose Fellowship, 2006; National Senior Woman Bioscientist Award, 2008 and Padma Shri in 2010. She made earnest effort to establish NBRC as an advanced research centre for neuroscience research in India. She also served as member of various national and international organisations in the field of her specialization. She was a Member of the Governing Council of International Brain Research Organization. During her tenure as Director of NBRC, she networked 45 institutions around the country with NBRC with a target to share resources and promote neuroscience research. NBRC was granted the status of Deemed University in May 2002. It achieved excellence in brain research, which received international acclaim. She has contributed several research articles in national and international journals. She has been the Member of editorial board of many prestigious journals including *Progress in Neurobiology*, (USA) *Neurotoxicity Research*, (USA) *Neuroscience Research*, (Japan) and *Current Science*, (India).

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एकः सूते सकलम्



Ray, Manju
(b.1947)

Dr. Manju Ray is a distinguished Biochemist of international repute for her work on cancer drugs. She was born to the family of Shri Promode Chandra Nag on 1st January 1947 at Agartala, Tripura.

She did BSc from Charu Chandra College, Calcutta, 1967. She qualified MSc with Gold Medal and First Class First Position from Calcutta University in 1969. She completed PhD from Calcutta University in 1975 and Postdoctoral Research, Jadavpur University, Calcutta from 1975-86.

She worked as Junior Research Fellow and Senior Research Fellow at Indian Council of Medical Research from 1970-76. She served as Research Associate and Research Scientist B, University Grants Commission, 1976. From 1992-2010, she worked as Professor in the Department of Biological Chemistry, Indian Association for the Cultivation of Science, Kolkata. After her retirement, she continued as Council of Scientific and Industrial Research (CSIR) Emeritus Scientist at the Bose Institute, Kolkata since 2011. She is an active member of the Society of Biological Chemists, India.

She received many awards and prizes for her outstanding research contributions including Young Scientists Medal, Indian National Science Academy, 1975; Shanti Swarup Bhatnagar Prize, 1989; Ladies Study Group Lifetime Achievement Award, Indian Chamber of Commerce, 2001; Dr. I C Chopra Memorial Award, Regional Research Laboratory,

Jammu, 2003; Dr. Janan Chandra Ghosh Memorial Award, Science Association of Bengal, 2012.

Dr. Manju Ray's major areas of research interest have been tumour biochemistry and bioenergetics, molecular enzymology, enzyme biotechnology and metabolic regulation. Her team of researchers has made groundbreaking achievement by discovering the ultimate cancer cure by developing a drug that selectively targets the cancer cells without harming the healthy ones. They claim that the patients in 'very advanced stages' of cancer for whom all other treatments had failed have been brought back to 'excellent' health with the help of a drug formulation that they have developed after a research spanning more than a decade. The drug was developed under a project funded by the Department of Science and Technology and the Council of Scientific and Industrial Research.

Her team primarily worked on the biological role of methylglyoxal, which was an enigma and challenge to many celebrated biochemists. Methylglyoxal was supposed to be a normal metabolite for quite a long time, but its precise enzymatic synthesis and breakdown were not known. By isolating and characterizing the enzymes responsible for the synthesis and breakdown of methylglyoxal, her lab could firmly establish methylglyoxal in the metabolic map. They have shown that the fundamental difference between normal and cancerous cells might reside in energy (ATP) production. This ATP molecule is the universal energy currency in all living organisms. Two enzymes namely mitochondrial complex I and glyceraldehyde-3-phosphate dehydrogenase, vital for the ATP production, are supposed to be altered and over-expressed in cancerous cells leading to excessive ATP production and as a consequence cancer develops. Methylglyoxal acts on the altered sites of cancerous cells sparing the normal cells. By utilizing the effect of methylglyoxal specifically against cancerous cells, her group could develop an anticancer formulation with methylglyoxal as the lead compound. The possible toxicity of this formulation was tested on different animals as per the guidelines of Drugs and Cosmetic Rules 1946 and it was found that the formulation was potentially safe for consumption by cancer patients. Around two hundred patients were treated with this formulation. It has been proved that it has no toxic effect and is reasonably effective

towards a wide variety of cancers. There are several enzymes in living organisms, which are capable of degrading methylglyoxal and hence might be a hindrance for its efficacy. To circumvent this problem, a polymer-based nano-conjugated methylglyoxal (NanoMG) has been developed in her laboratory with assistance from the Department of Science and Technology and a pharmaceutical company Lifecare Innovations Private Limited. The efficacy and potential toxicity of this NanoMG was tested and it was found that NanoMG is potentially safe for cancer patients and is two hundred times more effective than only methylglyoxal as per mass basis.

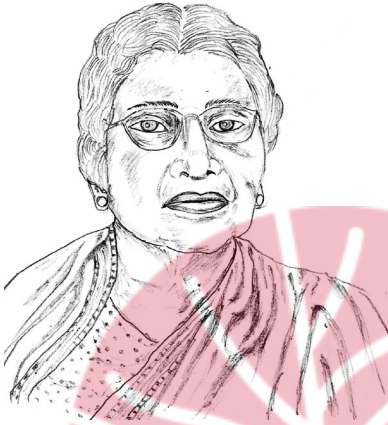
There is an ongoing collaborative project with Lifecare and Innovations Pvt. Ltd. for the development and commercialization of a cost-effective methylglyoxal-based anticancer therapy. The world is watching the progress of her research work closely. Her research has taken a giant step towards a possible solution for the therapy of terminally ill cancer patients.

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एकः सूते सकलम्



Reddi, Muthulakshmi
(1886–1968)

Dr. Muthulakshmi Reddi was born to the Isai Vellalar Community on 30th July 1886 in the princely state of Pudukkottai of Tamil Nadu. Her step father was S Narayanasami, a Tamil Brahmin and her mother was Chandrammal. Her stepfather was the Principal of Maharaja's College of Madras. He broke the age-old tradition of not educating girl child. He sent Muthulakshmi to a local school and she passed matriculation as a private candidate. After completing school education, she wished to take admission to the Maharaja's College, but it was denied by the then Principal because of her gender and background. However Maharaja of Pudukkottai was a progressive minded person, he took initiative to get her admitted to the college and gave her scholarship to complete her studies without any difficulty. After completing her studies at the Maharaja's College, she entered the Madras Medical College in 1907 and completed her MB (Bachelor of Medicine) degree in 1912. She was the first woman to get MB degree from the Madras Medical College. She also took CM Degree, Madras and Specialized Training in Diseases of Women and Children from UK. She married Dr. D T Sandara Reddi in 1914 under the 1872 Native Marriage Act. During her college days she met Sarojini Naidu. She was also greatly influenced by the ideology of Mahatma Gandhi and Annie Besant.

She started her medical career as a House Surgeon at Government Hospital for Women and Children, Madras, 1912. She was the first

Indian woman to become Vice-President of an Elected Legislature (Madras) from 1926-30. She started consultancy and private practice in medicine and served as the visiting doctor to several hospitals. Dr. Muthulakshmi Reddi made significant contributions for the social reform, girl's education, maternity care, nutrition standard and child welfare in Madras. She was a consistent defender of women's right to higher education. She opened a hostel for Muslim girls and provided scholarship for the education of Harijan girls. She was the Founder President, Women's Indian Association, 1918 and Chairman, Vice-President and President of All India Women's Conference (AIWC). She participated in the Third Round Table Conference, London in 1930 and the World Women's Congress, Chicago in 1932. She was the only woman member of the Sir Philip Hartog Education Committee to review educational projects in India and Burma. She actively participated in the Salt Satyagraha Movement of Mahatma Gandhi in 1930.

She served as an active member of Social Service League and widow's home with Anne Besant and Margaret Cousins in Madras. She established the first modern home for orphans and helped to build the first cancer hospital in South India.

She has many firsts to her credit including (i) First Woman Legislator of India, 1922, (ii) First woman doctor from Madras Medical College in 1912, (iii) First girl student to be admitted to Men's College, the Maharaja's College in Madras, (iv) First House Surgeon to the Government Hospital for Women and Children in Madras in 1912, (v) First Chairperson of the State Social Welfare Advisory Board, (vi) First Woman Deputy President to the Legislative Council of Madras, (vii) Alder woman in the Madras Corporation and (viii) She established the first cancer hospital in South India, the Adyar Cancer Institute and Hospital in 1955 through the Indian Women's Association's Cancer Relief Fund. She nurtured the dream of starting this institute ever since she lost her younger sister to cancer in 1923. Her son Dr. Krishnamurthi and Dr. Shanta took keen interest to further elevate the institute into an excellent modern cancer research centre in the country.

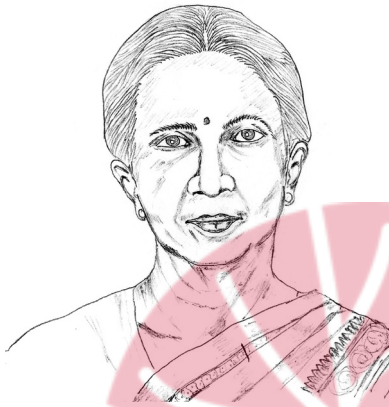
She made outstanding efforts for social upliftment and reform of women. She started Awai Home in Madras for free boarding and lodging

for poor and destitute children, especially girls. She took initiative to pass bills for suppression of brothels and immoral trafficking of women and children. She also started the cancer relief movement by establishing the first cancer institute in Madras, the Adyar Cancer Institute. The foundation stone of the institute was laid by the First Prime Minister of India, Pandit Jawaharlal Nehru in 1952, and the hospital started its service in 1954. She also fought for the eradication of the Devdasi System in the society. She was awarded the highest civil award, Padma Bhushan in 1956 for her phenomenal contributions. The Government of Tamil Nadu initiated Dr. Muthulakshmi Maternity Benefit Scheme since 10th Five Year Plan in her honour. Dr. Muthulakshmi Reddi continued to fight for the poor until her death on 22nd July 1968 in Madras at the age of 82.

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एकः सूते सकलम्



Reddy, Vinodini
(b.1934)

Dr. Vinodini Reddy, the eminent Nutritionist who framed the National Nutrition Programme in India was born on 15th February 1934 at Hyderabad, Andhra Pradesh. She took MBBS, DCH (Diploma in Child Health) and MD (Paediatrics) from Osmania University, Hyderabad in 1958, 1960 and 1965 respectively. She earned WHO Fellowship for Advanced Training in Gastroenterology and Nutrition, Harvard Medical School, Boston, USA from 1966-67. She joined National Institute of Nutrition, Hyderabad in 1961 as a Research Officer and continued till 1966, when she became the Chief of the Clinical Division of the same institute in 1968. She worked as Director, National Institute of Nutrition, Hyderabad from 1988-95 until she retired. She also served as a Visiting Professor, Johns Hopkins University, USA, 1995-2000.

Professor Vinodini Reddy has made significant research work in the field of infant nutrition and growth, nutrition-immunity interactions, vitamin A deficiency and its impact, and protein malnutrition. Her extensive research on nutrition facilitated to evolve National Nutrition Programme in India. She assisted Government of India in formulation of food and nutrition policies. She developed cost-effective recipes based on easily available local food to be used in supplementary feeding programme for malnourished children of India. She also emphasized upon the essential requirement of vitamin A and developed 'National Vitamin A Supplementation Programme' for combating vitamin A deficiency and its related diseases among children. She made valuable

research work on importance of micronutrient-rich food. She made earnest effort to improve the health of rural poor children by successful implementation of various National Nutrition Programmes. During her tenure as Director at National Institute of Nutrition, Hyderabad, she gave a new direction to the institute to develop it into a premier institute on various disciplines such as food science, nutrition, clinical medicine, public health and social medicine. She actively served as member of various committees of DGHS (Director General of Health Services), ICMR (Indian Council of Medical Research), ICAR (Indian Council of Agricultural Research), FAO, WHO, UNICEF, MI (Micronutrient Initiatives) and IVACG (International Vitamin A Consultative Group).

She travelled widely and gained extensive knowledge of dietary habits of population of different regions in India and abroad. Her extensive field work has carved for herself a prominent place as a leader in the field of nutrition and balanced diet. She has been a Fellow, Indian Academy of Pediatrics, 1984; Fellow, Andhra Pradesh Academy of Sciences, 1989; Fellow, National Academy of Medical Sciences (India), 1990; Fellow and Vice-President, International Union of Nutritional Sciences, 1990, 1993-97 and 1997-2003; Fellow, Indian National Science Academy, New Delhi, 1994. Her innovative efforts to reduce food and malnutrition problem in the developing countries have been acclaimed by bestowing her with prestigious awards including Coveted Freisland Prize from Netherlands Association of Dairy Science for her outstanding research on lactose intolerance in 1973; P N Raju Award, 1978; Dr. Kamala Menon Medical Research Award, 1981; J B Chatterjee Gold Medal, 1988; Dr. Y R Reddy Award, 1990; Dr. Siva Reddy Gold Medal, 1990; Basanti Devi Amirchand Prize, Indian Council of Medical Research, 1991; Dr. B C Roy National Award, 1992. She has contributed over 200 research articles in reputed medical journals.

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**Rodrigues, Veronica
Filomena**
(1953–2010)

Dr. Veronica Filomena Rodrigues was a distinguished Neurobiologist. She was born on 31st March 1953 in Kenya. She completed her school education in Nairobi. She took BA from Trinity College, Dublin, Ireland in 1976. She came to India in 1977. She received her MSc and PhD (1982) from Tata Institute of Fundamental Research, Mumbai. She also attended Max-Planck Institute fur Biologische Kyberneetik, Germany from 1982-85 for postdoctoral training under the guidance of Professor Karl Goetz and Erich Buchner, where her research work was on coding of olfactory information in the brain.

She joined Tata Institute of Fundamental Research, Mumbai as a Graduate Student Research Assistant in 1976. She started working under Professor Obaid Siddiqi, a renowned scientist of international standing on olfactory behaviour of flies. Subsequently, she became Faculty Member and Head of the Department of Biological Sciences, Tata Institute of Fundamental Research, Mumbai. She shifted to the National Centre for Biological Sciences (NCBS), Tata Institute of Fundamental Research, Bangalore in 2005 as a Senior Professor and continued till her premature death. She developed excellent laboratory and workshop in the newly formed NCBS. She became Indian citizen in 1997.

Dr. Rodrigues studied on how the ability of smell develops. She conducted significant research work on chemosensory circuits of insects, and also she worked on the mechanism of how odor is

encoded for activation across neurons within the olfactory lobe of *Drosophila*. She mapped the circuitry channel of the mechanism of the complete function of chemosensory transmission in animals and how the system of chemosensory circuit is modified and adopted under varying environmental conditions. She worked on olfactory habituation on *Drosophila melanogaster*. She tried to map brain activity to specific behaviour of animals. Her research findings explored that the brain centers, that process olfactory signals, have an exquisitely precise architecture. She and her group mapped the anatomy of the entire olfactory system of *Drosophila melanogaster* and its all stages of development via electron and immunoconfocal microscopy. She together with Professor Obaid Siddiqi pioneered in olfactory neurogenetics in flies and fly larvae. They are internationally recognized as outstanding scientists in this field.

She was an Elected Fellow of Indian National Science Academy, New Delhi, 1995; Fellow and Associate of Indian Academy of Sciences, 1993 and 1983-98. She was a leading neurobiologist who received Golden Jubilee Commemoration Medal in Biological Sciences, 2004; Senior National Women Bioscience Award, 2004 and J C Bose Fellowship, 2007. Professor Rodrigues published several research articles in high impact journals of national and international importance. She died of breast cancer on 10th November 2010 after five years battle with the disease. She was a great scientist, a mentor who instilled the value of sincerity and hard work to her students.

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Roy Chowdhury, Jayasree (b.1934)

Dr. Jayasree Roy Chowdhury is a prominent Oncologist, who made outstanding research investigations in cervical cancer and uterine cancer. It is estimated that over 74,000 Indian women die annually of cervical cancer, which forms about 24 per cent of total cancer cases among women in India, as compared to about 20 per cent for breast cancer. Poor women in rural India are at the highest risk. She dedicated her service to improve the situation by creating awareness and providing cancer health care facility to poor strata of women in rural India. She was born on 29th November 1934 at Calcutta, West Bengal. She is the daughter of Dr. Subodh Mitra, a renowned gynaecologist, who was one of the founders of the Chittaranjan National Cancer Institute, Calcutta. She is the wife of Late Narendranath Roy Chowdhury, a leading physician and a recipient of Dr. B C Roy National Award. She did MBBS; DPhil; PhD (Oncology and Physiology); DSc and MAMS.

She worked in various capacities in different organisations such as Faculty Member to the Department of Biochemistry, Bombay University and Calcutta University. She served as a Senior Scientific Officer and Head, Department of Tumour Biology, Chittaranjan National Cancer Research Institute (CNCR), Calcutta. Subsequently, she became Director of the institute. She made outstanding contributions by transforming the institute into an excellent centre of cancer research. She held many important positions in different societies and associations including

Executive Committee Member, North East Division, Indian Cancer Society; Founder Member and President, Indian Academy of Cytologists, 1982-83; Member, British Society of Cell Biology; Member, Indian Medical Association; Member, Association of Microbiologists of India. Dr. Roy Chowdhury conducted significant research work in the field of oncology. Her research findings formulated a drug Sicafeek, for the treatment of uterine cancer. Publication of her research on 'Tumor formation in Swiss mice with cancer filtrate' and 'Ectopic production of placental hormones in carcinoma of uterine cervix' acclaimed large citations from international research community.

She is the founder of Dr. Subodh Mitra Cancer Hospital and Research Centre, Salt Lake. She started the centre with an idea to get 'cancer treatment under single roof', as available in other metropolitan cities such as Mumbai, Chennai and Delhi. She pooled the facility of radiotherapy, bone marrow transplant, and haemato-oncology treatment available in the hospital. Dr. Roy Chowdhury also served as the Member of Accreditation of Cytology Laboratories in India.

Her field work and research contributions are acknowledged by awarding her Raja Ravisher Singh Memorial Cancer Research Award, 1966 and 1972. Indian Academy of Cytologists (Mumbai) organised Silver Jubilee Conference to felicitate her on her contribution to cancer research. She has published over 137 research papers in reputed international medical journals. She founded the *Journal of Cytology*.

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Rukmabai
(1864–1955)

Dr. Rukmabai was born on 1st January 1864 in Bombay. She was the daughter of Jayantibai from her first husband Janardan Pandurang. When her mother was seventeen and Rukmabai was merely two and a half, Janardan died. He left behind some property and willed it to his young widow. After six years of the death of her husband, Jayantibai married a widower Dr. Sakharam Arjun. Before her remarriage, Jayantibai transferred her property to her daughter Rukmabai.

Rukmabai was married at the age of 11 to Dadaji Bhikaji who was then twenty year old. Dadaji Bhikaji was the cousin of Dr. Sakharam Arjun, and it was agreed that in due course of time he will acquire education, but it did not materialize. When Rukmabai grew up and her in-laws insisted that she should move into the marital home, she refused. The case was brought to court, which came into the attention of British press as a typical case of child marriage and right of women. Although the verdict of the case went to the Rukmabai's favour, but an appeal went in Dadaji's favour. Rukmabai always wanted to study medicine and become a qualified doctor. Funds were raised for Rukmabai to travel to England to study medicine.

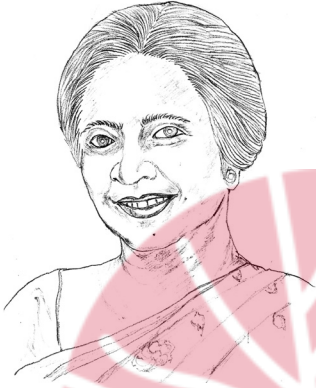
In 1889, she travelled to England and enrolled herself in the London School of Medicine for Women and qualified as a doctor in 1894. She earned MD degree from Brussels and took training at the Royal Free Hospital. Then she returned to India and worked as Honorary

Surgeon at the Cama Hospital in Bombay for eight months. Later, she joined Morarbhai Vajrabhushandas Hospital at Surat and worked there from 1895 to 1917. She worked as the Chief Doctor in the Princely state of Saurashtra at Rajkot from 1918 to 1930. She earned great reputation and respect during the plague and influenza epidemics in Gujarat. Her selfless hard work and dedication was recognised by awarding her Kaiser-i-Hind Medal. She died on 1st January 1955 in Bombay at the age of 91. Her courage and dedication is cherished as role model for all women to achieve one's goal against all odds.

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एकः सूते सकलम्



Sabharwal, Malavika
(b.1954)

Dr. Malvika Sabharwal, an eminent Obstetrician and Gynaecologist is one of the pioneers in laparoscopic surgery in India. She was born on 24th December 1954.

She received MBBS degree from Lady Hardinge Medical College, New Delhi in 1977 and DGO (Diploma in Gynaecology and Obstetrics) from Government Medical College, Patiala in 1981.

She has been in private practice as senior consultant in prestigious private hospitals in Delhi. She served as Chief of Gynaecology and Endoscopic Surgery, Jeewanmala Hospital, New Delhi. Currently, she is Chief Consultant at the Department of Gynaecology and Obstetrics, Nova Speciality Hospital, New Delhi.

Dr. Malvika Sabharwal is among the first few to have initiated gynaecological laparoscopic surgery in India. She took specialization training under Dr. Adam Magos at the Royal Free Hospital in London and received advanced training from Dr. K Wamstecker at Spaarne Hospital, Netherlands. After returning to India, she took up the mission to develop new cost-effective techniques by making laparoscopic surgery affordable to poor patients in India. Her effort in the field has not only reduced the cost and increased the safety of patient but also prevented many gynaecological disorders and their prevention much ahead of time. She was one of the first to institute laparoscopy technique in the country. She is credited for the removal

of world's largest fibroid (6.5 Kg) weighed as much as two full-term babies in 2010 without causing any injury to uterus. Thereby the 32 year old patient upon whom the surgery was conducted would be able to conceive baby in future. She holds bi-annual training sessions that provides training to doctors in laparoscopy and hysteroscopy. These trainings are recognised by the Federation of Obsteric and Gynaecology Society of India (FOGSI) and the Indian Academy of Medical Sciences (IMA). Doctors from all over the country and abroad participate in such trainings to learn the procedure. She has played a leading role in the professional development by holding important posts of office bearers in national and international level learned associations including Secretary, Delhi Endoscopic Society; Senior Member, Delhi Medical Association; Member, Indian Association of Endoscopic Surgeons; Member, Association of Obstetrics and Gynaecology, Delhi; Member, International Society of Gynaecological Endoscopy; Member, American Association of Gynaecological Leparoscopists and Minimal Invasive Procedures.

Her outstanding contributions have been acclaimed by awarding her Padma Shri in 2008 and Kesari Women Award by Punjab Kesari in 2011. She has published several research articles and presented several papers in national and international seminars and conferences.

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Sahgal, Laxmi
(1914–2012)

Dr. Laxmi Sahgal was an outstanding revolutionary, committed Physician, benevolent Social Reformer, courageous freedom fighter and commander of World's First Military Women Regiment, the Rani Jhansi Regiment. She was born into an illustrious family on 24th October 1914 in Madras Tamil Nadu. Her father S Swaminathan was a renowned criminal lawyer of Madras High Court and her mother, Ammu Swaminathan, was a noted social worker and freedom fighter. Her father was later elected to the Parliament from Dingdigul Lok Sabha constituency. Her brother was an eminent lawyer and her sister Mrinalini Sarabhai, was a great Indian classical dancer and wife of the noted nuclear scientist Dr. Vikram Sarabhai. She had two daughters, Subhasini Ali and Anisa Puri. Her daughter Subhasini Ali, is a costume designer, who designed costumes for the film *Umrao Jaan*, directed by her husband, Muzaffar Ali. Her grandson, Shaad Ali is a brilliant Bollywood director of the movies like *Saathia*, *Bunty aur Bubbly*, etc.

She attended Madras Queen Mary College and subsequently did her MBBS degree from Madras Medical College in 1938 and obtained DGO (Diploma in Gynaecology and Obstetrics).

Dr. Laxmi joined at the Government Kasturba Gandhi Hospital in Madras. She married Pilot P K N Rao, but the marriage could not survive for long and then she left for Singapore in 1940. There she opened her clinic and dispensaries for poor and needy, mostly migrant

labourers from India. During her stay, she got influenced by the work of Netaji Subhas Chandra Bose. She started playing an active role in the Netaji's Indian National Army and the Indian Independence League. She provided medical service to wounded Prisoners of War during the surrender of Singapore by the British to the Japanese. On 2nd July 1943, Netaji visited Singapore and in his public meeting, he expressed his desire to constitute women's regiment in the Indian National Army (INA) (*Azad Hind Fauj*). Dr. Laxmi came forward to take the initiative and brought together enthusiastic women to constitute the brigade, which in due course of time developed into the Rani Jhansi Regiment. Dr. Laxmi Swaminathan became the leader and the Captain of the regiment. She was given the designation of 'Colonel'. However, she is commonly referred to as 'Captain Laxmi Sahgal'. The INA marched to Burma (Myanmar) with Japanese Army in December 1944. Captain Laxmi was arrested by the British Army in May 1945 and she remained in Burma jail until March 1946, when she was sent back to India.

Dr. Laxmi married Colonel Prem Kumar Sahgal in March 1947 at Lahore, who was a leading member of INA and worked in close association with Subhas Chandra Bose. After their marriage they settled in Kanpur, where she continued with her medical practice and provided clinical service to refugees, who arrived in large numbers following partition of India. In 1971, she joined the Communist Party of India (Marxist) and represented the party in the Rajya Sabha. During the Bangladesh war, she provided medical service to Bangladeshi refugees, who reached India. She also provided free medical service to the victims of the Bhopal Gas Tragedy in December 1984. She also came forward and helped to restore normalcy in the city of Kanpur after the anti-Sikh riot across the country in 1984. She was the Founding Member of AIDWA (All India Democratic Women's Association) in 1981.

She was also nominated as the First Woman Presidential candidate of India in 2002 by four leftist parties (the Communist Party of India, The Communist Party of India (Marxist), the Revolutionary Socialist Party and the All India Forward Block), in which Dr. APJ Abdul Kalam became victorious. She was a very good singer, who loved singing in family and social gatherings. The gramophone record (SM 2006)

produced by National Gramophone Record Co., Bombay under the label of 'Young India' contains the songs 'Delhi Chalo—' and 'Jaya ho jai—' sung by Laxmi Sahgal and party. She was awarded the highest civil award, the Padma vibhushan in 1998. She published many articles in popular magazines. She wrote her autobiography *A Revolutionary Life: Memoirs of a Political Activist*. She continued to provide medical service to poor and destitute at her clinic in Kanpur till 19th July 2012, when she suffered cardiac arrest and passed away on 23rd July 2012 at the age of 97.

She devoted her life for the service of people. She attended her patients even a day before her heart attack, regardless of her age and frail health. As per her desire, her body was donated to the Kanpur Government Medical College for medical research. Her life and work will continue to inspire generations of young women in India.

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एकः सूते सकलम्



Sahni, Savitri
(1902–1985)

Savitri Sahni was born on 19th September 1902 to the family of Sunder Das Suri, who was an Inspector of schools in Punjab. She was married to Dr. Birbal Sahni, the founder of paleobotanical research in 1920.

Savitri Sahni had been a constant companion of her great husband Professor Birbal Sahni, whether at home or in research institutions in India and abroad. She frequently trekked Himalayan range with her husband on excursion tour. They crossed Pirpanjal Range in 1922 and Haji Pir Pass, Kashmir in 1944. She earned great field experience related to the plant species and flora of India. She also developed personal contact with many eminent scientists of her time. The first Prime Minister of India, Pandit Jawaharlal Nehru laid the foundation stone for the building of the Birbal Sahni Institute of Palaeobotany at Lucknow on 3rd April 1949, in the presence of large gathering of scientists from India and abroad. Prof. Sahni cherished the dream of making the institute one of its kind, but the destiny took different turn and suddenly on the midnight of 9th-10th April 1949, Prof. Birbal Sahni faced severe heart attack and died. It was a great shock to Savitri Sahni, but she did not loose her heart and faced the situation with great courage.

She played a pivotal role in the establishment of the institute and nurtured it for more than 36 years in one or other capacity to bring fame and developing the institute into an international centre

for palaeobotanical research of excellence. She dedicated her life with determination to fulfill the incomplete task of her husband. She served the institute as its President and Co-founder from 1949-69. In 1969, the institute became a part of the Department of Science and Technology, Government of India. Mrs Sahni was nominated as the Life Member of its governing body. She served as the President, Birbal Sahni Institute of Palaeobotany, Lucknow, 1959-68. She was appointed as the Observer to the International Union of Biosciences, Stockholm, Sweden by the Government of India. She worked as the First President, Palaeobotanical Society (India). In recognition to her service for establishing the Institute of Palaeobotany, Government of India conferred Padma Shri to her in 1969. She received honour by the Chairman, International Palaeobotanical Association, Stockholm in 1950. She was conferred with honourable Pin, Badges and Medal from USSR for her service in the field of palaeobotany in 1965. Besides, she was honoured by various institutions and scientific societies and research organisations from USSR, China, Japan and USA. She died on 26th April 1985 at the age of 83. Birbal Savitri Sahni Memorial Museum has been instituted with the personal collection and belongings of Eminent Professor and great Palaeobotanist Birbal Sahni, located at Birbal Sahni Marg, Lucknow.

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Saiduzzafar, Hamida
(1921–1988)

Dr. (Miss) Hamida Saiduzzafar was born on 16th July 1921 at Nainital, Uttar Pradesh. She was daughter of well-known physician Dr. Saiduzzafar Khan and Shakat Ara Begum. Her father was Professor of Anatomy at the Lucknow Medical College. She did MBBS; MS (Ophthalmology); and DCMS. Besides, she obtained PhD (Ophthalmology) from Moorfield Eye Hospital, London University. She availed advanced training and experience from Glaucoma Research Unit, Institute of Ophthalmology, University of London during 1960-62 under Colombo Plan. She served as Ophthalmic Surgeon at the Institute of Ophthalmology, Gandhi Eye Hospital, Aligarh since 1949. Subsequently she was promoted to Professor and Director of the Hospital. She was appointed as the Director and Professor, Institute of Ophthalmology, Aligarh Muslim University, 1978-81. She served as Professor Emeritus, Aligarh Muslim University, after her retirement in 1983.

She was a Fellow, Royal Society of Medicine, London. She was actively involved in several professional activities by being a Member of British Medical Association; Member, Ophthalmological Society of UK; Member, All-India Ophthalmological Society; Member, National Society for Prevention of Blindness; Member, Uttar Pradesh State Ophthalmological Society; Member, Indian Medical Association; and Member, Asia Pacific Academy of Ophthalmology, New Delhi, 1985.

Dr. Hamida Saiduzzafar was an eminent teacher and clinician in the field of ophthalmology. She wrote her *Autobiography: Hamida Saiduzzafar Khan, (1921-1988)*, which was edited by Lola Chatterjee, and published in 1996. In her book, she mentioned the socio-economic conditions and prejudice against women in the male-dominated society. She elaborated that the prejudice were also predominant among the learned professors of the Aligarh Medical College, where the faculty believed that women doctors should not be encouraged, because they will soon leave the profession, once they are married. Usually female doctors were taken to gynaecology for their higher specialization. In other departments they were not encouraged and they were not acceptable. When she joined MS (Ophthalmology) course, there were lots of resistance from the faculty as well as from her colleagues. She made extensive research work on the prevention of blindness and glaucoma in Uttar Pradesh. She focused her research on the relation of elastic properties of the coats of the eye and ocular rigidity to the intra-ocular pressure. She made significant research work on variant of Duane's retraction syndrome of eyes. She organised several workshops and camps in rural areas to promote prevention of blindness. She conducted surgical treatment of glaucoma and their application in small rural clinics, where electrical equipment were not available. She was awarded Trophy for Ophthalmic Services, 1956; Hayward Research Fellow for Glaucoma Research, London, 1967-70; and Distinguished Woman Award, Banaras Hindu University, 1982.

She worked as WHO Consultant on Prevention of Blindness and Glaucoma during 1987. She conducted wider field studies and published several articles and report in the area of her specialization in highly reputed medical journals including *British Journal of Ophthalmology* and *American Journal of Ophthalmology*. She died in 1988.

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Salotra, Poonam
(b.1955)

Dr. Poonam Salotra is a distinguished scientist in the field of pathology. She was born in 1955. She did her BSc (Honours) from University of Delhi and MSc (Biochemistry) from Post Graduate Institute of Medical Education and Research, Chandigarh. She completed PhD from University of Delhi. For advanced research she went abroad and did Postdoctoral Research from Roche Institute of Molecular Biology, New Jersey, USA; Courtesy Fellowship by CBER, FDA, USA, 2003 & 2005; National Foundation of Infectious Diseases Fellowship, USA, 2005; and International Fellowship for Senior Biomedical Scientists from Indian Council of Medical Research in 2006.

Dr. Salotra has worked in different capacities in various organisations such as Research Officer, Tuberculosis Research Centre, Madras, 1982; Principal Investigator, Young Scientists Scheme, Department of Science & Technology, India, 1991; Council of Scientific and Industrial Research (CSIR) Pool Officer, Centre of Biotechnology, Jawaharlal Nehru University, New Delhi, 1993; Senior Research Officer, National Institute of Pathology, Indian Council of Medical Research, New Delhi, 1996. She held the position of Deputy Director/ Scientist E, Institute of Pathology, Safdarjung Hospital, New Delhi since 2005.

She has made significant contributions as an active member of various academies, societies and associations. She has been a Fellow, Indian National Science Academy, 2012; Fellow, National Academy of Sciences

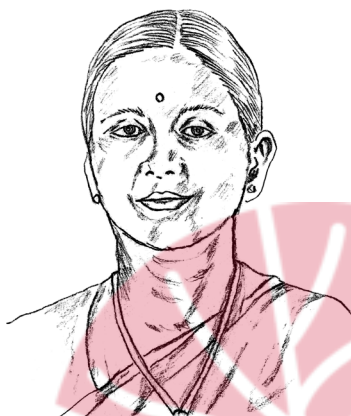
(India), Allahabad. She is a Life Member, Society of Parasitology; Life Member, Society of Biological Chemists, India; Life Member, Association of Clinical Biochemists of India; Life Member, Indian Association of Medical Microbiologists; Life Member, Indian Immunology Society.

Dr. Poonam has made valuable research on *leishmaniasis*, for last 15 years. She has made a global analysis of parasite genes to identify virulence related genes that may provide target for the development of vaccines, drugs and diagnosis for Kala-azar. Her work has also led to the development of certain knock out parasites and has been awarded a US patent for 'Live attenuated *Leishmania* vaccine'. Her work has not only led to the identification of target genes involved in drug resistance in Kala-azar, but also contributed to PKDL (Post Kala-azar Dermal Leishmaniasis) in high incidence of drug resistance in India. While working at the Roche Institute of Molecular Biology, she made remarkable research findings on the molecular mechanism of action of cholera toxin. She conducted pioneering work in the area of genomics, vaccines, diagnosis and mechanisms of drug resistance in Visceral Leishmaniasis (VL) and PKDL. She established molecular tests for non-invasive diagnosis and estimating the cure of VL and PKDL. Her research work has facilitated understanding of the immunopathogenesis of VL and PKDL. She has been awarded US Patents for 'species- specific PCR assay for detection of *Leishmania donovani* in clinical samples of Kala-azar and PKDL (Post Kala-azar Dermal Leishmaniasis)'.

Her research work has been acclaimed by awarding her Kanishka Oration Award, Indian Council of Medical Research, 2003; Silver Jubilee Award in Parasitology, Indian Association of Medical Microbiology, 2003; Prof. B K Aikat Oration Award, Indian Council of Medical Research, 2004; Excellence Research Output Award, Indian Council of Medical Research, 2004; Basanti Devi Amirchand Prize, Indian Council of Medical Research, 2006; Bill & Melinda Gates Global Health Series Award, 2007. She has published over 95 original research papers in reputed journals. She has been a Member Editorial Board of 'BMC Infectious Diseases'.

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Sandhyamani, S
(b.1953)

Dr. S Sandhyamani was born on 18th April 1953. She is the daughter of Dr. Samavedham Srinivasa Sriramachari and Dr. Pushpa. Her father was a doyen among pathologists in the country, who investigated autopsy of Bhopal Gas Tragedy victims, 1984. She studied MBBS from Maulana Azad Medical College, New Delhi; MD (Pathology), All India Institute of Medical Sciences, 1978. She joined Department of Pathology, All India Institute of Medical Sciences, New Delhi as senior resident. After the completion of her studies, she joined as Research Associate at the Department of Pathology, All India Institute of Medical Sciences, New Delhi. She got married to Mr Alwan, a chemical engineer in the Vikram Sarabhai Space Centre, Trivandrum, Kerala. She shifted to Kerala after her marriage and joined as a Lecturer, Department of Pathology, Sree Chitra Institute of Medical Science and Technology, Trivandrum. Subsequently she was promoted to Professor in the same Department.

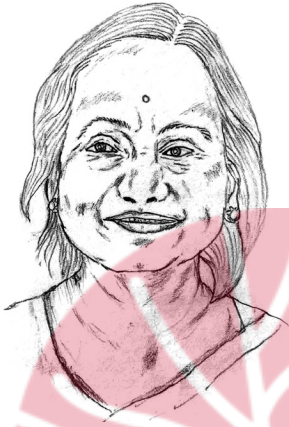
Dr. Sandhyamani has conducted significant research on cardiovascular diseases. Her father Dr. Sriramachari was a pathologist, who worked in Nutrition Research Laboratory, Coonoor. She followed the profession of her father and qualified as a trained pathologist. Her father was a role model for her and she followed the pathological research on monkey model by experimenting different material deficiencies on Primates as it used to be done by her father. Her research work on patients and the

monkey model identified four important areas of work pertaining to nutritional disorder such as: vascular diseases, endomyocardial fibrosis, rheumatic heart disease and diabetes mellitus of different forms. Dr. Sandhyamani identified a new vascular disorder in young individuals, which she names 'Muroid vasculopathy'. Using the monkey model, she explored that such conditions are developed by nutritional imbalance in the patient. Dr. G B Parulkar, Cardiovascular and Thoracic Surgeon, KEM Hospital, Mumbai, introduced her work at the World Congress of the International Union of Angiology, held in Paris in 1992, where Dr. Sandhyamani received second prize at the International Union of Angiology in 1992 for her contribution on monkey model for muroid vasculopathy and associated heart and endocrine organ changes.

Dr. Sandhyamani also worked on endomyocardial fibrosis due to severe forms of malnutrition among children, which received international attention and appreciation from Dr. JNP Davies, who also studied the similar malnutrition conditions among children of Uganda. She has been a Fellow, National Academy of Medical Sciences (India). She made valuable professional contributions as a Member, International Union of Angiology. She has received several awards and honours for her land mark research findings such as The First Asian to receive Bunny Becker Memorial Lecture in South Africa; Travelling Lectureship, International Academy of Pathology; Career Award, South Asian Society on Atherosclerosis and Thrombosis; Dr. S S Mira Memorial Award, 1992-93; Amrut Mody Unichem Award, Indian Council of Medical Research, 1993; Hari Om Ashram Alembic Research Award, Medical Council of India, 1993. Dr. Sndhyamani has published several research articles in reputed medical journals.

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Saraiya, Usha Bharat
(b.1937)

Dr. Usha B Saraiya is a highly respected personality in the field of obstetrics and gynaecology. She is the daughter of Col. D N Thakar and Nalini and was born on 24th April 1937 at Lahore, Pakistan. She took MBBS degree and then attended College of Physicians and Surgeons, Bombay and obtained DGO in 1962. She did MD, Bombay University, Bombay in 1964. She gained further specialization by attending fellowship courses from different academies including FIAC(Fellow of International Academy of Cytologists), 1975; FICS (Fellow of International College of Surgeons), 1975; FICOG (Fellow of Indian College of Obstetricians and Gynaecologists). She served as Honorary Obstetrician and Gynaecologist, Sir H N Hospital, Bombay, 1980; Honorary Professor, Grant Medical College, Bombay, 1996 (retired); Honorary Professor of Oncology, Cama and Albbless Hospital, Bombay, 1996; Post Graduate Teacher for MD in Obstetrics and Gynaecology, Bombay University, Bombay, 1996; Honorary Obstetrician and Gynaecologist, Breach Candy Hospital, Bombay. She remained closely attached to different hospitals and nursing homes in Bombay.

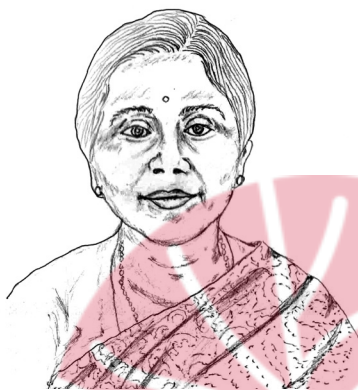
She was elected as the President, Indian Academy of Cytologists, 1984-85; President & Treasurer, Association of Medical Women in India; President, Mumbai Obstetrics and Gynaecologists Society, 1997-98; Vice-President, Indian Society of Oncologists; Honorary

Member, Polish Society of Obstetrics and Gynaecology; Vice-President, Medical Women's International Association, 2013. Saraiya is an eminent physician of India in the fields of Obstetrics, Gynaecology, Cytology, Colposcopy and Oncology. She started the Indian Section of Cervical Pathology. She was a member of the Executive Board of International Federation of Cervical Pathology and Colposcopy from 1966-1990. She has been contributing extensively in the field of her specialization in different capacities such as clinician, teacher, planner for over last four decades. She served as examiner to Bombay, Pune, Osmania, Calcutta and Delhi University for graduate and postgraduate medical degree courses. She started a Cytology Clinic at Cama & Albless Hospital in 1970 and a special Dysplasia Clinic in 1975. She served as member of many national level committees related to her subject. She led many delegations to USSR, China, South Africa, Bangladesh and Nepal. She also acted as an international consultant and conducted Colposcopy in Dhaka and Nepal. She has participated in several international fellowships, and attended and presented papers to over 31 international conferences. She has also delivered over 22 national level oration awards.

She has received numerous awards and prizes including Lady Reay Silver Medal and Prize; President of India's Silver Medal, 1961; S N Bhansali Prize for Research Work on Gynaecology, 1962; Colposcopy Recognition Award, American Society of Cervical Pathology and Colposcopy, Chicago, 1993; P N Wahi Award, Indian Council of Medical Research, 1993; Jagadishwar Misra Prize, Kanpur, 1995; Dr. Amarendranath Prize for Best Paper, 1996; Outstanding Woman Obstetrician and Gynaecologists, FIGO, 2003; Dr. D K Dutta Prize for best publication from FOGSI, 2004; She has edited seven text books and published over 100 research articles in reputed medical journals. She served as Member of *Journal of Obstetrics and Gynaecology and Research*, 2004-07. She also worked as the Editor (India region) for *Acta Cytologica*, 1992-97.

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Sarkar, Chitra
(b.1955)

Dr. Chitra Sarkar, an eminent Pathologist was born on 11th September 1955. She is recognized both at national and international level for her contributions in neuropathology. She did MBBS degree from Bangalore Medical College and MD (Pathology) from All India Institute of Medical Research, New Delhi. She obtained FRCP (Fellow of Royal College of Pathology) in 1989. She carried out her research training under Professor P L Lantos, Head of Neuropathology, Institute of Psychiatry, London during her fellowship in neuropathology. She joined Department of Pathology, All India Institute of Medical Sciences, New Delhi as a Faculty Member, in 1986. Subsequently, she worked as Associate Professor and then Professor. She became Professor and Head, Neuropathology Division, Department of Pathology, All India Institute of Medical Sciences, New Delhi in 1998. She received International Fellowship for Senior Scientist, Indian Council of Medical Research, 2010-11.

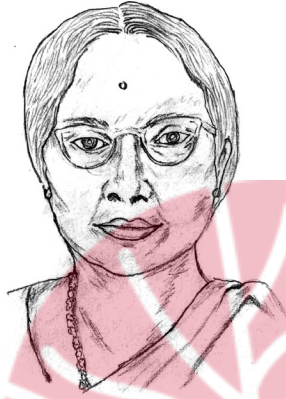
Dr. Chitra Sarkar is a specialist of neuro-oncology, neuroendocrinology and neuromuscular diseases. She has developed ultra-modern diagnostic neuropathology laboratory. Cases from all over India as well as neighbouring countries are referred to her laboratory for diagnostic workup. She has also made immense research work on clinically oriented and basic research in neuro-oncology, neuroendocrinology, and more recently neuromuscular diseases. Her studies on tumour markers and ultrastructural features of CNS tumours have helped in

better understanding of their histogenesis. She is specially recognized for her contributions in the genetics of CNS tumours and methods of evaluation of their biological aggressiveness. Her studies on proliferation kinetics, apoptosis and their regulatory oncogenes and tumour suppressor genes have provided better understanding of the genetic/molecular events involved in initiation, progression and recurrence of various CNS malignancies. She has added new insights into the mechanisms of glial tumorigenesis. She has also gained international recognition for her ultrastructural demonstration of the pluripotent nature of pituitary tumours. Her current research addresses the molecular and metabolic basis of the spectrum of muscle disorders seen in India.

She has been conferred with the Fellowship of Royal College of Pathologists, UK; Fellow, National Academy of Medical Sciences (India), 2009; Fellow, Indian Academy of Sciences, Bangalore, 1999; Fellow, National Academy of Sciences (India), Allahabad; Fellow, Indian College of Pathologists. In recognition to her brilliant research work, she has been awarded Pramanik Oration, Indian Association of Pathologists and Microbiologists; Herbert Krause Gold Medal for Neuro-Oncology, Neurological Society of India, 1985 and 1990; Novartis Oration Award for Research in the field of Cancer, Indian Council of Medical Research, 2008; Sir Shriram Memorial Oration, National Academy of Medical Sciences, 2008-09. She has published 230 research papers and written 25 chapters in books including invited review articles in international journals. Her contributions in neuropathology are widely cited in leading international textbooks of neuropathology including the recent editions of WHO textbook on *Pathology and Genetics of Tumors of the Nervous System* and *Greenfield's Textbook of Neuropathology*.

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**Satyavati, Gowdagere
Vedanti**
(b.1937)

Dr. Gowdagere Vedanti Satyavati is the first woman scientist in India to become the Director General of the Indian Council of Medical Research. She was born in 1937 in a middle class Brahmin family. She took MBBS degree from Medical College, Mysore in 1964. She specialized in Pharmacology by obtaining MD (Pharmacology), from Banaras Hindu University, Varanasi in 1966. Because of her family interest in medicinal plants and naturopathy, she carried out Ayurveda training from Banaras Hindu University, Varanasi.

She started her medical career as a Senior Research Officer at Indian Council of Medical Research (ICMR), Delhi in 1969. She received subsequent promotions and reached up to the position of Senior Deputy Director General, Indian Council of Medical Research, New Delhi. In July 1994, she became the Director General of the Indian Council of Medical Research, the foremost health research organisation of India. She held the post from 1994-97 until she retired from service. Presently, she is serving as the In charge of Dr. D N Prasad Memorial Foundation.

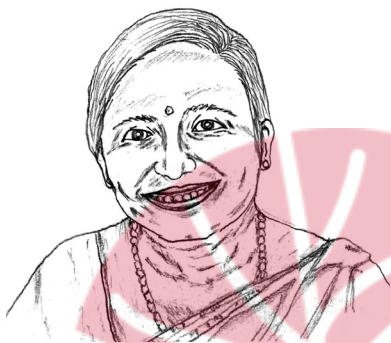
Dr. G V Satyavati conducted pioneering research on the discovery of lipid lowering effect of Gum Guggul. It was more than forty years ago that Dr. G V Satyavati first reported the hypolipidemic action of Guggul tree in her doctorate thesis submitted to the Banaras Hindu University for doctorate degree in Ayurveda. She received national and

international recognition for her significant research. She also earned her second doctorate degree in pharmacology while working on ICMR project under the Composite Drug Research Scheme (CDRS). She acquired vast knowledge and experience in herbal drug research through the integrated knowledge base of Ayurveda and western medicine due to her dual doctorate studies in two different systems of medicine. She met her husband Dr. D N Prasad, who was her guide for the doctorate thesis in pharmacology. She joined ICMR in 1969 and worked under different capacity having vast exposure to planning, policymaking, designing, research project executive and reviewing, monitoring administrative and managerial responsibilities. She had the opportunity to work under Professor C Dwarkanath in the field of herbal drug research when she joined ICMR in 1969, which provided her wider experience and knowledge on the composition of herbal drugs and their synthesis. She constituted the first central committee of 'Ethical Guidelines for Biomedical Research on Human Participants in India' in 1995-97. She is a Foundation Fellow, National Academy of Medical Sciences, (India) and Fellow, National Academy of Sciences (India), Allahabad. She is an active member of Indian Pharmacological Society. Her research efforts has been acclaimed by awarding her Col. Chopra Memorial Oration, Indian Pharmacological Society, 1988; Distinguished Career Award, South Asian Society of Atherosclerosis and Thrombosis, 1996; Mahila Shiromani (Women Achiever's) Award.

She has published several articles in reputed medical journals. She served as Chief Editor of the *Indian Journal of Medical Research*, Volume 64-99, 1976-93. She also edited two encyclopedic volumes on medicinal plants of India (published in 1976 and 1987). She is an authority on herbal drug research in India and has conducted many national level projects.

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**Savithri, Handanahal
Subbarao**
(b.1951)

Professor Handanahal Subbarao Savithri is a leading Biochemist, who made significant research work on plant virology. She was born on 18th March 1951 in Bangalore, Karnataka to Handanahal C and Lalitha Subbarao.

She did BSc (Honours) and MSc from Bangalore University, Bangalore in 1970 and 1972. She completed PhD from Indian Institute of Science, Bangalore in 1977. She conducted Postdoctoral Research from Purdue University, Indiana, 1977-81; Postdoctoral Fellow, Biological Science, 1981; Professor Associate, Institute Jacques Monod, Paris, 1990; Visiting Scientist, 1993; Indo-French Collaboration Research Project Staff, 1995. She has worked in different faculty positions in the Department of Biochemistry, Indian Institute of Science, Bangalore since 1977 including Postdoctoral Research Associate in 1977; Pool Officer (CSIR) during 1982-86; Research Scientist from 1985-88; Assistant Professor from 1988-93 and Associate Professor from 1993 onwards. At present, she is working as the Chairman and Professor, Department of Biochemistry, Indian Institute of Science, Bangalore. Prof. H S Savithri has made outstanding research work on molecular plant virology, enzymology and protein chemistry. She determined genome sequence of many viruses and their mechanism of infection. She identified many distinct species of virus native to India. She made significant research work on the mechanism of assembly of viruses

such as *Physalis mottle virus* (PhMV), *Sesbania mosaic virus* (SeMV), *Pepper vein banding virus* (PVBV), *Tomato leaf curl Bangalore virus* (ToLCBV), *Cotton leaf curl virus* (CLCuV) and *Peanut bud necrosis virus* (PBNV). She has also determined the complete genomic sequences of these viruses. Her research developed understanding related to cell-to-cell movement of the virus. Further her studies revealed the movement of protein (MP) in virus. She identified the variability in the genomic sequences of monopartite begomoviruses causing leaf curl disease in tomato and cotton in India. Diagnostic tools for detection and diagnosis of these viruses were developed. Infection by viruses is a major cause for reduced crop yields in India. A detailed study of the architecture, genome organization and expression of these viruses is necessary to understand the molecular mechanisms involved in the infection process. Her research findings will also be helpful in studying suitable strategies to control viral diseases of plants.

She has been honoured as Elected Fellow, Indian Academy of Sciences, Bangalore, 1992; Fellow, National Academy of Science (India), 2000 and Elected Fellow, Indian National Science Academy, New Delhi, 2005. She won a number of awards and prizes including Dr. A K Krishnamurthy Award, Society of Biological Chemists, 1977; Professor P S Sarma Memorial Award, Society of Biological Chemists, India, 1991; J C Bose Award, 2008. She has contributed several research articles in reputed scientific journals.

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**Scharlieb, Mary Ann
Dacomb (Nee Bird)**
(1845–1930)

Dr. Mary Ann Dacomb Scharlieb was born in London on 18th June 1845 and she was raised by her grandparents following the death of her mother, Mary Dacomb. She completed her school education in London. She married William Scharlieb in December 1865 and travelled to India, where her husband, was a law officer and a practicing barrister in Madras. After 10 years of stay in India, she realized that Indian women needed lady doctors badly because they were not allowed to be attended by male physicians due to the prejudice of *Purdah* culture prevailed in the society. She was 30 years old, when she took admission to Madras Medical College in 1875 and virtually could not attend classes for a few months as Professors like Dr. Branfoot could not adjust with the idea of teaching a woman in his class. Further, the situation improved and three more Anglo-Indian girls joined the class, namely Miss White, Miss Beal and Miss Mitchell. The four of them passed LMS (Licentiate in Medicine and Surgery) degree in medicine from Madras Medical College in 1878. Miss White topped the LMS result, while Scharlieb ranked second. And all the four students achieved First Class.

After practicing for few years in Madras, Scharlieb returned to England for higher studies. In 1882, she graduated from the Royal London School of Medicine as its first woman doctor graduate. She returned to India in 1883 and founded the Royal Victoria Hospital for Caste and Gosha Women (now known as the Kasturba Gandhi

Hospital for Women and Children). In 1887, Scharlieb returned to Great Britain She completed MD from London University in 1888 and became the first woman MD of the university.

She joined as the first woman consultant and Lecturer in Midwifery and Gynaecology in the Madras Medical College in 1883. She again visited Vienna to avail short-term six weeks training in the operative midwifery. In 1916, she returned to India to establish Women's Medical Service (WMS). She was knighted in 1926 and she became Dame Mary Scharlieb, the first woman doctor in Britain to be so honoured. Indian woman, Krupabai Sathianadhan followed the footsteps of Dr. Scharlieb and took admission to Madras Medical College. She topped the first year examination, but due to ill health she had to leave her medical studies. In 1887, three Indian girls Abala Das, Rose Govindurajylu and Gurdial Singh joined Madras Medical College. And in 1887 they received the LMS from Madras Medical College. She became Lecturer of Forensic Medicine at the Royal Free Hospital in 1887. From 1887-1902, Dr. Scharlieb worked at the New Hospital for Women (now Elizabeth Garrett Anderson Hospital, Euston Road). Initially she assisted Dr. (Mrs) Anderson and then she joined as Surgeon in 1887, promoted to Senior Surgeon in 1889, Chief Gynaecologist in 1902 and finally retired in 1909. She was awarded CBE (Commander Order of the British Empire) in 1917. She served as a Member of the Royal Commission on Venereal Diseases from 1913-16. She was an extremely dedicated and devoted Anglo-Catholic religious person, who always opposed contraception and divorce. She wrote her autobiography *Reminiscences* in 1925. She died in 1930 at the age of 85 years.

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Scott, Agnes C
(1875–1955)

Dr. Agnes C Scott, a British medical missionary was born on 26th October 1875 in London; she was the second daughter of Canon John Scott. She was educated at the Leeds Girl's High School and Yorkshire College (now University of Leeds). She obtained her medical education MB from School of Medicine for Women, London in 1901. She was sent to Delhi under the SPG (Society for the Propagation of the Gospel) and Cambridge Mission to Delhi to work in St. Stephen's Hospital in 1903. She was made the In charge of Mission Hospital at Karnal in 1904 along with the responsibility of St. Stephen's Hospital, when Dr. Muller was on leave. In 1917, she had to discontinue from the Mission Hospital and medical practice. She was posted to the Research Institute at Kasauli as medical staff. She was made Assistant to the I G Civil Hospitals, Punjab under the Women Medical Service (WMS) in 1918. She toured all over Punjab to supervise the Women Medical Service and to make necessary improvements in their service conditions, especially in case of difficult and remote work stations. Then she was promoted to the post of Chief Medical Officer (CMO) of Women's Medical Service, she succeeded Dr. Margaret Balfour and was posted to Delhi and Simla. In this post she inspected hospitals wherever WMS doctors were posted and supervised all Dufferin hospitals. She was actually responsible for their recruitment and posting. She was also the driving force behind the establishment/acquisition of the Irwin

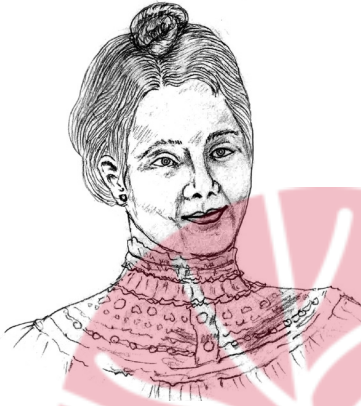
Lodge for the residence of CMO of the WMS in Simla. It was a great relief for newly appointed women doctors under WMS from going through the longer house hunt in summer during their posting in Simla.

In 1932 she returned to London, but she continued as a Medical Advisor to the Dufferin Fund Committee at the India Office in London until 1939. She was also appointed as the Chairman of the Medical Mission Committee of the SPG (Society for Propagation of Gospel) from 1937-47. In this post she provided help to Indian women doctors studying in England and to recruit them for WMS in India after completing their education in medicine. In 1931, she was honoured by CBE (Commander Order of the British Empire). Her service to India was also recognized by awarding Kaiser-i-Hind Gold medal to her in 1926. In 1939, she returned to India to investigate the possibility of appointing Jewish refugee doctors to work in India. Her final report on the subject led the government drop the idea of appointing Jewish doctors because it showed uncertainties and very few opening for them. In 1951, her health deteriorated and after an operation, she became weak and frail. She retired from all service responsibilities and went to live with her family at Cotswold. She occasionally visited London to attend any important meetings and gatherings connected with Indian affairs. In 1955, she was seriously ill and doctors conducted another operation at St. Luke's Hospital in London. She survived the operation and continued for a few days and finally passed away on 22nd March 1955.

Dr. Scott was a great personality, who worked for the betterment for women in India. She helped everybody whosoever approached her about their problems, medical and otherwise. She was often called in as a consultant and was considered valuable for safe official and personal advice to all members of WMS and people of all profession in their difficult times. She was much missed when she left India. Her patients and friends cherished memory of their association with Dr. Scott.

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Scudder, Ida Sophia
(1870–1969)

Dr. Ida Sophia Scudder was the granddaughter of Dr. John Scudder Sr., the first American Missionary under American Board of Commissioners for Foreign Missions, who visited India in 1819. He and his seven sons all became missionary and devoted their service to India. Dr. Ida Sophia Scudder was born on 9th December 1870 at Ranipet in South India. She was the youngest child and the only daughter of Dr. John Scudder Jr. and Sophia.

In 1887, Ida Sophia was sent to North Field School for Girls in North Field, Massachusetts. She returned to India in 1890 because of ill health of her mother. Ida as a young girl never liked overcrowded India. She was an aspirant of good life in America and marriage to a millionaire, but all her aspirations were changed in a single terrible night. When she encountered death of three women suffering from labour pain and their husbands preferred them to die rather than allowing them to be checked and treated by male doctors. She narrated the story of that night as ‘Three knocks in the night, changed my life’. Clinical malpractice and superstition of *purdah* culture in India used to endanger life of young ladies and unsafe child birth. Ida Sophia decided to return to America and study medicine and come back to India to help such women. In 1896, she returned to USA and took admission to Weill Medical College, Cornell University, New York

and completed her MD in 1899. At that time she was the one of the first women graduates of the Weill Medical College.

She returned to India on 1st January 1900 along with the MD degree and a grant of \$10,000 from Mr. Schell, a Manhattan Banker, who donated the money in the memory of his wife Mary Taber Schell to build a hospital. Initially Ida Sophia opened a one bed small clinic for women in Vellore, Tamil Nadu. In 1900, Ida Sophia's father Dr. John Scudder Jr. died after a brief illness. In 1902, she opened the Marry Taber Schell Hospital having 40 beds capacity. Dr. Ida worked hard against great odds, superstitions and cast distinction during the epidemics of cholera, plague and famines. In two years from 1900, she treated over 5000 patients. She performed her first abdominal operation in an open courtyard with the help of only one assistant trained by her. She started road side dispensaries to provide quick clinical service with the help of her lifelong friend Dr. Louis Hart and her companion Miss Gertrude Dodd. She extended her services for rural people by traveling in ox-cart and car. She also opened the first tuberculosis sanatorium. Soon she realized that it is very difficult for her to handle the job of the hospital, sanatorium and dispensaries single handedly. Therefore, she focused her attention to train local people to run the clinical jobs more efficiently.

In 1909, she opened a Nursing School at Vellore. Subsequently, she also started making effort to open a medical college for women. In 1918, she received the consent from the Surgeon General for opening a Medical College for Women to train them for diploma course, which later developed into a reputed medical college to train students for MBBS course under the Madras University. She again made efforts to collect grant to make the college co-educational. Thenafter the newly started medical college, the Christian Medical College, Vellore made steady progress and added many departments with the support of government grant. The hospital added new hospital building and laboratories in 1932. It added Maternity and Child Welfare Centre in 1924. The clinical skill of Dr. Ida Sophia in performing the difficult UVI operations spread not only in India, but even to neighbouring states. The Christian Medical College, Vellore soon developed into an excellent centre for medical research and ranked as the foremost among those all over India.

She also associated herself with the social cause related to women of India. She took initiative to start the Association of Medical Women in India and was the Founder Member and Vice-President of the association. She served as the First President of the All India Obstetrics and Gynaecological Congress held at Madras in 1936. She devoted over 60 years of her life for the health, safety and welfare of women and children in India. She retired from her service in 1946, but continued to provide clinical support to the hospital until her death. Recognizing her outstanding contributions, she was awarded Gold Medal of Kaiser-i-Hind Award. In America she was awarded DSc (Honoris Causa) degree in 1935 and FACS (Fellow of American College of Surgery). Three decades ago a tower was erected in her memory by one of her grateful patients. Miss Dodd and her friend and companion added a clock and a bell to the tower. The tower stands as a memorial of the great lady doctor, who established the best Medical Research Centre (The Christian Medical College) in India at Vellore.

Apart from clinical dedication, Dr. Ida Sophia was also very fond of sports and she played many games with her pupils. She was also an ardent lover of garden and she developed a beautiful garden at her residence on the Kodaikanal Hills, having over 250 varieties of exotic flowers and roses. She belonged to a family, which in four generations, sent 42 missionaries to India and other countries. One of her niece Dr. Isa Bella Scudder joined Vellore Medical College in 1931 and eventually became the Head of the Department of Radiology. Dr. Ida passed away on 24th May 1969 at the age of 89. A stamp was issued on 12th August 2000, portraying Dr. Ida Scudder to mark the Centenary Celebrations of the Christian Medical College, Vellore.

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Sen, Gouri
(b.1923)

Dr. Gouri Sen is a leading Obstetrician and Gynaecologist in Delhi. She was born on 14th April 1923 in Rangoon, Burma (Myanmar). She studied BSc and MBBS (1950) from Rangoon University, Burma. She obtained MD in obstetrics and gynaecology. She took advanced training under British Council Scholarship in 1968. She won WHO Fellowship in 1979.

She started her medical career as a Physician to Dufferin Hospital, Government of Burma, Rangoon in 1956. Dr. Gauri Sen joined Indian National Army of Netaji Subhas Chandra Bose and participated actively in the Indian independence movement. She was arrested and jailed for some time. In 1956, her family migrated to India. She joined Lady Hardinge Medical College, New Delhi as Junior Staff Surgeon. She served as the only woman volunteer specialist sent to NEFA (North East Frontier Area) to serve tribal and train local doctors in 1971. She joined the Ram Manohar Lohia Hospital as a Staff Surgeon, where she developed and started independent Department of Obstetrics and Gynaecology. She retired from her service in 1981 as a Professor and Head of the Department of Obstetrics and Gynaecology, Ram Manohar Lohia Hospital. She played a leading role in the establishment of the R K Puram Maternity Hospital as Peripheral Maternity Centre. She was a leading gynaecologist of India during 1970s-1980s. She also played a valuable role in creation of many family planning and

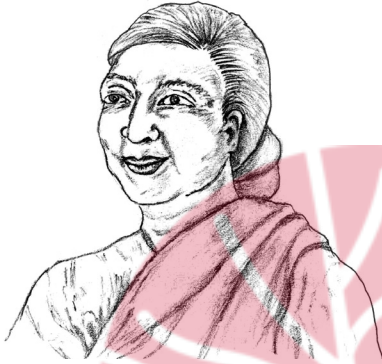
welfare clinics across the country. She emphasized for 'Optimal Patient Care' and quality service to patients. She instituted rotary inservice training facilities for CGHS doctors. Presently, she is serving as a Consultant Gynaecologist, Sukhda Hospital, New Delhi. She was Honorary Consultant to former Presidents of India, Shri Fakhruddin Ali Ahmad and Giani Zail Singh. Her pioneering service has been acknowledged by conferring her with 'Progressive Medicos Forum for Meritorious Achievement' by the Indian Medical Association and College of Medical Practitioners, 1992 and Padma Shri, 2001. She published several research papers and delivered many conference lectures in the field of her specialization.

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एकः सूते सकलम्



Sen, Haimabati
(1866–1932)

Haimabati Sen's life is a story of pain, humiliation and tragedy of a young widow, reflecting the condition of women that prevailed in the society during 19th Century in Bengal. Haimabati Ghosh was born in 1866 to an affluent Zamindar family belonging to the Kulin Kayastha in Khulna District of East Bengal. She was the eldest daughter and a favourite child of her father. She was very fond of study and she learned how to read and write from her cousin brothers.

She was married at the age of nine and a half to a Kulin Kayastha groom of the age of 45 years, twice widowed and father of two daughters. He was found to be a very suitable groom, as he belonged to a Kulin cast and was placed as a Deputy Magistrate in the colonial government. Infact, she and her step daughters were almost of the same age and all of them used to play together as friends in the afternoon. Haimabati's husband was a habitual drinker and there used to be a regular visit of prostitutes at night. Quite often Haimabati witnessed their interaction with utter fear and shock. Unfortunately, within few months after her marriage her husband fell ill and suddenly, died of pneumonia and liver abscess. Haimabati became widow at the age of ten and was subjected to the crude lifestyle of widowhood as per Bengali custom by shaving her hair, wearing white saree without any jewellery and eating vegetarian simple food without any hot spices. Fortunately, Haimabati's mother-in-law was a kind-hearted woman. She rescued

her from the clutches of orthodox elderly family members and allowed her to continue normal life.

Within few years, her mother-in-law and her parents died. Then Haimabati was left to face terrible financial and physical torture. Gradually, she discovered that she had been deprived of the share of her property by the elder brother of her husband. Then she had no other alternative than to take shelter of her brother. However, her brother also started ill treating her and turned her out of the house.

Finally she reached Banaras, the age old home of Hindu widows. Soon she realized the truth that even Banaras is not safe from sexual abuse and oppression for young widows and *sadhvis*, who earned their living by begging and singing religious *bhajans*. Haimabati always wanted to study and do some respectful job. She came in contact with some members of Brahma community. The Brahma Samaj in Bengal encouraged widow remarriage and setting up of widows and providing them education, training and shelter. During these troubled years, she took education and started working as a school teacher in a school established by a social reformer. Haimabati returned to Calcutta and became Brahma by her own choice in order to protect her interest and lead dignified life. Her friends and well wishers arranged her remarriage at the age of 25 with Kunjabehari Sen, a low level Brahma Samaj worker in 1890. The second marriage also did not bring any respite for Haimabati as her husband was jobless and was not keen to bear any family responsibility.

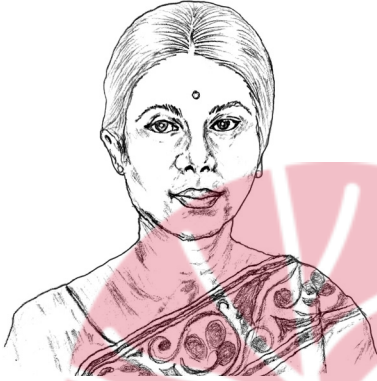
Haimabati joined three years medical graduation course in the Campbell Medical School, Sealdah in 1891 at the age of 26 with her first baby in her arm. After her marriage she needed financial support and at that time government used to pay monthly scholarship of Rs Seven to women medical students, which ensured financial security to her family for some time. In the final examination, Haimabati stood first by beating all male students in 1894. She was awarded Gold Medal for her achievement, but boys of her college went on strike in which general public and local press also joined them and raised voice against awarding Gold Medal to a woman. Haimabati was deprived of her Gold Medal and it was given to the male candidate, who stood second in the class, and Haimabati had to satisfy with the Silver Medal for her achievement.

After obtaining medical education, she joined Dufferin Hospital in Hooghly District from 1894 to 1910. Subsequently, she started private practice in Chinsurah in 1910 and continued until her death. During those days doctors in government service were also allowed to conduct private practice. Female doctors used to be in a great demand for private and home visit. They were highly paid as compared to their male counterparts. She used to get Rs 300 in District Hospital and additional Rs 100 from private practice. Hindu ladies of social high status preferred to call her for home service and paid her high fees. At times, lady doctors used to benefit their patients by protecting their personal secrets related to their health conditions. Haimabati once protected one of her old class friend, a young widow, who had remarried and took her help to conceal the fact that she was pregnant at the time of her marriage and help her to get delivery of a premature child. Haimabati's husband never joined any job and lived on her earnings though they had five children to take care of. Haimabati was a very strong personality with sharp tongue and remained a fighter forever for her survival and dignity. Haimabati died in 1932.

Haimabati wrote her memoir in Bengala in 1920s, and the hand written manuscript remained unnoticed and unpublished for years until her grandchildren took initiative to get it translated and published almost 80 years after her death.

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Sengupta, Sudipta
(b.1946)

A well-known Geologist and Mountaineer, Dr. Sudipta Sengupta was born on 28th August 1946. She is the daughter of Jyoti Ranjan Sengupta and Pushpa. Her father was an eminent meteorologist. From her childhood, she displayed her flair for geology. She studied BSc, MSc (Geology) and PhD (1972) from Jadavpur University, Calcutta. She completed her PhD under the supervision of renowned geologist Professor Subir Ghosh. She joined Postdoctoral Research at the Imperial College under Royal Commission for the Exhibition 1851, UK, London, 1973-77. She gained valuable research experience, when she joined as Docent for six months at the Institute of Geology, Uppsala University, Sweden, 1977. She also worked as Visiting Scientist, International Geodynamic Project, 1977-79, where she had an opportunity to work with Prof. Hans Ramberg.

She started her service career as a geologist at the Geological Survey of India, 1970-73. She assumed the duty of Senior Geologist, Geological Survey of India, from 1979-82. Subsequently, she served as Lecturer to Professor of Structural Geology, Jadavpur University, Calcutta from 1982 until she retired.

Prof. Sudipta Sengupta is also an expert mountaineer. She was trained in advanced mountaineering under the supervision of Tenzing Norgay at the Himalayan Mountaineering Institute. She was selected as a member of the Third Indian Scientific Expedition to Antarctica

Team in 1983 along with Dr. Aditi Pant (a marine biologist). They opened a new chapter for achievement of Indian women by becoming members of the Scientific Team of Indian Antarctic Expedition in 1983. They conducted pioneering geological and biological studies in the Schirmacher Hills of East Antarctica.

In 1989, she visited Antarctica for the second time where she conducted structural field studies in various terrains including Precambrian structures of Peninsular India, the Scottish Highlands, the Scandinavian caledonides and East Antarctica. She made valuable contributions on deformation of pebbles, deformation of rigid and deformable inclusions in a ductile matrix, development of shear zone structures, localization of shear zones at the margins of rigid bodies, modification of early lineation by later folding, analysis of transpersonal deformation from geometrical evolution of mesoscopic structures, and opening and closing of folds in superposed deformations.

She initiated many innovative research projects in the field of her specialization. She has been an Elected Fellow and Council Member, Indian National Science Academy, New Delhi, 1995 and 2001-03. She made valuable contributions as a member of the Task Group on Tectonic and Structural Geology, International Union of Geological Sciences. Her achievements in the profession are acclaimed by awarding her Career Award of Lady Study Group in Geology, 1986; Shanti Swarup Bhatnagar Prize in Science, 1991; National Mineral Award, 1997; Antarctica Award, Government of India, 2001.

Dr. Sengupta published a book in Bangla on her travel expedition to Antarctica, which became a best seller title in West Bengal. She served as member of Editorial Board of *Journal of Structural Geology*, since 2002. She also edited a book entitled *Evolution of Geological Structures in Micro-Macro Scales*.

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Seward, Sara (1833–1891)

Sara Seward was a native of the state of New York born in 1833. She was the daughter of the Late George W Seward, younger brother of the distinguished Secretary of State, William H Seward. She studied medicine from the Women's Medical College, Pennsylvania and obtained her graduation degree in December 1871. She was the first to respond to the call of the *Zenana Mission* for female physicians to go to India. She was sent to Allahabad in 1871 under the auspices of the Women's Union Missionary Society of New York. After two years, in 1873, she transferred her connection to the Board of Foreign Mission of the Presbyterian Church, but without any change of field. Initially, she started her practice in *Zenana* in December 1871 and in the following March she opened a small dispensary, which subsequently developed into a big building. She also served for some time in Calcutta and developed a small dispensary. She bought a Maxwell car from a local dealer to cope up with her busy schedule of clinical service.

Dr. Sara travelled to her native place due to ill health in April 1889 and returned to India in the same year after recovery. With her hard work and clinical skill, the Allahabad dispensary earned good reputation. A site in the heart of the city of Allahabad was chosen for the new dispensary building. In August 1890, the new building was built. The number of patients treated in the dispensary in 1890 was 3,738; the daily average attendance was 44, while some days the

number rose to 80. She laid down over 20 years of almost unremitted medical service for the people of Allahabad. Dr. Sara died of cholera at Allahabad on 12th June 1891. The newly built Allahabad dispensary was named in her memory as the Sara Seward Hospital, Allahabad.

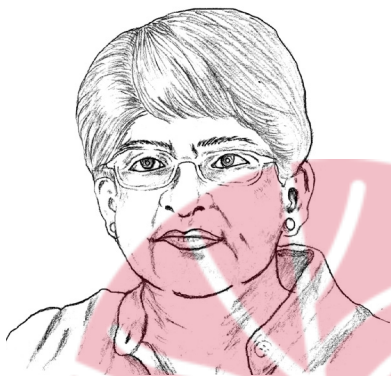
Dr. Sara was quite inquisitive regarding Indian diseases. She chose the disease 'Cholera' as her project studies during her graduation and submitted a thirty page synopsis '*An Essay on Cholera*' to the Faculty of the Women's Medical College, Pennsylvania during the session 1870-71. She provided details on the diagnosis and therapy of the dreadful disease. Unfortunately, she became the victim of the same disease after twenty years of her service in India.

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एकः सूते सकलम्



Shaha, Chandrima
(b.1952)

Dr. Chandrima Shaha is an eminent scientist in the field of cell and molecular biology. She was born on 14th October 1952 and is the daughter of renowned artist couple Karuna and Shambhu Shaha.

She received MSc from Calcutta University and PhD from Indian Institute of Chemical Biology, Calcutta. She visited USA for Postdoctoral Research at Kansas University Medical Centre, Kansas, and The Population Council, New York from 1982-84.

She joined National Institute of Immunology, New Delhi as a Staff Scientist in 1984. Later, she became Deputy Director and Head of the Cell Death and Differentiation Research Laboratory (CDDRL), National Institute of Immunology. Currently, she is serving as the Director, National Institute of Immunology.

Dr. Chandrima Shaha has provided novel insight into the understanding of cell death mechanisms to two different model systems, the multicellular model of mammalian germ cells and a unicellular Trypanosomatide parasite model. Her observations provided clues for the treatment of infertility and improving drug efficacy for protozoal parasitic diseases. She has discovered a novel pathway and modes of cell death prevalent in Trypanosomatide parasite, *Leishmania donovani*, providing clues for potential points of interruption in infectivity. She has also identified novel pathways of apoptosis in spermatogenic cell death in response to toxic action. She has also provided deeper

understanding of cell death and its relation to the course of evolution, which elaborated how species survive during the conditions of stress, natural development, differentiation and growth. It is evident that the continued growth or continuous stress would hamper survival. To circumvent these problems, all animal cells have evolved the capability to kill themselves by turning on gene-encoded cell suicide programmes. These programmes not only help the organisms to survive in conditions of excessive stress but also prevent abnormal growth. The decision of whether a particular cell will live or die is tightly regulated by many different signals originating both from within the cell and from its environment. The implementation of this self-destruction programme leads to a morphologically distinct form of cell death termed apoptosis and deregulation of apoptosis is associated with a variety of diseases including cancer, autoimmune diseases and neurodegenerative disorders.

She has been an Elected Fellow, National Academy of Sciences (India), Allahabad, 1979; Elected Fellow, Indian Academy of Sciences, Bangalore, 2005; Elected Fellow, Indian National Science Academy, New Delhi, 2008 and Fellow, West Bengal Academy of Sciences, 2011; Elected Fellow, Third World Academy of Sciences (TWAS), Trieste, Italy, 2014.

She has served as Member of Task Force on Human Genetics and Genome Analysis, Department of Biotechnology; Task Force on Male Contraception, Indian Council of Medical Research; Member, Steering Committee for the Task Force on Regulation of Male Fertility, World Health Organization and International Consortium on Male Contraception, New York.

Owing to her brilliant research work, she has been conferred with Shakuntala Amirchand Award, Indian Council of Medical Research, 1992; Department of Biotechnology Special Award for 50th Anniversary of DNA Double Helix Discovery, 2003; J C Bose National Fellow, 2009; Dr. Darshan Ranganathan Memorial Lecture Award, Indian National Science Academy, 2010; Ranbaxy Research Award for Basic Research in Medical Sciences, 2010 and Archana Sharma Memorial Lecture Award, National Academy of Sciences, 2013; Chandrakala Hora Memorial Medal, Indian National Science Academy, 2013; 14th Pushpa Sriramachari Foundation Day Oration Award, ICMR, 2014; and

Om Prakash Bhasin Award, 2015. She has published over 90 research articles and served as member of the Editorial Board of *Molecular and Cellular Endocrinolog* published by Elsevier and *Spermatogenesis* published by Lender Bioscience. She has motivated and guided several young scientists. She has instinct love for flora and fauna around her. She has been a close watcher of natural scientific phenomenon. Her father encouraged her to learn gardening, watching butterflies, caterpillars, beetles, photography, carpentry, painting, reading classics, Bengla literature including works of Rabindranath Tagore, etc. Her father, Mr. Shambhu Shaha is a renowned artist of realistic art and a proficient photographer of Kolkata. He is a pioneer, who sketched and photographed different shades of street life of Kolkata. He made precious collection of photographs of last years of Rabindranath Tagore. Dr. Chandrima Shaha learned different shades of value of life from her parents. She had made a collection of photographs of different stages of metamorphosis of butterflies in her childhood. She was also an ardent cricket player during her student life. She enjoys the privilege of all round talent and experience.

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एकः सूते सकलम्



Shakuntala, Devi
(1939–2013)

Shakuntala Devi was born on 4th November 1939 in Bangalore, Karnataka to a poor Brahmin family. Her father Raja Rao was a circus performer. She did not have any formal education. Once she was admitted to a school, but she could not continue her studies as her father was unable to pay her fees. She grew up in a poor settlement colony. Shakuntala Devi is an acclaimed mathematical genius and prodigy who manifested an extraordinary love for numbers while aged three. Her father introduced her to the world of mathematics through playing card tricks. Soon she became an expert in complex mental arithmetic including skill of addition, multiplication, division, calculating squares, cube roots, etc.

At the age of five, she demonstrated her talents at the Mysore University. Then she toured Europe and other parts of the world. She demonstrated her ultra rapid skill of mathematical calculation by the multiplication of two 13-digit numbers in 28 seconds at the Computer Department of Imperial College, London on 18th June 1980 and proved herself faster than any computer available at that time. She married Indian Civil Services Officer Paritosh Banerjee from Kolkata. The marriage could not survive long and they divorced in 1979. She earned the dignity of being a 'Human Computer' across the world. This record has been included in the *Guinness Book of World Record* in 1995. She also displayed her

mathematical skills at the World Bank, Washington DC and the United Nations in 1977.

She was awarded Gold Medal by the University of City, Manila as 'Most Distinguished Asiatic Woman of 1968'. She received the Ramanujan Mathematical Genius Award, Washington DC, USA in 1988. On 4th November 2013, she was honoured with 'Google Doodle', on the occasion of her 84th birthday. She was a practicing numerologist with astrology. She was a well consulted astrologer for many noted personalities. She authored several books on puzzle numbers, games of numbers, astrology, etc. She died at the age of 83 on 21st April 2013 after a brief illness in Bangalore. She is survived by her daughter and son-in-law.

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एकः सूते सकलम्



Shankar, Priti
(1947–2011)

Dr. Priti Shankar was the first woman graduate from the Indian Institute of Technology, Delhi in 1968. She was born on 11th September 1947 in Goa. She qualified BTech (Electrical) from Indian Institute of Technology, Delhi in 1968. She obtained PhD from the University of Maryland, College Park, USA, 1972. She started her service as Assistant Professor, School of Automation, Indian Institute of Science (IISc), Bangalore in 1973. She worked in different capacities and reached to the position of Professor in the same department.

Professor Priti Shankar developed interest in mathematics because of her mother, who taught mathematics. She pursued mathematics and engineering as her first choice for higher studies. After completion of her PhD from the University of Maryland, she returned to India and joined the newly started School of Automation of Indian Institute of Science (IISc), Bangalore. She took keen interest in developing the school into an advanced center of research. She made extensive research contributions to the theory as well as practice of computer science. Professor Priti Shankar conducted significant research work on compiler design algorithmic coding theory and formal language theory. Her work on error correction codes and compiler design received international acclaim and high citation index by eminent scientists around the world. She also conducted outstanding research work on Bose Chaudhuri-Hocquengham (BCH) codes, which hitherto been

defined over finite fields as to be operational over Galois rings. She co-edited the *First Handbook of Compilers* with Professor Y N Sri Kant by CRC Press in 2002. She was a member of the Editorial Board of *Resonance*. She married Dr. P N Shankar, a theoretical fluid dynamicist from the National Aeronautical Laboratory, Bangalore. She was a passionate gardener and had a wide collection of exotic plants at her residence.

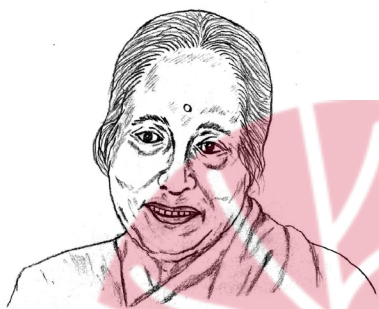
She received Outstanding Scholarship Award, American Association of University Women; Jaya Jayant Award for Teaching Excellence, Indian Institute of Science, Bangalore, 2008; and Distinguished Lecturer Award, IEEE, India, 2006-09.

She died of cancer on 17th October 2011 at the age of 64. She was a brilliant researcher, extraordinary teacher and a gentle human being, who always cared for those who were in distress around her. She believed that "A good teacher is like a candle, it consumes itself to light the way for others". The School of Computer Science and Automation (CSA), IISc started Professor Priti Shankar Lecture Series in her honour.

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एकः सूते सकलम्



Shanta, V
(b.1927)

Dr. V Shanta is one of the prominent personalities in the field of oncology. She was born on 11th March 1927 at Mylapore, Madras (Chennai), Tamil Nadu in a very illustrious family of academicians and scientists. The noble laureate Professor S Chandrasekhar was her maternal uncle and Sir C V Raman was her grandfather's brother. She attended National Girl's High School (now P S Siyaswamy Higher Secondary School). She did her MBBS; DGO (Diploma of Gynaecology and Obstetrics) and MD (Obstetrics and Gynaecology) from Madras Medical College, in 1949, 1952 and 1955. Subsequently she obtained super specialization by receiving MCh (Surgical Oncology) and DM (Medical Oncology) degrees. Beside she obtained DSc (Honoris Causa) from Sri Venkateswara University, Tirupati, 1998; and DSc (Honoris Cause), Dr. MGR Tamil Nadu Medical University, 2002.

She started her career as the First Resident Medical Officer at Cancer Institute, Adyar Cancer Institute (WIA) in 1955. She served as Physician, Medical Oncology Specialty, 1970; Physician, College of Oncological Sciences, 1984. She made immense contributions to establish the Adyar Cancer Institute (WIA), Chennai as the Chairman and Director from 1980-97. She also assumed the responsibility of a Member, Advisory Board on Cancer, World Health Organization.

The Adyar Cancer Institute was established by Dr. Muthulakhmi Reddy in 1955. Dr. V Shanta remained associated with the institute since she finished her MD and passed her Public Service Commission Examination in 1955. She transformed WIA from a cottage hospital 'Sevagram Huts' of 12 beds on floor mats into an International Centre for Excellence in Oncological Research. She was the only full time medical officer and was devoted to her patients, who called her *Mataji*. Through her efforts and benevolent donations from public, the first Cobalt-60 super voltage therapy machine in Asia was installed in the hospital. Dr. V Shanta pioneered paediatric cancer specialty in India by starting 'Paediatric Cancer Unit' in 1960. The first exclusive Medical Oncology Super Specialization was started in 1970, when the First College of Oncological Sciences to award degree of MCh (Surgical Oncology) and DM (Medical Oncology) was established. She started 'Cancer Registry' system in India in 1997. She dedicated 50 years of her life to fulfill the mission of organising and developing the 12 bedded Adyar Cancer Institute into an excellent cancer hospital and research institute of international reputation. She held various important assignments by being the State Advisory Board on Cancer, Tamil Nadu; Chairman, Indo-US Collaborative Group on Lymphoid Neoplasias; President, Indian Society of Oncology, 1988-90; President, Asian and Pacific Federation of Organizations for Cancer Control, 1997-99; Elected Honorary Member, International Association of Cancer Registry (IARC) for developing Cancer Registry in India in 1997.

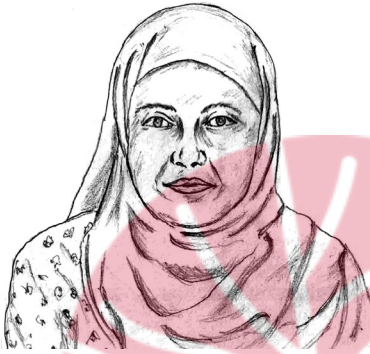
She received many prestigious awards such as Raja Ravi Sher Singh of Kalsia Memorial Award, Indian Council of Medical Research, 1973; Ambo-Dr. Pasupati Nath Wahi Cancer Award, 1982; Padma Shri, 1986; Smt. Vimala Shah Award, Banaras Hindu University, 1997; IARC Award for developing cancer registries in India, 1997; Nazi-Gad-El-Mawta Award, International Network for Cancer Treatment and Research, Brussels, 2002; Raman Magsaysay Award for Public Service, 2005; Padma Bhushan, 2006; Lifetime Achievement Award, Madras Medical College, 2010; Mother Teresa Memorial Award, Indian Development Foundation, 2013 and Avvaiyar Award, Tamil Nadu State Government, 2013. She

published over 100 research articles in the field of her subject specialization.

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Shariff, Shameem
(b.1953)

Dr. Shameem Shariff, born on 24th April 1953, is a distinguished Pathologist, who has made immense contributions in the field by introducing innovative laboratory techniques and publishing valuable textbooks for pathology courses. She received MBBS; MD (Pathology) and PhD (Pathology) from Karnataka University, Dharwad in 1976, 1981 and 1994. She has held important positions in India and abroad including Faculty Member and Professor, Department of Pathology, St. Johns Medical College, Bangalore, 1997-2002; Professor (Part Time), Arabian Gulf University, Bahrain, 2000-2006; Consultant in Pathology (Histopathology and Cytopathology), Salaniya Medical Complex, Bahrain, 1999-2006; Senior Consultant of Histopathology, Royal Hospital, Sultanate of Oman, Oman, 2007-08; Professor of Pathology, MVJ Medical College, Dandupalya, Bangalore since 2008. Currently, she is working as the Head of the Department of Pathology of the same medical college.

Dr. Shameem Shariff is a well-known pathologist of Karnataka. She specialised in surgical pathology, haematology, autopsy technique, special procedures of immunohistochemistry, etc. She is well versed in the performance of the Fine Needle Aspiration Cytology. She has conducted extensive research on breast pathology, lymphomas, renal pathology including needle biopsies of the kidney and fluid cytology. She has been teaching medical students from graduation to PhD level

since 1978. She has also served as the head of Cytology and Chairman of the Department of Pathology at the St. Johns Medical College, Belgaum during 1993-2002. She has gained wide experience abroad and has undergone short-term training courses in oncopathology and fine needle aspiration cytology at the Memorial Medical Centre of Long Beach, California and Memorial Sloan Kettering Cancer Centre, New York of USA in 1987.

She has been closely associated with many academic societies and associations. She is a Life Member of Indian Association of Pathologist and Microbiologists; Life Member, Indian Academy of Cytologists; Member, International Academy of Pathology and Member, Oncology Group, Bangalore, Karnataka. Her brilliant research findings have been felicitated by awarding her Khanolkar Award, Indian Association of Pathologists and Microbiologists, 1984; Excellence in Teaching Award, Jawaharlal Medical College, Belgaum, 1996; Ernest Fernandez Award, Indian Association of Cytologists, 1998. She has authored widely used textbooks on pathology entitled *Laboratory Techniques in Surgical Pathology* and *Fundamentals of Surgical Pathology*. Her second book won the First Prize in the textbook category of the CME Programme on Pathology of Endometrium and Ovary, 2012. She has been in the panel member of examiners for undergraduate and postgraduate medical examinations in Bangalore, Madras, Karnataka, Annamalai, Goa universities. She has also served as Organizing Secretary, Convener and Programme Coordinator for national and international seminars and conferences. She has published several research papers in reputed medical journals and served as a Member of the Editorial board of *Journal of Cytology*, 1986-2001 and *Karnataka Medical* from 1998 till date.

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Pinto, R G Wiseman. *Eminent Cytologists in India*. Panaji; Medical Education Cell, Goa Medical College. <http://www.gmmcmec.gov.in> (Accessed on 14.01.13).



Sharma, Archana
(1932–2008)

Dr. Archana Sharma was an eminent Academician and a Geneticist. She was born on 16th February 1932 at Pune, Maharashtra in an affluent family of Prof. Nandi Pati Mookerjea. She attended her BSc, Dungar College, Bikaner in 1949. She did her MSc and PhD, from Calcutta University, 1951 and 1955. She completed DSc from the same university in 1960. She joined the Department of Botany, University of Calcutta, 1966 as a Research Fellow and Honorary Lecturer of Cytogenetic. She became Professor of Cytogenetic and Professor of Genetics in 1974. Subsequently, she assumed the responsibility of Head, Department of Botany, Calcutta University, Calcutta, 1980. She was an Emeritus Scientist at Council of Scientific and Industrial Research. She was an Honorary Scientist, Indian National Science Academy (INSA) from 2006-07.

Professor Sharma had done distinguished research work on chromosome of plant and human systems. Her research focused on cytogenetic, human genetics and environmental mutagenesis. She developed new techniques to study chromosome structure and developed evidences of a new concept of speciation in vegetatively reproducing plants. She studied cytotaxonomic investigation on flowering plants and assessment of chromosomal and genetical polymorphism in normal human populations in Eastern India and their effects on pathological conditions. She also developed new staining and pretreatment techniques

for studying chromosome structure, which are now used throughout the world. She remained an active professional for over four decades. She was honoured as Elected Fellow, Indian National Science Academy, 1977; Fellow, Indian Academy of Sciences, Bangalore; Fellow, National Academy of Sciences (India), Allahabad. She, along with her husband, renowned scientist Dr. Arun Kumar Sharma made phenomenal contributions to the development of the profession of botanist and geneticist. She served as the President, General Section, Indian Science Congress Association, 1981-84; Treasurer, Society of Cytologists and Geneticists; Member; Council Member, Botanical Society of Bengal; President, Indian Botanical Society, 1989; and Member, International Academy of Sciences, Germany, 1990.

Her special achievements have been acknowledged by awarding her several prizes and awards including J C Bose Award in Life Sciences (shared with her husband), 1972; Shanti Swarup Bhatnagar Prize, 1975; National Lectureship, University Grants Commission, 1980; Padma Bhushan, 1984; FICCI Award, 1984; Birbal Sahni Medal, Indian Botanical Society, 1984; Platinum Jubilee Lecture, 1989; G P Chatterjee Award, 1995; S G Sinha Award, 1995; and Ashutosh Mukherjee Medal, Indian Science Congress Association, 1999.

She was a prolific writer and published over 300 articles, authored eight books and edited over 11 books. Her book *Chromosome Techniques: Theory and Practice* (Butterworth) is a classic, which came into three editions in 1965, 1972 and 1980. She served as member of the Editorial Board of many leading journals such as Editor of Botanical Society of Bengal. She was a Founding Editor of *The Nucleus*, an international journal of cytology. She was a distinguished teacher and a great mentor of many leading cytogeneticists across the country. She passed away on 14th January 2008. The National Academy of Sciences (India) instituted Archana Sharma Memorial Lecture Award in her memory.

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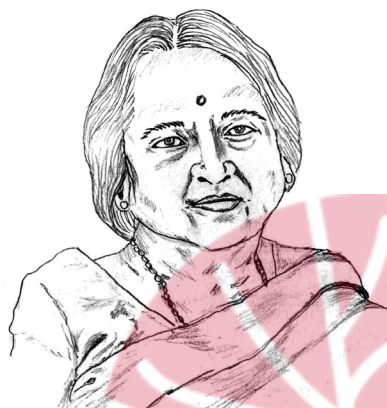
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एकः सूते सकलम्



Sharma, Manju
(b.1940)

Dr. Manju Sharma, born on 13th February 1940, has played a vital role in the establishment and development of the Department of Biotechnology, Government of India. She obtained MSc (Botany) from Lucknow University, Lucknow in 1961. She proceeded abroad to attend Postdoctoral Research at the Purdue University, USA from 1967-68, where she worked under the guidance of Professor A C Leopold on latex bearing plants.

She started her service career as a Pool Officer, Forest Research Institute, 1969-70; Research Officer, Indian Council of Medical Research, 1970; Senior Scientific Officer, Department of Science and Technology, India; Secretary, Department of Biotechnology, Government of India, from where she retired in February 2004. She also served as an Advisor to the Ministry of Science and Technology, Government of India. She had also been an Advisor on Biotechnology to the Government of Gujarat and Uttarakhand. She was a Guest Faculty, Indian Institute of Technology, Delhi in 2004; Founder President and Executive Director, Indian Institute of Advanced Research, Gandhi Nagar; Member, Board of Governors, United Nations University-Institute of Advanced Sciences (UNU-IAS), Tokyo; Member of the Committee on Women for Science under the Third World Academy of Sciences; President and Executive Director, Indian Institute of Advanced Research. She has been a Fellow, Third World Academy

of Sciences; Fellow, National Academy of Agricultural Sciences (India); Fellow and President, National Academy of Sciences (India), Allahabad, 1995-96; Fellow, Indian Academy of Wood Sciences. She was office bearers of learned societies and associations such as General President, Indian Science Congress Association; President, Association of Microbiologists of India, 1999 and President, Vigyan Parishad.

Dr. Manju Sharma is an eminent woman scientist of India, who has made remarkable contributions in the development of the emerging field of 'Biotechnology' in the country. She promoted widespread field level application of biotechnology to achieve optimum commercial utilization of the subject. She is the architect behind shaping the modern Biotechnology Department of Government of India. She pioneered the concept of Biotech Consortium in India to promote coordination between scientific laboratories and industry to make best use of scientific applications for the benefit of the society. She instilled the concept of promoting women in science. She took innovative approach to groom scientific manpower in the country. Her tenure as Secretary to the Department of Biotechnology registered record achievements in the field. She provided great financial as well as infrastructural support to newly started academic programmes in the field of biotechnology in different academic organisations. Her postdoctoral research on latex bearing plants led to the understanding that ethereal can stimulate the yield of latex and rubber by 100 per cent. Many developing countries made use of her research findings to improve quality and quantity of rubber yield in their country.

Her brilliant achievements have been felicitated by awarding her Birbal Sahni Memorial Gold Medal, 1961; Vasik Award, 1994; Norman E Borlaug Award, 1995; K N Bahl Memorial Gold Medal, 1997; Sri Om Prakash Bhasin Award in the field of Biotechnology, 1998; FIE's National Award, 1998; Jawaharlal Nehru National Award, Government of Madhya Pradesh, 2000; G M Modi Science Award, 2002; Ojaswani Shirsh Alankaran, 2002; Sir Ashutosh Mukherjee Medal, 2003; Delhi Ratna, 2003; Vigyan Gaurav, Government of Uttar Pradesh, 2004; Lifetime Achievement Award, Biospectrum, 2004; Padma Bhushan, 2007; Platinum Jubilee Gold Medal for Lifetime Contributions, National Academy of Sciences, India, 2006;

and National Senior Women Bioscientist Award, 2007. She has contributed several research articles, scientific reports, conference papers and proceedings.

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Sharma, Usha

(b.1943)

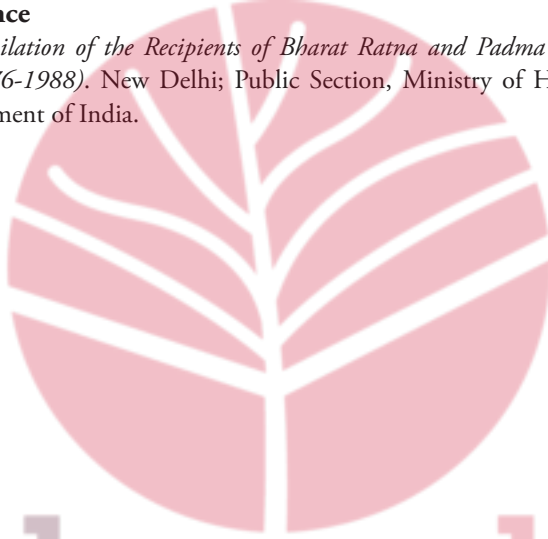
Dr. Usha Sharma is a renowned Obstetrician and Gynaecologist. She was born on 28th January 1943. She did MBBS in 1965 and MS (Obstetrics and Gynaecology) in 1968. She started her medical career as a Lecturer to Reader and then Professor, Department of Obstetrics and Gynaecology, Medical College, Meerut, 1971-1977. She was the Chief Hospital Administrator and Head, Muzaffar Nagar Medical College and Hospital since 2006. She has been an Advisor, Family Planning and Welfare to the Government of India.

Dr. Usha Sharma has a distinguished academic career and she has made notable achievements in the field of family welfare. She has organised extensive family planning camps and workshops for the field level implementation of government's family planning policy. She has performed over 70,000 laparoscopic ligations within a period of four years, which include the World Record of 611 operations in a day in October 1981. She has conducted over 200 camps of laparoscopic ligations in various districts and peripheral health centers in UP and Haryana. She also started Microsurgery Unit at the Medical College, Meerut for tubular reconstruction in childless couples. Dr. Sharma attended advanced course on 'Academic Skill', at the Johns Hopkins Hospital, Baltimore, Maryland, USA in 1982. She also did training in microsurgery at Mt. Sinai Hospital, Cleveland, Ohio, USA. She has contributed several research papers

in reputed medical journals in the field of her specialization. She has made valuable contributions as an active member of the Indian Medical Association, UP Branch. She has received Award from Indian Medical Association, UP Branch, 1983 and Padma Shri in 1985 for her valuable contributions.

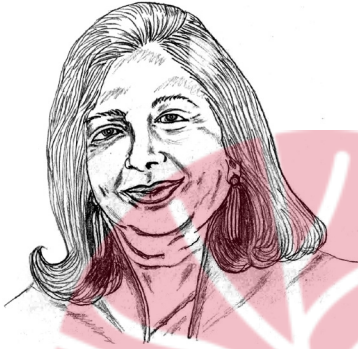
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एकः सूते सकलम्



Shaw, Kiran Mazumdar
(b.1953)

Dr. Kiran Mazumdar Shaw is an outstanding scientist-cum-entrepreneur. She was born on 23rd March 1953 at Pune, Maharashtra. She is the daughter of Rasendra Mazumdar and Yammi. Her father was the head brewmaster at United Breweries. She married head of Madura Coats John Shaw, a Scotsman in 1998. She completed school education from Bishop Cotton Girl's Higher Secondary School in 1968. She received BSc (Zoology) from Mount Carmel College, Bangalore University, Bangalore in 1973. Her father advised her to study fermentation science. She earned master's degree in brewing from Ballarat University, Melbourne, 1975. She has been awarded DSc (Biology) (Honoris Causa) from Ballarat University, Melbourne in 2004. She has received Honorary Doctorate from University of Abertay, Dundee, UK in 2007 and University of Glasgow, UK in 2008.

Dr. Kiran Shaw started her career as a trainee brewer in Carlton and United Breweries, Melbourne and as a trainee maltster at Barrett Brothers and Burston, Australia. She served as a Technical Consultant, Jupiter Breweries Ltd., Calcutta and Technical Manager, Standard Malting's Corporation, Baroda, 1975-77. She started Biocon from a garage of a rented house at Koramangala with Rs 10,000 bank balance in 1978. Initially, she started Biocon as an industrial enzyme manufacturing company, which grew up to be a fully integrated bio-pharmaceutical company. The company is presently focusing its

drug research on diabetes, oncology and autoimmune diseases. Dr. Kiran Mazumdar Shaw is serving as the Head and Chief Managing Director of Biocon, which is a multimillion industrial project having international network. She also started two subsidiary companies viz. (1) Syngene (1994) which provides service as an outsourcing firm for discovery research and (2) Clinigene (2000) which focuses on clinical development services. She has rendered the duty of Chairman, Karnataka's Vision Group on Biotech. She served as member of the Board of Science Foundation, Ireland. She assumed the position of Advisory Council Member, Department of Biotechnology, Government of India. She is also a member of the Board of Governors, Indian School of Business and Indian Institute of Technology, Hyderabad. She is a founder member of the Society for the formation of 'Institute for Stem Cell Biology and Regenerative Medicine'. She is associated with Indian Pharmacopoeia Commission.

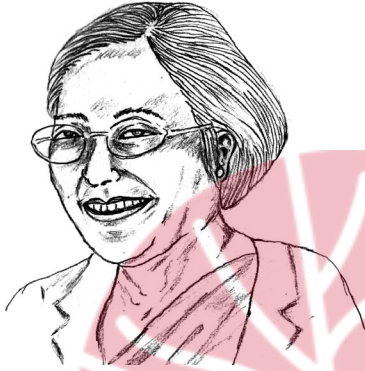
Dr. Kiran Shaw has made pioneering contributions in the research and development of biotechnology and steered Biocon's transition from industrial enzyme company to integrated biopharmaceutical company. She worked as Chairperson and mission leader of CII's National Task Force on Biotechnology and led research delegations to USA, Canada and UK. She received numerous awards for her outstanding achievements such as Padma Shri, 1989; Business Woman of the Year, *Economic Times*, 2004; Model Employer; Ernst and Young's Entrepreneur of the Year; Award for Life Sciences and Health Care, 2002; Padma Bhushan, 2005; Wharton-Infosys Business Transformation Award, 2006; Corporate Leadership Award, American India Foundation; Nikkei Asia Prize, 2009; Express Pharmaceutical Leadership Summit Award, 2009. She was awarded the Othmer Gold Medal, 2014 for outstanding contributions to the progress of science and chemistry. She received '2014 Global Economy Prize for Business' from German-based Kiel Institute for the World Economy. She has been distinguished as the World's 77th Most Powerful Woman by the Forbes List. She has also been recognized among the 50 Top Business Women by the *Financial Times*. Under her leadership, the Biocon is been ranked as 20th Leading Biotech Companies in the World by US Trade Publication Med Ad News in 2007-08. The Biocon received

the 2009 Bio Singapore Asia Pacific Biotechnology Award for the Best Listed Company.

She has been referred to as 'India's Biotech Queen' by *The Economist*; 'India's Mother of Innovation' by *New York Times*; and 'Most Influential Bio-business Personality outside Europe and USA' by *Nature Biotechnology*. She closely associated herself with people at grass-root level to understand their problems. She renders social service to poor, sick children and suffering humanity. In 2004, she started Biocon Foundation to conduct health and environment programme to benefit economically weaker sections of the society. Biocon Foundation runs seven ARY Clinics to provide health services to population of 50,000 in the radius of 10km. It helped to establish a 1,400 bed cancer care center at the Narayana Health City Campus at Bangalore along with the Dr. Devi Shetty's Narayana Hrudayalaya in 2007. She is Chairperson of the Board of Governors of Indian Institute of Management. She has been appointed as Global Alumini Ambassador for Australia by the Department of Foreign Affairs and Trades, Australia. Dr. Kiran Shaw has a flair for cooking; she enjoys listening to music and performing plays/theater and she has a large collection of artistic objects. She has been an eloquent public speaker, who has given many memorable lectures and demonstrations for young entrepreneurs. She is the second Indian to join the 'Giving Pledge,' a global initiative created by Harren Buffett and Bill and Melinda Gates that encourages billionaires to give the majority of their wealth to philanthropic causes.

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Shrivastava, Savitri
(b.1935)

Dr. Savitri Shrivastava is a renowned pioneer of paediatric cardiology. She was born on 1st July 1935 to the family of Dr. L N Shrivastava.

She did super specialization in paediatric cardiology by receiving advanced medical education and trainings including MD (Medicine), GRM College, Vikram University, 1961; DM (Cardiology), All India Institute of Medical Sciences, New Delhi, 1971; FAMS (Fellow, Indian Academy of Medical Sciences); FACC (Fellow, American College of Cardiology); FACA; FICC; Training on Paediatric Cardiology, University of Minnesota, Minneapolis, USA, 1975-76. She has been a distinguished teacher and Professor of the Department of Cardiology, All India Institute of Medical Sciences (AIIMS), New Delhi from 1977-92. She established the world class Echocardiography Section and introduced Non-Coronary Interventions at AIIMS and served the institute for over 20 years until she retired in 2002. She worked for one year as a Visiting Professor, University of Minnesota, Minneapolis, USA. She has been the Director and Head, Department of Pediatric and Congenital Heart Disease, Escort Heart Institute and Research Centre, New Delhi for 15 years. She established the Department of Paediatric Cardiology and CHD at the Fortis Escort Heart Institute in 1995. Currently, she is the Director, Paediatric Cardiology, Fortis Heart Institute, New Delhi.

Dr. Savitri Shrivastava is acclaimed as a pioneer in developing paediatric cardiac science in India. She initiated non-surgical management of paediatric and congenital heart diseases in India. She described interventional processes for the first time in the world. She was instrumental in the development of a separate branch of paediatric cardiology at the All India Institute of Medical Sciences. She also took initiative to study various new procedures in the field. She made outstanding research on the procedure of 'balloon dilation of internal spectrum', which she published in the *Indian Heart Journal* in 1987 along with the coauthors Dr. Radhakrishnan and Dr. M Rajani, which received international acclaim and high citation. She has made valuable studies on the role of catheter interventions in therapeutic management of congenital heart disease, which has completely revolutionized the role of cardiologists in cardiac catheterization laboratories. She is an iconic figure in India and abroad, who dedicated her life for the cause of children afflicted with cardiac malformations. She has been an active member of many professional associations including Founder President, Indian Academy of Echocardiography 1995; Founder President, Pediatric Cardiac Society of India, 1998; Founder President, Cardiological Society of India, UP Branch; and Member, National Neonatology Forum.

She received Life Time Achievement Award from Dr. APJ Abdul Kalam, President of India, 2006; Life Time Achievement Award from Dr. Pratibha Singh Patil, President of India, 2008; Life Time Achievement Award for Outstanding Contribution in Cardiology in the World, World Congress on Clinical and Paediatric Cardiology in 2006 & 2008; Glaxo Oration Award, National Academy of Medical Sciences, India, 2012; First Indian doctor to receive the Life Time Achievement Award from PICS (Paediatric International Cardiology Society), Miami, Florida, 2013. She has made immense contributions for the promotion of paediatric cardiology super specialization in India. She has been a mentor and source of inspiration to many young doctors. She has contributed over 260 research articles in reputed medical journals and authored 22 chapters in different books.

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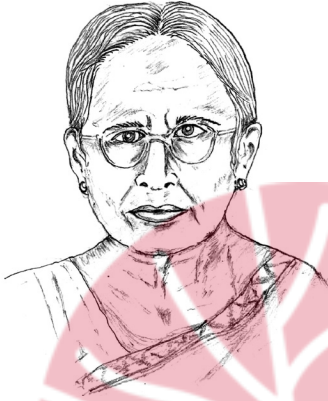
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Singh, Aji Iqbal
(b.1943)

Professor Aji Iqbal Singh, born on 1st June 1943 at Okara, Pakistan is an eminent personality in the field of mathematics. She did her BA (Honours) (Mathematics) and MSc (Mathematics) from the University of Delhi in 1963 and 1965. She served as a Faculty Member, Indraprastha College, Delhi for a short period in 1965. She proceeded abroad in 1966 to obtain PhD under Commonwealth Fellowship at the University of Cambridge where she worked under the supervision of Professor F Smithies. Upon her return to India she joined Hindu College, Delhi in 1969 as a faculty member. She assumed the position of Reader, Department of Mathematics, University of Delhi (South Campus), New Delhi from 1974-84. In 1984, she was promoted to the position of Professor in the same department, where she continued until her retirement in 2008. She was Head of the Department of Mathematics, University of Delhi from 1993-96. She continued her research as INSA (Indian National Science Academy) Senior Scientist and Professor, Indian Statistical Institute, Delhi from 2008-2015. She has widely travelled abroad and was visiting faculty at various universities including University of Oregon, Eugene, USA, 1976-77; Centre for Advanced Studies in Mathematics, University of Punjab, Chandigarh, 1989-91; National Research Centre, Munich, 1997; University of Ohio,

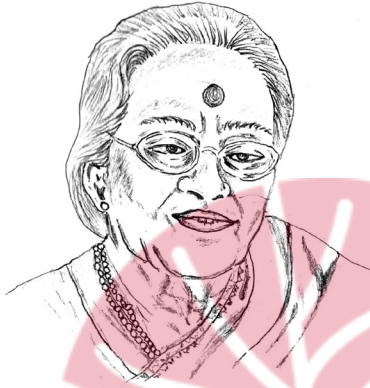
Athens, 1997-98. She has been an Elected Fellow and Council Member, Indian National Science Academy, New Delhi, 1999 and 2006-08; Fellow, National Academy of Sciences (India), Allahabad.

Professor Ajit Iqbal Singh has made significant mathematical work in the field of functional analysis, harmonic analysis, linear operators in locally convex spaces, locally convex algebras, spectral synthesis on hyper groups, applications of harmonic analysis to differential equations and orthogonal polynomials, geometry of the range of a vector measure, quotient rings of algebras, etc. She has been an active research scholar, a motivating teacher and a skillful administrator. She has also served as the member of various academic committees in the field of her subject interest. She has made valuable contributions by developing innovative educational programmes for school and college students through the platform of professional societies and associations including Indian Society of History of Mathematics, Indian Mathematical Society, etc.

She has been the source of inspiration to many young students to mathematics for their higher studies. She has received several awards and prizes for her outstanding research work including Rai Bahadur Brij Mohan Saheb Memorial Gold Medal; Ravi Kanta Devi Prize, University of Delhi and Dr. Hansraj Gupta Memorial Award Lecture, Indian Mathematical Society, 2013. She has published over 40 original research papers in reputed national and international journals. She also served as the Associate Editor of *Indian Journal of Pure and Applied Mathematics* 2004-2011. She has authored *Completely Positive Hyper Group Action*, published under *Memoirs of American Mathematical Society Series Vol. 124, no. 53, 1996*. She has also written survey articles and jointly edited many monographs in the subject of her specialization.

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**Sirsat, Satyavati
Motiram**
(1925–2010)

Dr. Satyavati Motiram Sirsat, born on 7th October 1925 at Karachi, (now in) Pakistan was a great pioneer of oncopathology in India. She was born in an affluent Gujarati family and received support of her parents to pursue education. She did her BSc (Microbiology), St. Xavier's College, Bombay, 1947; and PhD (Pathology), Tata Memorial Hospital for Cancer, Bombay, 1958. She took Training in Electron Microscopy, Chester Beatty Research Institute, London in 1958.

Dr. Satyavati started her career as a Scientist at the Cancer Research Institute (CRI), Tata Memorial Hospital for Cancer, Bombay. She had a chance to work with Dr. Y R Khanolkar, the Chief Pathologist during her PhD studies at the Tata Memorial Hospital of Cancer, where she developed great enthusiasm to the study of microbes, pathology and oncology. In 1948, the Ministry of Health, Government of India decided to make the Department of Pathology at the Tata Memorial Hospital into a full-fledged Indian Cancer Research Institute (CRI). After the completion of her PhD, she joined the Chester Beatty Research Institute in London to learn electron microscopy, where she had the opportunity to work with Hans Selye, Albert Szent-Gyorgyi, Linus Pauling, Alexander Haddow, Charles Oberling and William Astbury, scientific stalwarts of the time. After returning from UK, she established the first electron microscopy laboratory at the Indian Cancer Research Centre.

This became the first biomedical laboratory having the facility of ultrastructural cytology and diagnostic molecular pathology in India. She studied the ultrastructure of collagen fibers and epithelial mesenchymal relationships in experimentally induced and human cancer cells. Her ultrastructural studies helped in accurate diagnosis and therapy of cancer that was difficult to diagnose through light microscopic observations.

Dr. Sirsat made pioneering ultrastructural studies for the diagnosis of cancer in India. She was the Founder Member and President, Electron Microscope Society of India, 1967-72. She focused her research on the oral submucous fibrosis caused due to the habit lime-based *paan* chewing in India. She retired from her service in 1985. She served as a Social Worker, Bharatiya Vidya Bhavan Ayurvedic Centre, 1985-97. She played an active role as the Chairman of Medical Ethics Committee, Tata Memorial Centre, Mumbai. She also played a leading role in the establishment of the Life Sciences Department at the University of Bombay. She was a dedicated social worker and worked for Project Cancer of the 'Vridhatrayi' and worked for Bharatiya Vidya Bhavan Ayurvedic Centre for 17 years after her retirement. She always helped poor cancer patients. She was the founder trustee of the 'Hospice' since 1986 (Hospice helps to terminal cancer patients to find hope for a peaceful end). She was an Elected Fellow of Indian Academy of Sciences, Bangalore, 1975. She received Shakuntala Devi Amirchand Prize, Indian Council of Medical Research; Trans Asian Award for Biological Electron Microscopy; Bharatiya Vidya Bhavan's Citation for Lifetime Award for Science and Humanities; and Trans Asian Award for Biological Electron Microscopy for her landmark contributions in the field of oncopathology.

Dr. Sirsat published several research papers in highly reputed international journals such as *Nature*, *Nature New Biology*, *Journal of National Cancer Institute*, etc. She also served as a member of the Editorial Board of several journals. She was a great human being having multifaceted talent including proficiency in dance, classical music, humour, philosophy and great love for book collection. She was well versed with many languages including Gujarati, Tamil,

Kannada, Marathi, Hindi, English and French. She died of cancer on 10th July 2010.

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एकः सूते सकलम्



Sohoni, Kamala
(1911–1998)

Professor Kamala Sohoni is a scientist of international repute. She is the first Indian woman to obtain PhD from Cambridge University in 1939. She was born on 18th June 1911 in Baroda, Gujarat. Her father, Narayan Rao Bhagwat, was a renowned chemist. Her sister Durga Narayan Bhagwat was an eminent Indian scholar, writer and social worker.

Dr. Kamala Sohoni passed with the highest marks in the Bombay University for her BSc examination. She approached Indian Institute of Science, Bangalore, but Sir C V Raman, being gender biased refused to give admission to her. Finally, she was appointed as a Probationer Staff in biochemistry in 1933 with an understanding that her presence would not disturb male researchers. After one year she was allowed to be appointed as a regular research staff. She worked under her teacher Shri Sreenivasayya, who encouraged her to carry out research on protein of milk, pulses and legumes, which had a great role to play for malnourished Indians.

In 1936, she was the first researcher to work on pulse protein. She submitted her research work to the Bombay University and received the MSc degree in 1936. She was first Indian woman to get International Fellowship of the American Federation of University Women for research studies. She joined Cambridge University in 1936. She conducted valuable research during her tenure in the Cambridge

University and worked in the Laboratory of Dr. Derik Richter. After some time, Dr. Richter left the Laboratory and Ms Kamala continued her research under Robin Hill on plant tissue. Her research revealed that every cell of plant tissue contained the enzyme 'Cytochrome C', which was involved in the oxidation of all plant cells. This was the original discovery, which received international acclaim among the plant research scientists. She received two scholarships including one was at Sir William Dawn Institute of Biochemistry at the Cambridge University with the Noble Laureate Professor Fredrick Hopkins and the second one was American Travel Fellowship, which enabled her to meet eminent scientists of Europe. She submitted her thesis on 'Cytochrome C and its Role in the Respiration of Plant Tissue' to the Cambridge University. She was the First Indian Woman to be awarded PhD in science discipline in 1939. The same year she returned to India and joined the newly opened Biochemistry Department of the Lady Hardinge College, New Delhi. Later, she became Assistant Director of the Nutrition Research Laboratory, Coonor.

In 1947, she got married to Shri M V Sohonie, a professional actuary and moved to Bombay (Mumbai). She joined as Faculty Member of the newly opened Department of Biochemistry at the (Royal) Institute of Science, Bombay. Subsequently, she became Professor and Head of the Biochemistry Department. She became the First Director of the Institute of Science after lots of struggle and tough competition from her male counter parts. She conducted significant research on biochemical studies on three major groups of food items consumed by rural poor and established their nutritive value. She worked hard with her students and served as a teacher and mentor of many successful researchers and distinguished scientists. She provided valuable findings on leguminous proteins, trypsin inhibitors, palm gur, palm molasses, dhanata paddy flour, etc. Her research work on food items consumed by poor people attracted the attention of the First President of India, Dr. Rajendra Prasad. She received the President's Award for her pioneering work on nutritive value of major food stuff consumed by Indians. She also worked hard for standardization for food safety. She was an active member of the Consumer Guidance Society of India (CGSI) and served as Elected President of CGSI from

1982-83. She was also an active Member of the Biochemical Society, England; Member, Society of Biological Chemists of India; Member, Indian Science Congress Association and Nutrition Society of India. She received award and medal for her outstanding contributions to the biochemistry and nutritional value of Neera and Palm Gur by the President of India in 1960. At the age of 84, her work was felicitated by Dr. Gowdagere Vedanti Satyavati, (the First Woman Director General of Indian Council of Medical Research (ICMR)) in a function at ICMR. Dr. Kamala Sohoni passed away in 1998 at the age of 86.

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एकः सूते सकलम्



**Subrahmanyam,
Sarada**
(b.1918)

Dr. Sarada Subramanyam is a leading human physiologist. She was born on 1st August 1918 at Trichur, Kerala. She qualified MBBS. and PhD from Madras University. She also obtained FAMS; FIMAS and FTNAS.

She started her service as Lecturer in physiology, Stanley Medical College, Madras, 1948-54; Professor and Head, Department of Physiology, 1954-73, Emeritus Medical Scientist, ICMR, Institute of Neurology and Madras Medical College, 1973-76 and 1981; Professor and Head, Department of Physiology, PGIBMS, University of Madras, 1976-80; Emeritus Professor, Madras Medical College, 1980; Director, Madras Institute of Magnetobiology, Madras, 1984; Visiting Professor, London University, 1961; Visiting Professor, ST John's, Canada, 1982.

Dr. Subrahmanyam made outstanding research contributions in the field of physiology and neurology. She conducted pioneering research on magneto therapy in India in which patients are exposed to magnetic field daily for specific time period. She conducted research on low frequency magnetobiology. Her findings confirmed that magnetic therapy makes wonderful therapeutic effect for anemia, blood pressure, swollen knee joints, etc. Her research on magnetotherapy received international acclaim. The Madras Institute of Magnetobiology was established through her effort. She worked on Vedic Yoga therapeutics and provided the scientific justifications related to yoga exercises. She

also experimented with the concept of cosmic soul and psychological impact of meditation.

She played a valuable role in developing many professional societies and associations in the field of physiology. She is the Founder President, Indian Association of Biomedical Scientists; Member, International Heart Research Society; Member, Psychoneuroendocrinology Society, Italy; Member, Association of Physiologists and Pharmacologists of India; Member, Physiological Society of India; Member, Indian Science Congress Association; Vice-President, Indian Angiological Society; Member, Neuroscience Association of India. She is a distinguished teacher and mentor for many young doctors. She has been conferred with many awards such as Lakshmipathy Oration Award, 1979; Hari Om Ashram Award, 1980; Silver Jubilee Oration Award, 1980; Maharashi Award for Research in Meditation; ML Gupta Oration Award, 1981; Basu Memorial Oration Award, 1984; MK Nambyar Oration, 1984; Platinum Jubilee Oration Award, 1988; and JERIM Gold Medal, Singapore, 1988.

She has contributed over 150 articles in reputed medical journals, seminars and conferences. She also co-authored four textbooks for Indian students on physiology and neurology including *Text Book of Physiology*, *Neurohumoral Correlation of Behaviour*, *Concise Textbook of Physiology*, etc.

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Swaminathan, Soumya
(b.1959)

Dr. Soumya Swaminathan is a renowned medical research scholar. She was born on 2nd May 1959 to a family of academician and scientist Dr. M S Swaminathan, the father of green revolution in India and his wife Dr. Minu Swaminathan, a reputed educationist. She received her MBBS degree from Armed Force Medical College, Pune, 1980; MD (Paediatrics) from All India Institute of Medical Sciences, New Delhi, 1985; DNB (Paediatrics) from National Academy of Medical Sciences, New Delhi in 1987. She attended Fellowship for Paediatric Pulmology, Children's Hospital, Los Angeles, USA from 1987-89. She also served as Research Fellow, Department of Paediatrics, Leicester Royal Infirmary, Leicester, U K, from 1989-90.

She started working as a Senior Resident, Department of Paediatrics, All India Institute of Medical Sciences (AIIMS), New Delhi, 1985-86; Assistant Director, Tuberculosis Research Centre, Chennai, 1992-97. Subsequently, she was promoted to the position of Deputy Director from 1997-2002; Deputy Director (Senior Grade) from 2002-08; Scientist G and then Director from 2008 onwards. She also served as Chairman, HIV Section of the International Union against Tuberculosis and Lung Diseases in 2000. She was Coordinator of Research in Neglected Priorities, TDR, WHO, from 2009-2001. She joined as the Director General, Indian Council of Medical Research (ICMR)

from August 2015. She is also an Adjunct Professor of Medicine at the Tufts University of Medicine, Boston. In October 2017, World Health Organisation nominated Dr. Soumya Swaminathan as the Deputy Director General for Programmes. This position is the highest post held by an Indian in WHO.

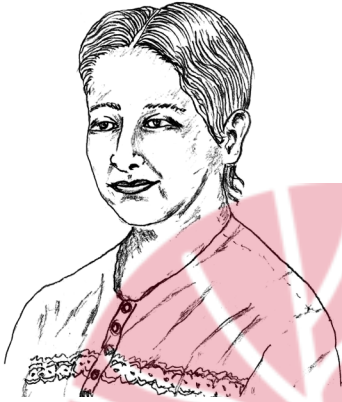
Dr. Soumya Swaminathan has made outstanding research contributions on HIV and tuberculosis and their epidemiology, pathogenesis and management. Her research work has provided the knowledge base of TB/HIV co-infection in India. She also provided comprehensive data about epidemiology, pathogenesis and best treatment strategies. Her research findings have global relevance and implication. She has conducted several clinical trials to determine the optimal regimen for treatment and prevention of tuberculosis among HIV-infected individuals/group at high risk for development of this disease and mortality from tuberculosis. She has studied the prevalence of tuberculosis drug resistance in HIV and investigated the pharmacokinetics and drug-drug interactions of anti-TB and antiretroviral drugs. By using molecular techniques, she demonstrated that recurrence among HIV infected patients were due to infection with new strains of *Mycobacterium tuberculosis*. She also investigated the poor malnutrition status of patients with HIV and tuberculosis and studied their response to better nutritional supplementation. Her research findings in the field of HIV and TB received international acclaim. She has been a fellow of Indian Academy of Paediatrics; Fellow, National Academy of Sciences, Allahabad, 2012; Fellow, Indian Academy of Sciences, Bangalore, 2013. She has been a Member of the Third World Organization of Women Scientists and International AIDS Committee. She made distinguished research contributions which has been acknowledged by awarding her Kanishka Oration Award, Indian Council of Medical Research, 2008; Lifetime Achievement Award, Indian Association of Applied Microbiologists, 2011; Tamil Nadu State Award for Science and Technology, 2012; Outstanding Women Achiever Award, Tamil Nadu Dr. MGR Medical University, 2012. She has published over 160 research articles in medical journals and contributed over 15 chapters in different books. She is a peer

reviewer of many prestigious journals. She has been the Member of the International Editorial Board of *Clinical Infectious Diseases*.

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Swain, Clara A
(1834–1910)

Dr. Clara A Swain was born on 18th July 1834 at Elmira, New York, USA. Her father was an Irish and her mother was from England. She was the youngest child of 10 children in the family. She spent her early life in Castile, New York. She was an American missionary woman physician, who was sent overseas by the Women's Foreign Missionary Society of the Methodist Episcopal Church. She was also the first fully accredited woman physician ever sent out by any missionary society into any part of the Non-Christian World.

At the age of eight, Clara A Swain joined the Methodist Church with an aspiration to join a Christian profession. After completing her school education, Clara joined teaching in Castile, New York. At the age of 21, she went to live with her aunt in Canandaigua, New York. She started teaching in a school, but she always took interest in nursing sick and unwell in the locality, which perhaps developed the instinct in her to become a doctor. Initially Clara took her medical training at the Castile Sanatorium under the guidance of Dr. Cordelia A Green, her mentor and motivator. Then she joined the Women's Medical College, Philadelphia and graduated in 1869. At that time, India was in dire need of female doctors to provide quality health care to women, who were not allowed to be treated by male doctors due to social prejudice of *purdah* culture. Mrs. Thomas, the Director of the girl's orphanage of the Methodist Mission in Bareilly sent a request letter to

Mrs. J T Gracey (a former missionary) to send trained female physician to India to save sisters in India from health neglect and death due to non-availability of medical care. In 1886, Dr. Swain was one of the female candidate to be sponsored for overseas missionary work by the newly founded Women's Foreign Missionary Society of the Methodist Episcopal Church. The other woman was Isabelle Thoburn, founder of Isabelle Thoburn College, Lucknow. Initially Dr. Clara Swain did not accept the appeal, but subsequently she agreed to take up the challenge and on 3rd November 1869 she started her journey from New York and reached Bareilly on 20th January 1870. She served and stayed in India for over 27 years of her life. She acted as her own anaesthetist, compounder and conducted her first surgery in an open courtyard. After working for some time she realized that India needs health care for a large number of people and it is not possible for her to manage them all alone. Therefore she started training local people and teaching them the basics of medicine including anatomy, physiology, materia medica and diseases of women and children. She took efforts to provide recognition and standardize the training. She selected 14 students and provided them proper training and organised their examination by American physicians. The first batch of 13 students passed the certificate for theory and practice in Clinical Training on 13th April 1873. They were granted certificates for practice in all ordinary diseases.

She was determined to achieve success in removing backwardness, illiteracy, ill-health, social discrimination of women in Indian society and provide them medical relief. She also focused her target to promote religious mission of the Methodist Church and promote teaching of Bible through them. She selected three of her trained students as 'Bible Women' to help her in achieving her mission. In 1876, Clara returned to USA due to her ill health. On 6th November 1879, she resumed her duty in Bareilly.

Soon Clara Swain's dispensary and the medical service expanded as the locals started developing confidence upon the European system of medicine against their initial resistance to European medicine and blending of Christian religion along with it. Slowly, the Princely States of Nawab of Rampur also started realizing the benefit of missionary services. His Highness Mohommad Kutub Ali Khan

Bahadur, Nawab of Rampur made generous donation from his property, which facilitated to build an elaborate dispensary in May 1873, which developed into the Clara Swain Hospital. The first women's hospital in Asia was the gift of the Nawab of Rampur and it was opened for public in January 1874. The number of patients increased every day and the hospital started serving the United Provinces and its neighbouring areas. The Clara Swain Hospital is the oldest and largest Methodist Church Hospital in India. The traditional use of ignorant *dais* and barber girls for handling child birth and gynaecological problems started reducing and Dr. Clara gained the confidence of the Royal families.

In March 1885, she treated the Rani of the Royal family of Khetri. After her recovery, she was offered the job of being personal physician of Rani. After much thought, she consented to give up her work in Bareilly and joined the job of Royal family. She also continued to work as Christian. In March 1888, she took another furlough to America. She enjoyed the luxurious lifestyle of the Royal family and she had less clinical burden to treat patients in the hospital. In October 1895, her service contract with Royal family in India expired and she went back to USA at the age of 61. Clara also served as a link between India and America for 27 years. She published a book under the title *A Glimpse of India* in 1909 containing the extract of letters she wrote to her family members, during her tenure in India. She also communicated through the magazine *Heathen Women's Friends*, a monthly periodical published by the Women's Foreign Missionary Society of the Methodist Episcopal Church. With her suggestion and persuasion Lady Dufferin started the 'Countess of Dufferin Fund Programme' in 1885 all over India to promote female medical education and relief work by establishing hospitals and medical training schools for women. This started a new era in the history of medical education and service in India. She paid final visit to India sometime during 1906-08 to attend the celebration related to the Founding of the First Methodist Mission to India. She died on 25th December 1910 in the same town Elmira, where she was born. She was a great missionary, educator, physician, a writer, a zenana worker, and a social reformer. She never married and died

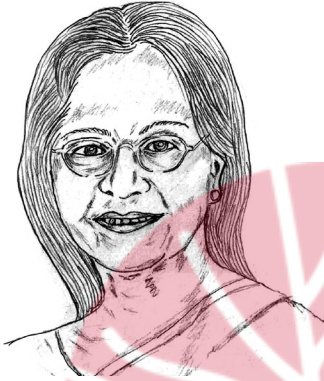
as a single woman, who dedicated her life for the care of people of foreign land. She spoke local languages and was regarded, respected and loved as a teacher, mother and an authority of high moral and kind heart.

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**Thomas, Irene
Manorama**
(1935–2016)

Internationally renowned Dr. Irene Manorama Thomas is well known for her noble work on bioethics and biomedical research on human participants. She was born on 12th October 1935 at Mangalore, Karnataka to the family of Ithiel Jedediah and Fidella Margaret Furtado. She is wife of leading pathologist Dr. John Arthur Thomas. They were classmates at CMC, vellore

She obtained BSc from Wilson College, Bombay in 1956 and MBBS degree from Christian Medical College, Vellore in 1960. She did specialization MS (Anatomy) from Darbhanga Medical College, Bihar in 1969. She joined Christian Medical College, Vellore as a Demonstrator from 1963-64 and Tutor from 1964-66. She joined St. John's Medical College, Bangalore in 1966 and continued to serve there for over three decades in different capacities such as Tutor, 1966-69; Assistant Professor, 1971-75; Associate Professor, 1975-84. She assumed the post of Professor at the Al-Fateh University, Tripoli from 1985-88 (on leave). She returned as Professor and Head, Anatomy Department and Human Genetics Division, St. John's Medical College, Bangalore from 1984 until her retirement. She continued her research work in the same medical college as Emeritus Professor after her retirement. She has been serving as the Chairperson of the Independent Ethics Committee (IEC) of Karnataka state.

A distinguished Anatomist and Human Geneticist, Dr. Thomas provided valuable medical service to women and children during her

tenure at the Christian Medical College, Vellore and St. John's Medical College in Bangalore. She was also a great teacher, who served as a mentor for young doctors during 1960s and 1970s. She served as member of several national level medical research institutions and colleges. She also made valuable contributions as member of Expert/Advisory Board of Indian Council of Medical Research in 1982. She was member of the National Task Force in Genetics. She served as an active member of the Department of Science and Technology, Government of India in 1982. She has done commendable job as Chairman, IEC, which made registration of all clinics and laboratories of sonologists and geneticists compulsory in Karnataka. She also initiated drive for punitive action under Supreme Court order of April 2001, which directed to ban pre-natal sex-determination tests. She took initiative to make thorough survey of such organisations. Her movement has made visible impact upon the illegal pre-natal sex-determination tests and abortions in the state of Karnataka. She played a leading role in drafting the ethical guidelines for biomedical research on human beings. She also advocated for maintaining privacy and human dignity related to collection of health data for research purpose.

She has been a Fellow of National Academy of Medical Sciences (India) and Associate of Bangalore Society of Obstetrics and Gynaecology.

She is actively associated with several societies and associations including Life Member, Anatomical Society of India; Life Member and Executive Committee Member, Indian Society of Human Genetics, 1985-89; Life Member, Christian Medical Association of India; Member, Indian Society of Prenatal Diagnosis and Therapy; Member, American Association of Anatomists; Member, Afro-Asian Oceania Association of Anatomists; and Member, Down Syndrome Association, UK.

She received many prestigious recognition and awards such as Lady Dufferin Merit Scholar; Katholischer Auslander Dienst Fellow, 1970; Dr. T A Mathias Award, All India Association of Anatomist, 1990-91; Kanishka Oration Award, Indian Council of Medical Research, 1991 Dr. B C Roy Award, Medical Council of India, 1992; Doctor's Day Award, Indian Medical Association, 1993; Teacher's Award, Bait Mission Xian Association, 2001; Sushruta Lifetime Achievement Gold Medal, Society of Anatomists, Karnataka Chapter, 2012. She has published over 150 research papers and several books. She passed away on 21 February 2016.

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एकः सूते सकलम्



Thomas, Tessy
(b.1963)

Tessy Thomas is one of the India's celebrated women scientists. She was born in April 1963 at Alappuzha, Kerala. She did BTech. from Thrissur Engineering College, Kozhikode, Calicut and MTech. (Guided Missiles) from Defense Institute of Armament Technology, Pune in 1987. She also completed MBA from Indira Gandhi National Open University in 1998.

She started her brilliant scientific career as Scientist B at the Defence Research and Development Organization (DRDO), Hyderabad in 1988. Dr. APJ Abdul Kalam, distinguished missile scientist, who is also known as the Father of Indian Missile Programme was the Director of DRDO at that time. She was lucky to have an opportunity to work under his guidance, which associated her in the missile projects of DRDO. She served as Assistant Project Director, Agni II System, DRDO in 2008. She was associated as the Associate Project Director, Agni III Missile Project, Advanced System Laboratory, DRDO. Then she served as the Project Director of Agni IV, DRDO, Hyderabad, which was successfully tested in 2011, and it broke new records for India by hitting a target 3000 km away from the Balasore test range in the Odisha coast. It was for the first time that India tested missile to hit target at that distance, thereby becoming the first Indian missile to cross the equator and hit a target in the Southern hemisphere.

Ms. Thomas has been made the Director of the Agni V Missile Project worth Rs 2500 crore, with the power to develop a rocket with a range of 5000 km.

Tessy Thomas is the first ever woman Director of an Indian Missile Project, which confirmed the place of India in an elite club of nations like the US, Russia, China with the capability to produce their own long range Inter-Continental Ballistic Missiles (ICBMs). She has been associated with Agni Missile Programme of DRDO since 1988. For her achievement in missile technology, she is been fondly called as 'The Missile Woman' or 'Agni Putri' of India.

She is an active member of many societies and associations such as Life Member, Astronautical Society of India (ASI); Life Member, Aeronautical Society of India; Member, National Society for Aerospace Related Mechanism (INSARM). Owing to her pioneering breakthrough in missile technology, she has been conferred with several awards including Agni Self Reliance Award, DRDO, 2001; Award for Path-Breaking Research Outstanding Technology Development, DRDO, 2007; International Women's Day Technical Paper Presentation Prize, DRDO, 2007; National Science Day-DRDO Silicon Medal and Commendation Certificate, 2008; Scientist of the Year, DRDO, 2008; Dr. Kalpana Chawla Memorial Lecture Honour, Aeronautical Society of India, 2009; India Today 'Woman of the Year', 2009; Suman Sharma Award, Institute of Engineers (India), 2009; DRDO Performance Excellence Award, 2011; Lal Bahadur Shastri National Award for Excellence in Public Administration, Academics and Management, 2012; Madam Curie Mahila Vijnana Puraskar, 5th National Women's Science Congress, 2012; CNN-IBN 'Indian of the Year', 2012; Maharaja Mewar Foundation's 3rd Annual Award, 2013.

Tessy Thomas is married to Saroj Kumar Patel, a naval officer, who was her class fellow at the defense institute, Pune. she is fond of playing badminton and cook variety of Indian dishes. She is an example of unbending spirit and courage of conviction in academic and technical pursuit. She is a role model for younger generation, who has enhanced the status of Indian women in the world.

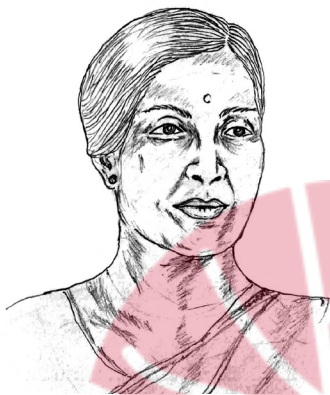
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एकः सूते सकलम्



Tiwari, Amrit
(b.1938)

Dr. Amrit Tiwari is a distinguished Dentist of Chandigarh city. She is the daughter of the eminent freedom fighter Shri S Tirath Singh Guram. She was born on 5th September 1938 at Dhuri, Punjab. She is wife of Professor Vishwanath Tiwari, a reputed writer and former Head of the Department of Modern Literature in Punjab University. She is mother of prominent Congress leader (India) Shri Manish Tiwari. She did BDS in 1960 and MDS (Pedodontistry and Preventive Dentistry) in 1965. She also attended World Health Organization's sponsored course on Child Dental Health Specialization in Denmark in 1971.

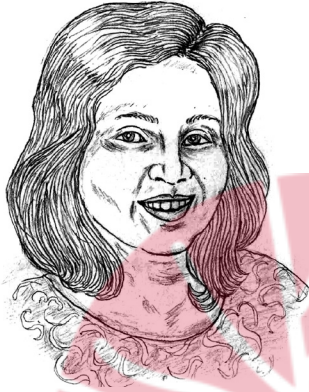
She started her service career as a Demonstrator, Dental College, Amritsar from 1960-61. She worked as Dentist, School Health Scheme, Chandigarh from 1961-64. Then she joined the Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh as Registrar and worked there from 1964-66. Subsequently, she rose to the position of Lecturer, 1966-71; Associate Professor, 1971-76; Professor and then Head of the Department from 1976 until her retirement. She continued to serve the institute and the hospital as a Professor Emeritus after her retirement. She made valuable contributions in streamlining the profession of dentistry and became a leading dentist of the country. She has been an Elected Fellow, International College of Dentists, 1976; Fellow, National Academy of Medical Sciences (India), 1985. She occupied very important positions of office bearer

in various professional associations including President, Indian Dental Association, Chandigarh Branch, 1962; Member, Central Council of Indian Dental Association, 1970; President Dental Council of India; President and General Secretary, Indian Society of Pedodontics and Preventive Dentistry, 1985, 1981-84.

Dr. Amrit Tiwari made significant research contributions in the field of Public Health Dentistry and Pedodontia and Preventive Dentistry. She conducted research on toxic effect of fluoride on teeth. Her investigation revealed that high content of fluoride in water of certain areas of the country cause decay of teeth. The incisors and molars get most adversely affected, which result into the development of dental caries in children, it may also develop plaque and accumulate bacteria to cause infection and permanent damage to teeth. She authored a textbook entitled *Fluoride and Dental Caries*. She also initiated National Oral Health Survey and Fluoride Mapping of the Country in 1988. She extensively worked in village areas for more than 10 years and developed National Module for Prevention of Dental Diseases in Villages. The National Rural Dental Health Module was aimed at providing low cost dental care to villagers. Her effort to create dental health care policy received national and international attention. She was invited by Royal Society of Medicine, London in 1989, The World Dental Congress, Bristol, UK in 1988, National Institute of Dental Research, Washington DC, USA in 1989 for presenting her research findings. She also served as the Member of Advisory Panel of WHO on Dentistry. She received State Level Award for dental service and Padma Shri in 1992. She has published over 150 research articles in reputed journals. She has authored three chapters in the *International Oral Health Research Book*. She prepared the draft for National Oral Health Policy in 1985. She has flair for writing poetry in English and Punjabi.

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Tole, Subha
(b.1967)

A noted Neuroscientist, Dr. Subha Tole was born on 31st August 1967. She did BSc (Life Sciences and Biochemistry) from St. Xavier's College, Mumbai, 1987. She proceeded abroad for higher education and obtained her MSc and PhD from California Institute of Technology (CalTech), USA in 1991 and 1994. She married Dr. Sandip Trivedi, a PhD in Theoretical Physics from the same University. She attended University of Chicago, USA, for Postdoctoral Fellow from 1994-99. She also worked as an International Fellow at the American Association of University Women, USA, 1996.

Upon her return to India, she served Tata Institute of Fundamental Research, Mumbai as a Fellow, from 1999-2002. Subsequently, she assumed the position of Reader from 2002-07 and Associate Professor from 2007-till date. She also served as a Visiting Professor, Stanford University, USA, 2008-09.

Dr. Subha Tole has made fundamental contributions to our understanding of brain development in identifying the mechanisms that control the hippocampus, which is the seat of learning and memory in the brain. Outstanding findings have emerged from her research about the genetic mechanisms which bring about the development of the brain and create a highly evolved complex structure. Her studies have revealed a fundamental mechanism that acts to create the cerebral cortex, the seat of our highest cognitive and perceptual functions such

as sensory perception, language, learning and memory. She explained that colour perception, language, and memory, etc. all arises from a single cell in the brain, which acts as its own command center. She developed insight into the process to explain how the brain develops from simple cells in the embryo into a complex command control center. Every mammal on Earth has the same basic pattern in the brain stem, where each brain structure is formed. If the development goes wrong, then it may cause disorders such as autism or schizophrenia. She and her group of scientists have identified how neurons form layers in the brain. They also discovered a gene called *Lhx2* which is responsible for the formation of cerebral cortex. Their landmark research findings were published in the *Nature Neuroscience*. She has been a Fellow of Indian Academy of Science, Bangalore, 2011 and National Academy of Science (India), Allahabad. She is an active member of American Society of Cell Biology, 2009; Board Member of Indian Society of Developmental Biologists, 2000 and a Member of Society of Neurosciences, USA, 1991.

She has received several awards and prizes including Wellcome Trust Senior International Fellowship, 1999; Swarnajayanti Fellowship, Department of Science and Technology, India, 2005; Research Award for Innovation in Neurosciences (RAIN), Society of Neuroscience, 2008; National Women Bioscientist Award, Department of Biotechnology, India, 2008; Shanti Swarup Bhatnagar Award in Biological Sciences, 2010; Infosys Prize in Life Sciences, 2014. Dr. Subha Tole has published several research articles in highly reputed scientific journals.

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Turnbull, Agnes Maria (1866–1907)

Dr. Agnes was a woman missionary doctor of Presbyterian Church in Canada. She was born on 29th August 1866 at Melrose, Upper Canada (now Ontario). She was the eldest daughter of Agnes Maltman and John Turnbull, a Presbyterian minister. Agnes was baptized in October 1866 by her father's friend William McLaren, who became convener of the Church's Foreign Missions Committee (Western Division) in 1875. Agnes spent her early years and schooling near Belleville area, where her father was in ministerial charge until 1881. In 1880, the family moved to Quebec. In 1885, she earned her teacher's certificate from McGill Normal School and began teaching. In 1887, she contacted the Foreign Missionary Committee and expressed her desire to become a foreign missionary. She was advised by the Committee to study medicine before becoming a missionary. She joined the Women's Medical College, Queen's University, Ontario in 1888 and earned her graduation in medicine in 1892. She also completed her post-graduate training in medicine from New York, USA.

On 11th August 1892, the church service in Belleville formally designated her for Foreign Medical Service to India. She travelled to Scotland with her father and visited her relatives, before proceeding to India. She travelled to India along with her fellow missionary Jessie Duncan and reached Indore in November, 1892. Indore was the

Headquarter of the Central India Mission of Presbyterian Church of Canada since its founding in 1877. Initially, she worked in Women's Medical Hospital and the mission's school in Indore. In 1885, she was transferred to the mission's station at Neemuch. She provided clinical service from two dispensaries. She also took initiative to provide pioneering medical service to a new outstation, Jawad. She made frequent home visits for her women patients and took the opportunity to amalgamate evangelistic interest through her clinical services. She worked hard to establish recognition of women missionaries in the work of mission's administration.

During her service tenure in India, she faced devastating famine in 1897. Then the tragedy of plague epidemic occurred in 1903. She was the medical in charge in Indore at that time. She worked day and night to cope up with the spread of the epidemic. She travelled long distances to save people by providing medicine, food and shelter to homeless and destitute. She worked in cooperation with the British Medical Officials in rescue work, which drew attention of Imperial authorities to her hard work and devotion. She was awarded Kaiser-i-Hind Medal from the British Government in 1906 in recognition to 'Service in the Advancement of Public Interest in India'. Within a month of receiving the medal, she suffered paralyzing illness and she died on 5th January 1907 in Neemuch, India at the age of 40 years. The British residents of Indore installed a brass tablet in her memory in the local Anglican Church. The Women's Foreign Missionary Services of Canada used her death as an example in missionary zeal to inspire many young women to offer themselves for foreign missionary services.

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Vaughan, Kathleen Olega

(1870–1956)

Kathleen Olega Vaughan was born in 1870 in St. Leonards, Sussex, England.

Dr. Kathleen Olega Vaughan worked as the Superintendent of The Victoria Dufferin Hospital in Calcutta in 1903. She also worked as the Superintendent at the His Highness Maharajah of Jammu and Kashmir's Diamond Jubilee Zenana State Hospital, Srinagar during 1920s. During her medical practice in Kashmir, she detected pelvic malformation among affluent Kashmiri women causing complicated child births. She made extensive study on the *Purdah* system and its effect on motherhood. She diagnosed the disease as 'osteomalacia' disease, prominent among rich women who lived in the confinement of *Purdah* system. She also observed that the disease was unknown to women who led active life in open air. Her findings concluded that osteomalacia is caused by the absence of light in the life of *pardanasheen* women. Vitamin D was discovered in 1922 and its deficiency was shown to be the reason behind osteomalacia (rickets) in 1929. Her research showed that Kashmiri women veiled since childhood suffered deformation of pelvis, which cause them to die from obstructed child labour.

She was made Inspector along with Col. Birdwood to inspect conditions of medical services for women and children at various hospitals funded by Dufferin Fund in India. They submitted the

'Comments and Review of the Countess of Dufferin Fund's Report'. The said report of their enquiry formed the basis for the formation of Women's Medical Service (WMS) in India. She also took leading role in the establishment of the Association of Medical Women in India. During her service in Kashmir she gave an insight into the influence of *purdah* system in India. She realized that women are allowed to die in the hands of untrained *dais* (mostly barber girls), rather than allowing them to be treated by male doctors to save them from complicated delivery cases. Women were not allowed to visit general hospitals, where there was a risk of their being seen by male doctors. Her survey study on the health conditions which prevailed in India at that time formed the basis and the turning point, which initiated the valuable improvements to the Countess of Dufferin Fund Programme and promotion of establishing hospitals and medical training schools for women in India. She also wrote a report entitled *Safe Child Birth*. The report provided standard guidelines for midwives for practicing safe child birth. She authored *The Enlargement of the Pelvis in the Squatting Position* (1934), in which she mentioned that posture possibly play some role in obstetrics. She explained that squatting opened out the pelvic joints in labour and thus increased the capacity and dimensions of pelvis. She devoted her service for the establishment of the Lady Hardinge Medical College for Women in Delhi. She died in November 1956 in England. She will be remembered for her contributions to the development of medical education and service facility for women in India.

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**Vellut, Claire Marie
Jeanne**
(1926–2013)

During early 1953 there was a huge storm with high tide at the coast of Belgium. At that time an international appeal was made for jute bags to fill sand and protect the sea coast of Belgium from flood damage. India made generous donation of several tones of jute bags. Government of Belgium was impressed with this generous timely help and it requested some eminent persons in Belgium to explore ways to reciprocate the gesture by providing service of social impact. As India was facing terrible problem of spread of Leprosy disease, Dr. Frans Hemerijckx, a dedicated leprologist having 25 years' experience in Congo was asked to start a Centre for Leprosy Control Programme in India. It was agreed, that the centre will support to equip, train staffs and control of disease for five years. And after five years the centre will be handed over to the Indian government.

Dr. (Miss) Claire Marie Jeanne Vellut, a Belgian Physician (Leprosy) came to India in 1954 and worked at Hemerijckx Government Leprosy Centre at Polambakkam Village, Chingleput District of Tamil Nadu. She was born on 29th October 1926 in Ixelles, Brussels. She was the sixth child of Fernand and Lucie. She studied in St. Andre Ixelles School and earned her High School Diploma (Greek and Latin) in 1944. At the age of 18, she joined ALM (Lay Auxillaries Mission).

She was a graduate from Medical College, Catholic University of Louvain, Belgium, 1952. She got her Diploma in Tropical Medicine

and Hygiene in 1953 from the London School of Hygiene & Tropical Medicine. While in India she did a short-term course on leprosy in 1957 (July-August) at the School of Tropical Medicine, Calcutta. She worked as a mentor of an important team of medical officers and paramedical personnel at the Hemerijckx Government Leprosy Centre to handle and care leprosy patients in the rural area. The centre developed into a Centre of National Leprosy Control Programme for leprosy field workers. Thousands of leprosy patients benefited from the service of the centre. The centre made outstanding contribution in rendering invaluable service to the patients of leprosy and prevention of leprosy under the dynamic guidance of Dr. Vellut. After five years, the Madras State Government took over the centre in 1960. Many Belgian staffs returned to their country, but Dr. Claire was requested to continue her service. Her tenure was renewed several times till 1980. In her 25 years of dedicated service, her team had taken care of over 50,000 patients through the service of 52 mobile clinics and small dispensaries. She also served as a short-term consultant from 1980-84 for the World Health Organization for evaluation of Leprosy Control Programme especially in Uttar Pradesh and Bihar.

In 1979, she was granted Indian citizenship. In 1984, she was nominated as a Fellow of Academy of Medical Sciences (India). She also became Secretary of Denim Foundation India Trust (DFIT) (NGO supported by Denim Foundation, Belgium on Leprosy and Tuberculosis). She co-authored an important study report on epidemiometric model in leprosy done in UCL Public Health School, Louvain in collaboration with Polambakkam Centre. In recognition to her dedicated service for the noble cause of leprosy patients, Government of India awarded her Padma Shri in 1981. She received Raoul Follereau Award in 1999. In September 2009, she returned to Belgium. She received International Gandhi Award, Government of India, 2011 in recognition to her 55 years dedicated service to India, this also provided her a chance to visit India. In the same year she was honoured with the Stri Ratna Award. Finally, she left India in July 2012. The University of Louvain honoured her with 'Doctor Honoris Causa' in public health. She remained spinster and passed away on 20th September 2013 at the home of her sister in Brussels.

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**Vergheese, Mary
Puthusseril**
(1925–2009)

Dr. Mary Puthusseril Vergheese was a woman paraplegic surgeon, who did operation from her wheel chair. She was born on 27th May 1925 at Cherai village, Cochin, Kerala in a prosperous family. She was the seventh child of eight children in the family. She attended Union High School in Cherai. She took college education with honours in chemistry from Maharaja's College, Ernakulam. She did MBBS from Christian Medical College (CMC), Vellore in 1952. After her graduation in medicine she met Dr. Ida Scudder, the Founder of the CMC, Vellore and took admission to the Department of Gynaecology for specialization. Dr. Mary started her career as a House Surgeon at the Christian Medical College (CMC), Vellore. After two years of her service, she joined Hand Research Unit (Leprosy) under Indian Council of Medical Research in the same hospital as a Research Assistant and worked there from 1954-59.

In 1954, she met with a fatal road accident, while a team of students were on picnic tour. She injured her spinal cord, which paralyzed the movement of her lower part and legs. She was treated by Dr. Paul Brand, a pioneer of physical medicine and rehabilitation surgery. Dr. Mary learned surgical skill to rehabilitate leprosy patients from him. She got admission to two years fellowship course of rehabilitation at Australian Rehabilitation Centre, Perth. She was sent to a hospital in Australia, where she was given special training to learn to walk and

to make use of her legs. Then she completed a fellowship programme at the Institute of Physical Medicine and Rehabilitation, New York in 1962 under Dr. Howard A Rusk, a pioneer in the field. She was trained here to set up a Centre for Disabled Persons. Upon her return to India, she assumed the duty of Head of the Physical Medicine and Rehabilitation Unit, CMC, Vellore. The unit developed into an independent Physical Medicine and Rehabilitation Institute, Vellore in 1966. It was the first institute of its kind in the country. Under the able guidance of Dr. Mary, the institute started two years Diploma Course for doctors in Physical Medicine and Rehabilitation. She worked there as the Head of the Institute of Physical Medicine and Rehabilitation on a wheel chair.

She conducted research projects on electromyographic studies on the neurological problems of leprosy patients and paraplegic rehabilitation research projects. She was a specialist of reconstructive hand surgery. She served as the President of the Indian Association of Physical Medicine and Rehabilitation from 1972-74. She also worked as the President of the Vellore Association of Rehabilitation for the Physically Handicapped in 1963. She was recipient of Padma Shri in 1972 and ICMR Award for her original work on Physical medicine and rehabilitation. She was honoured with the World Vision Award in 1985. She received Dr. P N Raju Oration Award for outstanding research on Rehabilitation in 1974-75. She started Dr. Mary Verghese Trust with her own savings in 1981 to help people with disabilities. She died on 4th March 2009. The Department of Physical Medicine and Rehabilitation at CMC, Vellore is named after her as the Dr. Mary Verghese Institute of Rehabilitation. It also started an annual Dr. Mary Verghese Award for Excellence in Empowering Ability from 2012. Her life is a story of courage and of love for her patients.

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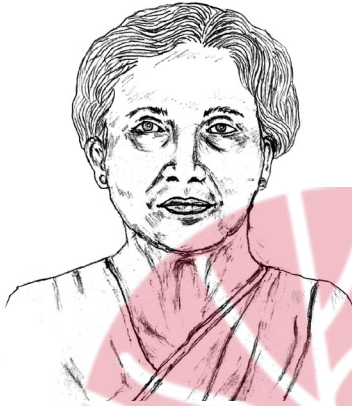
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एकः सूते सकलम्



Virmani, Vimla
(1919–1999)

Dr. Vimla Virmani was a pioneer, who made phenomenal contributions to the development of neurology in India. She was the daughter of Hakim Rai and was born on 12th April 1919 at Lyallpur, now in Pakistan.

She did not attend any school. She appeared for School Leaving Examination as a private candidate. She did MA (Psychology) as a private scholar from Foreman Christian College, Lahore. As she was keen to pursue her study in the field of medicine, the then Dean of Grant Medical College, Dr. D P Sethna allowed her to get admission to the MBBS course and then she obtained medical degree. She proceeded to United Kingdom on Fellowship at the Institute of Neurology and National Hospital for Nervous Diseases, Queens Square, London, where she had the opportunity to work with Professor MacDonald Critchley, Professor Dennis Williams, etc. where she gained working experience on neural mechanism of speech, cognition, body schema, etc. She was a Fellow, Academy of Medical Sciences (India) and Fellow, Royal College of Physicians, Edinburgh.

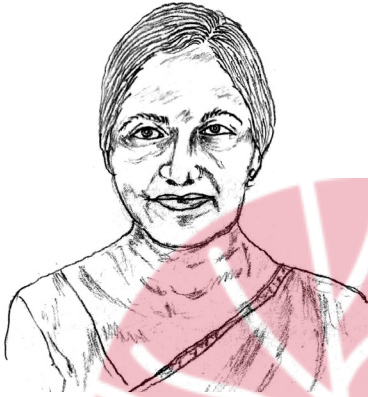
She started her service in India as an Assistant Research Officer, Indian Council of Medical Research, New Delhi, 1960-61; Research Fellow, Institute of Neurology and National Hospital for Nervous Diseases, London, 1961-62; Lecturer in Neurology, Postgraduate Institute for Medical Education and Research, Chandigarh, 1962-64; Associate Professor, All India Institute of Medical Sciences, New Delhi, 1971-76; She assumed the position of Professor and Head of the

Department of Neurology from 1976-79, after the demise of Professor S N Pathak. She also served as Visiting Professor, Sri Chitra Tirunal Institute of Medical Sciences and Technology, Trivandrum, 1979; Visiting Fellow, Neurological Institute, Montreal, 1969-70; Visiting Professor, Postgraduate Institute, Banaras Hindu University, Varanasi, 1973; Honorary Consultant, Tirath Ram Shah Hospital, Delhi.

Dr. Vimla Virmani was one of the pioneers to establish and expand the study of neuroscience in medical colleges of India. She played a leading role in setting up of the Neurology Section at the Post Graduate Institute of Medical Education and Research at Chandigarh. She joined the All India Institute of Medical Sciences and started the Department of Neurology in 1964. She expanded the department and started DM degree course in neurology and served as the Head of the department up to 1979 till she retired. She joined Sree Chitra Tirunal Institute of Medical Science and Technology (Trivandrum) after her retirement and started a new Department of Neurology at the institute. She also participated and took initiatives to start many professional associations in the field of neurology. She was the First Lady President and Member, Neurological Society of India, 1978; Member, International Federation of Neurology; Member, Indian Psychiatric Society; Member, Indian Medical Association; Member, Indian Epilepsy Association; Member, International League Against Epilepsy; Vice-President, Association of Medical Women in India; Member, National Council of Women in India; Member, Indian Bio-Science Association; Member, Neuro-Octological and Equilibrimetric Society of India. She published over 120 research articles in reputed medical journals. She suffered series of strokes and died in November 1999 after a prolonged illness.

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Wadhwa, Shashi
(b.1948)

Dr. Shashi Wadhwa is a distinguished Anatomist in India. She is daughter of Chamanlal Seth and was born in Delhi on 30th July 1948.

She completed her MBBS from Jabalpur Medical College and Hospital in 1970. She received MS (Anatomy) and PhD (Anatomy) from All India Institute of Medical Sciences, New Delhi in 1974 and 1987.

She joined Medical College and Hospital, Jabalpur, as a Senior Officer in 1971. Later in the same year, she joined the Department of Anatomy, All India Institute of Medical Sciences, New Delhi. Subsequently, she served as Resident House Officer, Tutor in Anatomy, Ad hoc Lecturer, Lecturer, Assistant Professor, Associate Professor and Professor in the same department until 2012. She assumed the responsibility of Dean, All India Institute of Medical Sciences, New Delhi in May 2012.


She held prestigious position of office bearer in several academies, societies and associations including Fellow, Indian Academy of Sciences, 1995; Fellow, Vice-President and President, Indian Academy of Neurosciences, 2001-02, 2005-06; Fellow, National Academy of Medical Sciences (India); Member of American Association of Anatomists; Member, International Society for Developmental Neuroscience; Member, International Society for Prenatal Psychology and Medicine;

Life Member, International Brain Research Organization; Member, New York Academy of Sciences, 2005; Member and Vice-President, International Society of Stereology, 1999, 1997-99; Life Member, Association of Surgeons of India; Member, Society for Neuroscience, 2000-06; Member, New York Academy of Sciences, 2005; Vice-President, Anatomical Society of India, 1999-2000.

Dr. Shashi Wadhwa's major research interests are developmental neurobiology, quantitative morphology and electron microscopy. Her laboratory has mainly focused on studying the developing human brain, human spinal cord, visual pathway, cerebellar nuclei. She has made valuable contributions in the area of human developmental neurobiology. She is a member of the National Apex Committee for Stem Cell Research and Therapy. She is also a member of National Advisory Board of the Journal of Anatomical Society of India. She has published extensively on developing human brain in several research papers in reputed national and international journals. Her work on development of human retina received international acclaim. Her achievements are recognized by conferring her with HK Chatterjee Memorial Gold Medal, Association of Surgeons of India, 1983; Shakuntala Devi Amir Chand Prize, Indian Council of Medical Research, 1988; Shanti Swarup Bhatnagar Prize, 1991; Prof. Samar Singh Memorial Oration, 2002; and B K Bachawat Lifetime Achievement Award, Indian Academy of Neurosciences, 2013.

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Wadia, Mehra J
(1903–1960)

Dr. Mehra J Wadia, a pioneer medical practitioner was born on 23rd September 1903. She received MBBS degree in 1927 and MD from Bombay University, Bombay in 1929. She went to Edinburgh, UK to attend Fellowship in Medicine in 1930. Upon her return to India, she started private practice and joined Cama and Alless Hospital, Bombay in 1931. She provided her service as Acting Assistant Medical Officer (for six months), Cama and Alless Hospital, Bombay, 1934; Honorary Surgeon, 1936-41; Honorary Obstetrician and Gynaecologist, 1941; Superintendent (when she succeeded Dr. Jerusha Jihrad), Cama and Alless Hospital, Bombay, 1947-58 till she retired. She continued as Honorary Consultant of Obstetrics and Gynaecologist to Cama and Alless Hospital, Bombay, after her retirement. She also started her private nursing home and earned high reputation for providing efficient health service.

She actively participated in various professional activities. She was Managing Committee Member of Bombay Branch and Treasurer, Association of Medical Women of India; Joint Honorary Secretary (1939-44), Treasurer and Vice-President (1944-45 and 1948-51) and President (1956-58), Bombay Obstetrics and Gynaecological Society; Convener, Standing Committee for Health, National Council of Women in India; Joint Honorary Secretary, State Council for Child Welfare.

Dr. Mehra J Wadia devoted over 27 years of her life at the Cama Albless Hospital. Her service at the prestigious hospital at different capacities proved ability of her administrative and clinical skills. She added Jamnabai Desai Memorial Administrative Block and the Nursery for Newborn Babies Project during her tenure. Her hard work and selfless dedication helped to increase the volume of OPD attendance of the hospital, which resulted into the creation of new posts and expansion of the hospital. She had excellent skill of surgical technique and was a wonderful teacher. She had extended her duty hours to help students and to conduct difficult surgeries. She also served as member of the Examination Board for MBBS and MD for surgeons and Physicians at the Bombay University. She played an active role in the smooth running of the Association of Medical Women in India (AMWI). She worked as an active member for the Celebration of the Golden Jubilee of the AMWI in Bombay. She set an example of a working mother and how a woman can keep balance between her profession and family life. She was a passionate doctor, dignified administrator and a proficient teacher and mentor of young lady doctors. She contributed several articles and reports on medical education, service facilities for married young lady doctors and on public health. She died on 7th June 1960 after a brief illness at the age of 57.

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एकः सूते सकलम्



White, Maria
(1858–1938)

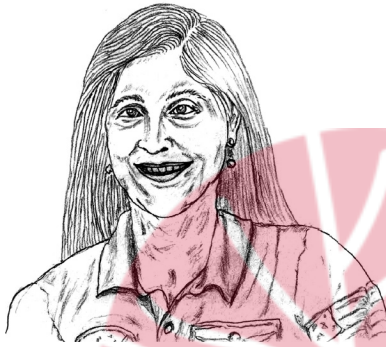
Maria White was the first lady surgeon sent out by the United Presbyterian Board. She was born in Grove City, Pennsylvania on 11th April 1858 to George W and Susanna Kerr White. She took her early education from State National School at Edinboro, Pennsylvania. Then she joined Grove City College for two years. In 1881, she went to New York City as a missionary under the United Presbyterian Board of Home Mission and served for one year in missionary service. In 1882, she was called home to Grove City on the death of her father. During this period she stayed home for one year and learnt medicine from Dr. Van Emon. In 1883, she joined Women's Medical College, Baltimore, USA. In 1886, she graduated in medicine. She also took a course in bacteriology at John Hopkins College. She went to New York for postgraduate studies and took special course on diseases of eye, ear, children, nervous system and orthopaedic surgery.

In September 1886, she sailed to Bombay for Punjab district of India. She was the first lady surgeon sent by the United Presbyterian Board of USA. She was the first American woman doctor who lived in India for forty years. She came to India with collection of fund from USA and started a hospital in 1887. By 1888, two hospital buildings equipped with medical appliances and machinery started under her supervision. Later the hospital was named as White Memorial Hospital of Sialkot after her father and mother, George Washington White

and Susannah Kerr Wallace. In 1909, another hospital was built in their name at Pasrur, 20 miles away from the first one. She served as the Head of White Memorial Hospital at Pasrur. She also established many open dispensaries in rural areas for the treatment of variety of diseases known in America and oriental region. The entire set of hospitals and dispensaries developed by Dr. White were limited for the treatment of women. Only male staffs and inmates were treated in the hospital, but no outside male patients were provided any clinical service in the White hospitals and dispensaries. She also provided home service for critical patients. She was an excellent clinician and surgeon. She treated thousands of patients with her expertise skill and specialization. She groomed and taught nursing to native girls. She developed a very strong group of nursing staffs in her hospital. The hospital at Pasrur provided marvelous service during the outbreak of Influenza epidemic. She supplied gallons of medicine, food and milk to rural areas to control and prevent the epidemic situation. She remained unmarried and returned to USA after her service in 1926. She died in 1938 at Florida, USA.

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Williams, Sunita L
(b.1965)

Sunita L Williams was born on 19th September 1965 at Euclid, Ohio to the family of Indian American Neuroanatomist, Deepak Pandya and Slovene American, Ursuline Bonnie, an X-ray technician. Sunita is the youngest among three siblings. Her father hailed from Jhulesan village, Mehsana District, Gujarat, India. She received inspiration to join US Naval Academy from her brother. She is the second woman of Indian origin to be selected for US Space Mission, after Late Kalpana Chawla, who died in Columbia Space Mission crash in 2003. She is also the second Slovenian heritage after Ronald M Sega to be included in US Space mission. She married Michael J Williams, a Federal Police Officer. They are married for over 20 years. She is deeply attached to the Indian customs and culture; she took a copy of *Bhagawad Gita*, a small figure of 'Lord Ganesha' and a few *samosas* along with her in the space mission. She visited her native village Jhulesan, Mehsana District, Gujarat and the Sabarmati Ashram of Gandhiji, when she visited India in 2013. She is first in the world to run Boston Marathon on the space station in 2007.

She graduated from Needham High School, Needham, Massachusetts, 1983. She did BS (Physical Sciences), US Naval Academy, 1987; MS (Engineering Management), Florida Institute of Technology, 1995; Sunita L William was commissioned as an Ensign in the United States Navy in May 1986. After six months,

she was designated as Basic Diving Officer at the Naval Coastal System Command. She was designated as Naval Aviator, Naval Air Training Command in July 1987. She was selected for United States Naval Test Pilot School, from where she graduated in December 1993.

Sunita Williams received initial H-46 Helicopter Combat Support Squadron 3 for initial HC-3, Scaknight training; and then was assigned Helicopter Combat Support Squadron 8(HC-8) in Norfolk, Virginia and made overseas deployments to the Mediterranean, Red Sea and the Persian Gulf in Support of Desert Shield and Operation Provide Comfort; Rotary Wing Aircraft Test Directorate as an H-46 Project Officer and V-22 Chase Pilot in the T-2; The Squadron Safety Officer and flew test fights in the SH-60B/E, UH-1,AH-1W, SH-2, VH-3, H-46, CH-53 and H-57.

In December 1995, she went back to the Naval Test Pilot School as an instructor in the Rotary Wing Department and the School's Safety Officer. There she flew the UH-60, OH-6 and the OH-58. She was deployed on board USS Saipan as the Aircraft Handler and Assistant Air Boss. Then she was selected for the NASA astronaut programme, June 1998. She had logged over 3000 flight hours in more than 30 different aircrafts. Sunita Williams began her Astronaut Candidate Training at the Johnson Space Centre in August, 1998. Her training included numerous scientific and technical briefing, instruction in shuttle and international space station systems, physiological training and ground school to prepare for T-38 flight training, as well as learning water and wilderness survival techniques. After her training, she worked in Moscow with the Russian Space Agency on Russian contribution to the International Space Station (ISS) and with the first expedition crew to the ISS. She also worked with the Robotic breach on the ISS Robotic Arm and the follow on Special Purpose Dexterions Manipulator. As a NEEM O2 crew member, she lived underwater in the aquarius habit for nine days. Sunita Williams launched with the crew of STS-116 on 9th December 2006, docking with the Station on 11th December 2006. She served in various prestigious positions during her career in NASA, such as Deputy Chief of Astronaut Officer in 2008. She worked as a Member of crew of Expedition 14 and 15. She served as a Flight Engineer to Expedition 32 in July 2012 and Commander of

Expedition 33 in September 2013. She also established several new records such as (a) Record for longest single space flight by a woman (195 days), (b) Total spacewalks by a woman (seven), (c) Most spacewalk time for a woman (50 hrs and 40 minutes), (d) Total time in space (321 days, 17 hrs, 15 minutes).

She received many awards and felicitation for her brilliant world records as a woman space astronaut. She has been conferred with the Navy Commendation Medal (twice); Navy and Marine Corps Achievement Medal; Humanitarian Service Medal; Padma Bhushan, India 2008; Medal for Merit in Space Exploration, Russia, 2011; Golden Order for Merits, Slovenia, 2013 and Sardar Vallabhbhai Patel Vishwa Pratibha Award, World Gujarati Society.

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Wills, Lucy
(1888–1964)

Lucy Wills was born on 10th May 1888 at Sutton Cold Field near Birmingham, UK. She was the third child of William Leonard Wills and Gertrude Annie. She belonged to an educated and well off family. Her father was a science scholar, who instilled interest for science in her. She attended the Cheltenham Ladies College and completed matriculation in 1906. She passed Tripos Exam in 1911 from Newnham College Cambridge. Lucy visited South Africa and served as a nurse during World War I, which motivated her to join the career of medical profession in 1915.

She obtained graduation in medicine from the London School of Medicine for Women. She was awarded the Licentiate of Royal College of Physicians (LRCP), London in May 1920. She completed the London University Degree of Medical Bachelor and Bachelor of Science (MBBS) in December 1920 at the age of 32. After qualifying degree in medicine, she preferred to continue with clinical research instead of medical practice. She started with research and teaching job in the Department of Clinical Pathology at the Royal Free Hospital, London. Her research interest focused on metabolic study of pregnancy, especially on macrocytic anaemia in pregnancy. Her research interest diverted her towards India as the cases of anaemia in pregnancy were more prevalent in India among poor malnourished women. Dr. Margaret Balfour of Indian Medical Service also invited

her to join the project 'Maternal Mortality Inquiry' in Bombay, which was being sponsored by the Hoffkine Institute, Bombay with the financial support of Lady Tata Foundation. She stayed in India from 1928 to 1933. She associated herself with the Pasture Institute of India (Coonoor), Caste and Gosha Hospital (Madras) for her research work. She observed that poor Muslim women were more susceptible to anaemia due to inadequate diet during pregnancy. Initially, she experimented with rat and monkey by providing dietary supplement to improve the condition of anaemia. She observed that when she fed rat with marimite (a yeast extract), it responded with reasonable improvement. She repeated the same experiment with monkey and identified the factor present in the marimite, the absence of which caused anaemia during pregnancy. Initially, the factor was recognized as the 'Will's Factor' in 1931 and finally in 1941, it was identified as folic acid. She made ground breaking discovery during her research experiment on Indian women natives. Her research findings made world wide impact upon generations of women of developing countries who suffer from anaemia during pregnancy due to malnutrition. Four reports of her field studies of Bombay women's anaemia of pregnancy entitled 'Pernicious Anaemia of Pregnancy' were published between 1929-31 in the *Indian Journal of Medical Research*.

In 1938, she returned to London and resumed her research and academic work at the Royal Free Hospital, London. She retired from her service in 1947. During World War II, she served as a full time pathologist of emergency medical service. She joined politics and became a Labour Councilor in Chelsea, London. She was a hardworking dedicated researcher. She was an enthusiastic teacher and mentor of many young doctors. She never married and remained spinster. She loved travelling, nursing her kitchen garden and enjoying natural surroundings. She was an ardent cross country skier, mountain climber and a sport lover. She passed away on 26th April, 1964.

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Winter, Priscilla
(Nee' Sandys)
(d.1881)

Priscilla Winter was born in Calcutta to two Anglican Missionaries. She spent her childhood in England. Priscilla came to India in 1858 at the age of 16 to join her father Timothy Sandys, a veteran Cambridge Missionary of Mirzapore, Calcutta. She worked in Calcutta under Zenana Missionary work. She used to distribute medicine to women confined at home under *Purdah* culture. She married Revd. Robert Winter, Head of Cambridge Missionary to Delhi in 1863. And then they shifted to Delhi.

Priscilla Winter was an Anglican missionary under the Union Society for the Propagation of Gospel (USPG). She was not a doctor and her duty was to propagate the teaching of Gospel among the women of Delhi. When she arrived in Delhi as a new bride, she already had an experience of working as a missionary's daughter and a Calcutta *Zenana* teacher for four years. She was highly influenced by the poor health condition of women under the prejudice of *purdah* system in the male dominated society. Initially, she started providing simple medicine to all classes of women to get respite from their suffering. Slowly this became her essential job to provide treatment to city women. She had no medical qualification other than a medical chest containing medicine for common health ailments.

She provided valuable clinical service to people of Delhi in 1864, when Cholera epidemic broke out. She started holding open dispensary

at the women's bathing *ghat* near the West Bank of the holy river Yamuna. She was popularly known as 'A Woman with Medicine Chest' at the *Ghat* of river Yamuna. In due course of time, her home turned into a small nursing home during the epidemics of fever and cholera in 1863-64. She founded Delhi Female Medical Mission to raise fund to build 'Medical Dispensary Project'. This later became the office of the Delhi Female Medical Mission. During the period of advent of epidemics, many missionaries, without any medical qualification attempted to practice medicine for local people. Priscilla Winter realized the urgent need for qualified medical doctors and she raised her voice through the Missionary Association to collect fund for the establishment of proper health care centre for Delhi women. The Punjab Government donated Rs 410 per year for medicine and the Delhi Municipality contributed Rs 75 a month for scholarship and training for women nurses and health workers. A small house was rented in Chandni Chowk to start a small dispensary and a 20 bedded hospital. This small dispensary developed into a maternity centre and then the St. Stephen's Hospital, the first hospital for women and children of Delhi. She did not live to see the fruits of her hard work and dedication as she died in 1881 before the new St. Stephen's hospital was built and opened on 31st of October in 1885 by Lady Dufferin.

Priscilla Winter died of fever after the birth of her tenth child at the age of 39. In 1906, the foundation stone for a bigger premise for the hospital building was laid at the Tis Hazari. Today, the St. Stephen's Hospital developed into a state of art of 650 bedded super specialty hospital fitted with ultramodern medical facilities and equipments. In 1908, St. Stephen's Hospital started training school for nurses under the guidance of Alice Wilkinson. In 1891, Robert Winter died and in memory of both Robert and Priscilla Winter an extension, a three storied block was built adjacent to the hospital.

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APPENDIX

Contributions of Foreign Missionary Women Doctors in India

S. No	Name	Place of Arrival/ Duration of Stay	Missionary Society	Contributions made by Women Medical Missionaries.
1.	Agnes C Scott (UK)	1903-1932/Delhi	Cambridge Mission to Delhi under SPG (Society of Propagation of Gospel)	1. Chief Medical Officer (C.M.O.), Women's Medical Service, India. 2. In charge, Mission Hospital at Karnal, 1904.
2.	Agnes Maria Turnbull (Canada)	1892-1907/ Indore	Presbyterian Medical Missionary Canada	1. Worked in women's hospital and Mission's school in Indore. 2. She faced several challenges during devastating famine of 1897 and plague of 1903. 3. She suffered paralyzing illness and passed away on 5th January 1907 at Neemuch.
3.	Anna Marthia Fullerton (USA)	Born at Agra to Missionary Parents	NA	Established Fullerton Memorial Dispensary and Hospital for Women and Children, Fatehgarh in 1907.
4.	Anna Sarah Kugler (USA)	1883/Guntur Died in Guntur on 26th July 1930	On Private visit. After two years joined Foreign Missionary Society of Lutheran Church, Baltimore, USA	1. She was the First Medical Missionary of Lutheran Church of USA. 2. Established Evangelical Lutheran Mission Hospital, Guntur in 1901. It was the First Women's Hospital in the coastal area of Andhra Pradesh.

S. No	Name	Place of Arrival/ Duration of Stay	Missionary Society	Contributions made by Women Medical Missionaries.
5.	Belle Chone Oliver (Canada)	1891-1927/ Bombay	Presbyterian Medical Missionary Canada	<ol style="list-style-type: none"> 1. She worked in Neemuch, Dhar and Banswara of Central India. 2. In 1891, she established a hospital for women in Indore. 3. She was In charge of Mission Hospital at Neemuch and Dhar. 4. In 1915, she was posted to Banswara where she established a dispensary in 1920 and a hospital in 1922.
6.	Charlotte Leighton Houlton (UK)	1913-47/Agra	Cambridge Mission to Delhi	<ol style="list-style-type: none"> 1. Principal, Lady Hardinge Medical College, Delhi, 1932-35. 2. Member for Planning, All India Institute of Medical Sciences, New Delhi.
7.	Claire Marie Jeanne Vellut (Belgium)	1954/ Chingleput, Tamil Nadu. Granted Indian citizenship in 1979.		<ol style="list-style-type: none"> 1. There was a huge storm in Belgium. The Government made international appeal to send jute bags to protect the sea coast. 2. Government of India sent several tones of jute bags. 3. To reciprocate the gratitude Belgium Government opened Hemerijckx Government Leprosy Centre, Polambakkam village, Chingleput in 1954.

S. No	Name	Place of Arrival/ Duration of Stay	Missionary Society	Contributions made by Women Medical Missionaries.
8.	Clara A Swain (USA)	1870-1895/ Bareilly	Women's Foreign Missionary Society of the Methodist Episcopal Church, USA	<p>4. Dr. Vellut developed the Leprosy Centre at Chingleput in a Centre for National Leprosy Control Programme. She started 52 mobile Clinics.</p> <p>1. First Missionary Doctor sent to Asia. She arrived at Bareilly on 20th January 1870.</p> <p>2. Recommended for the Establishment of Christian Medical College, Ludhiana.</p> <p>3. Recommended for Daffarin Fund to start medical service to improve the health condition of women and children of India.</p> <p>4. Established Clara Swain Hospital for Women, the 1st Women's Hospital in India in May 1873, built from the fund of Nawab of Rampur.</p>
9.	Dame Edith Mary Brown (UK)	1886-1891/ Ludhiana	NA	<p>Founder of Christian Medical College, Ludhiana, 1895.</p>
10.	Dorothy Dunning Chacko (USA)	1932-67/Kerala	Married Bishop C. Joseph Chacko (Indian)	<p>1. Established Bethany Village Treatment & Rehabilitation Colony for Leprosy, Ganaur, 1972.</p> <p>2. She took Indian nationality in 1947.</p>

S. No	Name	Place of Arrival/ Duration of Stay	Missionary Society	Contributions made by Women Medical Missionaries.
11.	Edith Pechey	1883-1906/ Bombay	On private invitation	<p>1. In 1869, five women students including Edith Pechey joined Medical School, Edinburgh University, and they paid extra fees (four times) to have separate class only for five women.</p> <p>2. In the final examination Pechey did brilliant result in Chemistry and became entitled to 'Hope Scholarship'. The male students raised objection, which resulted in to 'Edinburgh Riot of 1870'.</p> <p>3. Finally Hope Scholarship was granted to the second best male student on the plea that the scholarship was meant only for regular students and admission of women students were not legal.</p> <p>4. She took M.D. qualification from the University of Bern, Germany in 1877.</p> <p>5. She served as Senior Medical Officer, Camma Hospital for Women and Children, Bombay (the First hospital in the world to be staffed entirely by women).</p>

S. No	Name	Place of Arrival/ Duration of Stay	Missionary Society	Contributions made by Women Medical Missionaries.
12.	Elizabeth Bielby (Canada)	1878-1927/ Lucknow	First woman doctor to work under Dufferin Fund	<ol style="list-style-type: none"> 1. Served as Medical Missionary health worker and established a dispensary at Panna along with her sister a trained nurse. Her sister died after few months due to enteric fever. 2. She had a chance to treat Maharani of Panna. 3. She realized to be a qualified doctor and decided to return to London to earn medical degree. 4. She met Maharani of Panna before departure, who made her a personal request to convey her message to the Queen of England to send medical aid for Indian women. 5. Queen of England directed to start Lady Dufferin Fund in 1885 to support medical facility for women and children of India. 6. Elizabeth Bielby obtained medical degree and returned to India and served as First woman doctor to work under Dufferin Fund. 7. It was the turning point in the history of medical science in India, which officially opened the door for entry of foreign women missionary doctors to India.

S. No	Name	Place of Arrival/ Duration of Stay	Missionary Society	Contributions made by Women Medical Missionaries.
13.	Ellen Margaret Farrer (UK)	1891-1931/ Bhiwani, Hissar	1st Woman doctor under Baptist Missionary Society	Established New Farrer Hospital, Bhiwani in 1923.
14.	Elsie M Morris	1930s/Nellore	American Baptist Foreign Mission Society	<ol style="list-style-type: none"> 1. She was the only qualified doctor in Nellore region. 2. She lost one of her eye while conducting an operation. Pus from her patient got in to her eye and caused severe infection and she lost her eye. 3. Despite such crucial loss of her sensitive body part, she continued to serve as Superintendent, Women's and Children Hospital, Nellore, South India.
15.	Gretrude Jane Campbell (Scotland)	1901-52/Madras	Worked under Danish Mission of Free Church of Scotland	<ol style="list-style-type: none"> 1. Established Christina Rainy Hospital, Madras in 1914. 2. Started Nursing Course in India. 3. Served as Principal of Lady Lyall Hospital & Medical College, Agra. 4. Served as Principal, Lady Hardinge Medical College, Delhi, for 9 years from 1921.

S. No	Name	Place of Arrival/ Duration of Stay	Missionary Society	Contributions made by Women Medical Missionaries.
16.	Ida Sophia Scudder (USA)	Born at Ranipet, South India to Missionary parents	Under American Missionary Service	<ol style="list-style-type: none"> 1. Established Christian Medical College, Vellore, (which started as a small dispensary in 1900). 2. Opened Nursing School, Vellore, 1909. 3. She died in India on 24th May, 1969.
17.	Jemima MacKenzie, (Mina) (Canadian)	1904-1957/ Cawnpur (now Kanpur, UP)	Women's Union Missionary Society of America	Established Broadwell Christian Hospital in Fatehpur, Punjab in 1909.
18.	Jessica R Carleton (USA)	Born at Ambala, India to Missionary Parents	Missionary of Presbyterians Church of Philadelphia, USA	<ol style="list-style-type: none"> 1. Established Philadelphia Hospital of Women, Ambala 1901. 2. She died on 23rd October 1940 in Miraj Mission in India.
19.	Kathleen Olega Vaughan (UK)	Worked in Calcutta and Jammu & Kashmir	NA	<ol style="list-style-type: none"> 1. Discovered diagnosis of Osteomalacia disease among rich Kashmiri <i>Purdanasbeen</i> women, caused due to absence of light and vitamin D. This caused deformation of pelvis and complicated child birth. 2. Her finding helped to have safe child labor for thousands of women following purdah culture in India.

S. No	Name	Place of Arrival/ Duration of Stay	Missionary Society	Contributions made by Women Medical Missionaries.
20.	Lucy Wills (UK)	1928-33/ Coonoor and Madras	Under 'Maternal Mortality Inquiry' Project of Indian Medical Service financed by Lady Tata Foundation & Hoffkine Institute, Bombay	<p>3. Played leading role to establish Association of Medical Women of India.</p> <p>4. She established hospitals and medical training schools for women.</p> <p>5. She wrote several medical standard guide lines including the most popular, 'Safe Child Birth' for midwives.</p> <p>1. She conducted research on anaemia in pregnancy.</p> <p>2. Her research interest diverted her towards India as the cases of anaemia during pregnancy were more prevalent in India among malnourient women.</p> <p>3. She observed that, when anaemic rats are fed with marimite (a yeast extract), it shows improvement in its condition. And the absence of marimite causes anaemia.</p> <p>4. Initially, the condition was called as 'Will's Factor' in 1931.</p> <p>5. Finally, in 1941, it was recognized as folic acid.</p> <p>6. Her discovery made worldwide impact upon generations of women of developing countries, who are using folic acid supplements during pregnancy to avoid anaemia.</p>

S. No	Name	Place of Arrival/ Duration of Stay	Missionary Society	Contributions made by Women Medical Missionaries.
21.	Margaret MacKellar (Canada)	1890-1930/ Indore	Women's Foreign Missionary Society, Canada	<ol style="list-style-type: none"> 1. Established two dispensaries, a church, an orphanage and a 45-bed hospital at Neemuch. 2. Successfully handled devastating famine and plague epidemic in Central India in 1899.
22.	Margaret O'Hara (Canada)	1891-1927 (Bombay)	Presbyterian Medical Missionary, Canada	<ol style="list-style-type: none"> 1. Her work station was Dhar where she opened many small dispensaries, schools and an orphanage. She also established a well-equipped hospital. 2. She faced challenges during devastating famine of 1897 and 1899. She also managed to restrict the spread of tragic epidemic of plague in 1917.
23.	Maria White (USA)	1888/Sialkot	United Presbyterian Board of USA	<ol style="list-style-type: none"> 1. Established White Memorial Hospital of Sialkot in 1888. 2. She was the first lady surgeon sent by the United Presbyterian Board of USA to India in 1886.
24.	Mary Ann Dacomb Scharlieb (nee Bird)/ Anglo-Catholic/ (UK)	1865/Madras. Came as wife of William Scharlieb.	Private visit	<ol style="list-style-type: none"> 1. 1st woman to qualify L.M.S. (Licentiate of Medicine and Surgery) from Madras Medical College, India in 1878. 2. 1st woman graduate from the Royal London School of Medicine in 1882. 3. 1st woman Faculty Member as Lecturer to Madras Medical College in 1883.

S. No	Name	Place of Arrival/ Duration of Stay	Missionary Society	Contributions made by Women Medical Missionaries.
25.	Priscilla Winter	1858-1881 Born in Calcutta to Anglican Missionary parents	Union Society for the Propagation of Gospel (USPG)	<p>4. 1st woman MD of the London University in 1888.</p> <p>5. 1st Lady Doctor Knighted in 1926.</p> <p>6. Established Women's Medical Service (W.M.S.), India, 1916.</p>
				<p>1. She started holding open dispensary at the women's bathing ghat near the West Bank of the holy river Yamuna. She was popularly known as 'A Woman with Medicine Chest' at the Ghat of river Yamuna.</p> <p>2. This small dispensary developed into a maternity centre and then the St. Stephen's Hospital, the first hospital for women and children of Delhi.</p> <p>3. Though she did not have any medical qualification, but her dedication was the motivating and moving force behind the establishment of St. Stephen's Hospital, Delhi.</p> <p>4. She died in 1881 before St. Stephen's Hospital was opened on 31st October 1885.</p>

S. No	Name	Place of Arrival/ Duration of Stay	Missionary Society	Contributions made by Women Medical Missionaries.
26.	Sara Seward	1871/Allahabad	Women's Union Missionary Society of New York, USA. Then transferred to Board of Foreign Mission of the Presbyterian Church.	<ol style="list-style-type: none"> 1. Established Sara Seward Hospital, Allahabad, 1890. 2. Dr. Seward died of Cholera at Allahabad on 12th June 1891.



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Index III

Outstanding Achievements

Agarwal, Padam Kumari, Physician (Pathologist), p.35

1. Established Cytology Division in the Department of Pathology at the King Georg's Medical College, Lucknow in 1973.
2. Introduced Cytology subject in MBBS and BDS Courses.

Albuquerque, M C, Physician, p.37

1. Established Vani Vilas Hospital for Women (200 beds) in Mysore state in 1935.

Anna, Modayil Mani, Meteorologist, p.39

1. Pioneering work to establish meteorological measurement instrument production Unit in India.
2. She designed and standardized drawing for over 100 different weather instruments and their production in India.

Balakrishnan, Kamala (Lieutenant Colonel), Physician (Immunologist), p.42

1. Established First Histocompatibility Testing Laboratory in AIIMS, New Delhi.

Bandopadhyay, Padmavati (Air Marshal), Physician (Aviation Medicine), p.48

1. First Lady Air-Marshall in India, 2004.
2. First Woman Aviation Medicine specialist

Bhargava, Sneha, Physician (Radiologist), p.59

1. First Woman Director of the All India Institute of medical Sciences (AIIMS), New Delhi, 1984
2. Established Department of Radiology and Imaging at AIIMS.
3. Pioneered the CT and Ultrasound investigations in India.
4. First to introduce Lithotripsy machine for non-surgical removal of stones in AIIMS.

Bhatia, Sharayu. Nee' (Sharayu Pandit), Physician (Obstetrician and Gynaecologist), p.62

1. She served as the Honorary Secretary of the Association of Medical Women in India in 1948 and became the youngest President of the Association in 1957.
2. As Secretary of the Countess of Dufferin's Fund, she had the arduous task of winding up the Women's Medical Service (WMS) in India and absorption of the WMS officers into the state medical service.

Bielby, Elizabeth, Physician, p.68

1. She had a chance to treat Maharani of Panna.
2. She conveyed the message of Maharani of Panna to the Queen of England to send medical aid for Indian women.
3. Queen of England directed to start Lady Dufferin Fund in 1885 to support medical facility for women and children of India.
4. Elizabeth served as the First woman doctor to work under Dufferin Fund.
5. It was the turning point in the history of medical science in India, which officially opened the door for the entry of foreign women missionary doctors to India.

Brown, Dame Edith, Physician (Obstetrician and Gynaecologist), p.73

1. Founder of Christian Medical College, Ludhiana, 1895

Buti, Bimla, Physicist, p.79

1. First Indian Woman Fellow, Third World Academy of Sciences (TWAS), Trieste, Italy in 1990.
2. Organised Plasma Physics College at ICTP International Centre for Theoretical Physics), Trieste, Italy.
3. Established First Institute of Plasma Research, Department of Atomic Energy (DOAE), India.
4. Founded Plasma Science Society of India in 1992.

Carleton, Jessica R, Physician, p.85

1. Established Philadelphia Hospital of Women, Ambala 1901.

Chatterjee, Asima, Chemist, p.95

1. First Woman to be conferred DSc by any Indian University in 1944. She qualified DSc From Calcutta University in 1944.

2. First Woman to receive Shanti Swarup Bhatnagar Award in 1961.
3. First Woman Scientist to be selected as General President of Indian Science Congress Association in 1975.

Chatterjee, Dora, Physician, p.99

1. Established Denny Hospital for Women and Children in Hoshiarpur in 1902.
2. On the 49th Convocation, she refused to don the cap and gown of degree award ceremony of Women's Medical College, Pennsylvania, USA, which held at the Academy of Music on 14th May 1901.

Chatterjee, Rajeswari, Engineer, p.101

1. She was the First Woman Engineer of the Karnataka state in 1948.
2. She was the First Woman Professor of Engineering at the Indian Institute of Science, Bangalore.
3. Established First Microwave Laboratory in the Indian Institute of Sciences, Bangalore.

Chawla, Kalpana, Astronaut, p.104

1. She was the First Woman to be enrolled for Aeronautical Engineering in the Punjab Engineering College, Chandigarh in 1978.
2. She was the First Indian born American woman to enter space in 1997.

Chowdhury, Urmil Eulie, Architect, p.112

1. Co-designer of the country's most well designed and planned city Chandigarh.
2. According to IAWA (International Archive of Women in Architecture) established in 1985 by the College of Architecture and Urban Studies of Virginia Polytechnic Institution and State University, Virginia Tech., USA, she was the first woman to qualify as an architect in Asia.
3. She was the first Indian woman to be elected as Fellow of the Royal Institute of British Architects (London) and the Indian Institute of Architects.

Coyaji, Banoo Jehangir, Physician (Gynaecologist), p.114

1. Co-founder of KEM Hospital in Pune along with the Sardar Srinivas Moodliar, who started it as a small charitable Hospital with 4 maternity beds in the memory of King Edward VII in 1912.

2. She introduced Family Planning Department in KEM Hospital in 1947.

Dadabhoy, Dosibai J R, Physician (Obstetrician and Gynaecologist), p.116

1. She was one of the First Indian women to take up MRCP (Member of Royal College of Physicians) from London.
2. First doctor of India to order and bring Radium in the city of Bombay in early twenties for the treatment of cancer, the dreadful disease.
3. She was Member of the Bhore Committee, which made landmark recommendations for standardization of medical practice and maternity facility for working women in India.

Dinshaw, Ketayun Ardeshir, Physician (Oncologist), p.124

1. She was first to develop Brachytherapy Programme in India.
2. First to develop modern radiotherapy techniques including 3DCRT, SRT, IMRT, and IGRT.
3. Dr. Dinshaw has been responsible for starting the new ACTREC (Advanced Centre for Treatment, Research and Education in Cancer) at Navi Mumbai, having the best facility for advanced cancer research in the country.
4. She was the team leader for the development of indigenous tele Cobalt machine now called as 'Bhabhatron', installed in about 20 oncology centers across the country through the donation of IAEA (International Atomic Energy Agency).

Farrer, Ellen Margaret, Physician, p.131

1. Established New Farrer Hospital, Bhiwani in 1923.

Fullerton, Anna Martha, Physician, p.133

1. Established Fullerton Memorial Dispensary and Hospital for Women and Children, Fatehgarh in 1907.

Gangal, Sudha Gajanan, Zoologist and Oncologist, p.138

1. Developed First Cancer Immunology Division, Cancer Research Institute (CRI), Bombay.
2. She established the Genetic Clinic for Prenatal Diagnosis of Thalessemia at the Wadia Children's Hospital, Mumbai.
3. She started Hybridoma Laboratory at the CRI in 1980.

Ganguly, Kadambini, Physician, p.140

1. In 1871, Kadambini became the first woman to pass the University of Calcutta Entrance Examination.
2. First Woman graduate of Calcutta University in 1883.
3. One among two First qualified Indian women doctors in 1886.
4. First Indian qualified lady doctor to practice medicine in India.

Gupta, Malti, Physician (Plastic and Reconstructive Burn Surgeon), p.152

1. Dr. Malati Gupta established and developed the Department of Plastic Surgery at the SMS Medical College, Jaipur.
2. She is known as the 'Honey Girl' for the innovative technique she developed in the seventies for the preservation of skin grafts in honey.
3. She was the first woman surgeon of Rajasthan and the first person from the state to have achieved super speciality in her field.
4. She holds the distinction of being the First Woman President of the Indian Section of the International College of Surgeons in 1997.

Hinduja, Indira, Physician (Obstetrician and Gynaecologist), p.157

1. Pioneered the birth of India's first scientifically documented 'Test Tube Baby' on 6th August 1986 through GIFT (Gamete Intra-Fallopian Transfer Technique).

Hingorani, Veera, Physician (Gynaecologist), p.160

1. Dr. Hingorani worked on description of a New Sign for different diagnosis of ovarian cyst with pregnancy from Hydramnios, popularly referred as 'Hingorani Sign'.

Ila, Hiriyakkanavar, Chemist, p.166

1. First Woman to receive PhD from Indian Institute of Technology, Kanpur in 1968.

Janaki, Ammal Edavalesh Kakkat, Botanist, p.170

1. First Indian Woman to get DSc from University of Michigan, USA in 1931.
2. First Woman to be Elected as Fellow of the Indian National Science Academy in 1957.
3. First woman to be elected as Fellow of India Academy of Sciences in 1935.

Jhirad, Jacob Jerusha, Physician, p.175

1. First Indian woman to be awarded Government scholarship to study medicine in UK in 1916.
2. First Indian Woman Medical Officer of Camma & Albless Hospital, Bombay, 1925.
3. First Founder President of Federation of Obstetrical and Gynaecological Society of India (FOGSI) in 1948.
4. First woman doctor crusader to raise voice to grant reasonable service facility to young married women doctors to make their medical service sustainable.

Joshi, Anandibai, Physician, p. 178

1. In 1886 qualified medicine from Women's Medical College of Pennsylvania and she returned to India. She was appointed as Resident Physician at the Kolhapur Hospital, Kolhapur, but she could never take charge of a doctor as she died on 26th February 1987 at the age of 22. She was the First Indian Woman (one among two) to qualify as a doctor in India, but she could not practice medicine therefore she is not the first practicing women doctor of India.

Joshi, Anjali, Engineer (Electrical), p.180

1. She is the only woman among 52 Indian Institute of Technology, Kanpur Alumini chosen for the Honour of Golden Jubilee Alumini Convention of IIT, Kanpur, 2010.

Kalevar, Vasundhara, Physician (Ophthalmologist), p.182

1. She is the First Woman Cornea Surgeon in the country. She pioneered research work and initiated the movement in the field of eye bank organization and Keratoplasty.

Kalra, Veena, Physician (Pediatrician), p.184

1. She is instrumental in establishing pediatric neurology, a Super-specialty in India. She started DM course in Child Neurology at the All India Institute of Medical Sciences.

Kameswaran, Lalitha, Physician (Pharmacologist), p.187

1. She was the First Woman Director of Medical Education in the Tamil Nadu Government in 1983.

2. She was the First Vice Chancellor of the MGR University of Health, Tamil Nadu in 1988.

Karunasagar, Indrani, Microbiologist (Fisheries), p.192

1. Dr. Indrani's research has led to the development of recombinant protein vaccines for Indian major carps. This vaccine is seen to protect fish specifically against a common warm water fish pathogen *Aeromonashydrophila*.
2. In the area of shrimp disease management, the pioneering work of Dr. Indrani on the isolation and characterisation of several bacteriophages (viruses) against luminous vibriosis disease of shrimps has led to the development of phase therapy. It is for the first time in the world that phase therapy is being advocated in shrimp hatcheries on a commercial scale and is now being popularised in several countries where shrimp is cultured. The added advantage is that this eco-friendly approach will reduce the application of antibiotics in aquaculture and thus prevent the development and spread of antibiotic resistance in the environment and prevent antibiotic residues in shrimp meat.

Kaur, Surrinder, Physician (Dermatologist), p.200

1. Dr. Surrinder Kaur started the Department of Dermatology, Venereology and Leprology at Post Grsduste Institute of Medical Education and Research, Chandigarh.
2. She has done major work in the field of systemic involvement in leprosy.

Kola, Rajyalakshmi, Physician, p.206

1. First Vice Chancellor of Sri Padmavati Mahila Vishwa Vidyalayam, Tirupati, the only women University of Andhra Pradesh in 1986.

Krishnan, Yamuna, Chemist, p.211

1. She is the youngest woman scientist in India to receive the prestigious Shanti Swarup Bhatnagar Award of chemical science in 2013.

Kugler, Anna Sarah, Physician, p.216

1. She was the First Medical Missionary of Lutheran Church of USA.
2. Established Evangelical Lutheran Mission Hospital, Guntur in 1901. It was the First Women's Hospital in the coastal area of Andhra Pradesh.

Landol, Tsering, Physician (Obstetrician and Gynaecologist), p.221

1. First Ladakhi woman to get Padmashri in medicine in 2006.

Lazarus, Hilda Mary, Physician, p.223

1. First Indian Medical Officer of Women's Medical Service (WMS) in India and reached to the level of Lieutenant Colonel.
2. First Indian woman doctor to hold the post of Superintendent at the Victoria Hospital for Woman and Children, Madras.
3. First Indian Principal of the Lady Hardinge Medical College, New Delhi, 1940.
4. She served as the First Indian Principal of the Christian Medical College, Vellore from 1948-54.
5. She was a Member of the Sir Joseph Bhore Committee on Health Development (1943), conducted by the Government of India to bring standardization in Indian Medical Service. Even today the recommendations of Bhore Committee are followed by the Government for various medical specifications.

Lohia, Anuradha, Biochemist, p.226

1. She was the First to clone Entamoeba cell cycle genes and to demonstrate the presence of intrones in amoeba.

Lukose, Mary Poonen, Physician (Obstetrician and Gynaecologist), p.228

1. First Woman Graduate of Madras University, 1909.
2. She was the only Indian woman to work in different Military Hospitals in London during World War I.
3. First Woman Surgeon General (in the world), 1938 (permanent).
4. First Lady Member of the Lagislative Council of Travancore, 1922.
5. She played leading role to start Radium Ward and the Deep X-Ray Unit at the Women and Children's Hospital at Thycaud. She started the Radium Institute in Thiruvananthapuram.
6. Established the Thiruvananthapuram Branch of YWCA.
7. Established T B Hospital, Nagercoil.

Luthra, Usha Kehar, Physician (Pathologist), p.231

1. Dr Luthra is the Founder Director of the Institute of Cytology and Preventive Oncology, New Delhi. She worked on pre-cancer and cancer of uterine cervix, role of specific Human Papilloma

Viruses (HPV). Based on her work the preparation and trial of HPV vaccine was started. She also served as the Project Director of National Cancer Registry Project to create authentic data on problems of cancer in India.

Mackenzie, Jemima (Mina), p.238

1. Established Broadwell Christian Hospital in Fatehpur, Punjab in 1909.

Moolgaokar, Leela, Physician (Haematologist), p.259

1. First to start Blood Bank Movement in India in 1954
2. Established Federation of Bombay Blood Bank in 1980.
3. Poneered voluntary Blood Transfusion Service in India.

Morris, Elsie M, Physician, p.262

1. She lost one of her eye while conducting an operation. Pus from her patient got in to her eye and caused severe infection and she lost her eye.
2. Despite such crucial loss of her sensitive body part, she continued to serve as Superintendent, Women's and Children Hospital, Nellore, South India.

Nag, Devika, Physician (Neurosurgeon), p.268

1. She started DM Neurology at the King George Medical College, Lucknow in 1981.
2. She started the First Neurotoxicology Unit in Uttar Pradesh at the King George Medical College, Lucknow in 1978.

Nath, Indira, Physician (Pathologist), p.273

1. She discovered technique of identification of two M Leprae proteins, which are potential for the diagnosis of leprosy and identifying individuals with high risk.

Padmavati, Sivarama Krishna Iyer, Physician (Cardiologist), p.289

1. Opened First Heart Clinic in North India in the Lady Hardinge Medical College in 1954.
2. Established First Heart Institute in India in 1981.
3. As a Member of Medical Council of India, she started First DM course in Cardiology in India.
4. First woman Padma Vibhushan awardee in medicine in 1992.

Pant, Radha, Biochemist, p.292

1. First Woman Science Graduate in Science from Delhi University in 1934.
2. First Woman Science Lecturer of Allahabad University in 1945.
3. Established Biochemistry Department in the Allahabad University in 1960.

Parimala, Raman, Mathematician, p.295

1. First Woman to be awarded by TWAS (Third World Academy of Science) in Mathematics or Physics in 2005 (since 20 years of its inception).

Pechey, Edith, Physician, p.304

1. Served as Senior Medical Officer, Cama Hospital for Women and Children, Bombay (the first hospital in the world to be staffed entirely by women).

Ranadive, Kamal Jaysing, Physician (Oncologist), p.318

1. Established First Tissue Culture Laboratory in India at the Cancer Research Institute, Bombay.

Rao, Padma V, Physician (Obstetrician and Gynaecologist), p.323

1. First to perform Laproscopic Sterilization in India in 1971.

Reddi, Muthulakshmi, Physician, p.333

1. First woman to get MB Degree from the Madras Medical College in 1912.
2. Established the First cancer institute in South India, the Adyar Cancer Institute in 1955.
3. First Woman Padma Awardee in Medicine. Received Padma Bhushan in Medicine in 1956.

Sahgal, Laxmi, Physician and Social Reformer, p.346

1. Captain of Rani Jhansi Regiment of Indian National Army (Azad Hind Fauz).
2. First woman in India to be nominated as a Presidential Candidate in 2002 by leftist parties, in which Dr. APJ Abdul Kalam became victorious.

Sahni, Savitri, Botanist, p.349

1. Established BirbalSahni Institute of Paleobotany at Lucknow. India's First Prime Minister, Pandit Jawaharlal Nehru laid the foundation stone for the building of the Institute of Paleobotany at Lucknow on 3rd April 1949 (the dream project of Professor Birbal Sahni), but the destiny took a different turn and suddenly Professor Birbal Sahni died of massive heart attack on the mid-night of 9-10 April, 1949. Mrs Savitri Sahni (wife of Professor Sahni) did not loose her heart and completed the building with firm determination and nurtured it for 36 years in to an institute of international reputation. In 1969, the institute was christened as the BirbalSahni Institute of Paleobotany.
3. First Woman Padma Shri Awardee in Science and Engineering in 1969.

Satyavati, Gowdagere Vedanti, p.361

1. First woman scientist to become the Director General of the Indian Council of Medical Research in 1994.

Scharlieb, Mary Ann Dacomb (nee Bird), Physician, p.365

1. First woman graduate from the Royal London School of Medicine in 1882.
2. First woman Faculty Member as Lecturer to Madras Medical College in 1883.
2. First woman MD of the London University in 1888.
3. First Lady Doctor Knighted in 1926.

Scudder Ida Sophia, Physician, p.369

1. Established Christian Medical College, Vellore.
2. Started Nursing School, Vellore, 1909.

Sen, Gouri, Physician (Obstetrician and Gynaecologist), p.372

1. Established Obstetrics and Gynaecology Department at the Ram Manohar Lohia Hospital, New Delhi.
2. Established R K Puram Maternity Hospital as Perinatal Maternity Centre.

Sengupta, Sudipta, p.377

1. First woman member of the Third Indian Scientific Expedition to Antarctica Team in 1983 along with Dr. Aditi Pant (a marine

biologist). They opened a new chapter for achievement of Indian women by becoming members of the Scientific Team of Indian Antarctic Expedition.

Seward, Sara, Physician, p.379

1. Established Sara Seward Hospital, Allahabad, 1890.
2. Died of Cholera at Allahabad on 12th June 1891.

Shakuntala, Devi, Mathematician, p.384

1. First human to beat computer to perform multiplication of two 13-digit numbers in 28 seconds at the Computer Department of Imperial College, London on 18.06.1980 and proved herself faster than any computer available at that time. For which she earned the dignity of being a “Human Computer” across the world.

Shankar, Priti, Computer Sciences, p.386

1. First woman Graduate from Indian Institute of Technology, New Delhi in 1968.

Shanta, V, Physician (Oncologist), p.388

1. Developed Adyar Cancer Institute from 12 bedded Sevagram huts in to a modern cancer research centre.
2. Installed First Cobalt-60 Supervoltage Therapy Machine in Asia.
3. Established First Pediatric Cancer Unit in 1960.
4. Started First DM (Medical Oncology) and MCh (Surgical Oncology) in India.
5. Started Cancer Registry System in India in 1997.

Sirsat, Satyavati Motiram, Physician(Pathologist and Oncologist), p. 409

1. Established the First Electron Microscopy Laboratory at the Indian Cancer Research Centre, Bombay.

Sohonie, Kamala, Biochemist, p.412

1. First Indian Woman to get PhD from Cambridge University in 1939.

Swain, Clara A, Physician, p.420

1. First Missionary Doctor sent to Asia. She arrived at Bairelly on 20th January 1870.

2. Recommended for the Establishment of Christian Medical College, Ludhiana.
3. Recommended for Dafferin Fund to start medical service to improve the health condition of women and children of India.
4. Established Clara Swain Hospital for Women, the 1st Women's Hospital in India in May 1873, built from the fund of Nawab of Rampur.

Thomas, Tessy, Engineer, p.427

1. First Woman Director of Missile Project of Defence Research and Development Organization of the government of India.

Vaughan, Kathleen Olega, Physician, p.436

1. Discovered osteomalacia disease among rich Kashmiri women due to deficiency of light and vitamin D. Traditional custom of wearing burka and purdanasheen culture caused deformation of pelvis and complication in child birth.

Vellut, Claire Marie Jeanne, Physician, p.438

1. Established Leprosy Centre, Polambakkam village, Chingleput in 1954.
2. Started 52 mibile clinic for leprosy.

Vergheese, Mary Puthusseril, Physician, p.441

1. Dr. Mary Puthusseril Vergheese was a woman paraplegic surgeon, who did operation from her wheel chair. In 1954 she met with a fetal road accident, she injured her spinal cord, which paralyzed the movement of her lower part and legs.
2. She started an independent Physical Medicine and Rehabilitation Institute, Vellore in 1966. It was the first institute of its kind in the country. Under the able guidance of Dr. Mary, the institute started 2 years Diploma Course for doctors in Physical Medicine and Rehabilitation.

Virmani, Vimla, p.444

1. She played leading role in seting up of the Neurology Section at the Post Graduate Institute of Medical Education and Research at Chandigarh.

2. She started the Department of Neurology at the All India Institute of Medical Sciences in 1964. She expanded the Department and started DM degree course in Neurology.

White, Maria, Physician, p.450

1. Established White Memorial Hospital of Sialkot in 1888.
2. She was the first lady surgeon sent by the United Presbyterian Board of USA to India in 1886.

William, Sunita L, Astronaut, p.452

1. She established Record for longest single space flight by a woman (195 days).
2. Made record of seven total spacewalks by a woman.
3. Made record of highest space walk time for a woman (50 hrs and 40 minutes),
4. Made record of total time in space (321 days, 17hrs, 15 minutes).

Wills, Lucy, Physician, p.455

1. First to identify the cause of macrocytic anaemia in pregnancy due to deficiency of an element 'Wills Factor', this was finally identified as folic acid.
2. First to provide therapy for anaemia in pregnancy, by supplementing diet with iron and folic acid.

Winter, Priscilla (nee' Sandys), Health Worker, p.458

1. She started holding open dispensary at the women's bathing ghat near the West Bank of the holy river Yamuna. She was popularly known as 'A Woman with Medicine Chest' at the Ghat of river Yamuna.
2. This small dispensary developed in to a maternity centre and then the St. Stephen's Hospital, the first hospital for women and children of Delhi.
3. Though she did not have any medical qualification, but her dedication was the motivating and moving force behind the establishment of St. Stephen's Hospital, Delhi.



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