

The Indian Chemical Society:

A Century of Performance and Promise in the Service of the Nation



Dulal C Mukherjee

Dulal C. Mukherjee, a former Professor at Calcutta University, Kolkata (1968-2002), an Emeritus Professor at the Heritage Institute of Technology, Kolkata (2003-2012), and was a President of the Indian Chemical Society (ICS). He is currently one of the advisors of the ICS and has guided 15 Ph.D. theses during his career and published more than 120 research papers. Mukherjee did Postdoctoral research at the University of Arizona, Tucson, USA, and Eye Research Institute of Retina Foundation, Harvard University School of Medicine, Boston, USA. He received the Sir Rashbehari Ghosh Fellowship from the University of Calcutta, the H. K. Sen Memorial Award from the Institution of Chemists, the Award of the Indian Society for Surface Science Technology, and the World Science Congress. He received the Lifetime Achievement Award of the ICS and an Emeritus Fellowship of AICTE, Gol.



Ganapati D. Yadav

Professor Ganapati D. Yadav, Emeritus Professor of Eminence at ICT, Previous Vice Chancellor of ICT Mumbai, is currently the National Science Chair of Govt. of India. He is internationally recognized by over 125 prestigious awards and honors for his contributions to education, research, and innovation in Green Chemistry and Engineering, Catalysis, Chemical Engineering, Energy Engineering, Biotechnology, Nanotechnology, sustainability, green hydrogen, CO₂ refineries, and biomass valorization. He was conferred Padma Shri, the fourth highest civilian honor, by the President of India in 2016. He received two honorary doctorates and was elected to the US National Academy of Engineering and the US National Academy of Inventors. He supervised 107 Ph.D. and 135 M.Sc. students. He has published 515 research papers, 120 patents, and 3 books. He serves as an Independent Director on the boards of 6 public limited companies.



By: Dulal C. Mukherjee (Former President) and Ganapati D. Yadav (Current President) Indian Chemical Society

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The Indian Chemical Society (ICS), a premier Scientific Society of India, was founded in 1924 as a National Forum for the community of chemists and members of allied disciplines. It will enter the centennial year of its foundation on May 9, 2023. The driving force behind its establishment was the nationalistic spirit prevailing in India under the British rule. J. N. Mukherjee, J.C. Ghosh, and S.S. Bhatnagar while carrying out their research work in the University College, London, in 1919 for their D.Sc. Degree decided that after returning to India, they would endeavor to establish a Chemical Society like the Chemical Society of London, now the Royal Society of Chemistry (RSC). They dreamed of transforming it into a reality with the active cooperation of many of the country's leading personalities. The Indian Chemical Society was founded on May 9, 1924, as a registered Society, with Sir Prafulla Chandra Ray, the doyen of Indian Chemists, as the founding President (Figure 1). Many of the distinguished personalities in Chemical Sciences at that time in India took an active interest in nurturing the newborn Society.



INDIA'S CENTURY OF CHEMISTRY



Figure 1. Founders of the Indian Chemical Society and members of the first Council (1924). Top row from left: P. C. Mitter, Shanti Swarup Bhatnagar, J. C. Ghosh, and Sir P. C. Ray; bottom row: Sir J. L. Simonsen, J. N. Mukherjee, and Gilbert J. Fowler

The first Council of 1924 included President Sir P. C. Ray, Vice-Presidents Gilbert J. Fowler and E. R. Watson, Secretary J. N. Mukherjee, Treasurer P. C. Mitter, and Editors N. R. Dhar and A. N. Meldrum. Other Council members were H. E. Annett, S. S. Bhatnagar, R. L. Datta, B. K. Singh, B. B. Dey, and B. H. Wilsdon.

The Indian Chemical Society started its activity by publishing a quarterly journal. Initially, the Society did not have its own office. It functioned from the office of the Secretary, J. N. Mukherjee, who was then Sir Rashbehary Ghose Professor of Chemistry at the University College of Science, Calcutta. Sir P. C. Ray donated 10,000 Rupees to Calcutta University to adequately accommodate the ICS. The gift allowed the construction of three large rooms in 1933 on the second floor of the south wing of the Sir Taraknath Palit Building of the University College of Science and Technology. Two rooms were allotted to the Society for its use and the third one for the use of the University. The Society still functions from this location in University College of Science and Technology, Kolkata.

Publications

The first issue of the quarterly Journal of the Indian Chemical Society appeared in November 1924 and received appreciation from several leading organizations and personalities from other countries. Professor Wynne, the then President of the Chemical Society, London, cabled to Sir P. C. Ray, congratulating the Indian Chemical Society for this venture. Prof. P. C. Ray enthusiastically responded to Professor Wynne with thanks. The renowned journal *Nature* (London) related to this event:

The great work in chemistry which has occurred in the Indian Empire during the past ten years, had led to the establishment of an Indian Chemical Society, the first number of the quarterly journal of the Society has now appeared. There are thirteen papers, and only one of these is published under the

English names. The remaining papers were published by Indians and come from all parts of the Indian Empire. Four of these emanate from the College of Science, Calcutta, and this is as it should be, because for many years past, this Institution has been the backbone of chemical research in India.

The University College of Science, Calcutta, had been set up by Sir Ashutosh Mookherjee. The significant chemical research centers included Banaras, Lahore, Madras, Agra, Bombay, Dacca, and Bangalore. Everybody agreed that there would always be papers for the continuance of the Journal. The attitude of the provincial governments was not at all encouraging. Only the State of Baroda promised an annual grant. When the prospect of publishing the Journal looked grim, Sir Ashutosh Mookherjee, the then Vice-Chancellor of Calcutta University, came up with the generous offer of publishing the Journal of the Society 15,000 Rupees per year. Soon the Universities of Dacca, Allahabad, and Punjab promised annual grants of 200, 200, and 100 Rupees, respectively. At the meeting of the Watson Committee held at the Medical College, Lucknow, on January 11, 1923, the Committee decided that the funds promised would enable the founding of a Chemical Society and publish a quarterly journal. The Committee meeting at Bangalore in 1924 determined the rules and regulations of the society. Thus, the Indian Chemical Society was officially established and registered on May 9, 1924, with Sir P. C. Ray as the Founding President and J. N. Mukherjee as its Secretary.

Following the ICS foundation and its Journal's publication, the society started its endeavor to build up exchange relations with other such societies around the globe. First, they built links with the *Journal de Chemie Physique*, Paris, the *Chemical Abstract*, and the *Journal of the Chemical Society*. Papers continued to pour in from all over India, and despite extreme financial hardships, the

Journal had become a bimonthly by 1928 and a monthly by 1930.

As of January 2021, the Journal of the Indian Chemical Society (JInCS) is published by Elsevier and is part of ScienceDirect (<https://www.sciencedirect.com/>). All back issues (1924-2020) are now available free on the website, <http://indianchemicalsociety.com/>, financially supported by Xytel India Pvt Ltd., Clean Science & Technology, Ltd., and Meghmani Organics Ltd. A new Editorial Board includes 54 renowned experts from 21 countries. Under its new format, the Journal has six sections: Organic and Biochemistry, Inorganic and Material Chemistry, Physical and Theoretical Chemistry, Analytical and Environmental Chemistry, Industrial and Applied Chemistry, and Engineering Chemistry and Green Technology.

The inaugural issue of the Journal in January 2021 contained articles by invitation. Special issues are published from time to time in consultation with the Editor-in-Chief, Prof. G.D. Yadav. Daily 3-4 articles are submitted online to the Journal from all over the globe.

The activity of the Society was to make an effort to ensure the publication of original research papers and to encourage the enrollment of members and subscribers. In this way, the Society performed a commendable job with its Journal. In collaboration with the Institute of Chemist (India) and the industries, a new Edition was bought as a separate quarterly Journal. Later, in 1950, this Journal was renamed The Indian Journal of Applied Chemistry. Due to the lack of funds, the Journal was discontinued.

The ICS has published a few books and monographs, including the History of Chemistry in Ancient and Medieval India (incorporating P. C. Ray's History of Hindu Chemistry)-Edited by P. Ray, Reflections on Chemical Education - N. R. Dhar, Acharya Prafulla Chandra Ray: Life and Achievements - N. R. Dhar, Glimpses of Acharya P. C. Ray's



Figure 2. From left: photo and bust of Prafulla Chandra Ray, which is placed in the garden of Birla Industrial & Technological Museum, Kolkata; A bust of Sir P. C. Ray at the ICS headquarters; Ray on a 1961 stamp of India; ICS Logo.

Work in Chemical Science by Professor Animesh Chakravorty, Mahakaler Somkhipta Itihas: Prof Anil Kumar Dey, and the periodical (in Bengali), Education in Chemical Science and Technology.

The Society publishes a Bulletin called Chemical Warta, containing news of national and international events, members' achievements, conferences, and academic news.

The Objectives of the Society

The ICS was established with the following objectives as laid down in its Memorandum of Association:

- The cultivation and promotion of Chemistry and of allied branches of science.
- To co-operate with other Organizations having similar Objectives.
- To do and perform all other acts, matters, and things that may assist in, conduce to, or be necessary to fulfill the objects mentioned above and for the Society.
- The Society shall not make any dividend, gift, division, or bonus in money to, or between, any of its members but may pay remuneration to any of its Office-bearers.
- The Council shall have the power to acquire land by purchase or by lease for the fulfillment of the objects of the Society and to create a charge or mortgage on the immovable property of the Society for securing payment of unpaid purchase money or premium.

Society's logo

The ICS logo (Figure 2) contains the image of Sir Prafulla Chandra Ray, who was an eminent Indian chemist, educationist, historian, industrialist, and philanthropist. Ray received a D.Sc. degree from the University of Edinburgh in 1887 and spent 27 years packed with activities in Presidency College, Calcutta. In 1916 he moved to become the first Chair Professor of Chemistry in the

College of Science, Calcutta University, at the invitation of the legendary Vice-Chancellor Ashutosh Mookherjee, who later appointed Sir C. V. Raman as the first Chair Professor of Physics.

Ray established the first modern Indian research school in chemistry and is regarded as the father of chemical science in India. He founded the Bengal Chemicals & Pharmaceuticals, India's first pharmaceutical company. His book, A History of Hindu Chemistry from the Earliest Times to the Middle of the Sixteenth Century, was published in 1902.

India commemorated the centenary year of his birth with a postage stamp. His 150th birth centenary coincided with the International Year of Chemistry – 2011. In the same year, the Royal Society of Chemistry honored his life and work with the first ever Chemical Landmark Plaque outside Europe - on Ray in Presidency College, Kolkata, where he started his career (Figure 2).

ICS Branches

The Indian Chemical Society has several branches for the expansion of the activity of the Society. At present, the six active branches include the Allahabad, Bhagalpur, Baroda, Chennai, Raipur, and Mumbai. In 2021-22, a new Industries Branch was created for the benefit of chemists from industry, thus making it as the seventh branch. The Fellows associated with these branches are enthusiastically carrying out various academic activities.

Past ICS Presidents

Many illustrious chemists have served the Indian Chemical Society as the President since its foundation in 1924: Acharya Prafulla Chandra Ray, Gilbert John Fowler, Bawa Kartar Singh, Nil Ratan Dhar, Sir Upendranath Brahmachari, Jnan Chandra Ghosh, Hemendra Kumar Sen, Shanti Swarup Bhatnagar, Biman Behari Dey, Jnanendra Nath Mukherjee, Priyadarshan

Ray, Jnanendra Nath Ray, Prafulla Chandra Guha, Mata Prasad, Bires Chandra Guha, Prafulla Kumar Bose, Krishnaswami Venkataraman, Tiruvenkata Rajendra Seshadri, Ramanlal Chhoganlal Shah, Syed Husain Zaheer, Ranchhodji Dajibhai Desai, Jagdish Shankar, Tuticorin Raghavachari Govindachari, Ram Narayan Chakravorty, Ram Charan Mehrotra, Sukh Dev, and Sailendra Mohan Mukherjee.

The current President, G. D. Yadav, achieved the transfer of the Journal of Indian Chemical Society to Elsevier publishing house and arranged industry support for the digitization of all issues since 1924 (Figure 3).

The Library of the Society

The Society is receiving about 125 Journals in exchange for its own Journal. Some of these Journals are only available in the Eastern Region of India. In addition, there is a relatively large collection of books. The library facilities are open to all interested readers. But due to a shortage of adequate space, the Society cannot extend full facilities to its Fellows and other intending library users.

Memorable Past Events

The Society celebrated some landmark events over the years.

- Silver Jubilee Celebration at University College of Science and Technology, Calcutta, in 1948.
- Golden Jubilee Celebration at University College of Science and Technology, Calcutta, in 1973.
- Diamond Jubilee Celebration at Jadavpur University, Calcutta, in 1984.
- Platinum Jubilee Celebration at Jadavpur University & Indian Association for the Cultivation of Science, Calcutta, in 1999.



Figure 3. ICS President G. D. Yadav at the 2023 IDMA-APA Pharmaceutical Analysis Convention; cover of the Journal of Indian Chemical Society at the Elsevier publishing house; cover of the Chemical Warta bulletin depicting Honorary Fellows.

- Various year programs from May 9, 2023, to August 2, 2024, are planned as part of the Centennial Year.

Membership of the Society

The Indian Chemical Society has provisions for the following classes of Fellowship/Membership:

- 1) Life Membership
- 2) Life Fellowship
- 3) Institutional Membership
- 4) Corporate Membership
- 5) Student Membership

The ICS covers different related disciplines for joining different membership categories and the various industries associated with these disciplines.

Eligibility Criteria for Fellowship

The ICS uses the following criteria as guidelines to remove subjectivity in recommending applicants for the Fellowship of ICS subject to modifications and approval by the Council.

1. S.S. Bhatnagar Prize winners
2. Fellows of all National and International Academies.
3. Full Professors in Centrally Funded Institutes or equivalent grade pay in

Analytical Chemistry	Solid State Chemistry
Inorganic Chemistry	Theoretical Chemistry
Organic Chemistry	Chemical Engineering
Physical Chemistry	Chemical Technology
Green Chemistry	Physics
Industrial Chemistry	Biological Sciences
Polymer Chemistry	Biotechnology
Biochemistry	Materials Chemistry & Engineering
Food Chemistry & Technology	Natural Products Chemistry
Microbiology	Environmental Chemistry
Pharmaceutical Science and Technology	Nuclear Chemistry
Earth Sciences	Oceanography
Marine Chemistry	Chemical Physics
Agro-Chemistry	Biomedical Engineering
Soil Chemistry	Oil Chemistry
Interfacial Science	Dyestuff Chem & Technology
Textile Chemistry & Technology	Any Other

National Laboratories, CSIR, DAE, DRDO, ISRO, ICMR organizations, State Universities, and deemed to be Universities within the top 200 NIRF rank.

4. Vice Presidents and Directors (R and D) of DSIR-recognized laboratories

of Industries in the Public or Private sectors.

5. Associate Professors in CFI or UGC-recognized universities and colleges who have guided at least 5 Ph.D. publications and patents with a cumulative impact factor of 200. (The I.F. for international patent 20 and national patent

10). In exceptional cases, Assistant Professors with a cumulative impact factor of 300 will be considered.

6. General managers and group leaders from industrial R and D with at least 20 scientists having Ph.D. and evidence of patents and technology transfer.
7. College Principals or Vice Principals with Ph.D. having full professorship and evidence of producing at least 2 Ph.Ds or with publications and patents leading to cumulative I.F. of 50.
8. Full Professors in UGC recognized Private Universities with evidence of producing 2 Ph.D. and a cumulative Impact Factor of 200.
9. In exceptional cases, those responsible for promoting the chemical sciences through policymaking and whose names have been approved by the Council.
10. All others with a degree in Chemical Sciences and Engineering/ Technology, who did not fit into any of the above, will be eligible for Membership.

Awards and Recognitions

The Society recognizes outstanding achievements in Chemistry and allied sciences and engineering through Lifetime Achievement Awards, Endowment Award Lectures, and Convention Awards (including Young Scientists Awards). The Society has instituted several endowment lectures in the field of chemistry. Some awards are annual, whereas some are biennial.

Annual awards: Acharya P. C. Ray Memorial Award; Professor Priyadarajan Ray Memorial Award; Acharya J. C. Ghosh Memorial Award; Professor J. N. Mukherjee Memorial Award; Professor P. K. Bose Memorial Award; Professor Dhananjay Nasipuri Memorial Lecture; Professor A. S. R. Anjaneyulu 60th Birthday Commemoration Award; Professor Suresh C Ameta Award; Professor R. D. Desai 80th Birthday Commemoration Medal & Prize; Professor R. S. Varma Memorial Award; Professor A. K. Chandra Memorial Award.

Biennial awards: Dr. Basudev Banerjee Memorial Medal and Prize; Professor B. N. Ghosh 80th Birthday Medal and Prize; Dr. D. S. Bhakuni Prize; Professor D.P. Chakraborty 60th Birth Anniversary Commemoration Award; Rev. Fr. L. M. Yeddanapally Memorial Award; Professor S. S. Sandhu Award; Professor G. V. Bakore Memorial Award; Dr. Ghanshyam Srivastava Memorial Award;

Professor U.C. Pant Memorial Award; Professor H.L. Nigam Memorial Award.

The Society has also instituted many Annual Conventions of Chemists Awards for Young Scientists impetus to the young chemists working at different research laboratories. There are several convention awards for young researchers below 32 in several branches of Chemical Sciences. These are:

Analytical Chemistry: Professor V. S. Tripathi Award, and Professor V. Pandu Ranga Rao Award; (Inorganic Chemistry): Professor A. K. Dey Memorial Award, Professor B. C. Halder Memorial Award, and Sri B. M. L. Bhasin Memorial Award; (Industrial & Applied Chemistry): Professor K R Desai Award; (Organic & Biochemistry): Dr. B. N. Mankad Award, Dr. J. M. Dasgupta Award, Dr. D. S. Bhakuni Award, Professor P. Sengupta Memorial Award, and Professor S. K. Talapatra Award; (Physical Chemistry): Professor Santi Ranjan Palit Memorial Award, and Professor S. T. Nandibewoor Award; (Environmental Chemistry): Dr. Upadhyayulu V. Rao Memorial Award, Dr. Upadhyayulu Annapurna and Satyanarayana Memorial Award, and Professor G. Gopalarao Centenary Young Scientist Award

Annual Convention of Chemists

Since 1963 The Indian Chemical Society has been organizing an Annual Convention of Chemists in collaboration with the Institution of Chemists (India). Different funding agencies, such as the Council of Scientific and Industrial Research, University Grants Commission, including DST, and others, sponsor these conventions. At the Annual Convention, the endowment lectures of the Society are delivered by distinguished speakers selected by duly constituted selection committees. In addition, invited lectures are delivered in different sessions of the convention. Oral and poster presentations of communications by younger chemists are also arranged. Some papers published at the Annual Convention of Chemists are selected for Convention Awards.

Honorary Fellows

Several great Scientists and personalities have been honored by the Honorary Fellowships: (Late) Dr. Anji Reddy (India); Prof. W. J. Orville-Thomas (England); Dr. Purnendu Chatterjee (USA); Prof. Helmut Sigel (Switzerland); Prof. M. M. Sharma (India); Dr. R. A. Mashelkar (India); Bharat Ratna Prof. C. N. R. Rao (India); Prof. Animesh Chakravorty (India); Dr. K. L. Mittal (USA); Prof. R. B. Lal (India); (Late) Dr. Srikumar Banerjee (India); Prof. Christopher W. Bielawski (Korea); Mr. Prabir Kumar Ray (India); Padmashri Prof. K. Vijay Raghavan

(India); Prof. Ashutosh Sharma (India); Dr. Renu Swarup (India); Prof. Collin Suckling, OBE (UK); Prof. Eric Jacobsen (USA); Dr. Mukesh D. Ambani (India), Shri. Rajjubhai D. Shroff (India); Padma Bhushan Dr. T. Ramasami (India).

Some Nobel Laureates have been honored by the Honorary Fellowships: Prof. M. Eigen (Germany); Prof. Henry Taube (USA); Prof. Jean-Marie Lehn (France); Prof. Sir Richard J. Roberts (USA); Prof. Ryōji Noyori (Japan); Prof. Sir Venki Ramakrishnan (UK); Prof. Sir James Fraser Stoddart (USA), (Late) Prof. Robert H. Grubbs (USA).

Future Perspectives

The Indian Chemical Society is presently involved in various academic activities that have drawn attention from other countries. Its future depends on the sincere, honest, and vigorous efforts of its Fellows. Many industries have supported the Society for propagating chemical sciences and its welfare activities through the efforts of the current president Prof. G.D. Yadav to celebrate the centennial year with grand programs and fund drives. Clean Science and Technology Ltd, UPL Ltd, Meghmani Organics Ltd, Pidilite Industries Ltd and Xytel India have contributed generously, and many others are committed to bolstering the awards. The ICS invites young minds and corporate houses to nurture science for the societal benefits in India.

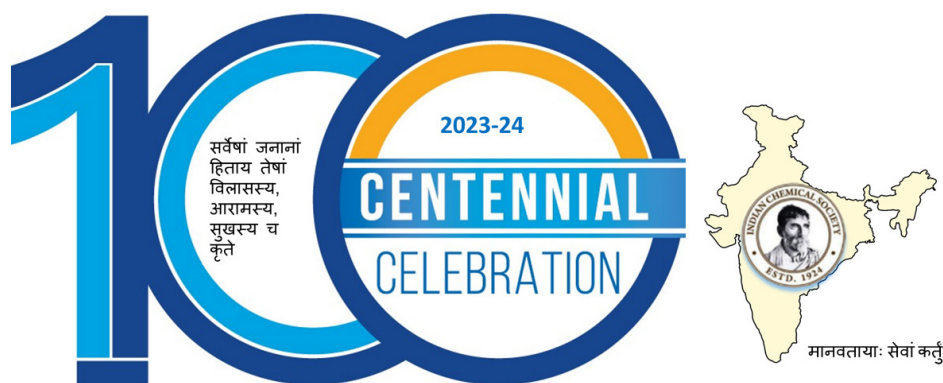
The Kolkata Municipal Corporation had allotted a piece of land within the city in 1967 for the construction of the building of the Society. Unfortunately, the construction could not occur for several reasons, such as a lack of resources and encroachment on the access road to the allotted plot. Despite the sanction of 20 million Rupees for the building about seven years ago by the Department of Science and Technology, Govt. of India, construction could not begin. We need generous donors from industry to complete the building with modern amenities. We intend to use CSR funds for continuing education, seminars, refresher courses, and training of students for the Chemistry Olympiad apart from the regular office and guest house with modern facilities.

Centennial Celebration Year

The Council of the Indian Chemical Society has planned many activities starting from May 9, 2023 until August 2, 2024, unveiled during the Annual General Body Meeting held on December 28, 2022 (Figure 4):

1. Inaugural Function in Delhi which will be graced by a VVIP.

2. Felicitation of achievers, roles models and past presidents responsible for the growth of the profession.
3. Securing Industry Support for All Endowment Awards and creating new awards (100 in number).
4. 5 Fellows from each country (20 countries).
5. Creation of Publication Corpus.
6. Increasing the IF and Cite Score of the Journal of the Indian Chemical Society (Elsevier Publication).
7. Making the Journal Open Access with innovative concepts.
8. 100+ Fellows from Industry.
9. 100 Corporate Members.
10. 100 Institutional members.
11. 100 Student Awards.
12. Encouragement for Lady Scientists by new awards.
13. Chemistry in School: New Initiative for School Children in All Schools to be celebrated on 2nd/3rd August every year.
14. Appeal to all Senior Fellows for Donation as Patrons.
15. Establishment of State Branches.
16. 100 College Chapters.
17. 100 University/IIT/IISERS/ Chapters.
18. Opening of Branches Overseas.
19. Collaboration of Branches with HO.
20. Collaboration with Other Organizations and Societies.
21. Reorganization of three major events across the country.
22. Conference by Foreign Fellows .



- Celebration of the Society's centenary year with year-long programming
- Construction of ICS building with the help of government & industry
- Securing industry support for all endowment lectures as well as creation of new awards
- Increasing numbers of fellows and members, especially fellows from industry
- Increasing the number of student chapters across the nation
- Introduction of E-Governance and streamlining of all databases
- Reorganization of the three main events to make them more impactful
- Raising the impact factor and source citation of the Journal of the Indian Chemical Society
- Opening of overseas branches
- Hosting weekly webinar series with the support of regional branches and council members
- Getting government approval for declaring August 2 as National Chemistry Day
- Increasing the corpus and financial health of the Society
- Collaboration with other professional societies in India and abroad for the benefit of the ICS

Figure 4. Planned activities for the ICS Centennial Year.

The Pledge of the Indian Chemical Society

This is my Society, the Indian Chemical Society. I take deep pride in it, but without vainglory; to it I owe solemn obligations that I am eager to fulfill.

I am privileged to be part of a great tradition, rich culture and ethos built by selfless services of great many individuals and followers of the Founder Acharya Prafulla Chandra Ray, the Sage.

I take great pride in the achievements and eminence of chemical sciences, engineering and technology.

I am fully aware that there is a confluence of chemical sciences with biological sciences in search of better solutions to the pressing problems faced by humanity. I am a beneficiary and benefactor.

Chemistry has been serving all lifeforms since time immemorial; and will continue to serve in achieving the goals of the Net Zero, sustainable development, containing climate change, and lead us towards the path of peace, prosperity, luxury and comfort.

I will be in a company of knowledge seekers, givers and servers associated with the Society. It will be my endeavour to protect its reputation and legacy. I will participate in none but honest enterprise.

I shall shun prejudice of all kinds and perform actions that are deemed righteous morally, ethically, professionally and legally.

To my fellows I pledge, in the same full measure I ask of them, integrity and fair dealing, tolerance and respect, and devotion to the repute and the dignity of our Society; with the consciousness, always, that our special expertness carries with the obligation TO SERVE HUMANITY WITH COMPLETE SINCERITY.