Prof. Anil Kumar Singh, Ph.D.

Professor (HAG), Department of Chemistry,
Indian Institute of Technology Bombay, Mumbai, 400076
+91 – 9820 74 7167 | + 91 – 22 – 2572 1761 | + 91 – 22 – 2576 7167 | retinal@chem.iitb.ac.in

SUMMARY

With teaching, research and administrative experiences spanning over three decades, Prof. Singh embodies a wealth of expertise and experience. As an academician and researcher of international repute and as a seasoned administrator, Prof. Singh has been associated at the highest management and governance levels with several academic and research organizations, government bodies, and scientific societies in the capacity of advisor/expert/office bearer/ member.

EDUCATION

1978 Ph.D., Chemistry, Indian Institute of Technology, Kanpur

1974 M.Sc., Chemistry, University of Gorakhpur, Gorakhpur

1972 B.Sc., University of Gorakhpur, Gorakhpur

ADMINISTRATIVE POSITIONS

2011 – 2014 Vice Chancellor, University of Allahabad (A Central University)

Under the directions of Hon. President of India- the Visitor of the University of Allahabad, Prof. Singh assumed the primary responsibility as Chief Executive for the academic, governance and overall organizational functioning of campus and enhancing the University's excellence in education, research, and public service.

- As the Vice Chancellor, managed academic and research University with an annual turnover of Rs.
 400+ Cr, 30+ academic units, 20,000+ Students, 300+ faculty, 1,000+ staff, and 11 constituent colleges.
- Focused on access, equity, engagement and outcome; content and quality of academic offerings; research and innovation; faculty recruitment and development; resource sharing; industry partnership; outreach activities; internationalization and foreign collaborations; alternate mode of delivery of academic offerings; campus development and student-centric activities, robust and transparent model of finance and good governance; modernization and infrastructure development, etc. A few are outlined below.
- Undertaken several administrative procedures reforms and rationalization.
- Created charter for financial transparency and initiated numerous innovative measures to improve
 governance, and academic practices suiting today's requirement, and putting the institution on the
 new trajectory of modernization, growth and progress in all respects.
- Established process for faculty recruitment and recruited world-class faculty at all levels.
- Established academic, admission and other standardization. Increased student enrollment by introducing national level centralized University admission process successfully across the country.
- Initiated faculty development plan with focus on career advancements, improving teacher-pupil ratio and improving academic environment of University.

- Focused on institutional reorientation and curriculum modernization. Introduced new pedagogies, performance evaluation protocols, developed new courses with focus on betterment of student experience, job prospects and alignment with Government's policies and welfare schemes.
- Introduced novel Dual Degree and flexible programs (like BS-PhD started in Development Studies, Materials Science).
- Initiated setting-up of innovative academic units like: centre for basic sciences advance education and research; nodal centre for lifelong learning; academy of institutional management and leadership development in higher education; faculty recruitment and development centre; international students cell; school of health science and technology; school of engineering and technology, etc. In addition, some other academic entities like centre for radiation and photo-sciences, culture and development studies centre, intellectual and property rights and human rights centre, etc. also started.
- Improved University infrastructure and ambience with renewed medical scheme and facility, classroom improvement through ICT and audio-visual installations, e-class rooms, augmentation and modernization of Library (digital / e-library, e-journals, reference materials and e-books).
- Developed new buildings and classrooms to cater to growing demands of University, and established new faculty, staff housing and student dormitories. Also several student-centric activities started for their overall development.
- Enhanced the community connect and other outreach activities, collaborations (both with academic institutions and industry), sponsored project activity, etc. Initiated Academia-Industry Cell, Campus-Community Interface Cell, ICT Cell, Innovation Cluster activity, Inspired Teachers Network, undergraduate research opportunity scheme, strengthened unit for training of students for administrative competitive examinations, started courses for community (urban/rural) on community college pattern, activated university employment bureau/ placement cell, brought in modernization and efficiency in constituent colleges, etc..
- Numerous other administrative and academic measures taken to effectively meet today's educational requirements, and other mandates of the University.

2008 – 2009 Convener, Indian Institute of Technology Gandhinagar Cell at IIT Bombay

- Led the team of Faculty members, Government officials and Academic and Administrative staff to initiate and establish new IIT in Gandhinagar (Gujarat).
- Played central role in organizational planning, initiating academic programs and policies, administration, infrastructure development, in a rather very short span of time (about two months).
- Building/ Land procurement, Setting-up offices, Faculty recruitment, etc.; established office at IIT Bombay and Gandhinagar.

2007 - 2008 Vice Chancellor, Budelkhand University, Jhansi

2004 – 2007 Dean of Academic Programs, Indian Institute of Technology, Mumbai

- Managed the academic portfolio of large number of courses for Bachelors, Masters and Doctoral studies across 25+ departments.
- Led the creation of new academic policies and programs of education and research.
- Restructured UG and PG programs to make these more flexible and student friendly.

- Enhanced the Ph.D. program through innovation and close collaboration with academia and industrial research.
- Expanded academic collaboration MoUs with global universities such as National University of Singapore, Monash University, Australia, Naval Academy Ezimala, and many industrial houses in India.

1984 – 2005	Other Administrative Roles in Indian Institute of Technology Bombay
1993 – 1996	Head, Department of Chemistry, IIT Bombay
1998 – 2000	Convener, Post-Graduate Academic Performance Evaluation Committee, IIT Bombay
2002 - 2002	Director, CSIR-Regional Research Laboratory, Jorhat (Assam)
2004 - 2005	Chairman, Joint Entrance Examination (IIT-JEE) IIT Bombay

- Convener, Institute Colloquium, 2001 2002.
- Associate Chairman, IIT Bombay Campus School and Junior College, 2001 2005.
- Member, Kendriya Vidayalaya Management Committee, 2000 2005.
- Member, Senate Search Committee, 2001 2003.
- Member, Inter-disciplinary Program Committee (IDPC), Biotechnology, 1992.
- Member, Chemistry Department Policy Committee, 1991 1993.
- Coordinator, Research Projects, M.Sc. Chemistry (2-Yr and 5-Yr Integrated) and M.Sc.(2-Yr)
 Biotechnology programs, 1990 1992.
- In-Charge, Biotechnology Lab, 1990.
- Member, Institute Publication Committee, 1987 1988.
- Secretary, Department Post-Graduate Program Committee (DPGC), 1987 1988.
- Member, Undergraduate Program Committee (UGPC) of IIT Bombay, 1987 1988.
- Secretary, Bioscience and Bioengineering Group, 1984 1988.
- In-Charge, Chemistry Department Central Instrumentation Facilities, 1984 1988.
- Member, IDPC, Biotechnology, 1984.

ACADEMIC POSITIONS

1990 - Current	Professor, Department of Chemistry, Indian Institute of Technology (IIT) Bombay
2003 – 2010	Associated Faculty, BJM School of Biosciences and Bioengineering, IIT Bombay
1989 (Jan – Dec)	Visiting Scientist, Department of Chemistry, University of Montreal, Montreal (Canada)
1988 – 1990	Associate Professor, Department of Chemistry, IIT Bombay
1984 – 1988	Assistant Professor, Department of Chemistry, IIT Bombay
1983 – 1984	Lecturer, Department of Chemistry, IIT Bombay
1982 (Jun-Nov)	Lecturer, University of Roorkee
1981 – 1982	Research Associate, Columbia University, New York City, USA.
1979 – 1981	Post-Doctoral Fellow, University of Hawaii at Manoa, Honolulu, USA.

1978 - 1979

Post-Doctoral Fellow, Florida State University, Tallahassee, USA.

PROFESSIONAL AND SCHOLARLY SERVICES

University Leadership

- Chairman and Member, NAAC Group, 2015.
- Member, Academic Audit Team for National Institutes of Technology, Durgapur, Patna, Silchar, Surat, 2014 – 2016.
- Visitor's Nominee, National Institutes of Technology, 2013 2016.
- Member, Board of Governors, Indian Institute of Management, Lucknow, 2012 2014
- Member, Executive Council, Central University of Gujarat, 2012-2014.
- Governing Council, Inter-University Accelerator Centre, New Delhi, 2011 2012.
- Member, Senate, SV National Institute of Technology, Surat, 2011 to date.
- Member, Academic Council, University of Rajasthan, Jaipur, 2010 2012.
- Member, Senate, Veermata Jijabai Technological Institute, Mumbai, 2010 2011.
- Expert Member, Committee for Preparation of By-Laws of Ph.D. Degree, IIS University, Jaipur, 2010.
- Chairman, Academic Committee, Gujarat Technical University, 2009 2010.
- Member, Academic Council, Central University of Himachal Pradesh, 2009 to date.
- Visitor's (Hon. President of India) Nominee, University Court, North-Eastern Hill University, Shillong, 2009 – 2012.
- Member, Governing Council, Atomic Energy Education Society, Department of Atomic Energy, 2008 – 2014.
- Member, Inter-Academy Science Education Panel (INSA-NASI-IAS), 2009 2012.
- Chairman, 5-Yr Integrated M.Sc. Chemistry course design and development, S.V.
 National Institute of Technology, Surat, 2009.
- Member, IITs JEE Reforms Committee, 2009.
- Member, Curriculum and Course Development (M.Sc. Chemistry) Indira Gandhi
 National Open University, New Delhi (Organic Chemistry) 2007.
- Convener, DPR on academic programs, infrastructure, policy, planning, development, Indian Navy's Naval Academy, Ezhimala, Kerala, 2005.
- Member, IITs Special Task Force for reforms in Joint Entrance Examination, Indian Institutes of Technology, 2005.
- Member, UGC Committee for CDC for UG/PG Chemistry Curriculum Development 2000.

Government of India Programs

- Member, Review Committee for DST-TIFAC Autonomous Bodies/Institutions in areas of Chemical Sciences, Materials Sciences and Engineering – 2017.
- Member, National Committee to commemorate 125th birth anniversary of Pt. Jawaharlal Nehru, 2013 – 14.
- Member, MHRD's Site Selection Committee for Central Women University, Rae

Bareli, 2013.

- Member, Airport Advisory Committee, Allahabad Airport, 2012 2014.
- Member, National Committee to commemorate 150th birth anniversary of Pt. Motilal Nehru, 2012.
- Member Subcommittee on Institutional Management and Leadership Development in Higher Education, Planning Commission of India, 2011.
- Member Expert Group, Working Group on Higher Education 12th Five Year Plan (MHRD), 2011.
- Member –Sub-group on ACCESS under Working Group of Higher Education, 12th
 Five Year Plan UGC, 2011.
- Member, Group of Yale India Yale Higher Education Leadership Program, Yale University, USA, 2011.
- Member, Specialist Group (R&D Sector) In Advanced Chemical Sciences, for Plan Projects under R&D Sectors, Department of Atomic Energy, 2008 - multiple years.
- Member, Project Advisory Committee, Board of Research in Nuclear Sciences
 (Department of Atomic Energy), Basic Sciences I, 1998 multiple years.
- Member, UPSC-PT Board.

Association with Professional Bodies

- Chairman, National Academy of Sciences India (Mumbai Chapter) 2016 to date.
- Member, National Advisory Board Conveners, Indian Society of Chemists and Biologists, 2011 – to date.
- Council Member, National Academy of Sciences, India, 2011–2012.
- President, Physical Sciences Section of 80th Annual Session of National Academy of Sciences, India, 2010.
- Vice President, Indian Society of Chemists and Biologists, 2009 2012.
- Council Member, Indian Society of Chemists and Biologists, 2009 12.
- Council Member, National Academy of Sciences India, 2007 2008.
- President, Chemical Sciences Section of 94th Session of the Indian Science Congress Association, 2007.
- Chairman, National Academy of Sciences India (Mumbai Chapter) 2007 2009.
- Scientist-in-Charge, Organic & Biochemistry, 43rd to 47th Annual Conventions of Chemists, Indian Chemical Society, 2006 – 2010.
- Executive Council Member, Indian Photobiology Society, 2005 2009.
- Advisor, National Academy of Sciences India Mumbai Chapter, 2004 2007.
- Vice President, Indian Photobiology Society, 2003 2005.
- President, Indian Society of Radiation and Photochemical Sciences, 2002 2004.
- President, Indian Chemical Society (Mumbai Branch) 2002 2004.
- Council Member, Chemical Research Society of India, 2002 2004.
- Vice President, Indian Chemical Society (Mumbai Branch), 2000 2002.
- Executive Board Member, National representative and Auditor, Asian-Oceania

- Society for Photobiology, Japan, 2001 Till Date.
- Vice President, Indian Chemical Society, 2001 2003.
- Council Member, Indian Chemical Society, 1997 1999.
- Vice President, Indian Society of Radiation and Photochemical Sciences, 1996 1998-2000.
- Scientist-in-Charge, Organic Chemistry, 17th Annual Conference of Indian Council of Chemists, 1998.
- Vice President, Indian Society of Radiation and Photochemical Sciences, 1996 98.
- Council Member, Indian Chemical Society (Mumbai Branch), 1996 2004.
- Council Member, Indian Society of Radiation and Photochemical Sciences, 1993 1995.
- Indian Society for Bioorganic Chemistry (Multiple years).
- Council Member, Indian Society of Radiation and Photochemical Sciences, 1985 1988.

A Few Other Scholarly Contributions

- External Assessor, Faculty Selection Committee, University Sains Malaysia,
 Penang, Malaysia, 2014 2015; Other Institutions in India multiple years/ times.
- UGC Nominee, UGC-SAP/CAS, Chemistry- University of Rajasthan, Jaipur, 2011.
- Member, Curriculum and Course Development, PG Chemistry Curriculum Committee, DAE Center for Basic Sciences, University of Mumbai, 2011.
- Member, Curriculum and Course Development (M.Sc. Chemistry) Central University of Rajasthan, 2010.
- Member, Curriculum and Course Development (M.Sc. Chemistry) IIS University, Jaipur, 2010.
- Member, Board of Studies in Chemistry, IIS University Jaipur, 2009 to date.
- Member, Research Committee, SIES College, University of Mumbai, 2009.
- UGC Nominee, UGC-SAP/CAS Programs in Chemistry- Kakatia University, Warangal, 2009 - 2014.
- UGC Nominee, UGC-SAP/CAS Programs in Chemistry- Gujarat University Ahmedabad, 2007 2012.
- Writer, Organic Chemistry (various topics) e-Books for NSDL Project, NISCAIR, New Delhi, 2007.
- Member Experts Panel, Analytical Chemistry Portal, Indian Institute of Information
 Technology & Management- Kerala, Kariyavattom, Thiruvananthapuram, 2007.
- Member, Research Degree Committee in Chemistry, South Gujarat University, Surat, 2005-06.
- Advisory Board member, VIDYA (Vidya Integrated Development for Youth and Adults), Mumbai, 2005.
- Member, Board of Faculty of Science, University of Allahabad, 2004 -2010.
- Member, Board of Studies in Chemistry, University of Mumbai, 2004 2005.

- Member, Advisory Committee, M.Sc. Biotechnology, Birla College of Arts, Science and Commerce, University of Mumbai, 2004 -05.
- UGC Nominee, UGC-SAP/CAS Programs in Chemistry- The Institute of Science, Mumbai, 2002 – 2007.
- Member, UGC Visiting Committee, 10thFive Year Plan, Aligarh Muslim University, 2002.
- Member, Board of Directors, KPO Research and Development, Bangalore, 2001-2003.
- Executive Board Member and Auditor, Asian-Oceania Society for Photobiology, Japan, 2002.
- Member, NCERT Writing Team for Higher Secondary Stage (XI & XII) Chemistry Text Books, 2001 – 2002.
- Organizer and Chairperson, Symposium on "Tertiary Structure of Retinal Proteins and its Implication in Photoreaction", 1st Asian Conference on Photobiology, Awaji, Japan, 2002.
- Member, Research Degree Committee in Chemistry, Devi Ahilaya Vishwavidyalaya, Indore (Vice-Chancellor's Nominee), 2001–08.
- Member, Board of Studies in Chemistry, DDU Gorakhpur University, 2000.
- Vice President, Indian Society of Radiation and Photochemical Sciences, 1998– 2000.
- Council Member, Indian Society of Radiation and Photochemical Sciences, 1998 to date).
- Member, Board of Studies/ Faculty Boards, BHU, Varanasi.
- Convener/ Co-Convener/ Advisor of conferences/ symposia/ AICTE/QIP-Short-Term Courses, etc.
- Member, Editorial Board of several Journals like Organic Chemistry International (multiple years); Proceedings of the National Academy of Sciences, India, Section A Physical Sciences (2005 2014, multiple years); Research Letters in Organic Chemistry (2008- onwards); Journal of Indian Council of Chemists (Multiple years); Indian Journal of Chemistry (Section B- Organic including Medicinal Chemistry) January 2008 to December 2010, January 2011 December 2013, and till date *i.e.* November 2014; Again 2015 -2017); International Editorial Advisory Board of 'International Journal of Chemistry', (2011 –till date); Guest Editor, ISRAPS Bulletin, 1990; Publication Committee, Journal of the Indian Chemical Society (2003); Guest Editor, Trombay Symposium on Radiation & Photochemistry Special Issue of ISRAPS Bulletin, 18/1 & 2/2006.
- Visitor's Nominee / Member, Panel of Experts for Recruitment and Assessment of Faculty and Scientists in different institutions including IITs, Central and State Universities, Colleges, NITs, Research Laboratories, etc. (Multiple years).
- Member, Committees for NASI Fellowship/ Membership/ Young Scientist Platinum
 Jubilee Award/ Awards of DAE and other academic and research institutions

(Multiple years).

- Book Reviews, Foreword Chemistry Books.
- Expert Member, DSIR (MS&T) Team for Industry visit.
- Reviewer of Research Papers In numerous journals like- Emerging Materials Research, Indian Journal Chemistry, Journal of Americal Chemical Society, Journal of Chemical Research, Journal of Chemical Science, Journal of Indian Chemical Society, Journal of Nanoscience and Nanotechnology, Journal of Fluorescence, Journal of Luminescence, Journal of Organic Chemistry, Journal of Photochemistry and Photobiology-A: Chemistry, Journal of Photochemistry and Photobiology-B: Biologgy, Luminescence: The Journal of Biological and Chemical Luminescence, Letters in Organic Chemistry, Nanoscience Nanotechnology Letters, National Academy Science Letters, Organic Chemistry International, Photochemistry Photobiology, Proceedings of National Academy of Sciences India, Synthetic Communications, Tetrahedron, Tetrahedron Letters......and many others, also including conference proceedings publications.
- External Ph.D. Thesis Adjudication of over 50 institutions (multiple times).
- Reviewer/ Adjudicator Research Projects Proposals from various national and international funding agencies like DST, CSIR, UGC, UPCST, DBT, BRNS, DST-Indo-French, Indo-US Science & Technology Forum / Swiss national Science Foundation, etc...

ACADEMIC SPECIALIZATION

Research Interest

Chemistry – Allied Sciences Interface; Organic- and Bio-organic chemistry, Photochemistry and Photobiology. Specific topics include:

- Bioactive natural products isolation and synthesis.
- Retinal-based biological photoreceptors structure and mechanism of function; bacteriorhodopsin a photoreceptor in halophile achebacteria *Halobacterium salinarium* involved in non-visual energy transduction.
- Photocontrol of structure and reactivity of organic and bioorganic systems photoactive synthetic/ semi-synthetic molecules and materials; photochromism, photobiological switches.
- Organic photochemical reactions photochemistry and photophysics of linear polyenes; photoisomerization and fluorescence; light-mediated organic reactions in organized assemblies; synthesis of novel heterocycles via photochemical routes.
- Fluorescence probes design of neutral and hydrophobic polarity and viscosity probes; charge transfer/ CRICT capable diarylpolyenes and related systems.
- Antiradical/ anticancer compounds synthesis and antiradical activity studies; development of radioprotective /antioxidants based on Vitamin E and A; synthesis and bioassay of retinoids as anticancer compounds.
- Biomolecular caging synthesis and excited state chemistry of phototrigers for biological/ biomedical applications (light-controlled, targeted delivery of bioactive compounds); Design of Pro-drugs.

• Organic Nanoparticles (ONPs) – synthesis and characterization of ONPs of low molecular weight organic compounds; fluorescent organic nanoparticles (FONs).

Projects Completed

- Individual and group projects undertaken with support of IIT Bombay, DST, BRNS (DAE), CSIR, DBT, MHRD, Imperial Chemical Industries and Indian Navy.
- Bioorganic investigations on rhodopsin and bacteriorhodopsin (DST).
- Photochemistry of linear polyenes (BRNS DAE).
- Synthesis of retinoids as anti-cancer compounds (CSIR).
- Photochemistry of aryl esters, amides and related compounds (CSIR).
- Photoprocesses in diphenylpolyenes (BRNS DAE).
- Excited state properties of donor-acceptor substituted diarylpolyenes (BRNS DAE).
- Photochemical reactions of dithiocarbamates mechanism and applications in Industry (ICI, Mumbai).
- Synthesis and properties of some novel photosensitive nitroaryl compounds and related biomolecular conjugates (CSIR).
- Studies of vitamin A and E compounds in DNA repair and cancer radiotherapy (BRNS DAE).
- Bioconversion Program, Biosciences & Bioengineering Group, IIT Bombay, (MHRD) (Purple membrane).
- Biotechnology Program, BSBE Group, IIT Bombay (DBT) (Bacteriorhodopsin).
- DPR for conduct of B.Sc./ B. Tech. by IIT Bombay at Naval Academy, Ezhimala (PI, collaborative, Indian Navy).

Research Publications / Presentations/ Patents

- 115+ Full length articles in peer reviewed journals, special periodicals.
- 10+ Abstracts/ comments in refereed journals, proceedings.
- One Thesis publication at Lambert Academic Publishing.
- 325+ Invited lectures/ papers in conferences/ symposia, etc.
- Patent on "A process for the preparation of polymers vinylic monomers using tetraethyl thiurium monosulfide (monosulfiram) as photoinitiator" (*Indian Patent No.* 204220 (2007). Granted on 24/01/2007).

Courses Taught

• More than two dozen types of courses at various levels in the area of chemical sciences and related interfacial biosciences, including Basic Chemistry, Basic Organic Chemistry, Organic Synthesis, Reaction Mechanism, Stereochemistry, Bioorganic Chemistry, Biomolecules, Spectroscopy, Thermal and Photochemical Reactions, Molecular Photochemistry, Natural Products, Analytical Biochemistry, Biochemical Techniques, Biotechnology, Biogenesis & Biosynthesis, Biotechnology, Biogenesis & Biosynthesis, Life Sciences, Photobiology, Structure and Stereochemistry, different Lab courses, including design and development of new UG, PG, and Doctoral level laboratories.

AWARDS AND RECOGNITIONS

- Fellow, Royal Society of Chemistry, U.K.
- Fellow, National Academy of Sciences, India.
- Fellow, Indian Academy of Sciences.
- Fellow, Maharashtra Academy of Sciences.

Prof. A. K Singh/ Curriculum Vitae

- Fellow, Indian Chemical society.
- Fellow, Institution of Chemists.
- Prof. P. K. Bose Memorial Award (Indian Chemical Society), 1999.
- Prof. J. N. Mukherjee Memorial Award (Indian Chemical Society), 2009.
- Award for Excellence in Chemical Sciences, 2009 (Indian Society of Chemists and Biologists).
- Chartered Chemist, Institution of Chemists (Kolkata) (declared in 1999).

PERSONAL INFORMATION

Present Position : Professor (Highest Academic Grade)

Date of Birth : April 02, 1952

Citizenship : India

Residence Address: Bungalow # A-4, Central Area, Indian Institute of Technology Bombay, Powai, Mumbai – 400 076 (India).

Telephone : +91 – 9820 74 7167 (Mobile) / + 91 – 22 – 2572 1761 (Land Line)

E-mail: retinal@chem.iitb.ac.in / retinal.iitb@gmail.com

Details of Keynote and Plenary Lectures, Invited Talks, Inaugural Addresses, different types and level of courses taught, students trained, research projects undertaken, and publications in refereed national and international journals, book chapters, and articles in bulletins and special periodicals, book reviews, foreword written, etc. can be furnished on request; and/or also available partly on: http://www.chem.iitb.ac.in/people/Faculty/prof/aks.html