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Highlights

A career of over 31 years marked by numerous accomplishments in bioinformatics research, teaching, mentoring, higher education reforms, and managing large institutions with outstanding success.

As advisor to National Knowledge Commission, identified several areas in need of the Commission's scrutiny and worked in formulating recommendations and reports to the Hon'ble Prime Minister.

As the Vice Chancellor of the University of Pune for the past five years, introduced sweeping reforms in university governance, financial management, and quality management. Introduced several new and innovative programs like MBA Biotechnology, Diploma program in Information and Network Security, M.Sc Bioinformatics, M.Tech Energy Studies, B.Sc Applied Geographical Information System etc. Increased university corpus substantially, from Rs.460 million to Rs.2 billion by means of accelerated fund raising and rational financial management. Established industry academia nexus by bringing in industry as the knowledge partner. Introduced numerous student and staff welfare programs. Implemented incentive schemes for quality improvement in affiliated colleges and recognized institutes. Adopted the latest technological advances like wi-fi connectivity throughout the campus, dedicated FM Radio station – "Vidya Vani", digital library, online student admissions, use of virtual classroom for quality teaching etc. Brought in radical reforms in the examination and evaluation systems. Pune University is the first university in the country to adopt measures such as transmission of question papers to examination centers through secured internet which eliminates the chances of question paper leakage. Improved research and training infrastructure on the campus.

One of the first few scientists in the world to pursue research in bioinformatics. Pioneered the establishment of the network of Distributed Information Centers (DICs) in India in the late 80s to initiate and promote bioinformatics research in India. Signal contributions to the field of bioinformatics include development of an algorithm to predict protein coding regions of a genome, development of first web based comprehensive database of animal viruses, development of complete methodology to design and develop peptide vaccines, development of VirGen – a database of full viral genomes and software tools to extract knowledge etc. Published over 60 papers in national and international peer reviewed journals, and edited books and monographs.

Teaching postgraduate programs and mentoring Ph.D. and M.Phil. students for the past 28 years at various universities – Central University of Hyderabad, University of Pune, and George Mason University in Fairfax, Virginia.

Over 20 years of management experience encompasses founding, nurturing, rejuvenating, and revamping small and large organizations. Founded the Bioinformatics Center at the University of Pune in 1988. As director of the center for 10 years, oversaw the rapid emergence of the center as the most dynamic of the contemporary centers conducting active research and disseminating information and training through innumerable national and international workshops, seminars, and conferences. Headed the Department of Biotechnology at the University of Pune for four years and Department of Zoology at the University of

Pune. As director of the Division of Bioinformatics at the American Type Culture Collection in Virginia, secured major grants for research in metabolic pathway engineering, biocomplexity, and poxvirus information system.

Personal Information

Name	Ashok Sadanand Kolaskar
Nationality	Indian
Age	57 years

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Professional Experience

4/06 – present	Advisor, National Knowledge Commission
2/06 - present	Professor, Biotechnology & Bioinformatics
2/01 – 2/06	Vice-Chancellor, University of Pune, Pune, India
8/99 - 2/01	Director, Bioinformatics Program, American Type Culture Collection (ATCC), Manassas, VA, USA
5/99 - 8/99	Research Scientist, Bioinformatics Program American Type Culture Collection (ATCC), Manassas, VA, USA
8/99 – present	Affiliate Professor, School of Computational Sciences, George Mason University, Fairfax, VA. USA
6/86 - 5/99	Director, Bioinformatics Centre, Professor, Department of Biotechnology, University of Pune, Pune, India
4/83 – 5/86	Scientist C, Center for Cellular and Molecular Biology, Hyderabad, India
1/78 – 3/83	Lecturer, School of Life Sciences, Central University of Hyderabad, Hyderabad, India

Education

- Bachelor's Degree in Physics, Chemistry, Mathematics, Nagpur University, India, 1969
- Master of Science in Physics, Nagpur University, India, 1971

- Ph.D. in Theoretical Studies on the Conformation of Peptides and Polypeptides, Indian Institute of Science, Bangalore, India, 1976

Patents

- Chimeric T-helper-B-cell peptide – US Patent # US2004076634, also granted Indian, European, Japanese and Australian patents.

Awards and Honours

- Honorary Degree of Doctor of Science, Deen Dayal Upadhyay Gorakhpur University
- IBM Vice Chancellor of the Year 2004-2005
- Pune Pride Award, 2004 for Excellence in the World of Academics from the Le Royale Regency Club, Pune
- Award of Excellence in the field of Education, 2004 from Top Management Consortium, Pune
- Governor's Citation, 2003 from the Governor of the State of Maryland, USA
- Shikshan – Ratna Puraskar, 2002 by Mumbai Doordarshan
- Felicitated by International Institute of Information Technology at the hands of Hon'ble President of India Dr. APJ Abdul Kalam for valuable contributions to the discipline of bioinformatics, 2002
- Fellow, National Academy of Sciences, Allahabad
- Fellow, Indian National Science Academy
- Fellow Maharashtra Academy of Sciences
- Life Member, Maharashtra Association of Cultivation of Sciences
- PARAM Award for best parallel computing application in bioinformatics
- Man of Achievement, International Biographical Centre, 5th Edition, 1991-92.
- Department of Science and Technology SERC Lecturership, 1991-92.
- Who's Who in the World Tenth Edition, 1991-92 (Macmilon Press).
- Short Term Department of Biotechnology Research Associateship, 1987-88.
- Young Associate Member of Indian Academy of Sciences, 1984-1988 and 1990.
- Prakya Ganpatrao Gold Medal, First in M.A./M.Sc., 1971.
- The Ramchandra Krishna Chandorkar Memorial Gold Medal, First in M.Sc., 1971.
- Balwantrao Mahajan Prize, First in M.Sc., 1971.

Serving as Member/Chairman of Various National Committees

- Member of the Steering Committee of Australia and India Universities Youth Forum, IDP Education Australia Ltd., Australia
- Member, Task Force on Bioinformatics, Department of Biotechnology, Government of India
- Member, Board of Governor, Indian Institute of Management, Bangalore
- Member, Executive Committee, National Institute of Banking Management, Pune
- Chairman, Academic Committee of NAAC Bangalore
- Chair India CSU (Long Beach) Co-operation in Education
- Governor of Maharashtra representative to select faculty members at BAU, Aurangabad
- Member Maharashtra Biotechnology Commission, Mumbai

Served as Member on various bodies (select few)

- Chairman, Task Force on Bioinformatics, Department of Biotechnology, Government of India
- Chairman, Biotechnology manpower development policy group, Department of Biotechnology, Govt. of India
- Chairman, Association of Indian Universities taskforce for the determination of university size and governance to improve quality of education
- Member, Governor's committee for the establishment of Biotechnology University in Maharashtra
- Chairman, Governor's Committee for the preparation of guidelines for the admission to and awarding of Ph.D. in Maharashtra
- Member of the UGC committee for formulation of Tenth Plan Profile of Higher Education in India.
- Member of the committee appointed by the Chairman, UGC to identify the Universities under "Potential for Excellence" Program
- Member of the Steering Committee of Australia and India Universities Youth Forum of IDP Education Australia Ltd., Australia
- Member of the Governing Body of the National Assessment & Accreditation Council (NAAC).
- Member of the Executive Committee of the National Assessment & Accreditation Council (NAAC).
- Member of the various Assessment Committees for assessment of Scientists at the CSIR.
- Member of the Committee constituted by Government of Maharashtra to formulate Biotechnology Policy of the State.
- Convener of the committee constituted by the Hon'ble Governor of Maharashtra to examine the existing pattern of higher education and reforms in the examination system.
- Member of the committee constituted by the Hon'ble Governor of Maharashtra to evolve set guidelines for sending proposals for conferment of honorary degrees.
- Member of the Court of the Indian Institute of Science, Bangalore.
- Member, Governing Body of the National Centre for Cell Sciences (NCCS).
- Member, Governing Body of the Inter-University Centre for Astronomy and Astrophysics (IUCAA).
- Member, Executive Council of Mahratta Chamber of Commerce & Industries.
- Co-Chairman, Institute of Marketing Management's Top Management Club.
- Member, Governing Body of YASHDA.
- Member, Governing Council of Vasantdada Sugar Institute, Manjri (Pune).
- Member, Management Council of Raja Dinkar Kelkar Museum
- Member, Pune Vyaspeeth.
- Member, Scientific Advisory Committee of Jubilant Biosys
- Member, Scientific Advisory Committee of KEM Hospital & Research Centre.
- Member, Scientific Advisory Committee of the National Institute of Virology.
- Member, Maharashtra Biotechnology Policy Committee
- Member, Governing Board of Biotechnology Policy of Maharashtra
- Member, General Body of ICCR, New Delhi
- Member of the Expert Committee for screening the proposals of the UGC for providing financial assistance to select departments including the courses/P.G. diplomas in emerging areas, etc
- Member, Committee for the establishment of Space Science University formed by the Hon'ble Governor of Maharashtra

Contributions towards improving higher education in India

Implemented numerous far-reaching reforms in the University of Pune in the areas of governance, financial management, and quality management, making it a model for the other

universities in the country. Increased the university corpus immensely by means of rational financial management and innovative fund raising initiatives. Developed the university into a model of internationalization of higher education by increasing the international student enrollment to about 2000 a year from nearly 70 countries and forging collaborations with more than 25 universities/institutes from different countries. Increased industry-academia interaction and a new experiment of bringing in industry as a knowledge partner was undertaken with very successful outcomes. Transformed the university into a research cum teaching institution and new centers of excellence in frontier areas such as sensor studies, nano and quantum sciences, biotechnology and bioinformatics, modeling and simulation, international studies, etc have been established. Contractual and joint faculty appointments were initiated and more than sixty new faculty members have been hired over a span of three years to improve the quality of education and research. Infrastructure to a tune of Rs 150 million has been added by way of new buildings, equipment, modernization of libraries, facilities such as gymnasium, etc. Formulated and implemented a highly effective system of incentives to improve the quality of affiliated colleges. Implemented numerous staff and student welfare measures such as low interest housing loans, health insurance, student aid fund, “earn while you learn” program etc. Provided a social face to higher education by encouraging student and teacher involvement in community work such as rainwater harvesting through continuous contour trenching, tree planting, and spreading awareness of issues such as pollution. Specific accomplishments are detailed in the following subsections.

Important Achievements As Vice Chancellor, University of Pune

The relentless effort from the time of assuming leadership to improve quality and governance of education and put the university at the forefront of higher education has earned many distinctions for the University of Pune. The university now has several firsts to its credit and enjoys the privilege of being a class apart in several other respects. Some of these honors include:

- Accreditation with the highest rating – A***** from the National Assessment and Accreditation Council (NAAC), Bangalore.
- First University in India to get ISO 9001-2000 certification of quality for Finance Branch.
- First University in the State of Maharashtra to introduce credit system in the postgraduate teaching departments.
- First and the only university in the country to have Wi-Fi connectivity throughout the campus of about 300 acres.
- First and the only University supporting quality improvement in affiliated colleges by providing funds from its own corpus.
- First university to bring in the concept of industry as knowledge partner and expand industry – academia interaction.
- First university to adopt the system of contractual and joint appointment of faculty.
- First university in the country to develop and implement IPR policy.
- University having the highest number of international students in the country and striving hard to make its education international in character.
- Identification by the University Grants Commission as the University with Potential for Excellence.
- A record increase in the university corpus from Rs.400 million to Rs. two billion in four years – a result of accelerated fund raising from the grant giving agencies combined with rationalization of investments and improved financial management.
- A record increase in the annual budget from Rs.450 million to Rs. One billion in three years.

- One of the few universities in the country getting major support under FIST program of DST, and from UGC under Department of Special Assistance.
- First university to develop software and execute transmission of question papers through secured internet, which eliminates the possibility of question paper leakage.
- One of the very few universities in the country to have dedicated FM radio station – Vidya Vani – to reach out to the community and student population.

Measures implemented to transform the university into a new age institution of international stature and repute

In step with the technological advances

- **Digital Library Project:** Acknowledging the necessity of state of the art libraries for quality research, University of Pune has joined hands with the Indian Institute of Science, Bangalore and Carnegie Mellon University, USA, and initiated universal digital library project. Under this project books are digitized and made available on the web.
- **INFONET program:** The University of Pune has also made available full text journals, reports, and documents on the web. This is a joint project of University of Pune, INFLIBNET, UGC, Ernet and Ford Foundation.
- **Radio Frequency Identification Technology:** The University Library having more than 400,000 books, journals, periodicals, etc. is automated by introducing Radio Frequency Identification Technology. Every book has an intelligent chip, so that the circulation can be completely automated. This project is a joint effort with X-ident GmbH Germany.
- **Digitization of examination records and other documents:** The University of Pune has undertaken the major task of digitizing examination results from 1949. The course content, syllabus, examination schedule, seating arrangement, various forms, details of important events etc. are made available on the web.
- **Wireless Connectivity:** The University of Pune is the first academic institution in the country that has fiber-optic network on the campus connecting all the departments through intranet and Internet. It is also the first university in the country and one of the very few in the world to have Wi-Fi connectivity throughout the campus.
- **External Students Admissions:** First University in the country to adopt the process of online admissions for external students and postgraduate programs on campus.

Industry Connection

One of the unique activities that the University has started is to **bring in Industry as Knowledge Partner**, and develop infrastructure on the campus and conduct research and development programs and courses in collaboration with the knowledge partners.

- Established the Centre for Information and Network Security (CINS), the only centre of its kind in South East Asia, in collaboration with Network Security Solutions, Courses in Network and Information Security are offered at certificate, diploma, and advanced diploma levels.
- Established Pune-University-Shimadzu Analytical Techniques Centre (PUSATC) with the help of Shimadzu Inc.
- Department of Electronic Sciences in collaboration with ICIT is offering certificate and diploma programs in various areas of electronics such as VLSI design
- Pfizer India has given generous grant to establish fellowships/summer training for M.Sc. students in the Department of Statistics.
- Reddies Research Foundation has established fellowships for M.Sc. students in Chemistry.
- The University has signed MoU with Frontier Technology, Hyderabad, in the area of Bioinformatics. The Scientists from Frontier and the faculty of Bioinformatics Centre are working together and the IPR generated will be shared 50%-50%.
- The University has signed MoU with Satyam Computers for imparting special training to software engineers in bioinformatics.
- School of Energy Studies has started M.Tech (Energy Studies) with the help of Thermax Limited
- Signed MoU with Education To Home (ETH), a private company, to spread computer literacy program in Marathi through Internet. More than 400 centers established in Maharashtra in 112 cities under this program and about 10,000 people certified thus far.
- With the help of Intel Asia, the University has brought about major changes in teacher education in the faculty of education by providing computer training to all teachers. Intel Asia Inc. provides CDs, study material and training to teachers in affiliated colleges.
- Developed new consultancy rules for promoting consultancy work by faculty.

Interaction with Government Agencies:

- The University has received major support from ISRO and ISRO has established “ISRO Chair in Space Sciences” in the University of Pune.
- The University has signed MoU with the Department of Atomic Energy, under which BARC will extend financial support for research.
- DAE has also established National Research Facility of Linear Accelerator in the Department of Chemistry and has given substantial funding.
- With the help of CSIR, the University has established Intellectual Property Right Chair and has prepared IPR policy of the University.
- Signed MoU with IIT, Mumbai for joint research in the areas of Engineering, Philosophy, Social Science, Biotechnology, Computational Biology, Biosensor, Cancer detection and cancer hyperthermia, rational drug design, newer imaging techniques etc.
- With the financial support of the University Grants Commission, the University has established National Centre for International Security and Defense Analysis (NISDA). This Centre will interact closely with various departments of the University as well as with the Armed Forces and will work on issues such as security of water, security of unborn, security of space, security of oceans etc.

Global Reach

- The University of Pune has signed MoUs with more than twenty international universities, such as University of Alaska, Fairbanks, Jonkoping University, Sweden, University of Lausanne, Switzerland etc. for research and training collaborations and exchange of students and teachers.
- University of Pune is the Indian component of the Asia-Link Program of European commission, which provides funding for social sciences research and training. Universities from Spain, Italy, and China are the other three partners.
- University with the highest number of international students in the country. About 1,600 international students from 82 different countries were admitted to University of Pune during the year 2005 – 2006 taking the total to about 8,500 international students.
- Global Partner of Academic Consortium of 21st century formed by Nagoya University.

Innovative Initiatives in University Governance and Quality Improvement:

- Initiation of “Earn While You Learn” program and Student Aid Fund with substantial funding.
- Undertaken Quality Improvement Program for Principals/Directors, teachers, and non teaching staff in affiliated colleges/recognized institutes by arranging seminars on various aspects of university governance and quality management.
- The University has made substantial provision from its own funds to enable teachers to undertake research projects to achieve academic excellence.
- First university to adopt the system of contractual and joint appointment of faculty.
- Initiated Adjunct Professorships
- The University of Pune has initiated an incentive scheme for colleges with excellence by way of substantial financial rewards. The University also initiated the scheme of recognizing best teachers and non-teaching staff from affiliated colleges in rural and urban areas.

Education responsive to contemporary needs

To impart education, which provides skill sets relevant to the changing work force requirements of the nation, the course content of all the existing programs has been revised and numerous new programs have been introduced in the past three years. Some of the new programs are:

- MBA (Biotechnology)
- Integrated Five/six Years M.Sc/M.Tech. (Biotechnology)
- M.Sc.(Bioinformatics)
- M.Sc. (Pharmaceutical Chemistry)
- M.Tech. (Energy Studies)
- B.Sc.(Biotechnology)
- B.Sc.(Applied) GIS and Remote Sensing
- Certificate Course in Forensic and Medical Jurisprudence
- Certificate and Diploma courses in Human Rights
- Certificate and Diploma courses in Clinical Trials and Clinical Data Management

The University has also developed a system by which the course content is updated at regular short intervals

Student and Employee Welfare

- Substantial increase in the student aid fund and funding for “Earn While You Learn” programs
- Evolved housing loan scheme for the employees from the university funds.
- Initiated orientation courses to improve quality of work of non-teaching staff.
- Yoga Classes for non-teaching staff, students, and teachers
- Day-care centre on the campus
- Medical Insurance for international students and university staff
- Steps to increase the life of the main building which is declared as a ‘Heritage Building’
- The University is establishing FM radio station on its campus, which will be very useful to communicate with the students and society.

Contributions to the Discipline of Bioinformatics

Research

Research interests in bioinformatics include the areas of protein folding, macromolecular sequence and structure analysis, molecular immunology and biological databases. The earliest protein folding research work disproved the existing belief that the peptide unit in the protein molecules is rigid and planar. Using quantum chemical calculations, it was shown that the peptide unit is flexible and the degree of non-planarity was calculated. Experimental data from crystal structures of small molecules confirmed these theoretical results and the era of non-planar peptides began with the publication of this work. The paper describing the “Non-Planarity of Peptide” has become a classic and is referred even today. It is a fundamental and pivotal concept in the theory of conformation of proteins and peptides and helped in understanding and refining structures of globular proteins. The second highlight of the protein folding research is developing a matrix from the analysis of 3-D crystal structure data of proteins and sequence alignment approach. The matrix, an extremely useful tool for protein data mining can be used to identify conformationally similar regions in different proteins. This method is also very useful to build initial 3-D structure of the protein for which only sequence information is available. Energy minimization based approaches can then be used to obtain 3-D structure models of the protein.

One of the first few scientists in the world to recognize the immense usefulness of the wealth of macromolecular sequence information and extract knowledge from that information. Developed software tools for predicting protein-coding regions in prokaryotic DNA using gene content and signal approach. PCGene, A US based company, exploited this conceptually novel and computationally simple algorithm in their commercial software package for predicting protein coding regions. Developed a method to predict antigenic determinants by analyzing known antigenic determinant amino acid sequence data. This method is a part of the GCG package, world’s most used sequence analysis package.

To facilitate rapid alignment of multiple sequences as opposed to pairwise alignment, a software package that allows multiple alignment of protein and nucleic acid sequences of almost unlimited length and number of sequences is developed on C-DAC parallel computer--a transputer-based machine. The farming approach is used for data parallelization. The speed gains are almost linear when the number of transputers is increased from 4 to 64. The software is used to carry out multiple alignment of 100 sequences each of alpha-chain and beta-chain of hemoglobin and 83 cytochrome C sequences. The single parameter, multiple alignment score, S, has been used to categorize proteins in different subfamilies and groups. This is the first software

on parallel computer to carry out efficiently multiple alignment of sequences. This work was recognized with "PARAM" Award for application software on parallel computer for biologists. The work in the area of structure prediction of large DNA and protein molecules using molecular dynamics as well as genetic algorithms has proved to be very useful in understanding the mechanism of biochemical reactions.

In Molecular immunology, a novel and pioneering method to identify peptide vaccine candidates has been developed and tested in the laboratory. Antigenic determinants in the envelope glycoproteins of flaviviruses were predicted using multiple sequence alignment method. To identify epitopes from amongst the predicted antigenic determinants, 3-D structure of the Japanese encephalitis virus (JEV) envelope glycoprotein (Egp) was predicted using the experimental 3-D structure of tick borne encephalitis virus Egp as a template. A method was then developed to predict conformational epitopes of the Egp. A B-cell binding epitope and a T-helper cell binding epitope were chosen and their conformations were predicted using molecular dynamics approach. A spacer peptide was designed and the three peptides were attached in the order B-cell binding epitope - spacer peptide - T-helper cell binding epitope. In addition, a small peptide was attached to the N-terminus of the B-cell binding epitope to stabilize its conformation. This was then synthesized in the laboratory of the collaborators and antibodies were raised against this peptide. It was shown that the monoclonal antibodies raised against this peptide bind specifically to JEV virus and also neutralize the virus. The peptide antibodies reduced the virus titer by more than 60%, indicating that the chosen peptide is a good vaccine candidate. The peptide has been awarded US, Indian, European, Japanese, and Australian patents.

The third area of major contribution is the development of databases. Developed a highly structured, computerized, web accessible animal virus information system, AVIS, with information on 1700 viruses. This is the first curated database in the area of biology from India and the first web-based biology database in the world. A software package that can be used by the virologists to identify online unknown virus isolates using AVIS was developed. A probabilistic method of virus identification based on Willcox's implementation of Bayes' theorem was implemented. The program also provides hints to the users about the additional tests required to obtain higher confidence in identification of virus species. Signature peptides of the virus can also be used to confirm identification. This is the first species identification software that allows the user to carry out identification online through Internet. This is considered one of the major contributions to the bioinformatics area, particularly in bioinformatics of virology.

Recently, a second database of all those viruses whose full genome sequences are published was compiled and a software package to analyze the data called VirGen was developed. VirGen is a comprehensive viral genome resource that organizes the 'sequence space' of viral genomes in a structured fashion. It has been developed with the objective of serving as an annotated and curated database comprising complete genome sequences of viruses, value-added derived data, and data mining tools. The current release (v1.1) contains 559 complete genomes in addition to 287 putative genomes of viruses belonging to eight viral families for which the host range includes animals and plants. Viral genomes in VirGen are annotated using sequence-based Bioinformatics approaches. The genomic data is also curated to identify 'alternate names' of viral proteins, where available. VirGen archives the results of comparisons of genomes, proteomes and individual proteins within and between viral species. It is the first resource to provide phylogenetic trees of viral species computed using whole-genome sequence data. The module of predicted B-cell antigenic determinants in VirGen is an attempt to link the genome to its

vaccinome. Comparative genome analysis data facilitate the study of genome organization and evolution of viruses, which would have implications in applied research to identify candidates for the design of vaccines and antiviral drugs.

Development of Bioinformatics in India

Spearheaded the establishment of the network of Distributed Information Centers in India in the late 80s to initiate and promote bioinformatics research in India. Responsible for establishing Bioinformatics Centers at Center for Cellular and Molecular Biology (CCMB), Hyderabad and at the University of Pune, Pune. The Center at the University of Pune is one of the largest and most active centers with state-of-the-art infrastructure. Numerous national and international workshops and short term training programs are organized on a continuous basis for biologists, physicians, and computer scientists, thus sensitizing them to bioinformatics. Foreseeing the need for highly trained bioinformatics manpower, introduced M.Sc., Ph.D., and one year advanced diploma courses in Bioinformatics for the first time in India. Mentored the first Ph.D. in Bioinformatics in India. Developed PC based bioinformatics software for molecular visualization and protein sequence data analysis, which was made available to the colleges and universities at a nominal fee to familiarize colleges and universities with the discipline of bioinformatics.

To develop the bioinformatics industry in India, special courses were designed and offered to IT professionals such as Satyam Computers personnel. Brought in software industry as partners in the development of bioinformatics products.

Has been a member of the bioinformatics taskforces of the Dept of Biotechnology, Govt. of India beginning with the very first taskforce and worked for the growth of bioinformatics in India. In recent years, as the chairman of the National Bioinformatics Taskforce, formulated bioinformatics policy of India with the goal of \$2.5 billion turnover by the year 2010 for the Indian bioinformatics endeavor. Worked on several advisory committees as bioinformatics expert including scientific advisory committee of Jubilant Biosys and monitoring committee of Strand Genomics.

Biotechnology Development Work

Actively involved in and contributed significantly over the past several years to the growth and evolution of biotechnology research, training, manpower development, and industry in India. Established an independent department of biotechnology at the University of Pune and worked as its first Head of the Department. This department is considered as the best department in the nation for master's program in biotechnology. As Vice Chancellor of the University of Pune introduced various unique courses for biotechnology manpower development such as MBA Biotechnology, 5/6 year integrated Biotechnology M.Sc/M.Tech . Continuing the biotechnology development work in the capacity of:

- Member, Scientific Advisory Committee, Department of Biotechnology, Government of India
- Chairman, Task Group on Bioinformatics of Department of Biotechnology, Government of India
- Member of the Reconstituted Biotechnology Research & Promotion Committee (BRPC) of Department of Biotechnology, Government of India.

- Principal Investigator of a major project of Rs. 8.6 million from the CSIR under the New Millennium Indian Technology Leadership Initiative (NMITLI) project.
- Member, Maharashtra Government's Task Force on Biotechnology.
- Member, Maharashtra Biotechnology Commission
- Member, Steering Committee on Information Technology & Biotechnology, of Maha. Govt.
- Responsible for recognition of Bioinformatics Centre as a Centre of Excellence by the Dept. of Biotechnology, Govt. of India, and received substantial funding under this program.
- Established Institute of Bioinformatics and Biotechnology under Potential Excellence Program of University Grants Commission
- Participated in several workshops organized by Maharashtra Industrial Development Corporation, Confederation of Indian Industry, Maharashtra Chamber of Commerce & Industries, FICCI etc. for sensitizing industrialists to the area of Biotechnology
- Established major DNA sequencing facility at Institute of Biotechnology & Bioinformatics. Initiated full genome sequencing of clinically important bacteria & started work on diabetes and malaria.
- Introduced Integrated M.Sc.(Biotechnology) – 5 years degree course after 12th grade.
- Started MBA (Biotechnology) – the only course of its kind in the country
- Initiated B.Sc.(Applied) Biotechnology and B.Sc.Biotechnology, and M.Sc Bioinformatics programs.

Scientific Publications

1. G.N.Ramachandran, A.V.Lakshminarayan and A.S.Kolaskar, 1973 - Theory of the Non-planar Peptide Unit, *Biochem.Biophys. Acta*, **303** 8-13.
2. G.N.Ramachandran, and A.S.Kolaskar, 1973, - The non-planar peptide unit II. Comparison of theory with crystal structure data., *Biochem, Biophys. Acta*, **303** 385-388.
3. G.N.Ramachandran, K.P.Sarathy and A.S.Kolaskar, 1973 - Interatomic potential functions and crystal packing, *Z.fur Kristallographic, Bd.*, **138** 299-312.
4. G.N.Ramachandran, K.P.Sarathy and A.S.Kolaskar, 1973 - Molecular packing of the crystal, N-methyl acetamide, *Z.fur Naturforsch*, **28-A** 643-646.
5. G.N.Ramchandran, A.S.Kolaskar and Ramesh Narayan,1974 - A new type of dihedral angle for the description of Biomolecular structure - *Curr.Sci.*, **43** 197-198.
6. A.S.Kolaskar, C. Ramakrishnan, V. Sasisekharan and G.N. Ramachandran, 1974 - The mean geometry of the peptide unit from crystal structure data., *Biochem.Biophys. Acta.*, **359** 298-302.
7. A.S.Kolaskar, K.P.Sarathy, A.V. Lakshminarayanan and V.Sasisekharan, 1975 - The non-planar peptide unit III. Quantum chemical calculations for related compounds and experimental X- ray diffraction data, *Biopolymers*, **14** 1081-1094.
8. A.S.Kolaskar, K.P.Sarathy and V.Sasisekharan, 1975 - The need for a modified psi potential in the dipeptide model, *Curr.Sci.*, **44** 33-38.
9. A.S.Kolaskar, K.P.Sarathy and V.Sasisekharan, 1975 - A note on the torsional potential function ν (O) in the dipeptide model, *Theoret. Chim. Acta*, **38** 109-114.
10. A.S.Kolaskar and D.Prashanth, 1977 - Torsional potentials from observed dipeptide conformations in protein structure data, *Curr.Sci.*, **46** 543-546.
11. A.S.Kolaskar and D.Prashanth, 1979 - Empirical torsional potential functions from protein data II. phi and psi potentials from nonglycyl Amino Acid residues, *Int.J.Peptide and Prot.Res.*, **14** 88-98.
12. A.S.Kolaskar and K.V.Soman, 1979 - A common factor in in-vivo synthesized polypeptides, *Curr.Sci.*, **48** 928-931.
13. A.S.Kolaskar and K.P.Sarathy, 1980 - The non-planar peptide unit IV Geometry and non-planar distortions of the cis-peptide unit, *Biopolymers*, **19** 1345-1355.
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1. Compiled two volumes of convocation addresses delivered by the chief guest from 1949-1993 entitled 'Precious Thoughts'.
2. Writing a book on 'Bioinformatics' for Wiley Eastern Ltd., India
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