

# DPU

**Dr. D. Y. Patil Vidyapeeth, Pune**  
**(DEEMED TO BE UNIVERSITY)**

(Re-accredited by NAAC with a CGPA of 3.62 on a four point scale at 'A' Grade)  
(An ISO 9001 : 2008 Certified University)

# INDUSTRY - ACADEMIA CONCLAVE 2018 (IAC 2018)

on  
February 23 - 24, 2018

## SOUVENIR



### VENUE

Main Conference Hall  
Global Business School & Research Centre  
Mumbai-Bangalore Highway, Tathawade, Pune 411033, Maharashtra, India

### Organized by

**Dr. D. Y. Patil Biotechnology & Bioinformatics Institute**  
**(DST\_FIST supported 2018-2023), Tathawade**  
**Pune, 411033**



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## **About D.Y.Patil Vidyapeeth, Pune**

Dr. D.Y. Patil Vidyapeeth (Deemed University), one of the well known Universities in West India, was established in the year 2003 under Section 3 of the UGC act 1956, Government of India and is accredited by NAAC with 'A' grade. It stands 47<sup>th</sup> in the NIRF ranking. Dr. D.Y. Patil Vidyapeeth was started with the mission *'To contribute to the socio-economic and ethical development of the nation, by providing high quality education through institutions that have dedicated faculty and state-of-the-art infrastructure, and are capable of developing competent professional and liberal-minded citizens'*. It has seven constituent Institutions at Pune viz., Padmashree Dr. D. Y. Patil Medical College, Hospital & Research Centre, Dr. D. Y. Patil Dental College and Hospital, Padmashree Dr. D. Y. Patil College of Physiotherapy, Dr. D. Y. Patil Institute of Optometry & Visual Sciences, Padmashree Dr. D. Y. Patil College of Nursing, Dr. D. Y. Patil Biotechnology & Bioinformatics Institute and Global Business School and Research Centre.

The well planned and equipped campus is situated at two places in Pune, main campus in Pimpri and two of its institutes viz: Dr. D. Y. Patil Biotechnology & Bioinformatics Institute and Global Business School and Research Centre are situated in Tathawade. Both the campuses have a splendid infrastructure with all basic and advanced amenities.

## **About Dr. D.Y.Patil Biotechnology and Bioinformatics Institute**

Dr. D.Y. Patil Institute of Biotechnology and Bioinformatics was established in the year 2004. It qualifies as one of the finest institute imparting B.Tech in Biotechnology and Bioinformatics, B.Tech Medical Biotechnology and M. Tech (integrated) in Biotechnology owing to its excellent faculty and supreme infrastructure. In the year 2007, the institute started M.Sc in Biotechnology, 2016 M.Sc in Bioinformatics started & in the year 2010, the institute started Ph.D. program in Biotechnology and Bioinformatics.

Biotechnology laboratories are well-equipped with facilities required for practical on biochemistry, microbiology, molecular biology, animal tissue culture and plant tissue culture. The computer laboratory is having high speed computers, application softwares and internet facilities required for practical's related to information technology and bioinformatics. Further improvement in the laboratories and the infrastructure are foreseen with strong and dedicated team and very supportive management.

The institute has one of the finest groups of faculties with expertise in different fields of biosciences. The highly qualified and efficient faculties provide knowledge to the students on maximum available branches of biosciences, a requirement for their specialization in future. They offer advanced curriculum with concrete practical education by means of well-equipped laboratories, well-stocked library and continuous student assessment with CGPA system of evaluation. The proficient infrastructure offers excellent opportunity, creating capable youth with sound theoretical and practical knowledge base to venture into the challenges of 21<sup>st</sup> century.

On the research front also the institute is progressing in great speed. It has received number of research grants from Government of India as well as foreign agencies. The students as well as the faculty are actively participating in field of research. There are number of students coming every year from other institutes to pursue their research projects. The main thrust research areas of the institute are bioremediation, fermentation technology, computational biology, computer aided drug designing, environmental biotechnology, plant biotechnology and microbial diversity.

The alumnus is very strong owing to their good positions in Industry, National and International laboratories. Nearly 20% students go ahead to pursue higher studies in well known national and international universities further adding to the alumni strength.

The Institute and the Vidyapeeth will continue their zest to provide quality education and research in the years to come.



## Organizers

Chief Patron	Dr. P. D. Patil, Chancellor, Dr. D. Y. Patil Vidyapeeth
Patron	Dr. P. N. Razdan, Vice-Chancellor, Dr. D. Y. Patil Vidyapeeth
Industry Patron	Mrs. Bhagyashree Patil, Director, Rise n' Shine Biotech Pvt. Ltd.
Chair	Dr. Somnath Patil, Executive Director, Dr. D. Y. Patil Biotechnology and Bioinformatics Institute and Secretary, Dr. D. Y. Patil Vidyapeeth Society
Convenor	Dr. J. K. Pal, Director, Dr. D. Y. Patil Biotechnology and Bioinformatics Institute

## National Advisory Committee

<b>Prof. KN Ganesh, IISER, Pune</b>
<b>Dr. Shekhar Mande, NCCS, Pune</b>
<b>Dr. Samit Chattopadhyay, IICB, Kolkata</b>
<b>Dr. Karnury VS Rao, THSTI, Faridabad</b>
<b>Prof. SC Lakhota, BHU, Varanasi</b>
<b>Dr. DT Mourya, NIV, Pune</b>
<b>Dr. RR Gangakhedkar, NARI, Pune</b>
<b>Prof. Ashwini Kumar Nangia, NCL, Pune</b>
<b>Prof. LS Shashidhara, IISER, Pune</b>
<b>Prof. Sanjeev Galande, IISER, Pune</b>
<b>Dr. Debasish Mitra, NCCS, Pune</b>
<b>Dr. Vidya Gupta, NCL, Pune</b>
<b>Dr. Ashok Giri, NCL, Pune</b>
<b>Dr. Saroj Ghaskadbi, SPPU, Pune</b>

# Vidyapeeth Advisory Committee

Mrs. Smita Jadhav, Trustee, Trustee, Dr. D. Y. Patil Vidyapeeth Society
Dr. J. S. Bhawalkar, Dean, Dr. D. Y. Patil Medical College, Hospital & Research Centre
Dr. Deepak Kulkarni, Dean, Dr. D. Y. Patil Dental College
Dr. Tushar Palekar, Principal, Dr. D. Y. Patil College of Physiotherapy
Mrs. Khurshid Jamadar, Principal, Dr. D. Y. Patil College of Nursing
Prof. H. P. Merchant, Principal, Dr. D. Y. Patil Institute of Hotel Management and Catering Technology
Dr. A. L. Kakrani, Dean, Faculty of Medicine, Dr. D. Y. Patil Vidyapeeth
Dr. Anil Keskar, Advisor, Management Studies, Dr. D. Y. Patil Vidyapeeth
Dr. A. N. Suryakar, Registrar, Dr. D. Y. Patil Vidyapeeth
Mr. M. S. Phirange, COE, Dr. D. Y. Patil Vidyapeeth
Dr. L. K. Tripathy, Director, Global Business School & Research Centre
Mr. Veshal Madan, Director-in-charge, Optometry Institute, Dr. D. Y. Patil Vidyapeeth

## Local Organizing Committee

Convener	Dr. J. K. Pal, Director, Dr. D. Y. Patil Biotechnology and Bioinformatics Institute
Organizing Secretary	Dr. Neelu Nawani, Professor, Dr. D. Y. Patil Biotechnology and Bioinformatics Institute
Organizing Coordinators	Dr. Amit Ranjan, Dr. Swapnil Gaikwad
Session Coordinators	Dr. G. D. Tandon, Dr. Nilesh Sharma, Dr. Rajesh Gupta, Dr. K. V. Swamy, Dr. Minal Wani and Dr. Manisha Deshpande
Publication & Website Committee	Dr. Shuchi Nagar, Dr. Prakash Nemade, Mrs. Shital Pandit, Mrs. Priyanka Bhopale and Mrs. Arti Deshmukh, Mr. Kiran Lokhande
Registration Committee	Dr. Manjusha Dake, Dr. Soumya Basu, Dr. Satish Sasikumar, and Dr. Rachana Pandey
Venue Management Committee	Dr. Girish Bhopale, Dr. Supriya Kore, Dr. Sarika Pawar, Dr. Jyoti Deshpande, Mr. Sandip Bansode, Mrs. Ipsha Singh
Local Travel & Hospitality and Food Committee	Dr. Arvind Goja, Dr. Viniti Vaidya, Dr. Anjana Singh, Mrs. Rashmi Pathe, Dr. Afreen Huda, Dr. Shipra Deep
Steering Committee	Mr. D. P. Chougule, Mr. Vinod Yadav, Mr. Shailesh Wathore, Mr. Laxman Kukade, Mr. Rahul Sagar, Mr. Shrikant Atre, Mr. Rushikesh Kadam, Mrs. Vaishali Mali

Ref. No. : DPU/46-18  
Date : 21-02-2018**CHIEF PATRON**

I am very happy that Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, a constituent unit of Dr. D. Y. Patil Vidyapeeth, Pune is organizing 'Industry – Academia Conclave 2018 (IAC 2018), during February 23-24, 2018 at Dr. D. Y. Patil Biotechnology & Bioinformatics Institute, Mumbai-Bangalore Highway, Tathawade, Pune.

Education is much more than the mere empowerment in terms of knowledge and skills. It also means the inculcation of values and the fostering of spirit of intellectual enquiry. In keeping with these objectives, Dr. D. Y. Patil Vidyapeeth, Pune supports the idea of bridging the gap between academia and industry.

Recent years have seen an unprecedented growth in biotechnology and its potential applications to human health. Yet, the promise of biotechnology will also bring challenges – challenges to the medical, scientific, and user communities, and to the legal and regulatory structures that govern the development and commercialization of these new biological tools. Interactions and exchange of ideas between scientists, industry experts and students would help to balance, and channelize the growth of biotechnology in the right direction.

I earnestly hope that the deliberations, scientific topics and mutual interactions amongst delegates and professional experts during the conclave would contribute largely to improve and strengthen the field of biotechnology and bioinformatics. I congratulate Dr. D. Y. Patil Biotechnology and Bioinformatics Institute for organizing the Conclave.

I wish great success for the Conclave.

**Dr. P. D. Patil**  
Chancellor  
Dr. D. Y. Patil Vidyapeeth, Pune

Dr. P. N. Razdan  
Vice Chancellor

## PATRON



I am glad to know that Dr. D. Y. Patil Biotechnology and Bioinformatics Institute of the Vidyapeeth is organizing IAC 2018, during February 23-24, 2018 at Dr. D. Y. Patil Biotechnology & Bioinformatics Institute, Tathawade, Pune .

Dr. D. Y. Patil Vidyapeeth (DPU) in short span of fifteen years have achieved recognition in both teaching-learning and research. DPU is committed to build the nation through empowerment of scientific knowledge and strongly believes that education should be for life and not for livelihood. University believes in promoting sustainable development of Higher Education and extends the frontiers of knowledge, for scientific communication in order that students and faculty members become useful members of an enlightened humane society. Dr. D. Y. Patil Biotechnology and Bioinformatics Institute has a significant contribution for the advancement of knowledge and has emerged as a pace setter in there fast expanding fields.

The deliberation in the conclave would comprise invited speakers from different walks of academia and industry in Biotechnology and Bioinformatics. This Conclave is aimed at bridging the gap between academia and industry by exchanging experiences and knowledge in theoretical and practical domain through presentations, dialogue and panel discussions. It would showcase the current technical advances in the major areas relating to Biotechnology and Bioinformatics and would be immensely useful for the students, scientists and researchers in India.

I extend my warm greetings to all the students and speakers and wish the conclave all success. On behalf of DPU, I would like to express my appreciations to all the staff and students of Biotechnology and Bioinformatics Institute, for their hard work and relentless effort. Without their commitment and contributions, this event would not have been possible at this time.



Dr. P. N. Razdan  
Vice Chancellor  
Dr. D. Y. Patil Vidyapeeth, Pune

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## Industry Patron

Industry – Academia Conclave 2018 (IAC 2018), is being organized by Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, a constituent unit of Dr. D. Y. Patil Vidyapeeth, Pune, on 23<sup>rd</sup> and 24<sup>th</sup> February 2018 at Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Pune. Biotechnology is on the forefront of a technological explosion. Indeed, this has already been dubbed the “Century of Biology.” In little more than a dozen years, the biotechnology Industry has grown from a handful of companies to over 30 new biotech offerings just this year. The Biotechnology Industry increasingly has an impact on a broad spectrum of fields including, health care, agriculture, and energy production. Waves of new products, including those that help save lives, disease resistant and nutritionally enriched crops, environmentally friendly fuels, and other products are already in the market.

To capitalize on the extraordinary opportunities, there is a need for amalgamation of data generated by various scientific laboratories and industries across India and abroad in the fields of both biotechnology and bioinformatics. A Conclave of this kind presents the right platform, for mutual exchange of ideas and generation of new ones for industrial applications. Whether in early stages of growth or more mature phases of development, biotech companies are eager to attract grants, investment and corporate partners where there are exciting ideas at stake.

The Rise n' Shine Group is a proud venture that has branched out into multiple trades viz. Floriculture, Horticulture and Biotech, each in its own right adhering to the highest quality standards. It is fast emerging as a major exporter of Horticulture and Floriculture products. Visualizing the vast business potential the world has to offer Rise n' Shine has set up tissue culture plants with a capacity of producing 30 million plants per year.

On behalf of Rise n' Shine Biotech Pvt. Ltd., I take the opportunity to wish the Conclave all success. I also congratulate the staff and students of Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, for organizing the insightful meeting.

Rise n' Shine Biotech Pvt. Ltd.

Mrs. Bhagyashree Patil  
(Director)

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Ref. No. :

Date :

**Chair**

It gives me an immense pleasure that Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, a constituent unit of Dr. D. Y. Patil Vidyapeeth is organizing an Industry – Academia Conclave 2018 (IAC 2018) on 23<sup>rd</sup> and 24<sup>th</sup> February, 2018 at Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Pune.

Importance of Science and Technology is increasing day by day and the immense knowledge available has to be grabbed in order to implement the knowledge. To fulfill this goal of implementing the knowledge, organization of Conclave of this stature is a good platform where industry patrons and scientists share the same platform to impart their knowledge and exchange their ideas on the future of Biotechnology and Bioinformatics field. This event will help to reduce the gap that exists between the industry and academia and further help to clear the understanding among students about the requirements of industry and academia.

I am happy that Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Pune, is organizing such a conclave where eminent people from various branches of Biotechnology and Bioinformatics are invited to share their experience and motivate the participants to gain expertise in their field of interest. Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, for organizing the insightful meeting.

I wish good luck to Dr. D. Y. Patil Biotechnology & Bioinformatics Institute for a grand success of the Conclave.

**Dr. Somnath Patil**  
Secretary



**Dr. D. Y. PATIL BIOTECHNOLOGY & BIOINFORMATICS INSTITUTE**

**Dr. D.Y. PATIL VIDYAPEETH, PUNE**

**(DEEMED UNIVERSITY)**

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**Prof. J. K. Pal, Ph.D., FNASc., FIMSc.**  
**Director**



## Convener

On behalf of the organizing committee of Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, a constituent unit of Dr. D. Y. Patil Vidyapeeth, Pune, I welcome all to the “Industry-Academia Conclave 2018” organized at Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Pune.

The field of biotechnology has, pervaded and percolated to every dimension of human activity, thus leading to employment generation, production and productivity, trade, economics and economy, health, well-being, and quality of human life, throughout the world. In order to reach different dimensions of biotechnology, we as a team have worked to invite different dignitaries from academia as well as industry to understand the global scenario that exists in the field of Biotechnology and Bioinformatics.

It is motivating to note the overwhelming response from our students for the Conclave.

On behalf of Dr. D. Y. Patil Vidyapeeth, I express my sincere gratitude to all the distinguished invitees and participants of the Conclave. I express my sincere gratitude to our dynamic leaders, Dr. P. D. Patil, Honorable Chancellor, DPU and Vice Chancellor, Dr. P. N. Razdan and to the whole scientific community who have supported us in organizing the Conclave. I express my heartfelt thanks to all the teaching and non-teaching staff and the student volunteers of Dr. D. Y. Patil Biotechnology & Bioinformatics for making this event happen.

  
**Dr. J. K. Pal**  
**Director, DYPBBI**





It gives me great pleasure to be a part of Industry – Academia Conclave 2018 organized by Dr. D Y Patil Biotechnology and Bioinformatics Institute on February 23-24. The aim of the Conclave is to impart updated information and knowledge to graduate and post graduate students and update the teachers with latest developments in the respective field. The key feature of this Conclave is the coverage of most important and contemporary areas of Modern biology. The speakers are the experts in the respective field and renowned scientists and industrialists with an excellent academic record. In addition to that these are also the best teachers who can convey their research activities in a palatable manner enhancing the enthusiasm of the students and triggering their inquisitiveness in their field of choice. We are confident that this cross pollination of ideas from various experts will make the young generation think differently towards a biological problem and eventually perform better in choosing discipline of their choice and to excel better in their future career. I wish all the success for this Conclave. Looking forward to an exciting Conclave and a fruitful session of panel discussion.

A handwritten signature in blue ink, appearing to read 'R. Bhonde', written over a horizontal line.

**Dr Ramesh Bhonde**  
**Director (Research)**  
**Dr. D. Y. Patil Vidyapeeth, Pune**



# Invitee Lecturers

## **LECTURE 1.**

### **DR. SANJAY SINGH**



Dr. Sanjay Singh, did his Masters in Biochemistry from the Lucknow University and holds a Ph.D. in Biochemistry from the Central Drug Research Institute, Lucknow. After obtaining his Ph.D., he worked on malaria vaccine development first at the International Center for Genetic Engineering and Biotechnology (ICGEB), New Delhi, India and then at the National Institute of Health (NIH), USA where he eventually headed the Antigen Research Section at the Malaria Vaccine Development Branch of National Institutes of Allergy and Infectious diseases (NIAID), NIH, USA. Dr. Singh has been associated at Gennova Biopharmaceuticals Ltd. since October 2006. At Gennova, his leadership has facilitated the launch of Elaxim™ (TNK-tPA); Vintor™ (erythropoietin); Emgrast™ (sargramostim); Exgrast™ (filgrastim); and PegEX™ (pegylated filgrastim) in the market. Under him Gennova was diversified into vaccine research specifically in the area of infectious diseases, in particular Malaria, HPV, Leishmaniasis and Tuberculosis in partnership with various national and global organizations.

Dr Singh is a member of the Steering Committee for the formulation of the Indian Biotechnology policies for Twelfth Five Year plan (Planning Commission Govt. of India). He also serves as a member of the Central Drugs Standard Control Organization (CDSCO), Drug Controller General of India (DCGI), Ministry of Health, Govt. of India for development of the India Guidelines on Similar Biologics (Regulatory Requirements for Marketing Authorization). Additionally, he is part of the working group for Gene Therapy constituted jointly by the Department of Health Research (DHR) and Department of Biotechnology (DBT), Govt. of India.

## PRE-HOSPITAL THROMBOLYSIS: THE HEALTHCARE INITIATIVE

Dr. Sanjay Singh

*Gennova Biopharmaceuticals Limited, Pune.*

*Sanjay.Singh@gennova.co.in*

Gennova Biopharmaceuticals Limited, headquartered in Pune, India, is a biotechnology company dedicated to the development, production and commercialization of bio-therapeutics to address life-threatening diseases across various indications. Incorporating recombinant DNA technologies together with innovative bio-manufacturing practices, Gennova has created a cost effective solutions for manufacturing and successfully commercializing bio-therapeutics across cardiovascular, nephrology and oncology markets.

One of Gennova's biosimilar portfolio, Tenecteplase (Elaxim), made in CHO cells was launched in 2007. Elaxim is indicated for acute myocardial infarction (AMI) and is available in three vial presentations (Elaxim-30mg, Elaxim-40mg and Elaxim-52.5mg) for single intravenous (IV) bolus administration. Gennova is credited to have launched the only biosimilar of this product in the world. Gennova succeeded in making the drug affordable in India by reducing the price from \$2800 to \$800. Today, Elaxim continues to be the market leader in India (as per IMS), a significant scientific and commercial achievement which can be attributed to Gennova's proprietary innovative manufacturing technologies.

It is already reported that more than 75% of deaths due to cardiovascular diseases occur in developing countries. One of the reasons is a limited opportunity for the AMI (acute myocardial infarction) patient to receive emergency care at their residence and it is unlikely that there is a nearby CATH lab for emergency primary catheterization. Moreover, inaccessible emergency transport and extreme traffic density adds further complications in timely treatment within the prescribed “golden hour” of 90 minutes for thrombolytic treatments.

To address this issue, Gennova Biopharmaceuticals Ltd. has established a three way collaboration with GE Healthcare and Indegene Lifesystems to implement a Pre Hospital Thrombolysis (PHT) program across India. Gennova and GE conducted the pilot PHT program in association with leading cardiologist.

Under our pilot program, we successfully diagnosed patients and treated with an average time from initial diagnosis (ECG) to Elaxim treatment within the window of golden hour (60-90 minutes).

## **LECTURE 2.**

### **DR. AMIT GHOSH**



Dr. Amit Ghosh is presently emeritus scientist at NICED, Kolkata. He did his Ph. D. in Physics from Calcutta University and he changed his interest to molecular biology. He did his postdoctoral studies at U. Rochester, Rochester and U. Wisconsin, Madison, USA, from 1976-1982. Following his postdoctoral studies he became the scientist in IICB, Kolkata. Then he became a visiting scientist at National Institute of Health, Bethesda, USA from 1987-1989. He served the Institute of Microbial Technology, Chandigarh from 1990 - 2004. He joined the institute as Deputy Director and went on to become the director of the institute. Later in 2005 he became the director of School of Biological Sciences, Indian Institute of Advanced Research, Ahmedabad. Since 2009 he has been a part of NICED Kolkata.

Dr. Ghosh's primary research interest is the molecular biology of diarrhoeagenic pathogens, with particular emphasis on *Vibrio cholerae*, the causative agent of the disease cholera and its viruses. He, in association with his collaborators at IICB and NICED, Kolkata, has developed an oral recombinant vaccine for cholera using a novel strategy, the first of its kind to be developed anywhere outside USA. His work on the molecular epidemiology of cholera has provided one of the first clues on how new clones of *V. cholerae* can possibly emerge. To date he has published ninety-eight scientific papers and has four patents.

Dr. Ghosh has been bestowed with many awards and honors like Prof. B. K. Bachhawat Memorial Lecture, NIPGR, 4th Prof. B. K. Bachhawat Memorial Lecture, JNU (2009) and Professor Sibte Hasan Zaidi Oration of ITRC (now, Indian Institute of Toxicology Research), Lucknow. Ranbaxy Award 2000, CSIR Shield for Process Technology (Team Member) (2002) and Lifetime Achievement Award of the Biotechnology Research Society of India. Lifetime Achievement Award of the Association of Microbiologists, India to name a few.

He is a Fellow of the Indian National Science Academy (INSA) Delhi, National Academy of Sciences, Allahabad, Indian Academy of Sciences, Bangalore, Biotechnology Research Society of India and a Member of the Guha Research Conference. He is currently the Chief Editor of the Proc. Nat. Acad. Sci. India, Sec. B. He was a member of the INSA Council (2011-13). Vice-President (2000-02), Sectional President, Biological Sciences, 2004 and Council Member (2000, 2003-05, 2010-11, 2014-15) of The National Academy of Sciences (India), Allahabad.



# THE USEFULNESS OF ( APPARENTLY ) USELESS KNOWLEDGE

Amit Ghosh

*National Institute of Cholera and Enteric Diseases, Kolkata*

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“In scientific research the core is the tension between basic and applied research..”(1). In the recent times there is a tendency at the level of policy makers to shift publicly funded research activities to from basic into areas that are considered applied ( research that would result in applications).This thought,although guided by the belief, that this approach would yield greater benefits to the society, actually tends to undervalue the tremendous contribution of basic research in making large number of technological advances possible. To quote Ronald Regan, - “ The remarkable thing is that although basic research does not begin with a particular practical goal, when you look at the results over the years,it ends up being one of the most practical things government does. For example, government sponsored basic research produced first laser. Today,less than three decades later, lasers are used in everything from microsurgery to the transmission of immense volumes of information.. Major industries, including television, communications, and computer industries, couldn't be where they are today without developments that began with basic research”. One could give many more examples. Further, “the road from fundamental discovery to practical application is often very long” (3). Genetic engineering took off almost after the structure of DNA was determined. Moreover, not all basic research may lead to commercial applications. All these, perhaps makes investment in basic research is an unattractive proposition for the industry. It is to be remembered, however, that if basic research gets ”squeezed” from both ends ,the consequences could be quite unfortunate for the society at large.

Examples of the applications I have given or many others I have not cited, were borne out of the research carried out abroad. Although works of Raman, Bose, Saha and quite a few others eventually led to practical applications ,in today's India it is difficult to find such examples and this could be the reason for policy makers lack of enthusiasm for basic research. Possible reasons for this would be discussed.

### **LECTURE 3.**

## **DR. MAHARAJ KISHEN SAHIB**



Dr. M. K. Sahib, did his Masters in Biochemistry from Aligarh Muslim University, Aligarh, in 1964 and PhD in Biochemistry from C.D.R.I., Luknow, in Year 1967. He worked with CDRI Lucknow as Sr. Asst. Director from 1986 to 1991 and Scientist, Asst. Director from 1971 to 1986. He also worked as a visiting Scientist at NIH, Bethesda, Maryland, USA from 1975-1977, National Institute of Medical Research Mill Hill, London, UK from 1989-1990; Institute Pasteur, Paris France and INSERM, France from 1988-89. He was an Assistant Professor / Lecturer in University of Colorado, School of Medicine, Denver, Colorado, USA from 1970-1971; Banaras Hindu University, Varanasi, from 1967-1968. He was a Research Associate at Harvard Medical School, Boston from 1968-1970.

Dr Sahib received several Awards and Honors like: Governor of Maharashtra State's (India) nominee for membership of Management Council & Senate, Dr. Babasaheb Ambedkar Marathwada University, Aurnagabad, Maharashtra, Dr. C.R. Krishnamurty memorial oration award in 2000 and several awards from Wockhardt as well.

He has served as a member Board of studies at various institutes like Indian Institute of Technology, Mumbai, Indian Institute of Science, Mumbai, University of Pune and many more.

He has developed biopesticide HALT, for which Wockhardt received first DSIR Award for in-house research in biotechnology. He has more than 100 publications in peer reviewed International Journals and several international patents to his credit. His Achievements include establishment of Biotechnology Research Center at WOCKHARDT, leading R&D Team for successful development of biosimilars/vaccines/fermentation products.

M. K. Sahib

*Director, Wockhardt, Aurangabad*

Convergence of biotechnology, information technology, nanotechnology and electronics has revolutionized healthcare delivery systems. This union has catalysed the speed of innovation with the help of new assorted tools. New discoveries have started impacting the four pillars of human need: healthcare, agricultural practices, environment reclamation and energy. Revolution in communication technology has reduced the gap between availability of technology and its implementation in all sectors. In healthcare segment, biotechnology innovation supports its four pillars: prevention, diagnosis, treatment and lifetime support. These innovations promise better quality of life for babies born in 21<sup>st</sup> century to live longer than one and quarter century. The longevity has its own challenges and impacts society at large. Biotechnology is solely knowledge driven and continuously evolving. In order to harness its advancements, the society needs to change current practices. There is an acute need to create an ascending ladder of human resources with different skill sets to deliver products and services for the benefit of society. Our country is sitting on a treasure of demographic dividend ready to be realized and we need to formulate new policies and laws for seamless engagement of academia, industry and civil society with different skill sets to achieve new heights.

## LECTURE 4. DR. VILAS P SINKAR



**Dr. Vilas P Sinkar**, currently works at the Department of Biotechnology, National Centre For Cell Science, Pune. Vilas does research in Agricultural Economics, Agronomy and Biotechnology. Their current project is 'Development of in-vitro techniques to identify allergen and irritants'.

Vilas Sinkar is the Vice President, Research & Development, and Site Head for Unilever R&D, Bangalore. Vilas Sinkar has MS and Ph. D. in Biological Sciences from University of Rochester, USA. He has done his Post Doctoral Fellowship from University of Washington, USA.

Before joining Unilever, Vilas Sinkar had been a Lecturer in Microbiology at Ruia College, University of Mumbai; a Teaching Fellow at University of Rochester; a Senior Fellow at University of Washington and a Scientist at the Centre for Biotechnology, National Dairy Development Board, Mumbai.

In Unilever, Vilas Sinkar has worked as Section Head, Microbiology; Head, Beverages Research; Head, Biological Sciences & Personal Care Products Research; Head, Environmental Safety Laboratory (now SEAC, Bangalore); Director, Unilever Foods and Health Research Institute and Director, Resource and Expertise, Unilever R&D Bangalore.

Vilas Sinkar has expertise and several publications in the areas of Microbiology (including Microbial Physiology, Microbial Genetics and Molecular Biology, Fermentation and Food Microbiology and Preservation) and Plant Sciences (Plant Tissue Culture, Plant Biochemistry, Plant Molecular Biology and Genetic Engineering).

Vilas Sinkar has been a recipient of several awards including the Charles Donald award from University of Rochester (in 1981 and 1982) and Senior Fellowship for Post Doctoral work from University of Washington (1984-1988). He is also a recognized guide for Ph.D. in Microbiology, University of Mumbai.





**LECTURE 5.**  
**DR. ROBIN MUKHOPADHYAYA**



Dr. Robin Mukhopadhyaya currently working as Principal Investigator at Advanced Centre for Treatment, Research and Education in Cancer, Navi Mumbai, India. Before coming to Advanced Centre for Treatment, Research and Education in Cancer he received Post Doctoral Fellowship at Laboratory of Tumor Cell Biology, NCI, NIH, USA from 1988-1990. He also worked at Institute of Human Virology, Baltimore, USA as Fogarty Visiting Associate. His area of specialization is Molecular Biology. He developed optimal protein expression systems using Mammalian cells as hosts. He got several National and International publications.

# OPPORTUNITIES AND CHALLENGES IN BIOMEDICAL INNOVATIONS & ENTREPRENEURSHIPS IN INDIA

R. Mukhopadhyaya.

*Formerly, Professor, Advanced Centre for Treatment,  
Research & Education in Cancer (ACTREC), Tata  
Memorial Centre, Kharghar, Navi Mumbai-410210.*

Unmet biomedical needs are huge in our country that is bearing an enormous load of infectious diseases, often with regional or country wide prevalence. To this is adding up an ever increasing life style related as well as age related diseases. Demand for vaccines, simple and cheap diagnostics, new drugs in affordable price, new generation antibiotics are some of the major issues.

Big pharma companies' interest and active funding of R&D in infectious diseases are limited from commercial viability view point and robust involvement of academia in purely translational research are yet to get a strong presence, and there are some pertinent and subtle issues in this scenario. Proof of concept in the laboratory level to bulk production at affordable price with commercial viability is a long and arduous path involving highly professional, regulated, time bound execution of sequential strategies and steps. Often an early promising candidate fades out failing to pass through the rigors of increasingly stringent quality controls or fund availability or lack of financial viability or appearance of more attractive candidate.

Due to a strong and wide presence of electronics/computation expertise in the country small to medium health parameter monitoring instrumentation is making some noticeable progress. However, private funding in such efforts are still not to a level that is required. Government therefore is assisting small and medium entrepreneurs with a formidable funding support, even supporting big pharma companies if they venture into disease eradication associated developments aiming the resource poor affected population at large.

Though loose academic-private collaborations are shaping up, absence of clear business model and awareness of regulatory hurdles, patent restrictions, future scale up feasibility, sustained funding options are some issues are not often considered holistically while venturing in a project by new entrepreneurs. In spite of these, few aspects of biomedical innovations are showing signs of emergence. A limited number of related issues in these regards will be discussed.

## **Lecture 6: DR. YOGESH SOUCHE**



Dr. Yogesh started his career as scientist, National Centre for Cell Science (NCCS) in Pune, India. He has research experience of 28 years in the field of microbial ecology, microbial molecular taxonomy and biodiversity. He has more than 330 publications to his credits in reputed journals. There are several national and international collaborations funded by various agencies. Seventeen students have been awarded PhD from University of Pune and Eight are currently registered under his guidance. He has twenty years of post-graduate teaching experience and five years teaching experience for M.Sc. students. He is also on the Editorial board of prestigious journals like Current Science, European Journal of Soil Biology, PlosOne and Scientific Reports.

In 2009, he was given a responsibility of establishing Microbial Culture Collection (MCC) which has become National Center for Microbial Resource (NCMR) from April 2017. NCMR currently holds more than 150,000 bacteria and fungi in its collection recognized by WFCC (World Federation of Culture Collection). It is also recognized as International Depository Authority (IDA). Dr. Yogesh now heads large group of researchers at NCMR including 15 Scientists and Technicians.

# HUMAN MICROBIOME: A NEW AVENUES FOR ENTREPRENEURSHIP FOR BIOTECHNOLOGISTS

Yogesh Shouche

*National Center for Microbial Resource, National  
Center for Cell Science, Pune*

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Microbial products including live microbes have always been important in human health and industry. The global market of microbial products was estimated to be USD 143.5 billion in 2014 and USD 306 billion by 2020 with compounded annual growth rate of 14.6 %. In the last few years the developments in technology to understand “non yet cultivated” majority has offered microbial solutions in many new areas and generated opportunities employment. Microbiome therapy is one such solution. The talk will discuss primarily our understanding of human microbiome and the opportunities for business generated by such projects



**Lecture 7:**  
**DR. SANJAY NENE**



Dr. Sanjay Nene did his postgraduation in applied microbiology. He also did postgraduation in biochemical engineering from IIT Delhi. later he joined as a research student in Chemical Engineering department to get a doctrate degree. In 1981 he joineed Hindustan Antibiotics as a research associate. In 1983 he joined as a technical consultant of Millipore Intertech Inc. From 1985 to 2014 he headed the Biochemical Engineering Unit of NCL. Today he is the CEO of Innovation Biologicals Pvt. Ltd, NCL Innovation Park. Dr. Nene's research interest are Fermentation for production of Human vaccines,enzymes (CGTase, alkaline protease, polyphenol oxidase), recombinant proteins (phytase and lactoferrin), chemicals from renewable resources (Lactic acid), Energy/Bioremediation (Algal cultivation), Recovery of natural products: Stevioside from Stevia leaves, Processing of fruit juices and natural beverages (Neera), Membrane processing (Microfiltration, ultrafiltration, nanofiltration and membrane distillation), aqueous two phase extraction, biotransformation of drug intermediates

Dr. Sanjay Nene has 35 international publications to his credit and 3 book chapters. he has 4 US patents and 5 indian patents to his credit.

He has been honored with B.D. Tilak Fellowship, K.J. Somaiya Professorship UDCT, Mumbai and Best Technology Award by NCL Foundation in 1993, 2013; Director's commendation for lactic acid technology, 2008

# OPPORTUNITIES FOR STUDENTS OF BIOTECHNOLOGY-ENGINEERING IN BIOTECH INDUSTRIES

Nene Sanjay N.

*CEO, Innovation Biologicals Private Limited, 100  
NCL innovation Park, Dr Homi Bhabha Road, Pune  
411 008*

Fermentation and Bioprocess Engineering are subjects which are currently covered by your institute syllabii. I wish to highlight in my lecture the role of Biochemical engineers in Biotech industries. This is in terms of knowledge base that Biochemical engineering students should possess, hands - on skills, areas of interest that these students should master during their formal education and awareness of what industry expects from fresh student

**Lecture 8:**  
**DR. YASMIN MIRZA**



Dr. Yasmin Mirza did her master's and Ph.D. in Microbiology, from Kurushetra University. She worked in Lupin as senior research associate in 2007. Later she went on to join Praj industries in 2008 as a senior staff technologist. Dr. Yasmin has also worked as adjunct faculty and Ph.D guide in Symbiosis International University and Pune University. Currently she is working as Principle technologist in Praj Industries where she is working for developing new products and processes in the area of microbial biotechnology, Scale-up (feasibility studies & actual) and Technology Transfer. She has more than 10 years of experience in Industrial Biotechnology, working with Vaccine, Pharma and Biotechnology Companies in India.

# TECHNOLOGY COMPETENCY AND LEADERSHIP

Yasmin Mirza

*Principal Technologist, Praj Industries Ltd.*

In a modern technology based world, 'Technology competency and leadership' is coming up as an important asset in evaluating the employability of a person or student. There is an increasing need to incorporate this element in the bridge between academia and industry and strengthen this bridge itself. The talk would elucidate the importance of project based learning, interdisciplinary specialization, formulating electives based on industry demands and a need to have a faster turnaround time for course curriculums. It would also highlight the benefits of having joint study and research programs by industry and academia.

## **Lecture 9: DR. KISHORI APTE**



Dr. Kishori Apte, presently the director of Apt Testing and Research Pvt. Ltd. since 1993. She was a graduate and post-graduate student from university of Pune. She got the degree of approved toxicologist in 1993 from F. D. A, Pune. After her post graduate degree she was working with Indian Institute of Toxicology till 1993. then she went ahead to set up her own laboratory i.e. National Toxicology Centre in 1992, known as Apt Testing and Research Pvt. Ltd. of which she is a director today. Since then she has prepared study protocols, conduct toxicology studies, prepared valid reports based on the study results and to interpret the toxicological studies for professional use by industry and academics. She has 23 papers to her credit with 2 patents to her name. She is a life member of Indian Pharmacological Society, Society of Toxicologists, India. A large number of projects have been handled by her like Reproductive Toxicology, Inhalation Toxicology, Ecotoxicity and Environmental Sciences, Pharmacognosy, Polyclonal Antibody production, Antiobesity, Liver cirrhosis, Antihypertention, Wound healing, Kidney stone, Neurosciences, peptic ulcer, Anti diabetic, Anti-inflammatory, Anti fertility, postmenopausal osteoporosis, Antidiabetic, Angiogenesis, Hepatoprotective, Anticholinergic, Prostetic hyperplacia, etc to name a few..



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**PANEL  
DISCUSSION  
OPINIONS**



Dr. RAMESH BHONDE, Director Research, Dr. D. Y. Patil Vidypeeth, Pune

**Dr. Ramesh Bhonde** has recently joined Dr D Y Patil University, Pune, as Director (Research). Prior to that he served as Professor & Dean, at the School of Regenerative Medicine, Bangalore for the last 5 years. He superannuated from National Center for Cell Science Pune as Scientist 'F' and joined Stempeutics Research Pvt. Ltd. Bangalore as Technical Director and then moved to Stempeutics Research Malaysia branch in Kuala Lumpur, Malaysia. He has been working in the field of pancreatic regeneration in diabetes for the past twenty five years. His areas of interest and expertise include Stem cells, Regenerative Biology, Tissue banking and engineering with special reference to the cultivation of fastidious cells such as hepatocytes, vascular endothelial cells, and islets of Langerhans. He is well trained in hESC and iPS technology. Being a zoologist he has handled several projects dealing with Development of fish cell lines of Indian origin and culture of Amoebocytes from Horseshoe crab. He has extensively worked on in vitro generation of islets from pancreatic and non- pancreatic stem cells. He showed that multiple injections of unfractionated bone marrow reverses experimental diabetes in mice His pioneering work on stem cells in breast milk is well appreciated by scientific community. He has guided till now 21 Ph. D students. He has more than 225 publications, of which 182 are listed in Pub Med., 197 on Scopus, and 73 in Web of Science. He has total citations 6261, h index 42 and i 10 index 117 Dr. Bhonde authored 7 book chapters and he is a recipient of Dr. TMA Pai Endowment Chair in Islet Engineering & Banking in October 2013 and Dr C.M. Habubullah Annual Oration Award in January 2014. Recently he is awarded Dr TMA Pai Endowment chair second time to work on Stem cell solution to Insulin resistance (2015-16)



Dr. SUNIL CHAUDHARY, Director, Life Point Research Foundstion, Pune

Dr. Sunil Chaudhary, did his bachelors (BHMS, Medicine) from Maharashtra University of Health Sciences in 2007. He received Post Graduate Diploma in Emergency Medicine Services, Medicine, from Ruby Hospital Pune. He received MBA from Sikkim Manipal University, Medical and Technological sciences, in 2011. He worked at Sanofi-aventis as Clinical Research Associate, Pentagon Research Pvt. Ltd., as Project Manager and Director. Currently he is working as a Director at Obenzo.com. He is an ACRP certified Clinical Research Associate.

OPPORTUNITIES FOR BIOTECHNOLOGISTS IN THE INDUSTRY SECTOR  
AT NATIONAL AND INTERNATIONAL LEVEL

Sunil Chaudhary,  
*Director, Life Point Research Foundstion, Pune*

My domain of work is Clinical research. In drug development, we do phase II, III, IV & bio-equivalence studies so that the clinical data can be developed about research molecules which in turn can be submitted to the regulatory body to decide whether the molecule can come in the market or not. I can also highlight on the career opportunities in this industry & associated branches.



Dr. MUGDHA POTNIS -LELE, Venture Centre, NCL Innovation, Pune

Dr. Mugdha Potnis-Lele did her Masters's and Ph.D. in Health Sciences from University of Pune. After Ph.D She Worked as a faculty at the Dept. of Genetics Immunology and Biochemistry from Apr 2007 to May 2014. She is working as a freelance consultant, Researcher and Trainer undertaking the assignments in the areas such as Molecular biology and genetics, Public health, Research methodology, Education technology. She is responsible to initiate and drive Social Innovation Immersion Program . Currently working as manager at Social Innovations at Venture Center, NCL Innovation Park, Pune .

#### ENTREPRENEURIAL OPPORTUNITIES FOR BIOTECHNOLOGISTS

Potnis-Lele M

*Manager – Social Innovations, Venture Center, Pune;*  
*[mugdha@venturecenter.co.in](mailto:mugdha@venturecenter.co.in)*

Science-based entrepreneurship is one of the upcoming avenues for biotechnologists and generally for individuals from a life sciences training. For any research idea to qualify as a business viable idea, there is a need for a scientific basis to the idea and a business execution aspect. Scientific basis involves the identification of the exact problem, the knowhow for the solution and the actual solution to the problem. The business execution aspect comprises prototype and product development based on the scientific know how, technology de-risking and other soft skills from the business point of view like attracting the right team members towards your business idea, raising funds for the idea, communication skills, branding and so on. Thus, for a tech-based business to be successful not only the science is important but other aspects of the ecosystem are also equally important. This brings out strongly the need for incubators and accelerators in this entire journey from ideation to commercialization of a science and technology driven entrepreneurship. Venture Center, Pune is India's largest technology business incubator, with about 65 startups physically incubating on the campus of the NCL Innovation Park. The important aspects in the entrepreneurial ecosystem are made available to budding entrepreneurs via the various services and programs at Venture Center. The focus is on providing incubation services (mentoring and advisory), scientific and technology support and help in raising funding for technology intensive ideas, in addition to providing the other building blocks in the entrepreneurial business journey of a startup.





## DR. RUPALIA. GADKARI, Gene Path DX, Pune

Dr. Rupali A Gadkari has her research interest in the filed of Bioinformatics, Molecular Genetics, Genomics, Structural Biology. She is currently heading the R&D (Genomics Services), Helical Bio/ GenePath Dx, Causeway Healthcare Private Ltd. Pune. She did her Ph. D from Indian Institute of Science (IISc), Bangalore in the field of protein biochemistry. After that she worked as post doctoral fellow at National Centre for Biological Sciences (NCBS) and IISc Bangalore. Later she worked for 3 years as Research Scientist at IISc understanding protein-protein interactions in cancer using bioinformatics and computational biology tools. Before joining GENE PATH DX, Dr. Rupali served as Associate Director, Medical Genetics & Genomics in Strand Life Sciences, Bangalaore in the field of NGS based cancer panel test data of clinical samples and molecular genetic report generation of the same. She has also created knowledge base required to support Strand Cancer Genomic Tests.



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