



Systems Biology approaches to human diseases

Overview

Systems biology is the study of systems of biological components, which may be molecules, cells, organisms or entire species. Living systems are dynamic and complex and their behavior may be hard to predict from the properties of individual parts. To study them, we use quantitative measurements of the behavior of groups of interacting components, systematic measurement technologies such as genomics, bioinformatics and proteomics, and mathematical and computational models to describe and predict dynamical behavior. Systems problems are emerging as central to all areas of biology and medicine. This course will introduce the participants to contemporary Systems Biology focused on mammalian cells, their constituents and their functions. Biology is moving from molecular to modular. As our knowledge of our genome and gene expression deepens and we develop lists of molecules involved in cellular processes, we need to understand how these molecules interact with each other to form modules that act as discrete functional systems. These systems underlie core sub-cellular processes such as signal transduction, transcription, motility and electrical excitability. The course will develop multiple lines of reasoning to answer the questions listed above. Two major reasoning threads are: the design, execution and interpretation of multivariable experiments that produce large data sets; quantitative reasoning, models and simulations.

Objectives

- Understanding functional molecular relationships.
- Understanding complex diseases and using systems biology in drug development .
- Addressing biological and biomedical problems at the systems level.

Dates	19-12-2016 to 30-12-2016
Modules	There are five modules in this course deal with systems biology
Number	Limited to 40 participants
You should attend if	<ul style="list-style-type: none">• You are a student of B.Tech or M.Tech in Biotechnology, Chemical Engineering, Bioinformatics, computer science, civil engineering• You are a student of M.Sc. in Biotechnology, Microbiology, Biochemistry, Botany, Zoology, Chemistry• You are a student of B.Pharmacy or M.Pharmacy• You are a faculty member at any academic or technical institution engaged in biology and applied areas

	<ul style="list-style-type: none"> • You are a Ph.D scholar in biology, chemistry, computer science, chemical engineering and applied areas • You are interested in expanding your qualification and expertise and knowledge. • You are a scientist, engineer, interested to know about systems biology
Fees (Course fees excluding lodging and boarding)	<p>Participants from abroad : US\$ 200 Industry/Private Research Organizations: Rs.8000 Faculty of Academic Institutions: Rs.4000 Students (with award of grades) : Rs.2000 (2 credits) Students(without award of grades) : Rs.1000 The above fee includes all institutional materials, computer and laboratory usage charges, internet facility, library etc. The participants will be provided with twin-sharing accommodation on payment basis in the institute's visitor's block, subject to availability on first-cum-first-serve-basis.</p>
Evaluation and Grading	<p>Students registered with grading will be evaluated for two credits based on continuous evaluation in tutorials, midterm and end of course examinations. Grade will be awarded based on the performance in the evaluation.</p>

The Faculty

International Expert



Dr. Deepak Nagrath is working as an Assistant Professor in the Department of Chemical and Biomolecular Engineering, Rice University, Houston, Texas, USA. He also worked as a Research Associate in the Department of Surgery at Massachusetts General Hospital and Harvard Medical School, USA. Nagrath's research interests lie in the application of systems-biology approaches to human diseases. Nagrath, who is from India, has earned a doctorate in Chemical Engineering and a master's degree in applied mathematics from Rensselaer Polytechnic Institute in Troy, New York, USA. He received a bachelor's degree in chemical engineering from the Indian Institute of Technology in Roorke, India. He has obtained 5 US patents in the area of systems biology. He has published many high quality research papers in reputed international journals like *cell* (impact factor **32**), *Molecular Systems Biology* (I.F.**14.1**), *Journal of National Cancer Institute* (I.F. **12.6**), *J. Am. Chem. Soc.* (I.F. **11.44**), *Journal of Hepatology* (I.F. **11.3**), *elife* (I.F.**9.3**).

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Institute Experts



Dr.K.Narasimhulu is working as an Assistant Professor in the Department of Biotechnology, National Institute of Technology Warangal, India. He obtained his B.Tech in Chemical Engineering from NIT Warangal, M.Tech in Biotechnology from JNTU Hyderabad and Ph.D in Biotechnology from NIT Warangal. He has 16 years of teaching experience in chemical engineering and biotechnology fields. He has published 23 research papers in national and international journals. He has developed two MHRD sponsored projects as co-coordinator for Curriculum Design and Development for Downstream Processing in Biotechnology and Novel separation techniques as a part of Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning under National Mission project on education through ICT. He has published two book chapters. He has been sanctioned a research project from DST, India under fasttrack worth of Rs.22 lakh. He has obtained 2015 Young Faculty Award and Young Scientist Award from Venus International Foundation, Chennai. India. He has under gone R&D training at Rice University, USA sponsored by TEQIP-II.



Prof. Y.Pydi Setty is working as a Professor in the Department of Chemical Engineering, National Institute of Technology Warangal. He has more than 30 years of teaching and research experience. Prof. Setty has obtained B.Tech in Chemical Engineering from Andhra University, M.Tech and Ph.D in Chemical Engineering from IIT Madras. He has published many research papers in national and international journals. He has guided 6 Ph.D students and M.Tech students. He served as Head of Chemical Engineering and Biotechnology Departments and chaired two international conferences. He has executed several research projects sponsored by various funding agencies. He has developed a MHRD sponsored for Curriculum Design and Development for Novel separation techniques as a part of Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning under National Mission project on education through ICT.

Course Coordinators

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