Systems Biology and Network Analysis for Enabling Research in Personalized Genomics

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Overview

The course introduces data integration and statistical methods used in contemporary Systems Biology, Bioinformatics and Systems Pharmacology research. It covers methods to process raw data from genome-wide mRNA expression studies (microarrays and RNA-seq) including data normalization, differential expression, clustering, enrichment analysis, and network construction. The course contains practical and tutorials for using tools and setting up pipelines, but it also covers the mathematics behind the methods applied within the tools. Few advanced topics related to data analysis will also be covered.

The course is mostly appropriate for beginning graduate students and advanced undergraduates majoring in fields such as biology, math, physics, chemistry, computer science, biomedical and electrical engineering. The course should be useful for researchers who encounter large datasets in their own research. The course presents various software tools that will be helpful for the participants for conducting their research work.

Dates	**December 14 - December 18, 2020** 14 hrs lectures and 10 hrs tutorials **Number of participants for the course will be limited to fifty.**
You Should Attend If…	▪ You are an experimentalist want to analyze own data, a computational biologist or computer science/IT engineer interested to learn advance algorithms to analyze biological data. ▪ You are a student (BTech/MTech/MSc/PhD) or faculty or a person from industry interested in learning how to do research on "big-data" problems in personalized genomics.
Fees	The participation fees for taking the course is as follows: **Participants from abroad :** US $500 **Industry/ Research Organizations:** Rs 10,000 **Academic Institutions (Within India)** BTech/MTech/MSc Students: Rs. 1,500 PhD/Post-Doctoral Fellows: Rs. 3,000 Faculty/Researchers/Scientists/Staff from Academic Institutions: Rs. 4,000 The above fee include all instructional materials, computer use for tutorials and assignments, 24 hr free internet facility. The participants will be provided with accommodation on payment basis. **Last date to apply:** December 10, 2020
Mode of Registration	All prospective participants need to do web registration for the course on GIAN (http://www.gian.iitkgp.ac.in/GREGN) portal. After the mandatory web registration, participants should share the registration details with the course coordinator by an email (sushmitapaulisikol@gmail.com). The shortlisted participants will be informed by email to register for the course by making full payment of the course registration fee.

The Faculty

Professor Animesh Ray earned his PhD in microbial genetics from Monash University in Melbourne, Australia. His PhD research led to the identification of a gene for efficient plasmid maintenance in Escherichia coli and a method for generating a multi-copy infectious plasmid that is packageable inside a virus coat an early example of synthetic biology. He subsequently conducted research at the Institute of Molecular Biology, University of Oregon, and the Department of Biology, Massachusetts Institute of Technology; University of Rochester. In the late 1990s, Dr. Ray, along with a computer scientist colleague Dr. Mitsunori Ogihara, published a series of papers on experimental and theoretical investigations on designing massively parallel computing devices using solution phase DNA chemistry. He currently teaches courses on molecular systems biology that includes molecular mechanisms of human diseases and pharmacogenomics. He was KGI's faculty chair (2010-2016) and director of KGI's PhD programs (2006-2016). His current research work involve systems biology of Huntington's disease, chromosome instability, non-coding RNAs in cancers, and cancer drug resistance mechanisms.

Dr. Sushmita Paul received the BSc, MSc, and PhD degrees from University of Rajasthan, Banasthali Vidyapith, and University of Calcutta, respectively. After obtaining her PhD degree in January 2014, she was associated with Indian Statistical Institute, Kolkata as Visting Scientist (January 2014 to July 2014). Later, she joined the University Hospital Erlangen, Germany as a Postdoctoral Research Fellow (August 2014 to December 2015). She also worked as Scientist at TCS Innovation Labs Kolkata, India (December 2015 to May 2016). Currently, she is an assistant professor in the Department of Bioscience and Bioengineering, Indian Institute of Technology Jodhpur, India. Her research interests include computational biology and bioinformatics, pattern recognition, soft computing, and so forth. She has published more than 30 papers in international journals and conferences, and 2 book chapters. She is a co-author of a book published by Springer-Verlag, London, and also a reviewer of many international journals. Dr. Paul was a recipient of 2017 Early Career Research Award from Science and Engineering Research Board, Department of Science and Technology, Government of India, 2017 Bioclues Innovation, Research and Development (BIRD) award, and 2009 Best Paper Award of the International Conference on Information Technology from the Orissa Information Technology Society, India

Course Co-ordinator

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