

On Frontiers at the Interface of Biology, Computing, and Mathematics

Overview

Modern science connects many basic secrets of living matter with the genetic codes. Biological organisms belong to a category of very complex natural systems, which correspond to a huge number of biological species with inherited properties. But surprisingly, molecular genetics has discovered that all organisms are identical to each other by their basic molecular-genetic structures. Due to this revolutionary discovery, a great unification of all biological organisms has happened in science. The information genetic line of investigations has become one of the most prospective lines not only in biology, but also in science as a whole.

Recent progress in the determination of genomic sequences has yielded many millions of gene sequences. But what do these sequences tell us and what are the generalities and rules that are governed by them? It seems that we understand very little about genetic contexts required to “read” them. Historically, mathematics, probability and statistics have been widely used in biological sciences. Science has a challenge to understand a system organization of molecular genetic ensemble with its unique properties of reliability and productivity. Disclosing of key secrets of this organization means a big step in science about nature in a whole and a big step to create the most productive biotechnologies. Knowledge about this structural organization should become apart of mathematical natural science. Recent advances of mathematical methods and techniques in bioinformatics have been rapidly growing. There is more to life than the genomic blueprint of each organism. Life functions within the natural laws that we know and the ones we do not know. Mathematics can be used to understand life from the molecular to the biosphere level. This course is devoted to cover the connection and integration between fundamental mathematical methods and biological sequences, DNA and protein structures, biological networks, systems biology, algebraic biology, and cognitive informatics

Course participants will learn these topics through lectures and hands-on experiments. Also case studies and assignments will be shared to stimulate research motivation of participants.

Course duration	December 17–December 21, 2018 (5 days) Number of participants for the course will be limited to fifty.
You Should Attend If...	you are a graduate student, researcher, faculty, scientist, educator, practitioner, in the fields of bioinformatics, informatics, information engineering, computer science/ applications, biotechnology and other related areas and wish to have exposure to the multidisciplinary approaches and learn the interaction among mathematics computing and biology, skills of bioinformatics, computational and systems biology and their applications...
Fees	The participation fees for taking the course is as follows: Participants from abroad : US \$ 500 Industry/ Research Organizations within India: ` Rs. 15000 Faculty/Staff from Academic Institutions within India: Rs. 5000 Students from India: Ph.D./Post-doctoral : Rs. 2000/3000 M.Tech./M.Sc. : Rs. 1000 The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. Boarding, lodging and meal charges are not included in the fees. The participants will be provided with accommodation on a payment basis.

The Faculty



Matthew He, Ph.D., Assistant Dean/Full Professor of the Halmos College of Natural Sciences and Oceanography of Nova Southeastern University in Florida, USA. His research interests are Scientific Computing, Approximation Theory, Non-rigid Motion Analysis, information Theory, Bioinformatics and Computational Biology, and Cognitive Informatics.



Dr. Kamal Raj Pardasani is a Professor in Department of Mathematics , Bioinformatics and Computer Applications at Maulana Azad National Institute of Technology, Bhopal , India. His research interests are Computational & Systems Biology (Computational Neuroscience, Computational Cell Biology, Computational Thermal Biology, Cognitive Science), Data Science (Data Analytics, DataWarehousing and Mining), Finite Element Modeling and Modelling Simulation.

Course Coordinator

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