

Conservation and Evolution in Developmental Gene Regulatory Networks: A Systemic View

(Under the aegis of MHRD-Global Initiative for Academic Networks-GIAN)

November 1, 2017 to November 8, 2017, at IISER Mohali, Punjab

Overview

Development of multicellular organism from a single cell zygote requires well-orchestrated activation of a plethora of genes throughout developmental time and space that directs the sequence of events governing the formation of body plan. Understanding the genomic regulatory mechanism that executes proper reiteration of the expression of developmental genes in each generation of each animal species and its role in the evolution of body plan is a pertinent issue that intrigues the scientific community. The turn of this century has witnessed the emergence of a highly valuable and exciting new field drawing much attention of scientists from various backgrounds that deals with the complex and intricate networks of regulatory interactions among transcription factors and signaling molecules, hardwired in the genome, that control gene expression involved in defining spatial organization, morphogenesis, and differentiation of cell types. Generally termed as “**Developmental Gene Regulatory Networks (DGRNs),**” they provide the specific causal links between inherited genomic regulatory program and the process of development. Understanding how the “algorithm” of the genome controls developmental processes requires a unique interdisciplinary mix of theoretical and experimental biologists working in different disciplines, including computer science, mathematics, genomics, molecular biology and developmental biology. This course intends to provide an unifying platform bringing advanced graduate students, postdoctoral scholars, and professional scientists from different disciplines and train them in a comprehensive theory of DGRN structure, diverse models of DGRN and various computational platforms for representation of DGRNs.

Topics to be covered	<ul style="list-style-type: none">• Principles of Developmental Process and modes of gene regulation.• Introduction to Developmental Gene Regulatory Networks (DGRN).• Conservation of DGRNs in development of diverse model organisms.• Evolution of DGRNs.• Modeling DGRNs. <p>Number of participants for the course will be limited to forty (40).</p>
Who should attend	<ul style="list-style-type: none">• Graduate students in the final year of their Integrated BS-MS program, B.Tech, M.Sc/M.Tech or equivalents.• PhD students and Post-doctoral scholars.• Young faculty from reputed academic institutions and technical institutions.
Fees	<ul style="list-style-type: none">• Participants from abroad: USD 500• Industry/Faculty: INR. 15,000• Students: INR. 10,000 <p><i>(Fees include local hospitality)</i></p>

The Faculty



Professor Volker Hartenstein, a pioneer in the field of developmental genetics, has been engaged for the last three decades in numerous projects using multiple model systems elucidating the conserved nature of developmental program across divergent taxa. His scientific contribution is phenomenal in terms of information that it has generated and the impact that it has on the field of developmental gene regulation. He is a faculty member of the department of Molecular Cell and Developmental Biology, UCLA, USA.



Professor Usha Vijayraghavan is from the Department of Microbiology and Cell Biology, Indian Institute of Sciences, Bangalore, India. Her laboratory is interested in understanding eukaryotic gene regulation at the transcriptional and post-transcriptional levels using molecular genetics and functional genomics. She employs rice plant as the developmental model for her study.



Professor L. S. Shashidhara is a faculty of Indian Institute of Science Education and Research Pune, India. Employing a diverse array of molecular genetic tools his group has opened up new avenues to study genetic mechanisms that help in fine-tuning signal transduction pathways involved in the specification of limb identity.



Professor Somdatta Sinha is a mathematical computational biologist. Currently she is a visiting faculty in the Department of Biological Sciences, Indian Institute of Science Education and Research Mohali, India. Her interest ranges from studying the pattern formation, evolution and maintenance of spatiotemporal organization in biological systems.



Dr. Lolitika Mandal is a faculty in the Department of Biological Sciences, Indian Institute of Science Education and Research Mohali, India. Her interest lies in understanding the combinatorial signals and their regulation essential for blood cell development in *Drosophila*. Her group works on hematopoietic stem cells and their interaction with the niche.



Dr. Sudip Mandal is a faculty in the Department of Biological Sciences, Indian Institute of Science Education and Research Mohali, India. He is interested in molecular genetic dissection of the retrograde signaling pathways from mitochondria in controlling cell biological processes like proliferation, growth and differentiation.

Local Coordinator:

Prof. Kapil H Paranjape

Course Coordinators:

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Dr. Lolitika Mandal

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