

DISTINGUISHED LECTURER SERIES

T H E I N S T I T U T E F O R S Y S T E M S R E S E A R C H



Tuesday, November 16, 5:00 p.m.

Cell Talk

Bhubaneswar 'Bud' Mishra

Professor of Computer Science, Mathematics and Cell Biology;
Courant Institute and NYU School of Medicine; New York
University

Freeman Dyson, in his 1985 Turner Lectures, asked: "Is life one thing or two things? Is there a logical connection between metabolism and replication?" What are their connections to genome evolution? How did life originate and which kind of life dominates the process? Are there unifying principles in biology that may have emerged from these processes? We will discuss computational tools we are developing to answer questions of this kind, and more. We also discuss challenges in systems biology, algorithm design and mathematical modeling that make these problems interesting to biologists, computer scientists and applied mathematicians. We introduce the concept of algebraic model checking systems to reason about biological processes, and how we use them to interpret experimental data modulated by regulatory, metabolic and inter-cellular signaling processes.

Biography

Bud Mishra is a professor of computer science and mathematics at NYU's Courant Institute and a professor of cell biology at NYU School of Medicine. His recent research work is at the interface of computer science and biology. He has developed sophisticated algorithms and statistical analysis tools to attack biological problems ranging from deciphering the genome of pathogens (*E. coli*, *P. falciparum*, etc.) to understanding chromosomal aberrations implicated in cancer. This work will eventually lead to diagnostics, therapy, vaccines and drugs for infectious and genetic diseases. His most recent focus has been on a bioinformatics environment, *Valis*, that will make it easier for biologists to develop their own computational tools. It includes tools for sophisticated visualization of biological information, design and simulation of in silico experiments and storage and communication of biological information. Prof. Mishra has a Ph.D. in Computer Science from Carnegie-Mellon University. He has industrial experience in Computer Science (Tartan Laboratories) and Finance (Tudor Investment and PRF, LLC) and is a founder of a biotechnology company, Opgen, Madison, Wisc. His research has ranged from compilers, algorithms and complexity, logic, and algebra to robotics, finance and biology.

Date and time

Lecture

November 16, 5:00 p.m.

1115 Computer Science

Instructional Center (CSIC)

Roundtable discussion

November 17, 10:00 a.m.

2168 A.V. Williams Building

The
Institute for
Systems
Research



A. JAMES CLARK
SCHOOL OF ENGINEERING