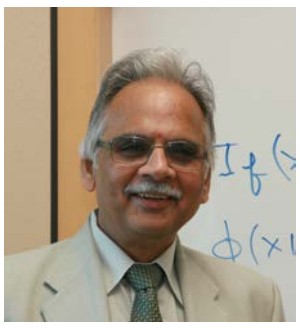
Institute Lecture

Machine Learning Methods in Cancer Biology



Prof. Mathukumalli Vidyasagar,
Chair Professor, Systems Biology Science,
The University of Texas at Dallas

Wednesday, 19th February 2014, Time: 5.15 PM,
Venue: Outreach Auditorium

Abstract
Recent publicly funded large projects such as TCGA (The Cancer Genome Atlas) have resulted in the generation of an enormous amount of high-quality data consisting of both molecular as well as clinical measurements of thousands of tumors from various sites. The challenge is to turn this raw data into knowledge. This provides a great opportunity for the development of novel machine learning algorithms that are specifically tailored to cancer biology applications. In this talk I will describe in detail two new algorithms: one for classification and one for regression. The classification algorithm has already been applied with success to predicting which endometrial cancer patients are at risk for metastasis (cancer spreading beyond the original site via pelvic lymph nodes), and for predicting which ovarian cancer patients will, or will not, respond to platinum-based chemotherapy. The regression algorithm has been applied to the time for a tumor to recur following surgery, in lung cancer and ovarian cancer patients. Another application is the identification of key genes to predict the IC50 value of a drug applied to cancer cell lines. In addition to describing the completed work, I will also describe some new problems that require new algorithmic development. The talk will be completely self-contained from the standpoints of both biology as well as machine learning.

About the speaker
Prof. M. Vidyasagar was born in Guntur, India. He received the B.S., M.S. and Ph.D. degrees in Electrical Engineering from the University of Wisconsin in Madison, in 1965, 1967 and 1969 respectively. Between 1969 and 1989, he was a Professor of Electrical Engineering at Marquette University, Milwaukee (1969-70), Concordia University, Montreal (1970-80), and the University of Waterloo, Waterloo, Canada (1980-89). In 1989, he returned to India as the Director of the newly created Centre for Artificial Intelligence and Robotics (CAIR) in Bangalore, under the Ministry of Defence, Government of India. In 2000, he moved to Tata Consultancy Services, where he created the Advanced Technology Center.

In 2009, he retired from TCS and joined the Erik Jonsson School of Engineering & Computer Science at the University of Texas at Dallas, as a Cecil & Ida Green Chair in Systems Biology Science. In March 2010, he was named as the Founding Head of the newly created Bioengineering Department. His current research interests are in the application of stochastic processes and stochastic modeling to problems in computational biology, and control systems.

Prof. Vidyasagar has received a number of awards in recognition of his research contributions, including Fellowship of The Royal Society, the world's oldest scientific academy in continuous existence, the IEEE Control Systems (Field) Award, the Rufus Oldenburger Medal of ASME, the John R. Ragazzini Education Award, and others. He is the author of eleven books and nearly 140 papers in peer-reviewed journals.

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Tea at 5.00 PM **All interested are welcome.**

Amalendu Chandra
Dean of Research and Development