

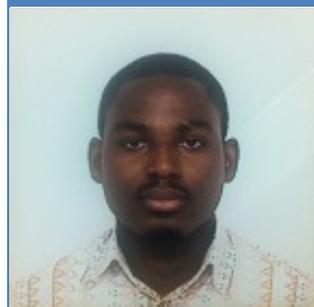


TOPIC	Inferring stable gene regulatory networks from steady-state data
ORGANIZERS	Drs. Karimodini and Homaifar; Gorji, and Lacewell (PhD students)
AREA	Data mining, machine learning, and control
SPEAKER	Joy Edward Larvie, MS student, ACIT Center, North Carolina A&T State University
DATE	Wednesday, February 25, 2015
TIME	2:00 PM to 3:00 PM
VENUE	ACIT Center, Room 342, Fort IRC Bldg, North Carolina A&T State University, 1601 East Market Street, Greensboro, NC 27411
FEES	No Charge

SYNOPSIS

Gene regulatory networks (GRN) capture the interactions among genes and other cell substances, resulting from the fundamental biological process of transcription and translation. Such networks have become useful in understanding the molecular mechanisms underlying important biological processes inherent in living organisms. Often times, the topology of the GRN is unknown and has to be recovered from experimental data. These experimental datasets consist of expression levels of the genes, usually measured as mRNA concentrations in microarray experiments. The high experimental cost imposes the “curse of dimensionality” on the data, resulting in fewer observations relative to the number of genes. With biological networks exhibiting loose connectivity, it is required that the inferred network be sparse. Several machine learning techniques such as clustering and information theoretic approaches have been adopted to understand the regulatory interactions existing in organisms from microarray data. The formulation of the least absolute shrinkage and selection operator – vector autoregressive (Lasso-VAR) model however, allows the incorporation of a stability constraint that relies on the Geršgorin theorem. The result is a stable, sparse and Granger causal model of the GRN that describes the associations among genes, providing a tool for biological research, medical diagnosis, disease treatment and targeted pathway discovery.

ABOUT THE SPEAKER



Joy Edward Larvie is an MS student at the North Carolina A&T State University and expected to graduate in May 2015. He received his bachelor’s degree in Computer Engineering with honors from the University of Ghana in 2010. His current research interests include machine learning, data mining, signal processing and control.

He has worked as a Teaching Assistant within the Electrical and Computer Engineering Dep’t at A&T where he tutored courses in Linear Control Systems and Digital Logic Design. He is currently a Research Assistant at the Autonomous Control and Information Technology Center, studying novel machine learning algorithms and their related applications.