



<b>TOPIC</b>	<b>An Introduction to Foundations of Learning Classifier Systems with an Extension to XCS Update Algorithm</b>
<b>ORGANIZERS</b>	Student Leadership Council and Faculty of ACIT Institute and TECHLAV Center
<b>AREA</b>	Machine Learning: Learning Classifier Systems
<b>SPEAKER</b>	Dr. Mohammad Razeghi-Jahromi
<b>DATE</b>	Friday February 3, 2017
<b>TIME</b>	3:00 – 4:00 P.M. (EST)
<b>VENUE</b>	Fort IRC 410, North Carolina A&T State University, UTSA and SIPI will be joining through video-conferencing
<b>FEES</b>	No Charge

## SYNOPSIS

Learning Classifier Systems (LCS) are machine learning techniques that use evolutionary computation and reinforcement learning in a supervised or unsupervised environment to learn rules in the form of “IF condition THEN action”. Original LCS was complex to understand and implement, therefore Wilson later introduced a simpler LCS structure with a new fitness calculation approach based on the classifier’s accuracy in predicting the payoff – XCS.

In this talk, Dr. Razeghi will present an introduction to foundations of learning classifier systems including different types and approaches, problem domains, and different knowledge representations. He will talk about XCS which is the most popular LCS implementation to date.

He will introduce a novel two-step Markov update scheme for XCS algorithm to achieve a better learning accuracy at steady state based on a mathematical framework using discrete-time dynamical system theory to analyze stability and convergence of the proposed method. He will discuss the sensitivity analysis for classifier prediction error to variations in learning rate, to investigate the transient and steady state behavior of the XCS algorithm. An experimental analysis is performed to learn a multiplexer benchmark problem to compare the results of the proposed update rules with the original XCS.

## ABOUT THE SPEAKER



**Mohammad Razeghi-Jahromi** received his B.S. degree from Amirkabir University of Technology, Tehran, Iran, in 1997, his M.S. degrees from University of Tehran, Iran in 2000 and University of Rochester, Rochester, NY, USA in 2012, respectively and his Ph.D. degree from University of Rochester, NY, USA in 2016, all in Electrical and Computer Engineering. His primary research interests include autonomous systems, networked control systems, control systems theory, stochastic control and stochastic differential equations, Markov jump linear systems, and convex optimization. Currently, he is a postdoctoral research associate in the ACIT Institute at North Carolina A&T State University.