

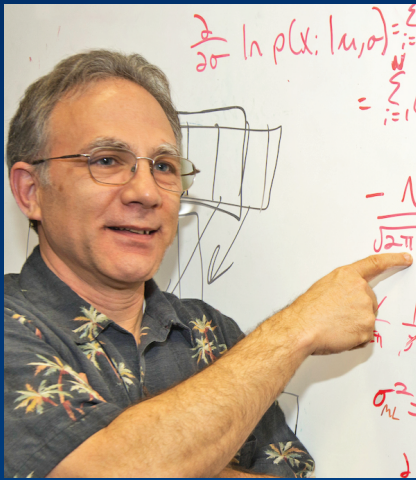
# DISTINGUISHED SPEAKER SEMINAR SERIES

THURSDAY, FEBRUARY 23, 2017 | 3:00 to 4:30 pm | CCSB G.0208

Refreshments will be served

## Possibilistic, Robust, Ambiguity (PRAM) Preserving Classification Algorithms

PROFESSOR PAUL GADER, UNIVERSITY OF FLORIDA



Paul Gader is a Professor and former chair of the Computer & Information Science & Engineering (CISE) department and is also affiliated with Environmental Engineering at the University of Florida. His research has ranged from mathematics to operational computational algorithms beginning with developing algorithms for detecting bridges in FLIR imagery in 1984.

He received a Ph.D. in Math in 1986 for parallelizing image processing algorithms. He has been a Senior Research Scientist at Honeywell; Research Engineer & Manager at the Environmental Research Institute of Michigan; and served on the faculties of Math, Electrical and Computer Engineering, and CISE at the Universities of Wisconsin-Oshkosh, Missouri, and Florida. He enjoys applying theory to problems, often using multi-sensor processing.

He has been a leading figure in the diverse application areas of handwriting recognition and landmine detection. He led teams that devised and implemented real-time algorithms for a Husky-Mounted Mine Detection System fielded in Afghanistan in 2008. The systems with those algorithms are featured in a National Geographic Television program: "Bomb Hunters: Afghanistan". He is currently focusing on computational analysis for Imaging Spectroscopy (Hyperspectral Image Analysis). He has published over 100 refereed journal papers and is a Fellow of the IEEE.

### ABSTRACT

This talk focuses on the need for and meaning of PRAM Algorithms for computer systems that learn from and react to data from sensors. Possibility theory is an axiomatic theory similar to probability that provides different mechanisms for ambiguity and robustness. Robust algorithm is an often used phrase that has become almost meaningless. There are several definitions given in the literature and sometimes no definition is given. However, statistical robustness is very important for algorithms used to process sensor data in somewhat unconstrained environments. Ambiguous patterns are patterns of measurements that could easily represent different classes of objects. The talk will provide an overview of possibility and robustness theory and relate that theory to the machine learning topic of manifold learning. Discussions of robustness properties of popular classifiers such as Support Vector Machines, Deep Learning Networks, and Bayesian methods will be given. Applications will be described in the fields of Handwriting Recognition, Landmine Detection, and Imaging Spectroscopy (aka Hyperspectral Image) Analysis.

### THE DISTINGUISHED SEMINAR SERIES

Established by the Dean's Office in the College of Engineering (CoE) in the spring of 2015, the CoE Distinguished Speaker Seminar Series brings internationally renowned experts, leaders and policy makers to help facilitate information exchange in order to promote research activity in the College, and enhance collaborative opportunities. The Seminar Series is funded through the research budget for the College in the Dean's Office.

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