



Department of Computer Science

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Energy-Aware Intelligence: Biological and Technical Systems

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Hosted by Zhi Wei

Date: Wednesday, April 27, 2022

Coffee: 1:15 PM – 1:20 PM

Time: 1:20 PM – 2:30 PM

Location: GITC 4402 (4th floor Seminar Hall)

WebEx Link: <https://njit.webex.com/njit/j.php?MTID=m905b46b204be124c4f0bcb15f7ab963a>

<https://cs.njit.edu/seminars>

Abstract:

Intelligence is expensive. Cutting-edge AI and Deep Learning technologies require exponentially increasing computational resources, data, and electrical power. The human brain uses about 1/4 of our body's total energy. At the same time, brains are very efficient devices. They use 20-30W power (just like a light bulb!), which is drastically less than the power consumption of today's supercomputers requiring MWs of power to solve specific learning tasks in an innovative way. Analyzing brain energy management helps develop computational and neuromorphic hardware implementations with drastic improvement in using resources, including energy, and provides a path towards sustainable AI. This talk overviews the challenges to intelligent systems, outlines crucial insights from brain studies, and introduces system designs combining the benefits of deep learning and neuromorphic technologies. We introduce several highly competitive solutions with applications to pattern recognition, reinforcement Deep-Q Learning, interactive decision making, and intelligent control.

Bio:

Dr. Robert Kozma (Fellow IEEE; Fellow INNS) holds a Ph.D. in Applied Physics (Delft, The Netherlands), two M.Sc. degrees (Mathematics, Hungary; and Power Engineering, Moscow, Soviet Union). He is Professor of Mathematics and funding Director of Center for Large-Scale Intelligent Optimization and Networks (CLION), FedEx Institute of Technology, University of Memphis, TN, USA. Various assignments included University of Massachusetts, Amherst; US Air Force Research Laboratory, Sensors; NASA Jet Propulsion Laboratory, Robotics; University of California at Berkeley, EECS & Neurobiology; Otago University, Information Sciences, New Zealand; Tohoku University, Quantum Science and Engineering, Japan. He has over 35 years of experience in intelligent signal processing, large-scale networks, distributed sensor systems, and biomedical domains. He has 7 book volumes, 300+ peer reviewed articles, 3 patents. Research funding by agencies NASA, DARPA, AFRL, AFOSR, NSF, and others. He is Editor-In-Chief of IEEE Transactions on Systems, Man,

and Cybernetics - Systems. He served on the Governing Board of IEEE Systems, Man, and Cybernetics Society, the AdCom of the IEEE Computational Intelligence Society; he is past President of the International Neural Networks Society (INNS), recipient of the Denis Gabor Award of INNS.

Webex Option

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