CECS
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CECS Seminar

"In Vitro Biological Neural Networks"

Professor Lawrence Rauchwerger

Professor in the Siebel School of Computing and Data Science at the University of Illinois Urbana-Champaign

Friday, October 18th
2:00-3:00 p.m.
Location: EH 2430

Abstract:

A computing stack powered by living neurons could unlock self-organizing and dynamically rewiring systems with extreme connectivity and parallel processing power, all while running on sugar with unprecedented energy efficiency. In this presentation we outline a framework that leverages in-silico simulation to establish an engineering testbed with the ultimate goal of learning to harness neural in-vitro systems for computational purposes. We describe an optimization approach to uncover reproducible neural activity present in a system that can be leveraged to carry out basic information processing tasks. We demonstrate the feasibility of this approach by optimizing a simulated neural system to perform digit classification, offering a proof-of-concept for a potential pathway to leveraging neural computation in vitro.

Biography:

Lawrence Rauchwerger is a professor in the Siebel School of Computing and Data Science at the University of Illinois Urbana-Champaign. He holds a doctoral degree in computer science from the University of Illinois Urbana-Champaign and an M.S. in electrical engineering from Stanford University. Rauchwerger is known for his approach to auto-parallelization, thread-level speculation and parallel library (STAPL). His research interests are in compilers for parallel computing, parallel and distributed C++ libraries, adaptive runtime optimizations, and architectures for parallel computing. Lately he has become active in neurocomputing. He received an IBM Faculty Award, an Intel Faculty Award, and the NSF Faculty Early Career Development (CAREER) Award. He is an IEEE Fellow and a AAAS Fellow.

Hosted By: Prof. Alex Veidenbaum