

Mechanical Engineering Seminar Series

November 4, 2024, 11:00

North Education Bldg, Room 271

Title: Swarm Robotics Research at the U.S. Naval Research Laboratory

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Abstract: Swarm robotics, a subfield of both robotics and artificial swarm intelligence, focuses on the development of teams composed of large numbers of autonomous robotic agents. Like swarm intelligence, swarm robotics arises from the study of the phenomenology of biological systems in which large numbers of individuals collaborate in joint collective actions for the benefit of the community as a whole. However, whereas swarm intelligence often utilizes the means and mechanisms of bio-inspired swarms for numerical optimization, the goals of bio-inspired robot swarms are generally concerned with the use of large numbers of low-cost physically embodied agents, acting together in a real-world environment, to achieve a common purpose. This talk will discuss research at the Naval Research Laboratory on key methods and bio-inspired algorithms for use in programming and controlling robotic swarms, and potential applications of these swarms.

Brief Bio: Don Sofge is a Roboticist and Section Head at the U.S. Naval Research Laboratory (NRL) with 36 years of experience (23 at NRL) in Artificial Intelligence and Control Systems R&D. He leads the Distributed Autonomous Systems Section in the Navy Center for Applied Research in Artificial Intelligence (NCARAI), where he develops nature-inspired computing paradigms to challenging problems in sensing, artificial intelligence, and control of autonomous robotic systems. His current research focuses on control of autonomous teams or swarms of robotic systems for Navy relevant missions. He has served as PI on dozens of federally funded R&D programs and has more than 200 peer-reviewed publications (including 12 edited books) on autonomy, intelligent control, quantum computing, and related topics. He has served as an advisor on autonomous systems to DARPA, ONR, OSD, ARL, NSF, and NASA, as well as US representative on international TTCP and NATO technical panels on autonomous systems, and has participated as a member of the National Science and Technology Council (NSTC) Networking and Information Technology Research and Development (NITRD) Program Interagency Working Groups: Intelligent Robotics and Autonomous Systems (IRAS), Machine Learning and Artificial Intelligence (MLAI), and the AI R&D Ad Hoc Group. Don also serves on the Academic Advisory Board for the Maryland Robotics Center (MRC) at the University of Maryland and occasionally serves as an Adjunct Faculty Member teaching graduate-level courses in Robotics.