

ME 250 SEMINAR

Long Duration Autonomy With Applications to Persistent Environmental Monitoring

When robots are to be deployed over long time scales, optimality should take a backseat to "survivability", i.e., it is more important that the robots do not break or completely deplete their energy sources than that they perform certain tasks as effectively as possible. For example, in the context of multi-agent robotics, we have a fairly good understanding of how to design coordinated control strategies for making teams of mobile robots achieve geometric objectives, such as assembling shapes or covering areas. But, what happens when these geometric objectives no longer matter all that much? In this talk, we consider this question of long duration autonomy for teams of robots that are deployed in an environment over a sustained period of time and that can be recruited to perform a number of different tasks in a distributed, safe, and provably correct manner. This development will involve the composition of multiple barrier certificates for encoding tasks and safety constraints through the development of non-smooth barrier functions, as well as a detour into ecology as a way of understanding how persistent environmental monitoring can be achieved by studying animals with low-energy life-styles, such as the three-toed sloth.

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ZOOM

11:00 AM - 11:50 AM



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Magnus Egerstedt is a Professor and School Chair in the School of Electrical and Computer Engineering at the Georgia Institute of Technology, where he also holds secondary faculty appointments in Mechanical Engineering, Aerospace Engineering, and Interactive Computing. Prior to becoming School Chair, he served as the director for Georgia Tech's multidisciplinary Institute for Robotics and Intelligent Machines. A native of Sweden, Dr. Egerstedt was born, raised, and educated in Stockholm. He received a B.A. degree in Philosophy from Stockholm University, and M.S. and Ph.D. degrees in Engineering Physics and Applied Mathematics, respectively, from the Royal Institute of Technology. He subsequently was a Postdoctoral Scholar at Harvard University. Dr. Egerstedt conducts research in the areas of control theory and robotics, with particular focus on control and coordination of complex networks, such as multi-robot systems, mobile sensor networks, and cyber-physical systems. He is a Fellow of both the IEEE and IFAC, and is a foreign member of the Royal Swedish Academy of Engineering Sciences. He has received a number of teaching and research awards for his work, including the John. R. Ragazzini Award from the American Automatic Control Council, the O. Hugo Schuck Best Paper Award from the American Control Conference, and the Best Multi-Robot Paper Award from the IEEE International Conference on Robotics and Automation.