November 7th, 2016
KAP 414
2:00 P.M. – 3:00 P.M.

Professor Theodorou Evangelos
(Georgia Tech)

"Real Time Stochastic Control and Decision Making: From Theory to Algorithms and Applications"

Abstract: For autonomous systems to operate in dynamic and uncertain environments they have to be equipped with fast decision-making processes to reason about the best possible action. In this talk, I will present sampling-based algorithms for decision making under uncertainty and stochastic control that go beyond classical formulations. The aforementioned algorithms rely on information theoretic interpretations of stochastic control theory, connections between fully Nonlinear PDEs and Forward Backward SDEs, and machine learning methods for statistical inference. In addition to sampling-based stochastic control, alternative methods that rely on uncertainty propagation using stochastic variation integrators, polynomial chaos theory and Gaussian Process regression will be presented and their implications to trajectory optimization and state estimation will be demonstrated. Applications span the

areas of robotics, autonomy, aerospace engineering, and social networks. At the end of this talk, and towards closing the gap between high-level reasoning-decision making   and low-level organization, I will highlight the interdependencies between theory, algorithms, and forms of computation and discuss future computational technologies at the intersection of theory and computation.

Bio: Dr. Evangelos A. Theodorou is an assistant professor in the Daniel Guggenheim School of Aerospace Engineering at the Georgia Institute of Technology. He is also affiliated with the Institute of Robotics and Intelligent Machines. Theodorou earned a Bachelor's degree in Electrical Engineering and a Master's degree in Production Engineering from the Technical University of Crete, Greece. Additionally, he received a Master's degree in Computer Science and Engineering from the University of Minnesota, and a Master's degree in Electrical Engineering and a Ph.D. in Computer Science from the University of Southern California. His research interests span the areas of stochastic optimal control, machine learning, statistical physics, and computational neuroscience.