



ROBOTICS SEMINAR

FRIDAY, April 23, 2021

3:30-4:30 p.m.

Join Zoom Meeting

Meeting ID: 957 2467 9972

Passcode: RISEM



Avik De

Co-founder & CTO

Ghost Robotics

Design and control of insect-scale bees and dog-scale quadrupeds

Abstract: Enhanced robot autonomy—whether it be in the context of extended tether-free flight of a 100mg insect-scale flapping-wing micro aerial vehicle (FWMAV), or long inspection routes for a quadrupedal robot—is hindered by fundamental constraints in power and computation. With this motivation, I will discuss a few projects I have worked on to circumvent these issues in academia and industry. I will discuss how applying an optimization-based framework to the FWMAV design problem allowed us to reason about the benefits of a nonlinear transmission in the RoboBee, how controller modularity allows us to have obstacle-aware dynamic quadrupedal locomotion with 5W of computational power, as well as progress towards onboard control of aggressive flight on a 25mg, 0.3W microcontroller.

Brief Bio: Avik is co-founder and CTO of Ghost Robotics, a startup company commercializing legged robotics in Philadelphia. The company currently has two products, a 45kg quadruped aimed at industrial applications, and a 12kg quadruped aimed at research applications. Previously, Avik completed a postdoc at Harvard SEAS advised by Rob Wood, where he researched design of micro-scale flapping robots, as well as strategies for their control. He received his PhD in Sep 2017, at the GRASP laboratory (Kodlab) in the University of Pennsylvania advised by Dan Koditschek. The main thread tying all of his work has been bio-inspired design and control strongly anchored in empirical robotics. His research has focused on examining the strengths and weaknesses of modular and hierarchical control strategies, as well as demonstrating efficient and effective control of dynamic locomotion in a way that generalizes across platforms (quadruped, tailed biped, ...) and behaviors (hopping, running, ...).

Host: Aaron Johnson

For a virtual meeting contact: Stephanie Matvey (smatvey@andrew.cmu.edu)