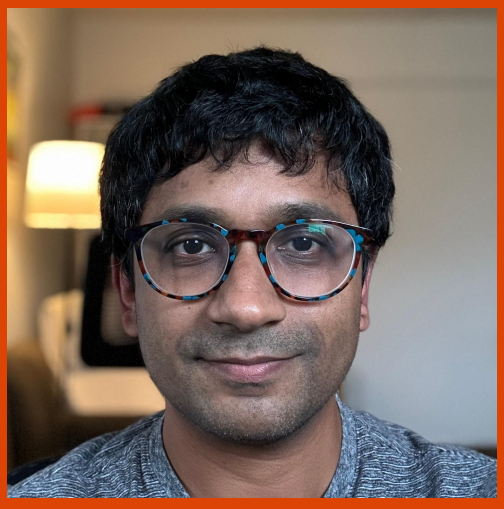
Robotics Seminar Series

Power-efficient Autonomous Mobile Robots

Dr. Avik De
Chief Technical Officer
Ghost Robotics

Enhanced robot autonomy is hindered by fundamental constraints in power and computation. With this motivation, I will discuss a few projects to optimize robot performance within these constraints, in academia and industry. On the design side, I will discuss how applying an optimization-based framework to the flapping-wing micro aerial vehicle (FWMAV) design problem allowed us to reason about the benefits of a nonlinear transmission in the RoboBee, as well as optimal design for the Vision 60 quadrupedal robot. On the control side, I will discuss how hierarchical and modular control allows us to have onboard flight control on a 25 mg, 0.3 W microcontroller, as well as obstacle-aware dynamic legged locomotion with 5 W of computational power. I will also discuss recent progress on increasing robot capabilities within this framework by combining model-based methods with machine learning in computationally efficient ways. Lastly, I will share some of our experience with the challenges in growing a robotics company, maintaining innovation while scaling manufacturing.



Avik De is co-founder and CTO of Ghost Robotics, a startup company commercializing legged robotics in Philadelphia. 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, etc.) and behaviors (hopping, running, walking, etc.).

FRIDAY
Nov 22
10-11AM

Covell Hall 221
FREE
Refreshments Served

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