

Graduate Opportunities: Biologically inspired flight control & unmanned aerial systems control

The Autonomous Physics Group at Oklahoma State University seeks doctoral graduate students to join our growing group. Funded research opportunities are available studying biologically inspired flight control, bringing mathematical rigor to how insects use limited computational resources to provide robust, high bandwidth, flexible information processing. Research positions include creating experimentally-consistent theoretical models of swarm autonomy, through translating those approaches to unmanned aerial systems.

Student Opportunity: Students in our group receive the opportunity (and expectation) to perform high-quality & creative research that has an impact on the academic and Defense Department communities. Our work is well-supported by a network of collaborators in government and academic research labs, and our projects have received support from ARO, AFRL, ONR, DARPA, NASA, & others. Our high-speed insect tracking facility has recently received extensive hardware improvements, with a new experimental enclosure and stimulus designed to stimulate previously un-quantified insect flight behaviors, allowing scientists to build quantitative mathematical models of the flexible information processing encoded in the sensing and feedback paths of aerial insects. Students receive mentoring from Prof. Imraan A. Faruque, whose career in academic and government labs has resulted in successful graduate students who have authored publications in leading journals (e.g., AIAA JGCD, IEEE TAES). The impact of his leadership and mentoring has been recognized with the 2019 ONR Young Investigator award and 2017 AIAA Hal Andrews Young Engineer/Scientist Award. This exceptional level of support allows students to focus on technical excellence and provides numerous opportunities for promising individuals to begin an outstanding career.

About the research group: The Autonomous Physics Group builds mathematically rigorous models of the flexible information processing aerial insects use to enable robust autonomy, and translates those models to engineered unmanned aerial systems. APG is housed within the Unmanned Systems Research Institute, which is also experiencing significant growth. Read more at <https://autophysics.weebly.com>.

Eligibility: Basic application requirements for these open positions include: 1) A BS or MS degree in a closely related field (such as aerospace engineering, electrical engineering, mechanical engineering, mathematics, or physics). 2) A strong record of courses taken related to systems and control. Published or submitted research papers, interdisciplinary controls project experience, related research experience, or US Citizenship are all strengths that should be indicated in your statement of interest.

Followup: Interested individuals should contact the lab director Imraan Faruque i.faruque@okstate.edu with "Prospective graduate student" in the email subject and attach a PDF including your resume, (include relevant courses or publications supporting your eligibility), and a statement of interest, which should highlight your previous project experience and goals. Publications (draft or submitted) may be attached; any publications and project experience should indicate your role on the project/paper.

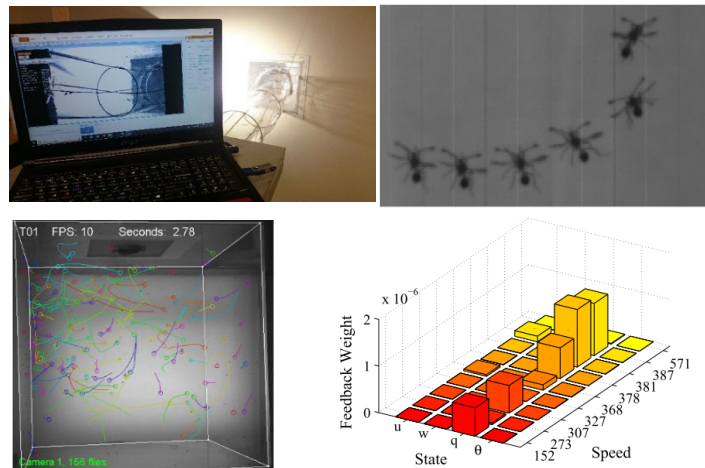


Figure 1. Laboratory setup for high speed insect tracking of high density honeybee hive approaches, NSF project with biologists to identify the role of eye ornamentation, recent cluttered *Drosophila* insect tracking in Bayesian inference framework (Cheng), and new techniques to extract individual insect reward strategies in populations of insects. (Faruque et al., *Biological Cybernetics* 2018)