Experiments + computational analysis + instrumentation + modeling

Highly interdisciplinary teams: biology, physics, engineering, compsci

Use physics principles and approach to solve fundamental bio(medical) problems
Collins Lab Research: Biomechanics in Hydra regeneration

How do you form biological patterns?

What is the role of mechanics?

Reaction-diffusion models coupled to tissue stretch?
Collins Lab Research: Biomechanics in Hydra physiology

How do you get large-scale phenomena from the actions of individual cells and their components?

What controls the symmetry and the coordination of the opening?

Jason Carter
(now MD/PhD student at Stony brook)
Collins Lab Research: Biomechanics & Statistics

Organismal diversity in an asexual planarian population

How do you create diversity without sexual reproduction?
Are asexual animals really clonal?
Can we understand populations from the behaviors of individual stem cells?

Collins Lab Research: Planarian high-throughput Neurotoxicology

- Fast & economic screening of possible environmental neurotoxicants and drugs

- Connecting behavioral phenotypes to signaling pathways via computational image analysis and bioinformatics: projects in **optimization, development of new methods**

- Design and optimization of parts of the instrumentation for the screening, e.g. plate loading, lighting stability, etc.
Collins Lab  (http://schoetzlab.ucsd.edu/)

Extensive record of publishing undergraduate student research projects, e.g.

**Carter et al.,** Dynamics of Mouth Opening in Hydra, *Biophys. J.* (2016)


Email Eva-Maria for more info: ecollin3@swarthmore.edu

Long-term projects/commitments (minimum ~1 year required)