

Project Title

World's Fastest Video Camera

Supervisor

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Theme(s)

Biomechanics and Mechanobiology

Project Description

High-speed imaging requires specialized cameras to capture fleeting events like explosions, hypersonic flow, or even the passage of light. In this project, we are interested in the oscillations of an ultrasound bubble, which occurs at frequencies of a few megahertz.

As such, we will need to build a camera that can image at around one hundred million frames per second, for a duration of around one second. These requirements are far beyond even the fastest cameras available today, necessitating a new development program.

The student on this project will be building part of the camera, specifically a small piece of the sensor. Using newly-available silicon photomultiplier arrays, we will be constructing a small-scale prototype with the sensitivity and speed necessary to capture data at these incredible speeds.

The ideal candidate will have a good background in electrical engineering and will be designing and testing readout circuitry for the camera.

Once this is complete, they will begin testing a small-scale prototype by building the large-scale optical system required to magnify the bubbles enough to be seen by the sensor. This project will also involve a certain amount of programming, in order to reconstruct the data after the experiment is complete.