

# Green Fluid Dynamics



Melissa Green

Assistant Professor, Mechanical and Aerospace Engineering

## CURRENT RESEARCH

### How fluid dynamics is propelling energy applications

When you drag an oar through the water, whirling vortices form at the edges, created by the difference in pressure in front of and behind the oar surface. The pressure difference creates the force you feel in the handle of the oar, the aerodynamic drag generated as you literally drag yourself across the river. Dr. Melissa Green, Assistant Professor of Mechanical and Aerospace Engineering at Syracuse University, studies the basic physical mechanisms of unsteady fluid flow around drag-producing bodies, like stationary paddles or posts, or flapping wings and fins. The generated drag force is directly related to the vortex structures that appear in the flow around the body, and Green's group studies how to design engineering applications to either create the force more efficiently (say, out of an oar stroke), or to mitigate the force as much as possible (as on a stationary structure in a current). Her work will help save energy for a variety of vehicles, and secure the safety of structures that are susceptible to fluid forces, like buildings and bridges.

In one project, Green and her lab investigate the vortex wakes created by the flapping of aquatic animal fins and flukes as a possible model of man-made underwater propulsion. While the researchers in the Green Fluid Dynamics Lab look at simple materials like plastic to create simple fin models, a collaboration with the Director of the Syracuse Biomaterials Institute collaboration also enables them to incorporate flexible bio-inspired materials that can actually resemble the bending and surface feel of a real fish fin. Uniquely equipped with expertise in measuring and visualizing fluid flows experimentally and visualizing data in order to create a thorough...

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## AFFILIATION



Syracuse University

## EDUCATION

- Ph.D. in Mechanical and Aerospace Engineering 2009, Princeton University

## AWARDS

- The Filtertech, Pi Tau Sigma, and Sigma Gamma Tau Award for Excellence in Education in Mechanical and Aerospace Engineering, 2015
- Air Force Office of Scientific Research Young Investigator Award, 2014
- National Research Council Research Associateship, 2009

## RESEARCH AREAS

Technology, Space, Fluidics, Space

## FUNDING REQUEST

Your contributions will help Dr. Melissa Green of Syracuse University delve into drag and vortices in fluid dynamics. Donations will support personnel and a high-speed particle image velocimetry system (PIV) that enables experiments in the water channel. Smaller amounts will fund other minor equipment, and help students travel to national conferences where they can gain visibility, networking, and motivation. Join Dr. Green's research to understand fluidics, which will have great energy applications in the future!