

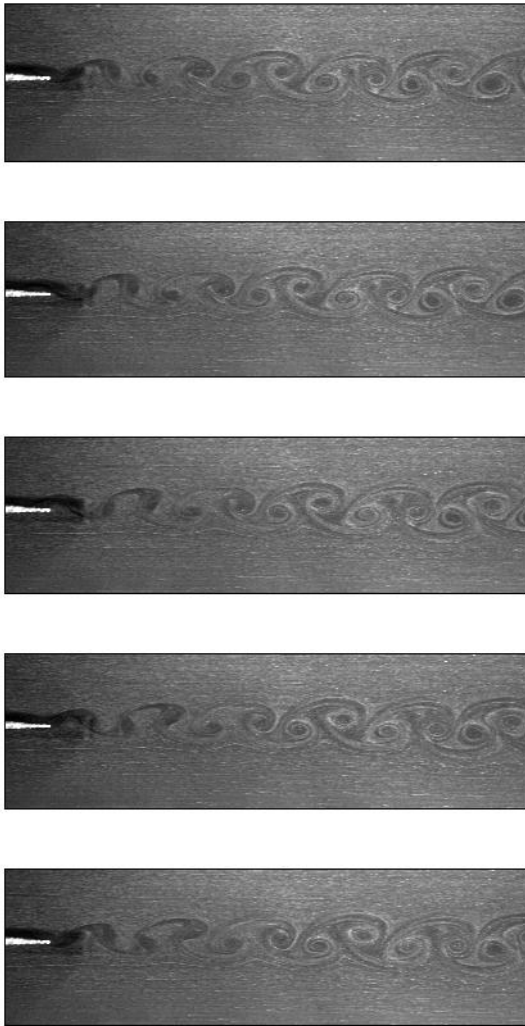
Faculty Mentor: Dr. Robert Ryan

Project Supervisor: Dr. Vibhav Durgesh (vibhav.durgesh@csun.edu)

Project Title: Designing experimental setup for flow visualization to understand complex fluid dynamics flows

Available Positions: Approximately 3 positions are available, scheduled for a maximum of 15 hours per week. Contact the project supervisor for specific hours of employment.

Expected Background: The work will take place in a laboratory environment using expensive equipment which is potentially hazardous if misused. Students must be capable of working safely and responsibly in this type of environment. No previous background in fluid mechanics is required. Experience with LabView is helpful but not required. Ability to work with hand tools (e.g. wrenches, drill, screwdrivers) is a plus.



#### Project Description:

Flow visualization is often used in applications where other techniques are difficult or impossible to use. When it is possible to couple flow visualization with other experimental techniques, visualization images provide a spatial view of the flow that, together with other measurements, yield a more comprehensive view of the flow than the individual techniques alone can provide. Despite their widespread use and effectiveness, flow visualization images alone are often hard to interpret. Furthermore, the flow visualization technique requires an extensive optical setup, (including lenses, camera and lighting) and a detailed understanding of visualization processes (like smoke wire, hydrogen bubble, fluorescent/photochromic dyes). During the summer AIMS2 project, students will design an experimental setup for flow visualization around various aerodynamics bodies (like cylinder, automobile models, plane models, etc.) using different flow visualization techniques. This will involve using several lenses, cameras, lighting, lasers, image acquisition system, and programming in LabView, to acquire images.

**Figure 1: Hydrogen bubble flow visualization in the wake of an airfoil. Experiments performed in the water tunnel in the fluids lab at CSUN.**