

COURSE ANNOUNCEMENT
Fall 2016

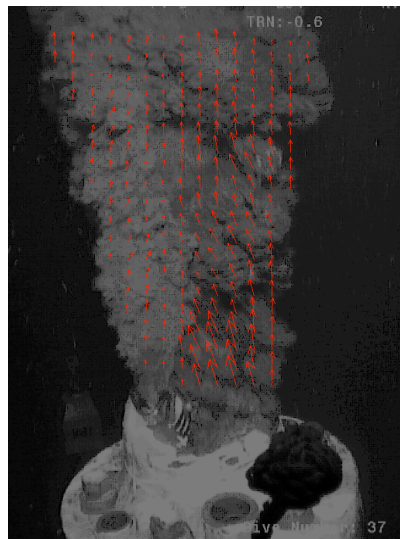
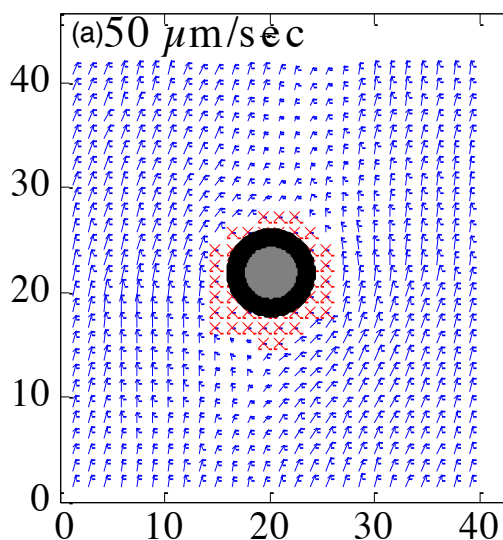
Fundamentals of Particle Image Velocimetry

ME5957 (CRN 19063)

Three credit hours, MWF at 2:30 pm, Room ME2004

Professor Steve Wereley, wereley@purdue.edu

Particle image velocimetry (PIV) and related techniques are quickly becoming the standard tools for measuring fluids and fluid-like materials in motion because of their utility in exploring complex flows such as the microflow around a human red blood cell (below left) and a oil discharging from a broken oil well (below right). This semester the previously one credit hour PIV course will be expanded to three credit hours and include a hands-on experimental component. This class will expose students to the wide variety of flows and flow parameters that can be measured with this versatile technique. The course will focus on the scientific principles underlying the PIV technique—fluid dynamics, particle dynamics, lasers, optics, imaging, etc.—as well as the practical application of these principles to reach an in-depth understanding of the technique including its advantages over competing techniques, its limitations, and its future potential. When finished with the course, students will have attained a level of expertise at which they can analyze a particular flow and determine the optimal parameter space for investigating that flow: algorithm choice, particle size, time between exposures, imaging format, magnification, etc. Students will be exposed to several of the popular commercial particle image velocimetry packages in addition to writing their own basic software. Advanced topics such as microscopic PIV, stereo PIV, and 3D velocity measurements will be covered. Course grades will be based on



approximately weekly assignments, several lab reports and a final independent project that can be based on the students research to be presented orally near the end of the semester.