

ALAN L. KASTENGREN

Argonne National Laboratory, 9700 S. Cass Avenue, Argonne, IL 60439
phone: 630/252-9681, e-mail: akastengren@anl.gov

PROFESSIONAL EXPERIENCE

ARGONNE NATIONAL LABORATORY

Argonne, IL

Postdoctoral Appointee, Center for Transportation Research August 2005 to August 2008

- Conducts time-resolved x-ray radiography measurements of diesel spray structure to quantify the near-nozzle behavior of diesel sprays
- Develops analysis techniques for x-ray radiography measurements to describe quantities of interest to the diesel spray community, including spray penetration speed, trailing edge speed, and cone angle
- Refines computer analysis tools used to interpret x-ray radiography measurements of diesel sprays
- Advises on and conduct numerical simulations of spray flowfields, comparing the results to x-ray radiography measurements to better understand the strengths and limitations of spray models
- Developed a novel data analysis strategy to extract average fuel speed from x-ray spray data
- Served as the x-ray fuel spray group's primary presenter at national and international technical meetings
- Lead author of eight papers in peer-reviewed publications and eight papers in conference proceedings

UNIVERSITY OF ILLINOIS

Urbana-Champaign, IL

Graduate Research Assistant and Graduate Fellow August 2001 to August 2005

- Performed time-resolved flow visualization of a blunt-base cylinder at an angle-of-attack to a supersonic freestream flow
- Analyzed flow visualizations to quantitatively describe the unsteady motions of this three-dimensional supersonic base flow
- Used flow visualization techniques to quantitatively study the unsteady motion of shock waves in supersonic base flows
- Obtained multi-frame high-speed visualizations of supersonic base flows in order to track the motion of large-scale turbulent structures
- Used advanced analysis techniques to describe the velocity and evolution of large-scale coherent structures in supersonic base flows from multi-frame high-speed flow visualizations.

LOS ALAMOS NATIONAL LABORATORY

Los Alamos, NM

Graduate Research Assistant May 2001 to August 2001

- Performed finite-element analysis using ABAQUS to evaluate a novel method to measure residual stresses in fabricated metal parts

- Conducted literature searches to support Dr. Battaglia's research efforts in microfluidics and swirling, combusting flows

EDUCATION

Ph.D., Mechanical Engineering, University of Illinois Urbana-Champaign
B.S., Mechanical Engineering, with Distinction, Iowa State
University

PROFESSIONAL SOCIETY ACTIVITIES

- Participated in numerous conferences sponsored by professional societies, including:
 - SAE World Congress 2006
 - ASME International Mechanical Engineering Congress and Exposition 2006
 - ASME 2007 Fall Internal Combustion Engines Conference
 - ILASS-Americas 2007 Annual Conference
- Member of SAE, ASME, and ILASS

PUBLICATIONS AND PRESENTATIONS

- Kastengren, A.**, Powell, C. F., Wang, Y.-J., and Wang, J., "Study of Diesel Jet Variability Using Single-Shot X-Ray Radiography," in press, *ASME Journal of Engineering for Gas Turbines and Power*.
- Kastengren, A.**, Powell, C. F., Riedel, T., Cheong, S.-K., Im, K.-S., Liu, X., and Wang, J., "Nozzle Geometry and Injection Duration Effects on Diesel Sprays Measured by X-Ray Radiography," in press, *ASME Journal of Fluids Engineering*.
- Kastengren, A.** and Powell, C. F., "Spray density measurements using X-ray radiography," *Proceedings of the I MECH E Part D, Journal of Automobile Engineering*, v. 221, n. 6, 2007, pp. 653-662.
- Kastengren, A.**, Dutton, J. C., and Elliott, G., "Coherent Structure Eduction and Convection Velocity in Compressible Blunt-Body Wakes," *AIAA Journal*, v. 45, n. 9, September 2007, pp. 2299-2311.
- Kastengren, A.**, Dutton, J. C., and Elliott, G., "Large-scale structure visualization and convection velocity in supersonic blunt-base cylinder wakes," *Physics of Fluids*, v. 19, n. 1, January 2007, paper 015103.
- Kastengren, A.** and Dutton, J. C., "Aspects of Shear Layer Unsteadiness in a Three-Dimensional Supersonic Wake," *ASME Journal of Fluids Engineering*, v. 127, n. 6, November 2005, pp. 1085-1094.
- Kastengren, A.**, Dutton, J. C., and Elliott, G., "A method for measuring recompression shock unsteadiness applied to two supersonic wakes," *Experiments in Fluids*, v. 39, n. 1, July 2005, pp. 140-151.

- Kastengren, A.** and Dutton, J. C., "Large-Structure Topology in a Three-Dimensional Supersonic Base Flow," *AIAA Journal*, v. 43, n. 5, May 2005, pp. 1053-1063.
- Miers, S., **Kastengren, A.**, El-Hannouny, E., and Longman, D., "An Experimental Investigation of Biodiesel Injection Characteristics Using a Light-Duty Diesel Injector," ASME Paper ICEF 2007-1735, ASME Internal Combustion Engines Division Fall Technical Conference, Charleston, SC, October 2007.
- Kastengren, A.**, Powell, C. F., Wang, Y.-J., and Wang, J., "Study of Diesel Jet Variability Using Single-Shot X-Ray Radiography," ASME Paper ICEF2007-1663, ASME Internal Combustion Engines Division Fall Technical Conference, Charleston, SC, October 2007.
- Leick, P., Riedel, T., Bittlinger, G., Powell, C. F., **Kastengren, A.**, and Wang, J., "X-Ray Measurements of the Mass Distribution in the Dense Primary Break-Up Region of the Spray from a Standard Multi-Hole Common-Rail Diesel Injection System," 21st Annual ILASS Europe Conference on Liquid Atomization and Spray Systems, Mugla, Turkey, September 2007.
- Kastengren, A.**, Powell, C. F., Riedel, T., Cheong, S.-K., Wang, Y.-J., Im, K.-S., Liu, X., and Wang, J., "Improved Method to Determine Spray Axial Velocity Using X-Ray Radiography," ILASS Americas 20th Annual Conference on Liquid Atomization and Spray Systems, Chicago, IL, May 2007.
- Kastengren, A.**, Powell, C. F., Riedel, T., Cheong, S.-K., Wang, Y.-J., Im, K.-S., Liu, X., and Wang, J., "Determination of Diesel Spray Axial Velocity Using X-Ray Radiography," SAE Paper 2007-0666, SAE World Congress, Detroit, MI, April 2007.
- Kastengren, A.**, Dutton, J. C., and Elliott, G., "Coherent Structure Eduction and Convection in Supersonic Wake Shear Layers," AIAA Paper 2005-2639, 35th AIAA Fluid Dynamics Conference and Exhibit, Toronto, ON, June 2005.
- Kastengren, A.**, Dutton, J. C., and Elliott, G., "Time-Correlated Visualizations of Supersonic Blunt-Base Cylinder Wakes," AIAA Paper 2005-1346, 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 2005.
- Kastengren, A.**, Dutton, J. C., and Elliott, G., "Recompression Shock Unsteadiness in Supersonic Blunt-Base Cylinder Wakes," AIAA Paper 2005-0315, 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 2005.
- Kastengren, A.** and Dutton, J. C., "Wake Topology in a Three-Dimensional Supersonic Base Flow," AIAA Paper 2004-2340, 34th AIAA Fluid Dynamics Conference and Exhibit, Portland, OR, June 2004.
- Kastengren, A.** and Dutton, J. C., "Turbulent Structures in a Supersonic Three-Dimensional Blunt Body Wake," AIAA Paper 2003-4149, 33rd AIAA Fluid Dynamics Conference and Exhibit, Orlando, FL, June 2003.
- "Effect of Ambient Pressure on Diesel Spray Axial Velocity and Internal Structure," U.S. Department of Energy Diesel Engine-Efficiency and Emissions Research Conference, Detroit, MI, August 2007.
- "Investigation of High-Pressure Fuel Sprays Using Ultra-Fast X-Ray Radiography," International Mechanical Engineering Congress and Exposition, Chicago, IL, November 2006.
- "Spray Structure Measured with X-Ray Radiography," U.S. Department of Energy Diesel Engine-Efficiency and Emissions Research Conference, Detroit, MI, August 2006.