Kim A. Shollenberger, Ph.D.

California Polytechnic State University
Mechanical Engineering Department
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PROFESSIONAL EXPERIENCE

2008-present *Professor*
2002-2008 *Associate Professor*
California Polytechnic State University — San Luis Obispo, CA
Lecture undergraduate thermal/fluids courses, senior project sequence, and graduate level course on computational heat transfer. Developing an applied research program with an emphasis on data acquisition, experimental design, and computational fluid mechanics.

1994-2002 *Senior Member of Technical Staff*
Sandia National Laboratories — Albuquerque, NM
Part of a team that developed advanced diagnostics for gas-liquid and gas-liquid-solid multiphase flows. Primary effort, funded by the Office of Industrial Technology, National Energy Technology Center, and a consortium of eleven companies, aimed at developing diagnostics applicable to opaque multiphase flows that exist in industrial slurry bubble-column reactors and circulating fluidized beds. Work was principally focused on experimental design, diagnostic development, and combining coarse industrial data with detailed experimental results obtained at Sandia's facilities. Techniques applied included gamma-densitometry tomography, electrical-impedance tomography, and high-speed pressure measurements. Also, worked on characterizing microscale multiphase transport processes in slurry flows and porous media using microfocus x-ray.

1989-1994 *Graduate Student Research Assistant*
University of California at Berkeley — Berkeley, CA
Conducted experimental, computer, and analytical analysis of downward annular mist two-phase flow in pipes and past restrictions. Used Phase Doppler Particle Anemometry (PDPA) and hot-wire anemometry to characterize droplet flow. Conducted heated water channel experiments that modeled the heat transfer over and in between ceramic tiles on NASA's space vehicles during reentry. Used thermocouples, liquid crystals, and flow visualization for characterization. Also, wrote a three-dimensional finite-element code to simulate experiments.

Mechanical Engineering Internship
1989 Air Products and Chemicals Inc. — Trexlertown, PA
1988 Gardner Cryogenics — Bethlehem, PA

EDUCATION

1991-1994	University of California at Berkeley, *Ph.D. in Mechanical Engineering*
1989-1991	University of California at Berkeley, *M.S. in Mechanical Engineering*
1987-1989	Cornell University, *B.S. in Mechanical Engineering* with Distinction

COURSES TAUGHT (*Course Coordinator)

ME 236, Thermal Measurements
ME 302, Thermodynamics
ME 303, Thermal Engineering
ME 343, Heat Transfer*
ME 346, Heat Transfer Laboratory
ME 341, Fluid Mechanics I
ME 347, Fluid Mechanics II*
ME 428/429/430, Senior Design
ME 450 Solar Power Systems
ME 554, Computational Heat Transfer*

Short Courses at Munich School of Applied Sciences:
Advanced Thermodynamics (Summer 2007)
Renewable Energy Systems (Summer 2012)
Gas Turbines (Summer 2015, Summer 2016, Summer 2017)

MASTER'S STUDENTS ADVISED

Basket, Ryan, "Effects of Support Structure Geometry on SLM Induced Residual Stresses in Overhanging Features," May 2017.
Tower, Jared, "Numerical Development and Optimization of a Phase Change Material Solar Thermal Storage Unit System Model," March 2016.
Willis, Bryce Reiko, "Net Zero Residential Design for Solar Cal Poly 2015 Solar Decathlon House, March 2015.
Eichermueller, Michael, "A Performance Study and Characterization of a Single Use Pharmaceutical Vibrational Mixer Using Computational Fluid Dynamics," December 2014.
Mitori, Tiffany, "Flight and stability of a laser inertial fusion energy target in the drift region between injection and the reaction chamber with computational fluid dynamics, March 2014.
Mustain, Evan, "Computational Fluid Dynamics Model of an Ischemic Left Ventricle: Optimizing the Shape of an Ischemic Heart," June 2011.
Kempenaar, Jason, "Transient Liquid-Fuel Penetration under Unsteady In-Cylinder Conditions," June 2007.
Kempenaar, Joshua, "Effect of Upstream Blockage on the Airflow and Fuel Spray in an Air/Fuel Swirler," July 2007.
Phillips, Brett, "Simulating the Formation of a Crater Resulting from a Solid Rocket Motor Impacting the Earth Using CTH Hydrocode," May 2007.
Spivey, Sean, "Numerical Analysis of Geometric Effects on Pressure Drop in 180 Degree Turning Channels," March 2006.

PROFESSIONAL MEMBERSHIPS

American Society of Mechanical Engineers, co-Faculty Advisor for HPV team (2010-14)
American Society of Engineering Education
Society of Women Engineers
Pi Tau Sigma

AWARDS AND ACHIEVEMENTS

2005 Bently Endowed Professor for Academic Year 2005-2006
1999 Award for Excellence, Sandia National Laboratories
1997 Award for Excellence, Sandia National Laboratories
1995 Award for Excellence, Sandia National Laboratories
1989 Graduate Opportunities Fellowship, University of California at Berkeley
1988 AT&T Research and Development Award, Cornell University
1987 Cornell Tradition Fellowship, Cornell University

PROFESSIONAL SERVICE ON CAMPUS

Cal Poly Corporation Board of Directors, 2012-present
Faculty Screening Committee, 2006-present
Computing Committee, 2006-present
General Education Committee, College of Engineering Representative, 2003-2006
Laboratory & Facilities Committee, 2002-2006
Hiring Procedures Committee, 2002-2004

RECENT PUBLICATIONS

Kempenaar, J., and Shollenberger, K. A., "Effect of Upstream Blockage on the Airflow and Fuel Spray in an Air/Fuel Swirler," ASME Fluids Engineering Division Summer Conference, Jacksonville, August 2008.

Kempenaar, J. G., Mueller, C. J., and Shollenberger, K. A., "In Situ Injection Rate Measurement of Multi-orifice Diesel Injector NozzlesASME Fluids Engineering Division Summer Conference, Jacksonville, August 2008.

Spivey, S. K., and Shollenberger, K. A., "Computational Fluid Dynamics (CFD) Analysis of U-Duct Turbine Cooling Channels," ASME Fluids Engineering Division Summer Conference, Jacksonville, August 2008.

Shollenberger, K. A., "Computational Fluid Dynamics (CFD) Instruction within the Undergraduate Curriculum," ASME International Mechanical Engineering Congress and Exposition, Seattle, November 2007.

Widmann, J., Shollenberger, K. A., and Kennedy, J., "Students Use of Author's Textbook Solution Manuals: Effect on Student Learning of Mechanics Fundamentals" ASEE Annual Conference, June 2007.

Binns, R., and Shollenberger, K. A., "Analysis of Air Filter and Modeling with FLUENT," ASME Fluids Engineering Division Summer Annual Meeting, Miami, July 2006.

Widmann, J., and Shollenberger, K. A., "Students Use of Textbook Solution Manuals: Student and Faculty Perspectives in a Large Mechanical Engineering Department," ASEE Annual Conference, June 2006.

Totora, P. R., Ceccio, S. M., Trujillo, S. M., Shollenberger, K. A., and O'Hern, T. J., "Capacitance Measurements of Solids Concentration in Gas-solid Flows," *Powder Technology*, 2003.

O'Hern, T. J., Torczynski, J. R., Barney, J., Castaneda, J. N., Cote, R. O., Shollenberger, K. A., "Investigation of Oil Injection into Brine for the Strategic Petroleum Reserve – Hydrodynamics Experiments with Simulant Liquids," SAND Report, 2003.

Liter, S. G., Torczynski, J. R., Shollenberger, K. A., and Ceccio, S. L., "Electrical-Impedance Tomography for Measuring Material Distributions of Multiphase Flows in a Conducting

Vessel," Joint ASME/European Fluids Engineering Division Summer Conference, Montreal, Canada, July 2002.

Shollenberger, K. A., George, D. L., and Torczynski, J. R., "Effect of Surface Tension on the Development of Gas-Volume-Fraction Profiles in Vertical Bubble-Column Flows," Joint ASME/European Fluids Engineering Division Summer Conference, Montreal, Canada, July 2002.

George, D. L., Shollenberger, K. A., Torczynski, J. R., O'Hern, T. J., Ceccio, S. L., "Three-Phase Material Distribution Measurements in a Vertical Flow Using Gamma-Densitometry Tomography and Electrical-Impedance Tomography," *International Journal of Multiphase Flow*, **27**, pp. 1903-1930, 2001.

Trujillo, S. M., Shollenberger, K. A., O'Hern, T. J., Torczynski, J. R., Tortora, P. R., and Ceccio, S. L., "Void Fraction Measurement Techniques in the Sandia/MFDRC Riser," AIChE Annual Meeting, Reno, NV, November 2001.

George, D. L., Torczynski, J. R., Shollenberger, K. A., O'Hern, T. J., and Ceccio, S. L., "Quantitative Electrical-Impedance Tomography in an Electrically Conducting Bubble-Column Vessel," ASME Fluids Engineering Division Summer Meeting, New Orleans, LA, June 2001.

Shollenberger, K. A., George, D. L., and Torczynski, J. R., "Effect of Liquid Viscosity on the Development of Gas-Volume-Fraction Profiles in Vertical Bubble-Column Flows," 4th International Conference on Multiphase Flow, New Orleans, LA, May 2001.

George, D. L., Torczynski, J. R., Shollenberger, K. A., O'Hern, T. J., Ceccio, S. L., "Validation of Electrical-Impedance Tomography for Measurements of Material Distribution in Two-Phase Flows," *International Journal of Multiphase Flow*, **26**, pp. 549-581, 2000.

Shollenberger, K. A., George, D. L., and Torczynski, J. R., "Effect of Sparger Geometry on Gas Volume Fraction in Vertical Bubble-Column Flows Measured by Gamma-Densitometry Tomography (GDT)," AIChE Annual Meeting, Los Angeles, CA, November 2000.

George, D. L., Shollenberger, K. A., and Torczynski, J. R., "Sparger Effects on Gas Volume Fraction Distributions in Vertical Bubble-Column Flows as Measured by Gamma-Densitometry Tomography," ASME Fluids Engineering Division Summer Meeting, Boston, MA, June 2000.