

Jeff R. Harris, Ph.D.

Applied Research Laboratory
PO Box 30 – MS 3120
State College, PA 16804

✉ jeff.harris@psu.edu
☎ 814-863-3025

Education & Training

Utah State University <i>Ph.D. Mechanical Engineering</i> Topic: Experimental Validation for CFD Simulations of Convective Flow	Logan, UT May 2014
<i>M.S. Mechanical Engineering</i> Topic: Relative Importance of Some Error Sources in Particle Image Velocimetry	May 2012
<i>B.S. Mechanical Engineering</i> Aerospace Emphasis, Math Minor, Passed FE Exam	May 2010
Idaho National Laboratory <i>Modeling, Experimentation, and Validation School</i> Studied safety analysis, risk assessment, and validation techniques in nuclear science	Idaho Falls, ID June 2010
American Society of Mechanical Engineers <i>Verification and Validation Short Course</i> Studied methods of code verification and experimental validation	Las Vegas, NV May 2014

Professional Experience

Applied Research Laboratory <i>Assistant Research Professor</i>	Pennsylvania State University <i>September 2014 – Present</i>
Experimental Fluid Dynamics Laboratory <i>Research Assistant and Postdoctoral Researcher</i>	Utah State University <i>Aug. 2010 – Sep. 2014</i>
Department of Mechanical and Aerospace Engineering <i>Teaching Assistant</i>	Utah State University <i>Aug. 2010 – Dec. 2010</i>
Idaho National Laboratory <i>Research Assistant</i>	Idaho Falls, ID <i>Summers 2009, 2010</i>
Apogee Instruments, Inc. <i>Mechanical Engineer</i>	Logan, UT <i>May 2008 – June 2009</i>

Select Publications

Peer-Reviewed Papers and Presentations

1. McPhail, M., Truong, C., Harris, J. "Stereoscopic Particle Shadow Velocimetry." In progress.
2. Truong, C., Hinkle, S., Harris, J., Krane, M., Sinding, K., Jefferies, R., Camp, T., Fontaine, A. "Multiplane Particle Shadow Velocimetry to Quantify Integral Length Scales." *Experiments in Fluids*, 2018 59: 73
3. Truong, C., Harris, J., McPhail, M. "The effect of out-of-plane shear within the depth of correlation in macroscopic planar particle shadow velocimetry." AIAA SciTech Meeting, 2018.
4. Hinkle, S., Jefferies, R., Truong, C., Harris, J., McPhail, M. "Spanwise Correlations along a Circular Cylinder using PSV." AIAA SciTech Meeting, 2018
5. Harris, J., Berger, Z., Truong, C., Hinkle, S. "Validation of PSV for Turbulence Measurements and Modeling." 55th AIAA SciTech Meeting, 2017.
6. Lance, B., Harris, J., Smith, B. "Experimental Validation Data for CFD of Mixed Convection on a Vertical Flat Plate." *J. of V, V, & UQ* 1 (2) 021005, 2016.
7. Harris, J., Lance, B., Smith, B. "Experimental Validation Data for CFD of Forced Convection on a Vertical Flat Plate." *J. of Fluids Engineering* 2015; 138(1):011401-011401-14, 2015.
8. Lance, B. and Harris, J. "Mixed Convection Validation and Simulation," American Nuclear Society 2014 Student Conference, April 3–5, 2014, State College, PA.
9. Harris, J., Lance, B., Smith, B. "Design of Apparatus for Validation Experiments," ANS Annual Meeting, Atlanta, GA, 2013.
10. Lance, B., Harris, J., et. al. "Validation Study on Forced and Mixed Convection in the Rotatable Buoyancy Tunnel." ASME FEDSM, Incline Village, NV, 2013.
11. Smith, B., Lance, B. Harris, J. Iverson, J. Spall, R. "The RoBuT for CFD Validation of Natural, Mixed, and Forced Convection," ASME V&V Symposium, Las Vegas, NV, 2013.
12. Harris, J., Lance, B., Smith, B., Spall, R. "Transient Mixed Convection Validation Facility and Study," NURETH-15, Pisa, Italy, 2013.
13. Harris, J., Lance, B., Iverson, J. "Forced Convection Validation Experiment and Simulation." ANS Student Conference, Boston, MA, 2013 - **Awarded "Best Overall Graduate Paper"**
14. Harris, J., Wilson, B., Smith, B. "Investigation of Relative Importance of Some Error Sources in Particle Image Velocimetry," ASME Fluids Engineering Summer Meeting, Puerto Rico, USA, 2012.
15. Harris, J., Nani, D., Jones, K., Khodier, M., Smith, B. "Investigation of the Uncertainty of a Validation Experiment due to Uncertainty in its Boundary Conditions," NURETH-14, 2011.
16. Wilson, B., Smith, B., Spall, R., Harris, J. "Validation of Unsteady CFD in a Confined Row of Cylinders," FEDSM2010-ICNMM2010, Proceedings of the ASME Fluids Engineering Conference, Montreal, Canada, 2010.

Non-Peer-Reviewed Conference Papers and Presentations

1. Harris, J., Truong, C., McPhail, M., Fontaine, A. "Stereo Particle Shadow Velocimetry." APS DFD Meeting. Denver, CO, Nov. 2017.
2. Harris, J., Truong, C., McPhail, M. "Effects of Depth of Field on Particle Shadow Velocimetry Measurements." ASME V&V Symposium. Las Vegas, NV May 2017.
3. Harris, J., Truong, C., McPhail, M., Berger, Z. "Multi-Plane Particle Shadow Velocimetry for Validation of Turbulence Models." Fluid Dynamics Research Consortium at Penn State University, Invited Speaker, Feb. 2017.

4. Truong, C., Hinkle, S., Sinding, K., Harris, J, Krane, M., Jefferies, R. "Validation of Multi-Plane Particle Shadow Velocimetry to Quantify Turbulence Scales." APS Division of Fluid Dynamics Meeting, Portland, OR 2016.
5. Hinkle, S., Truong, C., Sinding, K., Jefferies, R., Harris, J, Krane, M. "Application of Multi-Plane Particle Shadow Velocimetry to Obtain Velocity Fields Through an Optically Clear Object." APS Division of Fluid Dynamics Meeting, Portland, OR 2016.
6. Harris, J., Truong, C., Hinkle, S., Sinding, K., et al. "Multi-Plane Particle Shadow Velocimetry to Quantify Integral Length Scales." APS Division of Fluid Dynamics Meeting, Boston, MA 2015.
7. Harris, J., Lance, B., Skifton, R., Smith, B. "Centroid Correction on Shear Velocity." APS Division of Fluid Dynamics Meeting, Boston, MA 2015.
8. Harris, J. "Making Use of Expensive Cameras and Lasers – PIV/PSV at ARL." Invited speaker, GTWT Seminar Series, Dec. 4, 2014.
9. Harris, J. "A CFD Validation Experiment for Forced and Mixed Convection on a Vertical Heated Plate." GTWT Seminar, Applied Research Lab – PSU, May 2014.
10. Harris J. "Experimental Methods for Validation of CFD Simulations of Convective Flow in a Rotatable Wind Tunnel." GE Global Research Center, Dec. 2013.
11. Harris, J., Lance, B., Smith, B. "Experimental Validation of Simulations for Buoyancy Opposed Convection," APS Division of Fluid Dynamics Meeting, Pittsburgh, PA, 2013
12. Harris, J., Lance, B. "Design and Implementation of Simulation Validation Experiments for Passive Cooling Features in Nuclear Reactors." USU Graduate Research Symposium, Logan, UT, 2013 - **Honorable Mention for Best Oral Presentation**
13. Wilson, B., Harris, J., Smith, B. "Uncertainty in Velocity Fluctuations for Two-Component PIV Measurements," APS Division of Fluid Dynamics, Baltimore, Maryland, 2011.
14. Wilson, B., Harris, J., Smith, B., Spall, R. E. "Unsteady Validation Metrics for CFD in a Cylinder Array," Proceedings of the CFD4NRS, Washington D.C., USA, 2010.

Technical Reports

1. Harris, J., Jefferies, R., Brown, W., Sutton, T. Large-scale Containment Cooling Study Considering Turning Vane Effects. Tech. Memo. 16-002. 17 Feb. 2016.

Funded Grants and Projects

- NNL, 2018, "Tomographic Particle Image Velocimetry Shakedown and Best Practices." Jeff R. Harris-co-PI, \$185,000.
- Westinghouse Electric Company, 2017, "Large Scale Containment Cooling Study Considering the Baffle Wall Locus and Water Film Cooling." Jeff R. Harris-PI, #25339, \$425,000.
- Westinghouse Electric Company, 2016, "Full Scale Shield Building Thermal Response to Radiative Heat Transfer." Jeff R. Harris-PI, #24763, \$400,000.
- Westinghouse Electric Company, 2014, "Large Scale Containment Cooling Study Considering Baffle Turning Vane Effects." Jeff R. Harris-PI, #22868, \$130,000.

Teaching and Advising

Students Advised and Mentored

- Christine Truong, Ph.D., 2019 (expected). Research Advisor
- Kyle Sinding, Ph.D. 2018 (expected). Committee Member
- Steven Hinkle, M.S. 2019 (expected). Committee Member, ARL Supervisor

Courses Taught

- NUCE 430 Design Principles of Reactor Systems – Fall 2018
- EMCH 212 Dynamics – Spring 2018, Summer 2018
- EMCH 409 Advanced Dynamics – Fall 2017

Honors and Awards

- Applied Research Laboratory Spot Award for Technical Contribution, 2016
- USU College of Engineering Graduate Researcher of the Year, 2014
- USU College of Engineering Outstanding Graduate Scholar, 2014
- Best Overall Graduate Paper, American Nuclear Society Student Conference, 2013
- Honorable Mention for Best Oral Presentation, USU Research Symposium, 2013
- Nuclear Regulatory Commission Fellowship Recipient, 2012
- MAE Graduate Teaching Assistant of the Year, 2011
- Outstanding Senior, Mechanical and Aerospace Engineering, 2010
- Nuclear Regulatory Commission Scholarship Recipient, 2009
- Tau Beta Pi Scholarship Recipient, 2009
- Academic Excellence Award, Mechanical and Aerospace Engineering, 2008, 2009
- USU Presidential Scholarship Recipient, 2008

Service

- PSU ESM Today Faculty Judge – 2017, 2018
- PSU College of Engineering Research Symposium Faculty Judge - 2018
- Applied Research Laboratory Diversity Committee – Member, 2015-2017
- Penn State Fluid Dynamics Research Consortium – Member
- Department of Energy Nuclear Energy University Program Proposal Reviewer
- American Nuclear Society – Member
 - Founding Vice-President of USU Student Section of the American Nuclear Society, 2012
 - Student Host – GLOBAL 2013: International Nuclear Fuel Cycle Conference. 2013
- American Society of Mechanical Engineers – Member
 - Session Chair, Verification and Validation Symposium 2017
 - Reviewer – American Society of Mechanical Engineers IMECE Conference, 2013
 - Reviewer – American Society of Mechanical Engineers HTFENMM Conference, 2012
- Tau Beta Pi – Member
 - Invited lecturer, Engineering Tools Seminar Series, 2009, 2010
- American Physical Society – Member
 - Session Chair, APS-DFD Meeting 2017