

Justin Weinmeister

Oak Ridge National Laboratory, PO Box 2008 MS-6003, Oak Ridge, TN 37803-6003
(865) 574-8806 • weinmeisterj@ornl.gov
www.linkedin.com/in/jweinmeister

Profile

I am a passionate mechanical engineer with fluid mechanics and heat transfer expertise. My specialty is in verification, validation, and uncertainty quantification of computational models with crossover into optimization, surrogate modeling, and experimental fluid mechanics.

Experience

Oak Ridge National Laboratory Oak Ridge, TN
Associate Nuclear Fluid Mechanics Engineer 2023-Present

- Support Materials Plasma Exposure Experiment using analytic and computational modeling of radio frequency equipment and high heat flux vacuum vessel components
- Verify peridynamic simulations of tungsten divertor components for fusion reactors with finite element analysis

Application Engineer - Computational Fluid Dynamics 2019-2023

- Support development of 2 MW target for the Spallation Neutron Source through computational modeling and experimentation on gas injection strategies
- Designed and optimized Transformational Challenge Reactor (TCR) fuel form coolant channels
- Supported Materials Plasma Exposure eXperiment (MPEX) using analytic and computational modeling of radio frequency equipment and high heat flux vacuum vessel components
- Designed mercury check filter for helium venting of Spallation Neutron Source mercury loop

Post-Masters Fluids Engineer 2018-2019

- Supported development of 2 MW target for the Spallation Neutron Source through computational modeling and experimentation on gas injection strategies
- Conducted multiphase flow experiments of gas-water and gas-mercury systems
- Automated image analysis of gas bubble distribution and wall coverage
- Captured data using high-speed videography and particle image velocimetry (PIV)
- Assisted design of gas phase separator with computational fluid dynamics simulations

Computational Fluid Dynamics and Propulsion Laboratory Fort Collins, CO
Graduate Research Assistant 2016-2018

- Developed novel surrogate modeling tool in MATLAB for uncertainty quantification
- Conducted detailed simulations of various aerodynamic bodies
- Automated data-handling processes through Bash shell-scripting in Linux
- Teaching assistant for undergraduate numerical methods course

Education

University of Tennessee, Knoxville, TN
Ph.D. Mechanical Engineering 2021-Present

Colorado State University, Fort Collins, CO
M.S. Mechanical Engineering 2017 - 2018
Thesis: Development of Reduced Polynomial Chaos-Kriging Metamodel for Uncertainty Quantification of Computational Aerodynamics
B.S. Mechanical Engineering 2013 - 2017

Professional Activities

- Member, American Society of Mechanical Engineers 2020 - Present
Fluids Engineering Division Multiphase Flow Technical Committee
Fluids Engineering Division Computational Fluid Dynamics Technical Committee
Guest of VVUQ 20 subcommittee

- Member, American Nuclear Society 2020 - Present
- Member, American Institute of Aeronautics and Astronautics 2024 - Present

Awards and Honors

- American Nuclear Society Winter 2021 Young Professional Thermal-Hydraulics Research Competition, Honorable Mention
- American Society of Mechanical Engineers 2021 Robert T. Knapp Award, Co-author

Skills

- Computational Fluid Dynamics Solvers: STAR-CCM+ • FLUENT • CFD++
- Meshing Software: STAR-CCM+ • FLUENT • Pointwise • ICEM-CFD
- Computer Languages: Python • MATLAB • Bash • Java
- Other Software: Job Management-PBS/Slurm/OGE • Paraview • ImageJ • NX
- Experimental: High Speed Videography • Photography • Particle Image Velocimetry

Publications

Journal Articles

J. Weinmeister et al., *Coolant Channel Design for Additively Manufactured Reactor Cores*, Nuclear Science and Engineering, (2022) doi:10.1080/00295639.2022.2096999.

C. Barbier, E. Dominguez-Ontiveros, J. Weinmeister, J. Slade, D. Ottinger, and R. Sangrey, *A Compact Gas Liquid Separator for the Spallation Neutron Source Mercury Process Loop*, ASME J. Fluids Eng., 144(3):031402 (2022) doi:10.1115/1.4052241.

J. Weinmeister, X. Gao, and S. Roy, *Analysis of a Polynomial Chaos-Kriging Metamodel for Uncertainty Quantification in Aerodynamics*, AIAA Journal, 57(6):2280-2296 (2019) doi:10.2514/1.J057527.

Conference Proceedings

J. Weinmeister and D. Sanjaya, *Comparison of Full-Field and Integrated CFD Convergence Based on Richardson Extrapolation*, AIAA Aviation Forum and Ascend Conference, AIAA 2024-4470 (2024) doi:10.2514/6.2024-4470.

J. Weinmeister and D. Sanjaya, *Successive Procedure for Solution Verification Based on User Needs*, Proceedings of the ASME 2024 Verification, Validation, and Uncertainty Quantification Symposium, V001T07A001 (2024) doi:10.1115/VVUQ2024-127747.

J. Weinmeister and D. Elliott, *Thermal Limits of Standard Vacuum Viewports for Plasma Devices*, Transactions of the American Nuclear Society, 129(1):1138-1141 (2023) doi:10.13182/T129-42898.

J. Weinmeister and E. Dominguez-Ontiveros, *Initial Horizontal Co-Flow Gas Injection Studies in Water for Liquid Metal Spallation Targets*, Transactions of the American Nuclear Society, 127(1):1249-1252 (2022) doi:10.13182/T127-39815.

J. Weinmeister, J. Ulrich, and A. M. Aaron, *Coolant Design and Analysis for Low Thermal Conductivity Components of Linear Plasma Devices*, Transactions of the American Nuclear Society, 127(1):1404-1407 (2022) doi:10.13182/T127-39813.

B.J. Ade et al. [including J. Weinmeister], *Transformational Challenge Reactor Design Characteristics*, Proceedings of PHYSOR 2022, :2471 (2022) doi:10.13182/PHYSOR22-37543.

J. Weinmeister, A.S. Sabau, and P. Jain, *Additively Manufactured Surface Heat Transfer Enhancements for the Transformational Challenge Reactor*, Proceedings of the 19th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-19), 34157 (2022) ISBN: 9789076971261.

P.K. Jain, J. Weinmeister, B.J. Ade, and C. Jesse, *CFD Modeling for the Transformational Challenge Reactor Preliminary Design*, Proceedings of the 19th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-19), 35935 (2022) ISBN: 9789076971261.

J. Weinmeister, *Surface Roughness Modeling for Transformational Challenge Reactor Fuel Form*, Transactions of the American Nuclear Society, 125(1):1310-1313 (2021) doi:10.13182/T125-36642.
Honorable Mention, Young Professional Thermal-Hydraulics Research Competition Award

C.J. Jesse, J. Weinmeister, P. Jain, and B.J. Ade, *Flattening the Radial Temperature Profile across the Transformational Challenge Reactor Core*, Transactions of the American Nuclear Society, 125(1):1300-1303 (2021) doi:10.13182/T125-37027.

J. Weinmeister, D. Ottinger, and C. Barbier, *Helium Degassing Filter for Mercury Process Gas Liquid Separator*, Proceedings of the 2021 ASME International Mechanical Engineering Congress and Exposition, 10:V010T10A039 (2021) doi:10.1115/IMECE2021-72699.

B.J. Ade, P.K. Jain, J. Weinmeister, and B.R. Betzler, *The Impact of Temperature Modeling Assumptions for the Transformational Challenge Reactor*, Transactions of the American Nuclear Society, 124(1):616-619 (2021) doi:10.13182/T124-35185.

C. Barbier, J. Weinmeister et al., *Bubble Generation in the SNS 2 MW Mercury Target*, IPAC 2021 - 12th International Particle Accelerator Conference, ISSN 2673-5490:3567-3570 (2021) doi:10.18429/JACoW-IPAC2021-WEPAB367.

J. Weinmeister, C. Jesse, and P. Jain, *Gas Coolant Channel Optimization for Transformational Challenge Reactor*, Transactions of the American Nuclear Society, 123(1):1627-1630 (2020) doi:10.13182/T123-33107.

F. Rasheed, E. Dominguez-Ontiveros, J. Weinmeister, and C. Barbier, *Deep Learning for Intelligent Bubble Size Detection in the Spallation Neutron Source Visual Target*, Proceedings of the 2020 ASME International Mechanical Engineering Congress and Exposition, 10:V010T10A001 (2020) doi:10.1115/IMECE2020-23164. **2021 Robert T. Knapp Award**

J. Weinmeister and P. Jain, *Cooling Channel Optimization in Additively Manufactured Gas Cooled Reactor Core*, Transactions of the American Nuclear Society, 122(1):855-858 (2020) doi:10.13182/T122-31977.

J. Weinmeister, C. Barbier, and E. Dominguez-Ontiveros, *Gas Wall Layer Experiments for Spallation Neutron Source Target*, Proceedings of the ASME-JSME-KSME 2019 8th Joint Fluids Engineering Conference, 3A:V03AT03A048 (2019) doi:10.1115/AJKFluids2019-5101.

J. Weinmeister, N. Xie, X. Gao, A. Prasad, and S. Roy, *Analysis of a Polynomial Chaos-Kriging Metamodel for Uncertainty Quantification in Aerospace Applications*, 2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, AIAA 2018-0911 (2018) doi:10.2514/6.2018-0911.

J. Weinmeister, N. Xie, X. Gao, A. Prasad, and S. Roy, *Combining a Reduced Polynomial Chaos Expansion Approach with Universal Kriging for Uncertainty Quantification*, 8th AIAA Theoretical Fluid Mechanics Conference, AIAA 2017-3481 (2017) doi:10.2514/6.2017-3481.

Reports

B.J. Ade, J. Weinmeister, et al., *Iterative Design Incorporating As-Built Tolerances from Additive Manufacturing of Metal and Ceramic Structures*, Oak Ridge National Laboratory, ORNL/TM-2021/2248 (2021).

B.R. Betzler et al. [including J. Weinmeister], *Transformational Challenge Reactor Preliminary Design Report*, Oak Ridge National Laboratory, ORNL/TM-2020/1718 (2020).

B.R. Betzler et al. [including J. Weinmeister], *Transformational Challenge Reactor Conceptual Design Report*, Oak Ridge National Laboratory, ORNL/SPR-2020/1433 (2020).

Other Presentations

J. Weinmeister, X. Gao, A. Prasad, and S. Roy, *Uncertainty Quantification for Combined Polynomial Chaos Kriging Surrogate Models*, 70th Annual Meeting of the APS Division of Fluid Dynamics, 62:14 (2017) <http://meetings.aps.org/link/BAPS.2017.DFD.Q34.5>.