

Xu Wu

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Research Interests & Areas of Expertise

- **Computational Science and Engineering**
 - Calibration, Validation, Assimilation, Uncertainty and Sensitivity Analysis
 - Computational Statistics
 - Reduced Order Modeling
 - Bayesian Inference and Model Inversion
 - Scientific Machine Learning
 - Data-driven Modeling, Digital Twins
- **Nuclear Engineering**
 - Multi-physics Coupled Simulation
 - System Thermal-Hydraulics
 - Fuel Performance Modeling
 - Advanced Nuclear Reactors (Small Modular Reactors and Micro-reactors)
 - Reactor Design, Optimization and Safety Analysis

Education

- Ph.D., Nuclear, Plasma and Radiological Engineering**
University of Illinois at Urbana - Champaign, Urbana, IL, USA 2013 - 2017
- Thesis title: “Metamodel-based Inverse Uncertainty Quantification of Nuclear Reactor Simulators under the Bayesian Framework”
- M.S., Nuclear, Plasma and Radiological Engineering**
University of Illinois at Urbana - Champaign, Urbana, IL, USA 2011 - 2013
- Thesis title: “Coupling of System Thermal-Hydraulics and Monte Carlo Method for a Consistent Thermal-Hydraulics-Reactor Physics Feedback”
- B.S., Nuclear Engineering and Technology**
Shanghai Jiao Tong University, Shanghai, China 2007 - 2011

Research and Work Experience

- | | |
|---|--|
| Assistant Professor
<i>Department of Nuclear Engineering</i> | North Carolina State University
07/2019 - present |
| Postdoctoral Associate
<i>Department of Nuclear Science and Engineering</i> | Massachusetts Institute of Technology
10/2017 - 06/2019 |
| Research Aide
<i>Nuclear Engineering Division</i> | Argonne National Laboratory
05/2015 - 07/2015 |
| Research Intern
<i>Fuel Modeling and Simulation Department</i> | Idaho National Laboratory
05/2014 - 07/2014 |
| Graduate Research Assistant
<i>Department of Nuclear, Plasma and Radiological Engineering</i> | University of Illinois at Urbana - Champaign
01/2012 - 10/2017 |
| Graduate Teaching Assistant
<i>Department of Nuclear, Plasma and Radiological Engineering</i> | University of Illinois at Urbana - Champaign
08/2011 - 12/2011 |

Teaching Experience

NE 795: Advanced Scientific Machine Learning <i>Department of Nuclear Engineering, NCSU</i>	Fall 2022
NE 405/505: Reactor Systems <i>Department of Nuclear Engineering, NCSU</i>	Spring 2022
NE 491/591: Monte Carlo Methods and Applications <i>Department of Nuclear Engineering, NCSU</i>	Fall 2021, Fall 2022
NE 795: Scientific Machine Learning <i>Department of Nuclear Engineering, NCSU</i>	Fall 2020, Fall 2021
NE 408: Nuclear Engineering Design Project <i>Department of Nuclear Engineering, NCSU</i>	Spring 2020
NE 406: Nuclear Engineering Senior Design Preparation <i>Department of Nuclear Engineering, NCSU</i>	Fall 2019

Refereed Journal Publications

1. Xie, Z., Jiang, W., Wang, C., and **Wu, X.** (2022). Bayesian inverse uncertainty quantification of a MOOSE-based melt pool model for additive manufacturing using experimental data. *Annals of Nuclear Energy*, 165:108782
2. **Wu, X.**, Xie, Z., Alsafadi, F., and Kozlowski, T. (2021). A comprehensive survey of inverse uncertainty quantification of physical model parameters in nuclear system thermal-hydraulics codes. *Nuclear Engineering and Design*, 384:111460
3. Xie, Z., Alsafadi, F., and **Wu, X.** (2021). Towards Improving the Predictive Capability of Computer Simulations by Integrating Inverse Uncertainty Quantification and Quantitative Validation with Bayesian Hypothesis Testing. *Nuclear Engineering and Design*, 383:111423
4. Che, Y., **Wu, X.**, Pastore, G., Li, W., and Shirvan, K. (2021). Application of Kriging and Variational Bayesian Monte Carlo method for improved prediction of doped UO₂ fission gas release. *Annals of Nuclear Energy*, 153:108046
5. Lu, C., Wu, Z., and **Wu, X.** (2021). Enhancing the One-Dimensional SFR Thermal Stratification Model via Advanced Inverse Uncertainty Quantification Methods. *Nuclear Technology*, 207(5):692–710
6. Jin, Y., **Wu, X.**, and Shirvan, K. (2020). System code evaluation of near-term accident tolerant claddings during pressurized water reactor station blackout accidents. *Nuclear Engineering and Design*, 368:110814
7. **Wu, X.** and Shirvan, K. (2020). System code evaluation of near-term accident tolerant claddings during boiling water reactor short-term and long-term station blackout accidents. *Nuclear Engineering and Design*, 356:110362
8. **Wu, X.**, Shirvan, K., and Kozlowski, T. (2019). Demonstration of the Relationship Between Sensitivity and Identifiability for Inverse Uncertainty Quantification. *Journal of Computational Physics*, 396:12–30
9. Wang, C., **Wu, X.**, and Kozlowski, T. (2019). Gaussian process-based inverse uncertainty quantification for trace physical model parameters using steady-state psbt benchmark. *Nuclear Science and Engineering*, 193(1-2):100–114
10. **Wu, X.**, Kozlowski, T., Meidani, H., and Shirvan, K. (2018). Inverse uncertainty quantification using the modular Bayesian approach based on Gaussian Process, Part 2: Application to TRACE. *Nuclear Engineering and Design*, 335:417–431
11. **Wu, X.**, Kozlowski, T., Meidani, H., and Shirvan, K. (2018). Inverse uncertainty quantification using the modular Bayesian approach based on Gaussian process, part 1: theory. *Nuclear Engineering and Design*,

12. **Wu, X.**, Kozłowski, T., and Meidani, H. (2018). Kriging-based Inverse Uncertainty Quantification of Nuclear Fuel Performance Code BISON Fission Gas Release Model using Time Series Measurement Data. *Reliability Engineering & System Safety*, 169:422–436
13. **Wu, X.**, Mui, T., Hu, G., Meidani, H., and Kozłowski, T. (2017). Inverse uncertainty quantification of TRACE physical model parameters using sparse grid stochastic collocation surrogate model. *Nuclear Engineering and Design*, 319:185–200
14. **Wu, X.** and Kozłowski, T. (2017). Inverse uncertainty quantification of reactor simulations under the Bayesian framework using surrogate models constructed by polynomial chaos expansion. *Nuclear Engineering and Design*, 313:29–52
15. **Wu, X.**, Kozłowski, T., and Hales, J. D. (2015). Neutronics and fuel performance evaluation of accident tolerant FeCrAl cladding under normal operation conditions. *Annals of Nuclear Energy*, 85:763–775
16. **Wu, X.** and Kozłowski, T. (2015). Coupling of system thermal–hydraulics and Monte-Carlo code: Convergence criteria and quantification of correlation between statistical uncertainty and coupled error. *Annals of Nuclear Energy*, 75:377–387

Refereed Full-length Conference Papers

1. Godbole, C., Delipei, G., **Wu, X.**, Avramova, M., and Rohatgi, U. (2022). Machine Learning-based Prediction of Departure from Nucleate Boiling Power for PSBT Benchmark. In *Proceedings of the Advances in Thermal Hydraulics (ATH 2022)*. Anaheim, CA, USA, June 12–16, 2022
2. Moloko, L., Bokov, P., **Wu, X.**, and Ivanov, K. (2022). Quantification of Neural Networks Uncertainties with Applications to SAFARI-1 Axial Neutron Flux Profiles. In *Proceedings of the International Conference on Physics of Reactors (PHYSOR) 2022*. Pittsburgh, PA, USA, May 15–20, 2022
3. Xie, Z. and **Wu, X.** (2022). Bayesian Inverse Uncertainty Quantification of TRACE Physical Model Parameters using FEBA Reflood Experiments. In *Proceedings of the International Conference on Physics of Reactors (PHYSOR) 2022*. Pittsburgh, PA, USA, May 15–20, 2022
4. Akins, A. and **Wu, X.** (2022). Using Physics-Informed Neural Networks to solve a System of Coupled ODEs for a Reactivity Insertion Accident. In *Proceedings of the International Conference on Physics of Reactors (PHYSOR) 2022*. Pittsburgh, PA, USA, May 15–20, 2022
5. Xie, Z. and **Wu, X.** (2021). A Comprehensive Framework to Improve Computer Model Simulations by Integrating Inverse Uncertainty Quantification and Validation. In *Proceedings of the 2021 International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering (M&C-2021)*. Raleigh, North Carolina, October 3–7, 2021
6. Xie, Z., Jiang, W., Wang, C., and **Wu, X.** (2021). Inverse Uncertainty Quantification of a MOOSE-based Melt Pool Model for Additive Manufacturing. In *Proceedings of the 2021 International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering (M&C-2021)*. Raleigh, North Carolina, October 3–7, 2021
7. Chen, E., **Wu, X.**, and Dinh, N. (2021). Extrapolation Detection in Machine Learning via Topography Analysis. In *Proceedings of the Best Estimate Plus Uncertainty International Conference (BEPU 2021)*. Giardini Naxos, Sicily, Italy, May 30 - June 5, 2021
8. Wang, C., **Wu, X.**, and Kozłowski, T. (2019). Inverse Uncertainty Quantification by Hierarchical Bayesian Inference for TRACE Physical Model Parameters based on BFBT benchmark. In *Proceedings of the 18th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-18)*. Portland, Oregon, USA, Aug. 18-22, 2019

9. Che, Y., **Wu, X.**, Li, W., Shirvan, K., Pastore, G., and Hales, J. (2018). Sensitivity and Uncertainty Analysis of Fuel Performance Assessment of Chromia-Doped Fuel during Large-Break LOCA. In *Proceedings of the 2018 Light Water Reactor Fuel Performance Conference (TopFuel-2018)*. Prague, Czech Republic, Sep. 30 - Oct. 04, 2018
10. Wang, C., **Wu, X.**, and Kozlowski, T. (2018). Surrogate-based Bayesian Calibration of Thermal-Hydraulics Models based on PSBT Time-dependent Benchmark Data. In *Proceedings of the ANS Best Estimate Plus Uncertainty International Conference (BEPU-2018)*. Real Collegio, Lucca, Italy, May 13-19, 2018
11. **Wu, X.**, Kozlowski, T., and Shirvan, K. (2018). Inverse Uncertainty Quantification using the Modular Bayesian Approach in the Presence of Model Discrepancy. In *Proceedings of the ANS Best Estimate Plus Uncertainty International Conference (BEPU-2018)*. Real Collegio, Lucca, Italy, May 13-19, 2018
12. Wang, C., **Wu, X.**, and Kozlowski, T. (2017). Surrogate-based Inverse Uncertainty Quantification of TRACE Physical Model Parameters using Steady-State PSBT Void Fraction Data. In *Proceedings of the 17th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-17)*. Xi'an, Shaanxi, China, Sept. 3-8, 2017
13. Wang, C., **Wu, X.**, and Kozlowski, T. (2017). Sensitivity and Uncertainty Analysis of TRACE Physical Model Parameters based on PSBT benchmark using Gaussian Process Emulator. In *Proceedings of the 17th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-17)*. Xi'an, Shaanxi, China, Sept. 3-8, 2017
14. **Wu, X.** and Kozlowski, T. (2017). Investigation of Adaptive Markov Chain Monte Carlo Algorithms for Inverse Uncertainty Quantification. In *Proceedings of the 2017 International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering (M&C-2017)*. Jeju, Korea, April 16-20, 2017
15. **Wu, X.**, Wang, C., and Kozlowski, T. (2017). Kriging-based Surrogate Model for Uncertainty Quantification and Sensitivity Analysis. In *Proceedings of the 2017 International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering (M&C-2017)*. Jeju, Korea, April 16-20, 2017
16. **Wu, X.**, Wang, C., and Kozlowski, T. (2017). Global Sensitivity Analysis of TRACE Physical Model Parameters based on BFBT benchmark. In *Proceedings of the 2017 International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering (M&C-2017)*. Jeju, Korea, April 16-20, 2017
17. Rose, M., Downar, T., **Wu, X.**, and Kozlowski, T. (2015). Evaluation of Accident Tolerant FeCrAl Coating for PWR Cladding under Normal Operating Conditions with Coupled Neutron Transport and Fuel Performance. In *Proceedings of the 2015 Mathematics and Computations, Supercomputing in Nuclear Applications and Monte Carlo International Conference (M&C+SNA+MC-2015)*. Nashville, TN, USA, April 19-23, 2015
18. **Wu, X.** and Kozlowski, T. (2014). Development of a New Convergence Criterion for Monte Carlo Simulation with Thermal-Hydraulics Feedback. In *Proceedings of the 2014 Physics of Reactors conferences (PHYSOR-2014)*. Kyoto, Japan, September 28 - October 3, 2014
19. **Wu, X.**, Kozlowski, T., and Heuser, B. (2014). Neutronics Analysis of Improved Accident Tolerance of LWR Fuel by Modifying Zircaloy Cladding of Fuel Pins. In *Proceedings of the 2014 International Congress on Advances in Nuclear Power Plants (ICAPP-2014)*. Charlotte, NC, USA, April 6-9, 2014
20. **Wu, X.** and Kozlowski, T. (2014). Coupling of System Thermal-Hydraulics and Monte-Carlo Method for a Consistent Thermal-Hydraulics-Reactor Physics Feedback. In *Proceedings of the 2014 International Congress on Advances in Nuclear Power Plants (ICAPP-2014)*. Charlotte, NC, USA, April 6-9, 2014
21. Heuser, B., Kozlowski, T., and **Wu, X.** (2013). Engineered Zircaloy Cladding Modifications for Improved

Accident Tolerance of LWR Fuel: A Summary. In *Proceedings of the 2013 LWR Fuel Performance Meeting (TopFuel-2013)*, pages 15–19. Charlotte, NC, USA, September 15-19, 2013

Technical Reports

1. Yan, E., Sabharwall, P., Sandhu, H. K., Bodda, S. S., Gupta, A., and **Wu, X.** (2021). Structural Health Monitoring of Microreactor Safety Systems Using Convolutional Neural Networks. Technical report, INL/EXT-21-63619, Idaho National Laboratory, Idaho Falls, ID, USA
2. **Wu, X.**, Sabharwall, P., Hales, J., and Kozlowski, T. (2014). Neutronics and Fuel Performance Evaluation of Accident Tolerant Fuel under Normal Operation Conditions. Technical report, INL/EXT-14-32591, Idaho National Laboratory, Idaho Falls, ID, USA

Refereed Conference Transactions and Summaries

1. Zino, J. and **Wu, X.** (2022). A New Monte Carlo Course for Undergraduate Nuclear Engineering Students. In *Transactions of American Nuclear Society*. Anaheim, CA, USA. June 12–16, 2022
2. Yaseen, M. and **Wu, X.** (2022). How to Quantify Approximation Uncertainties of Deep Neural Networks? In *Transactions of American Nuclear Society*. Anaheim, CA, USA. June 12–16, 2022
3. Alsafadi, F. and **Wu, X.** (2022). Data Augmentation with Generative Adversarial Networks. In *Transactions of American Nuclear Society*. Anaheim, CA, USA. June 12–16, 2022
4. **Wu, X.** (2022). Development of a New Course on Scientific Machine Learning in a Nuclear Engineering Department. In *Transactions of American Nuclear Society*. Anaheim, CA, USA. June 12–16, 2022
5. Alsafadi, F., Xie, Z., and **Wu, X.** (2021). Quantitative Validation with Bayes Factor. In *Transactions of American Nuclear Society*. Washington, DC, USA, Nov. 30 - Dec. 4, 2021
6. Akins, A., Xie, Z., and **Wu, X.** (2021). Solving a System of Ordinary Differential Equations for Reactivity Insertion Accident with Artificial Neural Networks. In *Transactions of American Nuclear Society*. Washington, DC, USA, Nov. 30 - Dec. 4, 2021
7. Jin, Y., **Wu, X.**, and Shirvan, K. (2019). TRACE Simulation of a BWR Large Break LOCA with Zircaloy and Cr-Coated Cladding. In *Transactions of American Nuclear Society*. Washington, DC, USA, Nov. 17-21, 2019
8. **Wu, X.** and Shirvan, K. (2018). System Code Evaluation of Accident Tolerant Claddings during BWR Station Blackout Accident. In *Transactions of American Nuclear Society*. Orlando, FL, USA, Nov. 11-15, 2018
9. Che, Y., **Wu, X.**, Pastore, G., Hales, J., and Shirvan, K. (2018). Sensitivity and Uncertainty Analysis for Fuel Performance Evaluation of Cr₂O₃-doped UO₂ Fuel under LB-LOCA. In *Transactions of American Nuclear Society*. Orlando, FL, USA, Nov. 11-15, 2018
10. **Wu, X.**, Shirvan, K., and Kozlowski, T. (2018). Validating TRACE Void Fraction Predictive Capability using the Quantitative Area Validation Metric. In *Transactions of American Nuclear Society*. Philadelphia, PA, USA, June 17-21, 2018
11. **Wu, X.**, Shirvan, K., and Kozlowski, T. (2018). On the Connection between Sensitivity and Identifiability for Inverse Uncertainty Quantification. In *Transactions of American Nuclear Society*. Philadelphia, PA, USA, June 17-21, 2018
12. Wang, C., **Wu, X.**, Borowiec, K., and Kozlowski, T. (2018). Bayesian Calibration and Uncertainty Quantification for TRACE Based on PSBT Benchmark. In *Transactions of American Nuclear Society*. Philadelphia, PA, USA, June 17-21, 2018
13. **Wu, X.** and Kozlowski, T. (2017). Inverse Uncertainty Quantification of TRACE Physical Model Parameters with Model Discrepancy. In *Transactions of American Nuclear Society*. Washington, DC, USA, Oct. 29 - Nov.

2, 2017

14. **Wu, X.** and Kozlowski, T. (2017). Metamodel-based Inverse Uncertainty Quantification of TRACE Physical Model Parameters. In *ASME Verification and Validation Symposium (VVS-2017)*. Las Vegas, NV, USA, May 3-5, 2017
15. **Wu, X.** and Kozlowski, T. (2017). Kriging-based Inverse Uncertainty Quantification of BISON Fission Gas Release Model. In *Transactions of American Nuclear Society*. San Francisco, CA, USA, June 11-15, 2017
16. **Wu, X.** and Kozlowski, T. (2016). Inverse Uncertainty Quantification of Reactor Simulation with Polynomial Chaos Surrogate Model. In *Transactions of American Nuclear Society*. New Orleans, LA, USA, June 12-16, 2016
17. **Wu, X.** and Kozlowski, T. (2014). Uncertainty Quantification for Coupled Monte Carlo and Thermal-Hydraulics Codes. In *Transactions of American Nuclear Society*. Reno, NV, USA, June 15-19, 2014

Invited Talks

1. "EGMUP Task Force on Artificial Intelligence and Machine Learning for Scientific Computing in Nuclear Engineering", Annual Benchmark Workshops of the OECD/NEA Working Party of Scientific Issues and Uncertainty Analysis of Reactor Systems (WPRS), Aix-en-Provence, France, June 1, 2022.
2. "Scientific Machine Learning for Nuclear Engineering Applications", Workshop at PHYSOR 2022, Pittsburgh, PA, USA, May 15, 2022.
3. "Inverse Uncertainty Quantification with Machine Learning for Nuclear Reactor Simulations", Department of Nuclear Engineering, The University of New Mexico, April 19, 2022.
4. "Bayesian Inverse Uncertainty Quantification and Validation of Nuclear Reactor Simulators", SIAM Conference on Uncertainty Quantification (UQ22), Symposium on "Data-Centric Machine Learning for Uncertainty Quantification in Complex Systems", Atlanta, GA, USA, April 12, 2022.
5. "Inverse Uncertainty Quantification with Machine Learning for Nuclear Reactor Simulations", Department of Mechanical and Aerospace Engineering, Ohio State University, March 2, 2022.
6. "Inverse Uncertainty Quantification with Machine Learning for Nuclear Reactor Simulations", School of Nuclear Science & Engineering, Oregon State University, February 23, 2022.
7. "Inverse Uncertainty Quantification with Machine Learning for Nuclear Reactor Simulations", Department of Mechanical, Aerospace, and Nuclear Engineering, Rensselaer Polytechnic Institute, November 17, 2021.
8. "Scientific Machine Learning for Nuclear Engineering Applications", Online Workshop at M&C 2021, October 3, 2021.
9. "Improving Model Prediction by Integrating Inverse UQ and Quantitative Validation", OECD/NEA Working Party of Scientific Issues and Uncertainty Analysis of Reactor Systems (WPRS), UAM-LWR Workshop on Uncertainty Analysis in Modelling of Light Water Reactors (UAM-LWR), July 1, 2021.
10. "Modular Bayesian Approach for Inverse Uncertainty Quantification", OECD/NEA Working Party of Scientific Issues and Uncertainty Analysis of Reactor Systems (WPRS), UAM-LWR Workshop on Uncertainty Analysis in Modelling of Light Water Reactors (UAM-LWR), July 1, 2021.
11. "Improving Modeling & Simulation of Advanced Nuclear Reactors by Uncertainty Quantification and Scientific Machine Learning", NC State Engineering Foundation Board, April 16, 2021.
12. "Forward and Inverse Uncertainty Quantification", Department of Nuclear Irradiation Experiment Neutronic Analysis, Idaho National Laboratory, April 8, 2021.
13. "Uncertainty Quantification and Sensitivity Analysis for Nuclear Applications", Online Workshop in 2020 ANS Student Conference, April 5, 2021.
14. "Uncertainty Quantification and Machine Learning in Thermal-Hydraulics Applications", the Second Meeting of the Expert Group on Reactor Core Thermal-Hydraulics and Mechanics (EGTHM), OECD/NEA, February 16, 2021.

15. "Uncertainty Quantification with Scientific Machine Learning" Machine Learning & Artificial Intelligence Symposium 3.0, Idaho National Laboratory, October 16, 2020.
16. "Uncertainty Quantification Methods", Graduate Research Seminar, Department of Nuclear Engineering, North Carolina State University, Raleigh, NC, USA, August 27, 2020.
17. "Uncertainty Quantification Methods", the 2020 Modeling, Experimentation and Validation (MeV) Summer School, Idaho National Laboratory, August 3, 2020.
18. "Bridging the Gap between Models and Data - Addressing the ANS Nuclear Grand Challenge on Simulation and Experimentation", the 2019 "Big Data for Nuclear Power Plants" Workshop, the Ohio State University, Columbus, OH, USA, December 11, 2019.
19. "Physics and Technology of Advanced Water Cooled Reactors - Passive Safety Systems", presented at the IAEA Group Scientific Visit on the "State of Art Knowledge of Advanced Nuclear Power Reactor Designs with Educational Tools Supporting Regional Human Capacity Development", Department of Nuclear Engineering, North Carolina State University, Raleigh, NC, USA, September 9, 2019.
20. "Bridging the Gap between Models and Data - Addressing the ANS Nuclear Grand Challenge on Simulation and Experimentation", Department of Materials Science and Engineering, University of Florida, Gainesville, FL, USA, March 7, 2019.
21. "Bridging the Gap between Models and Data - Addressing the ANS Nuclear Grand Challenge on Simulation and Experimentation", Department of Nuclear Engineering, North Carolina State University, Raleigh, NC, USA, February 7, 2019.
22. "Inverse Uncertainty Quantification using the Modular Bayesian Approach in the Presence of Model Discrepancy", Idaho National Laboratory, Idaho Falls, ID, USA, August 10, 2018.
23. "Inverse Uncertainty Quantification using the Modular Bayesian Approach based on Gaussian Process", Department of Nuclear Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA, USA, July 10, 2017.

Selected Honors and Awards

Russell L. Heath Distinguished Postdoc <i>Idaho National Laboratory</i>	2018
Best Paper of the ANS "Young Professional Thermal Hydraulics Research Competition" <i>American Nuclear Society Winter Meeting 2017</i>	2017
Tau Beta Pi Engineering Honor Society <i>The Tau Beta Pi Engineering Honor Society</i>	2015
Conference Travel Scholarship <i>2014 International Congress on Advances in Nuclear Power Plants (ICAPP-2014)</i>	2014
Alpha Nu Sigma Honors Society <i>The Alpha Nu Sigma National Honor Society</i>	2013, 2014, 2015
Outstanding Graduate <i>Shanghai Jiao Tong University</i>	2011
National Endeavor Scholarship <i>China Ministry of Education</i>	2009, 2010
The 18th Guanghua Educational Scholarship <i>Guanghua Educational Fund</i>	2009
"Nuclear Power of China" Scholarship, first class <i>Nuclear Power Institute of China</i>	2008, 2009, 2010
Academic Excellence Scholarship, first class <i>Shanghai Jiao Tong University</i>	2008, 2009, 2010

Professional Service

Reviewer for Journals in Nuclear Engineering

- Nuclear Engineering and Design
- Annals of Nuclear Energy
- Progress in Nuclear Energy
- Journal of Nuclear Materials
- Nuclear Science and Engineering
- Nuclear Technology
- Nuclear Engineering and Technology
- Science and Technology of Nuclear Installations
- Nuclear Science and Techniques

Reviewer for Journals in Computational Science/Engineering and Others

- Reliability Engineering and System Safety
- Computer Physics Communications
- Mathematical Methods in the Applied Sciences
- Applied Mathematical Modeling
- Renewable Energy
- Science of the Total Environment
- Journal of Applied Statistics
- Systems Engineering
- Mathematical Problems in Engineering
- Scientific Reports
- IEEE Access

Reviewer for Professional Conferences

- *Transactions of American Nuclear Society*
- ICAPP: Int. Congress on Advances in Nuclear Power Plants
- NURETH: Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics
- PHYSOR: Int. Conference on Physics of Reactors
- M&C: Int. Conf. on Mathematics and Computational Methods in Nuclear Science and Engineering

Reviewer for Grants

- US DOE Office of Nuclear Energy Consolidated Innovative Nuclear Research (CINR) proposals
- US DOE Office of Science Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) Programs Phase I & II proposals

Other Services

- Chair, Task Force on Artificial Intelligence and Machine Learning for Scientific Computing in Nuclear Engineering, Expert Group on Reactor Systems Multi-Physics (EGMUP), Organisation for Economic Co-operation and Development (OECD) Nuclear Energy Agency (NEA)
- Technical Program Committee, M&C-2023
- Organizer and chair, 2021 and 2022 ANS Young Professional Thermal Hydraulics Research Competition
- Organizer and presenter, Workshop on “Scientific Machine Learning for Nuclear Engineering Applications”, M&C 2021, PHYSOR-2022
- Organizer and presenter, Workshop on “Uncertainty Quantification and Sensitivity Analysis”, 2021 ANS Student Conference
- Technical Program Committee, M&C-2021
- Topic Chair, the Int. Mechanical Engineering Congress and Exposition (IMECE), 2020
- Session Chairs, NURETH, ANS Annual and Winter Meetings
- Committee member, ASME V&V 70 - Verification and Validation of Machine Learning

Membership

- American Nuclear Society (ANS)
- Society for Industrial and Applied Mathematics (SIAM)
- American Society of Mechanical Engineers (ASME)