

Xu Wu

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🌐 <https://www.ne.ncsu.edu/people/xwu27/>

Research group: 🌐 <https://www.ne.ncsu.edu/artisans/>

Research Interests & Areas of Expertise

○ Computational Science and Engineering

- Scientific Machine Learning
- Deep Generative Modeling
- Uncertainty Quantification and Sensitivity Analysis
- Calibration, Validation, and Data Assimilation
- Reduced Order Modeling

○ Nuclear Engineering

- Artificial Intelligence for Nuclear Energy
- Nuclear Reactor Thermal-Hydraulics
- Multiphysics Simulation

Education and Training

Postdoctoral Research Associate

2017 - 2019

Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts, USA

- Department of Nuclear Science and Engineering
- *Postdoc supervisor*: Professor Koroush Shirvan
- *Project*: Evaluation of Economic Benefits of Accident Tolerant Plants through Risk-Informed Approaches

Ph.D. in Nuclear Engineering

2013 - 2017

University of Illinois at Urbana - Champaign (UIUC), Urbana, Illinois, USA

- Department of Nuclear, Plasma and Radiological Engineering
- *Thesis advisor*: Professor Tomasz Kozlowski
- *PhD thesis*: Metamodel-based Inverse Uncertainty Quantification of Nuclear Reactor Simulators under the Bayesian Framework

M.S. in Nuclear Engineering

2011 - 2013

University of Illinois at Urbana - Champaign (UIUC), Urbana, Illinois, USA

- Department of Nuclear, Plasma and Radiological Engineering
- *Thesis advisor*: Professor Tomasz Kozlowski
- *MS thesis*: Coupling of System Thermal-Hydraulics and Monte Carlo Method for a Consistent Thermal-Hydraulics-Reactor Physics Feedback

B.S., Nuclear Engineering and Technology

2007 - 2011

Shanghai Jiao Tong University (SJTU), Shanghai, China

Research and Work Experience

Associate Professor

North Carolina State University

Department of Nuclear Engineering

08/2025 - present

- PI of the ARTISANS (ARTificial Intelligence for Simulation of Advanced Nuclear Systems) research group.
- Major focus areas: Uncertainty Quantification, Bayesian inverse problems, Reduced Order Modeling, Scientific Machine Learning, Deep Generative Modeling, Generative AI, Large Language Models.
- Current students as of August 2026: 6 PhD and 6 undergraduate
- Graduated students as of August 2026: 7 PhD and 11 Master's

Assistant Professor <i>Department of Nuclear Engineering</i>	North Carolina State University 07/2019 - 07/2025
Postdoctoral Research Associate <i>Department of Nuclear Science and Engineering</i>	Massachusetts Institute of Technology 10/2017 - 06/2019
Research Aide <i>Nuclear Science and 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

Teaching Experience

NE 795: Advanced Scientific Machine Learning <i>Department of Nuclear Engineering, NCSU</i> Newly developed course since Fall 2023	Fall semesters biennially
NE 795: Scientific Machine Learning <i>Department of Nuclear Engineering, NCSU</i> Newly developed course since Fall 2020	Fall semesters biennially
NE 470/570: Monte Carlo Methods for Radiation Transport <i>Department of Nuclear Engineering, NCSU</i> Newly developed course since Fall 2021	Fall semesters biennially
NE 405/505: Reactor Systems <i>Department of Nuclear Engineering, NCSU</i> Re-designed course since Spring 2021	Spring semesters annually
NE 407: Nuclear Thermal-Hydraulics Laboratory <i>Department of Nuclear Engineering, NCSU</i>	Fall 2026
NE 408: Nuclear Engineering Senior Design Project <i>Department of Nuclear Engineering, NCSU</i>	Spring 2020 and 2023

Grants and Projects

DOE Genesis Mission Phase I, co-PI <i>Lead PI: Dr. Yang Liu, Texas A&M University</i>	Wu budget \$60,000
- Project title: SHIELD: Secure Human-in-the-loop Intelligence for Engineering and Licensing Deployment of Advanced Nuclear Systems - Prime sponsor: U.S. Department of Energy (DOE) - Total budget: \$720,000 - Project period: 09/2026 - 05/2027	
DOE Genesis Mission Phase II, co-PI <i>Lead PI: Peter Suyderhoud, Idaho National Laboratory</i>	\$200,000
- Project title: Prometheus – Nuclear Energy Faster, Safer, Cheaper - Prime sponsor: U.S. Department of Energy (DOE) - Total budget: \$60,000,000 - NCSU budget: \$600,000 - Project period: 09/2026 - 08/2028	

DOE Nuclear Energy University Program (NEUP), lead PI	\$800,000
<i>Lead PI: Dr. Xu Wu, NCSU</i>	
- Project title: A Comprehensive Uncertainty Quantification Methodology for High Fidelity Multi-Physics Simulation of Sodium-cooled Fast Reactors - Prime sponsor: U.S. Department of Energy (DOE) Office of Nuclear Energy - Total budget: \$1,000,000 - Project period: 08/2026 - 09/2029	
NCSU Dean's COE Applied AI Research Accelerator Award, lead PI	\$100,000
<i>Lead PI: Dr. Xu Wu, NCSU</i>	
- Project title: Foundations for CORA (Cognitive Operator Readiness Assistant): Knowledge Graph and Prototype Large Language Model for Nuclear Operator Training - Prime sponsor: NCSU College of Engineering (COE) - Total budget: \$100,000 - Project period: 07/2026 - 06/2027	
DOE NNSA Enabling Capabilities in Technology Consortium, co-PI	\$625,000
<i>Lead PI: Dr. Jason Hayward, The University of Tennessee, Knoxville (UTK)</i>	
- Project title: Enabling Capabilities in Technology (TECH) Consortium - Prime sponsor: U.S. DOE National Nuclear Security Administration Office of Defense Nuclear Nonproliferation - Total budget: \$25 million - Project period: 03/2025 - 03/2030	
DOE Office of NE Distinguished Early Career Program (DECP), single PI	\$625,000
<i>Lead PI: Dr. Xu Wu, NCSU</i>	
- Project title: Establishing the Predictive Credibility of Data Driven Scientific ML in Nuclear Applications - Prime sponsor: U.S. DOE Office of Nuclear Energy - Total budget: \$625,000 - Project period: 08/2024 - 09/2029	
DOE NNSA Consortium for Nuclear Forensics, co-PI	\$730,289
<i>Lead PI: Dr. James Baciak, The University of Florida (UF)</i>	
- Project title: Consortium for Nuclear Forensics (CNF) - Prime sponsor: U.S. DOE National Nuclear Security Administration (NNSA) - Total budget: \$25 million - Project period: 09/2023 - 08/2028	
NCSU CNP project, single PI	\$63,000
<i>Lead PI: Dr. Xu Wu, NCSU</i>	
- Project title: Design of 24-month fuel cycle for a Westinghouse 4-Loop plant - Phase 2 - Prime sponsor: Duke Energy, through NCSU Consortium for Nuclear Power (CNP) - Total budget: \$63,000 - Project period: 07/2024 - 06/2026	
NCSU CNEFS Core project, co-PI	\$325,181
<i>Lead PI: Dr. Abhinav Gupta, NCSU</i>	
- Project title: Probabilistic and AI/ML Approaches in Structural Engineering - Prime sponsor: NCSU Center for Nuclear Energy Facilities and Structures (CNEFS) - Total budget: N/A - Project period: 01/2022 - 12/2024	
NCSU CNEFS Enhancement project, co-PI	\$44,952
<i>Lead PI: Dr. Abhinav Gupta, NCSU</i>	
- Project title: Statistical Approaches to Reduce Uncertainty in Probabilistic Seismic Hazard Analysis - Prime sponsor: Electricite de France (EDF/DER), through NCSU CNEFS - Total budget: N/A - Project period: 01/2023 - 12/2023	

NCSU CNP project, single PI <i>Lead PI: Dr. Xu Wu, NCSU</i> - Project title: Using Machine Learning to Predict Locations with Crud Buildup - Prime sponsor: Duke Energy, through NCSU Consortium for Nuclear Power (CNP) - Total budget: \$63,000 - Project period: 07/2022 - 06/2023	\$63,000
Westinghouse project, single PI <i>Lead PI: Dr. Xu Wu, NCSU</i> - Project title: Uncertainty Quantification and Validation of CTF Two-phase Flow Modeling Capabilities - Prime sponsor: Westinghouse Electric Company - Total budget: \$50,000 - Project period: 03/2022 - 03/2023	\$50,000
INL LDRD project, co-PI <i>Lead PI: Dr. Dewen Yushu, Computational Mechanics and Materials Department, INL</i> - Project title: Artificial Intelligence-Based Process Control and Optimization for Advanced Manufacturing - Prime sponsor: Idaho National Laboratory (INL) Laboratory Directed Research and Development (LDRD) - Total budget: \$820,000 - Project period: 10/2021 - 09/2023	\$156,636
NCSU DSI Seed Fund, lead PI <i>Lead PI: Dr. Xu Wu, NCSU</i> - Project title: Machine Learning-based Mathematical Representation of Model Uncertainty for Bayesian Inverse Uncertainty Quantification - Prime sponsor: NCSU Data Science Initiative (DSI) - Total budget: \$50,000 - Project period: 08/2021 - 05/2022	\$50,000
INL LDRD project subcontract, co-PI <i>Lead PI: Dr. Wen Jiang, Nuclear Fuels & Materials Division, INL</i> - Project title: Multi-scale Modeling and Optimization of Additive Manufacturing Process for Nuclear Fuels - Subcontract title: Development of Physics-Informed Neural Networks for Additive Manufacturing Optimization - Prime sponsor: Idaho National Laboratory (INL) Laboratory Directed Research and Development (LDRD) - Total budget: \$700,000 - Project period: 01/2020 - 09/2020	\$39,859

Wu Budget Total: \$3,932,917

Peer-reviewed Journal Publications

1. Furlong, A., Monteiro, V. d. M., Salko, R., Duarte, J. P., and **Wu, X.** (2026). Assessment of Machine Learning-based Critical Heat Flux Models for Square Rod Bundles in Subchannel Code CTF. (*Under review*)
2. Palmer, J., Snow, N., Stewart, R., Hou, J., and **Wu, X.** (2026). An Integrated Physics-Informed LSTM for Long-Horizon Reactor Power Predictions using Sequential Chaining. (*Under review*)
3. Mertzyurek, U., Brady, C., Branco-Katcher, M., Cabellos, O., Delipei, G., Dorset, P., Hoefer, A., Hou, J., Houben, D., Hursin, M., Nguyen, K., Palmer, T., Shama, A., **Wu, X.**, Xie, Z., Sundaram, A., and Abdel-Khalik, H. (2026). The NEA Blind Performance Benchmark: Assessing Error Recovery and Experimental Coverage in Nuclear Data Assimilation. (*Under review*)
4. Furlong, A., Salko, R., Zhao, X., and **Wu, X.** (2026). A Three-Stage Bayesian Transfer Learning Framework to Improve Predictions in Data-Scarce Domains. (*Under review, arXiv preprint arXiv:2510.26541*).
<https://arxiv.org/abs/2510.26541>
5. Furlong, A., Zhao, X., Salko, R., and **Wu, X.** (2026). Deployment of Traditional and Hybrid Machine

Learning for Critical Heat Flux Prediction in the CTF Thermal Hydraulics Code. *Nuclear Technology*.
<https://doi.org/10.1080/00295450.2026.2616149>

6. Alsafadi, F., Akins, A., and **Wu, X.** (2026). Development of physics-consistent conditional diffusion model to overcome data scarcity in critical heat flux. *Energy and AI*, 24:100702.
<https://doi.org/10.1016/j.egyai.2026.100702>
7. Brady, C. and **Wu, X.** (2026). Nuclear Data Adjustment for Nonlinear Applications in the OECD/NEA WPNCS SG14 Benchmark - A Bayesian Inverse UQ-based Approach for Data Assimilation. *Nuclear Science and Engineering*.
<https://doi.org/10.1080/00295639.2025.2592175>
8. **Wu, X.**, Moloko, L., Bokov, P., Delipei, G., Kaizer, J., and Ivanov, K. (2026). Uncertainty Quantification for Data-Driven Machine Learning Models in Nuclear Engineering Applications: Where We Are and What Do We Need? *Nuclear Science and Engineering*, 200(8):1798–1820.
<https://doi.org/10.1080/00295639.2025.2552500>
9. Akins, A., Kultgen, D., **Wu, X.**, and Heifetz, A. (2025). Monte Carlo Dropout Uncertainty Quantification of Long Short-Term Memory Autoencoder Anomaly Detection in a Liquid Sodium Cold Trap. *Nuclear Technology*, 211(12):3004–3017.
<https://doi.org/10.1080/00295450.2025.2518613>
10. Kohler, L., Lisowski, D., Weathered, M., **Wu, X.**, and Heifetz, A. (2025). Bayesian Calibration and Sensitivity Analysis of Fiber Optic Distributed Temperature Sensing in Water. *Nuclear Science and Engineering*, 199(12):2129–2142.
<https://doi.org/10.1080/00295639.2025.2528506>
11. Alsafadi, F., Yaseen, M., and **Wu, X.** (2025). An Investigation on Machine Learning Predictive Accuracy Improvement and Uncertainty Reduction using VAE-based Data Augmentation. *Nuclear Engineering and Design*, 445:114433.
<https://doi.org/10.1016/j.nucengdes.2025.114433>
12. Furlong, A., Zhao, X., Salko, R., and **Wu, X.** (2025). Physics-based hybrid machine learning for critical heat flux prediction with uncertainty quantification. *Applied Thermal Engineering*, 279:127447.
<https://doi.org/10.1016/j.applthermaleng.2025.127447>
13. Alsafadi, F., Furlong, A., and **Wu, X.** (2025). Predicting critical heat flux with uncertainty quantification and domain generalization using conditional variational autoencoders and deep neural networks. *Annals of Nuclear Energy*, 220:111502.
<https://doi.org/10.1016/j.anucene.2025.111502>
14. Yaseen, M., Sadek, A., Osman, W., Altahhan, M., **Wu, X.**, Avramova, M., and Ivanov, K. (2025). Sensitivity and uncertainty analysis in pebble-bed reactors: A study using the High-Temperature Code Package (HCP). *Annals of Nuclear Energy*, 219:111428.
<https://doi.org/10.1016/j.anucene.2025.111428>
15. Furlong, A., Alsafadi, F., Palmtag, S., Godfrey, A., and **Wu, X.** (2025). Data-Driven Prediction and Uncertainty Quantification of PWR Crud-Induced Power Shift Using Convolutional Neural Networks. *Energy*, 316:134447.
<https://doi.org/10.1016/j.energy.2025.134447>
16. Xie, Z., Wang, C., and **Wu, X.** (2025). Hierarchical Bayesian Modeling for Inverse Uncertainty Quantification of System Thermal-Hydraulics Code using Critical Flow Experimental Data. *International Journal of Heat and Mass Transfer*, 239:126489.
<https://doi.org/10.1016/j.ijheatmasstransfer.2024.126489>
17. Moloko, L., Bokov, P., **Wu, X.**, and Ivanov, K. (2024). Clustering and uncertainty analysis to improve the

machine learning-based predictions of SAFARI-1 control follower assembly axial neutron flux profiles. *Annals of Nuclear Energy*, 206:110630.

<https://doi.org/10.1016/j.anucene.2024.110630>

18. Brady, C., Murray, W., Moss, L., Zino, J., Saito, E., and **Wu, X.** (2024). Design considerations and Monte Carlo criticality analysis of spiral plate heat exchangers for Molten Salt Reactors. *Progress in Nuclear Energy*, 173:105266.
<https://doi.org/10.1016/j.pnucene.2024.105266>
19. Akins, A., Furlong, A., Kohler, L., Clifford, J., Brady, C., Alsafadi, F., and **Wu, X.** (2024). ARTISANS - Artificial Intelligence for Simulation of Advanced Nuclear Systems for Nuclear Fission Technology. *Nuclear Engineering and Design*, 423:113170.
<https://doi.org/10.1016/j.nucengdes.2024.113170>
20. Baccou, J., Glantz, T., Ghione, A., Sargentini, L., Fillion, P., Damblin, G., Sueur, R., Iooss, B., Fang, J., Liu, J., Yang, C., Zheng, Y., Ui, A., Saito, M., Mendizábal Sanz, R., Bersano, A., Mascari, F., Skorek, T., Tiborcz, L., Hirose, Y., Takeda, T., Nakamura, H., Choi, C., Heo, J., Petruzzi, A., Zeng, K., Xie, Z., **Wu, X.**, Eguchi, H., Pangukir, F., Breijder, P., Franssen, S., Perret, G., Clifford, I., Coscai, T. M., Di Maio, F., Zio, E., Pedroni, N., Zhang, J., Freixa, J., Ciurluini, C., Giannetti, F., and Adorni, M. (2024). A systematic approach for the adequacy analysis of a set of experimental databases: Application in the framework of the ATRIUM activity. *Nuclear Engineering and Design*, 421:113035.
<https://doi.org/10.1016/j.nucengdes.2024.113035>
21. Xie, Z., Yaseen, M., and **Wu, X.** (2024). Functional PCA and Deep Neural Networks-based Bayesian Inverse Uncertainty Quantification with Transient Experimental Data. *Computer Methods in Applied Mechanics and Engineering*, 420:116721.
<https://doi.org/10.1016/j.cma.2023.116721>
22. Yaseen, M., Yushu, D., German, P., and **Wu, X.** (2023). Fast and Accurate Reduced-Order Modeling of a MOOSE-based Additive Manufacturing Model with Operator Learning. *The International Journal of Advanced Manufacturing Technology*, 129:3123–3139.
<https://doi.org/10.1007/s00170-023-12471-1>
23. Wang, C., **Wu, X.**, Xie, Z., and Kozlowski, T. (2023). Scalable Inverse Uncertainty Quantification by Hierarchical Bayesian Modeling and Variational Inference. *Energies*, 16(22):7664.
<https://doi.org/10.3390/en16227664>
24. Alsafadi, F. and **Wu, X.** (2023). Deep Generative Modeling-based Data Augmentation with Demonstration using the BFBT Benchmark Void Fraction Datasets. *Nuclear Engineering and Design*, 415:112712.
<https://doi.org/10.1016/j.nucengdes.2023.112712>
25. Moloko, L., Bokov, P., **Wu, X.**, and Ivanov, K. (2023). Prediction and Uncertainty Quantification of SAFARI-1 Axial Neutron Flux Profiles with Neural Networks. *Annals of Nuclear Energy*, 188:109813.
<https://doi.org/10.1016/j.anucene.2023.109813>
26. Yaseen, M. and **Wu, X.** (2023). Quantification of Deep Neural Network Prediction Uncertainties for VVUQ of Machine Learning Models. *Nuclear Science and Engineering*, 197(5):947–966.
<https://doi.org/10.1080/00295639.2022.2123203>
27. 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.
<https://doi.org/10.1016/j.anucene.2021.108782>
28. **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.

<https://doi.org/10.1016/j.nucengdes.2021.111460>

29. 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.
<https://doi.org/10.1016/j.nucengdes.2021.111423>
30. 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.
<https://doi.org/10.1016/j.anucene.2020.108046>
31. 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.
<https://doi.org/10.1080/00295450.2020.1805259>
32. 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.
<https://doi.org/10.1016/j.nucengdes.2020.110814>
33. **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.
<https://doi.org/10.1016/j.nucengdes.2019.110362>
34. **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.
<https://doi.org/10.1016/j.jcp.2019.06.032>
35. 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.
<https://doi.org/10.1080/00295639.2018.1499279>
36. **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.
<https://doi.org/10.1016/j.nucengdes.2018.06.003>
37. **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*, 335:339–355.
<https://doi.org/10.1016/j.nucengdes.2018.06.004>
38. **Wu, X.**, Kozlowski, 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.
<https://doi.org/10.1016/j.res.2017.09.029>
39. **Wu, X.**, Mui, T., Hu, G., Meidani, H., and Kozlowski, T. (2017). Inverse uncertainty quantification of TRACE physical model parameters using sparse gird stochastic collocation surrogate model. *Nuclear Engineering and Design*, 319:185–200.
<https://doi.org/10.1016/j.nucengdes.2017.05.011>
40. **Wu, X.** and Kozlowski, 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.

41. **Wu, X.**, Kozlowski, 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.
<https://doi.org/10.1016/j.anucene.2015.06.032>
42. **Wu, X.** and Kozlowski, 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.
<https://doi.org/10.1016/j.anucene.2014.08.016>

Peer-reviewed Full-length Conference Papers

1. Furlong, A., Akins, A., and **Wu, X.** (2026). Improving ML-based Critical Heat Flux Predictive Capability with Synthetic Data: A Comparison of Data Augmentation and Pretraining. In *Proceedings of the 2026 Advances in Thermal Hydraulics (ATH-2026)*. Phoenix, AZ, USA, November 15-18, 2026
2. Akins, A., Furlong, A., and **Wu, X.** (2026). Parametric Evaluation of Synthetic Critical Heat Flux Data Generated by a Conditional Physics-Informed Diffusion Model. In *Proceedings of the 2026 Advances in Thermal Hydraulics (ATH-2026)*. Phoenix, AZ, USA, November 15-18, 2026
3. Freixa, J., Chiesa, G., Zhang, J., Savas, Y., Sargentini, L., Ghione, A., Damblin, G., Mianné, G., Hirose, Y., Saito, M., Ui, A., Choi, C., Perret, G., Clifford, I., Xie, Z., and **Wu, X.** (2026). Assessment of Forward Propagation of Uncertainties within the OECD/NEA ATRIUM Project. In *Proceedings of the 15th International Topical Meeting on Nuclear Reactor Thermal-Hydraulics, Operation, and Safety (NUTHOS-15)*. Kashiwa-no-ha, Japan, September 28 - October 1, 2026
4. Clifford, J., Mikouchi-Lopez, J., Mines, M., Hou, J., and **Wu, X.** (2026). Development and Verification of an Artificial Intelligence Training Assistant for Nuclear Reactor Operators. In *Proceedings of the 15th International Topical Meeting on Nuclear Reactor Thermal-Hydraulics, Operation, and Safety (NUTHOS-15)*. Kashiwa-no-ha, Japan, September 28 - October 1, 2026
5. Palmer, J., Snow, N., Hou, J., and **Wu, X.** (2026). Reactor Dynamics Anomaly Detection using a Physics-Informed LSTM Autoencoder. In *Proceedings of the 15th International Topical Meeting on Nuclear Reactor Thermal-Hydraulics, Operation, and Safety (NUTHOS-15)*. Kashiwa-no-ha, Japan, September 28 - October 1, 2026
6. Moloko, L., Palmer, J., Bokov, P., Delipei, G., **Wu, X.**, and Ivanov, K. (2026). Validation of Physics-based and Data-driven Models using Measured SAFARI-1 Axial Neutron Flux Profiles. In *Proceedings of the International Conference on Physics of Reactors (PHYSOR 2026)*. Turin, Italy, April 19-23, 2026
7. Brady, C. and **Wu, X.** (2026). Estimation of Neutron-Induced Fission Product Yield Uncertainties from Gamma Spectra Data with Bayesian Inverse UQ. In *Proceedings of the International Conference on Physics of Reactors (PHYSOR 2026)*. Turin, Italy, April 19-23, 2026
8. Snow, N., Palmer, J., **Wu, X.**, and Hou, J. (2026). An Investigation on the Learning Strategies for a Physics-Informed LSTM Model with a Point-Reactor Kinetics Problem. In *Proceedings of the International Conference on Physics of Reactors (PHYSOR 2026)*. Turin, Italy, April 19-23, 2026
9. Palmer, J., Stewart, R., and **Wu, X.** (2026). A Comparative Uncertainty Quantification Study for Machine Learning-based Operational Prediction of a Realistic Heat Pipe-cooled Microreactor. In *Proceedings of the International Conference on Physics of Reactors (PHYSOR 2026)*. Turin, Italy, April 19-23, 2026
10. Le-Corre, J.-M., Delipei, G., Zhao, X., **Wu, X.**, and Buss, O. (2025). OECD/NEA Benchmark on Artificial Intelligence and Machine Learning for Critical Heat Flux Predictions – Summary of Phase 1 Results. In *Proceedings of the 21st International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-21)*. Busan, Republic of Korea, August 31 - September 5, 2025

11. Akins, A. G., **Wu, X.**, Kultgen, D., and Heifetz, A. (2025). Enhanced Anomaly Detection in Liquid Sodium Cold Trap Operation with Synchronization of Time Series of Multi-Modal Sensors. In *Proceedings of the 21st International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-21)*. Busan, Republic of Korea, August 31 - September 5, 2025
12. Furlong, A., **Wu, X.**, Zhao, X., and Salko, R. (2025). Uncertainty Quantification and CTF Implementation of Hybrid Machine Learning for Critical Heat Flux Prediction. In *Proceedings of the 21st International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-21)*. Busan, Republic of Korea, August 31 - September 5, 2025
13. Alsafadi, F. and **Wu, X.** (2025). Evaluating the Performance of Diffusion Models for Scientific Data Augmentation - a Case Study with Critical Heat Flux. In *Proceedings of the 21st International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-21)*. Busan, Republic of Korea, August 31 - September 5, 2025
14. Clifford, J., White, J., Heifetz, A., Hawari, A., and **Wu, X.** (2025). Enhancing Learning for Nuclear Reactor Operator Trainees with Large Language Models. In *Proceedings of the 2025 Nuclear Plant Instrumentation and Control & Human-Machine Interface Technology (NPIC&HMIT)*. Chicago, IL, USA, June 15-18, 2025
15. Brady, C., Asadchykh, S., Xie, Z., and **Wu, X.** (2025). Preliminary Results on using Bayesian Inverse Uncertainty Quantification for OECD/NEA WPNCs Subgroup 14 Benchmark Exercise for Error Recovery and Experimental Coverage. In *Proceedings of the 2025 International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering (M&C 2025)*. Denver, Colorado, USA, April 27-30, 2025
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19. Kohler, L., Lisowski, D., **Wu, X.**, and Heifetz, A. (2024). Bayesian Calibration of Fiber Optic Distributed Temperature Sensing in a Thermal Mixing Tee. In *Proceedings of the 2024 Best Estimate Plus Uncertainty International Conference (BEPU-2024)*. Lucca, Italy, May 19-24, 2024
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23. Furlong, A., Alsafadi, F., Palmtag, S., Godfrey, A., Hayes, S., and **Wu, X.** (2024). Predicting PWR Fuel Assembly CIPS Susceptibility with Convolutional Neural Networks: Performance and Uncertainty Quantification. In *Proceedings of the International Conference on Physics of Reactors (PHYSOR 2024)*. San Francisco, CA, USA, April 21-24, 2024

24. **Wu, X.**, Delipei, G., Avramova, M., Ivanov, K., and Buss, O. (2023). Introducing the OECD/NEA WPRS Benchmark on Artificial Intelligence and Machine Learning for Scientific Computing in Nuclear Engineering. In *Proceedings of the 20th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-20)*. Washington, D.C., USA, August 20-25, 2023
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43. **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
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47. **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
48. **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

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Book Chapters and Books

1. **Wu, X.** and Kozlowski, T., (2024) “Inverse uncertainty quantification based on the modular Bayesian approach”, Chapter 16 in “Risk-informed Methods and Applications in Nuclear and Energy Engineering”, Academic Press, Elsevier, ISBN: 978-0-323-91152-8

Technical Reports

1. Mertuyurek, U., Brady, C., Branco-Katcher, M., Cabellos, O., Delipei, G., Dorset, P., Hoefer, A., Hou, J., Houben, D., Hursin, M., Nguyen, K., Palmer, T., Shama, A., **Wu, X.**, Xie, Z., Sundaram, A., Abdel-Khalik, H., and Amundson, K. (2025). The NEA Blind Performance Benchmark: Assessing Error Recovery and Experimental Coverage in Nuclear Data Assimilation. Technical report, NEA Working Papers, NEA/WKP(2026)1, OECD Publishing, Paris
2. Richards, W., Chatzidakis, S., Anghel, C., Moravej, K., Delipei, G., and **Wu, X.** (2026). Benchmark on Artificial Intelligence and Machine Learning for Scientific Computing in Nuclear Engineering, Phase 1: Specifications for the Purdue University Reactor Number One (PUR-1) Exercise. Technical report, NEA Working Papers, NEA/WKP(2026)1, OECD Publishing, Paris
3. Le Corre, J.-M., Delipei, G., **Wu, X.**, and Zhao, X. (2024). Benchmark on Artificial Intelligence and Machine Learning for Scientific Computing in Nuclear Engineering. Phase 1: Critical Heat Flux Exercise Specifications. Technical report, NEA Working Papers, NEA/WKP(2023)1, OECD Publishing, Paris
4. 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
5. **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

Peer-reviewed Conference Transactions and Summaries

1. Palmer, J., Snow, N., Stewart, R., Hou, J., and **Wu, X.** (2026). Integral-Form Physics-Informed LSTM for Long-Horizon Reactor Power Prediction. In *Transactions of American Nuclear Society*. Phoenix, AZ, USA, November 15-18, 2026

2. Palmer, J., **Wu, X.**, and Stewart, R. (2026). Evaluating LSTM Explainability Under Progressive Sensor Loss for Heat-Pipe Microreactor Power Prediction. In *Transactions of American Nuclear Society*. Phoenix, AZ, USA, November 15-18, 2026
3. Akins, A. and **Wu, X.** (2026). Physics-Informed Diffusion Model for Generation of Physically Consistent Critical Heat Flux Data. In *Transactions of American Nuclear Society*. Denver, CO, USA, May 31 - June 3, 2026
4. Furlong, A., Salko, R., Zhao, X., and **Wu, X.** (2026). Prediction of Critical Heat Flux in Rod Bundles Using Tube-Based Hybrid ML Models in CTF. In *Transactions of American Nuclear Society*. Denver, CO, USA, May 31 - June 3, 2026
5. Clifford, J., **Wu, X.**, Heifetz, A., and Kultgen, D. (2026). Verification Methods for Deploying Trustworthy Large Language Model Systems in Nuclear Operations and Maintenance. In *Transactions of American Nuclear Society Student Conference*. College Station, TX, USA, April 16 - 18, 2026
6. Miles, M., Clifford, J., Mikouchi-Lopez, J., Hou, J., and **Wu, X.** (2026). CORA: GraphRAG/Neo4J-Powered Cognitive Operator Reactor Assistant. In *Transactions of American Nuclear Society Student Conference*. College Station, TX, USA, April 16 - 18, 2026
7. Furlong, A., Zhao, X., Salko, R., and **Wu, X.** (2025). Development and Deployment of Hybrid ML Models for Critical Heat Flux Prediction in Annulus Geometries. In *Transactions of American Nuclear Society*. Washington, DC, USA, November 9-12, 2025
8. Furlong, A., Zhao, X., Salko, R., and **Wu, X.** (2025). Native Fortran Implementation of TensorFlow-Trained Deep and Bayesian Neural Networks. In *Transactions of American Nuclear Society*. Chicago, IL, USA, June 15-18, 2025
9. Clifford, J., Kohler, L., White, J., Karim, N., Kautz, E., and **Wu, X.** (2025). Automating Spectroscopic Analysis of Lithium Isotopic Composition with Convolutional Neural Networks. In *Transactions of the 2025 ANS Student Conference*. Albuquerque, New Mexico, USA, April 3-5, 2025
10. Sadek, A., Yaseen, M., Ercanbrack, S., Ramzy Altahhan, M., **Wu, X.**, and Ivanov, K. (2024). Evaluating the Uncertainty Effects of Carbon Nuclear Data on Pebble Bed Reactor Physics: A Comparative Study of ENDF/B-VII.1 and ENDF/B-VIII.0. In *Transactions of American Nuclear Society*. Orlando, FL, USA, November 17-21, 2024
11. Richards, W., Dahm, Z., Buss, O., Anghel, C., Moravej, K., Zhao, X., Foad, B. F., Rohatgi, U., Delipei, G., **Wu, X.**, and Chatzidakis, S. (2024). Developing a Machine Learning Benchmark Using Real-Time Data from the PUR-1 Reactor for Nuclear Applications. In *Transactions of American Nuclear Society*. Las Vegas, NV, USA, June 16-19, 2024
12. Kohler, L., Clifford, J., Karim, N., Harilal, S. S., Kautz, E., and **Wu, X.** (2024). ML-LIBS: Machine Learning-Based Spectra Predictions of Time-Dependent Lithium Emission Spectroscopy Imaging. In *Transactions of the 2024 ANS Student Conference*. University Park, Pennsylvania, USA, April 4-6, 2024
13. Furlong, A., Alsafadi, F., Kohler, L., **Wu, X.**, Palmtag, S., Godfrey, A., and Hayes, S. (2023). Machine Learning-based Prediction of Crud Buildup Locations in Pressurized Water Reactors. In *Transactions of American Nuclear Society*. Washington, D.C., USA, November 12-15, 2023
14. Bolgova, D., Abarca, A., **Wu, X.**, and Avramova, M. (2023). CANDU Fuel Channel Modeling in CTF Within the OECD-NEA Blind Benchmark on CANDU Thermal-Hydraulics. In *Transactions of American Nuclear Society*. Washington, D.C., USA, November 12-15, 2023
15. Yushu, D., McMurtrey, M., **Wu, X.**, Monson, A., and German, P. (2023). Directed Energy Deposition Process Modeling, Validation, and Process-Informed Optimization. In *Proceedings of the 17th U. S. National Congress on Computational Mechanics (USNCCM)*. Albuquerque, New Mexico, USA, July 23-27, 2023
16. **Wu, X.**, Delipei, G., Avramova, M., and Ivanov, K. (2022). Introducing the OECD/NEA WPRS Task

- Force on Artificial Intelligence and Machine Learning. In *Transactions of American Nuclear Society*. Phoenix, AZ, USA, November 13-17, 2022
17. **Wu, X.**, Delipei, G., Avramova, M., and Ivanov, K. (2022). Why is Uncertainty Quantification Important for Machine Learning Models? In *Transactions of American Nuclear Society*. Phoenix, AZ, USA, November 13-17, 2022
 18. 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
 19. 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
 20. 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
 21. **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
 22. Alsafadi, F., Xie, Z., and **Wu, X.** (2021). Quantitative Validation with Bayes Factor. In *Transactions of American Nuclear Society*. Washington, DC, USA, November 30 - December 4, 2021
 23. 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, November 30 - December 4, 2021
 24. 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, November 17-21, 2019
 25. **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, November 11-15, 2018
 26. 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, November 11-15, 2018
 27. **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
 28. **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
 29. 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
 30. **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, October 29 - November 2, 2017
 31. **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
 32. **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
33. **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
34. **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. "Generative Artificial Intelligence Applications in Nuclear Energy", the 2026 Modeling, Experimentation and Validation (MeV) Summer School, Idaho National Laboratory, July 30th, 2026.
2. "Research Highlights at the NCSU ARTISANS (Artificial Intelligence for Simulation of Advanced Nuclear Systems) Research Group", Regulatory Research and Plant Optimization Division Seminar, Idaho National Laboratory, July 29th, 2026.
3. "Benchmark Development Efforts by the OECD/NEA WPRS Task Force on AI and ML for Scientific Computing in Nuclear Engineering", 2026 Small Modular Reactor (SMR) Workshop, North Carolina State University, Raleigh NC, USA, May 20th, 2026
4. "Updates on the OECD/NEA WPRS EGMUP Task Force on AI and ML 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), McMaster University, Hamilton, Ontario, Canada, May 12th, 2026.
5. "Applied AI for Nuclear Engineering: From Bayesian Inverse UQ and Deep Generative Modeling to LLM-Enabled Nuclear Reactor Operator Training", Graduate Research Seminar, Department of Nuclear Engineering, North Carolina State University, April 9th, 2026.
6. "Applied AI for Nuclear Engineering: From Bayesian Inverse UQ and Deep Generative Modeling to LLM-Enabled Nuclear Reactor Operator Training", Graduate Research Seminar, Department of Nuclear Engineering and Engineering Physics, University of Wisconsin - Madison, March 3rd, 2026.
7. "Benchmark Development Efforts by the OECD/NEA Task Force on AI and ML for Scientific Computing in Nuclear Engineering", OECD/NEA AI Platform for Nuclear Research and Education (AIxpertise) First Workshop (virtual), October 16th, 2025
8. "Overview of Scientific Machine Learning (SciML) Research at the NCSU ARTISANS Group", Annual Benchmark Workshops of the OECD/NEA Working Party of Scientific Issues and Uncertainty Analysis of Reactor Systems (WPRS), University of Cambridge, United Kingdom, June 30th, 2025.
9. "Opportunities and Challenges of Thermal-Hydraulics Education with AI", Panel on "Thermal Hydraulic Education: Opportunities with AI", 2025 ANS Annual Conference, Chicago, IL, USA, June 16th, 2025
10. "Scientific Machine Learning (SciML) Research at the NCSU ARTISANS Group", Workshop on the Subgroup 14 (SG14) "Performance Benchmark for Error Recovery and Experimental Coverage", OECD/NEA Working Party on Nuclear Criticality Safety (WPNCs), virtual, June 16th, 2025.
11. "A Comparative Review of Quantitative Validation Metrics", OECD/NEA Working Group on Analysis and Management of Accidents (WGAMA), Workshop on the "Application Tests for Realization of Inverse Uncertainty quantification and validation Methodologies in thermal-hydraulics (ATRIUM)" Project, Paris, France, November 14th, 2024.
12. "SciML-based Inverse UQ for Improving the Quality of Nuclear Data for Radiation Transport Simulations in Nuclear Forensics Applications", DOE NNSA Consortium for Nuclear Forensics Annual Workshop, Gainesville, FL, USA, October 15th, 2024.
13. "Artificial Intelligence and Machine Learning for Scientific Computing in Nuclear Engineering: Status, Benchmarks, and Outlook", American Nuclear Society Thermal Hydraulics Division Webinar on "Year in Review: Nuclear Thermal Hydraulics Achievements of 2023", March 15th, 2024.

14. "Inverse Uncertainty Quantification Methods of Nuclear System Thermal-Hydraulics Codes", SIAM Conference on Uncertainty Quantification (UQ24), Mini-symposium on "*Uncertainty Quantification of Thermal-Hydraulics Models in Nuclear Engineering*", Trieste, Italy, March 1st, 2024.
15. "Uncertainty Quantification of Deep Neural Networks for Nuclear Reactor Applications", SIAM Conference on Uncertainty Quantification (UQ24), Mini-symposium on "*Recent Advances in Uncertainty Quantification for Scientific Machine Learning*", Trieste, Italy, February 27th, 2024.
16. "ARTISANS - Artificial Intelligence for Simulation of Advanced Nuclear Systems", Nuclear Science and Engineering Division, Argonne National Laboratory, Lemont, IL, USA, February 22nd, 2024.
17. "Treatment of Different Sources of Uncertainties in Inverse Uncertainty Quantification", OECD/NEA Working Group on Analysis and Management of Accidents (WGAMA), Workshop on the "Application Tests for Realization of Inverse Uncertainty quantification and validation Methodologies in thermal-hydraulics (ATRIUM)" Project, Paris, France, November 21st, 2023.
18. "Inverse Uncertainty Quantification with Machine Learning for Nuclear Reactor Simulations", Nuclear Engineering Seminar Series, Virginia Tech, October 27th, 2023.
19. "Uncertainty Quantification of Machine Learning to Establish AI Trustworthiness in Nuclear Engineering Applications", U.S. Nuclear Regulatory Commission (NRC) Data Science and Artificial Intelligence Regulatory Applications Workshops #4: AI Characteristics for Regulatory Consideration, Panel Session on "AI Safety, Security and Explainability", Rockville, MD, USA, September 19th, 2023.
20. "Everything You Need To Know About Deep Neural Networks", in Workshop of "Scientific Machine Learning for Nuclear Engineering Applications", M&C-2023, Niagara Falls, Ontario, Canada, August 13th, 2023.
21. "Uncertainty Quantification for Physics-based Models and Data-driven Machine Learning Models", the 2023 Modeling, Experimentation and Validation (MeV) Summer School, Idaho National Laboratory, August 3rd, 2023.
22. "Inverse Uncertainty Quantification with Machine Learning for Nuclear Reactor Simulations", Nuclear Science & Technology (NS&T) Distinguished Seminar Series, Idaho National Laboratory, August 2nd, 2023.
23. "Artificial Intelligence and Machine Learning Applications to Nuclear Engineering Problems", the inaugural Lise Meitner Program (LMP), International Atomic Energy Agency, June 9th, 2023.
24. "Status Update on the Benchmark Exercises on AI/ML 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), Bologna, Italy, May 24th, 2023.
25. "Status Update on the OECD/NEA WPRS EGMUP Task Force on AI/ML for Scientific Computing in Nuclear Engineering", OECD/NEA Working Party on Scientific Issues and Uncertainty Analysis of Reactor Systems (WPRS), Expert Group on Reactor System Multiphysics (EGMUP) 3rd Meeting, February 22nd, 2023.
26. "Introducing the WPRS EGMUP Task Force on Artificial Intelligence and Machine Learning for Scientific Computing in Nuclear Engineering", OECD/NEA Working Party on Materials Science Issues in Nuclear Fuels and Structural Materials (WPFM), Expert Group on Fuel Materials (EGFM) Online Meeting, January 26th, 2023.
27. "Overview of Artificial Intelligence and Machine Learning with Potential Applications to Nuclear Industry Problems", Duke Energy Meeting with NCSU, McGuire Nuclear Station, Huntersville, NC, USA, June 23rd, 2022.
28. "Gaps and Challenges in Machine Learning Applications for Scientific Computing in Nuclear Engineering", ATH-2022 panel session on "Machine Learning for Reactor Thermal Hydraulics: Progresses, Challenges, and Opportunities", Anaheim, CA, USA, June 15th, 2022.
29. "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 1st, 2022.

30. "Scientific Machine Learning for Nuclear Engineering Applications", Workshop at PHYSOR 2022, Pittsburgh, PA, USA, May 15th, 2022.
31. "Inverse Uncertainty Quantification with Machine Learning for Nuclear Reactor Simulations", Department of Nuclear Engineering, The University of New Mexico, April 19th, 2022.
32. "Bayesian Inverse Uncertainty Quantification and Validation of Nuclear Reactor Simulators", SIAM Conference on Uncertainty Quantification (UQ22), Mini-symposium on "*Data-Centric Machine Learning for Uncertainty Quantification in Complex Systems*", Atlanta, GA, USA, April 12th, 2022.
33. "Inverse Uncertainty Quantification with Machine Learning for Nuclear Reactor Simulations", Department of Mechanical and Aerospace Engineering, Ohio State University, March 2nd, 2022.
34. "Inverse Uncertainty Quantification with Machine Learning for Nuclear Reactor Simulations", School of Nuclear Science & Engineering, Oregon State University, February 23rd, 2022.
35. "Inverse Uncertainty Quantification with Machine Learning for Nuclear Reactor Simulations", Department of Mechanical, Aerospace, and Nuclear Engineering, Rensselaer Polytechnic Institute, November 17th, 2021.
36. "Scientific Machine Learning for Nuclear Engineering Applications", Workshop at M&C 2021, October 3rd, 2021.
37. "Improving Model Prediction by Integrating Inverse UQ and Quantitative Validation", Workshop on Uncertainty Analysis in Modelling of Light Water Reactors (UAM-LWR), OECD/NEA Working Party of Scientific Issues and Uncertainty Analysis of Reactor Systems (WPRS), July 1st, 2021.
38. "Modular Bayesian Approach for Inverse Uncertainty Quantification", Workshop on Uncertainty Analysis in Modelling of Light Water Reactors (UAM-LWR), OECD/NEA Working Party of Scientific Issues and Uncertainty Analysis of Reactor Systems (WPRS), July 1st, 2021.
39. "Improving Modeling & Simulation of Advanced Nuclear Reactors by Uncertainty Quantification and Scientific Machine Learning", Engineering Foundation Board, North Carolina State University, Raleigh, NC, USA, April 16th, 2021.
40. "Forward and Inverse Uncertainty Quantification", Department of Nuclear Irradiation Experiment Neutronic Analysis, Idaho National Laboratory, April 8th, 2021.
41. "Uncertainty Quantification and Sensitivity Analysis for Nuclear Applications", Online Workshop in 2020 ANS Student Conference, April 5th, 2021.
42. "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 16th, 2021.
43. "Uncertainty Quantification with Scientific Machine Learning" Machine Learning & Artificial Intelligence Symposium 3.0 (online), Idaho National Laboratory, October 16th, 2020.
44. "Uncertainty Quantification Methods", Graduate Research Seminar, Department of Nuclear Engineering, North Carolina State University, Raleigh, NC, USA, August 27th, 2020.
45. "Uncertainty Quantification Methods", the 2020 Modeling, Experimentation and Validation (MeV) Summer School, Idaho National Laboratory, Idaho Falls, ID, USA, August 3rd, 2020.
46. "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 11th, 2019.
47. "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 9th, 2019.
48. "Bridging the Gap between Models and Data - Addressing the ANS Nuclear Grand Challenge on Simu-

lation and Experimentation”, Department of Materials Science and Engineering, University of Florida, Gainesville, FL, USA, March 7th, 2019.

49. “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 7th, 2019.
50. “Inverse Uncertainty Quantification using the Modular Bayesian Approach in the Presence of Model Discrepancy”, Idaho National Laboratory, Idaho Falls, ID, USA, August 10th, 2018.
51. “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 10th, 2017.

Honors and Awards

Landis Young Member Engineering Achievement Award

American Nuclear Society (ANS) 2026

Dean’s COE Applied AI Research Accelerator Award

NCSU College of Engineering (COE) 2026

Distinguished Early Career Award

Department of Energy (DOE) Office of Nuclear Energy 2024

Best Overall Paper Award (student: Lauren Kohler and Jason Clifford)

2024 American Nuclear Society (ANS) Student Conference 2024

Best Paper of the ANS “Young Professional Thermal Hydraulics Research Competition”

2017 American Nuclear Society (ANS) Winter Meeting 2017

Tau Beta Pi Engineering Honor Society

The Tau Beta Pi Engineering Honor Society 2015

Alpha Nu Sigma Honors Society

The Alpha Nu Sigma National Honor Society 2013, 2014, 2015

Outstanding Graduate

Shanghai Jiao Tong University 2011

National Endeavor Scholarship

China Ministry of Education 2009, 2010

The 18th Guanghua Educational Scholarship

Guanghua Educational Fund 2009

“Nuclear Power of China” Scholarship, first class

Nuclear Power Institute of China 2008, 2009, 2010

Awarded to the undergraduate student with the highest overall GPA from nuclear engineering

Academic Excellence Scholarship, first class

Shanghai Jiao Tong University 2008, 2009, 2010

Awarded to top 5% undergraduate students in academic performance from all areas

Professional Service

Reviewer for 10 journals in Nuclear Science and Engineering

- Annals of Nuclear Energy (ANE)
- IEEE Transactions on Nuclear Science (TNS)
- Journal of Nuclear Materials (JNM)
- Nuclear Engineering and Design (NED)
- Nuclear Engineering and Technology (NET)
- Nuclear Science and Engineering (NSE)

- Nuclear Science and Techniques (NST)
- Nuclear Technology (NT)
- Progress in Nuclear Energy (PNE)
- Science and Technology of Nuclear Installations (STNI)

Reviewer for 34 journals in Computational Science & Engineering and others

- Acta Materialia
- Advanced Engineering Informatics
- Applied Mathematical Modeling
- Artificial Intelligence In Medicine
- Computational Materials Science
- Computers and Fluids
- Computer Physics Communications
- Computers & Security
- Computers and Structures
- Ecological Informatics
- Energy Reports
- Engineering Applications of Artificial Intelligence
- Expert Systems With Applications
- IEEE Access
- IEEE Transactions on Emerging Topics in Computational Intelligence
- Information Fusion
- International Communications in Heat and Mass Transfer
- International Journal of Heat and Mass Transfer
- Journal of Applied Statistics
- Journal of Computational Mathematics and Data Science
- Journal of Computational Physics
- Mathematical Methods in the Applied Sciences
- Mathematical Problems in Engineering
- Measurement
- Neurocomputing
- Optics Express
- Reliability Engineering and System Safety
- Renewable Energy
- Results in Engineering
- Science of the Total Environment
- Scientific Reports
- SN Applied Sciences by Springer Nature
- SoftwareX
- Systems Engineering

Reviewer for professional conferences

- *ANS*: American Nuclear Society Annual/Winter Meetings and Student Conferences
- *ATH*: Advances in Thermal Hydraulics
- *ICAPP*: Int. Congress on Advances in Nuclear Power Plants
- *NURETH*: Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics
- *NUTHOS*: Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics, Operation, and Safety

- BEPU: Int. Conf. on Best Estimate Modelling Plus Uncertainties in Safety Analyses
- PHYSOR: Int. Conf. on Physics of Reactors
- M&C: Int. Conf. on Mathematics and Computational Methods in Nuclear Science and Engineering

Reviewer for grants

- U.S. DOE Office of Nuclear Energy Consolidated Innovative Nuclear Research (CINR) proposals
- U.S. DOE Office of Science Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) Programs Phase I & II proposals
- U.S. National Science Foundation (NSF), Computational and Data-Enabled Science and Engineering (CDS&E) meta-program, Condensed Matter and Materials Theory (CMMT) program
- U.S. NSF Biomaterials panel for Designing Materials to Revolutionize and Engineer our Future (DMREF) program
- Swiss National Science Foundation (SNSF)

Workshops, symposiums and special sessions organized/chaired

- Workshop series on “Scientific Machine Learning for Nuclear Engineering Applications”, in
 - M&C-2025, April 27th, 2025
 - PHYSOR-2024, April 21st, 2024
 - M&C-2023, August 13th, 2023
 - PHYSOR-2022, May 15th, 2022
 - M&C-2021, October 3rd, 2021
- Mini-symposium on “Uncertainty Quantification for Complex Engineering Systems with Machine Learning”, SIAM Conference on Uncertainty Quantification (UQ26), 2026
- Special panel on “AI/ML in Nuclear Engineering”, NUTHOS-14, 2024
- Symposium on “ML-Aided Uncertainty Quantification for Complex Systems Analysis”, in the 17th US National Congress on Computational Mechanics (USNCCM), July 25th, 2023.
- Workshop on “Uncertainty Quantification”, Idaho National Laboratory, July 26th, 2022.
- Workshop on “Uncertainty Quantification and Sensitivity Analysis”, ANS Student Conference, 2021

Panels served

- Panel on “Distinguished Early Career Award”, 2026 ANS Annual Conference, June 1st, 2026
- Panel on “AI in Nuclear: Age of Machine Learning and Nuclear Powered Data Centers”, 2026 ANS Student Conference, April 17th, 2026
- Panel on “Physics-Based AI, Digital Twins & Immersive Visualization”, Summit on the Role of Research and Education Reactors (RERs) and AI/ML in the Development of the Next-Generation Nuclear Workforce in Virginia and Beyond, February 19th, 2026
- Panel on “Advancing U.S.-International Engagement in Nuclear Energy”, 2025 ANS Annual Conference, June 18th, 2025
- Panel on “Thermal Hydraulic Education: Opportunities with AI”, 2025 ANS Annual Conference, June 16th, 2025
- Panel on “Machine Learning for Reactor Thermal Hydraulics: Progresses, Challenges, and Opportunities”, Advances in Thermal Hydraulics (ATH-2022), June 15th, 2022

International collaboration and service

- Chair, Task Force on Artificial Intelligence and Machine Learning for Scientific Computing in Nuclear Engineering, Working Party on Scientific Issues and Uncertainty Analysis of Reactor Systems (WPRS), Organisation for Economic Co-operation and Development (OECD) Nuclear Energy Agency (NEA).
 - In this role, I am coordinating a Task Force of over 60 professionals from 25 institutions in eight countries to develop benchmark exercises to evaluate the performance of AI/ML in multiphysics modeling and simulation of reactor systems.
 - The developed benchmark exercises focus on establishing and improving ML predictive credibility, through rigorous VVUQ of AI/ML which matches the quality standards for VVUQ of traditional

nuclear M&S models.

- The Task Force will provide recommendations to the WPRS and the nuclear community on the scientific development needs (data, methods, and benchmark exercises) for trustworthy AI/ML applications in nuclear scientific computing problems.

Editorship

- Editorial Board member (August 2025 - present), *Annals of Nuclear Energy*
- Editorial Advisory Board member (June 2023 - present), *Nuclear Science and Engineering*
- Guest Advisor for Article Collection on “Scientific Machine Learning for Nuclear Engineering Problems”, *Nuclear Science and Engineering*

Lecturer/Instructor

- Lise Meitner Program (LMP) for Early Professional Women Nuclear Engineers, International Atomic Energy Agency (IAEA)
- Modeling, Experimentation and Validation (MeV) Summer School (2020, 2023, 2026)
- Nuclear Engineering Young Investigators’ Summer Program, NCSU

Professional society committees

- ANS Thermal-Hydraulics Division, Executive Committee (2024 - present)
- ANS Thermal-Hydraulics Division, Program Committee (2023 - present)
- ASME VVUQ 70 sub-committee on “Verification and Validation of Machine Learning” (2022 - 2024)

Conference organization - Technical Program Committee (TPC) member for

- M&C-2027 (Track lead of “Special Session on Generative AI and LLMs for Nuclear Applications”)
- NUTHOS-2026 (International Committee)
- PHYSOR-2026 (Track Lead of “Current and Future Applications of Machine Learning and Artificial Intelligence in Reactor Physics”)
- NURETH-2025 (Track Chair of “Digital Technologies for Thermal Hydraulics”)
- M&C-2025 (Assistant TPC Chair, Workshop Chair)
- BEPU-2024
- NUTHOS-2024 (Track co-chair of “Thermal Hydraulics and Safety of Advanced Reactors”)
- M&C-2023
- M&C-2021

Organizer and Chair, ANS Young Professional Thermal Hydraulics Research Competition (YPTHRC) in

- 2024 Advances in Thermal Hydraulics
- 2023 ANS Winter Meeting
- 2022 Advances in Thermal Hydraulics
- 2021 ANS Winter Meeting

Conference session chairs

- PHYSOR
- NURETH
- M&C
- ANS Annual and Winter Meetings

Professional societies

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

PhD Students Mentored

1. **Gil Rubia** Chair
Department of Nuclear Engineering, NCSU 08/2026 - present
 PhD topic: A Comprehensive UQ Methodology for High Fidelity Multi-Physics Simulation of SFRs
 2026 - NC State Provost Doctoral Fellowship
 2026 - NC State Goodnight Doctoral Fellowship
2. **Jaden Palmer** Chair
Department of Nuclear Engineering, NCSU 08/2025 - present
 PhD topic: Uncertainty-aware ML Digital Twin for Advanced Nuclear Reactors
 2025 - National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP)
 2025 - NC State Graduate Fellowship
 2025 - NC State Provost Doctoral Fellowship
 2026 - ANS Reactor Physics Division (RPD) Massimo Salvatores Memoriam Graduate Scholarship
 2026 - Nuclear Engineering Student Delegation
3. **Joel Khristy** Chair
Distance PhD student, Nuclear Nonproliferation Division, Oak Ridge National Laboratory 08/2025 - present
 PhD topic: Computer Vision and Machine learning for Fireball Feature Extraction from Nuclear Test Films
4. **Jason Clifford** Chair
Distance PhD student, eval at P-1 AI 08/2025 - present
 PhD topic: Enhancing Learning for Nuclear Reactor Operator Trainees with Large Language Models
 2026 - NCSU College of Engineering Outstanding Thesis Master's Student of the Year
 2026 - ANS Student Conference Best Presentation Award in Mathematics, Computation, & AI Applications
 2026 - NCSU College of Engineering Graduate Merit Award (GMA)
5. **Lauren Kohler** Chair
Distance PhD student, GE Vernova Nuclear Edison Engineering Development Program 08/2024 - present
 PhD topic: TBD
 2024 - DOE University Nuclear Leadership Program (UNLP) Graduate Fellow
 2025 - DOE Office of Nuclear Energy FY25 Innovations in Nuclear Energy Student Paper Competition Award
 2025 - ANS Thermal-Hydraulics Division (THD) Vincent J. Esposito Thermal Hydraulic Graduate Scholarship
6. **Alexandra Akins** Chair
Department of Nuclear Engineering, NCSU 08/2023 - present
 PhD thesis title: Physics-informed Diffusion Model for Deep Generative Modeling
 2023 - National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP)
 2026 - John T. McCarter Jr. Graduate Student Fellowship
 2026 - ANS Graduate Scholarship
 2026 - GEM PhD Fellowship by Oak Ridge National Laboratory
7. **Christopher Brady** Chair
Department of Nuclear Engineering, NCSU Final defense: 05/2026
 PhD thesis title: Nuclear Data Adjustment with Bayesian Inverse UQ for Radiation Transport Simulations in Nuclear Forensics
 First job after graduation: TBD
8. **Aidan Furlong** Chair
Department of Nuclear Engineering, NCSU Final defense: 03/2026
 PhD thesis title: Development, Refinement, and Deployment of Explainable and Interpretable Critical Heat Flux Machine Learning Models
 2025 - Nuclear Engineering Student Delegation
 2026 - NCSU Nuclear Engineering Department Graduate Research Excellence Award
 First job after graduation: Postdoc, Nuclear Energy and Fuel Cycle Division, Oak Ridge National Laboratory (ORNL)
9. **Farah Alsafadi** Chair
Department of Nuclear Engineering, NCSU Final defense: 04/2025

PhD thesis title: Deep Generative Modeling-based Data Augmentation to Address the Data Scarcity Issue in Nuclear Engineering

2025 - NCSU College of Engineering Outstanding Doctoral Scholar of the Year for Scholarly Achievement

2025 - OECD/NEA Global Forum Rising Stars in Nuclear Education, Science, Technology and Policy

2026 - ANS Graduate Scholarship

First job after graduation: Postdoctoral Fellow, Center for Nuclear Engineering and Sciences, Paul Scherrer Institute (PSI), Switzerland

- Ziyu Xie** Chair
10. Department of Nuclear Engineering, NCSU *Final defense: 09/2024*
PhD thesis title: Machine Learning-based Model Discrepancy in Bayesian Inverse Uncertainty Quantification
First job after graduation: Tenure-track Assistant Professor of Nuclear Engineering, College of Nuclear Science and Technology, Harbin Engineering University, China
- Lesego Moloko** Chair
11. Distance PhD student, South African Nuclear Energy Corporation, South Africa *Final defense: 09/2024*
PhD thesis title: Integrated Neutronics Simulation and Machine Learning with Uncertainty Quantification for Reactor Core Monitoring and Safety
First job after graduation: Senior scientist, South African Nuclear Energy Corporation (Necsa), South Africa
- Chaitee Godbole** Co-chair with Prof. Maria Avramova
12. Department of Nuclear Engineering, NCSU *Final defense: 03/2023*
PhD thesis title: Machine Learning-based Prediction of Power at which Departure from Nucleate Boiling Occurs
First job after graduation: Postdoctoral Research Associate, Instrumentation and Controls Department, Idaho National Laboratory (INL), USA
- Parth Patel** Co-chair with Prof. Abhinav Gupta
13. Department of Civil and Environmental Engineering, NCSU *Final defense: 12/2022*
PhD thesis title: Simulating Damage and Degradation in Concrete Structures
First job after graduation: Postdoc, Center for Nuclear Energy Facilities and Structures (CNEFS), NCSU, USA

MS Students Mentored

- MSNE: Master of Science in Nuclear Engineering - thesis-based
- MNE: Master of Nuclear Engineering - project-based, no thesis

- Jason Clifford** MSNE
1. Department of Nuclear Engineering, NCSU *Graduation: 05/2026*
MS thesis title: Verification Methods for Deploying Trustworthy LLM Systems in Nuclear Operations and Maintenance
First job after graduation: eval at P-1 AI, Nuclear Engineering distance PhD student at NCSU
- Johnathan Wade Pack** MNE
2. Department of Nuclear Engineering, NCSU *Graduation: 05/2026*
MNE report title: Application of Deep Learning Tabular Methods to the Groeneveld Critical Heat Flux Database
First job after graduation: Framatome Inc.
- Lauren Kohler** MSNE
3. Department of Nuclear Engineering, NCSU *Graduation: 05/2025*
MS thesis title: Bayesian Calibration and Machine Learning-based Validation of Distributed Fiber Optic Sensors for Advanced Temperature Sensing in Nuclear Reactors
First job after graduation: GE Vernova Nuclear Edison Engineering Development Program and Nuclear Engineering distance PhD student at NCSU
- Alexandra Akins** MSNE
4. Department of Nuclear Engineering, NCSU *Graduation: 05/2025*
MS thesis title: Development of a Long Short-Term Memory Autoencoder Anomaly Detection Algorithm for a Liquid Sodium Thermal-Hydraulics System
First job after graduation: Nuclear Engineering PhD student at NCSU
- Aidan Furlong** MSNE
5. Department of Nuclear Engineering, NCSU *Graduation: 05/2024*

MS thesis title: Prediction of CIPS Susceptibility in PWR Assemblies Using 3D Convolutional Neural Networks
First job after graduation: Nuclear Engineering PhD student at NCSU

6. **Mahmoud Yaseen** MSNE
Department of Nuclear Engineering, NCSU *Graduation: 05/2024*
MS thesis title: Uncertainty Quantification in Deep Neural Network Models for Nuclear Reactor Benchmarks
First job after graduation: Nuclear Engineering PhD student at The Pennsylvania State University
7. **Farah Alsafadi** MNE
Department of Nuclear Engineering, NCSU *Graduation: 12/2023*
MNE report title: Deep generative modeling-based data augmentation with demonstration using the BFBT benchmark void fraction datasets
First job after graduation: Nuclear Engineering PhD student at NCSU
8. **Christopher Brady** MSNE
Department of Nuclear Engineering, NCSU *Graduation: 05/2023*
MS thesis title: Criticality Safety Analysis of a Spiral Plate Heat Exchanger for Molten Salt Reactors
First job after graduation: Nuclear Engineering PhD student at NCSU
9. **Richard Pfrogner** MSNE
Department of Nuclear Engineering, NCSU *Graduation: 05/2023*
MS thesis title: CTF PWR Core Modeling and Validation Applicable to High Burnup High Enrichment (HBHE) Fuel
First job after graduation: US Army
10. **Halil Ibrahim San** MSNE
Department of Nuclear Engineering, NCSU *Graduation: 08/2022*
MS thesis title: Sensitivity Analysis of Core Reflood Phenomena with Deep Learning
First job after graduation: unknown at Türkiye
11. **Jennifer Baglio** MNE
Distance Education student, GE-Hitachi Nuclear Energy *Graduation: 08/2021*
MNE report title: Analysis of Spent Fuel Pool Shielding for BWRX-300
First job after graduation: Stability and Radiological Analysis Engineer, GE-Hitachi Nuclear Energy

Undergraduate Students Mentored

1. **Ipsitha Vasipalli**
Department of Nuclear Engineering, NCSU *01/2026 - present*
Project title: Uncertainty Quantification of ML Models
2. **Audrey Schmal**
Department of Nuclear Engineering, NCSU *10/2025 - present*
Project title: Large Language Models for Nuclear Energy Applications
Main activities and honors during BS:
 - 2026 summer: Science Undergraduate Laboratory Internship (SULI) with Argonne National Laboratory (ANL)
3. **Jackson Dunderman**
Department of Nuclear Engineering, NCSU *10/2025 - present*
Project title: TBD
4. **Mason Mines**
Department of Computer Science, The University of North Carolina at Chapel Hill *09/2025 - present*
Project title: Enhancing Learning for Nuclear Reactor Operator Trainees with LLM
Main activities and honors during BS:
 - 2026: ANS Undergraduate Scholarship
 - 2026 summer: SULI with ANL
5. **Oliver Maynard**
Department of Nuclear Engineering, NCSU *10/2024 - present*

Project title: ML-based Inverse Uncertainty Quantification for Nuclear Forensics

Main activities and honors during BS:

- 2024: Duke Energy Nuclear Engineering Scholarship
- 2025 summer: SULI with Oak Ridge National Laboratory (ORNL)
- 2025: DOE University Nuclear Leadership Program (UNLP) Scholarship
- 2026: NCSU Nuclear Engineering Department Undergraduate Academic Excellence Award
- 2026 summer: Undergraduate research fellow of DOE NNSA Consortium of Nuclear Forensics (CNF)

Evan Hong

6. Department of Nuclear Engineering, NCSU 10/2024 - present
Project title: Verification and Validation for Retrieval Augmented Generation in LLM Systems

Main activities and honors during BS:

- 2025 summer: SULI internship with ORNL
- 2025: DOE UNLP Scholarship
- 2026: ANS Columbia SC Local Section Scholarship
- 2026 summer: SULI internship with ANL

Sofiia Asadchykh

7. Department of Nuclear Engineering, NCSU 10/2023 - 01/2026
Project title: ML-based Inverse Uncertainty Quantification for Nuclear Forensics
Employment after BS: continued as a Nuclear Engineering Master's student at NCSU

Main activities and honors during BS:

- 2024 summer: Internship with EnergySolutions
- 2024: DOE UNLP Scholarship
- 2024: ANS Scholarship
- 2025 summer: Internship at ORNL Incident Modeling and Computational Sciences Group
- 2025: DOE UNLP Scholarship
- 2026: The IAEA Marie Skłodowska-Curie Fellowship

Jason Clifford

8. Department of Nuclear Engineering, NCSU 10/2022 - 05/2025
Project title: ML-Based Spectra Predictions of Lithium Emission Spectroscopy Imaging
Employment after BS: continued as a Nuclear Engineering PhD student at NCSU

Main activities and honors during BS:

- 2023: National Academy of Engineering's Grand Challenge Scholars Program
- 05/2023 - 11/2023: SULI internship with Idaho National Laboratory (INL)
- 2023: DOE UNLP Scholarship
- 2023: ANS Undergraduate Scholarship
- 01/2024 - 05/2025: SULI internship with ANL
- 2024: ANS HFICD Joseph Naser Undergraduate Scholarship
- 2024: DOE UNLP Scholarship
- 2024: ANS Undergraduate Scholarship
- 2025: NCSU Nuclear Engineering Department Undergraduate Research Excellent Award

Lauren Kohler

9. Department of Nuclear Engineering, NCSU 10/2021 - 05/2024

Project title: ML-Based Spectra Predictions of Lithium Emission Spectroscopy Imaging

Employment after BS: continued as a Nuclear Engineering PhD student at NCSU

Main activities and honors during BS:

- 2022: DOE UNLP Scholarship
- 2022: ANS Undergraduate Scholarship
- 01/2023 - 05/2024: SULI internship with ANL
- 2023: DOE UNLP Scholarship
- 2023: Roy G. Post Foundation Scholarship
- 2023: Duke Power Nuclear Engineering Grant
- 2024: ANS MCD Robert A. Dannels Memorial Scholarship
- 2024: Best Overall Paper Award at 2024 ANS Student Conference
- 2024: Best Presentation Award in Power Reactor Reliability Operations & Safety at 2024 ANS Student Conference
- 2024: ANS John and Muriel Landis Scholarship
- 2024: DOE UNLP Graduate Fellowship
- 2024: NC State Nuclear Engineering Department Best Senior Design Presentation
- 2024: OECD/NEA Global Forum Rising Stars in Nuclear Education, Science, Technology and Policy

10. **Alexandra Akins**

Department of Nuclear Engineering, NCSU

10/2020 - 05/2023

Project title: Solving a System of ODEs for Reactivity Insertion Accident with ANNs

Employment after BS: continued as a Nuclear Engineering PhD student at NCSU

Main activities and honors during BS:

- 2020: US NRC Nuclear Education Program Scholarship
- 2021: DOE UNLP Scholarship
- 2021: NC State Women and Minority Engineering Programs Scholarship
- 2022: DOE UNLP Scholarship
- 05/2022 - 05/2023: SULI internship with ANL
- 2023: The “impact Argonne award” by ANL
- 2023: NC State College of Engineering Senior Award of Humanities
- 2023: NC State Sustainability Award
- 2023: Best Undergraduate Paper at the 2023 ANS Student Conference
- 2023: Featured Paper selected by the Editor of the journal “Energies”, with the title “Anomaly Detection in Liquid Sodium Cold Trap Operation with Multisensory Data Fusion Using Long Short-Term Memory Autoencoder”
- 2023: NC State Nuclear Engineering Department Best Senior Design Presentation
- 2023: NSF Graduate Research Fellowship
- 2023: OECD/NEA Global Forum Rising Stars in Nuclear Education, Science, Technology and Policy