Tao Wang

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EDUCATION

Doctor of Philosophy in Computer Science January 2024 – Present
University of Idaho, Moscow, Idaho | Advisor: Dr. Aleksandar Vakanski Expected May 2027

Bachelor of Science in Computer Science August 2022 – May 2023
University of Idaho, Moscow, Idaho

RESEARCH EXPERIENCE

Graduate Research Assistant January 2024 – Present
Department of Computer Science, University of Idaho, Moscow, Idaho

Machine Learning for Nuclear Materials Properties (with Idaho National Laboratory; INL LDRD-funded)

- Developed a physics-informed, temperature-dependent stress descriptor that corrects for specimen size and geometry effects; with gradient boosting it achieved R^2 = 0.914 on 2,433 creep tests from ten nuclear alloys (first author; under review at *Journal of Nuclear Materials*).
- Designed a domain-adaptive neural network (DS-AdaBN) with uncertainty-aware data augmentation to predict full-sized Charpy properties from sub-sized tests, achieving R^2 of 0.957 (USE) and 0.963 (DBTT) (first author; under review).
- Assisted with data collection and performed data organization and cleaning for a public, ML-ready database of 1,583 creep specimens from 54 sources; published in *Scientific Data*.

LLM Framework for Nuclear Power Plant Event Classification (with Idaho National Laboratory; NRC-funded)

- Co-developed a two-stage framework pairing knowledge-informed prescreening with a fine-tuned BERT model to classify shutdown initiating events in 10,928 U.S. nuclear power plant reports for probabilistic risk assessment.
- Excluded over 97% of irrelevant events and reached 93.4% classification accuracy; published in the *Journal of Risk and Reliability*.
- Co-developed a web-based NLP annotation tool deployed to Idaho National Laboratory.

PROJECTS

Mars Reentry Vehicle Senior Capstone (with NASA Ames Research Center) August 2022 – May 2023

- Collaborated on a seven-person interdisciplinary team to design, build, and flight-test a tube-deployed reentry vehicle prototype for a potential Mars weather station; won Best Booth Presentation at EXPO 2023.
- Validated the prototype through a high-altitude balloon drop (6,688 m apogee, 12.7 m/s terminal velocity, 0.90 drag coefficient) using an ESP32 flight computer running FreeRTOS.

PUBLICATIONS

- **Wang, T.**, et al. (under review). A temperature-dependent geometry-corrected stress descriptor for machine learning-based prediction of creep rupture life. *Journal of Nuclear Materials*.
- **Wang, T.**, et al. (under review). Domain-adaptation machine learning approach for correlation of full-sized Charpy properties from sub-sized tests.
- Xian, M., **Wang, T.**, et al. (2025). A knowledge-informed large language model framework for U.S. nuclear power plant shutdown initiating event classification for probabilistic risk assessment. *Journal of Risk and Reliability*, 239(6), 1257–1264.
- Lee, I., ..., **Wang, T.**, et al. (2026). Compilation of creep property data for nuclear structural materials. *Scientific Data*, 13, 1262.

SKILLS

Machine Learning: Large language models, NLP, domain adaptation, physics-informed machine learning, uncertainty quantification

Domain Knowledge: Nuclear power plant safety, probabilistic risk assessment, nuclear structural materials (Charpy impact and creep properties), scientific data curation