# Dr. Yuxuan Zhang

*ORCID: 0000-0002-0083-1408*

*P.O. Box 2008*
*Oak Ridge, TN 37831*
*(865)341-0139*
*zhangy6@ornl.gov*
*zhangy6x.github.io*
www.ornl.gov/staff-profile/yuxuan-zhang


## Education

2012.Jan-2016.Dec **Ph.D. Metallurgical Engineering**, *The University of Utah*, Salt Lake City, Utah, USA
Advisor: Prof. K.S. Ravi Chandran

2008.Sep-2012.Jun **B.E. Metallic Material Engineering**, *Hunan University of Technology*, Zhuzhou, Hunan, China
Advisor (senior year): Prof. Shuzhu Zhou

## Professional Experiences

2019.Mar-present **Neutron Imaging Scientist**, *Oak Ridge National Laboratory*, Oak Ridge, TN, USA
Work within the Materials Engineering Group to develop advanced neutron imaging techniques and conduct research at both HFIR and SNS.

- Point-of-contact of the Imaging/MARS beamline (CG-1D) at HFIR.
- Help industrial/academic users design/optimize experiments, on-site experimentation, data analysis, and write manuscripts.
- Collaborate with researchers in developing/implementing advanced neutron imaging techniques, such as high-resolution imaging, phase grating interferometry (nGI), polarized imaging, Bragg-edge imaging, and resonance imaging.
- Science lead of the MARS relocation after HFIR Beryllium Reflector Replacement and Cold Guide Hall Extension.

2017.Apr-2019.Feb **Postdoctoral Research Associate**, *Oak Ridge National Laboratory*, Oak Ridge, TN, USA
Mentored by neutron imaging scientists, software scientists, and radiochemists, contributed to the development of energy-dependent neutron imaging capability at the Spallation Neutron Source (SNS) and applied it to characterize nuclear fuel materials.

2013.Jan-2017.Mar **Graduate Research Assistant**, *The University of Utah*, Salt Lake City, UT, USA
Learned and applied neutron imaging/diffraction to investigate materials (Li-Mg alloy, Si powder) that are used in Li-ion batteries.

## Honors and Awards

2025 **DOE Early Career Research Award**, Office of Science, U.S. Department of Energy
2023 **Team Science Award**, Buildings and Transportation Science Division, ORNL
2022 **Team Science Award**, Buildings and Transportation Science Division, ORNL
2021 **Supplemental Performance Award**, Neutron Sciences Directorate, ORNL

## Mentorship

- Dayeeta Pal, Ph.D. student (Stanford University, Aug - Nov, 2025)
- Thomas Mulkey, Ph.D. student (Georgia State University, May - Aug, 2024)
- Naznin Afrin, M.S. student (The University of Texas Rio Grande Valley, Summer 2022)
- Esmeralda González, B.S. student (The University of Texas Rio Grande Valley, Summer 2023)

## Service

2021-present Technical committee member, Advanced Characterization, Testing, and Simulation Committee, *The Minerals, Metals and Materials Society*
2016-present Reviewer, *Journal of the Electrochemical Society*
2018-present Reviewer, *Scientific Reports*
2021-present Reviewer, *Nuclear Instruments and Methods*

2023-present Reviewer, *Journal of Applied Crystallography*

## Professional Associations

2020-present The Minerals, Metals and Materials Society (TMS)

2018-present Materials Research Society (MRS)

2018-present The Neutron Scattering Society of America (NSSA)

2018-present The International Society for Neutron Radiography (ISNR)

2018-2020 American Nuclear Society (ANS)

## Publications (full list -> Google Scholar)

2026 C. Xu, **Y. Zhang**, J. Torres, A. Mijalilovic, J. Wang, B. Sheldon, and H. Zhu*, "Operando Neutron Imaging of Lithium Flux and Gradient Cathode Design for Enhanced Kinetics in High-Loading All-Solid-State LiS Batteries", ***Advanced Materials***. `https://doi.org/10.1002/adma.202511553`

2025 W. Chuirazzi*, **Y. Zhang**, S. Morankar, and R. Kancharla, "Neutron and x-ray computed tomography of a natural uranium tristructural isotropic (TRISO) fuel compact", ***Journal of Radioanalytical and Nuclear Chemistry***. `https://doi.org/10.1007/s10967-025-10629-7`

2025 B. Kinzer*, J. Bilheux, E. Stringfellow, A. Jatkar, M. McMullen, H. Zhi, J. Tang, **Y. Zhang***, and R. Chandran*, "Operando Neutron Imaging of Reaction Extent and Particle Swelling Informs Limiting Factors for Salt Hydrate Thermochemical Energy Storage", ***ACS Materials Letters***.`https://doi.org/10.1021/acsmaterialslett.5c00986`

2025 J. Moon*, N. Gallego*, C. Contescu, J. Keiser, **Y. Zhang**, and H. Bilheux, "Viewing is understanding: Graphite microstructure effects on infiltrated molten salt distribution revealed by 3D neutron tomography", ***Carbon***. `https://doi.org/10.1016/j.carbon.2025.120903`

2025 M. Yusuf, J. LaManna*, **Y. Zhang**, M. Preefer, B. Khaykovich, M. Dixit, C. Cao, D. Finegan, J. Bilheux, T. Tanim, E. Dufek, A. Dunlop, B. Polzin, A. Jansen, S. Trask, R. Kasse, D. Agyeman-Budu, P. Paul, J. Weker*, and M. Toney*, "Neutron-friendly Li-ion battery coin cell for In Situ 3D visualization of Li plating", ***Journal of The Electrochemical Society***. `https://doi.org/10.1149/1945-7111/ae04a3`

2025 T. Ji, **Y. Zhang**, J. Torres, A. Mijailovic, Y. Tang, X. Zhao, J. Bilheux, J. Wang, B. Sheldon, O. Oyedeji, and H. Zhu*, "Operando neutron imaging-guided gradient design of Li-ion solid conductor for high-mass-loading cathodes", ***Nature Communications***. `https://doi.org/10.1038/s41467-025-62518-y`

2024 D. Cao, **Y. Zhang**, T. Ji, X. Zhao, E. Cakmak, S. Ozcan, M. Geiwitz, J. Bilheux, K. Xu, Y. Wang, K. Burch, Q. Tu, and H. Zhu*. "Li Dynamics in Mixed Ionic-Electronic Conducting Interlayer of All-Solid-State Li-metal Batteries", ***Nano Letters***. `https://doi.org/10.1002/adma.202511553`

2023 D. Cao, K. Zhang, W. Li, **Y. Zhang**, T. Ji, X. Zhao, E. Cakmak, J. Zhu, Y. Cao, and H. Zhu*, "Nondestructively Visualizing and Understanding the Mechano-Electro-chemical Origins of "Soft Short" and "Creeping" in All-Solid-State Batteries", ***Advanced Functional Materials***. `https://doi.org/10.1002/adfm.202307998.`

2023 **Y. Zhang***, K. Myhre, H. Bilheux, J. Johnson, J. Bilheux, C. Parish, A. Miskowiec, R. Hunt, and J. Lin, "Non-destructive characterization of advanced nuclear fuel materials using neutron imaging", ***Nuclear Materials and Energy***. `https://doi.org/10.1016/j.nme.2023.101434`

2023 J. Moon*, N. Gallego*, C. Contescu, J. Keiser, D. Sulejmanovic, **Y. Zhang**, and E. Stringfellow, "A neutron tomography study to visualize fluoride salt (FLiNaK) intrusion in nuclear-grade graphite", ***Carbon***. `https://doi.org/10.1016/j.carbon.2023.118258`

2022 J. Moon, H. Andrews*, C. Agca, J. Bilheux, A. Braatz, A. McAlister, J. McFarlane, J. McMurray, K. Robb, and **Y. Zhang**, "Density Measurements of Various Molten Sodium, Magnesium, Potassium, and Uranium Chloride Salt Compositions Using Neutron Imaging", ***Industrial and Engineering Chemistry Research***. `https://doi.org/10.1021/acs.iecr.2c02967`

2022 G. Jang, **Y. Zhang**, J. Keum, Y. Bootwala, M. Hatzell, D. Jassby, and C. Tsouris*, "Neutron tomography of porous aluminum electrodes used in electrocoagulation of groundwater", ***Frontiers in Chemical Engineering***. `https://doi.org/10.3389/fceng.2022.1046627`

2021 Y. Yuan, **Y. Zhang**, H. Bilheux, S. Salmon*, “Biocatalytic yarn for peroxide decomposition with controlled liquid transport”, ***Advanced Materials Interfaces***. `https://doi.org/10.1002/admi.202002104`

2021 F. Ossler*, C. Finney, J. Warren, J. Bilheux, **Y. Zhang**, R. Mills, L. Santodonato, and H. Bilheux. “Dynamics of hydrogen loss and structural changes in pyrolyzing biomass utilizing neutron imaging”, ***Carbon***. `https://doi.org/10.1016/j.carbon.2020.11.060`

2019 **Y. Zhang***, J. Bilheux, H. Bilheux and J. Lin. “An interactive web-based tool to guide the preparation of neutron imaging experiments at oak ridge national laboratory”, ***Journal of Physics Communications***. `https://doi.org/10.1088/2399-6528/ab4ee6`

2018 **Y. Zhang**, K. Myhre, H. Bilheux, A. Tremsin, J. Johnson, J. Bilheux, A. Miskowiec, R. Hunt, L. Santodonato and J. Molaison, “Neutron resonance radiography and application to nuclear fuel materials”, ***Transactions of the American Nuclear Society***. `https://www.osti.gov/servlets/purl/1489594`

2018 K. Myhre, **Y. Zhang**, H. Bilheux, J. Johnson, J. Bilheux, A. Miskowiec and R. Hunt, “Nondestructive tomographic mapping of uranium and gadolinium using energy-resolved neutron imaging”. ***Transactions of the American Nuclear Society***. `https://www.osti.gov/servlets/purl/1486958`

2018 **Y. Zhang**, K.S.R. Chandran* and H. Bilheux. “Imaging of the Li spatial distribution within $V_2O_5$ cathode in a coin cell by neutron computed tomography”, ***Journal of Power Sources***. `https://doi.org/10.1016/j.jpowsour.2017.11.080`

2017 **Y. Zhang*** and J. Bilheux. “ImagingReso: A tool for neutron resonance imaging”, ***The Journal of Open Source Software***. `https://doi.org/10.21105/joss.00407`

2017 **Y. Zhang**, K.S.R. Chandran*, M. Jagannathan, H. Bilheux and J. Bilheux, “The nature of electrochemical delithiation of Li-Mg alloy electrodes: Neutron computed tomography and analytical modeling of Li diffusion and delithiation phenomenon”, ***Journal of the Electrochemical Society***. `https://doi.org/10.1149/2.0051702jes`

## Presentations (Selected)

2026 Mar. **(Keynote)** “Probing Nanoscale Structural Details in Bulk Systems Using Neutron Grating Interferometry”, ***TMS 2026 Annual Meeting and Exhibition***, San Diego, CA.

2025 Jun. **(Invited)** “Advanced Neutron Imaging Techniques at the High Flux Isotope Reactor (HFIR) and Industrial Applications”, ***ASNT Research Symposium***, Indianapolis, IN.

2024 Mar. “Spatially resolving micro-/nano- structures in bulk additively manufactured parts by neutron grating interferometry”, ***TMS 2024 Annual Meeting and Exhibition***, Orlando, FL.

2024 Jun. “Grating Interferometry Imaging at the High Flux Isotope Reactor”, ***The 12th World Conference on Neutron Radiography***, Idaho Falls, ID.

2023 Mar. “Material characterization by neutron imaging and neutron grating interferometry”, ***TMS 2023 Annual Meeting and Exhibition***, San Diego, CA.

2022 Jun “Recent advances at the cold neutron imaging instrument at HFIR”, ***American Conference of Neutron Scattering (ACNS)***, Boulder, CO.

2022 Jun. **(Invited)** “Neutron Imaging Capabilities at Oak Ridge National Laboratory”, ***Wuhan University Graduate Seminar***, virtual.

2022 Mar. “Neutron imaging capabilities and recent development at High Flux Isotope Reactor”, ***TMS 2022 Annual Meeting and Exhibition***, March 2022.

2021 Dec. **(Invited)** “Neutron Imaging Capabilities at ORNL”, ***Innovation Driven Research/Education Ecosystem for Advanced Manufacturing For the Defense (IDREAM4D)***, virtual.

2021 Mar. **(Invited)** “Prospects and challenges of neutron imaging techniques”, ***TMS 2021 Annual Meeting and Exhibition***, virtual.

2019 Dec. **(Invited)** “Prospects and challenges of neutron imaging techniques”, ***American Geophysical Union SCIWS14 Workshop***, San Francisco, CA.

2019 Dec. “Advanced Characterization of Nuclear Materials Using Neutron Imaging”, ***MRS Fall Meeting***, Boston, MA.

| | |
|---|---|
| 2019 Oct. | “Neutron Imaging at the High Flux Isotope Reactor and Spallation Neutron Source”, ***International Collaboration on Advanced Neutron Sources XXIII***, Chattanooga, TN. |
| 2018 Nov. | “Neutron Resonance Radiography and Application to Nuclear Fuel Materials”, ***American Nuclear Society Winter Meeting***, Orlando, FL. |
| 2018 Jun. | “Three-Dimensional Mapping of Gadolinium and Uranium in TRISO Nuclear Fuel Kernels Using Epithermal Neutron Imaging”, ***American Conference on Neutron Scattering***, College Park, MD. |
| 2016 Oct. | “Investigation of Li Spatial Distribution inside Bulk Li-Mg Alloy Electrode after Delithiation Using Neutron Imaging”, ***Materials Science and Technology***, Salt Lake City, UT. |

## Projects

**2025-2030**

Title: **Development of Neutron Dark-Field Tomography to Map Nanostructures in Bulk Systems**
Funder: DOE Early Career Research Program
PI: Yuxuan Zhang
Awarded: $2,750,000
My Role: Lead PI

**2023-2025**

Title: **Intelligent Acquisition and Reconstruction for Hyperspectral Tomography Systems**
Funder: DOE BES
PI: Hassina Bilheux
Awarded: $3,150,000
My Role: Collaborator

**2020-2023**

Title: **Intelligent Acquisition and Reconstruction for Hyperspectral Tomography Systems**
Funder: DOE BES
PI: Hassina Bilheux
Awarded: $3,660,000
My Role: Collaborator