

YADUKRISHNAN SASIKUMAR (YADU)

R&D Associate,
Used Fuel and Nuclear Material Disposition Group, Oak Ridge National Laboratory



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Links

- Yadu Sasikumar
- Work Profile - Yadu Sasikumar

Skills

- Material Characterization and analysis (Microscopy - Optical, SEM, EBSD & FIB Spectroscopy - XRD, XRR)
- Hotcell experimentation (IFEL)
- ImageJ, MATLAB, AUTOCAD Fusion 360
- {MS} Office, Adobe Acrobat

WORK EXPERIENCE

Oak Ridge National Laboratory (ORNL)

R&D Associate Staff

Used Fuel and Nuclear Material Disposition Group

2023 – PRESENT

- Design and conduct hot cell experiments on U.S. commercial Spent Nuclear Fuel (SNF) to evaluate performance under long-term storage and disposal
- Principal Investigator of a DOE funded project to investigate the possibility of aerosol release from hypothetical SNF canister breaches
- ORNL Technical Lead on three U.S. Department of Energy (D.O.E) projects to identify gaps in licensing of aged and high-temperature annealed SNF

Purdue University

Postdoctoral Research Assistant

Department of Nuclear Engineering

2022 – 2023

- Performed aerosol source term measurements from SNF mechanical fracture tests
- Developed a model to investigate the diffusion of aerosols through Stress Corrosion Crack-like geometries

Oak Ridge Associated Universities, ORNL

ASTRO Scholar, Used Fuel Systems Group

2020 – 2022

- Designed and conducted static DI water leaching experiments to study corrosion and dissolution of SNF during potential accidents
- Co-designed and conducted a hot cell experiment to study steam/water transmission in failed SNF samples

EDUCATION

The Open University

Imperial Cambridge Open – Center for Doctoral Training Program

UNITED KINGDOM

FEB 2017 – JAN 2022

Degree: Doctor of Philosophy (Ph.D.) in Nuclear Engineering

Thesis title: Investigating the Solubility of Spent Nuclear Fuel

- Studied corrosion mechanisms of SNF using ICP-MS, Synchrotron X-ray scattering & adsorption isotherm experiments on real and model samples

Imperial College London

UNITED KINGDOM

SEP 2015 – SEP 2016

Degree: MSc. in Nuclear Engineering (Grade: Merit)

- Selected to conduct an international summer project at the Australian Nuclear Science and Technology Organization
- Thesis titled, "Ex-situ micro compression testing of Helium-ion irradiated Hastelloy-N", looked at the effects of irradiation embrittlement in a Gen-IV reactor material

Jawaharlal Nehru Technological University

HYDERABAD, INDIA

2011 – 2015

Degree: BTech. in Mechanical Engineering (Grade: First class with distinction)

Thesis title: First principles based thermal analysis of a stationary plasma thruster using finite difference methods

Journal Articles

- Sasikumar Y, et al., Experimental and Computational Characterization of a Modified Sioutas Cascade Impactor for Respirable Radioactive Aerosols. *Atmosphere*. 16(2):156. (2025) <https://doi.org/10.3390/atmos16020156>
- Sasikumar, Y., et al., An experimental apparatus to study the adsorption of water on proxies for spent nuclear fuel surfaces. *Measurement Science and Technology*, 35(11), p.116008. (2024) DOI: 10.1088/1361-6501/ad67fa
- Wasik, J., et al. Polyepitaxial grain matching to study the oxidation of uranium dioxide. *npj Mater Degrad* 8, 68 (2024). DOI: 10.1038/s41529-024-00479-1
- Montgomery R, et al., Key results from examinations of seven high burnup pressurized water reactor spent nuclear fuel rods. *Front. Nucl. Eng.* 3:1321627. (2024) DOI: 10.3389/fnuen.2024.1321627
- Sasikumar Y, et al., Assessing the release, transport, and retention of radioactive aerosols from hypothetical breaches in spent fuel storage canisters. *Front. Energy Res.* 12:1229025. (2024) DOI: 10.3389/fenrg.2024.1229025
- Muhammet Ayanoglu, et al., Metallographic Examination and Hydrogen Measurements of High-Burnup Spent Nuclear Fuel Cladding, *JNM* 154833, ISSN 0022-3115, (2023), DOI: 10.1016/j.jnucmat.2023.154833

Conference Proceedings

- Kumar, V., et al., Computational modeling and validation of a modified Marple cascade impactor, *CFD4NRS-9*, USA, February (2023).
- Y. Sasikumar, et al., "Radiolytic Corrosion of Model Spent Nuclear Fuel Surfaces," *Top Fuel 2022 Conference*, USA, October (2022) doi.org/10.13182/TopFuel22-39002
- Y. Sasikumar, et al., "Experimental Investigation of Aerosol Release from Spent Nuclear Fuel Fractures," *IHLRWM Conference 2022*, USA, November (2022), doi.org/10.13182/T127-39016
- Lau, J., et al., (2024). A numerical model to characterize gas flow in complex stress corrosion crack-like geometries. *Transactions of the American Nuclear Society*, 131(1), 246-249. <https://doi.org/10.13182/T131-45880>

Others

- Wang, Hong, et al. "Fatigue Testing and Characterization of Pre-hydrided Zircaloy-4 Cladding Tubes." , (2024). DOI: 10.2172/2438834
- Montgomery, Rose, et al. "Sister Rod Destructive Examinations (FY23) Appendix I: SNF Aerosols Released During Rod Fracture." , (2024). DOI: 10.2172/2502197
- Sasikumar, Yadukrishnan, et al. "Sister Rod Destructive Examinations (FY23): Appendix J: Leaching of High Burnup Used Nuclear Fuel in Deionized Water." , (2024). DOI: 10.2172/2438905
- Cantonwine, Paul, et al. "Sister Rod Destructive Examinations (FY23) Appendix F: Cyclic Integrated Reversible-Bending Fatigue Tests." , (2024). DOI: 10.2172/2345328
- Morris, Robert N., et al. "Sister Rod Destructive Examinations (FY23) Appendix C: Rod Internal Pressure, Void Volume, and Gas Transmission Tests." , (2024). DOI: 10.2172/2341393
- Montgomery, Rose and Bevard, Bruce. "Sister Rod Destructive Examinations (FY22)." , (2023). DOI: 10.2172/1976043
- Sasikumar, Yadukrishnan, et al. "Progress Report on Model Development for the Transport of Aerosol through Microchannels." , (2022). DOI: 10.2172/1963153
- Sasikumar, Yadukrishnan. "Investigating the Solubility of Spent Nuclear Fuel." PhD dissertation, The Open University, (2022). DOI: 10.21954/ou.ro.00013f99

Patents

- Montgomery, R.A., Cheng, M.D., Sasikumar, Y. and Bevard, B.B., UT-Battelle, LLC. SYSTEM FOR AEROSOL SAMPLING DURING MECHANICAL LOAD. U.S. Patent Application 17/469,419, (2024)

Languages

- ✎ English (Fluent)
- ✎ Malayalam, Hindi & Telugu (Native)

Achievements

- 2024 Won a supplemental performance award from Oak Ridge National Laboratory for significant achievements in Fiscal Year 2024
- 2022 Awarded an International Atomic Energy Agency grant to attend the Top Fuel 2022 Conference, U.S.A
- 2020 Awarded synchrotron beam time at the Advanced Photon Source - Argonne National Laboratory, U.S. for studying corrosion on model SNF surfaces as part of PhD research
- 2019 Awarded UK-XMaS synchrotron & offline tube source beam time at the European Synchrotron & Radiation Facility, France to for studying corrosion on model SNF surfaces as part of PhD research
- 2018 Awarded the EUCALL grant to attend the School on Synchrotron and XFEL Methods at the International Center for Theoretical Physics, Italy
- 2017 Awarded a United Kingdom - Engineering & Physical Sciences Research Council funded PhD scholarship under the Imperial Cambridge Open Center for Doctoral Training (ICO-CDT) in Nuclear Energy
- 2016 Selected to conduct a summer research project at the Australian Nuclear Science and Technology Organization for my post-graduate degree at Imperial College London, U.K.

Activities

- Executive Committee Member at the American Nuclear Society's Oak Ridge/Knoxville Local Chapter (2023-2026)
- Co-chair of the Division-level ORNL Gives Campaign - an annual employee-led effort to address needs throughout East Tennessee (2025-2027)
- Reviewer for *Frontiers in Nuclear Engineering*, *Journal of Solution Chemistry* & *MDPI (Energies & Atmosphere)*