VANDERBILT
School *of* Engineering

DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

CEE Faculty Search Seminar

Monday,
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4:00 pm
FGH 136

"SUSTAINABLE SEPARATION SCIENCE FOR NUCLEAR WASTE & RESOURCE RECOVERY: FROM BENCH-SCALE TO HIGH-THROUGHPUT, DATA-DRIVEN APPROACHES"

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ABSTRACT

Separation processes are central to nuclear waste management and resource sustainability, yet many existing approaches are energy intensive, difficult to optimize, and poorly suited for chemically complex feedstocks. In this seminar, I will first discuss relatively low-energy separation techniques applied to the aqueous reprocessing and geological disposal of spent nuclear fuel, emphasizing insights gained from manual, hypothesis-driven experimentation. I will then introduce the integration of high-throughput experimentation (HTE) and machine learning for critical materials recovery, particularly rare earth elements, highlighting how automation and data-driven design can accelerate separation process optimization. I will conclude with a brief outlook on my research vision for advancing separation science to support sustainable nuclear waste management and resource recovery.

BIOGRAPHY

Dr. Yufei Wang is a Postdoctoral Scholar in the Department of Chemical and Biomolecular Engineering at the University of California, Los Angeles. His research broadly centers on sustainable separation science, with applications spanning waste treatment and resource recovery. At UCLA, his work focuses on wastewater treatment through coagulation and filtration processes. Previously, he was a Postdoctoral Research Associate at Los Alamos National Laboratory, where he worked on critical materials recovery through the integration of automated high-throughput experimentation with machine learning. Dr. Wang earned his Ph.D. in Engineering from the University of California, Berkeley (major in Nuclear Engineering, minor in Chemical Engineering) under the supervision of Prof. Rebecca J. Abergel. His doctoral research, conducted at Lawrence Berkeley National Laboratory and Idaho National Laboratory, focused on aqueous reprocessing of spent nuclear fuel through the application of environmentally friendly hydroxypyridinone ligands to enhance rare earth element and actinide separations. Earlier in his training, he studied geological disposal of nuclear waste, focusing on the use of natural adsorbents to immobilize radionuclides.