

Lightweight Materials Workshop

Location: 2525 Fremont Ave, Idaho Falls, Idaho 83402- EROB Conference Rm.159 A, B, & C

November 8, 2022, 8:45 am to 5:00 pm (MST)

8:00 a.m.- Visitor badging will be at Willow Creek Building, located at 1955 Fremont Ave, Idaho Falls, Idaho

November 9, 2022, 9:00 am to 3:30 pm (MST)

Purpose: To understand technological challenges, knowledge gaps, and research needs associated with the development, demonstration, and application of light-weight materials for successful deployment and operation of simplified advanced reactor technologies.

Attire: Business Casual

Idaho National Laboratory

Allen Roach, Ph.D.

*Department Manager for Irradiated Fuels & Materials
Director, Advanced Materials & Manufacturing Initiative*

Andrea Jokisaari, Ph.D.

*Technical Area Lead for Environmental Effects, Advanced Materials
and Manufacturing Technologies (AMMT)*

Colin Judge, Ph.D.

Director, Characterization and Post Irradiation Examination

Jason Schulthess

Senior Staff Scientist

Sam Bays, Ph.D.

Reactor Physicist

Xiaofei Pu, Ph.D.

Instrument Scientist

Vivek Agarwal, Ph.D.

Senior Research Scientist

Youssef Ballout

Director of Reactor Systems Design & Analysis

Massachusetts Institute of Technology

Alexander O'Brien

Michael Short, Ph.D.

Associate Professor. Nuclear Science & Engineering

University of New Mexico

Zeev Shayer, Ph.D.

Research Professor, Department of Nuclear Engineering

Oregon State University

Megumi Kawasaki, Ph.D.

Associate Professor, Mechanical, Industrial, and Manufacturing Engineering

Tianyi Chen, Ph.D.

Assistant Professor, Nuclear Science and Engineering

Dong Lin, Ph.D.

Associate Professor, School of Mechanical, Industrial, and Manufacturing

North Carolina State University

Jacob Eapen, Ph.D.

Professor and Director of Undergraduate Program, Department of Nuclear Engineering

Afsaneh Rabiei, Ph.D.

Professor of Mechanical and Aerospace Engineering

Scott Palmtag, Ph.D.

Research Professor, Department of Nuclear Engineering

Yousry Azmy

Duke Energy Distinguished Professor, Department of Nuclear Engineering

The Ohio State University

Nate Ames, Ph.D.

Director, Center for Design and Manufacturing Excellence

Marat Khafizov, Ph.D.

Associate Professor, Mechanical and Aerospace Engineering

Hosts:

INL NS&T- Vivek Agarwal & INL NUC-Dayna Daubaras

November 8, 2022

Engineering Research Office Building EROB 159 and via Microsoft Teams

- 8:45 Welcome, Agenda Overview Vivek Agarwal and Youssef Ballout
Idaho National Lab
- 9:00 Introduction to Fission Battery Initiative Vivek Agarwal
Idaho National Lab
- 9:30 Preliminary Estimates of the Mass of the Shielded Spent Fission Battery Scott Palmtag and Yousry Azmy
North Carolina State University via Teams
- 10:00 Light-Weight Reflector/Shielding Material with Expectation of Enhancing
Fuel Efficiency and Economic Performance of Fission Battery Zeev Shayer
University of New Mexico
- 10:30 Break, Resume at 10:45
- 10:45 Shielding of Transportable Fission Batteries – Issues and Potential Solutions Sam Bays
Idaho National Lab
- 11:15 The Combinatorial Approach to Testing and Characterization of Irradiated Fuels
and Reactor Structural Materials Colin Judge
Idaho National Lab
- 11: 45 Lunch: Morning Summary Discussion All Participants
- 1:15 Designing Lightweight System Concepts for Nuclear Batteries Nate Ames
The Ohio State University
- 1:45 Applying Advanced Materials and Manufacturing Technologies to Achieve
Fission Batteries Andrea Jokisaari
Idaho National Lab
- 2:15 Composite Metal Foams and Their Application in Nuclear Structures Afsaneh Rabiei
North Carolina State University
- 2:45 Break, Resume at 3:00 pm
- 3:00 Rapid structural materials discovery and down-selection Michael Short
Massachusetts Institute of Technology via Teams
- 3:30 Synthesis of Lightweight Nanostructured Metals Through
Solid-State Bonding Under High-Pressure Torsion Megumi Kawasaki
Oregon State University via Teams
- 4:00 Round Table Discussion Day 1 All Participants
- 5:00 Adjourn

November 9, 2022

Engineering Research Office Building EROB 159 and via Microsoft Teams

- 9:00 Overview of the INL Advanced Materials and Manufacturing Initiative Allen Roach
Idaho National Lab
- 9:30 Thermal Energy, Atomic, and Radiation Transport Phenomena in Composite Materials..... Marat Khafizov
The Ohio State University
- 10:00 Lattice Structure Design of Low-Density Resilient Materials for Advanced Reactors Xiaofei Pu
Idaho National Lab
- 10:30 Break, Resume at 10:45
- 10:45 Moderator Materials for Fission Batteries Jacob Eapen
North Carolina State University via Teams
- 11:15 Application of 3D Printing for Improving Material Survivability Alexander O'Brien
Massachusetts Institute of Technology
- 11:45 Tensile Test Using Standard Capsule and Automated Mechanical Testing System Jason Schulthess
Idaho National Lab
- 12:15 Lunch: Morning Summary Discussion All Participants
- 1:00 Science-Based Acceleration of Development, Testing, and Qualifying Materials: Lessons Learned from Materials Tianyi Chen
Oregon State University
- 1:30 3D Printing of Aerogels Dong Lin
Oregon State University
- 2:00 Round Table Discussion Day 2 All Participants
- 3:00 Final Closeout All Participants
- 3:30 Adjourn