Fission Battery Workshop 2021

Wednesday, February 10, 2021

11:00 a.m. – 3:00 p.m. (Eastern Time)

Fission Battery Initiative

Technology Innovations for Fission Batteries: Modeling & Simulation and Soft & Virtual Sensors

Moderator: Izabela Gutowska, Ph.D.

The initiative envisions *developing technologies that enable nuclear reactor systems to function as batteries and to be referred as fission batteries*.

Autonomous controls and operation are one of the required technologies to achieve the initiative vision and to ensure expanded deployment of fission batteries to meet clean energy demands across broader applications and markets.

The aim of this *Workshop* is to:

- Understand technological challenges, knowledge gaps, and limitations (development, demonstration, and deployment) associated with autonomous controls and operation of fission batteries.
- Role of Multiphysics and multi-scale modeling and simulation, reduced order methods, machine learning and artificial intelligence, and digital twins achieving autonomous controls and operation of fission batteries.

The expected outcome of this workshop is to identify technological goals that autonomous controls and operation a fission battery must achieve. Concurrently, the workshop will enable broad discussion on the potential of the new technologies and facilitate the creation of research path and networks.

INL & Guest Presenters

Vivek Agarwal, Ph.D.
Senior Research Scientist,
Instrumentation, Controls, and Data Science
Idaho National Laboratory

Derek Gaston, Ph.D.
Computational Frameworks
Idaho National Laboratory

Phil Sharpe, Ph.D.
Vice President for Innovation and Special Projects
Studsvik Scandpower, Inc.

W. David Pointer, Ph.D.
Head, Advanced Reactor Engineering and Development
Nuclear Energy and Fuel Cycle Division
Oak Ridge National Laboratory

Brandon Haugh
Director, Modeling and Simulation
Kairos Power

Pattrick Calderoni, Ph.D.
Director, Advanced Sensors and Instrumentation
Manager, Measurement Science Department
Idaho National Laboratory

Richard Vilim, Ph.D.
Senior Nuclear Engineer
Department Manager, Plant Analysis & Control & Sensors
Nuclear Science and Engineering Division, Argonne National Laboratory

John Labram, Ph.D.
Assistant Professor
Electrical & Computer Engineering
Oregon State University

11:00-11:15 Fission Battery Initiative and Workshop Overview .....Vivek Agarwal
Senior Research Scientist
Instrumentation, Controls, and Data Science (ICDS) Department
Idaho National Laboratory

11:15-11:40 Adaptable Multiphysics Simulation.....Derek Gaston
Idaho National Laboratory

11:40-12:05 Connecting M&S Tools for Fission Battery & Microreactor Performance
..... Phil Sharpe
Studsvik Scandpower, Inc.

12:05-12:30 Advancing Fission Battery Deployment through Modeling and Simulation
..... David Pointer
Oak Ridge National Laboratory

12:30-12:45 Break .....

12:45 – 1:10 How Advanced Modeling and Simulation with Multi-Physics could help advance Fission Battery Systems.....Brandon Haugh
Kairos Power

1:10 – 1:35 Measurement Systems for Autonomous Operation of Nuclear Reactor
..... Pattrick Calderoni/Richard Vilim
Idaho National Laboratory/Argonne National Laboratory

1:35 – 2:00 Perovskite Retinomorphic Sensors .....John Labram
Oregon State University

2:00 – 3:00 .....Panel Session