NPSI-SPONSORED EVENTS AND LECTURES

August 24, 2016........................................ Aurora Clark (Washington State University) seminar at PNNL
December 9, 2016................................. John Auxier II (University of Tennessee-Knoxville) seminar at PNNL
April 5, 2017................................. Nanoparticle Reactivity symposium at American Chemical Society meeting
April 20, 2017..................................... Alexandra Navrotsky (University of California-Davis) seminar at PNNL
August 13, 2018............................ Melissa Denecke (University of Manchester) seminar at PNNL
October 8-10, 2018.................. Next-Generation Transmission Electron Microscopy Workshop (NexTEM)
April 1, 2017................................. Nanoparticle Reactivity symposium at American Chemical Society meeting
August 4, 2019........................................ Ian Farnan (University of Cambridge) seminar at PNNL

COLLABORATORS

City University of New York
Howard University
Karlsruhe Institute of Technology
Kyushu University
Lawrence Berkeley National Laboratory
Oak Ridge National Laboratory
Oregon State University
Sandia National Laboratories
Savannah River National Laboratory

Stanford Synchrotron Radiation Lightsource
Texas A&M University
University of Cambridge
University of Chicago
University of Missouri & MU Research Reactor
University of Sheffield
University of Utah
University of Washington
Washington State University

NPSI research supported the Direct Feed Low Activity Waste (DFLAW) test platform in the RPL. Here, researchers work in a hot cell on the platform.

The DFLAW test melter in the RPL benefitted from NPSI advancements.

NPSI’s researchers have used a wide range of instrumentation and equipment in the RPL to conduct their work.

NPSI-SPONSORED EVENTS AND LECTURES

NPSI was a five-year, multi-million-dollar Pacific Northwest National Laboratory (PNNL) investment focused on building capabilities to:

- Enable resolution of the nation’s legacy wastes from decades of weapons production
- Develop new signature discovery approaches for nuclear forensics and nonproliferation.

NPSI invested in people, programs, and capabilities to advance the initiative’s research aims and to help establish PNNL’s Radiochemical Processing Laboratory (RPL) as a premier national resource for research and development test beds. NPSI’s research projects were organized in three “thrust” areas: Legacy Waste, Nuclear Security, and Analytical Capabilities.

NPSI ACCOMPLISHMENTS IN PHOTOS

Researchers developed the world’s first liquid cell Atomic Force Microscope for operation in a radiation environment, studying beta and gamma radiation effects.

NPSI’s use of the Focused Ion Beam in RPL has helped enable advances in understanding noble metals and more fully using research instrumentation across PNNL.

NPSI researchers developed an X-ray diffraction approach that facilitated quantitative microstructural properties analysis spanning scales.

Raman spectroscopy measurements supported NPSI’s efforts to learn more about the formation of interfacial solids that occur during solvent extraction of nuclear fuel.

STAFF MEMBERS FROM ACROSS PNNL HAVE MADE CONTRIBUTIONS TO NPSI

NPSI’s researchers have used a wide range of instrumentation and equipment in the RPL to conduct their work.

PNNL-SA-145091
NUCLEAR PROCESS SCIENCE INITIATIVE TIMELINE

Key Highlights by Fiscal Year

2015: NPSI officially launches as a Laboratory Directed Research and Development initiative led by Sue Clark.
2016: PNNL staff involved in NPSI projects.
2017: Reid Peterson becomes NPSI lead.
2019: New GrandARM scanning transmission electron microscope, with NPSI assistance, undergoes preliminary testing in advance of full operations.

NPSI STATISTICS

- 150+ PNNL staff involved in NPSI projects.
- 28 PNNL new hires with ties to NPSI.
- 49 Staff promoted while supporting NPSI.
- 150+ Citations of work by others.
- 25 Million in business volume due to follow-on funding.
- 55 NPSI peer-reviewed publications.
- 4.5 Average publication impact factor.
- 219M Million in business volume due to follow-on funding.

CAPABILITIES DEVELOPED

- Aberration Corrected Scanning Transmission Electron Microscope in a Radiological Facility
- In-situ Transmission Electron Microscopy of rad materials
- Scanning Electron Microscope–Focused Ion Beam for preparation of radiological samples
- Atomic Force Microscope for operation in a radiation environment (radAFM)
- X-Ray Diffraction of radiation induced defects
- Transient rad effects

KEY PROJECTS DUE TO FOLLOW-ON FUNDING

- DOE Environmental Management (EM):
  - Direct Feed Low Activity Waste Test Platform
- National Security:
  - Nuclear forensics
  - Defense programs
- DOE Office of Science:
  - Energy Frontier Research Center (DOE Basic Energy Sciences)