

ATR-NSUF

2010 Faculty and Student Research Team Projects

To help ensure the availability of nuclear power as a clean and consistent energy source the U.S. Department of Energy designated the Advanced Test Reactor as a National Scientific User Facility (ATR NSUF), allowing broader access to nuclear energy researchers. The Advanced Test Reactor (ATR) and the post irradiation capability at the Idaho National Laboratory's Materials and Fuels Complex (MFC) provide a critical component of the nation's experimental nuclear research infrastructure. The mission of the ATR NSUF is to provide nuclear energy researchers access to world-class facilities, thereby facilitating the advancement of nuclear science and technology. The ATR NSUF seeks to create an engaged academic user community that is equipped to conduct research in this field.

To engage university faculty and students the ATR-NSUF is accepting proposals for two summer Faculty and Student Research Teams (FSRT) in 2010. FSRT teams will work closely with an ATR NSUF assigned technical contact to develop increased nuclear research capability at the ATR NSUF. FSRT teams will:

- Be led by a faculty member from an accredited U.S. university and at least two students (graduate students preferred)
- Spend 10 to 12 weeks (summer preferred) at the Idaho National Laboratory
- Work on a project that is mutually agreed-upon by the faculty member and an ATR NSUF assigned researcher prior to the team arrival at INL

Proposals

FSRT proposals will be limited to five pages. The proposal should describe the team's concept to perform a research/engineering task that will improve the research capability of the ATR NSUF. University faculty may submit more than one proposal. Collaborations between universities and with nuclear industry are allowed if they are appropriate for the proposed research scope.

The proposal should also include your team's qualifications, research interests, and a proposed budget, to include faculty and student labor, faculty overhead (see description under "Award" section for details on university overhead), materials, and travel.

Areas of Interest

FSRT teams can propose any project that results in increased research capability for the ATR NSUF.

The following are specific areas of interest in FY 2010.

- Ramp testing of fuel. Currently ramp tests are conducted using the PALM (Powered Axial Locator Mechanism) in ATR pressurized water loops located in

flux trap positions. To expand this capability, the feasibility of conducting these tests in ATR core reflector positions, such as the B-1 to B-8 positions and the I-positions should be evaluated. This project includes mechanical and electronic design, neutronic and thermal analysis, and ensuring that core safety requirements are met.

- Instrumentation test capsule. The ATR NSUF is currently upgrading experiment instrumentation capabilities. New instrumentation concepts require an irradiation test bed prior to implementation in critical experiments. This project designs a flexible irradiation test capsule that allows the testing of many advanced instrumentation devices, including monitoring and control, for testing advanced instrumentation. The possibility of cryogenic temperature irradiations could be considered in the design.
- In-canal measurements. Transport of materials from the reactor to the hot cells for interim examination during irradiation is costly and time consuming. Equipment for measurement of volume, dimensions, and corrosion layer formation in the ATR canal can be used to more efficiently conduct irradiation experiments. This project involves selection of appropriate measurement techniques and mechanical and electronic design of a system for performing these measurements.
- Integrated computational modeling for analysis of irradiation experiments. Currently the process for modeling experiment performance and safety requires that data be input manually from experiment drawings into separate neutronic (MCNP) and thermal analysis codes. This project continues to develop the framework for an integrated approach to experiment analysis that imports drawings or solid models into analysis codes and allows data transfer between these codes.
- In-reactor ultrasonic measurement. Ultrasonic tools have the potential for allowing a range of measurements to be made using a single sensor. This project will investigate the in-reactor application of ultrasonic measurement of dimensional change, crack nucleation and propagation, and other physical properties in a test reactor environment.
- ATR NSUF Knowledge Management System. As the NSUF generates technical data, a system is required to easily make accessible both NSUF-generated scientific data as well as relevant literature. Conceptually, a well-designed system would allow a potential new user to quickly evaluate a technical area in which they have an interest in submitting a proposal to determine if their idea is novel.
- ATR-C control upgrade/modernization project. Develop a conceptual design and component list for an upgrade of the ATR-C control system or develop an upgraded ATR-C MCNP core model to a level of fidelity that allows high confidence integral cross section measurements to be performed.
- ATR Experiment simulator. Design and fabrication of a system to be used as a teaching tool that can be used to simulate the in-reactor thermal hydraulic behavior of ATR experiments.

Evaluation of Proposals

FSRT team proposals will be evaluated by ATR NSUF technical staff and affiliated INL engineers/researchers. Proposals must be relevant to the ATR NSUF mission to be considered. Proposals will be scored using the following criteria:

Technical Merit – 50%
Feasibility – 25%
Team Qualifications – 25%

Submitting a Proposal

Submit FSRT team proposals to Jeff Benson at:

Jeff.Benson@inl.gov

If you have questions on submitting a proposal contact Jeff Benson at (208) 526-3841.

Proposal Due Date

All 2010 FSRT Team proposals must be E-mailed by December 16, 2009.

Proposal Award Date

Proposals selected for award will be announced by January 14, 2010.

Award

Selected proposals will be funded through a contract to the lead faculty's university. Overhead may be included however; the INL will only pay overhead at the university offsite rate since all work will be conducted at INL. INL will not pay for work or expenses for collaborator from industry.

Questions and Contacts?

For FSRT team questions contact:

Jeff Benson

(208) 526-3841

Jeff.Benson@inl.gov

For technical questions about ATR capability or post-irradiation capability of the MFC complex please reference the capabilities guide which can be reached from the ATR NSUF link on the INL home page at

<http://atrnsuf.inl.gov/Capabilities/tabid/56/Default.aspx> or contact:

Mitch Meyer

(208) 526-6833

Mitchell.Meyer@inl.gov

