



U.S. DEPARTMENT OF  
**ENERGY**

Nuclear Energy

# Computational and Experimental Benchmarking for Transient Fuel Testing

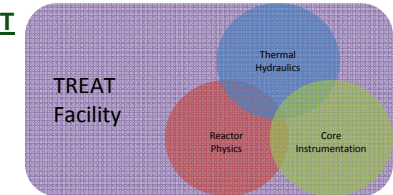
## OVERVIEW

**Purpose:** Support the transient fuel testing and Transient Reactor Test (TREAT) Facility Research efforts through comprehensive computational and experimental benchmarking. This includes both reactor physics and thermal hydraulics benchmarking efforts.

**Objectives:** This integrated research project contains four clear objectives:

- A comprehensive evaluation of existing TREAT Facility neutronics data using next generation reactor core neutronics codes.
- A complete thermal hydraulic characterization of existing sodium loop experimental data will be performed and documented.
- The collection of and benchmarking against new experimental thermal hydraulic data of a representative TREAT Facility water flow loop.
- A comprehensive instrumentation plan for the TREAT Facility that objectively aligns with the technical and functional requirements needed to maximize impact.

## IMPACT



## Logical Path:

**Outcomes:** Each objective will yield its own high-impact outcome:

- A fully characterized reactor core which may be utilized to support the safety case for the TREAT Facility research and future experiment design analysis efforts.
- A documented basis for developing future sodium flow loops to be utilized within the TREAT Facility.
- A documented water flow loop design and demonstration that is representative of a prototypic configuration for the TREAT Facility to provide benchmarking insights.
- A documented and demonstrated basis for the selection of in-pile instruments within the TREAT Facility that satisfies steady-state and transient test needs.

## DETAILS

**Principal Investigator:** Wade Marcum

**Institution:** Oregon State University

**Collaborators:** UM, MIT, INL, ORNL, ANL, HTTP, TerraPower

**Duration:** Three Years

**Total Funding Level:** \$4,000,000

**TPOC:** Nick Woolstenhulme

**Federal Manager:** Rob Versluis

**Workscope:** IRP-NE

**PICSNE Workpackage #:**

NU-15-OR-OSU\_-0701-01

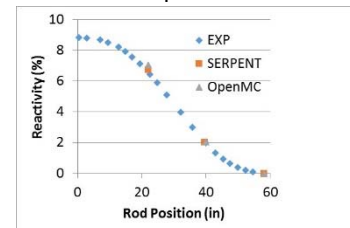


Participants of first biannual meeting

## RESULTS

### Results:

- Reactor Physics SS Benchmark results have shown good agreement with respect to one another as well as the limited experimental data that has been made available for benchmarking.



### Accomplishments:

- The draft SS reactor physics benchmark report has been completed and submitted
- Fabrication of the experimental loop has begun and all long-lead components procured.
- RELAP and TRACE models are have been developed for the TRTL.
- Identified parameter monitoring needs and how needs have been affected by TREAT restart program and upgrades to reactor data acquisition system.