

QUARTER 4 2021

# TRTR Newsletter



IN ROD WE TRUST

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### Hello TRTR Community,

First of all, I want to thank Ayman, Scott, and NC State for the excellent annual meeting! There is a writeup in the newsletter for those unable to attend or looking to find the presentations. We are looking forward to seeing everyone at next year's meeting hosted by Penn State University.

A quick update on the status of H.R. 4819: National Nuclear University Research Infrastructure Reinvestment Act of 2021 can be found [here](#). The bill was scheduled for markup by the [House Committee on Science, Space, and Technology](#) this week but that looks to be postponed.

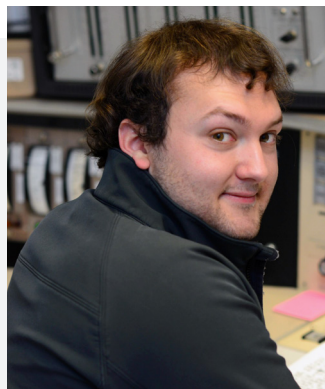
If you have suggestions for topics to be covered, sections you would like to see, or articles that you would like to share, please send an email to [TRTRnewsletter@isotopictopics.com](mailto:TRTRnewsletter@isotopictopics.com).

Best,

Amber



**Amber Johnson**  
University of Maryland  
Editor



**Luke Gilde**  
University of Maryland  
Content Editor

### Colleagues,

It's an exciting time in the research and test reactor community. New university reactors are being planned at Abilene Christian University and University of Illinois, and other non-power licensees, such as SHINE Medical, are coming online. I look forward to future TRTR meetings at which we will have a growing group of participants.

A delegation of TRTR representatives recently met with all three NRC Commissioners, the Director of NRR, and the Acting Assistant Secretary of Energy. These meetings were very positive and helpful, and the delegation worked to advance several goals of the community, such as reducing examination review times and supporting the NPUF rule. However, two NRC representatives, including the Chairman, expressed concern about the number of recent safety violations at our facilities. One of the best tools to reinforce positive safety culture and best practices is information sharing between reactor facilities. I encourage everyone to consider reaching out to other facilities and ask for peer audits, feedback, or advice, and to share such advice without judgment or reservation. There is always something to be learned from those with different experiences or points of view, and there are always ways to improve. Let's all continue to help each other to maintain an image of professionalism and excellence.

Happy Holidays,

Jeff Geuther, PSU

TRTR Chairman



TRTR Executive Committee Members visit the NRC. From left: Jere Jenkins (Associate Director, Nuclear Engineering and Science Center at Texas A&M Engineering Experiment Station), Jeff Geuther (Associate Director of Radiation Science and Engineering Center, Penn State University), Tom Newton (Deputy Director, NIST Center for Neutron Research), and Amber Johnson (Director, Radiation Facilities, University of Maryland)



### Jeff Geuther

Associate Director  
Radiation Science and Engineering Center  
Penn State University  
TRTR Chair

# NEWS

## **FRM-II Remains Shutdown**

The FRM-II Reactor near Munich remains shut-down until at least 2022. Work is ongoing to convert the reactor to Low Enriched Uranium fuel.

## **Royal Military College of Canada Reactor Refueled**

The SLOWPOKE Reactor at the Royal Military College of Canada in Kingston was refueled by the Canadian Nuclear Laboratories. The new core is expected to last at least 30 years.

## **Bruce Power to Produce Lu-177**

Bruce Power has received approval from the Canadian Nuclear Safety Commission to work towards producing the medical isotope Lutetium 177 in a CANDU Reactor.

## **NIST Reactor Shutdown Causes Disruptions**

The NIST Center for Neutron Research, which accounts for about 40% of US publication output in neutron science, has been shut down since a Safety Limit violation in February. NIST aims to restart the reactor next year before a 2023 outage to upgrade the cold source.

## **IAEA Reviews Delft Reactor**

The IAEA conducted an Integrated Safety Assessment of Research Reactors (INSARR) mission of the Hoger Onderwijs reactor (HOR) in the Netherlands. The INSARR is a voluntary peer review service that assesses and evaluates the safety of research reactors. A 7 member team made a number of recommendations for improving the operations of the reactor.

## **New South African Research Reactor**

The South African cabinet has approved the construction of the Multipurpose Reactor (MPR) to succeed the Safari-1 research reactor. Safari-1 is scheduled to shut down in 2030.

## **NIST Reactor Violation Linked to Staff Turnover**

The Root Cause Analysis of the Safety Limit Violation at the NIST Center for Neutron Research found that the event was linked to the inexperience of staff caused by high reactor operator turnover in recent years.

## **McMaster Nuclear Reactor Is Most Powerful Research Reactor in Canada**

The McMaster Nuclear

Reactor is Canada's most powerful research reactor, a leading producer of medical isotopes, and a major research center.

## **Floating Nuclear Power Plant in Russia Finds Acceptance**

The Akademik Lomonosov, a floating nuclear power plant used to power Pevek, Russia has begun to be used for direct heating of homes and hot water.

## **Jellyfish Force Reactor Shutdowns**

The Torness nuclear power plant in Scotland was forced to shutdown when jellyfish clogged the sea water-cooling intake pipes. It is suspected that rising ocean temperatures may lead to increased jellyfish populations making such events more frequent.

## **US Hanford Reactor to be Cocooned**

The decision has been made to cocoon 8 of the 9 plutonium production reactors at the Hanford site. 6 reactors have already been cocooned; work on cocooning the K-East reactor has already started and should be finished by 2023. The B-reactor will be maintained as a museum.

## **US Air Force Announces Plans for First Micro-Nuclear Reactor**

The US Air Force announced plans to use a microreactor to provide power to Eielson Air Force

Base in Alaska.

## **Hunt for Radioactive Artifacts in Canada**

Canada's Historic Artifact Recovery Program run by the Canadian Nuclear Laboratories (CNL) is charged with collecting and storing radioactive artifacts.

## **'No One Died From Radiation At Fukushima'**

IAEA Boss: IAEA director general Rafael Mariano Grossi was laughed at the COP26 conference for stating "No one died from radiation at Fukushima".

## **Nuscale Plans to Build Reactor in Romania**

Plans have been announced to build 6 Nuscale reactors in Romania.

## **Chinese HTGR Begins Operations**

The Shidaowan nuclear power plant, a pair of High Temperature Gas Reactors, has begun operations and been connected to the power grid.

## **Purdue Nuclear Reactor Profiled**

The PUR-1 Reactor was recognized by the Purdue student newspaper.

## **TerraPower to Build Reactor in Idaho**

TerraPower and Southern Company have announced plans to build a demonstration molten salt reactor (Molten Chloride Reactor Experiment, MCRE) at Idaho National Laboratory with DOE funding. The Molten Chloride

Reactor Experiment will be the world's first fast-spectrum, salt-fueled reactor to reach criticality.

### [Westinghouse Signs Agreement to Constructing New Nuclear Power Plant in Ukraine](#)

Westinghouse and Energoatom have signed an agreement to construct 2 new reactors at the Khmelnytsky Nuclear Power Plant.

### [Finding of No Significant Impact for MARVEL Reactor](#)

The U.S. Department of Energy announced a Finding of No Significant Impact for constructing the MARVEL microreactor inside Idaho National Laboratory's (INL's) Transient Reactor Test Facility.

### [Europe Rethinks Nuclear Power](#)

Several European countries are becoming more open to nuclear power as a means to meet climate goals.

### [GE Hitachi Selected to Build SMR in Canada](#)

GE Hitachi Nuclear Energy has been selected to build a small modular reactor with Ontario Power Generation (OPG) in Darlington by 2028.

# UPCOMING EVENTS

**March 3 - 4, 2022**

[International Conference on Nuclear Research Reactors](#)

Rome, Italy

**April 25 - 28, 2022**

[International Conference on Fast Reactors and Related Fuel Cycles: Sustainable Clean Energy for the Future](#)

Beijing, China

**May 15 - 20, 2022**

[International Conference on Physics of Reactors 2022](#)

Pittsburgh, PA

**June 12 - 16, 2022**

[American Nuclear Society Annual Meeting](#)

Anaheim, CA

**September 16 - 17, 2022**

[International Conference on Nuclear Research Reactors](#)

Rome, Italy

**September 25 - 29, 2022**

[International Conference on Radiation Shielding and Topical Meeting of the Radiation Protection and Shielding Division](#)

Seattle, WA

**October 18-22, 2022**

[International Conference on Topical Issues in Nuclear Installation Safety: Strengthening Safety of Evolutionary and Innovative Reactor Designs](#)

Vienna, Austria

**November 13-17, 2022**

[2022 ANS Winter Meeting and Technology Expo](#)

Phoenix, AZ

**February 6-9, 2023**

[Conference on Nuclear Training and Education](#)

Amelia Island, FL

# ELI BOLAND TAWFIK RABY SCHOLARSHIP WINNER

**Degree program:** PhD in Nuclear Engineering  
**Degree date:** May 2025 (anticipated)  
**Reactor License level:** RO

## What interested you in working at a reactor?

I first visited the reactor during the nuclear summer camp S&T held between my junior and senior years of high school. I knew I made the right decision to pursue nuclear engineering over any other engineering discipline when I walked into MSTR and laid my eyes upon the core for the first time. The Cherenkov radiation is truly beautiful the first time you see it in real life, and it made me determined to continue with nuclear.

During this tour, I saw a student worker who was in charge of the rabbit shots which were being conducted for our half-life lab. I thought that was by far the coolest thing anyone could do, so I decided then and there that I was

going to become a student worker at the reactor.

It was only later I learned you could also become a student operator which of course, I decided was the new coolest thing anyone could do, so again, I decided I was going to become an RO! The thought of being able to spend my whole day supporting a nuclear reactor just excites me to this day!

## What projects are you involved with?

One has many responsibilities as an RO at MSTR. While working at the reactor, I have created and set-up experiments for Missouri S&T's Reactor Lab I class utilizing the subcritical assembly (SCA) while the reactor was inoperable. This includes an SCA axial flux profile lab and a borated polyeth-



ylene poison coefficient lab.

With the reactor aging, instrumentation and controls at the reactor often require troubleshooting and repair. Some examples of me assisting with these include: assisting in the many electrical tests to diagnose the startup channel fission chamber which was declared inoperable due to being unstable during startup, assisting in replacing the servo motor for our control rod which had become stuck during a shutdown, and assisting in setting up and utilizing a new microphone system in order to determine our control rod drop times.

Other tasks I have received during my time at the reactor include designing solutions to issues

including; creating a guide to prevent the fission chamber wire from being caught during insertion and removal from the guide tube and creating a 3D printed stand for the startup channel circuit board to ensure electrical noise from movement of the circuit board is minimized.

I also often help in training students and/or trainees in both operations and walkthroughs. Operations includes guiding the students and/or trainees through weekly checklists, pre-startup checklists, startups, power changes, experiments, etc.

I also assist in creating lecture materials such as documentation Power-Point overviews. For the walkthroughs, I create and test trainees over ques-

tions and/or situations they may be asked during the facility walkthrough on their Nuclear Regulatory Commission (NRC) RO Exam including emergency scenarios, facility procedures, reactor physics, etc.

About once a year, the Missouri S&T American Nuclear Society (ANS) hosts "blue glow tours" of the reactor where students outside the nuclear field may tour the reactor and view the Cherenkov radiation while the reactor is at full power. During this tour, the students are given information about the origins of the reactor and a general overview of how it works. There are also indoctrination tours for trainees and nuclear students which occur a few times a semester where the students and trainees are given a safety briefing of the facility so they may conduct experiments safely while in the reactor. I often lead either of these tours when they occur.

Some miscellaneous duties include; processing packages at the front office, filling up liquid nitrogen tanks for the High-Purity Germanium (HPGe) and Sodium Iodide (NaI) detectors, reviewing and making suggestions for documentation edits, leading semesterly emergency response drills, and performing miscellaneous standard operating procedures (SOPs) such as performing and writing up the report for the MSTR Power Calibration, assisting Health Physics in radi-

ation and contamination surveys, performing confinement checks, replacing the pool demineralizer filters, and performing fuel movements.

Overall, there are many tasks to be performed by MSTR ROs, but we are well-trained to handle any situations thrown our way.

### Future plans, either with the reactor or after graduation?

I plan on obtaining my SRO license eventually before I graduate with my PhD. Until then, I will continue to assist the reactor manager in any way necessary to keep reactor operations running smoothly.

As for after I graduate, I plan on joining a national lab to conduct research to further the bounds of nuclear physics and engi-

neering.

### Anything else you would like to add?

Choosing to become an RO has been the best decision I've ever made! It helped me get my first internship at the Callaway nuclear power plant in Missouri, and it put me extremely far ahead of my other classmates in not only operations knowledge, but reactor physics/theory knowledge as well. Which truly made my undergraduate career easier. It's helped me meet some truly amazing people and was a great challenge for myself to accomplish while also taking classes and participating in organizations.

Previous page: Spiking the detectors with the neutron source.  
Below: Sitting at console, performing a startup.





North Carolina State University

### The 2021 TRTR Annual Meeting was hosted virtually by NC State University from October 18th-21st on Zoom.

The meeting included the TRTR Executive Committee Meeting, Doug Morrell's annual presentation on the DOE's support of university research reactors, presentations from 12 TRTR facilities, the DOE, and the NRC.

Some highlights of the meeting were panels on the cooperation between Research Reactor and Small/Microreactors, Research Applications, Reactor Regulation, and the 50.59 process for Digital Upgrades.

The full meeting agenda is available [here](#), and copies of many presenter's presentations are [here](#).

The traditional technical tour was replaced with a virtual tour of the NC State Reactor Facility and Tawfik M. Raby Scholarship was awarded to Eli Boland of Missouri S&T.

The 2022 TRTR Annual Meeting is scheduled to be hosted by Penn State University and the new TRTR Chair, Jeff Geuther. We hope to see you there in person!

### TRTR Election Results

#### Chair

Jeff Geuther, Pennsylvania State University

#### Past Chair

Ayman Hawari, North Carolina State University

#### Treasurer

Tom Newton, NIST

#### Secretary

Amber Johnson, University of Maryland

#### Chair Elect Committee

Jere Jenkins, Texas A&M University

### Future TRTR Annual Meetings

2022 - Penn State University

2023 - University of Maryland

## Idaho State Univ AGN-201 Reactor

**July 26-29, 2021 - [ML21225A086](#)**

The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation (LCOs), experiments, design changes, committees, audits and reviews, emergency planning, maintenance logs and records and fuel handling logs and records. A violation was identified for failure of 2 operators to receive a biennial medical examination.

## US Geological Survey TRIGA Reactor

**August 16 - 18, 2021 - [ML21252A588](#)**

The inspection included a review of security compliance. No violations were identified.

**August 16 - 19, 2021 - [ML21258A097](#)**

The inspection included a review of procedures, experiments, health physics, design changes, committees, audits and reviews, and transportation activities. No violations were identified.

## Texas A&M Univ AGN-201 Reactor

**Aug 31 – Sept 1, 2021 - [t](#)**

The inspection included a review of security compliance. No violations were identified.

## MIT Reactor

**August 9-12, 2021 - [ML21245A430](#)**

The inspection included a review of experiments, review audit and design change functions, radiation protection, effluent and environmental monitoring, and transportation activities. No violations were identified.

**Sept 13 - 15, 2021 - [ML21273A358](#)**

The inspection included a review of security compliance. No violations were identified.

**Sept 13 - 15, 2021 - [ML21271A634](#)**

The inspection included a review of operator licenses, requalification, and medical examinations, organization and operations and maintenance activities, procedures, fuel movement, surveillance, and emergency preparedness. No violations were identified.

## University of Utah TRIGA Reactor

**August 16 - 19, 2021 - [ML21245A237](#)**

The inspection included a review of organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation, experiments, design changes, committees, audits and reviews, emergency planning, maintenance logs and records, and fuel handling logs and records. A non-cited violation was identified for the reactor pool exceeding conductivity limits.

## Maryland University Training Reactor

**October 5-7, 2021 - [ML21286A764](#)**

The inspection included a review of procedures, experiments, health physics, emergency planning, fuel handling logs and records, and transportation activities. No violations were identified.

## Rhode Island Nuclear Science Center

**September 20-23, 2021 - [ML21281A256](#)**

The inspection included a review of operator licenses, requalification, and medical examinations, experiments, organization and operations and maintenance activities, review and audit and design change functions, procedures, fuel movement and surveillances. No violations were identified.

## UC Davis McClellan Nuclear Research Center

**October 26 - 28, 2021 - [ML21326A141](#)**

The inspection included a review of security compliance. No violations were identified.

## 50.59 Guidance Draft

### Available for Comment

**On November 23, 2021 the NRC released Draft Regulator Guide DG-2007 ([ML21243A103](#)) for implementing 10 CFR 50.59 at Non-power reactors for public comment. At the conclusion of the comment period (12/23/2021), the NRC will determine whether to implement the Regulatory Guide.**

If implemented, the Regulatory Guide would endorse the Technical Report, Guidelines For 10 CFR 50.59 Implementation At Non-power Production and Utilization Facilities ([ML21236A089](#)) as guidance on the performance of 10 CFR 50.59 screenings and reviews. The Technical Report was prepared by the Nuclear Energy Institute with input from staff members at a number of non-power reactors. It includes information on how 10 CFR 50.59 interacts with other regulations for non-power reactors, how the terminology used in 10 CFR 50.59 is defined for non-power reactors, as well as guidance and examples on how to conduct 50.59 Screenings and Reviews. The NRC would endorse this document with clarifications and one exception to the statement on changes in evaluation methodology (Section 4.3.8).

## Q4 2021 Reportable Occurrences

**The Missouri University Research Reactor declared 3 reportable occurrences in the 4th quarter of 2021.**

Event number [55516](#) was declared on 10/11/21 when a required primary coolant pressure scram channel

## NIST DOCUMENTS

set point was found to be out of the required range. The sensor was replaced and reactor operations were resumed. The follow up report for this event is [ML21298A197](#).

Event number [55568](#) was declared on 11/8/2021, when a required pool level measurement channel was found to not actuate a run-in within the required level range. The system was repaired and reactor operations were resumed. The follow up report for this event is [ML21327A304](#).

Event number [55583](#) was declared on 11/15/21 when a required flow rate scram channel was found to be inoperable. The alarm-meter unit was replaced and calibrated, and reactor operations were resumed. The follow up report for this event is [ML21327A305](#).

**The Penn State Breazeale Reactor declared a reportable occurrence on 12/8/2021 for exceeding its licensed power level.**

An operator error while operating in square wave mode lead to an inadvertent reactivity insertion. The resulting short period caused the reactor power to overshoot the maximum licensed power level before the reactor scrammed. The event number is [55632](#).

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### NEI License Amendment Request (LAR) Guidelines

**The Nuclear Energy Institute (NEI) provides guidelines for Nuclear Power Plants to submit license amendment requests (LAR). Although it is written for power plants, many of the report's suggestions are applicable to research reactors as well.**

NEI recommends citing precedent of similar NRC approved changes at other reactors in the LAR. This can help give the NRC Staff specific references to information about how similar changes have been treated in the past and may simplify their review process.

Pre-submittal meetings with the NRC may also ease the LAR process by determining reasonable and acceptable approaches to a planned license amendment request and ensuring that the NRC's expectations are met in the request.

LARs should be submitted in a standardized format including:

- Cover letter (required).
- Evaluation of the proposed change (required).
- List of regulatory commitments. (if needed)
- TS and/or License Document page markups (required).
- Bases page markups. (optional)
- Retyped TS and/or License Document pages

Wherever possible, any documents referenced in the LAR should be cited including by their ADAMS Accession Numbers.

It is also important to maintain communication with the NRC throughout the LAR process.

The complete NEI License Amendment Request Guidelines are [ML103360404](#).

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### NIST Documents

**On February 3, 2021, the NIST reactor experienced a Safety Limit Violation. NIST has completed a root cause analysis and submitted a request for approval to restart the reactor to the NRC. The current publicly available documents are listed below:**

#### Press Releases

- [February 3, 2021](#)
- [February 5, 2021](#)
- [March 2, 2021](#)
- [April 15, 2021](#)
- [May 6, 2021](#)
- [Q&A](#)
- [October 4, 2021](#)

#### NIST Reports to the NRC

- [Initial Notification of Alert](#) - February 3, 2021
- [Report on Declaration of Alert](#) - February 16, 2021
- [Addendum to Event Report](#) - March 4, 2021
- [Notice of Safety Limit Violation](#) - March 5, 2021
- [Follow Up Event Report](#) - May 7, 2021
- [Follow Up Event Report](#) - May 13, 2021

#### NRC Inspection Reports

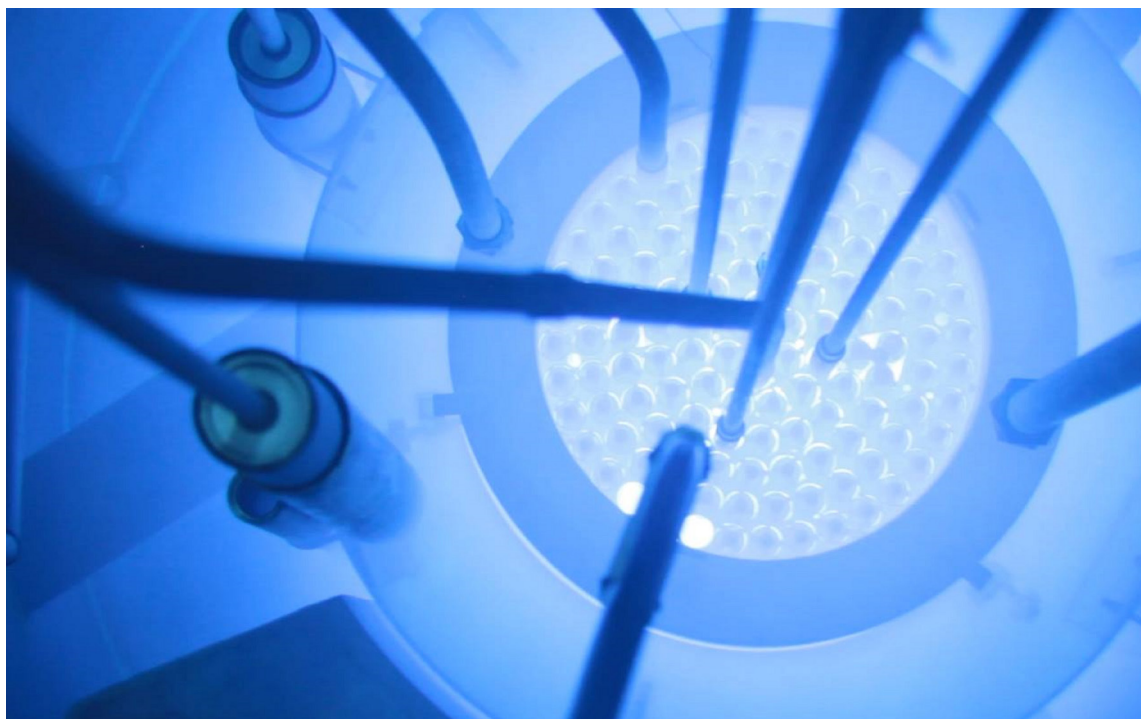
- [Interim Special Inspection Report](#) - April 14, 2021

#### NIST Request for Approval to Restart

- [Package ML21274A018](#): NBSR Report on February 3, 2021 Fuel Failure Event, Root Causes, Corrective Actions, and Restart Readiness
- [ML21288A555](#): Supplement to October 1, 2021 report and restart request
- [ML21288A554](#): Safety culture and NCNR leadership accountability
- [ML21288A553](#): Problem Identification and Resolution
- [ML21294A372](#): Nuclear Instrument Response
- [ML21294A373](#): Supplement to October 1, 2021 report and restart request

#### NRC Requests for Additional Information

- [ML21294A277](#): Supplemental Information Needed for the Request to Restart the National Bureau of Standards Test Reactor Following Exceedance of the Cladding Temperature Safety Limit



The Oregon State TRIGA Reactor during the peak of a pulse.

# OREGON STATE UNIVERSITY

Robert Schickler

Nuclear Science & Engineering  
Assistant Director, Radiation Center

**What year did your reactor first go critical?**  
In March of 1967.

**What is the reactor license number? Power level?**  
R-106. Originally 250 kW, currently licensed to 1.1 MW.

**What is your position at the reactor? How long have you held that position?**  
Assistant Director/Reactor Administrator. Since 2018. I was previously Reactor Engineer and a Senior Reactor Operator for the OSU TRIGA, originally hired in 2008.

**Have any major changes/modifications, such as conversion, power upgrade, etc..., been done?**  
In my first year at OSU, we added the Prompt

Gamma Neutron Activation Analysis facility to beam port #4 and converted our core from HEU to LEU. Other major projects were our reflector replacement in 2013 and secondary upgrade in 2018. Basically, something huge happens here every five years. We are currently in the process of removing the Instrumented Fuel Element requirements from our Tech Specs so that we can regain our pulsing capabilities.

**What is a unique feature of your reactor?**  
It is hard to think of something unique here when a lot of TRIGAs have similar features. We have had an exceptional track record for training students to be reactor operators (thanks to Dr. Wade Marcum for creating the training program and to Celia Oney for continuing it). We had our first group of 5 trainees in 2012, 4 of whom went on to receive a PhD at OSU. Since then, we have training classes at least once every two years and have had many excellent student operators. One operator recently completed their MS involving a neutron radiography project and was just hired as a reactor operator at the NRAD Facility.

**What is a fun fact about your reactor?**  
It was featured in the "Lethal Obsession" episode of "The New Detectives" as a forensic tool for examining bullets used by the "I-5 Killer". Despite being filmed in the late 90s, the control room does not look that much different! Also, the OSTR's original claim to fame was that it was used to analyze the moon rocks from the Apollo mission.

### What is the biggest challenge facing your reactor?

Our biggest challenge is a good problem to have: a large backlog of samples! Our CLICIT facility is very popular with the geochronology community and often experiences a long backlog of samples, sometimes hundreds of hours. We have been exploring options to allow for more efficient operations, such as a 2nd CLICIT (the CLOCIT) offering redundant capability within the core.

### What is the most unusual request someone has had to use your reactor?

Another forensic analysis request. There is an entry in our supervisor's log that shows that, in 1973, we irradiated a hatchet in our bulk shield tank for an investigation by the Eugene Police Department. I'm not sure what was determined from this irradiation, especially since this predated the use of high-purity germanium detectors.

### Before working at your reactor, what was the most unusual or interesting job you've ever had?

I honestly haven't had a lot of jobs. I worked at grocery stores until I graduated college and then went to work at a nuclear power plant (Watts Bar) as an unlicensed operator. I did try to get into whatever odd jobs I could while at Watts Bar, volunteering for the fuel handling team as well as the Fix-It-Now crew, so I got to see a lot of interesting stuff. One cool thing I got to experience was training in 1999-2000 before Unit 2 went online. We got to tour Unit 2's uncompleted, uncontaminated containment and I can say that I was inside the Unit 2 reactor vessel at one point in my life!

### What do you find the most challenging at your reactor?

Balancing the schedule. We have a lot of demand for the reactor and making sure all experimenters are happy can



Radiation Center Director Dr. Steve Reese standing in front of the reactor's bioshield, Senior Health Physicist Scott Menn, Development Engineer Steve Smith, and Dr. Reese examining a beam port repair. A mirror was used to examine because of a high radiation beam (over 10 R/hr), Me standing inside Watts Bar Nuclear Plant's Unit 2 cooling tower.

### What drew you to your current position?

Having previously worked in the power industry, I had a choice between Oregon State and San Onofre Nuclear Generating Station. I chose Oregon State because I was interested in continuing my education (which I did, completing my MS in 2012, and am currently working on my PhD). I chose wisely, as San Onofre shut down not too long after I would have started employment.

### What has been your favorite project?

Probably working on the 2nd CLICIT. It incorporated all of my experience operating the reactor with my learned experience of MCNP calculations to create a benefit for the reactor. Although a close second would be our reflector replacement in 2013. I learned so much about our facility that summer. At one point our reactor tank was completely empty. On my birthday, I got to enter the tank for a physical inspection, which was an unusual birthday gift.

be a challenge.

### What advice would you give to new reactor operators?

Absorb as much as you can. Volunteer for projects. Put yourself out there. You never know how valuable your knowledge and experience will be down the line.

### What are three career lessons you've learned thus far?

Search for career fulfillment rather than just the money. Live where you can thrive. Don't touch anything in the reactor bay without wearing gloves.

# NAME **THAT** CONSOLE!

HOW MANY **RESEARCH REACTOR CONSOLES** CAN YOU IDENTIFY?

A



D



B



E



C



F



Answers: A) University of Utah Training Reactor B) Maryland University  
Training Reactor C) UMass Lowell Radiation Laboratory D) Oregon State  
University E) Rhode Island Nuclear Science Center F) Ohio State Uni-  
versity Nuclear Reactor Laboratory