

Joshua Peterson
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EDUCATION

Doctor of Philosophy in Mechanical Engineering with a Nuclear Emphasis. August 2011. *GPA 3.94.* The University of Texas – Austin, Texas. Courses include: Fuel Cycle, Numerical Methods in Transport, Computational Methods in Neutron Transport Theory.

Master of Science in Nuclear Engineering. May 2006. *GPA 3.91.* Idaho State University – Pocatello, Idaho. Courses include: Thermal Hydraulics, Nuclear Instrumentation Lab, Low and High Level Waste Management.

Bachelor of Science in Mechanical Engineering. December 2004. *GPA 3.64.* Idaho State University – Pocatello, Idaho.

Associate of Science in Mathematics April 2000. *GPA 3.98.* Ricks College – Rexburg, Idaho.

RESEARCH EXPERIENCE

Reactor Physics Analyst: *Oak Ridge National Laboratory.* July 2011 - Present

- Database design and development for the UNF-ST&DARDS database for NFST and the Transmutation Library Database for FCRD
- Fuel cycle transition sensitivity analysis with ORION
- Worked with a multi-national team of scientists to develop UNF-Storage, Transportation & Disposal Analysis Resource and Data System (UNF-ST&DARDS)
- Worked with a multi-national team of scientists to categorize the UNF inventory in support of a comprehensive national nuclear fuel cycle strategy
- Developed an automated method for performing depletion analysis of irradiation targets within HFIR using MCNP coupled to SCALE6.1
- Provided independent analysis on the irradiation of Np-237 target for the DOE Pu-238 production project
- Worked on the development of SHIFT, a massively parallel Monte Carlo code, to couple thermal hydraulics and neutronics for HFIR analysis
- Project supervisor for undergraduate students from University of Tennessee

Visiting Scientist: *Idaho National Laboratory.* August 07-June 2011

- Worked on a team of scientists to drastically improve the neutronics modeling capabilities of the ATR
- Developed new computational tools for the ATR to accelerate the reactor physics calculations with the use of perturbation theory
- Used a 3-D deterministic Galerkin finite element analysis code, Attila, to perform safety analyses on the ATR
- Project supervisor to graduate and undergraduate students from Idaho State University and University of Wisconsin-Madison

Adjunct Lecturer: *Idaho State University*. August 08-December 08 & January 2010-May 2010

- Taught an introductory course in nuclear engineering to undergraduate and graduate students from Idaho State University, University of Idaho, and Brigham Young University-Idaho through satellite feed on three campuses
- Developed and taught a new course in motors and controls to mechanical engineering technicians in the Energy System Technology and Education Center

Reactor Operations Trainer: *Idaho National Laboratory*. August 08-December 08 & January 2010-August 2010

- Taught fundamentals of nuclear physics and radiation detection to nuclear facility operators with varied educational backgrounds

Nuclear Engineering Internship: *Idaho National Laboratory*. May 07-August 07

- Developed a 3D neutronics model for the ATR from a 2D PDQ7 input deck
- Benchmarked the model against experimental data and MCNP

Graduate Research Assistant: *The University of Texas-Austin*. August 06-May 07

- Calculated the neutron spectrum and flux for the TRIGA reactor using MCNPX
- Benchmarked the MCNPX calculations against experimental data

Nuclear Engineering Internship: *Idaho National Laboratory*. May 06-August 06

- Helped characterize BWR crud using both SEM and TEM
- Pre and post-irradiation analysis of low enriched U-Mo/Al dispersion fuel miniplates for RERTR.

Graduate Research Assistant: *Idaho National Laboratory*. Jan. 2005-May 2006

- Modeled the time to failure of spent TRISO fuel in a repository environment with Monte Carlo methodology using GoldSim to evaluate the more important parameters
- Researched and analyzed the corrosion processes of OPyC and SiC in the TRISO fuel and compared the degradation rates to that of high level waste glass and spent nuclear fuel

Laboratory Assistant – *Idaho State University Accelerator Center*. Fall 2004

- Supervised and engineered the construction of the radiation safety control system that conformed to NRC regulation standards for a transmutation experiment
- Supervised and engineered the construction of the water circulation and radiation contamination filtration system for a subcritical reactor

CONFERENCE PRESENTATIONS AND REPORTS

Sunny, E., et al., "Transition Analysis of Promising U.S. Future Fuel Cycles using ORION." GLOBAL 2015: Paris, France.

Ahmad Ibrahim, D.P., Josh Peterson, Robert Grove, "Analysis of Shutdown Dose Rate in Fusion Energy Systems Using Hybrid Monte Carlo/Deterministic Techniques." 2015 ANS Annual Meeting: San Antonio, Texas.

Ahmad Ibrahim, D.P., Robert Grove, Josh Peterson, Seth Johnson, "The Multi-Step CADIS Method for Shutdown Dose Rate Calculations and Uncertainty Propagation." Fusion Science and Technology, 2015.

Ahmad Ibrahim, D.P., Josh Peterson, Robert Grove, "Shutdown Dose Rate Analysis Using the Multi-Step CADIS Method." Fusion Science and Technology, 2015.

Peterson, J. and J. Scaglione, "Fuel Cycle Applications with the Data Stored Within the Unified Database." ANS International High Level Waste Management Conference April 12-16, 2015: Charleston, SC.

Eva Sunny, et al., "Fuel Cycle Assessment: Evaluation and Analyses using ORION for US Fuel Cycle Options", in ANS 2014 Winter Meeting and Technology Expo November 9-13, 2014: Anaheim, CA.

Ahmad Ibrahim, D.P., Josh Peterson, Robert Grove. "Acceleration of Shutdown Dose Rate Calculations and Uncertainty Propagation Using the Multi-Step CADIS Method". IX ITER Neutronics Meeting. June 24-27, 2014. Frascati, Italy.

Ahmad Ibrahim, D.P., Josh Peterson, Robert Grove. "Shutdown Dose Rate Analysis Using the Multi-Step CADIS Method". ANS Annual Meeting (TOFE meeting). Nov 8-13, 2014. Anaheim, CA.

Scaglione, J. Peterson, J. Banerjee, K. "Integrated Data and Analysis System for Commercial Used Nuclear Fuel Safety Assessments." WM2014 Conference, March 2-6, 2014.

Peterson, J., Wagner, J. "Characteristics of Commercial Spent Nuclear Fuel: Distributed, Diverse, and Changing with Time." RadWaste Solutions 21, 50-59 (2014).

Ibrahim A. Peplow, D. Peterson, J., et al. "Novel Hybrid Monte Carlo/Deterministic Technique for Shutdown Dose Rate Analyses of Fusion Energy System." Fusion Engineering and Design (2014).

- Dixon, B., Carlsen B., Williams, K. et al. "Review of NETL and NREL Nuclear Energy Reports." FCRD-FC0_2013-000394. Sep. 30, 2013.
- Scaglione, J., Lefebvre, R. Robb, K. Peterson, J. et al. "Integrated Data and Analysis System for Commercial Used Nuclear Fuel Safety Assessments." Proceedings of PATRAM 2013, San Francisco, CA, August 18-23, 2013.
- Peterson, J., Lefebvre, R., Harold, S., et al. "Used Nuclear Fuel Storage Transportation & Disposal Analysis Resource and Data System (UNF-ST&DARDS)." FCRD-NFST-2013-000117. Oak Ridge National Laboratory. March 22, 2013.
- Peterson, J. "Data Mining to Determine Inventory Characteristics of Used Nuclear Fuel For Potential Future Recycling Campaigns." International High Level Waste Management Conference. Albuquerque, NM. April 28-May 2, 2013.
- Wagner, J., Peterson, J., Mueller, D., et al. "Assessment of Used Nuclear Fuel Inventory Relative to Disposition Options." International High Level Waste Management Conference. Albuquerque, NM. April 28-May 2, 2013.
- Wagner, J. Peterson, J. et al. "Categorization of Used Nuclear Fuel Inventory in Support of a Comprehensive National Nuclear Fuel Cycle Strategy." Proceedings of WM2013, Phoenix, Arizona, February 24-28, 2013.
- Wagner, J., Peterson, J., Mueller, D. "Categorization of Used Nuclear Fuel Inventory in Support of a Comprehensive National Nuclear Fuel Cycle Strategy." ORNL/TM-2012/308 FCRD-FCT-2012-000232 Oak Ridge National Laboratory, December 2012.
- Peterson, J. Germina, I. "Calculation of Heating Values for the High Flux Isotopes Reactor." Physor, Knoxville TN. 2012.
- Peterson, J, Schneider, E. "A Linear Regression Method Used for Shim Rotation Prediction of the Advanced Test Reactor." American Nuclear Society Summer Meeting, Hollywood, FL. 2011.
- Peterson, J. Gougar, M. "Modeling Spent TRISO Fuel for Geological Disposal: Corrosion and Failure Under Oxidation Conditions in the Presence of Water" Progress in Nuclear Energy, In Press
- Peterson, J. et al. "Developing Open-Source Video Games to Educate the Public about Nuclear Energy -11385" Waste Management Conference, Phoenix, AZ, 2011
- Peterson, J. "The Need for Open Source Books for Nuclear Workforce Training – 11384" Waste Management Conference, Phoenix, AZ, 2011

Aryaeinejad, et al. Advanced Test Reactor Core Modeling Update Project: INL/EXT-10-19940, Sep 2010

Wilson, P. Snouffer, P. Schneider, E. Peterson, J. “A Monte Carlo Surface Source Method for Advanced Test Reactor Experiment Prototyping.” Physor 2010, Pittsburgh, PA. May 9-14 2010

Peterson, J. Schneider, E. “Use of Perturbation Theory to Augment Advanced Test Reactor Modeling Capability.” American Nuclear Society Summer Meeting, San Diego, CA 2010

Peterson, Joshua and Schneider, Erich. “Modeling the ATR Using PDQ7e in 3D” American Nuclear Society Winter Meeting Reno, NV 2008

Janney, Dawn, Porter, Douglas, and Peterson, Josh. “Phase Identification in Crud from Commercial Boiling Water Reactors at the Idaho National Laboratory by Transmission Electron Microscopy” 2007 International LWR Fuel Performance Meeting San Francisco, Sep. 2007

Peterson, Josh, Carlton, Chris, and Schneider, Erich, “Radiation Damage Study of Nano-Scale Metals at the University of Texas-Austin,” American Nuclear Society Winter Meeting Washington, D.C. November 2007

Peterson, Josh, et. al.. “Fast Breeder Reactors for the Next Century of India’s Nuclear Future”. International High Level Radioactive Waste Management Conference Las Vegas, NV, 2007.

Janney, Dawn, Peterson, Josh et. al. Report to DOE on the Crud Project, Idaho National Laboratory, INL/EXT-06-11742, 2006

Peterson, Joshua and Dunzik-Gougar, Mary Lou, “Degradation of TRISO Fuel in a Repository Environment,” American Nuclear Society Annual Meeting Reno, LV, June 2006.

Peterson, Joshua and Dunzik-Gougar, Mary Lou, “Qualification Plan of Spent TRISO Fuel for Permanent Disposal” International High Level Radioactive Waste Management Conference Las Vegas, NV, 2006.

Peterson, Joshua and Dunzik-Gougar, Mary Lou, “TRISO Fuel: History of the Disposal Qualification Process and Lessons Learned” Waste Management Conference Tucson, AZ 2006.

“Panel: International Youth Conference.” Waste Management Conference, Tucson, AZ, 2006

GUEST LECTURES

Presented a workshop at Physor 2012 on PYNE (a python library for nuclear engineering) with the other developers.

Presented DAGMC with ATR Substitution method for the ATR-NSUF at INL in Idaho Falls, ID May 2011

Presented DAGMC with ATR Substitution method for the ATR-NSUF at UCLV in Las Vegas, NV Nov. 2010

Presented lectures on MCNP5, DAGMC, and research on ATR Substitution method at ATR-NSUF User week June 2010

TEACHING EXPERIENCE

Teaching Assistant at the University of Texas at Austin for *Computational Methods in Neutron Transport*: Spring 2008.

Teaching Assistant at the University of Texas at Austin for *Nuclear Reactor Engineering*: Spring 2008.

Teaching Assistant at the University of Texas at Austin for *Introduction to Nuclear Power Systems*: Spring 2007.

VOLUNTEER INFORMATION

- Vice Chair, Chair, and Past Chair for Knoxville chapter of the American Nuclear Society, 2012-2015.
- ANS planning committee member for PHYSOR (2013), RPSD (2014), and Nuclear Science Week (2015)
- Senior Mentor for the FIRST Robotics Competition for West High School, Knoxville, TN. 2013.
- First Robotics Lego League state competition judge. 2012-present.
- Southern Appalachian Science and Engineering Fair judge. 2012-present.
- Big Brother volunteer. 2012-present.
- President of ANS at UT-Austin. Fall 2007-May 2008.

ADDITIONAL INFORMATION

- Best Paper awarded at MeV summer school Idaho Falls, ID June 2010.
- Will Rogers Scholarship, UT-Austin 2008-2009.
- Recipient of the Roy G. Post Scholarship, Feb 2007.
- 1st Place in the IHLWM'06 Poster Session, May 2006.
- Engineering In Training certified May 2005, Idaho.
- Modeling experience in SCALE6.1, ORIGEN, MCNP, Advantage, Attila, and Serpent.
- Attended two-week seminar at Lawrence Livermore National Lab on analytical methods for non-proliferation, July 2005.
- Program languages include Python, Java, R, FORTRAN, C, and Matlab
- Member of ANS and TBII Engineering Honor Society.
- Eagle Scout for the Boy Scouts of America.