

# Joshua S. Rehak

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## CONTACT INFORMATION

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## OBJECTIVE

Seeking research and practical opportunities in nuclear engineering and scientific computation to support the next generation of reliable and safe nuclear energy.

## PHD

**University of California, Berkeley, NUCLEAR ENGINEERING** **Expected Spring 2020**  
Using Tools for the Analysis and Assessment of Accelerating Solves of the Transport Equation  
Advisor: Professor Rachel N. Slaybaugh

## MS

**University of California, Berkeley, NUCLEAR ENGINEERING** **Spring 2017**  
Implementation of Weighted Delta-tracking with scattering in Serpent 2

## MEM

**Old Dominion University – Norfolk VA, ENGINEERING MANAGEMENT** **Fall 2015**

## BS

**University of Maryland, College Park, PHYSICS, ASTRONOMY** **Spring 2007**

## WORK & RESEARCH EXPERIENCE

**University of California, Berkeley, Berkeley, CA**  
*Graduate Student Researcher* **Fall 2015 – Present**  
Advisor: Professor Rachel N. Slaybaugh – [slaybaugh@berkeley.edu](mailto:slaybaugh@berkeley.edu)  
Developing a novel finite-element-based code for the implementation and assessment of acceleration methods for deterministic solves of the transport equation. Implementing and analyzing novel methods in Monte Carlo codes.

**The Idaho National Laboratory, Idaho Falls, ID**  
*Student Intern - Reactor physics group* **Summer 2016**  
Advisor: Dr. Mark DeHart – [mark.dehart@inl.gov](mailto:mark.dehart@inl.gov)  
Implemented a novel Monte Carlo algorithm for Nuclear Engineering applications.

## United States Navy

*Submarine Officer – Honorably discharged as a lieutenant (O-3)* **2008 – Fall 2015**

- Coordinated submarine operations and international participation for the Rim of the Pacific 2014 naval exercise involving 23 nations, 46 ships and six submarines.
- Supported two six-month deployments while qualified Officer of the Deck and Engineering Officer of the Watch on Los Angeles class submarines.
- Certified for assignment as Engineer Officer in charge of a Naval Nuclear Propulsion Plant.
- Led divisions responsible for the maintenance and operation of reactor plant instrumentation, radiological controls, and water chemical analysis.
- TS/SCI security clearance (single scope background investigation).

## PUBLICATIONS & PROCEEDINGS

**Rehak, J.S.**, Slaybaugh, R.N. “Assessing the Effectiveness of Acceleration Methods for Deterministic Neutron Transport Solvers” **Transactions of the American Nuclear Society** Volume 122. <https://doi.org/10.13182/T122-32383> June 2020.

**Rehak, J.S.**, Kerby, L.M., DeHart, M.D., Slaybaugh, R.N. “Weighted delta-tracking in scattering media” **Nuclear Engineering and Design** Volume 342. <https://doi.org/10.1016/j.nucengdes.2018.12.006>. December 2018.

**Rehak, J.S.**, Kerby, L.M., DeHart, M.D., Slaybaugh, R.N., Leppänen, J. “Implementation of Weighted Delta-Tracking with Scattering in the Serpent 2 Monte Carlo Code” **Transactions of the American Nuclear Society** Volume 116. <https://escholarship.org/uc/item/6bg1s71k> June 2017.

HONORS AND AWARDS	Department of Nuclear Engineering Graduate Fellowship	2015 – 2018
	Navy and Marine Corps Commendation Medal	August 2015
	For exceptional service as Submarine Force Exercise Officer and Submarine Watch Officer at Commander Submarine Forces Pacific	
	Navy and Marine Corps Achievement Medal	August 2015
	For coordination and execution of submarine operations for the Rim of the Pacific 2014 exercise	
CODE DEVELOPMENT	Navy and Marine Corps Achievement Medal	June 2013
	For service as a division officer on USS JACKSONVILLE (SSN-699) and successful completion of two six-month deployments and an extended dry-dock maintenance period.	
	Navy and Marine Corps Achievement Medal	April 2013
	For service as Chemistry/Radiological Assistant during an eight month dry-dock period.	
	Navy and Marine Corps Achievement Medal	January 2011
	For service as Reactor Control Assistant during a six-month deployment and Operational Reactor Safeguards Exam	
SCIENTIFIC COMPUTING SKILLS	<b>Bay Area Radiation Transport (BART)</b>	<a href="https://github.com/SlaybaughLab/BART">https://github.com/SlaybaughLab/BART</a>
	A finite-element-based transport solver that supports 1/2/3D and MPI, based on the <a href="#">deal.II</a> finite element library.	
	<ul style="list-style-type: none"> <li>• Designed for developer end-users for maximum modification and support of methods analysis and implementation.</li> <li>• Designed to support reproducibility, portability, and testing in codes. utilizes continuous integration, code coverage, and Docker containers.</li> <li>• Uses a novel protocol-buffer format for materials.</li> </ul>	
	<b>Languages</b> .....	C++20, python, bash
	<b>Build Systems</b> .....	make, CMake
	<b>Testing</b> .....	GoogleTest, GoogleMock, continuous integration, code coverage
	<b>Version Control</b> .....	git
	<b>Other</b> .....	Doxygen, L <sup>A</sup> T <sub>E</sub> X, MatLab, Protocol Buffers, Jupyter, Docker