RACHEL N. SLAYBAUGH

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EDUCATION

Ph.D.	**University of Wisconsin–Madison** Nuclear Engineering and Engineering Physics, with a certificate in Energy Analysis and Policy	2011
M.S.	**University of Wisconsin–Madison** Nuclear Engineering and Engineering Physics	2008
B.S.	**Pennsylvania State University** Nuclear Engineering	2006

RESEARCH EXPERIENCE

University of California, Berkeley Jan. 2014 - Present
Assistant Professor of Nuclear Engineering *Berkeley, CA*

- Researching numerical methods for neutral particle transport with an emphasis on supercomputing and advanced architectures; specialization in deterministic, Monte Carlo, and Hybrid methods
- Applications in reactor design, shielding, and nuclear security and nonproliferation
- Design Emphasis in Computational Science and Engineering Affiliated Faculty member
- Applied Science & Technology Faculty member

Bettis Laboratory Mar. 2012 - Aug. 2014
Senior Engineer in the Shield Design and Development group *West Mifflin, PA*

- Implemented the Forward-Weighted Consistent Adjoint Driven Importance Sampling (FW-CADIS) method for variance reduction in Monte Carlo; accredited method for use in shield design
- Developed new Resonance Factor variance reduction method for streaming through materials with space and energy self-shielding

University of Wisconsin–Madison Sept. 2006 - Nov. 2011
Research Assistant / Rickover Fellow *Madison, WI*

- Researched Acceleration Methods for Massively Parallel Deterministic Transport: added parallelization in the energy domain, an advanced eigenvalue solver, and a new multigrid in energy preconditioner to Denovo, developed at Oak Ridge National Lab
- Developed two Monte Carlo source sampling methods for arbitrarily shaped plasma sources; the sources are generated directly from plasma physics data

Forschungszentrum Karlsruhe (KIT) May 2008 - Dec. 2008
Visiting Researcher *Karlsruhe, Germany*

- Learned about the Rigorous 2 Step method for Monte Carlo geometry conversion while working in the Reactor Safety group
- Helped group incorporate DAGMC library into MCNP workflow

Penn State Breazeale Reactor Aug. 2003 - Apr. 2006
Reactor Operator *University Park, PA*

- NRC licensed Reactor Operator for TRIGA Mark III reactor
- Analyzed core burn-up anomaly; calibrated gamma irradiation facilities

SELECTED PUBLICATIONS

R. Vasques and K. Krycki and R. N. Slaybaugh. "Nonclassical Particle Transport in 1-D Random Periodic Media," *Nuclear Science and Engineering.* (accepted 2016)

M. Munk, R.N. Slaybaugh, "An Angle-Informed Hybrid Method for CADIS and FW-CADIS." Proceedings of the PHYSOR 2016 Meeting in Sun Valley, ID, May 2016. (accepted)

J. Bevins, R. Slaybaugh, "Application of Metaheuristic Optimization Methods for Neutron Spectral Shaping Applications." Proceedings of the Conference on Data Analysis 2016 in Santa Fe, NM, March 2016. (accepted)

L. Bernstein, D. Brown, et al. "Nuclear Data Needs and Capabilities for Applications." White Paper. Lawrence Berkeley National Laboratory, May 27-29 2015.

R.N. Slaybaugh, T.M. Evans, G.G. Davidson, and P.P.H. Wilson, "Rayleigh Quotient Iteration with a Multigrid in Energy Preconditioner for Massively Parallel Neutron Transport," Proceedings of Joint International Conference on Mathematics and Computation, Supercomputing in Nuclear Applications, and the Monte Carlo Method in Nashville, TN, April 2015.

S.C. Wilson and R.N. Slaybaugh. "Improved Monte Carlo Variance Reduction for Space and Energy Self-Shielding," *Nuclear Science and Engineering.* **179** (2015) 22-41.

R.N. Slaybaugh, T.M. Evans, G.G. Davidson, and P.P.H. Wilson. "Multigrid in energy preconditioner for Krylov solvers," *Journal of Computational Physics.* **242** (2013) 405-419.

R.N. Slaybaugh, T.M. Evans, G.G. Davidson, and P.P.H. Wilson. "Rayleigh Quotient Iteration in 3D, Deterministic Neutron Transport," Proceedings of the PHYSOR 2012 Meeting in Knoxville, TN, April 2012.

T.M. Evans, A.S. Stafford, R.N. Slaybaugh, and K.T. Clarno. "Denovo–A new three-dimensional parallel discrete ordinates code in SCALE." *Nuc. Tech.* **171** (2010) 171-200.

R.N. Slaybaugh, P.P.H. Wilson, L.A. El-Guebaly, and E.P. Marriott. "Three-Dimensional Neutron Source Models for Toroidal Fusion Energy Systems." *Fusion Engineering and Design.* **84** (2009) 1774-1778.

SYNERGISTIC ACTIVITIES

Software and Computing

Nuclear Energy Advisory Committee	Member since 2016
Berkeley Institute for Data Science	Senior Fellow
Python for Nuclear Engineering	Developer
The Hacker Within, UCB and UW	Faculty Advisor 2014-present; Founding member 2009
Software Carpentry	Instructor since 2013

American Nuclear Society, National Level

Math and Comp. Division	Chair rotation 2016-present, Exec. Comm. 2013-present
Rad. Protection and Shielding Div.	Exec. Comm. 2015-present
Young Members Group	Exec. Comm. 2014-present
NEED Comm.	Chair 2013-2015, Vice Chair 2010-2013
Professional Divisions Comm.	Vice chair 2012-2016
Student Sections Comm.	Chair 2010-2013, Vice Chair 2009-2010
Board of Directors	Student Member 2007-2009

Society of Industrial and Applied Mathematics (SIAM) member since 2009