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

Lawrence Berkeley National Laboratory Berkeley, CA
Division Director *Jan. 2021 – present*

- Managing the Cyclotron Road division, which facilitates the translation of hard science into positive societal impact
- Expanding the mission of Cyclotron Road to more broadly support deployment of innovation technologies

University of California, Berkeley Berkeley, CA
Assistant Professor of Nuclear Engineering *Jan. 2014 – July 2017*
Associate Professor *July 2017 – present*

- Researching numerical methods for neutral particle transport with an emphasis on supercomputing and advanced architectures as well as data science
- Applications in reactor design, shielding, and nuclear security and nonproliferation
- Berkeley Institute for Data Science Faculty Affiliate
- Designated Emphasis in Energy Science and Technology (DEEST) Executive Committe member
- Design Emphasis in Computational Science and Engineering Affiliated Faculty member
- Applied Science & Technology Faculty member

Advanced Research Projects Agency – Energy Washington, DC
Special Gov Employee / Program Director / Senior Technical Advisor *Jan. 2017 – Nov. 2020*

- Program creation and management
- Director for MEITNER, the Nuclear OPEN+ cohort, LISE, and GEMINA Programs, supporting research for enabling technologies for advanced nuclear fission reactors
- Co-Director for TERRA and ROOTS Programs, supporting research for sensing and data analytics for above- and below-ground plant outcomes
- Director for FOCUS Program, supporting research for solar technologies that combine photovoltaic and concentrated solar power technologies

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

- 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
- Built two software tools in support of using FW-CADIS for shield design
- Scientific Software Development Committee: leader in developing internal website for sharing software carpentry tools and resources

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

- 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) Karlsruhe, Germany
Visiting Researcher *May 2008 – Dec. 2008*

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

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

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

TEACHING EXPERIENCE

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

- Founder Nuclear Innovation Bootcamp, Su. 2016 - 2020
- NE 250, Nuclear Reactor Theory (graduate-level): Fa. 2015, 2017
- NE 255, Numerical Simulations for Radiation Transport (graduate-level): Fa. 2016
- NE 155, Introduction to Numerical Simulations for Radiation Transport (senior-level elective): Sp. 2014, 2015, 2016, 2017, 2021
- NE 100, Introduction to Nuclear Energy and Techn (junior-level required): Fa. 2020
- NE 198, Faculty sponsor for class in which Berkeley students do hands-on science experiments with students in under-served elementary schools in Oakland: Fa. 2015 - present
- NE 24, Putting the Science in Computational Science (Freshman seminar), Sp. 2015, 2016, 2017

Software Carpentry Scientific Computing Workshops
Instructor

- Jan. 14-15, 2016: git; Berkeley Institute for Data Science
- July 16, 2015: shell; École Polytechnique Fédérale Lausanne
- July 1-2, 2015: shell and Python; for underrepresented minority students; UC, Berkeley
- June 11, 2015: Python; Oak Ridge National Laboratory
- Jan. 5-6, 2015: version control; for women only; University of Colorado, Boulder
- Apr. 14-15, 2014: introductory material, version control, object oriented concepts in Python; for women only; Lawrence Berkeley National Laboratory

Bettis Laboratory Mar. 2012 - Aug. 2014
Instructor *West Mifflin, PA*

- Qualified instructor for Bettis Reactor Engineering School (BRES), an internal school for new DOE-Naval Reactors employees
- Co-taught BRES Shielding course Fa. 2012, 2013, and Sp. 2013

University of Pittsburgh Fa. 2012, Sp. 2013
Adjunct Professor *Pittsburgh, PA*

- Co-taught Introduction to Nuclear Engineering (ENGR 1700), Fa. 2012
- Co-taught *new* course Nuclear Chemistry and Radiochemistry (ENGR 2112), Sp. 2013

SELECTED PRESENTATIONS

"Nuclear in the 2020s: considerations for the decade ahead" **Keynote Speaker**, ARPA-E Annual Fission Meeting. Online. 23 Feb. 2021. (invited)

Panelist for "Flexible Nuclear for Future Energy Systems Webinar." Lucid Catalyst and ClearPath. 5 Aug. 2020. (invited)

Panelist for " Beyond Now: Microreactors and Near Term Demonstrations - Perspectives from the Department of Defense and Department of Energy." Panelist. U. S. WIN Virtual Conference. 28 July 2020. (invited)

Panelist for "Advanced Nuclear Tech in a Decarbonized Energy Future: Feasible or Fantastical?" Duke Energy Initiative lecture series. Online. 14 July 2020. (invited)

Panelist for "Challenges and Opportunities in Thermal Hydraulics of High Temperature Gas Cooled Reactors." American Nuclear Society Annual Meeting. Online. 8 June 2020. (invited)

Panelist for "Building Your Leadership Competency." American Nuclear Society Annual Meeting. Online. 8 June 2020. (invited)

"How Can Nuclear Be Part of a Clean Energy Future?" G20 Workshop on Circular Carbon Economy. Riyadh, KSA. 5 March 2020. (invited)

"Special Update: ARPA-E Nuclear Program Update." Advanced Reactors Summit VII. Knoxville, TN. 11 Feb 2020. (invited)

"How Can Nuclear Energy Be Part of a Clean Energy Future?" Climate Tech Convening 2020. San Francisco, CA. 30 Jan 2020. (invited)

Panelist for "Time to be Inclusive and Pragmatic Before Its Too Late: Advanced nuclear technologies must be a significant part of the solution set." Cleantech Forum. San Francisco, CA. 28 Jan 2020. (invited)

"The Opportunity of Next-Gen Nuclear Energy." Citizen's Climate Lobby, Fairfax Meeting. Annandale, VA. 11 Feb 2020. (invited)

"What is ARPA-E Doing in Nuclear Energy?" Argonne National Laboratory Colloquium. Lemont, IL. 20 November 2019. (invited)

Panelist for "The role of innovation in the civilian and military nuclear energy sectors." The civilian-military nexus and the role of innovation in nuclear energy, Atlantic Council. Washington, DC. 15 Oct 2019. (invited)

"Nuclear and ARPA-E: Activities and Opportunities." NUC Workshop: Innovations in Advanced Reactor Design, Analysis, and Licensing. Raleigh, NC (given remotely). 18 September 2019. (invited)

"Nuclear Energy Programs and Research at Advanced Research Projects Agency-Energy (ARPA-E)." GABI nuclear energy roundtable. Washington, DC. 12 September 2019. (invited)

Panelist for "Future Scientists and Engineers for Nuclear Energy." Third Symposium on US-Japan Nuclear Energy Research Cooperation. Washington, DC. 26 June 2019. (invited)

Panelist for "Lessons from Solar PV." Breakthrough Dialogue 2019 Whole Earth Discipline. Sausalito, CA. 21 June 2019. (invited)

"Computing in Nuclear Engineering: Moving Beyond Today's Limitations." MIT Nuclear Science & Engineering Colloquium. Cambridge, MA. 29 April 2019.

"Creating the Future of Nuclear Energy." CITRIS Research Exchange Seminar Series. Berkeley, CA. 28 Nov. 2018. (invited)

"U.S. Nuclear Innovation System." Commercialisation of Small Nuclear in the UK. Coventry, UK. 6 Nov. 2018. (invited)

"MEITNER: The Newest ARPA-E Program." NASA iTech. New York, NY. 14 June 2018. (invited)

"Deep decarbonization: financing the rapid deployment of innovations after R&D." 2050 Today Panel. San Fancisco, CA. 15 June 2018. (invited)

"Advanced Solvers for Radiation Transport." University of Illinois Urbana Champaign NPRE Dept. Graduate Colloquium. Champaign, IL. 5 Dec. 2017. (invited)

"Nuclear Energy: What Can Analytics Do for Economics and Safety?" **Keynote Speaker**, Industrial Machine Learning Workshop 17. San Francisco, CA. 24 Oct. 2017. (invited)

Panelist for "Alternative energy, nuclear and CCS: What are the prospects?" Low-Emissions Solution Conference at the 5th International Conference on Sustainable Development. New York, NY. 21 Sept. 2017. (invited)

Panelist for "The Case for Nuclear: Communications and Analyzing Risks and Benefits" Aspen Institute Future of Nuclear Energy Roundtable. Aspen, CO. 12 Sept. 2017. (invited)

"Advanced Solvers and Innovation for Penetrating Radiation" **Keynote Speaker**, SPIE Penetrating Radiation Technical Event. San Diego, CA. 8 Aug. 2017. (invited)

"Challenges & Opportunities in Developing an Innovation Culture in Nuclear." Second Annual Third Way Advanced Nuclear Summit Panel. Washington, DC. 21 Feb. 2017. (invited)

"Advancing Reactors with Advanced Solvers and Innovative Programs." Electric Power Research Institute. Research Meeting. Palo Alto, CA. 13 Feb. 2017. (invited)

"Exploring the Advanced Nuclear Ecosystem." SxSW Eco Panel. Austin, TX. 12 Oct. 2016. (invited)

"The Opportunity of Global Nuclear Innovation." 49th Japan Atomic Industrial Forum (JAIF) Annual Conference. Tokyo, Japan. 12 April 2016. (invited)

"Exascaling Nuclear Innovation." **Keynote speaker**, Conference on Data Analysis 2016. Santa Fe, NM. 4 Mar. 2016. (invited)

"Lets Get Real: When can we expect commercial advanced reactors?." The Advanced Nuclear Summit and Showcase Panel. Washington, DC. 27 Jan. 2016. (invited)

"Hybrid Transport Methods for Shielding Challenges." Idaho National Laboratory seminar. Idaho Falls, ID. 20 Nov. 2015. (invited)

K.L. Rowland, R.N. Slaybaugh. "Developments in the GPU-accelerated WARP Monte Carlo Neutron Transport Code." Workshop sur l'utilisation des accélérateurs (GPUs, MICs) pour les simulations Monte-Carlo. École Polytechnique, Saclay, France. 10 July 2015.

"The PyNE Software Library: A Framework for ENSDF?" Nuclear Data Week Meeting. Brookhaven National Laboratory. 6 Nov. 2014.

"The Resonance Factor Method: Accelerating Monte Carlo in the Presence of Space and Energy Self-Shielding." CEA-Saclay Colloquium. Saclay, France. 26 June 2014.

R.N. Slaybaugh, T.M. Evans, P.P.H. Wilson, S.C. Wilson. "Radiation Transport: Computational Methods and Real-World Use." NC State Univ. NE Dept. Graduate Colloquium. Raleigh, NC. 8 Nov. 2012. (invited)

R. Slaybaugh, M. Arbidze, S. Lamichhane, D. O'Connor. "An Evaluation of European Union Energy Policies." UW–Madison Center for World Affairs and the Global Economy Seminar. Madison, WI. 11 May 2011.

R.N. Slaybaugh, T.M. Evans, G.G. Davidson. "Parallel Algorithms for Fixed-Source and Eigenvalue Problems." 2010 SIAM Annual Meeting. Pittsburgh, PA. 12-16 July 2010.

COMPUTER SKILLS

Languages	C++, Python, Fortran 90/95/2003
Versioning and Testing	git, svn, cvs, CTest, GoogleTest, nose, TravisCI
Tools	EC2, Doxygen, LaTeX, MathCAD, Mathematica, shell, vim, bash, Emacs, Jupyter, Trilinos, LAPACK, MPI, Valgrind, cmake
Nuclear Software	Exnihilo, ADVANTG, MCNP, Serpent, SCALE, PyNE, MOOSE

HONORS AND AWARDS

American Nuclear Society (ANS) Young Member Excellence Award	2014
ANS Presidential Citation	2014
Rickover Fellowship	2008-2011
Second Place, 2011 ANS Winter Meeting Poster Session	2011
Selected participant, Modeling Experimentation and Validation Reactor Physics School	Jul. 2011
Selected participant, Energy Hub conference Poster Session	2011
Everitt P. Blizard Memorial Scholarship, ANS	2010-2011
ANS Mathematics and Computation Division Best Summary + Presentation Award	Nov. 2010
Graduate Scholarship, ANS	2009-2010
Selected participant, Lindau Meeting of Nobel Laureates in Physics	2008
Second Place, 2007 ANS Winter Meeting Poster Session	Nov. 2007
Best Paper, Health Physics Track, 2007 ANS Student Conference	2007
Tau Beta Pi Honor Society	2006
Alpha Nu Sigma Honor Society	2005

PROFESSIONAL SERVICE

National Academies of Science member of the Committee on Laying the Foundations for New and Advanced Nuclear Reactors in the United States, 2020-2022

Biden-Harris Transition Team, 2020

Good Energy Collective, Founding Board Chair, 2020-present

Pennsylvania State University, Nuclear Alumni Advisory Council, 2020-2021

University of Michigan, NERS Department Advisory Board, 2019-2021

Nuclear Energy Advisory Committee, Appointed Member, 2016-2017

Senior Fellow of the Breakthrough Institute, 2017-present

Journals, reviews, conference organizing

Nuclear Science and Engineering	Editorial Advisory Board, 2020-present reviewer
Annals of Nuclear Energy	reviewer
Journal of Computational Physics	reviewer
Journal of Nuclear Science and Technology	reviewer
Nuclear Engineering and Design	reviewer
Canadian Innovation Fund	proposal reviewer
Lawrence Livermore National Laboratory	LDRD reviewer
US DOE Consolidated Innovative Nuclear Research	proposal reviewer
US DOE Technology Commercialization Fund	proposal reviewer
Platform for Advanced Scientific Computing (PASC) Conference 21	Papers Domain Co-Chair for Engineering
ANS: Math & Comp, PHYSOR, national meetings	reviewer

American Nuclear Society, National Level

Math and Comp. Division	Chair Rotation 2016-2019; Exec. Comm. 2013-2016
Rad. Protection and Shielding Div.	Exec. Comm. 2015-2018
Young Members Group	Exec. Comm. 2014-2017
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
Professional Women in ANS	Chair 2008-2010, Vice Chair 2006-2008
Board of Directors	Student Member 2007-2009
Other committee service	Membership, Bylaws and Rules, Public Info., 2013 Nominating Comm., 2014 Special Selection Comm. for Nominating Comm. Candidates

Software and Computing

The Hacker Within, UCB and UW (http://thehackerwithin.github.io/berkeley/)	Faculty Advisor 2014-2018; Co-founder 2009
Berkeley Research Computing (http://research-it.berkeley.edu/programs/berkeley-research-computing)	User Advisory Group 2016-present
Software and Data Carpentry (http://software-carpentry.org/)	Instructor since 2013
Berkeley Computing and Computer Science Education Committee	2014-present

Energy and Science

Society of Industrial and Applied Mathematics	Member 2009-2020
Berkeley Energy and Resources Collaborative (BERC)	Advisory Board Member 2017-2021
UCB–ANS	Faculty Advisor 2014-2019
Nuclear Engineering Student Delegation	Co-Vice Chair 2010, Selected 2009
UW–Energy Hub	Conference Speaker Chair 2009, Founding Member 2007,

Education

UC Berkeley Admissions Reader	2021
Berkeley College of Engineering Graduate Education Committee	2014-2017
Berkeley College of Engineering Undergraduate Education Committee	2020-present
Search and promotion committees	member

PUBLICATIONS

Italicized names indicate my students or researchers

A. J. Novak, Sebastian Schunert, Robert Carlsen, Paolo Balestra, Rachel Slaybaugh, Richard Martineau. "Multiscale Thermal-Hydraulic Modeling of the Pebble Bed Fluoride-Salt-Cooled High-Temperature Reactor." *Annals of Nuclear Energy.* **154** (2021) 107968.
https://www.sciencedirect.com/science/article/pii/S0306454920306642

A. J. Novak, R. W. Carlsen, S. Schunert, P. Balestra, R. N. Slaybaugh, and R. C. Martineau. "Pronghorn: A Multidimensional Coarse Mesh Application for Advanced Reactor Thermal-Hydraulics." *Nuclear Technology.* DOI: 10.1080/00295450.2020.1825307
https://www.tandfonline.com/doi/full/10.1080/00295450.2020.1825307

R. Martineau, D. Andrs, R. Carlsen, D. Gaston, J. Hansel, F. Kong, A. Lindsay, C. Permann, A. Slaughter, E. Merzari, R. Hu, *A. Novak*, R. Slaybaugh. "Multiphysics for Nuclear Energy Applications Using a Cohesive Computational Framework." *Nuclear Engineering and Design.* **367** (2020) 1107512.
https://doi.org/10.1016/j.nucengdes.2020.110751
Best research award from ScienceDirect

A. J. Novak, J. W. Peterson, L. Zou, D. Andrš, R. N. Slaybaugh, R. C. Martineau, "Validation of Pronghorn Friction-Dominated Porous Media Thermal-Hydraulics Model with the SANA Experiments." *Nuclear Engineering and Design.* **350** (2019) 182-194.
https://www.sciencedirect.com/science/article/pii/S0029549319301037

Nicholas J. Quartemont, *James E. Bevins*, Lee Bernstein, Rachel Slaybaugh. "Analysis of an Energy Tuning Assembly for Simulating Nuclear Weapon Environments at the National Ignition Facility." *Journal of Radiation Effects.* **38**:1 (2020) 13-26.
https://apps.dtic.mil/sti/pdfs/AD1093191.pdf

Marissa Ramirez de Chanlette, *Weixiong Zheng*, R. N. Slaybaugh. "A Two-Grid and Nonlinear Diffusion Acceleration Method for the SN Equations with Neutron Upscattering." *Journal of Computational Transport Theory.* **49**:1 (2020) 1-14.
https://doi.org/10.1080/23324309.2019.1695631

Mario Ortega, Rachel N Slaybaugh, Peter N Brown, Teresa S Bailey, Britton Chang. "A Rayleigh Quotient Method for Criticality Eigenvalue Problems in Neutron Transport." *Annals of Nuclear Energy.* **138** (2020) 107120.
https://doi.org/10.1016/j.anucene.2019.107120

A. J. Novak, J. W. Peterson, L. Zou, D. Andrš, R. N. Slaybaugh, R. C. Martineau, "Validation of Pronghorn Friction-Dominated Porous Media Thermal-Hydraulics Model with the SANA Experiments." *Nuclear Engineering and Design.* **350** (2019) 182-194.
https://www.sciencedirect.com/science/article/pii/S0029549319301037

Richard Vasques, Leonardo R. C Moraes, Ricardo C Barros, Rachel N Slaybaugh,"A Spectral Approach for Solving the Nonclassical Transport Equation." *Journal Of Computational Physics.* **402** (2020) 109078.
http://arxiv.org/abs/1812.04811
https://www.sciencedirect.com/science/article/pii/S0021999119307831

Madicken Munk, Rachel Slaybaugh, "Review of Hybrid Methods for Deep-Penetration Neutron Transport." *Nuclear Science and Engineering.* **193**:10 (2019) 1055-1089.
https://www.tandfonline.com/doi/full/10.1080/00295639.2019.1586273

J. S. Rehak, L. M. Kerby, M. D. DeHart, R. N. Slaybaugh. "Weighted Delta-Tracking with Scattering," *Nuclear Engineering and Design.* **342** (2019) 231-239.
https://arxiv.org/abs/1802.02237

James Bevins, Zachary Sweger, Ninad Munshi, Bethany Goldblum, Josh Brown, Darren Bleuel, Lee Bernstein, Rachel Slaybaugh. "Performance Evaluation of an Energy Tuning Assembly for Neutron Spectral Shaping." *Nuclear Inst. and Methods in Physics Research, A.* **923** (2019) 79-87.
https://www.sciencedirect.com/science/article/pii/S0168900219300968

Kelly L. Rowland, Cory D. Ahrens, Steven Hamilton, and R.N. Slaybaugh. "Assessment of the Lagrange Discrete Ordinates Equations for Three-Dimensional Neutron Transport" *Nuclear Science and Engineering.* **193**:3 (2019) 233-252.
https://github.com/kellyrowland/ldo-deterministic

James E. Bevins, R.N. Slaybaugh. "Gnowee: A Metaheuristic Optimization Algorithm for Solving Engineering Problems Containing Continuous and Discrete Design Parameters." *Nuclear Technology.* **205**:4 (2019) 542-562.
http://arxiv.org/abs/1804.05429

I. Makine, *R. Vasques*, R.N. Slaybaugh. "Exact Transport Representation of the Classical and Nonclassical Simplified P_N Equations." *Journal of Computational and Theoretical Transport.* **47**:4-6 (2018) 326-349.
https://www.tandfonline.com/doi/abs/10.1080/23324309.2018.1496938

R.N. Slaybaugh, *M. Ramirez-Zweiger*, Tara Pandya, Steven Hamilton, T.M. Evans. "Eigenvalue Solvers for Modeling Nuclear Reactors on Leadership Class Machines," *Nuclear Science and Engineering.* **190** (2017) 31-44.
https://arxiv.org/abs/1708.04928

Jeffery B. Greenblatt, Nicholas R. Brown, Rachel Slaybaugh, Theresa Wilks, Emma Stewart, and Sean T. McCoy. "The Future of Low-Carbon Electricity," *Annual Review of Environment and Resources.* **42** (2017) 289-316.
http://www.annualreviews.org/doi/10.1146/annurev-environ-102016-061138

Ryan M. Bergmann, *Kelly L. Rowland*, *Nikola Radnović*, Rachel N. Slaybaugh, Jasmina L. Vujić. "Performance and Accuracy of Criticality Calculations Performed Using WARP, A Framework for Continuous Energy Monte Carlo Neutron Transport in General 3D Geometries on GPUs," *Annals of Nuclear Energy.* **103** (2017) 334-349.
https://www.sciencedirect.com/science/article/pii/S0306454916309902

Leah E. Morgan, *Madicken Munk*, Brett Davidheiser-Kroll, Nicholas H. Warner, Sanjeev Gupta, Rachel Slaybaugh, Patrick Harkness, Darren F. Mark. "Instrumentation development for planetary in situ $^{40}Ar/^{39}Ar$ geochronology," *Geostandards and Geoanalytical Research.* **41**:3 (2017) 381-396.
https://onlinelibrary.wiley.com/doi/full/10.1111/ggr.12170

R. Vasques, K. Krycki, R. N. Slaybaugh. "Nonclassical Particle Transport in One-Dimensional

Random Periodic Media," *Nuclear Science and Engineering.* **185**:1 (2017) 78-106.
https://arxiv.org/abs/1602.00825

S.C. Wilson and R.N. Slaybaugh. "Improved Monte Carlo Variance Reduction for Space and Energy Self-Shielding," *Nuclear Science and Engineering.* **179**:1 (2015) 22-41.
https://arxiv.org/abs/1502.04749

G.G. Davidson, T.M. Evans, J.J. Jarrell, S.P. Hamilton, T.M. Pandya, and R.N. Slaybaugh, "Massively Parallel, Three-Dimensional Transport Solutions for the k-Eigenvalue Problem," *Nuclear Science and Engineering.* **177**:2 (2014) 111-125.
https://www.tandfonline.com/doi/abs/10.13182/NSE12-101

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.
https://arxiv.org/abs/1612.00907

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**:2 (2010) 171-200.
https://www.tandfonline.com/doi/abs/10.13182/NT171-171

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.
https://www.sciencedirect.com/science/article/pii/S0920379609000076

Refereed Conference Proceedings

Mitch Negus, David Farley, Rachel Slaybaugh. No Data, No Problem. Giving nuclear inspectors better tools without revealing state secrets. Proceedings of ENIGMA, A Usenix Conference in Oakland, CA, Feb 2021.
https://www.usenix.org/conference/enigma2021/presentation/negus

Grey Batie, *Vanessa Goss*, Laura Shi, Christopher Poresky, Lucian Mihalescu, Per Peterson, Rachel Slaybaugh, and Kai Vetter. "Fault Detection Methods To Accurately Detect And Quantify Holdup In Advanced Nuclear Material Recycle Facilities." Proceedings of Institute of Nuclear Materials Management 61st Annual Meeting in Baltimore, MD, July 2020.

Mitch Negus, Rachel Slaybaugh, and David Farley. "Garbled circuits for enabling privacy preserving safeguards." Proceedings of Institute of Nuclear Materials Management 61st Annual Meeting in Baltimore, MD, July 2020.

J. S. Rehak, R. N. Slaybaugh. "Assessing the Effectiveness of Acceleration Methods for Deterministic Neutron Transport Solvers." Proceedings of the 2020 ANS Annual Meeting in Phoenix, AZ (online), June 2020. Transactions vol. 122.

Kelly L. Rowland, Cory D. Ahrens, Steven Hamilton, and R.N. Slaybaugh. "Assessment of the Lagrange Discrete Ordinates Equations for Monte Carlo Variance Reduction Parameter Generation." Proceedings of Joint International Conference on Supercomputing in Nuclear Applications + Monte Carlo 2020 in Tokyo, Japan, May 2020.

N. J. Quartemont, *J. E. Bevins*, R. Slaybaugh, and L. Bernstein, "Analysis of an Energy Tuning Assembly for Simulating Nuclear Weapon Environments at the National Ignition Facility." in Proceedings of the Hardened Electronics and Radiation Technology Conferencei in Melbourne, FL, Nov 2019. [winner Best Student Paper Award]

A.J. Novak, R.N. Slaybaugh, and R.C. Martineau. "Multiscale Core Thermal-Hydraulics Analysis of the Pebble Bed Fluoride-Salt-Cooled High-Temperature Reactor (PB-FHR)." Proceedings of the

The International Conference on Mathematics and Computational Methods applied to Nuclear Science and Engineering in Portland, OR, Aug 2019.

R. Martineau, D. Andrs, R. Carlsen, D. Gaston, J. Hansel, F. Kong, C. Permann, E. Mezari, Rui Hu, *A. Novak*, R. Slaybaugh. "Multiphysics for Nuclear Energy Applications Using a Cohesive Computational Framework." 18th International Topical Meeting on Nuclear Reactor Thermal Hydraulics NURETH in Portland, OR, Aug 18-23, 2019.

April Novak, Josh Peterson, Ling Zou, Rachel Slaybaugh, Rich Martineau. "Porous Media Thermal Hydraulics Simulations of Pebble Bed Nuclear Reactors using Pronghorn." SIAM Conference on Computational Science and Engineering in Spokane, WA, Feb 25 Mar 1, 2019. [invited]
`https://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=66138`

Kelly L. Rowland, Cory Ahrens, Steven Hamilton, Rachel Slaybaugh. "Assessment of the Lagrange Discrete Ordinates Equations for Three-dimensional Neutral Particle Transport." 2019 SIAM Conference on Computational Science and Engineering in Spokane, WA, Feb 25 Mar 1, 2019. [invited]
`https://meetings.siam.org/sess/dsp_talk.cfm?p=96180`

Nicholas J. Quartemont, James E. Bevins, Rachel Slaybaugh, Lee Bernstein. "Development of a Novel National Ignition Facility Platform for Simulating Nuclear Relevant Neutron Environments." IEEE Nuclear Science Symposium and Medical Imaging Conference in Sydney, Australia, Nov 2018.

April J. Novak, Ling Zou, John W. Peterson, Richard C. Martineau, and Rachel N. Slaybaugh. "Pronghorn: Porous Media Thermal-Hydraulics for Reactor Applications." Proceedings of the 2018 ANS Winter Meeting in Orlando, FL, Nov 2018. Transactions vol. 119. [invited]

M. I. Ortega, P. N. Brown, T. S. Bailey, and B. Chang, and R. N. Slaybaugh. "A Rayleigh Quotient Method for Criticality Eigenvalue Problems in Neutron Transport." Proceedings of PHYTRA4 - The Fourth International Conference on Physics and Technology of Reactors and Applications in Marrakech, Morocco, Sept 17-19, 2018. [invited]

Sandra Bogetic, *James E. Bevins*, Lee A. Bernstein, Rachel Slaybaugh, and Jasmina Vujić. "Metaheuristic Optimization Method for Neutron Spectra Shaping." Proceedings of the 2018 ANS June Meeting in Philadelphia, PA, June 2018. Transactions vol. 118.

A. J. Novak, L. Zou, J. W. Peterson, R. C. Martineau, and R. N. Slaybaugh. "Pronghorn: A Porous Media Thermal-Hydraulics Core Simulator and its Validation with the SANA Experiments." Proceedings of the International Congress on Advances in Nuclear Power Plants in Charlotte, NC, Apr 2018.

A. Novak, P. Romano, B. Wendt, R. Rahaman, E. Merzari, L. Kerby, C. Permann, R. Martineau, and R. N. Slaybaugh. "Preliminary Coupling of OpenMC and Nek5000 Within The MOOSE Framework." Proceedings of the PHYSOR 2018 Meeting in Cancun, Mexico, Apr 2018.

I. Makine, *R. Vasques*, and R.N. Slaybaugh. "Exact Transport Representations of the Classical and Nonclassical Simplified P_N Equations." 25th International Conference on Transport Theory, Monterey, CA, 16-20 Oct 2017.

M. I. Ortega, P.N. Brown, T. S. Bailey, R. N. Slaybaugh, and B. Chang. "A Raiyleigh Quotient Method for Solving the Alpha-Eignevalue Problem in Neutron Transport." 25th International Conference on Transport Theory, Monterey, CA, 16-20 Oct 2017.

Marissa Ramirez Zweiger, *Weixiong Zheng*, and R.N. Slaybaugh. "Two-Grid and Nonlinear Diffusion Acceleration Method for the Multigroup S_N Equations with Neutron Upscattering." 25th International Conference on Transport Theory, Monterey, CA, 16-20 Oct 2017.

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