Research Experience

Rachel N. Slaybaugh

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

- Research based in numerical methods for neutral particle transport with an emphasis on supercomputing
- Applications in reactor design, shielding, and nuclear security and nonproliferation

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
- 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 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
- Investigated effects of uncertainty in gamma sources on Monte Carlo transport
- Developed two Monte Carlo source sampling methods for arbitrarily shaped plasma sources; the sources are generated directly from plasma physics data
- Wrote an efficient sampling method for secondary photon sources in the Monte Carlo CAD software library, Direct Accelerated Geometry Monte Carlo (DAGMC)

Knolls Atomic Power Laboratory Summer 2009
Rickover Fellow Practicum *Schenectady, NY*

- Helped couple the Monte Carlo code MC21 to the deterministic code Jaguar via the interface code UNIK for the purpose of variance reduction
- Added weight window capability to MC21
- Investigated and recommended methods for creating weight window values

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

Oak Ridge National Laboratory Summers 2005 & 2006
Summer Intern *Oak Ridge, TN*

- Investigated use of the 3-D deterministic transport code TORT for radiation treatment planning (RTP) when using proper cross sections
- Demonstrated that RTP is possible with TORT, but for limited cases
- Learned about electron transport and created electron cross sections with CEPXS

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