Simon Bolding

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Ph.D. Candidate at Texas A&M University
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Education

Texas A&M University College Station, TX

Ph.D. Nuclear Engineering *2013–Current*

- Projected Defense Date, September 2016
- **DOE Nuclear Energy University Program Fellowship**, 3 years
- Emphasis on hybrid deterministic-Monte Carlo transport methods with finite elements for thermal radiative transfer. Developed in C++ research code.
- GPA: 4.0/4.0, Advisor: Jim E. Morel, Expected Graduation: December 2016

Kansas State University Manhattan, KS

M.S. Nuclear Engineering *2011–2013*

- Thesis on two applications of Monte Carlo simulations: design and proof of concept of a neutron spectrometer and validation of nuclear data with subcritical multiplicity experiments
- GPA: 4.0/4.0, Advisor: Ken Shultis

B.S. Mechanical Engineering with a Nuclear Engineering Option *2007–2011*

- Graduated Summe Cum Laude with a Physics minor
- GPA: 4.0/4.0

Technical Training

Languages	C++, Python, Fortran 90/77
Programs	MCNP5/6, Matlab, Excel, Solidworks, LaTeX
Development Tools	Unix, TotalView, Visual Studio, Git, CMake, Valgrind, UML
Relevant Coursework	Deterministic & Monte Carlo Transport, Finite Element Methods, Multiphysics Coupling, Statistics & Uncertainty Quantification, Engineering Analysis, Finite Differences, Parallel Algorithms
Active Q Clearance	

Awards

Department of Energy Nuclear Energy University Program Fellowship 2012-2015
ANS Graduate Scholarship 2011, 2012
Outstanding Senior of KSU MNE Department Class of 2011 2011
Sigma Pi Sigma - Physics Honor Society 2011
Alpha Nu Sigma - Nuclear Engineering Honor Society 2011

Experience

Lawrence Livermore National Laboratory: WCI Physics Div. Livermore, CA
Graduate Intern *Summer 2015*

- Development and testing of acceleration methods for iterative Implicit Monte Carlo (IMC) method.
- Implemented methods in standalone version of Kull, a production C++ IMC code.
- Applied some OpenMPI parallelization

Los Alamos National Laboratory: CCS-2 Los Alamos, NM
Graduate Intern *Summer 2014*

- Extended steady-state neutronics hybrid-Monte Carlo research code to handle time-dependent, grey **thermal radiative transfer** problems
- Developed methodology for thermal radiation physics, implemented non-linear solution method, and learned **C++ templates** and software development tools such as CMake, OOP design patterns, and simple XML parsing

Los Alamos National Laboratory: XCP-7 Los Alamos, NM
Graduate Intern *Summer 2013*

- Determining a spatially dependent cost function in **MCNP6** for weight-independent **variance reduction techniques**
- Developed and **integrated code** in the MCNP6 source
- Understanding of first and second moments of tally scores for importance map and high-resolution CPU clock timing modules

Los Alamos National Laboratory: XCP-7 Los Alamos, NM
Graduate Intern *Summer 2012*

- Perturbing nuclear data on an energy dependent basis to correct bias by **MCNP** for **subcritical multiplicity simulations**
- Wrote in-depth **Python** modules for modifying Data that **extended object-oriented framework** for nuclear data at LANL
- Applied **statistical sampling methods** for generating new data based on ENDF covariance matrices

Kansas State University Manhattan, KS
Graduate Research Assistant *01/2012–05/2013*

- The Semiconductor Materials and Radiological Technologies research group
- Perform MCNP simulations as needed by the group for design and optimization of detectors, using **Python** scripts to automate optimizations
- Modeling of a Neutron Spectrometer and detection of nuclear devices from a distance, requiring application and automation of **variance reduction** techniques.

Knolls Atomic Power Laboratory: Transport Methods Niskayuna, NY
Intern *Summer 2011*

- Self-guided benchmarking of deterministic transport code in early development stages in Nuclear Data and Methods Unit
- Gained a basic understanding of deterministic transport physics and numerical methods

Knolls Atomic Power Laboratory: Spent Fuel Analysis Niskayuna, NY

Intern *Summer 2010*

- Spent Fuel Analysis Unit. Interacted with requestors to understand scope and objective of project. Learned how to use in-house Monte Carlo code, similar to MCNP, to develop computer models
- Used the models to study fundamental effects on reactivity and tied basic principles of nuclear engineering to practical laboratory applications. Self-initiated side-studies to understand unique conditions found during reactivity studies
- Documented work in technical reports and provided a clear and organized presentation to reactor physics community

Kansas State University: Standoff Bomb Detection Group Manhattan, KS

Undergraduate Researcher *06/2009–05/2011*

- Project Goal was to build a prototype device for detecting improvised explosives from a safe distance using backscattered radiation
- Performed **MCNP5** modeling of experiments for graduate students, creating scripts to automate the making of input files. Performed neutron and photon backscatter experiments.

Refereed Publications and Conference Proceedings

1. S.R. Bolding, M. Cleveland, and J.E. Morel. A High-Order Low-Order Algorithm with Exponentially-Convergent Monte Carlo for Thermal Radiative Transfer. *Nuclear Science & Engineering: M&C 2015 Special Issue*, 2016. Accepted.
2. S.R. Bolding, J. Hansel, J.D. Edwards, R.B. Lowrie, and J.E. Morel. Second-order discretization in space and time for radiation-hydrodynamics. *Journal of Computational Physics*, 2016. Submitted.
3. Simon R. Bolding, Joshua E. Hansel, and Jim E. Morel. Second-Order Discretization in Space and Time for Grey S_2 Radiation-Hydrodynamics. Wurzburg, Germany, September 2015. International Conference on Numerical Methods for Multi-Material Fluid Flow (MULTIMAT).
4. S.R. Bolding, M. Cleveland, and J.E. Morel. A High-Order Low-Order Algorithm with Exponentially-Convergent Monte Carlo for Thermal Radiative Transfer. M&C, 2015.
5. S.R. Bolding and J.E. Morel. A High-Order Low-Order Algorithm with Exponentially-Convergent Monte Carlo for k-Eigenvalue problems. ANS Winter Meeting, 2014.
6. S.R. Bolding and C.J. Solomon. Simulations of Multiplicity Distributions with Perturbations to Nuclear Data. ANS Winter Meeting, 2013.
7. S.R. Bolding. Design of a Neutron Spectrometer and Simulations of Multiplicity Distributions with Nuclear Data Perturbations. Master's thesis, Kansas State University, Manhattan, KS, 2013.
8. B.W. Cooper, D.S. McGregor, S.L. Bellinger, S.R. Bolding, and J.K. Shultis. Portable Neutron Energy Spectrometer Utilizing Microstructured Semiconductor Neutron Detectors. Presented at IEEE NSS/MIC Conference, 2012.
9. K.A. Nelson, S.R. Bolding, A.J. Schmidt, J.K. Shultis, C.D. Wayant, and D.S. McGregor. A simulation of a layered 6Li foil multi-wire proportional counter. IEEE Conf. Proceedings NSS/MIC, N1-94, pp. 207-210, 2012.
10. K. Callender, S Heider, S.R. Bolding, and W.L. Dunn. A Tiered-Filter Approach to the Signature-Based Radiation Scanning Technique for Standoff Detection of Nitrogen-Rich Explosives. Presented at IRRMA 8, 2011.