Andrew Holcomb, Ph.D.

Nuclear Data and Criticality Safety
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Education

Georgia Institute of Technology, Atlanta, GA
Ph.D., Nuclear Engineering, December 2015
Dissertation: *A New Unresolved Resonance Region Methodology*
Minor: Mathematics
Advisors: Dr. Farzad Rahnema, Dr. Luiz Leal

M.S., Nuclear Engineering, December 2013
Thesis: *Development of a Graphical User Interface for the Coarse Mesh Radiation Transport Code COMET and Cross Section Generation with HELIOS*
Advisor: Dr. Farzad Rahnema

University of Florida, Gainesville, FL
B.S., Nuclear and Radiological Engineering, May 2011

Experience

Nuclear Data Analyst, Oak Ridge National Laboratory, Dec. 2017 – Present

- Continue to support maintenance, modernization, and development of AMPX, SAMMY, and SCALE code packages
  - Extending SAMMY code capabilities while maintaining legacy support, including:
    - Implementing the Brune transform to convert between theoretical and observed resonance parameters, adding an alternative R-Matrix representation available for cross section reconstruction
    - Integrated a third-party Coulomb wave function solver package, which is used as the solver when the solution is non-analytic and difficult to obtain
    - Supporting Doppler broadening improvements, shared between AMPX, SAMMY, and SCALE through a shared Application Programming Interface
    - Leveraging SCALE MPI implementation for efficient computation of sensitivity matrix required during the fitting procedure
  - Use AMPX to generate continuous-energy (CE) and multi-group (MG) libraries from ENDF formatted data, perform testing with SCALE using the VALID suite

Postdoctoral Research Associate, Oak Ridge National Laboratory, Jan. 2016 – Nov. 2017

- Facilitated modernization of AMPX, SAMMY, and SCALE code packages
  - Modernized the SAMMY module responsible for reconstructing energy-differential and double-differential cross sections from the R-Matrix Limited format (SAMRML)
  - Rewrote the AMPX module used to reconstruct one-dimensional neutron cross sections from discrete sets of resonance parameters (POLIDENT)

- Revamped the AMPX PLATINUM module to take advantage of the new HDF5 format to reduce on-disk storage requirements for continuous-energy neutron transport

Graduate Research Assistant, Georgia Institute of Technology, Aug. 2011 – Dec. 2015

- Constructed a graphical user interface for the coarse mesh radiation transport (COMET) code, greatly easing the task of input file creation and providing a capability to post-process COMET output files to generate Tecplot input files for plotting
- Used HELIOS to generate six-group cross-section libraries for a modular high temperature gas reactor benchmark problem
- Interned at Oak Ridge National Lab (ORNL) through the Nuclear Engineering Science Laboratory Synthesis (NESLS) program and updated the legacy SAMRML FORTRAN code to a modern C++ implementation in AMPX to reconstruct angular-differential and energy-differential cross sections directly from evaluated resonance parameters
- While completing doctoral studies, interned at ORNL from December 2013 to December 2015 developing a new AMPX module that uses a Reich-Moore based methodology to construct probability tables in the unresolved resonance region

UFTR Digital Upgrade Fellow, University of Florida
October 2009 – July 2011

- Assisted in licensing a digital control system upgrade to the University of Florida Training Reactor (UFTR).
- Generated reactor safety system layouts using Areva's SPACE program
- Assisted in the UFTR's rebuild, including fuel storage and refueling activities

Skills & Abilities

- Proficient in C++ and FORTRAN, with experience in Python and MATLAB
- Experienced in developing production-level code in large-scale, scientific software systems
- Familiarity with version control systems, including Mercurial and Git
- Strong background in iterative methods for linear and nonlinear systems

Selected Publications and Presentations

1. **A. Holcomb**, L. Leal, F. Rahnema, D. Wiarda, and G. Arbanas, "Reconstructing Double-differential and Energy-differential Resonance Cross Sections Using the R-Matrix Limited Formalism in the AMPX Code," *Trans. Am. Nucl. Soc.* (2014).
2. **A. Holcomb**, L. Leal, F. Rahnema, D. Wiarda, and G. Arbanas, "Development and Testing of a New Unresolved Resonance Region Analysis Methodology," Nuclear Criticality Safety Technical Program Review (2015).
3. **A. Holcomb**, L. Leal, F. Rahnema, and D. Wiarda, "Development of a New Unresolved Resonance Region Analysis Methodology," Nuclear Criticality Safety Technical Program Review (2016).

4. G. Arbanas, V. Sobes, **A. Holcomb,** P. Ducru, M. Pigni, and D. Wiarda, "Generalized Reich-Moore *R*-matrix Approximation," EPJ Web of Conferences: ND 2016 International Conference on Nuclear Data for Science and Technology (2016).
5. D. Wiarda, **A. Holcomb**, S. Hart, C. Celik, and M. Dunn, "AMPX Modernization for SCALE Nuclear Data Libraries," ORNL/LTR-2016/584 (2016).
6. **A. Holcomb**, L. Leal, F. Rahnema, and D. Wiarda, "A New Method for Generating Probability Tables in the Unresolved Resonance Region," *Nucl. Sci. and Eng.*, **186**:147-155 (2017).
7. D. Wiarda, **A. Holcomb**, S. Hart, C. Celik, and M. Dunn, "AMPX Modernization for SCALE Nuclear Data Libraries," ORNL/LTR-2017/160 (2017).
8. **A. Holcomb,** D. Wiarda, and W. J. Marshall, "ENDF/B-VIII.0 Testing with AMPX and SCALE", Nuclear Criticality Safety Division Topical (2017).
9. M. Pigni, S. Croft, and **A. Holcomb**, "n+^{16}O Evaluation within the CIELO Collaboration: Oak Ridge National Laboratory," Nuclear Data Sheets, (2018, expected).