

# Kathryn D. Huff

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CONTACT INFORMATION	Department of Nuclear Engineering, University of California, Berkeley Postdoctoral Scholar, <i>Nuclear Science and Security Consortium</i> Data Science Fellow, <i>Berkeley Institute for Data Science</i>	mobile: (281) 734-1342 e-mail: kathyhuff@gmail.com website: kathyhuff.github.com
RESEARCH INTERESTS	Advanced nuclear reactors and fuel cycles, multi-physics simulation, nuclear fuel cycle analysis, scientific computation.	
POSTDOC	<b>University of California - Berkeley, NUCLEAR ENGINEERING</b> • PIs: Professor Jasmina Vujic, Professor Per Peterson, Professor Saul Perlmutter	<b>Sep 2013 – Aug 2015</b>
PHD	<b>University of Wisconsin - Madison, NUCLEAR ENGINEERING</b> • An Integrated Used Fuel Disposition and Generic Repository Model for Fuel Cycle Analysis • Advisor: Professor Paul P.H. Wilson	<b>Aug 2008 – Aug 2013</b>
BA	<b>University of Chicago, PHYSICS</b> • Celestial Gain Calibrations of QUIET Telescope Polarimeters	<b>Aug 2004 – June 2008</b>
HONORS AND AWARDS	National Energy Research Scientific Computing Allocation, Senior Investigator. Data Science Fellowship, Berkeley Institute for Data Science, UC Berkeley. Nuclear Science and Security Consortium Postdoctoral Fellowship, UC Berkeley. DOE Office of Science Laboratory Graduate Appointment, Argonne National Lab. Roy G. Post Foundation Nuclear Waste Management Graduate Scholarship. John Randall Memorial Scholarship, American Nuclear Society FCWMD. J.A. McDeavitt Scholarship, University of Chicago, Chicago, IL. University Scholar Award, University of Chicago, Chicago, IL. Los Alamos Distinguished Student Performance Award, Los Alamos National Lab.	<b>2015–2016</b> <b>2014–2016</b> <b>2013–2016</b> <b>2011–2013</b> <b>2011</b> <b>2009</b> <b>2007–2008</b> <b>2004–2008</b> <b>2004</b>
RESEARCH EXPERIENCE	<b>University of California - Berkeley, NE Dept., Berkeley, CA</b> <i>Postdoctoral Scholar, Nuclear Science and Security Consortium</i> <i>Data Science Fellow, Berkeley Institute for Data Science</i> Developing computational tools and multiphysics models for advanced reactor safety analysis.  <b>Argonne National Laboratory, Argonne, IL</b> <i>Laboratory Graduate Research Appointee, Used Fuel Disposition Campaign</i> Developed a used fuel disposition and generic repository computational model.  <b>University of Wisconsin - Madison, NEEP Dept., Madison, WI</b> <i>Graduate Research Assistant, Computational Nuclear Engineering Research Group</i> Developed and applied CYCLUS, a nuclear fuel cycle systems analysis tool.  <b>Idaho National Laboratory, Idaho Falls, ID</b> <i>Graduate Research Assistant, Systems Analysis Campaign</i> Developed software functions and requirements for the Fuel Cycle Simulator concept.  <b>Kavli Institute For Cosmological Physics, Chicago, IL</b> <i>Research Assistant, Laboratory for Astrophysics and Space Research</i> Programmed & machined instrumentation. Planned protocol for QUIET polarimeter calibration.  <b>Universidad de Chile, Physics Dept., Santiago, Chile</b> <i>Research Assistant, Chicago-Chile Research Exchange Program</i> Constructed and operated a far from equilibrium granular materials experiment.  <b>Los Alamos Neutron Science Center, Los Alamos, NM</b> <i>Research Assistant, LANSCE-3</i> Applied digital filtration algorithms and MCNPX models to experimental data.	<b>Sept 2013 – Present</b> <b>Aug 2014 – Present</b>  <b>June 2011 – Aug 2013</b>  <b>June 2008 – Aug 2013</b>  <b>June – Aug 2010</b>  <b>Jan 2005 – June 2008</b>  <b>June – Sept 2006</b>  <b>June – Sept 2004</b> <b>May – Aug 2003</b>

- BOOKS [1] Scopatz, A., **Huff, K.** “Effective Computation in Physics: Field Guide to Research in Python” O’Reilly Media. 2015. [shop.oreilly.com/product/0636920033424.do](http://shop.oreilly.com/product/0636920033424.do).
- JOURNAL PUBLICATIONS [2] Aruliah, D.A., Brown, C.T., Chue Hong, N.P., Davis, M., Guy, R.T., Haddock, S.H.D., **Huff, K.**, Mitchell, I., Plumbley, M., Waugh, B., White, E.P., Wilson, G.V., and Wilson, P.P.H. “Best Practices For Scientific Computing.” **PLOS Biology**, Vol 1, Issue 12, 2014. [dx.doi.org/10.1371/journal.pbio.1001745](https://doi.org/10.1371/journal.pbio.1001745)
- [3] Clerc, M., Dunstan, J., **Huff, K.**, Mujica, N., Varas, G. “Liquid-Solid-Like Transition in Quasi-One-Dimensional Driven Granular Media ”, **Nature Physics**, Vol 4, 249 - 254, 2008.
- SUBMITTED [4] **Huff, K.** “Rapid Methods for Radionuclide Contaminant Transport in Nuclear Fuel Cycle Simulation”, 2015. (**submitted**)
- [5] **Huff, K.**, Gidden, M., Carlsen, R., Flanagan, R., McGarry, M., Opotowsky, A., Rakhimov, O., Welch, Z., Schneider, E., Scopatz, A., Wilson, P. “Fundamental Concepts in the CYCLUSFuel Cycle Simulator Framework and Modeling Ecosystem”, 2015. (**submitted**) [github.com/cyclus/fundamentals-paper](https://github.com/cyclus/fundamentals-paper)
- [6] Scopatz, A., Gidden, M., Carlsen, R., Flanagan, R., **Huff, K.**, McGarry, M., Opotowsky, A., Rakhimov, O., Welch, Z., Wilson, P. “CYCLUSArchetypes”, 2015. (**submitted**) [github.com/cyclus/archetype-paper](https://github.com/cyclus/archetype-paper)
- REFEREED CONFERENCE PUBLICATIONS [7] Krumwiede, D.L., Andreades, C., Choi, J.K., Cisneros, A.T., Huddar, L., **Huff, K.**, Laufer, M.D., Munk, M., Scarlat, R.O., Seifried, J.E., Zweibaum, N., Greenspan, E., and Peterson, P.F. “Design of the Mark-I Pebble-Bed, Fluoride-Salt-Cooled, High-Temperature Reactor Commercial Power Plant,” Paper 14231. **Proceedings of ICAPP**, Charlotte, NC. April 2014.
- [8] **Huff, K.** “CYCLUSFuel Cycle Simulation Capabilities with the Cyder Disposal System Model,” Paper 7730. **Proceedings of Global**, Salt Lake City, UT. October 2013.
- [9] Gidden, M., Wilson, P., **Huff, K.**, Carlsen, R. “An Agent-Based Framework for Fuel Cycle Simulation with Recycling,” Paper 7737. **Proceedings of Global**, Salt Lake City, UT. October 2013.
- [10] **Huff, K.**, Nutt, M. “Hydrologic Nuclide Transport Models in Cyder, a Geologic Disposal Software Library,” Paper 13328. **Proceedings of the Waste Management Symposium**, Phoenix, AZ. February 2013.
- [11] Oliver, K.M., Wilson, P.P.H., Reveillere, A., **Huff, K.** “Studying international fuel cycle robustness with the GENIUSv2 discrete facilities/materials fuel cycle systems analysis tool ”, Paper 9166. **Proceedings of Global**, Paris, France. 2009.
- [12] Rochman, D., Haight, R. C., Wender, S. A., O’Donnell, J. M., Michaudon, A., **Huff, K.**, Vieira, D. J., Bond, E., Rundberg, R.S., Kronenberg, A., Wilhelmy, J., Bredeweg, T. A., Schwantes, J., Ethvignot, T., Granier, T., Petit, M., Danon, Y. “First Measurements with a Lead Slowing-Down Spectrometer at LANSCE,” **AIP Conference Proceedings, International Conference on Nuclear Data for Science and Technology**. Volume 769. 2005.
- CONFERENCE PUBLICATIONS [13] **Huff, K.**, Fratoni, M., Greenberg, H. “Extensions to the CYCLUS Ecosystem in Support of Market-Driven Transition Capability” **Transactions of the American Nuclear Society Winter Conference**. Anaheim, CA. November 2014.
- [14] Bates, C., Biondo, E., **Huff, K.**, Kiesling, K., Scopatz, A. “PyNE Progress Report” **Transactions of the American Nuclear Society Winter Conference**. Anaheim, CA. November 2014.
- [15] **Huff, K.**, Bara, A. “Dynamic Determination of Thermal Repository Capacity For Fuel Cycle Analysis.” **Transactions of the American Nuclear Society Annual Conference**. Atlanta, GA. June 2013.
- [16] **Huff, K.**, Nutt, M. “Key Processes and Parameters in a Generic Clay Disposal System Model.” **Transactions of the American Nuclear Society Winter Conference**. San Diego, CA. November 2012.
- [17] Scopatz, A.M., Romano, P.K., Wilson, P.P.H., **Huff, K.** “PyNE: Python For Nuclear Engineering.” **Transactions of the American Nuclear Society Winter Conference**. San Diego, CA. November 2012.

- [18] **Huff, K.**, Bauer, T. “Numerical Calibration of an Analytical Generic Nuclear Repository Heat Transfer Model.” **Transactions of the American Nuclear Society Annual Conference**. Chicago, IL. June 2012.
- [19] **Huff, K.**, Gidden, M., Wilson, P.P.H. “Open architecture and modular paradigm of CYCLUS, a fuel cycle simulation code.” **Transactions of the American Nuclear Society Annual Conference**. Hollywood, FL. June 2011.
- [20] **Huff, K.**, Scopatz, A., Preston, N., Wilson, P.P.H. “Rapid Peer Education of a Computational Nuclear Engineering Skill Suite.” **Transactions of the American Nuclear Society Annual Conference**. Hollywood, FL. June 2011.
- [21] **Huff, K.** “CYCLUS: An Open, Modular, Next Generation Fuel Cycle Simulator Platform. ” (poster) **Waste Management Symposium**. Phoenix, AZ. March 2011.
- [22] **Huff, K.**, “MOX Fuel Recipe Approximation Tests in GENIUSv2. ” **Proceedings of the American Nuclear Society Student Conference**. Ypsilanti, MI. April 2010.
- [23] **Huff, K.**, Oliver, K., Wilson, P.P.H. “GENIUSv2 Discrete Facilities/Materials Modeling of International Fuel Cycle Robustness. ” **Transactions of the American Nuclear Society Winter Conference**. Washington D.C. November 2009.
- [24] **Huff, K.**, Wilson, P.P.H., Oliver, K. “GENIUS Version 2: Modelling the Worldwide Nuclear Fuel Cycle.” (poster) **eHub Conference**. University of Wisconsin - Madison. November 2009.
- SOFTWARE PRODUCTS [25] Carlsen, R., Gidden, M. **Huff, K.**, Opotowsky, A., Rakhimov, O., Scopatz, A., Welch, Z., Wilson, P. “CYCLUSv1.0.0.” **figshare**. <http://dx.doi.org/10.6084/m9.figshare.1041745>. June 2014.
- [26] Carlsen, R., Gidden, M. **Huff, K.**, Opotowsky, A., Rakhimov, O., Scopatz, A., Welch, Z., Wilson, P. “Cycamore v1.0.0.” **figshare**. <http://dx.doi.org/10.6084/m9.figshare.1041829>. June 2014.
- TECHNICAL REPORTS [27] C. Andreades, A. T. Cisneros, J.K. Choi, A.Y.K. Chong, D. L. Krumwiede, L.R. Huddar, **K. Huff**, M. R. Laufer, M.O. Munk, R.O. Scarlat, J. Seifried, N. Zweibaum, E. Greenspan, and P. F. Peterson, “Technical Description of the Mark 1 Pebble-Bed Fluoride-Salt-Cooled High-Temperature Reactor (PB-FHR) Power Plant,” **Department of Nuclear Engineering, U.C. Berkeley**, Report UCBTH-14-002, 2014.
- [28] **Huff, K.**, Nutt, W.M. “FY12 Sensitivity Studies Using the UFD Clay Generic Disposal System Model.” **Argonne National Laboratory**. July 2012.
- [29] **Huff, K.**, Bauer, T.H. “Benchmarking a New Closed-Form Thermal Analysis Technique Against a Traditional Lumped Parameter, Finite-Difference Method” **Argonne National Laboratory**. (FCRD-UFD-2012-000142). July 2012.
- [30] **Huff, K.**, Dixon, B., Braase, L. “Next Generation Fuel Cycle Simulator Functions and Requirements Document.” **Idaho National Laboratory** (FCRD-SYSA-2010-000110). July 2010.
- [31] **Huff, K.** “Digital Filtering Application to the Lead Slowing Down Spectrometer.” Los Alamos Neutron Science Center. August 2004. (**awarded los alamos distinguished student award.**)
- [32] **Huff, K.** “Excess Single Event Effects in the Second Chip of a Series.” Los Alamos Neutron Science Center. August 2003.
- OTHER PUBLICATIONS [33] **Huff, K.** An Integrated Used Fuel Disposition and Generic Repository Model for Fuel Cycle Analysis. Ph.D. Dissertation–Nuclear Engineering and Engineering Physics. University of Wisconsin – Madison. August 2013.
- [34] **Huff, K.** An Integrated Used Fuel Disposition and Generic Repository Model. Ph.D. Preliminary Examination–Nuclear Engineering and Engineering Physics. University of Wisconsin – Madison. September 2011.
- [35] **Huff, K.** “Celestial Calibrations of the Quiet Telescope.” Undergraduate Honors Thesis. University of Chicago. June 2008.
- [36] Biris, O., Gracey, K., **Huff, K.**, Ng, W.K. “An Analysis of the Consolidated Fuel Treatment Center Nuclear Reprocessing Initiative.” **Big Problems Energy Seminar**. **University of Chicago**. June 2008.

ENGINEERING TEACHING	<b>University of California - Berkeley</b> , DEPT. OF NUCLEAR ENGINEERING <i>NE 255, Numerical Simulation in Radiation Transport</i> Best Practices in Computational Nuclear Engineering	<b>Sept 11, 2014</b>
	<b>University of Wisconsin - Madison</b> , DEPT. OF NUCLEAR ENGINEERING <i>NE 571, Economic and Environmental Aspects of Nuclear Energy</i> Nuclear Waste Repository Technology, Policy, and History	<b>Apr 1&amp;3, 2013</b>
	<b>University of Wisconsin - Madison</b> , DEPT. OF NUCLEAR ENGINEERING <i>NE 406, Nuclear Reactor Analysis</i> UNIX Shell, Basic Scripting, Environment Variables, Permissions, Regular Expressions, Makefiles	<b>Sept 9&amp;11, 2009</b>
	<b>University of Wisconsin - Madison</b> , DEPT. OF NUCLEAR ENGINEERING <i>NE 506, Practicum in Monte Carlo Radiation Transport</i> UNIX Shell, Basic Scripting, Environment Variables, Permissions, Regular Expressions, Makefiles	<b>Feb 10, 2010</b>
SCIENTIFIC COMPUTING TEACHING	<b>University of Split (invited)</b> , Split, Croatia G-Node Advanced Scientific Programming in Python Summer School	<b>Sept 8–13, 2014</b>
	<b>Lawrence Berkeley National Laboratory</b> , Berkeley, CA Women in Science and Engineering Bootcamp	<b>Apr 14–15, 2014</b>
	<b>SciPy Conference (invited)</b> , Austin, TX Version Control and Unit Testing For Scientific Software	<b>Jun 25, 2013</b>
	<b>University of Chicago, Graduate School (invited)</b> , Chicago, IL Computational Literacy Workshop	<b>Jan 12–13, 2013</b>
	<b>University of California, Berkeley (invited)</b> , Berkeley, CA Department of Statistics Scientific Computing Workshop	<b>Oct 20–21, 2012</b>
	<b>Lawrence Berkeley National Laboratory (invited)</b> , Berkeley, CA Software Carpentry Python Workshop	<b>Oct 17–18, 2012</b>
	<b>The University of Chicago</b> , Chicago, IL Software Carpentry Scientific Computing Workshop	<b>Apr 2–3, 2012</b>
	<b>International Center for Theoretical Physics (invited)</b> , Trieste, Italy UNESCO/IAEA Advanced School on Scientific Software Development	<b>Feb 20–Mar 2, 2012</b>
	<b>University of Toronto (invited)</b> , Toronto, ON, Canada SciNet Consortium For High Performance Computing Software Carpentry Bootcamp	<b>Nov 7–8, 2011</b>
	<b>American Nuclear Society Winter Meeting (invited)</b> , Washington, D.C. Young Professionals Congress Hacker Within Scientific Computing Tutorial	<b>Nov 1, 2011</b>
	<b>Michigan State University (invited)</b> , East Lansing, MI Institute for Cyber Enabled Research (iCER) and BEACON Center THW Bootcamp	<b>June 4–5, 2011</b>
	<b>The University of Wisconsin</b> , Madison, WI The Hacker Within Software Carpentry Bootcamp	<b>Jan 12–14, 2011</b>
	<b>The University of Wisconsin</b> , Madison, WI The Hacker Within Python Bootcamp	<b>Jan 12–14, 2010</b>
	<b>The University of Wisconsin</b> , Madison, WI The Hacker Within C++ Bootcamp	<b>Mar 24–31, 2009</b>
	<b>The University of Wisconsin</b> , Madison, WI University of Wisconsin, Hacker Within UNIX Bootcamp	<b>Jan 12–15, 2009</b>

SCIENTIFIC COMPUTING SKILLS	<b>Languages</b>	bash/csh, C++, FORTRAN, Perl, Python, XML.
	<b>Build Systems</b>	make, CMake, automake.
	<b>Databases</b>	HDF5, SQL.
	<b>Test Frameworks</b>	CTest, GoogleTest, nose.
	<b>Version Control</b>	cvs, git, hg, svn.
	<b>Other Tools</b>	Doxygen, Sphinx, GoldSim, L <sup>A</sup> T <sub>E</sub> X, MathCAD, Mathematica, MatLab, MCNP.

PROFESSIONAL SERVICE	<b>Vice Chair</b> , Fuel Cycle & Waste Management Division, ANS.	<b>2015–2016</b>
	<b>Chair</b> , Steering Committee, Software Carpentry Foundation.	<b>2014–2015</b>
	<b>Editor</b> , Proceedings of the SciPy Scientific Python Conference.	<b>2015</b>
	<b>Secretary–Treasurer</b> , Fuel Cycle & Waste Management Division, ANS.	<b>2013–2015</b>
	<b>Secretary</b> , Young Members Group, ANS.	<b>2013–2014</b>
	<b>Technical Program Co-Chair</b> , SciPy, Scientific Python Conference.	<b>2013–2014</b>
	<b>Member</b> , Next Generation Leadership Committee, Waste Management Symposium.	<b>2013–2014</b>
	<b>Moderator, Organizer, Panelist</b> , inSCIght Scientific Computing Podcast.	<b>2011–2013</b>
	<b>Editor</b> , Proceedings of the SciPy Scientific Python Conference.	<b>2013</b>
	<b>Co-Founder</b> , Nuclear Pride, LGBTQA Organization.	<b>2011–2013</b>
	<b>Co-Founder, Treasurer, President</b> , Hacker Within Scientific Computing Group.	<b>2008–2011</b>
	<b>Governor, Treasurer</b> , University of Wisconsin ANS student section.	<b>2008–2010</b>

REFERENCES	Available upon request
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