Kathryn D. Huff

Contact Information

Department of Nuclear Engineering, University of California, Berkeley
Postdoctoral Scholar, *Nuclear Science and Security Consortium*
Data Science Fellow, *Berkeley Institute for Data Science*

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Research Interests

Advanced nuclear reactors and fuel cycles, multi-physics simulation, nuclear fuel cycle analysis, scientific computation.

Education

University of Wisconsin, Madison, WI
Doctor of Philosophy Nuclear Engineering — **Aug 2008 – Aug 2013**

University of Chicago, Chicago, IL
Bachelor of Arts and Sciences Physics — **Aug 2004 – June 2008**

Honors and Awards

National Energy Research Scientific Computing Allocation, Senior Investigator	**2015–2016**
Data Science Fellowship, Berkeley Institute for Data Science, UC Berkeley	**2014–2016**
Nuclear Science and Security Consortium Postdoctoral Fellowship, UC Berkeley	**2013–2016**
DOE Office of Science Laboratory Graduate Appointment, Argonne National Lab	**2011–2013**
Roy G Post Foundation Nuclear Waste Management Graduate Scholarship	**2011**
John Randall Memorial Scholarship, American Nuclear Society FCWMD	**2009**

Research Experience

University of California - Berkeley, NE Dept., Berkeley, CA
Postdoctoral Scholar, Nuclear Science and Security Consortium — **Sept 2013 – Present**
Data Science Fellow, Berkeley Institute for Data Science — **Aug 2014 – Present**
Developing computational tools and multiphysics models for advanced reactor safety analysis.

Argonne National Laboratory, Argonne, IL — **June 2011 – Aug 2013**
Laboratory Graduate Research Appointee, Used Fuel Disposition Campaign
Developed a used fuel disposition and generic repository computational model.

University of Wisconsin - Madison, NEEP Dept., Madison, WI — **June 2008 – Aug 2013**
Graduate Research Assistant, Computational Nuclear Engineering Research Group
Developed and applied Cyclus, a nuclear fuel cycle systems analysis tool.

Idaho National Laboratory, Idaho Falls, ID — **June – Aug 2010**
Graduate Research Assistant, Systems Analysis Campaign
Developed software functions and requirements for the Fuel Cycle Simulator concept.

Kavli Institute For Cosmological Physics, Chicago, IL — **Jan 2005 – June 2008**
Research Assistant, Laboratory for Astrophysics and Space Research
Programmed & machined instrumentation. Planned protocol for QUIET polarimeter calibration.

Universidad de Chile, Physics Dept., Santiago, Chile — **June – Sept 2006**
Research Assistant, Chicago-Chile Research Exchange Program
Constructed and operated a far from equilibrium granular materials experiment.

Los Alamos Neutron Science Center, Los Alamos, NM — **June – Sept 2004**
Research Assistant, LANSCE-3 — **May – Aug 2003**
Applied digital filtration algorithms and MCNPX models to experimental data.

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`.

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`

[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 Cyclus Fuel Cycle Simulator Framework and Modeling Ecosystem", 2015. **(submitted)** `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. "Cyclus Archetypes", 2015. **(submitted)** `github.com/cyclus/archetype-paper`

Refereed Conference Proceedings

[7] Greenberg, H., Fratoni, M., Djokic, D., **Huff, K.**, Nibbelink, R., Scopatz, A. "The Application of CYCLUS to Fuel Cycle Transition Modeling" Paper 5061. **Proceedings of Global**, Paris, France. September 2015.

[8] **Huff, K.**, "PyRK: Python for Reactor Kinetics." **Proceedings of the 14th Python in Science Conference**, Austin, TX. July 2015.

[9] 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.

[10] **Huff, K.** "Cyclus Fuel Cycle Simulation Capabilities with the Cyder Disposal System Model," Paper 7730. **Proceedings of Global**, Salt Lake City, UT. October 2013.

[11] 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.

[12] **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.

[13] 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.

[14] 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.

Software Products

[15] Carlsen, R., Gidden, M. **Huff, K.**, Opotowsky, A., Rakhimov, O., Scopatz, A., Welch, Z., Wilson, P. "Cyclus v1.0.0." **figshare.** http://dx.doi.org/10.6084/m9.figshare.1041745. June 2014.

[16] 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.

Scientific Computing Skills

Languages	bash/csh, C++, FORTRAN, Perl, Python, XML
Build Systems	make, CMake, automake
Databases	HDF5, SQL
Test Frameworks	CTest, GoogleTest, nose
Version Control	cvs, git, hg, svn
Nuclear	Cyclus, MCNP5/6/X, MOOSE, ORIGEN, PyNE, Serpent, VISION.
Other Tools	Doxygen, Sphinx, GoldSim, LaTeX, MathCAD, Mathematica, MatLab, MCNP

Professional Service

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