Kathryn D. Huff

Contact Information

Associate Professor
Dept. of Nuclear, Plasma, and Radiological Engineering
University of Illinois at Urbana-Champaign

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Research Interests

Advanced nuclear reactors and fuel cycles, multi-physics simulation, energy systems analysis, scientific computation, nuclear energy policy.

PhD

University of Wisconsin - Madison, Nuclear Engineering — **Aug 2008 – Aug 2013**

- An Integrated Used Fuel Disposition and Generic Repository Model for Fuel Cycle Analysis
- Advisor: Professor Paul P.H. Wilson

BA

University of Chicago, Physics — **Aug 2004 – Jun 2008**

- Celestial Gain Calibrations of QUIET Telescope Polarimeters

Research and Professional Experience

University of Illinois at Urbana-Champaign, Urbana, IL
Associate Professor, Nuclear Plasma and Radiological Engineering — **Sep 2021 – Present**
Affiliate Faculty, National Center for Supercomputing Applications — **Aug 2016 – Present**
Affiliate Faculty, Computational Science and Engineering — **Aug 2018 – Present**
Director, Advanced Reactors and Fuel Cycles group.

Office of Nuclear Energy, Department of Energy, Washington, DC
Assistant Secretary, Nuclear Energy — **May 2022 – May 2024**
Senior Advisor to the Secretary, Nuclear Energy — **Jan 2022 – May 2022**
Acting Assistant Secretary, Nuclear Energy — **May 2021 – Jan 2022**
Principal Deputy Assistant Secretary, Nuclear Energy — **May 2021 – Jan 2022**
Presidentially appointed, Senate Confirmed Official leading the Office of Nuclear Energy
On extended Unpaid Leave of Absence from the University of Illinois.

University of Illinois at Urbana-Champaign, Urbana, IL
Blue Waters Assistant Professor — **Aug 2016 – Sep 2021**
Principal Investigator, Advanced Reactors and Fuel Cycles group.

University of California - Berkeley, NE Dept., Berkeley, CA
Postdoctoral Scholar, Nuclear Science and Security Consortium — **Sep 2013 – Jul 2016**
Data Science Fellow, Berkeley Institute for Data Science — **Aug 2014 – Jul 2016**
Developing computational tools and multiphysics models for advanced reactor safety analysis.

Argonne National Laboratory, Argonne, IL — **Jun 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 — **Jun 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 — **Jun – 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 – Jun 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 — **Jun – Sep 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 **Jun – Sep 2004**
Research Assistant, LANSCE-3 **May – Aug 2003**
Applied digital filtration algorithms and MCNPX models to experimental data.

Honors and Awards

Warren K. Sinclair Medal, National Countil on Radiaton Protection	**2024**
Secretary's Honor Awards, Pathways to Commercial Liftoff Team, U.S. Department of Energy	**2024**
Presidential Nomination & Senate Confirmation, Assistant Secretary for Nuclear Energy	**2022**
Stanley H. Pierce Award, UIUC Engineering Council	**2019**
American Nuclear Society, Oestmann Professional Women's Achievement Award	**2017**
AE3, Collins Scholars Program Graduate	**2017**
NPRE, Students Award for Excellence in Undergraduate Teaching	**2017**
UIUC, Teachers Ranked as Excellent	**F 2016, S 2020**
American Nuclear Society, Young Member Excellence Award	**2016**
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**
J.A McDeavitt Scholarship, University of Chicago, Chicago, IL	**2007–2008**
University Scholar Award, University of Chicago, Chicago, IL	**2004–2008**
Los Alamos Distinguished Student Performance Award, Los Alamos National Lab	**2004**

Grants Awarded

Nuclear Science and Security Consortium[1] *Period:* 2021–2026
Source: DOE-NNSA Office of DNN R&D *Award Total:* $25,000,000
Role: Consortium Co-PI, UIUC PI, Thrust Area Lead *Huff Allocation:* **$625,000**

Evaluation of micro-reactor requirements and performance in an existing well-characterized micro-grid[1] *Period:* 2020–2022
Source: DOE-NEUP *Award Total:* $800,000
Role: Co-PI *Huff Allocation:* **$265,000**

Enabling Load Following Capability in the Transatomic Power MSR[1] *Period:* 2018–2021
Source: ARPA - E - MEITNER *Award Total:* **$999,694**
Role: **Principal Investigator** *Huff Allocation:* $205,000

US Research Software Sustainability Institute (URSSI) *Period:* 2017–2018
Source: NSF - OAC - SI2 - S2I2 Conceptualization *Award Total:* $499,999
Role: Senior Personnel *Huff Allocation:* **N/A**

Dynamic Transition Analysis with TIMES *Period:* 2018–2019
Source: I^{2}CNER *Award Total:* $76,359
Role: Co-PI *Huff Allocation:* **$76,359**

Investigation of Agricultural Uses of Nuclear Waste Heat *Period:* 2017–2018
Source: Exelon *Award Total:* $151,257
Role: Co-PI *Huff Allocation:* **$11,678**

Consortium for Verification Technology *Period:* 2015–2020
Source: DOE-NNSA Office of DNN R&D *Award Total:* $25,000,000
Role: Consortium Co-PI, UIUC PI, CVT Investigator *Huff Allocation:* **$347,000**

Consortium for Nonproliferation Enabling Capabilities *Period:* 2014–2019
Source: DOE-NNSA Office of DNN R&D *Award Total:* $25,000,000
Role: Consortium Co-PI, UIUC PI, Thrust Area Lead *Huff Allocation:* **$648,000**

Collaborative, Open-Source Curriculum Development *Period:* 2017–2018
Source: UIUC Strategic Instructional Innovations Program *Award Total:* $19,347
Role: **Principal Investigator** *Huff Allocation:* **$13,000**

[1] PI-ship transferred to other leadership in May 2021 corresponding with unpaid leave of absence.

REU Site: INCLUSION at U. Illinois
Source: NSF - ACI
Role: Senior Personnel
Period: 2017–2020
Award Total: $380,036
Huff Allocation: **N/A**

Demand-Driven Cycamore Archetypes
Source: DOE, NEUP R&D
Role: Co-PI
Period: 2016–2019
Award Total: $800,000
Huff Allocation: **$395,066**

Books

[1] A. M. Scopatz and **K. D. Huff**. *Effective computation in physics: Field guide to research with python*. O'Reilly Media, Sebastopol, CA, 1 edition, May 2015. URL: http://shop.oreilly.com/product/0636920033424.do

Book Chapters

[2] S. Gesing, M. Pierce, S. Marru, M. Zentner, **K. Huff**, S. Bradley, S. B. Cleveland, S. R. Brandt, R. Ramnath, K. Kee, M. Dahan, B. M. V. Martínez, W. C. Sepulveda, and J. J. S. Mondragón. Science Gateways and AI/ML: How Can Gateway Concepts and Solutions Meet the Needs in Data Science? In *Critical Infrastructure - Modern Approach and New Developments*. IntechOpen, Mar. 2023. URL: https://www.intechopen.com/chapters/86501, doi:10.5772/intechopen.110144

[3] **K. Huff**. Chapter One - Economics of Advanced Reactors and Fuel Cycles. In H. Bindra, editor, *Storage and Hybridization of Nuclear Energy*, volume 1, pages 1–20. Science & Technology Books Elsevier, Inc., Cambridge, MA, United States, 1 edition, Jan. 2019. URL: http://www.sciencedirect.com/science/article/pii/B9780128139752000016, doi:10.1016/B978-0-12-813975-2.00001-6

[4] **K. Huff**. Case Study: Cyclus Project. In J. Kitzes, F. Imamoglu, and D. Turek, editors, *The Practice of Reproducible Research: Case Studies and Lessons from the Data-Intensive Sciences*, volume 1. University of California Press, University of California, Berkeley, 1 edition, 2017. URL: https://www.ucpress.edu/book.php?isbn=9780520294752

[5] **K. Huff**. Lessons Learned. In J. Kitzes, F. Imamoglu, and D. Turek, editors, *The Practice of Reproducible Research: Case Studies and Lessons from the Data-Intensive Sciences*, volume 1. University of California Press, University of California, Berkeley, 1 edition, 2017. URL: https://www.ucpress.edu/book.php?isbn=9780520294752

Journal Publications

[6] N. Thiollière, X. Doligez, M. Halasz, G. Krivtchik, I. Merino, B. Mouginot, A. V. Skarbeli, A. Hernandez-Solis, F. Alvarez-Velarde, F. Courtin, H. Druenne, M. Ernoult, **K. Huff**, M. Szieberth, B. Vermeeren, and P. Wilson. Impact of fresh fuel loading management in fuel cycle simulators: A functionality isolation test. *Nuclear Engineering and Design*, 392:111748, June 2022. URL: https://www.sciencedirect.com/science/article/pii/S0029549322001029, doi:10.1016/j.nucengdes.2022.111748

[7] M. Turkmen, G. J. Y. Chee, and **K. D. Huff**. Machine learning application to single channel design of molten salt reactor. *Annals of Nuclear Energy*, 161:108409, Oct. 2021. URL: https://www.sciencedirect.com/science/article/pii/S0306454921002851, doi:10.1016/j.anucene.2021.108409

[8] A. Chaube, A. Chapman, A. Minami, J. Stubbins, and **K. D. Huff**. The role of current and emerging technologies in meeting Japan's mid- to long-term carbon reduction goals. *Applied Energy*, 304:117669, Dec. 2021. URL: https://www.sciencedirect.com/science/article/pii/S0306261921010308, doi:10.1016/j.apenergy.2021.117669

[9] A. Chapman, Y. Shigetomi, S. Chandra Karmaker, B. Baran Saha, **K. Huff**, C. Brooks, and J. Stubbins. The cultural dynamics of energy: The impact of lived experience, preference and demographics on future energy policy in the United States. *Energy Research & Social Science*, 80:102231, Oct. 2021. URL: https://www.sciencedirect.com/science/article/pii/S2214629621003248, doi:10.1016/j.erss.2021.102231

[10] O. Ashraf, A. Rykhlevskii, G. V. Tikhomirov, and **K. D. Huff**. Preliminary design of control rods in the single-fluid double-zone thorium molten salt reactor (SD-TMSR). *Annals of Nuclear Energy*, 152:108035, Mar. 2021. URL: http://www.sciencedirect.com/science/article/pii/S0306454920307313, doi:10.1016/j.anucene.2020.108035

[11] O. Ashraf, A. Rykhlevskii, G. V. Tikhomirov, and **K. D. Huff**. Strategies for thorium fuel cycle transition in the SD-TMSR. *Annals of Nuclear Energy*, 148:107656, Dec. 2020. URL: http://www.sciencedirect.com/science/article/pii/S0306454920303546, doi:10.1016/j.anucene.2020.107656

[12] E. A. Miernicki, A. L. Heald, **K. D. Huff**, C. S. Brooks, and A. J. Margenot. Nuclear waste heat use in agriculture: History and opportunities in the United States. *Journal of Cleaner Production*, 267:121918, Sept. 2020. URL: http://www.sciencedirect.com/science/article/pii/S095965262031965X, doi:10.1016/j.jclepro.2020.121918

[13] G. J. Chee, R. E. F. Agosta, J. W. Bae, R. R. Flanagan, A. M. Scopatz, and **K. D. Huff**. Demand-Driven Deployment Capabilities in Cyclus, a Fuel Cycle Simulator. *Nuclear Technology*, 0(0):1–22, July 2020. doi:10.1080/00295450.2020.1753444

[14] A. Chaube, A. Chapman, Y. Shigetomi, **K. Huff**, and J. Stubbins. The Role of Hydrogen in Achieving Long Term Japanese Energy System Goals. *Energies*, 13(17):4539, Sept. 2020. Number: 17 Publisher: Multidisciplinary Digital Publishing Institute. URL: https://www.mdpi.com/1996-1073/13/17/4539, doi:10.3390/en13174539

[15] J. W. Bae, A. Rykhlevskii, G. Chee, and **K. D. Huff**. Deep learning approach to nuclear fuel transmutation in a fuel cycle simulator. *Annals of Nuclear Energy*, 139:107230, May 2020. URL: http://www.sciencedirect.com/science/article/pii/S0306454919307406, doi:10.1016/j.anucene.2019.107230

[16] O. Ashraf, A. Rykhlevskii, G. Tikhomirov, and **K. D. Huff**. Whole core analysis of the single-fluid double-zone thorium molten salt reactor (SD-TMSR). *Annals of Nuclear Energy*, 137:107–115, Mar. 2020. URL: http://www.sciencedirect.com/science/article/pii/S0306454919306255, doi:https://doi.org/10.1016/j.anucene.2019.107115

[17] M. Kamuda, J. Zhao, and **K. Huff**. A comparison of machine learning methods for automated gamma-ray spectroscopy. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 954:161385, Feb. 2020. URL: http://www.sciencedirect.com/science/article/pii/S0168900218313779, doi:10.1016/j.nima.2018.10.063

[18] J. W. Bae, C. E. Singer, and **K. D. Huff**. Synergistic spent nuclear fuel dynamics within the European Union. *Progress in Nuclear Energy*, 114:1–12, July 2019. URL: http://www.sciencedirect.com/science/article/pii/S014919701930037X, doi:10.1016/j.pnucene.2019.02.001

[19] J. W. Bae, J. L. Peterson-Droogh, and **K. D. Huff**. Standardized verification of the Cyclus fuel cycle simulator. *Annals of Nuclear Energy*, 128:288–291, June 2019. URL: http://www.sciencedirect.com/science/article/pii/S0306454919300179, doi:10.1016/j.anucene.2019.01.014

[20] A. Rykhlevskii, J. W. Bae, and **K. D. Huff**. Modeling and simulation of online reprocessing in the thorium-fueled molten salt breeder reactor. *Annals of Nuclear Energy*, 128:366–379, June 2019. URL: http://www.sciencedirect.com/science/article/pii/S0306454919300350, doi:10.1016/j.anucene.2019.01.030

[21] A. Lindsay, G. Ridley, A. Rykhlevskii, and **K. Huff**. Introduction to Moltres: An application for simulation of Molten Salt Reactors. *Annals of Nuclear Energy*, 114:530–540, Apr. 2018. URL: https://linkinghub.elsevier.com/retrieve/pii/S0306454917304760, doi:10.1016/j.anucene.2017.12.025

[22] A. M. Smith, K. E. Niemeyer, D. S. Katz, L. A. Barba, G. Githinji, M. Gymrek, **K. D. Huff**, C. R. Madan, A. C. Mayes, K. M. Moerman, P. Prins, K. Ram, A. Rokem, T. K. Teal, R. V. Guimera, and J. T. Vanderplas. Journal of Open Source Software (JOSS): design and first-year review. *PeerJ Computer Science*, 4:e147, Feb. 2018. URL: https://peerj.com/articles/cs-147, doi:10.7717/peerj-cs.147

[23] A. Lindsay and **K. Huff**. Moltres: finite element based simulation of molten salt reactors. *The Journal of Open Source Software*, 3(21):1–2, Jan. 2018. doi:10.21105/joss.00298

[24] A. Allen, C. Aragon, C. Becker, J. Carver, A. Chis, B. Combemale, M. Croucher, K. Crowston, D. Garijo, A. Gehani, C. Goble, R. Haines, R. Hirschfeld, J. Howison, **K. Huff**, C. Jay, D. S. Katz, C. Kirchner, K. Kuksenok, R. Lämmel, O. Nierstrasz, M. Turk, R. v. Nieuwpoort, M. Vaughn, and J. J. Vinju. Engineering Academic Software (Dagstuhl Perspectives Workshop 16252). *Dagstuhl Manifestos*, 6(1):1–20, 2017. URL: http://drops.dagstuhl.de/opus/volltexte/2017/7146, doi:10.4230/DagMan.6.1.1

[25] **K. Huff**. Rapid methods for radionuclide contaminant transport in nuclear fuel cycle simulation. *Advances in Engineering Software*, 114:268–281, Dec. 2017. doi:10.1016/j.advengsoft.2017.07.006

[26] C. Andreades, A. T. Cisneros, J. K. Choi, A. Y. Chong, M. Fratoni, S. Hong, L. R. Huddar, **K. D. Huff**, J. Kendrick, D. L. Krumwiede, M. Laufer, M. Munk, R. O. Scarlat, X. Wang, N. Zwiebaum, E. Greenspan, and P. Peterson. Design Summary of the Mark-I Pebble-Bed, Fluoride Salt–Cooled, High-Temperature Reactor Commercial Power Plant. *Nuclear Technology*, 195(3):222–238, Sept. 2016. URL: http://www.ans.org/pubs/journals/nt/a_38935, doi:10.13182/NT16-2

[27] **K. D. Huff**, M. J. Gidden, R. W. Carlsen, R. R. Flanagan, M. B. McGarry, A. C. Opotowsky, E. A. Schneider, A. M. Scopatz, and P. P. H. Wilson. Fundamental concepts in the Cyclus nuclear fuel cycle simulation framework. *Advances in Engineering Software*, 94:46–59, Apr. 2016. arXiv: 1509.03604. URL: http://www.sciencedirect.com/science/article/pii/S0965997816300229, doi:10.1016/j.advengsoft.2016.01.014

[28] G. V. Wilson, D. A. Aruliah, C. T. Brown, N. P. Chue Hong, M. Davis, R. T. Guy, S. H. D. Haddock, **K. D. Huff**, I. M. Mitchell, M. D. Plumbley, B. Waugh, E. P. White, and P. Wilson. Best Practices for Scientific Computing. *PLoS Biol*, 12(1):e1001745, Jan. 2014. URL: http://dx.doi.org/10.1371/journal.pbio.1001745, doi:10.1371/journal.pbio.1001745

[29] M. G. Clerc, P. Cordero, J. Dunstan, **K. D. Huff**, N. Mujica, D. Risso, and G. Varas. Liquid-solid-like transition in quasi-one-dimensional driven granular media. *Nature Physics*, 4(3):249–254, Mar. 2008. URL: http://dx.doi.org.ezproxy.library.wisc.edu/10.1038/nphys884, doi:10.1038/nphys884

Refereed Conference Proceedings

[30] B. Petrovic, K. Ramey, I. Hill, E. Losa, M. Elsawi, Z. Wu, C. Lu, J. Gonzalez, D. Novog, G. Chee, **K. D. Huff**, M. Margulis, N. Read, and E. Shwegaraus. Preliminary Results of the NEA FHR Benchmark Phase I-A and I-B (Fuel Element 2-D Benchmark). In *Proceedings of ANS M&C 2021*, pages 1924–1933, Virtual, Oct. 2021. American Nuclear Society. (Submitted before May 2021). URL: https://www.ans.org/pubs/proceedings/article-50163/

[31] B. R. Betzler, A. Rykhlevskii, A. Worrall, and **K. D. Huff**. Impacts of Fast-Spectrum Molten Salt Reactor Characteristics on Fuel Cycle Performance. In *Proceedings of GLOBAL International Fuel Cycle Conference*, Seattle, WA, United States, Sept. 2019. American Nuclear Society. URL: http://epubs.ans.org/?a=46968

[32] G. Chee, J. W. Bae, **K. D. Huff**, R. R. Flanagan, and R. Fairhurst. Demonstration of Demand-Driven Deployment Capabilities in Cyclus. In *Proceedings of Global/Top Fuel 2019*, pages 394–401, Seattle, WA, United States, Sept. 2019. American Nuclear Society. URL: http://epubs.ans.org/?a=46949

[33] R. R. Flanagan, J. W. Bae, **K. D. Huff**, G. J. Chee, and R. Fairhurst. Methods for Automated Fuel Cycle Facility Deployment. In *Proceedings of Global/Top Fuel 2019*, pages 402–427, Seattle, WA, United States, Sept. 2019. American Nuclear Society. URL: http://epubs.ans.org/?a=46950

[34] S. M. Park, A. Rykhlevskii, and **K. Huff**. Safety Analysis of the Molten Salt Fast Reactor Fuel Composition using Moltres. In *Proceedings of GLOBAL International Fuel Cycle Conference*, Seattle, WA, United States, Sept. 2019. American Nuclear Society. URL: http://epubs.ans.org/?a=47030, doi:10.31224/osf.io/7ce89

[35] A. Rykhlevskii, B. R. Betzler, A. Worrall, and **K. D. Huff**. Fuel Cycle Performance of Fast Spectrum Molten Salt Reactor Designs. In *Proceedings of Mathematics and Computation 2019*, pages 342–353, Portland, OR, Aug. 2019. American Nuclear Society. URL: http://epubs.ans.org/?a=46618

[36] G. Westphal and **K. Huff**. PyRe: A Cyclus Pyroprocessing Facility Archetype. In *Proceedings of the 2018 Advances in Nuclear Nonproliferation Technology and Policy Conference*, pages 73–76, Orlando, FL, Nov. 2018. American Nuclear Society. URL: http://epubs.ans.org/?a=44666

[37] A. Smith, L. A. Barba, G. Githinji, M. Gymrek, **K. Huff**, D. S. Katz, C. Madan, A. C. Mayes, K. M. Moerman, K. Niemeyer, P. Prins, K. Ram, A. Rokem, T. Teal, R. Valls Guimera, and J. T. Vanderplas. Introducing JOSS: The Journal of Open Source Software. In *Proceedings of SciPy*, Austin, TX, United States, July 2017. SciPy. 10.6084/m9.figshare.5208151.v1. doi:10.6084/m9.figshare.5208151.v1

[38] A. Smith, L. A. Barba, G. Githinji, M. Gymrek, **K. Huff**, D. S. Katz, C. Madan, A. C. Mayes, K. M. Moerman, K. Niemeyer, P. Prins, K. Ram, A. Rokem, T. Teal, and J. Vanderplas. The Journal of Open Source Software. In *Poster*, volume Computational Science and Engineering, Atlanta, GA, Feb. 2017. Society for Industrial and Applied Mathematics. URL: https://figshare.com/articles/The_Journal_of_Open_Source_Software/4688911, doi:10.6084/m9.figshare.4688911.v1

[39] **K. D. Huff**, J. W. Bae, K. A. Mummah, R. R. Flanagan, and A. M. Scopatz. Current Status of Predictive Transition Capability in Fuel Cycle Simulation. In *Proceedings of Global 2017*, Seoul, South Korea, Sept. 2017. American Nuclear Society. URL: https://books.google.com/books/about/GLOBAL_2017.html?id=1UjsuQEACAAJ

[40] J. W. Bae, W. Roy, and **K. D. Huff**. Benefits of Siting a Borehole Repository at a Non-operating Nuclear Facility. In *Proceedings of the International High Level Radioactive Waste Management Conference*, pages 876–883, Charlotte, North Carolina, Apr. 2017. American Nuclear Society. URL: http://epubs.ans.org/?a=43329

[41] X. Wang, **K. D. Huff**, M. Aufiero, P. F. Peterson, and M. Fratoni. Coupled Reactor Kinetics and Heat Transfer Model for Fluoride Salt-Cooled High-Temperature Reactor Transient Analysis. In *Proceedings of ICONE 2016*, Charlotte, North Carolina, June 2016. JC0003. URL: http://dx.doi.org/10.1115/ICONE24-60728, doi:10.1115/ICONE24-60728

[42] X. Wang, **K. D. Huff**, M. Aufiero, P. F. Peterson, and M. Fratoni. A Sensitivity Study of a Coupled Kinetics and Thermal-Hydraulics Model for Fluoride-Salt-Cooled, High-Temperature Reactor (FHR) Transient Analysis. In *Proceedings of ICAPP 2016*, page Paper 16555, San Francisco, CA, Apr. 2016. International Congress on Advances in Nuclear Power Plants. URL: icapp.ans.org

[43] D. Djokic, A. M. Scopatz, H. R. Greenberg, **K. D. Huff**, R. P. Nibbelink, and M. Fratoni. The Application of CYCLUS to Fuel Cycle Transition Analysis. In *Proceedings of Global 2015*, LLNL-CONF-669315, Paris, France, Sept. 2015. URL: https://www.osti.gov/biblio/1241931-application-cyclus-fuel-cycle-transition-analysis

[44] **K. Huff**. PyRK: A Python Package For Nuclear Reactor Kinetics. In *Proceedings of the 14th Python in Science Conference*, pages 87–93, Austin, TX, United States, 2015. SciPy. URL: http://conference.scipy.org/proceedings/scipy2015/kathryn_huff.html, doi:10.25080/Majora-7b98e3ed-00d

[45] D. L. Krumwiede, C. Andreades, J. Choi, A. Cisneros, L. Huddar, **K. D. Huff**, M. Laufer, M. Munk, R. O. Scarlat, J. E. Seifried, N. Zwiebaum, E. Greenspan, and P. F. Peterson. Design of the Mark-1 Pebble-Bed, Fluoride-Salt-Cooled, High-Temperature Reactor Commercial Power Plant. In *Proceedings of ICAPP*, volume 1, Charlotte, North Carolina, 2014. American Nuclear Society. URL: https://api.semanticscholar.org/CorpusID:30717062

[46] **K. D. Huff**. Cyclus Fuel Cycle Simulation Capabilities with the Cyder Disposal System Model. In *Proceedings of GLOBAL 2013: International Nuclear Fuel Cycle Conference-Nuclear Energy at a Crossroads*, volume 45 of *Nuclear Fuel Cycle and Fuel Materials*, Salt Lake City, UT, United States, Oct. 2013. URL: https://inis.iaea.org/search/search.aspx?orig_q=RN:45085412

[47] M. Gidden, P. Wilson, **K. D. Huff**, and R. W. Carlsen. An Agent-Based Framework for Fuel Cycle Simulation with Recycling. In *Proceedings of GLOBAL*, volume 45 of *Nuclear Fuel Cycle and Fuel Materials*, Salt Lake City, UT, United States, Sept. 2013. URL: https://inis.iaea.org/search/search.aspx?orig_q=RN:45085433

[48] **K. D. Huff**. Hydrologic Nuclide Transport Models in Cyder, a Geologic Disposal Software Library. In *WM2013*, Phoenix, AZ, Feb. 2013. Waste Management Symposium. URL: https://inis.iaea.org/search/search.aspx?orig_q=RN:45042278

[49] **K. D. Huff**. Cyclus: An Open, Modular, Next Generation Fuel Cycle Simulator Platform (poster). In *Proceedings of the Waste Management Symposium*, Phoenix, AZ, Mar. 2011

[50] K. M. Oliver, P. P. Wilson, A. Reveillere, T. W. Ahn, K. Dunn, **K. D. Huff**, and R. A. Elmore. Studying international fuel cycle robustness with the GENIUSv2 discrete facilities/materials fuel cycle systems analysis tool. In *Proceedings of GLOBAL 2009*, GLOBAL 2009: Advanced Nuclear Fuel Cycles and Systems, Paris, France, Sept. 2009. URL: https://sfen.fr/GLOBAL-2009

[51] N. Mujica, M. Clerc, P. Cordero, J. Dunstan, **K. D. Huff**, L. Oyarte, R. Soto, G. Varas, and D. Risso. Solid-liquid-like transition in vibrated granular monolayers. In *APS Division of Fluid Dynamics Meeting Abstracts*, Nov. 2008. URL: http://adsabs.harvard.edu/abs/2008APS..DFD.HM008M

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Invited Talks

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Oregon State Univ., Dept. of Nuclear Science and Engineering, *Seminar*. **May 13, 2021**
American Nuclear Society, NPT at 50 Years Webinar *Invited Panelist*. **Feb 15, 2021**
U.C. Berkeley, Nuclear Engineering *Colloquium*. **Jan 22, 2021**
GAIN-EPRI-NEI, Microreactor Program Virtual Workshop, *Invited Panelist*. **Aug 19, 2020**
Society of Women Engineers, Graduate Community Virtual *Seminar*. **May 20, 2020**
SIAM CSE 2019, Spokane, WA, *Invited Minisymposium Speaker* **Feb 25, 2019**
SciFOO, Google X, *Invited Camper*. **Jun 23, 2018**
U. Illinois, Hack Illinois, *Keynote*. **Feb 24, 2018**
U. Michigan, Nuclear Engineering and Radiological Sciences *Seminar*. **Feb 9, 2018**
PyData, Meetup, Ann Arbor, MI *Invited Tech. Talk*. **Feb 8, 2018**
Olin College of Engineering, *Seminar*. **Oct 31, 2017**
Argonne National Laboratory, NNSA Nuclear Nonproliferation, *Seminar*. **Sep 21, 2017**

SciPy 2017, Scientific Python Conference, Austin, TX, *Keynote.* **Jul 12, 2017**
ANS Annual, Young Members Group, Workforce Transition, *Panel.* **Jun 13, 2017**
ANS Annual, Mathematics and Computation Division, Current Issues, *Panel.* **Jun 12, 2017**
Oak Ridge National Laboratory, RPNSD, *Seminar.* **Jun 29, 2017**
PyCon 2017, Portland, OR. *Keynote.* **May 19, 2017**
U. California, Davis, Mechanical and Aerospace Engineering, *Seminar.* **April 20, 2017**
U. Illinois, Computational Science and Engineering, *Seminar.* **Feb 2, 2017**
U. Illinois, AE3 Lightning Symposium, *Lightning Talk.* **Mar 2, 2017**
U. Illinois, Nuclear, Plasma, & Radiological Engineering, *Undergraduate Seminar.* **Feb 14, 2017**
U. California, Berkeley, Berkeley Institute for Data Science, *Symposium.* **Jan 27, 2017**
U. Illinois, Informatics, *Seminar.* **Oct 13, 2016**
PyData 2016, Chicago, IL. *Keynote.* **Aug 27, 2016**
Oak Ridge National Laboratory, RPNSD, *Seminar.* **Mar 3, 2016**
U. Tennessee, Knoxville, Nuclear Engineering, *Seminar.* **Mar 2, 2016**
Michigan State, Computational, Mathematics, Science, and Engineering, *Seminar.* **Dec 15, 2015**
U. Illinois, Nuclear, Plasma, & Radiological Engineering, *Seminar.* **Dec 8, 2015**
SC15, Austin TX, Python in High Performance Computing workshop, *Keynote.* **Nov 15, 2015**
U. Illinois, National Center for Supercomputing Applications, *Colloquium.* **Nov 6, 2015**
North Carolina State University, Nuclear Engineering, *Colloquium.* **Oct 15, 2015**
Texas A&M University, Nuclear Engineering, *Colloquium.* **Sep 29, 2015**
Rensselaer Polytechnic Inst, Mechanical and Nuclear Engineering, *Colloquium.* **Sep 21, 2015**
U. Washington, What Can Academia Learn from Open Source?, *Panel.* **Feb 2, 2015**

Engineering Teaching

University of Illinois at Urbana-Champaign
Dept. of Nuclear, Plasma, and Radiological Engineering

NPRE 247, Modeling Nuclear Energy Systems **Fall 2018**

NPRE 412, Nuclear Power Economics and Fuel Management **Fall 2016**, **Fall 2017**, **Spring 2020**, **Spring 2021**

NPRE 446, Radiation Interactions with Matter I **Fall 2019**

NPRE 555, Reactor Theory I **Spring 2018**, **Fall 2020**

NPRE 560, Reactor Kinetics and Dynamics **Spring 2019**

Guest Lectures

University of California, Berkeley, Dept. of Nuclear Engineering **Nov 10, 2020**
NE 100, Introduction to Nuclear Engineering
Nuclear Fuel Cycle, Advanced Reactors

University of California, Berkeley, Dept. of Nuclear Engineering **Apr 1,3,22, 2015**
NE 155, Introduction to Numerical Simulations in Radiation Transport Point Reactor Kinetics, Monte Carlo Methods

University of California, Berkeley, Dept. of Nuclear Engineering **Sep 11, 2014**
NE 255, Numerical Simulation in Radiation Transport
Best Practices in Computational Nuclear Engineering

University of Wisconsin - Madison, Dept. of Nuclear Engineering **Apr 1&3, 2013**
NE 571, Economic and Environmental Aspects of Nuclear Energy
Nuclear Waste Repository Technology, Policy, and History

University of Wisconsin - Madison, Dept. of Nuclear Engineering **Sep 9&11, 2009**
NE 406, Nuclear Reactor Analysis
UNIX Shell, Basic Scripting, Environment Variables, Permissions, Regular Expressions, Makefiles

University of Wisconsin - Madison, Dept. of Nuclear Engineering **Feb 10, 2010**
NE 506, Practicum in Monte Carlo Radiation Transport
UNIX Shell, Basic Scripting, Environment Variables, Permissions, Regular Expressions, Makefiles

Invited Scientific Computing Teaching

SciPy Conference, Austin, TX **Jul 6–7, 2015**
Introductory Python For Scientific Software

University of Split, Split, Croatia **Sep 8–13, 2014**
G-Node Advanced Scientific Programming in Python Summer School

SciPy Conference, Austin, TX **Jun 25, 2013**
Version Control and Unit Testing For Scientific Software

University of Chicago, Graduate School, Chicago, IL **Jan 12–13, 2013**
Computational Literacy Workshop

University of California, Berkeley, Berkeley, CA **Oct 20–21, 2012**
Department of Statistics Scientific Computing Workshop

Lawrence Berkeley National Laboratory, Berkeley, CA **Oct 17–18, 2012**
Software Carpentry Python Workshop

International Center for Theoretical Physics, Trieste, Italy **Feb 20–Mar 2, 2012**
UNESCO/IAEA Advanced School on Scientific Software Development

University of Toronto, Toronto, ON, Canada **Nov 7–8, 2011**
SciNet Consortium For High Performance Computing Software Carpentry Bootcamp

American Nuclear Society Winter Meeting, Washington, D.C. **Nov 1, 2011**
Young Professionals Congress Hacker Within Scientific Computing Tutorial

Michigan State University, East Lansing, MI **Jun 4–5, 2011**
Institute for Cyber Enabled Research (iCER) and BEACON Center THW Bootcamp

Scientific Computing Teaching

Berkeley Institute for Data Science, Berkeley, CA **Jan 14–15, 2015**
Managing Databases in SQL

Berkeley Institute for Data Science, Berkeley, CA **Jun 4–5, 2015**
Testing for Scientific Software

Lawrence Berkeley National Laboratory, Berkeley, CA **Apr 14–15, 2014**
Women in Science and Engineering Bootcamp

The University of Chicago, Chicago, IL **Apr 2–3, 2012**
Software Carpentry Scientific Computing Workshop

The University of Wisconsin, Madison, WI **Jan 12–14, 2011**
The Hacker Within Software Carpentry Bootcamp

The University of Wisconsin, Madison, WI **Jan 12–14, 2010**
The Hacker Within Python Bootcamp

The University of Wisconsin, Madison, WI **Mar 24–31, 2009**
The Hacker Within C++ Bootcamp

The University of Wisconsin, Madison, WI **Jan 12–15, 2009**
University of Wisconsin, Hacker Within UNIX Bootcamp

Postdoctoral Researchers

Name	Dates	Role
Mehmet Turkmen	2019–2020	Advisor
Alexander Lindsay	2016–2017	Advisor

Graduate Researchers

Name	Degree - Year	Role
Michael Cheng	MS - 2017	MS Second Reader

Mark Kamuda	MS - 2017	MS Second Reader
Mark Kamuda	PhD - 2019	PhD Advisor
Gregory Westphal	MS - 2019	MS Advisor
Erik Medhurst	MS - 2020	MS Advisor
Andrei Rykhlevskii	PhD - 2020	PhD Advisor
Jin Whan Bae	MS - 2019	MS Advisor
Katherine C. Hepler	PhD - 2020	Dissertation Committee Chair
Alvin Lee	MS - 2020	MS Second Reader
Sun Myung Park	PhD - (est. 2022)	PhD Advisor
Anshuman Chaube	PhD - (est. 2022)	PhD Advisor
Gwendolyn Chee	PhD - (est. 2022)	PhD Advisor
Roberto Fairhurst-Agosta	PhD - (est. 2023)	PhD Advisor
Zoë Richter	PhD - (est. 2023)	PhD Advisor
Samuel Dotson	PhD - (est. 2024)	PhD Advisor
Amanda Bachmann	PhD - (est. 2024)	PhD Advisor
Luke Seifert	PhD - (est. 2025)	PhD Advisor
Lu Kissinger	PhD - (est. 2025)	PhD Advisor
Oleksandr Yardas	PhD - (est. 2025)	PhD Advisor

Undergraduate Researchers

Name	Degree - Year	Scholarships
Jin Whan Bae	BS - 2017	NPRE Outstanding Undergrad Research ANS Best Student Fuel Cycle Presentation
Kathryn Mummah	BS - 2017	Roy G. Post Foundation Scholarship ANS FCWMD Randall Scholar
Eric Riewski	BS - 2017	
GyuTae Park	BS - (est. 2018)	
Yukun Tan	BS - (est. 2018)	Students Pushing Innovation
Lu Kissinger	BS - 2019	
Xin Wen	BS - 2018	Students Pushing Innovation
Daniel Chu	BS - 2020	
Tyler Kennelly	BS - 2019	
Bradley Ellis	BS - 2019	
Adam Pichman	BS - 2019	
Zoë Richter	BS - 2018	
Gavin Davis	BS - (est. 2021)	
Kip Kleimenhagen	BS - (est. 2021)	
David Atwater	BS - (est. 2021)	
Nathan Ryan	BS - (est. 2022)	
Anna Balla	BS - (est. 2021)	
Nataly Panczyk	BS - (est. 2024)	

Visiting Researchers

Name	Dates	Level - Institution
Gavin Ridey	2017	BS–University of Tennessee, Knoxville
Aditya Bhosale	2017	BS - IIT, Bombay
Snehal Chandan	2017	BS - IIT, Bombay
Eleonora Skrzypek	2019	PhD - Warsaw University of Technology, Poland

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
Other Tools	Doxygen, Sphinx, GoldSim, LaTeX, Mathematica, MatLab, MCNP, MOOSE

Editing and Reviewing

Editorial Board

Journal of Open Source Software **2016 – present**
Journal of Open Source Education **2018 – present**
Nuclear Technology **2018 – present**
Nuclear Engineering and Design **2020 – present**
Papers in Physics **2020 – 2023**
Proceedings of the SciPy Scientific Python Conference **2013, 2015, & 2017**

Manuscript Referee

Annals of Nuclear Energy
Journal of Nuclear Energy Science and Power Generation Technology
Nuclear Engineering and Design
Nuclear Science and Engineering
Nuclear Technology
Progress in Nuclear Energy

Grant Proposal Referee

Dept. of Energy Nuclear Energy University Programs
Dept. of Energy Technology Commercialization Fund
Blue Waters Fellows Program
Alfred P. Sloan Foundation

Book Proposal Referee

O'Reilly Media
Elsevier

Professional Service

Advisory Committee, Digital Information Technology, Sloan Foundation	**2019-2021**
Chair, Nonproliferation and Policy Division, ANS	**2020–2021**
Executive Committee, Mathematics and Computation Division, ANS	**2020–2021**
Vice Chair, Nonproliferation and Policy Division, ANS	**2019–2020**
Chair & Host, Technical Workshop on Fuel Cycle Simulation	**2019**
Past Chair *(ex officio)*, Fuel Cycle & Waste Management Division, ANS	**2016–2017**
Co-Organizer, Technical Workshop on Fuel Cycle Simulation	**2017**
Technical Program Committee, IHLRWM Conference	**2017**
Chair, Fuel Cycle & Waste Management Division, ANS	**2016–2017**
Vice Chair, Fuel Cycle & Waste Management Division, ANS	**2015–2016**
Chair, Steering Committee, Software Carpentry Foundation	**2014–2015**
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**
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**

Departmental Service

Faculty Advisor, UIUC ANS Student Section	**2016–present**
Undergraduate Committee	**2019–present**
Graduate Committee, Qualifying Exam Sub-Committee	**2017-2019**
Admissions Sub-Committee	**Spring 2017**
Admissions Sub-Committee	**Fall 2016**
Advisory Committee,	**2017–2018**
Faculty Search Committee,	**2017–2018**
Faculty Advisor, UIUC WiN Student Section	**2017–2018**

College Service

Member, Instructional Facility Working Group,	**2017-2018**

	Selection Committee, Clare Boothe Luce (CBL) Research Scholars,	**2020-2021**
	Member, Engineering IT Governance Education Working Group,	**2020-2021**
	Faculty Mentor, ARISE program	**2019-2020**
	Member, ENG/TE Liaison Committee	**2020-present**
	Member, Instructional Facility Working Group	**2017–2018**
	Faculty Advisor, UIUC CSE The Hacker Within Scientific Computing Group	**2016–2017**
Campus Service	**Steering Committee Member**, Illinois Data Science Initiative	**2018**
	Hack Mentor, Hack Illinois	**2017**
Consulting	**Thomas Edison State University** Trenton, NJ	**2018-2019**
	Subject Matter Expert	
	Institute of Nuclear Power Operations (INPO) Academic Program Review	