# 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**
*Unpaid Leave of Absence* **May 2021 – May 2024**
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
*Assistant Professor, Nuclear Plasma and Radiological Engineering* **Aug 2016 – May 2021**
*Blue Waters Asst. Professor* **Aug 2016 – May 2021**
*Affiliate Faculty, National Center for Supercomputing Applications* **Aug 2016 – May 2021**
*Affiliate Faculty, Computational Science and Engineering* **Aug 2018 – May 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

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|---|---|
| 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

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

*Role:* **Principal Investigator** — *Huff Allocation:* **$13,000**

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

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

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## Invited Talks

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**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<br>ANS Best Student Fuel Cycle Presentation |
| **Kathryn Mummah** | BS - 2017 | Roy G. Post Foundation Scholarship<br>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**

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|---|---|---|
| | **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<br>*Subject Matter Expert*<br>Institute of Nuclear Power Operations (INPO) Academic Program Review | **2018-2019** |