Matthew J. Gidden, Ph.D.

CONTACT INFORMATION

International Institute for Applied Systems Analysis
Schlossplatz 1, A-2361 Laxenburg
Austria

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CITIZENSHIP

USA

RESEARCH INTERESTS

Nuclear fuel cycle simulation and analysis, agent-based modeling, linear/non-linear optimization techniques, simulation execution leveraging high throughput computing, energy policy, nuclear non-proliferation, reactor physics simulations for fuel cycles, advanced nuclear fuel cycles

EDUCATION

PH.D., *Nuclear Engineering*, **University of Wisconsin - Madison** **March 2015**
- An Agent-Based Modeling Framework and Application for the Generic Nuclear Fuel Cycle
- Advisor: Professor Paul P.H. Wilson

MASTERS, *Nuclear Engineering*, **University of Wisconsin - Madison** **December 2011**

B.S., *Nuclear Engineering*, **Texas A&M University** **May 2009**
- *Summa cum Laude*, With Honors in Engineering
- Minor in Mathematics

HONORS & AWARDS

2nd Place in Energy Policy, Innovations in Fuel Cycle Research	**2014**
Winner, The Why Files Cool Science Image Contest	**2014**
Nuclear Energy University Program Graduate Research Fellowship	**2010 – 2013**
American Nuclear Society Graduate Scholarship	**2013**
Nuclear Regulatory Commision Undergraduate Scholarship	**2008 – 2009**
President's Endowed Scholarship, Texas A&M University	**2005 – 2009**
Stinson Scholarship, Texas A&M University	**2005 – 2009**

RESEARCH EXPERIENCE

International Institute for Applied Systems Analysis, Energy Group, Laxenburg, AUSTRIA
Oct 2015 – Present
Research Scholar
Performed large-scale integrated assessment modeling exercises and specialized in GIS-based spatial modeling and analysis.

University of Wisconsin, NE Dept., Madison, WI **Apr – Oct 2015**
Postdoctoral Researcher
Investigated novel methods for modeling recycle fuel fabrication in NFC simulations.

University of Wisconsin, NE Dept., Madison, WI **Aug 2010 – Mar 2015**
Graduate Research Assistant **Aug 2009 – Jan 2010**
Developed and extended the Cyclus NFC simulator to model generic nuclear fuel cycles.

AREVA, Paris, FRANCE **Feb – Jul 2010**
Research Intern (Stagiaire), Core Design Group
Simulated and analyzed a boron dilution accident in multiple reactor configurations using MCNP.

Pacific Northwest National Lab, Richland, WA **Jun – Aug 2009**
Research Assistant
Analyzed a design of an automated verification unit for canisters of enriched UF_6 using MCNP.

TN International (AREVA), Montigny-le-Bretonneux, FRANCE **Jun – Aug 2008**
Research Intern, Materials Group
Analyzed material suitability for nuclear cask shock absorber via dynamic compression testing.

Oak Ridge National Lab, Oak Ridge, TN **Jun – Aug 2007**
Research Assistant **Jun – Aug 2006**
Tested the collimation of radiation portal monitors for use with the U.S. Megaports Initiative.

Professional Organizations & Service

Elsevier Energy Forum, Member **2017 – Present**
European Geosciences Union, Member **2016 – Present**
Institute for Operations Research and Management Science, Member **2014 – Present**
American Nuclear Society, Member **2006 – Present**
- Communications Committee, Member **2013 – Present**
- Public Policy Committee, Member **2013 – Present**
- Special Advisory Committee on Nuclear Nonproliferation, Member **2012 – 2016**
- Student Sections Committee, Member **2010 – 2016**
- Local Sections Committee, Member **2010 – 2012**
- Nuclear Nonproliferation Special Committee, Member **2010 – 2012**
- ANS Student Conference, Co-Chair **2008**

Institute of Nuclear Materials Management, Member **2008 – Present**
Alpha Nu Sigma, Member **2009 – Present**
Nuclear Engineering Student Delegation, Delegate **2011 – 2013**
- Chair **2013**
- Vice Chair **2012**

American Nuclear Society, Texas A&M Chapter, Member **2005 – 2009**
- Vice President **2006 – 2007**

Journal Publications

[1] **Gidden, M. J.** Wilson, P. P., "A methodology for determining the dynamic exchange of resources in nuclear fuel cycle simulation," *Nuclear Engineering and Design*, pp. –, 2016, ISSN: 0029-5493. DOI: http://dx.doi.org/10.1016/j.nucengdes.2016.10.029. [Online]. Available: http://www.sciencedirect.com/science/article/pii/S0029549316304101

[2] Huff, K. D. **Gidden, M. J.** Carlsen, R. W. Flanagan, R. R. McGarry, M. B. Opotowsky, A. C. Schneider, E. A. Scopatz, A. M. Wilson, P. P., "Fundamental concepts in the cyclus nuclear fuel cycle simulation framework," *Advances in Engineering Software*, vol. 94, pp. 46 –59, 2016, ISSN: 0965-9978. DOI: http://dx.doi.org/10.1016/j.advengsoft.2016.01.014. [Online]. Available: http://www.sciencedirect.com/science/article/pii/S0965997816300229

[3] Pearce, T. M. Williams, J. J. Kruzel, S. P. **Gidden, M. J.** Williams, J. C., "Dynamic control of extracellular environment in in vitro neural recording systems," *Neural Systems and Rehabilitation Engineering, IEEE Transactions on*, vol. 13, no. 2, pp. 207–212, 2005

Refereed Proceedings

[4] **Gidden, M.** Wilson, P., "Dynamic Resource Exchange with CoinOR-CBC in Cyclus, a Nuclear Fuel Cycle Simulator," in *Operations Research and Computing: Algorithms and Software for Analytics*, Richland, VA, United States, Jan. 2015

[5] **Gidden, M.** Carlsen, R. Opotowsky, A. Rakhimov, O. Scopatz, A. Wilson, P., "Agent-based dynamic resource exchange in cyclus," in *Proceedings of PHYSOR*, Kyoto, Japan, Sep. 2014

[6] **Gidden, M.** Wilson, P., "An agent-based framework for fuel cycle simulation with recycling," in *Proceedings of GLOBAL*, Salt Lake City, UT, United States, Sep. 2013

CONFERENCE PUBLICATIONS

[7] **Gidden, M. J.** Byers, E. Greve, P. Kahil, T. Parkinson, S. Raptis, C. Rogelj, J. Satoh, Y. Vliet, M. Wada, Y. Krey, V. Langan, S. Riahi, K., "Hydroclimatic risks and uncertainty in the global power sector," in *European Geosciences Union General Assembly*, Vienna, Austria, Apr. 2017

[8] **Gidden, M. J.** Huppmann, D. Krey, V. Fricko, O. Kolp, P. Riahi, K., "The new MESSAGE$_{ix}$ Modeling Platform," in *Open Energy Modelling Workshop*, Frankfurt, Germany, Apr. 2017

[9] **Gidden, M. J.** Parkinson, S. C. Rao, N. D. Riahi, K., "Spatial Downscaling of Urban and Rural Income and Inequality for the Shared Socioeconomic Pathways," in *Ninth Annual Meeting of the IAMC 2016*, Beijing, China, Dec. 2016

[10] **Gidden, M.** Wilson, P., "Dynamic Resource Exchange Performance in Cyclus," in *Transactions of the American Nuclear Society*, San Antonio, TX, United States, Jun. 2015

[11] **Gidden, M.**, *Exploring Nuclear Fuel Cycle Simulation using HTCondor*, HTCondor Week, May 2015

[12] Carlsen, R. W. **Gidden, M. J.** Wilson, P. P., "Deployment Optimization with the CYCLUS Fuel Cycle Simulator," in *Transactions of the American Nuclear Society*, DOI link for code, methods, etc: http://dx.doi.org/10.6084/m9.figshare.1086284, vol. 111, Anaheim, CA, Nov. 2014, pp. 241–244

[13] Biondo, E. Scopatz, A. **Gidden, M.** Slaybaugh, R. Bates, C. WIlson, P. P., "Quality Assurance within the PyNE Open Source Toolkit," in *Transactions of the American Nuclear Society*, vol. 111, Anaheim, CA, Nov. 2014. [Online]. Available: https://github.com/pyne/ans-winter-2014-vnv

[14] **Gidden, M.** Wilson, P. Scopatz, A., "Developing standardized, open benchmarks and a corresponding specification language for the simulation of dynamic fuel cycles," in *Proceedings of the 2013 ANS Summer Conference*, Atlanta, GA, United States, Jun. 2013

[15] **Gidden, M.** Wilson, P. Huff, K. Carlsen, R., "Once-through benchmarks with cyclus, a modular, open-source fuel cycle simulator," in *Proceedings of the 2012 ANS Winter Conference*, San Diego, CA, Nov. 2012

[16] **Gidden, M.** Wilson, P. Huff, K., "Once-Through Benchmarks with Cyclus," in *ANS Student Conference*, Las Vegas, NV, 2011

[17] Huff, K. D. Wilson, P. P. **Gidden, M. J.**, "Open Architecture and Modular Paradigm of Cyclus, a Fuel Cycle Simulation Code," in *Transactions of the American Nuclear Society*, vol. 104, 2011, p. 183

[18] Huff, K. Wilson, P. **Gidden, M.** Elmore, R., *Cyclus : An Open, Modular, Next Generation Fuel Cycle Simulator Platform*, Poster, Mar. 2011

[19] **Gidden, M.** Livesay, J. York, R. Blessinger, C., "Collimation of Radiation Portal Monitors to Reduce the Innocent Alarm Rate (Poster)," in *Transactions of the American Nuclear Society*, Washington, DC, Nov. 2007

OTHER PUBLICATIONS

[20] Krey, V. Havlik, P. Fricko, O. Zilliacus, J. **Gidden, M.** Strubegger, M. Kartasasmita, G. Ermolieva, T. Forsell, N. Gusti, M. Johnson, N. Kindermann, G. Kolp, P. McCollum, D. L. Pachauri, S. Rao, S. Rogelj, J. Valin, H. Obersteiner, M. Riahi, K., "MESSAGE-GLOBIOM 1.0 Documentation," International Institute for Applied Systems Analysis (IIASA), Tech. Rep., 2016. [Online]. Available: http://data.ene.iiasa.ac.at/message-globiom/

[21] **Gidden, M. J.**, "An Agent-Based Modeling Framework and Application for the Generic Nuclear Fuel Cycle," Thesis, University of Wisconsin, Madison, WI, United States, Mar. 2015

[22] **Gidden, M.**, "An agent-based modeling framework and application for the generic nuclear fuel cycle," Prelim, University of Wisconsin, Madison, Sep. 2013. [Online]. Available: http://dx.doi.org/10.6084/m9.figshare.1132596

Software

[23] Carlsen, R. W. **Gidden, M.** Huff, K. Opotowsky, A. C. Rakhimov, O. Scopatz, A. M. Welch, Z. Wilson, P., *Cyclus v1.0.0*, Jun. 2014. [Online]. Available: http://figshare.com/articles/Cyclus_v1_0_0/1041745

[24] Carlsen, R. W. **Gidden, M.** Huff, K. Opotowsky, A. C. Rakhimov, O. Scopatz, A. M. Wilson, P., *Cycamore v1.0.0*, Jun. 2014. [Online]. Available: http://figshare.com/articles/Cycamore_v1_0_0/1041829

[25] **Gidden, M.**, *Cyclopts*, http://mattgidden.com/cyclopts/, Dec. 2014. [Online]. Available: http://mattgidden.com/cyclopts/

[26] Scopatz, A. **Gidden, M.** Welch, Z., "Polyphemus v0.1," Jun. 2014. [Online]. Available: http://dx.doi.org/10.6084/m9.figshare.1066058

[27] Scopatz, A. Bates, C. R. Biondo, E. Huff, K. Kiesling, K. Carlsen, R. Davis, A. **Gidden, M.** Haines, T. Howland, J. Huff, B. Manalo, K. Opotowsky, A. Slaybaugh, R. Relson, E. Romano, P. Shriwise, P. Xia, J. D. Wilson, P. Zachman, J., "PyNE Progress Report," Nov. 2014. [Online]. Available: http://dx.doi.org/10.6084/m9.figshare.1250143

Computational Skills

I have deep and broad software development skills and experience. I help maintain and manage a number of open source scientific software packages including Cyclus and PyNE.

Expert (5+ Years Experience)

Languages	C++/C, Python
Build Systems	CMake, Make, Autoconf/Automake
Version Control	Git
Tools	LaTeX, Doxygen, Sphinx, XML
Database Formats	SQL, HDF5
Test Frameworks	GoogleTest, Nose
NE Applications	MCNP, Origen

Familiar

Languages	FORTRAN, Java, Visual Basic, Perl
Version Control	Mercurial, Subversion
Tools	Jekyll, JSON
NE Applications	DRAGON, TransLAT
Other Applications	IPython/IPython Notebooks, Matlab, Mathcad, Mathematica, Maple