

Education & Academic Research Positions

University of Pittsburgh, Chemical & Petroleum Engineering, Assistant Professor	2014 – present
Harvard University, Chemistry & Chemical Biology, Postdoctoral Fellow Project: “Metal-organic frameworks for photovoltaic applications,” Advisor: Alan Aspuru-Guzik	2013 – 2014
Northwestern University, Chemical & Biological Engineering, PhD Candidate Doctoral thesis: “Designing optimal nanoporous crystals with genetic algorithms,” Advisor: Randall Q. Snurr	2007 – 2013
University of Toronto, Engineering Science, BAsC Senior thesis: “Towards autonomous mobile nanomachines,” Advisor: Geoffrey A. Ozin	2002 – 2007

Publications (cited by over 1200 articles, h-index: 14)

23. R.D. Kennedy, D.J. Clingerman, W.Morris, **C.E. Wilmer**, A.A. Sarjeant, C.L. Stern, M. O’Keeffe, R.Q. Snurr, J.T. Hupp, O.K. Farha, and C.A. Mirkin, “Metallacarborane-based metal–organic framework (MOF) with a complex topology,” *Crystal Growth & Design*, *in press*, (2014). [[link](#)]
22. Y.-S. Bae, J. Liu, **C.E. Wilmer**, H. Sun, A.N. Dickey, M.B. Kim, A.I. Benin, R.R. Willis, D. Barpaga, D. Levan, and R.Q. Snurr, “The effect of pyridine modification of Ni/DOBDC on CO₂ capture under humid conditions,” *Chemical Communications*, *in press*, (2014). [[link](#)]
21. R.D Kennedy, V. Krungleviciute, D.J. Clingerman, J.E. Mondloch, Y. Peng, **C.E. Wilmer**, A.A. Sarjeant, R.Q. Snurr, J.T. Hupp, T. Yildirim, O.K. Farha, and C.A. Mirkin, “Carborane-based metal–organic framework with high methane and hydrogen storage capacities,” *Chemistry of Materials*, 25, 3539-3543, (2013). [[link](#)]
20. Y. Peng, G. Srinivasa, **C.E. Wilmer**, R.Q. Snurr, J.T. Hupp, T. Yildirim, and O.K. Farha, “Simultaneously high gravimetric and volumetric methane uptake characteristics of the metal–organic framework NU-111,” *Chemical Communications*, 49, 2992 (2013). [[link](#)]
19. H.-J. Son, S. Jin, S. Patwardhan, S.J. Wezenberg, N.C. Jeong, M. So, **C.E. Wilmer**, A.A. Sarjeant, G.C. Schatz, R.Q. Snurr, O.K. Farha, G.P. Wiederrecht, and J.T. Hupp, “Light harvesting and ultrafast energy migration in porphyrin-based metal-organic frameworks,” *Journal of the American Chemical Society*, 135, 862-869 (2013). [[link](#)]
18. Y.J. Colón, D. Fairen-Jimenez, **C.E. Wilmer** and R.Q. Snurr, “Limits of ambient temperature hydrogen storage capacity in porous sorbents,” *under review*.
17. M. Fernández, **C.E. Wilmer**, R.Q. Snurr, and T.K. Woo, “Large-scale quantitative structure-property relationship (QSPR) analysis of methane storage in metal-organic frameworks,” *Journal of Physical Chemistry C*, 117, 7681-7689 (2013). [[link](#)]
16. **C.E. Wilmer**, O.K. Farha, T. Yildirim, I. Eryazici, V. Krungleviciute, A.A. Sarjeant, R.Q. Snurr and J.T. Hupp, “Gram-scale, high-yield synthesis of a robust metal–organic framework for storing methane and other gases,” *Energy & Environmental Science*, 6, 1158-1163 (2013). [[link](#)]
15. **C.E. Wilmer**, O.K. Farha, Y.-S. Bae, J.T. Hupp, and R.Q. Snurr, “Structure-property relationships of porous materials for carbon dioxide separation and capture,” *Energy & Environmental Science*, *in press*. [[link](#)]
14. O.K. Farha, I. Eryazici, N.C. Jeong, B.G. Hauser, **C.E. Wilmer**, A.A. Sarjeant, S.T. Nguyen, R.Q. Snurr, S.T. Nguyen, A.Ö. Yazaydin, and J.T. Hupp, “Metal-organic framework materials with ultrahigh surface areas: Is the sky the limit?” *Journal of the American Chemical Society*, 134, 15016-15021 (2012). [[link](#)]
13. **C.E. Wilmer**, K.C. Kim, and R.Q. Snurr, “An extended charge equilibration method,” *Journal of Physical Chemistry Letters*, 3, 2506-2511 (2012). [[link](#)]
12. O.K. Farha, **C.E. Wilmer (co-first author)**, I. Eryazici, B.G. Hauser, P.A. Parilla, K. O’Neill, A.A. Sarjeant, S.T. Nguyen, R.Q. Snurr, and J.T. Hupp, “Designing higher surface area metal-organic frameworks: Are triple bonds better than phenyls?” *Journal of the American Chemical Society*, 134, 9860-9863 (2012). [[link](#)]
11. B. Sikora, **C.E. Wilmer**, M.L. Greenfield, and R.Q. Snurr, “Thermodynamic analysis of Xe/Kr selectivity in over 137,000 hypothetical metal-organic frameworks,” *Chemical Science*, 3, 2217-2223 (2012). [[link](#)]

10. J.J. Gassensmith, R.A. Smaldone, R.S. Forgan, **C.E. Wilmer (co-first author)**, D.B. Cordes, Y.Y. Botros, A.M.Z. Slawin, R.Q. Snurr, and J.F. Stoddart, "Polyporous metal-coordination frameworks," *Organic Letters*, 14, 1460-1463 (2012). [[link](#)]
9. R.S. Forgan, R.A. Smaldone, J.J. Gassensmith, H. Furukawa, D.B. Cordes, Q. Li, **C.E. Wilmer**, Y.Y. Botros, R.Q. Snurr, A.M.Z. Slawin, and J.F. Stoddart, "Nanoporous carbohydrate metal-organic frameworks," *Journal of the American Chemical Society*, 134, 406-417 (2012). [[link](#)]
8. **C.E. Wilmer**, M. Leaf, C.Y. Lee, O.K. Farha, B.G. Hauser, J.T. Hupp, and R.Q. Snurr, "Large-scale screening of hypothetical metal-organic frameworks for methane storage," *Nature Chemistry*, 4, 83-89 (2012). [[link](#)]
7. R.B. Getman, Y.-S. Bae, **C.E. Wilmer**, and R.Q. Snurr, "Review and analysis of molecular simulations of methane, hydrogen, and acetylene storage in metal-organic frameworks," *Chemical Reviews*, 112, 703-723 (2012). [[link](#)]
6. **C.E. Wilmer** and R.Q. Snurr, "Towards rapid computational screening of metal-organic frameworks for carbon dioxide capture: calculation of framework charges via charge equilibration," *Chemical Engineering Journal*, 171, 775-781 (2011). [[link](#)]
5. D.A. Walker, **C.E. Wilmer**, B. Kowalczyk, K.J.M. Bishop, and B.A. Grzybowski, "Precision assembly of oppositely- and like-charged nanoobjects mediated by charge-induced dipole interactions," *Nano Letters*, 10, 2275-2280 (2010). [[link](#)]
4. K.J.M. Bishop, **C.E. Wilmer**, S. Soh, and B.A. Grzybowski, "Nanoscale forces and their uses in self-assembly," *Small*, 5, 1600-1630 (2009). [[link](#)]
3. B.A. Grzybowski, **C.E. Wilmer**, and M. Fialkowski, "Mechanical and electrical properties of nanostructured 'plastic metals,'" *Journal of Non-Crystalline Solids*, 355, 1313-1317 (2009). [[link](#)]
2. B.A. Grzybowski, K.J.M. Bishop, B. Kowalczyk, and **C.E. Wilmer**, "The 'wired' universe of organic chemistry," *Nature Chemistry*, 1, 31-36 (2009). [[link](#)]
1. B.A. Grzybowski, **C.E. Wilmer**, J. Kim, K. Browne, and K.J.M. Bishop, "Self-assembly: From crystals to cells," *Soft Matter*, 5, 1110-1128 (2009). [[link](#)]

Honors & Fellowships

- Named to the Forbes Top 30-Under-30 list in Energy Innovation (**Dec. 2012**)
- AIChE Computational Molecular Science & Engineering (COMSEF) Graduate Student Award (**Oct. 2012**)
- Distinguished Graduate Researcher Award, Chem. & Bio. Engineering, Northwestern University (**Sept. 2012**)
- Voted Top Speaker in U. of Washington Chem. Eng. Distinguished Young Scholar Seminar Series (**iPad, Aug. 2012**)
- Excellence in Graduate Research Award, ACS Energy & Fuels (**1st prize, \$300, Aug. 2012**)
- Invitation to Ring the Closing Bell of the NASDAQ Stock Exchange (**twice, July & August, 2012**)
- Northwestern ISEN Travel Grant (**\$6,000, April 2012**)
- International Science & Engineering Visualization Challenge Winner (**featured in *Science*, Feb. 2012**)
- Awesome Foundation Grant (**\$1,000, Sept. 2011**)
- Walter P. Murphy and Royal E. Cabell Fellowship (**\$6,250, Sept. 2011**)
- Ryan Fellowship International Research Program Travel Award (**\$4,500, May 2011**)
- Declared a 2010 Top Solver/Innovator by InnoCentive (**top 16 out of 200,000+**)
- Northwestern Ryan Fellowship (**\$7,500 per year, Sept. 2010**)
- NVIDIA Academic Partnership Program Award (**\$5,000, July 2010**)
- Northwestern ISEN Cluster Fellowship (**\$12,500, July 2010**)
- Annual MGLC Art Competition: 3D General category (**1st prize, \$150, June 2010**)
- Ontario Millennium Bursary (**\$3,000 CDN, Sept. 2006**)
- Ontario “Aiming For the Top” Scholarship (**\$3,500 CDN per year, Sept. 2002**)

Innovation & Entrepreneurship Awards

- P.E. Fuller, **C.E. Wilmer**, and O.K. Farha, “Thiol functionalized metal-organic frameworks as highly effective packed-bed mercury removal sorbents.”
 - *InnoCentive: Private sponsor* (**1st prize, \$1,000, Oct. 2012**)
- **C.E. Wilmer**, O.K. Farha, T. Ebrahim, and B. Hernandez, “NuMat Technologies.”
 - *National Clean Energy Competition at The White House* (**Grand prize, \$180,000, June 2012**)
 - *Kellogg Innovation Network Prize* (**2nd prize, \$27,000, May 2012**)
 - *Northwestern University Venture Challenge* (**1st prize, \$15,000, May 2012**)
 - *Global Venture Labs Investment Competition* (**Grand prize, \$135,000, May 2012**)
 - *Kleiner Perkins Clean Tech Innovation Prize* (**\$100,000, April 2012**)
 - *Rice Business Plan Competition* (**Grand prize, \$774,000 April 2012**)
 - *Clean Energy Challenge Prize* (**Grand prize, \$100,000, March 2012**)
 - *InNUvation Applied Research Day* (**1st prize, \$500, March 2012**)
 - *Clean Energy Challenge State Prize* (**\$10,000, Feb. 2012**)
 - *InNUvation Monthly Pitch Challenge* (**1st prize, \$500, Feb. 2012**)
- **C.E. Wilmer**, T.V. Phan, S. Bogdanov, and E. Hoxha, “Overcoming the cultural barrier: Leveraging microfinance networks for local community-based distribution of folic acid & other micronutrients.”
 - *Dow Sustainability Innovation Student Challenge Award* (**\$5,000, May 2011**)
 - *InnoCentive: Scientists Without Borders Global Malnutrition Challenge Prize* (**3rd prize, \$1,000, March 2011**)
- **C.E. Wilmer** and R. Appel, “Clean drinking water in developing countries via solar disinfection: An inexpensive quality control mechanism.”
 - *Northwestern Public Health Innovations Conference* (**1st prize, \$50, May 2011**)
 - *InNUvation Applied Research Day ISEN Award* (**\$250, April 2011**)
 - *Perkins Coie Innovative Minds Award* (**1st prize, \$10,000, Jan. 2011**)
 - *InnoCentive: Rockefeller Foundation GlobalGiveback Innovation Challenge* (**finalist, Oct. 2010**)
- **C.E. Wilmer** and T.V. Phan, “Oral Care for the poor: Waste-free refillable toothpaste system.”
 - *Perkins Coie Innovative Minds Award* (**3rd prize, \$1,000, Jan. 2011**)
- **C.E. Wilmer**, “Synthetic DNA management system.”
 - *InnoCentive: Private sponsor* (**1st prize, \$31,500, May 2010**)
- **C.E. Wilmer**, T.V. Phan, and S. Bogdanov, “Absence of (profit driven) incentive to employ water treatment technology in rural populations of developing nations.”
 - *InnoCentive: Nature.com* (**1st prize, \$4,000, Sept. 2009**)

Invention Disclosures, Patent Applications & Awarded Patents

3. **C.E. Wilmer**, M. Leaf, R.Q. Snurr, O.K. Farha, J.T. Hupp, "System and method for generating and/or screening potential metal-organic frameworks," U.S. and international patent applications filed July 6, 2012 (13/543,189).
2. O.K. Farha, J.T. Hupp, **C.E. Wilmer**, I. Eryazici, R.Q. Snurr, "Metal-organic framework materials with ultrahigh surface areas," provisional patent application filed June 18, 2012 (61/661,194).
1. B.A. Grzybowski, K.J.M. Bishop, B. Kowatczyk, **C.E. Wilmer**, "Networks for organic reactions and compounds," U.S. patent application published on Sept. 9, 2010 (12/717,801).

Grants Authored or Co-Authored as a Principal Investigator

1. J. Lewnard, O.K. Farha, J.T. Hupp, **C.E. Wilmer** and R.Q. Snurr, "Commercial prototype adsorbed natural gas (ANG) system for light duty vehicles," *Advanced Research Projects Agency: Energy*, (**\$1.5 million, Jan. 2013 – Dec. 2013**).

Selected Invited Talks, Conference Presentations & Public Outreach Seminars

- **C.E. Wilmer (plenary session)**, O.K. Farha, B.J. Sikora, Y.-S. Bae, J.T. Hupp and R.Q. Snurr "A bird's eye view of porous materials for CO₂ separation and capture," *American Institute of Chemical Engineers*, Pittsburgh, PA (Oct. 2012).
- **C.E. Wilmer**, B.J. Sikora, O.K. Farha, Y.-S. Bae, J.T. Hupp, and R.Q. Snurr "High-throughput identification and synthesis of optimal MOFs for gas storage and separation applications," *MOF2012*, Edinburgh, Scotland (Sept. 2012).
- **C.E. Wilmer**, O.K. Farha, W. Bury, C.-Y. Lee, B.G. Hauser, J.T. Hupp, and R.Q. Snurr "Towards improved natural gas fuel tanks with tailored metal-organic frameworks," (poster) *American Chemical Society*, Philadelphia, PA (Aug. 2012).
- **C.E. Wilmer**, O.K. Farha, B.J. Sikora, K-C. Kim, M.L. Greenfield, J.T. Hupp, and R.Q. Snurr, "High-throughput generation and screening of metal-organic frameworks for adsorption applications," *American Chemical Society*, Philadelphia, PA (Aug. 2012).
- **C.E. Wilmer (invited)** and R.Q. Snurr, "Algorithmic exploration of 'building block' chemistry," *University of Washington, Chemical Engineering Dept.*, Seattle, WA (Aug. 2012).
- **C.E. Wilmer (public outreach seminar)** and O.K. Farha, "Toy molecules: How chemists are building (tiny) shelves, cages & machines out of molecular 'building blocks,'" *Science Café*, Evanston, IL (May 2012).
- **C.E. Wilmer (invited)** and R.Q. Snurr, "Enumerating chemically detailed porous crystals," *American Mathematical Society*, Tampa, FL (March 2012).
- **C.E. Wilmer (keynote speaker)**, "The rewards of random innovations," *InNUvation Applied Research Day*, Evanston, IL (Jan. 2012).
- **C.E. Wilmer (invited)**, "Rapid production of 3D figures in PowerPoint," *Art of Science Lecture Series*, Evanston, IL (Nov. 2011).
- **C.E. Wilmer (invited)**, "High throughput generation and screening of hypothetical porous crystals," *University of Ottawa, Woo Research Group in the Chemistry Department*, Ottawa, ON, Canada (Oct. 2011).
- **C.E. Wilmer (invited)**, and R.Q. Snurr, "Computational discovery of new metal-organic frameworks" *University of Liverpool, Centre for Materials Discovery*, Liverpool, England (July. 2011).
- **C.E. Wilmer**, M. Leaf, B.J. Sikora, O.K. Farha, J.T. Hupp, and R.Q. Snurr, "A database of hypothetical metal-organic frameworks for rapid screening," *Materials Research Society*, San Francisco, CA (April 2011).
- **C.E. Wilmer (plenary session)**, B.J. Sikora, M. Leaf, and R.Q. Snurr, "High throughput computational screening of hypothetical porous crystalline materials," *American Institute of Chemical Engineers*, Salt Lake City, UT (Nov. 2010).
- Decai Yu, **C.E. Wilmer**, and R.Q. Snurr, "Computational screening of metal-organic frameworks as sorbents for dangerous gases," *Chemical/Biological Filtration Strategies Working Group*, Arlington, VA (July 2010).

Teaching & Advising Experience

Co-Lecturer, Teaching Apprentice (*ChE 322 Heat Transfer*) **Jan. 2012 – June 2012**

- Applied and was selected for the competitive teaching apprentice program to co-teach an undergraduate course in chemical engineering.
- Developed and presented original lecture material and designed homework problems as well as exams questions while under the mentorship of Prof. John Torkelson.

Classroom Design Project Advisor (*Engineering Design, Segal Design Institute*) **Jan. 2011 – June 2011**

- Developed project problems and trial solutions as a starting platform for undergraduates.
- Supervised and coached two undergraduate teams during as they developed and refined a working prototype.

Research Advisor for High School Students (*Illinois Mathematics & Sciences Academy*) **Sept. 2010 – April 2012**

- Mentored two high school students who visited the Snurr group once a week for one academic year.
- Taught students to write their own basic molecular dynamics software and also use advanced Monte Carlo simulations.

Research Advisor for Undergraduate Students (*Chem. & Bio. Engineering Dept.*) **Sept. 2009 – Present**

- Worked closely with students on research projects that were conceived and submitted for publication within one year.
- Supervised follow-up independent research projects.

Teaching Assistantships (*Chem. & Bio. Engineering Dept.*) **Sept. 2007 – June 2010**

- ChE 342 – Undergraduate Chemical Engineering Laboratory (**Fall, 2007**)
- ChE 404 – Graduate Advanced Thermodynamics (**Winter, 2008**)
- MBioTech 301 – Undergraduate Balances and Kinetics for Bioprocessing (**Fall, 2009**)
- ISEN 230 – Climate Change and Sustainability: Political and Ethical Dimensions (**Spring, 2010**)

Leadership, Service, Public Outreach & Professional Activities

- Co-founder with Toàn Phan of the interdisciplinary graduate student think-tank *The Earth Team*, which develops innovative solutions to address humanitarian, environmental, and social problems. Worked with a team of students from the Kellogg School of Management to deploy water purification technology in Gabon, Africa, in partnership with the Medical Research Unit of the Albert Schweitzer Hospital in 2012.
- For three years (2008-2011) was the president of the of the graduate student group *Let's Connect the Dots*, which hosted over thirty moderated discussions that brought together members of the academic community to discuss contemporary issues.
- Released source code to the public for two programs developed during my PhD research: a C++ algorithm to calculate partial charges (EQeq), and a python module to determine pore geometries (Void Analyzer).
- Developed a website (hmofs.northwestern.edu), database, and graphical interface that allows anyone to search through over 100,000 hypothetical crystal structures. This database has been accessed by users in over 40 countries since Feb. 2012.
- Created a movie for the general public about self-assembled porous materials that explains both the underlying physical concepts and the transformative technological possibilities of this research. In addition to winning an NSF sponsored visualization competition, this movie has been featured in *Science*, *MSNBC*, and *Wired* magazine among others, and has been viewed over 35,000 times in over 140 countries on YouTube.
- Regularly write tutorials (posted on my personal website) and hold seminars on producing scientific artwork for grant proposals and publications.

References

Available upon request.