

Benjamin M. Adams

CURRICULUM VITAE

Dec 2016

Post-Doctoral Associate
Department of Earth Sciences
University of Minnesota
310 Pillsbury Dr. S.E.
Minneapolis, MN 55455

tel: 715.321.0567
email: adam0068@umn.edu

PROFESSIONAL INTERESTS

Mechanical design, simulation, and integration of renewable electrical power generation systems, especially those utilizing CO₂ refrigerants or combined with carbon capture and sequestration equipment; design and implementation of engineering curriculum.

EDUCATION

- Ph.D., 2015, University of Minnesota, Minneapolis MN, Department of Mechanical Engineering.
Dissertation: “On the Power Performance and Integration of Carbon-dioxide Plume Geothermal (CPG) Electrical Energy Production.” Advisor: Thomas H. Kuehn; Co-Advisor: Martin O. Saar
- MSME, 2010, University of Minnesota, Minneapolis MN, Department of Mechanical Engineering. Project: “Redesign of the Compressible Flow Laboratory.” Advisors: Peter McMurry & Will Durfee
- BAEM, 2004, University of Minnesota, Minneapolis MN, Department of Aerospace Engineering and Mechanics.

PROFESSIONAL APPOINTMENTS

- University of Minnesota, Department of Mechanical Engineering. Post-Doctoral Associate. June 2015 – Sept 2016.
- University of Minnesota, Department of Earth Sciences. Post-Doctoral Associate. Sept 2016 – Present.

PUBLICATIONS

Peer-reviewed Journal Articles

- Adams, B.M., Kuehn, T.H., Bielicki, J.M., Garapati, N., & Saar, M.O. (In preparation). A characterization of temperature depletion in a sedimentary basin and its effect on the electric power output of CO₂ plume geothermal (CPG) power systems. *Geothermics*.

Fleming, M.R., Adams, B.M., Kuehn, T.H., Bielicki, J.M., & Saar, M.O. (In preparation). CO₂ Plume Geothermal Vertical Well and Power Modeling for Solutions of CO₂-H₂O. *Geothermics*.

Garapati, N., Adams, B.M., Randolph, J.B., Kuehn, T.H., & Saar, M.O. (In preparation). Auxiliary Heating of Geothermally Preheated Brine or CO₂ to Boost Electricity Production.

Adams, B.M., Kuehn, T.H., Bielicki, J.M., Randolph, J.B., & Saar, M.O. (2015). A comparison of electric power output of CO₂ Plume Geothermal (CPG) and brine geothermal systems for varying reservoir conditions. *Applied Energy*, 140, 365-377. <http://dx.doi.org/10.1016/j.apenergy.2014.11.043>

Adams, B.M., Kuehn, T.H., Bielicki, J.M., Randolph, J.B., & Saar, M.O. (2014). On the importance of the thermosiphon effect in CPG (CO₂ plume geothermal) power systems. *Energy*, 69, 409-418. <http://dx.doi.org/10.1016/j.energy.2014.03.032>

Conference Proceedings

Garapati, N., Adams, B.M., Bielicki, J.M., Schaedle, P., Randolph, J.B., Kuehn, T.H., & Saar, M.O. (2016). A Hybrid Geothermal Energy Conversion Technology - A Potential Solution for Production of Electricity from Shallow Geothermal Resources. *Energy Procedia*.

Bielicki, J.M., Jamiyansuren, B., Adams, B.M., Choi, H., Saar, M.O., Taff, S.J., Buscheck, T.A., & Ogland-Hand, J.D. (In preparation). The cost of geothermal electricity generated by sequestered carbon dioxide. *14th Annual Carbon Capture, Utilization, and Storage Conference*, Pittsburgh, PA, April 28-May 1, 2015.

Garapati, N., Adams, B.M., Saar, M.O., Randolph, J.B., & Kuehn, T.H. (In preparation). Optimizing geothermal system performance through iterative coupling of reservoir and surface plant simulations. *1st Workshop of Numerical Geothermal Simulation*, TU Munich, April 8-9, 2015.

Buscheck, TA, Bielicki, JM, Randolph, JB, Chen, M, Hao, Y, Edmunds, TA, Adams, B, & Sun, Y. (2014). Multi-fluid geothermal energy systems in stratigraphic reservoirs: Using brine, N₂, and CO₂ for dispatchable renewable power generation and bulk energy storage (No. LLNL-CONF-650283). *Proceedings of the Thirty-Ninth Workshop on Geothermal Reservoir Engineering*, Stanford University, Stanford, California, February 24-26, 2014.

Adams, B.M., Kuehn, T. H., Randolph, J.B., & Saar, Martin O. (2013). The reduced pumping power requirements from increasing the injection well fluid density. *Geothermal Resources Council Transactions*, 37: 667-672.

Randolph, J.B., Adams, B., Kuehn, T.H., & Saar, M.O. (2012) Wellbore heat transfer in CO₂-based geothermal systems. *Geothermal Resources Council Transactions*, 36: 549-554.

Adams, B. & Kuehn, T.H. (2012). The complementary nature of CO₂-plume geothermal (CPG) energy production and electrical power demand. *Proceedings of the ASME 2012 International Mechanical Engineering Congress & Exposition*, IMECE2012-88704, November 9-15, 2012, Houston, Texas, USA.

Durfee, W.K., Adams, B.M., Appelsies, A., & Flash, P. (2011). A Writing Program for Mechanical Engineering. *Proceedings of the ASEE 2011 Conference & Exposition*.

Instructional Materials

Adams, B.M. (2012). Basic data acquisition using LabView. *YouTube*.
<https://www.youtube.com/watch?v=GBhJk5Tnshe>.

Adams, B.M. & Durfee, W.K. (2011). Student writing guide: How to write a problem set.
<http://www.me.umn.edu/education/undergraduate/writing/>.

Adams, B.M. (2010). Wiring a thermistor and acquiring temperatures in LabView. *YouTube*.
<https://www.youtube.com/watch?v=7znlYLkk-mw>.

Adams, B.M. (2010). Frequency analysis of microphone data using LabView. *YouTube*.
<https://www.youtube.com/watch?v=DKQT4M7M2Fg>.

Adams, B.M. (2010). Plotting XY graphs and linear regression in LabView. *YouTube*.
https://www.youtube.com/watch?v=zyYq6K7_WDM.

Adams, B.M. (2010). Creating confidence intervals for linear regression in EXCEL. *YouTube*.
<https://www.youtube.com/watch?v=aSOUQKqIYak>.

Adams, B.M. & Durfee, W.K. (2009). Student writing guide: How to write a lab report.
<http://www.me.umn.edu/education/undergraduate/writing/>.

Adams, B.M. & Durfee, W.K. (2009). Student writing guide: How to write a design report.
<http://www.me.umn.edu/education/undergraduate/writing/>.

AWARDS and HONORS

Teaching Assistant of the Year, Department of Mechanical Engineering, University of Minnesota, 2009.
Institute of Technology Dean's List, University of Minnesota, 2003.

CONFERENCE ACTIVITY

Papers Presented

- “The reduced pumping power requirements from increasing the injection well fluid density,” Geothermal Resources Council Annual Meeting, Las Vegas, NV, October 2013.
- “The complementary nature of CO₂-plume geothermal (CPG) energy production and electrical power demand,” ASME Intl. Mechanical Engineering Congress & Exposition, Houston, TX, Nov 2012.
- “Wellbore heat transfer in CO₂-based geothermal systems,” Geothermal Resources Council Annual Meeting, Reno, NV, October 2012.

Presenter

- “Development of discipline-specific writing and teaching guides in the mechanical engineering department,” 12th International Writing Across the Curriculum Conference, Mpls, MN, June 2014.
- “The future of WAC is WEC: Infusing relevant writing into diverse undergraduate curricula,” 11th International Writing Across the Curriculum Conference, Savannah, GA, June 2012.

TEACHING EXPERIENCE

University of Minnesota

- Mechanical Engineering Department Teaching Assistant Orientation, 2014, 1 sem.
- University-wide Teaching Assistant Writing Workshop, 2014, 1 sem.
- Basic Mechanical Measurements Laboratory, 2007-2012, 9 sem.
- Introduction to Engineering, 2007-2011, 4 sem.
- Departmental Writing Teaching Assistant, 2008-2011, 4 sem.
- Thermal Sciences III (Heat Transfer), 2010, 1 sem.
- Design Projects (Senior Capstone), 2009, 1 sem.

RESEARCH EXPERIENCE

- Research Assistant, CO₂-Plume Geothermal (CPG) Multi-disciplinary NSF-sponsored Research Project, Department of Mechanical Engineering, University of Minnesota, 2011-2015.
- Geothermal Consultant, Preliminary Simulation of Potential CPG Development Site, Heat Mining Company (TerraCOH, Inc), 2012.
- Research Assistant, Undergraduate Measurements Laboratory Redesign Project, Department of Mechanical Engineering, University of Minnesota, 2009-2010.
- Participant Researcher, NASA Reduced Gravity Flight Education Program (RGEFP), Department of Aerospace Engineering & Mechanics, University of Minnesota, 2003-2004.

SERVICE TO PROFESSION

- President, Student branch, American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE), 2013-2014.
- Vice President, Student branch, ASHRAE, 2012-2013.
- Reviewer, ASHRAE Conference Proceedings, 2013-2014.

DEPARTMENTAL SERVICE

- Co-chair and co-founder, Mechanical Engineering Graduate Student Committee (MEGSC), 2011-2014.
- President and co-founder, Geek Cinema, Registered UMN Student Group, 2008-2009.

COMMUNITY OUTREACH

- Instructional Developer and Facilitator, CCEFP Fluid Power Challenge, 2014-2016.
- Facilitator, CCEFP Fluid Power Challenge, 2013-2014.
- Guest Lecture, “You, too, can be a rocket scientist!” Stevens Point Area Senior High School, 2004.

PROFESSIONAL SOCIETIES

American Society of Mechanical Engineers (ASME)

American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE)

Geothermal Resources Council (GRC)

REFERENCES

Available upon request.