

ADAM J. HAWKINS

PERSONAL DATA

Assistant Professor
School of Civil and Environmental Engineering and Earth Science
Clemson University
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EDUCATION

- Ph.D., Cornell University, 2017, Geological Sciences
- M.S., California State University, Long Beach, 2013, Geology
- B.S., University of California, Davis, 2009, Geology

PROFESSIONAL EXPERIENCE

- Clemson University, 2024-, Assistant Professor
- Cornell University, 2019-2024, Postdoctoral Fellow, Smith School of Chemical and Biomolecular Engineering
- Stanford University, 2017-2019, TomKat Center Postdoctoral Fellow in Sustainable Energy, Energy Science & Engineering

MEMBERSHIPS

- Member, American Physical Society, APS (2023-)
- Member, American Geophysical Union, AGU (2015-)
- Member, Geothermal Rising, (2015-)

HONORS AND AWARDS

- Geothermal Design Challenge 2021 – 3rd Place, Department of Energy – National Renewable Energy Laboratory (2021)
- Editor's Choice Award, Water Resources Research (2018)
- Excellence in Research, Cornell University (2017)
- TomKat Center Postdoctoral Fellowship in Sustainable Energy, Stanford University (2016)
- IGERT Fellowship, National Science Foundation (2013)
- Graduate Student Honors, California State University, Long Beach (2013)
- Research Scholarship, National Groundwater Association of California (2011)

PUBLICATIONS

Google Scholar H-Index: 11

Books and Monographs

1. A. J. Hawkins and J. W. Tester, *Encyclopedia of Geochemistry: Geothermal Systems*, Version 2 (2016), Springer, Switzerland.

Refereed Journal Publications

Published

1. N. Rangel-Jurado*, A. J. Hawkins, and P. M. Fulton, "Influence of extreme fracture flow channels on the thermal performance of open-loop geothermal systems at commercial scale", *Geothermal Energy*, **11**, <https://doi.org/10.1186/s40517-023-00261-7> (2023). **Impact Factor: 2.9**
2. Y. Zhang*, A. E. Dekas, A. J. Hawkins, J. Carlo Primo*, and O. Gorbatenko, "Comparison of microbial profiling and tracer testing for the characterization of injector-producer interwell connectivities", *Water*, **14**, 2921, <https://doi.org/10.3390/w14182921> (2022). **Impact Factor: 3.0**

3. Y. Zhang*, R. N. Horne, A. J. Hawkins, J. Carlo Primo*, O. Gorbatenko, and A. E. Dekas, “Geological activity shapes the microbiome in deep-subsurface aquifers by advection”, *Proceedings of the National Academy of Sciences*, **119**, e2113985119 (2022). **Impact Factor: 9.4**
4. A. Suzuki, E. K. Bjarkason, A. Yamaguchi, A. J. Hawkins, and T. Hashida, “Estimation of flow-channel structures with uncertainty quantification: Validation by 3D-printed fractures and field application”, *Geothermics*, **105**, 102480 (2022). **Impact Factor: 3.5**
5. K. Beckers, N. Rangel-Jurado*, H. Chandrasekar*, A. J. Hawkins, P. M. Fulton, and J. W. Tester, “Techno-Economic Performance of Closed-Loop Geothermal Systems for Heat Production and Electricity Generation”, *Geothermics*, **100**, 102318, <https://doi.org/10.1016/j.geothermics.2021.102046> (2022). **Impact Factor: 3.5**
6. A. J. Hawkins, J. T. Bender, R. Grooms, C. J. Schissel, and J. W. Tester, “Temperature-responsive smart tracers for field-measurement of inter-well thermal evolution: Heterogeneous kinetics and field demonstration”, *Geothermics*, **92**, 102046, <https://doi.org/10.1016/j.geothermics.2021.102046> (2021). **Impact Factor: 3.5**
7. J. Tester, K. Beckers, A. J. Hawkins, and M. Lukawski, “The evolving role of geothermal energy for decarbonizing the United States”, *Energy & Environmental Science*, **14**, 6211-6241, doi:10.1039/d1ee02309h (2021). **Impact Factor: 32.4**
8. H. Wu, P. Fu, A. J. Hawkins, H. Tang, and J. P. Morris, “Predicting thermal performance of an enhanced geothermal system from tracer tests in a data assimilation framework”, *Water Resources Research*, **57**, <https://doi.org/10.1029/2021> (2021b). **Impact Factor: 5.4**
9. Y. Zhang*, M. Hartung*, A. J. Hawkins, A. E. Dekas, K. Li, and R. N. Horne, “DNA tracer transport through porous media – The effect of DNA length and adsorption”, *Water Resources Research*, **57**, 1-15, e2020WR028382, <https://doi.org/10.1029/2020WR028382> (2021). **Impact Factor: 5.4**
10. H. Wu, P. Fu, J. P. Morris, E. D. Mattson, G. Neupane, M. M. Smith, A. J. Hawkins, Y. Zhang*, T. Kneafsey, and the EGS Collab Team, “Characterization of flow and transport in a fracture network at the EGS Collab field experiment through stochastic modeling of tracer recovery”, *Journal of Hydrology*, **593**, <https://doi.org/10.1016/j.jhydrol.2020.125888> (2021). **Impact Factor: 4.7**
11. A. J. Hawkins, D. B. Fox, D. L. Koch, M. W. Becker, and J. W. Tester, “Predictive inverse model for advective heat transfer in a short-circuited fracture: Dimensional analysis, machine learning, and field demonstration”, *Water Resources Research*, **56**, e2020WR027065, <https://doi.org/10.1029/2020WR027065> (2020). **Impact Factor: 5.4**
12. Y. Zhang*, A. E. Dekas, A. J. Hawkins, A. E. Parada*, O. Gorbatenko, K. Li, and R. N. Horne, “Microbial community composition in deep-subsurface reservoir fluids reveals natural interwell connectivity”, *Water Resources Research*, **56**, doi:10.1029/2019WR025916 (2020). **Impact Factor: 5.4**
13. L. Sinclair*, J. Brown*, D. May*, B. Guilhaiee*, A. Hawkins, and L. Cathles, “Optimization of fluorescence and surface adsorption of citric acid/ethanolamine carbon nanoparticles for subsurface tracers”, *Carbon*, **169**, doi: <https://doi.org/10.1016/j.carbon.2020.07.024> (2020). **Impact Factor: 10.5**
14. M. Schoenball, J. B. Ajo-Franklin, D. Blankenship, C. Chai, A. Chakravarty, P. Dobson, et al., “Creation of a mixed-mode fracture network at mesoscale through hydraulic fracturing and shear stimulation”, *Journal of Geophysical Research: Solid Earth*, **125**, e2020JB019807, <https://doi.org/10.1029/2020JB019807> (2020). **Impact Factor: 6.3**
15. I. Beentjes*, J. T. Bender*, A. J. Hawkins, and J. W. Tester, “Chemical dissolution drilling of Barre granite using a sodium hydroxide enhanced supercritical water jet”, *Rock Mechanics and Rock Engineering*, **53**, <https://doi.org/10.1007/s00603-019-01912-7> (2019). **Impact Factor: 5.5**
16. A. J. Hawkins, M. W. Becker, and J. W. Tester, “Inert and adsorptive tracer tests for field measurement of flow-wetted surface area”, *Water Resources Research*, **54**, doi: 10.1029/2017WR021910 (2018). **(Winner – Editor’s Choice Award) Impact Factor: 5.4**
17. A. J. Hawkins, M. Becker, and G. Tsofilias, “Evaluation of inert tracers in a bedrock fracture using ground penetrating radar and thermal sensors”, *Geothermics*, **67**, doi: 10.1016/j.geothermics.2017.01.006 (2017). **Impact Factor: 3.5**
18. A. J. Hawkins, D. Fox*, M. Becker, and J. Tester, “Measurement and simulation of heat exchange in fractured bedrock using inert and thermally degrading tracers”, *Water Resources Research*, **53**, doi: 10.1002/2016WR019617 (2017). **Impact Factor: 5.4**

PRESENTATIONS

1. Hawkins, A. J., “Active Tracers for Hydraulic Control of Cooled Short Circuits”, *Invited talk at the Gordon Research Conference: Flow and Transport in Permeable Media*, Newry, Maine (July 2024).
2. Hawkins, A. J., “Subsurface Engineering and the Global Energy Problem”, *Invited talk at Clemson University*, Clemson, South Carolina (April 2024).
3. Hawkins, A. J., “The Role of Earth’s Subsurface in a Low Carbon World”, *Invited talk at Virginia Polytechnic Institute and State University*, Blacksburg, Virginia (February 2024).
4. Hawkins, A. J., “Active Tracers for Hydraulic Control of Cooled Short Circuits: Bench-Scale Demonstration and Forward Modeling”, *Invited talk at the Society of Petroleum Engineers Geothermal Workshop*, Galveston, Texas (August 2023).
5. Hawkins, A. J., “Fires from the Deep: Earth’s Internal Heat as a Solution to the Global Energy Problem”, *Invited talk at Public Works*, Ithaca, New York (July 2023).
6. Hawkins, A. J., “Earth’s Internal Heat as a Solution to the Global Energy Problem”, *Invited lecture in DSOC 3150: Climate Change & Global Development: Living in the Anthropocene*, Cornell University (November 2022).
7. Hawkins, A. J., “Geothermal Energy and Cornell’s Earth Source Heat”, *Invited talk at the 2022 Nature-Society Workshop*, Ithaca, New York (October 2022).
8. Hawkins, A. J., “Beneath our Feet: Geothermal Energy and its Transformative Potential for Heating Homes, Campuses and Entire Cities”, *Invited talk at the New Bedford Science Café*, New Bedford, Massachusetts (June 2020).
9. Hawkins, A. J., “The Role of Earth’s Subsurface in a Low-carbon World”, *Invited talk at the Pennsylvania State University*, State College, Pennsylvania (February 2020).
10. Hawkins, A. J., “Unknown Interfacial Surface Area at Low Reynolds Number”, *Invited talk at Tohoku University*, Sendai, Miyagi, Japan (December 2019).
11. Hawkins, A. J., “Earth’s Internal Heat as a Sustainable Energy Resource”, *Invited talk at the Rainbow Mansion*, Cupertino, California (July 2019).
12. Hawkins, A. J., “Heat and Reactive Transport Theory for Fractured Crystalline Rocks: Implications for Geothermal, Nuclear, and the Energy-Water-Environment Nexus”, TomKat Center for Sustainable Energy, Stanford, California (June 2019).
13. Hawkins, A. J., “Bridging the Scale-gap in Geothermal Reservoir Engineering”, *Invited talk at the Delft University of Technology*, Delft, Netherlands (February 2019).
14. Hawkins, A. J., “A Summary of Tracer and Thermal Tests Conducted at the Altona Field Laboratory”, *Invited talk at the Institute of Fluid Science*, Tohoku University, Sendai, Miyagi, Japan (December 2018).
15. Hawkins, A. J., “Reactive Tracers for Characterizing Fractured Geothermal Reservoirs”, *Invited talk at SUPRI-B, Energy Resources Engineering*, Stanford, California (November 2018).
16. Hawkins, A. J., “Earth’s Internal Heat as a Sustainable Energy Resource”, *Invited talk at the TomKat Center for Sustainable Energy*, Stanford University, Stanford, California (January 2018).
17. Hawkins, A. J., “Reactive Tracers for Characterizing Fractured Geothermal Reservoirs”, *Invited talk at Lawrence Berkeley National Laboratory*, Berkeley, California (July 2017).
18. Hawkins, A. J., “Meso-Scale Field Testing of Reactive Tracers in a Model Geothermal Reservoir”, *Invited talk at Reykjavik Energy*, Reykjavik, Iceland (May 2016).

SPONSORED RESEARCH

- “Temperature-Responsive Swelling Particles for Elimination of Cooled Short Circuits in a Discrete Fracture”, DOE EERE – Geothermal Technologies Office, Supporting, \$3,494,652, (2022-2025)
- “A reactive tracer method for predicting EGS reservoir geometry and thermal lifetime: development and field validation”, DOE EERE – Geothermal Technologies Office, Supporting, \$528,706, (2014-2018).
- “Verification of Geothermal Tracer Methods in Highly Constrained Field Experiments”, DOE EERE - Geothermal Technologies Office, Supporting, \$536,575, (2010-2012).

TEACHING

Courses Taught

Before Fall 2024

- CHEME 6663, Energy Module Series: Geothermal Energy, Spring 2024
- CHEME 6663, Energy Module Series: Geothermal Energy, Spring 2023
- CHEME 6663, Energy Module Series: Geothermal Energy, Spring 2022
- CHEME 6663, Energy Module Series: Geothermal Energy, Spring 2021

MISCELLANEOUS

- Faculty Webpage <https://www.clemson.edu/cecas/departments/ees/people/facultydirectory/hawkins.html>
- Personal Webpage www.adamjhawkins.com
- Google Scholar Profile Page <https://scholar.google.com/citations?user=OSQPF1sAAAAJ&hl=en>
- Researchgate Profile Page https://www.researchgate.net/profile/Adam_Hawkins2
- LinkedIn Profile Page <https://www.linkedin.com/in/adam-hawkins-7485a285>
- ORCID Page <https://orcid.org/0000-0003-1853-0010>
- Select Media:
 - <https://www.fluidimaging.com/blog/flowcam-helps-cornell-university-expand-geothermal-heating-solutions>
 - <https://research.cornell.edu/research/reducing-cost-deep-source-geothermal-energy>
 - <https://www.scientificamerican.com/article/geologic-activity-lets-microbes-mingle-deep-underground/>
 - <https://cornellsun.com/2022/08/31/the-science-behind-cornells-new-sustainable-energy-initiative-earth-source-heat/>
 - <https://sanfordlab.org/article/what-lives-where-and-why-stanford-university-study-surf-sheds-light-makeup-subsurface-0>
 - <https://news.stanford.edu/2022/07/14/geological-activity-can-rapidly-change-deep-microbial-communities/?fbclid=IwAR1jetVrVwgxnWVhDOmkV8u6jt6-7bBZSWFM0e18-url-mUA6ZzpSI3xPzQ>
 - <https://news.cornell.edu/stories/2022/04/swelling-colloids-could-fix-short-circuits-geothermal-wells>
 - https://rapidcityjournal.com/news/local/sanford-underground-research-facility-studying-geothermal-fracking/article_ba904f05-b921-59d1-95ab-042b894546c0.html
 - <https://research.cornell.edu/news-features/beneath-our-feet-geothermal-energy>

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