

Jennifer Houghton

Curriculum Vitae

Environmental Science Program
Dept. of Biology
Rhodes College
Memphis, TN 38112
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Education

- 2003 **Ph.D., Geology and Geophysics** **University of Minnesota**
Biogeochemistry of seafloor hydrothermal vent systems: an experimental study
conducted at *in situ* conditions (advisor: Dr. William E. Seyfried)
- 1996 B.A., Geology College of Wooster
Fluid-rock interaction modeling of epidotization in the plagiogranites of the
Troodos ophiolite, Cyprus (advisor: Dr. Lori Bettison-Varga)

Research Experience

- 2008-present: Assistant Professor, PT, Rhodes College
2004-2007: Adjunct Professor, University of Memphis
1996-2003: Graduate Research and Teaching Assistant, University of Minnesota
1994-1995: Keck Symposium undergraduate internship, College of Wooster
- Field work on the Troodos Ophiolite, Cyprus, leading to senior thesis
 - Field work in the Quetico Provincial Park, Ontario, leading to the publication of an extended abstract

Funding

- 2010: History of Geology Using the Rhodes Vanuxem Collection; Rhodes Fellowship Program (funded)
- 2010: Expanding opportunities for inquiry-based learning in the science and mathematics curriculum with a petrographic microscope; Hill Grant for Curricular Development, Rhodes College (declined)
- 2009: Facilitating a Multi-Institutional NSF Research Experience for Undergraduates Proposal for Environmental Analysis of Sustainability at the Firestone Center for Restoration Ecology, Costa Rica; Mellon23 Collaborative Workshops (declined)
- 2008: Role of tidal forcing on subsurface flow and microbial distribution in hydrothermal systems and its effects on porosity, permeability, and micro-habitats; (coPI: 50%), collaborator: Dr. Lensyl Urbano; NSF Marine Geology and Geophysics (partially funded as SGER)
- 2008: Biological and environmental factors controlling Archaeal species distribution along the Endeavour Segment; (coPI: 50%), collaborator: Dr. Juliann Waits; NSF RIDGE2000 (declined)
- 2001: Collaborative Research: Interdependence of microbial activity and rates of geochemical reactions – an interdisciplinary experimental study under hydrothermal conditions; (named graduate student), PIs: Dr. Bill Seyfried, Dr. Anna-Louise Reysenbach; NSF MGG/Chem OCE

Oceanographic Field Research

- 2002: AdVenture 9 ALVIN cruise (Karen Von Damm, chief scientist): Conducted shipboard experiments using a high pressure/temperature flow-through apparatus to study microbial diversity and microbe-mineral reactions in hydrothermal chimneys

Teaching Experience

2008-present	Assistant Professor	Rhodes College
	<ul style="list-style-type: none">• Earth Systems Science (Geo 111)• Global Environmental Change (Geo 116)• Environmental Hydrogeology (Geo 214)	
2004-2007	Instructor	University of Memphis
	<ul style="list-style-type: none">• Environmental Geology (ESCI 1103)• Weather and Climate (ESCI 1010)• Aqueous Geochemistry (ESCI 6341)	
2002	Instructor	University of Minnesota
	<ul style="list-style-type: none">• Oceanography: a course designed to integrate aspects of geology, chemistry, physics, and biology related to the world oceans within the context of human history and society's environmental impact.	
2001	Guest lectures in Oceanography	University of Minnesota
	<ul style="list-style-type: none">• Interactions between deep-sea biology and chemical and physical oceanography	
1996-2000	Graduate Teaching Assistant	University of Minnesota
	<ul style="list-style-type: none">• Development of lab exercises for Oceanography, involving hands-on exercises that demonstrate concepts of thermohaline circulation, the coriolis effect, shoreline processes, bathymetry, alkalinity and navigation among others.• Lab instructor for Oceanography• Lab instructor for Introduction to Physical Geology	
1995-1996	Undergraduate Teaching Assistant	College of Wooster
	<ul style="list-style-type: none">• Historical Geology• Lab instructor for Paleontology	

Mentoring Experience

2010-11	Rhodes Fellowship: History of Geology Using the Rhodes Vanuxem Collection John Geyer (http://earthsciweb.org/vanuxem/)	
2010	Rhodes Institute for Regional Studies Adam Alsamadisi: An Analysis of Communities at Risk of Environmental Injustices Andrea Perkins: Discordant Dialogue: Discursive Differences at Defense Depot Memphis, Tennessee	
2009-10	Independent Study (Jennifer Whatley, Rhodes College) Analysis of residual pesticides in soils of the Loosahatchie and Wolf watersheds in Memphis, TN	
2008	Independent Study (Charles Forbes, Rhodes College) Application of statistical microbial ecology methods to published microbial survey datasets from hydrothermal vents **presented at Fall AGU 2008	
2007	Independent Study (Ashley Taylor, University of Memphis) Hydrothermal biogeochemical database development: biological data entry	
2007	Independent Study (Tim Crosas, University of Memphis) Initial development of hydrothermal biogeochemical database: GIS mapping emphasis	
2001	NSF-REU summer intern (Aaron Burnett, Boston University) Designing and conducting initial experiments testing the flow-through apparatus with a pure culture of strain EX-H1	
2000	NSF-REU summer intern (Monique Tsang, Haverford College) Testing of a H ₂ gas-membrane system to regulate dissolved gas concentrations in biogeochemical experiments	

Fellowships and Awards

2001-2002	GAANN Fellowship, Geology Department, University of Minnesota
2001	Rama Murthy/Janice Noruk Fellowship, Geology Department, University of Minnesota
1999-2000	GEOFLUIDS Fellowship, Geology Department, University of Minnesota
1998	Outstanding Teaching Assistant Award, University of Minnesota

Academic Service

2010	Rhodes Institute for Regional Studies (summer research with 3 Rhodes students)
2010	Co-organizer of the 1 st annual IMPAct Project to bring sustainability into the curriculum at Rhodes (modeled after the Piedmont Project at Emory University)
2009	Rhodes representative to the AASHE Sustainability Across the Curriculum Leadership Workshop
2008-present	GIS committee, Rhodes College Environmental Program Committee, Rhodes College
2010	Hosted Ocean Leadership Distinguished Lecturer: Dr. Ken MacLeod
2009	Hosted geophysics speaker: Dr. Christoph Geiss Hosted RIDGE Distinguished Lecturer: Dr. Breea Govenar
2000-2001	Geology Department Seminar Organizing Committee
1999	Graduate Representative to Paleontology/Geobiology Faculty Search Committee
1998-2000	Graduate Representative to faculty meetings

Publications

- Rogers, K. M. Adams, P. Canovas, D. Foustoukos, P. Girguis, T. Hoehler, J. Holden, **J. Houghton**, B. Larson, T. McCollom, C. Meile, E. Shock, L. Stewart, M. Schulte. (in prep) Bioenergetics of Deep-Sea Hydrothermal Systems: from measurement to modeling. *Nature Geosciences Review*.
- Foustoukos, D. I., **J. L. Houghton**, W. E. Seyfried, Jr., S. Sievert, G. D. Cody. (in press) Kinetics of H₂-O₂-H₂O redox equilibria and formation of metastable H₂O₂ under low temperature hydrothermal conditions. *Geochimica et Cosmochimica Acta*.
- Houghton, J. L.** and W. E. Seyfried, Jr. (2010) An experimental and theoretical approach to determining linkages between geochemical variability and microbial biodiversity in seafloor hydrothermal chimneys. *Geobiology*, 8:5. 457-470.
- Houghton, J. L.**, W. E. Seyfried, A. B. Banta, A. L. Reysenbach. (2007) Continuous enrichment culturing of thermophiles under sulfate and nitrate-reducing conditions and at deep-sea hydrostatic pressures. *Extremophiles*, 11:2. 371-382.
- Urbano, L., and **Houghton, J.**, (2006) An Interactive Computer Model for Coriolis Demonstrations, *Journal of Geoscience Education*, v. 54, no. 1, p. 54-60.
- Houghton, J. L.**, W. C. Shanks, III, W. E. Seyfried, Jr. (2004) Massive sulfide deposition and trace element mobilization in the Middle Valley sediment-hosted hydrothermal system, northern Juan de Fuca Ridge. *Geochim. et Cosmochim. Acta*, **68**, 2863-2873.

Lab Manuals

- Wittkop, C., **J. Houghton**, F. Barnwell, C. Paola, W. Seyfried, N. Strong, M. Jones. (2000) GEO1006: Oceanography Lab Manual. Department of Geology and Geophysics, University of Minnesota.

Invited Talks at Professional Meetings

- Houghton, J. L.** (2010) Investigating contaminant transport and environmental justice issues in a local watershed through service learning projects with Sierra Club. On the Cutting Edge: Teaching Service Learning in the Geosciences, Virtual Workshop Feb.3-9, 2010.
- Houghton, J. L., A. Taylor, J. L. Waits** (2008) Analysis of environmental factors controlling microbial biogeography and community dynamics in seafloor hydrothermal systems. RIDGE2000: Mantle to Microbes, Portland, OR.
- Houghton, J. L. and L. D. Urbano** (2008) Modeling Environmental Controls on Microbial Biogeography in Seafloor Hydrothermal Vent Systems. AGU Chapman Conference on Biogeophysics, Portland, ME.

Papers presented at Professional Meetings

- Houghton, J. L. and L. D. Urbano** (2010) Evaluating fluid dynamic and geochemical perturbations in seafloor hydrothermal systems by subsurface biofilms using a novel flow-through experimental apparatus. GCA, 74:11 Suppl 1. A421.
- Houghton, J. L. and L. D. Urbano** (2009) Applications of diversity indices, geochemical models, and infrared imaging: two very different approaches to integration. RIDGE2000: Developing a holistic view of oceanic spreading center processes, St. Louis, MO.
- Houghton, J. L., L. D. Urbano, Charles Forbes**.** (2008) Linking Geochemical Models and Microbial Populations Within Hydrothermal Chimneys on the East Pacific Rise. AGU Fall Meeting.
- Houghton, J.L., W.E. Seyfried, Jr., A-L. Reysenbach, A. Banta, K. Von Damm.** (2002) Biogeochemistry of hydrothermal chimney environments: continuous-flow experiments at in situ temperature and pressure. AGU Fall Meeting.
- Houghton, J.L., A. Burnett, D. Goetz, A-L. Reysenbach, W. E. Seyfried.** (2001) Microbial Growth of a Denitrifying Culture at *In-situ* Hydrothermal Conditions: Implications for Biomineralization at Mid-ocean Ridges. AGU Fall Meeting.
- Houghton, J.L., W.E. Seyfried, Jr., D. Goetz, A-L. Reysenbach.** (2000) Relative Rates of Heterogeneous Reactions in the System FeO-Fe₂O₃-H₂S-H₂O-HCl: Implications for Microbial Processes in Subseafloor Hydrothermal Systems. AGU Fall Meeting.
- Houghton, J. L., W. E. Seyfried, Jr.** (2000) Kinetic inhibition of heterogeneous Fe and S reactions: Experimental and theoretical constraints on microbial energy sources in a subseafloor biosphere. RIDGE Theoretical Institute: The subsurface biosphere at mid-ocean ridges.
- Houghton, J. L., W. E. Seyfried III, P. Novak.** (1999) Thermodynamic and Kinetic Constraints on Energy Sources for Microbial Metabolism in Mid-Ocean Ridge Hydrothermal Systems. International Symposium on Subsurface Microbiology, American Society for Microbiology.
- Houghton, J. L., M. E. Berndt, W. E. Seyfried, Jr.** (1998) Thermodynamic and Kinetic Constraints on Hydrothermal Energy Sources for Microbial Communities in Mid-Ocean Ridge Systems. EOS Transactions, v 281. 223.
- Houghton, J. L., T. Pulsipher, W. C. Shanks.** (1997) Major and minor element geochemistry of sulfide minerals from Middle Valley and Escanaba Trough sediment hosted volcanogenic massive sulfide deposits. EOS Transactions, AGU fall meeting.

Professional Society Memberships

- American Geophysical Union (since 1997)
- Geochemical Society (since 2010)