

# MARGARET A. G. HINKLE

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## EDUCATION

**Ph.D.** (September 2010 – May 2015) in Earth & Planetary Sciences, Washington University in St. Louis. Dissertation: "Ion interactions at the mineral-water interface during biogeochemical iron and manganese cycling." *Advisor:* Prof. Jeffrey G. Catalano

**A.M.** (September 2010 – May 2012) in Earth & Planetary Sciences, Washington University in St. Louis. *Advisor:* Prof. Jeffrey G. Catalano

**B.S.** (September 2005 – May 2009) in Chemistry (academic minor: Anthropology), Sewanee: The University of the South, cum laude. *Research Advisor:* Prof. Robert E. Bachman, *Advisor:* Prof. John H. Shibata

## PROFESSIONAL EXPERIENCE

2017-present **Assistant Professor**, Geology, Washington and Lee University

2018-present **Affiliate Faculty Member**, Environmental Studies Program, Washington and Lee University

2015-2017 **Peter Buck Postdoctoral Fellow**, Mineral Sciences, National Museum of Natural History, Smithsonian Institution

2012-2014 **Washington University STEM Teaching-As-Research Intern**, Earth & Planetary Sci., Washington University in St. Louis

## TEACHING EXPERIENCE

**Washington and Lee University**, Assistant Professor, Fall 2017-Present

### Courses Taught

1. GEOL101 General Geology, Winter 2018, 4 credits (class + lab course)
2. GEOL 150 Water Resources, Winter 2018, 3 credits (class)
3. GEOL 240 Hydrology, Fall 2017, 4 credits (class + lab course)

**Washington University in St. Louis**, Graduate Student, 2010-2015

### Teaching Assistantships

1. EPSc 444 Environmental Geochemistry, Fall 2012 (class)
  - Co-lectured the course, prepared and led discussions of assignment material, held weekly office hours, graded geochemical modeling assignments, and implemented the STEM Teaching-As-Research project described below.
2. EPSc 201 Earth & Environment (Introduction to Geology), Fall 2011 (class + lab)
  - Taught a weekly lab section of 20 students, prepared and presented lab lectures, graded exams and lab assignments, and held weekly office hours.
3. EPSc 108 Oceans & the Atmosphere, Fall 2010 (class).

### Teacher Training Activities

1. STEM Teaching-As-Research (WU-STAR) Intern, 2012-2014.
  - Designed and implemented a research project comparing structured-inquiry modeling assignments with traditional rote-based modeling assignments on

enhancing students' conceptual knowledge and ability to interpret data and graphs. Learning gains were assessed by changes in pre- and post-questions for each assignment.

- Audited a course on Teaching-As-Research methodology.
  - Presented a poster on the findings of this research at Washington University's Graduate Research Symposium in Spring 2013.
  - Gave a talk on my TAR results to Washington University's Education Research Group (ERG) in Fall 2013.
2. Mentor, Students & Teachers as Research Scientists (STARS), Summer 2012.
    - Closely mentored a high school student in the Catalano lab over the summer as part of the St. Louis STARS program from designing the research project to providing constructive feedback on paper writing skills.
  3. Guest Lecturer, Biology 101 (Nerinx Hall High School, St. Louis), Spring 2011.
    - Held an afternoon lecture and Q&A session to a junior high school class on Earth and Planetary Sciences.
  4. Activity Leader, Association for Women in Science (AWIS) St. Louis Regional Chapter, 2010 & 2011.
    - Co-led and designed demonstrations on mineralogy and radial chromatography for high school female students interested in STEM fields.

#### **Sewanee: The University of the South, Undergraduate Student, 2005-2009**

##### Teacher Training Activities

1. Teaching Assistant, CHEM 308 (Inorganic Chemistry), 2008.
2. Tutor, Chemistry Department, 2007-2008.

#### **PEER-REVIEWED PUBLICATIONS**

1. **Hinkle M.A.G.**, Becker K.G., Catalano J.G. (2017) "Impact of Mn(II)-manganese oxide reactions on Ni and Zn speciation." *Environmental Science & Technology* **51**, 3187-3196.
2. **Hinkle M.A.G.**, Flynn E.D., Catalano J.G. (2016) "Structural response of phylломanganates to wet aging and Mn(II)." *Geochimica et Cosmochimica Acta* **192**, 220-234.
3. Arvidson R.E., Squyres S.W., Morris R.V., Knoll A.H., Gellert R. Clark B.C., Catalano J.G., Jolliff B.L., McLennan S.M., Herkenhoff K.E., VanBommel S., Mittlefehldt D.W., Grotzinger J.P., Guinness E.A., Johnson J.R., Bell III J.F., Farrand W.H., Stein N., Fox V.K., Golombek M.P., **Hinkle M.A.G.**, Calvin W.M., Desouza Jr. P.A. (2016) "High concentrations of manganese and sulfur in deposits on Murray Ridge, Endeavour Crater, Mars." *American Mineralogist* **101**, 1389-1405.
4. **Hinkle M.A.G.** and Catalano J.G. (2015) "Effect of phosphate and sulfate on Ni repartitioning during Fe(II)-catalyzed Fe(III) oxide mineral recrystallization." *Geochimica et Cosmochimica Acta* **165**, 62-74.
5. **Hinkle M.A.G.**, Wang Z., Giammar D.E., Catalano J.G. (2015) "Interaction of Fe(II) with phosphate and sulfate on iron oxide surfaces." *Geochimica et Cosmochimica Acta*

158, 130-146.

6. Bachman R.E., Bodolosky-Bettis S.A., Pyle C.J., **Gray M.A.** (2008) "Reversible oxidative addition and reductive elimination of fluorinated disulfides at gold (I) thiolate complexes: A new ligand exchange mechanism." *Journal of the American Chemical Society* **130**, 14303-14310.

#### **MANUSCRIPTS IN PREPARATION**

1. **Hinkle M.A.G.**, Post J., Santelli C.M. "Effect of Good's buffers on mycogenic manganese oxide formation." *Planned submission Summer 2018*.

#### **PRESENTATIONS** (\*denotes presenting author)

1. \***Hinkle M.A.G.**, Ling F.T., Heaney P., Post J.E. (2018) "Structural variability in manganese oxides produced at a coal mine drainage remediation site." Oral presentation by Hinkle at the 255<sup>th</sup> American Chemical Society Meeting, New Orleans, LA, March 2018.
2. \*Catalano J.G., Flynn E.D., **Hinkle M.A.G.** (2018) "Reduction of layered manganese oxides by organic acids: Effects on mineral structure and trace metal fate. Invited oral presentation by Catalano at the 255<sup>th</sup> American Chemical Society Meeting, New Orleans, LA, March 2018.
3. \***Hinkle M.A.G.**, Rosenfeld C.E., Santelli C.M., Post J.E. (2017) "Changes in Ni binding to and uptake by mycogenic Mn oxides with aging." Invited oral presentation by Hinkle at the *Soil Science Society of America Meeting*, Tampa, FL, October 2017
4. \*Rosenfeld C.E., **Hinkle M.A.G.**, James B.R., Santelli C.M. (2017) "Mycogenic minerals – Impacts of multi-metal systems on fungal mineral production and metal sequestration." Invited oral presentation by Rosenfeld at the *Soil Science Society of America Meeting*, Tampa, FL, October 2017
5. \***Hinkle M.A.G.**, Flynn E.D., Dye K.G., Santelli C.M., Post J.E., Catalano J.G. (2017) "Interfacial reactions during Mn biogeochemical cycling: Impact on Mn oxide structures and reactivities towards trace metals." Invited oral presentation by Hinkle at the 253<sup>rd</sup> American Chemical Society Meeting, San Francisco, CA, April 2017.
6. \*Rosenfeld C., **Hinkle M.A.G.**, James B.R., Santelli C.M. (2017) "Dualing biominerals? Characterizing simultaneously produced fungal biogenic Mn oxides and Se(0). Invited oral presentation by Rosenfeld at the 253<sup>rd</sup> American Chemical Society Meeting, San Francisco, CA, April 2017.
7. \***Hinkle M.A.G.** (2016) "Interfacial reactions during manganese biogeochemical cycling: Impact on mineral transformations and mycogenic manganese oxide formation." Invited oral presentation at the *Department of Geology, University of Maryland Geochemistry Seminar*, April 2016.
8. \***Hinkle M.A.G.**, Santelli C.M., Post J.E. (2015) "Impact of buffers on mycogenic manganese oxide formation." Oral presentation by Hinkle at *The Geological Society of America Annual Meeting*, Baltimore, MD, November 2015.
9. \***Hinkle M.A.G.** (2015) "Interfacial reactions during Fe and Mn biogeochemical cycling: Impact on mineral transformations and trace element fate." Invited oral presentation at the *Department of Chemistry, Sewanee*, October 2015.

10. \*Catalano J.G., **Hinkle M.A.G.** (2015) "Contrasting effects on trace element fate of iron and manganese oxide transformations induced by electron transfer reactions." Invited oral presentation by Catalano at 25<sup>th</sup> *Goldschmidt Conference*, Prague, Czech Republic, August 2015.
11. \*Catalano J.G., Becker K.G., Flynn E.D., Friedrich A.J., Gadol H.J., **Hinkle M.A.G.**, Luo, Y. (2014) "Trace element redistribution during iron oxide recrystallization." Invited oral presentation by Catalano at *Telluride Science Research Center Workshop: Biogeochemistry and Redox Transformations of Iron*, Telluride, CO, August 2014.
12. \*Catalano J.G., Becker K.G., Flynn E.D., Friedrich A.J., Gadol H.J., **Hinkle M.A.G.** (2014) "Trace element partitioning between iron oxides and aqueous solutions: Evidence for recrystallization." Invited oral presentation by Catalano at 24<sup>th</sup> *Goldschmidt Conference*, Sacramento, CA, June 2014.
13. \***Hinkle M.A.G.**, Catalano J.G. (2014) "Introducing inquiry based assignments in a STEM course & assessing the efficacy of interventions." Oral presentation by Hinkle to the Washington University in St. Louis's Education Research Group, February 2014.
14. \***Hinkle M.A.G.**, Catalano J.G. (2013) "Effect of phosphate and sulfate on Fe(II)-catalyzed trace metal incorporation into and release from Fe(III) oxides." Oral presentation at 23<sup>rd</sup> *Goldschmidt Conference*, Florence, Italy, *Mineralogical Magazine*, 2013, 77(5), 1301.
15. \*Catalano J.G., Becker K.G., Friedrich A.J., **Hinkle M.A.G.**, Luo Y., Otemuyiwa B. (2013) "Trace element and contaminant fate during Fe(II)-catalyzed iron oxide surface transformations." Invited oral presentation by Catalano at 23<sup>rd</sup> *Goldschmidt Conference*, Florence, Italy, *Mineralogical Magazine*, 2013, 77(5), 840.
16. \***Hinkle M.A.G.**, Catalano J.G. "Interactions of phosphate and sulfate with aqueous Fe(II) on Fe(III) oxide surfaces." (2013) Oral presentation at 245<sup>th</sup> *American Chemical Society Meeting*, New Orleans, LA, April 2013.
17. \***Hinkle M.A.G.**, Catalano J. G. (2013) "A comparison of assignment design: Enhancing conceptual and scientific knowledge with structured inquiry methods." Poster presentation at 17<sup>th</sup> *Graduate Research Symposium*, Washington University in St. Louis, MO, February 2013.
18. \***Hinkle M.A.G.**, Catalano J.G. (2012) "Interaction of Fe(II) with phosphate and sulfate on iron oxide surfaces: Implications for interfacial electron transfer." Poster presentation at *Midwest Geobiology Symposium*, St. Louis, MO, September, 2012.
19. \***Hinkle M.A.G.**, Catalano J.G. (2012) "Interaction of Fe(II) with phosphate and sulfate on iron oxide surfaces: Implications for interfacial electron transfer." Poster presentation 22<sup>nd</sup> *Goldschmidt Conference*, Montreal, QC, *Mineralogical Magazine*, 2012, 76(6), 1845.
20. \***Gray M.A.**, Buckley A.J., Bachman R.E. (2008) "Solution aggregation and complexation in bipyridine platinum(II) dihalide complexes." Poster presentation at 60<sup>th</sup> *Southeast Regional Meeting of the American Chemical Society*, Nashville, TN, November 2008, SERM-914.

## **AWARDS, SCHOLARSHIPS, INTERNSHIPS, & FELLOWSHIPS**

Lenfest Summer Fellowship Award, Washington & Lee University, 2018  
Peter Buck Postdoctoral Fellowship, Smithsonian Institution, 2015-2017  
Washington University STEM Teaching-As-Research Internship, 2012-2014  
Carl Tolman Prize (outstanding teaching assistant), E&PS, Washington University, 2013  
Goldschmidt Travel Grant, Florence, Italy, 2013  
Dean's Award for Teaching Excellence for 2012-2013, Washington University, 2013  
T.A. Letter of Recognition, E&PS, Washington University, 2012  
Goldschmidt Travel Grant, Montreal, Quebec, 2012  
Wilkins Scholar, Sewanee, 2005-2009  
Tennessee Hope Scholar, Sewanee, 2005-2009  
Order of the Gownsmen (academic honor society), Sewanee, 2006-2009  
I. Croom Beatty Chemistry Research Internship, Sewanee, 2008

## **SERVICE**

Reviewer for: Environmental Science & Technology, Geochimica et Cosmochimica Acta, American Mineralogist, Chemical Geology, and Journal of Geochemical Exploration.  
Women in Math and Science (WIMS) co-organizer, Washington and Lee University, 2018.  
Peer Mentor, Earth & Planetary Sciences, Washington University in St. Louis, 2012-2014.  
Student Mentor, Students & Teachers as Research Scientists (STARS), Summer 2012.  
Activity Leader, Association for Women in Science (AWIS), 2010 & 2011.

## **INSTRUMENTATION EXPERIENCE**

XAFS spectroscopy  
ATR-FTIR spectroscopy  
ICP-OES  
IC  
XRD  
NMR spectroscopy  
UV-vis spectroscopy  
BET analysis  
SEM/EDS

## **SOFTWARE PROFICIENCY**

MatLab, Geochemist's Workbench, ArcGIS, SixPack, FEFF, Ifeffit—Athena, Hephaestus, ATOMS

## **PROFESSIONAL AFFILIATIONS**

International X-ray Absorption Society  
Mineralogical Society of America  
National Association of Geoscience Teachers  
Omicron Delta Kappa National Leadership Honor Society  
The Geochemical Society  
Soil Science Society of America  
American Chemical Society