

# Bethany A. Chidester

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Earth and Planetary Sciences  
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Last updated: March 5, 2019

- Education**            **University of Chicago** Ph.D. in Geophysical Sciences 2017  
**University of Toledo** B.S. in Chemistry, December 2011 (magna cum laude)
- Research Experience**
- 2018-**            Postdoctoral Researcher, UC Davis, Earth and Planetary Sciences
  - 2017-2018**    Postdoctoral Appointee, Sandia National Laboratories, Dynamic Materials Properties
  - 2012-2017**    Graduate research assistant, University of Chicago, Laboratory for Mineral Physics  
Advisors: Dr. Andrew Campbell, Dr. Dion Heinz  
Dissertation: The distribution of heat-producing radioactive elements in the deep Earth
  - 2011-2012**    Undergraduate lab technician, University of Toledo, Department of Chemistry  
Advisor: Dr. Terry Bigioni  
Research project: Silver nanoparticle synthesis: Controlling the chemistry to eliminate competing products
  - 2010**            Summer scholar (Research Experiences for Undergraduates program), Carnegie Institution of Washington, Geophysical Laboratory  
Advisor: Dr. Timothy Strobel  
Research project: The ammonia-hydrogen system under pressure
- Honors, Awards and Grants**
- 2015**            Outstanding Student Paper Award, Mineral and Rock Physics, American Geophysical Union Fall Meeting
  - 2013-2016**    National Science Foundation Graduate Research Fellowship
  - 2011**            Magna cum laude, University of Toledo
  - 2011**            Departmental Physical Chemistry Award, Department of Chemistry, University of Toledo

**Travel grants:**

University of Chicago Grad Council (2016 AGU Fall Meeting)  
COMPRES Annual Meeting (2013, 2014, 2015, 2016)

**Proposals awarded time at user facilities:**

Investigating giant impacts between rocky planets with high pressure melting and shock equations of state measurements on complex silicates (Steady and decaying shock experiments at Omega EP) (1 day, ~14 shots) 2019  
Actinide partitioning in metal-silicate systems at high pressures and temperatures (XANES measurements at APS 13-ID-E) (54 shifts) 2015-2016  
Equation of state and phase studies of uranium- and thorium-bearing minerals (APS 13-ID-D) (18 shifts) 2013-2015

Spectroscopic properties of pyrite (FeS<sub>2</sub>) at high pressure (NSLS I U2A) (5 days)  
2013

## Publications

7. **Chidester B.A.**, Lock, S.J., Rahman Z., Righter K., and Campbell A.J. (Submitted) The lithophile element budget of Earth's core. *Geochimica et Cosmochimica Acta*.
6. Fischer R.A., Campbell A.J., **Chidester B.A.**, Reaman, D.M., Thompson E.C., Pigott J.S., Prakapenka V.B., and Smith J.S. (2018) Equations of state and phase boundary for stishovite and CaCl<sub>2</sub>-type SiO<sub>2</sub>. *American Mineralogist*, **103**, 792-802.
5. **Chidester B.A.**, Pardo O.S., Fischer R.A., Thompson E.C., Heinz D.L., Campbell A.J., Prescher C., and Prakapenka V.B. (2018) High pressure phase behavior and equations of state of ThO<sub>2</sub> polymorphs. *American Mineralogist*, **103**, 749-756.
4. Boujibar A., Habermann M., Righter K., Driscoll, P., **Chidester B.A.**, Righter M., Ross D.K., and Danielson L.R. (Revised) Experimental evidence of a radioactive core in Mercury.
3. **Chidester B.A.**, Rahman Z., Righter K., and Campbell A.J. (2017) Metal–silicate partitioning of U: Implications for the heat budget of the core and evidence for reduced U in the mantle. *Geochim. Cosmochim. Acta*, **199**, 1-12.
2. Thompson E.C., **Chidester B.A.**, Fischer R.A., Myers G.I., Heinz D.L., Prakapenka V.B., and Campbell A.J. (2016) Equation of state of pyrite to 85 GPa and 2400 K. *Am. Mineral.*, **101**, 1046-1051.
1. **Chidester B.A.** and Strobel T.A. (2011) The ammonia-hydrogen system under pressure. *J. Phys. Chem. A*, **115**, 10433-10437.

## Papers in Prep

- Chidester B.A.**, Panero W., Fischer R.A., Thompson E.C., Heinz D.L., Campbell A.J., Prescher C., and Prakapenka V.B. (In Prep) High pressure phase behavior and equations of state of UO<sub>2</sub> polymorphs.
- Shofner G.A., Campbell A.J., **Chidester B.A.**, Danielson L.R., Lanzirotti A., Rahman Z., and Righter K. (In Prep) Metal–silicate partitioning of tungsten from 10 to 50 GPa: Implications for core formation.
- Chidester B.A.**, Campbell A.J., Thompson E.C., Fischer R.A., Reaman D.M., Heinz D.L., and Prakapenka V.B. (In Prep) An experimental equation of state of B2 KCl.

## Invited Talks

- Caltech, Division of Geological and Planetary Sciences Geology Club Seminar, planned May 2019.
- Harvard University, Department of Earth and Planetary Sciences BiSEPPS Seminar, February 2017. “The lithophile element budget of Earth's core.”
- Penn State University, Department of Geosciences, November 2017. “The distribution of heat producing radioactive elements in the deep Earth.”

University of Rochester, Laboratory for Laser Energetics, October 2017. “The distribution of heat producing radioactive elements in the deep Earth.”  
 University of Rochester, Department of Earth and Environmental Sciences, March 2017. “Radioactive heat-producing elements in the deep Earth”; and, “Actinide mineralogy under extreme conditions.”  
 Sandia National Labs, High Energy Density Materials Physics, March 2017. “Radioactive heat-producing elements in the deep Earth.”  
 NASA Johnson Space Center, Astro Research and Exploration Science, Experimental Petrology, 2014. “Metal–silicate partitioning of uranium: Implications for the heat budget of the core.”  
 University of Toledo, Department of Chemistry Analytical/Inorganic/Physical Chemistry Seminar, 2011. “Silver nanoparticle synthesis: Controlling the chemistry to eliminate competing products.”

**Teaching Experience**

**Spring 2017** Guest lecture for Physics of the Earth “Earth’s Global Heat Budget”  
**Winter 2017** Teaching assistant for GEOS 21000 (Mineralogy)  
**Winter 2016** Teaching assistant for PHSC 10100 (Evolution of the Solar System and the Earth)  
**Spring 2015** Teaching assistant for GEOS 21200/31200 (Physics of the Earth)  
**Spring 2014** Teaching assistant for PHSC 13400 (Global Warming)  
**Winter 2013** Teaching assistant for PHSC 10100 (Evolution of the Solar System and the Earth)  
**Autumn 2012** Teaching assistant for PHSC 10900 (Ice Age Earth)

**Service**

**Journal reviewer:** *Geochimica et Cosmochimica Acta*, *American Mineralogist*, *Earth and Planetary Science Letters*, *Geophysical Research Letters*, *Journal of Nuclear Materials*, *Physics and Chemistry of Minerals*

**2017** Session organizer, chair and OSPA liaison, American Geophysical Union Fall Meeting: MR21C and MR31B – *Liquids and melting in Earth and planetary interiors*  
**2016** Session organizer, chair and OSPA liaison, American Geophysical Union Fall Meeting: DI014 - *Structure, dynamics and evolution of Earth’s deep mantle*

Mentor for undergrad honors theses (Jacob Britz (2015), Olivia Pardo (2017))

**Professional Development**

Cooperative Institute for Dynamic Earth Research (CIDER), July 2018  
 The 7 Secrets of Mentoring Highly Successful Graduate Students, UC Davis, 2018  
 Strengths Based Leadership Training, UC Davis, 2018  
 AGU, Studies on Earth’s Deep Interior Convener Mentorship Program, 2016  
 Seminar on Teaching Portfolios, Chicago Center for Teaching Excell., 2016  
 Seminar on Course Design and College Teaching, CCTE, Spring 2016  
 Teaching@Chicago: Course Assistants workshop, 2015  
 Uranium - Cradle to Grave, GAC-MAC short course, 2013

**Activities and Outreach**

UC Davis Picnic Day – Team Impact Factors, April 2018  
 Telescope facilitator volunteer, Adler Planetarium, 2015-2017  
 Speaker at GeoUnion (undergrad geology club), 2015, 2016

Featured Speaker at UChicagoGRAD Lab Crawl, October 2016  
Phys. Sci. Div. NSF-GRFP prior winners panel, Univ. of Chicago, August 2015  
Teen Science Career Panel, Lincoln Park Zoo, July 2014  
American Geophysical Union member 2010-2011, 2013-present  
American Chemical Society member 2010-2012  
Volunteer at the UT Outdoor Classroom Garden 2010-2011  
USAC Study Abroad, San Sebastian, Basque Country, Spain, Summer 2009

### Contributed Conference Presentations

(†Students mentored by BAC)

\***Chidester B.A.**, Campbell A.J., Lock S.J., and Stewart S.T. Constraining the conditions of the Moon-forming giant impact with metal–silicate partitioning of lithophile elements. *2018 AGU Fall Meeting* (poster)

\***Chidester B.A.**, †Pardo O.S., Panero W.R., Fischer R.A., Thompson E.C., Heinz D.L., Prescher C., Prakapenka V.B., and Campbell A.J. Phase behavior and equations of state of the actinide oxides. *2017 AGU Fall Meeting* (oral)

\*Zurkowski C.C., **Chidester B.A.**, Davis A.H., Brauser N.M., Greenberg E., Prakapenka V.B., and Campbell A.J. Stability of the high-pressure phase Fe<sub>3</sub>S<sub>2</sub> up to Earth's core pressures in the Fe-S-O and the Fe-S-Si systems. *2017 AGU Fall Meeting* (oral)

\*†Brennan M.C., Zurkowski C.C., **Chidester B.A.**, and Campbell A.J. Deep-Earth equilibration between molten iron and solid silicates. *2017 AGU Fall Meeting* (poster)

\*Davis A.H., Brauser N.M., Thompson E.C., **Chidester B.A.**, Greenberg E., Prakapenka V.B., and Campbell A.J. Equation of state of Fe<sub>3</sub>C and implications for the carbon content of Earth's core. *2017 AGU Fall Meeting* (poster)

\***Chidester B.A.**, †Pardo O.S., Fischer R.A., Thompson E.C., Heinz D.L., Prescher C., Prakapenka V.B., and Campbell A.J. High P-T behavior and equations of state of the actinide oxides. *2017 NNSA SSAP Meeting* (poster)

\***Chidester B.A.**, Rahman Z., Righter K., and Campbell A.J. Heat producing elements and the energy budget of Earth's core. *2016 AGU Fall Meeting* (oral)

\*Boujibar A., Habermann M., Righter K., **Chidester B.A.**, Righter M., Ross D.K., Rapp J.F., Pando K., Andreasen R., and Danielson L.R. U, Th, and K in planetary cores: Implications for volatile elements and heat production. *2016 AGU Fall Meeting* (oral, invited)

\*Thompson E.C., **Chidester B.A.**, Danielson L.R., Prakapenka V., Campbell A.J., and Tsuchiya J. Pressure-induced hydrogen bond symmetrization in aluminous Phase D. *2016 AGU Fall Meeting* (poster)

\*Campbell A.J., Mattillion A., Bausch H., Tecklenburg S., Fischer R.A., **Chidester B.A.**, and Prakapenka V. Equation of state of Fe<sub>3</sub>S and limits on the sulfur content of Earth's core. *2016 AGU Fall Meeting* (poster)

\***Chidester B.A.**, Shofner, G.A., Rahman, Z., Righter, K., Lanzirrotti, A. and Campbell A.J. Synchrotron XANES measurement of cation oxidation state in high pressure metal–silicate partitioning samples. *2016 COMPRES Annual Meeting* (oral and poster)

\***Chidester B.A.**, Rahman Z., Righter K. and Campbell A.J. Metal–silicate partitioning of lithophile elements at high pressures and temperatures. *2015 AGU Fall Meeting* (poster, OSPA winner)

\*Thompson E.C., **Chidester B.A.**, Fischer R.A., Prakapenka V.B., Bi W.L., Alp E.E., Campbell A.J. High-pressure behavior of fcc phase FeH<sub>x</sub>, *2015 AGU Fall Meeting* (poster)

\***Chidester B.A.**, Rahman Z., Righter K. and Campbell A.J. Metal-silicate partitioning of uranium at high pressures and temperatures. *2015 COMPRES Annual Meeting* (oral and poster)

- \***Chidester B.A.**, Rahman Z., Righter K. and Campbell A.J. Metal-silicate partitioning of uranium at high pressures and temperatures. *2014 AGU Fall Meeting* (poster)
- \*Thompson E.C., **Chidester B.A.**, Campbell A.J., Prakapenka V.B. Equation of state of pyrite to 85 GPa and 2400 K, *2014 AGU Fall Meeting* (poster)
- \*Campbell A.J., Fischer R.A., **Chidester B.A.**, Thompson E.C., Prakapenka V.B. Melting in the Fe-O-S system at high pressure, *2014 Goldschmidt Annual Meeting* (oral).
- \***Chidester B.A.**, Campbell A.J., Fischer R.A., Reaman D.M., Heinz D.L., Thompson E.C., Britz J.C. and Prakapenka V.B. High-pressure high-temperature phase changes and equations of state of UO<sub>2</sub> and ThO<sub>2</sub>. *2014 COMPRES Annual Meeting* (poster)
- \*Campbell A.J., Fischer R.A., **Chidester B.A.**, Thompson E.C., Prakapenka V.B. Melting in the Fe-O-S system at high pressure, *2014 COMPRES Annual Meeting* (poster)
- \***Chidester B.A.**, Campbell A.J., Fischer R.A., Reaman D.M., Heinz D.L., Thompson E.C., Britz J.C. and Prakapenka V.B. High-pressure high-temperature phase changes and equations of state of UO<sub>2</sub> and ThO<sub>2</sub>. *2013 AGU Fall Meeting* (poster)
- \***Chidester B.A.**, Campbell A.J., Fischer R.A., Reaman D.M., Heinz D.L. and Prakapenka V.B. High-pressure high-temperature equations of state of UO<sub>2</sub> and ThO<sub>2</sub>. *2013 COMPRES Annual Meeting* (poster)
- \***Chidester B.A.** and Bigioni T.P. Silver nanoparticle chemistry: The role of halides. *2012 American Chemical Society Central Midwest Regional Meeting* (poster)
- \***Chidester B.A.** and Strobel T.A. Phase Behavior of NH<sub>3</sub>-H<sub>2</sub> at High Pressure. *2011 NNSA Stewardship Science Academic Alliances Symposium* (poster)
- \***Chidester B.A.** and Strobel T.A. A High Pressure Study of the NH<sub>3</sub>-H<sub>2</sub> System. *2010 AGU Fall Meeting* (poster)