

Bethany A. Chidester

Earth and Planetary Sciences
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Last updated: June 20, 2018

Education

University of Chicago Ph.D. candidate in Geophysical Sciences
University of Toledo B.S. in Chemistry, December 2011 (magna cum laude)

Research Experience

2018- Postdoctoral Research, 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
2009-2011 Undergraduate lab technician, University of Toledo, Department of Environmental Sciences
Advisor: Dr. Michael Weintraub

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 (FeS₂) at high pressure (NSLS I U2A) (5 days) 2013

Publications

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 CaCl₂-type SiO₂. *American Mineralogist*, **103**, 792-802.

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 ThO₂ polymorphs. *American Mineralogist*, **103**, 749-756.

Boujibar A., Habermann M., Righter K., Driscoll, P., **Chidester B.A.**, Righter M., Ross D.K., and Danielson L.R. (In Revision) Experimental evidence of a radioactive core in Mercury.

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.

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.

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 UO₂ polymorphs.

Chidester B.A., Rahman Z., Righter K., and Campbell A.J. (In Prep) The lithophile element budget of Earth's core.

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

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: 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, May 2018
Strengths Based Leadership Training, UC Davis, May 2018
AGU, Studies on Earth’s Deep Interior Convener Mentorship Program, 2016
Seminar on Teaching Portfolios, Chicago Center for Teaching Excell., Summer 2016
Seminar on Course Design and College Teaching, CCTE, Spring 2016
Teaching@Chicago: Course Assistants workshop, September 2015
Uranium - Cradle to Grave, GAC-MAC short course, May 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

Contributed
Conference
Presentations

(†Students mentored by BAC)

- ***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 Fe₃S₂ 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 Fe₃C 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 Fe₃S 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., Lanzirotti, 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_x, *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 UO₂ and ThO₂. *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_2 and ThO_2 . *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_2 and ThO_2 . *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 $\text{NH}_3\text{-H}_2$ at High Pressure. *2011 NNSA Stewardship Science Academic Alliances Symposium* (poster)
- ***Chidester B.A.** and Strobel T.A. A High Pressure Study of the $\text{NH}_3\text{-H}_2$ System. *2010 AGU Fall Meeting* (poster)