

## July 2016 News Notes

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### Alumni Change Lives

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*Samuel Perry was an undergraduate researcher with Prof Wendy Panero. Here he describes how Friends of Orton Hall helped to further his studies. If you are interested in giving to support the Friends of Orton Hall or other funds, please visit our giving page ([link](#)).*

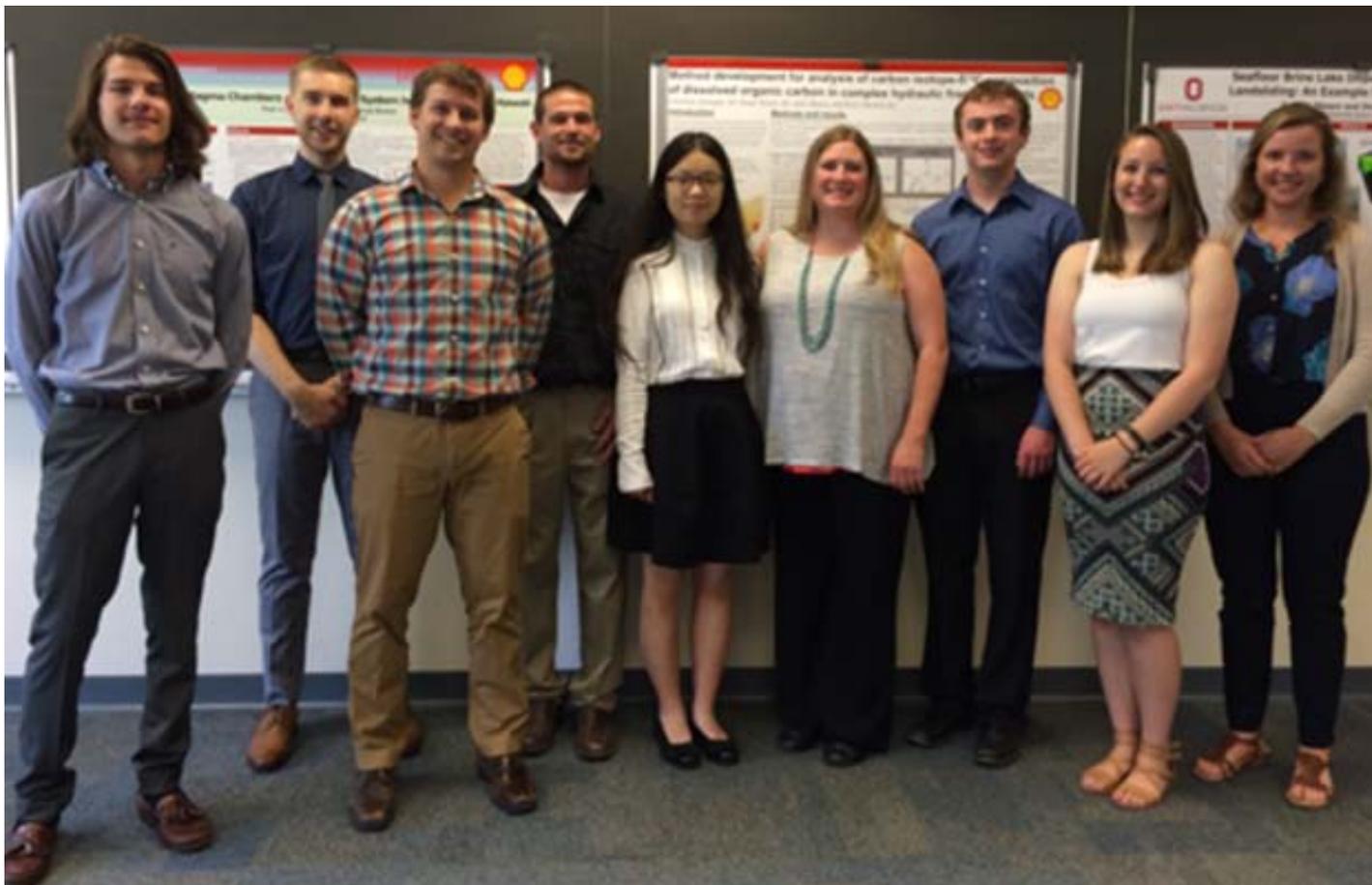
I am studying the behavior of two heat producing radioactive elements within the deep Earth: uranium and thorium. In the lower mantle, the major mineral candidate to host these actinides is CaSiO<sub>3</sub>-perovskite. This project made use of *ab-initio* software to simulate the pressure and internal energy of the actinide oxides and orthosilicates, as well as CaSiO<sub>3</sub>-perovskite. We then calculated the enthalpy of reaction between the actinides and solid-solutions of CaSiO<sub>3</sub>-perovskite. Although our results suggest that uranium and thorium are unlikely to be incorporated into CaSiO<sub>3</sub>-perovskite with a calcium vacancy providing charge balance, a coupled substitution with aluminum replacing silicon is preferred for both actinide species compared to minor pure oxide or silicate phases. We additionally found uranium to be more compatible than thorium, implying it may be sequestered deeper in the mantle.



These findings were presented during a poster session at the 2015 annual meeting of the Geological Society of America in Baltimore, Maryland. The Friends of Orton fund greatly reduced the travel costs of attending the conference, allowing me to make contact and exchange ideas with academics studying actinide behavior at other institutions. Additionally, the Friends of Orton fund provided me with an opportunity to personally meet the leading minds in actinide research; an opportunity which may have otherwise been out of my reach and for which I am very grateful.

# Shell Undergraduate Research Experience 2016

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The 2016 Shell Undergraduate Research Experience (SURE) program concluded on July 14 and 15 with a visit from Shell geologist Bill Magee (BS 2009, MS 2011) and a poster session where the eight SURE interns presented posters of their summer research projects. Visitors at the poster session included many of the SES faculty, probably all the SES graduate students (thank you for being so supportive!), and many of the undergraduates who were in Columbus for the summer. Visitors from other units included Dr. Christopher Hadad, Arts and Sciences Divisional Dean for Natural and Mathematical Sciences, Dr. Steve Fink, Arts and Sciences Associate Executive Dean for Curriculum, Helene Cweren, Associate Director of the Undergraduate Research Office, and several others. The 2016 SURE interns are Alec Moore, Collin Oborn, Tom Copeland, Yuyu Li, Christina Jauregui, Alan Mason, Nikki Kinash and Elsa Saelens.

This year is the 9th year that the SURE program has been generously supported by Shell Exploration and Production Company. Since 2008, 109 students have received paid internships to work with faculty mentors and participate in technical and professional development workshops. Bill Magee was among the 11 students in the first cohort of SURE students in 2008.

Congratulations to all eight SURE interns on a great summer of research!

# Geology at Day Care

Recently, graduate student Myles Moore (adviser Prof Tom Darrah) visited BFA (Balanced Family Academy), a private day care in Columbus off Bethel Rd. for children ages birth to 5). Myles did mineral and rock lessons on June 13th, and taught 5 half hour lessons to children ages 2 to 5. He brought in an assortment of minerals, (pyrite, calcite, quartz, etc.) rocks, (coquina, sandstones, quartzites, phyllites, basalts, etc.) block diagrams, and maps for the children to look at and explore.



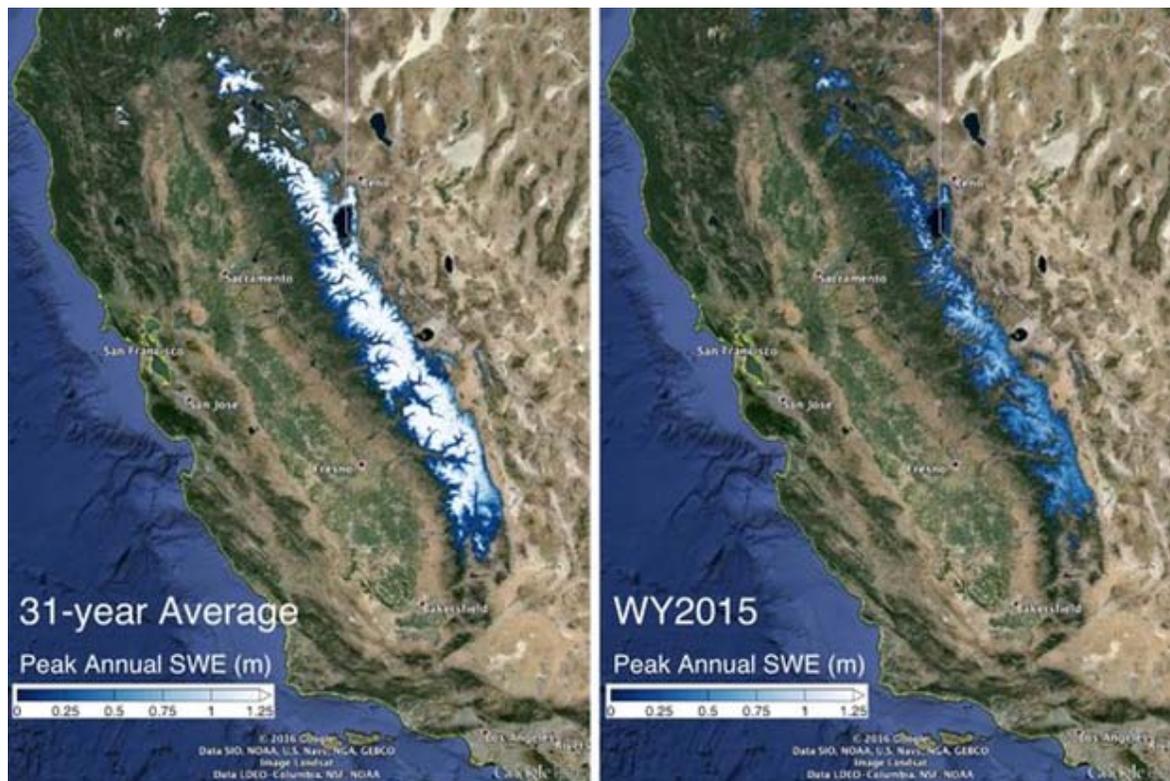
# New Study on Sierra Nevada Drought

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Prof Michael Durand and graduate student Dongyue Li contributed to a study that appeared in *Geophysical Research Letters* June 21, entitled “Characterizing the extreme 2015 snowpack deficit in the Sierra Nevada (USA) and the implications for drought recovery” ([link](#)). Led by Durand’s PhD adviser, Prof Steven Margulis (UCLA), the study builds off an algorithm developed by Durand while in graduate school to map snow water equivalent (SWE) in the Sierra at 90 m spatial resolution using a combination of modeling and remote sensing.

The study characterizes the cumulative effect of inannual drought in the Sierra, and uses a statistical model to predict that recovery to pre-drought conditions will take over four years.

The article was featured in *Eos* ([link](#)) and both Margulis and Durand were interviewed in a local California radio piece ([link](#)). The graphic below shows Water Year 2015 SWE in comparison with the 31-year average.



## Brevia

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Prof Audrey Sawyer was awarded the Kohout Early Career Award by GSA's Hydrogeology division. She will receive it at the fall meeting in September. Congratulations, Audrey!

Graduate student Dongyue Li (adviser Michael Durand) successfully defended his PhD thesis. He will be going to UCLA for a postdoc position with Dennis Lettenmaier and Steve Margulis. Congratulations, Dongyue!