

November 2017 News Notes

- Alumni Change Lives
- Professor Jekeli's Newly Published Book
- Ordovician Life Just Needed a Breath of Fresh Air
- Dr. Andrea Grottoli Named 2017 AAAS Fellow
- SES students awarded McKenzie–Brecher Scholarships
- Janie Rector visits the School of Earth Sciences

Alumni Change Lives

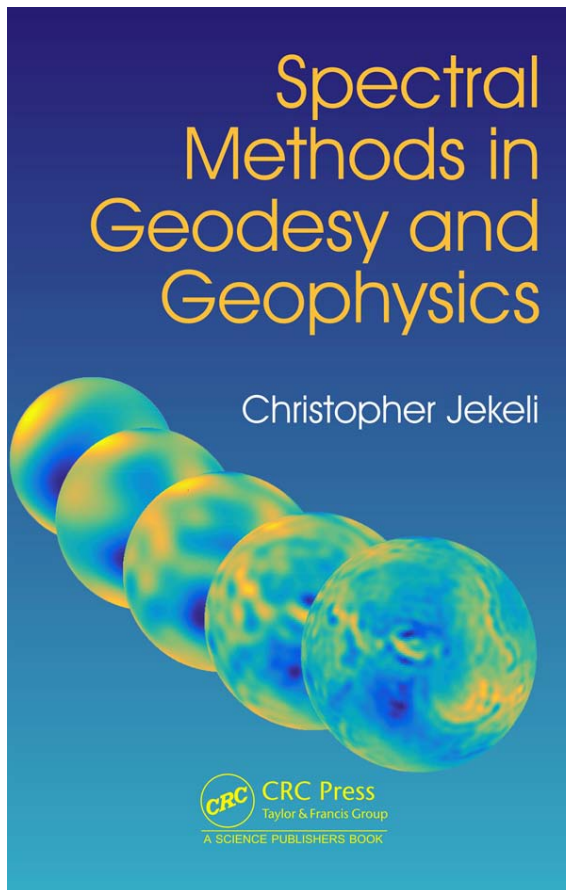
George Grant is a graduate student working with Dr. Steven Lower. Here he describes how the Friends of Orton Hall fund helped further his graduate studies. If you are interested in giving to support the Friends of Orton Hall or other funds, please visit our giving page ([link](#)).



The poles are especially susceptible to climate change, particularly in terms of warming; parts of the Arctic have been shown to be warming 10 times faster than the equator. The last time in Earth's history that reached similar atmospheric greenhouse gas concentrations (the primary driver of climate change) as today and was during the Pliocene Epoch (2.6 to 5.3 mya). This makes the Pliocene a useful proxy for understanding contemporary climate change. As this time period is beyond the scope of dates stored in ice records, sedimentary deposits are another way to gather information about near surface climates and environments. The Eklbaw Deposit

(Ellesmere Island, Nunavut, Canada) is a forest deposit that exhibits very little lithification (i.e. little mineral replacement of original contents). Included in this deposit are numerous tree remains that have retained cellulose that can be utilized for chemical analysis. The isotopic content (oxygen in particular) of cellulose is reflective of the temperatures that the trees grew in, thus we can calculate local ecosystem temperatures through the concentration of oxygen isotopes in cellulose. I was fortunate enough to be able to travel to the Geological Society of America National Meeting in Seattle, Washington from October 20th to 25th. Here I presented results of this cellulose analysis and our estimate of age based on the organisms that are present in the deposit during the session entitled "Miocene–Pliocene Terrestrial Ecosystem Response to the Climate System". This was my first-time presenting research as a professional talk to a group of peers and it was very exciting, satisfying, and eye opening. I was able to meet colleagues that I did not know I had, make new friends, and reinforce old friendships. I was even fortunate enough to spend time with one of the session organizers who gave me insightful advice about graduate school and careers after graduation. Participating in this conference will have a profound impact on my path as a graduate student, but will also have an impact on the direction that I take my career. The entire experience was an exceptional one that I could not have had without the Friends of Orton fund being available to students in the School of Earth Sciences.

Professor Jekeli's Newly Published Book



Prof Chris Jekeli's new book, *Spectral Methods in Geodesy and Geophysics*, was published last month.

The text develops the principal aspects of applied Fourier analysis and methodology with the main goal to inculcate a different way of perceiving global and regional geodetic and geophysical data, namely from the perspective of the frequency, or spectral, domain rather than the spatial domain. The word "methods" in the title is meant to convey that the transformation of a geophysical signal into the spectral domain can be applied for purposes of analysis as well as rapid computation. The text is written for graduate students; however, Chapters 1 through 4 and parts of 5 can also benefit undergraduates who have a solid and fluent knowledge of integral and differential calculus, have some statistical background, and are not uncomfortable with complex numbers. Concepts are developed by starting from the one-dimensional domain and working up to the spherical domain, which is part of every chapter. Many concepts are illustrated graphically with actual geophysical data primarily from signals of gravity, magnetism, and topography.

Congratulations, Chris!

Ordovician Life Just Needed a Breath of Fresh Air

Near Modern Levels of Oxygen Spurred Animal Biodiversity Nearly Half a Billion Years Ago

Earth Sciences professor Matthew Saltzman is co-author on a paper in *Nature Geoscience* this month, with former PhD student Cole Edwards (PhD 2014, now Assistant Professor at Appalachian State Univ) as lead author, which links a dramatic tripling of biodiversity of animal life during the Ordovician period to a rise of atmospheric oxygen to near modern levels. The study integrated geologic proxy data from carbon isotopes in ancient sediments with quantitative modeling of Earth's oxygen levels that was based on isotope mass balance and the oxygen dependence of biological isotope fractionation. You can view the full study in *Nature Geoscience* here ([link](#), also with a News & Views by OSU alum Alycia Stigall) and a related media story here ([link](#)).

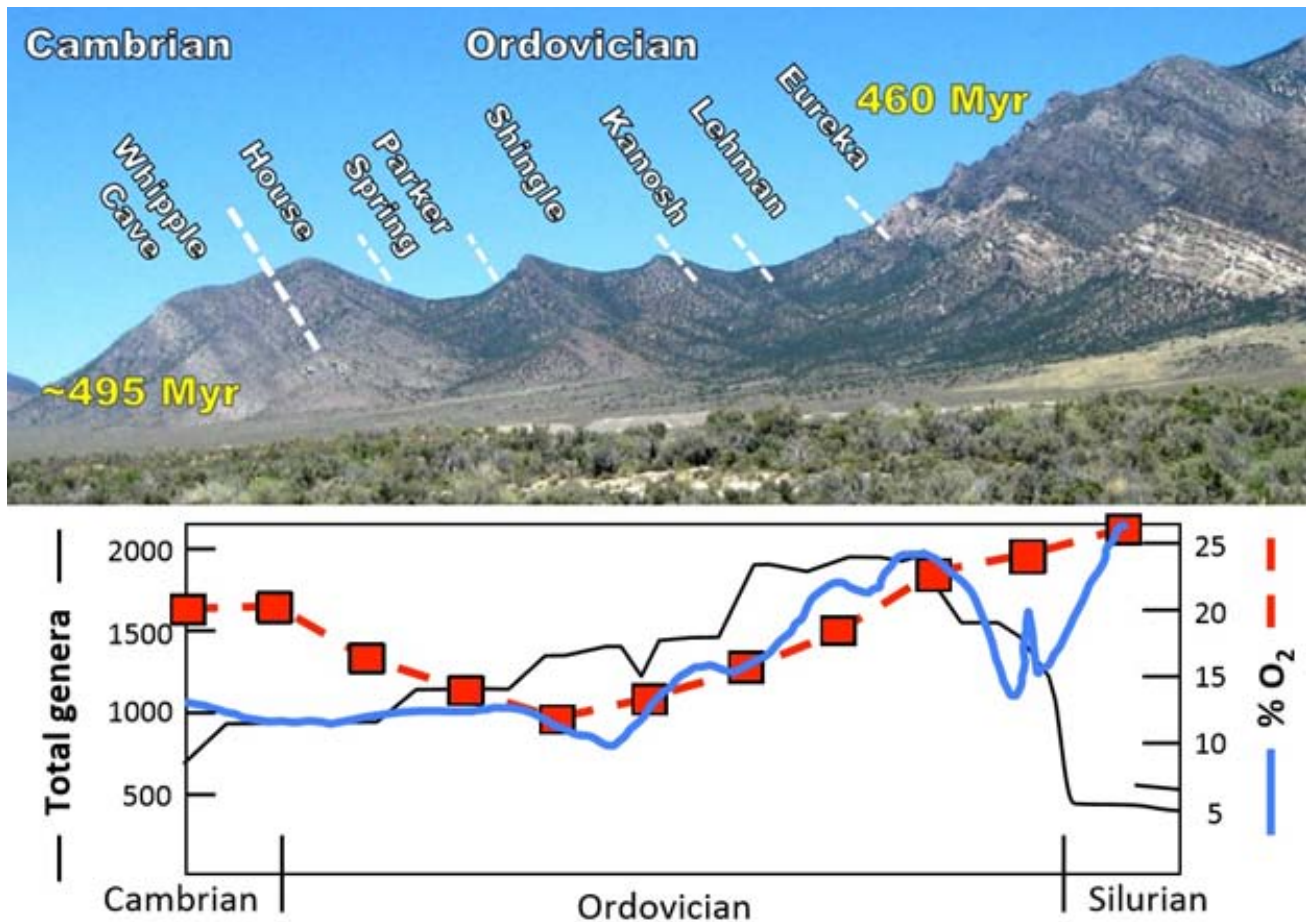
Former PhD Student, Cole



Professor Matthew Saltzman



Below, see photo of Ordovician strata exposed at Shingle Pass, Nevada, alongside a plot of atmospheric oxygen levels and biodiversity from the publication. Congratulations, Matt!



Dr. Andrea Grottoli Named 2017 AAAS Fellow



Andrea Grottoli is one of two OSU Arts and Sciences faculty members to be elected as 2017 Fellows of the American Association for the Advancement of Science (AAAS) — a prestigious honor bestowed upon AAAS members who are elected by their peers and who have made exceptional efforts to advance science.

Grottoli's recognition is for her leading research on coral reefs and climate change. Since coral reefs are vital to marine biodiversity, protecting shorelines from storms, tropical tourism and more, identifying resilience is more important now than ever.

"I'm motivated to do this research because I see the demise of coral reefs every year and I want to make a difference," Grottoli said. "I want to be part of the solution."

She will be recognized along with the other elected fellows in February at the AAAS annual meeting in Austin.

Read the full story here: [link](#)

SES students awarded McKenzie–Brecher Scholarships

Earth Sciences undergraduate majors, Lillian “Lily” Kleban and Rebecca “Becky” Anderson, have been awarded McKenzie–Brecher Undergraduate Research Scholarships from the Byrd Polar and Climate Research Center. The scholarships that will support costs of the students’ research. Becky’s project, “Petrographic Analysis of Metamorphic Rocks from the Choshui River in Taiwan” was funded in the amount of \$543 for the preparation of thin sections that she will examine to determine the mineralogy of rocks collected in the Choshui River watershed by SES alumnus Kevin Meyer in 2015. Becky’s determination of the minerals in the rocks will inform ongoing research on chemical weathering of silicate minerals in carbon sequestration in Taiwan watersheds.



Lily’s project, “Dissolution Kinetics of Volcanic Ash in Sea Water” was selected for funding in the amount of \$800 which will cover the costs of water analyses and laboratory supplies for her laboratory experiments determining the kinetics of several different volcanic ashes collected by Anne Carey and SES alumnus Steve Goldsmith. Lily is determining the role of ash weathering in supplying dissolved iron, phosphorus, and silica as nutrients for marine phytoplankton primary productivity. Both students’ projects are part of Professor Anne Carey’s research on chemical and physical weathering on high-standing oceanic islands. Lily is working closely with Dr. Sue Welch on her laboratory experiments and analyses. Pictured during the awards ceremony at BP-CRC on November 1, 2017 with Professor Emeritus Garry McKenzie are scholarship-winners Lily and Becky. Congratulations!

Janie Rector visits School of Earth Sciences

On Thursday, October 26, Janie Rector visited the School of Earth Sciences to catch up on what the Rector Scholars are doing for their research and how their academic pursuits are progressing. Becky Anderson, BS expected 2019, and Ally Brady, BS expected 2018, are the current holders of the Willis E. “Bill” Rector scholarships that are granted annually to Earth Sciences undergraduate majors and supported by the fund which Janie and her children endowed in 2002 in memory of alumnus, Bill Rector,



BS 1957. The Willis E. ‘Bill’ Rector Endowed Scholarship Fund in Geological Sciences was established to provide scholarships for students studying Geological Sciences who exhibit academic achievement, character, and financial need and has been awarded annually since 2002 and has supported 15 different Geological Sciences and Earth Sciences majors since its endowment. Making the O-H-I-O are Becky Anderson, Janie Rector, Ally Brady and Anne Carey. Thank you to Janie for her generosity.