

October 2014 News Notes

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Alumni Change Lives

Selina Cole is a graduate student in SES working with Professor Emeritus Bill Ausich. Here she explains how funding from the Friends of Orton Hall fund helped to further her graduate studies.

My dissertation research with Prof Ausich focuses on crinoid phylogenetics, but I am also interested in the macroevolutionary patterns of all echinoderms through the Phanerozoic. After taking a geochemistry class with Berry Lyons, I and two other OSU students (David Wright & Jeffrey Thompson) became interested in how calcite-aragonite sea transitions may have influenced macroevolutionary patterns, a topic that has been debated for decades but never tested empirically with echinoderms. Fluctuating rates of seafloor spreading throughout the Phanerozoic have induced changes in Mg/Ca ratios, thereby determining whether calcite or aragonite is the dominant CaCO_3 precipitant in the oceans. Echinoderms are capable of regenerating their high-Mg calcite skeletons, an adaptive evolutionary strategy that may have increased the likelihood of survival under predation

pressure when seawater chemistry matched their skeletal composition. With a grant I received from FOH, we were able to set up an experiment to actually test this hypothesis empirically. Reagent-grade chemicals were used to mix artificial seawater that approximated high-Mg (calcite seas), low-Mg (aragonite seas, the Mg/Ca levels in modern oceans), and intermediate Mg/Ca seawater. Living ophiuroids (brittle stars) were placed in the three treatments, an arm was removed from each specimen, and the regenerating arms were measured for 15 weeks (see photo at right). We found that specimens in the high-Mg treatment had a regeneration rate that was 12x faster than the low-Mg



treatment, providing the first empirical evidence that Mg/Ca ratios have a significant effect on regeneration rates of echinoderms. I presented a talk this month at GSA in Vancouver on the implications of this experiment. Specifically, the talk explored the link between taxonomic survivorship of CaCO_3 skeletonized taxa and secular changes in seawater chemistry. We hope to publish our results within the next year. Without the help of FOH, I would never have been able to get involved such a fantastic "side project" that has broadened my interests, boosted my CV, and greatly enriched my research skills.

Faculty Profile: Derek Sawyer

Recent earthquakes and tsunami in Japan and Chile, and the Macondo oil incident underscore the fundamental need to understand the dynamic crustal processes that shape earth's surface and present potential hazards to society. My research group is dedicated to understanding the links and feedbacks between earth's tectonic stresses and fluid pressure in the crust. My lab combines computational facilities to interpret and process geophysical seismic data and borehole logs to map geology in three dimensions as well as geotechnical experiments directly with sediment and rock. I work closely with the International Ocean Discovery Program on marine research expeditions. I am currently working projects offshore Japan where earthquakes and landslides occur and off North Carolina where frozen methane hydrate exists. The Utica shale development here in Ohio is an important research focus because as it is an important energy resource and requires an understanding of the stresses and pressures at depth for potential to perturb adjacent fault systems.



Like many geoscientists, my interest in the field grew by spending time outdoors asking questions of what controlled the natural features around me. I grew up in coastal Maine spending as much time as I could around the glacially carved harbors and islands. As the first in my family to attend college, I wanted to embark on a career that would allow me to travel the world. I quickly gravitated to marine geology while a freshman at Eckerd College in St. Petersburg, Florida. There I was fortunate to participate in research projects, which inspired me to seek my own Ph.D. Along the way I studied at Penn State and the University of Texas conducting research in the North Atlantic and Gulf of Mexico. Upon graduating with my Ph.D., I worked at the ExxonMobil Exploration Company drilling wells in the deepwater basins of the Gulf of Mexico and Black Sea in areas of high fluid pressure that require important pre-drill pressure predictions as well as real-time pressure surveillance.

At Ohio State I am excited to join a vibrant and enthusiastic group of faculty and students. Earth science will play an important role in many pressing issues of today and the future and it offers exciting careers. One of my most important jobs is to teach and inspire the next generation of earth scientists. My own career track has been shaped significantly by mentors, teachers, and colleagues who inspired and motivated and I aim to do the same at Ohio State.

Fund Profile: Friends of Orton Hall

This piece was contributed by Dr. M. Barton, chair of the Friends of Orton Hall committee.

The section titled “Alumni Change Lives” included each month in the News Notes allows students that have received support from SES development accounts including the Friends of Orton Hall (FOH) fund to provide a brief description of their research projects and how these funds were utilized. One of the major goals of this section is to inform donors of how their contributions to accounts such as the FOH fund are impacting the lives of SES students. Indeed, one of the conditions for receiving an award from FOH is that students agree to submit a short description of their research along with a photograph that can be included in the News. It is clear from reading the monthly issues of the News for the past year that alumni donations to FOH are having a major impact on the lives of SES students, just as awards from FOH probably helped change the lives of alumni in years past.

The FOH fund provides small grants to undergraduate majors and graduate students pursuing studies in the School of Earth Sciences. These grants are typically used to support fieldwork, analytical work, or the presentation of research results at professional meetings. The fund is exclusively for use by students. Applications are considered by a faculty committee consisting of a chairperson and three faculty members. Students are expected to submit materials prior to one of three annual deadlines (on or around 15 September, 15 January, and 15 May) in order to expedite the timely review and processing of applications. For example, for the 15 September deadline this year, we received a total of 16 applications from graduate (12) and undergraduate (4) students. All of these applications were funded. Awards for travel to professional meetings in order to make presentations ranged from \$700-900. Two additional awards were approved for support of research activities, specifically to help with the costs of performing radiogenic isotope analyses, and to allow the preparation of polished thin sections for analysis of mid-ocean ridge basalts.

The total amount of monies distributed in September was \$13,600, and is close to the amount requested by the applicants (\$15,800). This is because the steady increase in the amount available in the FOH fund (thanks to the generosity of our alumni donors) has allowed us to increase the size of individual awards to more realistically cover the costs involved in travel and research. Support from FOH is greatly appreciated by both students and their advisors. On behalf of the FOH committee, the faculty, and the students in SES, I want to sincerely thank all alumni that donate to the FOH fund.

Orton Museum Receives Donations

Recently, a retired physician and his wife donated a large slab of Moroccan cephalopods (which will be put in the Main Office of the School of Earth Sciences) and a beautiful specimen of red quartz crystals.

A number of specimens have recently been received by the museum from the Chemical Engineering Department. Years ago two professors in Chemical Engineering collected minerals that were on display in the hallway of Fontana Lab. That department is moving, and the entire collection of 79 specimens were donated to the Orton Museum including a large beryl crystal and a large quartz crystal held here by Lena Cole, one of our graduate students.



AAPG Chapter Update

Eastern Section AAPG Student Expo. The OSU Student Chapter hosted over 70 students from several different schools during the Student Job Expo that was held on September 19-20. Student were able to attend a Core Workshop, a Chapter Leadership Seminar and a Black Shales Talk presented by Prof Tom Darrah of SES (photo at right). Chesapeake Energy, Chevron, Cabot Oil & Gas, and EQT Energy were able to positively engage with students.



Monthly Chapter Meeting. On October 7th, chapter members attended an informative talk presented by SES's Dr. Frank Schwartz entitled "Folk Beliefs & Fracking" (photo at left). The meeting also included updates on our future fundraising/volunteering events, the direction of IBA (Imperial Barrel Award) at SES, and the future integration of SEG (Society of Exploration Geophysicists) into the chapter in order to increase geophysical resources and opportunities.

We Have a Website! Thanks to our wonderful Social Media Chair Andrew Collins, we are proud to announce the launch of our website. Though still in the development phase, <http://aapg.org.ohio-state.edu> (go.osu.edu/aapg for short) will be the best place to contact us and keep up with all things AAPG at OSU. We are excited to utilize this interface, along with our social media to continue to increase our engagement with alumni and industry. Stayed tuned and GO BUCKS !!!

Brevium

Prof. Grottoli was interviewed for an Ensia.com story on saving coral reefs ([link](#)). The interview focused on her recent paper in Global Change Biology (see the July edition of the News). Congratulations, Andrea!