THE OHIO STATE UNIVERSITY

SCHOOL OF EARTHSCIENCES

August 2015 News Notes

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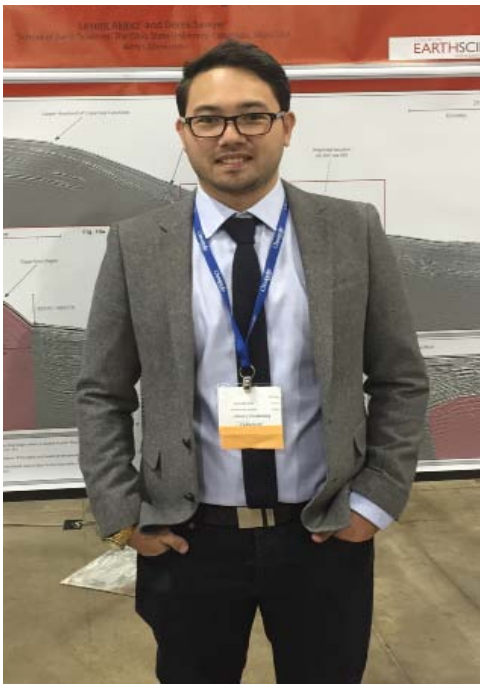
Alumni Change Lives

Levent Akinci is an M.S. student working with Prof Derek Sawyer. Here, he explains how Friends of Orton Hall funding helped further his studies.



Understanding slope stability is important, as the failure of unstable slopes can have catastrophic consequences. By studying slope stability we can learn how to mitigate the risk associated with slope failures. In the marine setting, slope failures can cause tsunamis, thus posing a threat to coastal communities around the world. They can also damage undersea infrastructure, such as pipelines and cables; thus, understanding slope stability is also of major interest to the petroleum industry.

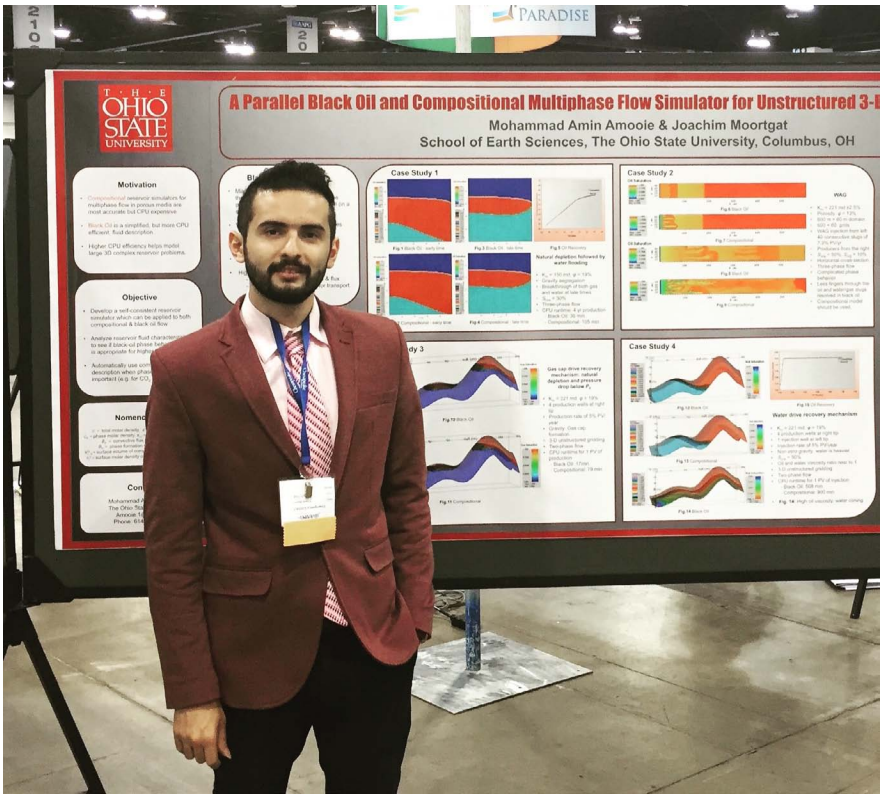
My research focuses on the interaction between salt tectonics and slope stability. I have been using newly acquired seismic data from offshore North Carolina, USA to look at the feedbacks between a rising salt diapir and the Cape Fear landslide. The Cape Fear diapir has been proposed to have possibly triggered the Cape Fear landslide, which is one of the largest mass movement features along the eastern margin of the United States. However, little is known about how the salt may have reacted to the removal of overburden caused by the landslide. With this in mind, my main aim has been to quantify the rate of vertical salt rise post-landslide, in order to determine the relationship between the salt and landslide. Preliminary calculations indicate a maximum possible rise of approximately 1 m since the time of the landslide. Such a small change in salt height would have meant that the pre-failure maximum slope angle would have been approximately the same as it is today (7°), which is well below the angle of repose for these sediments. Therefore, we know that there had to be some sort of overpressure mechanism at play here to cause the Cape Fear landslide. Moreover, as the rate of salt rise is lower than the hydraulic conductivity of the sediments, it would have been impossible for the salt rise to generate any pressure buildup. This means the salt-triggered landslide theory is not plausible here, and some other external force (perhaps dissociating gas hydrates) is the more likely culprit.

Funding from the Friends of Orton Hall has helped me in my research by enabling me to travel to the American Association of Petroleum Geologists' (AAPG) Annual Convention and Exhibition, in Denver, Colorado, in June, to present a poster of my work. In doing so I was able to discuss my findings with several industry professionals, as well as many salt tectonics experts, who gave me useful suggestions on additional analyses I could perform to further my work. Such advice has been invaluable to improving my Master's research, which would not have been conveyed to me if it were not for the funding I received from Friends of Orton Hall.

AAPG Chapter Update

As football season and classes are around the corner, the Student Chapter is excited to kick off our semester with a very busy September. We hope to develop as geoscientists with lectures, workshops, and professional opportunities.

Member Highlight : Mohammad Amin Amooie



I finished my BSc in Iran, at its best engineering school, Sharif University of Technology, majoring in Petroleum Engineering. I worked for a software development company for nine months, which laid the foundation for high performance programming, now beneficial to my research. In addition to that, I was part of a research team, working mainly on oil reservoir fluid characterization, which inspired me to ultimately become a reservoir engineer and an expert in modeling the complex fluid phase behavior and its flow through porous media. Soon, I was intrigued by the expertise and research of Dr. Joachim Moortgat at the OSU School of Earth Sciences, which I found the most matching with my interests. Last June, I presented my research as a poster at the AAPG 2015 Annual Convention & Exhibition in Denver, Colorado.

Upcoming Chapter Events & Activities

- AAPG/SEG Student Chapter Meeting - September 2nd at 5pm, Mendenhall 291, OSU.
- Mock Interviews - 2nd Week of September, TBA, Mendenhall 291, OSU.
- OhioSeis & Core Workshop - September 16th, H.R. Collins Lab & Repository.
- 44th Annual Eastern Section AAPG Meeting (Student Job Fair, Poster Presentations, other Student Leadership Activities) – Sept 20-22, in Indianapolis, Indiana.
- AAPG/SEG Student Expo – Sept 22-23 in Houston,TX.

Please let us know if you will be these upcoming events!

Contact us at aapg@osu.edu for more information on all things AAPG/SEG at Ohio State.

Stayed tuned and GO BUCKS !!!

Faculty Profiles: Michael Durand

After a long hiatus, we are reviving the column on Faculty Profiles. Each month we'll give a profile of one faculty member, in roughly reverse chronological order. See the March - October 2014 editions of the Notes for earlier Faculty Profiles.

Perhaps most people do not grow up telling their friends, "I want to be a hydrologist, when I grow up." My dad was a mechanical engineer, so I grew up wanting to be a mechanical engineer, and started off studying that in college at Virginia Tech (don't worry, I'm rooting for the Bucks next Monday!). But studying how machines worked was less interesting to me than studying natural systems. I picked up a second major in biological systems engineering. Coming from an engineering background, it was hard to believe that our hydrologic models struggled with such fundamental processes as infiltration of water into soils! Predicitons never perfectly matched our observations, even for such controlled settings as plot-scale rainfall simulations on bare soil. Why not? I was hooked.

I started out studying groundwater at UCLA in graduate school, then moved to surface water hydrology and remote sensing with Steve Margulis in Civil Engineering, and eventually found my way to Ohio State, working at Byrd Polar Climate & Research Center with Prof Doug Alsdorf of SES, and then started on the SES faculty in 2010. Given how fundamental water is to our planet, I've found that students in my classes are sometimes surprised to find out how many global hydrology science questions remain unanswered. For example, I suspect right now that the best available estimates of snow stored in the world's mountains are probably too low by a factor of ~five, and many commonly-used estimates are off by an order of magnitude. Globally, data on river flows are not shared adequately: on average, globally, we have information on only about 10-15% of rivers the size of the Scioto (drainage basin ~15,000 km^2). This lack of understanding is important right now, as the hydrologic community answers hard questions about possible changes in the global hydrologic cycle in a warming climate. I'm involved with NASA's Surface Water & Ocean Topography (link) mission, which will provide data on global water, and help to understand global river flows.

Satellite remote sensing measurements have really opened up a new area in hydrology. You can see the whole planet, and get a feel for the big picture. However, it's not easy to take light waves and infer things about the amount of water moving around the planet. So you end up interested in things like snow grain size, since that affects how satellite imagery looks. You have to understand grain size to understand snow remote sensing. The picture below at right shows me and a couple of students from University of Colorado measuring grain size using a near-infrared camera. The photo is from earlier this year near a research facility in Colorado.

The near-infrared camera is one of a few recent technologies developed to make rapid measurements of snow grain size (really we're interested in specific surface area) in the field. Remote sensing of global hydrology is an exciting, dynamic field, and I feel so privileged to be able to explore it here at SES, and with the Byrd Polar and Climate Research Center. You can check out current projects at my perpetually slightly-out-of-date website (link).

Brevia

Senior Research Scientist and Adjunct Professor of SES John Olesik was elected a elected a 2015 fellow of the Royal Society of Chemistry (RSC). Congratulations, John!

Yelp-Columbus featured Orton Geological Museum in a recent story, entitled “Weird and Wonderful Museums” (link). This was sent out in Yelp-Columbus’ weekly email, a few weeks ago.