GEOSCIENCES
THE UNIVERSITY OF ARIZONA

Geophysics Newsletter

2018 - 2019

Global Seismology

The Global Seismology and Tectonic (GSAT) group welcomes Daniella Della-Giustina as the newest PhD student. She will be working with Dr. Susan Beck. Daniella currently works at the Lunar and Planetary Laboratory at UA as a senior staff scientist and is interested in studying the ice sheets of Greenland as an analog for Europa. The group additionally welcomes undergraduate students Tony Guajardo who is working with researcher Dr. Colton Lynner and Erika Jaski who is working with PhD student Audrey Dunham and Dr. Eric Kiser.

PhD student Daniella Della-Giustina creating a source during her fieldwork in Greenland this past summer.

The GSAT group sends its farewells to Drs. Brandon Bishop and James Ryan who both successfully defended their dissertations last Spring. As for the rest of the group, they're continuing to work hard!

PhD students Audrey Dunham, Haiyang Kehoe, and David Moussa and undergraduate student Ashlee Cowles post-Teton Fault deployment.

This summer, PhD student Audrey Dunham received a GSA student research grant to deploy the University of Arizona Nodal Array, consisting of 96 nodal seismometers, along the Teton Fault in Grand Teton National Park. She is interested in detecting and locating small magnitude seismicity to constrain fault geometry and update seismic hazard estimates of the region. Undergraduate Erika Jaski will be analyzing the seismic data for this project.

The Nodal Array was also deployed earlier in the summer in Raton, New Mexico. The instruments were active for five weeks to investigate the relationship between seismicity and oil and gas extraction near the Raton Basin.

Tectonic Geodesy

The Tectonic Geodesy Laboratory (TGL) has a number of exciting accomplishments to report! Dr. Rick Bennett, received all of the funding necessary to begin deploying continuous GPS, borehole strainmeters, and borehole seismometers in central Italy. Installation of the instruments will begin in the spring. He is also on a team with Jack Holt and Chris Harig of the Geosciences department, and Jekan Thenga of the Aerospace and Mechanical Engineering (AME) department that is mentoring seniors in the AME department to develop a radar sounder CubeSat.

Rick Bennett and Deidre Lamb (Assistant Director, UA Disability Resource Center) also held the third-annual Accessible Earth course in Orvieto, Italy, which more than doubled its number of enrolled students from last year! Rick Bennett is also an executive committee member of UA's Earth Dynamics Observatory (EDO), a program led by UA faculty in the Chemical and Environmental Engineering, Hydrology, and Atmospheric Sciences, with their sights set on becoming a preeminent and highly competitive center for remote sensing

satellite instrumentation and mission design. EDO is already proving to be a smashing success, having been awarded a $30 million grant for a NASA Earth Observation satellite mission!

PhD candidate Phillip McFarland brings us exciting news of his employment at NOAA in Washington, D.C. He is also currently working on his thesis, which is focused on developing a comprehensive block model for the Central Andes that incorporates data from a combined GPS network spanning the South American continent.

In the parking lot of a hotel in the city of Padua, Italy, Prof. Bennett prepares the students of Accessible Earth for a trip to the Dolomites of Northern Italy. Everyone is eager to get a first-hand experience of the geology of the Italian Alps!

PhD candidate Katherine Guns spent the summer working as a volunteer at the USGS in Menlo Park, CA, learning new crustal deformation modeling techniques concerning post-seismic signals in GPS data. She is plugging away on her geodetic analysis of crustal deformation in southern California, and is currently organizing another campaign for GPS data in Joshua Tree National Park using funds from a GSA Graduate Student Research Grant received earlier this year.

PhD candidate Lisa Jose is working to refine the methods by which we use GPS and GRACE observations to monitor movement of water on continental scales. She is also co-chair for Spring 2019 GeoDaze and has recently joined the instructor staff at UA Sky School, an outdoor education program for Tucson public school students. Undergraduate Stephanie Zech is looking at Coulomb stress changes associated with a sequence of recent earthquakes in central Italy. Specifically, she is assessing the role that viscoelastic stress relaxation may have played in controlling the timing of the earthquake

Reflection Seismology

The reflection seismology group welcomes two new students: Lauren Reeher and Terrance Delisser who will both be working with Roy Johnson and Amanda Hughes. Lauren joins the Keck Paleofluids team working on developing a basin model for the Paradox Basin in southern Utah. She is also involved in work to constrain geomechanical parameters of stratigraphic units in the basin. Terrance is will be working to assess the growth and seismic hazard of the White Wolf Fault which generated the largest blind thrust fault in Southern California History (1952 Mw 7.3 Kern County). Early next semester the group will collect seismic reflection profiles over the associated fold scarp. This study will provide the opportunity to relate the observed co-seismic deformation pattern associated with this blind thrust fault to the geometry and location of past folding events in the subsurface. Additionally, the will also allow us to test the hypothesis that folding deformation above blind thrust faults is localized to discrete zones.

Geodynamics & Remote Sensing

This is the inaugural section for the Geodynamics and Remote Sensing group!

The Geodynamics and Remote Sensing group at UA. From left to right: Mila Lubeck, Dr. Lavanya Ashokkumar, Dr. Anthony Osei Tutu, Dr. Chris Harig, Lisa Knowles, and Ken Gourley.

Our group has expanded quite a bit over the past year. Dr. Lavanya Ashokkumar joined the group in Spring, having completed her Ph.D. from the Swansea University in Wales, UK. Her current work links climate data with estimates of mass balance of ice sheets to develop a prediction of ice mass loss through the rest of the 21st century. Dr. Anthony Osei Tutu joined the group over the summer after he finished his Ph. D. at GFZ Potsdam in Germany. Anthony is using a new technique to estimate viscosity in the upper mantle using satellite measurements of Earth's gravity field. Also this fall Ken Gourley arrived from UC Berkeley to UA to pursue a Masters degree. He is starting a project to investigate the topography of southern Africa and how it relates to mantle convection. Last but not least, undergraduate Mila Lubeck is gearing up to tackle a new research project that is still in the planning stages. Everyone is excited to start on these new projects and grow the group in its first full year.