

## **Geoscience Alumni Research Award 2016 Update**

Benjamin Keisling, Ph.D. Candidate

Awarded a Joseph Hartshorn Memorial Scholarship, \$1050

Title of Project: "International Summer School in Glaciology in McCarthy, AK"

A generous grant from the Department of Geosciences allowed me to attend the International Summer School in Glaciology run by the University of Alaska–Fairbanks (UAF) in the city of McCarthy, AK from June 6–17, 2016. Twenty-eight students from eleven countries attended the course, which focused the theoretical and numerical study of glaciers and ice sheets. As my dissertation concerns the modeling the behavior of the Greenland ice sheet over geologic time, the course was extremely relevant to my ongoing research.

The course was structured around three main activities. Each day we had between three and four lectures on topics spanning continuum mechanics, ice dynamics, thermodynamics, glacier mass balance, hydrology, remote sensing, inverse modeling, and numerical modeling. In the afternoon, we worked on exercises to put what we had learned that day into practice with pencil and paper. In the evenings, we worked on group projects with 1-3 other students and a faculty mentor. I worked with another student and Dr. Andy Aschwanden from UAF to build a model of subglacial erosion. At the end of the course, we gave a 12-minute presentation on our research project and received feedback from the other students and instructors.

Although the classroom work was intense and took up most of the summer school, we took one day "off" to go into the field and visit a local glacier. The Root and Kennicott glaciers terminate within a kilometer of the center of town, making McCarthy a spectacular place to see glaciers up-close. As my Ph.D. does not include fieldwork and there are no glaciers near Amherst, this opportunity was really special for me. The excursion took us on a 10-mile route over and around the glacier, into a valley on the western side of the Kennicott that fills with meltwater every year and causes a dramatic jökullhaup. In fact, for many years, this massive flood washed away the only bridge into town every summer, and it had to be rebuilt each fall. Standing in the empty chamber beneath the glacier provided a really unique reference point for our classroom studies of glacier hydrology. We were very lucky to be able to directly observe the ways that water interacts with the bed of a glacier.

The course will have a lasting impact on my Ph.D. and my career. Firstly, the opportunity to take a structured glaciology course, which is not possible at UMass, has given me a framework for better understanding the technical details of the modeling work I am doing. Secondly, the exposure to other techniques in glaciology, especially remote sensing, has given me new ideas about ways to test and validate the results of my own research. Thirdly, the summer school provided an invaluable opportunity to network with U.S. and international students, as well as with faculty members at UAF, Simon Fraser University (CAN) and University of Kansas. The relationships forged in the two weeks together in McCarthy will certainly persist throughout my career as a glaciologist and I look forward to some of them growing into opportunities for scientific collaboration, both during my Ph.D. and afterward.



Benjamin on top of the Kennicott Glacier in McCarthy, AK. The icefall is visible in the background. (Photo Credit Chen Zhao, University of Tasmania)



An aerial view of the Root and Kennicott Glaciers.



Students exploring an ice cave on the edge of the Root glacier.