

# News

## Report from the Fourth International Summer School in Glaciology

McCarthy, Alaska, USA, 7–17 June 2016

Early in the morning of 7 June 2016, we, 28 graduate students from ten different countries (most from the USA and Canada, but others travelling from Bolivia, Germany, Switzerland, England, Norway, India, Nepal and Australia) started our journey from Fairbanks (Alaska) to McCarthy, for the fourth International Summer School in Glaciology. The International Summer School in Glaciology is an intense 11-day glaciology course hosted by the University of Alaska Fairbanks (UAF), providing graduate students with a ‘comprehensive overview of the physics of glaciers and current research frontiers in glaciology’ through formal lectures, exercises and group projects. Joining us as course instructors were Regine Hock (UAF, summer school coordinator), Andy Aschwanden (UAF), Ed Bueler (UAF), Gwenn Flowers (SFU, Canada), Leigh Stearns (Kansas University), Martin Truffer (UAF) and Mike Loso (Alaska Pacific University Anchorage), all prominent researchers in their field.

After a bumpy 11 hour journey through the scenic mountains of southern Alaska, we arrived in the small town McCarthy. McCarthy, a holdover from the copper boom of the early 20th century, is surrounded by the largest National Park in the USA, Wrangell–St. Elias National Park, and is within walking distance of the Kennicott glacier, which makes it the ideal location for this glaciology course. We spent our days at the Wrangell Mountains Center (WMC) which is a non-profit institution open to all and dedicated

to the exploration, and appreciation of wildlands and mountain culture in Alaska and beyond. The WMC not only served as our classroom, research center, and social club, but also as our mess hall providing three delicious meals a day, all prepared with freshly harvested garden ingredients. We spent our nights in our colorful tent-city, set up in a wide grassland area only a few walking minutes away from the WMC.

Each morning consisted of 4 hours of lecture covering a variety of glaciological topics, ranging from the theory of continuum mechanics, glacier mass balance, ice flow dynamics and glacier hydrology to remote sensing techniques and ice sheet modeling. The lectures were held in a log cabin called the ‘Porphyry Place’. This added a special ambience to each lecture as the ‘Porphyry Place’ is the former home of Edward LaChapelle, a pioneer in the field of avalanche research and forecasting as well as a glaciologist, mountaineer, skier and author. During our first afternoon, we covered the walls of the WMC with the research posters that each student was asked to prepare in advance of the course. This student poster session lasted the entire afternoon where we had the opportunity to communicate our own research ideas and learn about the research projects of others, while also receiving valuable feedback and suggestions from students and instructors. The remaining afternoons were dedicated to reinforcing our understanding of the theory presented during



Students working on hands-on exercises in the front yard of the Wrangell Mountains Center. Photo: Regine Hock.



Students setting up their research posters for the afternoon-long poster session to discuss our MSc and PhD research projects. Photo: Regine Hock.



Gwenn Flowers, Jessica Zimmermann Mejia, Christina Carr, John Cavanagh and Dustin Carroll working on their student project. Photo: Regine Hock.



Mike Loso giving some glacier-travelling safety instructions before crossing Root glacier. Photo: Regine Hock.

the morning lectures through 2 hour long hands-on exercises. The rest of the afternoon, we would then spend working on group projects. The group projects were mini research projects assigned to groups of two or three students, each designed and supervised by one of the course instructors. The projects covered a large variety of topics including analyzing the use of GPS data to derive ice flow velocities, evaluating glacier surges in space and time, modeling the glacier surface energy balance and the subglacial drainage, or

analyzing inverse models to determine subglacial bedrock properties. For most students, their group project topic was different from their graduate research, which challenged us to broaden our horizons and develop new skills in different areas of glaciology. At the end of the week, each group presented their project results in a miniature conference, which was a great opportunity to practice our presentation skills. It was impressive to see how much we had achieved in such a short period of time!



Group picture of the students and instructors from the fourth International Summer School in Glaciology during the excursion on the Root glacier. Photo: Andy Aschwanden.

A highlight of the course was the one-day excursion onto the Kennicott/Root glacier, led by Mike Loso. We started with a short hike from the former mining village of Kennicott to the Root glacier. We then traversed across Root glacier, which merges with the debris-covered Kennicott glacier. On the glacier we admired the beauty of various glacial features such as meltwater channels, medial moraines, moulins, and sediment covered ice structures that marked the position of former moulins. At the western margin of the Root glacier, near Donahoe Falls, there is a lake that forms annually and is dammed by the glacier. This year, the lake had already drained prior to our arrival, which allowed us to explore the impressive ice cave that had been formed by water cutting underneath the glacier. A separate half-day excursion was also organized to the front of the Kennicott glacier. There, students saw a recently-formed proglacial lake, learned about the regional geomorphology of the area and saw lateral moraines as well as overridden tree trunks remaining from the advance of the glacier during the Little Ice Age. Every student thoroughly enjoyed these excursions outside the classroom to experience the beauty of the glaciers near McCarthy for themselves. For some students, the excursion onto the Root glacier was their first experience walking on a glacier and is therefore something they will never forget!

A special 2 hour portion of the course was set aside for a workshop on Engaged Scholarship led by Lizz Utlea, a fellow classmate and PhD student from the University of Michigan. Lizz is deeply interested in ethics, diversity of knowledge and community service and has long been involved in volunteering and NGO administration related to intercultural education and exchange. Lizz's session comprised an interactive workshop that guided students through discussions about our individual goals in research, involvement in community outreach and politics. In the end, we learned about how to get involved and share our research in an accessible and engaging way, certainly an important skill for our future careers as scientists.

On three of our evenings, we re-grouped after dinner for a guest lecture. Mark Vail, a long-time resident of McCarthy gave a guest lecture entitled 'A View from Here' on one of our first evenings. Mark shared with us his knowledge of the fascinating history of McCarthy, Kennicott and the mining industry, as well as former glacier states, yearly flood events and how each year the bridges needed to be rebuilt after the flooding. On another evening, we enjoyed a guest lecture from Vladimir Alexeev (UAF) about recent changes in the Arctic climate and associated changes in sea



Student exploring the ice cave beneath Root glacier. Photo: Regine Hock.

ice. For a final lecture, everyone from McCarthy was invited to attend a public lecture on tidewater glaciers by Martin Truffer. Besides the scientific facts about tidewater glaciers and their behavior under recent climatic changes, we all enjoyed the stunning videos and impressive pictures from tidewater glaciers that Martin showed.

On other evenings, we would either gather around a bonfire in tent-city, play in the weekly Friday night softball game organized by McCarthy's residents, or attend the open mic night at 'The Golden Saloon', where the bravest of us would dare to sing a song. And of course, one night we ran the traditional glaciology summer school soccer game, in which the American students and instructors played against those of us from the rest of the world. The 'rest of the world' team clearly won; however, our strategy of loudly cheering and applauding at every near goal until everyone agreed that it indeed went in might have helped with the win. On our last evening together, we celebrated the success of the course during a fun banquet dinner in the dining room of 'The Golden Saloon'. After the delicious pork dinner, the pictures and videos taken during the week and entered in this year's photo/video contest were shown. The winners of the contest were chosen by the highly scientific applause-o-meter, and were awarded with hats and T-shirts generously sponsored by IGS.

After a short night and quick pack in the morning, we began our long and bumpy journey back to Fairbanks. There, Regine Hock invited us all for pizza at her home before we made our separate ways back to our universities across the globe. Our 11-day summer school successfully brought together a diverse group of graduate students and instructors, where we were trained in glaciology through lectures, exercises and group work in a beautiful and intimate setting. We

left as a new generation of glaciologists armed not only with a better understanding of the ice bodies we study, but also with new connections and friendships to fellow scientists across the globe!

The International Summer School in Glaciology received generous support from NASA, the Glaciology Exchange program (GlacioEx) funded by SIU (Norwegian Center for International Cooperation in Education) the International Glaciological Society (IGS), the International Association of Cryospheric Sciences (IACS), the International Union of Geodesy and Geophysics (IUGG), and the Geophysical Institute, University of Alaska Fairbanks.

We thank these organizations for their support and we thank the course instructors for dedicating their time and experience to teaching and supporting us for those 11 days! We hope that the International Summer School in Glaciology will take place for many more years so that future students have the same opportunity to learn from and interact with experienced and world-renown glaciologists in such an ideal setting.

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## Presentation of Honorary Membership to Professor Keiji Higuchi

On 30 November 2016, Honorary Membership of the International Glaciological Society was awarded to Professor Keiji Higuchi on the occasion of the 7th Symposium on Polar Science held in the National Institute of Polar Research in Tokyo. The certificate was presented by Professor Atsumu Ohmura, a former president of the IGS, following a memorial lecture Professor Higuchi gave on his research activity in the Arctic on T3.



Above: Professor Higuchi delivering his memorial lecture. Left: Professor Ohmura (right) presents Professor Higuchi with his certificate of Honorary Membership (pictured below).

