GEOGRAPHY

2015 Fall Newsletter

University of Colorado, Boulder

Researching the Historic Colorado Front Range Flood of 2013

"In Boulder Canyon and similar areas, the majority of the sediment transfer down slopes occurs during these rare, punctuated events, following hundreds of years of weathering to produce the sediment," said Geography professor Suzanne Anderson, "The 2013 storm was a unique opportunity to catch the sediment movement in action." *pg 10.*

Jennifer Bloom, Caitlin McShane, Kate Gregory, Meagan Todd

From the U.S. to Russia to Iceland to the Arctic, students discuss their passion for Geography, what motivates them, and what they hope to accomplish. *pg 12.*

Message from the Chair

Emily Yeh, Department Chair

I'd like to extend warm greetings from the Department of Geography to our students, alumni, and friends. As the fall semester draws to a close, here is a bit about what's been happening in our department. Please keep in touch and share your news with us as well.

As represented by the artwork in this newsletter, we have many exciting initiatives underway from the earth to the stars. **Jennifer Balch** is Principal Investigator of Earth Lab, a major research effort selected as one of two core research initiatives of CU-Boulder's Grand Challenge, *Our Space, Our Future*. The goal of Earth Lab is to harness big data observations of Earth from space and integrate them to answer outstanding questions about the pace and pattern of environmental change. The team that Balch is leading, which also includes Geography professors **Bill Travis**, **Barbara Buttenfield**, **Carson Farmer**, and **Suzanne Anderson** is developing an earth analytics hub, and will work, among other things, on issues of adaptation to fires, floods and drought. In addition, I am co-leading the "Project Society" component of the Integrated Remote and In Situ Sensing Initiative (IRISS), the other core research initiative of the Grand Challenge. This component is aimed at organizing and developing expertise on the CU Boulder campus for understanding the social, ethical, political and cultural implications of the rapidly growing use of Unmanned Aerial Vehicles.

This fall, **Carson Farmer,** a specialist in computational GIScience and spatial analysis, joined us from Hunter College. With Marcia Signer's retirement after more than two decades, **Darla Shatto** has very ably taken over her position as Department Administrator. Most recently, we've welcomed **Leslie Yakubowski** as our new Undergraduate Assistant.

The department's strong reputation continues to grow. CU Boulder was named #2 in the US News Rankings for "Best Global Universities for Geosciences," which includes the Geography department. In the Academic Analytics 2014 release, we ranked 1st among 101 departments in the US in 5 categories, including percentage of faculty with an article, number of faculty members with a grant, and percentage of faculty with a citation. Despite ranking 11th in total number of faculty, our department also ranked in the top 5 departments on an Academic Analytics overall measure, 2nd in total grant dollars, and 4th on total citations.

Emily Yeh doing fieldwork in northwest Yunnan, China, summer 2015

Our faculty members are frequently recognized with awards and honors. In September, **Waleed Abdalati** delivered a keynote address at a citizen science forum at the White House. In October, **John O'Louglin** became the first foreigner in more than 100 years to win the Semenov-Tyan-Shansky gold medal for research on Russia, the highest research award of the Russian Geographical Society. We are also very proud of our undergraduate majors, including last year's von Dreden Stacey Fellowship recipients, **Jennifer Bloom**, **Katherine Gregory**, **Emily Gulick**, and **Caitlin McShane**, who conducted independent research in the summer of 2015 with faculty mentorship.

Another exciting development in the works is our Professional Masters program for Geographic Data Science and Spatial Analytics, led by **Seth Spielman**, together with **Barbara Buttenfield, Stefan Leyk,** and **Carson Farmer**. With input and advice from our Industry Advisory Board, the group is developing a professional MA program aimed at providing world-class education in Geospatial data science and Computational Analytics, in an effort to train the next generation of geospatial leaders. We hope to be able to bring the proposal before the Regents within the next year.

We are doing all of these things in the face of a rapidly changing landscape in higher education. Most people do not realize state funding is currently only 4.4% of the university's total budget. The Chancellor and Provost both project state funding will fall to zero percent in the near future. While this is part of a national trend, it is also a fact that Colorado is currently 49th in the country in state funding of higher education. This makes us all the more proud of our accomplishments and reputation, while at the same time driving home the need to open up a conversation about why a state university receives almost no state funding, and to develop new pathways to ensure we will continue to flourish. Last year, several alumni generously gave gifts in honor of former professor Albert Smith. Through this and the von Dreden Stacey Scholarship fund, we have been able to provide undergraduate students with a unique opportunity to engage in mentored research.

In this coming year, our emphasis will be on our Graduate Student Support Fund, which is used to support Masters and PhD students in all aspects of the research they conduct for their degrees. Faculty members believe strongly in the importance of supporting graduate students in the face of declining public resources, and many contribute personally to the fund.

Tibet Himalaya Initiative

colorado.edu/tibethimalayainitiative

A number of Geography faculty and graduate students (including **Sierra Gladfelter, Galen Murton, Rupak Shrestha, Dorje Tashi**, and **Emily Volkmar**) have been actively involved in CU Boulder's new Tibet Himalaya Initiative, an interdisciplinary hub for research, teaching, and public engagement on Tibet and the Himalayas. Its mission is to promote educational opportunities, cultural exchange, and public understandings about Tibet and the Himalayas as the region undergoes rapid social, cultural, political, and environmental transformations. Graduate students in Geography organized a Tibet Himalaya Study Group, for students across campus to share research. Geography students also studied Nepali and two dialects of Tibetan, and the initiative hosted a number of film screenings, artists, and public lectures, with more events to come in the spring.

Galen Murton, near the Nepal-Chinese border

Sierra Gladfelter at Rapti River, near Nepalgunj

Thank You! The Department of Geography is grateful to its alumni and friends for their financial support over the years. Our donors have had a big impact, making a difference not only to the Department as a whole, but to the lives of many individual students. There is always a real need for funds to support academic departments. As we strive for higher standards and more and better opportunities for our students, we depend on the caring and generous nature of alumni and friends like you to meet these ever increasing financial needs. Your gift to the Department of Geography can take many different shapes. The information below may help you find the type of gift that best meets your needs, the impact you want, and the way you want to give. The CU Foundation can also assist you with your needs, be they for targeted or unrestricted programs.

Geography Department Fund

This fund is for academic support in the broad sense. If giving online and you want your gift to go to a specific scholarship, please provide scholarship name in the "Comments" section.

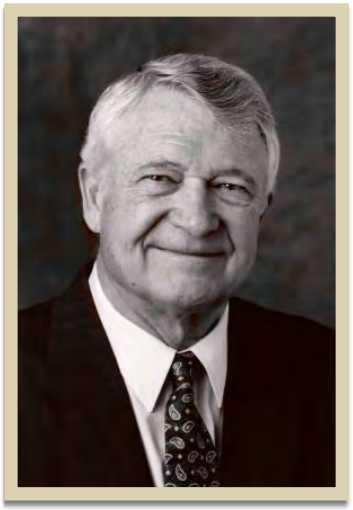
GIVE NOW Go online to: *geography.colorado.edu/about/donate*

Undergraduate Scholarship Programs

A. David Hill Scholarship Fund

Established by Richard L. Knowlton, Professor Hill's former teammate and friend, and recently endowed by Myhra and Graham Hill, his wife and son. Applicant must be a Geography major, and have a minimum GPA of 3.0 in Geography, with a preference for those with interests in the environment-society relationship. Award is based on merit and demonstrated financial eligibility.

GIVE NOW Go online to: *geography.colorado.edu/about/donate*



A. David Hill

Albert W. Smith Geography Scholarship

Established in 1983 to honor Professor Smith at his retirement from the Geography Department faculty after thirty-one years of service to the University. Applicant must be a full-time senior majoring in Geography. Award is based on academic performance.

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Karl and Barbara von Dreden Stacey Scholarship

Established by Katherine and Frank Baxter in honor of Katherine's parents, Barbara von Dreden (CU class of 1940) and Karl Stacey (CU class of 1936). This scholarship supports undergraduate students to engage in summer research with faculty. Preference given to applicants who are juniors or seniors majoring in Geography, and graduates from Colorado high schools. Award is based on academic performance.

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Theodore C. Myers Memorial Scholarship

Named in honor of long-time geography instructor Ted Myers. Scholarship is awarded to the undergraduate student with the most exceptional honors thesis.

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Mable B. Duncan Scholarship Fund

To support scholarships for Geography majors at the University of Colorado Boulder, based on financial need.

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Graduate Scholarship Programs

Geography Graduate Student Support Fund

This fund provides support for all aspects of graduate student research in the Department of Geography. With declining funding, the faculty members feel this is particularly important for us to continue to support our Masters and PhD students, and to maintain our very strong national reputation as a graduate department. This year we are making a concerted effort to raise funds in this area.

Jennifer Dinaburg

Gifts to this fund can be made in memory of (IMO) **Jennifer Dinaburg**. A vibrant, active doctoral candidate in the Geography department, Jennifer passed away on April 26, 2012 at the age of 31. She was passionate about geography in its many forms: through the environment, the outdoors, and through her research on ethnobotany and conservation in China. She brought her love of mountains, travel, and unconventional learning to the department, where she was well loved for her sense of humor, wit and compassion. In her memory, the department has established a small, named fellowship for doctoral fieldwork.

GIVE NOW *If desired, please specify "In Memory of Jennifer Dinaburg" in the Comments field.*

Gary L. Gaile DART Graduate Fellowship in Geography

This fund, in memory of Professor Gary Gaile, provides a fellowship/scholarship for Geography MA and PhD students doing field research addressing social and environmental concerns in developing areas.

GIVE NOW Go online to: *geography.colorado.edu/about/donate*

James A. and Jeanne B. DeSana Graduate Research Scholarship Fund

This fund provides invaluable support for graduate student research.

GIVE NOW Go online to: *geography.colorado.edu/about/donate*

Gilbert F. White Dissertation Fellowship

Named in honor of Professor Emeritus Gilbert F. White, this fellowship provides funding to outstanding Ph.D. students in the final year of dissertation preparation. Students are nominated by their academic advisors. Award is based on merit and financial eligibility.

GIVE NOW Go online to: *geography.colorado.edu/about/donate*

Please specify "Gilbert F. White Dissertation Fellowship" in the Comments field.

To Give by Mail, download Donor Support form (pdf) from: geography.colorado.edu/about/donate

Dr. Carson Farmer

Carson J. Q. Farmer (PhD National University of Ireland Maynooth, 2011) joined the Department of Geography this fall. Prior to joining the faculty at CU Boulder, Carson was Associate Director of the Center for Advanced Research of Spatial Information (CARSI) and Assistant Professor of GIScience at Hunter College of the City University of New York. In 2012, he held a postdoctoral position at the University of St. Andrews in Scotland and in 2011 he completed a PhD funded by the Irish Social Sciences Platform (ISSP) and the Social Sciences and Humanities Research Council (SSHRC) of Canada at the National Center for Geocomputation at the University of Maynooth (formerly National University of Ireland Maynooth) in Ireland. Both his undergraduate and Masters were completed in the Geography Department at the University of Victoria, in B.C. Canada (his hometown).

Carson's research interests are ultimately concerned with modeling and understanding spatial processes through the lens of GIScience and spatial analysis. His work tends to fall under the general banner of 'computational GIScience' and encompasses work on networks, transportation, big-data, snow/water processes, and geospatial algorithms. He is as much interested in theories of interactions of human and environmental processes as he is in the methods and models designed to characterize them. As part of his long-term research goals, he continues to incorporate theories of spatial interaction and time-geography into his work on complex systems and dynamics. The photo behind him (above) has been used to describe the dynamic nature of his work.

Carson's primary interest is in flow and movement data associated with underlying networks within human and natural environments. Spatial models are his primary means of quantitatively characterizing urban processes, and are used to explore data at a range of spatial and temporal resolutions. He also has a keen interest in developing new approaches to solving geographical problems by fostering expanded use of ideas and methods from outside geography and GIScience (such as data-streams and computer graphics). Additionally, he aims to promote the use of spatial analysis methods in data-intensive research to help explore the complex hierarchies and interactions within, across, and between human and natural systems. Carson is also a strong advocate for open source software and open data, and has been a leader in the open geospatial community since 2007.

Profiles of Scholarship Winners

Students are at the heart of what makes CU Geography a great place to be, and this year we were fortunate to award six fellowships to undergraduate students.

Back row: Jesus Davis, Kate Gregory, Emily Gulick, Caitlin McShane, Kyle Webber
Front row: Jennifer Bloom, Dr. John Pitlick

A. David Hill and Albert W. Smith Scholarships

Each year the Department awards two merit-based scholarships honoring retired Geography professors **A. David Hill** and **Albert W. Smith** to students majoring in Geography. Both are made possible by donations from alumni and friends of the Department in honor of Professors Hill and Smith. For the 2015-2016 academic year, the scholarships were awarded to **Jesus Davis** and **Kyle Webber**.

The Albert W. Smith Scholarship was awarded to **Jesus Davis**. Jesus entered the department as a junior transfer student in 2013 after seven years in the US Army. Through his service in Africa, Afghanistan, and Iraq, Jesus says he felt as if he had already become a human geographer before entering the Department. At CU, he's expanded his interests through course work in hydrology and GIS. Davis is in his final semester at CU. In addition to his academic interests, Davis enjoys digital photography and cycling. This past summer, he completed his first half Ironman triathlon, finishing in 6 hours.

Kyle Webber is the recipient of this year's A. David Hill Scholarship. Kyle came to CU Geography as a junior transfer in 2014. He did not stay in town long! In his second semester, he enrolled in a study abroad program in Bolivia. In addition to honing his Spanish

and immersing himself in another culture, Kyle used the time to do independent research on access to clean water and sanitation in Cochabamba. He is writing an honor's thesis on the topic, and will graduate in May 2016. Kyle enjoys photography and music, and plans to attend graduate school.

Both Jesus and Kyle have contributed a great deal to the Department through their scholarship, enthusiasm for Geography, and intellectual talents. We are pleased to be able to support them in their efforts.

Von Dreden Stacey Undergraduate Research Fellowship

It is no secret that a passion for research is what drives many of our students and faculty to Geography. This past academic year, we were able to support four undergraduate students to do mentored research with Geography faculty and affiliates. This opportunity was made possible through a fund established by **Katherine and Frank Baxter** in honor of Katherine's parents, **Barbara von Dreden (CU '40)** and **Karl Stacey (CU '36**). The four recipients of this year's awards were **Jennifer Bloom, Katherine Gregory, Emily Gulick,** and **Caitlin McShane**. All four completed individual research projects this past summer. They presented their work in a department colloquium on September 11, 2015.

Jennifer Bloom researched the potential to use remote sensing and GIS to identify areas of geothermal activity in Colorado. Her project analyzed satellite imagery of a geothermal "hot spot" near Trinidad, experimenting with techniques for measuring heat. She did her research under the direction of Geography Professor **Waleed Abdalati**, a former Chief Scientist at NASA and the current director of the Cooperative Institute for Research in Environmental Sciences (CIRES).

Katherine Gregory spent the summer in Iceland researching the cultural aspects of sustainability. Through interviews and site visits, Katherine gathered information on how Icelanders themselves understand and practice sustainability. Her research was directed by **Dr. Abby Hickcox**, an alumnus and affiliate of the Geography Department teaching in the College of Arts and Sciences Honors Program at CU.

Emily Gulick is a double major in Geography and Environmental Studies. Her research used remote sensing to model change in the forest-meadow boundary dynamics. She did her research at the CU's Mountain Research Station, and found a 37% increase in forest cover over a 23-year period. Her work will be incorporated into regional studies of similar dynamics in the Front Range led by her faculty supervisors, Professor **Suzanne Anderson** (Geography) and Professor Dan Doak (ENVS).

Caitlin McShane studied the characteristics of extreme precipitation events in the Arctic. Her research found a slight increase in the number of extreme precipitation events – those falling within the top 1% of statistic distribution of all events – across the Arctic. However, within this increase she was also able to detect areas of increasing and decreasing trends within the region that vary further by season and month. Her research was supervised by Geography Professor **Mark Serreze**. Professor Serreze is the Director of the National Snow and Ice Data Center housed at CU's Cooperative Institute for Research in Environmental Sciences (CIRES). Caitlin was also one of the featured speakers at the College of Arts & Sciences Scholarship Celebration.

All four students gave excellent presentations on their research at the Department Colloquia, capping off a highly successful first round of summer research awards. We are all very thankful to the von Dreden Stacey family for their generous support of this effort.

Waleed Abdalati in the News

Waleed Abdalati, Professor of Geography at the University of Colorado Boulder and director of the Cooperative Institute for Research in Environmental Sciences (CIRES), will co-chair a prestigious national committee charged with developing U.S. priorities for observing Earth's atmosphere, oceans and land surfaces by satellite. With co-chair Antonio Busalacchi of the University of Maryland, Abdalati will lead the Decadal Survey for Earth Science and Applications from Space, the second such survey conducted by the National Research Council. The first was released in 2007.

Waleed Abdalati

Dr. Abdalati speaking at the White House.

"This is a testament to Dr. Abdalati's standing in the scientific community and builds upon our reputation as a leader in earth sciences," said CU-Boulder Chancellor Philip P. DiStefano. Abdalati and Busalacchi will spend the next two years leading a team of dozens of scientists, engineers and policy experts from around the country. They'll develop satellite science priorities for NASA, the National Oceanic and Atmospheric Administration (NOAA), the U.S. Geological Survey and other federal agencies from 2017 to 2028.

Additionally, **Dr. Abdalati** recently spoke at the White House. On September 30, 2015 the White House Office of Science and Technology Policy (OSTP) and the Domestic Policy Council (DPC), in collaboration with the Federal Community of Practice on Crowdsourcing and Citizen Science, hosted a live-webcast Citizen Science Forum entitled "Open Science and Innovation: Of the People, By the People, For the People" to raise awareness of citizen science and crowdsourcing inside and outside the Federal government, and to encourage more agencies and Americans to take advantage of these approaches.

The opening speech was given by John Holdren, Director of the White House Office of Science and Technology Policy and Science Adviser to the President. Dr. Abdalati gave the closing speech. His talk focused on how the citizen scientist – like Abdalati's background in Earth observations from space – provides a powerful perspective that helps us understand the world in which we live.

The Boulder Affordable Housing Research Initiative

Geography Professor **Jennifer Fluri**, **Dr. Abby Hickcox** of the Undergraduate Honors Program, and Geography PhD student **Shae Frydenlund** have partnered with Boulder residents, community organizations, nonprofits, and municipal representatives to create a collaborative research project that addresses the pressing issue of affordable housing in Boulder. The research team was awarded a CU Outreach grant to fund mixed-methods research to improve our understanding of Boulder's critical shortage of affordable housing while fostering relations between CU Boulder students and the wider Boulder community. The project has also included two exceptional geography undergraduates, **Chloe Dodge** and **Andrea Baeza-Breinbaur**, as research assistants who are engaged in community outreach and data analysis.

Jennifer Balch in the News

CU launches Earth Lab as part of the campus-wide Grand Challenge Initiative, led by Director and Assistant Professor in Geography, **Dr. Jennifer Balch**. Earth Lab is a new synthesis initiative that builds on CU's research strengths. Earth Lab's mission is to capitalize on the wave of observations from space to better understand the pace and pattern of global change. Earth Lab will yield new insights by capitalizing on existing resources already devoted to data generation. This effort enhances the value of the entire Earth observation enterprise. Through Earth Lab, CU-Boulder will be known as the place for cutting-edge Earth Analytics which thrives on the wealth of aerospace-derived data, and as the place for training the next generation of data scientists who have the knowledge and expertise to tackle the most pressing environmental questions. This effort involves several geography faculty, including **Suzanne Anderson, Babs Buttenfield, Carson Farmer, and William Travis**.

Additionally, **Dr. Balch** led a recent synthesis paper summarizing the results from a decade-long burn experiment in the Amazon—the longest-running and biggest experiment of its kind in Amazon forests — and was published in *BioScience*. Her research made the cover of the journal. *BioScience* did a podcast about it, here: bioscienceaibs.libsyn.com/episode-4-fire-in-the-amazon. Dr. Balch's work was featured in our Fall 2014 Newsletter.

John O'Loughlin Wins Gold Medal from the Russian Geographical Society

Geography Professor and faculty associate in the Institute of Behavioral Science, **John O'Loughlin**, has become the first foreigner in more than 100 years to win the Semenov-Tyan-Shansky gold medal for research on Russia. It is the highest research award of the **Russian Geographical Society** typically targeted toward Russian and, previously, Soviet scholars working in the area of the former Soviet Union. "This honor is an unusual one because of the political sensitivities between the U.S. and Russia right now," said **Dr. O'Loughlin**, whose research in 2014 was featured in a *New York Times* **article**. O'Loughlin studies the political geography of the former Soviet Union including post-conflict relations among different ethnic groups in the north and south Caucasus Mountain region and de facto, or separatist, states. "It's very much field-based research on ordinary people living in these war zones and what they think and what their lives are now like," said O'Loughlin.

Dr. O'Loughlin, center, accepts the award in Moscow (Aug 2015)

Researching the Historic Colorado Storm of September 2013

Suzanne Anderson was featured in *OVCR Magazine* (Office of the Vice Chancellor for Research) with a report on the historic September 2013 storm which triggered widespread flooding across Colorado's Front Range and caused devastating property damage in and around Boulder and Larimer Counties. In the aftermath of the flooding, researchers at the Institute of Arctic and Alpine Research (INSTAAR) discovered the storm eroded the equivalent of nearly a thousand years worth of accumulated sediment from the foothills west of Boulder, a finding which casts new light on previous assumptions. "In Boulder Canyon and similar areas, the majority of the sediment transfer down slopes occurs during these rare, punctuated events, following hundreds of years of weathering to produce the sediment," said

Boulder Creek after the storm

Suzanne Anderson, Geography Professor and INSTAAR research fellow. "The 2013 storm was a unique opportunity to catch the sediment movement in action. The long-term erosion rate in this area is about two-tenths of an inch per century — that is less than the thickness of a human hair per year," said Anderson. "It took a large storm to mobilize accumulated sediment in a way that we can measure directly." The 2013 storm dropped between 7–18 inches of precipitation across Colorado's Front Range over a five-day period, equivalent to the average yearly rainfall for much of the region. The rain triggered more than 1,100 landslides of various sizes and produced flooding in every nearby river. Anderson and her fellow researchers, in collaboration with the Boulder Creek Critical Zone Observatory, examined 120 separate landslides over a 39-square-mile area west of Boulder and found that individual landslides ranged from small (around 350 cubic feet of sediment removed) to large (about 740,000 cubic feet removed). The largest landslides swept down slopes, incorporating additional water and sediment, creating dangerous, fast-moving debris flows. "We estimated the velocities of some of these debris flows at about 10 meters per second, which is as fast as sprinter Usain Bolt runs," said Anderson. "They're incredibly destructive because they happen so quickly and there's no warning system once a flow is triggered."

Photos on this page are from Coal Creek Canyon, a few miles south of Boulder, in the days immediately following the storm.

The size and rapidity of debris flows contrast with the slow pace of the processes that produce the sediment. "From isotope measurements, we know what the normal weathering rate is. To see so much sediment transported off the slopes in one event means that these cannot happen frequently," said Anderson. No one knows when—if ever—a storm of that magnitude will occur again. What began as a unique opportunity to study a disaster firsthand ended up highlighting the underrated importance of infrequent extreme weather in the formation of the slopes in our backyard.

Jennifer Bloom, Undergraduate Student

My interest in geography developed naturally by growing up in Colorado. Curiosity led me to seek answers regarding the changes in space and time I experienced in my native state, and witnessed occurring globally. This led me from Ecology toward Geography. Our department offers a concentration in Geographic Information Science (GIS), and this was the concentration I chose. The theories and technological tools provided by GIS are used to rapidly acquire, process, and analyze large amounts of spatial data. This helps develop solutions to the large-scale problems facing humanity and our planet's biosphere. Geography offers many ways of applying solutions to social and ecological concerns. It's a field where independent and outside-the-box thinking is encouraged. For these reasons, I chose to get my degree in geography.

Jennifer Bloom

As a nontraditional student lacking a lot of financial help, I was fortunate enough to have great support and encouragement from instructors, professors and staff. My teachers inspired me to pursue both a thesis in remote sensing and an internship applying cartography and GIS. For my internship, I developed maps for the Emergency Family Assistance Association (EFFA); these were used to develop strategies to provide basic needs to impoverished persons in Boulder county. My Honors thesis research was funded by the von Dreden Stacey Fellowship, where I used thermal remote sensing image analysis techniques to locate regions in Colorado with high geothermal energy potential. The techniques I learned can help in the development of more sustainable energy infrastructures.

After graduation, I intend to apply the skills I've learned in Geography to help my community through volunteering, and to pursue a career where I can contribute skills using remote sensing, mapping and data analysis to finding solutions to the large scale problems facing our species. I also intend to continue my education through graduate studies in Geography. As a nontraditional student, completing a degree was difficult. I had many hurdles and barriers to overcome, such as commuting from Colorado Springs to Boulder weekly for a year, until I could afford to move closer. My success is in part the direct result of the strong support system provided by my department, and the scholarships and grants available to me. Every minute of this pursuit has been worth the hardship!

Caitlin McShane, Undergraduate Student

I am pursuing a degree in Geography because I believe it has a large breadth of application. I love the outdoors and am perpetually amazed at the world I inhabit, so much so, that I want to spend a lifetime trying to understand how it all works and fits together into one cohesive system. I want to participate in field research which takes me to places, such as the Arctic, places that others will only ever see in pictures, because of my insatiable desire for adventure. I also see the potential for geographers to influence the changes that society needs to make in order to mitigate the effects of climate change and I really want to be a part of it. Honestly, when I initially came back to school to finish my undergraduate degree I opted for Geography because I had the most credit hours in it and I was looking to finish any degree ASAP. However, as time progressed I fell in love with the geography department and discovered my passion lies in all things related to the atmosphere and water (unless it is subsurface water; then I am not such a fan). I discovered these interests when I took Dr. Serreze's class, 'The Arctic Climate System'. I became so interested in the topic I asked Dr. Serreze to be my honors advisor so I could study extreme precipitation events in the Arctic.

Although I am from Chicago, my geographical focus is the Arctic. I love the Arctic system because of its vast complexity and importance in global weather patterns. There are so many different areas of study one can pursue when it comes to the Arctic, you could spend a lifetime learning about it and still probably not understand it in its entirety. I love complex systems; I love pulling them apart to see how they work and what factors influence the system as a whole. I hope to significantly contribute to our understanding of the atmosphere and why the Arctic seems to hold the key to the changes we are seeing around us. I would love to help answer questions concerning 'stuck' weather patterns and why we are seeing them. I can also see myself pursuing an applied science path to participate in creating sustainable solutions to mitigate the effects of climate change. I guess you could say my main goal is just to contribute to the scientific community in a significant way. As to what that is or how I will do it is a question I am going to answer over the next year before I apply to graduate schools.

Kate Gregory, Undergraduate Student

I'm not sure how, but growing up in one place instilled a very large-scale curiosity in me about the world as a whole and how all of its parts interact. When I started college at CU I wanted to pursue a degree that would expand my understanding of how humans and the environment interrelate. Back then, however, I did not quite know where to direct my interests, so I chose a major in International Affairs. During my first semester of college I took classes in International Affairs, but I also took a Geography course through the CU Honors Program with **Dr. Abby Hickcox**. When the Geography class did a much better job of catching my interest than any of my other classes, I knew a major in Geography would be much more fulfilling. The department has far from let me down. I have taken fantastic classes with inspiring professors, gained a skill-set in GIS, become part of a wonderful community, and had the opportunity to explore issues I am concerned about.

Kate Gregory

I am currently working on a Senior Honors Thesis based on research I did while studying abroad in Iceland this past summer, a trip partially funded by a fellowship through the Geography Department. While my research has had a long evolution, it essentially explores how sustainability functions

in Iceland and what this tells us about how incentives for sustainable practices vary across scales. This has been a very enlightening project for me to embark on because as someone intrigued by sustainability, I idolized Iceland as a place with all the answers for implementing environmental solutions. What I ultimately discovered through interviews and research about Iceland's industries and government is that instead of having ethical incentives for sustainable actions or policies, as the sustainability discourse often assumes, Icelanders are more often motivated by economic gain, nationalistic sentiments and resource availability.

Meagan Todd, PhD Student: Changing Migration Patterns and Islam in Moscow, Russia

Thanks to the support of the **Dinaburg Fellowship**, I traveled to Moscow in August 2015 to investigate how and if outmigration of guest workers, pejoratively called *gasterbaiters*, impacted attendance at Moscow's mosques. Many of these workers are from Islamic regions in Central Asia and the Caucasus. This question is important because Moscow has 4 mosques and an estimated 2 million Muslims. Each Friday service is overcrowded, leading to mass groups of worshippers praying in the streets. This overcrowding disrupts traffic flows and causes some frustration between non-Muslim Muscovites and Muslims, and between (native to Moscow) Tatar Muslims and Muslims from other regions. Although there have been plans to construct new mosques in Moscow 5 times in the past 4 years, these plans have never come to fruition and lack support of the Moscow Mayor Sergei Sobyanin, who has called most of the worshippers temporary visitors who do not need a permanent place of worship. Since the ruble has collapsed on the international market, I wanted to know if fewer migrants meant fewer Muslims attended mosques and if there was a reduced presence of Islam in Moscow's public space.

My research this summer investigated the temporality of the Muslim immigrant in Moscow. I observed Friday services at two of the mosques in Moscow and interviewed an imam, muezzin, and three representatives of the Russian Muftis Council to understand if the Russian financial crisis and stringent migration Russian language law had led to a reduced amount of worshippers on Friday. I discovered that one mosque, Cathedral Mosque, experienced no reduction or increased number of worshippers on typical Fridays, but fewer worshippers on holidays such as Kurban Bayram. They had no technical way of measuring; this was just a guess by leaders. The imam of Historical Mosque, however, stated they had increased attendance at the mosque. This increased attendance was observed one Friday at the 1pm prayer. In 2013, outdoors prayer space for those who could not fit inside the mosque was confined to the courtyard

A typical Friday scene of Islamic worshippers and riot police on Bolshaya Tatarskaya Street in Moscow. About ten officers were in the vehicle on the left of the photo.

surrounding the building. However, in 2015, a large portion of neighboring Bolshaya Tatarskaya Ulitsa was cordoned off and additional security measures were in place (photo above). There was an additional presence of riot police, some who randomly checked immigration papers, as well as security gates with metal detectors. These measures were much more intense than in the past. Both mosques had implemented Russian language courses for migrants to help them learn the language in compliance with the new migration laws; however, the classes had low attendance of about 40-50 students. Imams believed workers did not really have enough time to come regularly to these classes.

I also expanded my overall research project to investigate the plan to construct 200 new Russian Orthodox Churches in Moscow's suburbs, and interviewed many priests and electricians, and observed services at churches built for this project. I also traveled to a site of contention, wherein locals were camping for over 60 days to protect their local park from becoming a site of church construction. I interviewed and observed this protest group as well as Russian Orthodox Church members and a Cossack who had erected a cross and were camping out on the site of the proposed church.

At the end of my research trip, I was able to present findings from my research at the International Geographer's Union in a presentation, "Biopolitics of Religious Construction Projects in Moscow, Russia." I received feedback from an international audience, visited many sessions on Russian geographies by Russian scholars. I will present further findings from this research trip at the Davis Center's Conference on Islam in Russia at Harvard University this October to an audience of specialists in this field.

Alumni News

Don Cline (BA, MA, and PhD, University of Colorado Geography, 1996) has been selected as the USGS's Associate Director (AD) for Water, tentatively beginning on January 11, 2016. In this capacity, he will be responsible for overseeing USGS research, monitoring, and assessment of the Nation's water resources.

Joining the USGS after a career with the National Oceanic and Atmospheric Administration (NOAA), Don brings with him 20 years of leadership, research, and development and operational experience in applied hydrologic science and geographic information systems. Just before coming to the USGS, he served as the Director for the National Water Center (NWC) of the National Weather Service, where he designed the conceptual, architectural, and programmatic plans for the new Center — the first facility in the world designed specifically to address major societal challenges in water resources. He also established the Integrated Water Resources Science and Services (IWRSS), an innovative federal interagency collaboration with four water-sector agencies to improve interoperability of data and information systems, leverage resources toward the development of comprehensive water modeling and prediction capabilities, and establish a common operating picture among federal water agencies. Don was Director for the National Operational Hydrologic Remote Sensing Center and then Chief for the Office of Hydrologic Development prior to becoming Director for the NWC. He joined NOAA in 1996 as a science development and operations officer after obtaining bachelor's and master's degrees and a PhD from the Department of Geography at the University of Colorado, Boulder.

New Book Announcement

Mountains: A Very Short Introduction, by **Martin F. Price** (PhD, University of Colorado Geography, 1984). Price outlines why mountains matter at the global level, and addresses the existing and likely impacts of climate change on mountain, hydrological and ecological systems. For more information about this title please contact Katherine.Stileman@oup.com.

GEOGRAPHY

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