

The Icebreaker

CENTER FOR REMOTE SENSING OF ICE SHEETS

CReSIS Students Join and Document Summer Research Program in Alaska

// by **Elise Reuter**

// edited by **Vicky Díaz-Camacho**

Two former CReSIS undergraduate student researchers trekked across Alaska as part of the 60th annual Juneau Icefield Research Program (JIRP) this summer.

Maya Smith and Ya'Shonti Bridgers joined 30 other students to hike, ski, and camp from Juneau, Alaska to Altin, British Columbia to gain information on how climate

change is affecting the ice field ecosystem. Each student contributes to CReSIS blog postings to give an inside look at their research and experiences.

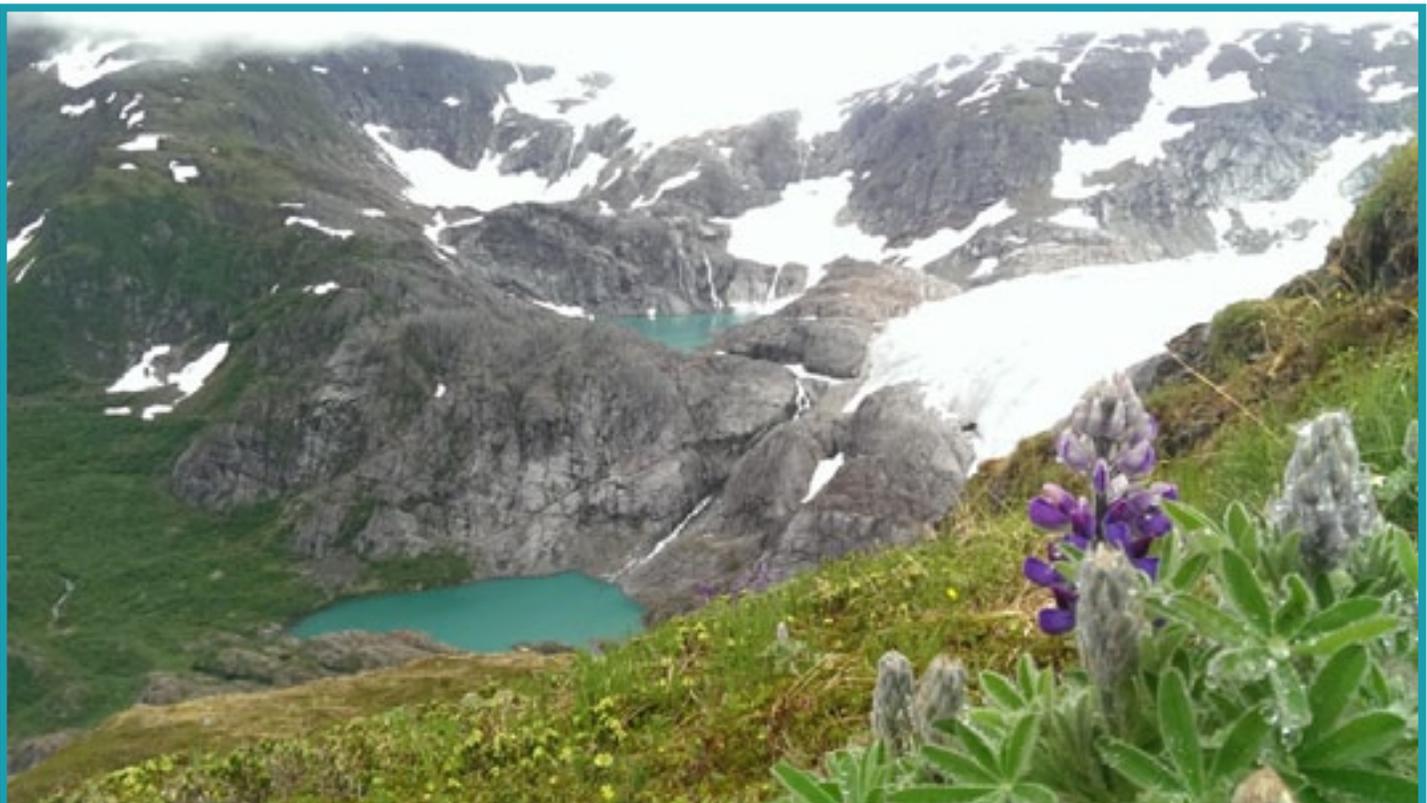
"I would like to get the experience of not being behind a computer all day, but going outside and getting to do field work and seeing it for myself," Smith said.

Smith, a junior studying information technology at Winston-Salem State University (WSSU), worked previously with CReSIS as an REU under

John Paden in 2012 and 2013 to create programs using echograms to gather information about glaciers.

"I can definitely relate it to this experience," Smith said. "The purpose is to collect different data related to the glacier elevation and melting that CReSIS can use to broaden their research, but I also think it's something everyone needs to know is going on."

Bridgers' previous experience *(article continues on next page)*



The view from camp 17A. | Photo courtesy of Stan Pinchak & the JIRP Blog

CRISIS Students Join and Document Summer Research Program in Alaska



Top: A student walks across a log to get to the Juneau campsite. | Photo courtesy of the JIRP Blog
Below: Students trek the Mendenhall Glacier. | Photo courtesy of the JIRP Blog

[article continued from previous page]
as an REU with CRISIS from 2011 to 2013 also prepared her for the JIRP program this summer. Bridgers, a senior studying math at Elizabeth State University, examined the receding ice shelf in Antarctica's Pine Island Bay. While the research topics during the eight-week program vary widely, from ecology and glaciology to geology, all prior experience is helpful.

Several graduate students will be posted at research stations along the journey to help JIRP students conduct research at each site. Kiya Riverman, a Ph.D. student from Pennsylvania State, will study the Taku glacier, the world's thickest glacier outside of Antarctica and Greenland. Unlike most other glaciers, the Taku glacier has actually advanced, rather than melted, in the past few decades.

"We're interested in learning how the material underneath the glacier has played a role in the ability of this giant glacier to advance when all other glaciers around it are retreating," Riverman said.

To accomplish this, the students will make small earthquakes on the ice using dynamite and measure the resulting quakes using sensitive instruments called geophones. Riverman and the students will present their research at the end of the eight-week program. ■

Educational Outreach Assistant Reports from D.C.

// by **Levi Houk**

// edited by **Vicky Díaz-Camacho**

From April 25 until April 27, the Center for Remote Sensing of Ice Sheets (CRISIS) Education team participated in the national Science & Engineering Festival in

Washington D.C.

Education team members from the University of Kansas (KU) included Education Coordinator Darryl Monteau, Education GRA Kuang Chen Hsu, and student educational outreach assistant Levi Houk. They

[article continues on the next page]

Educational Outreach Assistant Reports from D.C.

[article continued from previous page]

were joined by the CReSIS Associate Director of Education Dr. Linda Hayden and her student, Patrina Bly, from Elizabeth City State University (ECSU).

More than 325,000 people attended the Science & Engineering Festival, which was free and open to the public, and although not every individual visited the CReSIS booth at the festival, the exciting research and knowledge CReSIS scientists' and engineers are discovering were shared with thousands. The festival also featured celebrated scientists and STEM promoters Bill Nye the Science Guy, the musicians of They Might Be Giants, and Mike Rowe of Dirty Jobs and David Pogue of PBS shows, such as Nova and Science Now.

The CReSIS booth featured activities from the Ice, Ice, Baby! program developed by the CReSIS Education Team, which taught festival participants about glacier

dynamics, the properties of glaciers, and what happens underneath a glacier. Participants got hands-on experience by interacting with a "glacier," represented by glacier goo, as it traveled down a ramp and discovered how the forces of the weight of the glacier spreads out from the continent of Antarctica.

The interactive Glaciers in Motion animation, created and designed by CReSIS GRA Kuang Chen Hsu, was also set up at the booth. Hsu, who was particularly excited to attend the festival to educate young, future glaciologists, was on hand to share features of the animation with festival attendees. The CReSIS booth also featured a new activity, called Glacier Sand, which emulated what happens to the rock below the glaciers after it is crushed by ice for thousands of years.

The Education Team also highlighted recent achievements made by the scientists and engineers at CReSIS, including the first ever UAS flight to successfully measure ice thickness in Antarctica, the discovery of the 460 mile long mega-canyon under



Kuang Chen Hsu helping a future engineer with the Glaciers in Motion animation | Photo courtesy of ECSU.

the ice sheets of Greenland, and the generation of improved maps of Antarctic bedrock using CReSIS data. CReSIS was also proud to share that an Antarctic trench, newly termed the Gogineni Subglacial Trench, was named after CReSIS Director Prasad Gogineni to honor him and the work CReSIS has done to at the Poles through the development of radar that has led to a better understanding of the ice.

Both the Education Team and the participants had a blast at the Science and Engineering Festival, which wouldn't have been complete without a photo opportunity with a live, six-foot penguin. The real souvenir, however, was knowledge about the importance of glaciers and ice sheets, and the impact climate change may have on their future. ■

More photos from this year's festival can be found at the following link: <http://nia.ecsu.edu/ur/1314/140425sciencefestival/>



ECSU student Patricia Bly and the CReSIS Penguin (Levi Houk) await visitors to the booth | Photo courtesy of Darryl Monteau.



Future glaciologists modeling with Glacier Goo to understand how glaciers spread out over the continent of Antarctica | Photo courtesy of ECSU.

On the Ice: Looking Back with Carolyn Branecky



Carolyn Branecky in the field. | Photo courtesy of Carolyn Branecky.

// by **Vicky Díaz-Camacho**

In this interview, we're catching up with Carolyn Branecky, a former student intern from the 2012 CReSIS REU Program at the University of Kansas. Branecky worked with Leigh Stearns, Ph.D., a professor in the Geology Department studying glaciology-related research. During her internship, Branecky embarked on a field study that placed her on the ice doing hands-on research.

Let's hear what the young researcher had to say about her adventure with CReSIS on the ice.

Tell me about being on the ice with John and the CReSIS team. How was it?

I was on the same flight with many of the CReSIS folk from New Zealand to Antarctica. A few of us were also on the same Happy Camper training, the program

to learn how to live on the ice with one night of camping. I got to know members of the group much better through that experience. The training program was really fun and entirely new to me, as I had never even done winter camping before. When we had been out on the ice a few weeks the camping became routine.

I wouldn't call the experience scary, but you really feel the level of commitment you've made to the project when the plane drops you on the ice and you know you won't be off of the ice for at least a month. The landscape was surreal, partly because of the monotony of color and topography (completely flat). I was happy that we had a view of the Transantarctic Mountains by which to orient ourselves. Because the CReSIS team was much larger than our group (only six of us for the first couple weeks), it was fun to be around their camp, especially when we all gathered in a large tent for meals.

What was/is your affiliation with CReSIS?

I was a student intern of the CReSIS REU program in summer 2012.

How old are you and could you tell us where you studied?

I am 23 and am in my first year of a PhD in Earth Sciences at UC Santa Cruz. I graduated college last year from Rice University with degrees in Earth Science and Philosophy. At Rice I became interested in glaciology my sophomore year and got involved with a project using glacial marine sediments from Antarctica.

What was the purpose of the research?

I went out in the field with Slawek

Tulaczyk, a professor at UC Santa Cruz and my advisor, as part of the WISSARD project. WISSARD stands for Whillans Ice Stream Subglacial Access Research Drilling and is a multi-year, multi-million dollar project to drill to the base of the ice sheet and investigate the physical conditions in connection with ice stream dynamics and microbiology.

Last year, the team drilled into a subglacial lake beneath the Whillans Ice Stream and discovered microbes. I was not yet part of the team at that point. This year due to the shutdown the project was scaled back to doing geophysical studies on the Whillans Ice Stream. This did include drilling four holes in the ice using a hot water drill, but was not accompanied by all the technology needed to access the subglacial environment. Another drilling season is scheduled for next winter, but I will likely not be involved in that field work.

When was the last time you were on the field? Was it a similar mission?

The last time I was in the field was with Slawek's group in Iceland. In both Antarctica and Iceland we were installing seismometers on the ice, so there was that in common. However, in Iceland the ice was rapidly melting, and our goal was to pick up that signal. Of course, in Antarctica it is too cold to melt the ice.

Where were you for this mission?

The location of the Whillans Ice Stream is east of McMurdo Station roughly 300 km. The CRe-

On the Ice: Branecky

(article continued from previous page)

SIS team was based very close to the WISSARD drill site for the first year of the project. They groomed a runway there, which was used both by the CReSIS group and us. We spent some time at the beginning gathering equipment from last year's drill site and brought in the New Year with the CReSIS

team. Our remote camp was located some 30+ km from the CReSIS group and moved around between several sites where we set up instruments and drilled four boreholes.

Carolyn Branecky keeps moving forward, accruing work experiences from fieldwork, events, and personal research. She said this year would be a busy one, full of hopes for returning to the ice this winter for the final season of the WISSARD drilling project

and works involving the effects of ice loading on the deep earth. She will also host an event this year bringing together scholars and activists to discuss geologic change and human response.

"I see my work as part of the project of deepening understandings of geologic change," Branecky said. "In the future I want to do more to make these understandings inform the way we live in the world."

Student Spotlight: Undergraduate Researcher Receives FLAS Fellowship To Study In Korea



// by **Elise Reuter**

Sam Buchanan, an undergraduate research assistant for CReSIS, will depart for Korea next year

to continue his studies. Buchanan, a senior electrical engineering major at the University of Kansas, received the Foreign Language and Area Studies Fellowship for a full year of study through the U.S. Department of Education. He plans to study both Korean language and culture through Seoul National University, in hopes of pursuing a future career in electrical engineering in the country.

"I want to get my language up to a point where I can function in a workplace environment. If I can accomplish that, then I can get a job at a Korean company after I finish the year up," Buchanan said. "It's going to be a really big challenge, but that's the kind of thing I really thrive off of."

Buchanan has some previous experience with the Korean language, as he is finishing a minor in Korean, but still plans to work to overcome the language barrier. He hopes that by being exposed to the culture and the language on a daily basis, he will gain a working proficiency.

He is also applying for an internship with Samsung, to build on

his engineering experience while studying in Seoul.

"If I can accomplish that goal, get a job and work like that for a few years, I think I'll be the better for it," Buchanan said.

Buchanan is working with Dr. Zongbo Wang to measure and correct imperfections in antenna for the new CReSIS radar, which will be deployed to Greenland in August. The radar is the first of its kind in processing data at a high sampling rate, which is split up into parallel systems rather than using digital systems. Buchanan plans to apply the working skills he gained through CReSIS toward his studies in Korea.

"It's a different application, going and studying abroad, but I think a lot of the work I've done as an engineer would translate into that," Buchanan said. "I'm confident that I'll be able to overcome the obstacles inherent in taking courses in another language just because I've learned so well how to work hard here." ■



A view from the nose of the NASA P-3 aircraft flying over the south coast of Greenland. | Photo courtesy of Bruno Camps Raga.

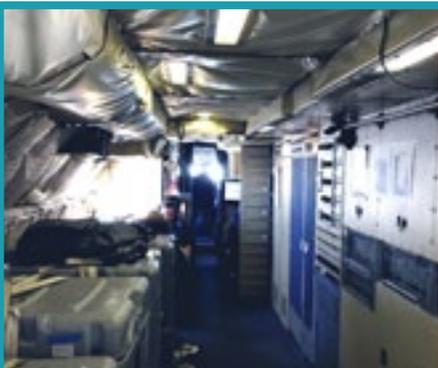
The 2014 OIB Wrap-Up

// by **Vicky Díaz-Camacho**

Operation IceBridge (OIB) mission researchers concluded their field campaign May 24, returning from Greenland after 11 weeks on the field.

This year, researchers from Indiana University collaborated with the University of Kansas to collect and back up data for OIB. Carl Leuschen, Deputy Director at CReSIS, was the principal investigator for the arctic campaign.

“IU and KU perform two different set of tasks during a field



Researchers working from within the NASA P-3 Aircraft. | Photo courtesy of Bruno Camps Raga.

deployment, both of which are very important to ensuring we collect and back up the best set of data as possible,” Leuschen said.

CReSIS engineering associate Bruno Camps-Raga served as the mission’s radar team lead. For this position, Camps-Raga functioned as the OIB mission liaison for project management and was in charge of registering work updates, requesting special flight maneuvers, and securing additional time to work with the instruments. He worked alongside Jilu Li, a CReSIS assistant research professor who collaborated with personnel from Indiana University to set up the field servers.

IU ran and troubleshoot servers on ground and in-flight. The collaboration made sure data collected by KU would properly save to IU’s SSD drive, to be backed up and ready for processing. Camps-Raga worked closely with Aaron Wells, a student from IU, to monitor the process.

CReSIS developed four radar systems that were used to obtain data: the MCoRDS Radar depth sounder/imager, the Accumulation

Radar system, the Snow Radar system, and the Ku-Band Altimeter system. These radars were mounted on the NASA P-3 aircraft and flown over Alaska, Greenland and Canada.

The data collected help researchers understand how Arctic ice is changing, which, according to the IceBridge report published May 28, helps forecast sea ice coverage changes in the summer.

The field team deployed from NASA’s Wallops Flight Facility to Thule Airbase in Greenland on the NASA P-3 aircraft March 10. The WFF team in Virginia included four members from KU and one from IU. The WFF team members were Fernando Rodriguez-Morales, Bryan Townley, and Aaron Paden of KU with Aaron Wells and Patrick Keenan of IU.

“KU typically sends two personnel to operate the radar systems and one person to process the data,” Judith Riley, former CReSIS Project Manager said.

CReSIS field team members included Leuschen, Camps-Raga,

(article continued from previous page)

Li, and Townley, (all from KU), and Wells (from IU). Wells managed the data collection and storage of the data. Because the mission is roughly 11 weeks long, teams switched personnel out around the middle of the mission.

Though researchers hit a bit of turbulence on some flight days, the missions were successful in terms of data collection. Camps-Raga said the sea-ice flights were ideal for on-flight processing.

“I believe it was a fruitful mission since we got many fly days this season and collected large amounts of radar data,” Camps-Raga said. “Although I lost count after a few weeks, at some point I recall the NASA team telling me that we had already flown the equivalent to twice around the Earth. And that was before the end of the first half of the deployment.”

Scientists and engineers have collaborated with OIB since 2007, marking their fifth year this March. Each year, OIB researchers

spend one week in Alaska surveying sea ice north of Alaska as well as the conditions across the Arctic Basin. This year, the teams completed four sea ice science missions: Sea Ice SIZRA on March 15, North Beaufort Loop (with Barrow) March 17, Sea Ice East Beaufort/Fairbanks March 18, and Beaufort Chukchi Diamond on March 19.

Researchers also collected data over sea ice in the Beaufort Sea to support ONR’s Seasonal Ice Zone Reconnaissance Surveys program. In addition, they were able to collect data for the joint NASA/ESA CryoVEx project and provided ESA/CryoVEx with preliminary snow depth estimates for field site selection.

“The missions have all gone well since we started with the IceBridge project,” Leuschen said. “Some of the biggest successes have been the rapid development of the MCoRDS arrays a few years ago. There are always challenges with keeping the systems running and collecting high quality data.”

Li said CReSIS also provided land



The NASA P-3 aircraft shown after landing at Thule Air Force Base. | Photo courtesy of Bruno Camps Raga.

ice data in time to support three on-going ice-drilling projects.

“The final data products from this season will benefit the whole Cryo community,” he said. “We also collected multi-beam data for developing wide-swath ice bed mapping technology.”

Aside from gathering data and working on the field, OIB also extended opportunities for interested students across the U.S. via live online chat sessions.

“We do this while we are flying and collecting data, and the students get to ask whatever is on their minds,” Camps-Raga said. “We had a couple of groups from Lawrence and Olathe this time!” ■



Another view from the nose of aircraft P-3 during a sea ice mission in April. | Photo courtesy of Bruno Camps Raga.

Former CReSIS REU
Students Honored At 2014
Admi Conference

// by **Elise Reuter**

Two former CReSIS undergraduate student researchers, Maya Smith and Ricky Dixon, attended the ADMI Symposium on April 3. The program, hosted by the Association of Computer and Information Science Engineering Departments at Minority Institutions, a CReSIS partner, brings students from across the country together to present their research.

Smith, a junior from Winston-Salem State University, won first place overall for her presentation titled "Analysis Functionality to enhance MATLAB default interpolation schema using mGstat." Smith worked on the project with CReSIS at the University of Kansas, where she used a function in MATLAB to display a variogram that will serve as a visual aid for researchers.

"Researchers in Antarctica or Greenland have plots and numbers of the glacier, but don't remember what it looks like," Smith said. "This way, they can see the depth and model of what the glacier looks like."

Smith plans to add to her research by expanding it to other programming languages, such as Python, and getting the program to run faster. Smith also hopes to apply this experience to her major in information technology and the computer science work she conducts on the side. She says her re-



ADMJ President Dr. Rebecca Caldwell presents an award to Maya Smith (pictured left) for her research presentation on producing variograms using MATLAB. Smith won first place overall of the oral presentations. | Photo courtesy of Maya Smith.

search with CReSIS helped prepare her for this experience:

"It's one of those places that has broadened my horizons to research, and I think that's why I keep coming back," Smith said.

Dixon, another former REU stu-

dent, gave a poster presentation at the conference on the effectiveness and application of Common Core Standards in the classroom. Dixon's research was titled "Using Common Core State Standards of *(article continues on the next page)*



Ricky Dixon, a junior at Mississippi Valley State University, gives a poster presentation on the effectiveness of Common Core Standards for seventh grade mathematics. | Photo courtesy of Kevin Jones with the Center for Remote Sensing Education and Research of Elizabeth City State University.

Former CReSIS REU Students Honored At 2014 Admi Conference

(article continued from previous page)

Seventh Grade Mathematics in the Application of NXT LEGO robotics for CReSIS Middle School Students.”

Dixon used LEGO robotics to teach the scientific and mathematic concepts under the Common Core standards to junior high students. The students played an active role in designing, building, and then programming the robots. According to his research, the students were successful, improving by an average of 38 percent.

CReSIS Education Program Manager Dr. Darnell Johnson helped Dixon pick the research topic during his summer 2013 research program. Dixon was thrilled when he found out he was accepted to the 2014 ADMI Symposium later that year.

“I had already gone one time,” Dixon said. “I wanted to present this year, so I was happy I got accepted.”

Dixon, a junior from Mississippi Valley State University, is studying mathematics education and hopes to apply this information to classrooms in the future.

“I would like to teach at the middle school level,” Dixon said.

Dixon plans to pursue a M.S. and Ph.D. in mathematics after graduating next year. ■

CReSIS Welcomes Ana-Maria Ilisei

// by **Vicky Díaz-Camacho**



Ana-Maria Ilisei is a newcomer to the United States. She hails from Romania, but her most recent post was Italy for graduate school.

From 22-year-old undergraduate to 30-year-old Ph.D. scholar, Ilisei has traveled from Romania to Austria to Germany. She is fond of traveling, Italian food, hiking, nature, and dancing, the latter one of her favorite activities.

“I love dancing,” Ilisei said. “I learned traditional Romanian dance from my parents. Even in Trento, the city where I live, there is a small group of dancers and sometimes we’ll perform.”

Ilisei talked of hiking the mountains of Italy and cultivated an affinity for nature. She said another thing is the food.

“Very natural,” she said. “They know how to mix flavors and how to cook.”

Ilisei moved to Italy for her studies when she was 22 years old, and this summer she joined researchers at the Center for Remote Sensing of Ice Sheets. Ilisei is two years into her Ph.D. and decided to gain hands-on experience working with radars at CReSIS. Her work focuses on the development of techniques for extraction of information radar sound data.

This is her first time out of Europe and she said her first few weeks have been pleasant. She said this experience would both help herself and the program in Italy.

Ilisei likes to share knowledge and said that through her work here at CReSIS, her “knowledge will grow,” and she will share this with her lab [in Italy].

“What we want is to get more knowledge and integrate concepts of glaciology, ice physics, electromagnetic models with image processing,” Ilisei said. ■

CHECK US OUT ONLINE



<http://www.facebook.com/pages/CReSIS-Center-for-Remote-Sensing-of-Ice-Sheets/104872089592282>



<http://twitter.com/#!/CReSIS>

CReSIS Welcomes Visiting Scholar, Abhishek Awasthi



// by **Vicky Díaz-Camacho**

From small town in India to a small town in Kansas, Abhishek Awasthi says the transition to America was a smooth one.

The 28-year-old engineering graduate student came to Lawrence from Northern India. He said homes in India are bunched together, while here there are front yards in nearly every home. Back home, families Tetris their gardens in any space available, he said.

“When I came to Kansas, I was excited to be a place outside of India, a place about which I don’t have a lot of knowledge,” he said. “Honestly I was little scared about how [things would go.] But everything moved very smoothly. I didn’t feel any problem while working and living here.”

Nearly everything is different, including the coffee. He said the differences mainly have to do with society, lifestyle and market.

He comes from a small town in India but said he came to America to be immersed in the culture and take advantage of resources made available by the program.

Awasthi has been working on antenna simulation at the Center for Remote Sensing of Ice Sheets since April this year. His project deals with the effect of mutual coupling on the performance of antenna rays. The engineer is working alongside CReSIS Director, Prasad Gogineni and Assistant Research Professor Stephen Yan. He is designing for his dissertation.

“Simulations are nearly done and results are good,” Awasthi said. “My simulations are going to finish within a week [from June 10]. I am very satisfied with the work.”

During his stay, the engineer has been working on the DC-8 antenna array, which NASA’s aircraft used for monitoring the Antarctic ice sheet.

Once the team completes the simulations, the designs will go through hardware fabrication and the antennas will be tested. After successful testing, researchers will use these antennas in the field with ice depth sounding radars, he said.

“The antenna array I am working on is part of the radar system of this aircraft,” Awasthi said.

Gogineni not only supported Awasthi in his research and with networking with others in the field but also helped him to become better acquainted with the university.

“We have a long-standing collaboration with the Indian Institute of Technology-Kanpur, and Abhishek’s visit serves to further strengthen

that collaboration,” Gogineni said. “The work he is doing on the antenna array for the DC-8 is invaluable and will improve the quality of data to be collected this coming field season and in the future.”

Awasthi began his undergraduate engineering degree in 2004 after a one-year-long job at Telecom Co.

“I wasn’t utilizing any of my energy so I decided I would go into research,” he said.

He enrolled for his master’s in 2009 at Ambedkar Institute of technology Delhi and started his Ph.D. at the Indian Institute of Technology Kanpur in December 2011. His adviser, A.R. Harris, spent time at CReSIS and encouraged him to take advantage of the program.

Following his work with CReSIS, Awasthi will attain his Ph.D from the Indian Institute of Technology Kanpur in approximately two years. After graduating, Awasthi hopes to become a teacher in India.

“One of my oldest thoughts has been to teach,” he said. “I want to do research and be a teacher. This is my ultimatum.”

Until then, he will focus on his CReSIS project and dissertation.

Awasthi presented his work “Wideband Tightly Coupled Antenna Array” June 12, which outlined ways to improve bandwidth within an antenna. The work was a theoretical analysis concerning infinite and finite arrays in the antenna structure.

“This is a wonderful program for me,” he said. “I got a lot of support from everyone at CReSIS.” ■

CReSIS Welcomes New Staff Members

// by **Vicky Diaz-Camacho**



Jawad Ahmed Obaid is 31 and from the United Arab Emirates. He serves as the CReSIS Project Coordinator. Jawad has a B.S in Computer Science and an M.S in Engineering Management, both from KU. Outside of work, he likes reading, watching Discovery and National Geographic, as well as hanging out with friends. His coffee of choice? "I like my coffee strong and very sweet, lots of sugar & cream," he said. His favorite comedian is Chelsea Handler. Jawad's favorite food includes burgers and fries and pizza. A fun fact about him is he collects Disney movies on Blu-ray!



Jennifer Bean, 39, was born in Lawrence and works for CReSIS as the Accounting Specialist. She attained a B.S. in Agriculture/Animal Science and holds a Master of Business Administration. Outside of work she said she enjoys traveling. Her coffee of choice? She sips on Vanilla Cappuccinos. Jennifer's favorite food is Italian and her favorite comedian is Jerry Seinfeld.



Shannon McGill is 22 and hails from Omaha, Nebraska, though she says the Rocky Mountains will always be her home. This summer, she is working as a graphic designer for CReSIS as part of the Knowledge Transfer team. She completed her BFA in Visual Communication this past May and will finish her degree in Community Health this coming spring. Outside of class and work, she enjoys biking, hiking, growing food, painting, and cooking. Her coffee of choice? "I prefer a light roast with a splash of almond milk." Her favorite comedian in her own words, "Tina Fey, man, Tina Fey." Her favorite food, nutrition aside, said she could probably survive on mashed potatoes, popcorn, and kimchi. A fun fact about Shannon is she is a warm weather fiend. "I am getting the heck out of the Midwest as soon as I can."

CReSIS

Center for Remote Sensing of Ice Sheets

Nichols Hall

2335 Irving Hill Rd.
Lawrence, KS 66045-7552
(785) 864-4390



Editors J. Collins, P. Gogineni, J. Laverentz, V. Díaz-Camacho
Design and Layout S. McGill
Staff Writers V. Díaz-Camacho, E. Reuter, L. Houk
Publication Date July 2014

The Icebreaker

IS PUBLISHED QUARTERLY, CONTRIBUTIONS CAN BE SENT TO:

jacollins@ku.edu