CReSIS REVEALS FREEZING FRIDAYS TO AREA SCHOOLS

// by Shawn Schaller

Last November, the CReSIS Education team at the organization’s headquarters in Lawrence, Kan., revealed its latest outreach activity: Freezing Fridays.

Freezing Fridays is a new program that brings CReSIS employees and University of Kansas students Kelsey Leinmiller-Renick and Xiushan Jiang into area schools with a handful of CReSIS activities on Friday afternoons.

CReSIS K-12 Outreach Coordinator Cheri Hamilton and her education team are used to spending time in elementary school classrooms. Though it varies greatly based on availability and grade level, Hamilton normally visits several underserved schools each month to teach an in-depth class using her custom-made Ice, Ice Baby lessons. These lessons, available on the K-12 Education page of the CReSIS website, cover topics that range from “Water Properties” to “Remote Sensing” and generally target middle school age groups.

Freezing Fridays, on the other hand, are designed to make a limited number of CReSIS activities available to any interested area elementary school and take up only a small portion of an afternoon. The very first Freezing Friday, for example, sent Jiang and Leinmiller-Renick to Tonganoxie Elementary school where they worked with students from one kindergarten and two third-grade classes.

Freezing Fridays activities are specially designed to introduce young students to information about Antarctica in a simple, efficient, and exciting fashion. These activities generally include familiarizing young students with the landscape of Antarctica and experimenting with glacier goo, a goopy mixture of glue and borax powder. On one Freezing Friday, first grade students from Sara Boyle’s class at Sunflower Elementary in Lawrence, Kan., even had the opportunity to video-chat with CReSIS Deputy Director Carl Leuschen in Antarctica and ask him questions about the Center’s work there.

The biggest difference between Hamilton’s normal school visits and Freezing Fridays is that Hamilton isn’t always present – her full schedule is normally fixed far in advance. The new program gives Leinmiller-Renick, an undergraduate Environmental Studies student in the

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Cheri Hamilton, CReSIS K-12 outreach coordinator, and Brandon Gillette, CReSIS graduate research assistant, attended the National Science Teachers Association (NSTA) Regional Conference in December 2011.

The conference is one of three regional and four nation-wide NSTA conferences held annually. This year’s meeting was from Dec. 8 to Dec. 10, 2011, in Seattle, Washington. Hamilton’s presentation focused on a new set of science-based activities she designed for elementary and middle school students. The cleverly-titled CReSIS Pieces are tailor-made 4 x 6 inch booklets created to aid teachers in quickly evaluating basic science-skill levels in the classroom. CReSIS Pieces booklets are visually stimulating and are aimed at encouraging younger students to feel curious about and comfortable with scientific ideas.

Gillette’s presentation targeted high-school educators. He introduced the idea of incorporating raw data into the teaching of science at the high-school level. Gillette’s presentation reflects a key element in the Center’s educational philosophy, which aims to apply what we learn in the field to our educational outreach activities. Given the large volume of raw data CReSIS gathers, crunches, analyzes and ultimately shares with the scientific community, Gillette is well-positioned to articulate the value and versatility of raw data as a teaching tool. The overall appeal of this topic and Gillette’s high-school focus was evident in this presentation turn-out. He estimated that roughly 75 NSTA participants in total attended his presentation.

“There are a lot of people collecting data,” said Gillette of his presentation subject, “but not nearly as many people using it. Data such as that retrieved by CReSIS can be used to teach not only science, but math, computer science and other subjects as well. It’s something people want to do, but aren’t comfortable enough or don’t have the time to do it.”

Gillette proposed a solution to this problem by suggesting simple ways to utilize raw data in a variety of classroom settings. “Once teachers see how manageable it can be more teachers will use it,” he concluded.

Identifying and creating new ways to support teachers and engage K-12 and high-school students in technology, engineering and math (STEM) fields of study remains a fundamental goal of the CReSIS Education Team.
LEIGH STEARNS RETURNS TO BYRD GLACIER FOR FLOW DYNAMICS PROJECT

// by Shawn Schaller

CReSIS faculty member Leigh Stearns will return to Byrd Glacier to conclude the second year of the Byrd Glacier Flow Dynamics project. She will leave for Antarctica on Jan. 21, 2012 and return to Lawrence in early Feb., 2012.

According to Stearns, the project’s principal investigator and an Assistant Professor of Geology at the University of Kansas, the team will be retrieving global positioning system (GPS) units that were placed on Byrd Glacier last November. The GPS units are strategically set up across the glacier, as well as on nearby stationary rocks used as reference points, to track the glacier’s movement. Measurements taken with these units are accurate to the centimeter.

Stearns’s team deployed 32 GPS units in November; all but seven will be retrieved during the Jan/Feb trip. The seven ‘winter-over’ units will remain deployed for the entire project, collecting GPS information every five seconds.

The measurements taken by these GPS units over the Antarctic summer and winter provide flow information about one of East Antarctica’s largest glaciers. Byrd Glacier is about 20 km wide and drains a catchment area of more than one-million square kilometers, yet according to Stearns, little is known about it.

“Most of the glaciers that drain out of East Antarctica into the Ross Ice Shelf are considered slow and boring, and for sea level rise they’re probably not that important right now,” Stearns said. “But, for understanding glaciology and flow dynamics, it is a very interesting glacier that we don’t know much about.”

One factor affecting the flow dynamics of Byrd Glacier is the presence of two subglacial lakes underneath the glacier that influence its speed. These lakes periodically drain and refill, Stearns said, though it’s difficult to say at this point how often and to what extent they affect the glacier’s movement. Those are questions only further research can help answer.

Stearns is especially excited to get back to the field after missing the last deployment due to an untimely hand injury. While her team, which consisted of Ph.D. student Sarah Child and collaborators from the University of Maine, was deploying GPS units in the East Antarctic ice, Stearns was forced to remain at home.

“It was a big downer,” Stearns said, “but the rest of the team went down there and got the work done, so, all in all, it worked out.”

The Byrd Glacier Flow Dynamics project and research is funded by the NSF as a three-year project and is separate from the CReSIS grant. This deployment will keep the Byrd Glacier team in Antarctica for about three weeks if the weather cooperates. The trip will conclude the second year of the three-year project; the final round of placing and retrieving GPS units will occur next November and the following January.
UKanTeach program, and Jiang, a Ph.D. student in Higher Education Administration, the opportunity to take classroom presentations into their own hands. They saw the Freezing Fridays program as an opportunity to utilize their own time to further encourage the community’s young students to participate in Science, Technology, Engineering and Mathematics (STEM) education activities.

“Freezing Fridays are important because science is not as emphasized in the elementary school classroom,” Renick said, “and these lessons help encourage the understanding of polar sciences, specifically properties of glaciers and ice sheets.”

Freezing Fridays have already been largely successful, and Leinmiller-Renick, Jiang and Hamilton hope that its continued success will aid the Education Team’s goal of promoting CReSIS research and global awareness.

Two students place their Glacier Goo on a map of Antarctica.

Students observe the properties of Glacier Goo.
When CReSIS Graduate Research Assistant (GRA) and Electrical Engineering and Computer Science student Shashanka Jagarlapudi was preparing for the Winter 2011 NASA Operation IceBridge DC-8 deployment to Antarctica, he had more than one reason to be excited. This was Jagarlapudi’s first CReSIS deployment, as well as his first trip to Chile and his first CReSIS Antarctic flight.

In early October, Jagarlapudi made the trip with his CReSIS associates to the University of Magallanes in Punta Arenas, Chile, where he spent the majority of the deployment. His primary duty on the mission was to process the data obtained by CReSIS radars during the DC-8 aircraft’s flights over Antarctica. He, along with data backup expert Matt Standish of Indiana University, did most of their work from a room reserved for them by the University of Magallanes.

When not in front of his computer, however, Jagarlapudi was tagging along on flights, learning to operate radars and simply taking in the scenery. “It was amazing, really,” Jagarlapudi said. “Once we started seeing sea ice, I was just glued to the window, taking lots of pictures, and a couple of videos. It was fun.”

Whenever he had a down day, Jagarlapudi said, he was able to ride along on the DC-8 with fellow CReSIS GRA Ben Panzer and the field team lead, Assistant Research Professor John Paden. The idea, he said, was for him to learn to operate the radar system individually in case Panzer and Paden needed him in a pinch. Also, with 10 completed flights, he becomes eligible for the Antarctic Service Medal.

Jagarlapudi said his favorite flights were without a doubt the flights over the peninsula.

“Toward the end we had a bunch of peninsula flights, which were completely out of this world,” Jagarlapudi said as a smile crept across his face. “It was beautiful.”

The entire team also had a few spare days to take in the sights Chile had to offer. These days included some penguin watching and a trip to historic Fort Bulnes.

Unfortunately, lengthy missions also require some sacrifices. Jagarlapudi said it’s always extremely difficult to leave one’s family behind, but he also left in the middle of the school semester and had to complete two graduate classes online.

“Both professors were extremely helpful,” Jagarlapudi said in gratitude.
Jagarlapudi enjoys the scenery of Punta Arenas, Chile.

Jagarlapudi operates the Radar Depth Sounder.

toward their efforts. "You are missing half the semester in classes, but I am very thankful to both of them because they agreed. I probably could not have done what I did without those guys."

Though it was his first deployment, Jagarlapudi was very thankful that all facets of the trip seemed to go smoothly. In fact, his only minor complaint from the trip was the cuisine.

"In 25 years, I’ve never lived like that," Jagarlapudi said of the dining routine in Chile. "I’ve always had rice at least once between every two days or three days." In Chile, he explained, meals with rice were much fewer and farther between than he was used to.

"Down there I didn’t have much spicy; nothing was spicy," Jagarlapudi said, remembering the first meal he ate upon his return home. "So when [my wife] came to pick me up at the airport, she got me a really spicy Indian rice dish, it was one of my favorites, but I just couldn’t eat it for a while. It was too spicy for me."

The food was just another small sacrifice Jagarlapudi was happy to trade for the terrific experience. He said he would like the opportunity to go on another deployment, perhaps to Greenland the second time around.

Unlike the four-to-five week trips to Antarctica, however, trips to Greenland usually last 10 weeks. Though he and his wife are accustomed to the long-distance relationship paradigm, as she currently lives in Pennsylvania and he in Kansas, she was not thrilled at the idea of a second, longer deployment.

So while Jagarlapudi admitted with a smile that he was interested in seeing both ends of the Earth, he has some other priorities to consider as well.
CReSIS ASSOCIATES PRESENT AT ANNUAL AMERICAN GEOPHYSICAL UNION CONFERENCE

// by Shawn Schaller

CReSIS Graduate Research Assistant (GRA) Anthony Hoch, Assistant Research Professor John Paden, and former Research Experience for Undergraduate (REU) students Alexandra Arntsen and Tim Godaire (summer 2012) presented posters at the American Geophysical Union Fall Meeting in San Francisco last December.

According to the AGU website, the fall meeting is the largest geophysical sciences conference in the world. It welcomes nearly 20,000 select attendees each year in an effort to procure a sustainable future for the Earth.

Fall meetings take place in the Moscone Center of San Francisco; this year’s conference began on Dec. 5, 2011 and lasted until Dec. 9, 2011.

Hoch and Paden presented their topics individually; Paden discussed 3-D imaging for ice core selection along the ice divide between the NEEM and NGRIP ice cores in Greenland, and Hoch spoke on using Radar Depth Sounder Data to characterize the Jakobshavn Isbræ Catchment Region. Former REUs Arntsen and Godaire presented their poster on Jakobshavn Glacier together; the poster was comprised of CReSIS data the two compiled during their summer REU session.

At the meeting, posters remained on display from 8:00am to 5:00pm, and the presenters were required to stand by their individual posters and give an oral presentation on their topic for 30 minutes to one hour. Arntsen, Godaire and Hoch gave their presentations concurrently to attract a larger crowd of attendees and generate interest in their related topics.

When not presenting, the CReSIS associates explored the rest of the conference, taking in a vast array of presentations and meeting scientists and educators from around the world. Meeting new people is Hoch’s favorite aspect of the conference.

“I actually, literally ran into one of the NASA program directors at one of the evening social dinners,” Hoch said with a smile. “I backed up and almost knocked him over.”

“People are everywhere. It’s just how it all works,” Hoch finished. “It’s a great networking and contact location.”

Although this conference was the sixth that Hoch has attended, he enjoys participating and hopes that he, and others at CReSIS, will continue to attend the conference in the future.

CReSIS GRA Anthony Hoch and Summer 2011 REU student Tim Godaire model their presentations at the 2011 AGU Conference. Photo courtesy of George Tsoflias.
PHOTOS FROM THE FIELD

While on the 2011 deployment, John Paden and the OIB team spent an off day observing a Magallanes penguin colony. Magallanes is the Southern-most geographic region of Chile and home to the city of Punta Arenas and the University of Magallanes, which hosts the OIB team during Antarctic deployments. The team saw nearly 100 Magallanes penguins and various other wildlife during their stay.

*These photos are courtesy of the 2011 Antarctic OIB team.*
NEW CReSIS MEMBER 
TO OPERATE HAAS CNC TOOLROOM MILL

// by Jennifer Salva and Shawn Schaller

New CReSIS member Stephen Vincent, a graduate student in Mechanical Engineering at the University of Kansas, has been charged with operating the complex HAAS CNC Toolroom Mill housed in Nichols Hall at the University of Kansas.

HAAS Automation Inc. is one of the top companies in the industry and offers a wide array of cutting-edge machine tools. Though not as intricate as a full HAAS Automation Machining Center, the Toolroom Mill still requires a great deal of care and experience to operate properly. Vincent has previous experience working with hand-operated mills and more high-tech machines, such as the HAAS Toolroom model currently used at CReSIS.

At CReSIS, engineers use the mill to produce customized mechanical parts. These consist primarily of encasements for the electrical equipment contained in CReSIS radars.

When beginning a project, the CReSIS mechanical and electrical engineers involved in the process meet and discuss the requirements that the constructed parts need to fulfill. For example, the CReSIS electrical engineers may ask the mechanical engineers to construct casings for radar system circuit boards. The mechanical engineers first model each individual part of the prospective case then return the blueprint to the electrical engineers for corrections.

According to Vincent, blueprints for products are first designed in SolidWorks, a 3D mechanical CAD (computer-aided design) program. This program allows the engineer to visualize how their final product will function as a tangible object.

Next, the engineers use a program called FeatureCAM to convert the design into a code that the Mill can read. This code programs the machine to automatically carve each individual piece of the product. Finally, the product is pieced together and readied for installation.

“Without a CNC Mill, we wouldn’t be able to make parts with nearly the same precision,” Vincent said, “and it would take 10 times the amount of time.”

While the machine is largely utilized at CReSIS to create radar chassis, its potential goes far above and beyond simple encasements. Vincent noted that a motivated team of mechanical and electrical engineers could potentially use the CNC Mill to efficiently and accurately create as many useful products as can be imagined.
TWO NEW STAFF MEMBERS JOIN CReSIS

// by Jennifer Salva

David Jones joined CReSIS in January, 2012, as the new CReSIS student webmaster. He previously held web-related positions at several University of Kansas departments, including KU ResNet and KUCRL (The KU Center for Research on Learning). He currently works as a Resident Assistant for on-campus housing. In his free time, David enjoys exercising and ballroom dancing with KU Dancesport. During his time at CReSIS, David looks forward to gaining work experience in a research environment.

Stephen Vincent joined CReSIS in January, 2012. He is currently working towards his Master’s degree in Mechanical Engineering at the University of Kansas. Stephen previously worked at a multi-discipline product design firm, Marche Design. During his time at CReSIS, Stephen will be in charge of mill operation and will work on mechanical part production. In his free time, Stephen enjoys biking and making furniture.