NSF Grant Enables Construction of New Anechoic Chamber

// by Jennifer Salva

A new grant from the National Science Foundation has enabled CReSIS to begin construction of an anechoic chamber on the University of Kansas main campus. The chamber will be used for characterizing electromagnetic interference (EMI) and reducing it to improve the sensitivity of the radars used to collect data on fast-flowing glaciers. High-sensitivity radars are needed to sound these fast-flowing glaciers and radar data are needed to understand why some glaciers speed up. Construction of the chamber was initially delayed so that it could be installed in the new Measurement, Materials and Sustainable Environment Center (M2SEC), an engineering research facility granted by The National Institute of Standards and Technology, on main campus.

The metal enclosure and blue electromagnetic wave absorbers being installed on the chamber walls isolate undesired electromagnetic activity, creating an electromagnetically quiet space. This is analogous to the isolation booths performing artists use to record their sound tracks. The chamber allows researchers to characterize antennas and electronic system noise in a well-controlled environment. The wide range of frequencies (30 MHz to 18 GHz) covered by the chamber facilitates the testing of the large variety of CReSIS radar systems, including the Multichannel Coherent Radar Depth Sounder/Imager (MCoRDS/I), Temperate Ice Depth Sounding Radar (TIDSoR), accumulation and snow radars, and Ku-band altimeter. The chamber will also be used to obtain RFI and EMI compatibility measurements of the radar systems to be used on the Unmanned Aerial Vehicles (UAVs), which are developed by CReSIS for polar research.

[article continues on page 3]
On Monday April 2nd and Tuesday April 3rd, the 2012 CReSIS Advisory Board assembled at the University of Kansas.

The Board is comprised of members from across the nation and includes prominent engineers, research scientists, business leaders and education directors. Following the 2012 session, each member contributed valuable feedback to uphold the Center’s ongoing achievements. The diversity of disciplines represented by the board allows expert advice to benefit every component of the Center.

Mr. Suresh Ramamurthi, technology entrepreneur and the 2012 Board Chair, describes this collaboration as “a piece that shows how we collect data, a piece that shows how the data is interpreted, a piece that shows how the various things are built [and] a piece that shows how little things are integrated.”

Topics on the agenda included Field Programs, Technology, Education, Research Programs and Modeling.

Geography undergraduate student, Kyle Purdon, was enticed by the great presentations and topics relevant to his area of study. He notes that “it’s nice to get all these people together and get everybody’s varied opinions in one room. It leads to a lot of development.”

Purdon also contributed one of many poster presentations researched and designed by CReSIS undergraduate and graduate students. The presentation encouraged interaction between students and board members and re-emphasized the large number of disciplines encompassed by the CReSIS mission.

CReSIS was pleased to host a board of primarily returning members, as well as welcome an additional member, Steve Ericson. Mr. Ericson is Senior Manager of Skunk Works and Chief Engineer of Special Projects. The veteran board of Charles Luther, Dr. Carl Person, Dr. Jonathan Bamber, Jeffery Stepp, Dr. Scott Beaven, Dr. Roger Hathaway, Dr. Tony Hey, Dr. David Holland, Mr. Suresh Ramamurthi, Dr. Christopher Shuman, and Mr. Herb White, was able to provide rich feedback due to their continued involvement with CReSIS.

Geographic Information Sciences staff member Steve Fogg shares his thoughts on the 2012 CReSIS Advisory Board: “It’s a real serious effort we have to collaborate with different types of studies and backgrounds.... It really shows what kind of expertise we have at the Center.”

This spring, Associate Professor of Business Sanjay Mishra and the President of the KU Center for Technology Commercialization Julie Goonewardene introduced a new business course at the University of Kansas. Mishra is a faculty member at CReSIS and part of the CReSIS Knowledge Transfer team.

CReSIS is currently exploring the possibility of Technology Transfer, or the commercialization of its unique technologies. The new course, entitled “Fuzzy Front End of Product Development and Technology Evaluation: Marketing and Entrepreneurship,” is dedicated to the study of these CReSIS technologies, specifically their potential in the business world.

The goal of the class, in a nutshell, is to observe whether or not CReSIS technologies would make viable patents for production and sale. Not only is the class a unique opportunity for graduate students in business-related fields, but it functions as an examination of the Center’s business prospects as well.

The idea is “to find out if there is any [CReSIS] technology that is worth moving out,” Mishra explained to the class and guests at the beginning of the session. Every Friday, Mishra and his students meet for class, occasionally with guest speakers, in a variety of classrooms. “We go where the action is,” Mishra said with a smile when asked about the location of his class.

During class, the students learn everything about the life of a product, from the inception of the idea to the process of a patent and its implementation, in various forms, into the market.

On Friday, April 13, for example, the class was able to meet with George and Jennifer Lawrence to discuss the discovery, patent process and market implementation of an amino acid. The amino acid is a powerful binding agent for numerous metals from the periodic table of elements.

Jennifer stumbled upon the amino acid during research for another project. Now, she and her husband George are in the process of developing and marketing the discovery. The two are exploring its potential implications in a number of fields, most importantly the medical field, where it could lead to advances in chemotherapy.

The class was given a quick history of the discovery, followed by the steps taken directly afterward and the couple’s plans for the future of the amino acid. Ideally the students will observe this situation and similar ones, taking the lessons they learn from each discussion and applying it to the Center’s current Technology Transfer explorations.

CReSIS activities in ice-sheet research have required the development of several world-class specialized radars. Perhaps the biggest challenge for the students of the course—and Professor Mishra—is to find ways to commercialize the technology without compromising the technological lead that CReSIS has achieved.
NSF Grant Enables Construction of New Anechoic Chamber

(article continued from page 1)

Professor Carl Leuschen is the Principal Investigator for this grant, and Professors David Braaten, Prasad Gogineni, Sara Seguin and Cornelis van der Veen are co-Principal Investigators.

The 10-meter chamber is equipped with a powered turntable capable of accommodating a UAV weighing 1,100 lbs. This permits CReSIS researchers to study the effects of antenna placement on aircraft platforms and understand the disturbance imposed on the antennas’ radiation characteristics. It will also enable CReSIS researchers to make further improvements to the sensitivity of radars, which are used to obtain essential data for the construction of more realistic ice-sheet models.

In addition to the prospective contributions in the fields of ice modeling and glaciology at CReSIS, the chambers will allow engineering students at the University of Kansas to incorporate laboratory exercises into their studies of the growing field of electromagnetics and radio-frequency (RF)/microwave engineering.

Andrea Lawrence Honored as HistoryMaker

// by Shawn Schaller

Earlier this year, CReSIS Associate Director for ADMI Dr. Andrea Lawrence was given the prestigious honor of being named a HistoryMaker.

Lawrence was official honored at an event entitled Blazing Trails: African Americans in Science, Technology, Engineering and Mathematics, which took place on Feb. 24, 2012, at the SciWorks Science Center and Environmental Park in Winston-Salem, N.C. According to VisitWinstonSalem.com, it was funded by a $2.3 million grant from the National Science Foundation as one of a national series of ScienceMakers events and was overseen by the HistoryMakers Institution.

Lawrence is an Associate Professor of Computer Science at Spelman University and an ex-officio President of the Association of Computer/Information Sciences and Engineering Departments at Minority Institutions (ADMI).

This is just one of several prestigious awards for Lawrence. According to her HistoryMakers biography, she was given the National Technical Association’s Technical Achiever of the Year Award in 2004 and was named a Technology All-Star by the National Women of Color in 2005 among others. She was also the first African-American to receive her Doctorate Degree from the Georgia Institute of Technology in 1993.

Honored with Lawrence that evening were three other prominent African-Americans in the fields of Science, Technology, Engineering and Mathematics. Hunter College theoretical physicist Godfrey Gumbs, Duke University neurobiologist Erich Jarvis and nuclear physicist Calvin Howell were the other honorees at the event.

The Blazing Trails program on Friday evening kicked off a two-day ScienceMakers Education Festival at SciWorks. Students from the surrounding area and guests from Winston-Salem had the opportunity to meet Lawrence and the other HistoryMakers throughout the two-day event.

Lawrence currently teaches a wide range of computer science classes at Spelman College and continues to serve on the ADMI board. Her research focuses on human-computer interaction, such as using computer-generated animations to teach complex algorithms.
In this two-part story, we will follow first-year PhD student Kiya Wilson and her fellow Penn State CReSIS researchers to the North East Greenland Ice Sheet, where they are spending the 2012 summer conducting geophysical surveys in the deep field.

Preparing for a summer of fieldwork in the middle of an ice sheet is not as simple as packing a toothbrush and pillow, as I am coming to learn. When there are 400 miles of barren ice between you and the closest town, you have to plan ahead for every possible situation. Why am I preparing for my first summer in the remote, desolate interior of Greenland? Because of the mysteries that lie beneath the North East Greenland Ice Stream.

Ice streams are regions of fast flowing ice within an otherwise slow-moving ice sheet. They are common along the margins of the Antarctic Ice Sheet, but only one extends deep into the interior of Greenland: the creatively named North East Greenland Ice Stream. This ice stream is pretty cool for a couple of reasons: it is over 700 kilometers long and drains a considerable volume of ice into the ocean each year, yet there is very little known about why the ice here flows so rapidly. Across the space of a few kilometers, ice in the interior of Greenland transitions from virtually stagnant to flowing at speeds of about 100m/yr. Why? My team and I will be spending five weeks on the ice this summer trying to answer this seemingly simple question.

We will be using two main tools – ice-penetrating radar and active seismics – to peer through the ice and look at the ice-rock transition, which is where most of the ice movement happens. Dr. Leo Peters is our seismics guru and field leader, Dr. Knut Christianson is the radar guy, and Dr. Atsu Muto and I will be helping and learning. We are specifically interested in looking at the thickness of sediments and water under the ice. Our plan is to collect a 40-kilometer seismic reflection profile of the ice stream, as well as a tightly spaced grid of common-offset radar data. These data should allow us to characterize the basal conditions of the ice stream, which in turn will address our questions regarding the mechanism behind rapid ice flow initiation.

There are some large hoops to jump through in order to conduct work in this remote part of Greenland: government permits for our presence in the national park and for the explosives we will be detonating, physical tests and clearances, and agreements with the Air National Guard who will be transporting us and our many tons of equipment. Even once you have permission to work on the ice, you aren’t done yet; there is a lot of specialized equipment to purchase that is necessary for life on an ice sheet. From highly reflective glacier glasses to water-bottle insulators and massive down parkas, we have outfitted ourselves with the gear necessary to survive in the potentially harsh arctic climate. The local outdoor gear shop now knows me by name and my preferred thickness of woolen socks. Silly small things become extremely important to plan for, such as how am I going to keep my spare contacts from freezing? We’re just about ready, though. Food has been purchased (I think three jumbo-sized candy bars per person per day should be enough), gear has been shipped, high-resolution satellite imagery has been scanned to ensure that we won’t fall through any giant crevasses in the ice, and in a few short weeks we will excitedly set out for the ice.

What awaits us on the ice stream is a host of fascinating yet unanswered questions about the nature of this misunderstood, hauntingly beautiful, and treacherous ice sheet. More tales upon our return!
CReSIS Associates Attend Education Conferences Across the Country

// by Shawn Schaller

This spring, several members of the CReSIS Education and Outreach team traveled to different education conferences across the country. During the months of February and April, these associates represented CReSIS and its Education Team from Washington D.C. to Vancouver, Canada.

Brandon Gillette
(Graduate Research Assistant)

Gillette attended the Oregon Coast Aquatic and Marine Science Partnership (OCAMP) in Newport, Ore., on Saturday, Feb. 11, 2012. The conference was sponsored by the Lincoln County school district at the Hatfield Marine Science Center in Newport, Ore., and 35 teachers attended.

At the conference, Gillette gave three different presentations. One gave a general overview of CReSIS’ field work, including certain methods and locations. The second demonstrated the Education and Outreach team’s home-grown CReSIS Pieces activities for elementary school teachers. The third demonstrated the use of the online data portal for high school teachers.

Darryl Monteau (Education Coordinator)

Monteau attended the Association of Computer/Information Sciences and Engineering Departments at Minority Institutions (ADMI) 2012 Annual Symposium from April 12, 2012, to April 14, 2012. The conference took place at Howard University in Washington, D.C. and was attended by approximately 150 students as well as several members of CReSIS partner institutions.

While there, Monteau helped judge graduate student presentations and papers. “I appreciated attending,” Monteau said in reflection of her first ADMI experience, “being a part of the event, the symposium and being with the students.”

Xiushan Jiang
(Graduate Research Assistant)

Jiang attended the American Education Research Association (AERA) conference that took place from April 13, 2012, to April 17, 2012. The national annual conference was held in Vancouver of British Columbia, Canada. It holds the distinction of being the largest conference for psychology and social science education on the continent and was attended by nearly 10,000 people throughout the week.

At the conference, Jiang gave two different presentations. One presentation focused on his current work, which focuses on researching students who begin their undergraduate careers as engineering majors, but change majors in their first or second year of school. The second showed his research on the effects of small-group learning; using MAT Analysis methodology, he believes that small groups foster better attitudes toward learning.

Kelsey Leinmiller-Renick
(Undergraduate Education Assistant)

Leinmiller-Renick attended the Kansas Association of Teachers of Science (KATS) camp at Rock Springs 4-H Camp near Junction City, Kan., from April 20, 2012, to April 22, 2012. The conference was attended by science teachers of multiple academic levels from across the state.
state. While at Rock Springs, Leinmiller-Renick presented on CReSIS and the Center’s work with bringing glaciers into the classroom, as well as on her summer research, “Grounding Line Location Using Echograms.”

“It was a learning experience for two reasons,” Leinmiller-Renick said of the conference. “One, I got to improve my presentation skills, and two, I gained new ideas for future classroom lessons. It was fun to represent CReSIS at the conference.”

Cheri Hamilton (Education and Outreach Coordinator)

Hamilton attended the Polar Educators Workshop Conference, from April 20, 2012 to April 22nd, 2012. Nearly 170 teachers in total attended the conference. This conference was followed by the International Polar Year 2012 Conference in Montreal in the Quebec province of Canada from April 23, 2012 to April 26, 2012.

Her work at the conference included a mentoring session for the Association of Polar Early Career Scientists and assisting a presentation entitled “Drilling Back to the Future” for the workshop.

Unfortunately, Hamilton’s experience got off on the wrong foot as her luggage was lost somewhere between Lawrence and Montreal. Hamilton said she didn’t have any of her classroom materials for presentation, or even her coat to protect her from the cold Canadian elements. Despite the circumstances, she still felt that her experience was a good one.

CReSIS Welcomes New Staff Members

// by Jennifer Salva and Shawn Schaller

Corbin Charpentier joined CReSIS in February of 2012 as a Student Systems Administrator. He is working towards his Bachelor’s Degree in Computer Science with a Minor in Music at The University of Kansas. Previously, Charpentier has held other technical support positions, though he looks forward to the increased technical aspects of his responsibilities at CReSIS. He is excited to work in an environment full of learning opportunities and interesting people. In addition to working with computers, Charpentier enjoys video games, lacrosse and playing his cello.

Riley Epperson was hired by CReSIS in March 2012. At CReSIS, Epperson will serve as an Information Specialist. He graduated with his Bachelor’s Degree in Computer Engineering from Wichita State and previously worked as a System Support Specialist at Sales Data, Inc., in Hutchinson, Kansas. Epperson said he was attracted to CReSIS because of the opportunity to work with a bigger IT Enterprise Data support system, and he hopes that he can assist the cause by streamlining CReSIS operations. In his spare time, he bowls and simply enjoys his leisure time.

William Daehler was hired by CReSIS in May 2012 as a student journalist. He graduated from the University of Kansas with Bachelor’s degrees in political science and journalism in May 2012. He’s currently working towards a Master’s in political science at the University of Kansas. Daehler looks forward to working with the many interesting people at CReSIS while also learning about its important work. When he’s not working, Daehler enjoys cooking, golf and playing banjo.

Cheri Hamilton (Education and Outreach Coordinator)

Hamilton attended the Polar Educators Workshop Conference, from April 20, 2012 to April 22nd, 2012. Nearly 170 teachers in total attended the conference. This conference was followed by the International Polar Year 2012 Conference in Montreal in the Quebec province of Canada from April 23, 2012 to April 26, 2012.

Her work at the conference included a mentoring session for the Association of Polar Early Career Scientists and assisting a presentation entitled “Drilling Back to the Future” for the workshop.