



The Icebreaker

Issue 5 | Spring 2007

Director's Message

The past few months have been busy at CReSIS. The CReSIS Advisory Board met in February, and NSF conducted its second site visit review of CReSIS in mid-March. Both meetings were successful and helpful in improving the Center.

The CReSIS Spring Seminar Series started in February, and has featured outstanding speakers. In this issue of the Icebreaker, we feature a profile of one of the speakers, Dr. James R. Fleming from Colby College.

In February, an article entitled "Risk of Rising Sea Level to Population and

Land Area" was published in EOS Transactions in the Feb. 27 issue. CReSIS faculty and students from KU and Haskell collaborated on this project.

We are pleased to welcome a new research engineer, Dr. Hee Chun, to CReSIS. Dr. Chun joined us in February and will be working on designing and implementing software systems for CReSIS radars, as well as improving data analysis systems.

We are looking forward to a very productive summer at CReSIS. Fifteen REU students will join us here at KU, with three other REU students at part-

ner institutions. In addition, Dr. Sergey Chernyakov, the head of the Murmansk Geophysical Observatory at the Polar Geophysical Institute, Kola Science Center of the Russian Academy of Sciences is visiting CReSIS for 10 weeks to develop a policy brief on increasing the competitiveness of universities in Northern Russia.

I hope you enjoy the newsletter. Please send us any comments or suggestions.

-Prasad Gogineni



photos courtesy of Thomas Overly

The Center for Remote Sensing of Ice Sheets is made possible by a five-year award from the National Science Foundation (#0424589), which began in June, 2005.

>Administration

Center welcomes software engineer Dr. Hee Chun



BY BETH RUHL

Dr. Hee Chun joined CReSIS in February as a software engineer. He came to KU from CReSIS partner institution Ohio State University where he worked as a Post-Doctorate Researcher in radiology.

Chun's work will consist of designing

software for CReSIS radars and processing returned data signals from the radars to interpret key ice sheet parameters such as ice thickness, basal characteristics, and internal layers.

"Climate change is important to the peoples of the world" said Chun. He explained that CReSIS is a good place to work because the people are nice and the researchers are experienced in their fields.

Chun received his B.S. degree in engineering from a university in South Korea. He then went on to receive his M.S. degree in engineering from the University of Illinois, and his PhD. in engineering at Ohio State University.

CReSIS Student Organization

Election Results: May 4, 2007

Peter Adany: vice-president
Melanie Gile: education coordinator
Kevin Player: social coordinator (summer term only)

Summer Activities

- Every Friday 3:30 to 5 p.m.: Ultimate Frisbee and soccer.
- Stop Day (May 11): BBQ during weekly sports clinic
- June 8, 2007: BBQ at Clinton Lake to welcome REU students.
- CReSIS retreat will be scheduled for the last weekend of July 2007.



>Technology

Lora Koenig applies acquired radar knowledge to gather data in field

Dear Members of CReSIS,

Since I came to learn about your 35 GHz FMCW radar in August of 2006, I have been quite busy with the data I obtained using the radar on the US ITASE traverse in Antarctica. I collected these data with the help of Joe Flaherty, University of Washington, and Brian Welch, St. Olaf College, at 4 locations in East Antarctica from early November to the middle of January.

We started the traverse from Taylor Dome, Antarctica and headed towards South Pole for about 500 km. A map of the locations, marked with yellow circles, is shown at the right. I collected two types of radar data: pit data where the radar was at a spot location above a snow pit; and traverse data where the radar was being dragged along a traverse line. The spot-location pit data allowed me to obtain radar reflectance information simultaneously with detailed snow pit data, which included stratigraphy, firn microstructure and density measurements.

The snow pits were also used to place reflectors in the firn in order to gain an understanding of 35 GHz extinction lengths. We found that the loss, or extinction, was so high in the East Antarctic firn that our reflector sphere was not giving enough power return to the radar.

While we did not get the exact quantitative measurement of extinction length that we wanted, we were able to determine that the radar penetration in East Antarctica is about a third of the penetration depths measured previously with the same radar in Greenland.

The radar traverse data turned out very well. We have 6 different traverse lines where we can see different reflecting layers. These data will be used to investigate length scales over which layers in the top meter of firn persist.

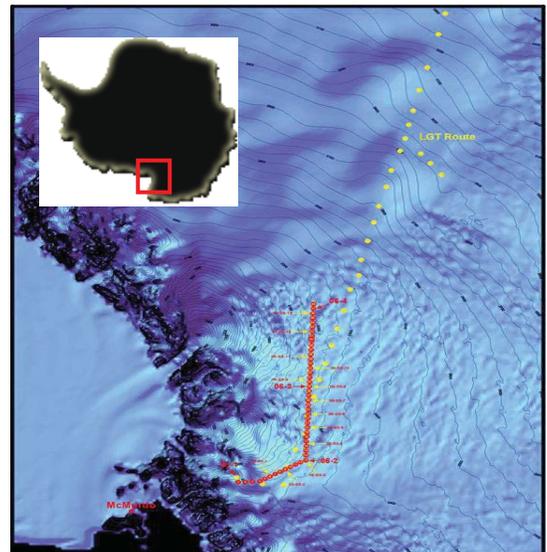
I am going to use the radar at Summit, Greenland in June because the radar will have less loss at Summit allowing for better extinction length measurements. Summit is also a good location because the radar has been used there before, the firn microstructure is fairly homogenous, and I want to compare the 35 GHz FMCW radar extinction length measurements to previous measurement taken at Summit using a 37GHz radiometer.

The field methodology at Summit will be similar to Antarctic measurements except I will be using a luneberg lens reflector in the snow pit to replace the calibration sphere. The luneberg lens reflector will give a larger power return to the radar than calibration sphere.

We are taking in-situ measurements of firn properties and microwave extinction length on the ice sheets in order to better understand space-borne passive microwave data

sets. These data sets, which started in 1978, may have the ability to monitor accumulation rates over the ice sheets. Hopefully the radar data I am gathering on the ground can help scientists better understand the passive microwave satellite signal and how it can be used to determine accumulation rate changes over the past 30 years. Thank you for your help!

Sincerely,
Lora Koenig



>Geography

EOS features CReSIS research article

BY ASHLEY THOMPSON

An article based on the research of CReSIS students and professors at KU and Haskell was featured on the cover of the Feb. 27 issue of EOS Transactions.

The article, entitled "Risk of Rising Sea Level to Population and Land Areas," described the group's methods of predicting inundation zones according to the amount of rise in sea level.

Using GLOBE digital elevation model and LandScan, a population data set, the group estimated the impacts of a one meter to six meter sea level rise on population and land area.

Products from this research are available on the CReSIS website, including inundation layers viewable on Google Earth, static maps of sea level rise, animations of sea level rise, and inundation layers in GIS format.

Colby College professor examines climate change through archives, historical lens

BY ASHLEY THOMPSON

In 1938, English engineer Guy Callendar brought together the modern-day anthropogenic greenhouse effect with a detailed study of gases in the Earth's atmosphere.

Fifty years after his studies, a pivotal headline ran in *The New York Times*. It was June 24, 1988, the beginning of a new era of climate change and concern for the environment.

"Global Warming has begun," it said.

It certainly had. Nearly 20 years after those bold letters ran across the most-read newspaper in the country, James Fleming, a professor at Colby College, stood in front of a crowd at the University of Kansas' Hall Center of Humanities, part of the CReSIS-sponsored Spring Seminar Series, preaching his expertise – a mélange of history,

science and public policy.

"There's a problem with how we communicate with people," Fleming said. "We need all of our talents, with everybody using their best abilities to work together. This isn't just about science. It's about what the public and the politicians do about it."

The facts are there. The IPCC's recently released report states that a sea-level rise of anywhere between 18 and 59 centimeters by the end of this century is imminent. Fleming's strategy is looking at the past to examine what we can expect in the coming 100 years. A self-described "archival hound," he has spent hours pilfering through Smithsonian archives. It was there that Fleming found Callendar's papers, buried in the masses.

Fleming was an astronomy undergraduate major at

Pennsylvania State University, but switched to atmospheric science for his graduate studies at Colorado State University. For his dissertation, which was on the history of meteorology, he had to convince the committee to allow him to stray from the normal list of topics, often dealing with the likes of Copernicus and Darwin.

"I wanted to start working backwards and research the history of climate," Fleming said, "and not stop until I didn't understand what was going on. That's when the learning begins."

Since then, Fleming has written two books about the meteorological history of America and edited eight others. He is the founder and president of the International Commission on History of Meteorology, based at Colby College.



Professor James Fleming speaks on March 8 on the KU campus as part of CReSIS' Spring Seminar Series. -*University Daily Kansan* file photo

>Education

ESCU's partnerships garner student success



CReSIS partners meet for a cyberinfrastructure strategy session in Fall 2006. *photo courtesy of Dr. Linda Hayden*

BY LINDA HAYDEN /ASHLEY THOMPSON

During the past year, Elizabeth City State University, an HBCU in North Carolina with fewer than 3,000 students, has positioned students as leaders in polar research and technology, in part because of the Minority-Serving Institutions Cyberinfrastructure Institute (MSICI).

MSICI, a National Science Foundation demonstration project, aims to broaden participation and use CI as a mechanism to enhance the participation of MSI's in cutting-edge research and education. Other participating educational institutions are the American Indian Higher Education Consortium, the Hispanic Association of Colleges and Universities, and the National Association for Equal Opportunity in Higher Education.

CReSIS, ESCU, Indiana University, and other MSI collaborators have submitted a NSF Major Research Instrumentation (MRI) proposal for PolarGrid CI, which would structure polar research institutions' interaction nationally and worldwide. ESCU plans to add a CI track to its master's program in the future, as well.

ESCU's partnership with CReSIS has given students the opportunities for summer internships and a close connection with leading scientists in the field. ESCU's next step toward garnering more student and university success is a stronger partnership with Indiana University. This partnership will provide an innovative infrastructure that will link intermittently disconnected field and base grids in the polar regions to "lower 48" data and computing resources.

December 2006-March 2007 Talks and Events

Conferences Held

--Midwest Glaciology Meeting, at CRISIS, Lawrence, KS, March 1-3, 2007

Conference Presentations

--12/11/06: "The Development of an Uninhabited Aircraft System for Remote Sensing in the Cryosphere," Poster Session, EOS, 87, Fall Meeting Supplement, Abstract C11A-1127, San Francisco, CA: W.R. Donovan and R.D. Hale
--12/11/06 – 12/15/06: "Reconstructing Holocene Glacier Changes in West Greenland from Multispectral ASTER Imagery," Poster Session, EOS, 87, Fall Meeting Supplement, Abstract C11A-1134, San Francisco, CA: K.I. Huh, B. Csatho, C.J. van der Veen and Y. Ahn
--12/11/06 – 12/15/06: "Subglacial Topographic Controls on the Geothermal Heat Flux of the Greenland Ice Sheet," Poster Session, EOS, 87, Fall Meeting Supplement, Abstract C41A-0319, San Francisco, CA: T.E. Leftwich, C.J. van der Veen, R.R. von Frese, and B. Csatho
--12/11/06 – 12/15/06: "Hybrid Streamers for Polar Seismic," Poster Session, EOS, 87, Fall Meeting Supplement, Abstract C41B-0335, San Francisco, CA: C. Gifford, A. Agah, and G. P.

Tsoflias

--12/11/06 – 12/15/06: Anandakrishnan, S., 2006: Modeling the Effect of Grounding-Zone Sediment Wedges on the Stability of Ice Streams to Sea Level Rise Discovery of till deposition at the grounding line of Whillans Ice Stream and implications for ice stream stability, Eos Trans. AGU, 87(52), Fall Meet. Suppl.
--12/11/06 – 12/15/06: Wiens, D., S. Anandakrishnan, and A. Nyblade, 2006: Remote Detection and Monitoring of Glacial Slip from Whillans Ice Stream using Seismic Rayleigh Waves Recorded by the TAMSEIS Array, Eos Trans. AGU, 87(52), Fall Meet. Suppl.
--12/11/06 – 12/15/06: Winberry, J.P. and S. Anandakrishnan, 2006: Insight into the basal mechanics of ice streams from passive seismic observations, Eos Trans. AGU, 87(52), Fall Meet. Suppl.
--12/11/06 – 12/15/06: Zoet, and S. Anandakrishnan, 2006: Seismicity Associated with Flow of Antarctic Glaciers, Eos Trans. AGU, 87(52), Fall Meet. Suppl.
--12/11/06 – 12/15/06: Larson, A. Nyblade, D. Wiens, and S. Anandakrishnan, 2006: Results for the Mantle Transition Zone Beneath the Transantarctic Mountains From Receiver Functions, Eos Trans. AGU, 87(52), Fall Meet. Suppl.
--12/11/06 – 12/15/06: Christopher M. Gifford, Arvin

Agah, and Georgios P. Tsoflias, 2006: Hybrid streamers for polar seismic. In Proceedings of the 2006 American Geophysical Union (AGU) Fall Meeting, San Francisco, California, December 2006, Eos Trans. AGU, Vol. 87, No. 52, Abstract C41B-0335.
--12/11/06 – 12/15/06: Christopher M. Gifford, Cheniece L. Arthur, Bryce L. Carmichael, Gary K. Webber, and Arvin Agah, 2006: Promoting diversity in undergraduate research in robotics-based seismic. In Proceedings of the 2006 American Geophysical Union (AGU) Fall Meeting, San Francisco, California, December 2006, Eos Trans. AGU, Vol. 87, No. 52, Abstract ED33B-1385.

Talks

--2/17/07, Lonnie G. Thompson, "Tropical Ice Cores," University of Kansas, Lawrence, KS
--2/11/07, Richard Alley, "Global Warming and the Effects on Ice," University Baptist and Brethren Church, State College, PA
--3/8/07, James Flemming, "The Human Dimensions of Climate Change Science," University of Kansas, Lawrence, KS
--3/21/07, Seppo Korpela, "Peak Oil," University of Kansas, Lawrence, KS