The Center for Remote Sensing of Ice Sheets (CReSIS)

Kelly Mason

Project Coordinator for Education

National Science Foundation :: Kansas Technology Enterprise Corporation :: National Aeronautics and Space Administration

The University of Kansas | The Ohio State University | Pennsylvania State University
The University of Maine | Elizabeth City State University | Haskell Indian Nations University

Centre for Polar Observation and Modelling | University of Copenhagen
Technical University of Denmark | Antarctic Climate & Ecosystems CRC

CReSIS

CReSIS

- Who we are
- What we do
- Our link with CI-TEAM
- Opportunities for students

NSF NASA KTEC CReSIS

Who We Are

- CReSIS was established in 2005 by a major grant from the National Science Foundation (NSF).
- It is one of 17 Science and Technology Centers (STCs) funded by the NSF.
  - STCs conduct world-class research in partnerships among academic institutions, national laboratories, industrial organizations, and/or other entities to create new and meaningful knowledge of significant benefit to society.
  - STCs nurture and foster education by integrating education with research, and by providing opportunities for students to pursue degrees in science and engineering.
  - STCs demonstrate leadership to increase diversity by including all members of society regardless of race, ethnicity or gender in all aspects of the Center's activities.

(http://www.nsf.gov/od/oia/programs/stc/)

CReSIS Partners

HASKELL
INDIAN NATIONS
UNIVERSITY

THE UNIVERSITY OF
KANSAS

PENNSTATE
1855

T · H · E
OHIO
STATE
UNIVERSITY

1865 THE UNIVERSITY OF
MAINE

ELIZABETH CITY
ECSU
STATE UNIVERSITY
Founded 1891

CReSIS

NSF NASA KTEC

Our Mission

- Research: To understand and predict the role of the ice sheets in sea level change.
  - Satellite observations
  - Sensors
  - Autonomous platforms
    - Ground-based rovers
    - Uncrewed aerial vehicles (UAVs)
  - Field activities
  - Data products and modeling
  - Analysis and synthesis
- Education: To train the next generation of scientists and engineers while taking into account the full diversity of the nation.
- Knowledge Transfer: To communicate the issues and results of our research to the public, policy makers, and the scientific community.

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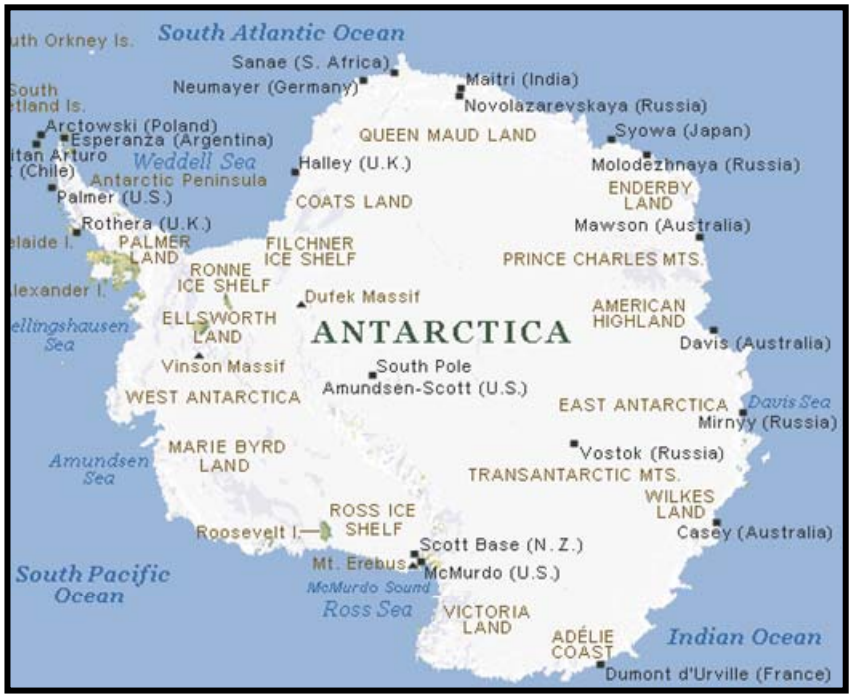
Ice Sheets and Sea Level Rise



Greenland: 1.8 x 10^6 km^2 area (enough water to raise sea level about 7 meters)

Antarctica: 1.3 x 10^7 km^2 area (enough water to raise sea level about 60 meters)

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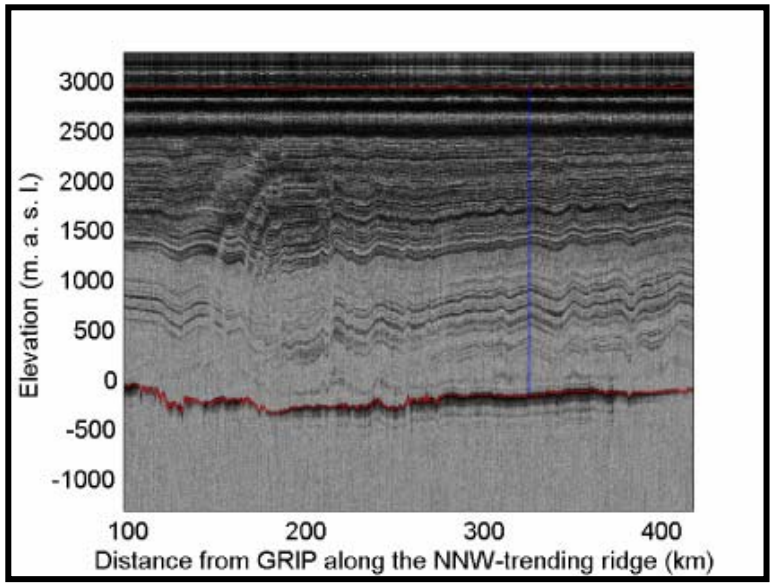
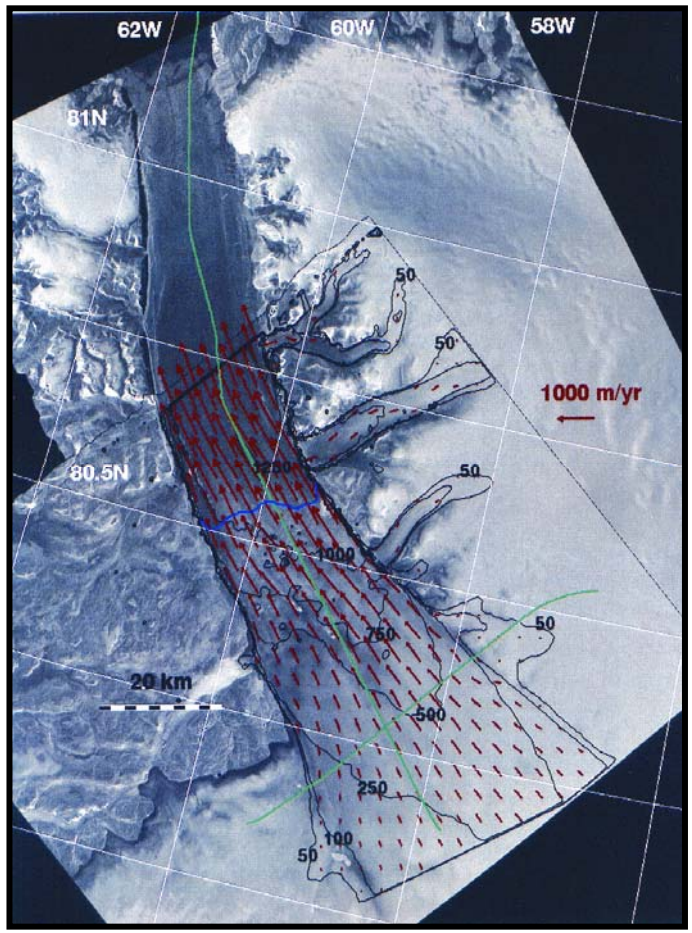
Data and Data Products



Radar data showing a cross-section of the ice sheet.

Model of glacier structure and movement.



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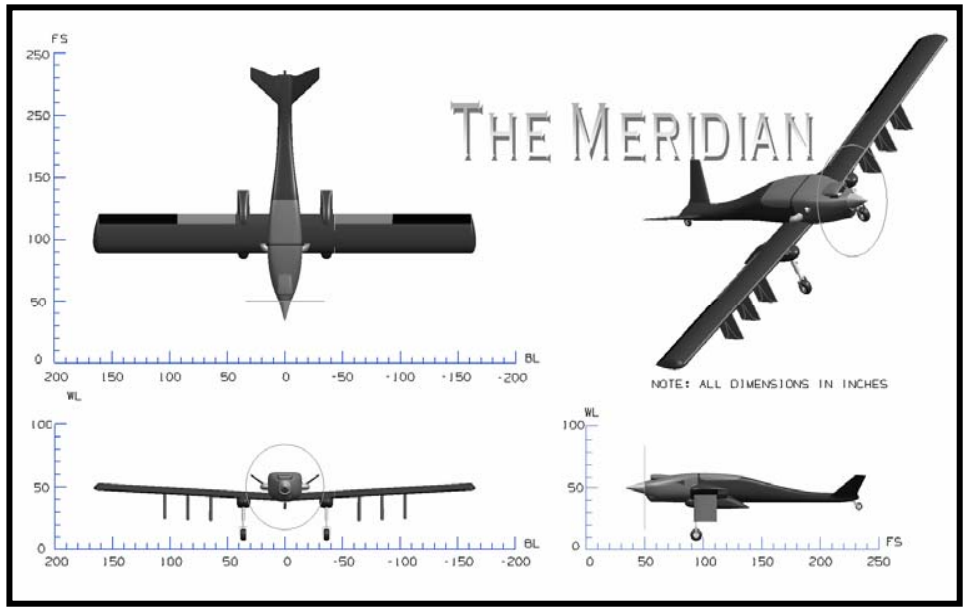
Example of Science-Driven Technology Development

- Aircraft summary:
  - W_{TO} = 491 kg (1,083 lbs)
  - W_E = 280 kg (618 lbs)
  - W_F = 134 kg (295 lbs)
  - W_{PL} = 75 kg (165 lbs)
  - Wingspan = 8 m (26.4 ft)
  - Length = 5 m (17 ft)
  - Range = 1,750 km (950 m)
  - Endurance = 13 hours

- Critical design requirements:
  - Payload integration (antenna size)
  - Takeoff / landing distance
  - Size limitations
    - Shipping
    - Hangar size
  - Fuel type
  - Cold weather requirements (anti-icing)

Current UAV Design Concept



Videoconference Facilities

- KU: Polycom VSX 8000
  - Capable of linking 16 sites simultaneously
  - Depending on configuration of remote sites, image of speaker and/or presentation content visible to participants
  - Presentations are recorded and archived on CReSIS website
  - CI-TEAM members have access
- Uses:
  - Presentations
  - Design reviews
  - Courses
  - Collaboration on projects, proposals, etc.

Videoconference Highlights

- CReSIS all-hands presentations
  - Presenters: CReSIS students and faculty
  - Speakers and presentations:
    - Katy Farness, OSU, “Improvement of Digital Elevation Model of Greenland Ice by Using ICESat Satellite Laser Altimetry Data”
    - Nelson Brown and Tiaotiao Xie, “IREP Australia Trip”
- Guest seminars
  - Presenters: visiting faculty, distinguished guests
  - Speakers and presentations:
    - Gordon Oswald, U. of Maine, “Radar Processing, Echo Interpretation, and Basal Classification”
    - Paul Rosen, NASA JPL, “Radar Interferometry, Science, and Missions”
    - Robin Bell, Lamont-Doherty Observatory, Columbia U., “East Antarctica: An Ice Sheet Controlled by Lakes and Mountains”

Courses Offered by Videoconference

(available to all CReSIS partners)

Fall 2006:

- Teaching College-Level Science and Engineering
- Principles of Microwave Remote Sensing

Spring 2007:

- Ice and Climate
- InSAR and Applications

Future courses:

- Polar Science Related to Climate Change
- Advanced Glacier Dynamics
- Seismic Imaging of, and Beneath, Glaciers
- Holistic Ice Sheet Modeling
- Geophysical Signal Processing
- RF Circuit Design
- Business and Financial Issues of Climate Change
- Geophysics of Glaciers

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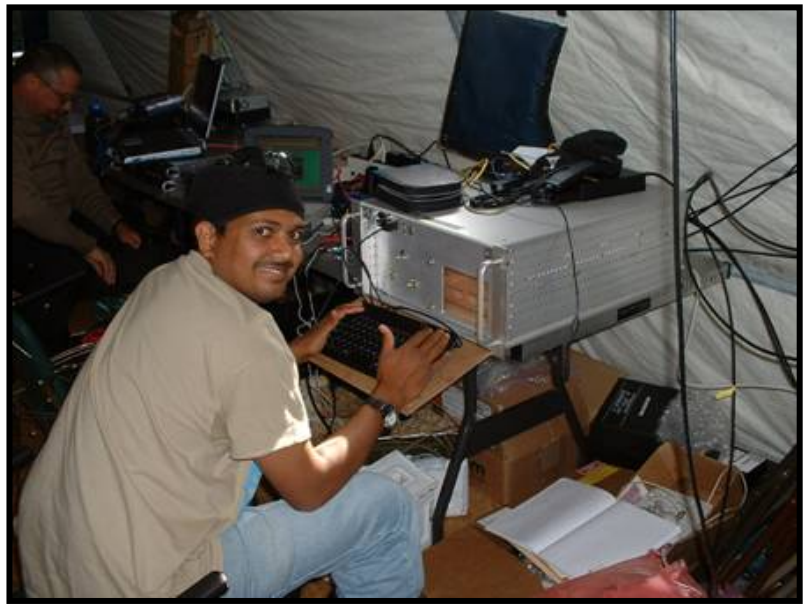
Graduate Research Assistantships

- Average work hours:
  - 20 hours per week during academic year
  - Full time during summer
- Compensation:
  - Biweekly salary and tuition
  - ~$26,000/year for first-year master's student



Undergraduate Research Assistantships

- Average work hours:
  - 20 hours per week during academic year
  - Full time during summer
- Compensation:
  - Hourly wage (~$10/hr)
  - ~$12,800/yr

International Research and Education Program (IREP)

- Study for two months at one of our international partner institutions
- Earn research credit hours
- CReSIS provides:
  - Travel costs
  - Room and board
  - Stipend
  - Tuition

cpom

Department of Space & Climate Physics, UCL
Centre for Polar Observation and Modelling
UCL

ace CRC
ANTARCTIC CLIMATE & ECOSYSTEMS
COOPERATIVE RESEARCH CENTRE

DTU

NSF NASA KTEC

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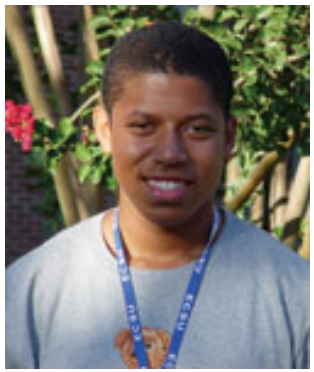
Research Experience for Undergraduates (REU)

- Two-month summer program at CReSIS partner institution
- Financial benefits:
  - $3600 stipend
  - On-campus room and board
  - Tuition for one hour of college credit
- Academic benefits:
  - Multidisciplinary research experience
  - One-to-one supervision by faculty
  - Tutorials and seminars
- Requirements:
  - Have completed freshman year of college
  - U.S. citizenship or permanent residency



Bryce Carmichael and Uniquiea Wade, ECSU students who attended KU as REU students in summer 2006.

To Apply or Find Out More

Contact :

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Or visit the CReSIS web site:

http://cresis.ku.edu

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National Science Foundation

WHERE DISCOVERIES BEGIN

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KANSAS TECHNOLOGY ENTERPRISE CORPORATION

KU THE UNIVERSITY OF KANSAS

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