

The Polar Cyberinfrastructure Program



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Outline

- What is **cyberinfrastructure** ?
- Previously funded polar cyberinfrastructure activities
- Programmatic goals and priorities
- Opportunities and discussion



'Cyberinfrastructure'

- No definition is present on the Oxford dictionary. This is confusing, at the minimum: *how can we talk about something if we do not know what it is ?*
- The term **cyberinfrastructure** was used in a press briefing on PDD-63 on May 22, 1998 with *Richard A. Clarke*, then national coordinator for security, infrastructure protection, and counter-terrorism, and *Jeffrey Hunker*, who had just been named director of the critical infrastructure assurance office.

*"One of the key conclusions of the President's commission that laid the intellectual framework for the President's announcement today was that while we certainly have a history of some real attacks, some very serious, to our **cyberinfrastructure**, the real threat lay in the future. And we can't say whether that's tomorrow or years hence. But we've been very successful as a country and as an economy in wiring together our critical infrastructures. This is a development that's taken place really over the last 10 or 15 years — the Internet, most obviously, but electric power, transportation systems, our banking and financial systems."*

Source: Wikipedia (accessed February 20th, 2013)



- The term **cyberinfrastructure** was then used by a United States National Science Foundation (NSF) blue-ribbon committee in 2003 in response to the question:

how can NSF, as the nation's premier agency funding basic research, remove existing barriers to the rapid evolution of high performance computing, making it truly usable by all the nation's scientists, engineers, scholars, and citizens?

The NSF use of the term focuses on the integrated assemblage of these information technologies with one another.



- Cyberinfrastructure (CI) refers to computing systems, software, data acquisition, storage, and retrieval systems, and visualization environments—all linked by high-speed networks and supported by expert professionals.
- The Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21). This initiative supports the building of a **comprehensive, integrated, secure** and **sustainable** cyberinfrastructure necessary to support **complex science and engineering research**, supporting the **development of a broad range of computational and data-enabled scientists and engineers**, and **assisting and encouraging their careers**.



For modern-day scientists and engineers, cyberinfrastructure can be thought in the same way that we, as citizens, think about physical infrastructures providing us electricity, water, transportation, etc

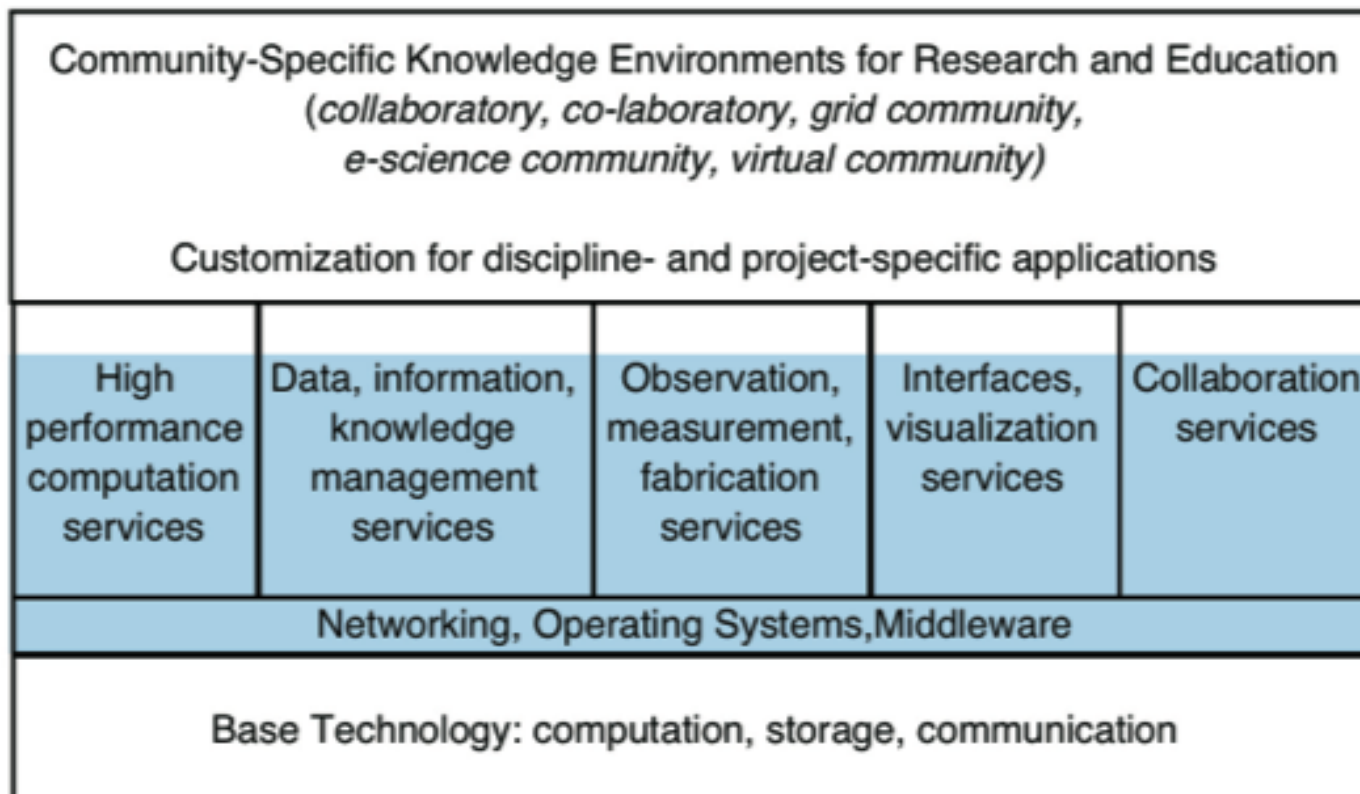


- Ubiquitous
- Accessible
- Reliable
- Transparent



- A new flavor of mixed science and technology professional is emerging. These individuals have expertise in a particular domain science area, as well as considerable expertise in computer science and mathematics.
- Also needed in this interdisciplinary mix are professionals who are trained to understand and address the human factors dimensions of working across disciplines, cultures, and institutions using technology-mediated collaborative tools.
- People are a key element





 = cyberinfrastructure: hardware, software, services, personnel, organizations

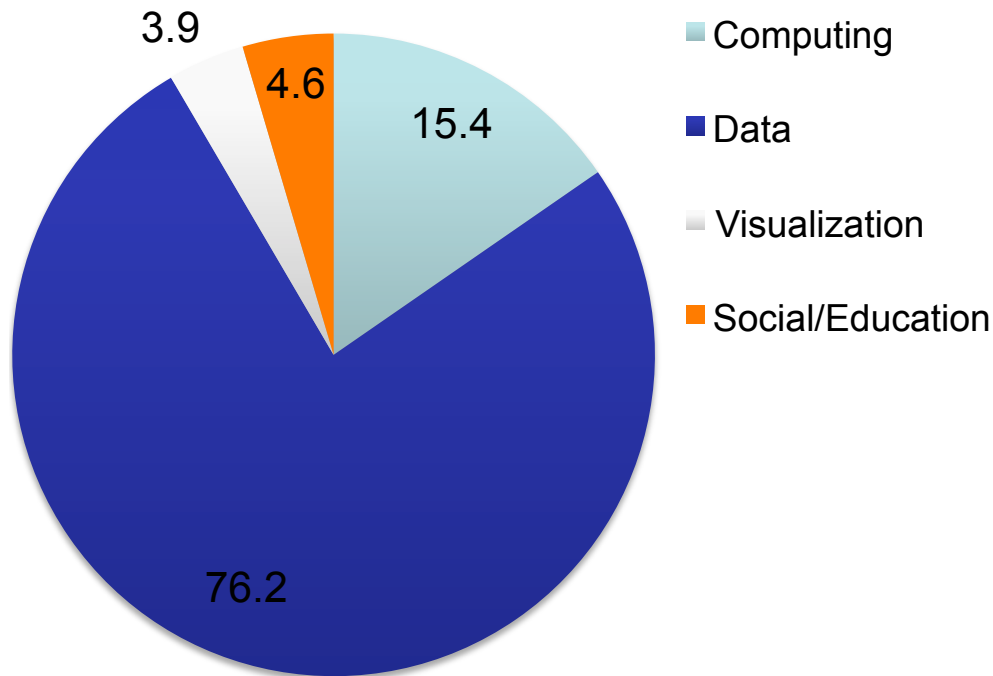
Source: Revolutionizing Science and Engineering Through Cyberinfrastructure,
 Report of the National Science Foundation Blue-Ribbon Advisory Panel on Cyberinfrastructure



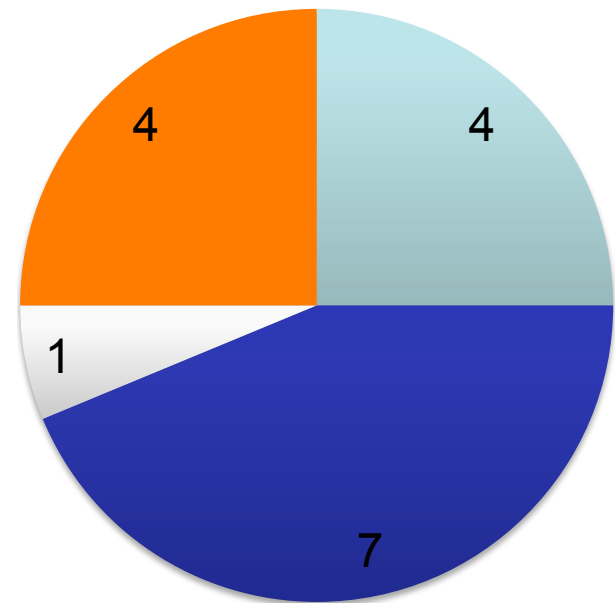
Examples of previously funded initiatives



Cumulative 2009 – 2013



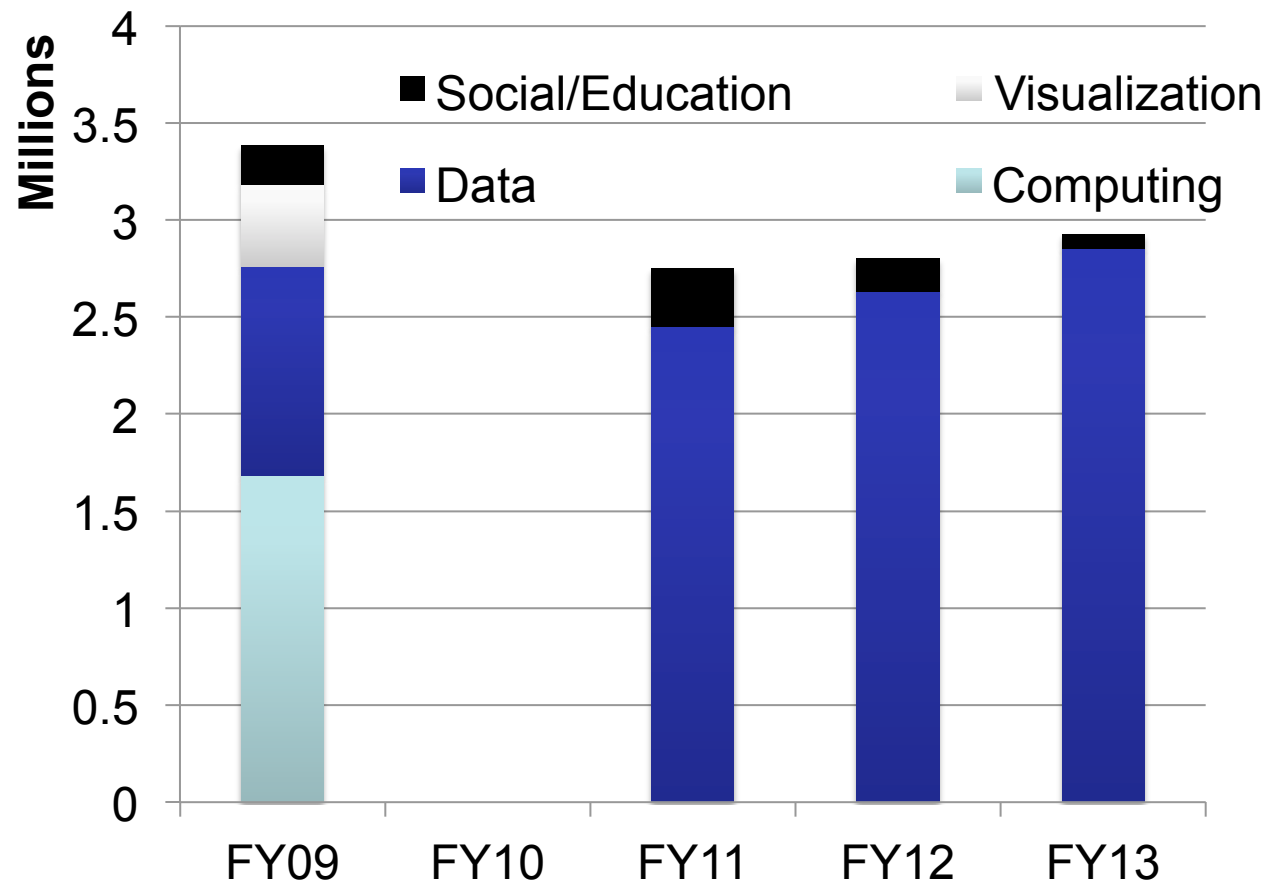
**FY 09 - 13
Awards (% of M\$)**



**FY 09 - 13
of awards**

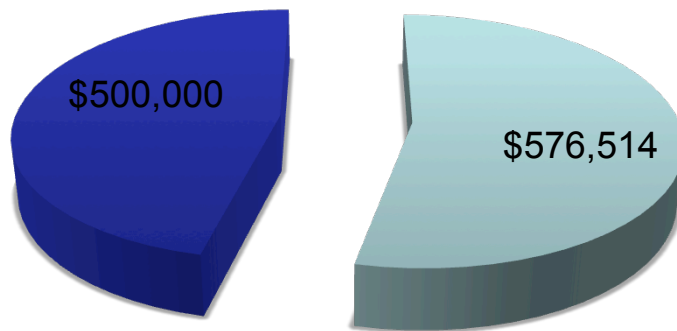


Cumulative 2009 – 2013 (cont'd)



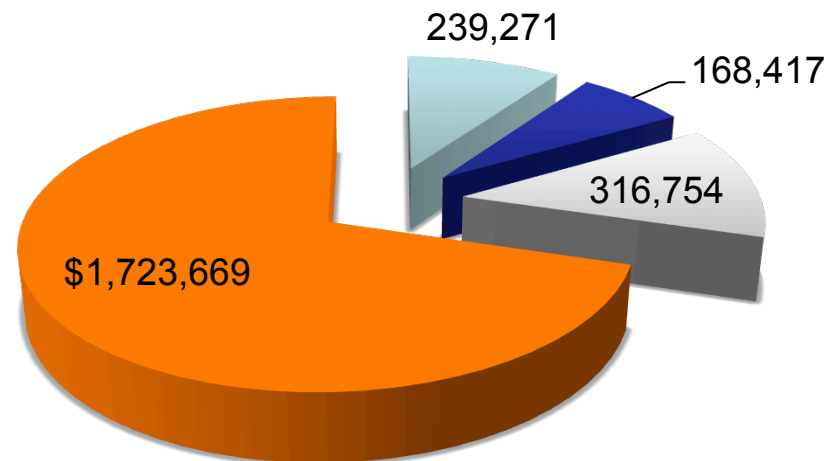
Number of 'Data' awards and budgets

FY 09



2 data awards in 2009
Total ~ 1.1 M\$

FY 11



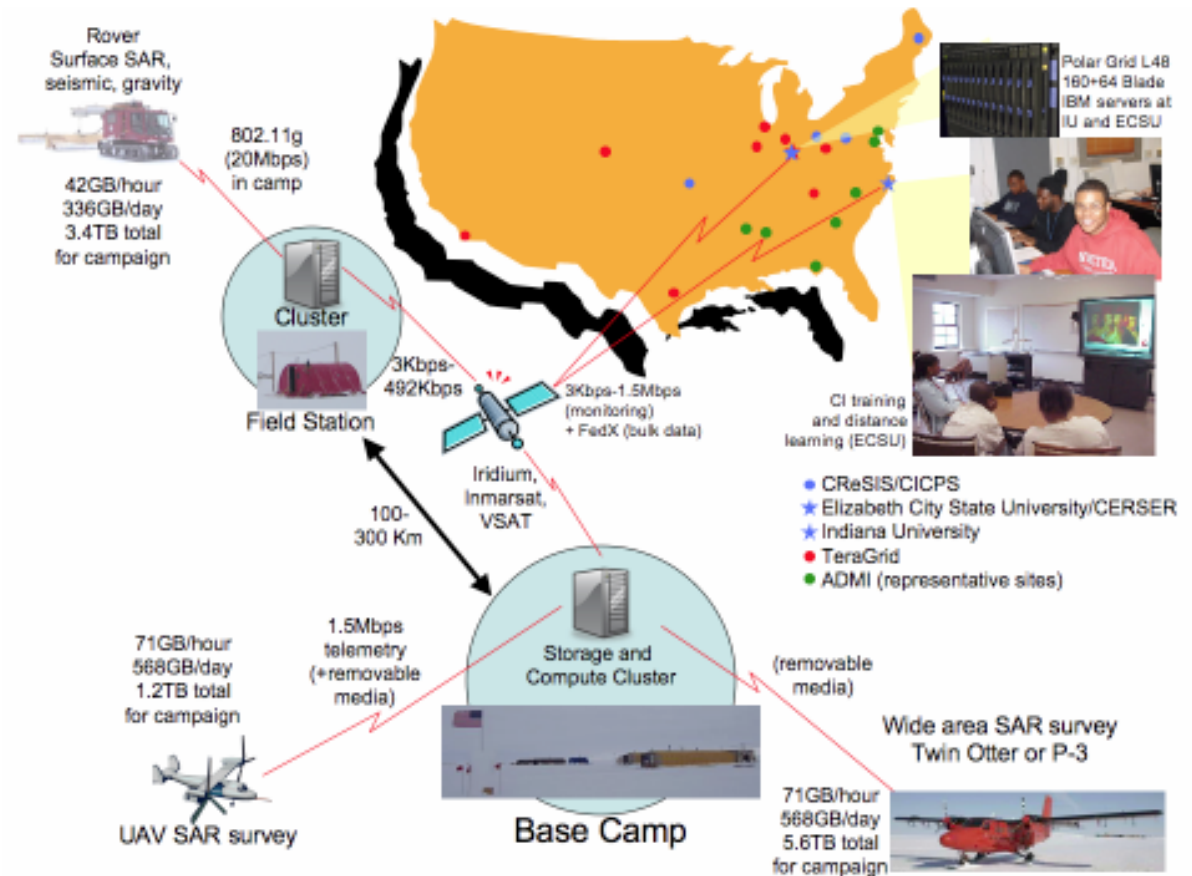
4 data awards in 2011
Total ~ 2.4 M\$





POLARGRID

Polar Grid was an NSF MRI funded partnership of Indiana University and Elizabeth City State University to acquire and deploy the computing infrastructure needed to investigate the urgent problems in glacial melting.





Welcome to the Advanced Cooperative Arctic Data and Information Service (ACADIS)

Data Services

- [Data Providers Guide](#)
- [Data Conversion Tools](#)
- [Data Management Plan Template](#)

Other Links

- [Presentations](#)
- [AON Related Links](#)
- [SEARCH Home Page](#)

The Advanced Cooperative Arctic Data and Information Service (ACADIS) is a joint effort by the National Snow and Ice Data Center (NSIDC), the University Corporation for Atmospheric Research (UCAR), UNIDATA, and the National Center for Atmospheric Research (NCAR) to provide data archival, preservation and access for all projects funded by NSF's Arctic Science Program (ARC). ACADIS builds on the CADIS project that supported the Arctic Observing Network (AON). This portal will continue to be a gateway for AON data and is being expanded to include all NSF ARC data.

ACADIS provides a [template](#) to assist investigators in developing the Data Management Plan required for all NSF proposals.

To contribute your data:

- If you are an OPP-ARC Investigator, please [contribute](#) your data and metadata.
- If you are another Arctic investigator who would like to contribute data not funded by ARC, please contact support@aoncadis.org

Search for Data



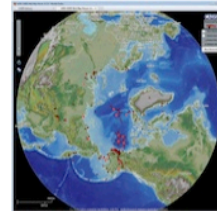
Search for data using variable, principal investigator, discipline, temporal/spatial coverage, and other parameters.

View Projects Geographically

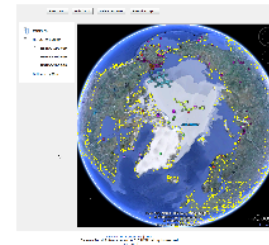
Each of the options below represent a different way to view the project locations (or the location of a component of each project). Click on an icon to view that option in a new window.



MapServer shows... Selected NSF-funded Arctic projects with the option of displaying alongside other field projects supported by NCAR.



The ACADIS Web Map Viewer shows... The locations of Arctic Observing Network projects with the option of showing other NSF funded work through ARMAP. We suggest you **START HERE** unless you prefer a full GIS or Google Earth interface.



Google Earth shows... NSF-funded Arctic projects hosted on or associated with ACADIS, with the option of layering KML-format data files such as sea ice extent.





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Welcome to the Barrow Area Information Database (BAID)

BAID is a suite of online, interactive maps and services that support Arctic science with a special focus on the research hubs of Barrow, Atkasuk and Ivotuk on the North Slope of Alaska.

The BAID database currently includes the locations of over 9,600 research plots and instrument locations. This ongoing effort incorporates both new research locations and sampling sites dating back to the 1940s.

2011 Sea ice imagery available from the [Barrow SAR Viewer](#)

[Learn more](#) about contributing your research locations. Don't hesitate to [contact us](#) with questions.

Data Viewers



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[Download Google Earth](#)



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Use the BAID Internet Map Server (BAID-IMS) or BAID in Google Earth to navigate to areas of interest and explore or query information about field-based scientific research. Current and historic research sites are shown as points with links to details about project investigators, discipline, funding program, year, related web sites, site photos and other information. In addition, BAID-IMS includes 150+ ancillary data layers including ground control points, land ownership, vegetation maps, topographic data and local infrastructure. Users can print or export maps for presentations and export tabular information.

Which one should I use?

Find out which application best suits your needs [here](#).

BAID research sites are also available via [Open Geospatial Consortium web services and REST](#).

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Space Science & Engineering Center, UW-Madison



Antarctic Meteorological Research Center & Automatic Weather Stations Project



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The Antarctic Meteorological Research Center (AMRC) and Automatic Weather Station (AWS) program are United States Antarctic Program (USAP) sister projects focusing on observational Antarctic meteorological research, providing real-time and archived meteorological data and observations, and supporting a network of automatic weather stations in Antarctica.

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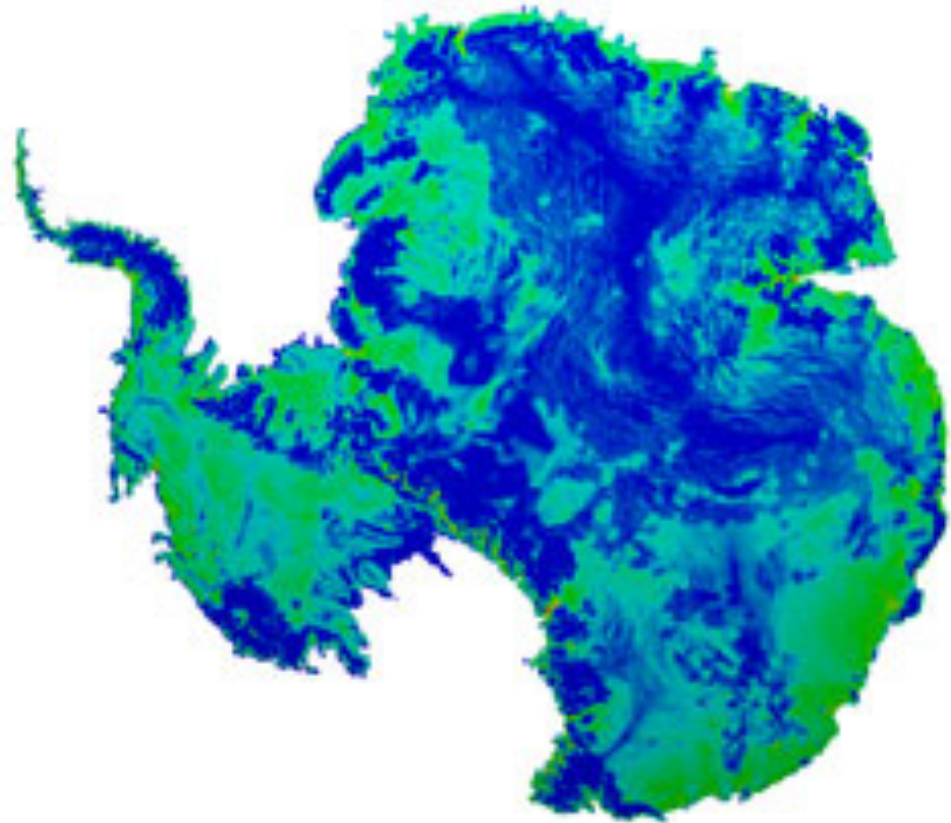
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Last updated: 2010-09-16 by [SSEC Webmaster](#)



Dynamics of Ice Sheets: Advanced Simulation Models, Large-Scale Data Inversion, and Quantification of in Sea Level Rise Projections



Credit: Tobin Isaac and Georg Stadler, Institute for Computational Science & Engineering (ICES); Omar Ghattas, ICES, Jackson School of Geosciences, and Department of Mechanical Engineering; The University of Texas at Austin



Current programmatic activities

- Collect information from the scientific and engineering polar community on past and current ongoing polar/cyber projects and activities
- Identify areas of low risk/high return investments
- Favor the dialogue between the polar and cyber communities for expanding funding resources and opportunities
- Support the development of cyberinfrastructure cross-activities within the OPP programs and solicitations
- Develop a strategic plan for supporting polar cyberinfrastructure activities and guarantee the growth and continuity of the program
- Establish channels of communication with private companies



Areas of investment (not exhaustive)

- Data storage, management, distribution, discoverability, integration and accessibility
- Data mining and visualization
- Computing and information services
- Advanced data acquisition, intelligent sensors, comprehensive sensor network
- Efficient connection between laboratories, data, computers, and people
- Invest in education activities and early career scientists for supporting the creation of future workforce trained across the borders of polar and cyber activities
- Support minority and underrepresented groups
- Establish international collaborations



Opportunities

- Submit proposals to the Arctic and Antarctic solicitations (Antarctic Science deadline is April 14, 2013, Arctic October annually)
- Submit unsolicited proposals focusing on Polar Cyberinfrastructure
- Submit proposals for community network building (e.g., EarthCube RCN, RCN SEES) or workshops
- Early-concept Grants for Exploratory Research (EAGER)
- EarthCube solicitations (March 26 or May 22)
- Division of Advanced Cyberinfrastructure (DACI) – DIBBS, SSE, SSII
- First Workshop on Polar Cyberinfrastructure – September 2013 – Minneapolis



Questions

