

WHO WE ARE

The Polar Research Coordination Network aims to connect the Polar Science, Data and High-Performance and Distributed Computing (HPDC) communities to enable deeper penetration of computing methods and cyberinfrastructure into the polar sciences.



SHANTENU JHA, Lead PI
Associate Professor
Computer Engineering
Rutgers University



HEATHER LYNCH, co-PI
Assistant Professor
Ecology and Evolution
Stony Brook University



JAREK NABRZYSKI, co-PI
Director, Ctr for Research Computing
Associate Professor
Computer Science and Engineering
University of Notre Dame



ALLEN POPE, co-PI
Research Scientist
National Snow & Ice Data Center



ASA RENNERMALM
Associate Professor, Geography
Arctic Hydroclimatology Research Lab
Rutgers University



JANE WYNGAARD
Postdoctoral Scholar
NASA Jet Propulsion Laboratory

NSF EarthCube Research Coordination Network for High-Performance Distributed Computing in the Polar Sciences

polar-computing.org

Polar HPC Hackathon Open Closing Session

16:15 - 18:15 | Tues, July 19 | Flagler

Four teams of Polar scientists and scientific computing experts will take on the challenge and work together to tackle important and interesting problems. Join us for the closing session for project highlights and summaries!

Cover Image:
Courtesy Ted Scambos, NSIDC

Inside Background Image:
NDSIC Courtesy Alice O'Connor

FIND OUT MORE

polar-computing.org

polar-computing@googlegroups.com

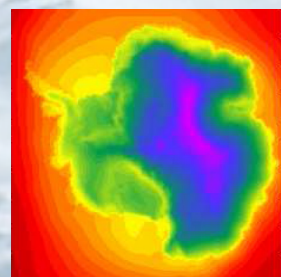
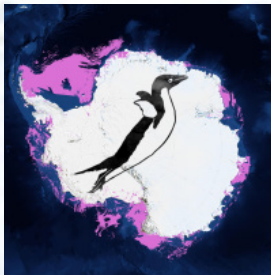
@PolarComputing

The Polar Computing Research Coordination Network (<http://polar-computing.org>) in collaboration with XSEDE are organizing a 3 day high-performance computing hackathon in the Polar sciences. The objective of this hackathon is to bring together several Polar science teams, with HPC, XSEDE and scientific computing experts to collectively solve problems and address barriers to the uptake of HPC/XSEDE resources.

The four teams will work on the following problems:

AerosolDelta

Many of Earth's glaciers have been losing mass at an alarming rate in the past few decades. Both anthropogenic and natural aerosols deposited on snow and ice can darken reflective surfaces, increase solar absorption and subsequently enhance snow and ice melt rates. This project seeks to map aerosols over Earth's cryosphere using the global land ice identification mask and monthly mean MERRA-2 aerosol data. Ideally, the project will be completed for all of Earth, mapping aerosol concentrations, with seasonal and annual totals from 1980-present. This project will lead to the development of a Aerosols-to-glacier geo mapping and visualisation workflow.



ParallelOBLIMAP

Ice caps are part of the climate system and interact with the atmosphere and ocean via complex feedback mechanisms. To simulate this coupled system, General Circulation Models (GCM's) are coupled with ice dynamical models. A custom-built package (OBLIMAP) has been designed for

this purpose and after its first open source release (see <http://www.geosci-model-dev.net/3/13/2010/gmd-3-13-2010.html>). OBLIMAP 2.0 (see <http://www.geosci-model-dev-discuss.net/gmd-2016-124/>) affords a dramatic performance gain that allows for fast embedded on-line coupling of an ice model within a GCM. This project aims to parallelize the scanning phase in OBLIMAP, a Fortran based mapping that projects and interpolates parameter fields between the geographical based coordinate system of a General Circulation Model and a rectangular based Ice Model. This will enable the rapid coupling of ice models with General Circulation Models (GCM) using adaptive grids.

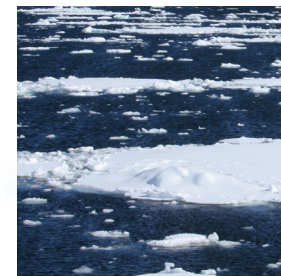
3DSeal

Weddell seals are ice seals, meaning they live on, among, and under the pack ice of Antarctica year-round. This project aims to understand the distribution of Weddell seals on the Antarctic Peninsula and their movements within and among years by tracking them with opportunistic photography sourced from researchers and tourists. This project will kickstart the development of a Weddell Seal image catalog and will develop the tools for computerized automation of the process to match a new photo to the image catalog. While photo catalogs have proven highly successful for other species, most notably the humpback whale, Weddell seals are difficult to photograph in a standardized way, and individual spot patterns can be distorted and degraded by the posture of the animal, folds in the skin, and even moisture. For this reason, creation of a Weddell seal catalog is likely to involve new techniques not currently used in the pattern matching community but well developed in visual computing and/or text recognition.



Sealce

There is growing consensus that the Polar science community needs a set of open source and accessible image processing tools to carry out segmentation and classification of remotely sensed imagery, without which current workflows for imagery analysis cannot be adequately parallelized. Applications include the identification of melt ponds and sea ice features over large spatial scales (e.g., Arctic- or Antarctic-wide). Many open source visual computing tools currently exist, but they have not been tailored for use by the larger polar science community or integrated into existing workflows that currently rely on highly specialized commercial software. The aim of this project is to develop an open source polar imagery toolchain to, as an initial use case, derive sea ice concentration, floe size, and melt pond distributions using high spatial resolution sea ice images. Manually delineating sea ice and melt ponds is time-consuming and labor-intensive. We propose to develop a high-performance version of existing object-based image classification algorithms as a module. This will enable interoperability at the data exchange, Web services level, as well as "knowledge" and product level.



Join us for the closing session of the Polar HPC Hackathon for highlights and summaries from the teams that worked on four important and interesting problems!

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