

# Bringing Existing Global Earth and Environmental Cyberinfrastructures into a Common Framework.

Cliff Jacobs<sup>1</sup>, Lesley Wyborn<sup>2</sup>, Roger Proctor<sup>3</sup>, Ben Evans<sup>4</sup>

<sup>1</sup>National Science Foundation, USA, [cjacobs@nsf.gov](mailto:cjacobs@nsf.gov)

<sup>2</sup>Geoscience Australia, Canberra, Australia, [lesley.wyborn@ga.gov.au](mailto:lesley.wyborn@ga.gov.au)

<sup>3</sup> Integrated Marine Observing System, Hobart, Australia, [roger.proctor@utas.edu.au](mailto:roger.proctor@utas.edu.au)

<sup>4</sup>National Computational Infrastructure Facility, Canberra, Australia, [ben.evans@anu.edu.au](mailto:ben.evans@anu.edu.au)

## GENERAL INFORMATION

This will be a one-day workshop convened by the NSF, Geoscience Australia and IMOS. There are no constraints on the number of attendees and the format will be a mixture of presentations, breakout sessions and plenary sessions.

## DESCRIPTION

The NSF EarthCube project is a bold new initiative to develop an framework to understand and predict the Earth System from the center of the sun to the center of the earth. As volumes of data relevant to this vision grow exponentially, an ever-increasing array of cyberinfrastructure solutions have been developed to analyse and process these data. However, although outputs from these initiatives have been of great value to the communities that they serve, the capacity to combine these initiatives to enable the understanding and predicting of the Earth as a single complex system is yet to be fully realised. There is just insufficient community dialog and sharing of ideas, practices, data, etc across the various disciplines within the geosciences. In some cases this has resulted in creating many similar cyber-technology enabled solutions to solve similar problems. Without an overall guiding framework to promote convergence across these initiatives, the diversity of approaches becomes a barrier to the holistic study of the Earth system. It also prevents the earth sciences from being able to use the new generation of emerging technologies to transform the geosciences and undertake novel research studies to generate new theories at scales previously inconceivable.

This workshop is therefore about exploring ways of bringing existing global earth and environmental cyberinfrastructures into a common framework to transform these sciences to be able to undertake research into the earth as a system that has not been previously possible.

## OUTLINE

1. **The Big Picture:** A presentation on NSF EarthCube project and how an overall framework is being developed to promote convergence across the ever increasing number of portals, virtual laboratories, infrastructures and initiatives that are being developed to investigate our earth and our environment. *45 minutes*
2. **Science Drivers:** A series of short presentations on the science drivers: what will be the next generation of science that can be enabled through a greater capacity to utilise the current tsunami of CPU's to harness the vast amounts of data being gathered daily to support Earth and Environmental Science research. *30 minutes*
3. **Technology breakout session:** Members of various national and international infrastructure projects will be grouped around topics such as governance, data access and discovery, workflows and architectures to discuss commonalities and identify key challenges to achieving a capability to enable a holistic approach to Earth System Science. *60 minutes*
4. **Plenary session** to explore commonalities across all groups and develop a common technology framework. This session will also assess the common barriers and develop strategies to overcome them. *60 minutes*.
5. **Reality Check:** Discussion on whether the science drivers will be addressed through the proposed technology framework. *30 minutes*
6. **Next Steps:** Summary of workshop and development of plans to take the process further forward.

## WHO SHOULD ATTEND

This workshop is open to anyone who has an interest in understanding and predicting the earth as a system. It is open to those who are actively working on various earth and environmental science cyberinfrastructures that are trying to achieve this aim. The workshop is also open to those scientists that may not be directly

interested in the underpinning technologies, but have an interest in enabling transformative research and education in Earth and Space System Science.

## WHAT TO BRING

There are no special requirements for this workshop. Bring yourself, your enthusiasm and your ability to undertake big picture thinking. Leave behind any doubts or inhibitions that a global framework to understand and predict the earth as a system from the centre of the sun to the centre of the earth cannot be achieved.

## ABOUT THE PRESENTERS

**Cliff Jacobs** is a senior advisor for the Geosciences Directorate at the National Science Foundation. His career spans the private sector and government service and has engaged him in basic and applied research, training and scientific program management. For more than 25 years he served as the program officer for the National Center for Atmospheric Research where he oversaw research activities and the provision of facilities of the university community, including a broad range of cyber infrastructure activities.

**Lesley Wyborn** is a granite specialist by training and joined the then BMR in 1972. She has held a variety of positions as the organization changed to AGSO and to Geoscience Australia. She has been involved in eResearch projects since 2000 and with CSIRO was one of the founders of the Solid Earth and Environmental Grid (SEE Grid – <http://www.seegrid.csiro.au> ). With Robert Woodcock and other CSIRO staff, she was part of NCRIS/SuperScience projects such as AuScope Grid, SISS and the NeCTAR Virtual Geophysics Laboratory.

**Roger Proctor** has been the Director of the eMarine Information Infrastructure facility of the Australian Integrated Marine Observing System (IMOS) since 2008. IMOS is a \$100m Australian Government Research Infrastructure project. In this role he has responsibility for coordinating the discovery of, and access to, the IMOS data streams, and in developing the broader Australian Ocean Data Network. In this capacity he is a member of the US-IOOC Data Management and Communications Steering Team, the Board of the Australian Ocean Data Centre Joint Facility, the NeCTAR Board, and the University of Tasmania eResearch Steering Committee. Prior to this appointment he was a senior researcher with the UK Natural Environment Research Council, at the Proudman Oceanographic Laboratory (POL) in Liverpool (now National Oceanography Centre, Liverpool), where he specialized in developing coastal ocean modeling and observation systems.

**Ben Evans** is the Associate Director of NCI with a portfolio in Research Engagement and Initiatives focused on increased potential of the NCI capability and research outcomes. Ben has been part of a core collaborative team with GA and CSIRO to review data in the geosciences and provide high performance methods and develop and exploit new environments for fast analysis and efficient data management.