The Climate and Weather Science Laboratory, a NeCTAR virtual laboratory

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OVERVIEW
The Australian Bureau of Meteorology in partnership with the Centre for Australian Weather and Climate Research (CAWCR), CSIRO Marine and Atmosphere Research (CMAR) and the Australian National University's National Computational Infrastructure (ANU/NCI), and in strong collaboration with the ARC Centre of Excellence in Climate System Science, are developing a NeCTAR virtual laboratory called “the Climate and Weather Science Laboratory” at the ANU/NCI Petascale HPC facility.

The virtual laboratory is a new community project to establish an integrated national facility for research in climate and weather sciences that complements and leverages the Super Science investments in computational and storage infrastructure at the ANU/NCI facility.

The Climate and Weather Science Laboratory will leverage and integrate existing infrastructure to support the Australian Community Climate Earth-System Simulator (ACCESS) that allows scientists to analyze and simulate climate and weather phenomena. The laboratory will provide an integrated facility from model development to the provision and assessment of climate and weather simulations, while making data outputs readily available.

OBJECTIVES AND BENEFITS
The four objectives of the virtual laboratory are to provide the community with:

- A facility for climate and weather prediction in uncoupled and coupled ACCESS model development and simulation,
- A facility for scientific workflows in climate and weather model analysis,
- A collaborative content management and data access service with support for a geospatial web-based graphics capability in support of climate and weather research, and
- A data library management and communication service to integrate and interoperate with national and international climate and weather data catalogues and repositories.

The benefits of the virtual laboratory are:

- The preparation and run of coupled and uncoupled model experiments within a framework designed with reproducibility, ease of use, support, and sharing of code and experiments.
- A scientific workflow to easily run analyses, share and reproduce analyses, help enforce a controlled vocabulary, and create metadata for traceability and reproducibility while reducing the need for specialist skills.
- Established mechanisms for users to align with managed approaches in simulation, data analysis, and data management to further improve research collaborations and applications.
- Improved data discovery and access to climate and weather repositories through community standard protocols and services.

PRESENTATION
The presentation of the NeCTAR virtual laboratory is to describe the research infrastructure building activity for the Australian climate and weather science community and provide the latest information on the implementation plan and schedule. We invite the eResearch and climate and weather community's feedback.

The 20-minute presentation will describe the virtual laboratory for climate and weather research and identify the key benefits, resources, technologies and frameworks utilized in the laboratory. We'll describe the implementation plan and schedule, and deployment of services for the laboratory and community.

ABOUT THE AUTHOR(S)
Mr. Tim F. Pugh is member of Centre for Australian Weather and Climate Research (CAWCR), a partnership between CSIRO and the Australian Bureau of Meteorology. Tim is leading the project to build an integrated climate and weather science laboratory for the simulation and analysis of earth modelling systems.

Dr. Ben Evans is the Associate Director of Research, Initiatives and Engagement at the ANU Supercomputer Facility at the Australian National University. He leads projects in HPC and Data-Intensive analysis, working with the partners of NCI and the research sector.