

NITheCS Colloquium

Monday, 25 July 2022, 16h00 – 17h00 SAST

Prof Francois Engelbrecht (Global Change Institute, University of the Witwatersrand)

‘The dawn of exascale computing in the climate sciences’

This event is aligned with the topics and themes of the International Year of Basic Sciences for Sustainable Development

ABSTRACT



Dynamic climate models have become the main tools to generate detailed projections of future climate change, either globally when applied as global climate models (GCMs), or regionally when applied over limited areas of interest as regional climate models (RCMs). Very similar models are also applied for short-range numerical weather prediction (NWP). Both fields (NWP and dynamic climate modelling) are currently responding to new computing architectures that make feasible the integration of models using hundreds of thousands of cores, or even a million cores, for single ultra high-resolution simulations.

In this talk, Prof Francois Engelbrecht will talk about this new frontier in climate modelling: convective-scale or cloud-resolving modelling on massively parallel computing systems. He will also suggest methodologies through which African-based scientists working in the computational climate sciences can undertake competitive research on smaller (yet still powerful) computational resources such as the Lengau cluster of the CHPC. He will highlight some currently running climate modelling experiments at the GCI, undertaken as part of the WITS Global Change Institute’s research programme of building an African-based Earth System Model.

BIOGRAPHY

Francois Engelbrecht is Distinguished Professor of Climatology and Director of the Global Change Institute at the University of the Witwatersrand. He specialises in climate model development and the simulation of climate variability and change in Africa and the Southern Hemisphere.

Francois has established extensive regional climate modelling capabilities in South Africa, and leads the development of an African-based Earth System Model. He served as an invited Lead Author of the IPCC’s *Special Report on Global*

Warming of 1.5 °C (2018) as well as of the *Assessment Report Six Working Group I* report (2021).

Francois is a Scientific Steering Group Member of CLIVAR of the World Climate Research Programme (WCRP) and a member of the Working Group on Numerical Experimentation of WCRP. He also co-chairs the Joint Expert Team on Earth System Implementation of the World Meteorological Organisation.

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