

CLIMATE CHANGE RESEARCH CENTRE
ANNUAL REPORT

2020



www.ccrc.unsw.edu.au

Climate Change
Research Centre

OUR MISSION

THE CCRC ACTIVELY ENGAGES IN WORLD-CLASS RESEARCH FOCUSED ON CLIMATE SYSTEM SCIENCE TO HELP BETTER UNDERSTAND, PREDICT, AND ADAPT TO CLIMATE VARIABILITY AND CLIMATE CHANGE. WE ALSO EDUCATE UNSW STUDENTS, SUPPORT STEM, ENGAGE IN PUBLIC OUTREACH, AND ADVISE THE GOVERNMENT AND PRIVATE SECTORS ON CLIMATE-RELATED SCIENCE AND THE CAUSES AND CONSEQUENCES OF GLOBAL WARMING. WE ARE THE FOUNDATION FOR THE ARC CENTRE OF EXCELLENCE FOR CLIMATE EXTREMES.

RESEARCH HIGHLIGHTS

- The range of Earth's climate sensitivity refined to 2.3–4.7 K using multiple lines of evidence: 10.1029/2019RG000678
- The first conserving global gridded estimates of land surface water and energy budgets: 10.1175/JCLI-D-19-0036.1
- Commonalities between marine heatwave characteristics and seasonality: 10.1038/s41598-020-75445-3
- The first analysis of compound events potentially causing floods, droughts, and fires: 10.1038/s41467-020-19639-3
- A systematic examination of regional and global observed heatwave trends: 10.1038/s41467-020-16970-7
- Characteristics and biases in Indian Ocean Dipole and ENSO in CMIP5/6 models: 10.1038/s41598-020-68268-9
- Intercomparison of precipitation over land from in situ, space-based, reanalysis products: 10.1088/1748-9326/ab79e2
- Mid-level clouds over the Sahara in a convection-permitting regional model: 10.1007/s00382-020-05188-4
- A future warmer and dryer southwest and southeast Australia (CORDEX): 10.1007/s00382-020-05459-0
- CORDEX, the largest regional climate projection ensemble for the Australasia region: 10.1007/s00382-020-05459-0
- Southeast Australian droughts caused by reduced moisture supply from ocean: 10.1029/2020GL090238 Climate and

AWARDS & HONOURS

- Alex Sen Gupta, Lisa Alexander, Matt England: 2020 Clarivate highly cited authors
- John Church: 2020 American Geophysical Union (AGU) Fellow
- Matt England: Australian Meteorological Oceanographic Society (AMOS) Moreton Medal
- Lisa Alexander: Australian Meteorological Oceanographic Society (AMOS) Fellow
- Melissa Hart: UNSW Vice Chancellors Award for Higher Degree Research Leadership
- Katrin Meissner: 2020 Fellow of the Royal Society of New South Wales
- Multiple student and postdoctoral awards:
• Jiawei Bao, Ariaan Purich and Rishav Goyal.

RESEARCH OUTPUTS

Two books, five book sections, 146 journal articles, and 10 conference papers:

- 40% in top 10% most cited, 85% in SJR's top 10%
- 13 publications with student first authors
- 4 publications in *Nature*, 1 in *Science*
- 15 publications in *Nature* family journals

NATIONAL & INTERNATIONAL LEADERSHIP

OPEN LETTERS

"There is no strong, resilient Australia without deep cuts in greenhouse gas emissions".
Feb 2020, led by CCRC academics Alex Sen Gupta and Katrin Meissner

"An open letter on Australian bushfires and climate: Urgent need for deep cuts in carbon emissions".
Jan 2020, Laureate's Open Letter led by CCRC's Steven Sherwood.

IPCC LEADERSHIP

- **Jason Evans:** Lead author, Intergovernmental Panel on Climate Change (IPCC) Special Report on Climate Change & Land Desertification Chapter
- **Alejandro Di Luca:** Lead author, IPCC 6th Assessment Report on 'Weather & climate extreme events in a changing climate'

INTERNATIONAL LEADERSHIP

- **Gab Abramowitz:** Chair, Global Land Atmosphere System Study, World Research Climate Programme (WCRP)
- **Lisa Alexander:** Chair, World Meteorological Organization (WMO); Expert Team Sector-specific Climate Indices; Executive Committee, International Association of Meteorology and Atmospheric Sciences (IAMAS); Executive Committee, International Union of Geodesy; Fellow Australian Meteorological and Oceanographic Society (AMOS); World Health Organisation (WHO) - World Meteorological Organisation (WMO) Working Group on Occupational Health
- **John Church:** Chair, Transient Tracer-based Investigation of Circulation and Thermal Ocean Change (TICTOC) Advisory Committee
- **Martin De Kauwe:** Co-chair of the leadership committee for the Community Atmosphere Biosphere Land Exchange; Scientific Steering Committee for the Amazon Free-Air CO₂ Enrichment experiment
- **Matthew England:** Chair, Advisory Board, European Southern Ocean Carbon and Heat Impact on Climate Project (SO-CHIC); Chair, Advisory Panel, Securing Multidisciplinary Understanding & Prediction of Hiatus & Surge; Coordinator, International Universities Climate Alliance (IUCA)
- **Jason Evans:** WCRP Coordinated Regional Climate Downscaling Experiment (CORDEX) Science Advisory Team
- **Donna Green:** Expert Advisory for Governing Plastic, Institute for Advanced Studies, Switzerland; APRU Co-chair, Global Health Education and Technology Group
- **Melissa Hart:** Board of the International Association for Urban Climate
- **Katrin Meissner:** Committee of Experts for the German Excellence Strategy; Executive Committee and Scientific Committee for Past Global Changes (PAGES); Steering Committee, Cycles of Sea-Ice Dynamics in the Earth System Working Group (C-SIDE) PAGES

- **Laurie Menviel:** Chair of the QUIGS-IFG virtual workshop on Glacial terminations; Steering Committee, Quaternary Interglacials Working Group (QUIGS) PAGES; Steering Committee, INQUA focus group on Glacial terminations 5 to 0
- **Sarah Perkins-Kirkpatrick:** Co-lead, WMO Commission for Climatology Expert team on Communication and Outreach; Vice Chair, Early Career Scientist Committee, International Association for Meteorological and Atmospheric Sciences
- **Andy Pitman:** American Geophysical Union (AGU) International Committee for International Participation
- **Alex Sen Gupta:** Climate and Ocean Variability Predictability and Change (CLIVAR), Northwestern Pacific Ocean Circulation and Climate Experiment (NPOCE) Committee
- **Steve Sherwood:** Steering Committee, WCRP Grand Challenge on Climate Sensitivity; Co-chair, WCRP Lighthouse on Safe Landing Climates
- **Andrea Taschetto:** CLIVAR Tropical Basin Interactions Working Group

NATIONAL LEADERSHIP

- **Jason Evans:** Technical Advisory Group, Climate Measurement Standards Initiative (CMSI); Co-ordinator, WCRP CORDEX Australasia
- **Stephen Gray:** Member, ARC Major Investments Working Group
- **Donna Green:** Climate and Health Alliance Research and Policy Committee
- **Melissa Hart:** Chair, Australian Meteorological and Oceanographic Society PhD Thesis Prize Committee; Judge, Eureka prize for outstanding Early Career Researcher; Course Advisory Committee, Bureau of Meteorology Graduate Diploma in Meteorology
- **Angela Maharaj:** President, Australian Meteorological & Oceanographic Society (AMOS)
- **Sarah Perkins-Kirkpatrick:** Australian Meteorological & Oceanographic Society (AMOS), Committee; Co-convenor, AMOS Annual Conference
- **Andy Pitman:** Review of Climate Risk Method for Regional Water Strategies, Department of Planning, Industry & Environment; Technical Advisory Group for the Climate Measurement Standards Initiative (CMSI); National Collaborative Research Infrastructure Strategy
- **Andrea Taschetto:** AMOS Council Member

EDITORIAL ROLES

- Lisa Alexander: Editor-in-Chief, *Weather and Climate Extremes*
- Laurie Menviel: Co-Editor-in-Chief, *Climate of the Past*
- Laurie Menviel: Guest Editor for Special Issue on Paleoceanography, *Oceanography*
- Jason Evans: Editor, *Journal of Climate*
- Andy Pitman: Associate Editor, *International Journal of Climatology*
- Sarah Perkins-Kirkpatrick: Associate Editor, *Weather and Climate Extremes*
- Sarah Perkins-Kirkpatrick: Editorial Board of *Frontiers in Climate*
- Donna Green, Katrin Meissner: Executive Editorial Board, *Environmental Research Letters*
- Steve Sherwood: Board of Review Editors, *Science*
- Martin De Kauwe: Associate Editor, *Biogeoscience*
- Martin De Kauwe: Editorial Board, *Global Change Biology*
- Martin De Kauwe: Editorial Board, *New Phytologist*
- Agus Santoso: Editor, AGU Monograph 'El Nino Southern Oscillation in a Changing Climate'
- Andrea Taschetto: Guest Editor of *Atmosphere on Weather and Climate Extremes*.
- Andrea Taschetto: Associate Editor of the *Journal of Southern Hemisphere Earth Systems Science*
- Gab Abramowitz: Associate Editor for *Journal of Hydrometeorology*

PROMOTIONS

Angela Maharaj: Senior Lecturer
Laurie Menviel: Associate Professor
Andrea Taschetto: Associate Professor

VISITORS

- Michael Mann (Director, Penn State ESSC)
- Hugh Morrison (US NCAR)
- Julia Windmiller (MPI, Hamburg Germany)

MEDIA HIGHLIGHTS

- 25 newspaper articles, 9 press releases, 3 radio interviews, 8 TV interviews, 12 online articles, 2 magazine articles and 1 podcast
- 6 stories in The Guardian
- 9 stories in Fairfax Metro Media
- Climate change is already here: major scientific report. Sydney Morning Herald. 11/13. Andy Pitman
- Major new climate study rules out less severe global warming scenarios. Washington Post. 23/07. Steven Sherwood
- Heat waves have become more frequent and intense since the 1950s. New York Post. 6/7. Sarah Perkins-Kirkpatrick
- ABC; Bloomberg Quint; Bustle; Carbon Brief; Channel News Asia; CLEX Website; CNN; Domain Fairfax; Echo Chamber Escape; Environmental Protection; Femestella; Global; Goalscast; International Business Times; LN24; Medium.com; Nature; NBC News (Online); news.com.au; Newshub NZ; New York Post; R744.com; Reuters; SBS; Science Friday; SMH, The Age; Sydney Morning Herald (SMH); Science Magazine; The Australian; The Beverly Review; The Daily Telegraph (Australia); The Feed SBS; The Guardian; Washington Post; WDR/Radio Bremen/RBB; WDR5

PHILANTHROPY

Prof John Church donated \$150k to the CCRC in 2019/ 2020 upon receiving the BBVA Foundation Frontiers of Knowledge Award in Climate Change. This amount was matched by the Faculty of Science, bringing total philanthropic funds to \$300k.

Investment earnings will be used on a continuing basis to fund Undergraduate Summer scholar research projects, an online alumni network, and an annual workshop featuring a prominent International researcher.

GRADUATIONS

Nathan Cooper - PhD
Michael Eabry - Masters

GRANTS

Current grants (excluding CLEx) totalled \$2.48m. CCRC was awarded several grants including the ARC Special Research Initiative in Excellence in Antarctic Science and a DECRA in 2020 that will be reported in 2021.



OUR VISION

THE CCRC IS A WORLD-LEADING RESEARCH CENTRE IN PHYSICAL AND BIOGEOCHEMICAL CLIMATE SCIENCE, EDUCATING THE AUSTRALIAN AND GLOBAL COMMUNITY ABOUT RISKS ASSOCIATED WITH CLIMATE VARIABILITY AND CHANGE.



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