

Kate Saunders

POSTDOCTORAL RESEARCHER

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About me

- Postdoctoral research is on improving probabilistic forecasts of extreme weather events
- Core focus is on statistical post-processing methods for compound events forecasts
- PhD Thesis submitted October 2018, Graduation Ceremony April 2019
- Postgraduate studies were in extreme value theory with climate applications
- Core focus was on modelling rainfall extremes in continuous space with dependence
- Passionate about R programming and data visualisation

Employment and Education

Postdoctoral Researcher

DELFT UNIVERSITY OF TECHNOLOGY

Delft, Netherlands

Oct. 2018 - Present

- Collaborate on a joint project with Koninklijk Nederlands Meteorologisch Instituut (KNMI)
- Project Title: Probabilistic forecasts of extreme weather utilizing advanced methods from extreme value theory
- Research Interests: Statistical Post-processing, Compound Events, Multivariate Weather Forecasting, Multivariate Scoring

Doctor of Philosophy

THE UNIVERSITY OF MELBOURNE

Melbourne, Australia

Mar. 2014 - Oct. 2018

- Thesis Advisors: Prof. Peter Taylor, Prof. David Karoly and Dr. Alec Stephenson
- Thesis Title: An Investigation of Australian Rainfall using Extreme Value Theory
- Research Interests: Extreme Value Theory, Statistics, Max-stable Processes, Rainfall Extremes, Extremal Dependence, Quality Control

Graduate Researcher

COMMONWEALTH SCIENTIFIC INSTITUTE OF TECHNOLOGY (CSIRO)

Melbourne, Australia

Feb. 2012 - Feb. 2014

- Research Interests: Natural Disaster Modelling, ie. Floods, Tsunamis, Sea Level Rise, Computational Fluid Dynamics

Bachelor of Science (Honours I in Mathematics)

THE UNIVERSITY OF QUEENSLAND

Brisbane, Australia

Jul. 2010 - Jun. 2011

- Thesis advisors: Prof. Tony Roberts
- Thesis title: Mean First Passage Time for Discrete Periodic Networks

Bachelor of Science

THE UNIVERSITY OF QUEENSLAND

Brisbane, Australia

Feb. 2007 - Jun. 2010

- Major in mathematics

Publications

Redefining Southern Australia's Climatic Regions and Seasons

JOURNAL OF SOUTHERN HEMISPHERE EARTH SYSTEMS SCIENCE

In Review

2020

- S. Fiddes, A. Pepler, K. R. Saunders, and P. Hope

Attribution of the Australian Bushfire Risk to Anthropogenic Climate Change

NATURAL HAZARDS EARTH SYSTEM SCIENCES

In Review

2020

- G. J. van Oldenborgh, F. Krikken, S. Lewis, N. J. Leach, F. Lehner, K. R. Saunders, M. van Wee, K. Haustein, S. Li, et al.
- DOI: 10.5194/nhess-2020-69

A Regionalisation Approach for Rainfall based on Extremal Dependence

EXTREMES

Accepted awaiting print

2020

- K.R. Saunders, A.G. Stephenson, AG and D.J. Karoly
- Preprint: <https://arxiv.org/abs/1907.05750>

An Investigation of Australian Rainfall Using Extreme Value Theory

PHD THESIS

2018

- K.R. Saunders
- Identifier: <http://hdl.handle.net/11343/220318>

The Winning Entry for the EVA2017 Competition for Spatiotemporal Prediction of Extreme Rainfall using Generalized Extreme Value Quantiles

EXTREMES

2018

- A.G. Stephenson, K. Saunders and L. Tafakori
- DOI: [10.1007/s10687-018-0321-0](https://doi.org/10.1007/s10687-018-0321-0)

The Spatial Distribution of Rainfall Extremes and the Influence of El Niño Southern Oscillation

WEATHER AND CLIMATE EXTREMES

2017

- K. Saunders, A.G. Stephenson, P.G. Taylor, and D. Karoly
- DOI: [10.1016/j.wace.2017.10.001](https://doi.org/10.1016/j.wace.2017.10.001)

Assessing Sea Level Rise Risks to Coastal Floodplains in the Kakadu Region, Northern Australia, using a tidally-driven hydrodynamic model

MARINE AND FRESHWATER RESEARCH

2016

- P. Bayliss, K. Saunders, L. Dutra, L. Melo, J. Hilton, M. Prakash, F. Woolard
- DOI: [10.1071/MF16049](https://doi.org/10.1071/MF16049)

Application of Smoothed Particle Hydrodynamics for Modelling Gated Spillway Flows

APPLIED MATHEMATICAL MODELLING

2014

- K. Saunders, M. Prakash, P.W. Cleary and M. Cordell
- DOI: [10.1016/j.apm.2014.05.008](https://doi.org/10.1016/j.apm.2014.05.008)

Teaching Experience

Lecturer

TU Delft

DEFLT INSTITUTE OF APPLIED MATHEMATICS

2019

- WI2180LR-II Probability and Statistics for Aeronautical Engineers
- Responsibilities included: Course development, assessment design, student consultation, collecting PRIME learning statistics

Sessional Tutor

The University of Melbourne

SCHOOL OF MATHEMATICS AND STATISTICS

2014 – 2015

- MAST20005 Statistics, MAST20004 Probability for statistics, MAST10006 Calculus 2

Sessional Tutor

The University of Queensland

SCHOOL OF MATHEMATICS AND PHYSICS

2007 – 2011

- MATH1061 Discrete Mathematics, MATH1051 Calculus and Linear Algebra, MATH1050 Mathematical Foundations, MATH1040 Basic Mathematics

Supervision Experience

Jiyu Chen - Masters Thesis

Utrecht University

PRIMARY CO-SUPERVISORS: KATE SAUNDERS AND KIRIEN WHAN AT KNMI, WITH UNIVERSITY CO-SUPERVISOR: JASON FRANK

2020

- Project Title: Quality control and verification of citizen science wind observations
- Paper in preparation for Quarterly Journal of the Royal Meteorological Society
- Expected paper submission November 2020
- KNMI also provided additional funding to produce a quality controlled dataset and an R Package

Kieran Maguire - Undergraduate Project

The University of Melbourne

CO-SUPERVISORS: KATE SAUNDERS AND PETER TAYLOR

2016

- Project Title: Identifying spurious inhomogeneities in daily rainfall observations
- The technical report from this project was shared with the Bureau of Meteorology

Meng Shi - Undergraduate Project

CSIRO

CO-SUPERVISORS: CAROLYN HUSTON AND KATE SAUNDERS

2012

- Project Title: A sensitivity analysis of tsunami inundation using a shallow water solver

Grants

Research Support Scheme (\$20,000 AUD)

ACEMS

APPLICANTS: DR. BORIS BERANGER (UNSW), DR. KATE SAUNDERS (TU DELFT) AND DR. ALEC STEPHENSON (CSIRO)

2020

- Grant Title: Modelling of Environmental and Climate Extremes
- This grant is to foster collaboration between ACEMS Research Fellows and Associate Investigators
- As corona prevents international travel this funding went into stasis
- This funding can now be used for domestic travel given my forthcoming position at QUT

R Consortium Grant (\$6,000 USD / \$8,200 AUD)

R Consortium

APPLICANTS: DR. JACKON KWOK (UoM) AND DR. KATE SAUNDERS (TU DELFT)

2020

- Grant Title: Interactive Visualisations in R via R-to-JavaScript-transpilation
- This grant funds the development of projects that help the R community
- This is part one of a two part proposal
- RConsortium has encouraged submission of the second part after the completion of the first set of milestones.

Scholarships and Awards

Laureate Fellowship: Postgraduate Researcher Award

The University of Melbourne

\$30,000 AUD PER ANNUM (€18,800 TAX FREE)

2014 – 2018

- Awarded in lieu of the Australian Postgraduate Award (\$25,000 AUD per annum)

Postgraduate Top Up Scholarship

CSIRO

\$10,000 PER ANNUM (€6,265 TAX FREE)

2015 – 2018

- Awarded to outstanding graduates to undertake postgraduate research

Science Abroad Travelling Scholarship

The University of Melbourne

\$1,500 AUD IN TOTAL (€940 TAX FREE)

2016

- Awarded to outstanding graduates to undertake research abroad

Other Academic Activities

INVITED TALKS

Machine Learning in the Netherlands (ML in NL)

Amsterdam, Netherlands

PICNIC DATA SCIENCE

April, 2020 (Cancelled Due to Corona)

- Examining our Implicit Assumptions when Clustering

Probability Seminar

Newcastle, UK

NEWCASTLE UNIVERSITY

March, 2020 (Cancelled Due to Corona)

- Changing Spatial Dependence of Heatwaves

Extremes TiDE Seminar Series

Tilburg, Netherlands

TILBURG UNIVERSITY

February, 2019

- A Regionalisation Approach for Extremes

WORKSHOP ORGANISATION

Statistical Post-Processing Workshop

TU Delft, Netherlands

JOINT WORKSHOP BETWEEN KNMI AND TU DELFT

2019

- Inaugural workshop designed to foster collaboration between statistics and climate researchers

German Climate and Energy College Retreat

Hidden Vale, Victoria

MEMBERS OF THE EXTENDED COLLEGE COMMUNITY

2018

- A workshop to promote knowledge sharing between PhD students

Applied Probability Group Retreat

Lorne, Victoria

UNIVERSITY OF MELBOURNE RESEARCHERS

2017

- An internal workshop to share new research ideas in applied probability

JOURNAL REFEREEING

Weather and Climate Extremes, Environmetrics, Extremes, Spatial Statistics, Stochastic Networks

PROMOTION OF WOMEN IN STEM

An Introduction to Web Scraping using Rvest

Rotterdam, Netherlands

INVITED PRESENTATION FOR R-LADIES ROTTERDAM

2019

- R-Ladies' is a diversity initiative, whose aim is to help empower underrepresented minorities within the R community.

Women in mathematics panel discussion on affirmative action

EVENT ORGANISER AND PANEL CHAIR

- International Womens' Day Event #BeBoldForChange

A Celebration of Dr. Alison Harcourt (Order of Australia)

EVENT JOINT ORGANISER WITH GALA CAMACHO FERRARI

- International Womens' Day Event #MakeItHappen

University of Melbourne

2016

University of Melbourne

2015

MENTORING

Grabbing your Audience's Attention: Advice on Giving Talks

ACEMS SEMINAR SERIES

- Mentoring talk live streamed across ACEMS university nodes

University of Melbourne

2019

COMMITTEE POSITIONS

Postgraduate Student President

STATISTICS AND MATHEMATICS STUDENT SOCIETY (STAMPS)

- Some events run include: National Science Week Events, Careers Panel, Social Events

University of Melbourne

2015 – 2016

Outreach & Science Communication

ART EXHIBITION

ClimArt: R Package

WITH PROF. DAVID KAROLY

- Produced code that visualises climate observations and how these observations are changing.
- These visualisations were used in an exhibition called Climate Change versus Art.

2019

POPULAR SCIENCE ARTICLES

Is Usain Bolt the greatest athlete of all time? That's not what the numbers say

K. SAUNDERS AND A.G. STEPHENSON

- Article statistics: 20,609 Readers, 275 Shares

Explainer: was the Sydney storm 'once-in-a-century'?

K. SAUNDERS, D. KAROLY AND P.G. TAYLOR

- Article statistics: 8591 Readers, 80 Shares

The Conversation

2017

The Conversation

2015

SCHOOLS

Maths like a Mathematician

ACEMS MATHSCRAFT

- Initiative to work with schools to teach mathematical style thinking to students

Mathematicians in Schools

CSIRO INITIATIVE

- Presented my research in schools to help students understand how maths is used in the real world

Multiple locations

2015 - 2017

Mentone Girls' Grammar School

2012 - 2013

Affiliations

- Academic Collaborator with Koninklijk Nederlands Meteorologisch Instituut (KNMI)
- Member of the European COST Action for compound events (Damocles)
- Associate Investigator with Australian Centre of Excellence in Mathematical and Statistical Frontiers (ACEMS)
- German Climate and Energy College (Alumni)
- Australian Women in Mathematics Special Interest Group (WIMSIG) (Past Member)
- Statistical Society of Australia: SSA (Past Member)
- Australian Mathematical Society (Past Member)

Referees

Available upon request