

Kate Saunders

LECTURER

Queensland University of Technology (QUT)

+61 7 3138 9952 | kate.r.saunders@qut.edu.au | [katerobsau](https://www.katerobsau.com) | [katerobsau](https://www.katerobsau.com)

About me

- Primary research interest is in extreme value theory methods as applied to problems in climatology
- Other research interests include; statistical post-processing, compound event modelling and quality control
- Passionate about R programming, data visualisation and data ethics
- Preference for lecturing into probability and statistics units
- Postdoctoral research was in improving statistical post-processing methods for compound event forecasts
- Postgraduate research was in extreme value theory methods with applications in Australian rainfall extremes
- PhD Thesis submitted October 2018, Graduation Ceremony April 2019

Employment and Education

Lecturer (3 year fixed term contract)

Brisbane, Australia

QUEENSLAND UNIVERSITY OF TECHNOLOGY

Jan 2021 - Present

- Currently lecturing Statistical Data Analysis (MXN500) and Quantitative Methods in Science (SEB113)
- As unit coordinator I have responsibility for the development, implementation and review of learning and teaching in these units
- Research Interests: Extreme Value Theory, Statistical Post-processing, Compound Risk Assessment, Quality Control

Postdoctoral Researcher

Delft, Netherlands

DELFT UNIVERSITY OF TECHNOLOGY

Oct. 2018 - Oct. 2020

- Collaborated 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
- Lectured Probability and Statistics for Aeronautical Engineers (WI2180LR-II)

Doctor of Philosophy

Melbourne, Australia

THE UNIVERSITY OF MELBOURNE

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, Max-stable Processes, Rainfall Extremes, Extremal Dependence, Quality Control

Graduate Researcher

Melbourne, Australia

COMMONWEALTH SCIENTIFIC INSTITUTE OF TECHNOLOGY (CSIRO)

Feb. 2012 - Feb. 2014

- Interested in using computational fluid dynamics for natural disaster modelling, ie. floods, tsunamis, storm surge, sea level rise

Bachelor of Science (Honours I in Mathematics)

Brisbane, Australia

THE UNIVERSITY OF QUEENSLAND

Jul. 2010 - Jun. 2011

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

Bachelor of Science

Brisbane, Australia

THE UNIVERSITY OF QUEENSLAND

Feb. 2007 - Jun. 2010

- Major in mathematics

Publications

Bottom-up identification of key elements of compound events

Accepted with minor revisions

EARTH'S FUTURE

2021

- E. Bevacqua, C. De Michele, C. Manning, A. Couasnon, A.F.S. Ribeiro, A.M. Ramos, E. Vignotto, A. Bastos, S. Blesic, F. Durante, J. Hillier, S.C. Oliveira, J.G. Pinto E. Ragno, P. Rivoire, K.R. Saunders, K. Van Der Wiel, W. Wu, T. Zhang, J. Zscheischler
- Preprint: doi.org/10.1002/essoar.10507809.1

Quality control and bias adjustment of crowd sourced wind speed observations

QUARTERLY JOURNAL OF THE ROYAL METEOROLOGICAL SOCIETY

2021

- J. Chen, K. R. Saunders, and K. Whan
- DOI: 10.1002/qj.4146

Redefining Southern Australia's Climatic Regions and Seasons

JOURNAL OF SOUTHERN HEMISPHERE EARTH SYSTEMS SCIENCE

2021

- S. Fiddes, A. Pepler, K. R. Saunders, and P. Hope
- DOI: 10.1071/ES20003

Attribution of the Australian Bushfire Risk to Anthropogenic Climate Change

NATURAL HAZARDS EARTH SYSTEM SCIENCES

2021

- G. J. van Oldenborgh, F. Krikken, S. Lewis, N. J. Leach, F. Lehner, K. R. Saunders, M. van Weele, K. Haustein, S. Li, et al.
- DOI: 10.5194/nhess-21-941-2021

A Regionalisation Approach for Rainfall based on Extremal Dependence

EXTREMES

2020

- K.R. Saunders, A.G. Stephenson, AG and D.J. Karoly
- DOI: 10.1007/s10687-020-00395-y

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

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

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

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

Grants

First Byte (\$10,000 AUD)

QUT Centre for Data Science

APPLICANTS: DR. DR. KATE SAUNDERS (QUT) TO WORK JOINTLY WITH RESEARCHERS AT THE BUREAU OF METEOROLOGY

2021

- Grant Title: Understanding the value of observations for wind forecasting on days of high fire danger

ACEMS Ideas Challenge (\$10,000 AUD)

ACEMS

APPLICANTS: DR. DR. KATE SAUNDERS (QUT), DR. CAROLYN HUSTON (CSIRO) AND DR. PETRA KUHNERT (CSIRO)

2021

- Grant Title: Complementing official wind records with crowd-sourced observations for improved forecasts of wind and fire behaviour
- This grant is to fund research between ACEMS researchers and industry partners

Research Support Scheme (\$15,000 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 initially went into stasis
- This funding has since been diverted to a research assistant due to rolling lockdowns

Prizes

Harry Otten Prize: 1st place €25,500 (\$40,000 AUD)

European Meteorological Society

JOINT WINNER WITH DR. KIRIEN WHAN FROM KNMI

2021

- A prize for innovation in meteorology
- Project title: Second Wind - Extending the official wind gust record with citizen science observations

Winner of the Young Statisticians Video Competition (\$200 AUD)

Statistics Society of Australia

K.R. SAUNDERS

2017

- https://www.youtube.com/watch?v=88ZRYK0DmKs&ab_channel=KateSaunders

Winning Team of the Data Challenge: Prediction of Extremal Precipitation

Extreme Value Analysis Conference,
Delft

A.G. STEPHENSON, K.R. SAUNDERS AND L. TAFEKORI

2017

- Winning method was published: DOI: 10.1007/s10687-018-0321-0

Scholarships and Awards

Postgraduate Researcher Award funded by a Laureate Fellowship

The University of Melbourne

\$30,000 AUD PER ANNUM

2014 – 2018

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

Postgraduate Top Up Scholarship

CSIRO

\$10,000 PER ANNUM

2015 – 2018

- Awarded to outstanding graduates to undertake postgraduate research

Science Abroad Travelling Scholarship

The University of Melbourne

\$1,500 AUD IN TOTAL

2016

- Awarded to outstanding graduates to undertake research abroad

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 accepted in the Quarterly Journal of the Royal Meteorological Society
- 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

Other Academic Activities

INVITED TALKS

Spatial Extremes Session

London and in hybrid

COMPUTATIONAL AND METHODOLOGICAL STATISTICS

(Upcoming) December, 2021

- Extreme Value Modelling of Compound Rainfall Extremes

Bureau of Meteorology Research Seminar

Virtual

BUREAU OF METEOROLOGY

April, 2021

- Second Wind: Extending the official wind speed records with citizen science observations

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

Newcastle Probability Seminar

NEWCASTLE UNIVERSITY

- Changing Spatial Dependence of Heatwaves

Extremes TiDE Seminar Series

TILBURG UNIVERSITY

- A Regionalisation Approach for Extremes

WORKSHOP ORGANISATION

Statistical Post-Processing Workshop

JOINT WORKSHOP BETWEEN KNMI AND TU DELFT

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

German Climate and Energy College Retreat

MEMBERS OF THE EXTENDED COLLEGE COMMUNITY

- A workshop to promote knowledge sharing between PhD students

Applied Probability Group Retreat

UNIVERSITY OF MELBOURNE RESEARCHERS

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

JOURNAL REFEREEING

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

CONTRIBUTION TO PROMOTING WOMEN IN STEM AND GENERAL DIVERSITY

ACEMS Equity and Diversity Committee

CHAIR

- ACEMS is underpinned by a commitment to equal opportunity and diversity

Reboot STEMM Workshop

VOLUNTEER PARTICIPANT

- Involved in think-tank discussion with early- and mid-career researchers (EMCRs)
- Helped co-design a strategy for a more inclusive and diverse way of defining, recognising and rewarding success

An Introduction to Web Scraping using Rvest

INVITED PRESENTATION FOR R-LADIES ROTTERDAM

- 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

MENTORING

Grabbing your Audience's Attention: Advice on Giving Talks

ACEMS SEMINAR SERIES

- Mentoring talk live streamed across ACEMS university nodes

OTHER COMMITTEE POSITIONS

Postgraduate Student President

STATISTICS AND MATHEMATICS STUDENT SOCIETY (STAMPS)

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

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.

POPULAR SCIENCE ARTICLES

Newcastle, UK

March, 2020 (Cancelled Due to Corona)

Tilburg, Netherlands

February, 2019

TU Delft, Netherlands

2019

Hidden Vale, Victoria

2018

Lorne, Victoria

2017

Australia

2021

Virtual

2021

Rotterdam, Netherlands

2019

University of Melbourne

2016

University of Melbourne

2015

University of Melbourne

2019

University of Melbourne

2015 – 2016

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

The Conversation

2017

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

2015

SCHOOLS

Maths like a Mathematician

ACEMS MATHSCRAFT

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

Multiple locations

2015 - 2017

Mathematicians in Schools

CSIRO INITIATIVE

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

Mentone Girls' Grammar School

2012 - 2013

Affiliations

- Member of the QUT Centre for Data Science
- 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)