Kate Saunders

POSTDOCTORAL RESEARCHER

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About me

- Current research is in statistical post-processing and compound events
- Core focus is on improving probabilistic forecasts of extreme weather events
- PhD studies in extreme value theory with climate applications
- Focus was on modelling rainfall extremes in continuous space with dependence
- Applications considered in the thesis helped to improve our understanding of rainfall extremes in Australia
- Passionate about R programming and data visualisation

Employment and Education

Postdoctoral Researcher   *Deflt, Netherlands*

DELFT UNIVERSITY OF TECHNOLOGY   *Oct. 2018 - Present*

- Collaborating on a joint project with Koninklijk Nederlands Meteorologisch Instituut (KNMI)

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

Graduate Researcher   *Melbourne, Australia*

COMMONWEALTH SCIENTIFIC INSTITUE OF TECHNOLOGY (CSIRO)   *Feb. 2012 - Feb. 2014*

- Research Interests: natural disaster modelling, floods, tsnumais, sea level rise, computational fluid dynamics

Bachelor of Science (Honours I in Mathematics)   *Brisbane, Australia*

THE UNIVERSITY OF QUEENSLAND   *Jul. 2010 - Jun. 2011*

- Thesis advisors: 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

A Regionalisation Approach for Rainfall based on Extremal Dependence   *Extremes (in submission)*

K.R. SAUNDERS, A.G. STEPHENSON, AG AND D.J. KAROLY   *2019*

- Preprint: https://arxiv.org/abs/1907.05750

An Investigation of Australian Rainfall Using Extreme Value Theory   *PhD Thesis*

K.R. SAUNDERS   *2018*

- 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*

A.G. STEPHENSON, K. SAUNDERS AND L. TAFAKORI   *2018*

- 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*

K. SAUNDERS, A.G. STEPHENSON, P.G. TAYLOR, AND D. KAROLY   *2017*

- 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*

P. BAYLISS, K. SAUNDERS, L. DUTRA, L. MELO, J. HILTON, M. PRAKASH, F. WOOLARD *2016*

- DOI: 10.1071/MF16049

Application of Smoothed Particle Hydrodynamics for Modelling Gated Spillway Flows   *Applied Mathematical Modelling*

K. SAUNDERS, M. PRAKASH, P.W. CLEARY AND M. CORDELL   *2014*

- DOI: 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

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

Jiyeu Chen, Masters Student *Utrecht University*
Project Topic: Using citizen science observations to improve wind forecasts *2019*

Kieran Maguire, Undergraduate Student *The University of Melbourne*
Project Topic: Identifying spurious inhomogeneities in daily rainfall observations *2016*

Meng Shi, Undergraduate Student *CSIRO*
Project Topic: A sensitivity analysis of tsunami inundation using a shallow water solver *2012*

Other Academic Activities

Invited talks

Extremes TiDE Seminar Series
Tilburg University, Netherlands *2019*
- A Regionalisation Approach for Extremes

Workshop Organisation

KNMI and TU Delft joint workshop on post-processing
TU Delft *2019*
- Inaugural workshop designed to foster collaboration between statistics and climate researchers

Climate and Energy College Retreat
Hidden Vale, Victoria *2018*
- A workshop to promote knowledge sharing between PhD students

Applied Probability Group Retreat
Lorne, Victoria *2017*
- An internal workshop to share new research ideas in applied probability

Journal Refereering

Spatial Statistics, Stochastic Networks, Extremes, Environmetrics

Promotion of Women in STEM

An Introduction to Web Scraping using Rvest
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 affirmitive action
Event Organiser and Panel Chair *2016*
- International Womens' Day Event #BeBoldForChange

A celebration of Dr. Alison Harcourt (Order of Australia)
Event Joint Organiser *2015*
- Internation Womens' Day Event #MakeItHappen

Mentoring

Grabbing your Audience's Attention: Advice on Giving Talks

ACEMS Seminar Series   *2019*

- Mentoring talk shared live across ACEMS university nodes

Committee Positions

Student President   *University of Melbourne*

Mathematics and Statistics Student Society (STAMPS)   *2015 – 2016*

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

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

Prizes

Winner of the Young Statisticians Video Competition

Statistics Society of Australia   *2017*

Winning Team of the Data Challenge: Prediction of Extremal Precipitation

Extreme Value Analysis Conference, Delft, 2017   *2017*

Outreach & Science Communication

Art Exhibition

ClimArt

R Package   *2019*

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

Popular Science Articles

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

K. Saunders and A.G. Stephenson   *2017*

- Article statistics: 20,609 Readers, 275 Shares

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

K. Saunders, D. Karoly and P.G. Taylor   *2015*

- Article statistics: 8591 Readers, 80 Shares

Schools

Maths like a Mathematician

ACEMS Mathscraft   *2015 - 2017*

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

Mathematicians in Schools

Partner school Mentone Girls' Grammar School   *2012 - 2013*

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

Affiliations

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