

Kate Saunders

POSTDOCTORAL RESEARCHER

Delft Institute of Applied Mathematics, TU Delft

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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 research was in extreme value theory
- Core PhD 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

Postdoctoral Researcher

DELFT UNIVERSITY OF TECHNOLOGY

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

Delft, Netherlands

Oct. 2018 - Present

Graduate Researcher

COMMONWEALTH SCIENTIFIC INSTITUTE OF TECHNOLOGY (CSIRO)

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

Melbourne, Australia

Feb. 2012 - Feb. 2014

Education

Doctor of Philosophy

THE UNIVERSITY OF MELBOURNE

- 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

Melbourne, Australia

Mar. 2014 - Oct. 2018

Bachelor of Science (Honours I in Mathematics)

THE UNIVERSITY OF QUEENSLAND

- Thesis advisors: Prof. Tony Roberts
- Thesis title: Mean first passage time for discrete periodic networks

Brisbane, Australia

Jul. 2010 - Jun. 2011

Bachelor of Science

THE UNIVERSITY OF QUEENSLAND

- Major in mathematics

Brisbane, Australia

Feb. 2007 - Jun. 2010

Publications

A Regionalisation Approach for Rainfall based on Extremal Dependence

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

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

Extremes (in submission)

2019

An Investigation of Australian Rainfall Using Extreme Value Theory

K.R. SAUNDERS

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

PhD Thesis

2018

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

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

- DOI: 10.1007/s10687-018-0321-0

Extremes

2018

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

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

- DOI: 10.1016/j.wace.2017.10.001

Weather and Climate Extremes

2017

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

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

- DOI: 10.1071/MF16049

Marine and Freshwater Research

2016

Teaching Experience

Lecturer

DEFLT INSTITUTE OF APPLIED MATHEMATICS

- W12180LR-II Probability and Statistics for Aeronautical Engineers

TU Delft

2019

Sessional Tutor

SCHOOL OF MATHEMATICS AND STATISTICS

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

The University of Melbourne

2014 – 2015

Sessional Tutor

SCHOOL OF MATHEMATICS AND PHYSICS

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

The University of Queensland

2007 – 2011

Invited talks

Extremes TiDE Seminar Series

A REGIONALISATION APPROACH FOR EXTREMES

Tilburg University, Netherlands

2019

Supervision Experience

Undergraduate Student

PROJECT TOPIC: IDENTIFYING SPURIOUS INHOMOGENEITIES IN DAILY RAINFALL OBSERVATIONS

The University of Melbourne

2016

Undergraduate Student

PROJECT TOPIC: A SENSITIVITY ANALYSIS OF TSUNAMI INUNDATION USING A SHALLOW WATER SOLVER

CSIRO

2012

Other Academic Activities

WORKSHOP ORGANISATION

Climate and Energy College Retreat

HIDDEN VALE, VICTORIA

- A workshop to promote knowledge sharing between PhD students

2018

Applied Probability Group Retreat

LORNE, VICTORIA

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

2017

JOURNAL REFEREEING

Spatial Statistics, Stochastic Networks, Extremes, Environmetrics

PROMOTION OF WOMEN IN STEM

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.

2019

Women in mathematics panel discussion on affirmative action

EVENT ORGANISER AND PANEL CHAIR

- International Womens' Day Event #BeBoldForChange

2016

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

EVENT JOINT ORGANISER

- International Womens' Day Event #MakeItHappen

2015

MENTORING

Grabbing your Audience's Attention: Advice on Giving Talks

ACEMS SEMINAR SERIES

2019

- Mentoring talk shared live across ACEMS university nodes

ACEMS Mentoring Program

MENTOR

2019

- Paired with an early stage PhD Student in Statistics at Monash University

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

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

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

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)