ASC & OZCOTS 2023

Schedule

Monday, 11 December, 2023

08:00-08:50 Building 11, University Hall

Registration

08:50-09:20 Building 11, University Hall

Opening ceremony and welcome to country

Zoom Link

09:20-09:30 Building 11, University Hall

Announcements/housekeeping

Zoom Link

09:30-10:30 Building 11, University Hall

Foreman Lecture: Professor Xiao-Li Meng

Paul Schubert
Keynote
Sponsors: Business Events Perth

Multi-resolution Meandering: Personalized Treatments, IndividualPrivacy, Machine Unlearning, and a World without Randomness
Data science revolutionizes the granularity of human inquiries and even offers the promise of personalized assessments. However, how can we assess individual treatment effect before treating the individual? Transitional Inference addresses this dilemma through the concept of "transfer to the similar," a notion that has been pondered by philosophers since Galen of the Roman Empire. This talk presents a Multi-Resolution Framework (Li and Meng, 2021, JASA) for transitional inference, where similarity is prescribed probabilistically by concomitantly specifying the sameness — the shared distributional form — and the differences — the individual realizations. This framework avoids the concept of randomness and defines "individual probability" as a deterministic limit with infinite resolution. These conceptualizations help us operationalize the meaning of personalized treatments, clarify what individual privacy is protected by differential privacy, and anticipate the challenges of preserving an individual's right to be forgotten through machine unlearning. Furthermore, it reveals a world that is resistant to overfitting when the resolutions of our data and (deep) learning far exceed the resolution necessary for pattern recognition.

Zoom Link

10:30-10:50

Morning Tea

Morning Tea

10:50-11:50 Building 11, University Hall

<u>Horizon Lecture: Associate Professor Andrew Zammit Mangion</u>

Noel Cressie
Keynote
Sponsors: Business Events Perth

Fast statistical inference with neural networks and amortisation: Golden ticket or red herring?
Neural networks can provide solutions to tasks that were inconceivable just a few years ago and have benefitted society in numerous ways. These benefits primarily stem from a property often referred to as "amortisation": Training a neural network usually requires significant effort and resources but, once trained, the network can solve similar problems repeatedly and rapidly with virtually no additional computational cost. Hence, the substantial initial training cost of training neural networks is "amortised" over time. Amortisation can also be used to enable fast inference with parametric statistical models: Once a network is trained using observational data as input and inferential targets (e.g., model parameters) as output, the network can make inference with future data in a fraction of the computing time needed by conventional likelihood or Monte Carlo methods. These amortised inferential tools have several compelling advantages over classical methods: They do not require knowledge of the likelihood function, are relatively easy to implement, and facilitate inference at a substantially reduced computational cost. In this lecture I will first give a brief review of recent work that has leveraged the property of "amortisation" in statistical inference. I will then evaluate the merits and drawbacks of amortised inference from a statistician's perspective and conclude by outlining the challenges that need to be overcome for these inferential tools to gain widespread acceptance.
Zoom link

12:00-13:00 Building 20, Lecture Room 1

<u>CPS1 Differential privacy</u>

Adam Leinweber, Kathrin Schemann
Contributed Session
Zoom Link

12:00-13:00 Building 20, Lecture Room 2

<u>CPS2 Lessons learned in statistical consultancy</u>

Jessica Kasza, Rushani Wijesuriya
Contributed Session
Zoom Link

12:00-13:00 Building 20, Lecture Room 3

<u>CPS3 Ecology</u>

Andrew Grant, Rob Hyndman
Contributed Session
Zoom Link

12:00-13:00 Building 20, Lecture Room 4

<u>CPS4 Network / graph theory</u>

John Henstridge, Stanislaus Stadlmann
Contributed Session
Zoom Link

13:00-14:00
Lunch

13:00-14:00
Lunch

13:00-14:00
Lunch

13:00-14:00
Lunch

13:00-14:00 Building 11, University Hall

Lunchtime session: Welcome for new members

Have you recently joined the SSA? Would you like to learn more about the SSA or get to know other members? Join us for this lunchtime event where you will learn about the society from SSA President Ian Gordon, mingle with branch representatives and get to know fellow members.
Schedule
13:00 – 13:10 Allow time for participants to pick up lunch
13:10 – 13:30 Brief welcome and presentation about the SSA, presented by Ian Gordon, followed by Q & A
13:30 – 14:00 Mingling with branch representatives / social networking activity
Zoom Link

14:00-15:30 Building 20, Lecture Room 1

IPS1 Biostatistics and Bioinformatics

Alberto Nettel Aguirre, Nicola Armstrong
Invited Session
Sponsors: Biostatistics Collaboration of Australia
Zoom Link

14:00-15:30 Building 20, Lecture Room 2

CPS5 Small area estimation

Dulari Hakamuwa Lekamlage, Matt Moores
Contributed Session
Zoom Link

14:00-15:30 Building 20, Lecture Room 3

CPS6 Spatial statistics and the environment 1

Paul Kabaila, Jayani Lakshika
Contributed Session
Zoom Link

14:00-15:30 Building 20, Lecture Room 4

CPS7 Advances in Bayesian computation 1

Udaya Banda Konarasinghe, Chris Lloyd
Contributed Session
Zoom Link

14:00-15:30 Building 11, University Hall

P1 Rapid Poster session

Paul Fortuin, Thomas Fung
Poster
Sponsors: Survey Design and Analysis Services
Zoom Link

15:30-16:00

Afternoon Break

16:00-17:30 Building 20, Lecture Room 1

IPS2 Statistical Consultancy

Marijka Batterham, Sue Finch
Invited Session
Zoom Link

16:00-17:30 Building 20, Lecture Room 2

CPS8 Statistical graphics

Edward Cripps
Contributed Session
Zoom Link

16:00-17:30 Building 20, Lecture Room 3

CPS9 High dimensional data analysis

Alanah Cronin, Yan Wang
Contributed Session
Zoom Link

16:00-17:30 Building 20, Lecture Room 4

CPS10 Epidemiology

Xingjuan Li, Rheanna Mainzer
Contributed Session
Zoom Link

16:00-17:30 Building 11, University Hall

P2 Rapid Poster session

Ziyang Lyu, John Ormerod
Poster
Sponsors: Survey Design and Analysis Services

Zoom Link

17:30-18:00 Building 11, University Hall

Poster viewing

Poster

18:00-18:30 Building 11, University Hall

Welcome drinks & reception

Sponsors: NIASRA (University of Wollongong)
Welcome drinks & reception will be held in the Uni Bar

Tuesday, 12 December, 2023

08:50-09:00 Building 11, University Hall

Announcements/Housekeeping

Zoom Link

09:00-10:00 Building 11, University Hall

Moran Lecture: Professor Julie Simpson

Nicole White
Keynote
Sponsors: Business Events Perth

Bridging the gap: integrating statistical modelling and mathematical biology
The success of malaria control relies on the availability of highly effective antimalarial drugs that can significantly improve individual treatment outcomes. The widespread emergence of drug-resistant parasites now threatens the efficacy of first-line treatments, necessitating the urgent development of novel regimens and combinations of existing and new therapeutic agents to ensure adequate cure of malaria.
Addressing this challenge, biostatisticians and mathematical biologists often approach the determination of optimal treatment regimens from a different starting point. Biostatisticians primarily analyse clinical data to estimate the effects of different treatment regimens on patient outcomes. While this approach provides valuable insights into the investigated dosing regimens, it doesn't provide an appropriate model for predicting patient outcomes under different mechanisms of drug resistance or explore alternative dosing schemes — a necessity for improving the control of infectious diseases. Mathematical biologists begin by developing a model for prediction that captures the biological mechanisms of the infection, such as the life cycle of the malaria parasite within the red blood cell. However, when these "mechanistic" mathematical models are expanded to incorporate treatment actions and patient immunity, they often become highly complex, impeding their validation against clinical data within a proper statistical framework.
This presentation will outline an interdisciplinary approach that brings together mathematical biology and Bayesian statistical methods, demonstrating how it can be used to determine optimal treatment regimens and how this work has informed WHO treatment guidelines for malaria.
Zoom Link

10:00-10:20

Morning tea

10:20-11:20   Building 11, University Hall

Horizon Lecture: Dr Marijke Welvaert

Keynote
Sponsors: Business Events Perth
The tale of a career with large variance and a central tendency of promoting good statistical practice
Starting out studying a degree in psychology, my career has taken many unexpected turns. Whilst it would be easy to state that this was always part of the plan, the truth is more like a random walk being the driver. I have counted moths and mice. I have been hooked up to machines. I have received electroshocks. And that all for the greater good of statistics.
In this lecture I will walk you through the varied path of my career, lessons I learned along the way and demonstrating that the career of an applied statistician can have large variance, but at the centre of it is the quest for improving statistical practice in all application areas.
Zoom Link

11:30-12:45   Building 20, Lecture Room 1

CPS11 Clinical trials 1

Margarita Moreno-Betancur, Quan Vu
Zoom Link

11:30-12:45   Building 20, Lecture Room 2

CPS12 Big data methods

Lewis Mitchell, Yunwei Zhang
Zoom Link

11:30-12:45   Building 20, Lecture Room 3

CPS13 Spatial statistics and the environment 2

Alistair Martin, Andriy Olenko
Zoom Link

11:30-12:45   Building 20, Lecture Room 4

CPS14 Variable selection

James Bailie, Marijke Welvaert
Zoom Link

12:45-14:00

Lunch + Exhibit Hall

The exhibit hall will include stalls for:
4 AM Software
Australian Bureau of Statistics
Australian Institute of Family Studies (AIFS)
Biostatistics Collaboration of Australia (BCA)
Chapman and Hall (QR code to order books)
KBI Insurance
La Trobe University
R-Ladies
Royal Society Publishing
SDAS
Social Research Centre (SRC)
Statistical Society of Australia
SSA Mentoring Program
University of Wollongong

R-Ladies will be doing demos of R and SDAS will be doing demos of STATA.

14:00-17:00

Social afternoon

Wednesday, 13 December, 2023

08:50-09:00 Building 11, University Hall

Announcements/Housekeeping

Zoom Link

09:00-10:00 Building 11, University Hall

National Keynote: Associate Professor Kalinda Griffiths

Dina Neiger
Keynote
Sponsors: Business Events Perth

Identifying Indigenous People in Australian National Data: Challenges and Priorities
The inclusion of Aboriginal and Torres Strait islander people in official statistics in Australia, a realisation that occurred in 1967, brings to light a range of historical and contemporary issues that demand attention. This talk explores the definition of Indigenous peoples, the entities responsible for defining them, and the practical implementation of identification processes in official data collections. It also emphasises the significance of ensuring the completeness and accuracy of data on Aboriginal and Torres Strait islander people, as it directly impacts the measurement of health and wellbeing within the nation.
Official national reporting of the health and wellbeing of Aboriginal and Torres Strait Islander people typically relies on data derived from censuses, vital statistics, administrative data collections, and surveys. In accordance with human rights standards, individuals in Australia have the option to self-identify as 'Indigenous.' Historical context and limitations in decision making has made Aboriginal and Torres Strait Islander data a fraught discussion. Even as we further develop our national capabilities in data sharing, challenges persist in obtaining high-quality data, which can lead to biases in estimating the characteristics and progress of Aboriginal and Torres Strait Islander communities. The resulting measurement issues arising from incomplete and inaccurate data also require serious consideration, particularly when assessing our developments in 'Closing the Gap' within Australian society.
By recognising the historical and contemporary factors that shape data collection practices, policymakers and researchers should be aiming to support developments in Indigenous Data Sovereignty and self-determining governance. These will work towards enhancing the accuracy and completeness of Aboriginal and Torres Strait Islander data, contributing to more informed decision-making processes and the advancement of equitable outcomes for Aboriginal and Torres Strait Islander peoples in Australia.
Zoom Link

10:00-10:20

Morning tea

10:20-11:20 Building 11, University Hall

Horizon Lecture: Associate Professor Margarita Moreno-Betancur

John Carlin
Keynote
Sponsors: Business Events Perth

Causal machine learning in health data science
The ultimate goal of medical and health research is to improve patient outcomes and population health. As a result, the overwhelming majority of clinical and public health research studies ask "causal" questions, concerning the effect of treatments, policies, behaviours and other exposures on health outcomes. In many cases, especially in the current era of data deluge, these studies rely on observational (non-experimental) data to address causal questions. Unfortunately, for a long time the statistics discipline largely shunned the possibility of causal inference beyond randomised trials, and instead focused on the development of tools such as regression models without clarity regarding their usefulness and limitations for addressing the causal questions that substantive areas continued to ask. In recent decades, however, the discipline has seen the rise of a new area focused on determining the settings and approaches that could allow causal inference from observational data.
This talk will first provide an overview of some of the fundamental contributions of this statistical area to enable and improve the study of causality in health research, and then describe the role of machine learning within this causal inference paradigm, including recent methodological advances.
Zoom Link

11:30-13:00 Building 20, Lecture Room 2

CPS15 Statistics about society

David Hughes, Andrew Zammit Mangion
Contributed Session
Zoom Link

11:30-13:00 Building 20, Lecture Room 3

CPS16 Statistical reporting and practice

Alanah Cronin, Stephen Horn
Contributed Session
Zoom Link

11:30-13:00 Building 20, Lecture Room 4

CPS17 Causal inference & methods

Shih-Ching Fu, Benoit Liquet
Contributed Session
Zoom Link

13:00-14:00

Lunch

13:00-14:00

Lunch

13:00-14:00
Lunch

13:00-14:00
Lunch

13:00-14:00 Building 11, University Hall

Lunchtime session: Women in Statistics and Data Science

Alysha De Livera

You are invited to ASC2023 Women in Statistics and Data Science Networking Event! Hear from Prof Julie Simpson and Prof Inge Koch about their lengthy academic journeys as female researchers, what motivated them to continue their work in Statistics and Data Science, their perspectives on barriers and opportunities for women to work in the field, and advice to younger women in Statistics and Data Science.
Join us to offer support, guidance and perspective to other women in Statistics and Data Science, bring along your questions and expand your networks with women in Statistics and Data Science.

Speaker biographies
Professor Inge Koch is a Statistician with research interests in the analysis of high-dimensional and functional data, ranging from new methodology to cross-disciplinary collaborations including biologists and medical experts. She has a strong background in pure and applied mathematics and experience in industry and the CSIRO. Since the completion of her PhD in statistics at the Australian National University, she first taught statistics at the University of Newcastle and the University of New South Wales. In 2009 she became Associate Professor in Statistics at the University of Adelaide, and, in 2019, she was appointed as Professor of Statistics and Data Science at UWA. Inge joined RMIT as Associate Dean, Mathematical Sciences, in February 2023.
Throughout her career, Inge has been a champion for mathematics and gender diversity in mathematics, passionate about encouraging young women to study mathematics at all levels and to follow careers that use maths skills. She is a co-founder of UNSW's Girls Do The Maths, a program that began in 2004 and still flourishes today. She brought the same commitment to diversity to the University of Adelaide through her involvement with the Women in Mathematics Workshops. In 2015, she was appointed Executive Director of the Australian Mathematical Sciences Institute (AMSI) and of their ChooseMaths program which aimed at changing public perception of mathematics and improve participation, particularly of girls and women, in mathematics across Australia. At UWA she combined this interest with developing statistical data science at all levels ranging from a new first year course in data science to research forums involving academics and HDR students from all faculties. She has been part of the National Review panel for Data Science, jointly organised by AMSI and the SSA, and is a member of the AMSI board.
Professor Julie Simpson is Head of the Biostatistics Unit at the Melbourne School of Population and Global Health, Director of the Methods and Implementation Support for Clinical and Health (MISCH) Research Hub, and recipient of a NHMRC Leadership Investigator Grant (2021-5). Prof. Simpson has 30 years experience working in biostatistics teaching and research positions, and has led and collaborated on many research projects (laboratory, clinical trials and large-scale population studies), illustrating her broad knowledge of study design and statistical methodology. Her primary area of research is the bridging of novel statistical and mathematical modelling approaches to inform treatment policy for malaria and she has been an advisor to WHO, Medicines for Malaria Venture and the WorldWide Antimalarial Resistance Network regarding dosing regimens for current and new antimalarial drugs. Her research has generated evidence that has led to revised dosing recommendations for antimalarial regimens and improved sampling designs for antimalarial pharmacokinetic-pharmacodynamic studies. Her other main research interest is the application of complex statistical methods to answer important public health questions in longitudinal observational cohorts, in particular, the implementation of multiple imputation for handling missing data.

Zoom Link

14:00-15:30   Building 20, Lecture Room 1

IPS4 Environmental Statistics

David Warton
Invited Session
Zoom Link

14:00-15:30   Building 20, Lecture Room 2

CPS18 Training the next generation of statisticians

Zhi Yang Tho, Fan Zengyan
Contributed Session
Zoom Link

14:00-15:30   Building 20, Lecture Room 3

CPS19 Advances in Bayesian computation 2

Josh Jacobson, Samantha Low-Choy
Contributed Session
Zoom Link

14:00-15:30   Building 20, Lecture Room 4

CPS20 Modelling methods

Michael Bertolacci, Lauren Kennedy
Contributed Session
Zoom Link

15:30-16:00

Afternoon Break

16:00-17:15   Building 20, Lecture Room 1

IPS5 Bayesian Statistics

David Frazier, Samantha Low-Choy
Invited Session
Zoom Link

16:00-17:15   Building 20, Lecture Room 2

CPS21 Survey methods

Monique Jordan, Damjan Vukcevic
Zoom Link

16:00-17:15   Building 20, Lecture Room 3

CPS22 Spatial statistics

Pavel Krivitsky, Linh Nghiem
Zoom Link

16:00-17:15 Building 20, Lecture Room 4

CPS23 Clinical trials 2

Alan Herschtal, Sarat Moka

Zoom Link

19:00-22:00

Conference dinner

Thursday, 14 December, 2023

09:20-09:30 Building 11, University Hall

OZCOTS Opening & Announcements/Housekeeping

Zoom Link

09:30-10:30 Building 11, University Hall

Joint ASC/OZCOTS Keynote: Professor Sir David Spiegelhalter FRS OBE

Karen Lamb
Keynote
Sponsors: Business Events Perth

Trustworthy communication of data-derived evidence: what it is, and how we can get more of it
The recent pandemic has emphasised the key role played by evidence based on data. But how do we decide whether to trust all the claims that are made? Are the numbers being used to manipulate us? Using a wide range of examples, I will look at the way that statistics can be used to try and persuade audiences to think or act in a certain way, and contrast this with efforts to make communication 'trustworthy', by presenting balanced information that seeks to inform rather than persuade.
 Trustworthy communication should also acknowledge uncertainty and limitations in the quality of the underlying evidence (something sadly missing from ChatGPT).
But if authorities admit their uncertainties and present both the potential benefits and harms of innovations, won't people distrust them? The opposite appears to be the case, and I will discuss results from randomised trials by my colleagues that suggest that current one-sided information actively decreases trust in those sceptical of the innovation who, ironically, are the very people whose trust is being sought.
I will finish by showing some examples of trying to do things properly, in particular relating to the benefits and harms of the AstraZeneca COVID vaccine, and list the questions that anyone should ask whenever you are presented with claims that are based on numbers.
Zoom Link

10:30-10:40 Building 11, University Hall

Pitman Medal Award Ceremony

Keynote
Zoom

10:40-11:00

Morning tea

11:00-12:30   Building 20, Lecture Room 1

IPS6 Statistical Computing & Data Visualisation

Dianne Cook
Invited Session
Zoom Link

11:00-12:30   Building 20, Lecture Room 2

CPS24 Time Series methods

Mohammad Javad Davoudabadi, Cecilia Xia
Contributed Session
Zoom Link

11:00-12:30   Building 20, Lecture Room 3

CPS25 Prediction modelling

Aline Kunnel, Katrina Scurrah
Contributed Session
Zoom Link

11:00-12:30   Building 20, Lecture Room 4

OZCOTS1: Novel approaches and practices

Helen MacGillivray
Zoom Link

12:30-13:30

Lunch

12:30-13:30

Lunch

12:30-13:30

Lunch

12:30-13:30

Lunch

12:30-13:30 Building 11, University Hall

Lunchtime session: Writing for Significance

Susanna Cramb

Do you consider yourself a budding science communicator? Do you have a compelling data story to tell? Think you can take the jargon out of your stats chat and put your writing skills to the test? If so, then this is the conference session for you! Join the SSA *Significance* Editorial Board members and guests over a bite to eat during the lunchtime session on Thursday 14th December at ASC 2023 to learn about how to write accessible statistical articles for *Significance*: a magazine discussing the role of statistics in life, science, politics and business.

You can learn more about Significance magazine before the session at https://significancemagazine.com/

Zoom Link

13:30-15:00 Building 20, Lecture Room 1

IPS7 Official Statistics

Paul Schubert
Invited Session

Zoom Link

13:30-15:00 Building 20, Lecture Room 2

CPS26 Law, elections and statistics

Graham Hepworth, Xiaotian Zheng
Contributed Session

Zoom Link

13:30-15:00 Building 20, Lecture Room 3

CPS27 Machine learning, neural networks and deep learning

Ryan Covey, Scott Sisson
Contributed Session

Zoom Link

13:30-15:00 Building 20, Lecture Room 4

OZCOTS2: Training Professionals

Michael Bulmer

Zoom

15:00-15:30

Afternoon Break

15:30-17:00 Building 20, Lecture Room 1

IPS8 Statistical Education

Ayse Bilgin, Peter Howley
Invited Session

Zoom Link

15:30-17:00 Building 20, Lecture Room 2

CPS28 Experimental design & analysis

Swen Kuh, Agus Salim
Contributed Session

Zoom Link

15:30-17:00 Building 20, Lecture Room 3

CPS29 Business analytics

Clara Grazian, Kassel Hingee
Contributed Session

Zoom Link

15:30-17:00 Building 20, Lecture Room 4

CPS30 COVID, climate change and crime

Farzana Jahan, Gordana Popovic
Contributed Session

Zoom Link

17:00-18:00 Building 11, University Hall

ASC Closing ceremony

Zoom Link

19:00-23:00

OZCOTS Conference Dinner

The OZCOTS committee would love to invite you to come and join us for a lovely meal and catch up at a beautiful beach front venue:
Lucia's By the Sea
16 Cliff Rd, Wollongong NSW 2500
Register via conference site

Friday, 15 December, 2023

09:20-09:30 Building 11, University Hall

Announcements/Housekeeping

Zoom Link

09:30-10:30 Building 11, University Hall

OZCOTS Keynote: Professor Ian Gordon

Sue Finch
Keynote
Sponsors: Business Events Perth

"I don't care about the data ..." (said a statistician)
Have you ever heard a statistician say this? I have. Why might this be said, and what should be the disposition of a statistical educator to this attitude?
This presentation will explore the many dimensions of "caring about the data", including: thinking broadly about context, design and research questions; data quality and integrity; representing data well; the coherence of data, models and inferences; data ethics, and ways to encourage student understanding and experience of these issues. I will provide examples from my own experience as a statistician and statistical educator.
Zoom Link

10:30-11:00
Morning tea

11:00-12:30 Building 20, Lecture Room 2
OZCOTS3: Evidence-based teaching and learning practices

Elinor Jones
Zoom Link

11:00-12:30 Building 20, Lecture Room 3
OZCOTS4: Challenges of wider participation

Lynne Giles
Zoom Link

12:30-13:30
Lunch

13:30-15:20 Building 20, Lecture Room 2
OZCOTS5: Innovation in teaching and assessment

Emily Karahalios
Zoom Link

13:30-15:20 Building 20, Lecture Room 3
OZCOTS6: Online learning and teaching

Matt Moores
Zoom Link

15:20-15:35 Building 20, Lecture Room 2
OZCOTS Closing Ceremony

15:35-16:00

Afternoon break