JAMES BAILIE

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jameshbailie.github.io

EDUCATION & RESEARCH

2020– **PhD (statistics)**

Harvard University

Beginning in September 2020, a PhD student within the Statistics Department at Harvard.

2013–2017 **Bachelor of Science (Honours)**

The Australian National University

Majored in mathematics and statistics with a GPA of 6.971. See a descriptive list of my upper division and graduate coursework in mathematics, statistics and computer science.
Received high distinctions in courses covering metric spaces, spectral theory, Hilbert spaces, measure theory, topology, ODEs, vector calculus, algebraic topology, linear algebra, group theory, generalised linear modelling, statistical inference, stochastic processes, Markov chains and martingales. Also completed 9 courses in computer science, including artificial intelligence, reinforcement learning, algorithms, information theory and theory of computation.
Honours in pure mathematics completed in 2017 with thesis *Vector Fields on Spheres*, supervised by Dr. Vigleik Angeltveit.

2016–2017 **Vacation Research Scholar**

The Australian Mathematical Sciences Institute

Summer project *Stable Homotopy and Category of Spectra*, supervised by Dr. Vigleik Angeltveit. Work presented at AMSIConnect conference in Melbourne, February 2017. vrs.amsi.org.au/james-bailie-2017

2013–2014 **Summer Research Scholar**

The University of Queensland

At the Centre for Educational Innovation and Technology.

AWARDS & SCHOLARSHIPS

The International Association for Official Statistics

2020 · Young Statisticians Third Prize

Awarded for the paper *Big Data, Differential Privacy and National Statistical Organisations*.

Australian Bureau of Statistics

2019 · Ken Foreman Award

Awarded for significant methodological contributions in the areas of data linking, confidentiality and machine learning.

The Australian-American Fulbright Commission

2019 · Fulbright Future Scholarship

Awarded for a full U.S. PhD program (up to five years) starting in 2020. Benefits include paid tuition and research fees, a monthly stipend of approximately US$2,400, and health insurance, for a period of five years.

The Australian National University

2017 · ANU Honours Scholarship

2016 · Hanna Neumann Prize for Third Year Mathematics (awarded to the top student in the cohort)

2015 · Boyapati Computer Science and Mathematics Prize for Second Year (awarded to the top student in the cohort)

2014 · Boyapati Computer Science and Mathematics Prize for First Year (awarded to the top student in the cohort)

WORK EXPERIENCE

2018–2020 **Researcher**

The Australian Bureau of Statistics

Working on machine learning applications, administrative data use, data integration, confidentiality, differential privacy, and emerging statistical attacks, within the Methodology Division.
Extensive use of the R programming language as well as experience in writing mathematical proofs and developing theoretical analysis. Completed graduate courses in survey methodology and time series methods, with marks of 90% and 98% respectively.
Started as a graduate in 2018 in Methodology Futures, with projects on data integration and machine learning decision models to improve Census workforce efficiency.
In November 2018, rotated to the Data Integration, Access and Confidentiality Methodology Unit. Currently investigating statistical privacy vulnerabilities (e.g. averaging, differencing and reconstruction attacks) and protections (including the application of differential privacy in the ABS).
In 2019, received the *Ken Foreman Award* and *ABS Census and Data Services Group Excellence Award* for this work.

2020 **Secondee**

The Department of the Prime Minister and Cabinet

Six week secondment to the data team within the COVID-19 taskforce.

2013–2017 **Tutor**

The Australian National University & Self-employed

Tutor for *MATH1115 Advanced Mathematics and Applications 1* at the Australian National University in semester 1 of 2017. In semester 2, tutor for the follow-on course *MATH1116*. Led classes of approx. 30 students in discussions and small group work in addition to marking fortnightly assignments and exams. Received an average rating of 4.3 out of 5 in the student evaluations of overall satisfaction. Previously, a private high school and university mathematics tutor.

2013–2016 **Data Analyst**

Menzies School of Health Research

Casual employee in data management and analysis for the *Engaging Stakeholders in Identifying Priority Evidence-Practice Gaps and Strategies for Improvement in Primary Health Care* project during 2013 to 2015. Tasks included data cleaning, synthesis and presentation, using Python and STATA programming languages. Managed and analysed large datasets (2 million+ entries) in order to extract indicators on health centre performance.
In 2016, conducted Poisson regression to investigate trends in hospitalisation rates in Broken Hill, using the R programming language.

2011–2013 **IT Assistant**

Menzies School of Health Research

Casual employee as part of the One21seventy National Centre for Quality Improvement in Indigenous Primary Health Care. Worked on database design and management, statistical analysis, Python and VBA programming, document proof reading, data entry and technical writing.

SELECTED PAPERS

2019

Bailie J, *Big Data, Differential Privacy and National Statistical Organisations*. Awarded the 2020 Interational Association for Official Statistics (IAOS) Young Statisticians Third Prize. Upcoming in the *Statistical Journal of the IAOS*, December.

Chipperfield J, Bailie J, *Weighting a Survey that is Linked to Multiple Administrative Files when there are False Negatives*. Submitted to the *Statistical Journal of the IAOS*.

Bailie J, Chien C, *ABS Perturbation Methodology Through the Lens of Differential Privacy*, UN Economic Commission for Europe, Work Session on Statistical Data Confidentiality.

Bailie J, Lu E, Elazar D, Chiu K, *A Disrete Calibration Approach to Improving Data Linkage*. Paper presented to the ABS Methodological Advisory Committee (members include Professor Robert Breunig, Professor Kerrie Mengersen, Professor Scott Sisson, Professor Dianne Cook, Scientia Professor Robert Kohn).

2014–2016

Statistical analysis while at the Menzies School of Health Research acknowledged in seven publications. See jameshbailie.github.io/Papers/index.html for a comprehensive list.

SELECTED TALKS

5/2/2020

Designing Formally Private Mechanisms for the p% Rule, NIASRA's (National Institute for Applied Statistics Research Australia) 'Workshop on Advances in Statistical Disclosure Limitation', University of Wollongong

8/11/2019

The Promises of Differential Privacy, ABS Seminar

1/10/2019

Using Admin Data and Machine Learning to Predict Dwelling Occupancy on Census Night, Statistical Society of Australia's 'Young Statisticians Conference'

2/9/2019

New Statistical Attacks on Population Count Tables, ABS Seminar

9/2/2017

Stable Homotopy Theory, Australian Mathematical Sciences Institute Connect Conference

PROGRAMMING SKILLS

Basic

C++, Javascript, Visual Basic for Applications

Intermediate

Git, Linux command-line, Python, SAS, STATA, SQL

Advanced

R, LaTeX

OTHER INFORMATION

Professional Associations

2018–Present · Member of the Statistical Society of Australia

Service

2015–Present · Elected to the ANU Mountaineering Club executive:

2015 general officer; 2016-2017 president; 2018-2019 secretary; 2019-present vice president

Inducted into the ANU Mountaineering Club *Hall of Fame* in 2019.

Canberra's largest and most active outdoor club with 400+ members and 250+ trips annually.

ANUMC awarded ANU Sport *Club of the Year* in 2018.

2015 · Senior Resident (2015), Academic Mentor (2014–2015) and IT Assistant (2014) at Ursula Hall, ANU

Interests

2016–Present · Mountaineering. Sponsored expeditions:
New Zealand (11/2016 and 12/2017-2/2018)
Kyrgyzstan (two first ascents, including a 5000m+ peak; 8-9/2018)
Peru (6-8/2019).

September 1, 2020