

JAMES BAILIE

[firstName] h [lastName] at gmail dot com
jameshbailie.github.io

EDUCATION & RESEARCH

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| <i>The Australian
National
University</i> | 2013–2017 Bachelor of Science (Honours) |
| | Majoried 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 <i>Vector Fields on Spheres</i> , supervised by Dr. Vigleik ANGELTVEIT. |
| <i>The Australian
Mathematical
Sciences Institute</i> | 2016–2017 Vacation Research Scholar |
| | Summer project <i>Stable Homotopy and Category of Spectra</i> , supervised by Dr. Vigleik ANGELTVEIT. Work presented at AMSIConnect conference in Melbourne, February 2017. vrs.amsi.org.au/james-bailie-2017 |
| <i>The University of
Queensland</i> | 2013–2014 Summer Research Scholar |
| | At the Centre for Educational Innovation and Technology. |

AWARDS & SCHOLARSHIPS

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| <i>The Australian-
American
Fulbright
Commission</i> | 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. |
| <i>The Australian
National
University</i> | 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

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| <i>The Australian
Bureau of
Statistics</i> | 2018–Present Researcher |
| | 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 *ABS Census and Data Services Group Excellence Award* for this work.

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*. Submitted to the 2020 International Association for Official Statistics (IAOS) Young Statisticians Prize, for publication in the *Statistical Journal of the IAOS*.

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 Discrete 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	<i>Designing Formally Private Mechanisms for the $p\%$ Rule</i> , NIASRA's (National Institute for Applied Statistics Research Australia) 'Workshop on Advances in Statistical Disclosure Limitation', University of Wollongong
8/11/2019	<i>The Promises of Differential Privacy</i> , ABS Seminar
1/10/2019	<i>Using Admin Data and Machine Learning to Predict Dwelling Occupancy on Census Night</i> , Statistical Society of Australia's 'Young Statisticians Conference'
2/9/2019	<i>New Statistical Attacks on Population Count Tables</i> , ABS Seminar
9/2/2017	<i>Stable Homotopy Theory</i> , Australian Mathematical Sciences Institute Connect Conference

PROGRAMMING SKILLS

<i>Basic</i>	C++, Javascript, Visual Basic for Applications
<i>Intermediate</i>	Git, Linux command-line, Python, SAS, STATA, SQL
<i>Advanced</i>	R, \LaTeX

OTHER INFORMATION

<i>Professional Associations</i>	2018–Present · Member of the Statistical Society of Australia
<i>Service</i>	<p>2015–Present · Elected to the ANU Mountaineering Club executive: 2015 general officer; 2016–2017 president; 2018–2019 secretary; 2019–present vice president</p> <p>Inducted into the ANU Mountaineering Club <i>Hall of Fame</i> in 2019.</p> <p>Canberra's largest and most active outdoor club with 400+ members and 250+ trips annually.</p> <p>ANUMC awarded ANU Sport <i>Club of the Year</i> in 2018.</p> <p>2015 · Senior Resident (2015), Academic Mentor (2014–2015) and IT Assistant (2014) at Ursula Hall, ANU</p>
<i>Interests</i>	<p>2016–Present · Mountaineering. Sponsored expeditions:</p> <p>New Zealand (11/2016 and 12/2017–2/2018)</p> <p>Kyrgyzstan (two first ascents, including a 5000m+ peak; 8–9/2018)</p> <p>Peru (6–8/2019).</p>

February 6, 2020