

# Natalie Karavarsamis

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## ACADEMIC AND RESEARCH POSITIONS

- 2018– **Lecturer of Statistics**, Department of Mathematics and Statistics, La Trobe University.
- 2016– **Honorary Research Fellow**, School of Mathematics and Statistics, University of Melbourne.  
Collaborators: Prof. Richard Huggins, Dr Gurutzeta Guillera-Arroita, Prof. Byron Morgan, Ass. Prof. Ray Watson
- 2016–2017 **Lecturer of Statistics**, School of Mathematics and Statistics, University of Melbourne.
- 2016–2017 **Postdoctoral Research Fellow**, School of Biosciences, University of Melbourne.
- 2015 **Postdoctoral Research Fellow**, School of Mathematical and Geospatial Sciences, RMIT University.  
Project title: New statistical approaches for analysing species distributions
- 2009–2014 **PhD candidate**, School of Mathematics and Statistics, University of Melbourne.
- 2009–2012 **Statistical Consultant**, Parks Victoria, Melbourne.
- 2008 **Research Fellow**, School of Food and Land Sciences, University of Melbourne, Deakin University.
- 2004–2007 **Biometrician**, Department of Primary Industries, Victorian State Government, Australia.
- 2004–2007 **Research Associate**, Department of Primary Industries, Victorian State Government, Australia.
- 2004–2007 **Supervisor**, Department of Primary Industries, Victorian State Government, Australia.
- 2004 **Statistical Consultant**, Department of Primary Industries, Victorian State Government, Australia.
- 2001–2003 **Biostatistician**, Cancer Epidemiology Centre, Cancer Council of Victoria, Australia
- 2001–2003 **Statistical Consultant**, Cancer Epidemiology Centre, Cancer Council of Victoria, Australia
- 2001–2003 **Research Associate**, *Cancer Epidemiology Centre*, Cancer Council of Victoria, Australia.
- 2001–2017 **Teaching Assistant**, School of Mathematics and Statistics, University of Melbourne.
- 2000 **Honours Candidate in Statistics**, School of Mathematics and Statistics, University of Melbourne.
- 2000 **Research Assistant**, Statistical Consulting Centre, School of Mathematics and Statistics, University of Melbourne
- 1999 **Research Assistant**, School of Medicine, University of Crete, Greece
- 1998 **Private Tutor**.

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## EDUCATION

- 2009–2015 **Ph.D. in Statistics**, School of Mathematics and Statistics, University of Melbourne, Australia.  
Thesis: Methods for estimating occupancy.  
Supervisors: Prof. Richard Huggins, A/Prof. Ray Watson, Ass. Prof. Andrew Robinson and Ass. Prof. Graham Hepworth.
- 2000 **B.Sc. Honours degree in Statistics - 1<sup>st</sup> Class Honours**, School of Mathematics and Statistics, University of Melbourne, Australia.  
Thesis: Methods of Meta-Analysis.  
Supervisors: Dr Ken Sharpe and Ass. Prof. Ian Gordon.
- 1996 **B.Sc. in Statistics and Operations Research**, School of Mathematics and Statistics, University of Melbourne, Australia.

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## TEACHING COORDINATOR

- 2020–present **STA3BS**, *Biostatistics*, 3rd year Undergraduate, Department of Mathematics and Statistics.  
La Trobe University
- 2019 **STM3EPS**, *Engineering Probability and Statistics*, 3rd year Undergraduate, Department of Mathematics and Statistics, Department of Engineering.  
La Trobe University
- 2018–present **STA3AS**, *Applied Statistics*, 3rd year Undergraduate & 4th year Honours, Advanced statistical methods, Department of Mathematics and Statistics.  
La Trobe University
- 2018–present **STA2ASM**, *Applied Statistical Methods*, 2nd year Undergraduate, Department of Mathematics and Statistics.  
La Trobe University
- 2018 **STA3LM**, *Linear Models*, 3rd year Undergraduate, Advanced statistical methods, Department of Mathematics and Statistics.  
La Trobe University
- 2016–2017 **MAST90044**, *Thinking and Reasoning with Data*, Masters & Postgraduate, School of Mathematics and Statistics.  
University of Melbourne

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## TEACHING ASSISTANT

- 2010–2017 **Statistics for Research Workers**, Postgraduate and Professional level. Intensive 6-day short course, Statistical Consulting Centre, School of Mathematics and Statistics.  
University of Melbourne
- 2009 **Critical Thinking with Data**, 1st year Undergraduate, School of Mathematics and Statistics.  
University of Melbourne
- 2008–2017 **MAST10010**, *Data Analysis*, 1st year Undergraduate, School of Mathematics and Statistics.  
University of Melbourne
- 2008 **Experimental Design and Data Analysis for Biomedical Science**, 1st year Undergraduate, School of Mathematics and Statistics.  
University of Melbourne

- 2007, 2008 **Applied Statistics**, 2nd year Undergraduate, School of Mathematics and Statistics. University of Melbourne
- 2007,2008 **Experimental Design/Statistical Methods**, 2nd year Undergraduate, School of Mathematics and Statistics. University of Melbourne
- 2001–2017 **MAST10011**, *Experimental Design and Data Analysis*, 1st year Undergraduate, School of Mathematics and Statistics. University of Melbourne

### Other Teaching

- 2006–2007 **Tutor**, *Volunteer*, Drop-in After School Tutoring Centre, Reading and comprehension, maths and science, primary and secondary level. Hanover Centre, Footscray Library
- 1999– **Tutor**, *Private*, Primary, secondary (including Year 11 and 12): Maths, Science, Chemistry, Physics, Undergraduate, postgraduate & professional level Statistics tutoring across universities and faculties.

## INDUSTRY CONSULTATION PROJECTS

- 2006–2007 Validating the yield performance of alternatives to methyl bromide for pre-plant fumigation, TEAP and UNEP. Department of Primary Industries
- 2003–2005 Reducing Spoilage and Contamination Risks of Fresh Vegetables in China and Australia, Chinese Collaboration. Department of Primary Industries
- 2004–2005 National (Australian) Industry potato grower Project. Department of Primary Industries
- 2004 Import Risk Analysis for Apples from New Zealand. Department of Primary Industries
- 2001–2003 Melbourne Collaborative Cohort Study (MCCS), commenced 1990. Cancer Council of Victoria.
- 2001–2003 Eating Patterns and Food Consumption Survey and Methods Development, MCCS, Cancer Council of Victoria
- 2001–2003 Nutrient Analysis Methods Development and Testing. Software testing (Visual Basic-VBA) and software development in STATA. Cancer Council of Victoria
- 1999 European Union Seven Countries Study. School of Medicine, University of Crete, Greece

## CURRENT RESEARCH FOCUS

- Methods Circular distributions; Cylindrical distributions; Time-series; Partial likelihoods; Zero-inflated distributions; Inference for zero-inflated distributions; GAMs; GLMMs; HMMs; Statistical ecology methods; Hypothesis tests for two-sample occupancy models; Equivalence tests
- Applications Analysis of high-dimensional data sets in life and social sciences, including data from neuroscience; Statistical ecology methods and applications; Spatio-temporal modelling for biological data

## MANUSCRIPTS IN PREPARATION

1. **Karavarsamis, N.** and Huggins, R.M.. A two-stage approach to the analysis of occupancy data III. The Heterogeneous case with GAMs.

2. **Karavarsamis, N.**, Cylindrical distributions for zebrafish data.
3. **Karavarsamis, N.**, Ullmann, J., Ngyuen, H. and Reutens, D.. Adult zebrafish locomotor behaviour for controls with the cylindrical distribution.
4. **Karavarsamis, N.**, Ullmann, J., Ngyuen, H. and Reutens, D.. HMMs for zebrafish.
5. **Karavarsamis, N.**. R software package for the two stage approaches to the analysis of occupancy data: `twostage`.
6. **Karavarsamis, N.** and Watson, R.. Plausible region for estimating occupancy.
7. **Karavarsamis, N.** and Watson, R.. Bias of occupancy estimator.
8. **Karavarsamis, N.**, Huggins, R.M.. Methods for sparse occupancy data.
9. **Karavarsamis, N.**, Huggins, R.M.. EM maximisation for occupancy data.
10. Staudte, R.G., **Karavarsamis, N.**. Evidence for goodness-of-fit in Chi-squared tests.

## PUBLICATIONS

11. Makdissi, R., Atkins, Z.S., Clemann, N., **Karavarsamis, N.** and Robert, K.A.. A skink in grasshopper's clothing: utilisation of Batesian mimicry in juvenile Guthega skinks as an antipredator defence (*under review*).
12. **Karavarsamis, N.**, Guillera-Arroita, G., Huggins, R.M. and Morgan, B. (2020). How can the score test be consistent?. *Australian and New Zealand Journal of Statistics (in press)*.
13. **Karavarsamis, N.** (2019). Estimating Occupancy and Fitting Models with the Two-Stage Approach. H. Nguyen (Ed.): Research School of Statistics and Data Science, RSSDS 2019, Communications in Computer and Information Science (CCIS) vol. 1150, pp. 68–80, 2019. Springer Nature Singapore Pte Ltd. [https://doi.org/10.1007/978-981-15-1960-4\\_5](https://doi.org/10.1007/978-981-15-1960-4_5)
14. **Karavarsamis, N.** and Huggins, R.M. (2019). A two-stage approach to the analysis of occupancy data I. The Homogeneous case. *Communications in Statistics - Theory and Methods*. DOI: 10.1080/03610926.2019.1607385.
15. **Karavarsamis, N.** and Huggins, R.M.(2019). A two-stage approach to the analysis of occupancy data II. The Heterogeneous case. *Computational Statistics and Data Analysis*, 133:195–207. <https://doi.org/10.1016/j.csda.2018.09.009>.
16. Bagnall, J., Jones A., **Karavarsamis, N.** and Nguyen H. (2019). The Fully-Visible Boltzmann Machine and the Senate of the 45th Australian Parliament in 2016. *Journal of Computational Social Science*. <https://dx.doi.org/10.2139/ssrn.3287903>.
17. **Karavarsamis, N.** (2015). Methods for Estimating Occupancy. PhD thesis.
18. Mara, D., Hamilton, A.J., Sleight, A., **Karavarsamis, N.**, Razak Seidu. (2015). Tools for Risk Analysis: Updating the 2006 Guidelines. Wastewater Irrigation and Health. Earthscan.
19. **Karavarsamis, N.**, Robinson, A. P., Hepworth, G., Hamilton, A.J. and Heard, G.W. (2013). Comparison of four bootstrap-based interval estimators of species occupancy and detection probabilities. *Australian and New Zealand Journal of Statistics*, 55(3):235–252.
20. Kreidl, S., Holmes, R., Partington, D., **Karavarsamis, N.** (2012). The effect of calcium and nitrogen nutrition on the development of postharvest rots in pak choi. *Acta horticulture*, 944:73–82.
21. Mara, D., Hamilton, A.J., Sleight, A., **Karavarsamis, N.** (2011). Tools for risk assessment: updating the 2006 WHO guidelines. *Wastewater irrigation and health: Assessing and mitigating risk in low-income countries*. Earthscan, IDRC and IWMI. Editors: P. Drechsel and C.H.Scott and L. Easchild-Sally ajnd M. Redwood and A. Bahri (89–100).
22. **Karavarsamis, N.** and Hamilton, A.J. (2010). Estimators of Annual Probability of Infection for quantitative microbial risk assessment. *Journal of Water and Health*, 8(2):365–373.
23. **Karavarsamis, N.** (2010). Safeguarding our species. *The Age; The Voice*, June, 6(6). <http://voice.unimelb.edu.au/volume-6/number-6/safeguarding-our-species>.
24. Mara D, Hamilton AJ, Sleight A, **Karavarsamis N.**, Seidu R. (2009). Tools for risk analysis: Updating the 2006 WHO guidelines. In *Wastewater Irrigation and Health: Assessing and Mitigating*

Risk in Low-income Countries. 89-100. (Book Chapter).

25. **Karavarsamis, N.**, and Hamilton, A.(2008). Estimators of Annual Probability of Infection. Australian Statistical Conference (ASC2008), Australian Mathematical Sciences Institute (AMSI) and Statistical Society of Australia Inc. (SSAI).
26. Porter, I.J., Trinder, L., Partington, D., Banks, J., Smith, S., Hannah, M., **Karavarsamis, N.** (2006). Special report validating the yield performance of alternatives to Methyl Bromide for pre-plant fumigation. *TEAP/MBTOC Special Report, UNEP Nairobi*.
27. **Karavarsamis, N.** (2005). Control of downy mildew of grapevines by boosting their natural defence system, Final Report to Grape and Wine Research and Development Corporation 2004 – 2005.
28. **Karavarsamis, N.** (2004). Reducing Spoilage and Contamination Risks of Fresh Vegetables in China and Australia, Chinese Collaboration.
29. **Karavarsamis, N.** (2004). Submission (to Australian Government) for the Revised Draft Import Risk Analysis Report for Apples from New Zealand.
30. Giles, G., English, D., **Karavarsamis, N.**, Thursfield, V. (2003). Cancer Survival in Victoria – Relative survival for selected cancers diagnosed from 1982 to 1997 with follow-up to 2000. *Cancer Council Monographs*.
31. **Karavarsamis, N.** (2003). Survival in women in the Victorian breast survey management cohorts: 1986-1995. *Cancer Council Monographs*.
32. **Karavarsamis, N.** (2003). Nutrient Analysis Software – Stata language. Commercial Release of Software.
33. Roberts, S., **Karavarsamis, N.**, English, D., Giles, G. (2001). Hepatocellular carcinoma in Victoria Australia: survival and prognostic factors. 53rd Annual Meeting of the Association for the Study of Liver Diseases (AASLD), Boston, Massachusetts. *Hepatology*. (Conference proceedings)

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## ACADEMIC SERVICE

### Editorial Positions

2018–present Technical Sub-Editor, Australian and New Zealand Journal of Statistics (Wiley)

### Peer Review

2020–present B

iometrics (Wiley)      2019 Peer-review of proceedings papers of RSSDS 2019 (Research School on Statistics and Data Science 2019), Springer Communications in Computer and Information Science

2019–present PhD thesis examiner

2018–present Journal of Pediatric Rehabilitation Medicine (IOS Press)

2018–present Austral Ecology, A Journal of ecology in the Southern Hemisphere, Ecological Society of Australia (Wiley)

### Roles

2019–present Bachelor of Science Course Advisor, Department of Mathematics and Statistics, La Trobe University

2018–present Higher Degree Thesis Reviewer, Department of Mathematics and Statistics, La Trobe University

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## COMMITTEES

2019–present Local Organising Committee, International Statistical Ecology Conference (ISEC2020), University of New South Wales, Sydney, Australia, June 22–26, 2020

- 2019–present Co-Chair, Research School on Statistics and Data Science (RSSDS2019), La Trobe University, Melbourne, Australia, July 24–26, 2019
- 2019–present Program Committee, Research School on Statistics and Data Science (RSSDS2019), La Trobe University, July 2019
  - 2019 Committee, Women in Mathematics Day, La Trobe University, joint WIMISG event in honour of Maryam Mirzakhani the first female Fields Medallist
  - 2019 Committee, Choose Maths Day, La Trobe University, in collaboration with Australian Mathematical Sciences Institute (AMSI)
  - 2018 Founder and Administrator, Statistics Journal Club, Department of Mathematics and Statistics, La Trobe University
- 2018–present Reviewer, International PhD Applicants, Department Mathematics and Statistics, La Trobe University
  - 2017 Committee Member & Organisator, Mathematics & Statistics Female Academics & PhD Mentoring Program, University of Melbourne
- 2014–2017 Member, Equity Plenary Committee, University of Melbourne
  - 2010 Committee, 2010 Victorian Mathematics and Statistics Student Conference, School of Mathematics and Statistics, of Melbourne Melbourne
- 2009–2012 Journal Club organiser and presenter, School of Mathematics and Statistics, University of Melbourne
- 2003–2005 Founder, Committee Member and Administrator, Young Statisticians of Statistical Society Australia (SSA), Victoria, Australia

## PROFESSIONAL SERVICE & OUTREACH

- 2019 Invited Speaker, Subject Selection Fair 2019, La Trobe University, Melbourne, Australia
- 2019 Q&A Panel Member, Women in Mathematics Day, La Trobe University, joint WIMISG event in honour of Maryam Mirzakhani the first female Fields Medallist
- 2018 Chair, Statistics Session, AMSI Summer Scholar Conference, Melbourne University
- 2018 Invited Speaker, Australian Mathematical Sciences Institute (AMSI) Choose Maths Day, La Trobe University
- 2018 Discussion Panel Member, AMSI Choose Maths, La Trobe University
- 2018 Ambassador, Mathematics & Statistics Education at La Trobe University, 55th Annual Conference, Mathematical Association of Victoria, La Trobe University
- 2018 Ambassador, Open Day activities, Department of Mathematics and Statistics, La Trobe University
- 2018 Invitee, Vice Chancellor's Luncheon, La Trobe University
- 2017 Mentor, Mathematics & Statistics Female PhD & Academic Mentoring Program
- 2009–2012 Ambassador, Open Day activities, Department of Mathematics and Statistics, Melbourne University
  - 2012 Invited teacher, Year 9 Mathematics Class
- 2009–2014 Mentor, International Students, University of Melbourne
  - 2007 Volunteer Tutor, Hanover Center, Melbourne, Australia
- 2001–2017 Tutor at the First-Year Learning Centre, Department of Mathematics, University of Melbourne



2001– Member, Statistical Society of Australia

## CONFERENCE, INVITED PRESENTATIONS, AND WORKSHOPS

- 2019 Invited Speaker, Boston Children's Hospital and Department of Neuroscience, November, Harvard University, USA
- 2019 Invited Speaker, INRIA Seminar Series, November, INRIA Seminar Series, Grenoble, France
- 2019 Invited Speaker, Monash Statistics Seminar Series, October, Monash University, Melbourne, Australia
- 2019 Invited Speaker, RMIT Data Analytics Seminar Series, October, RMIT University, Melbourne, Australia
- 2019 *Estimating occupancy and fitting models*, **Karavarsamis, N.** Invited Speaker, 3rd Research School on Statistics and Data Science (RSSDS2019), July, La Trobe University, Melbourne, Australia (Springer)
- 2019 *Data mining swimming behaviour of adult zebrafish*, **Karavarsamis, N.** 3rd International Conference on Econometrics and Statistics (EcoSta 2019), June, National Chung Hsing University, Taiwan
- 2019 *Circular statistics for Zebrafish - Special seminar*, **Karavarsamis, N.** Invited Speaker, June, Joint Harvard and La Trobe University Special Seminar, La Trobe University, Melbourne, Australia
- 2018 *How can the score test be consistent?*, **Karavarsamis, N.** Invited Speaker, La Trobe–Kyushu Joint Seminar Series, La Trobe University
- 2018 *How can the score test be consistent?*, **Karavarsamis, N.** Speaker, International Statistical Ecology Conference (ISEC) 2018, St Andrews, Scotland
- 2018 *How can the score test be consistent?*, **Karavarsamis, N.** Invited speaker, Statistical Seminar Series, La Trobe University
- 2018 Invited Speaker & Discussion Panel Member, AMSI Choose Maths Day, La Trobe University
- 2014 *Methods for Estimating Occupancy*, **Karavarsamis, N.** PhD Completion Seminar. School of Mathematics and Statistics, University of Melbourne
- 2013 *Occupancy Models*, **Karavarsamis, N.** Invited Speaker, Fortnightly seminar series. School of Mathematics and Statistics, University of Melbourne
- 2010 *Comparison of four bootstrap-based interval estimators of species occupancy and detection probabilities* **Karavarsamis, N.**, Robinson, A. P., Hepworth, G., Hamilton, A.J. and Heard, G.W.. International Statistical Ecology Conference (ISEC), University of Kent, UK
- 2010 *Occupancy Methods*, **Karavarsamis, N.** ACERA, University of Melbourne
- 2009 *Comparison of four bootstrap-based interval estimators of species occupancy and detection probabilities*, **Karavarsamis, N.**, Robinson, A. P., Hepworth, G., Hamilton, A., and Heard, G.. International Biometrics Society Australasian Region Conference (IBS), Taupo, New Zealand
- 2008 *Estimators of Annual Probability of Infection*, **Karavarsamis, N.** Speaker, Australasian Statistical Conference (ASC), Melbourne, Australia

- 2005 The 55<sup>th</sup> Session of the International Statistical Institute (ISI) . Sydney, NSW Australia. Conference Delegate. Funding: Denise Lievesley Young Statisticians Award, and Department of Primary Industries
- 2004 *Design of Experiments*, **Karavarsamis, N.**. Workshop Invited Presenter, Department of Primary Industries, Irymple, Victoria
- 2004 International Biometrics Conference joint Statistical Society of Australia (SSAI). Cairns, QLD, Australia. Conference delegate. Funding: Department of Primary Industries (DPI)
- 2003 **Karavarsamis, N.**. Energy-adjustment methods for nutrient data. Work in Progress (WIP) Statistics Seminars, Centre for Genetic Epidemiology & School of Public Health, University of Melbourne. Convenor: Prof. John Hopper
- 2001 The Australasian Epidemiological Conference and the Biostatistics Conference. Sydney, NSW, Australia. (Conference delegate)

## GRANTS, AWARDS AND FUNDING

- 2019 Travel Grant, Department Mathematics and Statistics, La Trobe University AUD 6000
- 2018 Australian-French Association for Research and Innovation (AFRAN) AUD 3000
- 2016 Establishment Grant, School of Mathematics and Statistics, University of Melbourne AUD 6000
- 2015 Ph.D. Write Up Grant, University of Melbourne AUD 6000
- 2009–2014 Ph.D. Scholarship, University of Melbourne AUD 23 000 per annum
- 2010–2012 Ph.D. Stipend, Fox Control Program, Parks Victoria AUD 10000 per annum
- 2010 Melbourne abroad travelling scholarships (MATS), School of Mathematics and Statistics, University of Melbourne AUD 15 000
- 2010 The Overseas Research Student Belz Award Scheme. School of Mathematics and Statistics, The University of Melbourne AUD 15 000
- 2009 Travel Award, School of Mathematics and Statistics, University of Melbourne AUD 10 000
- 2008 Conference funding, Department of Land and Food Sciences, University of Melbourne AUD 5000
- 2005 Denise Lievesley Young Statisticians Award, Statistical Society of Australia
- 2004 Travel Award, International Biometrics (IBC) and Australasian Statistical (ASC) conference, Department of Primary Industries AUD 7000
- 2001 Travel Award, Australasian Epidemiological Association (AEA) and Biostatistics Conference, Cancer Epidemiology Centre (CEC), Cancer Council of Victoria AUD 6000

## SUPERVISION

- 2018– Co-supervisor, PhD Candidate, Department of Mathematics and Statistics, La Trobe University
- 2018 Supervisor, AMSI Summer Scholarships, Department of Mathematics and Statistics, La Trobe University



- 2018 Supervisor, AMSI Summer Scholarships, Department of Mathematics and Statistics,  
La Trobe University
- 2004–2005 Supervisor, Research Assistants, Department of Primary Industries

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## EXTRA-CURRICULAR ACHIEVEMENTS

- 2011 **Karavarsamis, N.**, *Dance Class*. Concept, Executive Producer and Dancer. Contemporary dance performance for 16 dancers with 6 choreographers. 1 year development from concept to performance. Gasworks Theatre Melbourne. Australia.