

# BEN C. STEVENSON

Senior Lecturer · University of Auckland

## PERSONAL DETAILS

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**Address** Department of Statistics  
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## EMPLOYMENT

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**University of Auckland**  
Senior Lecturer *2021–Present*  
Lecturer *2017–2021*

**University of St Andrews** *2016*  
Research Fellow

## EDUCATION

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**PhD in Statistics** *2012–2016*  
University of St Andrews  
Thesis title: *Methods in spatially explicit capture-recapture*

**MSc in Statistics** *2010–2011*  
First Class Honours  
University of Auckland  
Thesis title: *Assessment of lunar and indigenous fishing calendar predictions using catch data of snapper*

**BSc (Hons) in Statistics** *2009–2010*  
First Class Honours  
University of Auckland

**BSc in Statistics and Psychology** *2006–2009*  
University of Auckland

## AWARDS

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**University of Auckland Baking Competition** *2019*  
Awarded second place in the banana cake category.

**Dean's Teaching Commendation** *2017–2019*  
Awarded by the Dean of Science at the University of Auckland for exceptional levels of student satisfaction.

**Departmental Teaching Award** *2017, 2018*  
Awarded by the Department of Statistics at the University of Auckland to recognise teaching excellence.

**Worsley Early-Career Award** 2017

Awarded by the New Zealand Statistical Association, recognising outstanding recent published research from a New Zealand statistician in the early stages of their career.

**EPSRC Doctoral Fellowship Prize** 2015

Awarded funding for a one-year research fellow post at the University of St Andrews.

**American Statistical Association Student Paper Prize** 2015

A winner in the Statistical Computing Section with a manuscript entitled *An R package for the estimation of animal density from a fixed array of remote detectors*; invited to present this work at the Joint Statistical Meetings, Seattle, USA, August 2015.

## RESEARCH GRANTS

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**co-PI, Marsden Standard Grant, \$712 000** 2024-2027

*Fast statistical methods for enigmatic sensor data*

**PI, Faculty of Science Research Fellowship Award, \$178 662** 2023-2025

*Scaling up: Data science for ecological monitoring at landscape dimensions*

**PI, Marsden Fast-Start Grant, \$300 000** 2020-2024

*Estimating animal population size in an unobservable spatial obstacle course*

**AI, EPSRC Impact Acceleration Grant, £25 619** 2021-2022

*Training the trainer: Assessing gibbon populations with digital acoustic recorders*

**AI, Marsden Grant, \$680 000** 2018-2021

*Cells and whistles: Supercharging our biodiversity monitoring toolkit using genetic and acoustic records*

**PI, Faculty of Science Strategic Impact Grant, \$5 000** 2021

*User-friendly software to analyse acoustic wildlife survey data*

**PI, FRDF New-Staff Grant, \$30 000** 2018-2020

*Putting the ‘spatial’ in ‘spatial capture-recapture’: Accounting for spatial structure in ecological processes for robust estimation of population density*

## PEER-REVIEWED PUBLICATIONS

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van Dam-Bates, P., Papathomas, M., **Stevenson, B. C.**, Fewster, R. M., Turek, D., Stewart, F. E. C., and Borchers, D. L. (in press) A flexible framework for spatial capture-recapture with unknown identities. *Biometrics*.

Setyawan, E., Erdmann, M. V., Mambrasar, R., Ambafen, O., Hasan, A. W., Izuan, M., Mofu, I., Putra, M. I. H., Sianipar, A. B., Constantine, R., **Stevenson, B. C.**, and Jaïne, F. R. A. (in press) Spatial connectivity of reef manta rays across the Raja Ampat archipelago, Indonesia. *Royal Society Open Science*.

Durbach, I., Chopara, R., Borchers, D. L., Phillip, R., Sharma, K., and **Stevenson, B. C.** (2024) That’s not the Mona Lisa! How to interpret spatial capture-recapture density surface estimates. *Biometrics*, 80(1), ujad020.

Martin, L. H., Hepinstall-Cymerman, J. H., Chandler, R. B., Cooper, R. J., Parrish, M. C., Hao, L., and **Stevenson, B. C.** (2024) Estimating owl population density using acoustic spatial capture-recapture. *Journal of Raptor Research*, 58(1), 1–13.

- McGrath, S., Liu, J., **Stevenson, B. C.**, and Behie, A. M. (2023) Density and population size estimates of the endangered northern yellow-cheeked crested gibbon *Nomascus annamensis* in selectively logged Veun Sai-Siem Pang National Park in Cambodia using acoustic spatial capture-recapture methods. *PLoS ONE*, 18(11), e0292386.
- Stevenson, B. C.**, Fewster, R. M., and Sharma, K. (2022) Spatial correlation structures for detections of individuals in spatial capture-recapture models. *Biometrics*, 78(3), 963–973.
- Setyawan, E., **Stevenson, B. C.**, Erdmann, M. V., Hasan, A. W., Sianipar, A. B., Mofu, I., Putra, M. I. H., Izuan, M., Ambafen, O., Fewster, R. M., Aldridge-Sutton, R., Mambrasar, R., and Constantine, R. (2022) Population estimates of photo-identified individuals using a modified POPAN model reveal that Raja Ampat’s reef manta rays are thriving. *Frontiers in Marine Science*, 9(1), 1014791.
- Borchers, D. L., Nightingale, P., **Stevenson, B. C.**, and Fewster, R. M. (2022) A latent capture history model for digital aerial surveys. *Biometrics*, 78(1), 274–285.
- Setyawan, E., Erdmann, M. V., Mambrasar, R., Hasan, A., Sianipar, A., Constantine, R., **Stevenson, B. C.**, and Jaine, F. R. A. (2022) Residency and use of an important nursery habitat, Raja Ampat’s Wayag lagoon, by juvenile reef manta rays (*Mobula alfredi*). *Frontiers in Marine Science*, 9(1), 815094.
- Setyawan, E., **Stevenson, B. C.**, Izuan, M., Constantine, R., and Erdmann, M. V. (2022) How big is that manta ray? A novel and non-invasive method for measuring reef manta rays using small drones. *Drones*, 6(3), 63.
- Stevenson, B. C.**, van Dam-Bates, P., Young, C. K. Y., and Measey, J. (2021) A spatial capture-recapture model to estimate call rate and population density from passive acoustic surveys. *Methods in Ecology and Evolution*, 12(3), 432–442.
- Baron, H. R., **Stevenson, B. C.**, and Phalen, D. N. (2021) Comparison of in-clinic diagnostic testing methods for *Macrorhabdus ornithogaster*. *Journal of Avian Medicine and Surgery*, 35(1), 37–44.
- Samaniego, A., Griffiths, R., Gronwald, M., Holmes, N. D., Oppel, S., **Stevenson, B. C.**, and Russell, J. C. (2020) Risks posed by rat reproduction and diet to eradications on tropical islands. *Biological Invasions*, 22(4), 1365–1378.
- Baron, H. R., **Stevenson, B. C.**, and Phalen, D. N. (2020) Inconsistent efficacy of water soluble Amphotericin B for the treatment of *Macrorhabdus ornithogaster* in a budgerigar (*Melopsittacus undulatus*) aviary. *Australian Veterinary Journal*, 98(7), 333–337.
- Stevenson, B. C.**, Borchers, D. L., and Fewster, R. M. (2019) Cluster capture-recapture to account for identification uncertainty on aerial surveys of animal populations. *Biometrics*, 75(1), 326–336. *Figure 1 from this publication was selected to appear on the issue cover.*
- Baron, H. R., Phalen, D. N., Sabater Gonzalez, M., **Stevenson, B. C.**, and Leung, K. C. L. (2019) Evidence of Amphotericin B resistance in *Macrorhabdus ornithogaster* in Australian cage-birds. *Medical Mycology*, 57(4), 421–428.
- Jones-Todd, C. M., Caie, P., Illian, J. B., **Stevenson, B. C.**, Savage, A., Harrison, D. J., and Bown, G. L. (2019) Identifying prognostic structural features in tissue sections of colon cancer patients using point pattern analysis. *Statistics in Medicine*, 38(8), 1421–1441.
- Measey, G. J., **Stevenson, B. C.**, Scott, T., Altwegg, R., and Borchers, D. L. (2017) Counting chirps: Acoustic monitoring of cryptic frogs. *Journal of Applied Ecology*, 54(3), 894–902.

- Kidney, D., Rawson, B. M., Borchers, D. L., **Stevenson, B. C.**, Marques, T. A., and Thomas, L. (2016) An efficient acoustic density estimation method with human detectors applied to gibbons in Cambodia. *PLoS ONE*, 11(5), e0155066.
- Fewster, R. M., **Stevenson, B. C.**, and Borchers, D. L. (2016) Trace-contrast models for capture-recapture without capture histories. *Statistical Science*, 31(2), 245–258.
- Borchers, D. L., **Stevenson, B. C.**, Kidney, D., Thomas, L., and Marques, T. A. (2015) A unifying model for capture-recapture and distance sampling surveys of wildlife populations. *Journal of the American Statistical Association*, 110(509), 195–204.
- Stevenson, B. C.**, Borchers, D. L., Altwegg, R., Swift, R. J., Gillespie, D. M., and Measey, G. J. (2015) A general framework for animal density estimation from acoustic detections across a fixed microphone array. *Methods in Ecology and Evolution*, 6(1), 38–48.
- Stevenson, B. C.**, and Millar, R. B. (2013) Promising the moon? Evaluation of indigenous and lunar fishing calendars using semiparametric generalized mixed models of recreational catch data. *Environmental and Ecological Statistics*, 20(4), 591–608.

## INVITED CONFERENCE TALKS

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- Data science for modern wildlife surveys** *June 2023*  
 ICMS workshop: Building interdisciplinary solutions to modern ecological challenges  
 Edinburgh, UK  
*Plenary speaker*
- Spatial correlation structures for detections of individuals in spatial capture-recapture models** *July 2020*  
 Australian and New Zealand Statistics Conference  
 Gold Coast, Australia  
*Invitation declined and conference cancelled due to COVID-19*
- Acoustic density estimation: Recent advances for terrestrial species** *November 2018*  
 Joint Meeting of the Acoustical Society of America and Acoustics Week in Canada  
 Vancouver, Canada  
*Invitation declined*
- Estimation of animal density from acoustic detections** *December 2017*  
 Joint International Association for Statistical Computing (Asia Regional Section)  
 and New Zealand Statistical Association Conference  
 Auckland, NZ
- Spatial capture-recapture methods for acoustic detection data** *October 2015*  
 The Wildlife Society Annual Conference  
 Winnipeg, Canada
- An R package for the analysis of spatially explicit capture-recapture data** *August 2015*  
 Joint Statistical Meetings  
 Seattle, USA
- Spatially explicit capture-recapture with imperfect information on animal location** *September 2013*  
 The Royal Statistical Society International Conference

## TEACHING

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### 2024

STATS 399: Statistics in action *Semester 2*

### 2023

SCIGEN 399: Science capstone *Semester 1*

STATS 762: Regression for data science *Semester 1*

STATS 399: Statistics in action *Semester 2*

### 2022

STATS 330: Statistical modelling *Summer Semester*

STATS 399: Statistics in action *Semester 2*

### 2021

STATS 399: Statistics in action *Semester 1*

STATS 399: Statistics in action *Semester 2*

### 2020

STATS 101/108: Introduction to statistics *Semester 2*

### 2019

STATS 330: Statistical modelling *Semester 1*

STATS 201/208: Data analysis *Southwest University, China*

### 2018

STATS 330: Statistical modelling *Semester 1*

STATS 201/208: Data analysis *Semester 2*

STATS 201/208: Data analysis *Southwest University, China*

### 2017

STATS 201/208: Data analysis *Semester 1*

STATS 330: Statistical modelling *Semester 1*

STATS 201/208: Data analysis *Semester 2*

## RESEARCH SUPERVISION

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### PhD

Rishika Chopara *due to complete 2024*

*Goodness-of-fit for spatial capture-recapture models*

Cosupervisor: Rachel Fewster

Pei (Zoe) Luo *completed 2024*

*Two-phase subsampling designs for DNA sequencing, with an application to the relatedness in endangered species*

Cosupervisor: Thomas Lumley

Edy Setyawan *completed 2023*  
*Investigating the movement ecology, feeding behaviour, and genetic structure of a meta-population of reef manta rays *Mobula alfredi* in Raja Ampat, Indonesia*  
Cosupervisors: Rochelle Constantine, Mark Erdmann, and Fabrice Jaine

David Chan *completed 2023*  
*Advancing spatial capture-recapture methods for acoustic surveys of cetacean populations*  
Cosupervisor: Rachel Fewster

Markus Gronwald *completed 2022*  
*Behaviour of invasive rat species in low population densities on islands*  
Cosupervisor: James Russell

### **MSc (research)**

Callum Young *completed 2018*  
*Spatial capture-recapture models for detection counts and clustered activity centres*

### **BSc (Hons) and MSc/MProfStuds (taught)**

Melissa Bather *completed 2023*  
*Fitting spatial capture-recapture models in *acre**

Yaotian Shi *completed 2023*  
*A comparison between spatial capture-recapture and occupancy models for passive acoustic surveys*

Zhitian (Rose) Wang *completed 2023*  
*Comparing methods to estimate call rate and animal density from passive acoustic surveys*  
Cosupervisor: David Chan

Jinxi (Simone) Zhang *completed 2021*  
*Fast, accurate approximations for spatial capture-recapture likelihoods*  
Winner of the Faculty of Science Sustainability Research Award  
Cosupervisor: Jing Liu

Rishika Chopara *completed 2020*  
*That's not the Mona Lisa! How to interpret spatial capture-recapture density surface estimates*

Lingyu Hao *completed 2020*  
*A state-space model to evaluate ice hockey goaltender performance in the NHL*

Jessie Colbert *completed 2019*  
*Estimating whale distribution in the Hauraki Gulf via sighting data and sea surface temperature*  
Cosupervisors: Melissa Bowen and Rochelle Constantine

Jiyoung (Janice) Seo *completed 2019*  
*A survival analysis for guinea pigs with dental disease*

Zheni Chao *completed 2019*  
*Predicting *E. coli* concentrations at freshwater swimming sites*

Jiyoung (Janice) Seo *completed 2018*  
*Robustness of spatial capture-recapture models to detection function misspecification*

### **Summer Research Students**

Yilin Hou *completed 2023*  
*Bioacoustics for animal density estimation*

Michael Walker <i>Modelling morphometric data of animal populations collected by drones</i>	<i>completed 2023</i>
Alec van Helsdingen <i>Modelling reef manta ray movement in Raja Ampat, Indonesia</i> Cosupervisor: Edy Setyawan	<i>completed 2021</i>
Rishika Chopara <i>Goodness-of-fit for hierarchical models in population ecology</i>	<i>completed 2020</i>
Xin (Gasper) Qian <i>Estimating frog density from acoustic surveys: A comparison of spatial capture-recapture methods</i>	<i>completed 2019</i>
Rishika Chopara <i>Species distribution maps from spatial capture-recapture models</i>	<i>completed 2018</i>
Yi Ding <i>A spatial capture-recapture model for camera-trap data of leopards in Kruger Park</i> Cosupervisor: David Borchers	<i>completed 2016</i>

## PROFESSIONAL SERVICE

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### Primary ongoing service roles

Associate editor, <i>Biometrics</i>	<i>2023–present</i>
Editor, <i>New Zealand Statistical Association Newsletter</i>	<i>2022–present</i>
Member of the New Zealand Statistical Association Executive Committee	<i>2022–present</i>
Department of Statistics Stage III Coordinator	<i>2021–present</i>
Member of the Department of Statistics Research Committee	<i>2018–present</i>
Deputy Chair of the Department of Statistics Staff-Student Consultative Committee	<i>2021–2023</i>
Coordinator of the Summer Research Scholarships Programme	<i>2017–2023</i>
Chair of the Department of Statistics Staff-Student Consultative Committee	<i>2018–2021</i>

### Manuscript reviewing

Reviewer of manuscripts submitted to the following journals:

*Annals of Applied Statistics*  
*Biological Conservation*  
*Biology Letters*  
*Biometrics*  
*Conservation Biology*  
*Ecological Applications*  
*Ecological Research*  
*Ecology* (×2)  
*Ecology and Evolution*  
*Journal of Agricultural, Biological, and Environmental Statistics* (×2)  
*Journal of Statistical Software*  
*Journal of the Acoustical Society of America*  
*Journal of the American Statistical Association*  
*Methods in Ecology and Evolution* (×8)  
*Movement Ecology*  
*New Zealand Journal of Ecology* (×2)  
*PeerJ* (×2)  
*PLoS ONE*  
*Population Ecology*

## **PROFESSIONAL MEMBERSHIPS**

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Member of the International Biometric Society

Member of the New Zealand Statistical Association

International member of the National Centre for Statistical Ecology (UK)