

Department of Ecology, Evolution & Organismal Biology
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Anna L. Carter

EDUCATION

- 2015** **Ph.D., Ecology & Biodiversity**
Victoria University of Wellington *Te Whare Wānanga o te Ūpoko o te Ika a Māui*
New Zealand
Thesis: Modelling the incubation microclimate to predict offspring sex ratios and hatching phenology in tuatara (*Sphenodon punctatus*)
- 2005** **B.S. (Honors), Biological Sciences**
East Tennessee State University, U.S.

RESEARCH & PROFESSIONAL EXPERIENCE

- 2016-pres** **Postdoctoral Research Associate:** Department of Ecology, Evolution & Organismal Biology, Iowa State University, US
- 2015-2017** **Honorary Research Associate:** School of Biological Sciences, Victoria University of Wellington, NZ
- 2015** **Research Assistant:** School of Biological Sciences, Victoria University of Wellington
Tuatara niche modelling (Principal Investigator: Nicola Nelson)
- 2015** **Ecology Trial Analyst:** Victoria University of Wellington Post-PhD Industry Internship; Goodnature Ltd., Wellington, NZ
- 2010-15** **Research Associate:** Allan Wilson Centre, Victoria University of Wellington
- 2010-14** **Research Assistant:** School of Biological Sciences, Victoria University of Wellington
Reptile niche modelling (Principal Investigator: Nicola Nelson)

TEACHING EXPERIENCE

- 2017** **Ecological Society of America Education Scholar:** Quantitative Undergraduate Biology Education Synthesis, Data Incubator Group
- 2016** **Teaching Fellow:** School of Biological Sciences, Victoria University of Wellington
Courses (**co-instructor**): Biology of Animals; Animal Diversity; Biodiversity, Population & Community Ecology
- 2015-16** **Senior Tutor:** Science in Society Group, Victoria University of Wellington
Course (**Course Coordinator, sole instructor**): Contemporary Issues in Science & Society
- 2015** **Teaching Assistant:** School of Chemical and Physical Sciences, Victoria University of Wellington
Course: Contemporary Issues in Science & Society
- 2011-15** **Teaching Assistant:** School of Biological Sciences, Victoria University of Wellington
Courses: Biology of Animals (**lead TA**); Animal Diversity; Biodiversity, Population & Community Ecology; Behaviour & Conservation Ecology; Evolution (**sole TA**)
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PUBLICATIONS

Carter A. (In review) Painting turtles: an introduction to species distribution modeling in R. *Teaching Issues and Experiments in Ecology*.

Stenhouse V., **A. Carter**, K. Hare, S. Hartley & N. Nelson (In review) Modelled soil temperatures indicate wider potential distributions for an oviparous lizard under climate change. *Journal of Biogeography*.

Carter A., S.H. Hartley, M.R. Kearney, W.P. Porter & N.J. Nelson. (In revision) Geostatistical interpolation can reliably extend coverage of a very high-resolution biophysical model. *Journal of Biogeography*.

Carter A. (2016) A new framework for teaching ecology. [Review of Ecology in Action, by F.D. Singer]. *Frontiers in Biogeography*, doi: 10.21425/F58331939.

Carter A., S. Barr, C. Bond, G. Paske, D. Peters & R. van Dam. (2016) Controlling sympatric pest mammal populations in New Zealand with self-resetting, toxicant-free traps: a promising tool for invasive species management. *Biological Invasions*, doi: 10.1007/s10530-016-1115-4.

Carter A., N.J. Mitchell, S.H. Hartley, M.R. Kearney, W.P. Porter & N.J. Nelson (2015) Modelling the soil microclimate: does the spatial or temporal resolution of input parameters matter? *Frontiers in Biogeography* 7(4): 138-154.

Drummond A.J., R.D. Newcomb, T.R. Buckley, D. Xie, A. Dopheide, B.C.M. Potter, J. Heled, H.A. Ross, L. Tooman L., S. Grosser, D. Park, N.J. Demetras, M.I. Stevens, J.C. Russell, S.H. Anderson, **A. Carter** & N.J. Nelson (2015) Evaluating a multi-gene environmental DNA approach for comprehensive biodiversity assessment. *GigaScience* 4:46.

Culbertson J.B., I. Valiela, E.E. Peacock, C. Reddy, **A. Carter** & R. VanderKruik (2007) Long-term biological effects of petroleum residues on fiddler crabs in salt marshes. *Marine Pollution Bulletin*, doi:10.1016/j.marpolbul.2007.02.015.

In Prep

Carter A., B.L. Bodensteiner, J.B. Iverson, C.L. Milne-Zelman, T.S. Mitchell, D.A. Warner & F.J. Janzen. Modeling the potential for geographic variation in thermal reaction norms to buffer sex ratios against climate change.

Carter A., S.H. Hartley, M.R. Kearney, W.P. Porter & N.J. Nelson. Incubation-microclimate surfaces indicate a lack of thermally suitable nesting sites under climate change for a reintroduced reptile population. *Global Change Biology*.

Conference Proceedings

Carter A., R. van Dam, S. Barr & D. Peters (In review) Using self-resetting traps for eradication and incursion control of rats on a small, re-invadable island in New Zealand. *Proceedings of the Island Invasives Conference 2017*.

Carter A. & D. Peters (In press) Self-resetting traps provide sustained landscape-scale control of a rat plague in New Zealand. *Proceedings of the 27th Vertebrate Pest Conference*.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson (2015) Modelled microclimate surfaces predict nest site suitability and hatchling sex ratios for tuatara under climate change. Nelson, N.J. & S.N. Keall (eds.) *Recent developments in New Zealand herpetofauna research: Abstracts of papers presented at the 15th and 16th biennial conferences of the Society for Research on Amphibians and Reptiles in New Zealand*.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson (2015) Effects of behavioural and environmental variation on offspring sex ratios in New Zealand tuatara. Nelson, N.J. & S.N. Keall (eds.)

Recent developments in New Zealand herpetofauna research: Abstracts of papers presented at the 15th and 16th biennial conferences of the Society for Research on Amphibians and Reptiles in New Zealand.

Carter A. (2011) Effects of environment on species interactions in New Zealand reptile communities. Nelson, N.J. & S.N. Keall (eds.) *Abstracts of papers presented at the 14th biennial conference of the Society for Research on Amphibians & Reptiles in New Zealand.*

RESEARCH GRANTS

- 2016** Minnesota Herpetological Society Research Grant
- 2013** Victoria University of Wellington Science Faculty Strategic Research Grant
- 2012** Royal Society of New Zealand Hutton Fund
- Society for Research on Amphibians & Reptiles in New Zealand Herpetological Research Award
- Victoria University of Wellington Centre for Biodiversity & Restoration Ecology Research Grant
- Australasian Society for the Study of Animal Behaviour Student Research Grant
- 2011** Victoria University of Wellington Science Faculty Strategic Research Grant

SCHOLARSHIPS & AWARDS

- 2015** Ecological Society of America Physiological Ecology Section Student Travel Award
- Society for Research on Amphibians & Reptiles in New Zealand Award for Best Student Presentation
- 2014** Victoria University of Wellington Ph.D. Submission Scholarship
- 2013** Society for Research on Amphibians & Reptiles in New Zealand Award for Best Student Presentation in Conservation
- British Ecological Society INTECOL Training & Travel Grant
- 2011** Society for Conservation Biology 25th International Conference on Conservation Biology Student Travel Grant
- 2010** Victoria University of Wellington Doctoral Research Scholarship

CONFERENCE PRESENTATIONS

Carter A., S. Barr, C. Bond, G. Paske, D. Peters & R. van Dam. Eradication and incursion control of three species of rats using self-resetting traps on a small re-invadable inshore island in New Zealand. Island Invasives Conference, 10-14 July 2017.

Buckley K.M., M. Gruber, A. Felden, J. Zucarello, M. Preuss & **A. Carter**. Dodging the fare: an eScience consultant meets the (Bio)Conductor, and friends. eResearch NZ, 20-22 Feb 2017.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson. Modelling the thermal environment of incubation informs predictions of habitat suitability for a species with temperature-dependent sex determination. Ecological Society of America Centennial Annual Meeting, 9-14 Aug 2015.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson. Sheep paddocks and sex ratios: tuatara as a case study in the physiological drivers of conservation. BioLive2015 Conference, 7 Jul 2015.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson. Modelled microclimate surfaces predict nest site suitability and hatchling sex ratios for tuatara under climate change. Society for Research on Amphibians and Reptiles in New Zealand 25th Biennial Conference, 31 Jan-2 Feb 2015.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson. Modelled microclimate surfaces predict nest site suitability and hatchling sex ratios for tuatara on Hauturu. Allan Wilson Centre Annual Meeting, 29-31 Oct 2014.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson. Remote sensing, GIS, and climate modelling inform tuatara offspring sex ratio predictions. Australian Herpetological Society Annual Meeting, 29 Jan-1 Feb 2014.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson. Modelled thermal environment informs sex ratio predictions in New Zealand tuatara. International Biogeography Society Early Career Researchers Conference, 7-10 Jan 2014.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson. Nesting behaviour and environment interact to inform sex ratio predictions in New Zealand tuatara. New Zealand Ecological Society & Ecological Society of Australia 5th Joint Conference, 24-29 Nov 2013.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson. Modelled soil thermal environment informs tuatara offspring sex ratio predictions. Allan Wilson Centre Annual Meeting, 23-25 Oct 2013.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson. Predicting intersections of behaviour and environment in a population with low evolutionary potential. British Ecological Society INTECOL Centennial Conference, 18-23 Aug 2013.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson. Nesting behaviour and environment interact to inform predictions of offspring sex ratios in New Zealand tuatara. Australasian Society for the Study of Animal Behaviour Annual Meeting, 1-4 July 2013.

Carter A., N.J. Mitchell, M.R. Kearney, S. Hartley & N.J. Nelson. Effects of behavioural and environmental variation on offspring sex ratios in New Zealand tuatara. Society for Research on Amphibians and Reptiles in New Zealand 25th Biennial Conference, 10-13 Feb 2013.

Carter A. Climate and community interactions in a model ecosystem. Allan Wilson Centre for Molecular Ecology & Evolution Annual Meeting, 2-4 Nov 2010.

CONFERENCE POSTERS

Carter A., B.L. Bodensteiner, J.B. Iverson, C.L. Milne-Zelman, T.S. Mitchell, J.M. Refsnider, D.A. Warner & F.J. Janzen. Modeling the incubation microclimate to predict implications of responses to climate change for a thermally-mediated trait. EEB Research Symposium, 11 Feb 2017.

Carter A., B.L. Bodensteiner, J.B. Iverson, C.L. Milne-Zelman, T.S. Mitchell, J.M. Refsnider, D.A. Warner & F.J. Janzen. Modeling the incubation microclimate to predict implications of responses to climate change for a thermally-mediated trait. Society for Integrative and Comparative Biology Annual Meeting, 3-9 Jan 2017.

Salmon R., R. Priestley, D. Mitchell & **A. Carter**. Exploring the role of science and society through flexible online courses. Science Communicators Association of NZ Conference, 30 Nov-1 Dec 2015.

Salmon R., R. Priestley, D. Mitchell & **A. Carter**. Science in Society spreads its wings: an online course suite and integrative MOOC approach. Distance Education Association of New Zealand Biennial Conference, 17-20 Apr 2016.

Carter A. Implications of behavioral plasticity for conservation of New Zealand tuatara. 25th Annual Meeting of the Society for Conservation Biology International Congress of Conservation Biology, 5-9 Dec 2011.

INVITED PUBLIC TALKS

Tuatara: past, present & future. Southern Suburbs Stroke Club, Newtown, Wellington, NZ. 9 June 2015.

Finding a flat in Wellington...or predicting sex ratios of tuatara populations. Nerd Nite #28, Te Aro, Wellington, NZ. 18 May 2015.

Sheep paddocks and sex ratios: linking eco-restoration and climate to predict tuatara offspring sex ratios. University of the Third Age: Mana, Porirua, NZ. 13 April 2015.

Sheep paddocks and sex ratios: linking eco-restoration and climate to predict tuatara offspring sex ratios. University of the Third Age: Island Bay, Wellington, NZ. 13 November 2014.

Linking eco-restoration, reproductive behaviour & climate modelling to predict tuatara offspring sex ratios. University of the Third Age, Wellington, NZ. 27 June 2014.

Can eco-restoration buffer tuatara sex ratios against climate change? Zealandia Tuatara February, Wellington, NZ. 20 February 2014.

ON-CAMPUS TALKS

Tuatara (and other New Zealand herps). Herpetology Club, Iowa State University. 21 Feb 2017.

Modelling the incubation environment informs predictions of habitat suitability for tuatara. Ecology & Evolution Seminar Series, School of Biological Sciences, Victoria University of Wellington. 2 June 2016.

Nesting behaviour and environment interact to inform predictions of offspring sex ratios in New Zealand tuatara. Ecology & Evolution Seminar Series, School of Biological Sciences, Victoria University of Wellington. 1 August 2013.

SUPERVISION

2015-2017 Vaughn Stenhouse (MSc) School of Biological Sciences, Victoria University of Wellington, New Zealand
Thesis: Modelling the distribution of an oviparous skink, *Oligosoma suteri*

PEER REVIEW

Ecological Modelling (1), PLoS ONE (2), Biological Invasions (2), Biological Conservation (1), Austral Ecology (4), New Zealand Journal of Ecology (2), American Midland Naturalist (1), Climatic Change (1), Elsevier (1)

SERVICE

2017 SEEDS Student Mentor: Ecological Society of America Annual Meeting, Strategies for Ecology Education, Development and Sustainability

Facilitator: Graduate Inclusion Postdoc Workshops, Graduate College, Iowa State University

Session Reviewer: Mathematics and Statistics, Computer and Information Science, Engineering; Conference Program Committee, Society for Advancement of Hispanics, Chicanos and Native Americans in Science (SACNAS) National Diversity in STEM Conference

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- Grant Reviewer:** British Ecological Society Small & Large Research Grants
- Grant Reviewer:** British Ecological Society Outreach Grants
- Reviewer:** Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) Regional Assessments of Biodiversity and Ecosystem Services
- Reviewer:** Student Travel Scholarship; Society for Advancement of Hispanics, Chicanos and Native Americans in Science (SACNAS) National Diversity in STEM Conference
- Reviewer:** Student Research Presentations; Society for Advancement of Hispanics, Chicanos and Native Americans in Science (SACNAS) National Diversity in STEM Conference
- Presentation Judge:** Graduate and Professional Student Senate Research Conference, Iowa State University
- 2016** **Reviewer:** Symposium Abstract Review Committee; Department of Ecology, Evolution & Organismal Biology, Iowa State University
- Grant Reviewer:** British Ecological Society Small Research Grants
- Grant Reviewer:** British Ecological Society Outreach Grants
- Presenter:** Learn R! Workshop; Society for Advancement of Hispanics, Chicanos and Native Americans in Science (SACNAS), Iowa State University
- Guest Lecturer:** Department of Ecology, Evolution & Organismal Biology, Iowa State University
Course: Herpetology
- 2015** **Grant Reviewer:** British Ecological Society Small Research Grants
- Reviewer:** Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) Methodological Assessment of Scenario Analysis and Modelling of Biodiversity and Ecosystem Services
- 2013** **Grant Reviewer:** Society for Research on Amphibians and Reptiles in New Zealand Herpetological Research Awards
- 2012** **Organizer:** Ecology & Evolution Seminar Series, School of Biological Sciences, Victoria University of Wellington
- 2011** **Guest Lecturer:** School of Biological Sciences, Victoria University of Wellington
Courses: Biodiversity & Conservation, Global Change Biology
- Organizer:** Masters Aims & Methods Seminars, School of Biological Sciences, Victoria University of Wellington
- Organizer:** Ecology & Evolution Seminar Series, School of Biological Sciences, Victoria University of Wellington

PROFESSIONAL AFFILIATIONS

Society for Integrative and Comparative Biology (SICB)
 International Biogeography Society (IBS)
 International Society of Ecological Modelling (ISEM)
 Ecological Society of America (ESA)
 British Ecological Society (BES)
 Society for the Study of Evolution (SSE)

SOFTWARE AND COMPUTING

GIS

ArcGIS Pro, QGIS, R, GRASS, Maxent, ImageJ, Land Change Modeler (Terrset), ERDAS Imagine

Programming & Data Analysis

R, Python, Matlab, PyMOL, Niche Analyst, Arduino, Energia, GitHub, SQL

REFERENCES

Research

Fredric J. Janzen, Professor
Department of Ecology, Evolution & Organismal Biology
Iowa State University
2200 Osborne Dr.
Ames, IA 50011 USA
fjanzen@iastate.edu

Nicola J. Nelson, Associate Professor
School of Biological Sciences
Victoria University of Wellington
Wellington 6140, New Zealand
nicola.nelson@vuw.ac.nz

Michael R. Kearney, Associate Professor
School of Biosciences
University of Melbourne
Victoria 3010, Australia
m.kearney@unimelb.edu

Teaching

Rhian Salmon, Senior Lecturer
Science in Context
Victoria University of Wellington
Room 202, Alan MacDiarmid Bldg
Wellington 6140, New Zealand
rhian.salmon@vuw.ac.nz

Peter Ritchie, Associate Professor
School of Biological Sciences
Victoria University of Wellington
Level 5, New Kirk Bldg
Wellington 6140, New Zealand
peter.ritchie@vuw.ac.nz
