

# Matteo Rizzuto

POSTDOCTORAL ASSOCIATE · SCHOOL OF THE ENVIRONMENT, YALE UNIVERSITY

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## Current position

POSTDOCTORAL ASSOCIATE

2022–Present

Schmitz Lab, School of the Environment, Yale University

New Haven, USA

- Developing new mathematical models to investigate animal-mediated effects on ecosystem carbon budgets
- Working with non-governmental organizations to inform rewilding efforts and expand nature-based climate change solutions

## Highlights

- Published 13 peer-reviewed papers, of which 4 as first author and one as shared first author, with a combined 143 citations and an h-index of 7.
- Winner of *Oecologia*'s 2021 Hanski prize for best student-authored paper in animal ecology (as first author) and of the *Journal of Animal Ecology*'s 2021 Sidnie Manton award for best early-career contribution (as co-author).

## Education

DOCTOR OF PHILOSOPHY, BIOLOGY

2016–2021

Memorial University of Newfoundland and Labrador

St. John's, NL, Canada

- Thesis title: From elements to landscapes: the role of terrestrial consumers in ecosystem functioning
- Advisor: Dr. Shawn J. Leroux

MASTER OF RESEARCH (DISTINCTION), ECOLOGY, EVOLUTION, AND CONSERVATION

2013–2014

Imperial College London

London, UK

MASTER OF SCIENCE, EVOLUTION OF ANIMAL AND HUMAN BEHAVIOUR

2009–2012

University of Turin

Turin, Italy

BACHELOR OF SCIENCE (HONOURS), BIOLOGY

2004–2009

University of Turin

Turin, Italy

## Publications

A † marks equal contributions. When listed as 2<sup>nd</sup> or 3<sup>rd</sup> author, I contributed to ideas, design, data collection and analysis, interpretation, and writing. When listed as 4<sup>th</sup> author or later, I contributed to ideas, data collection, and writing.

### Peer reviewed

14. [Rizzuto, M.](#), Leroux, S. J., Schmitz, O. J. 2023 Rewiring the carbon cycle: a theoretical framework for animal-driven ecosystem carbon sequestration. Accepted, *Journal of Geophysical Research: Biogeosciences*, manuscript id: 2024JG008026R. *bioRxiv preprint*.
13. [Rizzuto, M.](#), Leroux, S. J., Schmitz, O. J., Vander Wal, E., Wiersma, Y. F., Heckford, T. R. 2024. Animal-vectored nutrient flows across resource gradients influence the nature of local and meta-ecosystem functioning. *Ecological Modelling* **488**, 110570. doi: [10.1016/j.ecolmodel.2023.110570](https://doi.org/10.1016/j.ecolmodel.2023.110570).
12. McLeod, A.M., Leroux, S.J., [Rizzuto, M.](#), Leibold, M.A., Schiesari, L. 2024. Integrating ecosystem and contaminant models to predict the effects of ecosystem fluxes on contaminant dynamics. *Ecosphere*, **15**(1): e4739. doi: [10.1002/ecs2.4739](https://doi.org/10.1002/ecs2.4739)
11. Heckford, T.R., Leroux, S.J., Vander Wal, E., [Rizzuto, M.](#), Balluffi-Fry, J., Richmond, I.C., Wiersma, Y.F. 2022. Ecoregion and community structure influences on the foliar elemental niche of balsam fir (*Abies balsamea* (L.) Mill.) and white birch (*Betula papyrifera* Marshall). *Ecology and Evolution* **12**, e9244. doi: [10.1002/ece3.9244](https://doi.org/10.1002/ece3.9244).
10. Little, C.J.†, [Rizzuto, M.](#)†, Luhring, T.M., Monk, J.D., Nowicki, R.J., Paseka, R.E., Stegen, J.C., Symons, C.C., Taub, F.B., Yan, J.D.L. 2022. Movement with Meaning: Integrating Information into Meta-Ecology. *Oikos* **8**, e08892. doi: [10.1111/oik.08892](https://doi.org/10.1111/oik.08892).  
**Editor's Choice**

9. Balluffi-Fry, J., Leroux, S.J., Wiersma, Y.F., Richmond, I.C., Heckford, T.R., **Rizzuto, M.**, Kennah, J.L., Vander Wal, E. 2022. Integrating plant stoichiometry and feeding experiments: state-dependent forage choice and its implications on body mass. *Oecologia* **198**(3), 579–591. doi: [10.1007/s00442-021-05069-5](https://doi.org/10.1007/s00442-021-05069-5).
8. Richmond, I.C., Balluffi-Fry, J., Vander Wal, E., Leroux, S.J., **Rizzuto, M.**, Heckford, T.R., Kennah, J.L., Riefesel, G.R., Wiersma, Y.F. 2022. Individual snowshoe hares manage risk differently: integrating stoichiometric distribution models and foraging ecology. *Journal of Mammalogy* **103**(1), 196–208. doi: [10.1093/jmammal/gyab130](https://doi.org/10.1093/jmammal/gyab130).
7. Heckford, T.R., Leroux, S.J., Vander Wal, E., **Rizzuto, M.**, Balluffi-Fry, J., Richmond, I.C., Wiersma, Y.F. 2022. Spatially explicit correlates of plant functional traits inform landscape patterns of resource quality. *Landscape Ecology* **37**, 59–80. doi: [10.1007/s10980-021-01334-3](https://doi.org/10.1007/s10980-021-01334-3).
6. **Rizzuto, M.**, Leroux, S.J., Vander Wal, E., Richmond, I.C., Heckford, T.R., Balluffi-Fry, J., Wiersma, Y.F. 2021. Forage stoichiometry predicts the home range size of a small terrestrial herbivore. *Oecologia* **197**(2), 327–338. doi: [10.1007/s00442-021-04965-0](https://doi.org/10.1007/s00442-021-04965-0). **Winner, Hanski Prize 2021**
5. Ellis-Soto, D.<sup>†</sup>, Ferraro, K.M.<sup>†</sup>, **Rizzuto, M.**, Briggs, E., Monk, J.D., and Schmitz, O.J. 2021. A methodological roadmap to quantify animal-vectored spatial ecosystem subsidies. *Journal of Animal Ecology* **90**(7), 1605–1622. doi: [10.1111/1365-2656.13538](https://doi.org/10.1111/1365-2656.13538). **Winner, Sidnie Manton Award 2021**
4. Richmond, I.C., Leroux, S.J., Vander Wal, E., Heckford, T.R., **Rizzuto, M.**, Balluffi-Fry, J., Kennah, J., Wiersma, Y.F. 2021. Temporal variation and its drivers in the elemental traits of four boreal plant species. *Journal of Plant Ecology* **14**(3), 398–413. doi: [10.1093/jpe/rtaa103](https://doi.org/10.1093/jpe/rtaa103).
3. Balluffi-Fry, J., Leroux, S.J., Wiersma, Y.F., Heckford, T.R., **Rizzuto, M.**, Richmond, I.C., Vander Wal, E. 2020. Quantity-quality trade-offs revealed using a multiscale test of herbivore resource selection on elemental landscapes. *Ecology and Evolution* **10**(24), 13847–13859. doi: [10.1002/ece3.6975](https://doi.org/10.1002/ece3.6975).
2. **Rizzuto, M.**, Leroux, S.J., Vander Wal, E., Wiersma, Y.F., Heckford, T.R., Balluffi-Fry, J. 2019. Patterns and potential drivers of intraspecific variability in the body C, N, and P composition of a terrestrial vertebrate, the snowshoe hare (*Lepus americanus*). *Ecology and Evolution* **9**(24), 14453–14464. doi: [10.1002/ece3.5880](https://doi.org/10.1002/ece3.5880).
1. **Rizzuto, M.**, Carbone, C., and Pawar, S. 2018. Foraging constraints reverse the scaling of activity time in carnivores. *Nature Ecology and Evolution* **2**(2), 247–253. doi: [10.1038/s41559-017-0386-1](https://doi.org/10.1038/s41559-017-0386-1). **Cover Story**

## Outreach

- Wiersma, Y.F., Catto, N., Deal, C., Edinger, E., Evans, R., Geissinger, E., Hearn, C., Sun Lim, K., McCann, N., MacDonald, K., Meyer, A., Prosser, J., Quinn, D., Richmond, I.C., **Rizzuto, M.**, Roncal, J., Swain, M. 2020. The classroom goes virtual—experiences at Memorial University. *Blog post*.
- Cagnacci, F., Rocca, M., Nicoloso, S., Ossi, F., Peters, W., Mancinelli, S., Valent, M., **Rizzuto, M.**, Hebblewhite, M. 2013. Il progetto 2C2T. *Il Cacciatore Trentino*, 93, 4–15.

## Presentations

### Conference Talks

- **Rizzuto, M.**, Leroux, S.J., Schmitz, O.J. *Modeling the zoogeochemical effects of herbivores on ecosystem carbon cycles*. “For All Ecologists” Ecological Society of America Annual Meeting, Portland, OR, USA. 6–11 Aug. 2023 **Invited talk**
- **Rizzuto, M.**, Leroux, S.J., Schmitz, O.J. *Modeling the zoogeochemical effects of herbivores on ecosystem carbon cycles*. 6<sup>th</sup> Yale Postdoc Association Annual Symposium, New Haven, CT, USA. 25 May 2023
- **Rizzuto, M.**, Leroux, S.J., Schmitz, O.J., Vander Wal, E., Wiersma, Y.F., Heckford, T.R. *Movers and shakers: Animal-vectored nutrient flows across resource gradients influence local and meta-ecosystem functioning*. “Ecological Models for Tomorrow’s Solutions” The International Society for Ecological Modelling Global Conference 2023, Toronto, ON, Canada. 2–6 May 2023
- **Rizzuto, M.**, Leroux, S.J., Schmitz, O.J., Vander Wal, E., Wiersma, Y.F., Heckford, T.R. *Going against the flow: non-diffusive organismal movement influences local and meta-ecosystem functioning*. “Vital Connections in Ecology” Ecological Society of America Virtual Annual Meeting, Long Beach, CA, USA. 2–6 Aug. 2021
- **Rizzuto, M.**, Leroux, S.J., Vander Wal, E., Wiersma, Y.F., Heckford, T.R., Balluffi-Fry, J. *Ontogeny and Ecological Stoichiometry of Snowshoe hares (*Lepus americanus*) in the Boreal Forests of Newfoundland*. Canadian Society for Ecology and Evolution Annual General Meeting, Guelph, ON, Canada. 18–21 Jul. 2018

- **Rizzuto, M.**, Carbone, C., and Pawar, S. *Bio-mechanical constraints on foraging reverse the scaling of activity rate among carnivores*. Canadian Society for Ecology and Evolution Annual General Meeting, St. John's, NL, Canada. 7–11 Jul. 2016

## Conference Posters

- **Rizzuto, M.**, Leroux, S.J., Vander Wal, E., Wiersma, Y.F., Heckford, T.R., Balluffi-Fry, J. *Beyond Diffusion: Animal-Mediated Nutrient Transport at Different Spatial Scales*. “Unifying Ecology Across Scales” Gordon Research Seminar and Conference, Biddeford, ME, USA. 21–27 Jul. 2018

## Workshops

- **Rizzuto, M.** *Grammar of Graphics: ggplot2*. Part of SPRY: A Learning Community for Quantitative Skill-Sharing Yale University, School of the Environment. 4 Nov. 2022
- **Rizzuto, M.** *(R)markdown: a brief tour*. Part of SPRY: A Learning Community for Quantitative Skill-Sharing Yale University, School of the Environment. 14 Oct. 2022

## Outreach

- **Rizzuto, M.** *Skype-a-Scientist*, Hope Township Elementary School. 22 Mar. 2023

## Teaching

### YALE UNIVERSITY

Guest Lecturer

2022–Present  
New Haven, USA

#### THE MODERN INSTRUCTOR, Lecture series

Fall 2023

- Design and delivered two lectures on ecosystem ecology and climate change aimed at a generalist audience

#### ECOSYSTEMS AND LANDSCAPES, Graduate course

Fall 2023

- Lead instructor on one of five course modules, focused on linking biodiversity to biogeochemistry

#### INDUSTRIAL ECOLOGY, Graduate course

Fall 2022

- Crafted and delivered a lecture introducing ideas and theories from metabolic ecology to urban ecology

### MEMORIAL UNIVERSITY OF NEWFOUNDLAND AND LABRADOR

2017–2020

#### Teaching Assistant and Guest Lecturer

St. John's, Canada

#### MODELS IN BIOLOGY, Graduate and Undergraduate course

Winter 2020

- Designed and delivered lectures on classical models in Ecology, models of species interactions, and meta-ecology models

#### PRINCIPLES OF ECOLOGY, Undergraduate course

Fall 2018

- Managed the online learning part of the course, provided administrative and academic support to students

#### GRADUATE CORE SEMINAR, Graduate course

Fall 2018

- Developed and delivered a seminar on Student-Supervisor Communications

#### PRINCIPLES OF BIOLOGY, Undergraduate course

Winter 2017

- Assisted during lab-based lectures, marked lab reports, midterms, and invigilated final exams

### IMPERIAL COLLEGE LONDON

2014–2015

#### Teaching Assistant

London, UK

#### ECOLOGY, Undergraduate course

Spring 2015

- Demonstrator for the course's field trip, helped students design, collect data, and run analyses for their final projects

#### BEHAVIORAL ECOLOGY, Undergraduate course

Winter 2015

- Assisted with lab-based lectures, from experiment setup to helping students with lab data analysis

#### INTRODUCTION TO BIOLOGICAL STATISTICS, Undergraduate course

Fall 2014

- Helped students learn base and advanced R language, facilitated Q&A sessions ahead of final exams

#### STATISTICS, Graduate course

Fall 2014

- Helped students in developing and coding statistical analyses in R

#### MACROECOLOGY AND CLIMATE CHANGE, Graduate course

Fall 2014

- Assisted students using the species distribution software Maxent

## Research Appointments

### VISITING ASSISTANT IN RESEARCH

Feb.–Apr. 2019

Schmitz Lab, School of the Environment, Yale University

New Haven, USA

<b>RESEARCH ASSISTANT</b> Pawar Lab, Department of Life Sciences, Imperial College London—Silwood Park	Jan.–Mar. 2016 Ascot, UK
<b>RESEARCH ASSISTANT</b> Tsaobis Baboon Project, Zoological Society of London	Jun.–Oct. 2015 London, UK
<b>RESEARCH ASSISTANT</b> Roe & Red Deer in Trentino and Technology Project, Fondazione Edmund Mach	Jun.–Sept. 2013 Trento, Italy
<b>GRADUATE INTERN</b> Piedmont Wolf Project, Maritime Alps Nature Park	Jun.–Dec. 2011 Entracque (CN), Italy
<b>UNDERGRADUATE INTERN</b> Ethology Lab, University of Turin	2008–2009 Turin, Italy

## Service

Note: *Memorial University* stands for Memorial University of Newfoundland and Labrador.

**Manuscript reviewer** for *Biological Conservation*, *Science of the Total Environment*, *Ecology and Evolution*

### Conferences organized

<b>6<sup>TH</sup> AND 7<sup>TH</sup> ANNUAL POSTDOC SYMPOSIUM</b> Yale University	2023–2024 New Haven, CT, USA
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### Volunteer and community work

<b>YALE POSTDOCTORAL ASSOCIATION</b> Yale University	2022–Present New Haven, CT, USA
<ul style="list-style-type: none"> <li>• Buddy Program Mentor, Present</li> <li>• Symposium Committee Co-coordinator, 2023</li> <li>• Symposium Committee Member, 2022</li> </ul>	

<b>BIOLOGY GRADUATE STUDENT ASSOCIATION</b> Memorial University	2017–2020 St. John's, NL, Canada
<ul style="list-style-type: none"> <li>• Communications officer, 2019–2020</li> <li>• Chairperson, 2018–2019</li> <li>• Seminar Co-coordinator, 2017–2018</li> </ul>	

<b>EDUCATOR</b> Associazione O.A.S.I.—Operazione Mato Grosso di Torino	2000–2013 Turin, Italy
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<b>TEAM LEADER</b> XX Winter Olympic and IX Paralympic Games	2005–2006 Turin, Italy
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## Professional Development

Note: *Memorial University* stands for Memorial University of Newfoundland and Labrador.

### Courses

<b>THE MODERN INSTRUCTOR LECTURE SERIES</b> Yale Postdoc Association and Yale Poorvu Center for Teaching and Learning	November 2023 Yale University
<b>MENTORSHIP TRAINING PROGRAM FOR YALE POSTDOCS</b> Office for Postdoctoral Affairs	March 2023 Yale University
<b>CAREER DEVELOPMENT LEADERS PROGRAM</b> Office of Career Strategy	Jan.–Mar. 2023 Yale University
<b>BECOMING A MORE EQUITABLE EDUCATOR: MINDSETS AND PRACTICES</b> MIT Teaching Systems Lab	Mar.–Jun. 2020 Attended online at edX.org
<b>TEACHING SKILLS ENHANCEMENT PROGRAM</b> Centre for Innovation in Teaching and Learning	Sept. 2019–Aug. 2020 Memorial University

### Workshops

<b>ADVANCED TEACHING WORKSHOPS: WRITING THE TEACHING STATEMENT</b> Yale Poorvu Center for Teaching and Learning	14 September 2023 Yale University
<b>THE ART OF TEACHING: BALANCING PASSIVE AND ACTIVE LEARNING</b> Yale Postdoc Association and Yale Poorvu Center for Teaching and Learning	13 September 2023 Yale University
<b>INCLUSIVE LEADERSHIP TRAINING</b> Yale Postdoc Association and Yale DEI Office	30 Aug. 2023 Yale University
<b>BYSTANDER INTERVENTION TRAINING</b> Yale Postdoc Association	13 Jun. 2023 Yale University
<b>HOW TO HELP: TIPS FROM MENTAL HEALTH FIRST AID</b> Being Well at Yale	1 Mar. 2023 Yale University
<b>ALT-ACADEMIC CAREER Q&amp;A</b> Early Career Section	8-9 Feb. 2023 Ecological Society of America
<b>HOW TO WRITE AN EFFECTIVE DIVERSITY STATEMENT</b> Graduate Writing Lab	11 Oct. 2022 Yale University
<b>BUILDING YOUR BRAND WORKSHOP</b> Beyond the PhD	8 Sept. 2022 Attended online
<b>REPRODUCIBLE RESEARCH THROUGH OPEN SCIENCE</b> Canadian Institute for Ecology and Evolution & NSERC-CREATE “Living Data Project”	11 Jun. 2020 Attended online at <a href="https://osf.io">osf.io</a>
<b>TEACHING INCLUSIVELY &amp; EQUITABLY ONLINE</b> American Society for Engineering Education & NSF INCLUDES Aspire Alliance	21 May 2020 Attended online
<b>H5P MAKER SESSION</b> Centre for Innovation in Teaching and Learning	24 Oct. 2019 Memorial University
<b>COMMUNITY OF INQUIRY COFFEE BREAK: OPEN ACCESS</b> Centre for Innovation in Teaching and Learning	23 Oct. 2019 Memorial University
<b>OPEN ACCESS AND SCHOLARLY PUBLISHING</b> Centre for Innovation in Teaching and Learning	22 Oct. 2019 Memorial University
<b>FOUR THINGS TO CONSIDER FOR GRADUATE STUDENT TEACHING</b> Enhanced Development of the Graduate Experience	8 Nov. 2018 Memorial University
<b>AARMS CRG SOFTWARE CARPENTRY WORKSHOP</b> The Carpentries	27 May 2017 Memorial University

## Honors & Awards

Note: *Memorial University* stands for Memorial University of Newfoundland and Labrador.

<b>HANSKI PRIZE</b> , Oecologia	2021
<b>MITACS RESEARCH TRAINING AWARD</b> , Mitacs, St. John's, Canada	2020
<b>FIRST PLACE–H5P MAKER SESSION</b> , Memorial University, St. John's, Canada	2019
<b>MITACS GLOBALINK RESEARCH AWARD</b> , Mitacs, St. John's, Canada	2019
<b>DEAN'S DOCTORAL AWARD</b> , Memorial University, St. John's, Canada	2016–2020
<b>GRADUATED WITH DISTINCTION</b> , Imperial College London, London, UK	2014
<b>ERASMUS-LLP SCHOLARSHIP</b> , University of Turin, Turin, Italy	2010

## Professional Affiliations

International Society for Ecological Modelling	2023–2025
Ecological Society of America	2021–2023
Canadian Society for Ecology and Evolution	2016–2021