

# Matteo Rizzuto

POSTDOCTORAL ASSOCIATE · SCHOOL OF THE ENVIRONMENT, YALE UNIVERSITY

🏠 [matteorizzuto.github.io](https://matteorizzuto.github.io) | 🆔 0000-0003-3065-9140 | 🎓 Matteo Rizzuto | Pronouns: he/him/his

## Current position

POSTDOCTORAL ASSOCIATE

Schmitz Lab, School of the Environment, Yale University

- Building mathematical models to investigate and quantify animal influences on ecosystem carbon cycling, and inform and expand nature-based climate change solutions

Present

New Haven, USA

## Education

DOCTOR OF PHILOSOPHY, BIOLOGY

Memorial University of Newfoundland and Labrador

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

2016–2021

St. John's, NL, Canada

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

Imperial College London

2013–2014

London, UK

MASTER OF SCIENCE, EVOLUTION OF ANIMAL AND HUMAN BEHAVIOUR

University of Turin

2009–2012

Turin, Italy

BACHELOR OF SCIENCE (HONOURS), BIOLOGY

University of Turin

2004–2009

Turin, Italy

## Highlights

- Published 13 peer-reviewed papers, of which 4 as first author and one as shared first author, with a combined 136 citations and an h-index of 7 (i10-index of 5).
- 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).

## 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.

13. Rizzuto, M., Leroux, S. J., Schmitz, O. J., Vander Wal, E., Wiersma, Y. F., Heckford, T. R. 2023. Animal-vector nutrient flows across resource gradients influence the nature of local and meta-ecosystem functioning. Accepted, *Ecological Modelling*, manuscript id: ECOMOD-23-431R2. *bioRxiv preprint*.
12. McLeod, A.M., Leroux, S.J., Rizzuto, M., Leibold, M.A., Schiesari, L. 2023. Integrating ecosystem and contaminant models to predict the effects of ecosystem fluxes on contaminant dynamics. Accepted, *Ecosphere*, manuscript id: ECS23-0511. *bioRxiv preprint*.
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.
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.

**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.
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.
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.
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.  
**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.  
**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.
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.
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.
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.

### Cover Story

#### In progress

- **Rizzuto, M.**, Leroux, S. J., Schmitz, O. J. 2023 Rewiring the carbon cycle: a theoretical framework for animal-driven ecosystem carbon sequestration. In revision, *Journal of Geophysical Research: Biogeosciences*, manuscript id: 2023JG007714. *bioRxiv preprint*.

#### 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.

## Research Appointments

### VISITING ASSISTANT IN RESEARCH

Schmitz Lab, School of the Environment, Yale University

Feb.–Apr. 2019

New Haven, USA

- Developed a meta-ecosystem model capturing the effects of animal-mediated nutrient transport across ecosystem boundaries

### RESEARCH ASSISTANT

Pawar Lab, Department of Life Sciences, Imperial College London—Silwood Park

Jan.–Mar. 2016

Ascot, UK

- Collected and managed data for a meta-analysis of published studies of plant thermal responses

## RESEARCH ASSISTANT

Tsaobis Baboon Project, Zoological Society of London

- Field-based placement to collect behavioral, dietary, and population data from wild *Chacma* baboons in the Namib Desert

Jun.–Oct. 2015

London, UK

## RESEARCH ASSISTANT

Roe & Red Deer in Trentino and Technology Project, Fondazione Edmund Mach

- Field-based placement to collect data on roe deer movement data, plant phenology, and pellet decay rate in the Eastern Alps

Jun.–Sept. 2013

Trento, Italy

## GRADUATE INTERN

Piedmont Wolf Project, Maritime Alps Nature Park

- Designed and led a mixed laboratory and field-based study of wolves-chamois predator-prey interactions in the Western Alps

Jun.–Dec. 2011

Entracque (CN), Italy

## UNDERGRADUATE INTERN

Ethology Lab, University of Turin

- Bio-acoustic study of an individual's contribution to their family group song among *Indri* lemurs

2008–2009

Turin, Italy

# Presentations

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## Conference Talks

- **Rizzuto, M.**, Leroux, S.J., Schmitz, O.J. *Modeling the zoogeographical 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 zoogeographical 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

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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 general audience of postdocs and researchers

**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

# Service

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

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

**SYMPOSIUM COMMITTEE CO-COORDINATOR**

Present

Yale Postdoctoral Association

Yale University

- Co-coordinated the activities of the YPA Symposium Committee and organized the Annual Yale Postdoc Symposium
- Member of the Yale Postdoctoral Association Executive Board, participating in monthly meetings to steer the Association's activities

**BUDDY PROGRAM MENTOR**

Present

Yale Postdoctoral Association

Yale University

- Offered advice and help to incoming international postdocs

**SYMPOSIUM COMMITTEE MEMBER**

2022–2023

Yale Postdoctoral Association

Yale University

- Leader of the Scheduling subcommittee
- Developed the Symposium's schedule, planned and organized outreach and social activities, coordinated the search for the keynote speaker and panelists

<b>COMMUNICATIONS OFFICER</b> Biology Graduate Student Association	2019–2020 Memorial University
• Managed the Association's weekly newsletter, website, event advertisement campaigns, and social media presence	
<b>CHAIRPERSON</b> Biology Graduate Student Association	2018–2019 Memorial University
• Coordinated the activities of the Executive Committee, focusing on fundraising, the welfare and mental health of graduate students, and community outreach	
• Liaised with the Head of the Department of Biology to coordinate activities and events	
<b>SEMINAR CO-COORDINATOR</b> Biology Graduate Student Association	2017–2018 Memorial University
• One-third of the Seminar team, in charge of approaching, scheduling, and managing internal and visiting speakers for the weekly seminar series of the Biology Department	
<b>EDUCATOR</b> Associazione O.A.S.I.—Operazione Mato Grosso di Torino	2000–2013 Turin, Italy
• Designed, scheduled, and run educational activities and community outreach events with and for children, teenagers, and young adults in Turin, Italy, and at the Hospital São Julião in Campo Grande, Mato Grosso do Sul, Brazil	
<b>TEAM LEADER</b> XX Winter Olympic and IX Paralympic Games	2005–2006 Turin, Italy
• Led, scheduled, and supervised the daily activities of a ten-strong team of volunteers within the International Relations and Services Protocol Crew at the Ice Hockey, Curling, and Ceremonies Olympic venues	

## Professional Development

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### Courses

<b>THE MODERN INSTRUCTOR LECTURE SERIES</b> Yale Postdoc Association 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 <a href="https://edX.org">edX.org</a>
<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	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 I</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

## REPRODUCIBLE RESEARCH THROUGH OPEN SCIENCE

Canadian Institute for Ecology and Evolution & NSERC-CREATE “Living Data Project”

11 Jun. 2020

Attended online at [osf.io](https://osf.io)

## TEACHING INCLUSIVELY & EQUITABLY ONLINE

American Society for Engineering Education & NSF INCLUDES Aspire Alliance

21 May 2020

Attended online

## H5P MAKER SESSION

Centre for Innovation in Teaching and Learning

24 Oct. 2019

Memorial University

## COMMUNITY OF INQUIRY COFFEE BREAK: OPEN ACCESS

Centre for Innovation in Teaching and Learning

23 Oct. 2019

Memorial University

## OPEN ACCESS AND SCHOLARLY PUBLISHING

Centre for Innovation in Teaching and Learning

22 Oct. 2019

Memorial University

## FOUR THINGS TO CONSIDER FOR GRADUATE STUDENT TEACHING

Enhanced Development of the Graduate Experience

8 Nov. 2018

Memorial University

## AARMS CRG SOFTWARE CARPENTRY WORKSHOP

The Carpentries

27 May 2017

Memorial University

## Honors & Awards

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### Hanski Prize, Oecologia

2021

Awarded by the journal's Editorial Board to the best student-authored paper in animal ecology

### Mitacs Research Training Award, Mitacs, St. John's, Canada

2020

Awarded to graduate students to conduct research during the COVID-19 pandemic

### First Place–H5P Maker Session, Memorial University, St. John's, Canada

2019

Awarded by the Centre for Innovation in Teaching & Learning to the creator of the best HTML5 interactive learning object

### Mitacs Globalink Research Award, Mitacs, St. John's, Canada

2019

Awarded to senior graduate students to conduct research abroad

### Dean's Doctoral Award, Memorial University, St. John's, Canada

2016–2020

Awarded to Ph.D. students based on academic excellence and research potential

### Graduated with Distinction, Imperial College London, London, UK

2014

Awarded to the top 5% of all Master's students in a cohort

### Erasmus-LLP Scholarship, University of Turin, Turin, Italy

2010

Awarded to students to take part in the Erasmus exchange program of the European Union

## Professional Affiliations

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INTERNATIONAL SOCIETY FOR ECOLOGICAL MODELLING

2023–2025

ECOLOGICAL SOCIETY OF AMERICA

2021–2023

CANADIAN SOCIETY FOR ECOLOGY AND EVOLUTION

2016–2021

## Conferences

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Organized

6<sup>TH</sup> ANNUAL SYMPOSIUM

25 May 2023

Yale Postdoc Association

New Haven, CT, USA

Attended

FOR ALL ECOLOGISTS

6–11 Aug. 2023

Ecological Society of America, Annual Meeting

Portland, OR, USA

## ECOLOGICAL MODELS FOR TOMORROW'S SOLUTIONS

The International Society for Ecological Modelling Global Conference 2023

2–6 May 2023

Toronto, ON, Canada

## VITAL CONNECTIONS IN ECOLOGY

Ecological Society of America, Virtual Annual Meeting

2–6 Aug. 2021

Long Beach, CA, USA

## UNIFYING ECOLOGY ACROSS SCALES

Gordon Research Seminar and Conference

21–27 Jul. 2018

Biddeford, ME, USA

## ANNUAL GENERAL MEETING

Canadian Society for Ecology and Evolution

18–21 Jul. 2018

Guelph, ON, Canada

## ANNUAL GENERAL MEETING

Canadian Society for Ecology and Evolution

7–11 Jul. 2016

St. John's, NL, Canada

## FROM ENERGETICS TO MACRO ECOLOGY: CARNIVORE RESPONSES TO ENVIRONMENTAL CHANGE

Zoological Society of London

14–15 Nov. 2013

London, UK

## ESOF—EUROSCIENCE OPEN FORUM

Euroscience

2–7 Jul. 2010

Turin, Italy

## XIX CONGRESS

Italian Primatological Society

1–3 Apr. 2009

Asti, Italy

## Skills

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### Programming

R, Wolfram Mathematica, LaTeX, Bash, HTML

### Software

Version Control (Git, GitHub), RStudio, Atom, Sublime Text, QGIS, Inkscape

### Platforms

macOS, Windows

### Languages

Italian (Native), English (Fluent), French (Basic), Spanish (Basic), Polish (Basic)

## Certificates

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### WILDERNESS AND REMOTE FIRST AID

Canadian Red Cross

2016–2019

St. John's, NL, Canada

### WHMIS AND LAB SAFETY

Memorial University of Newfoundland and Labrador

2017

St. John's, NL, Canada

### BASIC OUTDOOR FIRST AID

Marlin Training Ltd.

2014

London, UK

### INTERNATIONAL ENGLISH LANGUAGE TESTING SYSTEM

British Council

2013

Turin, Italy

Grade: 8.5

### INTERNATIONAL COMPUTER DRIVING LICENCE

University of Turin

2007

Turin, Italy

## Interests

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Hiking, Photography, Yoga, Watercolor painting