

# Matteo Rizzuto

POSTDOCTORAL ASSOCIATE · SCHOOL OF THE ENVIRONMENT, YALE UNIVERSITY

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## Education

### DOCTOR OF PHILOSOPHY, BIOLOGY

Memorial University of Newfoundland and Labrador

2016–2021

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

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

## Research Appointments

### POSTDOCTORAL ASSOCIATE

Schmitz Lab, School of the Environment, Yale University

Present

New Haven, USA

- Developing new mathematical models to assess how animals influence carbon budgets and nutrient cycling in terrestrial ecosystems

### 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

Jun.–Oct. 2015

London, UK

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

### RESEARCH ASSISTANT

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

Jun.–Sept. 2013

Trento, Italy

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

### GRADUATE INTERN

Piedmont Wolf Project, Maritime Alps Nature Park

Jun.–Dec. 2011

Entracque (CN), Italy

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

### UNDERGRADUATE INTERN

Ethology Lab, University of Turin

2008–2009

Turin, Italy

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

## Publications

Peer reviewed. <sup>†</sup> stands for equal contribution.

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.<sup>†</sup>, [Rizzuto, M.<sup>†</sup>](#), 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., Vander Wal, E., Wiersma, Y. F., Heckford, T. R. 2023. Animal-vectored nutrient flows across resource gradients influence the nature of local and meta-ecosystem functioning. In review, *Theoretical Ecology*, manuscript id: 42acf097-9459-4763-8814-0ef6c8a5c5d9. *bioRxiv preprint*.
- McLeod, A.M., Leroux, S.J., [Rizzuto, M.](#), Leibold, M.A., Schiesari, L. Integrating ecosystem and contaminant models to study the spatial dynamics of contaminants. In review, *Ecosphere*, manuscript id: ECS23-0188.

#### 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

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#### Conference Talks

- **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, 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 Graphic: 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

## Honors & Awards

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

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| <b>Hanski Prize</b> , Oecologia  | 2021      |
| Awarded by the journal’s Editorial Board to the best student-authored paper in animal ecology                            |           |
| <b>Mitacs Research Training Award</b> , Mitacs, St. John’s, Canada   | 2020      |
| Awarded to graduate students to conduct research during the COVID-19 pandemic  |           |
| <b>First Place–H5P Maker Session</b> , 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 |           |
| <b>Mitacs Globalink Research Award</b> , Mitacs, St. John’s, Canada  | 2019      |
| Awarded to senior graduate students to conduct research abroad   |           |
| <b>Dean’s Doctoral Award</b> , Memorial University, St. John’s, Canada   | 2016–2020 |
| Awarded to Ph.D. students based on academic excellence and research potential  |           |
| <b>Graduated with Distinction</b> , Imperial College London, London, UK  | 2014      |
| Awarded to the top 5% of all Master’s students in a cohort   |           |
| <b>Erasmus-LLP Scholarship</b> , University of Turin, Turin, Italy   | 2010      |
| Awarded to students to take part in the Erasmus exchange program of the European Union                                   |           |

## Teaching

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## INDUSTRIAL ECOLOGY, Graduate course

Fall 2022

- Crafted and delivered a lecture weaving the concept of metabolism from ecology into 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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**Manuscript Reviewer** *Biological Conservation, Science of the Total Environment, Ecology and Evolution*

## Professional Development

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### Courses

## MENTORSHIP TRAINING PROGRAM FOR YALE POSTDOCS

March 2023

Office for Postdoctoral Affairs

Yale University

## CAREER DEVELOPMENT LEADERS PROGRAM

Jan.–Mar. 2023

Office of Career Strategy

Yale University

## BECOMING A MORE EQUITABLE EDUCATOR: MINDSETS AND PRACTICES

Mar.–Jun. 2020

MIT Teaching Systems Lab

Attended online at edX.org

## TEACHING SKILLS ENHANCEMENT PROGRAM

Sept. 2019–Aug. 2020

Centre for Innovation in Teaching and Learning

Memorial University

### Workshops

## HOW TO HELP: TIPS FROM MENTAL HEALTH FIRST AID

1 Mar. 2023

Being Well at Yale

Yale University

## ALT-ACADEMIC CAREER Q&amp;A I

8–9 Feb. 2023

Early Career Section

Ecological Society of America

## HOW TO WRITE AN EFFECTIVE DIVERSITY STATEMENT

11 Oct. 2022

Graduate Writing Lab

Yale University

**BUILDING YOUR BRAND WORKSHOP**

Beyond the PhD

8 Sept. 2022

Attended online

**REPRODUCIBLE RESEARCH THROUGH OPEN SCIENCE**

Canadian Institute for Ecology and Evolution &amp; 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 &amp; 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

## Extracurricular Activity

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

**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

**COMMUNICATIONS OFFICER**

2019–2020

Biology Graduate Student Association

Memorial University

- Managed the Association's weekly newsletter, website, event advertisement campaigns, and social media presence

**CHAIRPERSON**

2018–2019

Biology Graduate Student Association

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

**SEMINAR CO-COORDINATOR**

2017–2018

Biology Graduate Student Association

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

**YOUTH EDUCATOR**

2000–2013

Associazione O.A.S.I.—Operazione Mato Grosso di Torino

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

**TEAM LEADER**

2005–2006

XX Winter Olympic and IX Paralympic Games

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 Affiliations

## Conferences Attended

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|---|------------------------|
| ECOLOGICAL MODELS FOR TOMORROW'S SOLUTIONS                                    | 2–6 May 2023           |
| The International Society for Ecological Modelling Global Conference 2023     | Toronto, Canada        |
| VITAL CONNECTIONS IN ECOLOGY  | 2–6 Aug. 2021          |
| Ecological Society of America, Virtual Annual Meeting                         | Long Beach, CA, USA    |
| UNIFYING ECOLOGY ACROSS SCALES  | 21–27 Jul. 2018        |
| Gordon Research Seminar and Conference  | Biddeford, ME, USA     |
| ANNUAL GENERAL MEETING  | 18–21 Jul. 2018        |
| Canadian Society for Ecology and Evolution                                    | Guelph, ON, Canada     |
| ANNUAL GENERAL MEETING  | 7–11 Jul. 2016         |
| Canadian Society for Ecology and Evolution                                    | St. John's, NL, Canada |
| FROM ENERGETICS TO MACRO ECOLOGY: CARNIVORE RESPONSES TO ENVIRONMENTAL CHANGE | 14–15 Nov. 2013        |
| Zoological Society of London  | London, UK             |
| ESOF—EUROSCIENCE OPEN FORUM   | 2–7 Jul. 2010          |
| Euroscience   | Turin, Italy           |
| XIX CONGRESS  | 1–3 Apr. 2009          |
| Italian Primatological Society  | Asti, Italy            |

## Skills

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| <b>Programming</b> | R, Bash, Wolfram Mathematica, LaTeX, HTML                      |
| <b>Software</b>    | VCS (Git, GitHub), RStudio, Atom, Sublime Text, QGIS, Inkscape |
| <b>Platform</b>    | macOS, Windows   |
| <b>Languages</b>   | Italian, English   |

## Certificates

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| WILDERNESS AND REMOTE FIRST AID                  | 2016–2019              |
| Canadian Red Cross                               | St. John's, NL, Canada |
| WHMIS AND LAB SAFETY                             | 2017                   |
| Memorial University of Newfoundland and Labrador | St. John's, NL, Canada |
| BASIC OUTDOOR FIRST AID                          | 2014                   |
| Marlin Training Ltd.                             | London, UK             |
| INTERNATIONAL ENGLISH LANGUAGE TESTING SYSTEM    | 2013                   |
| British Council                                  | Turin, Italy           |
| Grade: 8.5                                       |                        |
| INTERNATIONAL COMPUTER DRIVING LICENCE           | 2007                   |
| University of Turin                              | Turin, Italy           |

## Interests

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Hiking, Photography, Yoga, Watercolor painting