Andrea Zampetti

PhD student in Environmental and Evolutionary Biology

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CV highlights

- H-index: 3
- 5 publications on peer-reviewed journals
- 1 technical report
- Reviewer for 7 scientific journals
- Advanced ecological modelling & AI for wildlife monitoring
- Fieldwork in challenging environments

Personal statement

I am a PhD student in Environmental and Evolutionary Biology at Sapienza University of Rome, working at the intersection of ecology, conservation biology, and artificial intelligence. My research focuses on developing and applying AI and computer vision approaches for wildlife monitoring, particularly through camera-trapping methods for estimating population density and abundance. I am especially interested in advancing automated data processing pipelines using machine learning algorithms to improve species detection, classification, and density estimation. By integrating ecological modelling with AI-based analytical tools, I aim to enhance large-scale conservation assessments and decision-making processes through accurate, scalable, and data-driven monitoring of wildlife populations.

Current position

Nov 2023 - present

PhD student in Environmental and Evolutionary Biology
Sapienza University of Rome, Italy

- Supervisor: Dr. Luca Santini
- Ecology and Conservation Across Scales (ECAS) lab
- Working on applying wildlife population density data to conservation studies across different spatial scales through modelling and integrated approaches

Education

Oct 2022 – Jul 2023

MSc in Ecobiology
Sapienza University of Rome, Italy

- **Thesis**: "Density estimation with camera-traps: comparison between two methods and evaluation of the effects of a machine learning approach for images classification"
- **Final evaluation**: 110/110 cum laude

Oct 2018 – Oct 2021

BSc in Biological Sciences
Sapienza University of Rome, Italy

- **Thesis**: "Aggression and conflict: an overview of mammalian mating systems"
- **Final evaluation**: 107/110

Sep 2013 – Jul 2018 **Scientific high school diploma**
I.I.S. "Leonardo da Vinci" high school, Maccarese, Italy
- **Final evaluation**: 110/110 cum laude

Employments

Nov 2024 - present **Research contract (junior):** "Machine learning applications for automatic species recognition from camera-trap data"
Sapienza University of Rome, Italy
- **FUNDING:** uGov/000301_22_NaturaConnect_HorizonEU-CL6-2021-BIODIV01_CUP_B83C21001860006_SANTINI
- **P.I.:** Dr. Luca Santini, Dept. of Biology and Biotechnologies "Charles Darwin"
- **ROLE**: To develop and apply integrated methods for automated species classification and density estimation in camera-traps

Nov 2023 – Nov 2024 **Research contract (M2, full-time):** AYUDAS RAMÓN Y CAJAL 2021
Museo Nacional de Ciencias Naturales (CSIC), Madrid, Spain
- **FUNDING:** proj. RYC2021-031737-I, MCIN/AEI/10.13039/501100011033, "NextGenerationEU"/PRTR
- **P.I.:** Dr. Ana Benítez-López, Dept. Of Biogeography and Global Change
- **ROLE**: To develop of a machine learning algorithm for automated classification of arboreal mammal and bird species in the Neotropics

Field/practical experiences

Nov 2023 – Feb 2024 **Fieldwork as technician for the TROPECOLNET project:** "Characterizing the role of interacting species, the drivers and the structure of plant-frugivore ecological networks along a defaunation gradient in tropical forests"

- Medio Juruá Extractive Reserve, Amazonas (Brazil)
- Supervisor: Dr. Ana Benítez-López
- In collaboration with *Instituto Juruá* (NGO)
- Fieldwork expedition logistic
- Camera-traps placement, maintenance and data management: visual recognition of mammal and bird species

Mar 2022 – Jul 2023 **Fieldwork assistant for a PhD project:** "Impact of ecotourism on species spatial habitat use"

- Tenuta Sant'Egidio reserve in Soriano nel Cimino (VT), Italy
- Supervisor(s): Dr. Luca Santini, Dr. Davide Mirante
- Camera-traps placement, maintenance and data management: visual recognition, activity patterns and density estimation for mammal species
- Audio-recording devices placement and maintenance for acoustic surveys of birds and bats

Oct 2022 – Dec 2023 **Internship activities for MSc degree**

- Sapienza University of Rome, ECAS lab
- Basic statistical modelling, data management and analysis of large datasets, intermediate coding in R and elementary understanding of Python programming language

Scientific production

5. **Zampetti, A.**, Santini, L., Ferreiro-Arias, I., Paltrinieri, L., Ortiz, I., Cedeño-Panchez, B.A., Baltzinger, C., Beirne, C., Bowler, M., Guilbert, E., Kemp, Y.J.M., Peres, C.A., Scabin, A.B., Whitworth, A., & Benítez-López, A. (2026). Introducing TropiCam-AI: A taxonomically flexible automated classifier of Neotropical arboreal mammals and birds from camera-trap data. *Methods in Ecology and Evolution*. https://doi.org/10.1111/2041-210x.70213

4. Giuliani, M., Mirante, D., Russo, L. F., **Zampetti, A.**, & Santini, L. (2025). SANE: An Index of Anthropogenic Noise Levels for Wildlife Research in Terrestrial Ecosystems. *bioRxiv*. https://doi.org/10.64898/2025.12.23.696194

3. **Zampetti A.**, Mirante D., Palencia P., Santini L. (2024). Towards an automated protocol for wildlife density estimation using camera-traps, *Methods in Ecology and Evolution*. https://doi.org/10.1111/2041-210X.14450

2. Santini L., Mendez Angarita V., Karoulis C., Fundarò D., Pranzini N., Vivaldi C., Zhang T., **Zampetti A.**, Gargano S., Mirante D., Paltrinieri L. (2024). TetraDENSITY 2.0: A database of population density estimates in Tetrapods, *Global Ecology and Biogeography*, e13929. https://doi.org/10.1111/geb.13929

1. Mirante D., Ancillotto L., **Zampetti A.**, Coiro G., Pisa G., Santocchi C., Giuliani M., Santini L. (2024). Finetuning coexistence: wildlife's short-term responses to dynamic human disturbance patterns, *Global Ecology and Conservation*, e03053. https://doi.org/10.1016/j.gecco.2024.e03053

Technical reports

1. Santini L., & **Zampetti A**. (2025). National-scale estimates of mammal species abundance in Italy for the Habitat Directive reporting. *Technical Report*. https://doi.org/10.32942/X2V93M

Participation in congresses

Jun 17th, 2025 — **"Introducing *TropiCam-AI*: An automated classifier of Neotropical arboreal mammals and birds from camera-trap images"**
Brisbane, Australia

- Oral presentation at ICCB 2025, 32nd International Congress of Conservation Biology held by Society of Conservation Biology (Oceania chapter)

May 6th, 2025 — **"Introducing *TropiCam-AI*: An automated classifier of Neotropical arboreal mammals and birds from camera-trap images"**
L'Aquila, Italy

- Oral presentation at "Biodiversity and Global Changes: A Conservation Perspective", 2nd conference of Conservation Biology for Early Career Researchers held by Society of Conservation Biology (Italian chapter)

Jun 21st, 2024 — **"Towards an automated protocol for wildlife density estimation using camera-traps"**
Bologna, Italy

- Oral presentation at ECCB 2024, 7th European Congress of Conservation Biology held by Society of Conservation Biology (Italian chapter)

Apr 20th, 2023 — **"Testing the effect of AI-based species identification on wildlife monitoring"**

Rome, Italy

- Poster exposition at "Challenging Conservation", 1st conference of Conservation Biology for Early Career Researchers held by Society of Conservation Biology (Italian chapter)

Participation in projects

Nov 2024 – Jun 2025

"National-scale estimates of mammal species abundance in Italy for the Habitat Directive reporting"
ATIt (Theriological Italian Association), Italy

- Contribution in quality of experienced modeller to evaluate distribution and population abundance of mammal species for the 5° Reporting of the Habitat Directive
- In collaboration with ATIt (*Theriological Italian Association*), University of Turin, and ISPRA (*Superior Institute for Environmental Protection and Research*)

Nov 2023 – Nov 2024

TROPECOLNET project: "Characterizing the role of interacting species, the drivers and the structure of plant-frugivore ecological networks along a defaunation gradient in tropical forests""
National Museum of Natural Sciences (MNCN-CSIC), Madrid, Spain

- Fieldwork as technician for camera-trapping season in Medio Juruá Extractive Reserve, Amazonas (Brazil)
- Development of a machine learning algorithm for automated classification of arboreal mammal and bird species in the Neotropics
- P.I.: Dr. Ana Benítez-López, Dept. Of Biogeography and Global Change
- In collaboration with *Instituto Juruá* (NGO)

Grants & awards

Dec 9th, 2025

"Avvio alla Ricerca" grant (1.200€)
Sapienza University of Rome, Italy

- Project "HAIRS: Hairs AI Recognition Support for small mammals monitoring"

May 6th, 2025

Best Oral Presentation Award
"Biodiversity and Global Changes: A Conservation Perspective" conference by SCB Italy

- Title: "Introducing TropiCam-AI: An automated classifier of Neotropical arboreal mammals and birds from camera-trap images"

Teaching experience

Mar 27th, 2025

Held a practical seminar titled "*Wildlife occupancy modelling and activity patterns estimation using camera-traps*" within the Vertebrate Zoology course, MSc degree in Ecosystem and Conservation Biology, Sapienza University of Rome

Mar 27th, 2025

Held a lecture titled "*Surveying wildlife through (mostly) non-invasive techniques*" within the Vertebrate Zoology course, MSc degree in Ecosystem and Conservation Biology, Sapienza University of Rome

Dec 16th, 2024	Held a lecture titled "*Eyes in the forest: camera-traps for wildlife monitoring and conservation*" within the Vertebrate Zoology course, MSc degree in Ecosystem and Conservation Biology, Sapienza University of Rome

Supervision

Sep 2025 – Ongoing	Supervisor of Valerio Ferretti, BSc student in Biological Sciences at Sapienza University of Rome. Thesis: "*Drones in wildlife monitoring and conservation: applications and case studies*"
Feb 2025 – Oct 2025	Supervisor of Matteo D'Alessandro, BSc student in Biological Sciences at Sapienza University of Rome. Thesis: "*Density estimation of the crested porcupine (Hystrix cristata) in a private reserve in Central Italy*"
Sep 2024 – Jul 2025	Co-supervisor of Gabriele Ferraro, MSc student in Ecosystem and Conservation Biology at Sapienza University of Rome. Thesis: "*Estimates of carnivore densities and habitat use in the Anjozorobe-Angavo protected area, Madagascar*"
Jul 2024 – Oct 2024	Supervisor of Eleonora Lenci, BSc student in Biological Sciences at Sapienza University of Rome. Thesis: "*Optimization of the analysis of camera-trap data in conservation studies: from citizen science to machine learning*"

Core Skills

- Excellent written and verbal communication skills
- Quick to learn and adapt to new tools, methods, and environments
- Creative and lateral thinker with strong problem-solving abilities
- Collaborative and team-oriented, fostering productive partnerships
- Ambitious, adaptable, and proactive in achieving project objectives

COMPUTER COMPETENCY

Programming & Data Science

- R (advanced): statistical modelling, simulations, machine learning, data visualization
- Python/Conda (intermediate): environment management, computer vision training workflows
- AI/ML: model training for image classification (e.g. species detection & identification)

Data Management & Analysis Tools

- GitHub for version control, collaborative coding, and project documentation
- Microsoft Excel, Word, PowerPoint (advanced)
- Supercomputing workflows: SSH/bash scripting for large-scale analyses
- QGIS for spatial analysis

LANGUAGE COMPETENCY

Italian: native
English: written C1 (advanced), comprehension C2 (proficient), spoken C1 (advanced)
Spanish: comprehension B1 (basic)

References

Dr. Luca Santini

- Associate Professor, Department of Biology and Biotechnologies “Charles Darwin”, Sapienza University of Rome
- Relationship: PhD supervisor
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- Tel: (+39) 351 803 1074