

Riccardo Ceccaroni

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🐦 [@riccardoc95](#)



Employment History

2022 – 2023 📖 **Data Collection Specialist**, GStep - Policlinico Universitario Agostino Gemelli, Rome, Italy.

Education

2023 – now 📖 **Ph.D., Data Science** Sapienza University, Rome, Italy.
2020 – 2022 📖 **M.Sc. Data Science**, Sapienza University, Rome, Italy.
Thesis title: *Topological Persistence for Astronomical Image Segmentation*.
2015 – 2019 📖 **B.Sc. Mathematics**, Tor Vergata University, Rome, Italy.
Thesis title: *Metodi di simulazione in statistica*.

Skills

Languages	📖 Reading, writing and speaking competencies for English.
Coding	📖 Python, R, C/C++, Matlab, Eiffel, SQL, HTML, $\LaTeX$.
Databases	📖 MySQL, PostgreSQL, MongoDB, Neo4j.
Operating System	📖 Linux, MacOS, Windows.
Software & Tools	📖 Visualization: Matplotlib, GNUplot Data handling/analysis: Numpy, Scipy, Pandas Machine learning: TensorFlow, PyTorch, Scikit-learn Apache Hadoop/Spark REDCap Docker Microsoft Office
Misc.	📖 Play piano and guitar.

Miscellaneous Experience

Visiting

2025 📖 **MIA Lab, La Rochelle Université**, Visiting Researcher

Teaching Assistant

2024 📖 **Istituzioni di Matematica**, Filosofia e Intelligenza Artificiale, Sapienza University, Rome, Italy.

Summer Schools

2025 📖 **International HPC Summer School 2025**, Napoli, Italy

Miscellaneous Experience (continued)

2024  **Deep Learning and Computer Vision 2024**, Genova, Italy.

2023  **ESSAI & ACAI**, Ljubljana, Slovenia.

Research Interests

-  **Persistent Homology**: applications in image analysis and computer vision tasks.
-  **Image Processing**: denoising and segmentation, with a focus on astronomical images.
-  **Image Generation and Synthesis**: diffusion models for generative modeling and image synthesis.
-  **High-Performance Computing**: developing parallel and distributed algorithms

Research Publications

Journal Articles

- 1 R. Ceccaroni, L. Di Rocco, U. Ferraro Petrillo, and P. Brutti, “A distributed approach for persistent homology computation on a large scale,” *THE JOURNAL OF SUPERCOMPUTING*, no. 17, 2024.
 DOI: 10.1007/s11227-024-06374-5.

Conference Proceedings

- 1 R. Ceccaroni, L. Di Rocco, and U. Ferraro Petrillo, “Sapientigraph: An open knowledge graph of university degree programs at sapienza,” in *New Trends in Database and Information Systems*, Springer Nature Switzerland, 2026, pp. 398–409, ISBN: 978-3-032-05727-3.
- 2 R. Ceccaroni and P. Brutti, “Topology-driven explainable gnns for trojan detection in deep learning,” in *International Joint Conference on Neural Networks Conference Proceedings*, 2025, ISBN: 979-8-3315-1042-8.
- 3 R. Ceccaroni, L. Di Rocco, U. Ferraro Petrillo, and P. Brutti, “A distributed workflow for long reads self-correction,” in *Euro-Par 2024: Parallel Processing Workshops*, 2025, pp. 105–116, ISBN: 9783031902031.
 DOI: 10.1007/978-3-031-90203-1_10.
- 4 S. La Commare, R. Ceccaroni, and P. Brutti, “Topological anomalies for trojaned neural networks detection,” in *Statistical Methods for Data Analysis and Decision Sciences*, 2025.
- 5 R. Ceccaroni and P. Brutti, “Pixhomology: A new algorithm for computing persistent homology for pixel data,” in *Methodological and Applied Statistics and Demography – SIS 2024 Short Papers*, Springer Cham, 2024, ISBN: 978-3-031-64345-3.
- 6 R. Ceccaroni and P. Brutti, “Topological attention for denoising astronomical images,” in *Proceedings of the Statistics and Data Science 2024 Conference*, Palermo: Unipapress, 2024, pp. 316–321, ISBN: 978-88-5509-645-4.
- 7 R. Ceccaroni, P. Brutti, M. Castellano, A. Fontana, and E. Merlin, “Topological persistence for astronomical image segmentation,” in *Book of short papers. SIS 2022*, Torino: Pearson, 2022, pp. 1993–1998, ISBN: 9788891932310.