Marco Pegoraro
Ph.D. Student

m.pegoraro@hotmail.it
WebSite
Google Scholar
GitHub: Marco-Peg
Twitter: @MPegoraro42

Research Profile

As a Ph.D. student at Sapienza University of Rome, I am part of the GLADIA research group led by Emanuele Rodolà. With a Computer Science and Engineering background from the University of Verona (2021), I specialize in Geometric Deep Learning, Geometry Processing, and 3D spectral shape analysis.

My research interests lie at the intersection of Geometry and Bioinformatics. I am actively exploring the application of Geometric Deep Learning to the domains of Biology and Chemistry, specifically focusing on leveraging geometric analysis for the prediction of molecule properties. I am particularly fascinated by the complexities involved in working with probability and distributions on non-Euclidean domains, such as manifolds. Additionally, I have delved into the intersection of geometry processing and graph learning, emphasising spectral techniques for graph analysis.

I am proud to have received recognition for my Master's thesis with the Best Italian Master Thesis in Computer Graphics (*Matteo Dellepiane award*) at the Italian Chapter of EuroGraphics (STAG). In March, I joined the research group of Alex Bronstein at Technion (Israel) to start a collaboration on geometry processing applied to vector quantile regression and geometric deep learning applied to aromatic compounds.

Research Interests

- Geometric Deep Learning, Computational Biology, Spectral shape Analysis.

List of Publications

- **Marco Pegoraro**, Sanketh Vedula, Aviv A. Rosenberg, Irene Tallini, Emanuele Rodolà, Alex M. Bronstein, *Vector Quantile Regression on Manifolds*, **AISTATS 2024**

- **Marco Pegoraro**, Clémentine Dominé, Emanuele Rodolà, Petar Veličković, Andreea Deac, *Geometric Epitope and Paratope Prediction*, **NeurIPS 2023 NeuReps Workshop**

- **Marco Pegoraro**, Riccardo Marin, Arianna Rampini, Simone Melzi, Luca Cosmo, Emanuele Rodolà, *Spectral Maps for Learning on Subgraphs*, **NeurIPS 2023 NeuReps Workshop** (oral, best paper)

- Sanketh Vedula, Irene Tallini, Aviv A. Rosenberg, **Marco Pegoraro**, Emanuele Rodolá, Yaniv Romano, Alex M. Bronstein, *Continuous Vector Quantile Regression*, **ICML 2023 Workshop on New Frontiers in Learning, Control, and Dynamical Systems**

- **Marco Pegoraro**, Simone Melzi, Umberto Castellani, Riccardo Marin, Emanuele Rodolà, *Localized Shape Modelling with Global Coherence: An Inverse Spectral Approach*, **Symposium of Geometry Processing** - published in **Computer Graphics Forum** [impact factor: 2.363], 2022

- Ariel Caputo, Andrea Giachetti, Franca Giannini, Katia Lupinetti, Marina Monti, **Marco Pegoraro**, Andrea Ranieri, *SFINGE 3D: A novel benchmark for online detection and recognition of heterogeneous hand gestures from 3D fingers' trajectories*, **Computers & Graphics** [impact factor: 1.821], 2020

Education

- **Ph.D. in Computer Science**   *1/10/2021 – present*
  Advisor: *Emanuele Rodolà*
  Sapienza University of Rome, Italy – Computer Science department
  As a Ph.D. student, my research focuses on exploring the relationship between geometry processing and graph learning. My current research directions encompass:
  - Developing spectral representations for graphs and subgraphs to address alignment problems.
  - Analyzing biomolecular interactions from a geometric perspective.
  - Investigating the use of spectral structures to represent graphs.

- **Master's Degree in Computer Science and Engineering**   *2019 – 2021*
  Thesis: *Data-driven inverse spectral geometry: learning to generate shapes from multi spectra*
  Grade: *110/110 with honour*
  University of Verona, Italy

Rome, January 20, 2024,

- **Bachelor Degree in Computer Science** *2016 – 2019*
  Thesis: *Gesture recognition in augmented reality applications using neural networks*
  Grade: *110/110 with honour*
  University of Verona, Italy

International Research Visits

- **Technion - Israel Institute of Technology** *03/2023 - 09/2023*
  Research visit; supervisor: *Prof. Alex Bronstein*.

Teaching & Mentoring

- *Teaching assistant* **in Introduction to Algorithm** *03/2022 – 06/2022*
  Sapienza University of Rome, Italy - Computer Science department

Professional Activities / Academic Service

- **Reviewer - Conferences**

  - ICML 2022
  - IJCAI 2022
  - NEURIPS NeuReps Workshop 2022-2023
  - NEURIPS UniReps Workshop 2023

- **Reviewer - Journals**

  - ACM computing surveys

Invited Talks and Seminars

- *HARNESSING SPECTRAL REPRESENTATIONS FOR SUBGRAPH ALIGNMENT* *3/11/2022*
  scientific seminar at the Ca' Foscari University of Venice hosted by *Prof. Luca Cosmo*

- *Spectral Representations for Learning* *5/10/2023*
  invited talk at Gatsby Computational Neuroscience Unit (UCL) hosted by *Andrew Saxe*

Honors, Awards and Scholarships

- **PhD Sandwich Scholarship for International Students** *2023*
  Technion - Israel

- **"MOBILITÀ INTERNAZIONALE PHD 2022" grant for visiting period at Technion - Israel** *2022*
  Sapienza University of Rome

- **"Avvio alla Ricerca" grant for young researchers** *2022*
  Sapienza University of Rome

- **Matteo Dellepiane Award for best thesis in Computer Graphics** *2021*
  at the Italian Chapter of Eurographics (STAG 2021)

- **Research Scholarship on "Gestures recognition methods for virtual and augmented reality"** *2019*
  University of Verona

Skills

Technical specialties: Software design and implementation, with(in) a team.
Expert programming in MATLAB, Python, and libraries for Deep Learning and Data Science, such as PyTorch, PyTorch Geometric, Deep Graph Library, Tensorflow (1 and 2), Keras, Pandas, Scipy, and Scikit-learn.
Good programming in C/C++ and Java. Knowledge of graphic tools such as Blender, Unity.
Experience using Virtual Reality tools such as Oculus Rift, HoloLens, and ZedMini.

Natural languages: Italian (*mother tongue*), English (*professional proficiency*), French (*elementary proficiency*)