

Filippo Maggioli, Ph.D.



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Short Bio

Research profile

I am a Postdoctoral Researcher at *University of Milano-Bicocca*, where I am a member of the *DIG AIR* research lab led by Simone Melzi. Previously, I was a Postdoctoral Researcher at *Sapienza – University of Rome* in the *GLADIA* research lab led by Emanuele Rodolà, and a Research Intern at the *King Abdullah University of Science and Technology (KAUST)* in the *VCC* research lab led by Peter Wonka. I received my Ph.D. in Computer Science at *Sapienza – University of Rome* (2023), where I also graduated in Computer Science (2019).

I work on geometry processing, spectral geometry, and 3D shape analysis, but I am an active researcher also in other fields of computer graphics, such as procedural shading and physical simulation.

I regularly serve in the program committee of international conferences as chair and reviewer, and I maintain worldwide collaborations with researchers from other institutions and countries.

Research interests

Geometry Processing; Spectral Geometry; 3D Shape Analysis; Procedural Texturing; Simulation of Natural Phenomena; Numerical Linear Algebra.

Author profiles

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Academic Appointments and Teaching

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| Dec 2023 – Present |  Postdoctoral researcher. University of Milano-Bicocca
Member of the <i>DIG AIR</i> research lab under the supervision of prof. Simone Melzi.
Research activity on computational and spectral geometry. |
| Apr 2024 – Present |  Adjunct professor. Pegaso University
Undergrad courses on <i>Computer Architecture</i> and <i>Networking and Cybersecurity</i> .
Supervision of BSc students during the development of their thesis. |
| Aug 2023 – Nov 2023 |  Postdoctoral researcher. Sapienza – University of Rome
Member of the <i>Gladia</i> research lab under the supervision of prof. Emanuele Rodolà.
Research activity on computational geometry, spectral geometry, and numerical linear algebra. |
| Sep 2022 – Jan 2023 |  Research internship. King Abdullah University of Science and Technology
Member of the <i>VCC</i> research lab under the supervision of prof. Dominik L. Michels.
Research activity on simulation of natural phenomena in agricultural settings. |
| Mar 2021 – Jul 2021 |  Teaching assistant. Sapienza – University of Rome
Undergrad course on <i>Introduction to Algorithms</i> . |

Education

- 2019 – 2023 **Ph.D. in Computer Science.** Sapienza – University of Rome.
Thesis title: *Scalable geometry processing for computer graphics applications.*
- 2018 – 2019 **M.Sc. in Computer Science.** Sapienza – University of Rome.
Thesis title: *Time-efficient function reconstruction via Laplacian eigenproducts.*
- 2014 – 2017 **B.Sc. in Computer Science.** Sapienza – University of Rome.
Thesis title: *Modeling of biological pathways with systems of differential-algebraic equations.*

Academic Service

- 2023 **Member of program committee.** TAG-ML
ICML's workshop on Topology, Algebra, and Geometry in Machine Learning. *Honolulu, Hawaii*
- 2021 **Event chair.** STAG
Smart Tools and Applications in Graphics. *Rome, Italy*

Invited Talks and Seminars

- May 2022 **Strassen's algorithm in practice**
Sapienza – University of Rome, hosted by *R. Marin.*

Grants

- 2022 **Sapienza Research Starting Grant: Avvio alla Ricerca – Tipo 2**
Principal investigator for the project *Enhancing Procedural Computer Graphics in Multimedia Applications with Fast Geometry Processing Techniques.*
- 2021 **Sapienza Research Starting Grant: Avvio alla Ricerca – Tipo 1**
Principal investigator for the project *Automation of Casting Mold Design for Industrial Fabrication of Digital Objects.*
- 2020 **Sapienza Research Starting Grant: Avvio alla Ricerca – Tipo 1**
Principal investigator for the project *GPU Fluid Simulation on Non-Euclidean Domains and Application for Simulation of Erosion Phenomena.*

Reviewing Service

- 2024 **Pacific Graphics.** Pacific Conference on Computer Graphics and Applications.
ECCV. European Conference on Computer Vision.
EUROGRAPHICS. Annual Conference of the European Association for Computer Graphics.
CGF. Computer Graphics Forum.
TVCG. IEEE Transactions on Visualization and Computer Graphics.
- 2023 **Pacific Graphics.** Pacific Conference on Computer Graphics and Applications.
TAG-ML. ICML's workshop on Topology, Algebra, and Geometry in Machine Learning.
ICCV. International Conference on Computer Vision.
NeurReps. NeurIPS' workshop on Symmetry and Geometry in Neural Representations.
ICIAP. International Conference on Image Analysis and Processing.
- 2022 **EUROGRAPHICS.** Annual Conference of the European Association for Computer Graphics.

Supervision and Mentoring

- 2024 – Present
- 📖 **Giulio Viganó, Ph.D.** University of Milano-Bicocca
In the role of internal supervisor (not as formal advisor).
 - 📖 **Francesca Maccarone, Ph.D.** University of Milano-Bicocca
In the role of internal supervisor (not as formal advisor).
 - 📖 **Giorgio Longari, M.Sc.** University of Milano-Bicocca
In the role of internal supervisor (not as formal advisor).
- 2022 – Present
- 📖 **Daniele Baieri, Ph.D.** Sapienza – University of Rome
In the role of internal supervisor (not as formal advisor).
- 2023 – 2024
- 📖 **Roberta Giorgi, B.Sc.** Sapienza – University of Rome
In the role of internal supervisor (not as formal advisor).
- 2024
- 📖 **Simone Pedico, B.Sc. Thesis.** University of Milano-Bicocca
In the role of co-advisor for the thesis.
 - 📖 **Alessio Tosato, B.Sc. Thesis.** University of Milano-Bicocca
In the role of co-advisor for the thesis.
 - 📖 **Pietro Manconi, B.Sc. Thesis.** Pegaso University
In the role of advisor for the thesis.
 - 📖 **Anthony Petralia, B.Sc. Thesis.** Pegaso University
In the role of advisor for the thesis.
 - 📖 **Daniele Rinaldi, B.Sc. Thesis.** Pegaso University
In the role of advisor for the thesis.
 - 📖 **Valerio Cascapera, B.Sc. Thesis.** Pegaso University
In the role of advisor for the thesis.
- 2021
- 📖 **Daniele Solombrino, B.Sc. Thesis.** Sapienza – University of Rome
In the role of internal supervisor (not as formal advisor).

Skills

- Languages
- 📖 Italian (mother tongue), English (professional proficiency).
- Interpersonal
- 📖 Adaptability to work independently and with(in) a team. Capability of supervising and communicating efficaciously. Excellent organizational and teaching abilities.
- Programming
- 📖 Proficient in C/C++ and MATLAB. Knowledge of Python and C#.
- Tools
- 📖 Expert with the mesh processing software *MeshLab* and the rendering engine *Blender*. Advanced knowledge of the game engines *Unreal Engine 4 and 5* and *Unity 3D*. Familiar with software for raster (*GIMP*) and vector (*InkScape*) 2D graphics.

Research Publications

Journal Articles

- 1 **F. Maggioli**, R. Marin, S. Melzi, and E. Rodolà, “Momax: Mold manifold simulation for real-time procedural texturing,” vol. 41, no. 7, pp. 519–527, 2022.
- 2 L. Moschella, S. Melzi, L. Cosmo, **F. Maggioli**, O. Litany, M. Ovsjanikov, L. Guibas, and E. Rodolà, “Learning spectral unions of partial deformable 3d shapes,” vol. 41, no. 2, pp. 407–417, 2022.
- 3 **F. Maggioli**, S. Melzi, M. Ovsjanikov, M. M. Bronstein, and E. Rodolà, “Orthogonalized fourier polynomials for signal approximation and transfer,” vol. 40, no. 2, pp. 435–447, 2021.
- 4 **F. Maggioli**, T. Mancini, and E. Tronci, “Sbml2modelica: Integrating biochemical models within open-standard simulation ecosystems,” *Bioinformatics*, vol. 36, no. 7, pp. 2165–2172, 2020.

Conference Proceedings

- 1 D. Marin, **F. Maggioli**, S. Melzi, S. Ohrhallinger, and M. Wimmer, “Reconstructing curves from sparse samples on riemannian manifolds,” in *Symposium on geometry processing*, 2024.
- 2 **F. Maggioli**, J. Klein, T. Hädrich, E. Rodolà, W. Palubicki, S. Pirk, and D. L. Michels, “A physically-inspired approach to the simulation of plant wilting,” in *SIGGRAPH Asia 2023 Conference Papers*, 2023, pp. 1–8.
- 3 **F. Maggioli**, D. Baieri, S. Melzi, and E. Rodolà, “Newton’s fractals on surfaces via bicomplex algebra,” in *ACM SIGGRAPH 2022 Posters*, 2022, pp. 1–2.
- 4 V. Arrigoni, **F. Maggioli**, A. Massini, and E. Rodolà, “Efficiently parallelizable strassen-based multiplication of a matrix by its transpose,” in *Proceedings of the 50th International Conference on Parallel Processing*, 2021, pp. 1–12.

Pre-prints

- 1 D. Baieri, **F. Maggioli**, Z. Löhner, S. Melzi, and E. Rodolà, “Implicit-arap: Efficient handle-guided deformation of high-resolution meshes and neural fields via local patch meshing,” 2024.
- 2 D. Baieri, D. Crisostomi, S. Esposito, **F. Maggioli**, and E. Rodolà, “Efficient generation of multimodal fluid simulation data,” 2023.
- 3 D. Baieri, S. Esposito, **F. Maggioli**, and E. Rodolà, “Fluid dynamics network: Topology-agnostic 4d reconstruction via fluid dynamics priors,” 2023.
- 4 **F. Maggioli**, D. Baieri, E. Rodolà, and S. Melzi, “Rematching: Low-resolution representations for scalable shape correspondence,” 2023.

Rome, June 19, 2024