

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

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| 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. |
| | ■ Daniele Solombrino, B.Sc. Thesis. Sapienza – University of Rome In the role of internal supervisor (not as formal advisor). |
| 2021 | ■ Daniele Solombrino, B.Sc. Thesis. Sapienza – University of Rome In the role of internal supervisor (not as formal advisor). |

Skills

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| 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 <i>MeshLab</i> and the rendering engine <i>Blender</i> . Advanced knowledge of the game engines <i>Unreal Engine 4 and 5</i> and <i>Unity 3D</i> . Familiar with software for raster (<i>GIMP</i>) and vector (<i>InkScape</i>) 2D graphics. |

Research Publications

Journal Articles

- 1 **F. Maggioli**, R. Marin, S. Melzi, and E. Rodolà, “Momas: 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. Lähner, 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