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 Rodolá, 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**

ORCID:	🆔 0000-0001-8008-8468		
Google Scholar ID:	VN1fbwUAAAAJ	*h*-index: 5	*i10*-index: 2
Scopus Author ID:	57216313662	*h*-index: 4	*i10*-index: 1

Academic Appointments and Teaching

Dec 2023 – Present	🔖 **Postdoctoral researcher.** University of Milano-Bicocca Member of the *DIG AIR* research lab. Advisor: prof. Simone Melzi. Research activity on computational and spectral geometry.
Apr 2024 – Present	🔖 **Adjunct professor.** Pegaso University Undergrad courses on *Computer Achitecture* and *Networking and Cybersecurity*. Supervision of BSc students during the development of their theses.
Aug 2023 – Nov 2023	🔖 **Postdoctoral researcher.** Sapienza – University of Rome Member of the *Gladia* research lab. Advisor: 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 *VCC* research lab. Advisor: 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 *Introduction to Algorithms*.

Education

2019 – 2023   **Ph.D. in Computer Science.** Sapienza – University of Rome.
Advisor: prof. Emanuele Rodolà.
Thesis title: *Scalable geometry processing for computer graphics applications.*
Honourable mention at EG-Italy Award for PhD Thesis in Computer Graphics.

2018 – 2019   **M.Sc. in Computer Science.** Sapienza – University of Rome.
Advisor: prof. Emanuele Rodolà.
Thesis title: *Time-efficient function reconstruction via Laplacian eigenproducts.*

2014 – 2017   **B.Sc. in Computer Science.** Sapienza – University of Rome.
Advisor: prof. Enrico Tronci.
Thesis title: *Modeling of biological pathways with systems of differential-algebraic equations.*

Courses and Schools

Jul 2022   **IRDTA DeepLearn 2022 Summer.**
6th International Gran Canaria School on Deep Learning. *Las Palmas de Gran Canaria, Spain.*

Jul 2021   **ACDL 2021.**
Advanced Online & Onsite Course on Data Science & Machine Learning. *Pontignano, Italy.*

Academic Service

2023   **Member of program committee.** TAG-ML
ICML's workshop on Topology, Algebra, and Geometry in Machine Learning. *Honululu, Hawaii*

2022   **Member of RCDC Conference Coffee Committee.** ACM SIGGRAPH RCDC
ACM SIGGRAPH Research Career Development Committee. *Vancouver, Canada*

2021   **Event chair.** STAG
Smart Tools and Applications in Graphics. *Rome, Italy*

Invited, Conference, and Seminars Talks

Nov 2024   **Scalable geometry processing in computer graphics applications**
Smart Tools and Applications in Graphics, 2024. *Verona, Italy*

TACO: a benchmark for connectivity-invariance in shape correspondence
Smart Tools and Applications in Graphics, 2024. *Verona, Italy*

Efficient Generation of Multimodal Fluid Simulation Data
Smart Tools and Applications in Graphics, 2024. *Verona, Italy*

Dec 2023   **A physically-inspired approach to the simulation of plant wilting**
ACM SIGGRAPH Asia, 2023. *Sydney, Australia.*

Oct 2022   **MoMaS: mold manifold simulation for real-time procedural texturing**
Pacific Graphics (PG), 2022. *Kyoto, Japan.*

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

Aug 2021   **Efficiently parallelizable Strassen-based multiplication of a matrix by its transpose**
International Conference on Parallel Processing (ICPP), 2021. *Chicago, Illinois, USA.*

May 2021   **Orthogonalized Fourier polynomials for signal approximation and transfer**
EUROGRAPHICS (EG), 2021. *Vienna, Austria.*

Honours & Awards

2024   **Matteo Dellepiane Award for PhD Thesis in Computer Graphics (Honourable mention)**
The Italian Chapter of EuroGraphics (EG-Italy).

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   **ToG.** ACM Transaction on Graphics.

     ACCV. Asian Conference on Computer Vision.

     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).

     Francesco De Canio, Ph.D. Sapienza – University of Rome
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).

     Alireza Alipanah, B.Sc. Sharif University of Technology
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).

Supervision and Mentoring (continued)

2023 – 2024   **Roberta Giorgi, M.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. Advanced knowledge of GPU programming with CUDA, GLSL, and HLSL. 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. D. Marin, **F. Maggioli**, S. Melzi, S. Ohrhallinger, and M. Wimmer, "Reconstructing curves from sparse samples on riemannian manifolds," *Computer Graphics Forum*, vol. 43, no. 5, e15136, 2024.

2. **F. Maggioli**, R. Marin, S. Melzi, and E. Rodolà, "Momas: Mold manifold simulation for real-time procedural texturing," *Computer Graphics Forum*, vol. 41, no. 7, pp. 519–527, 2022.

3. 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," *Computer Graphics Forum*, vol. 41, no. 2, pp. 407–417, 2022.

4. **F. Maggioli**, S. Melzi, M. Ovsjanikov, M. M. Bronstein, and E. Rodolà, "Orthogonalized fourier polynomials for signal approximation and transfer," *Computer Graphics Forum*, vol. 40, no. 2, pp. 435–447, 2021.

5. **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. Baieri, D. Crisostomi, S. Esposito, **F. Maggioli**, and E. Rodolà, "Efficient generation of multimodal fluid simulation data," in *Smart Tools and Applications in Graphics-Eurographics Italian Chapter Conference*, 2024.

2 F. Maccarone, G. Longari, G. Viganò, D. Peruzzo, **F. Maggioli**, and S. Melzi, "S4a: Scalable spectral statistical shape analysis," in *Smart Tools and Applications in Graphics-Eurographics Italian Chapter Conference*, 2024.

3 **F. Maggioli**, D. Baieri, E. Rodolà, and S. Melzi, "Rematching: Low-resolution representations for scalable shape correspondence," in *European Conference on Computer Vision*, Springer, 2024.

4 S. Pedico, S. Melzi, and **F. Maggioli**, "Taco: A benchmark for connectivity-invariance in shape correspondence," in *Smart Tools and Applications in Graphics-Eurographics Italian Chapter Conference*, 2024.

5 **F. Maggioli**, J. Klein, T. Hädrich, E. Rodolà, W. Pałubicki, 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.

6 **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.

7 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," arXiv preprint arXiv:2405.12895, 2024.

2 **F. Maggioli**, D. Baieri, Z. Lähner, and S. Melzi, "Sshade: A framework for scalable shape deformation via local representations," arXiv preprint arXiv:2409.17961, 2024.

3 D. Baieri, S. Esposito, **F. Maggioli**, and E. Rodolà, "Fluid dynamics network: Topology-agnostic 4d reconstruction via fluid dynamics priors," arXiv preprint arXiv:2303.09871, 2023.