

Personal data

Birth Date: March 30, 1996
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Academic appointments

Current position

November 1, 2022 – **PhD Student in Engineering and Information Science in Engineering and Science**, *University of Siena*, Siena, Italy.

Education

October 1, 2019 – April 22, 2022 **Master Degree in Applied Mathematics**, *University of Siena*, Italy, 110/110 cum laude.
Thesis: “Combinatorial and Discrete Differential Operators for the Study of Beta-sheets”, Advisor: Cristiano Bocci.

October 1, 2015 – April 12, 2019 **Bachelor Degree in Mathematics**, *University of Siena*, Italy, 110/110 cum laude.
Thesis: “Operatori Logici e Reti Neurali”, Advisor: Luca Chiantini.

September 2010 – July 2015 **Upper secondary school diploma**, *Liceo Scientifico “Galileo Galilei” of Siena*, Italy, 100/100 cum laude.

Awards, Grants and Fellowships

November 1, 2022 – **Ph.D. Full Scholarship in Engineering and Information Science in Engineering and Science (XXXVIII cycle)**, *University of Siena*, Siena, Italy.

July 7 – 11, 2025 **Travel award for the 2025 SIAM Conference on Applied Algebraic Geometry (AG25)**, *University of Wisconsin-Madison*, Madison, Wisconsin USA.

November 23, 2022 **Best student in Applied Mathematics at DIISM in a.y. 2020-2021 Awarding**, *University of Siena*, Siena, Italy.

Research interests

Applied Algebraic Geometry, Tensors and Applications, Topological Data Analysis for Machine Learning, and Bioinformatics.

Publications

1. B. T. Corradini, B. Cullen, C. Gallegati, G. A. D'Inverno, S. Marziali, M. Bianchini, F. Scarselli, *Training dynamics of GANs through the lens of persistent homology*, *Neurocomputing* **661**, 131976 (2026),
doi: 10.1016/j.neucom.2025.131976.
2. S. Marziali, *Boolean operators and neural networks*, *Annali dell'Università di Ferrara* (2024),
doi: 10.1007/s11565-024-00541-5.
3. M. Tanfoni, E. G. Ceroni, S. Marziali, N. Pancino, M. Maggini, M. Bianchini, *Generated or Not Generated (GNG): The Importance of Background in the Detection of Fake Images*, *Electronics* **13**, no. 16, 3161 (2024),
doi: 10.3390/electronics13163161.
4. S. Marziali, G. Nunziati, A. L. Prete, N. Niccolai, M. Bianchini, *SADIC v2: A modern implementation of the Simple Atom Depth Index Calculator*, *SoftwareX* **27** (2024),
doi: 10.1016/j.softx.2024.101803.
5. S. Marziali, G. Nunziati, A. L. Prete, N. Niccolai, S. Brunetti, M. Bianchini, *A Discrete Geometry Method for Atom Depth Computation in Complex Molecular Systems*, *International Conference on Discrete Geometry and Mathematical Morphology* (2024), 443 – 455,
doi: 10.1007/978-3-031-57793-2_34.
6. F. Guerranti, M. Mannino, F. Baccini, P. Bongini, N. Pancino, A. Visibelli, S. Marziali, *Care-giverMatcher: graph neural networks for connecting caregivers of rare disease patients*, *Procedia Computer Science* **192** (2021), 1696 – 1704,
doi: 10.1016/j.procs.2021.08.174.

Teaching experience

Bachelor and master level

- May 12 – 23, 2025 **Teaching for the “Ciclo seminariale di matematica in lingua inglese - Centro CLUSS - UniStraSi**, *University for Foreigners of Siena (UniStraSi)*, Siena, Italy, 12 hours.
- October 1, 2022 – July 31, 2023 **Teaching Assistant for the Mathematical Analysis 2 undergraduate course (Spring 2023)**, *Department of Information Engineering and Mathematics, University of Siena*, Siena, Italy.
- October 1, 2022 – June 30, 2023 **Teaching Assistant for the Linear Algebra undergraduate course (Fall 2022, Spring 2023)**, *Department of Information Engineering and Mathematics, University of Siena*, Siena, Italy.
- October 1, 2022 – June 30, 2023 **Teaching Assistant for the Mathematical Analysis 1 undergraduate course (Fall 2022)**, *Department of Information Engineering and Mathematics, University of Siena*, Siena, Italy.

Secondary school level

December 21, 2023 – April 6, 2024 **Teacher of Mathematics, Logic and Physics for the “Corso di preparazione ai test di ammissione e chirurgia a.a. 2023/2024”**, *Department of Medicine, Surgery and Neuroscience, University of Siena, Siena, Italy.*

Research Stays

October 17, 2024 – April 30, 2025 **Visiting scholar**, *Université Toulouse III - Paul Sabatier, Toulouse, France*
Host: Prof. Fulvio Gesmundo.

January 12 – April 4, 2024 **Visiting scholar**, *Auburn University, Auburn, Alabama, USA*
Host: Prof. Luke Oeding.

Conferences, workshops and seminars

Invited talks

October 23, 2025 **Seminar “Product of tensors and description of the network for matrix multiplication via Strassen’s algorithm”**, *within “TensorDec group Seminars”*, University of Trento, Trento, Italy.

May 29, 2024 **Seminar “Product of Tensors and Description of Networks”**, *within ‘TensorDec group Seminars’*, University of Trento, Trento, Italy.

March 19, 20, 21, 2024 **Seminar “Product of Tensors and Description of Networks”**, *Johns Hopkins University, Baltimore, Maryland, USA.*

January 30, 2024 **Seminar “Product of Tensors and Description of Networks”**, *within “Auburn Algebra Seminar”*, University of Auburn, Auburn, Alabama, USA.

November 17, 2023 **Seminar “Product of Tensors and Description of Networks”**, *within “Applied Algebraic Geometry 2023-2024 Seminars”*, University of Florence, Florence, Italy.

Conference and workshop presentations

October 3, 2025 **WORKSHOP ARCIDOSSO25: Aspetti matematici e fondazionali della modellizzazione di sistemi complessi**, *Contribution title: “Product of Tensors and Description of Networks”*, Castello Aldobrandesco, Arcidosso (Grosseto), Italy
October 3 – 5, 2025.

8 July, 2024 **SIAM CONFERENCE ON APPLIED ALGEBRAIC GEOMETRY (AG25)**, *Contribution title: “The Batthacharya-Mesner Product: From Tensor Rank Analysis to Description of Networks”*, University of Wisconsin-Madison, Madison, USA
July 7-11, 2025.

May 14, 2024 **JM Invariant at 60 - A Conference on Tensor Invariants in Geometry and Complexity Theory**, *Contribution title: “Product of Tensors and Description of Networks”*, Auburn University, Auburn, Alabama, USA
May 13–17, 2024.

- April 18, 2024 **IAPR Third International Conference on Discrete Geometry and Mathematical Morphology**, *Contribution title: "A Discrete Geometry Method for Atom Depth Computation in Complex Molecular Systems"*, University of Florence, Florence, Italy
April 15–18, 2024.
- [Conference and workshop attendance](#)
- July 29 – August 2, 2024 **Effective Methods in Algebraic Geometry – MEGA 2024**, MPI für Mathematik in den Naturwissenschaften Leipzig and Universität Leipzig, Leipzig, Germany.
- June 13, 14, 2024 **II Meeting UMI for Doctoral Students**, Naples, Italy.
- September 18 – 22, 2023 **Third Young Applied Mathematicians Conference**, *University of Siena*, Siena, Italy.
- January 24, 25, 2023 **Workshop on Communicating Mathematics for the Public**, Isaac Newton Institute, Cambridge, UK.
- [Organiser](#)
- September 22 – 26, 2025 **Organising and Scientific Committee for "The Fifth Young Applied Mathematicians Conference"**, *University of Padua*, Padua, Italy, with G. Auricchio, E. Bachini, C. Carrara, G. A. D'Inverno, C. Faccio, A. Kushova, A. Marchetti, C. Millevoi, E. Onofri.
- December 4 – 6, 2024 **Organising Committee for the "Learning on Graph Conference 2024 – Italy Meetup"**, *University of Siena*, Siena, Italy, with P. Bongini, F. Costanti, B. Cullen, G. A. D'Inverno, C. Gallegati, C. Graziani, V. Lachi, N. Pancino, F. Pichi.
- September 16 – 20, 2024 **Organising and Scientific Committee for the "Fourth Young Applied Mathematicians Conference"**, *University of Rome "La Sapienza"*, Rome, Italy, with G. Auricchio, C. Carrara, G. A. D'Inverno, C. Graziani, A. Kushova, G. Loli, A. Marchetti, M. Menci, E. Onofri.

--- Educational activities

- October 13 – 24, 2025 **Masterclass and PhD course - Tensors and their applications: foundations and recent advances**, *University of Trento*, Lecturer: Jeroen Zuiddam (U. Amsterdam / QuSoft), Exercise sessions: Maxim van den Berg (Ruhr-U. Bochum / U. Amsterdam), Trento, Italy.
- May 26 – 30, 2025 **TiME 2025 – Invariant Theory from Classic to Modern Developments**, *Lie-Størmer Center*, Tromsø, Norway.
- June 10 – 14, 2023 **6th Advanced Course on Data Science & Machine Learning (ACDL)**, *Castiglione della Pescaia (Grosseto)*, Italy.
- July 22 – August 16, 2019 **Interuniversity Mathematics Summer School (SMI)**, *Course of Numerical Analysis with Professor Michele Benzi (Scuola Normale Superiore, Pisa, Italy): final grade A; Course of Differential Geometry with Prof. Liviu Ornea (University of Bucharest, Romania): final grade B*, Perugia, Italy.

Further information

Scientific Associations and Membership

- *Society for Industrial and Applied Mathematics* (SIAM), Student Membership (July 1, 2025 – December 31, 2026).

Professional activities and projects

May 9, 2022 – **Pint of Science**, *Local Team Collaborator*, Siena, Italy.
Current

October 5, 19, 2023 **7th Rare Disease Hackathon 2020: Health System Forum - Re-evolution of Intelligence Special Lysosomal Storage Diseases**, *Challenge: "Caregiving pathways. Patients, caregivers and lysosomal storage disorders: challenges and solutions"*, Proposed solution: "SAM: Assistance and Monitoring System", "Stazione La Leopolda", Florence, Italy
Third place awarded.

November 4, 5, 2020 **Rare Disease Hackathon 2020 (digital edition)**, "Stazione La Leopolda", Firenze, Italy
Finalist Team.

Computer skills and competencies

- Matlab, Python, Latex
- European Computer Driving Licence (ECDL Certificate) achieved on June 3, 2014.

Language competences

- Italian: Mother tongue
- English: Proficient, Cambridge C1 Advanced exam in English (CAE), Certification from Cambridge University, English Qualifications, June 2024.

References

Prof. Dr. **Luca Chiantini**

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Prof. Dr. **Cristiano Bocci**

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