Rocco Ascone

Curriculum Vitae

Education

From 11/2022	**Ph.D. student**, Earth sciences, Fluid-dynamics and Mathematics program, *Department of Mathematics, Informatics and Geosciences, University of Trieste*, Italy.

Research interest: natural computing models and complexity theory.
Expected graduation: March 2026.
Supervisors: Prof. Luca Manzoni and Prof. Giulia Bernardini.

2020–2022	**M.Sc. in Advanced Mathematics**, *University of Trieste*, Italy, joint program with SISSA (Scuola Internazionale Superiore di Studi Avanzati).

Thesis: An Application of Persistent Homology to Musical Analysis.
Description: The aim of the thesis is to analyse musical pieces through the *Tonnetz* model and persistent homology.
Supervisor: Prof. Mattia Mecchia.
Mark: 110/110 cum laude.

2017–2020	**B.Sc. in Mathematics**, *University of Trieste*, Italy.

Thesis: Il teorema di Gauss-Bonnet.
Supervisor: Prof. Mattia Mecchia.
Mark: 110/110 cum laude.

2017–2023	**Bachelor of Music in Violin**, *G. Tartini Conservatory of Music*, Trieste, Italy.

Awards

June 2024	**Best paper award at CMC 2024**, *25th Conference on Membrane Computing, Nice (France)*, for the paper "Chemical Pure Reaction Automata in Maximally Parallel Manner".

Teaching

Fall 2024	**Teaching Assistant**, *Computabilità, Complessità e Logica* (50 hrs, INF/01), second year of the B.Sc. in Artificial Intelligence and Data Analytics. Department of Mathematics, Informatics and Geosciences. University of Trieste.
Fall 2024	**Teaching Assistant**, *Algebra Lineare ed Elementi di Geometria* (50 hrs, MAT/03), first year of the B.Sc.in Artificial Intelligence and Data Analytics. Department of Mathematics, Informatics and Geosciences. University of Trieste.
Fall 2023	**Teaching Assistant**, *Geometria 1* (50 hrs, MAT/03), first year of the B.Sc. in Physics and Mathematics. Department of Physics. University of Trieste.

09/2023	**Lecturer**, *Linear Algebra Pre-Course* (12 hrs, MAT/02), Master's Degree Programme in Data Science and Scentific Computing.
	Department of Mathematics, Informatics and Geosciences. University of Trieste.
Fall 2022	**Teaching Assistant**, *Geometria 1* (50 hrs, MAT/03), first year of the B.Sc. in Physics and Mathematics.
	Department of Physics. University of Trieste.

Master thesis supervision

from Jan. 2025	**Co-supervisor**, *Master student:* Francesco Leiter, *Supervisor:* Prof. Luca Manzoni, *Topic:* Computability of Pure Reaction Automata.

Conferences, Workshops, Seminars

Mar. 2025	**Participant**, *Workshop Data Structures in Bioinformatics (DSB 2025)*, Pisa, Italy.
Jan. 2025	**Participant**, *21th Brainstorming Week on Membrane Computing*, Seville, Spain.
Sept. 2024	**Speaker**, *19th Workshop on Compression, Text, and Algorithms (WCTA 2024)*, Puerto Vallarta, México (online partecipation).
Sept. 2024	**Participant**, *4th International Workshop on Reaction Systems*, Pisa, Italy.
Sept. 2024	**Speaker**, *24th International Workshop on Algorithms in Bioinformatics (WABI 2024)*, London, UK.
July 2024	**Seminar**, *"Complexity of the dynamics of resource-bounded reaction systems"*, online seminar for LIS, Aix-Marseille Université, invited by Antonio E. Porreca.
June 2024	**Speaker**, *25th Conference on Membrane Computing (CMC 2024)*, Nice, France.
Feb. 2024	**Participant**, *Sequences in London (workshop)*, London, UK.
Jan. 2024	**Participant**, *20th Brainstorming Week on Membrane Computing*, Seville, Spain.
Sept. 2023	**Participant**, *29th International Workshop on Cellular Automata and Discrete Complex Systems*, Trieste, Italy.

Visiting

2024-2025	**Guest**, *University of Pisa*, 6-9 May 2024, 3-7 Mar. 2025, visiting Prof. Nadia Pisanti and Prof. Roberto Grossi.
	Topics: conditional lower bounds on pattern matching of degenerate strings [7].
2024	**Guest**, *King's College London*, 7 Feb., visiting Prof. Grigorios Loukides.
	Topics: discussion on data mining and jumbled pattern matching.

Refereeing Duties

Journals	Theoretical Computer Science, Natural Computing, Journal of Membrane Computing, Algorithms for Molecular Biology.

Conferences Symposium on Experimental Algorithms (SEA 2025), Symposium on Combinatorial Pattern Matching (CPM 2024, CPM 2025), Symposium on String Processing and Information Retrieval (SPIRE 2024), Workshop on Algorithms in Bioinformatics (WABI 2024).

Peer-Reviewed Journal Publications

[1] R. Ascone, G. Bernardini, L. Manzoni. *Cycles and Global Attractors of Reactantless and Inhibitorless Reaction Systems.* In: **Theoretical Computer Science**, 2025. DOI: `10.1016/j.tcs.2025.115300`

[2] R. Ascone, G. Bernardini, F. Leiter, L. Manzoni. *Chemical pure reaction automata in maximally parallel manner.* In: **Journal of Membrane Computing**, 2025. DOI: `10.1007/s41965-024-00176-7`.

[3] R. Ascone, G. Bernardini, E. Formenti, F. Leiter, L. Manzoni. *Pure Reaction Automata.* In: **Natural Computing**, 2024. DOI: `10.1007/s11047-024-09980-7`

[4] R. Ascone, G. Bernardini, L. Manzoni. *Fixed points and attractors of additive reaction systems.* In: **Natural Computing**, 2024. DOI: `10.1007/s11047-024-09977-2`

[5] R. Ascone, G. Bernardini, L. Manzoni. *Fixed points and attractors of reactantless and inhibitorless reaction systems.* In: **Theoretical Computer Science**, 2024. DOI: `10.1016/j.tcs.2023.114322`

Peer-Reviewed Conference Publications

[6] R. Ascone, L. Mariot, L. Manzoni, G. Pietropolli. *Evolving Cryptographic Boolean Functions with Reaction Systems.* In: The Genetic and Evolutionary Computation Conference (**GECCO 2025**). *To appear.*

[7] R. Ascone, G. Bernardini, A. Conte, M. Equi, E. Gabory, R. Grossi, N. Pisanti. *A unifying taxonomy of pattern matching in degenerate strings and founder graphs.* In: 24th International Workshop on Algorithms in Bioinformatics (**WABI 2024**). DOI: `10.4230/LIPIcs.WABI.2024.14`

[8] R. Ascone, G. Bernardini, F. Leiter, L. Manzoni. *Chemical Pure Reaction Automata in Maximally Parallel Manner.* In: 25th Conference on Membrane Computing (**CMC 2024**).

TRIESTE, 3/6/2025