Greta Coraglia

https://etagreta.github.io/ coraglia.eta@gmail.com 09/04/1994, Italy

Professional profile



I am a mathematician specializing in category theory, type theory, and theoretical computer science, with a strong drive to apply foundational ideas to real-world AI systems. My interest sits at the intersection of categorical and probabilistic reasoning: I am passionate about working out how compositionality can guide inference, enabling systems that are both expressive and transparent.

I thrive in roles that require moving between abstraction and implementation, translating rigorous mathematical structure into something people can understand and build with — a habit reinforced by six years in local government, most recently with executive authority over budget and digital transformation. I am collaborative, interdisciplinary by nature, and most energized when working with people with different perspectives.

Relevant work experience

MIRAI Srl **Mar 2024 - present:** *AI Research Scientist, Co-founder*
Co-founded a company assessing ethics issues in AI, where I contribute to the development of formal and probabilistic methods applied to real-world systems. My R&D work includes designing and implementing frameworks for fairness assessment in ML classification, formal approaches to risk quantification, and end-to-end evaluation pipelines for AI systems deployed by public and private sector clients.

University of Pavia, AI Dept. **Mar 2025 - present:** *Adjunct professor in Logics for AI*
Lectured for the Logics course in the joint Bachelor's program in Artificial Intelligence (UniPv–UniMi–UniMiB), with a focus on Bayesian networks and probabilistic graphical models for AI engineering students. Teaching at this level requires translating formal probabilistic reasoning into terms that engineering students can immediately apply, meaning I got to sharpen both my mathematics and my communication skills.

Segrate Municipality **Sept 2020 - present:** *Deputy mayor for budget, digital, and strategic planning*
Co-organized a civic movement and was elected to my city's council in 2020, going on to serve for six years as chief whip of the largest council group and vice-president of the council. In June 2026, I was appointed to the municipal executive with delegated authority over budget, digitalization, and strategic planning. Current responsibilities include drafting and overseeing the annual and multi-year budget, leading digital transformation initiatives across municipal services, and coordinating the city's strategic planning documents, working closely with technical offices and stakeholders to translate policy priorities into resourced, implementable plans.

University of Milan, Philosophy Dept. **Mar 2023 - July 2025:** *Postdoctoral researcher*
Conducted research in the BRIO (Bias, Risk, and Opacity in AI) project, advancing formal methods to assess AI fairness and risk. I co-developed open-source tools in partnership with private companies for real-world applications, such as to credit scoring. I benefitted from working within a multidisciplinary team, combining strong technical problem-solving with effective cross-sector communication.

University of Genoa, Mathematics Dept. **Nov 2019 - Aug 2023:** *Doctoral candidate*
Worked for a Ph.D. in Mathematics with specialization in logic, category theory, type theory, and theoretical computer science. I developed a strong foundation in rigorous problem-solving and abstract reasoning, with practical applications to formal system design, programming language theory, and algorithmic thinking.

During this time, I also taught a Linear Algebra (Geometry) course to first-year Electronic Engineering students. That strengthened my ability to explain complex technical concepts clearly, while reinforcing my expertise in linear algebra with an emphasis on its engineering applications in data modeling.

Technical tools

Python, C, Git, tools for formal methods (SAT, SMT).

Education

University of Genoa *Nov 2019 – Aug 2023*
Ph.D. in Mathematics
Thesis: "Categorical structures for deduction", supervisor: Prof. G. Rosolini
Expertise: logic, category theory, theoretical computer science, type theory

University of Milan *2017 – 2019*
M.Sc. in Mathematics (with honors)
Thesis: "A categorical perspective on Heyting-valued sets", sups: Profs. S. Ghilardi and G. Rosolini
Expertise: logic, category theory, fuzzy logic, automated reasoning, formal methods

University of Milan *2013 – 2017*
B.Sc. in Mathematics
Expertise: algebra, linear algebra, geometry, logic, foundations of mathematics

Selected research

Fuzzy type theory for opinion dynamics *j/w ACT Adjoint School* *2022 – 2024*
Applied enriched category theory to develop syntax and semantics for a fuzzy type theory, targeting probabilistic programming and opinion dynamics.
› Presented as a poster at ACT 2023 and at the Logic Colloquium (Jun 2023).

On the fibration of algebras *j/w Castelnovo, Loregian, Martins-Ferreira, Ahman, Reimaa* *2022 – 2024*
Studied algebraic properties of parametric endofunctors, co/monads, and their algebras using fibered category theory, producing abstract structural results about their behaviour.
› Invited talks at HoTTEST (Mar 2024) and CATNIP (May 2024). Submitted for publication.

Categorical models of subtyping *j/w J. Emmenegger* *2023*
Used categorical tools to infer principled notions of subtyping, with connections to coercive subtyping and programming language semantics.
› Published in the *Proceedings of TYPES 2023*, 2024.

Context, judgement, deduction *j/w I. Di Liberti* *2021 – 2022*
Introduced judgemental theories and their calculi as a general framework for presenting and studying deductive systems, with dependent type theory and natural deduction as special cases.
› Accepted talks at CIRM (Feb 2022) and TACL (Jun 2022); invited talk at the Compositional Systems and Methods group at TalTech. In publication.

Risk assessment in credit scoring *j/w BRIO@UniMi* *2023 – 2025*
Quantified risk inherent to opaque ML classification algorithms, with real-world applications to credit scoring in collaboration with private sector companies.
› Submitted for publication.

Awards, certifications, and such

Academic. Won the prize for Best Master's Thesis in Logic (2019) awarded by the Italian Logic Association (AILA). Won several research and travel grants: the Adjoint School participation (2022) in Glasgow, a stay at CIRM Marseille (2022) for "Logic and Higher Structures" and "Linear Logic Winter School", travel to the Symposium on Compositional Structures (SYCO, 2019) in Leicester, and invitations to visit the Mathematics Department at the University of Aberdeen (May 2023), the Laboratoire de Mathématiques de l'Université Savoie Mont Blanc (Nov-Dec 2023), the Compositional Systems and Methods group at Tallinn's University of Technology (May 2022).

Linguistic. British Council Aptis ESOL attested (January 2025) CEFR grade: C2.

Reasoning and numerical. Successfully passed (June 2024) selection tests from the European Personnel Selection office highest grade: EPSO/CAST/P/17/2017 - Information and communication technology (FG IV).

Social involvement

Popularization. I am a strong believer in the necessity of democratizing knowledge: during COVID with some friends we organized community seminars on YouTube; in 2020 with a colleague we participated in a high school programme teaching logic to high-school students; with ItaCa, I helped organizing a YouTube course in category theory with specialists in the topic; I wrote about constructive mathematics in a dissemination journal; with some friends and colleagues we organize public conferences to demystify the narrative on AI, to learn its benefits, and to encourage action.

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