

Davide Castelnovo

Ph. D.

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Citizenship: Italian

Education

- Sep. 2024 - currently **Research Fellow**, University of Pisa, Italy
- Jun. 2023 - Jun. 2024 **Research Fellow**, University of Padova, Italy
- Nov. 2019 - Oct. 2023 **Ph. D.**, University of Udine, Italy
 - Thesis: *"Fuzzy algebraic theories and \mathcal{M}, \mathcal{N} -adhesive categories"*
 - Supervisor: Prof. Marino Miculan
- Jan. - May 2022 **Visiting student at Tallinn Institute of Technology**, Estonia, Collaborating with Dr. Fosco Loregian
- Oct. 2016 - Dec. 2018 **Master in Mathematics**, University of Milano, Italy
 - Master thesis *"A conservative embedding of intuitionistic logic in a topos of sheaves"*
 - Supervisors: Prof. S. Mantovani (Univ. of Milano) & Prof. M. E. Maietti (Univ. of Padova).
 - GPA: 110/110 summa cum laude.
- Oct. 2012 - Jul. 2016 **Bachelor in Mathematics**, University of Milano, Italy
 - GPA: 99/110
- Sep. 2007 - Jun. 2012 **High School**, Liceo Scientifico Tecnologico "Antonio Badoni", Lecco, Italy
 - GPA: 97/100

Technical skills and research interests

My main research activity lies at the intersection of **Category Theory** and theoretical computer science. In particular, I have worked in the field of **Algebraic Graph Transformation**, where I have produced extensive theoretical work on **Double Pushout (DPO) Rewriting Systems**, an abstract mathematical framework for graph rewriting based on two steps approach: first, deleting the part of the graph required to apply a given rule, and then inserting a new graph into the resulting "hole".

My academic work has given me a highly abstract and theoretical perspective in computer science and formal methods. To complement this, I have independently been improving my programming skills, particularly in **Haskell**, **Python**, and **Bash**. I also have extensive expertise with the \LaTeX editor.

Other interests

Outside of academia, my main passion is the mountains. Practically, this is reflected in my love for mountaineering and climbing, activities I have been practicing for over ten years. Intellectually, this passion extends to economic history, with a focus for the economic and demographic development of the Alpine Arc and the related evolution in social institutions.

Languages

Italian Mother tongue

English Fluent, speaking and writing

List of publications

Preprints

- 2025 Roberto Biondo, Davide Castelnovo, Fabio Gadducci, *EGGs are adhesive!*, arXiv preprint arXiv:2503.13678, submitted to the 9th International Conference on Algebra and Coalgebra in Computer Science

Journals

- 2025 Davide Castelnovo, Marino Miculan, *On The Axioms Of \mathcal{M}, \mathcal{N} -Adhesive Categories*, Logical Methods in Computer Science, 21
- 2024 Davide Castelnovo, Fabio Gadducci, Marino Miculan, *A simple criterion for \mathcal{M}, \mathcal{N} -adhesivity*, Theoretical Computer Science 982:114280

Proceedings of conferences

- 2024 Paolo Baldan, Davide Castelnovo, Andrea Corradini, Fabio Gadducci, *Left-Linear Rewriting in Adhesive Categories*, Proceedings of the 35th International Conference on Concurrency Theory
- 2022 Davide Castelnovo, Fabio Gadducci, Marino Miculan, *A new criterion for \mathcal{M}, \mathcal{N} -adhesivity, with an application to hierarchical graphs*, Proceedings of the 25th International Conference on Foundations of Software Science and Computation Structures
- 2022 Davide Castelnovo, Marino Miculan, *Fuzzy Algebraic Theories*, Proceedings of the 30th EACSL Annual Conference on Computer Science Logic
- 2021 Davide Castelnovo, Marino Miculan, *Closure Hyperdoctrines*, Proceedings of the 9th Conference on Algebra and Coalgebra in Computer Science

Talks and workshops

- Sep. 2024 **Talk at 35th International Conference on Concurrency Theory, “Left-Linear Rewriting in Adhesive Categories”**, University of Calgary, Calgary, Canada
- Mar. 2024 **Talk at Workshop on Process Theory for Security Protocols and Cryptography “On the axioms of \mathcal{M}, \mathcal{N} -adhesive categories”**, Tallinn Institute of Technology, Tallinn, Estonia
- Feb. 2024 **Talk at 35th Estonian and the 9th Joint Estonian-Latvian Theory Days “On the axioms of \mathcal{M}, \mathcal{N} -adhesive categories”**, Randivälja, Estonia
- Feb. 2024 **Talk at TallCat - Compositional Systems and Methods group at Tal-Tech, “On the axioms of \mathcal{M}, \mathcal{N} -adhesive categories”**, Tallinn Institute of Technology, Tallinn, Estonia
- Jul. 2023 **Talk at PRIN 2017 “IT-MATTERS” Final Workshop “ \mathcal{M}, \mathcal{N} -adhesivity: results and examples”**, Scuola IMT Alti Studi, Lucca, Italy
- Dec. 2022 **3rd ItaCa Workshop**, University of Pisa, Pisa, Italy
- Sep. 2022 **9th Symposium on Compositional Structures**, University of Como, Como, Italy
- Apr. 2022 **Talk at 25th International Conference on Foundations of Software Science and Computation Structures, “A new criterion for \mathcal{M}, \mathcal{N} -adhesivity, with an application to hierarchical graphs”**, Technische Universität München, München, Germany

- Feb. 2022 **Talk at 30th EACSL Annual Conference on Computer Science in Logic 2022, “Fuzzy Algebraic theories”**, *University of Göttingen*, Göttingen (online), Germany
- Mar. 2021 **Talk at 22nd Graduate Student Conference in Logic “Closure Hyperdoctrines”**, *University of Illinois*, Urbana-Champaign (online), United States of America
- Sep. 2021 **International Conference on Algebra, Topology and Their Interactions**, *Udine (online)*, Italy
- Sep. 2021 **Talk at 9th Conference on Algebra and Coalgebra in Computer Science, “Closure Hyperdoctrines”**, *University of Salzburg*, Salzburg, Austria
- Apr. 2021 **Midlands Graduate School in the Foundations of Computing Science**, *University of Sheffield*, Sheffield (online), United Kingdom
- Oct. 2020 **Talk at TalCat - Compositional Systems and Methods group at TalTech, “Equational theories in an enriched context”**, *Tallinn Institute of Technology*, Tallinn (online), Estonia
- Mar. 2020 **Talk at 25th Estonian Winter School in Computer Science, “Preclosure Hyperdoctrines, Completeness of (Higher Order) Spatial Logic for Closure Spaces”**, *Tallinn Institute of Technology*, Tallinn, Estonia
- Dec. 2019 **1st ItaCa Workshop**, *University of Milano*, Milano, Italy

Peer-reviews

I have been a reviewer for both international conferences and journals.

Conferences International Conference on Algebra and Coalgebra in Computer Science (CALCO), Symposium on Logic in Computer Science (LICS), International Colloquium on Automata, Languages, and Programming (ICALP), Italian Conference on Theoretical Computer Science (ICTCS), International Conference on Graph Transformation (ICGT)

Journals Logical Methods in Computer Science

Teaching and outreach activities

- 2020, 2021 (winter term) **Undergraduate students tutoring**, Tutoring the *Algebra 1* class for the first year of the Math undergraduate program, University of Udine
- 2021, 2023 (winter term) **Undergraduate students tutoring**, Tutoring the *Linear Algebra* for the first year of the Mechanical Engineering undergraduate program, University of Udine

Other scientific activities

- Sep. 7-8, 2021 **Member of the Organizing Committee of the International Conference on Algebra, Topology and Their Interactions**, *Udine (online)*, Italy
- 2020 - 2023 **Students' representative at Mathematics, Computer Science and Physics Departmental Council**, *Univ. of Udine*, Italy
- 2021 - 2023 **Students' representative at Mathematics, Computer Science and Physics Ph. D. School Council**, *University of Udine*, Italy