

# 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  $\text{\LaTeX}$  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

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## List of publications

### Preprints

- 2025 Roberto Biondo, Davide Castelnovo, Fabio Gadducci, *EGGs are adhesive!*, arXiv preprint arXiv:2503.13678, submitted to the 9<sup>th</sup> 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 35<sup>th</sup> 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 25<sup>th</sup> International Conference on Foundations of Software Science and Computation Structures
- 2022 Davide Castelnovo, Marino Miculan, *Fuzzy Algebraic Theories*, Proceedings of the 30<sup>th</sup> EACSL Annual Conference on Computer Science Logic
- 2021 Davide Castelnovo, Marino Miculan, *Closure Hyperdoctrines*, Proceedings of the 9<sup>th</sup> Conference on Algebra and Coalgebra in Computer Science

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## Talks and workshops

- Sep. 2024 **Talk at 35<sup>th</sup> 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 35<sup>th</sup> Estonian and the 9<sup>th</sup> 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 **3<sup>rd</sup> ItaCa Workshop**, University of Pisa, Pisa, Italy
- Sep. 2022 **9<sup>th</sup> Symposium on Compositional Structures**, University of Como, Como, Italy
- Apr. 2022 **Talk at 25<sup>th</sup> 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 30<sup>th</sup> EACSL Annual Conference on Computer Science in Logic 2022, “Fuzzy Algebraic theories”**, *University of Göttingen*, Göttingen (online), Germany
- Mar. 2021 **Talk at 22<sup>nd</sup> 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 9<sup>th</sup> Conference 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 TallCat - Compositional Systems and Methods group at TalTech, “Equational theories in an enriched context”**, *Tallinn Institute of Technology*, Tallinn (online), Estonia
- Mar. 2020 **Talk at 25<sup>th</sup> Estonian Winter School in Computer Science, “Preclosure Hyperdoctrines, Completeness of (Higher Order) Spatial Logic for Closure Spaces”**, *Tallinn Institute of Technology*, Palmse, Estonia
- Dec. 2019 **1<sup>st</sup> ItaCa Workshop**, *University of Milano*, Milano, Italy

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## 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 2024)

Journals Logical Methods in Computer Science

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## 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

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## 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