

# Davide Castelnovo

Ph. D.

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Citizenship: Italian

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## 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

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## 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.

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## 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.

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## Languages

Italian Mother tongue

English Fluent, speaking and writing

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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 TalTech, “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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## 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 Activity

- 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

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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