

Postdoctoral researcher in theoretical computer science at the University of Oxford.

### Academic positions and education

**University of Oxford**

*Postdoctoral researcher working with Sam Staton*

United Kingdom  
from Jan 2025

**Università di Pisa**

*Postdoctoral researcher working with Filippo Bonchi*

Italy  
Jan 2024 - Dec 2024

**Tallinn University of Technology**

*PhD in Theoretical Computer Science*

Estonia  
2019 - 2023

- Thesis: Monoidal Width

Supervisor: Professor Paweł Sobociński

**University of Oxford**

*MSc in Mathematics and Foundations of Computer Science*

United Kingdom  
2018 - 2019

- Thesis: Subgame Perfection in Compositional Game Theory

Supervisors: Dr Jules Hedges, Dr Jamie Vicary

- Mark: merit

**Università di Pisa**

*BSc in Mathematics*

Italy  
2017 - 2018

- Thesis: Data-driven Estimation for Nash Equilibria

Supervisor: Professor Giancarlo Bigi

- Mark: 110 cum laude / 110

**Politecnico di Milano**

*BSc in Mathematical Engineering*

Italy  
2014 - 2017

- Thesis: Floquet Theory Applied to a Perturbed Wave Equation

Supervisor: Professor Gianni Arioli

- Mark: 110 cum laude / 110

– Studies abroad: Erasmus program at Linnaeus University, Växjö, Sweden

### Awards and distinctions

- (July 2025) Distinguished paper [BDR25b], ACM/IEEE LiCS conference.
- (June 2024) Distinguished presentation [BDR24], ACT conference.
- (August 2023) Distinguished presentation [DR23b], ACT conference.
- (July 2022) Distinguished presentation [DdR22b], ACT conference.
- (July 2022) Distinguished paper [DdR22a], ACM/IEEE LiCS conference.
- (July 2022) **Kleene Award** to the best student paper [DdR22a], ACM/IEEE LiCS.
- (2015–2017) Exemptions for High Academic Performance (Politecnico di Milano).
- (2015) Best Freshers Award (Politecnico di Milano).

## Academic commitments

- (April 2026) Program committee member of the Applied Category Theory Conference.
- (February 2026) Program committee member of the 18th International Workshop on Coalgebraic Methods in Computer Science.
- (April 2025) Program committee member of the 41st conference on Mathematical Foundations of Programming Semantics.
- (March 2025) Program committee member of the Applied Category Theory conference.
- (since Dec 2023) Steering committee member of the Adjoint School.
- (since May 2023) Executive board member of the journal Compositionality.
- (September 2022) Local co-organiser of the 9th Symposium on Compositional Structures.
- (May 2022) Program committee member of the Applied Category Theory conference.
- (2021-2023) Organiser of the Adjoint School.
- Reviewer for conferences (LiCS, POPL, MFPS, ...) and journals (LMCS, MSCS, TAC, RAIRO, ...).

## Teaching experience

- (Autumn 2025) Teaching assistant for the Categories, Proofs and Processes course, University of Oxford.
- (Spring 2024) Co-supervision of the BSc thesis of Anna Ricci at the University of Pisa, with Filippo Bonchi, work published in CSL2025 [BDR25a].
- (Spring 2024) Co-supervision of the BSc thesis of Francesco Stefani at the University of Pisa, with Filippo Bonchi.
- (Spring 2024) Teaching assistant for the Introduction to Category Theory course, University of Pisa.
- (Spring 2023) Teaching assistant for the Introduction to Category Theory course, TalTech.
- (Spring 2021) Teaching assistant for the Introduction to Category Theory course, TalTech.

## Grant writing

- (July 2024) Grant from the Advanced Research + Innovation Agency, UK, *Monoidal Coalgebraic Metrics*, PI: Filippo Bonchi.
- (July 2024) Grant from the Advanced Research + Innovation Agency, UK, *String Diagrams for Probabilistic Logic: Specification and Modelling Languages*, PI: Paweł Sobociński.
- (July 2024) Grant from the Advanced Research + Innovation Agency, UK, *Categorical Probability Towards Safe AI*, PI: Sam Staton.
- (June 2024) European (EuroProofNet) travel grant for a Short Term Scientific Mission (host): *A type theory for exact and continuous Bayesian observations* with Mario Román.
- (March 2024) European (EuroProofNet) travel grant for a Short Term Scientific Mission (visitor): *Bidimensional Markov categories* with Mario Román.

## Publications

- [Bon+25] Filippo Bonchi, Cipriano Junior Cioffo, Alessandro Di Giorgio, and Elena Di Lavoro. “Tape Diagrams for Monoidal Monads”. In: *11th Conference on Algebra and Coalgebra in Computer Science (CALCO 2025)*. Ed. by Corina Cîrstea and Alexander Knapp. Vol. 342. Leibniz International Proceedings in Informatics (LIPIcs). Dagstuhl, Germany: Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2025, 11:1–11:24. ISBN: 978-3-95977-383-6. DOI: [10.4230/LIPIcs.CALCO.2025.11](https://doi.org/10.4230/LIPIcs.CALCO.2025.11). URL: <https://drops.dagstuhl.de/entities/document/10.4230/LIPIcs.CALCO.2025.11>.
- [BDD25] Filippo Bonchi, Alessandro Di Giorgio, and Elena Di Lavoro. “A Diagrammatic Algebra for Program Logics”. In: *Foundations of Software Science and Computation Structures*. Ed. by Parosh Aziz Abdulla and Delia Kesner. Springer Nature Switzerland, 2025, pp. 308–330. ISBN: 978-3-031-90897-2. DOI: [10.1007/978-3-031-90897-2\\_15](https://doi.org/10.1007/978-3-031-90897-2_15).
- [BDR25a] Filippo Bonchi, Elena Di Lavoro, and Anna Ricci. “Strong Induction Is an Up-To Technique”. In: *33rd EACSL Annual Conference on Computer Science Logic (CSL 2025)*. Ed. by Jörg Endrullis and Sylvain Schmitz. Vol. 326. Leibniz International Proceedings in Informatics (LIPIcs). Dagstuhl, Germany: Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2025, 28:1–28:21. ISBN: 978-3-95977-362-1. DOI: [10.4230/LIPIcs.CSL.2025.28](https://doi.org/10.4230/LIPIcs.CSL.2025.28). URL: <https://drops.dagstuhl.de/entities/document/10.4230/LIPIcs.CSL.2025.28>.
- [BDR25b] Filippo Bonchi, Elena Di Lavoro, and Mario Román. “Effectful Mealy Machines: Bisimulation and Trace”. In: *2025 40th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS)*. 2025, pp. 541–554. DOI: [10.1109/LICS65433.2025.00047](https://doi.org/10.1109/LICS65433.2025.00047). arXiv: [2410.10627v2 \[cs.LO\]](https://arxiv.org/abs/2410.10627v2).
- [Cer+25] Lorenzo Ceragioli, Elena Di Lavoro, Giuseppe Lomurno, and Gabriele Tedeschi. “A Coalgebraic Model of Quantum Bisimulation”. In: Proceedings Seventh International Conference on Applied Category Theory 2024, Oxford, United Kingdom, 17 - 21 June 2024. Ed. by Michael Johnson and David Jaz Myers. Vol. 429. Electronic Proceedings in Theoretical Computer Science. Open Publishing Association, 2025, pp. 249–269. DOI: [10.4204/EPTCS.429.14](https://doi.org/10.4204/EPTCS.429.14).
- [DdR25] Elena Di Lavoro, Giovanni de Felice, and Mario Román. “Coinductive Streams in Monoidal Categories”. In: *Logical Methods in Computer Science* Volume 21, Issue 3, 18 (Aug. 2025). ISSN: 1860-5974. DOI: [10.46298/lmcs-21\(3:18\)2025](https://doi.org/10.46298/lmcs-21(3:18)2025). URL: <https://lmcs.episciences.org/10759>.
- [DLd25] Elena Di Lavoro, Wilmer Leal, and Valeria de Paiva. “Dialectica Petri Nets”. In: *Fundamenta Informaticae* Volume 194, Issue 3, 4 (Dec. 2025). ISSN: 1875-8681. DOI: [10.46298/fi.13125](https://doi.org/10.46298/fi.13125). URL: <https://fi.episciences.org/13125>.
- [Di +25] Elena Di Lavoro, Mario Román, Paweł Sobociński, and Márk Széles. “Order in Partial Markov Categories”. In: *Electronic Notes in Theoretical Informatics and Computer Science* Volume 5 - Proceedings of MFPS XLI, 14 (Dec. 2025). ISSN: 2969-2431. DOI: [10.46298/entics.16686](https://doi.org/10.46298/entics.16686). URL: <https://entics.episciences.org/16686>.
- [Gia+24] Francesco Giannini, Stefano Fioravanti, Pietro Barbiero, Alberto Tonda, Pietro Liò, and Elena Di Lavoro. “Categorical Foundation of Explainable AI: A Unifying Theory”. In: *Explainable Artificial Intelligence*. Ed. by Luca Longo, Sebastian Lapuschkin, and Christin Seifert. Springer Nature Switzerland, 2024, pp. 185–206. DOI: [10.1007/978-3-031-63800-8\\_10](https://doi.org/10.1007/978-3-031-63800-8_10).
- [Di 23] Elena Di Lavoro. “Monoidal Width”. PhD thesis. Tallinn, Estonia: Tallinna Tehnikaülikool, Nov. 2023. DOI: [10.23658/taltech.55/2023](https://doi.org/10.23658/taltech.55/2023).

- [Di +23] Elena Di Lavoro, Alessandro Gianola, Mario Román, Nicoletta Sabadini, and Paweł Sobociński. “Span(Graph): a Canonical Feedback Algebra of Open Transition Systems”. In: *Software and Systems Modeling* 22 (2023), pp. 495–520. doi: [10.1007/s10270-023-01092-7](https://doi.org/10.1007/s10270-023-01092-7). arXiv: [2010.10069 \[math.CT\]](https://arxiv.org/abs/2010.10069).
- [DR23a] Elena Di Lavoro and Mario Román. “Evidential Decision Theory via Partial Markov Categories”. In: *2023 38th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS)*. 2023, pp. 1–14. doi: [10.1109/LICS56636.2023.10175776](https://doi.org/10.1109/LICS56636.2023.10175776). arXiv: [2301.12989 \[cs.LO\]](https://arxiv.org/abs/2301.12989).
- [DS23a] Elena Di Lavoro and Paweł Sobociński. “Monoidal Width”. In: *Logical Methods in Computer Science* 19 (3 Sept. 2023). doi: [10.46298/lmcs-19\(3:15\)2023](https://doi.org/10.46298/lmcs-19(3:15)2023).
- [DS23b] Elena Di Lavoro and Paweł Sobociński. “Monoidal Width: Capturing Rank Width”. In: Proceedings Fifth International Conference on *Applied Category Theory*, Glasgow, United Kingdom, 18-22 July 2022. Ed. by Jade Master and Martha Lewis. Vol. 380. Electronic Proceedings in Theoretical Computer Science. Open Publishing Association, 2023, pp. 268–283. doi: [10.4204/EPTCS.380.16](https://doi.org/10.4204/EPTCS.380.16).
- [DdR22a] Elena Di Lavoro, Giovanni de Felice, and Mario Román. “Monoidal Streams for Dataflow Programming”. In: *Proceedings of the 37th Annual ACM/IEEE Symposium on Logic in Computer Science*. 2022, pp. 1–14. doi: [10.1145/3531130.3533365](https://doi.org/10.1145/3531130.3533365). arXiv: [2202.02061 \[cs.LO\]](https://arxiv.org/abs/2202.02061).
- [de +21] Giovanni de Felice, Elena Di Lavoro, Mario Román, and Alexis Toumi. “Functorial Language Games for Question Answering”. In: *Electronic Proceedings in Theoretical Computer Science*. Vol. 333. Open Publishing Association, Feb. 2021, pp. 311–321. doi: [10.4204/eptcs.333.21](https://doi.org/10.4204/eptcs.333.21).
- [Di +21] Elena Di Lavoro, Alessandro Gianola, Mario Román, Nicoletta Sabadini, and Paweł Sobociński. “A Canonical Algebra of Open Transition Systems”. In: *Formal Aspects of Component Software*. Ed. by Gwen Salaün and Anton Wijs. Vol. 13077. Cham: Springer International Publishing, 2021, pp. 63–81. ISBN: 978-3-030-90636-8. doi: [10.1007/978-3-030-90636-8\\_4](https://doi.org/10.1007/978-3-030-90636-8_4). arXiv: [2010.10069v1 \[math.CT\]](https://arxiv.org/abs/2010.10069v1).
- [DHS21] Elena Di Lavoro, Jules Hedges, and Paweł Sobociński. “Compositional Modelling of Network Games”. In: *29th EACSL Annual Conference on Computer Science Logic (CSL 2021)*. Ed. by Christel Baier and Jean Goubault-Larrecq. Vol. 183. Leibniz International Proceedings in Informatics (LIPIcs). Dagstuhl, Germany: Schloss Dagstuhl–Leibniz-Zentrum für Informatik, 2021, 30:1–30:24. ISBN: 978-3-95977-175-7. doi: [10.4230/LIPIcs.CSL.2021.30](https://doi.org/10.4230/LIPIcs.CSL.2021.30). arXiv: [2006.03493 \[cs.GT\]](https://arxiv.org/abs/2006.03493).

## Invited talks

- (17 Jun 2025) Conference on Algebra and Coalgebra in Computer Science.
- (04 Jun 2025) Logic, Homotopy, Categories days, École Polytechnique.
- (24 Apr 2025) Thirteenth Symposium on Compositional Structures, University College London.
- (13 Mar 2025) Chocola seminar, Université Paris Cité.

## Extended abstracts in peer-reviewed workshops

- [DR25] Elena Di Lavoro and Mario Román. “Graded Coalgebras of Monads for Continuous Dynamics (Early Ideas)”. In: *Conference on Algebra and Coalgebra 2025*. 2025.
- [BDR24] Filippo Bonchi, Elena Di Lavoro, and Mario Román. “Effectful streams - Extended Abstract”. In: *Applied Category Theory 2024*. 2024.
- [DR23b] Elena Di Lavoro and Mario Román. “Partial Markov Categories - Extended Abstract”. In: *Applied Category Theory 2023*. 2023.
- [DR23c] Elena Di Lavoro and Mario Román. “Symmetric Monoidal Automata - Extended Abstract”. In: *Nordic Workshop in Programming Theory 2023*. 2023.
- [Bha+22] Siddharth Bhat, Elena Di Lavoro, Pim de Haan, Miguel Lopez, Mario Román, Nicoletta Sabadini, and Ruben van Belle. “Cyclic Causal Networks via Partial Markov Categories - Extended Abstract”. In: *Symposium on Compositional Structures 9*. 2022.
- [DdR22b] Elena Di Lavoro, Giovanni de Felice, and Mario Román. “Monoidal Streams for Dataflow Programming - Extended Abstract”. In: *Applied Category Theory 2022*. 2022.
- [DR22] Elena Di Lavoro and Mario Román. “Evidential Decision Theory via Partial Markov Categories - Extended Abstract”. In: *Nordic Workshop in Programming Theory 2022*. 2022.
- [DS22] Elena Di Lavoro and Paweł Sobociński. “Monoidal Width - Extended Abstract”. In: *Women in Logic 2022*. 2022.
- [DdR21] Elena Di Lavoro, Giovanni de Felice, and Mario Román. “Stream-based Computations in Monoidal Categories - Extended Abstract”. In: *Nordic Workshop in Programming Theory 2021*. 2021.
- [DLd21] Elena Di Lavoro, Wilmer Leal, and Valeria de Paiva. “Dialectica Petri Nets - Extended Abstract”. In: *Symposium on Compositional Structures 8*. 2021.
- [DS21] Elena Di Lavoro and Paweł Sobociński. “Monoidal Width - Extended Abstract”. In: *Symposium on Compositional Structures 8*. 2021.

## Academic talks

- (23 Dec 2025) ItaCa Workshop, Università degli Studi di Milano.
- (23 Jun 2025) Logic Mentoring Workshop, colocated with LiCS 2025.
- (17 Jun 2025) Conference on Algebra and Coalgebra in Computer Science.
- (12 Mar 2025) group seminar at IRIF, Paris.
- (19 Jun 2024) Applied Category Theory conference.
- (16 May 2024) Topos Institute Colloquium.
- (09 Apr 2024) Workshop, University of Padova.
- (19 Mar 2024) Process Theory for Security Protocols, Tallinn University of Technology.
- (08 Mar 2024) Oxford Advanced Seminar on Informatic Structures, University of Oxford.
- (08 Jan 2024) Directions and Perspectives in the  $\lambda$ -calculus, University of Bologna.
- (22 Nov 2023) 34th Nordic Workshop on Programming Theory.
- (01 Aug 2023) Applied Category Theory conference.

- (18 Jul 2023) Coresources workshop, University of Cambridge.
- (27 Jun 2023) Logic in Computer Science conference.
- (25 Jun 2023) International Workshop on Quantitative Logical methods.
- (14 Jun 2023) Categories Networking Project opening workshop, University of Edinburgh.
- (26 Apr 2023) Italian Category Theory Fest 2023.
- (01 Aug 2022) Women in Logic workshop.
- (22 Jul 2022) Applied Category Theory conference.
- (26 Jun 2022) 29th Foundational Methods in Computer Science workshop.
- (25 May 2022) Comonads Meetup, University of Cambridge.
- (24 May 2022) Mathematical Foundations Seminar, University of Bath.
- (13 Dec 2021) Symposium on Compositional Structures 8.
- (26 Jan 2021) Computer Science Logic 2021 conference.

### **Doctoral schools**

- (2019-2020) Student in the Adjoint School mentored by Valeria de Paiva.
- (Mar 2020) Estonian Winter School in Computer Science