PERSONAL INFORMATION Francesco Di Cosmo, PhD

SUMMARY

PhD in Computer Science (cum laude, supervised by Diego Calvanese) at Free-University of Bozen-Bolzano, following an MSc in mathematics (cum laude) at University of Trieste. Professional experience in Research, Teaching, and Testing. Interested in Formal Verification, Mathematical Logic, Declarative Programming, Distributed Systems, and Concurrent Systems.

EDUCATION

10/2024	PhD in Computer Science, cum laude – Free University of Bozen-Bolzano.
3/2019	MSc in Mathematics, 110/110 cum laude – University of Trieste, Italy.
12/2014	BSc in Mathematics, 105/110 – University of Trieste, Italy.

EMPLOYMENT

11/2023 – ongoing	Research Assistant – Free University of Bozen-Bolzano.
2025	Lab Instructor for *Software Systems Engineering M1: Tools and Tehcniques for Software Testing* of the BSc in Computer Science, summer semester – Free University of Bozen-Bolzano.
2021, 2022, 2024	Teaching assistant for *Introduction to Databases* of the BSc in Computer Science, winter semesters – Free University of Bozen-Bolzano.
7 – 10/2019	Software tester - Innova, Trieste, Italy.
2017	Tutor for *Mathematics* of the BSc in Chemistry, MSc in Pharmacy, and MSc in Pharmaceutical Chemistry and Technologies, winter semester – University of Trieste.
2016, 2017	Tutor for *Mathematics and Statistics* of the BSc in Biological Sciences and Technologies, winter semesters – University of Trieste.

RESEARCH

Research Area	My research lies at the interface of logic programming, distributed systems, and formal verification. Specifically, I study the model checking problem of Declarative Distributed Systems, i.e., networks of intercommunicating data-aware processes based on declarative programming languages, such as variants of Answer Set Programming. I am also interested in related areas, such as Petri Nets, modal/temporal logics mixed with query languages like First-Order Logic or Datalog, and Average-case Computational Complexity.

Research Fellowships

6/2024	Student grant, PODS 2024 conference, Chile.
3/9/2023 – 8/9/2023	Student grant, Advanced Course on Petri Nets 2023 at Toruń, Poland.
1/2023 – 3/2023	Visiting PhD student at Chennai Mathematical Institute, Tamil Nadu, India.
11/2019 – 10/2023	PhD Scholarship, Free University of Bozen-Bolzano, Italy.
3–5/2017	Visiting master student at Technische Universität Wien, Austria.

COMMUNITY SERVICE

2025	Subreviewer for JELIA 2025.
8/2024-ongoing	Guest-Editor of *MDPI Logics* special issue for the European Summer School in Logic, Language, and Computation (ESSLLI) '23 and '24 Student Sessions.
2024	Chair, reviewer, and moderator of European Summer School in Logic, Language, and Computation, ESSLLI 2024 Student Session.
2023	Subreviewer for ECAI 2023.
2023	Co-Chair of European Summer School in Logic, Language, and Computation, ESSLLI 2023 Student Session, Logic and Computation track.

2021   Moderator of discussion channels associated to a course of ESSLLI 2021.

PRESENTATIONS

2025   Talk – *Nets-Within-Nets Through the Lens of Data-Nets* at RP 2025, Madrid, Spain.

2025   Lightning Talk – *The computational power of imperfections* at Complexity as a kaleidoscope Research School, Marseille, France.

2025   Talk – *Foundations of Fast Growing Complexity Classes* at Chennai Mathematical Institute, Tamil Nadu, India.

2024   PhD Thesis Defence – *Decidability Boundaries in Formal Verification of Declarative Distributed Systems* at UniBZ.

2024   Talk – *Bounded Verification of Petri Nets and EOSs using Telingo: An Experience Report* at CILC 2024.

2024   Talk – *Deciding Reachability and Coverability in Lossy EOS* at PNSE@Petri Nets 2024.

2024   Talk – *Verification of Unary Communicating Datalog Programs* at PODS 2024.

2023   Talk – *Analyzing Termination for Prev-Aware Fragments of Communicating Datalog Program* at RuleML+RR 2023.

2023   Poster – *Decidability Borders of Verification of Communicating Datalog Agents* at EUMAS 2023 PhD Day.

2023   Poster – *Applying Data-Aware Petri Nets to the Verification of Communicating Datalog Programs* at Advanced Course on Petri Nets 2023.

2023   Talk – *Verification of Prev-Free Communicating Datalog Programs.* at CILC 2023.

2023   Seminar – *A Tutorial on Datalog* at Chennai Mathematical Institute, Tamil Nadu, India.

2021   Talk – *Convergence Verification of Declarative Distributed Systems* at CILC 2021.

2021   Talk – *Verification of Sometimes Termination of Lazy-Bounded Declarative Distributed Systems* at ESSLLI 2021 Student Session.

2021   Talk – preliminary results on Lazy-Bounded DDSs at Midlands Graduate School in the Foundations of Computer Science 2021.

2019   Talk – *FO Queries Strongly Distributing over Components in Arbitrary Cardinality* at CILC 2019.

2018   Poster – *On Perfect Matchings for some Bipartite Graphs* at Proof Society Summer School 2018.

SCHOOLS AND COURSES

2025   Complexity as a Kaleidoscope 2025 – CIRM, Marseille, France.

2024   Java Programming I and II (10 ECTS) – MOOC.fi, University of Helsinki.

2024   Presentazioni che lasciano il segno – NOI Techpark, Bolzano, Italy.

2024   European Summer School in Logic, Language, and Computation, ESSLLI – Katholieke Universiteit Leuven, Belgium.

2024   Visual Thinking – NOI Techpark, Bolzano, Italy.

2023   Reasoning Web Summer School, RW – Oslo Metropolitan University, Oslo, Norway.

2023   Advanced Course on Petri Nets, ACPN – Nicolaus Copernicus University, Toruń, Poland.

2023   European Summer School in Logic, Language, and Computation, ESSLLI – University of Ljubljana, Slovenia.

2023   European Summer School in Artificial Intelligence, ESSAI – University of Ljubljana, Slovenia.

2022   European Summer School in Logic, Language, and Computation, ESSLLI – National University of Ireland, Galway, Ireland.

2021   European Summer School in Logic, Language, and Computation, ESSLLI – Free University of Bozen-Bolzano, Italy – Virtual.

2021   Summer school 2021 in HPC and AI – Free University of Bozen Bolzano, Italy – Virtual.

2021   Tenth Summer School on Formal Techniques, SSFT – Menlo College, Atherton, CA, USA – Virtual.

2021	Midlands Graduate School in the Foundations of Computer Science, MGS – University of Sheffield, United Kingdom – Virtual.
2020	Summer School on Modelling and Verification of Parallel Processes, MOVEP – University of Grenoble Alpes, France – Virtual.
2018	Proof Society Summer School – Ghent University, Belgium.
2016	European Summer School in Logic, Language, and Computation, ESSLLI – Free University of Bozen-Bolzano, Italy.
2016	Bayesian Analysis for Medical Data – University of Trieste, Italy.
2016	Logic Programming Summer School, CILC – University of Genova, Italy.

PUBLICATIONS

[1] C. Aiswarya, Diego Calvanese, Francesco Di Cosmo, and Marco Montali. "Verification of Unary Communicating Datalog Programs". In: *Proc. ACM Manag. Data* 2.2 (2024), p. 89.

[2] Francesco Di Cosmo, Soumodev Mal, and Tephilla Prince. "Deciding Reachability and Coverability in Lossy EOS". In: *Proceedings of the International Workshop on Petri Nets and Software Engineering 2024 co-located with the 45th International Conference on Application and Theory of Petri Nets and Concurrency (PETRI NETS 2024), June 24 - 25, 2024, Geneva, Switzerland*. Ed. by Michael Köhler-Bussmeier, Daniel Moldt, and Heiko Rölke. Vol. 3730. CEUR Workshop Proceedings. CEUR-WS.org, 2024, pp. 74–95.

[3] Francesco Di Cosmo and Tephilla Prince. "Bounded Verification of Petri Nets and EOSs using Telingo: An Experience Report". In: *Proceedings of the 39th Italian Conference on Computational Logic, Rome, Italy, June 26-28, 2024*. Ed. by Emanuele De Angelis and Maurizio Proietti. Vol. 3733. CEUR Workshop Proceedings. CEUR-WS.org, 2024.

[4] Cyriac Aiswarya, Diego Calvanese, Francesco Di Cosmo, and Marco Montali. "Verification of Unary Communicating Datalog Programs (Discussion Paper)". In: *Proceedings of the 32nd Symposium of Advanced Database Systems, Villasimius, Italy, June 23rd to 26th, 2024*. Ed. by Maurizio Atzori, Paolo Ciaccia, Michelangelo Ceci, Federica Mandreoli, Donato Malerba, Manuela Sanguinetti, Antonio Pellicani, and Federico Motta. Vol. 3741. CEUR Workshop Proceedings. CEUR-WS.org, 2024, pp. 185–194.

[5] Francesco Di Cosmo. "Verification of Prev-Free Communicating Datalog Programs". In: *Proceedings of the 38th Italian Conference on Computational Logic, Udine, Italy, June 21-23, 2023*. Ed. by Agostino Dovier and Andrea Formisano. Vol. 3428. CEUR Workshop Proceedings. CEUR-WS.org, 2023.

[6] Diego Calvanese, Francesco Di Cosmo, Jorge Lobo, and Marco Montali. "Convergence Verification of Declarative Distributed Systems". In: *Proceedings of the 36th Italian Conference on Computational Logic, Parma, Italy, September 7-9, 2021*. Ed. by Stefania Monica and Federico Bergenti. Vol. 3002. CEUR Workshop Proceedings. CEUR-WS.org, 2021, pp. 62–76.

[7] Francesco Di Cosmo. "Verification of Sometimes Termination of Lazy-Bounded Declarative Distributed Systems". In: *Proceedings of the ESSLLI Student Session 2021, 32nd European Summer School in Logic, Language and Information July 26 – August 13, online*. Ed. by Mina Young Pedersen and Alexandra Pavlova. Available at https://doi.org/10.48550/arXiv.2308.10007. 2021, pp. 13–23.

[8] Francesco Di Cosmo. "FO Queries Strongly Distributing over Components in Arbitrary Cardinality". In: *Proceedings of the 34th Italian Conference on Computational Logic, Trieste, Italy, June 19-21, 2019*. Ed. by Alberto Casagrande and Eugenio G. Omodeo. Vol. 2396. CEUR Workshop Proceedings. CEUR-WS.org, 2019, pp. 260–268.

[9] Alberto Casagrande, Francesco Di Cosmo, and Eugenio G. Omodeo. "On Perfect Matchings for some Bipartite Graphs". In: *Proceedings of the 3rd International Workshop on Sets and Tools co-located with the 6th International ABZ Conference, SETS@ABZ 2018, Southampton, UK, June 5, 2018*. Ed. by Maximiliano Cristiá, David Delahaye, and Catherine Dubois. Vol. 2199. CEUR Workshop Proceedings. CEUR-WS.org, 2018, pp. 38–51.

[10] Francesco Di Cosmo. "Analyzing Termination for Prev-Aware Fragments of Communicating Datalog Programs". In: *Rule ML + RR 2023*. To appear. 2023.

[11] Francesco Di Cosmo. "Decidability Borders of Verification of Communicating Datalog Agents". In: *Multi-Agent Systems - 20th European Conference, EUMAS 2023, Naples, Italy, September 14-15, 2023, Proceedings*. Ed. by Vadim Malvone and Aniello Murano. Vol. 14282. Lecture Notes in Computer Science. Springer, 2023, pp. 507–513.

[12] Francesco Di Cosmo. "The Impact of Propositional Messages on Termination of Declarative Distributed Systems". In: *Selected reflections in logic, language and information*. Ed. by Mina Young Pedersen and Alexandra M. Pavlova. Lecture Notes in Computer Science. To Appear. Springer, 2023.