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Matteo Cimini

Curriculum Vitae

Education

Ph.D Ph.D. in Computer Science.
Reykjavik University, Iceland, January 2012.
Advisors: Prof. Luca Aceto and Prof. Anna Ingólfsdóttir.

M.Sc. M.Sc. in Computer Science.
University of Bologna, Italy, 2008.
M.Sc. thesis supervisor: Prof. Davide Sangiorgi.
Co-supervisor: Prof. Claudio Sacerdoti Coen.

B.Sc. B.Sc. in Computer Science
University of Bologna, Italy, 2005.

Employment

present time - Sept. 2017 *University of Massachusetts Lowell*, MA, USA.
Assistant Professor.

Aug. 2017 - Feb. 2014 *Indiana University, Bloomington*, IN, USA.
Research Associate (July 2016 - Aug. 2017).
Postdoctoral fellow (Feb. 2014 - June 2016).

Jan. 2014 - Oct. 2012 *INRIA-Saclay*, France.
Postdoctoral researcher.

Sept. 2012 - Jan. 2009 *Reykjavik University*, Iceland.
Doctoral Student and Research Assistant (Jan. 2009 - Dec. 2011).
Postdoctoral researcher (Jan. 2012 - Sept. 2012).

Grants and Awards

2023 - 2026 NSF SHF: SMALL: Language-agnostic Proofs. (Oct. 2023 - Sept. 2026)
PI: Matteo Cimini (sole PI).
Award amount (includes REU supplement): $233,336
(SHF (Software and Hardware Foundations) is the NSF core program in my field.)

2023 Best Paper Award at the 17th International Conference on Tests and Proofs (TAP 2023).

2021 Teaching Excellence Award at UMass Lowell.

2020 Launch Mentors Award at UMass Lowell.

Publications

Here, *publications* also include papers "accepted for publication" though not yet in print.

Summary by the numbers:

- 43 publications in total (incl. a conference proceedings).
- Since joining UMass Lowell: 24 publications (incl. a conference proceedings).
- Since joining UMass Lowell: 16 first-author papers.
- Since joining UMass Lowell: 8 publications with my students.

UMass Lowell students who are (or were) under my supervision are underlined

[43] **A Typestate Approach to Purpose-aware Programming.**
Joan Montas, Samuel Dodson, Anitha Gollamudi, Matteo Cimini.
Accepted for publication in the proceedings of the *2026 Workshop on Formal Techniques for Judicious Programming (FTfJP 2026).*

[42] **Type Soundness of Functional Languages with Subtyping in Lang-n-Prove.**
Matteo Cimini, Joan Montas.
In the journal *Science of Computer Programming, Volume 248, 103380, March 2026. (accepted for publication in 2025).*

[41] **From Program Logics towards Language Logics.**
Matteo Cimini.
In *Proceedings of the 22nd International Colloquium on Theoretical Aspects of Computing (ICTAC 2025), pages 220-238, 2025.*

[40] **A Debugging System for Language-Parameterized Proofs.**
Charlesowityear Ly, Eswarasanthosh Kumar Mamillapalli, Matteo Cimini.
In Rebeca for Actor Analysis in Action. Lecture Notes in Computer Science, vol 15560. Springer, Cham, pages 364-389, 2025. (Festschrift volume dedicated to Marjan Sirjani.)

[39] **Language-parameterized Proofs for Functional Languages with Subtyping.**
Seth Galasso, Matteo Cimini.
In Proceedings of the 17th International Symposium on Functional and Logic Programming (FLOPS 2024), pages 291-310, May 2024.

[38] **Towards the Complexity Analysis of Programming Language Proof Methods.**
Matteo Cimini.
In Proceedings of the 20th International Colloquium on Theoretical Aspects of Computing (ICTAC 2023), pages, 100-118, December 2023.

[37] **Testing Languages with a Languages-as-Databases Approach.**
Matteo Cimini.
In Proceedings of the 17th International Conference on Tests and Proofs (TAP 2023), pages 108-126, July 2023.
Best Paper Award.

[36] **A Declarative Validator for GSOS Languages.**
Matteo Cimini.
In Proceedings of the 14th International Workshop on Programming Language Approaches to Concurrency- and Communication-cEntric Software (PLACES 2023), pages 14-25, April 2023.

[35] **A Query Language for Language Analysis.**
Matteo Cimini.
In Proceedings of the 20th edition of the International Conference on Software Engineering and Formal Methods (SEFM'22), pages 57-73, September 2022.

[34] **Lang-n-Prove: A DSL for Language Proofs.**
Matteo Cimini.
In Proceedings of the 15th ACM SIGPLAN International Conference on Software Language Engineering (SLE'22), pages 16-29, December 2022.

[33] **Lang-n-Send Extended: Sending Regular Expressions to Monitors.**
Matteo Cimini.
In Proceedings of the 15th Interaction and Concurrency Experience (ICE 2022), pages 69–84, June 2022.

[32] **Lang-n-Send: Processes That Send Languages.**
Matteo Cimini.
In Proceedings of the 13th International Workshop on Programming Language Approaches to Concurrency- and Communication-cEntric Software (PLACES 2022), pages 46–56, April 2022.

[31] **A Calculus for Multi-Language Operational Semantics.**
Matteo Cimini.
In Proceedings of the 13th Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE 2021), pages 25–42, October 2021.

[30] **Language Transformations in the Classroom.**
Matteo Cimini, Benjamin Mourad.
In Proceedings of the Combined 28th International Workshop on Expressiveness in Concurrency and 18th Workshop on Structural Operational Semantics (EXPRESS/SOS 2021), pages 43–58, August 2021.

[29] **A Declarative Gradualizer with Language Transformations.**
Benjamin Mourad, Matteo Cimini.
In Proceedings of the 32nd Symposium on Implementation and Application of Functional Languages (IFL 2020), pages 44–54, September 2020.

[28] **Extrinsically Typed Operational Semantics for Functional Languages.**
Matteo Cimini, Dale Miller, Jeremy G. Siek.
In Proceedings of the 13th ACM SIGPLAN International Conference on Software Language Engineering (SLE 2020), pages 108–125, November 2020.

[27] **On the Effectiveness of Higher-Order Logic Programming in Language-Oriented Programming.**
Matteo Cimini.
In Proceedings of the 15th International Symposium on Functional and Logic Programming (FLOPS 2020), pages 106–123, April 2020.

[26] **System Description: Lang-n-Change - A Tool for Transforming Languages.**
Benjamin Mourad, Matteo Cimini.
In Proceedings of the 15th International Symposium on Functional and Logic Programming (FLOPS 2020), pages 198–214, April 2020.

[25] **A Calculus for Language Transformations.**
Benjamin Mourad, Matteo Cimini.
In Proceedings of the 46th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2020), pages 547–555, Limassol, Cyprus, 2020.

[24] **Early Experience in Teaching the Basics of Functional Language Design with a Language Type Checker.**
Matteo Cimini.
In Proceedings of the 20th International Symposium on Trends in Functional Programming (TFP 2019), pages 21–37, Vancouver, Canada, June 2019.

[23] **Towards Gradually Typed Capabilities in the Pi-Calculus.**
Matteo Cimini.
In Proceedings of Interaction and Concurrency Experience (ICE 2019) - 12th International Workshop, pages 61–76, Copenhagen, Denmark, June 2019.

[22] **Proceedings of the 30th Symposium on Implementation and Application of Functional Languages (IFL 2018)**.
Matteo Cimini, Jay McCarthy.
Proceedings of the IFL 2018 symposium, Lowell, MA, USA – September 05 - 07, 2018.

[21] **Languages as First-Class Citizens (Vision Paper).**
Matteo Cimini.
In Proceedings of the 11th ACM SIGPLAN International Conference on Software Language Engineering (SLE 2018), pages 65–69, Boston, USA, November 2018.

[20] **Ghostbuster: A Tool for Simplifying and Converting GADTs.**
Timothy Zakian, Trevor McDonell, Matteo Cimini, Ryan Newton.
In the journal *Journal of Functional Programming (JFP)*, Volume 28, e16, 2018.

— ***Remark:*** Below are the publications of Prof. Cimini prior to joining UMass Lowell.

[19] **Automatically Generating the Dynamic Semantics of Gradually Typed Languages.**
Matteo Cimini and Jeremy G. Siek.
In *Proceedings of the 44th ACM SIGPLAN Symposium on Principles of Programming Languages, POPL 2017, Paris, France, January 2017.*

[18] **Fractional Permissions for Race-Free Mutable References in a Dataflow Intermediate Language.**
Matteo Cimini and Jeremy Siek.
In *Proceedings of the 1st Workshop on Programming Models and Languages for Distributed Computing (PMLDC 2016), Rome, Italy, July 2016.*

[17] **Ghostbuster: A Tool for Simplifying and Converting GADTs.**
Trevor McDonell, Timothy Zakian, Matteo Cimini, Ryan Newton.
In *Proceedings of the 21st annual ACM SIGPLAN International Conference on Functional Programming (ICFP 2016) , Nara, Japan, September 2016*, pages 338–350, 2016.

[16] **PTRebeca: Modeling and Analysis of Distributed and Asynchronous Systems.**
Ali Jafari, Ehsan Khamespanah, Marjan Sirjani, Holger Hermanns, Matteo Cimini.
In the journal *Science of Computer Programming, 128:22–128:50, 2016.*

[15] **The Gradualizer: A Methodology and Algorithm for Generating Gradual Type Systems.**
Matteo Cimini and Jeremy G. Siek.
In *Proceedings of the 43rd Annual ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages, POPL 2016, St. Petersburg, Florida, United States, January 20-22, 2016.* pages 443–455, 2016.

[14] **Refined Criteria for Gradual Typing.**
Jeremy G. Siek, Michael M. Vitousek, Matteo Cimini, and John Tang Boyland.
In *1st Summit on Advances in Programming Languages, SNAPL 2015, May 3-6, 2015, Asilomar, California, USA*, pages 274–293, 2015.

[13] **Monotonic References for Efficient Gradual Typing.**
Jeremy G. Siek, Michael M. Vitousek, Matteo Cimini, Sam Tobin-Hochstadt, and Ronald Garcia.
In *24th European Symposium on Programming, ESOP 2015, London, UK, April 11-18, 2015*, pages 432–456, 2015.

[12] **Principal Type Schemes for Gradual Programs.**
Ronald Garcia and Matteo Cimini.
In *Proceedings of the 42nd Annual ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages, POPL 2015, Mumbai, India, January 15-17, 2015*, pages 303–315, 2015.

[11] **A Lightweight Formalization of the Meta-theory of Bisimulation-up-to.**
Kaustuv Chaudhuri, Matteo Cimini, and Dale Miller.
In *Proceedings of the 2015 Conference on Certified Programs and Proofs, CPP 2015, Mumbai, India, January 15-17, 2015*, pages 157–166, 2015.

[10] **Modelling and simulation of asynchronous real-time systems using Timed Rebeca.**
Arni Hermann Reynisson, Marjan Sirjani, Luca Aceto, Matteo Cimini, Ali Jafari, Anna Ingólfsdóttir, and Steinar Hugi Sigurdarson.
In the journal *Science of Computer Programming, 89:41–89:68, 2014.*

[9] **Rule formats for distributivity.**
Luca Aceto, Matteo Cimini, Anna Ingólfsdóttir, Mohammadreza Mousavi, and Michel A. Reniers.
In the journal *Theoretical Computer Science*, 458:1–458:28, 2012.

[8] **Nominal SOS.**
Matteo Cimini, MohamamdReza Mousavi, Michel A. Reniers and Murdoch J. Gabbay.
In *Proceedings of the 28th Conference on the Mathematical Foundations of Programming Semantics (MFPS XXVIII), Bath, UK, Electronic Notes in Theoretical Computer Science, Elsevier*, 2012.

[7] **Proving the validity of equations in GSOS languages using rule-matching bisimilarity**. Luca Aceto, Matteo Cimini, and Anna Ingólfsdóttir.
In the journal *Mathematical Structures in Computer Science.*, 22(2):291–331, Cambridge University Press, 2012.

[6] **SOS rule formats for zero and unit elements.**
Luca Aceto, Matteo Cimini, Anna Ingólfsdóttir, MohammadReza Mousavi, and Michel A. Reniers.
In the journal *Theoretical Computer Science, 412(28):3045–3071, 2011.*

[5] **Modelling and simulation of asynchronous real-time systems using Timed Rebeca.**
Luca Aceto, Matteo Cimini, Anna Ingólfsdóttir, Arni Hermann Reynisson, Steinar Hugi Sigurdarson, and Marjan Sirjani.
In *Proceedings of the 10th International Workshop on the Foundations of Coordination Languages and Software Architectures (FOCLASA 2011), volume 58 of Electronic Proceedings in Theoretical Computer Science*, pages 1–19, 2011.

[4] **Rule formats for distributivity.**
Luca Aceto, Matteo Cimini, Anna Ingólfsdóttir, Mohammadreza Mousavi, and Michel A. Reniers.
In *Proceedings of the 5th International Conference on Language and Automata Theory and Applications (LATA 2011), volume 6638 of Lecture Notes in Computer Science,* pages 79–90, Springer-Verlag, 2011.

[3] **On rule formats for zero and unit elements.**
Luca Aceto, Matteo Cimini, Anna Ingólfsdóttir, MohammadReza Mousavi, and Michel A. Reniers.
In *Proceedings of the 26th Conference on the Mathematical Foundations of Programming Semantics (MFPS XXVI), Ottawa, Canada, volume 265 of Electronic Notes in Theoretical Computer Science*, pages 145–160. Elsevier B.V., The Netherlands, 2010.

[2] **Functions as processes: Termination and the $\bar{\lambda}\mu\tilde{\mu}$-Calculus.**
Matteo Cimini, Claudio Sacerdoti Coen, and Davide Sangiorgi.
In *Proceedings of the 5th Symposium on Trustworthy Global Computing (TGC 2010), volume 6084 of Lecture Notes in Computer Science,* pages 73–86, *Revised Selected Papers*, Springer-Verlag, 2010.

[1] **A bisimulation-based method for proving the validity of equations in GSOS languages.**
Luca Aceto, Matteo Cimini, and Anna Ingólfsdóttir.
In *Proceedings of the 6th Workshop on Structural Operational Semantics 2009 (SOS 2009), August 31, 2009, Bologna (Italy), volume 18 of Electronic Proceedings in Theoretical Computer Science*, pages 1–16, 2010.

Mentoring

Below, all students are (or were) students at UMass Lowell except the high school student.

2024 – present time: Ph.D. student: Joan Montas.
2 publications with Prof. Cimini.

Spring 2025: Undergraduate student: Tristan McDermott.

Spring 2025: Undergraduate student: Merlyn Zimmerman.

Spring 2025: Undergraduate student: Nikolaos Tentas.
Merlyn's and Nikolaos' work led to a software tool in my research themes.
(See CongruenceTool: `https://github.com/mcimini/CongruenceTool`)

2024: Master's student: Eswarasanthosh Kumar Mamillapalli.
1 publication with Prof. Cimini and Charlesowityear Ly.
M.Sc. Thesis supervised by Prof. Cimini. Graduated in 2024.

2024: Undergraduate student: Charlesowityear Ly.
1 publication. (The above-mentioned paper.)

2023 & 2024: Undergraduate student: Tess Galasso.
1 publication with Prof. Cimini [39].

2019 - 2021: Master's student: Benjamin Mourad.
Remark: I consider it as if we did "Ph.D. level" work even if formally for Master's.
4 publications with Prof. Cimini.
M.Sc. Thesis supervised by Prof. Cimini. Graduated in 2021.
Employed at Draper Laboratory after degree.

Fall 2021: High school student (local high school in the general area of Lowell, MA).
Duties: Learn Programming Language Theory and assist in research.

2020: Master's student: Nandan Kulkarni (Co-supervised with Prof. Narain, UMass Lowell).

Teaching Experience

Summary by the numbers:

- 9 years of teaching experience at UMass Lowell.
- 6 distinct courses. (3 undergraduate, 2 graduate, 1 corporate education)
- The 3 undergraduate courses are all required in the CS degree at UMass Lowell.
- Scheduled to teach a 7th distinct course in Spring 2027.

To help, one instance of my distinct courses is in **bold underlined font**.

Courses taught at University of Massachusetts Lowell

Spring 2027: *Scheduled to teach COMP.1020 Computing II* (Undergraduate, required)
(Data structures such as stacks, queues, trees, etc., in C.)

Fall 2026: ***COMP.3010 Organization of Programming Languages*** - Section 201 (Undergrad.)

Fall 2026: *COMP.3010 Organization of Programming Languages* - Section 202 (Undergraduate)
(These two courses above are currently taking place)

Spring 2026: *COMP.3010 Organization of Programming Languages* (Undergraduate level)

Fall 2025: *COMP.3010 Organization of Programming Languages* - Section 201 (Undergraduate)

Fall 2025: *COMP.3010 Organization of Programming Languages* - Section 202 (Undergraduate)

Spring 2025: ***COMP.5020 Foundations of Computer Science (Graduate level)***

Fall 2024: *Parental leave*

Spring 2024: *COMP.3010 Organization of Programming Languages* (Undergraduate level)

Fall 2023: *COMP.3010 Organization of Programming Languages* (Undergraduate level)

Fall 2023: ***COMP.5310 Design of Programming Languages (Graduate level)***

Summer '23	*COMP.3010 Organization of Programming Languages* (Undergraduate level)
Spring 2023	*COMP.3010 Organization of Programming Languages* (Undergraduate level)
Spring 2023	***COMP.4040 Analysis of Algorithms (Undergraduate level)***
Fall 2022	*COMP.3010 Organization of Programming Languages* (Undergraduate level)
Fall 2022	*COMP.5310 Design of Programming Languages* (Graduate level)
Spring 2022	*Parental leave*
Fall 2021	*COMP.3010 Organization of Programming Languages* (Undergraduate level)
Fall 2021	*COMP.5310 Design of Programming Languages* (Graduate level)
Spring 2021	*COMP.3010 Organization of Programming Languages* - Section 201 (Undergraduate)
Spring 2021	*COMP.3010 Organization of Programming Languages* - Section 202 (Undergraduate)
Spring 2021	***Developing Radar Signal Processing***
	(Corporate education course, as co-instructor, my part was 2/3rd of the course.)
Fall 2020	*COMP.4040 Analysis of Algorithms* - Section 201 (Undergraduate level)
Fall 2020	*COMP.4040 Analysis of Algorithms* - Section 202 (Undergraduate level)
Spring 2020	***COMP.3040 Foundations of Computer Science (Undergraduate level)***
Spring 2020	*COMP.3010 Organization of Programming Languages* (Undergraduate level)
Fall 2019	*COMP.5310 Design of Programming Languages* (Graduate level)
Spring 2019	*COMP.5310 Design of Programming Languages* (Graduate level)
Fall 2018	*COMP.5020 Foundations of Computer Science* (Graduate level)
Spring 2018	*COMP.5310 Design of Programming Languages* (Graduate level)
Fall 2017	*COMP.5020 Foundations of Computer Science* (Graduate level)

Professional Service

Organization:

- 2025 ♦ NEPLS 2025, Co-organizer of the New England Programming Languages and Systems Symposium at UMass Lowell. (regional symposium, ∼80 participants)
- 2018 ♦ IFL 2018, Co-Chair of the 30th Symposium on Implementation and Application of Functional Languages at UMass Lowell. (with ACM proceedings)
- 2015 ♦ YR-CONCUR 2015, PC chair. (Satellite workshop of CONCUR 2015.
- 2011 ♦ PACO 2011, Organization Chair. (Satellite workshop of DisCoTec 2011). (First Workshop on Process Algebra and Coordination Languages)

Committee Member: (PC member in all items unless otherwise stated)

- 2027 ♦ OOPSLA 2027
- 2026 ♦ SEFM 2026. (Int. Conf. on Software Engineering and Formal Methods)
  ♦ FORTE 2026. (Int. Conf. on Formal Techniques for Distributed Objects, Components, and Systems)
  ♦ ICE 2026. (Interaction and Concurrency Experience, workshop)
- 2025 ♦ SLE 2025. (Int. Conf. on Software Language Engineering)
  ♦ IFL 2025. (Symposium on Implementation and Application of Functional Languages)
  ♦ FORTE 2025.
  ♦ ICE 2025. (Interaction and Concurrency Experience, workshop)
- 2024 ♦ FLOPS 2024. (Int. Symposium on Functional and Logic Programming)
  ♦ EXPRESS/SOS 2024. (Int. Workshop on Expressiveness in Concurrency + Int. Workshop on Structural Operational Semantics)
- 2023 ♦ OOPSLA 2023, External Review / Artifact Evaluation Committee Member.

♦ EXPRESS/SOS 2023

2022 ♦ FLOPS 2022. (Int. Symposium on Functional and Logic Programming)

2021 ♦ ICFP 2021.

♦ ICE 2021. (Interaction and Concurrency Experience, workshop)

2020 ♦ POPL 2020.

♦ ICE 2020. (Interaction and Concurrency Experience, workshop)

2019 ♦ SLE 2019, (Int. Conf. on Software Language Engineering).

♦ TFP 2019. (Symposium on Trends in Functional Programming).

♦ ICE 2019. (Interaction and Concurrency Experience, workshop)

♦ EXPRESS/SOS 2019.

♦ SBMF 2018. (21st Brazilian Symposium On Formal Methods).

♦ PLDI 2018, External Review Committee.

♦ PLDI Artifact Evaluation 2018, Evaluation Committee.

♦ OOPSLA Artifact Evaluation 2018, Evaluation Committee.

♦ ICE 2018. (Interaction and Concurrency Experience, workshop).

2017 ♦ POPL SRC 2017, (Student Research Competition), Evaluation Committee Member.

♦ OOPSLA Artifact Evaluation 2017, Evaluation Committee.

♦ ICE 2017. (Interaction and Concurrency Experience, workshop).

2016 ♦ EXPRESS/SOS 2016.

♦ PrePost 2016. (1st Int. Workshop on Pre- and Post-Deployment Verification Techniques)

♦ ICE 2016 (Interaction and Concurrency Experience, workshop).

♦ EXPRESS/SOS 2015. PC member.

♦ ICE 2015 (Interaction and Concurrency Experience, workshop).

2014 ♦ EXPRESS/SOS 2014.

To the present time Journal reviewer for: Journal of Functional Programming, Journal of Computer Languages, Information and Computation, Science of Computer Programming, Logical and Algebraic Methods in Programming, Journal of Software and Systems Modeling, Information Processing Letter.

University / Department Service at UMass Lowell

(Only some selected examples are listed. I served multiple times in some items below.)

♦ Undergraduate Curriculum Committee member.

♦ Scholarship and Award Committee (Chair). *(Beyond the ordinary duties of the matter, we held an Award Ceremony Banquet: I was the host of the evening, and presented the awards to students in front of parents, faculty, etc.)*

♦ Faculty Hiring Search Committee member.

♦ Operations Committee member.

♦ Faculty Senate member.

♦ Volunteer at UMass Lowell Welcome Day and Open House (for prospective students)

♦ Advising Period, per semester. *(A fraction of the undergraduate students is assigned to faculty, including me. They have a hold that prevents them from enrolling in classes and they need to discuss their plan with me.)*

♦ Summer Advising.

♦ and others.