

Matteo Cimini

Curriculum Vitae

Indiana University, CREST
420 North Walnut Street, Bloomington, Indiana 47404
Phone: +1 812 606 1539
Email: mcimini@indiana.edu
Homepage: <http://matteo.cimini.info>

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Personal Details

Citizenship Italian

Current employment

Jul. 2016 - *Indiana University, Bloomington, IN, USA.*

present time Research Associate.

I am a member of the *Programming Languages Group at Indiana University* and the *Center for Research in Extreme Scale Technologies (CREST)*.

Past employment

Feb. 2014 - *Indiana University, Bloomington, IN, USA.*

Jun. 2016 Postdoctoral fellow.

Supervised by Prof. Jeremy Siek.

Oct. 2012 - *INRIA-Saclay, at École polytechnique, France.*

Jan. 2014 Postdoctoral researcher.

Supervised by Prof. Dale Miller.

Jan. 2012 - *Reykjavik University, Iceland.*

Sept. 2012 Postdoctoral researcher and teaching assistant.

Supervised by Prof. Luca Aceto and Prof. Anna Ingólfssdóttir.

Education

Ph.D. in *Reykjavik University, Iceland, January 2009 - December 2011*

Computer **Advisors:** Prof. Luca Aceto and Prof. Anna Ingólfssdóttir

Science **Ph.D. thesis title:**

Contributions to the Meta-Theory of Structural Operational Semantics.

M.Sc. in *University of Bologna, Italy, 2008.*

Computer **Advisor:** Prof. Davide Sangiorgi

Science **M.Sc. thesis title:**

λ -calculi based on sequents: abstract machines and comparison with the π -calculus.

Remark: This work led to publication [2] below.

Research Interests

- Programming Languages
- Operational Semantics
- Concurrent Programming
- Interactive Theorem Proving
- Formal Methods

Teaching Experience

Jan. 2012 - **Programming Languages.** Teaching Assistant (~ 100 students).

Mar. 2012 at Reykjavik University. (Undergraduate level)

Grants and Awards

- 2014 - 2016 *Disclaimer: I do **not** figure as proposer of this project.*
The Icelandic Research Fund kindly funds the following 3-year long project:
Title: Nominal Structural Operational Semantics.
Principal Investigator: Prof. Luca Aceto (my former Ph.D. advisor).
The research programme that we have formulated is entirely based on the publication [8] below (Nominal SOS) and Chapter 5 of my Ph.D. Thesis. I am part of the project as external collaborator.
- Jun. 2013 I have been offered the distinguished ERCIM fellowship (ERCIM Alain Bensuossan Fellowship) for a postdoc position (1 year). However, I had declined the offer in favor of my current position at Indiana University. I am very thankful to the European Research Consortium for Informatics and Mathematics for finding me worth the fellowship.

Visiting Periods

- Feb. 2014 Reykjavik, Iceland, 1 week. Visit to Luca Aceto and Anna Ingólfssdóttir at Reykjavik University.
- Dec. 2013 Argentina, 3 weeks. This visit was kindly funded by the European project MEALS (Mobility between Europe and Argentina applying Logics to Systems). I have visited Prof. Hernan Melgratti at Universidad de Buenos Aires and Prof. Nazareno Aguirre at Universidad Nacional de Rio Cuarto.
- 2009-2011 Eindhoven, The Netherlands, 6 months. Visiting period abroad during my Ph.D. studies. I had spent about 6 months at the Eindhoven University of Technology. I have visited Prof. MohammadReza Mousavi (now at Almstaad University, Sweden) and Prof. Michel Reniers.

Publications

- [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*. To appear.
- [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*, 128:22-50, 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 Ingólfssdóttir, and Steinar Hugi Sigurdarson. In the journal *Science of Computer Programming*, 89:41-68, 2014.
- [9] **Rule formats for distributivity.** Luca Aceto, Matteo Cimini, Anna Ingólfssdóttir, Mohammadreza Mousavi, and Michel A. Reniers. In the journal *Theoretical Computer Science*, 458:1-28, 2012.
- [8] **Nominal SOS.** Matteo Cimini, MohamadReza 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 Ingólfssdóttir. 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 Ingólfssdóttir, 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 Ingólfssdóttir, 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 Ingólfssdóttir, 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 Ingólfssdóttir, 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 $\bar{\lambda}\mu\tilde{\iota}$ -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 Ingólfssdóttir. 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.

Relevant Tech Reports, and Drafts

Well-Typed Languages are Sound.

Matteo Cimini, Dale Miller, Jeremy G. Siek.

Archived at <https://arxiv.org/abs/1611.05105> (2016)

The Semantics of ParalleX, v1.0.

Matteo Cimini, Jeremy G. Siek, Thomas Sterling.

Indiana University Technical Report TR726. (2016)

Nominal Structural Operational Semantics. Luca Aceto, Matteo Cimini, Anna Ingólfssdóttir, MohammadReza Mousavi, Michel A. Reniers and Murdoch J. Gabbay.

Up-to-date online resource of the Nominal SOS framework. (2015)

This draft is based on [8] and Chapter 5 of my Ph.D. thesis and will be finalized for a journal submission.

Programme Committees and Organization

- 2017 ♦ Evaluation Committee Member, POPL SRC 2017, satellite event of POPL 2017, Paris, France.
- ♦ PC of Interaction and Concurrency Experience (ICE 2017), satellite workshop of DisCoTec 2017.
- 2016 ♦ PC of EXPRESS/SOS 2016, satellite workshop of CONCUR 2016, Quebec City, Canada.
- ♦ PC of the International Workshop on Pre- and Post-Deployment Verification Techniques (PrePost 2016), Reykjavik, Iceland.
- ♦ PC of the international workshop: Interaction and Concurrency Experience (ICE 2016).
- 2015 ♦ Organizer and PC chair of YR-CONCUR 2015, satellite workshop of CONCUR 2015, Madrid, Spain.
- ♦ PC of EXPRESS/SOS 2015, satellite workshop of CONCUR 2015, Madrid, Spain.
- ♦ PC of Interaction and Concurrency Experience (ICE 2015), satellite workshop of DisCoTec 2015, Grenoble, France.
- 2014 ♦ PC of EXPRESS/SOS 2014, satellite workshop of CONCUR 2014, Rome, Italy.
- 2011 ♦ Organization Chair of the workshop Process Algebra and Coordination Languages (PACO 2011), satellite workshop of DisCoTec 2011, Reykjavik, Iceland.

Talks and Presentations

- Jan. 2017 I will present [19] at POPL 2017, Paris, France.
- Jan. 2016 Presented [15] at POPL 2016, St. Petersburg, Florida, United States.
- Jun. 2015 Presentation at the Pacific Northwest National Laboratory (PNNL), Richland, WA, USA.
Work meeting on a project I am part of on execution models and exascale computing.
- Jan. 2015 Presented [12] at POPL 2015, Mumbai, India.
- Jan. 2015 Presented [11] at CPP 2015, Mumbai, India.
- Feb. 2014 One guest lecture at Reykjavik University (Logic class, undergraduate level).
- Jan. 2014 Talk at LSV, in Cachan, France.
- Jan. 2014 Talk at CWI, in Amsterdam, The Netherlands.
- Dec. 2013 Talk at the Laboratoire PPS at Université Paris Diderot-Paris 7, in Paris. My talk was kindly hosted by Daniele Varacca.
- Nov. 2013 Talk at the LIP lab at École Normal Superior du Lyon, in Lyon. My talk was kindly hosted by Filippo Bonchi.
- Mar. 2013 Talk at the LIX Lab at École polytechnique, Palaiseau.
- Jun. 2012 Talk at UCLA, University of California, Los Angeles. My talk was kindly hosted by Prof. Jens Palsberg.
- Dec. 2011 Talk at the University of Camerino, Italy. My talk was kindly hosted by Prof. Emanuela Merelli.
- May 2011 Presented [4] at LATA 2011, Tarragona, Spain.
- Dec. 2010 Talk at the Eindhoven University of Technology (Seminar), Eindhoven, The Netherlands.
- Sep. 2010 Talk at YR- CONCUR 2010 (accepted presentation), Paris, France.
- May 2010 Presented [3] at MFPS 2010, Ottawa, Canada.
- Sep. 2009 Presented [1] at SOS 2009, Bologna, Italy.
- Sep. 2009 Talk at EXPRESS 2009 (accepted short paper), Bologna, Italy. This short paper was based on results in my M.Sc. thesis.

Selected Further Experiences

- Aug. 2014 I have been invited to participate to the Extreme Scale Productivity Workshop 2014 (XPW14), Bloomington, IN, USA. In this 3-day long workshop, I have joined the effort on identifying difficulties and characteristics of possible formulations of a notion of productivity in exascale computing.
- Aug. 2007 I have participated at the Types Summer School 2007, Bertinoro, Italy. The main topics of the school were proof theory and formalized mathematics. Particular attention was devoted to the use of proof assistants.