Ugo Dal Lago, PhD
Curriculum Vitae

Personal Data

Date of birth : 26 February, 1977
Place of birth : Schio, Italy
Nationality : Italian
Current position : Full Professor of Computer Science, Department of Computer Science and Engineering, University of Bologna.

Employment

Long Term

from 11/2019: *University of Bologna, Italy*. Full Professor.

11/2014–10/2019 *University of Bologna, Italy*. Associate Professor.

10/2006–10/2015 *University of Bologna, Italy*. Assistant Professor.

01/2007–12/2007: *Paris-Diderot University, Paris, France*. Marie Curie Fellow. Research Topic: Abstract Semantic Frameworks for Implicit Computational Complexity. Funded by European Commission.

09/2001–07/2002: *ITC-IRST, Trento, Italy*. Research Assistant.

Short Term

06/2016 *Paris-Diderot University, Paris, France*. Invited Professor. Research Topic: Probabilistic Programming and Denotational Semantics.

01/2016 *ENS Lyon, France*. Invited Professor. Research Topic: Complexity Analysis by Linear Dependent Types.

03/2011 *Kyoto University, Japan*. Invited Professor. Research Topic: Intersection Types and Implicit Complexity.

03/2011 *Paris-Diderot University, Paris, France*. Invited Professor. Research Topic: Quantum Computation.

07/2010 *ENS Lyon, France*. Invited Professor. Research Topic: Implicit Computational Complexity.

05/2006–10/2006: *Paris 13 University, Paris, France*. Postdoc Grant. Research Topic: Implicit Computational Complexity. Funded by Paris 13 University.

01/2006–04/2006: *University of Verona, Italy*. Postdoc Grant. Research Topic: Implicit Computational Complexity. Funded by MIUR (Ministero dell'Istruzione, della Ricerca e dell'Università).

Education

01/2003–12/2005: *University of Bologna, Italy*. Computer Science PhD Studentship. Advisor: Professor Simone Martini. Research Topic: Linear Logic and Implicit Computational Complexity. Funded by MIUR (Ministero dell'Istruzione, della Ricerca e dell'Università). Defense Date: April 26th, 2006.

10/1996–07/2001: *University of Udine, Italy*. Computer Science Master. Graduated with full marks (110/110 cum laude).

Awards

05/2015: *Best Italian Young Researcher in Theoretical Computer Science*. Awarded by Italian Chapter of EATCS.

09/2006: *Best Italian PhD Thesis on Theoretical Computer Science*. Awarded by Italian Chapter of EATCS.

07/2006: *Kleene Award for Best LICS Student Paper*. Awarded by IEEE.

Fellowships

05/2006: *"Marie Curie" Fellowship*. Funded by European Union.

02/2006: *Post-doc Fellowship*. Funded by Paris 13 University.

01/2006: *Post-doc Fellowship*. Funded by MIUR (Ministero dell'Istruzione, della Ricerca e dell'Università).

05/2004: *"Marco Polo" Fellowship*. Funded by the University of Bologna.

Research

Research Interests

- Program Semantics.
- Complexity Analsysis.
- Probabilistic Computation and Cryptography.
- Linear Logic.
- Quantum Computation Theory.

Research Projects

2022–2025 ICSC "National Research Centre for High Performance Computing, Big Data and Quantum Computing". Research Project. Funded by the EU through PNRR.

2022–2025 CAFFEINE ("Compositional and Effectful Program Distances"). Research Project. Funded by MUR (Ministero dell'Università e della Ricerca). **Scientific Coordinator**.

2020-2023 PPS ("Probabilistic Program Semantics"). Research Project. Funded by ANR, France.

2019–2022 ASPRA ("Analysing Program Analyses"). Funded by MUR (Ministero dell'Università e della Ricerca)).

2019-2024 DIAPASoN ("Differential Program Semantics"). ERC Consolidator Grant. **Scientific Coordinator**.

2016–2020 REPAS ("Reliable and Privacy-Aware Software systems"). Research Project. Funded by ANR, France.

2015-2020 CRECOGI ("Concurrent, Resourceful and Effectful COmputation, by Geometry of Interaction"). Équipe Associée INRIA-JAPON. **Scientific Coordinator**.

2014-2018 ELICA ("Expanding Logical Ideas in Complexity Analysis"). Research Project. Funded by ANR, France.

2013-2016 PACE ("beyond plain Processes: Analysis techniques, Coinduction and Expressiveness"). Research Project. Funded by ANR, France.

2011-2012 ETERNAL ("intEracTive rEsouRce AnaLysis"). Cooperative Research Project. Founded by INRIA, France. **Scientific coordinator** of the project, involving INRIA-PARSIFAL (local coordinator: Dale Miller) and INRIA-PIR2 (local coordinator: Pierre-Louis Curien).

2009–2012 HATS ("Highly Adaptable and Trustworthy Software using formal methods"). Research Project (Project no. FP7-231620). Funded by European Union under FP7.

2008–2010 CONCERTO ("CONtrol and CERTification of Resources Usage"). Research Project. Partially funded by MIUR (Ministero dell'Istruzione, Università e Ricerca).

2006 NOCOST ("Nouveaux Outils pour la COmplexité : Sémantique et Types"). Funded by ANR (Agence Nationale de la Recherche).

2005–2006 FOLLIA ("FOndazioni LOgiche di LInguaggi Astratti di programmazione") Research Project. Partially funded by MIUR (Ministero dell'Istruzione, Universitá e Ricerca).

2003–2004 PROTOCOLLO ("From PROof TO COmputation through Linear LOgic") Research Project. Partially funded by MIUR (Ministero dell'Istruzione, Università e Ricerca).

2001–2002 FORPICS European Research Project.

Invited Talks

- "On Model-Checking Higher-Order Effectful Programs", *DIBRIS, University of Genova*, April 2024.
- "Enumerating Error Bounded Polytime Algorithms Through Arithmetical Theorie", *Seminar on Logic and Rewriting*, Radboud University, Nijmegen, Netherlands, April 2024.
- "From Equivalences to Metrics, Effectfully", *CS Colloquium*, Yale University, New Haven CT, February 2024.
- "On Interaction, Efficiency, and Reversibility", *GALOP*, London, January 2024.
- "From Equivalences to Metrics, Effectfully",*PoP Seminar Talk*, CMU, Pittsburgh PA, February 2023.
- "From Equivalences to Metrics, Effectfully'", *Lorents Center's Workshop on New Challenges in Programming Language Semantics*, Leiden, Netherlands, November 2022.
- "On Higher-Order Cryptography", *18th International Conference on Computability and Complexity in Analysis*, July 2021.
- "On Differential Program Semantics", *16th International Computer Science Symposium in Russia*, July 2021.
- "On Differential Program Semantics", *Online Worldwide Seminar on Logic and Semantics*, June 16th, 2021.
- "Intersection Types and (Positive) Almost-Sure Termination", *Mathematical Foundations Seminar, University of Bath*, February 23rd, 2021.
- "On Higher-Order Cryptography", *Research Seminar, Information Security Group, Royal Holloway University of London*, February 4th, 2021.
- "On Higher-Order Cryptography", *BUSec Security Seminar, Boston University*, May 18th, 2020.
- "Differential Logical Relations" *Mathematical Foundations Seminar, University of Bath*, July 30th, 2019.
- "Complexity Classes and Higher-Order Calculi — How Martin Contributed to Shaping ICC" *Martin Hofmann Memorial Meeting, LMU Munich*, July 13th, 2019.
- "Differential Program Semantics" *Computer Science Workshop, University of Genova*, June 11th, 2019.
- "Differential Program Semantics" *Colloquium, University Roma Tre*, January 26th, 2019.
- "Context Equivalences and Metrics in Probabilistic Lambda-Calculi" *Logic and Semantics Seminar, University of Cambridge*, October 21st 2016.
- "Higher-Order Probabilistic Computation: Calculi, Observational Equivalence, and Implicit Complexity" *16th Italian Conference on Theoretical Computer Sceince, Firenze*, September 10th, 2015.
- "On Bisimulation Relations for Probabilistic Higher-order Functional Programs". *Workshop on Semantics of proofs and programs, IHP, Paris*, June 2014.

- "The Geometry of Synchronization". *Workshop on Concurrency, Logic, and Types, Lyon*, February 14th, 2014.
- "The Geometry of Types", *2nd International Workshop on Linearity, Tallinn*, April 1st, 2012.
- "Implicit Computational Complexity in a Concurrency Scenario". 11th International *Workshop on Logic and Computational Complexity (LCC), Edinburgh*, July 10th, 2010.
- Invited Lectures on "Implicit Computational Complexity". European Summer School on Logic, Language and Information. Copenhagen, August 8th to 13th, 2010.
- "On the Linear Logic Approach to Implicit Computational Complexity: Semantics". *LOGIC. Workshop in Honor of Jean-Yves Girard's 60th Birthday*. May 19th 2007.
- "Context Semantics and Implicit Computational Complexity". *Logic and Interaction Seminars, IML Marseille*. March 27th 2007.
- "An Invariant Cost Model for the Lambda Calculus". *Laboratoire d'Informatique de l'University Paris-Nord, Paris, France*. November 28th, 2005.
- "Quantitative Models and Implicit Complexity". *Laboratoire d'Informatique de l'University Paris-Nord, Paris, France*. June 15th, 2005.
- "The Geometry of Linear Higher-Order Recursion". *CRISS workshop, Paris, France* June 13th, 2005.
- "Quantitative Models and Implicit Complexity". *National Institute of Informatics, Tokyo, Japan*. April 14th 2005.
- "The Geometry of Linear Higher-Order Recursion". *University of Verona, Italy*. March 21st, 2005.

Participation to Editorial Boards

from 1/2019: member of the editorial board of the journal *Acta Informatica*.

from 12/2017: member of the editorial board of the journal *Logical Methods in Computer Science*.

from 12/2017: member of the editorial board of the journal *Mathematical Structures in Computer Science*

Participation to Steering Committees

from 12/2018: member of the Steering Committee of the FoSSaCS Conference ("Foundations of Software Science and Computational Structures").

12/2014–12/2018: secretary of IFIP Working Group 1.6, Term Rewriting.

7/2014–7/2016: member of the Steering Committee of the TLCA Conference ("Typed Lambda Calculi and Applications").

from 3/2012: member of the Steering Committee of the DICE Workshop ("Developments in Implicit Complexity").

7/2016–6/2022: member of the Steering Committee of the LCC Workshop ("Logic and Computational Complexity").

Program Committee Chairing

- *Conferences*: ICTCS2022, FOSSACS2018.
- *Workshop*: TLLA2020, GALOP2018, LCC2016, FOPARA2015, DCM2014, FOPARA2013, DICE2012.

Participation to Program Committees

- *Conferences*: LICS2023, POPL2023, FOSSACS2023, ICFP2022, MFCS2022,ICALP2021, FOSSACS2021, PPDP2020, POPL2020, LICS2020, FSCD2019, LICS2018, FSCD2017, CSL2017, FSCD2016, ICTCS2015, CSL2015, ICALP2015, FOSSACS2015, IFIP-TCS2014, RTATLCA2014, FSTTCS2013, CSL2013, FOSSACS2013, ICALP2012, TLCA2011, ICALP2010, LICS2008.

- *Workshops*: TLLA2022, WST2016, CMCS2016, FOPARA2015, DCM2015, LOLA2014, GALOP2013, WST2012, DICE2011, DICE2010, FOPARA2009, LINEARITY2009, GALOP2009.

Participation to PhD Thesis Committees

- Member of the PhD Committee for the following PhD Theses:
  - Alejandro Aguirre, "Relational logics for higher-order effectful programs", Universidad Politecnica de Madrid, 2021;
  - Federico Olimpieri, "Intersection types and resource calculi in the denotational semantics of λ-calculus", Université Aix-Marseille, 2020;
  - Gianluca Curzi, "Non-Laziness in Implicit Computational Complexity and Probabilistic λ-calculus", Univerità di Torino, 2020;
  - Niels Vorneveld, "Equality Between Programs with Effects", University of Ljubljana", 2020;
  - Koko Muroya, "Hypernet Semantics of Programming Languages", University of Birmingham", 2019;
  - Simon Castellan, "Structures Concurrentes en Sémantique de Jeux", ENS Lyon, 2017;
  - Charles Grellois, "Semantics of Linear Logic and Higher-Order Model-Checking", Paris-Diderot University, 2016;
  - Thomas Leventis, "Lambda-théories Probabilistes", Aix-Marseille University, 2016;
  - Matteo Pascucci, "Modal Logics with Propositional Constants" University of Verona, 2016;
  - Erika de Benedetti, "Linear Logic, Type Assignment Systems and Implicit Computational Complexity" University of Torino, 2015;
  - Marc Bagnol, "On the Resolution Semiring" Aix-Marseille University, 2014;
  - Michele Alberti, "On Operational Properties of Quantitative Extensions of Lambda-Calculus" University Aix-Marseille, 2014;
  - Stephane Zimmermann, "Vers une Ludique Differentielle" Paris-Diderot University, 2013;
  - Clément Aubert, "Linear Logic and Sub-polynomial Classes of Complexity" Paris 13 University, 2013;
  - Antoine Madet, "Implicit Complexity in Concurrent Lambda-Calculi", Paris-Diderot University, 2012.

PhD Thesis Reviewing

- Reviewer of the following PhD Theses:
  - Simon Castellan, "Structures Concurrentes en Sémantique de Jeux", ENS Lyon, 2017;
  - Erika de Benedetti, "Linear Logic, Type Assignment Systems and Implicit Computational Complexity", University of Torino, 2015;
  - Marc Bagnol, "On the Resolution Semiring", Aix-Marseille University, 2014;
  - Stephane Zimmermann, "Vers une Ludique Differentielle", Paris-Diderot University, 2013;
  - Clément Aubert, "Linear Logic and Sub-polynomial Classes of Complexity", Paris 13 University, 2013;
  - Martin Avanzini, "Verifying Polytime Computability Automatically", University of Innsbruck, 2013.
  - Antoine Madet, "Implicit Complexity in Concurrent Lambda-Calculi", Paris-Diderot University, 2012.

Teaching

Courses

- Computer Architectures, *University of Bologna*.
- Cryptography, *University of Bologna*.
- Combinatorial Optimization, *University of Bologna*.

- Introduction to Java Programming, *University of Bologna*.
- Introduction to Python Programming, *University of Bologna*.
- Foundations of Logic for Computer Science, *University of Bologna*.
- Algorithms and Data Structures for Biology, *University of Bologna*.
- Languages and Algorithms for Artificial Intelligence, *University of Bologna*.

Teaching Assistantship

- Mathematical Logic for Computer Science, *University of Bologna*.
- Programming, *University of Padova*.

PhD Thesis Supervision

- Melissa Antonelli. *Probabilistic Arithmetic and Almost-sure Termination"*. Dottorato in Informatica, University of Bologna. Supervisor.
- Gabriele Vanoni. *Optimal Reduction, Geometry of Interaction, and the Space-Time Tradeoff*. Dottorato in Informatica, University of Bologna. Supervisor.
- Francesco Gavazzo. *Coinductive Equivalences and Metrics for Higher-order Languages with Algebraic Effects*. Dottorato in Informatica, University of Bologna. Supervisor.
- Raphaëlle Crubillé. *Behavioral Distances for Probabilistic Higher-Order Programs*. École doctorale de Sciences Mathématiques de Paris Centre. Co-Supervisor.
- Alberto Cappai. *On Equivalences, Metrics, and Computational Indistinguishability*. Dottorato in Informatica, University of Bologna. Supervisor.
- Alessandro Rioli. *Coinductive Techniques on a Linear Quantum λ-Calculus*. Dottorato in Informatica, University of Bologna. Supervisor.
- Sara Zuppiroli. *Probabilistic Recursion Theory and Implicit Computational Complexity*. Dottorato in Informatica, University of Bologna. Supervisor.
- Giulio Pellitta. *Extending Implicit Computational Complexity and Abstract Machines to Languages with Control*. Dottorato in Informatica, University of Bologna. Co-supervisor.
- Paolo Parisen Toldin. *Implicit Computational Complexity and Probabilistic Classes*. Dottorato in Informatica, University of Bologna. Co-supervisor.

Selected Papers and Publications

Thesis

[DL06] **Ugo Dal Lago**. *Semantic Frameworks for Implicit Computational Complexity*. Ph.D. thesis, Dipartimento di Informatica, Università degli Studi di Bologna, March 2006. Winner of the 2006 award for the best italian doctoral thesis on theoretical computer science, assigned by the Italian Chapter of EATCS.

Journals

[1] Ugo Dal Lago and Alexis Ghyselen. On model-checking higher-order effectful programs. *Proc. ACM Program. Lang.*, 8(POPL):2610–2638, 2024.

[2] Melissa Antonelli, **Ugo Dal Lago**, and Paolo Pistone. On counting propositional logic and wagner's hierarchy. *Theor. Comput. Sci.*, 966-967:113928, 2023.

[3] **Ugo Dal Lago**, Reinhard Kahle, and Isabel Oitavem. Implicit recursion-theoretic characterizations of counting classes. *Arch. Math. Log.*, 61(7-8):1129–1144, 2022.

[4] **Ugo Dal Lago** and Francesco Gavazzo. A relational theory of effects and coeffects. *Proc. ACM Program. Lang.*, 6(POPL):1–28, 2022.

[5] **Ugo Dal Lago** and Francesco Gavazzo. Effectful program distancing. *Proc. ACM Program. Lang.*, 6(POPL):1–30, 2022.

[6] **Ugo Dal Lago**. Implicit computation complexity in higher-order programming languages: A survey in memory of martin hofmann. *Math. Struct. Comput. Sci.*, 32(6):760–776, 2022.

[7] Gilles Barthe, Raphaëlle Crubillé, **Ugo Dal Lago**, and Francesco Gavazzo. On feller continuity and full abstraction. *Proc. ACM Program. Lang.*, 6(ICFP):826–854, 2022.

[8] Beniamino Accattoli, **Ugo Dal Lago**, and Gabriele Vanoni. Multi types and reasonable space. *Proc. ACM Program. Lang.*, 6(ICFP):799–825, 2022.

[9] **Ugo Dal Lago** and Naohiko Hoshino. The geometry of bayesian programming. *Math. Struct. Comput. Sci.*, 31(6):633–681, 2021.

[10] **Ugo Dal Lago** and Francesco Gavazzo. Differential logical relations, part II: Increments and derivatives. *Theor. Comput. Sci.*, 895:34–47, 2021.

[11] **Ugo Dal Lago**, Claudia Faggian, and Simona Ronchi Della Rocca. Intersection types and (positive) almost-sure termination. *Proc. ACM Program. Lang.*, 5(POPL):1–32, 2021.

[12] Flavien Breuvart, **Ugo Dal Lago**, and Agathe Herrou. On higher-order probabilistic subrecursion. *Log. Methods Comput. Sci.*, 17(4), 2021.

[13] Martin Avanzini, Gilles Barthe, and **Ugo Dal Lago**. On continuation-passing transformations and expected cost analysis. *Proc. ACM Program. Lang.*, 5(ICFP):1–30, 2021.

[14] Beniamino Accattoli, **Ugo Dal Lago**, and Gabriele Vanoni. The (in)efficiency of interaction. *Proc. ACM Program. Lang.*, 5(POPL):1–33, 2021.

[15] **Ugo Dal Lago** and Gabriele Vanoni. On randomised strategies in the λ-calculus. *Theor. Comput. Sci.*, 813:100–116, 2020.

[16] **Ugo Dal Lago**, Francesco Gavazzo, and Ryo Tanaka. Effectful applicative similarity for call-by-name lambda calculi. *Theor. Comput. Sci.*, 813:234–247, 2020.

[17] Naoki Kobayashi, **Ugo Dal Lago**, and Charles Grellois. On the termination problem for probabilistic higher-order recursive programs. *Log. Methods Comput. Sci.*, 16(4), 2020.

[18] Martin Avanzini, **Ugo Dal Lago**, and Akihisa Yamada. On probabilistic term rewriting. *Sci. Comput. Program.*, 185, 2020.

[19] **Ugo Dal Lago** and Charles Grellois. Probabilistic termination by monadic affine sized typing. *ACM Trans. Program. Lang. Syst.*, 41(2):10:1–10:65, 2019.

[20] Patrick Baillot, Gilles Barthe, and **Ugo Dal Lago**. Implicit computational complexity of subrecursive definitions and applications to cryptographic proofs. *J. Autom. Reasoning*, 63(4):813–855, 2019.

[21] Martin Avanzini and **Ugo Dal Lago**. On sharing, memoization, and polynomial time. *Inf. Comput.*, 261:3–22, 2018.

[22] **Ugo Dal Lago** and Ulrich Schöpp. Computation by interaction for space-bounded functional programming. *Inf. Comput.*, 248:150–194, 2016.

[23] **Ugo Dal Lago**, Simone Martini, and Davide Sangiorgi. Light logics and higher-order processes. *Mathematical Structures in Computer Science*, 26(6):969–992, 2016.

[24] **Ugo Dal Lago** and Paolo Di Giamberardino. On session types and polynomial time. *Mathematical Structures in Computer Science*, 26(8):1433–1458, 2016.

[25] Patrick Baillot and **Ugo Dal Lago**. Higher-order interpretations and program complexity. *Inf. Comput.*, 248:56–81, 2016.

[26] Beniamino Accattoli and **Ugo Dal Lago**. (leftmost-outermost) beta reduction is invariant, indeed. *Logical Methods in Computer Science*, 12(1), 2016.

[27] **Ugo Dal Lago** and Paolo Parisen Toldin. A higher-order characterization of probabilistic polynomial time. *Inf. Comput.*, 241:114–141, 2015.

[28] **Ugo Dal Lago**, Sara Zuppiroli, and Maurizio Gabbrielli. Probabilistic recursion theory and implicit computational complexity. *Sci. Ann. Comp. Sci.*, 24(2):177–216, 2014.

[29] **Ugo Dal Lago** and Barbara Petit. Linear dependent types in a call-by-value scenario. *Sci. Comput. Program.*, 84:77–100, 2014.

[30] **Ugo Dal Lago** and Margherita Zorzi. Probabilistic operational semantics for the lambda calculus. *RAIRO - Theor. Inf. and Applic.*, 46(3):413–450, 2012.

[31] **Ugo Dal Lago** and Simone Martini. On constructor rewrite systems and the lambda calculus. *Logical Methods in Computer Science*, 8(3), 2012.

[32] **Ugo Dal Lago** and Marco Gaboardi. Linear dependent types and relative completeness. *Logical Methods in Computer Science*, 8(4), 2012.

[33] Patrick Baillot, **Ugo Dal Lago**, and Jean-Yves Moyen. On quasi-interpretations, blind abstractions and implicit complexity. *Mathematical Structures in Computer Science*, 22(4):549–580, 2012.

[34] **Ugo Dal Lago** and Martin Hofmann. Realizability models and implicit complexity. *Theor. Comput. Sci.*, 412(20):2029–2047, 2011.

[35] Patrick Baillot, Paolo Coppola, and **Ugo Dal Lago**. Light logics and optimal reduction: Completeness and complexity. *Information and Computation*, 209(2):118–142, 2011.

[36] **Ugo Dal Lago**, Andrea Masini, and Margherita Zorzi. Quantum implicit computational complexity. *Theoretical Computer Science*, 411(2):377–409, 2010.

[37] **Ugo Dal Lago** and Martin Hofmann. A semantic proof of polytime soundness for light affine logic. *Theory of Computing Systems*, 46(4):673–689, 2010.

[38] **Ugo Dal Lago** and Martin Hofmann. Bounded linear logic, revisited. *Logical Methods in Computer Science*, 6(4), 2010.

[39] **Ugo Dal Lago**, Andrea Masini, and Margherita Zorzi. On a measurement-free quantum lambda calculus with classical control. *Mathematical Structures in Computer Science*, 19(2):297–335, 2009.

[40] **Ugo Dal Lago**. The geometry of linear higher-order recursion. *ACM Transactions on Computational Logic*, 10(2), 2009.

[41] **Ugo Dal Lago**. Context semantics, linear logic and computational complexity. *ACM Transactions on Computational Logic*, 10(4), 2009.

[42] **Ugo Dal Lago** and Simone Martini. The weak lambda-calculus as a reasonable machine. *Theoretical Computer Science*, 398(1-3):32–50, 2008.

[43] Paolo Coppola, **Ugo Dal Lago**, and Simonetta Ronchi Della Rocca. Light logics and the call-by-value lambda calculus. *Logical Methods in Computer Science*, 4(4), 2008.

[44] **Ugo Dal Lago**, Angelo Montanari, and Gabriele Puppis. Compact and tractable automaton-based representations of time granularities. *Theoretical Computer Science*, 373(1-2):115–141, 2007.

[45] **Ugo Dal Lago** and Patrick Baillot. Light affine logic, uniform encodings and polynomial time. *Mathematical Structures in Computer Science*, 16(4):713–733, 2006.

[46] **Ugo Dal Lago** and Simone Martini. Phase semantics and decidability of elementary affine logic. *Theoretical Computer Science*, 318(3):409–433, 2004.

Conferences and Workshops with Refereed Proceedings

[1] Andrea Colledan and **Ugo Dal Lago**. Circuit width estimation via effect typing and linear dependency. In *Programming Languages and Systems - 33rd European Symposium on Programming, ESOP 2024*, volume 14577 of *Lecture Notes in Computer Science*, pages 3–30. Springer, 2024.

[2] Patrick Baillot, **Ugo Dal Lago**, Cynthia Kop, and Deivid Vale. On basic feasible functionals and the interpretation method. In *Foundations of Software Science and Computation Structures - 27th International Conference, FoSSaCS 2024*, volume 14575 of *Lecture Notes in Computer Science*, pages 70–91. Springer, 2024.

[3] Melissa Antonelli, **Ugo Dal Lago**, Davide Davoli, Isabel Oitavem, and Paolo Pistone. Enumerating error bounded polytime algorithms through arithmetical theories. In *32nd EACSL Annual Conference on Computer Science Logic, CSL 2024, February 19-23, 2024, Naples, Italy*, volume 288 of *LIPIcs*, pages 10:1–10:19. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2024.

[4] **Ugo Dal Lago** and Gabriele Vanoni. (not so) boring abstract machines. In *Proceedings of the 24th Italian Conference on Theoretical Computer Science, Palermo, Italy, September 13-15, 2023*, volume 3587 of *CEUR Workshop Proceedings*, pages 225–240. CEUR-WS.org, 2023.

[5] **Ugo Dal Lago**, Naohiko Hoshino, and Paolo Pistone. On the lattice of program metrics. In *8th International Conference on Formal Structures for Computation and Deduction, FSCD 2023, July 3-6, 2023, Rome, Italy*, volume 260 of *LIPIcs*, pages 20:1–20:19. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2023.

[6] **Ugo Dal Lago**, Francesco Gavazzo, and Alexis Ghyselen. Open higher-order logic. In *31st EACSL Annual Conference on Computer Science Logic, CSL 2023, February 13-16, 2023, Warsaw, Poland*, volume 252 of *LIPIcs*, pages 17:1–17:17. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2023.

[7] **Ugo Dal Lago**, Furio Honsell, Marina Lenisa, and Paolo Pistone. On quantitative algebraic higher-order theories. In *7th International Conference on Formal Structures for Computation and Deduction, FSCD 2022, August 2-5, 2022, Haifa, Israel*, volume 228 of *LIPIcs*, pages 4:1–4:18. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2022.

[8] **Ugo Dal Lago** and Giulia Giusti. On session typing, probabilistic polynomial time, and cryptographic experiments. In *33rd International Conference on Concurrency Theory, CONCUR 2022, September 12-16, 2022, Warsaw, Poland*, volume 243 of *LIPIcs*, pages 37:1–37:18. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2022.

[9] Andrea Colledan and **Ugo Dal Lago**. On dynamic lifting and effect typing in circuit description languages. In *28th International Conference on Types for Proofs and Programs, TYPES 2022, June 20-25, 2022, LS2N, University of Nantes, France*, volume 269 of *LIPIcs*, pages 3:1–3:21. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2022.

[10] Gilles Barthe, **Ugo Dal Lago**, Giulio Malavolta, and Itsaka Rakotonirina. Tidy: Symbolic verification of timed cryptographic protocols. In *Proceedings of the 2022 ACM SIGSAC Conference on Computer and Communications Security, CCS 2022, Los Angeles, CA, USA, November 7-11, 2022*, pages 263–276. ACM, 2022.

[11] Melissa Antonelli, **Ugo Dal Lago**, and Paolo Pistone. Curry and howard meet borel. In *Logic in Computer Science, 37th Annual ACM/IEEE Symposium (LICS 2022), Proceedings*, pages 45:1–45:13. ACM, 2022.

[12] Beniamino Accattoli, **Ugo Dal Lago**, and Gabriele Vanoni. Reasonable space for the λ-calculus, logarithmically. In *Logic in Computer Science, 37th Annual ACM/IEEE Symposium (LICS 2022), Proceedings*, pages 47:1–47:13. ACM, 2022.

[13] **Ugo Dal Lago**, Reinhard Kahle, and Isabel Oitavem. A recursion-theoretic characterization of the probabilistic class PP. In *Mathematical Foundations of Computer Science, 46th International Symposium (MFCS 2021), Proceedings*, volume 202 of *LIPIcs*, pages 35:1–35:12. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2021.

[14] **Ugo Dal Lago** and Francesco Gavazzo. Resource transition systems and full abstraction for linear higher-order effectful programs. In *Formal Structures for Computation and Deduction, 6th International Conference (FSCD 2021), Proceedings*, volume 195 of *LIPIcs*, pages 23:1–23:19. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2021.

[15] Melissa Antonelli, **Ugo Dal Lago**, and Paolo Pistone. On measure quantifiers in first-order arithmetic. In *Computability in Europe, 17th Conference (CiE 2021), Proceedings*, volume 12813 of *Lecture Notes in Computer Science*, pages 12–24. Springer, 2021.

[16] Beniamino Accattoli, **Ugo Dal Lago**, and Gabriele Vanoni. The space of interaction. In *Logic in Computer Science, 36th Annual ACM/IEEE Symposium on (LICS 2021), Proceddings*, pages 1–13. IEEE, 2021.

[17] **Ugo Dal Lago**, Giulio Guerrieri, and Willem Heijltjes. Decomposing probabilistic lambda-calculi. In *Foundations of Software Science and Computation Structures, 23rd International Conference (FOSSACS 2020), Proceedings*, volume 12077 of *Lecture Notes in Computer Science*, pages 136–156. Springer, 2020.

[18] **Ugo Dal Lago** and Francesco Gavazzo. Differential logical relations part II: increments and derivatives. In *Theoretical Computer Science, 21st Italian Conference (ICTCS 2020), Proceedings*, volume 2756 of *CEUR Workshop Proceedings*, pages 101–114. CEUR-WS.org, 2020.

[19] Gilles Barthe, Raphaëlle Crubillé, **Ugo Dal Lago**, and Francesco Gavazzo. On the versatility of open logical relations - continuity, automatic differentiation, and a containment theorem. In *Programming Languages and Systems, 29th European Symposium (ESOP 2020), Proceedings*, volume 12075 of *Lecture Notes in Computer Science*, pages 56–83. Springer, 2020.

[20] Boaz Barak, Raphaëlle Crubillé, and **Ugo Dal Lago**. On higher-order cryptography. In *Automata, Languages, and Programming, 47th International Colloquium (ICALP 2020), Proceddings*, volume 168 of *LIPIcs*, pages 108:1–108:16. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2020.

[21] Beniamino Accattoli, **Ugo Dal Lago**, and Gabriele Vanoni. The machinery of interaction. In *Principles and Practice of Declarative Programming, 22nd International Symposium (PPDP 2020), Proceedings*, pages 4:1–4:15. ACM, 2020.

[22] **Ugo Dal Lago** and Thomas Leventis. On the taylor expansion of probabilistic lambda-terms. In *Formal Structures for Computation and Deduction, 4th International Conference (FSCD 2019), Proceedings*, volume 131 of *LIPIcs*, pages 13:1–13:16. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2019.

[23] **Ugo Dal Lago** and Naohiko Hoshino. The geometry of bayesian programming. In *Logic in Computer Science, 34th Annual ACM/IEEE Symposium (LICS 2019), Proceedings*, pages 1–13. IEEE, 2019.

[24] **Ugo Dal Lago**, Francesco Gavazzo, and Akira Yoshimizu. Differential logical relations, part I: the simply-typed case. In *Automata, Languages, and Programming, 46th International Colloquium (ICALP 2019), Proceedings*, volume 132 of *LIPIcs*, pages 111:1–111:14, 2019.

[25] **Ugo Dal Lago** and Francesco Gavazzo. Effectful normal form bisimulation. In *Programming Languages and Systems, 28th European Symposium, (ESOP 2019), Proceedings*, volume 11423 of *Lecture Notes in Computer Science*, pages 263–292. Springer, 2019.

[26] Naoki Kobayashi, **Ugo Dal Lago**, and Charles Grellois. On the termination problem for probabilistic higher-order recursive programs. In *Logic in Computer Science, 34th Annual ACM/IEEE Symposium (LICS 2019), Proceedings*, pages 1–14. IEEE, 2019.

[27] Martin Avanzini, **Ugo Dal Lago**, and Alexis Ghyselen. Type-based complexity analysis of probabilistic functional programs. In *Logic in Computer Science, 34th Annual ACM/IEEE Symposium (LICS 2019), Proceedings*, pages 1–13. IEEE, 2019.

[28] Martin Avanzini, **Ugo Dal Lago**, and Akihisa Yamada. On probabilistic term rewriting. In *Functional and Logic Programming, 14th International Symposium (FLOPS 2018), Proceedings*, volume 10818 of *Lecture Notes in Computer Science*, pages 132–148. Springer, 2018.

[29] **Ugo Dal Lago**, Ryo Tanaka, and Akira Yoshimizu. The geometry of concurrent interaction: Handling multiple ports by way of multiple tokens. In *Logic in Computer Science, 32nd Annual ACM/IEEE Symposium (LICS 2017), Proceedings*, pages 1–12. IEEE Computer Society, 2017.

[30] **Ugo Dal Lago** and Charles Grellois. Probabilistic termination by monadic affine sized typing. In *Programming Languages and Systems, 26th European Symposium (ESOP 2017), Proceedings*, volume 10201 of *Lecture Notes in Computer Science*, pages 393–419. Springer, 2017.

[31] **Ugo Dal Lago**, Francesco Gavazzo, and Paul Blain Levy. Effectful applicative bisimilarity: Monads, relators, and howe's method. In *Logic in Computer Science, 32nd Annual ACM/IEEE Symposium (LICS 2017), Proceedings*, pages 1–12. IEEE Computer Society, 2017.

[32] **Ugo Dal Lago**, Claudia Faggian, Benoît Valiron, and Akira Yoshimizu. The geometry of parallelism: classical, probabilistic, and quantum effects. In *Principles of Programming Languages, 44th ACM SIGPLAN Symposium (POPL 2017), Proceedings*, pages 833–845. ACM, 2017.

[33] Raphaëlle Crubillé and **Ugo Dal Lago**. Metric reasoning about λ-terms: The general case. In *Programming Languages and Systems, 26th European Symposium (ESOP 2017), Proceedings*, volume 10201 of *Lecture Notes in Computer Science*, pages 341–367. Springer, 2017.

[34] Flavien Breuvart, **Ugo Dal Lago**, and Agathe Herrou. On higher-order probabilistic subrecursion. In *Foundations of Software Science and Computation Structures, 20th International Conference (FoSSaCS 2017), Proceedings*, volume 10203 of *Lecture Notes in Computer Science*, pages 370–386, 2017.

[35] **Ugo Dal Lago**. Infinitary lambda calculi from a linear perspective. In *Logic in Computer Science, 31st Annual ACM/IEEE Symposium (LICS 2016), Proceedings*, pages 447–456. ACM, 2016.

[36] Johannes Borgström, **Ugo Dal Lago**, Andrew D. Gordon, and Marcin Szymczak. A lambda-calculus foundation for universal probabilistic programming. In *Functional Programming, 21st ACM SIGPLAN International Conference (ICFP 2017), Proceedings*, pages 33–46. ACM, 2016.

[37] **Ugo Dal Lago**, Claudia Faggian, Benoît Valiron, and Akira Yoshimizu. Parallelism and synchronization in an infinitary context. In *Logic in Computer Science, 30th Annual IEEE Symposium (LICS 2015), Proceedings*, pages 559–572. IEEE Computer Society, 2015.

[38] Yuxin Deng, Yuan Feng, and **Ugo Dal Lago**. On coinduction and quantum lambda calculi. In *Concurrency Theory, 26th International Conference (CONCUR 2015), Proceedings*, volume 42 of *LIPIcs*, pages 427–440, 2015.

[39] Raphaëlle Crubillé and **Ugo Dal Lago**. Metric reasoning about λ-terms: The affine case. In *Logic in Computer Science, 30th Annual IEEE Symposium (LICS 2015), Proceedings*, pages 633–644. IEEE Computer Society, 2015.

[40] Patrick Baillot, Gilles Barthe, and **Ugo Dal Lago**. Implicit computational complexity of subrecursive definitions and applications to cryptographic proofs. volume 9450 of *Lecture Notes in Computer Science*, pages 203–218. Springer, 2015.

[41] Martin Avanzini, **Ugo Dal Lago**, and Georg Moser. Analysing the complexity of functional programs: higher-order meets first-order. In *Functional Programming, 20th ACM SIGPLAN International Conference (ICFP 2015), Proceedings*, pages 152–164. ACM, 2015.

[42] Martin Avanzini and **Ugo Dal Lago**. On sharing, memoization, and polynomial time. In *Theoretical Aspects of Computer Science, 32nd International Symposium, Proceedings*, volume 30 of *LIPIcs*, pages 62–75. Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, 2015.

[43] Akira Yoshimizu, Ichiro Hasuo, Claudia Faggian, and **Ugo Dal Lago**. Measurements in proof nets as higher-order quantum circuits. In *Programming Languages and Systems, 23rd European Symposium, Proceedings*, volume 8410 of *LNCS*, pages 371–391. Springer, 2014.

[44] **Ugo Dal Lago** and Sara Zuppiroli. Probabilistic recursion theory and implicit computational complexity. In *Theoretical Aspects of Computing, 11th International Colloquium, Proceedings*, volume 8687 of *LNCS*, pages 97–114. Springer, 2014.

[45] **Ugo Dal Lago**, Davide Sangiorgi, and Michele Alberti. On coinductive equivalences for higher-order probabilistic functional programs. In *Principles of Programming Languages, 41st Annual Symposium, Proceedings*, pages 297–308. ACM, 2014.

[46] **Ugo Dal Lago**, Claudia Faggian, Ichiro Hasuo, and Akira Yoshimizu. The geometry of synchronization. In *Twenty-Third Annual Conference on Computer Science Logic and Twenty-Ninth Annual Symposium on Logic in Computer Science, Proceedings*, page 35, 2014.

[47] Raphaëlle Crubillé and **Ugo Dal Lago**. On probabilistic applicative bisimulation and call-by-value λ-calculi. In *Programming Languages and Systems, 23rd European Symposium, Proceedings*, volume 8410 of *LNCS*, pages 209–228. Springer, 2014.

[48] Beniamino Accattoli and **Ugo Dal Lago**. Beta reduction is invariant, indeed. In *Twenty-Third Annual Conference on Computer Science Logic and Twenty-Ninth Annual Symposium on Logic in Computer Science, Proceedings*, page 8, 2014.

[49] **Ugo Dal Lago** and Barbara Petit. The geometry of types. In *Principles of Programming Languages, 40th Annual Symposium, Proceedings*, pages 167–178. ACM, 2013.

[50] **Ugo Dal Lago** and Giulio Pellitta. Complexity analysis in presence of control operators and higher-order functions. In *Logic for Programming, Artificial Intelligence, and Reasoning, 19th International Conference, Proceedings*, volume 8312 of *LNCS*, pages 258–273. Springer, 2013.

[51] Patrick Baillot and **Ugo Dal Lago**. Higher-order interpretations and program complexity. In *Computer Science Logic, 26th International Workshop, Proceedings*, volume 16 of *LIPIcs*, pages 62–76. Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, 2012.

[52] Beniamino Accattoli and **Ugo Dal Lago**. On the invariance of the unitary cost model for head reduction. In *Rewriting Techniques and Applications, 23rd International Conference, Proceedings*, volume 15 of *LIPIcs*, pages 22–37. Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, 2012.

[53] **Ugo Dal Lago** and Paolo Parisen Toldin. A higher-order characterization of probabilistic polynomial time. In *Foundational and Practical Aspects of Resource Analysis, Second International Workshop, Revised Selected Papers*, volume 7177 of *LNCS*, pages 1–18. Springer, 2011.

[54] **Ugo Dal Lago** and Marco Gaboardi. Linear dependent types and relative completeness. In *Logic in Computer Science, 26th International Symposium, Proceedings*, pages 133–142. IEEE Computer Society, 2011.

[55] **Ugo Dal Lago** and Ulrich Schöepp. Functional programming in sublinear space. In *Programming Languages and Systems, 19th European Symposium, Proceedings*, volume 6012 of *LNCS*, pages 205–225. Springer, 2010.

[56] **Ugo Dal Lago** and Simone Martini. On constructor rewrite systems and the lambda-calculus. In *International Conference on Automata, Languages and Programming, Proceedings*, volume 5556 of *LNCS*, pages 163–174. Springer, 2009.

[57] **Ugo Dal Lago** and Simone Martini. Derivational complexity is an invariant cost model. In *Foundational and Practical Aspects of Resource Analysis, First International Workshop, Revised Selected Papers*, volume 6324 of *LNCS*, pages 100–113. Springer, 2009.

[58] **Ugo Dal Lago** and Martin Hofmann. Bounded linear logic, revisited. In *Typed Lambda Calculi and Applications, 9th International Conference, Proceedings*, volume 5608 of *LNCS*, pages 80–94. Springer, 2009.

[59] **Ugo Dal Lago** and Olivier Laurent. Quantitative game semantics for linear logic. In *Computer Science Logic, 22nd International Workshop, Proceedings*, LNCS. Springer, 2008. To appear.

[60] **Ugo Dal Lago**, Angelo Montanari, and Gabriele Puppis. On the equivalence of automaton-based representations of time granularities. In *14th International Symposium on Temporal Representation and Reasoning, Proceedings*, pages 82–93. IEEE Computer Society, 2007.

[61] Patrick Baillot, Paolo Coppola, and **Ugo Dal Lago**. Light logics and optimal reduction: Completeness and complexity. In *Logic in Computer Science, 22nd International Symposium, Proceedings*, pages 421–430. IEEE Computer Society, 2007.

[62] **Ugo Dal Lago** and Simone Martini. An invariant cost model for the lambda calculus. In *Logical Approaches to Computational Barriers, Second Conference on Computability in Europe*, volume 3988 of *LNCS*, pages 105–114. Springer, 2006.

[63] **Ugo Dal Lago**. Context semantics, linear logic and computational complexity. In *Logic in Computer Science, 21th International Symposium, Proceedings*, pages 169–178. IEEE Computer Society, 2006. Winner of the 2006 Kleene Award for the best student paper presented at the LICS conference.

[64] **Ugo Dal Lago** and Martin Hofmann. Quantitative models and implicit complexity. In *Foundations of Software Technology and Theoretical Computer Science, Proceedings*, volume 3821 of *LNCS*, pages 189–200. Springer, 2005.

[65] **Ugo Dal Lago**. The geometry of linear higher-order recursion. In *Logic in Computer Science, 20th International Symposium, Proceedings*, pages 366–375. IEEE Computer Society, 2005.

[66] Paolo Coppola, **Ugo Dal Lago**, and Simona Ronchi Della Rocca. Elementary affine logic and the call-by-value lambda calculus. In *Typed Lambda Calculi and Applications, 7th International Conference, Proceedings*, volume 3461 of *LNCS*, pages 131–145. Springer, 2005.

[67] **Ugo Dal Lago**, Marco Pistore, and Paolo Traverso. Planning with a language for extended goals. In *Eighteenth National Conference of Artificial Intelligence, Proceedings*, pages 447–454. AAAI Press, 2002.

[68] **Ugo Dal Lago** and Angelo Montanari. Calendars, time granularities and automata. In *Advances in Spatial and Temporal Databases, 7th International Symposium, Proceedings*, volume 2121 of *LNCS*, pages 279–298. Springer, 2001.