Luca Carai

Date of Birth: 20 September 1990
Citizenship: Italian
Address: Dipartimento di Matematica 'Federigo Enriques', Università degli Studi di Milano
  via Cesare Saldini 50, 20133 Milan, Italy.
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PROFESSIONAL EXPERIENCE

Ricercatore a tempo determinato di tipo A (RTDA). Università degli Studi di Milano, Italy.
September 2023 – ongoing

Juan de la Cierva fellowship. Universitat de Barcelona, Spain. December 2022 – August 2023

Postdoctoral researcher. Università degli Studi di Salerno, Italy. July 2021 – November 2022

EDUCATION

Ph.D.
Mathematics
New Mexico State University, Las Cruces, USA
Advisor: Prof. Guram Bezhanishvili
Thesis: "New directions in duality theory for modal logic"
August 2017–May 2021

Master's degree
Mathematics
Università degli Studi di Milano, Milan, Italy
Advisor: Prof. Silvio Ghilardi
Thesis: "Model completion of varieties of Heyting algebras and Brouwerian semilattices"
October 2014–December 2016
Final grade: 110/110 cum Laude

PUBLICATIONS

PUBLISHED/ACCEPTED

1. G. Bezhanishvili, L. Carai, and P. J. Morandi, *Heyting frames and Esakia duality*, accepted for publication in Algebra Universalis (2023).

2. G. Bezhanishvili, L. Carai, P. J. Morandi, *A New Proof of the Joyal-Tierney Theorem*, accepted for publication in Cahiers de Topologie et Géométrie Différentielle Catégoriques (2023).

3. M. Abbadini, G. Bezhanishvili, and L. Carai, *A generalization of de Vries duality to closed relations between compact Hausdorff spaces*, Topology Appl. **337** (2023), Paper No. 108641

4. G. Bezhanishvili, L. Carai, P. J. Morandi, and B. Olberding, *A unified approach to Gelfand and de Vries dualities*, Forum Math. **35** (2023), no. 3, 647–676.

5. G. Bezhanishvili, L. Carai, P. J. Morandi, and B. Olberding, *De Vries powers and proximity Specker algebras*, Appl. Categ. Structures **31** (2023), no. 3, Paper No. 24.

6. N. Bezhanishvili, L. Carai, S. Ghilardi, and L. Landi, *Admissibility of Π_2-inference rules: interpolation, model completion, and contact algebras*, Ann. Pure Appl. Logic **174** (2023), no. 1, Paper No. 103169.

7. G. Bezhanishvili, L. Carai, and P. Morandi, *A Point-Free Approach to Canonical Extensions of Boolean Algebras and Bounded Archimedean ℓ-Algebras*, Order **40** (2023), no. 2, 257–287.

8. G. Bezhanishvili, L. Carai, and P. J. Morandi, *Duality for powerset coalgebras*, Log. Methods Comput. Sci. **18** (2022), no. 1.

9. G. Bezhanishvili and L. Carai, *Temporal interpretation of monadic intuitionistic quantifiers*, Rev. Symb. Log. **16** (2023), no. 1, 164-187.

10. G. Bezhanishvili, L. Carai, and P. J. Morandi, *Modal operators on rings of continuous functions*, J. Symb. Log. **87** (2022), no. 4, 1322–1348.

11. G. Bezhanishvili, L. Carai, and P. J. Morandi, *The Vietoris functor and modal operators on rings of continuous functions*, Ann. Pure Appl. Log. **173** (2022), no. 1, 103029.

12. G. Bezhanishvili, L. Carai, and P. J. Morandi, *Free bounded archimedean ℓ-algebras*, Appl. Categ. Struct. **29** (2021), no. 5, 879–888.

13. G. Bezhanishvili, N. Bezhanishvili, L. Carai, D. Gabelaia, S. Ghilardi, and M. Jibladze, *Diego's theorem for nuclear implicative semilattices*, Indag. Math. (N.S.) **32** (2021), no. 2, 498–535.

14. G. Bezhanishvili and L. Carai, *Temporal interpretation of intuitionistic quantifiers*, Advances in Modal Logic (Nicola Olivetti, Rineke Verbrugge, Sara Negri, and Gabriel Sandu, eds.), vol. 13, College Publications, 2020, pp. 95–114.

15. L. Carai and S. Ghilardi, *Existentially closed Brouwerian semilattices*, J. Symb. Log. **84** (2019), no. 4, 1544–1575.

16. G. Bezhanishvili and L. Carai, *Characterization of metrizable Esakia spaces via some forbidden configurations*, Algebra Univers. **80** (2019), no. 4, Paper No. 42, 18.

SUBMITTED

17. M. Abbadini, G. Bezhanishvili, and L. Carai, *Ideal and MacNeille completions of subordination algebras*, submitted, preprint available at arXiv:2211.02974, 2022.

18. G. Bezhanishvili, L. Carai, and P. J. Morandi, *Deriving Priestley duality and its generalizations from Pontryagin duality for semilattices*, submitted, preprint available at arXiv:2207.13938, 2022.

19. M. Abbadini, G. Bezhanishvili, and L. Carai, *Vietoris endofunctor for closed relations and its de Vries dual*, submitted, preprint available at arXiv:2308.16823, 2023.

PRESENTATIONS

INVITED TALKS

- *Baker-Beynon duality beyond semisimplicity*
  Algebra Week 2023, Siena, Italy, 4–7 July 2023.

- *Dualities for abelian ℓ-groups and vector lattices beyond archimedeanity*
  AMS Spring Western Sectional Meeting, Algebraic Logic session, 14–15 May 2022, online.

- *Dualities for abelian ℓ-groups and vector lattices beyond archimedeanity*
  Ordered Algebras and Logic, Les Diablerets, Switzerland, 30 March–2 April 2022.

- *Connecting dualities for compact Hausdorff spaces*
  DOCToR workshop, 7–9 July 2021, online.

- *Coalgebras for the powerset functor and Thomason duality*
  2021 North American Annual Meeting of the ASL, 22–25 June 2021, online.

- *Esakia's theorem in the monadic setting*
  BLAST 2021, Las Cruces, USA, 9–13 June 2021, online.

CONTRIBUTED TALKS

- *Ideal and MacNeille completions of subordination algebras*
  LATD 2023, Tbilisi, Georgia, 11–15 September 2023.
- *Modal companions of monadic intuitionistic logic*
  XXII Congresso UMI, Pisa, Italy, 4–9 September 2023.
- *Deriving Priestley and Esakia dualities and their generalizations from Pontryagin duality for semilattices*
  Logic Colloquium 2023, Milan, Italy, 5–9 June 2023.
- *Admissibility of Π_2-Inference Rules: interpolation, model completion, and contact algebras*
  TACL 2022, Coimbra, Portugal, 20–24 June 2022.
- *Admissibility of Π_2-Inference Rules: interpolation, model completion, and contact algebras*
  Logic4Peace, Amsterdam, Netherlands, 22–23 April 2022, online.
- *Temporal interpretation of intuitionistic quantifiers*
  AiML 2020, Helsinki, Finland, 24–28 August 2020, online.
- *Modal operators on rings of continuous functions*
  25th Joint UTEP/NMSU Workshop, El Paso, USA, 2 November 2019.
- *A temporal interpretation of intuitionistic quantifiers*
  TACL 2019, Nice, France, 17–21 June 2019.
- *Characterization of metrizable Esakia spaces via some forbidden configurations*
  SYSMICS 2019, Amsterdam, Netherlands, 21–25 January 2019.
- *Existentially closed Brouwerian semilattices*
  TACL 2017, Prague, Czech Republic, 26–30 June 2017.

SEMINAR TALKS

- *Subordination algebras and closed relations between compact Hausdorff spaces*
  Seminari Lògiques No-Clàssiques, University of Barcelona, Spain, 10 May 2023.
- *Baker-Beynon and Marra-Spada dualities beyond semisimplicity*
  Università degli Studi di Salerno, Salerno, Italy, 6 May 2022.
- *Dualities for MV-algebras*
  Università degli Studi di Campania Luigi Vanvitelli, Caserta, Italy, 11 March 2022.
- *Modal operators on rings of continuous functions*
  Nonclassical Logic Webinar, University of Denver, USA, 20 November 2020, online.
- *Temporal interpretation of intuitionistic quantifiers*
  Algebra|Coalgebra Seminar, University of Amsterdam, Netherlands, 10 June 2020, online.
- *A Generalization of Gelfand Duality to compact Hausdorff spaces with continuous relations*
  Algebra seminar, New Mexico State University, Las Cruces, USA, 30 September 2019.
- *Characterization of metrizable Esakia spaces via some forbidden configurations*
  Algebra seminar, New Mexico State University, Las Cruces, USA, 15, 22 October 2018.

SUMMER SCHOOLS

- *TACL 2019 Summer School*, Île de Porquerolles, France, 10–15 June 2019.
- *SYSMICS Summer School*, Les Diablerets, Switzerland, 22–26 August 2018.
- *TACL 2017 Summer School*, Olomouc, Czech Republic, 20–24 June 2017.
- *Scuola Estiva di Logica*, Gargnano, Italy, 21–27 August 2016.
- *Scuola Estiva di Logica*, Gargnano, Italy, 23–29 August 2015.

TEACHING

- *Matematica I*, Spring 2022, Università degli Studi di Salerno.
- *Matrix Theory and Applied Linear Algebra*, Fall 2020 and Spring 2021, New Mexico State University.
- *Introduction to Ordinary Differential Equations*, Fall 2019 and Spring 2020, New Mexico State University.
- *Calculus I*, Spring 2019, New Mexico State University.
- *Trigonometry and pre-calculus*, Fall 2018, New Mexico State University.
- Teaching assistant for *Calculus II Honors* by G. Bezhanishvili, Spring 2018 and Spring 2021, New Mexico State University.

TUTORING

- *Matematica I* by M. Abbadini and S. Lapenta, Fall 2021, Università degli Studi di Salerno.
- *Introduction to Real Analysis II* by T. Giorgi, Spring 2018, New Mexico State University.
- *Introduction to Real Analysis I* by T. Giorgi, Fall 2017, New Mexico State University.
- *Algebra I* by P. J. Morandi, Fall 2017, New Mexico State University.

OTHER ACTIVITIES

- Reviewer for: Journal of Logic and Computation: Non-Classical Logics corner, Advances in Modal Logic (AiML), Foundations of Software Science and Computation Structures (FoSSaCS), Logic Journal of the IGPL, Studia Logica, Communications in Algebra, Mathematical Logic Quarterly, Algebra Universalis, Bulletin of the Iranian Mathematical Society, Mathscinet.
- Co-supervisor, with L. Spada, of the bachelor's thesis of A. Cardone at the University of Salerno, December 2022.
- Member of the organizing committee of LATD 2022 and the MOSAIC kick off meeting, Paestum, Italy, September 2022.
- Member of the organizing committee of BLAST 2021, Las Cruces, USA, June 2021, online.

AWARDS AND SCHOLARSHIPS

- *Arts and Sciences Outstanding Graduate Award* from New Mexico State University, Spring 2021.
- *Kist award: oustanding graduate student award in research* from Department of Mathematical Sciences of New Mexico State University, Fall 2020.
- *Graduate Tuition Fellowship* from New Mexico State University, Fall 2018–Spring 2021.
- *Joseph E. Kist Graduate Studies Fund* from Department of Mathematical Sciences of New Mexico State University, Spring 2020–Spring 2021.

September 2023