

# Luca Carai

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## PROFESSIONAL EXPERIENCE

*Postdoctoral researcher.* Università degli Studi di Salerno, Italy. July 2021 – ongoing

## 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. N. Bezhanishvili, L. Carai, S. Ghilardi, and L. Landi, *Admissibility of  $\Pi_2$ -Inference Rules: interpolation, model completion, and contact algebras*, Ann. Pure Appl. Log. 174 (2023), no. 1, 103169.
2. G. Bezhanishvili, L. Carai, and P. J. Morandi, *A point-free approach to canonical extensions of boolean algebras and bounded archimedean  $\ell$ -algebras*, accepted for publication in Order (2022), DOI: 10.1007/s11083-022-09609-3
3. G. Bezhanishvili, L. Carai, and P. J. Morandi, *Duality for powerset coalgebras*, Log. Methods Comput. Sci. **18** (2022), no. 1.
4. G. Bezhanishvili and L. Carai, *Temporal interpretation of monadic intuitionistic quantifiers*, accepted for publication in the Review of Symbolic Logic (2022), DOI: 10.1017/S1755020321000496
5. G. Bezhanishvili, L. Carai, and P. J. Morandi, *Modal operators on rings of continuous functions*, accepted for publication in the Journal of Symbolic Logic (2022), DOI: 10.1017/jsl.2021.83
6. 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.
7. G. Bezhanishvili, L. Carai, and P. J. Morandi, *Free bounded archimedean  $\ell$ -algebras*, Appl. Categ. Struct. **29** (2021), no. 5, 879–888.
8. 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.

9. 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.
10. L. Carai and S. Ghilardi, *Existentially closed Brouwerian semilattices*, J. Symb. Log. **84** (2019), no. 4, 1544–1575.
11. 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

12. 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.
13. M. Abbadini, G. Bezhanishvili, and L. Carai, *A generalization of de Vries duality to closed relations between compact Hausdorff spaces*, submitted, preprint available at arXiv:2206.05711, 2022.
14. G. Bezhanishvili, L. Carai, P. J. Morandi, and B. Olberding, *A Unified Approach to Gelfand and de Vries Dualities*, submitted, preprint available at arXiv:2203.13795, 2022.
15. G. Bezhanishvili, L. Carai, P. J. Morandi, and B. Olberding, *De Vries powers and proximity Specker algebras*, submitted, preprint available at arXiv:2201.04423, 2022.

## PRESENTATIONS

### INVITED TALKS

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

- *Admissibility of  $\Pi_2$ -Inference Rules: interpolation, model completion, and contact algebras*  
TACL 2022, Coimbra, Portugal, 20–24 June 2022.
- *Admissibility of  $\Pi_2$ -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

- *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, Mathscinet.
- 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: outstanding 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.

November 2022

A handwritten signature in black ink, consisting of stylized, flowing letters that appear to be 'L' and 'C' followed by a period.