

Alessio Santamaria

Curriculum Vitæ

Department of Informatics
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A Lecturer in Computer Science with a solid research background and teaching experience. I am interested in an academic position involving research and teaching in equal amounts.

Education

- 2015–2019 **PhD in Computer Science, University of Bath**
Thesis: *Towards a Godement Calculus for Dinatural Transformations*, examined by Prof Alex Simpson and Dr Willem Heijltjes. The main contribution is to provide a solution for the compositionality problem of dinatural transformations. Supervisors: Prof Guy McCusker, Dr Alessio Guglielmi.
- 2013–2015 **Master's Degree (Laurea Magistrale) in Mathematics, Università di Genova**, grade 110/110 cum laude
Dissertation: *Frames and Equilogical Spaces*. A research dissertation about showing how Frames are algebras for Equilogical Spaces via a Stone Duality-like theorem. Supervisor Prof Giuseppe Rosolini.
- 2010–2013 **Bachelor's Degree (Laurea) in Mathematics, Università di Genova**
Dissertation: *Borel and Lebesgue σ -algebras*. Supervisor Prof Giancarlo Mauceri.

Awards and funding

- 2021 **Best paper award, FoSSaCS 2021**
We were invited to submit a journal version of our article to a special issue of Logical Methods in Computer Science devoted to the best FoSSaCS papers.
- Apr 2019 **Postgraduate Teacher of the Year Award, University of Bath**
- Apr 2018 The Award is given by the University of Bath Students' Union every year since 2018. Quotes from the nominations include: "Alessio goes out of his way to explain each concept that students must learn, providing multiple examples and ensuring that students understand before moving on" and "Without his astounding tutorials, I doubt I could have understood half of the course materials I do now".
- 2015–2019 **University Research Studentship Award (URSA), University of Bath**
The University's studentship funded my PhD for 3.5 years, paying all fees, providing a training support fund and a living allowance.

Research experience

My research focuses on the study of algebraic structures arising from the semantics of programming languages.

Employment history

- Jan 2023– **Lecturer in Computer Science**, *University of Sussex*
Part of the Foundation of Software Systems research group. This permanent position involves teaching and research in equal proportions.
- Mar 2020–Dec 2022 **Assegnista di Ricerca**, *Università di Pisa*
Part of the Analysis for Program Analyses project (PRIN 2017), under the lead of Prof Filippo Bonchi. Currently developing a novel graphical language for freely generated bimonoidal categories. Previously I worked on algebraic approaches to categorical logic; I also studied categorical tools for the semantics of automata with non-determinism and quantitative features and possible connections between coinduction up-to techniques and abstract interpretation.
- Aug 2019– **Postdoctoral Research Assistant**, *Queen Mary, University of London*
- Feb 2020 Part of the Interface Reasoning for Interactive Systems project (<https://gow.epsrc.ukri.org/NGBOViewGrant.aspx?GrantRef=EP/R006865/1>), under the lead of Prof Edmund Robinson. We described different kinds of bisimulations of transition systems as instances of logical relations.

Publications

- Bonchi, F., Di Giorgio, A., and Santamaria, A., 2023. *Deconstructing the Calculus of Relations with Tape Diagrams*. Proceedings of the ACM on Programming Languages, Volume 7, Issue POPL.
- Bonchi, F. and Santamaria, A., 2022 *Convexity via Weak Distributive Laws*. Logical Methods in Computer Science, Volume 18, Issue 4 (special issue devoted to the best FoSSaCS 2021 papers).
- Hermida, C., Reddy, U., Robinson, E. and Santamaria, A., 2022. *Bisimulation as a Logical Relation*. Mathematical Structures in Computer Science, Volume 32, Special Issue 4: The Power Festschrift.
- Bonchi, F., Seeber, J., Sobocinski, P. and Santamaria, A., 2021. *On Doctrines and Cartesian Bicategories*. 9th Conference on Algebra and Coalgebra in Computer Science (CALCO 2021).
- Bonchi, F. and Santamaria, A., 2021. *Combining Semilattices and Semimodules*. 24th International Conference in Foundations of Software Science and Computation Structures (FoSSaCS 2021).
- McCusker, G. and Santamaria, A., 2021. *Composing Dinatural Transformations: Towards a Calculus of Substitution*. Journal of Pure and Applied Algebra, Volume 225, Issue 10. Extract from my PhD thesis, with enhancements of some results.
- Santamaria, A., 2019. *Towards a Godement Calculus for Dinatural Transformations*. University of Bath, PhD thesis.
- Frosoni, G., Rosolini, G. and Santamaria, A., 2019. *Frames and Topological Algebras for a Double-Power Monad*. Journal of Logic and Analysis, Volume 11. Part of this paper is an extract of my Master's dissertation.
- McCusker, G. and Santamaria, A., 2018. *On Compositionality of Dinatural Transformations*. 27th EACSL Annual Conference on Computer Science Logic (CSL 2018).

Conferences and presentations

- Jan 2023 POPL conference, Boston, USA (attended, with publication)
- Jun 2022 Workshop in New Ideas on Effects, Types, and Sharing, Bath, UK (presented)
- Sep 2021 CALCO 2021 conference, Salzburg, Austria (presented)
- Mar 2021 FOSSACS 2021 conference, online (presented)
- Jul 2020 ItaCaFest, online (presented)
- Jul 2019 Category Theory 2019 conference (CT2019), Edinburgh (presented)
- Sep 2018 CSL2018 conference, Birmingham (presented)
- Mar 2018 Compositional Methods for Network Diagrams and Component-Based Systems workshop, Barbados (presented)
- Sep 2017 First Workshop on String Diagrams in Computation, Logic, and Physics (STRING2017), Oxford (presented)
- Jun 2016 Oregon Programming Languages Summer School, Eugene, USA (attended)
- May 2016 Proof, Computation and Complexity workshop 2016, Munich (presented)
- Apr 2016 Midlands Graduate School 2016, Birmingham (attended)

Teaching experience

- 2023– **Lecturer in Computer Science, *University of Sussex***
I am the assessment and module convenor of the Data Structures and Algorithms course, which enrolls about 240 students.
- 2021 **Foundations of Computing Lecturer, *University of Pisa***
I replaced the main lecturer for thirty hours in his 1st year Computer Science unit. Lectures were both online and in person addressing about 120 students.
- 2016–2019 **Teaching Assistant, *University of Bath***
 - Delivering small-class tutorials and labs six hours per week in the following units in Computer Science:
 - Discrete Mathematics for Computation (1st year)
 - Analytical Mathematics for Applications (1st year)
 - Principles of Programming 1 (1st year)
 - Functional Programming (2nd year)
 - Running on occasion one-to-one tutorials with students needing specific help
 - Marking coursework in all the units above

Administrative experience

- 2018–2019 **Departmental Seminars organiser**
Part of the organising committee of the internal departmental seminars in Computer Science at the University of Bath. That year we revamped the seminars by running them fortnightly on a fixed schedule, which involves all the PGR students in Computer Science giving a talk to the whole department.

2017–2018 **Departmental Doctoral Students Conference organiser**

Part of the organising committee of the annual internal postgraduate research students conference BCCS (Bath Conference in Computer Science).

2017–2018 **Mathematical Foundations Seminar organiser**

I organised the seminars for my research group, Mathematical Foundations, in the department. They happened weekly and involved both students and staff, including external speakers.