

# Alessio Santamaria

## Curriculum Vitæ

Dipartimento di Informatica  
Università degli Studi di Pisa  
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A PhD in Computer Science with solid research background and teaching experience. I am interested in pursuing an academic career that involves a strong component of research and teaching.

### 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  $\sigma$ -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

- Mar 2020– **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*. 50th ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2023).
- 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.
- 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 225 (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 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

- Jun 2022 Workshop on New Ideas in 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)
- Oct 2019 Theory Group seminar, Pisa, Italy (presented)
- Jul 2019 Category Theory 2019 conference (CT2019), Edinburgh (presented)
- May 2019 Theory Group seminar, Pisa, Italy (presented)
- Jan 2019 Theory Group seminar at Queen Mary University, London (presented)
- Sep 2018 CSL2018 conference, Birmingham (presented)
- Mar 2018 Compositional Methods for Network Diagrams and Component-Based Systems workshop, Barbados (presented)
- Oct 2017 Theory and Applications of Categories seminar, Genoa, Italy (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)
- Dec 2015 Efficient and Natural Proof Systems workshop, Bath (attended)

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## Teaching experience

- 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

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## 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 happen weekly and involve both students and staff, including external speakers.