Mario Román

Mathematics and Computer Science

Contact

Mario Román García
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References

Pedro García-Sánchez
University of Granada
pedro@ugr.es

Francisco Herrera
University of Granada
herrera@decsai.ugr.es

Carmen Constantin
University of Oxford
i.m.carmen@gmail.com

Languages

Spanish, English, Italian

Programming

Experience in **Haskell**, the proof assistants **Agda** and **Coq**, and imperative programming in **C++**.

Software

Technical knowledge of **Gnu/Linux**. Experienced user of **Emacs** and **LaTeX**.

Education

2018-2019 MSc. Mathematics and Founds. of Computer Science — University of Oxford
Candidate. Expected graduation in September 2019.

- Categories, Proofs (95/100)
- Homological Algebra (85/100)
- Quantum Comp.Sci. (81/100)
- Category Theory (91/100)

2012-2018 Bachelor degree in **Mathematics** — University of Granada
Emphasis in abstract algebra. Grade Point Average: 9.55/10.

- Calculus
- Geometry, linear algebra
- Numerical methods
- Probability
- Algebra
- Analysis and measure theory
- Topology
- Non-euclidean geometry
- Algebraic topology
- Galois theory
- Mathematical modelling
- Statistical inference
- Curves and surfaces
- Differential equations
- Number theory, criptography
- Computational algebra
- Modern algebra
- Logic, discrete mathematics

2012-2018 Bachelor degree in **Computer Science** — University of Granada
Emphasis in computation. Grade Point Average: 9.35/10

- C++ Programming
- System administration
- Computer architecture
- Operative systems
- Algorithms
- Data structures
- Object-oriented programming
- Computability theory
- Automata and languages
- Software engineering
- Information theory
- Functional programming
- Databases
- Computer graphics
- Artificial intelligence
- Metaheuristics

2015-2018 **Courses and conferences**
Attended:

- SYCO 2 - Univ. Strathclyde, on applied category theory.
- CAP Days - Siegen, on computable homological algebra and categories.
- School on Univalent Mathematics - Birmingham, on Univalent foundations.
- EUTypes Summer School, on Homotopy type theory, Agda and Coq.
- Seminar on Affine group schemes, Hopf algebras and algebroids.
- ESSLLI-Barcelona, on Logic, Languages and Computation.
- Lambda World, on functional programming.
- OrientaMat - LaTeX course, volunteering as *teaching assistant*.

2008-2012 **Estalmat** — University of Granada, Spain
A project to detect and stimulate the precocious mathematical talent.

Mathematics

2017-2018 **Category theory and λ-calculus (pdf)** — Bachelor's thesis
Advisor: Prof. Pedro A. García-Sánchez.
Prize to the best bachelor's thesis in Mathematics of the University of Granada (2017-18). On categorical semantics of lambda calculus. Studies Martin-Löf type theory as the internal language of locally closed cartesian categories. Agda is used to provide examples of formalized univalent mathematics.

2016-2017 **Koszul pairs and their applications** — unpublished
Research grant. Working with the Algebra Department on Homology theory from a categorical perspective.

Computer science projects

2016-2018 **Mikrokosmos** github.com/mroman42/mikrokosmos
Hackage: hackage.haskell.org/package/mikrokosmos
An didactic free software λ-calculus interpreter written in Haskell supporting multiple evaluation strategies and exemplifying the Curry-Howard isomorphism.

2014-2015 **GranaSAT Client** github.com/mroman42/granasatClient
Git repository: github.com/mroman42/granasatClient
Software for a satellite student experiment for the European Space Agency BEXUS campaign.

A complete portfolio can be found at https://github.com/mroman42/.

Publications

2018 **Mikrokosmos: an educational lambda calculus interpreter (pdf)**
Mario Román
DOI: 10.21105/jose.00029
The Journal of Open Source Education.

2016 **A comparison of implementations of basic evolutionary algorithm operations in different languages**
J.J. Merelo-Guervós, I. Blancas, P. Castillo, G. Romero, V. Rivas, M. García-Valdez, A. Hernández-Aguila, M. Román.
DOI: 10.1109/CEC.2016.7743980
Conference: IEEE Congress on Evolutionary Computation (CEC)

Awards and Grants

2017-2018 **Collaboration Grant (2000€)** Algebra department, University of Granada
By virtue of which I could develop my bachelor's thesis. I administered the deparment servers, developed *didactic material* and the *Mikrokosmos* interpreter, and assisted in the teaching of the course **"Logic and Programming"**.

2015-2016 **Erasmus+ Grant (5442€)** University of Milan
Exchange student at the University of Milan for a year. Studying at the department of computer science.

2012–2013 **International Mathematical Olympiad (IMO)** Argentina
National *Gold & Silver Medals* and international *Honourable mention*.

Interests

I am passionate about **category theory**, **abstract algebra**, **logic** and their applications to functional programming and proof assistants. Since I started programming with dependently typed languages such as Coq and Agda, I have become increasingly more interested in type-theoretical foundations of mathematics, categorical logic and topos theory.

I also am actively involved in the **divulgation of mathematics** and computer science at a universitary level.

2014–2018 **LibreIM** libreim.github.io/
Founder and coordinator of a community of Math&CS students. I am the main contributor to our blog and the organizer of weekly seminars where I have organized seminars about Haskell, Category theory and Constructive mathematics, among other topics.