Mario Román

Mathematics and Computer Science student

Contact

Mario Román García
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Languages

Spanish
English
Italian

Programming

Experience in **Haskell** and the proof assistants **Coq** and **Agda**; object-oriented programming and scripting in **Ruby**; and imperative programming in **C++**.

Software

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

Education

2013-2017 Bachelor degree in **Mathematics** — University of Granada, Spain
Emphasis in abstract algebra. GPA: 9.51/10.

- 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

2013-2017 Bachelor degree in **Computer Science** — University of Granada, Spain
Emphasis in computation. GPA: 9.47/10

- C++ Programming
- System administration
- Electronics
- 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
- Advanced functional prog.

Exchange student at the University of Milan (2015–2016)

2015-2017 **Courses and conferences**
Attended:

- 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.

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

Mathematical projects

2017-2018 **Category theory and λ-calculus** — Bachelor's thesis (in progress)
Bachelor thesis on the relation between type theories and categorical logic. Martin-Löf type theories are regarded as the internal language of locally closed cartesian categories and presented as a foundation of mathematics. Agda and Coq are used to prove theorems in Homotopy type theory.

2016-2017 **Koszul pairs and their applications** — unpublished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-Now **Mikrokosmos** github.com/M42/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/M42/granasatClient
Git repository: github.com/M42/granasatClient
Software for a satellite student experiment for the European Space Agency BEXUS campaign.

Publications

2016 **A comparison of implementations of basic evolutionary algorithm operations in different languages**
DOI: 10.1109/CEC.2016.7743980
Conference: IEEE Congress on Evolutionary Computation (CEC)

Awards & Grants

2017-2018 **Collaboration Grant** Algebra department, University of Granada
By virtue of which I can develop my **bachelor's thesis**, I administer the deparment servers and I develop **didactic material** and assist in the teaching of the course **"Logic and Programming"**.

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

Interests

I passionate about **logic**, **abstract algebra**, **category theory** and their applications to **functional programming**. Since I program 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 am actively involved in the **divulgation of mathematics** and computer science at an universitary level. I weekly organize mathematics and computer-science talks at my university; where I have been able to develop teaching skills and a deeper understanding of mathematics.

2014–Now **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 lectured about Haskell, Category theory and Type theory, among other topics.