

Mario Román

Mathematics and Computer Science student

Contact

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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. Grade Point Average: 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, cryptography
 - Computational algebra
 - Modern algebra
 - Logic, discrete mathematics
- 2013-2017 Bachelor degree in **Computer Science** [University of Granada, Spain](#)
Emphasis in computation. Grade Point Average: 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.
- 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.
 - [OrientaMat - LaTeX course](#), as **teaching assistant**.
- 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 \(in progress\)](#)
Advisor: Prof. Pedro A. García-Sánchez.
Bachelor thesis on the relationship 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.

A complete portfolio can be found at m42.github.io.

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 department servers and I develop **didactic material** and assist in the teaching of the course "**Logic and Programming**".
- 2015-2016 **Erasmus+ Grant** [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 **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 **divulgarion of mathematics** and computer science at a university 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.
- 2002-2012 **School of Music** [Granada, Spain](#)
Foundational and professional level. Specialization in violin, music theory and composition.