

# eduardzorita

scientist, electrical/electronics & software engineer, bioinformatician

## contact



Eduard Valera Zorita



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github.com/ezorita

## languages

catalan

spanish

english

## programming

C & C++

python, Java

Matlab, R

PHP, django, SQL

HTML, CSS

shell scripting

VHDL

L<sup>A</sup>T<sub>E</sub>X, git

## skills

### computer science

algorithm design

machine learning

parallel computing

automated testing

databases

### electrical eng

signal processing

networks

microprocessors/FPGA

PCB design

microelectronics

control systems

### biology

bioinformatics

genomics

molecular biology

math

physics

statistics

## projects

starcoder

horari sunion

## interests

**professional:** science, creativity, algorithms, big data, biology **personal:** learning, teaching, music, hiking, photography, circus arts, literature, theater, sports and popular culture.

## education

- 2012–2013 **Research Scholar** Massachusetts Institute of Technology, Cambridge (MA)  
I was enrolled at the Department of Mechanical Engineering, where I conducted research on autonomous underwater vehicles and underwater wireless communications.
- 2011–2012 **MSc Thesis in Electrical Engineering** Northeastern University, Boston (MA)  
Master's Thesis at the Digital Signal Processing laboratory under the supervision of Milica Stojanovic: Underwater communications.  
The study was also supported by the Massachusetts Institute of Technology.  
 Thesis.
- 2011–2014 **MSc Electronics Engineering** Universitat Politècnica de Catalunya, Barcelona  
Main subjects: semiconductor physics, electronic and photonic devices, microelectronic layer design, FPGA/microcontroller systems design, feedback control circuits.  
 Thesis.
- 2006–2011 **BSc & MSc Electrical Engineering** Universitat Politècnica de Catalunya, Barcelona  
Main subjects: math, statistics/probability, physics, circuit theory, electronics, programming, computer architecture, communication theory, information science, antennas, networks, optical communications, advanced signal processing, machine learning, cryptography and digital security, quantum computing.
- 2008–2011 **BSc Physics** Universitat de Barcelona  
Degree not completed, 3 years out of 4 finished.  
Main subjects: math, mechanics, electromagnetism, thermodynamics, optics, quantum physics, relativity, particle physics.

## experience

### Science & Engineering

- 2014–Now **Centre for Genomic Regulation (CRG)** Barcelona  
*Research Scientist/Bioinformatician*  
Research scientist at the Genome Architecture laboratory (Guillaume Filion). At the lab I work on algorithmically complex problems derived from experimental data analyses, such as sequence clustering, sequence alignment and pattern matching. I also analyze bioinformatic data and contribute to the design of molecular biology experiments.  
**Research fields:** computer science, computational biology, genomics and molecular biology.  
**Research projects:** HIV latency, genome alignment and assembly, DNA sequence clustering.  
 Lab website.

- 2013–2014 **Applied Ocean Systems** San Diego, CA  
*Electrical Engineer*  
 Remotely worked on a small company determined to launch the first underwater wireless communication device capable of transmitting live video stream.  
**Main responsibilities:**
  - Design of cutting-edge communication/modulation technology.
  - Algorithms for signal synchronization & Doppler compensation.
- 2012–2013 **AUV Lab @ Massachusetts Institute of Technology** Cambridge, MA  
*Research Engineer*  
 I worked as communications and electrical engineer at the Autonomous Underwater Vehicles laboratory. Our research lab was comprised of three engineers and our goal was to design and manufacture unmanned and remotely-controlled underwater vehicles for diverse scientific missions.  
**Main responsibilities:**
  - Onboard hardware and software design for autonomous underwater vehicles.
  - Design of communication technologies for underwater vehicles.
  - Design of autopilot and sensor drivers for an autonomous vehicle.[↗](#) Department website.
- 2009–2010 **Signal Theory & Communications department @ UPC** Barcelona  
*Research assistant*  
 I worked as research assistant under the supervision of Prof. Josep Vidal. Our line of research focused on communication techniques for the 4G wireless standard.  
**Research topics:** wireless communications, signal processing, algebra, antenna array processing (MIMO).
- 2009–2011 **Sunion ICC** Barcelona  
*Software Developer*  
 I developed a platform to provide digital support to a dynamic class schedule system. The project was specially developed for a secondary school based in Barcelona. The platform has a desktop editor software, database server, screen visualization system and mobile/web app.  
[↗](#) Web/mobile app.

## Teaching

- 2015–2016 **School of Molecular and Theoretical Biology** Pushchino, Russia/Barcelona  
*Faculty*  
 I participated as faculty in two editions of the School of Theoretical and Molecular biology held in Pushchino, Russia and Barcelona on August 2015/2016, respectively.  
**Projects taught:**
  - Laboratory of DNA manipulation.** The students learned how to clone specific DNA sequences from major Eukaryote species in a real laboratory project. They further analyzed and presented the obtained results following the scientific method.
  - Laboratory of Yeast transformation.** The students learned how to make genetically modified yeast in a real laboratory project. They further analyzed and presented the obtained results following the scientific method.**Skills taught:**
  - Molecular biology.
  - Basic microbiology.
  - Basic bioinformatics.
  - DNA cloning.
  - Yeast culture and growth.

- 2015      **Bioinformatics, Laboratory Course**      Universitat Pompeu Fabra, Barcelona  
*Human Biology degree*  
 I taught a laboratory project on basic bioinformatics. The students had to use basic bioinformatic tools and programming knowledge to identify selenoproteins through sequence analysis and protein structure prediction.
- 2010–2011      **Physics, Course I**      Universitat Politècnica de Catalunya, Barcelona  
*Electrical Engineering degree*  
 I taught an undergraduate course on Physics. Teaching evaluation awards: Most attended course and best attendee performance.

## volunteering

- 2013–2015      **ALS palliative care**      Fundació Miquel Valls, Barcelona  
 I provided weekly palliative care to patients with Amyotrophic Lateral Sclerosis, a fatal motor neuron disease.
- 2011      **Education through sport**      Uvikiuta Organization, Tanzania, Africa  
 We used sports and games to assist education and cultural exchange with primary school kids in Dar es Salaam, Tanzania.

## publications

### Journal articles

- Position effects influence HIV latency reversal  
 Heng-Chang Chen, Javier P. Martinez, Eduard Zorita, Andreas Meyerhans, and Guillaume J. Filion  
*Nature Structural & Molecular Biology* 24.1 (Jan. 2017) pp. 47–54. Nature Publishing Group, 2017
- Starcode: sequence clustering based on all-pairs search  
 Eduard Zorita, Pol Cuscó, and Guillaume J. Filion  
*Bioinformatics* 31.12 (2015) pp. 1913–1919. 2015
- Space-Frequency Block Coding for Underwater Acoustic Communications  
 E. Zorita and M. Stojanovic  
*IEEE Journal of Oceanic Engineering* 40.2 (Apr. 2015) pp. 303–314. 2015

### Conference papers

- Space-frequency coded OFDM for underwater acoustic communications  
 E. Zorita and M. Stojanovic  
*2012 Oceans*, 2012
- Network MIMO for downlink in-band relay transmissions with relaying phases of fixed duration  
 A. Agustin, J. Vidal, S. Lagen, and E. Zorita  
*2011 19th European Signal Processing Conference*, 2011
- Network-MIMO backhauling for QoS-constrained relay transmission  
 J. Vidal, A. Agustín, S. Lagén, E. Zorita, O. Muñoz, A. Garcia Armada, and M. S. Fernández  
*2011 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2011