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
LaTeX, git

skills

algorithm design
automated testing
bioinformatics
biology
communications
computer science
databases
firmware programming
microprocessors/FPGA
genomics
machine learning
math
molecular biology
open source
PCB design
physics
signal processing
statistics

projects

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interests

professional: data analysis, algorithms, biomedicine, creativity, science **personal:** learning, teaching, hiking, photography, circus arts, books, 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 Politecnica 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 Politecnica 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, criptography 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 analysis, such as sequence clustering, sequence alignment and pattern matching. I also do bioinformatic analysis data and contribute to the design of molecular biology of HIV experiments.
Research fields: genomics data processing, computational biology, molecular biology and computer science.
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

Main responsibilities at the AUV lab:

- 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 was 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 an app which provides digital support to a dynamic class schedule system. The project was specially developed for a secondary school based in Barcelona. The app 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. *Skills taught*: basic microbiology, molecular biology, DNA manipulation and basic bioinformatics.

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 thaught*: Yeast culture and growth, molecular biology.

2015 **Bioinformatics Laboratory** 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 Politecnica de Catalunya, Barcelona
Electrical Engineering degree
First level undergraduate course on Physics. Most attended course and best attendee performance award.

volunteering

2013–2015 **ALS palliative care** Barcelona
I provided weekly palliative care to patients with Amyotrophic Lateral Sclerosis, a fatal motor neuron disease.

2011 **Education through sport** 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