



Gabriel Jaumà Gómez

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📍 Madrid, 1995

Profile

During the last course of my BSc in aerospace engineering, I joined a biotech start-up where I spent two years working as a R&D engineer, developing secondary electrospray ionization sources for mass spectrometry. Feeling an urge to broaden my knowledge on the physical rules that govern our universe I enrolled a MSc in the field of physics of complex systems, where I found that my passion lies within the range of quantum phenomenon. Among the endless branches of physics, quantum computing strikes me as one of the most promising regarding the depth and diversity of its applications. My current goal is to join a community devoted to this field, developing my scientific career as I help to develop this outstanding discipline.

Professional and Research Experience

● Institute of Fundamental Physics - CSIC 2021 – Present

Scientific Researcher

After a year working as a Research Student, the group offered me a temporal contract to work as a research scientist at the Horizon 2020 project [SuperQuILAN](#). The goal of this project is to demonstrate a quantum local area network of separated superconducting quantum processors.

● Institute of Fundamental Physics - CSIC 2020 – 2021

MSc Research Student

At the end of my first MSc year, I contacted J. J. Garcia Ripoll and to the best of my wishes he accepted me as a research student in his scientific group [QUINFOG](#) at [IFE-CSIC](#), to work at the Horizon 2020 project [AVaQus](#), focused on the development of a superconducting quantum annealer. The sub-projects where I was completely immersed were:

- Development of a python class to construct and simulate arbitrary superconducting circuits based on Josephson-junctions, capacitors, inductors and voltage sources. This class outputs the energy spectrum, wavefunctions and effective Hamiltonians of the whole circuit or parts of it.
- Explore the parameter space of flux qubits coupled with a dc-SQUID to design tunable superconducting qubits with non-stoquastic effective Hamiltonians in the strong interaction regime.
- Design the connectivity between qubits in a quantum annealing processor to obtain architectures that can simulate spin-glass problems with nonzero critical temperature and that hence might be hard to approximate classically.

● Fossil Ion Technology 2017 – 2019

R&D Engineer

I joined [the company](#) at an early stage (half a year of operations, workforce of 2 employees). My area of focus was **laboratory instrumentation development**, but working in a small and dynamic team allowed me to participate in almost all the activities of the company, always with a mindset of reaching objectives and not fully immersing in the subject.

Science & Engineering

- **Laboratory instrumentation development.** I have participated at all stages of this process: requirement definition, preliminary architecture, FEM simulation, CAD design, component selection, fabrication and testing.
- **Circuit diagram design**, PCB design with SMD & THT components, soldering.
- **Product certification** according to standards **IEC 61010 & IEC 61326**.
- **Laboratory experiments** in [SESL-MS](#) with human breath.
- **Algorithm development** for Mass Spectrometry signal post-processing.

Business Administration

- **Logistics:** Stock control, purchases management, B2B relations.
- **Human resources:** I proposed the first four engineers of the company. They all were hired.
- **Marketing:** Complete development of the company's website, copywriting, scientific writing, product photography and visual content.
- **Sales:** Collaboration with sales dept. in strategy development and meetings with clients.

Engineers Preparation Center S.L. Madrid,

2019 – 2021

University academy teacher

Having considered to pursue a career within the university I decided to test my aptitudes and expectations of being a teacher in a university environment, preparing three courses for the Technical University of Madrid.

- **Computer Sciences** Prepared and taught a 6 ECTS course for the Civil and Territorial Engineering BSc.
- **Fluid Mechanics II.** Prepared and taught a 6 ECTS course for the Aerospace Engineering BSc.
- **Vibrations.** Prepared and taught a 6 ECTS course for the Aerospace Engineering BSc.

Awards

- **Cowinner of the [Qiskit Hackathon Europe 2021](#) for the project: [“Hardware-efficient Variational Quantum Eigensolver”](#)**

Scientific publications

1. Francisco Escudero, David Fernández-Fernández, Gabriel Jaumà, Guillermo F. Peñas, Luciano Pereira. "**Hardware-efficient entangled measurements for variational quantum algorithms.**" arXiv:2202.06979 (2022)
2. Hita-Pérez, María, Gabriel Jaumà, Manuel Pino, and Juan José García-Ripoll. "**Ultrastrong capacitive coupling of flux qubits.**" Phys. Rev. Applied 17, 014028 (2021)
3. Hita-Pérez, María, Gabriel Jaumà, Manuel Pino, and Juan José García-Ripoll. "**Three-Josephson Junctions Flux Qubit Couplings.**" Appl. Phys. Lett. 119, 000000 (2021);
4. Singh, Kapil Dev, Georgi Tancev, Fabienne Decrue, Jakob Usemann, Rhea Appenzeller, Pedro Barreiro, Gabriel Jaumà et al. "**Standardization procedures for real-time breath analysis by secondary electrospray ionization high-resolution mass spectrometry.**" Analytical and bioanalytical chemistry 411, no. 19 (2019): 4883-4898.

Contributions to conferences

- **Oral presentation at the scientific congress VIII-SEEM: Secondary electrospray ionization (SESI) for counterflow Mass Spectrometers: expanding compatibility to Time of Flight (TOF).**

Education

National Distance Education University, Spain MSc in Physics of Complex Systems Courses <ul style="list-style-type: none">• Master 's Thesis<ul style="list-style-type: none">• "Design of Novel Coupling Mechanisms between Superconducting Flux Qubits"• Microscopic Processes in Condensed Matter<ul style="list-style-type: none">• Course's final work proposed by student: "Superconductivity for Quantum Computing"• Many-Electron Problem: Density Functional Theory<ul style="list-style-type: none">• Course's final work proposed by student: "Nitrogen vacancies in diamond for Quantum Computing"• Modeling and Simulation of Complex Systems• Advanced Numerical Methods• Fluctuations of Dynamical Systems• Advanced Statistical Mechanics• Dynamics of Complex Systems• Artificial Neural Networks and Complex Networks (H) = With honors	2019 – 2021 <i>GPA: 9.8/10 (First of promotion)</i> Grade 10 (H) 10 (H) 10 (H) 10 (H) 9.5 (H) 10 (H) 10 (H) 10 8.5
Technical University of Madrid, Spain BSc in Aerospace Engineering Selected achievements My BSc thesis, " <i>Design, development and validation of an ionization system for breath analysis</i> " was given a perfect score and was selected for an oral presentation at the VIII Congress of the Spanish Society for Mass Spectrometry .	2013 – 2017 <i>GPA: 7.5/10 (Top 10%)</i>
IES Miraflores High School, Spain Graduated with honors	2012 – 2013 <i>GPA: 9.3/10 (Third of promotion)</i>
Keyes High School, Oklahoma, USA	2011 – 2012
Boca Prep International School, Florida, USA	2008 – 2009

IT Skills

- Python, MATALB, Fortran, Maple
- Autodesk Fusion 360, COMSOL Multiphysics, KiCad, Abinit
- Linux, Microsoft Office, LaTeX, Photoshop, Inkscape

Hobbies

- Mountaineering expeditions, nature.
- Climbing, surfing, splitboarding.
- Photography, drawing, graphic arts.
- Reading books about physics, biology and philosophy.

Languages

- Spanish: Native.
- English: Proficiency.