

ESTEBAN VALLESPÍR LÓPEZ

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EDUCATION

BSc in Physics

Universitat Autònoma de Barcelona

2021 - Expected 2025

Grade: 7.56

BSc in Mathematics

Universitat Autònoma de Barcelona

2023 - Expected 2027

Grade: 8.01

EXPERIENCE AND PROJECTS

Qiskit Fall Fest Winner

October 17–24, 2024

Collaborated with a newly formed team to solve the *N-Queens problem*, placing N queens on an $N \times N$ chessboard so that no two threaten each other. We modeled the challenge as a physics-based optimization problem and implemented the *Quantum Approximate Optimization Algorithm (QAOA)* using Qiskit.

- Applied fundamental Qiskit programming to a combinatorial optimization problem.
- Gained practical understanding of quantum computing principles and basic quantum gates.
- Strengthened teamwork and Git-based collaboration in a fast-paced environment.

Numerical Modelling of the Solar System

Simulated the Solar System over 3 years using Python and the Runge-Kutta 4 method.

- Created a class-based structure for planet objects.
- Used Matplotlib to generate 2D and 3D plots of planetary trajectories.

Numerical Modelling of Cardiac Ablation

Simulated temperature variation during cardiac ablation based on Fourier's law.

- Compared the behavior of implicit and explicit Euler methods against the analytical solution.
- Created animations of temperature evolution using Matplotlib.

Numerical Modelling of the Quantum Tunneling Effect

Simulated the wave function of an electron with initial velocity in a finite square well using the Crank–Nicolson method.

- Solved systems of linear equations using SciPy.
- Animated the evolution of the electron's wave function using Matplotlib.

SKILLS AND CERTIFICATES

Programming Languages/Libraries: C, Python, Matplotlib, SciPy, NumPy, Pandas, Qiskit.

Languages: Spanish (Native), Catalan (Native), English (C1).

Certificates:

- Basics of Quantum Information – IBM
- Certificate in Advanced English – Cambridge

Grade: 196