Giovanni Gravili

R&D-Oriented Computational Physicist

Modena/Bologna, Italy
(+39) 366 4207296
giovannigravili112@gmail.com
linkedin.com/in/giovanni-gravili

About Me

I hold a graduate degree in **Material Physics and Nanoscience**, specializing in **computational physics**. My expertise includes **materials modeling**, **molecular dynamics simulations**, and applying **machine learning** techniques. I recently finished my Master's thesis on **nanoscale tribology** using High-Performance Computing (HPC) systems, while also driving the development as the Technical Lead of an EdTech startup project. I enjoy connecting theory and practical application, whether through writing code for physical simulations, building software products, or developing ways to visualize complex data. With strong programming skills in multiple languages and frameworks, I'm looking for **research or industry roles** where I can use both computational methods and hands-on development to solve real-world problems in materials science and related areas.

Education

2023–2025 **Master's in Material Physics and Nanoscience**, University of Bologna, *Final Grade 107/110*.

2019–2023 **Bachelor's in Physics**, University of Bologna, *Final Grade 97/110*.

Key Graduate Courses

Computational Focus My expertise is centered on **computational materials science** (VASP, Quantum ESPRESSO, DFT, Multiscale Simulations, ML-based Force Fields), supported by a strong **theoretical foundation** in quantum material properties (band theory, charge transport, optics, magnetism and superconductivity).

Practical Skills Gained via hands-on training through two intensive **laboratory courses** in X-ray techniques, AFM/STM, photoluminescence, and nano-electronics, supplemented by focused **coursework** in semiconductor materials and applied physics electronics.

Professional Experience

March–September 2025 **EdTech Entrepreneurship Project**, *"Bequire"*, Dokuz Eylül University Technopark (DEPARK Bambu), Izmir, Turkey.

Driving development as Technical Lead of an AI-centered EdTech startup during its incubation phase. Completed a seven-month entrepreneurship program with an international co-founder, advancing from 90 competing teams to win first place among 11 finalists at Demo Day. Currently continuing product development and market validation.

Research Experience

March–September 2025 **Master's Thesis Research Internship**, *"Unraveling the Pathways of Tribochemical Reactions Involving the ZDDP Lubricant Additive by Machine-Learning-Informed Molecular Dynamics"*, University of Bologna.

Investigated nanoscale tribological film growth mechanisms through large-scale molecular dynamics simulations on **Cineca LEONARDO's HPC systems**, developing Python-based analysis pipelines and custom visualization workflows that majorly contributed to a peer-reviewed publication.

September–December 2023 **Bachelor's Thesis Research Internship**, *"Faulting Processes in a Poro-Elastic Half-Space"*, University of Bologna.

Simulated coupled displacement and pressure field evolution in earthquakes' faults through time- and space-resolved FORTRAN simulations, developing visualization techniques in Python, Mathematica, and MATLAB to reveal spatiotemporal patterns consistent with real-world seismological data.

Technical Projects

January 2025 **On-Device Arduino Machine Learning for MNIST Digit Recognition**, *Exam Project*.

Built a real-time handwritten digit recognition system on Arduino Nano 33 BLE Sense with embedded TensorFlow, developing a Flask-based Python backend and Next.js frontend for live classification visualization with automated deployment.

May 2024 **Nuclear Quadrupole Resonance Applied to Quantum Materials**, *MANO 2024 Spring Workshop*, University of Bologna.

Contributed to experimental setup and data analysis investigating the Charge Density Wave transition in Kagomè superconductor CsV_3Sb_5 using Antimony NQR Spectroscopy to characterize structural phase changes.

February 2024 **DFT Solver for Helium Ground-State Energy**, *Exam Project*.

Developed a finite-difference numerical solver in Julia for the radial Kohn-Sham equations with self-consistent electron density refinement, solving the Schrödinger equation via Verlet integration and achieving convergence with known ground-state energies.

Awards

October 2025 **(1st Place) General Entrepreneurship Program**, Dokuz Eylül University Technopark (DEPARK Bambu), Izmir, Turkey.

Technical Skills

Computational Modeling **LAMMPS**, **VASP**, Quantum ESPRESSO, **OVITO**, **ASE**.

Programming Languages **Python**, C++, FORTRAN, MATLAB, Mathematica, Julia, JavaScript/TypeScript.

ML & Data Science **TensorFlow**, **PyTorch**, **Scikit-Learn**, **NumPy**, **Pandas**, Large-Scale Data Pipelines.

Cloud & DevOps React, Next.js, Node.js, MongoDB, Google Cloud Storage (GCS), Firebase/Firestore, REST APIs, **Docker**, **Git/GitHub**, **CI/CD Pipelines**, Embedded Systems.

Experimental Techniques Raman, IR, UV-Vis Spectroscopy, X-ray Diffraction (XRD) and Fluorescence (XRF), Atomic Force Miscroscopy (AFM), Mott-Schottky Analysis, Photocurrent Characterization, LASERs.

Soft Skills

Adaptivity & Teamwork My focus is on applying a **structured, pragmatic methodology** to challenges, while *communicating clearly* and working across different domains. From leading technical development in a startup project, to working in teams with contributions from various fields (including *theorists*, *experimentalists*, and *business people*), I am adept at tackling **complex technical challenges** thanks to my ability to adapt to different situations. This involves designing *analysis pipelines* for large-scale simulation data, *debugging unexpected results*, while translating intricate computational results into **clear visualizations** for both technical and non-technical audiences.

Challenge Tackling I approach complex problems with a strong focus on **teamwork** as the core foundation, supported by a smooth collaboration, especially across complementary teams speaking different languages. One of my strengths is the writing of **robust, reliable and documented code**. This commitment to code quality is complemented by frequently sharing my technical doubts and insights with teammates to ensure *effective communication* and collective problem-solving.

Communication Skills

May 2024 Oral Presentation for *MANO 2024 Spring Workshop*

January 2024 Poster at *MANO 2024 Winter Workshop*

Languages

Native	**Italian**
Advanced Proficiency	**English** (CEFR C2), **Spanish** (CEFR B2–C1)
Intermediate Proficiency	**French** (CEFR B1–B2)

Interests and Hobbies

Formula 1 and MotoGP.