

Contact

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Skills & Knowledge

- Programming Languages :**
- Python (NumPy, SciPy, Matplotlib,Pandas, Scikit-Learn, TensorFlow, PyTorch, etc)
  - Data Analysis with Python
  - Machine Learning with Python
  - Java
  - C++
  - MATLAB
  - Maple
- Scientific Tools :**
- GitLab / GitHub and Overleaf Integration
  - PHITS (Monte Carlo Simulations, FORTRAN-based)
  - LaTeX
  - Typst (LaTeX alternative)
  - Local LLM Optimization (LM Studio / Ollama)
- Operating Systems and Softwares :**
- Experience with Windows, MacOS, and Linux (Mint, Ubuntu, Kali)
  - Fiji / ImageJ, Paraview
  - Stellarium, Celestia
  - Microsoft Office, Libre Office, Canva
  - VSCode, JetBrains (Pycharm), Google Colab, Jupyter Lab
  - Vi/Vim and NeoVim (LSP configuration)
  - Experience with the use of virtual machines and SSH protocol basics

Languages

- English (Fluent, Scientific Redaction and Communication)
  - French (Fluent, Scientific Redaction and Communication with a 98/100 on the DELF B2 certification exam)
  - Arabic (Native)

Interests

Cosmology, Mathematics, Particle Physics, Astrophysics, Quantum and Statistical Mechanics, Programming, Open Source Contributions, Machine Learning, Homebrewing Retro Consoles using Open Source Software, Philosophy

I especially enjoy the intersection between cosmology, mathematics, and philosophy or, as Eugene Wigner would call it, “The Unreasonable Effectiveness of Mathematics in the Natural World”

Education

- Master's Degree in Fundamental Physics**

2025 - Current

*Université Paris-Saclay, Orsay, France*
- Bachelor of Science in Physics**

2023 - 2025

*Université Saint Joseph de Beyrouth, Beirut, Lebanon*
  - Completed the equivalent of nearly 3 years of courses in 2 years
  - Received the Valedictorian Prize for being valedictorian in every semester
  - Dean's List of Honor every semester with a final grade of 92.13/100
- Bachelor of Engineering in Computer Engineering**

2022 - 2023

*Lebanese American University, Beirut, Lebanon*
  - Dean's List of Honor in each of the two semesters
- High School Diploma (General Sciences - Maths, Physics)**

2019 - 2022

*Collège des Saints Cœurs Ain Najm, Ain Najm, Lebanon*
  - Valedictorian with a grade of 17.88/20 on the official General Sciences Lebanese Baccalaureate

Projects and Experience

- Research Internship**

2025

*CNRS-L (Lebanese Atomic Energy Comission), Beirut, Lebanon*
  - Conducted Monte Carlo radiation shielding simulations using the FORTRAN-based PHITS radiation transport simulation software
  - Designed multiple, continuously evolving, shielding designs aiming for optimal protection against ionizing radiation from both an AmBe source and a D-D neutron generator situated in Lebanon's leading research facility
  - Shielding parameters and design specifically tailored towards preparing the facility for future advanced neutron spectrometry experiments, including the planned integration of Bonner Sphere detection systems.
- Hubble Constant Estimating App**

Ongoing (2026)

*Personal Project*
  - Built an interactive Python application to infer the Hubble constant using observational data from the HOLICOW collaboration, implementing the cosmological time-delay distance ( $\Delta t$ ) formalism for lensed quasar systems.
  - Modeled how lensing geometry, redshift, and light-travel time contribute to constraints on  $H_0$ , with visual tools to explore parameter sensitivity and cosmological interpretation
  - Compared a linear regression model to a neural network under identical conditions to demonstrate the non-linear nature of gravitational lensing predictions; the neural network achieved  $MSE \approx 0.1$  vs.  $\approx 26$  for the linear model.
  - Integrated real-time visualizations, uncertainty controls, and a built-in LLaMA-3 (Grog) assistant capable of answering any questions a user may have about the project by explaining both the physics and the methodology
- Nuclear Shell Model Solver**

Ongoing (2026)

*Personal Project*
  - Developing a Python implementation of the radial Schrödinger equation using a Woods–Saxon potential with spin–orbit coupling
  - Computing single-particle nuclear energy levels and reproducing magic numbers through energy-gap analysis
  - Applying finite-difference discretization and eigenvalue solvers (NumPy/SciPy)
  - Visualizing  $n l j$  orbitals and shell structure with Matplotlib
- Numerical Exploration of Relativistic Spacetime Models**

Ongoing (2026)

*Personal Project*
  - Exploring discrete numerical representations of spacetime metrics inspired by general relativity
  - Investigating simplified geodesic evolution and curvature effects under strong computational constraints
  - Targeting deployment on constrained ARM-based hardware (Nintendo DSi) using homebrew tools
  - Emphasis on performance-aware implementation rather than full numerical general relativity
  - Studying how physical models must be adapted when computational resources are severely limited
- Documented Visits in Medical Physics**

2024

*Medical Physics Course at Université Saint-Joseph de Beyrouth*
  - Conducted in-depth physical analysis of radioprotection, radiotherapy and radiology operations, describing clinical procedures and workflow coordination across different hospital sections
  - Authored three detailed reports synthesizing the quantum and nuclear physics principles governing high-tech medical machinery (e.g., MRI, linear accelerators) and explaining the rationale behind operational standards
- Scientific Vulgarization and Creation of Scientific Posters**

2024

*Science Communication Course at Université Saint-Joseph de Beyrouth*
  - Received dedicated training in public speaking from Lebanon's leading experts
  - Created and presented scientific posters in front of an audience and a jury consisting of both the Physics and Chemistry head of departments
  - Acquired essential skills in researching complex topics, tailoring them towards their audience, and presenting them in a clear, concise manner.
- Citizen Science in Astronomy**

2023

*Personal Project*
  - Contributed to multiple active citizen science research on the Zooniverse platform with a focus on astronomy and cosmology oriented projects