Rafael Souza Mattos – PhD

Software Developer | HPC & Scientific Computing

mattos.rsouza@gmail.com | Marseille, France
rsmattos | rafaelcpii93 | rsmattos.xyz

Profile

Software developer with strong experience in scientific programming, high-performance computing, and algorithm development. Skilled in building, optimizing, and maintaining complex codebases in Python, C/C++, and Fortran, with hands-on experience in Linux environments, HPC clusters, and numerical simulations. Adept at translating complex problems into efficient software solutions and seeking to apply analytical and programming expertise to software development roles beyond academia.

Technical Skills

Programming: Python, Fortran, Perl, C/C++, CUDA, Bash scripting

Software Development: Git, Linux, HPC environments, performance optimization

Libraries & Tools: NumPy, Pandas, Matplotlib, HDF5

Other Tools: LaTeX, Office Suite

Languages: Portuguese (native), English (fluent), French (intermediate)

Experience

Postdoctoral Researcher – Aix-Marseille University, France 2025 – present

- Maintain and extend the functionality of a complex codebase.
- Help multiple people with system setup, scripting, and performing scientific calculations.
- Collaborate in different projects as a guide for newer group members, a listener for more advanced members, and with hands-on collaboration in performing simulations.

PhD Researcher – Aix-Marseille University, France 2021 – 2024

- Designed and implemented scientific software for quantum dynamics simulations in Python and Fortran.
- Optimized algorithms for large-scale simulations, improving runtime and scalability on HPC clusters.
- Built data analysis pipelines in Python (NumPy, Pandas, Matplotlib) to process and visualize simulation outputs.
- Collaborated with international teams, managing multi-language codebases and contributing to open-source projects.

Software Developer (Research Projects) 2018 – 2021

- Implemented GPU-accelerated computational code in CUDA and C++ for molecular simulations.
- Developed and maintained scripts in Python for input generation, workflow automation, and data processing.
- Integrated external software (Gaussian, ORCA, Turbomole) into custom simulation pipelines.
- Worked with version control (Git) and Linux-based environments for daily development.

Education

- PhD in Chemistry (focus: computational methods & software development)
  Aix-Marseille Université, France — 2021–2024
- Master's in Chemistry (focus: molecular quantum chemistry simulation)
  Universidade Federal do Rio de Janeiro (UFRJ), Brazil — 2019–2021
- Bachelor's in Chemical Engineering (focus: development of CUDA code for speeding up fluid dynamics simulation)
  Universidade Federal do Rio de Janeiro (UFRJ), Brazil — 2012–2018

Additional Information

- Strong experience in cross-disciplinary projects, bridging science and software.
- Comfortable working in international and collaborative environments.
- Holder of competitive scholarships (Science Without Borders, CAPES).