GIACOMO ROSILHO DE SOUZA

Applied Mathematician (PhD) | Numerical Methods | Stochastic Calculus

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☆ Swiss and Brazilian

SUMMARY

Mathematician expert in **numerical methods**, **stochastic calculus**, **probability theory**, **distributed computing, optimization,** and **differential equations**. Develop and implement algorithms in **Python** and **C++**. Excellent **communication** skills acquired through lecturing, presenting at international conferences, and remote collaborations. Author of several scientific articles in top-tier journals, full list.

NUMERICAL METHODS HIGHLIGHTS

Multi-scale Stochastic Differential Equations

Designed **Monte Carlo** integration methods achieving speed-up factors of 10+ (C++).

Jump-Diffusion Stochastic Differential Equations

Devised **stabilized** solvers increasing speed and accuracy (C++).

Distributed computing

First parallel-in-time scheme for heart simulations on **1000+ processors** (Python).

Machine Learning

Accelerated training by stabilizing **optimization** methods (Python).

EXPERIENCE

Research Scientist

USI - Università della Svizzera italiana

11/2021 - 12/2024 Lugano, Switzerland

- Contributed to 2 **European** high-performance computing (HPC) **projects. Collaborated** with **remote** teams.
- Developed **parallel** and **multi-scale** solvers for large systems of nonlinear **PDE**s, reducing computational time by 50% on 1000+ processors (Python).
- Research on stabilized **optimization** methods.
- Lecturer, rated 9/10 by MSc students. Supervisor for 3 MSc thesis students.

Research Scientist

EPFL - Swiss Federal Technology Institute of Lausanne

06/2020 - 08/2021 Lausanne, Switzerland

- Performed research in **stochastic** differential equations and **mixed-precision** methods for GPUs, improving computational efficiency by 75% (C++).
- Lecturer for the MSc course "Numerical integration of dynamical systems".

PhD Student

EPFL - Swiss Federal Technology Institute of Lausanne

09/2015 - 05/2020 Lausanne, Switzerland

- Enhanced **stochastic** differential equations solvers and **finite element** methods, achieving speed-up factors of 10+ (C++).
- **Supervisor** for 5 BSc and MSc students in research projects.
- Teaching assistant for mathematics courses at EPFL.

Computational scientist intern

CSCS - Swiss National Supercomputing Centre

09/2013 - 01/2014 Lugano, Switzerland

Migrated an astrophysics simulation code from CPUs to GPUs (Fortran).

- Optimized code, algorithms, and data structures, achieving a 10x speed-up.
- Results presented at international conferences.

SELECTED PUBLICATION

Explicit stabilized multirate method for stiff stochastic diff. eq.

SIAM Journal on Scientific Computing

https://doi.org/10.1137/21M1439018

Explicit multi-scale integration method for large systems of SDEs accelerating **Monte Carlo** integration.

EDUCATION

PhD in Applied Mathematics

EPFL

09/2015 - 05/2020

MSc in Mathematical Engineering

GPA **5.75** / 6

EPFL

09/2012 - 06/2014

BSc in Mathematics

GPA **5.45** / 6

EPFL

09/2009 - 06/2012

SKILLS

Quantitative Finance

Derivatives pricing, Stochastic calculus, Monte Carlo, Binomial asset pricing, Options, Risk neutral

Mathematics

Numerical methods, Probability, Stochastic processes, Optimization, Differential equations, Bayesian inference, Machine learning, Statistics

Computer Science

Python, C++, Git, CMake, SQL, NumPy, Linux, Docker, Conda, pandas, LaTeX, MATLAB, JAX

Managerial

Public speaking, Led report writing, Supervision of talents, Communication, Collaboration

AWARDS

Prize in Numerical Analysis

Received international Butcher Prize for excellent **communication skills** and **research quality**.

CERTIFICATION

IBM Data Science Professional Certificate

LANGUAGES

English	Fluent
French	Fluent
Italian	Native
Portuguese	Native
Spanish	Fluent

INTERESTS

Quantitative Finance

Reading *Stochastic Calculus for Finance I & II*, Shreve.

Fermentation

Soy sauce, miso, beer, cheese, kefir, tempeh, kvass, ...