





Andrea Muolo


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EXPERIENCE

Software Engineer and Business Analyst

Systemorph AG

 Dec 2021 - Mar 2024  Zürich, Switzerland

- Assist clients in the insurance industry sector to effortlessly achieve their goals. Simplify their transition from complex spreadsheets to efficient business applications tackling data management and data governance.
- Led a Proof of Concept aimed at designing and building a business web app to address the Own Risk Solvency Assessment. Responsible for negotiating specifications and requirements with client stakeholders, providing guidance on business logic, actuarial methodology implementation, and business processes. Focus on auditability and governance.
- Organize and conduct presentations to clients, on-site trainings, and workshops.
- Skilled Backend Engineer proficient in Scrum methodology and test-driven development. Developer of the Systemorph Cloud Platform (platform as a service), and several in-house packages for data import, report generation, data persistence, data modelling, business logic implementation, and business process.
- Thrilled by modern design patterns. Researched, architect and implemented concurrency models founded on the actor model and microservices.
- Developer and tester of concept applications to showcase our technology and foster our community of users. Product promotion and marketing initiatives.

Research Scientist - Computational Physics

Fritz Haber Center for Molecular Dynamics

 Oct 2019 - Nov 2021  Jerusalem, Israel

- Development of analytical solutions and numerical methods for studying topological properties of non-adiabatic quantum states. Genuine predictions on the Berry phase. Algorithms developed in C++20 and run on HPC.

Research and Teaching Assistant

ETH Zürich

 Dec 2018 - Sept 2019  Zürich, Switzerland

- Many-body Dirac Equation and relativistic quantum mechanics. Novel analytical and numerical solutions to integrals to enable symmetry projected optimization.
- Method development: Pre-Born–Oppenheimer and Tensor Networks algorithm.
- Rich experience in concurrent and distributed computing using C++17.

EDUCATION

PhD in Computational Physics

ETH Zürich

 Nov 2014 – Dec 2018  Zürich, Switzerland

- Explicitly Correlated Gaussians and the Quantum Few-Body Problem.
- Algorithm engineering: embrace exciting engineering challenges to meet extreme scaling requirements and numerical stability, safety, and maintainability aspects.

BSc and MSc in Physical Chemistry

University of Pavia and University of Cambridge

 Sept 2009 – Sept 2014  Pavia, Italy – Cambridge UK

- MSc : A classical dynamic that conserves the quantum Boltzmann distribution.
- BSc: Molecular Memories: rotaxane- and catenane-based molecular devices.
- Second level MSc at Scuola Universitaria Superiore (IUSS).

TECH STACKS

2.5+ years

C#, .NET Core, .NET Web API

Nuget, SignalR, ML.NET, SQL, EF, DI

Razor, Blazor, WPF, MVC, MVVM

Rest, Javascript, AJAX, HTML5, CSS

Kubernetes, Docker, CI/CD

7+ years

C++20, OpenMP, MPI, SIMD, HPC

Armadillo, Boost, Eigen, Intel MKL

Eclipse, Visual Studio (+ReSharper)

Git, Mathematica, LaTeX

Python, NumPy, SciPy, Matplotlib, SciKit

STRENGTHS

Algorithm Engineer

Strong Math Foundation

Extreme Scalability

Concurrency Models

Quantum

Optimization Problems

Scrum

Numerical Methods

Cloud Architectures

Data Modelling

Business Process

Business App

Client-Centric Data Management Expert

Insurance

Actuarial Methods

Accounting Standards IFRS

Fast Learning

Scientific Writing


Coaching


Public Speaking


Communication

Leadership

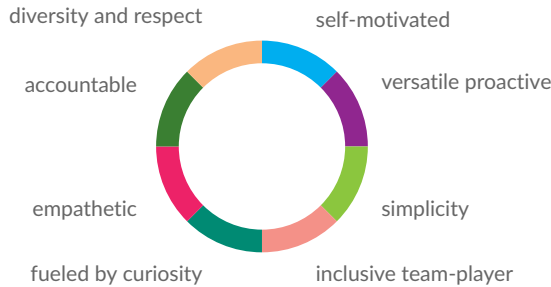
LANGUAGES

 German (A2)

 English (fluent)

 Italian (native)

ABOUT ME



SELECTION OF PUBLICATIONS

J. Chem. Theory Comput., 18, 234 (2022)
Quantum Proton Effects from Density Matrix Renormalization Group Calculations

Phys. Rev. A, 102, 022803 (2020)
Analytically projected, rotationally symmetric, explicitly correlated Gaussians with one-axis shifted centers

J. Chem. Phys., 142, 134103 (2015)
Boltzmann-conserving classical dynamics in quantum time-correlation functions: “Matsubara dynamics”