Sebastián REYES RIFFO

Applied mathematician, I am attracted by the opportunity to work in a interdisciplinary team, on questions related to data analytics and visualization, algorithm design, mathematical modeling, and numerical analysis. Fluent in French, English, and Spanish.

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EXPERIENCE

03.2024 - Present — **Research engineer.** IPSL, Sorbonne Université.

09.2022 - 05.2023 — **Independent developer.** Parliamentary election maps.
Created an interactive chart visualization of the last 20 Chilean legislative elections, accessible at *sebastianriffo.github.io/congreso-chile*.
- Gathered data from governmental sources by using Beautiful Soup.
- Utilized Pandas to combine, cleanse, and standardize electoral data.
- Automated data extraction from georeferenced maps in QGIS.
- Built a spatial visualization with Folium and Highcharts.

10.2020 - 09.2021 — **Postdoctoral researcher.** Géoazur, CNRS.
Within an interdisciplinary team working on seismic imaging, I developed a program aiming to integrate new algorithms into their data-fitting workflow.
- Designed and implemented a divide-and-conquer parallelization strategy for an existing wave propagation solver, using Fortran and MPI.
- Began interfacing these codes with the scalable library PETSc.

02.2016 - 11.2019 — **PhD student.** CEREMADE, Université Paris Dauphine-PSL.
By employing a problem-solving approach, I conducted an in-depth analysis of issues related to marine energy extraction.
- Developed and validated an inverse model for seafloor reconstruction.
- Carried out research to gain insight into a blade design procedure.
- Proposed a time-parallel algorithm for unbounded in time data assimilation.
- Conceived a theoretical framework for the topics mentioned above.

06.2011 - 08.2014 — **Research assistant.** CEAMOS and ISCI, Universidad de Chile.
- Performed a study of agent-based models for social behavior.
- Led a 15-person team to coordinate programs for 400 pre-college students.

EDUCATION

2019 — **PhD in Applied Mathematics.** Université Paris Dauphine-PSL.
Mathematical methods for marine energy extraction.
Thesis directed by Julien Salomon.

2015 — **Master 2 in Applied Mathematics.** Université Paris Dauphine-PSL.

2013 — **Mathematical Engineering.** Universidad de Chile.

COMPUTER SKILLS

Currently using — Python (Pandas, Beautiful Soup, Folium) •Git •markdown •LaTeX •HTML •CSS

Worked with — Fortran •MPI •Matlab •QGIS

Notions of — SQL •JavaScript •Linux •Bash •C++

Languages — English (fluent), French (fluent), Spanish (native).

TEACHING EXPERIENCE

2017 - 2019   **Assistant teacher** ($\sim$60h). MIDO, Université Paris Dauphine-PSL.
- Linear algebra 3.
- Complex analysis.

01.2018   **Lecturer** ($\sim$22.5h). EdV, Universidad de Chile.
- An introduction to abstract algebra.

2011 - 2013   **Coordinator.** EdV, Universidad de Chile.
- Summer mathematics program for pre-college students.

2008 - 2013   **Assistant teacher** ($\sim$160h). DIM, Universidad de Chile.
- Probability and statistics.
- Introduction to partial differential equations.
- Ordinary differential equations.
- Algebra 1.
- Linear algebra.
- Single variable calculus.

CONFERENCES

07-12.12.2020   *Time-parallelization of sequential data assimilation problems.*
26th International Conference on Domain Decomposition Methods (DD26).
Chinese University of Hong Kong, Hong Kong, China.

10-11.12.2020   12th Conference FreeFEM Days.
Laboratoire Jacques-Louis Lions (LJLL), Paris, France.

02-04.07.2019   2nd Conference on Simulation and Optimization for Renewable Marine Energies (EMRSIM19).
Roscoff marine station, Roscoff, France.

02-05.09.2018   7th Workshop on Parallel-in-Time Methods (PinT18).
Roscoff marine station, Roscoff, France.

06-10.02.2017   24th International Conference on Domain Decomposition Methods (DD24).
University of Bergen, Longyearbyen, Norway.

AWARDS

2015   Doctoral contract granted by École Doctorale de Dauphine.

2014   Master scholarship granted by Fondation Sciences Mathématiques de Paris.

2006   Excellence scholarship granted by Universidad de Chile.

PUBLICATIONS

(1) P.-H. Tournier, P. Jolivet, V. Dolean, H. Aghamiry, S. Operto and S. Riffo. *3D finite-difference and finite-element frequency-domain wave simulation with multilevel optimized additive Schwarz domain-decomposition preconditioner: A tool for full-waveform inversion of sparse node datasets.* Geophysics, 87(5), pp. T381-T402, 2022.

(2) P.-H. Cocquet, S. Riffo, J. Salomon. *Optimization of bathymetry for long waves with small amplitude.* SIAM J. Control Optim., 59(6), pp. 4429–4456, 2021.

(3) J. Ledoux, S. Riffo, J. Salomon. *Analysis of the Blade Element Momentum Theory.* SIAM J. Appl. Math., 81(6), pp. 2596–2621, 2021.