Ignacio **Labarca Figueroa**

(+56) 9 7887 5223 | ignacio.labarca@uc.cl | Ignacio Labarca-Figueroa

Professional Experience

Institute for Mathematical and Computational Engineering, PUC — *Santiago, Chile*

Postdoctoral Researcher — *Aug. 2025 - Present*

- Postdoc Advisor: Elwin van 't Wout.

University of Innsbruck — *Innsbruck, Austria*

Postdoctoral Researcher — *Feb. 2024 - Jun. 2025*

- Time-dependent shear response in dilute suspensions.
- Postdoc Advisors: Prof. Thomas Franosch (Bio-Nano Physics), Prof. Heiko Gimperlein (Engineering Mathematics).

Education

ETH Zurich (Eidgenössische Technische Hochschule Zürich) — *Zurich, Switzerland*

Ph. D. in Applied Mathematics — *Jan. 2020 - Jan. 2024*

- Coupled Boundary-Volume Integral Equations for Wave Propagation
- Advisor: Prof. Ralf Hiptmair
- `https://doi.org/10.3929/ethz-b-000668613`

PUC (Pontificia Universidad Católica de Chile) — *Santiago, Chile*

M. Sc. in Engineering — *Jan. 2017 - Oct. 2019*

- Convolution Quadrature method for Time Domain Acoustic Wave propagation in Layered media and Composite materials.
- Advisor: Prof. Carlos Jerez-Hanckes

PUC (Pontificia Universidad Católica de Chile) — *Santiago, Chile*

Mathematical and Computational Engineering — *Jan. 2017 - Oct. 2019*

- Professional Diploma

PUC (Pontificia Universidad Católica de Chile) — *Santiago, Chile*

B.S. in Engineering — *Mar. 2013 - Dec. 2016*

- Major in Mathematical Engineering
- Minor in Theory and Applications of Mathematical Engineering

Teaching Experience

Institute for Mathematical and Computational Engineering, PUC — *Santiago, Chile*

Lecturer — *Aug. 2025 - Present*

- IMT2220 Cálculo para Ciencia de Datos (*Calculus for Data Science*).
- Semester 2025-2.
- Multivariate Calculus and Fourier Analysis.

Department of Computer Science, PUC — *Santiago, Chile*

Lecturer — *Aug. 2025 - Oct. 2025*

- IMT3870 Computación de Alto Rendimiento (*High Performance Computing*).
- Bimester 2025-3.
- Minimum for the Master of Artificial Intelligence (MIA UC).

Department of Computer Science, PUC — *Santiago, Chile*

Lecturer — *Mar. 2025 - Present*

- IIC3533 Computación de Alto Rendimiento (*High Performance Computing*).
- Semesters 2025-1, 2025-2.

Instituto de Matemáticas (IMA), Pontificia Universidad Católica de Valparaíso (PUCV) — *Valparaíso, Chile*

Lecturer — *May. 2025 - Jul. 2025*

- MSC001 Introducción a la Modelación Matemática (*Introduction to Mathematical Modelling*).
- Block: Modelling based on PDEs.
- Minimum for the Master of Computational Simulation (`http://ima.ucv.cl/programas/msc/`).

Facultad de Ciencias, Universidad Adolfo Ibáñez — *Santiago, Chile*

Lecturer — *Mar. 2025 - Jul. 2025*

- Cálculo Diferencial (*Differential Calculus*).

Faculty of Mathematics, Computer Science and Physics, University of Innsbruck — *Innsbruck, Austria*

Lecturer — *Winter Semester, 2024/2025*

- Modelling as Basis for Simulation

CSE Program & Department of Physics, ETH Zurich — *Zurich, Switzerland*

Organizer & Teaching Assistant — *Autumn Semester, 2020-2022*

- Programming Techniques for Scientific Simulations

Faculty of Engineering, PUC — *Santiago, Chile*

Teaching Assistant — *Mar. 2017 - Jul. 2018*

- Functional Analysis and Partial Differential Equations Applications in Engineering.
- Introduction to Mathematical Engineering.

Faculty of Mathematics, PUC — *Santiago, Chile*

Teaching Assistant — *Mar. 2014 - Jul. 2018*

- Linear Algebra for Engineering.
- Calculus I. Calculus in one variable for Engineering.
- Calculus II. Curves, surfaces, series and improper integrals.
- Calculus III. Multivariate Calculus for Engineering.
- Probability Theory. Probability with Measure Theory for Mathematicians and Mathematical Engineering.

Publications & Preprints

A posteriori error estimates and space-adaptive mesh refinements for time-dependent scattering problems

T. Chaumont-Frelet, H. Gimperlein, I. Labarca-Figueroa, J. Nick — *Submitted*

- Preprint: `https://doi.org/10.48550/arXiv.2509.04217`

Domain Uncertainty Quantification for the Lippmann-Schwinger Volume Integral Equation

F. Henriquez, I. Labarca-Figueroa. — *Accepted in SIAM Journal on Uncertainty Quantification*

- Preprint: `https://doi.org/10.48550/arXiv.2407.11512`

Coupled Boundary and Volume Integral Equations for Electromagnetic Scattering

I. Labarca-Figueroa, R. Hiptmair. — *Journal of Computational and Applied Mathematics*, *Dec. 2024*

- `https://doi.org/10.1016/j.cam.2024.116443`
- Preprint: `https://doi.org/10.48550/arXiv.2403.17731`

Time-Domain Multiple Traces Boundary Integral Formulation for Acoustic Wave Scattering in 2D — *Engineering Analysis with Boundary Elements*

C. Jerez-Hanckes, I. Labarca. — *Sep. 2023*

- https://doi.org/10.1016/j.enganabound.2023.09.005

Volume Integral Equations and Single-Trace Formulations for Acoustic Wave Scattering in an Inhomogeneous Medium — *Computational Methods in Applied Mathematics*

I. Labarca, R. Hiptmair. — *May 2023*

- https://doi.org/10.1515/cmam-2022-0119
- Preprint: https://www.sam.math.ethz.ch/sam_reports/reports_final/reports2022/2022-24_rev2.pdf

Acoustic Scattering Problems with Convolution Quadrature and the Method of Fundamental Solutions — *Communications in Computational Physics*

I. Labarca, R. Hiptmair. — *Oct. 2021*

- https://doi.org/10.4208/cicp.OA-2020-0249

Convolution Quadrature methods for time-domain scattering from unbounded penetrable interfaces — *Proceedings of the Royal Society A*

I. Labarca, C. Perez-Arancibia and L. Faria. — *Jul. 2019*

- https://doi.org/10.1098/rspa.2019.0029

Talks and Conferences

Coupled Boundary and Volume Integral Equations for Electromagnetics — *Talca, Chile*

Talca Numérica I — *Jul. 2025*

Boundary Element Method for Dilute Colloidal Suspensions under Shear Flow — *Kleinwalsertal, Austria*

Soellerhaus Workshop 2024. — *Sep. 2024*

Coupled Boundary and Volume Integral Equations for Electromagnetics — *Berlin, Germany*

Waves 2024. Frequency-Domain Boundary Element Methods — *Jul. 2024*

Coupled Boundary and Volume Integral Equations for Electromagnetics — *Concepción, Chile*

WONAPDE 2024. Recent Advances for BEM in Complex Domains. — *Jan. 2024*

Coupled Boundary and Volume Integral Equations for Electromagnetics — *Kleinwalsertal, Austria*

Soellerhaus Workshop 2023. — *Oct. 2023*

Volume Integral Equations and Single-Trace Formulations for Acoustic Wave Scattering in an Inhomogeneous Medium. — *Amsterdam, The Netherlands*

SIAM CSE 2023. Recent Advances on Integral Equation and Spectral Methods for Inhomogeneous Problems — *Feb. 2023*

Volume Integral Equations and Single-Trace Formulations for Acoustic Wave Scattering in an Inhomogeneous Medium. — *Kleinwalsertal, Austria*

Soellerhaus Workshop 2022. — *Oct. 2022*

Coupled Single-Trace Formulations with Volume Integral Operators for Acoustic Transmission Problems. — *Palaiseau, France*

Waves 2022. Integral Equations: Analysis and Applications — *Jul. 2022*

Acoustic Scattering with Convolution Quadrature and the Method of Fundamental Solutions. *Kleinwalsertal, Austria*

Soellerhaus Workshop 2020. *Oct. 2020*

Convolution Quadrature methods for Time-Domain Scattering from Unbounded Penetrable Interfaces. *Concepción, Chile*

WONAPDE 2019. Time-Evolution and Frequency-Domain Methods for Partial Differential Equations *Jan. 2019*

Convolution Quadrature methods for Time-Domain Scattering from Unbounded Penetrable Interfaces. *Portland, OR, USA*

SIAM Annual Meeting 2018. Student Days *Jul. 2018*

Research Visits

Massachusetts Institute of Technology *Cambridge, MA, USA*

Visiting Researcher *Jan. 2018 - Mar. 2018*

- Convolution Quadrature and Layered media problems.
- Advisor: Prof. Carlos Pérez-Arancibia

Research Supervision

Stable L^2–Pairings for Discrete Differential Forms *Zurich, Switzerland*

Ramon Schönholzer *Sep. 2024 – May 2025*

- Co-supervised Bachelor's Thesis in Computational Science and Engineering Program, ETH Zurich.
- Thesis Document

Skills

Programming

- MATLAB
- Python
- C++

Languages

- Spanish (native)
- English (fluent)