

Ignacio Labarca Figueroa

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Professional Experience

Institute for Mathematical and Computational Engineering, PUC

POSTDOCTORAL RESEARCHER

- Postdoc Advisor: Elwin van 't Wout.

Santiago, Chile

Aug. 2025 - Present

University of Innsbruck

POSTDOCTORAL RESEARCHER

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

Innsbruck, Austria

Feb. 2024 - Jun. 2025

Education

ETH Zurich (Eidgenössische Technische Hochschule Zürich)

PH. D. IN APPLIED MATHEMATICS

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

Zurich, Switzerland

Jan. 2020 - Jan. 2024

PUC (Pontificia Universidad Católica de Chile)

M. SC. IN ENGINEERING

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

Santiago, Chile

Jan. 2017 - Oct. 2019

PUC (Pontificia Universidad Católica de Chile)

MATHEMATICAL AND COMPUTATIONAL ENGINEERING

- Professional Diploma

Santiago, Chile

Jan. 2017 - Oct. 2019

PUC (Pontificia Universidad Católica de Chile)

B.S. IN ENGINEERING

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

Santiago, Chile

Mar. 2013 - Dec. 2016

Teaching Experience

Institute for Mathematical and Computational Engineering, PUC

LECTURER

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

Santiago, Chile

Aug. 2025 - Present

Department of Computer Science, PUC

LECTURER

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

Santiago, Chile

Aug. 2025 - Oct. 2025

Department of Computer Science, PUC

LECTURER

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

Santiago, Chile

Mar. 2025 - Present

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

Journal of Computational and Applied Mathematics

I. LABARCA-FIGUEROA, R. HIPTMAIR.

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.0A-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.

SOELLERHAUS WORKSHOP 2020.

Kleinwalsertal, Austria

Oct. 2020

Convolution Quadrature methods for Time-Domain Scattering from Unbounded Penetrable Interfaces.

WONAPDE 2019. TIME-EVOLUTION AND FREQUENCY-DOMAIN METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS

Concepción, Chile

Jan. 2019

Convolution Quadrature methods for Time-Domain Scattering from Unbounded Penetrable Interfaces.

SIAM ANNUAL MEETING 2018. STUDENT DAYS

Portland, OR, USA

Jul. 2018

Research Visits

Massachusetts Institute of Technology

VISITING RESEARCHER

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

Cambridge, MA, USA

Jan. 2018 - Mar. 2018

Research Supervision

Stable L^2 -Pairings for Discrete Differential Forms

RAMON SCHÖNHOLZER

- Co-supervised Bachelor's Thesis in Computational Science and Engineering Program, ETH Zurich.
- [Thesis Document](#)

Zurich, Switzerland

Sep. 2024 – May 2025

Skills

Programming

- MATLAB
- Python
- C++

Languages

- Spanish (native)
- English (fluent)