

IGNACIO BREVIS VERGARA

School of Mathematical Sciences
University of Nottingham
Mathematical Sciences Building, University Park
Nottingham, NG7 2RD.
Room A12

✉ ignacio.brevis.v@gmail.com
🏠 [Home page](#)
🔍 [Google Scholar site](#)
🐙 [Github site](#)

EXPERIENCE

Nov 2022-	Research Fellow , School of Mathematical Sciences, University of Nottingham, Nottingham, United Kingdom
Apr 2019-Oct 2022	Postdoctoral Fellow , Institute of Mathematics, Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile
Jul 2018-Dec 2019	Part-time Lecturer , Department of mathematics, Universidad Técnica Federico Santa María, Valparaíso, Chile
Apr 2017-Jun 2018	Technical staff , <i>Laboratory for Scientific Image Analysis</i> (SCIAN-Lab), BNI, Program of Anatomy and Development, ICBM, Faculty of Medicine, Universidad de Chile, Santiago, Chile
Nov 2016-Mar 2017	Projects Engineer , <i>Center for Mathematical Modeling</i> (CMM), FCFM, Universidad de Chile, Santiago, Chile
Mar 2014-Dec 2014	Part-time Lecturer , Department of Mathematics and Computer Science, Faculty of Sciences, Universidad de Santiago de Chile, Santiago, Chile

EDUCATION

Ph.D.	Universidad de Chile , Department of Mathematical Engineering Ph.D. in Engineering Sciences, Mention in Mathematical Modeling Dissertation: <i>Source Time Reversal Methods for Acoustic and Elastic Waves</i> Advisor: Prof. Jaime H. Ortega Co-advisor: Prof. David Pardo (Universidad del País Vasco (UPV/EHU))	2018
Eng	Universidad de Santiago de Chile , Department of Mathematics and Computer Science Mathematical Engineer Thesis: <i>Fractional Fourier Transform in Magnetic Resonance Imaging</i> (spanish) Advisor: Prof. Carlos Lizama	2011
B.S.	Universidad de Santiago de Chile , Department of Mathematics and Computer Science B.S. in Mathematics	2010

RESEARCH INTEREST

- Numerical Analysis
- Scientific Computing
- Deep Learning
- Partial Differential Equations
- Machine learning
- Inverse Problems

PUBLICATIONS

IN PREPARATION OR SUBMITTED

- **I. Brevis**, I. Muga, D. Pardo, O. Rodríguez, and K. G. van der Zee, **A machine-learning minimal-residual (ML-MRes) framework for parametric PDEs with quantity of interest.**

PUBLISHED

- **I. Brevis**, I. Muga, and K. G. van der Zee, **Neural control of discrete weak formulations: Galerkin, least-squares & minimal-residual methods with quasi-optimal weights**, *Computer Methods in Applied Mechanics and Engineering*, Vol. 402, 2022, pp. 115716.
- **I. Brevis**, I. Muga, and K. G. van der Zee, **A machine-learning minimal-residual (ML-MRes) framework for goal-oriented finite element discretizations**, *Computers and Mathematics with Applications*, Vol. 95, 2021, pp. 186–199.
- **I. Brevis**, A. Rodríguez-Rozas, J. H. Ortega, and D. Pardo, **Source time reversal (STR) method for linear elasticity**, *Computers and Mathematics with Applications*, Vol. 77, Issue 5, 2019, pp. 1358–1375.
- **R. I. Brevis**, J. H. Ortega, and D. Pardo, **A source time reversal method for seismicity induced by mining**, *Inverse Problems and Imaging*, Vol. 11, Issue 1, 2017, pp. 25–45.

RESEARCH VISITS

May 2022-Jun 2022	Research Stay , <i>part of the project MATHROCKS</i> , Basque Center for Applied Mathematics (BCAM), Bilbao, Spain
Jul 2021-Jan 2022	Research Stay , <i>part of the project MATHROCKS</i> , Department of Applied Mathematics, Statistics, and Operational Research, Universidad del País Vasco (UPV/EHU), Leioa, Spain
Dec 2020-Mar 2021	Research Stay , <i>part of the project MATHROCKS</i> , Department of Applied Mathematics, Statistics, and Operational Research, Universidad del País Vasco (UPV/EHU), Leioa, Spain
Apr 2015-Feb 2016	Internship , <i>Mathematical Modeling, Simulations, and Industrial Applications (M2SI) group</i> , Department of Applied Mathematics, Statistics, and Operational Research, Universidad del País Vasco (UPV/EHU), Leioa, Spain

AWARDS AND FELLOWSHIPS

2020	Postdoctoral grant	<i>Concurso Fondecyt de Postdoctorado</i> at Pontificial Universidad Católica de Valparaíso (project id: 3200827).
2019	Postdoctoral grant	<i>Concurso Interno</i> at Pontificial Universidad Católica de Valparaíso (project id: 37.0 / 2019).
2012	PhD scholarship	<i>Beca de Doctorado Nacional</i> at Conicyt (project id: 21120646).

RESEARCH PROJECTS PARTICIPATION

2018-2023	EPSRC EP/W010011/1	<i>Additive and intelligent manufacturing of multi-functional membranes (AIM3)</i> (PI: Begum Tokay). Research fellow (Nov 2022-Jun 2025).
2018-2023	H2020-MSCA-RISE-2017-777778	<i>Multiscale Inversion of Porous Rock Physics using High-Performance Simulators: Bridging the Gap between Mathematics and Geophysics (MATHROCKS)</i> (PI: David Pardo). Researcher (Dec 2020-Mar 2021) and (Jul 2021-Jan 2022).

- 2020-2022 **FONDECYT de Postdoctorado 3200827**, *Data-driven methods for solving differential equations using deep learning and goal-oriented finite element spaces.*
Principal Investigator (Apr 2020-Nov 2022).
- 2016-2019 **FONDECYT Iniciación 11161033**, *Breaking the Brightness Constancy Constraint in Optical Flow Methods for in vivo Biomedical Imaging.*
(PI: Mauricio Cerda)
Technical Staff (Apr 2017-Jul 2018).
- 2015-2017 **H2020-MSCA-RISE-2014 644202** *Geophysical Exploration using Advanced Galerkin Methods (GEAGAM).*
(PI: David Pardo)
Researcher (Apr 2015-Dec 2015)
- 2011-2015 **FONDECYT Regular 1111012** *Variational Approach for Image Processing Problems.*
(PI: Jaime H. Ortega)
PhD. Thesis Student (Mar 2015-Dec 2015)
- 2010-2014 **FONDECYT Regular 1100485** *Analysis of Continuous, Discrete and Stochastic Evolution Equations in Banach Spaces.*
(PI: Carlos Lizama)
Thesis Student (Mar 2012-Sep 2012)
- 2009-2013 **FONDECYT Regular 1090470** *Qualitative Properties of some Nonlinear Partial Differential Equations: Analysis and Simulation.*
(PI: Ignacio Guerra)
Technical Staff (Sep 2009-Jan 2010)

CONFERENCES AND WORKSHOPS

- Feb 2022 **SIAM Conference on Computational Science & Engineering (CSE23)**,
RAI Congress Centre, Amsterdam, Netherlands
Poster Session
Title: *A machine learning minimal residual method for solving quantities of interest of parametric PDEs*
- Jun 2022 **VI ECCOMAS CONGRESS 2022**,
NOVA Spektrum, Oslo, Norway
Mini-symposium: Deep Learning in Scientific Computing
Talk: *A machine learning minimal residual method for solving quantities of interest of parametric PDEs*
- Jul 2021 **VI ECCOMAS YOUNG INVESTIGATORS CONFERENCE**,
Universitat Politècnica de València, Valencia, Spain (Virtual Conference)
Mini-symposium: Stabilized and unconditionally stable FE methods for challenging problems in engineering and science
Talk: *A machine-learning minimal-residual (ML-MREs) framework for goal-oriented finite element discretizations*
- Jun 2021 **SIAM Conference on Mathematical & Computational Issues in the Geosciences (GS21)**,
Politecnico di Milano, Milan, Italy (Virtual Conference)
Mini-symposium: Enhanced Forward Modelling using Machine Learning Techniques
Talk: *A machine-learning minimal-residual (ML-MREs) framework for goal-oriented finite element discretizations*

- Aug 2019 **IX Congreso Internacional de Matemática Aplicada y Computacional**,
Universidad Nacional Agraria La Molina, Lima, Perú
Talk: *Time reversal methods for source reconstruction on acoustic and elastic waves*
- Apr 2019 **XXXII Jornada de Matemática de la Zona Sur**,
Universidad de Magallanes, Punta Arenas, Chile
Talk: *Time reversal methods for source reconstruction on acoustic and elastic waves*
- Jan 2019 **Valparaíso's Mathematics and its Applications Days 2019**,
Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile
Talk: *Time reversal methods for source reconstruction on acoustic and elastic waves*
- Jan 2018 **3er MINIWORKSHOP Control y Problemas Inversos de EDP**,
Universidad Técnica Federico Santa María, Valparaíso, Chile
Talk: *Source time reversal methods for seismicity induced by mining*
- Nov 2016 **X CONGRESS GAFEVOL 2016**,
Universidad de Santiago de Chile, Santiago, Chile
Talk: *A source time-reversal method for seismicity induced by mining*
- Nov 2010 **V Taller de Análisis Funcional y Ecuaciones de Evolución**,
Universidad de Santiago de Chile, Santiago, Chile
Talk: *Transformada de Fourier fraccionaria en imágenes de resonancia magnética*

TEACHING

LECTURES

- Fall 2022 **Elective: Deep learning for solving PDEs**, Mathematics, Pontificia Universidad Católica de Valparaíso.
- Spring 2019 **Algebra I**, Engineering, Universidad Técnica Federico Santa maría.
- Fall 2019 **Algebra I**, Engineering, Universidad Técnica Federico Santa maría.
- Spring 2018 **Algebra I**, Engineering, Universidad Técnica Federico Santa maría.
- Spring 2014 **Vector calculus**, Mathematical Engineering, Universidad de Santiago de Chile.
- Fall 2014 **Vector calculus**, Mathematical Engineering, Universidad de Santiago de Chile.

TEACHING ASSISTANT

- Spring 2018 **Algebra & Calculus**, Engineering, Universidad Técnica Federico Santa maría.
- Fall 2018 **Algebra & Calculus**, Engineering, Universidad Técnica Federico Santa maría.
- Fall 2008 **Calculus**, Mathematical Engineering, Universidad de Santiago de Chile.
- Spring 2006 **Introduction to complex analysis**, Mathematical Engineering, Universidad de Santiago de Chile.

SPECIALIZATION COURSES

- **Machine Learning**, *Convolutional Neural Networks*, Prof. Andrew Ng, DeepLearning.AI, Online. May 2020
- **Machine Learning**, *Structuring Machine Learning Projects*, Prof. Andrew Ng, DeepLearning.AI, Online. May 2020
- **Machine Learning**, *Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization*, Prof. Andrew Ng, DeepLearning.AI, Online. May 2020
- **Machine Learning**, *Neural Networks and Deep Learning*, Prof. Andrew Ng, DeepLearning.AI, Online. Apr 2020
- **Finite element**, *Fast and smooth simulation of space-time problems*, Prof. Maciej Paszynski, Institute of Mathematics (IMA), Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile. Jul 2017
- **Finite element**, *Coding the FEM II*, Prof. David Pardo, Cajón del Maipo, Chile. Jan 2017
- **Finite element**, *Coding the FEM*, Prof. David Pardo, Casablanca, Chile. Sep 2014
- **Summer course**, *Curso Iniciação Científica: Análise na reta*, Prof. Fagner Araruna, Universidade Federal de Pernambuco, Recife, Brasil. Jan 2008-Feb 2008

THESIS ADVISING

UNDERGRADUATE LEVEL

Jul 2022 **Carlos Gonzalez Moraga**,
Mathematics, Pontificia Universidad Católica de Valparaíso.
Title: *Deep Learning for solving Partial Differential Equations* (in spanish)
(Co-direction with Paulina Sepúlveda).

REVIEWER

- **Journal of Computational Science**
- **Computer Methods in Applied Mechanics and Engineering**
- **Engineering with Computers**

OUTREACH

- **Research Group Member**, *IMA Numerics* (Web page), Valparaíso, Chile. 2019-2022
- **Research Group Member**, *Grupo de Análisis Funcional y Ecuaciones de Evolución* (GAFEVOL) (Web page), Santiago, Chile. 2009-2012

LANGUAGES

Spanish Fluent (Native)
English Advanced (SELT UKVI level B1 passed with merit)

Scan the QR code to get the last version:
(Current version: February 7, 2023)

