Curriculum Vitae

Sebastián Alejandro Muñoz Thon

Personal Data

- Birth: April 16th, 1997, Valdivia, Chile.
- Citizenship: Chilean.
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Education

- Ph.D. in Mathematics. Purdue University (2021-present).
- M.S. in Mathematics. Pontifical Catholic University of Chile (2019-2021).
- B.S. in Mathematics. Pontifical Catholic University of Chile (2015-2018).

Research

- *A Calderón's problem for harmonic maps.* arxiv:2411.01659.
- *Scattering rigidity for standard stationary manifolds via timelike geodesics.* arxiv:2404.09449.
- The linearization of the boundary rigidity problem for MP-systems and generic local boundary rigidity. Inverse Problems, 40(12), 125008.
- The boundary and scattering rigidity problems for simple MP-systems. Inverse Problems and Imaging, 2024, 18(6): 1431-1446.

Prizes and Scholarships

- 2024 December: "Highly Commended Prize" for the poster "A Calderón's Problem for Harmonic Maps", awarded by the Australia and New Zealand Industrial and Applied Mathematics.
- 2024 Fall-2025 Spring: "Ross–Lynn fellowship". For outstanding students of the College of Science, Purdue University.
- 2024: "Special employee recognition". One-time awards for Purdue University employee who are making a difference.
- 2019-2020: "Beca para Magíster en Matemáticas". Scholarship awarded by the Faculty of Mathematics at Pontifical Catholic University of Chile to outstanding graduate students.
- 2018: "Beca al Mérito Académico". Scholarship awarded by the Faculty of Mathematics at Pontifical Catholic University of Chile to outstanding undergraduates.
- 2015-2018: "Beca Bicentenario". Scholarship for undergraduate studies, awarded by the Chilean government.

Talks on Conferences and Seminars

- *Scattering rigidity for standard stationary Lorentzian manifolds via timelike geodesics* Primer Encuentro Colombiano de Geometría y Topología, Universidad Nacional de Colombia, sede Bogotá. August, 2024.
- *Boundary and Scattering rigidity.* CBMS Conference: Inverse Problems and Nonlinearity, Clemson University. June, 2024.
- *Boundary and Scattering rigidity for MP-systems and Standard Stationary Manifolds.* Spectral and Scattering Theory Seminar, Purdue University. March, 2024.

Last updated: December 16th, 2024.

- *Boundary and Scattering rigidity for MP-systems.* Inverse Problems for the Physical Sciences 2024, Puerto Varas, Chile. January, 2024.
- *Boundary and Scattering rigidity for MP-systems.* XCI Annual Meeting of the Chilean Mathematical Society, Analysis of PDEs session, University of Chile. December, 2023.
- *Boundary rigidity problem under the presence of a magnetic field and a potential.* Seminario de Análisis y Geometría, Pontificia Universidad Católica de Chile. August, 2023.

Meetings/Congress/Conferences attended

- Joint Meeting of the New Zealand, Australian and American Mathematical Societies. The University of Auckland, December 9-13, 2024.
- Summer School: Geometric Inverse Problems and Inverse Problems for Elliptic Equations. University of California Santa Cruz. August 19- 22, 2024.
- Primer Encuentro Colombiano de Geometría y Topología. Universidad Nacional de Colombia, sede Bogotá. July 22-August 2, 2024.
- Microlocal Analysis and Quantum Dynamics 2024. Northwestern University. June 17-28, 2024.
- CBMS Conference: Inverse Problems and Nonlinearity. Clemson University. June 3-7, 2024.
- Paris-Saclay conference in Analysis and PDE. Laboratoire de Mathématiques d'Orsay, May 27-31, 2024.
- From Microlocal to Global Analysis. MIT, May 10-12, 2024.
- Kansas Geometric Analysis Conference. Wichita State University, April 20-21, 2024.
- Inverse Problems for the Physical Sciences 2024. Puerto Varas. January 15-19, 2024.
- XCI Annual Meeting of the Chilean Mathematical Society. University of Chile, December 18-21, 2023.
- IMJ-PRG Summer School 2023: Microlocal and probabilistic methods in geometry and dynamics. Sorbonne Université (Campus de Jussieu), July 3-7, 2023.
- MSRI Summer Graduate School: Topics in Geometric Flows and Minimal Surfaces. St. Mary's College, June 20-30, 2023.
- Tomography Across the Scales, Workshop 4: Geometrical Inverse Problems. Johann Radon Institute for Computational and Applied Mathematics, November 7-11, 2022.
- Calculus of Variations and PDEs: recent developments and future directions. ETH Zürich (hybrid mode), June 21–25, 2021.
- Doctoral School in Applied Mathematics. PUC Chile, September 21–October 2 2020.
- The Eighth Pacific Rim Conference in Mathematics. University of California Berkeley (online), August 3-5, 2020.
- Spring School in Analysis and Mathematical Physics. PUC Chile, October 14–22 2019.
- LXXXVII Annual Meeting of the Chilean Mathematical Society. University of O'Higgins, November 19-21, 2018.
- Doctoral School in Probabilities and Dynamical Systems. PUC Chile, October 8-19, 2018.
- XXXI Mathematical Meeting of Southern Area. Austral University of Chile, April 25-27, 2018.
- LXXXVI Annual Meeting of the Chilean Mathematical Society. University of Talca, November 2-4, 2017.
- III Chilean Meeting of Number Theory. PUC Chile, May 9–10, 2016.

Academic Visits

- University of Washington. Invited by Gunther Uhlmann. August 2024-July 2025.
- University of Chile. Invited by Axel Osses. February, 2024.
- Pontifical Catholic University of Chile. Invited by Mariel Sáez Trumper. June-August, 2022.

Mathematical Service

- Organizer Baby Inverse Problems Seminar (Zoom seminar), Fall 2024.
- Coorganized Graduate Students Analysis Seminar at Purdue University, 2023.

Poster Presentations

- "A Calderón's Problem for Harmonic Maps", Joint Meeting of the New Zealand, Australian and American Mathematical Societies, The University of Auckland. December 2024.
- "Boundary and Scattering Rigidity: $\mathcal{MP}$-systems and Stationary Manifolds", Microlocal Analysis and Quantum Dynamics 2024, Northwestern University. June, 2024.
- "Boundary and Scattering Rigidity: $\mathcal{MP}$-systems and Stationary Manifolds", CBMS Conference: Inverse Problems and Nonlinearity, Clemson University. June, 2024.

Talks on Students Seminars

- *A Calderón's problem for harmonic maps*, Graduate Students Analysis Seminar, University of Washington, November, 2024.
- *Simple manifolds and the folliation condition*, Topolodays, Purdue University, October 2023.
- *Boundary rigidity problem under the presence of a magnetic field and a potential*, Graduate Students Analysis Seminar, Purdue University, September 2023.
- *Microlocal Stability of the X-ray transform*, Graduate Students Analysis Seminar, Purdue University, January 2023.
- *The Sphere Theorem of Micallef and Moore*, Topolodays, Purdue University, September 2022.
- *Topological Restrictions for the Existence of Harmonic Maps between Riemannian Manifolds*, Topolodays, Purdue University, April 2022.
- *Phase transitions with bounded Morse index*, Seminario de Geometría Diferencial (reading seminar), Pontificia Universidad Católica de Chile, November 2021.
- *Bounds and extensions of harmonic maps*, Seminario de Geometría Diferencial (reading seminar), Pontificia Universidad Católica de Chile, September 2020.
- *Evolution of geometric quantities under Ricci Flow*, Seminario de Geometría Diferencial (reading seminar), Pontificia Universidad Católica de Chile, October 2020.
- *Pólya's theorem about transcendent functions*, Seminario de Teoría de Números, Pontificia Universidad Católica de Chile, October 2019.
- *Finite time extinction of the third homotopy group*, Seminario de Geometría Diferencial (reading seminar), Pontificia Universidad Católica de Chile, September 2019.
- *Classic results on harmonic functions and Sobolev spaces*, Seminario de Geometría Diferencial (reading seminar), Pontificia Universidad Católica de Chile, September 2018.
- *Introduction to the Modular Forms*, Seminario de Teoría de Números, Pontificia Universidad Católica de Chile, June 2018.
- *Preliminars of Riemannian geometry*, Seminario de Geometría Diferencial (reading seminar), Pontificia Universidad Católica de Chile, August 2017.

Work experience

Teaching Assistant at Purdue University:

- Spring 2023: Multivariate Calculus (MA 26100).

Grader at Purdue University:

- Fall 2022: Foundations Of Analysis (MA 34100), Elements Of Algebra I (MA 45300).
- Spring 2022: Ordinary Differential Equations (MA 36600).
- Fall 2021: Elementary Linear Algebra (MA 35100).

Teaching Assistant of the mini course "Geometric flows: Deforming geometry in time" at Mathematics Sin Fronteras, Spring 2021. (Pan-American (virtual) bilingual (English-Spanish) extracurricular weekly math outreach lecture series spread over a 3-month period)

Teaching Assistant at Pontificia Universidad Católica de Chile:

- 2017-2021: *Taller de Razonamiento Matemático* (TRM). Course for talented high school students.
- 2021-1st Semester: *Partial Differential Equations*. Faculty of Mathematics.
- 2021-1st Semester: *Introduction to Algebra*. Faculty of Mathematics.
- 2020-2nd Semester: *Analisis II* (for graduate students). Faculty of Mathematics.
- 2020-2nd Semester: *Integration Theory*. Faculty of Mathematics.
- 2020-1st Semester: *Calculus II*. School of Engineering.
- 2020-1st Semester: *Introduction to Algebra*. Faculty of Mathematics.
- 2019-2nd Semester: *Complex Variables*. Faculty of Mathematics.
- 2019-1st Semester: *Differential Geometry*. Faculty of Mathematics.
- 2019-1st Semester: *Calculus III*. School of Engineering.
- 2018-2nd Semester: *Integration Theory*. Faculty of Mathematics.
- 2018-1st Semester: *Mathematics Workshop*. Faculty of Mathematics/Faculty of Education.
- 2018-1st Semester: *Calculus III*. Faculty of Education/Faculty of Mathematics.
- 2018-Summer: *PIMU A Program* (for freshmen). Faculty of Education/Faculty of Mathematics.
- 2017-2nd Semester: *Algebra and Number Systems II* (for students of Pedagogy in Mathematics). Faculty of Education.
- 2017: *SAM* (help room for freshmen of mathematics). Faculty of Mathematics.
- 2017-1st Semester: *Mathematics Workshop*. Faculty of Mathematics/Faculty of Education.
- 2017-Summer: *PIMU B and C Program* (for freshmen). Faculty of Engineering.
- 2016-2nd Semester: *Introduction to Calculus*. Faculty of Mathematics.
- 2016-Summer: *PIMU B Program* (for freshmen). Faculty of Engineering.

Activities related to Mathematical Competitions

- Grader for the Chilean Mathematical Olympiad, 2017-2020.
- Instructor of the Chilean Team for Cono Sur Mathematical Olympiad, 2017.
- Member of the Academic Committee of the Campeonato Nacional de Matemáticas (CMAT). 2015-2016.

Activities related to Mathematics outreach

- *Ciencia al Parque*. Carnival for diffusion of science. Stand: Bubbles and minimal surfaces. Santiago, Chile, October 6th, 2018.