

CARLOS PÉREZ-ARANCIBIA

Curriculum Vitae

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Last updated December 22, 2024

RESEARCH INTERESTS

Scientific computing; high-order PDE solvers; fast algorithms; numerical analysis; boundary and volume integral equations; wave phenomena; computational electromagnetics; optical metamaterials.

EMPLOYMENT HISTORY

ASSOCIATE PROFESSOR (UHD2, TENURED) Mathematics of Computational Science Department of Applied Mathematics Faculty of Electrical Engineering, Mathematics and Computer Science University of Twente, Enschede, the Netherlands	12/24 – Present
ASSISTANT PROFESSOR (UD1, TENURED) Mathematics of Computational Science Department of Applied Mathematics Faculty of Electrical Engineering, Mathematics and Computer Science University of Twente, Enschede, the Netherlands	9/21 – 11/24
ASSISTANT PROFESSOR Institute for Mathematical and Computational Engineering Pontificia Universidad Católica de Chile, Santiago, Chile	7/17 – 8/21
INSTRUCTOR IN APPLIED MATHEMATICS Department of Mathematics Massachusetts Institute of Technology, Cambridge, MA, USA	9/16 – 6/18

EDUCATION

CALIFORNIA INSTITUTE OF TECHNOLOGY, PASADENA, CA, USA · Ph.D. in Applied & Computational Mathematics · Thesis supervisor: Oscar P. Bruno	8/16
PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE, SANTIAGO, CHILE · Diploma in Mathematical Engineering (with the highest distinction) · Master in Engineering Sciences (with the highest distinction) · Minor in Philosophy · Bachelor in Engineering Sciences	5/10 5/10 5/10 12/08
UNIVERSITY TEACHING QUALIFICATION (UTQ) University of Twente, The Netherlands Recognized for meeting national standards in higher education teaching.	11/24

JOURNAL PAPERS¹

27. ‡ V. Hojas, C. Pérez-Arancibia and M. A. Sánchez, *Reflectionless discrete perfectly matched layers for higher-order finite difference schemes*. SIAM J. Sci. Comput. 46.5 (2024), pp. A3094-A3123.
26. † A.-S. Bonnet-Ben Dhia, L. Faria and C. Pérez-Arancibia, *A complex-scaled boundary integral equation for time-harmonic water waves*. SIAM J. Appl. Math., 84.4 (2024), pp. 1532-1556.

¹Papers marked with the symbol † follow the mathematical tradition of alphabetical authorship ordering, whereas those marked with ‡ denote work with mentored students.

- 25.† T. G. Anderson, M. Bonnet, L. M. Faria and C. Pérez-Arancibia, *Fast, high-order accurate numerical evaluation of volume potentials via polynomial density interpolation*, J. Comput. Phys., 511 (2024), p. 11309.
- 24.† T. G. Anderson, M. Bonnet, L. M. Faria, and C. Pérez-Arancibia, *Construction of polynomial particular solutions of linear constant-coefficient partial differential equations*, Comput. Math. Appl., 162 (2024), pp. 94-103.
- 23.† L. Faria, C. Pérez-Arancibia and C. Turc, *Combined field-only boundary integral equations for PEC electromagnetic scattering problem in spherical geometries*, SIAM J. Appl. Math., 84.1 (2024), pp. 1-38.
- 22.‡ T. Strauszer-Caussade, L. Faria, A. Fernandez-Lado and C. Pérez-Arancibia, *Windowed Green function method for wave scattering by periodic arrays of 2D obstacles*, Stud. Appl. Math., 150.1. (2023), pp. 277-315.
- 21.‡ R. Arrieta and C. Pérez-Arancibia, *Windowed Green function MoM for second-kind surface integral equation formulations of layered media electromagnetic scattering problems*, IEEE Trans. Antennas Propag., 70.12 (2022), pp. 11978-11989.
- 20.‡ V. Gómez and C. Pérez-Arancibia, *On the regularization of Cauchy-type integral operators via the density interpolation method and applications*, Comput. Math. Appl., 87 (2021), pp. 108-119.
19. L. Faria, C. Pérez-Arancibia and M. Bonnet, *General-purpose kernel regularization of boundary integral equations via density interpolation*, Comput. Methods Appl. Mech. Eng., 378 (2021), p. 113703.
18. C. Pérez-Arancibia, C. Turc, L. Faria and C. Sideris, *Planewave density interpolation methods for the EFIE on simple and composite surfaces*, IEEE Trans. Antennas Propag., 69.1 (2021), pp. 317-331.
- 17.† D. Nicholls, C. Pérez-Arancibia, and C. Turc, *Sweeping preconditioners for the iterative solution of quasiperiodic Helmholtz transmission problems in layered media*, J. Sci. Comput., 82.44 (2020), pp. 1-45.
- 16.‡ I. Labarca, L. Faria and C. Pérez-Arancibia, *Convolution quadrature methods for time-domain scattering from unbounded penetrable interfaces*, Proc. R. Soc. A, 475.2027 (2019), pp. 1-18.
15. C. Pérez-Arancibia, C. Turc and L. Faria, *Planewave density interpolation methods for 3D Helmholtz boundary integral equations*, SIAM J. Sci. Comput., 41.4. (2019), pp. A2065-A2087.
- 14.† C. Pérez-Arancibia, S. Shipman, C. Turc and S. Venakides, *Domain decomposition for quasi-periodic scattering by layered media via robust boundary-integral equations at all frequencies*, Commun. Comput. Phys., 26 (2019), pp. 265-310.
13. C. Pérez-Arancibia, L. Faria and C. Turc, *Harmonic density interpolation methods for high-order evaluation of Laplace layer potentials in 2D and 3D*, J. Comput. Phys., 376 (2019), pp. 411-434.
12. R. Pestourie, C. Pérez-Arancibia, Z. Lin, W. Shin, F. Capasso and S. G. Johnson, *Inverse design of large-area metasurfaces*, Opt. Express, 26.26. (2018), pp. 33732-33747.
11. C. Pérez-Arancibia, R. Pestourie and S. G. Johnson, *Sideways adiabaticity: Beyond ray optics for slowly varying metasurfaces*, Opt. Express, 26.23. (2018), pp. 30202-30230.
10. C. Pérez-Arancibia, E. Godoy and M. Durán, *Modeling and simulation of an acoustic well stimulation method*, Wave Motion, 77 (2018), pp. 214-228.
9. C. Pérez-Arancibia, *A planewave singularity subtraction technique for the classical Dirichlet and Neumann combined field integral equations*, Appl. Numer. Math., 123 (2018), pp. 221-240.
- 8.† C. Jerez-Hanckes, C. Pérez-Arancibia and C. Turc, *Multitrace/singletrace formulations and domain decomposition methods for the solution of Helmholtz transmission problems for bounded composite scatterers*, J. Comput. Phys., 350 (2017), pp. 343-360.
- 7.† O. P. Bruno, E. Garza-Gonzalez and C. Pérez-Arancibia, *Windowed Green Function method for nonuniform open-waveguide problems*, IEEE Trans. Antennas Propag., 65.9 (2017), pp. 4684-4692.
- 6.† O. P. Bruno and C. Pérez-Arancibia, *Windowed Green Function method for the Helmholtz equation in presence of multiply layered media*, Proc. R. Soc. A, 473.2202 (2017), pp. 1-20.
- 5.† O. P. Bruno, M. Lyon, C. Pérez-Arancibia and C. Turc, *Windowed Green Function method for layered-media scattering*, SIAM J. Appl. Math., 76.5 (2016), pp. 1871-1898.

4. C. Pérez-Arancibia and O. Bruno, *High-order integral equation methods for problems of scattering by bumps and cavities on half-planes*, J. Opt. Soc. Am. A, 31.8 (2014), pp. 1738-1746.
3. C. Pérez-Arancibia, P. Zhang, O. P. Bruno and Y. Y. Lau, *Electromagnetic power absorption due to bumps and trenches on flat surfaces*, J. Appl. Phys., 116.12 (2014), p. 124904.
2. C. Pérez-Arancibia, P. Ramaciotti, R. Hein and M. Durán, *Fast multipole boundary element method for the Laplace equation in a locally perturbed half-plane with a Robin boundary condition*, Comput. Methods Appl. Mech. Engrg., 233.1. (2012), pp. 152-163.
1. C. Pérez-Arancibia and M. Durán, *On the Green's function for the Helmholtz operator in an impedance circular cylindrical waveguide*, J. Comput. Appl. Math., 235.1 (2010), pp. 244-262.

CONFERENCE (PEER-REVIEWED) PAPERS²

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- L. M. Faria, C. Pérez-Arancibia, and C. Turc. Combined field-only boundary integral equations for electromagnetic scattering. Accepted to *WAVES 2024: The 16th International Conference on Mathematical and Numerical Aspects of Wave Propagation*, June 30–July 5, 2024, Berlin, Germany.
 - T. G. Anderson, L. M. Faria, and C. Pérez-Arancibia. Solving boundary and volume integral equations with `Inti.jl`. Accepted to *WAVES 2024: The 16th International Conference on Mathematical and Numerical Aspects of Wave Propagation*, June 30–July 5, 2024, Berlin, Germany.
 - T. G. Anderson, M. Bonnet, L. M. Faria, and C. Pérez-Arancibia. Fast, provably high-order accurate methods for volume integral operators. Accepted to *WAVES 2024: The 16th International Conference on Mathematical and Numerical Aspects of Wave Propagation*, June 30–July 5, 2024, Berlin, Germany.
 - T. Strauszer-Caussade, L. M. Faria, and C. Pérez-Arancibia, Windowed Green function method for wave scattering by periodic arrays of 2D obstacles. Accepted to *WAVES 2024: The 16th International Conference on Mathematical and Numerical Aspects of Wave Propagation*, June 30–July 5, 2024, Berlin, Germany.
 - R. Arrieta, L. Faria, C. Pérez-Arancibia, and C. Turc. A high-order density-interpolation-based Nyström method for three-dimensional electromagnetic boundary integral equations. *WAVES 2022: The 15th International Conference on Mathematical and Numerical Aspects of Wave Propagation*, July 24–29 2022, Palaiseau, France.
 - J. Hu, E. Garza, C. Pérez-Arancibia and C. Sideris. High-Order accurate integral equation based mode solver for layered nanophotonic waveguides. *International Microwave Symposium*, June 6–11 2021, Atlanta, GA, USA.
 - C. Pérez-Arancibia and O. P. Bruno. A high-order integral equation solver for problems of electromagnetic scattering by three-dimensional open surfaces. *WAVES 2015: The 12th International Conference on Mathematical and Numerical Aspects of Wave Propagation*, July 20–24 2015, Karlsruhe, Germany.


THESES

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- Windowed integral equation methods for problems of scattering by defects and obstacles in layered media. Ph.D. thesis, California Institute of Technology, Pasadena, CA, USA, 2016.
 - Modeling and simulation of time-harmonic wave propagation in cylindrical impedance waveguides: Application to an oil well stimulation technology. Master's thesis, Escuela de Ingeniería, Pontificia Universidad Católica de Chile, Santiago, Chile, 2010.

SELECTED TALKS AND PRESENTATIONS

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- The 13th International Conference on Mathematical and Numerical Aspects of Wave Propagation (WAVES 2024), Berlin, Germany, June 20–July 5, 2024.
 - International Conference on Applied Mathematics (ICAM 2024), City University of Hong Kong, Hong Kong, May 28 – June 1, 2024 (invited speaker).
 - Institute of Computational Mathematics and Scientific Computing Seminar, Chinese Academy of Sciences, May 7, 2024 (invited talk online).

²The speaker's name is underlined.

- Seminars in Numerical Analysis, Delft University of Technology, Delft, March 16, 2024 (invited talk).
- The 10th International Congress on Industrial and Applied Mathematics (ICIAM 2023), Tokyo, Japan, August 20–25, 2023 (invited talk).
- Workshop on Computational Methods for Multiple Scattering. Isaac Newton Institute, Cambridge, UK, April 17–21, 2023 (invited talk). [Link to video](#) .
- SIAM Conference on Computational Science and Engineering, Amsterdam, The Netherlands, March 1, 2023.
- The 12th International Conference on Mathematical and Numerical Aspects of Wave Propagation (WAVES 2022), Palaiseau, France, July 25–29, 2022.
- IEEE GRSS-APS Joint Student Chapter, University of Southern California, Los Angeles, CA, USA, April 7, 2022 (invited talk online).
- Conference on Mathematics of Wave Phenomena, Karlsruhe, Germany, February 14–18, 2022 (invited talk online).
- Applied Mathematics Colloquium, University of Colorado at Boulder, January 21, 2022 (invited talk online).
- International Conference on Spectral and High Order Methods (ICOSAHOM 2020+1), Vienna, Austria, July 12–16, 2021.
- POEMS Seminar, ENSTA Paris, Palaiseau, France, April 15, 2021 (invited talk online).
- Numerical Analysis of Electromagnetic Problems, Oberwolfach Mathematical Research Institute, Germany, March 23, 2021 (invited talk online).
- Applied Mathematics Colloquium, New Jersey Institute of Technology, Newark, NJ, USA, January 31, 2020 (invited talk).
- Numerical Methods for Partial Differential Equations Seminar, MIT, Cambridge, MA, USA, January 29, 2020 (invited talk).
- Applied Mathematics and Scientific Computing Seminar, Temple University, Philadelphia, PA, USA, January 27, 2020 (invited talk).
- French Latin-American Conference on New Trends in Applied Mathematics, Center for Mathematical Modeling, Universidad de Chile, Santiago, Chile, November 5–8, 2019 (invited talk).
- PUC-Bath Workshop on PDE's and Applications, Santiago, Chile, September 12, 2019 (invited talk).
- Coloquio del Departamento de Ingeniería Matemática, Universidad de Concepción, Chile, May 23, 2019 (invited talk).
- SIAM Conference on Computational Science and Engineering, Spokane, Washington, WA, USA, March 1, 2019 (invited talk).
- The 6th Chilean Workshop on Numerical Analysis of Partial Differential Equations (WONAPDE 2019), Concepción, Chile, January 22, 2019.
- The 2nd Chilean Symposium on Boundary Element Methods, Universidad Federico Santa María, Valparaíso, Chile, December 14, 2018 (invited talk).
- Mathematical Sciences Colloquium, University of Massachusetts at Lowell, MA, USA, October 13, 2017 (invited talk).
- Institute for Mathematical and Computational Engineering Seminar, PUC, Santiago, Chile, August 24, 2017 (invited talk).
- Caleta Numérica, Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile, August 18, 2017 (invited talk).
- The 9th Meeting on Numerical Analysis of Partial Differential Equations (Santiago Numérico III), Santiago, Chile, June–28–30, 2017.
- Numerical Methods for Partial Differential Equations Seminar, MIT, Cambridge, MA, USA, April 19, 2017 (invited talk).

- The 10th International Conference on Scientific Computing and Applications, Fields Institute, Toronto, Canada, June 6-10, 2016 (invited talk).
- The 13th Annual Conference on Frontiers in Applied and Computational Mathematics (FACM 2016), Newark, NJ, USA, June 3-4, 2016 (invited talk).
- Applied and Computational Mathematics Seminar, University of California, Irvine, CA, USA, February 22, 2016 (invited talk).
- Applied and Computational Mathematics Seminar, University of California, Merced, CA, USA, February 2, 2016 (invited talk).
- The 12th International Conference on Mathematical and Numerical Aspects of Wave Propagation (WAVES 2015), Karlsruhe, Germany, July 20-24, 2015.
- AMMCS-CAIMS Congress, Waterloo, Ontario, Canada, June 7-12, 2015 (invited talk).
- SIAM Conference on Computational Science and Engineering, Salt Lake City, Utah, USA, March 14-18, 2015 (invited talk).
- International Conference on Spectral and High Order Methods (ICOSAHOM 2014), Salt Lake City, UT, USA, June 23-27, 2014.
- NSF Workshop on the BEM, University of Minnesota, Minneapolis, MN, USA, April 23-26, 2012 (poster).
- Valparaíso's Mathematics and its Applications Days, Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile, December 12-14, 2012 (invited talk).

TEACHING EXPERIENCE

UNIVERSITY OF TWENTE

9/21 - Present

Lecturer

- Analysis I, 1st term, 2022 and 2023.
- Analysis II, 2nd term, 2022 and 2023.
- Introduction to Partial Differential Equations, 3rd term, 2024.
- Finite Element Methods, 3rd term, 2024.

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE

6/18 - 8/21

Lecturer

- Calculus III (MAT1630), 1st semester of 2020 (~240 students) and 2021 (~190 students).
- Engineering Applications of PDEs and Functional Analysis (IMT3130/3773), 1st semester of 2019, 2020, and 2021.
- Scientific Computing II (MAT2615), 2nd semester 2020.
- Scientific Computing I (MAT2605), 2nd semester 2019.
- Advanced Topics in Numerical Analysis (IMT3810), 2nd semester 2019.
- Capstone Course on Mathematical and Computational Engineering (IMT3500), 2nd semester 2018.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

9/16 - 6/18

Lecturer

- Fast Methods for Partial Differential and Integral Equations (18.336J/6.335J), Fall 2016 and 2017 (link to the course's website [↗](#)).
- Linear Partial Differential Equations: Analysis and Numerics (18.303), Spring 2018.

CALIFORNIA INSTITUTE OF TECHNOLOGY

9/12 - 6/16

Teaching Assistant

- Methods of Applied Mathematics A (ACM101A), Fall 2014 and 2015.
- Methods of Applied Mathematics B (ACM101B), Winter 2015 and 2016.
- Introductory Methods of Applied Mathematics A (ACM100A), Fall 2012, 2013 and 2014.
- Introductory Methods of Applied Mathematics B (ACM100B), Winter Term 2013.

- Introductory Methods of Applied Mathematics C (ACM100C), Spring 2013, 2014 and 2015.
- Introductory Methods of Computational Mathematics B (ACM106B), Winter 2014.

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
Lecturer

8/10 - 12/10

- Mathematical Methods Applied to Engineering (IMM2650), 2nd Semester 2010.

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
Teaching Assistant

3/06 - 12/09

- Numerical Analysis of Partial Differential Equations, 2nd semester 2009.
- Introduction to Numerical Analysis of Partial Differential Equations, 1st semester 2009.
- Calculus II, 2nd semester 2008.
- Calculus III, 2nd semester 2008.
- Partial Differential Equations, 1st semester 2007 and 2008.
- Calculus I (Maple laboratory), 1st semester 2008.
- Differential Equations, 1st semester 2006 and 2nd semester 2007.
- Linear Algebra, 1st and 2nd semesters 2006.

FUNDING

- NWO OPEN COMPETITION DOMAIN SCIENCE (M1) awarded by the Dutch Research Council, the Netherlands
 Title: *Density interpolation methods for the fast and high-order evaluation of volume potentials in complex geometries*
 Role: Principal investigator
 Period: 2024 – 2028 (4 years)
 Budget: €372,565 (~ \$405,209)
- STRATEGIC RESEARCH INITIATIVE awarded by the 4TU Applied Mathematics Institute, the Netherlands
 Title: *Advancing mathematical methods for wave phenomena*
 Role: Co-principal investigator
 Period: 2024 – 2026 (2 years)
 Budget: €5,000 (~\$5,515) extendable to €25,000 (~\$27,579).
- FONDECYT DE INICIACIÓN EN INVESTIGACIÓN awarded by Agencia Nacional de Investigación y Desarrollo, Chile
 Title: *Fast and efficient method of moments for electromagnetic wave propagation and scattering in the presence of unbounded material interfaces*
 Role: Principal investigator
 Period: 2018 – 2021 (3 years)
 Budget: CLP 61,298,000 (~ \$87,500)
- MISTI GLOBAL SEED FUNDS awarded by the Massachusetts Institute Technology and the Pontificia Universidad Católica de Chile
 Title: *High-Contrast challenges in numerical wave scattering*
 Role: Co-principal investigator
 Period: 2016 – 2017 (2 years)

AWARDS

- TOP CHINA UC SANTANDER FELLOWSHIP, December 2018.
- ICES POSTDOCTORAL FELLOWSHIP, UNIVERSITY OF TEXAS AT AUSTIN, February 2016 (declined).
- IMA POSTDOCTORAL FELLOWSHIP, UNIVERSITY OF MINNESOTA, January 2016 (declined).
- PIMS POSTDOCTORAL FELLOWSHIP (CANADA), December 2015 (declined).
- AMMCS-CAIMS STUDENT TRAVEL AWARD, June 2015.
- SIAM STUDENT TRAVEL AWARD, March 2015.

- STUDENT TRAVEL AWARD, NSF Workshop on the BEM, University of Minnesota, April 2012.
- CALTECH INSTITUTE FELLOWSHIP, September 2011.
- CONICYT SCHOLARSHIP FOR MASTER'S STUDIES IN CHILE, January 2009.
- PADRE ALBERTO HURTADO AWARD, Pontificia Universidad Católica de Chile, March 2003.

SERVICE

JOURNAL PAPER REVIEW

- Journal of Computational Physics (2015, 2018, 2019, 2022)
- SIAM Journal on Applied Mathematics (2018, 2020, 2022)
- SIAM Journal on Scientific Computing (2017)
- SIAM Journal on Numerical Analysis (2018)
- Computers and Mathematics with Applications (2019)
- Advances in Computational Mathematics (2023)
- IMA Journal of Applied Mathematics (2022)
- IMA Journal of Numerical Analysis (2020)
- SN Partial Differential Equations and Applications (2020)
- IEEE Transactions on Antennas and Propagation (2021)
- Engineering Optimization (2017)
- International Journal for Numerical Methods in Engineering (2015)
- Journal of Algorithms and Optimization (2014)
- Progress in Electromagnetic Research PIERS (2011, 2012, 2014)
- International Journal on Geomathematics (2022)
- Journal of Applied Mechanics (2024)
- Nature Communications (2023)

SEMINAR AND MINISYMPOSIUM ORGANIZATION

- Kick-off meeting of the 4TU.AMI Strategic Research Initiative: WAVES NL: Advancing Mathematical Methods for Wave Phenomena. University of Twente, Sept. 20, 2024.
- Recent Advances on Integral Equation and Spectral Methods for Inhomogeneous Problems (with Thomas G. Anderson, Rice University). Minisymposium at SIAM CSE 2023, March 2023.
- Time-Evolution and Frequency-Domain Methods for Partial Differential Equations (with David Shirokoff, NJIT). Minisymposium at WONAPDE 2019, January 2019.
- Seminar of the Institute for Mathematical and Computational Engineering. Weekly research seminar for graduate and undergraduate applied mathematics students at PUC Chile. 2020 academic year.
- Numerical Methods for Partial Differential Equations Seminar (with Manuel A. Sánchez, PUC). PUC Chile, 2nd Semester 2018.

MEMBERSHIPS

- Applied Mathematics Programme Committee, University of Twente (since September 2023).
- Society of Industrial and Applied Mathematics (SIAM).
- Institute of Electrical and Electronics Engineers (IEEE).

PARTICIPATION IN PH.D. COMMITTEES

- Erli Wind-Andersen, Ph.D. in Mathematical Sciences, New Jersey Institute of Technology.
- Ruben Ailwyn. Ph.D. in Electrical Engineering, PUC Chile.

PARTICIPATION IN M.Sc COMMITTEES

- Lavinia Lanting, MSc. in Applied Mathematics, University of Twente.
- Bert Oudsten, MSc. in Applied Mathematics, University of Twente.
- Reinout Nonhebel, MSc. in Applied Physics, University of Twente.

- Genaro Laymuns, MSc. in Mathematical and Computational Engineering, PUC.
- Pedro Izquiero, MSc. in Mathematical and Computational Engineering, PUC.

RESEARCH SUPERVISION

CURRENT GRADUATE STUDENTS MENTORSHIP

- Juan Sebastian Burbano: Ph.D. student at University of Twente (Sept. 2024 – Present).

FORMER GRADUATE STUDENTS MENTORSHIP

- Vicente Hojas: Master's student at PUC Chile (now Ph.D. student at Caltech).
- Thomas Strauszer: Master's student at PUC Chile (now Ph.D. student at University College London).
- Rodrigo Arrieta: Master's student at PUC Chile (now Ph.D. student at MIT).
- Ignacio Labarca: Master's student at PUC Chile (Ph.D. from ETH Zürich).

FORMER UNDERGRADUATE STUDENTS MENTORSHIP

- Robert-Jan Nijhuis: Bachelor's thesis at University of Twente.
- Mayank Thakur: Bachelor's thesis at University of Twente.
- Gernt Hanskamp: Bachelor's thesis at University of Twente.
- Jelle Boon: Bachelor's thesis at University of Twente.
- Guilhem Penet: Research internship as bachelor student from ENSTA Paris, France.
- Vicente Gomez: Bachelor's student at PUC Chile (now Ph.D. student at NYU Courant Institute).