

Nicolás Carreño

Assistant Professor

Universidad Técnica Federico Santa María
Campus Vitacura, Santiago, Chile

Postal address:
Universidad Técnica Federico Santa María (UTFSM)
Departamento de Matemática
Avda. Santa María 6400
7660251 Vitacura
Santiago, Chile
✉ nicolas.carrenog@usm.cl
📧 ncarreno.mat.utfsm.cl

Office address:
Avda. Santa María 6400, Vitacura, Santiago
Oficina A-256

PERSONAL DETAILS

Date of birth: August 15th, 1983.

Citizenship: Chilean.

Marital status: Married.

PROFESSIONAL EMPLOYMENT

2017- Universidad Técnica Federico Santa María, Departamento de Matemática, **Assistant Professor**, Santiago - Chile.

2014-2017 Universidad Técnica Federico Santa María, Departamento de Matemática, **Postdoctoral Researcher**, Santiago - Chile.
Funded by FONDECYT Project No. 3150089.

EDUCATION

- 2014 **PhD in Mathematics**, Université Pierre et Marie Curie, Paris - France.
Thesis: On the controllability of some systems of the parabolic kind with a reduced number of controls and of a KdV equation in the vanishing dispersion limit.
- 2011 **Master of Sciences**, Université Pierre et Marie Curie, Paris - France.
Numerical Analysis and Partial Differential Equations (M2 ANEDP).
- 2009 **Mathematical Engineering Degree**, Universidad de Chile, Santiago - Chile.
- 2008 **Bachelor of Sciences**, Universidad de Chile, Santiago - Chile.
Major in Mathematics.

PUBLICATIONS

10. **Uniform null controllability of a linear KdV equation using two controls** (with S. Guerrero), *J. Math. Anal. Appl.* 457 (2018), no. 1, 922-943.
9. **Insensitizing controls for the Boussinesq system with no control on the temperature equation**, *Adv. Differential Equations* 22 (2017), no. 3-4, 235-258.
8. **On the cost of null controllability of a linear fourth order parabolic equation** (with P. Guzmán), *J. Differential Equations* 261 (2016), no. 11, 6485-6520.
7. **Local controllability of the stabilized Kuramoto-Sivashinsky system by a single control acting on the heat equation** (with E. Cerpa), *J. Math. Pures Appl.* 106 (2016), no. 4, 670-694.
6. **Insensitizing controls for a phase field system** (with B. M. R. Calsavara and E. Cerpa), *Nonlinear Anal.* 143 (2016), 120-137.
5. **On the non-uniform null controllability of a linear KdV equation** (with S. Guerrero), *Asymptot. Anal.* 94 (2015), no. 1-2, 33-69.

4. **Insensitizing controls with two vanishing components for the three-dimensional Boussinesq system** (with S. Guerrero and M. Gueye), *ESAIM Control Optim. Calc. Var.* 21 (2015), no. 1, 73-100.
3. **Insensitizing controls with one vanishing component for the Navier-Stokes system** (with M. Gueye), *J. Math. Pures Appl.* 101 (2014), no. 1, 27-53.
2. **Local controllability of the N-dimensional Boussinesq system with N-1 scalar controls in an arbitrary control domain**, *Math. Control Relat. Fields* 2 (2012), no. 4, 361-382.
1. **Local null controllability of the N-dimensional Navier-Stokes system with N-1 scalar controls in an arbitrary control domain** (with S. Guerrero), *J. Math. Fluid Mech.* 15 (2013), no. 1, 139-153.

AWARDS AND FELLOWSHIPS

- 2014 Postdoctoral grant by Fondecyt (Project No. 3150089: Control and inverse problems of partial differential equations).
- 2009 “Becas Chile PhD” Scholarship.
- 2007 Outstanding Student Award by Universidad de Chile.

TALKS

- 2017 **Control of parabolic systems and application to a hierarchical control problem**, LXXXVI Encuentro Anual - Sociedad de Matemática de Chile, Sesión Análisis de Ecuaciones Diferenciales Parciales, Talca - Chile, November 3.
- 2017 **Control of parabolic systems and application to a hierarchical control problem**, Séminaire du Département Automatique, Gipsa-lab - Université Grenoble-Alpes, Grenoble - France, September 14.
- 2017 **Sobre el costo a cero de algunas ecuaciones en derivadas parciales lineales**, XXX Jornada Matemática de la Zona Sur - Universidad Católica de la Santísima Concepción, Sesión Ecuaciones Diferenciales Parciales y Teoría de Control, Concepción - Chile, April 28.
- 2016 **Stackelberg-Nash exact controllability for the Kuramoto-Sivashinsky equation**, V CLAM, Congreso Latinoamericano de Matemáticos - Universidad del Norte, Barranquilla - Colombia, July 11.
- 2016 **Control de EDP: Observabilidad, costo y sistemas**, V-Coloquio, Instituto de Matemáticas - Pontificia Universidad Católica de Valparaíso, Valparaíso - Chile, June 14.
- 2015 **On the cost of null controllability of some partial differential equations**, 2da Escuela de Control y Optimización ECOPT 2015 - Universidad Técnica Federico Santa María, Santiago - Chile, December 17.
- 2015 **Insensitizing controls for the Boussinesq system with a reduced number of controls**, CAPDE seminar, Mathematical Engineering Department - Universidad de Chile, Santiago - Chile, November 30.
- 2015 **Sobre el costo a cero de algunas ecuaciones en derivadas parciales lineales**, LXXXIV Encuentro Anual - Sociedad de Matemática de Chile, Sesión Problemas Inversos y de Control de EDP, Pucón - Chile, November 28.
- 2015 **On the cost of null controllability of a linear KdV equation**, PDE Seminar, Mathematics Department - Universidade Federal de Pernambuco, Recife - Brazil, November 17.
- 2015 **On the cost of null controllability of a linear KdV equation**, Conference Partial Differential Equations, Optimal Design and Numerics, Centro de Ciencias de Benasque Pedro Pascual, Benasque - Spain, August 26.
- 2015 **On the cost of null controllability of a linear KdV equation**, Workshop on Control Systems and Identification Problems, Valparaíso - Chile, January 15.
- 2014 **Insensitizing controls with vanishing components for the Boussinesq system**, LXXXIII Encuentro Anual - Sociedad de Matemática de Chile, Sesión Problemas Inversos y de Control de EDP, Quinamávida - Chile, December 5.

- 2014 **On the cost of null controllability of a linear KdV equation**, Inverse and Control Problems Seminar, CMM - Universidad de Chile, Santiago - Chile, November 19.
- 2014 **Sur la contrôlabilité de quelques systèmes de type parabolique avec un nombre réduit de contrôles et d'une équation de KdV avec dispersion évanescence**, Groupe de Travail des Thésards, Laboratoire Jacques-Louis Lions - UPMC, Paris - France, September 30.
- 2014 **Insensitizing controls for the Boussinesq system with vanishing components**, Conference Control of PDEs, Conservatoire National des Arts et Métiers, Paris - France, April 2.
- 2014 **Some controllability results for the Navier-Stokes equation with a reduced number of scalar controls**, Department of Mathematics Student Seminar, Universidad Técnica Federico Santa María, Valparaíso - Chile, January 9.
- 2013 **Quelques résultats de contrôlabilité pour l'équation de Navier-Stokes avec un nombre réduit de contrôles**, Séminaire d'équations aux dérivées partielles et applications, Institut Élie Cartan de Nancy - Université de Lorraine, Nancy - France, June 4.
- 2013 **Quelques résultats de contrôlabilité avec un nombre réduit de contrôles**, Martinée Contrôle avec Alfio Quarteroni, Laboratoire Jacques-Louis Lions - UPMC, Paris - France, March 21.
- 2012 **Some controllability results for the Navier-Stokes and Boussinesq systems with a reduced number of scalar controls**, Inverse and Control Problems Seminar, CMM - Universidad de Chile, Santiago - Chile, September 6.
- 2012 **Some controllability results with a reduced number of controls via Carleman estimates**, Journée Interne LJLL, Laboratoire Jacques-Louis Lions - UPMC, Paris - France, March 14.
- 2011 **Local null controllability of the Navier-Stokes system with a reduced number of scalar controls**, Journée Jeunes Contrôleurs, Laboratoire Jacques-Louis Lions - UPMC, Paris - France, November 29.

CONFERENCE PARTICIPATION

Organization

- 2016 **Thematic Session: Control Theory and Inverse Problems**, 1er Encuentro de la Sociedad Matemática de Chile y la Unión Matemática Argentina (SUMA 2016) - U. de Valparaíso, U. Técnica Federico Santa María, Pontificia U. Católica de Valparaíso, Valparaíso - Chile, December 14-17.
- 2016 **Mini-Workshop on Control and Inverse Problems of PDE**, U. Técnica Federico Santa María, Valparaíso - Chile, January 18-19.

Attendance

- 2017 **LXXXVI Encuentro Anual - Sociedad de Matemática de Chile**, Universidad de Talca, Talca - Chile, November 2-4.
- 2017 **XXX Jornada de Matemática de la Zona Sur**, Universidad Católica de la Santísima Concepción, Concepción - Chile, April 26-28.
- 2016 **V CLAM - Congreso Latinoamerica de Matemáticos**, Universidad del Norte, Barranquilla - Colombia, July 11-15.
- 2016 **Nonlinear Partial Differential Equations and Applications - A conference in the honor of Jean-Michel Coron for his 60th birthday**, Institut Henri Poincaré, Paris - France, June 20-24.
- 2015 **LXXXIV Encuentro Anual - Sociedad de Matemática de Chile**, Green Park Hotel, Pucón - Chile, November 26-28.
- 2015 **Partial Differential Equations, Optimal Design and Numerics**, Centro de Ciencias de Benasque Pedro Pascual, Benasque - Spain, August 23-September 4.

- 2015 **Workshop on Control Systems and Identification Problems**, Universidad Técnica Federico Santa María, Valparaíso - Chile, January 12-16.
- 2014 **LXXXIII Encuentro Anual - Sociedad de Matemática de Chile**, Termas de Quinamávinda, Quinamávinda - Chile, December 4-6.
- 2014 **Control of PDEs**, Conservatoire National des Arts et Métiers, Paris - France, March 31-April 4.
- 2013 **MCPIT2013: Modelling, Control and Inverse Problems for the Planet Earth in all its states**, Institut Henri Poincaré, Paris - France, November 18-22.
- 2013 **Mathematical Aspects of Fluid-Structure Interactions**, Institut Henri Poincaré, Paris - France, November 4-8.
- 2013 **Partial Differential Equations, Optimal Design and Numerics**, Centro de Ciencias de Benasque Pedro Pascual, Benasque - Spain, August 25-September 5.
- 2013 **8th Workshop on Control of Distributed Parameter Systems**, University of Craiova, Craiova - Romania, July 1-5.
- 2012 **Thematic school of the GDRE ConEDP: Control of PDE's, interactions and application challenges**, Centre International de Rencontres Mathématiques (CIRM), Marseille - France, November 5-9.
- 2012 **International Conference on Inverse Problems and PDE Control**, Sichuan University, Chengdu - China, July 30-August 3.
- 2012 **Control of Fluid-Structure Systems and Inverse Problems**, Institut de Mathématiques de Toulouse, Université Paul Sabatier, Toulouse - France, June 25-28.
- 2012 **PASI-CIPPDE 2012 Inverse Problems and PDE Control**, Pontificia Universidad Católica de Chile, Santiago - Chile, January 16-27.
- 2010 **WIPA 2010: Workshop on Inverse Problems and Applications**, Universidad Técnica Federico Santa María, Valparaíso - Chile, January 18-22.
- 2010 **CIMPA Summer School on Inverse Problems and its Applications**, Universidad de Chile, Santiago - Chile, January 4-15.

TEACHING EXPERIENCE

Instructor

Universidad Técnica Federico Santa María, Santiago - Chile.

Linear Algebra (2016-02, 2017-02).

Optimization and Control (2016-01).

Introduction to Calculus (2015-01, 2015-02).

Differential and Integral Calculus (2017-01).

Universidad de los Andes, Santiago - Chile.

Differential and Integral Calculus (2010-01).

Ordinary Differential Equations (2010-01).

Teaching Assistant

Universidad de los Andes, Santiago - Chile.

Calculus (2009-02).

Differential and Integral Calculus (2008-02, 2009-01, 2009-02).

Algebra (2009-01).

Ordinary Differential Equations (2008-02, 2009-01).

Universidad de Chile, Santiago - Chile.

Ordinary Differential Equations (2006-02, 2007-01, 2007-02, 2008-01, 2008-02).

Algebra (2007-01).

Numerical Analysis of Partial Differential Equations (2008-02, 2009-02).

RESEARCH PROJECTS

- 2017- **Responsible Researcher**, FONDECYT Iniciación 11170489.
Carleman estimates and the control of parabolic systems

- 2017- **Researcher**, ECOS-CONICYT Project C16E06, Chile - France.
Control of distributed systems with applications in physical networks
- 2014-2017 **Responsible Researcher**, FONDECYT Postdoctorado 3150089.
Control and inverse problems of partial differential equations
- 2014-2015 **Researcher**, Math-Amsud Project COSIP 14MATH-03, Brazil - Chile - France.
Control Systems and Identification Problems
- 2011-2014 **PhD Student**, Laboratoire Jacques-Louis Lions, Université Pierre et Marie Curie, Paris - France.
Controllability of Navier-Stokes like systems with a reduced number of scalar controls.
Cost of null controllability of a transport equation in the zero-dispersion limit.

SERVICE TO PROFESSION

Journal Manuscript Review Work

Applied Mathematics and Computation
 Communications in Contemporary Mathematics
 ESAIM: Control, Optimisation and Calculus of Variations
 Journal of Mathematical Analysis and Applications
 Journal of Evolution Equations
 Journal de Mathématiques Pures et Appliquées
 Mathematical Control and Related Fields
 Mathematics of Control, Signals, and Systems
 Systems & Control Letters

Evaluation Committees

- 2017 Nicolás Espitia Hoyos, Thesis defense, PhD in automatic control, Université de Grenoble-Alpes, Grenoble - France.
- 2017 María Soledad Gutiérrez, Qualifying exam, PhD in mathematics, Universidad de Chile, Santiago - Chile.
- 2016 Cristhian Montoya, Thesis defense, PhD in mathematics, Universidad de Chile, Santiago - Chile.
- 2016 Roberto Morales, Qualifying exam, PhD in mathematics, Universidad de Chile, Santiago - Chile.
- 2016 Nicolás Molina, Thesis defense, Mathematical Engineering, Universidad de Chile, Santiago - Chile.

LANGUAGES

Spanish Native.
 English Fluent.
 French Fluent.