

Christophe Zhang

Postdoctoral researcher in applied mathematics

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Education

- 2016–2019 **PhD in applied mathematics.**
Laboratoire Jacques-Louis Lions, Sorbonne Université.
Internal control and stabilization of some 1D hyperbolic systems.
supervised by Jean-Michel Coron, thesis defended on October 25 2019.
- 2017–2018 **Master of public administration.**
Curriculum of the Corps des mines, École Nationale Supérieure des Mines de Paris.
- 2015–2016 **Master of Science - Mathematical modelling.**
Laboratoire Jacques-Louis Lions, Sorbonne Université
- 2015 **Accepted into the French Corps des mines.**
Special section of French public service.
- 2012–2015 **Engineering degree, pure and applied mathematics, theoretical physics.**
École polytechnique.

Research

- Since September 2021 **Guest researcher (in secondment), INRIA Nancy Grand Est, SPHINX team,**
Institut Élie Cartan de Lorraine.
Université de Lorraine
- 2020-2021 **Postdoctoral researcher, Friedrich-Alexander Universität Erlangen-Nürnberg,**
Chair for Applied Analysis, Alexander-von-Humboldt Professorship.
- 2016–2019 **PhD candidate, Laboratoire Jacques-Louis Lions, Sorbonne Université.**
- 2017 **Academic guest, Forschungsinstitut für Mathematik, ETH Zürich.**

Teaching

- 2023 **Lecturer, École des mines de Nancy, Mathematical engineering.**
Optimization: theory and practice
- 2020-2021 **Teaching assistant, FAU Erlangen Nürnberg.**
Mathematics for engineers (first year course).
Tutor and online support, FAU Erlangen, Transition Studies for Chemistry.
Basic statistics and calculus for future master students in chemistry.
- 2017 **Teaching assistant, ETH Zürich.**
Measure and integration (second year course).

Professional experience

Corporate

- Nov - Sept **Intern at la Grande Épicerie de Paris**, *Logistics*.
2015 - 2016 Designed the new logistical organization to prepare for the opening of a second outlet.

Volunteering

- Spring 2020 **Shelter for unaccompanied minors**, *Chios, Greece*, volunteer for the NGO METAdrasi.
Caretaking, language and math lessons, daily activities with children.
August 2015 **Volunteer coordinator**, *Festival Musique et Patrimoine en Pays du Mont-Blanc*.
Artistic liaison, logistics.
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Publications

Published in peer-reviewed journals

- [1] **Christophe Zhang**, *Internal controllability of systems of semilinear coupled one-dimensional wave equations with one control*, SIAM J. Control Optim. 56 no. 4 (2018) , 3092–3127.
- [2] **Christophe Zhang**, *Finite-time internal stabilization of a linear 1-D transport equation*, Systems Control Lett. 133 (2019), 104529.
- [3] **Christophe Zhang**, *Internal rapid stabilization of a 1-D linear transport equation with a scalar feedback*, Mathematical Control & Related Fields 12 no.1 (2022) , 169-200.
- [4] **Jean-Michel Coron, Amaury Hayat, Shengquan Xiang, Christophe Zhang**, *Stabilization of the linearized water tank system*, Archive for Rational Mechanics and Analysis 244 no.3 (2022), 1019-1097.
- [5] **Ludovick Gagnon, Amaury Hayat, Shengquan Xiang, Christophe Zhang**, *Fredholm transformation on Laplacian and rapid stabilization for the heat equation*, J. of Func. Analysis (2022), 109664.
- [6] **Christophe Zhang, Enrique Zuazua**, *A quantitative analysis for Koopman operator methods for system identification and predictions*, Comptes Rendus. Mécanique, Online first (2023), pp. 1-31. doi : 10.5802/crmeca.138..
- [7] **Ludovick Gagnon, Amaury Hayat, Shengquan Xiang, Christophe Zhang**, *Fredholm backstepping for critical operators and application to rapid stabilization for the linearized water waves* , Accepted by Annales de l'Institut Fourier.
- [8] **Camille Pouchol, Emmanuel Trélat, Christophe Zhang**, *Approximate control of parabolic equations with on-off shape controls by Fenchel duality* , Annales de l'Institut Henri Poincaré C (2024): 1-43..

Submitted in peer-reviewed journals

- [9] **Ivan Hasenohr, Camille Pouchol, Yannick Privat, Christophe Zhang,** *Computer-assisted proof of non-reachability for linear finite-dimensional control systems*, <https://hal.science/hal-04523794>, 2024.

Talks

National and international congresses

CANUM (Congress for Numerical Analysis, SMAI), *June 16 2022*, Évian-les-Bains, France, Minisymposium on constrained control for diffusion equations.

SIAM CT21, *July 20 2021*, Conference on Control and its Applications, Minisymposium on the stabilization of partial differential equations.

Workshop iNdAM: “Analysis and numerics of Design, Control and Inverse problems”, *July 7 2021*.

International Congress for Industrial and Applied Mathematics, *July 19 2019*, Valencia, Spain.

Rapid and finite-time stabilization of hyperbolic systems with a distributed scalar input.

Workshop LIA COPDESC: “Analysis, control and inverse problems for PDEs”, *November 26 2018*, Naples, Italy.

Internal stabilization of transport systems.

National SMAI Congress, *June 5 2017*, Ronce-lès-Bains, France.

Indirect control of coupled semilinear wave equations.

Seminars

Seminar for automatical engineering, *November 23 2023*, Laboratoire Signaux & Systèmes, Gif-sur-Yvette.

ANR SHAPO workshop, *April 7 2023*, Institut de Mathématiques de Jussieu-Paris Rive Gauche.

Seminar of the CO2 team, *October 6 2022*, Centre de Recherche en Automatique de Nancy.

Seminar for PDEs, analysis and applications, *June 3 2022*, Institut Élie Cartan de Lorraine, Metz.

Séminaire Équations aux dérivées partielles, *December 14 2021*, Institut de Recherche Mathématique Avancée, Strasbourg.

ANR TreCos workshop, *April 29 2021*.

Séminaire Analyse, Phénomènes Stochastiques et Applications, *April 13 2021*, Laboratoire de Mathématiques de Bretagne Atlantique, Brest.

Control in Times of Crisis Webinar, *February 18 2021*.

Stabilization of controllable systems: application to the water tank

CAA mini-workshop on hyperbolic problems, *October 12 2020*, FAU Erlangen-Nürnberg.

System identification using the Koopman operator: some quantitative considerations

Young controller's day, *June 21 2019*, Laboratoire Jacques-Louis-Lions.

Internal stabilization of linear 1D hyperbolic systems with a scalar control.

Seminar for PhD students, *January 31 2019*, CEREMADE.

Internal stabilization of a transport equation.

Computer and language skills

Programming Python, Matlab.

Languages French/English (bilingual), German (C1 - Goethe Institut), Mandarin (spoken).

Hobbies

Sports **Swimming, Yoga.**

Music **Piano**, *frequent concerts.*

Conducting, Assistant conductor of the Orchestre du Plateau de Saclay from 2016 to 2019, Music director of the Orchestre l'Échappée belle.

Music director of the Harmonie Nancéienne

Debating **In English**, *Secretary General of the la French Debating Association from 2018 to 2019.*

In French, *Former member of the Fédération Francophone de Débat.*

Founder of the French debating club of the École polytechnique.