

# Christophe Zhang

*Postdoctoral researcher in applied  
mathematics*

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## Experience

- Since April 2025 **Researcher (in secondment)**, *INRIA Paris*, CAGE team, Laboratoire Jacques-Louis Lions.  
Sorbonne Université
- 2021-2025 **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.

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## 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).

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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.

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## Professional experience

### Corporate

- Nov - Sept 2015 - 2016 **Intern at la Grande Épicerie de Paris**, *Logistics*.  
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..

- [9] **Ivan Hasenohr, Camille Pouchol, Yannick Privat, Christophe Zhang**, *Computer-assisted proof of non-reachability for linear finite-dimensional control systems*, SIAM Journal on Control and Optimization, 2025.

#### Submitted in peer-reviewed journals

- [10] **Camille Pouchol, Emmanuel Trélat, Christophe Zhang**, *Constructive reachability for linear control problems under conic constraints*, <https://hal.science/hal-04572161v1>, 2024.
- [11] **Ivan Hasenohr, Camille Pouchol, Yannick Privat, Christophe Zhang**, *Computer-assisted proofs of non-reachability for linear parabolic PDEs under bounded control constraints*, <https://hal.science/hal-05357694>, 2025.
- [12] **Ludovick Gagnon, Amaury Hayat, Swann Marx, Shengquan Xiang, Christophe Zhang**, *An abstract setting for the Fredholm backstepping transformation: self-adjoint case*, <https://inrap.hal.science/UNAM/hal-05354436v1>, 2025.
- [13] **Ludovick Gagnon, Christophe Zhang**, *Generalized backstepping and Gramian methods for spectral assignability in infinite dimension*, <https://hal.science/hal-05532504>, 2026.
- [14] **Camille Pouchol, Emmanuel Trélat, Christophe Zhang**, *Generalization of Farkas' lemma beyond closedness: a constructive approach via Fenchel-Rockafellar duality*, <https://hal.science/hal-05548185v1>, 2026.

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## 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, Roncesvalles, France.

Indirect control of coupled semilinear wave equations.

### Seminars

**Seminar of the LJLL**, *November 7 2025*, Laboratoire Jacques-Louis Lions, Paris.

**Seminar of the LMA**, *November 28 2024*, Laboratoire de Mathématiques d'Avignon, Avignon.

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

**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.

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## 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.

Former 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.