

# Borjan Geshkovski

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CONTACT INFORMATION	borjan.geshkovski@inria.fr <a href="https://borjanG.github.io">https://borjanG.github.io</a>	Laboratoire Jacques-Louis Lions Sorbonne Université Bureau 217, Tour 15-25 4 Place Jussieu 75005 Paris
	yob: 1994 citizenship: Macedonian	
RESEARCH INTERESTS	partial differential equations, machine learning	
APPOINTMENTS	<b>Tenured Junior Researcher</b> Inria – LJLL, Sorbonne Université	01.2024 – present
	<b>Postdoc</b> MIT mentors: Philippe Rigollet and Laurent Demanet	01.2022 – 12.2023
EDUCATION	<b>Ph.D. in Mathematics</b> Universidad Autónoma de Madrid adviser: Enrique Zuazua	07.2018 – 05.2021
	<b>M.Sc. in Mathematics</b> Université de Bordeaux mention Très Bien, ranked 1st	09.2016 – 06.2018
	<b>B.Sc. in Applied Mathematics &amp; Computer Science</b> Université de Bordeaux	09.2012 – 06.2016
ARTICLES	10. A mathematical perspective on Transformers with Cyril Letrouit, Yury Polyanskiy, Philippe Rigollet arXiv preprint, 2023	
	9. The emergence of clusters in self-attention dynamics with Cyril Letrouit, Yury Polyanskiy, Philippe Rigollet NeurIPS, 2024	
	8. Control of the Stefan problem in a periodic box with Debayan Maity Mathematical Models and Methods in the Applied Sciences, 2022	
	7. Sparse approximation in learning via neural ODEs with Carlos Esteve Systems and Control Letters, 2023	
	6. Optimal actuator design via Brunovsky’s normal form with Enrique Zuazua IEEE Transactions on Automatic Control, 2022	

5. Turnpike in optimal control of PDEs, ResNets, and beyond  
with Enrique Zuazua  
Acta Numerica, 2022
4. Turnpike in Lipschitz-nonlinear optimal control  
with Carlos Esteve, Dario Pighin, Enrique Zuazua  
Nonlinearity, 2022
3. Large-time asymptotics in deep learning  
with Carlos Esteve, Dario Pighin, Enrique Zuazua  
arXiv preprint, 2021
2. Controllability of one-dimensional viscous free boundary flows  
with Enrique Zuazua  
SIAM Journal on Control and Optimization, 2021
1. Null-controllability of perturbed porous medium gas flow  
ESAIM COCV, 2020

TALKS

[A mathematical perspective on Transformers](#)

Oberwolfach Seminar on Control and Learning	November 2024
Gijón French-Spanish Optimization conference	June 2024
Séminaire Parisien de Statistiques, Institut Henri Poincaré	June 2024
Imperial College London LC2 Seminar <sup>v</sup>	May 2024
Cargèse Optimal Transport Workshop	April 2024
SMAI MODE Workshop, Lyon	March 2024
SIAM Uncertainty Quantification, Trieste	February 2024
Liverpool MIF++ seminar <sup>v</sup>	February 2024
LJLL PEPR PDE-AI Kickoff meeting	January 2024
NUS Singapore Mathematics of Data Program	January 2024
MIT nmPDE Seminar	December 2023
NeurIPS New Orleans (Poster)	December 2023
Arizona Applied Math Guest Lecture <sup>v</sup>	November 2023
LAAS Toulouse Control Workshop	October 2023
Harvard Probabilitas Seminar	October 2023
UIUC CSL Seminar	October 2023
Allerton Conference	September 2023
Harvard Quantum Optics Meeting	September 2023

[Styling through matrix recovery](#)

Strasbourg SciML Workshop	July 2024
MIT ERL Annual Meeting	June 2023

[Control and learning](#)

IRMA Strasbourg PDE Seminar	November 2022
LJLL Groupe de Travail Contrôle	November 2022
SIAM Imaging Sciences <sup>v</sup>	March 2022
Cambridge Image Analysis Seminar <sup>v</sup>	2022
FAU Dynamics, Control and Numerics Seminar <sup>v</sup>	2022
Bordeaux ConFlex Workshop	August 2021
CSIC Machine Learning in Madrid <sup>v</sup>	2021
FAU Math of Deep Learning Seminar <sup>v</sup>	2021
Fields Institute Symposium on ML and Dynamical Systems <sup>v</sup>	2020
Imperial College London ConFlex Workshop <sup>v</sup>	2020

### Control of free boundaries

Benasque PDE, Optimal Design and Numerics Workshop	2019
ICMAT Homogenization, Spectral Theory and other topics in PDEs Workshop	2019
Madrid ConFlex Workshop	2019

VISITS At least one week: IMS Singapore (2024), UIUC (M. Raginsky, Sep. 2023), IRMA Strasbourg (Y. Privat, Nov. 2022), LJLL Paris (B. Després, Nov. 2022), FAU Erlangen (E. Zuazua, Jan. 2020), FAU Erlangen (G. Leugering, Nov. 2019)

TEACHING MIT  
18.300 – Principles of Continuum Applied Mathematics (Instructor) spring 2023

MENTORING Hugo Koubbi, M.Sc., ENS Paris-Saclay spring 2024  
Gatien Dony, M.Sc., UC Louvain & MIT summer 2023  
Rui Sun, Undergraduate Research Project, MIT summer 2022  
Pierre Mordant, M.Sc., École Polytechnique spring 2021

SERVICE Organization of conferences and mini-symposia:  
Oberwolfach Seminar: Control and Machine Learning November 2024

Journal Reviewer: Foundations of Computational Mathematics, Journal of Functional Analysis, Journal de Mathématiques Pures et Appliquées (quick opinion), Information and Inference: A Journal of the IMA, SIAM Journal on Scientific Computing, Journal of Differential Equations (x2), ESAIM: COCV (x2), Portugaliae Mathematica, Nonlinear Analysis, Mathematics of Control, Signals and Systems, Systems & Control Letters, Mathematical Control and Related Fields (x3), Advances in Differential Equations, Computational and Applied Mathematics

Conference Reviewer: CDC 2022, ECC 2022, INdAM Inverse problems and Control 2021