

Borjan Geshkovski

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| CONTACT INFORMATION | Chair of Computational Mathematics Universidad de Deusto Bilbao, 48009 Spain | (+34) 94 413 9003 Ext: 3282 geshkovskiborjan@gmail.com https://borjanG.github.io |
| PERSONAL INFORMATION | Born 9th of August, 1994 (26 years old). Citizenship: Macedonian. | |
| EXPERTISE | Machine learning and data science (deep neural networks, generative modeling), applied mathematics (control theory, partial differential equations) | |
| EDUCATION | PhD, Applied Mathematics Universidad Autónoma de Madrid | july 2018 - may 2021 |
| | Title: <i>Control in moving interfaces and deep learning</i> Advisor: <i>Enrique Zuazua</i> . | |
| | MSc, Applied Mathematics Université de Bordeaux | 2018 |
| | Summa Cum Laude (Mention "Très Bien"), Ranked 1st. | |
| PROFESSIONAL EXPERIENCE | BSc, Applied Mathematics and Computer Science Université de Bordeaux | 2016 |
| | Cum Laude (Mention "Assez Bien") Minor in Cognitive Science. | |
| | Early Stage Researcher Universidad Autónoma de Madrid | july 2018 - july 2021 |
| | I am an Early Stage Researcher within the Marie Skłodowska-Curie H2020 project " Control of flexible structures and fluid-structure interaction – ConFlex ". I am also affiliated with the Chair of Computational Mathematics in Fundación Deusto, Bilbao. | |
| | Internship DeustoTech, Universidad de Deusto, Bilbao (Spain). | february - april 2018 |
| | Research internship in optimal control and numerics of partial differential equations, variational inequalities in elasticity, and finite element discretizations (blog , report). Supervisor: <i>Enrique Zuazua</i> . | |
| | Internship Institut de Mathématiques de Bordeaux, CNRS (France). | may - august 2017 |
| | Research internship in analysis and partial differential equations, strongly continuous and analytic operator semigroups, and their application to control theory. I participated in the organization of the international workshop <i>Control of Distributed Parameter Systems 2017</i> . Supervisor: <i>Marius Tucsnak</i> . | |
| | Internship INRIA & Université de Bordeaux (France). | may - july 2015 |
| | Research internship in signal processing. Working in a team of two, we improved an existing software | |

and developed a new graphical user interface for the analysis of EEG signals. Programming was done in **Matlab**. ([link](#), [report](#))
 Supervisor: *Pierrick Legrand*.

HONORS AND AWARDS

- **Best Presentation Prize** february 2019
 I was awarded the "Best Presentation Prize" (500€) as the best among 15 presenters during the [2nd. workshop of the ConFlex consortium](#).
 I finished in second place for the same award during the [3rd. workshop of the ConFlex consortium](#).
- **Marie Skłodowska-Curie Fellowship** july 2018 - july 2021
 My PhD was financed by the Marie Skłodowska-Curie H2020 grant [Control of flexible structures and fluid-structure interaction - ConFlex](#).
- **Bourse du gouvernement français** september 2016 - may 2017
 A scholarship awarded on merit by the French government to top foreign MSc students in France.

PUBLICATIONS

[†] denotes first author, * denotes equal main contributors (authors listed in alphabetical order).

1. Sparse approximation in learning via neural ODEs. Esteve C.*, Geshkovski B.*. *In review in SIAM Journal on Mathematics of Data Science* (2021).
[Preprint](#).
2. Large-time asymptotics in deep learning. Esteve C.*, Geshkovski B.*, Pighin D., Zuazua E. *In review in Journal of Machine Learning Research* (2021)
[Preprint](#).
3. Controllability of one-dimensional viscous free boundary flows. B. Geshkovski[†], E. Zuazua. *To appear in SIAM Journal on Control and Optimization* (2021).
[Preprint](#).
4. Turnpike in Lipschitz-nonlinear optimal control Esteve C.*, Geshkovski G.*, Pighin D.*, Zuazua E. *In review in Nonlinearity* (2020).
[Preprint](#).
5. Null-controllability of perturbed porous medium gas flow. B. Geshkovski[†], ESAIM Control, Optimisation and Calculus of Variations, vol. 26, No. 85 (2020).
[Published](#), [Preprint](#).

COMPUTER SKILLS

- Proficient in **Python**: machine learning and neural networks ([code](#) in PyTorch, scikit-learn), object oriented programming, simulation of PDEs ([code](#) in FEniCS).
- Proficient in **Matlab**: simulation PDEs, digital image processing (wavelet transformations).
- Proficient in markup languages (HTML, L^AT_EX).
- Operating Systems: Proficient in Mac OS, Linux. Familiar with Windows.

LANGUAGES

English (fluent), French (fluent), Spanish (beginner), Slavic languages (basic), Macedonian (native).

INVITED TALKS AT CONFERENCES

- "The interplay of deep learning and control theory", [SIAM Conference on Control and its Applications](#), Spokane WA, USA (virtual, july 19-21, 2021).
- "Turnpike control and deep learning", [2nd. Symposium on Machine Learning and Dynamical Systems at Fields Institute](#), Toronto, Canada (virtual, 24.08.2020). [YouTube video](#).
- "Control in interfaces and deep learning", 3rd. workshop of the ConFlex consortium, Imperial College London, UK (virtual, 30.06.2020).
- "Control of perturbed porous medium gas flow", [8th Workshop on PDE, Optimal Design and Numerics](#), Centro de Ciencias "Pedro Pascual" Benasque, Spain (23.08.2019)
- "Control of linearized porous medium gas flow", [Workshop on homogenization, spectral theory and other topics in PDEs](#), ICMAT Madrid, Spain (06.05.2019).

- "Control of free boundary problems", 2nd. workshop of the ConFlex consortium, Bilbao, Spain (20.02.2019).
I was awarded the **Best review and presentation prize**.

INVITED TALKS AT SEMINARS

- "The interplay of deep learning and control theory", Machine Learning in Madrid, CSIC Madrid Spain (virtual, 22.02.2021). **Video**.
- "The interplay of deep learning and control theory", AG Mathematics of Deep Learning, FAU Erlangen-Nürnberg, Germany (virtual, 09.12.2020). **Video**.
- "Large-time asymptotics in deep learning", Seminario de Estadísticas, UAM, Spain (virtual 23.10.2020).
- "Mathematical control and deep learning", CAA Seminar, Friedrich Alexander Universität Erlangen-Nürnberg, Germany (21.01.2020).
- "Control and free boundaries", Chair in Applied Mathematics 2 Seminar, Friedrich Alexander Universität Erlangen-Nürnberg, Germany (20.01.2019).

RESEARCH VISITS

- Chair in Applied Analysis, Friedrich Alexander Universität Erlangen-Nürnberg (Germany), january 2020 – february 2020 (1 month). Invited by M. Gugat.
- Chair in Applied Mathematics 2, Friedrich Alexander Universität Erlangen-Nürnberg (Germany) november 2018 – january 2019 (2 months). Invited by G. Leugering.

TEACHING EXPERIENCE

Peer tutoring

october 2015 - may 2016

Université de Bordeaux.

I tutored a group of first year undergraduate students in mathematics and computer science.

REFERENCES

Enrique Zuazua
Alexander von Humboldt
Professor
FAU Erlangen-Nürnberg
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Marius Tucsnak
Professor of Mathematics
Université de Bordeaux
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Antonio Cuevas
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