

# David Loiseaux

*PhD student at Inria,  
DataShape team.*

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Motorcycle & car licenses  
Web page



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## Education

- 2021 – on **PhD Candidate: Multiparameter Topological Persistence for Machine Learning**, DataShape team  
Centre Inria d'Université Côte d'Azur.
- 2018 – 2021 **MSc de l'aléatoire (Probability, Statistics, Machine Learning)**, with honors  
Université Paris-Saclay (Orsay), ÉNS Rennes.
- 2018 – 2020 **Master of Education in Mathematics**, with honors  
ÉNS Rennes and Université Rennes 1.
- 2015 – 2018 **BSc in Mathematics**, with honors  
ÉNS Rennes and Université Rennes 1.

## Internships

- 2021 **Theoretical and empirical analysis of Multiparameter Persistence with applications to immunofluorescence images**, DataShape team, Centre Inria d'Université Côte d'Azur, France  
Supervised by Mathieu Carrière.
- 2019 **Theoretical analysis of Morse Theory with Eilenberg Steenrod axiomatics point of view**, Department of Mathematics and Statistics, Université de Montréal, Montréal, Canada  
Supervised by Octav Cornea.
- 2018 **On Singular Points of Differential Equations over a Formal Series Field**, Institut Fourier, Grenoble, France  
Supervised by Andrea Pulita.

## Distinctions

- 2020 **Agrégé de Mathématiques**, (highest examination for civil service in the French public education system)  
French Ministry of Education

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## Scientific productions

### Publications

- 2023 **A Framework for Fast and Stable Representations of Multiparameter Persistent Homology Decompositions**, *NeurIPS 2023*  
[https://papers.nips.cc/paper\\_files/paper/2023/hash/702b67152ec4435795f681865b67999c-Abstract-Conference.html](https://papers.nips.cc/paper_files/paper/2023/hash/702b67152ec4435795f681865b67999c-Abstract-Conference.html)
- 2023 **Stable Vectorization of Multiparameter Persistent Homology using Signed Barcodes as Measures**, *NeurIPS 2023*  
[https://papers.nips.cc/paper\\_files/paper/2023/hash/d75c474bc01735929a1fab5d0de3b189-Abstract-Conference.html](https://papers.nips.cc/paper_files/paper/2023/hash/d75c474bc01735929a1fab5d0de3b189-Abstract-Conference.html)
- 2024 **Differentiability and Convergence of Filtration Learning with Multiparameter Persistence**, *ICML 2024*  
<https://proceedings.mlr.press/v235/scoccola24a.html>

## Pre-publications

- 2022 **Fast, Stable and Efficient Approximation of Multi-parameter Persistence Modules with MMA**  
<https://arxiv.org/abs/2206.02026>
- 2024 ***multipers*: Multiparameter Persistence for Machine Learning**, *submitted to Journal of Open Source Software*  
<https://joss.theoj.org/papers/73e33046702c27dbb1cc76841e7d5fba>

## Code

- 2021-on ***multipers*: Multiparameter Persistence for Machine Learning**  
<https://github.com/DavidLapous/multipers>  
>>> pip install multipers
- 2022-on **Member of the Gudhi Library**  
<https://github.com/GUDHI/gudhi-devel>

## Challenges

- 2023 **AI & Companies**, *Mathematics Study Groups with Industry*, Ministry of Defense

## Outreach

- 2022–2024 **Co-organizer of the bi-monthly DataShape seminar**
- 2022–on **Reviewer**, *SoCG, ICLR, ICML, NeurIPS, JACT*

## Grants

- 2024 **DocWalker (5 000€)** for a visit at **Columbia University**, *Université Côte d'Azur*

## Talks

- 2024 **Applied Algebraic Topology Research Network (AATRN)**
- 2024 **Inria PhD Seminar**
- 2024 **DataShape Seminar**
- 2024 **Applied Topology in Albany (ATiA)**, *SUNY*, Albany (New York, US)
- 2023 **Young Topologists Meeting (YTM)**, *EPFL*, Lausanne
- 2023 **PhD Colloquium**, *Laboratoire Jean Alexandre Dieudonné*
- 2023 **3IA PhD Seminar**, *Centre Inria d'Université Côte d'Azur*
- 2023 **Datashape Seminar**
- 2023 **Inria PhD Seminar**, *Centre Inria d'Université Côte d'Azur*
- 2023 **World AI Cannes Festival**, *Presentation of the AI & Companies challenge results*
- 2022 **Young Researcher Forum**, *International Symposium on Computational Geometry*, Berlin, Germany
- 2022 **Datashape Seminar**

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## Languages

French (mother tongue), Breton (bilingual education), English (fluent), Spanish (intermediate), German (basic).

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## Programming Skills

### Setup

ArchLinux (OS), Neovim (code), Inkscape (graphics).

### Proficient level

Python, C++, Cython, L<sup>A</sup>T<sub>E</sub>X, Julia.

### Intermediate level

R, Scilab, Matlab, C, Rust, ASM.

## Teaching experiences

### Lecturer

2021–2024 **Maths for AI**, *Centrale Marseille Digital Lab*, Nice, France.

### Teaching assistant

2022–2023 **Foundation of geometric methods in data analysis**, *Université Côte d'Azur*, Sophia Antipolis, France.

2021–2022 **Research project**, *Université Côte d'Azur*, Sophia Antipolis, France.

2021–2022 **Economics**, *Université Côte d'Azur*, Nice, France.

### Previous experiences

2020–2021 **Colles\* PSI\* for students**, *Lycée Hoche*, Versailles, France.

\*Weekly oral practice exam

2017–2018 **Colles for BSc students**, *Université Rennes 1*, Rennes, France.

2016 **Teaching assistant**, *Lycée Jean Macé*, Rennes, France.

2015 **Teaching assistant & animation**, *orphanage in Adétikopé*, Togo.

## References

### **Mathieu Carrière**

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### **Andrew J. Blumberg**

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### **Steve Oudot**

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