David Loiseaux

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Motorcycle & car licenses
Web page

Employment

2026 – on **PostDoc**, Applied Math. and Computational Research (AMCR) division
Lawrence Berkeley National Lab, Berkeley, CA, USA

2025 – 2026 **PostDoc**, GeomeriX team
Centre Inria de Saclay, Saclay, France

Education

2021 – 2024 **PhD: 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

2025 1st **prize PhD award in Computer Sciences**, Université Côte d'Azur, STIC doctoral school
`https://webusers.i3s.unice.fr/edstic/5-2-prixDeThese-fr.php`

2020 **Agrégé de Mathématiques**, (highest examination for civil service in the French public education system), French Ministry of Education
`https://agreg.org/index.php?id=resultats2020`

Scientific productions

Publications

2025 **Multi-parameter Module Approximation: an efficient and interpretable invariant for multi-parameter persistence**, *Journal of Applied and Computational Topology*
https://doi.org/10.1007/s41468-025-00222-y

2025 **T-REGS: Minimum Spanning Tree Regularization for Self-Supervised Learning** , *NeurIPS 2025*
https://neurips.cc/virtual/2025/poster/116424

2024 **Differentiability and Convergence of Filtration Learning with Multiparameter Persistence**, *ICML 2024*
https://proceedings.mlr.press/v235/scoccola24a.html

2024 ***multipers*: Multiparameter Persistence for Machine Learning**, *Journal of Open Source Software*
https://doi.org/10.21105/joss.06773

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

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

Pre-publications

2025 **Pulp Motion: Framing-aware multimodal camera and human motion generation**, *To appear in ICLR 2026*
https://arxiv.org/abs/2510.05097

2025 **Estimating the persistent homology of $\mathbb{R}^n$-valued functions using function-geometric multifiltrations**, *To appear in SoCG 2026*
https://arxiv.org/abs/2412.04162v2

Code

2021-on ***multipers*: Multiparameter Persistence for Machine Learning**, *over 150k cumulated downloads*
https://github.com/DavidLapous/multipers
```
>> pip install multipers
>> conda install multipers -c conda-forge
```

2022-on **Member of the Gudhi Editorial Board**
https://github.com/GUDHI/gudhi-devel

Challenges

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

Outreach

2025-on **Co-organizer of "Jeunes Chercheuses et Chercheurs en Géométrie"**
https://jcgeo25.sciencesconf.org/

2022–2024 **Co-organizer of the bi-monthly DataShape seminar**
https://team.inria.fr/datashape/seminars/

2022–on **Reviewer**, *SoCG(2023, 2024), ICLR (2023, 2026), ICML (2023, 2024), NeurIPS (2023, 2024, 2025), JACT, Pattern Recognition*

Grants & Awards

2025 **Top Reviewer**, *NeurIPS 2025*

2024 **DocWalker (5 000€) for a visit at Columbia University**, *Université Côte d'Azur*
https://ds4h.univ-cotedazur.eu/education/phd/phd-fundings/docwalker-program

Talks

2025 **Workshop on Geometry, Topology, and Machine Learning (GTML 2025)**, Max Plank Institute for Mathematics in Science, Leipzig
`https://www.mis.mpg.de/events/series/workshop-on-geometry-topology-and-machine-learning-gtml-2025`

2025 **Invited speaker. London - Oxford - Paris TDA seminar**, University of London
`https://sites.google.com/view/london-oxford-paris-seminar/home`

2025 **JGA2025 : Journées de géométrie algorithmique**, Station biologique de Roscoff
`https://jga2025.sciencesconf.org/`

2025 **GeomeriX seminar**, Inria Saclay

2025 **Invited speaker. Minicourse: "Topological Data Analysis for Machine Learning"**, Okinawa Institute of Science and Technology, Okinawa, Japan
`https://groups.oist.jp/tsvp/event/mini-course-tutorial-topological-data-analysis-machine-learning-dr-david-loiseaux`

2025 **Invited speaker. Symposium: "Representation Theory and Topological Data Analysis: Latest Advances"**, Okinawa Institute of Science and Technology, Okinawa, Japan
`https://groups.oist.jp/tsvp/event/tsvp-symposium-representation-theory-and-topological-data-analysis`

2025 **Califrais research seminar**, Califrais, Paris, France

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**

Languages

French (native), Breton (native), English (fluent), Spanish (intermediate), German (basic), Italian (basic).

Programming Skills

Setup

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

Proficient level

Python, C++, Cython, LaTeX, 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

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