

Adélie Garin

CV

Background

- September 2022-
now **Lecturer and Referent for the Propedeutic Center, EPFL.**
- April 2022-
August 2022 **Postdoc in Mathematics, EPFL.**
- Oct. 2018-March
2022 **PhD in Mathematics, EPFL.**
PhD in Applied Topology under the supervision of Pr. Kathryn Hess. Work on topological image processing, at the crossroads between applied topology, machine learning and image processing, and on inverse problems in TDA, in particular the relation between trees and their barcodes.
- 2016-2018 **Master in Mathematics, University of Geneva.**
Master thesis: "Exploring connectivities of subcritical Poisson Boolean models", grade 6/6. Semester project: "Persistent Homology and Stability Theorem".
- 2015-2016 **University exchange, University of California, San Diego.**
Bachelor exchange of one academic year, mainly taking graduate classes.
- 2013-2016 **Bachelor in Mathematics, University of Geneva.**

Teaching - Admin - Communication

Teaching

- 2019-2022 **Euler course, EPFL.**
Teaching high school students with high potential in mathematics the equivalent of a first university level course in geometry (lectures + exercises). In 2020, I started teaching a new course, *Algebraic Structures*, where I created the lecture notes and exercises.
- 2020 & 2022 **MAN++ week, EPFL.**
Taught students who start at EPFL a preparation course on algebraic structures (lectures + exercises).
- 2019-2021 **Students supervision, EPFL.**
Supervised and cosupervised several bachelor projects (alone and/or with C. Hacker and S. Ebli) on various topics (5 projects in total).
- 2016-2018 **Teaching Assistant, University of Geneva.**
Exercises session with first year students to develop their proof writing skills and understanding in analysis, algebra and geometry.

Synergistic Activities

- 2022 **Organiser - Climathics Workshop, Switzerland.**
Co-organiser of a workshop on math & climate change.

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- 2022 **Program Committee ICLR 2022 workshop**, *Geometric and Topological Representation Learning, ICLR 2022*.
Reviewed 1 paper for the workshop.
- 2021 **Program Committee ICLR 2021 workshop**, *Geometric and Topological Representation Learning, ICLR 2021 (online)*.
Reviewed 2 papers for the workshop.
- 2020 **Program Committee NeurIPS 2020 workshop**, *Topological data analysis and beyond, NeurIPS 2020, ETH Zurich (moved online)*.
Reviewed 3 papers for the workshop.
- 2019-2022 **Organiser - Applied Topology Seminar**, *EPFL*.
Co-organiser with C. Hacker of the weekly Applied Topology Seminar at EPFL.
- 2019-2021 **PhD representative**, *EDMA, EPFL*.
Representant of the PhD students in mathematics at EPFL.
- 2019 **Organiser - Young Topologists Meeting**, *EPFL*.
With S. Ebli, A. Ergus, C. Hacker, L. Moser and H. Wu, we organised the whole conference, from funding to accomodation, planning the speakers and schedule.
- 2019 **Organiser - TopApp Workshop**, *IST Austria*.
Organisation (with S. Cultrera) of a 3 days-workshop for young PhD students in Computational Topology.
- 2016-2017 **President of the Sciences students association**, *University of Geneva*.
Organisation of events for the faculty of Sciences, including a job fair.
- Communication & Outreach**
- 2022 **Finalist "My thesis in 180 seconds"**, *EPFL*.
Finalist of the MT180 contest.
- 2021-2022 **Logic workshop: math to understand the world**, *EPFL*.
Co-created a workshop for 12+ years old on the most common logical mistakes and how to identify and avoid them. We presented it to a few classes and hope to continue in the future.
- 2018-2021 **Outreach events**, *EPFL*.
Animation for various EPFL outreach events, from open days to the "journée des métiers".
- 2016-2018 **Mathscope**, *University of Geneva*.
Animated mathematics activities with classes from primary school to high school.
- 2016 **Athena program**, *University of Geneva*.
Supervised high school students taking a university class (geometry).

Research Programs and Workshops

- 2021 **MSRI Summer Research Program for women in mathematics**, *Postponed from 2020 to 2021 due to COVID-19 pandemic*.
Admitted in the summer research program for women in mathematics to follow up the collaboration started in 2019 at the Women in Computational Topology workshop.
- 2020 **GeoCoW Workshop**, *Les Diablerets, Switzerland*.
Poster presentation: *A Topological Reading lesson: a TDA pipeline in image analysis*

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- 2019 **Visitor, ANU.**
During my PhD, I spent a month in the Australian National University visiting Katharine Turner and Vanessa Robins to pursue some work started at the WinCompTop in the summer of 2019.
- 2019 **Women in Computational Topology Workshop, ANU, Canberra.**
5-days workshop in a group led by Vanessa Robins, working on persistent homology for images depending on the resolution.
- 2018 **Summer School in TDA, Trento, Italy.**
Participant
- 2017 **Women in Topology Workshop, MSRI, Berkeley.**
3-days workshop in a group led by Kathryn Hess, working on directed persistent homology.
- 2017 **Science Me! Contest, Hannover, Germany.**
Science show competition
- 2017 **EuroScienceFun, Bonn, Germany.**
Outreach conference

Publications and Preprints

- 2022 **Stratifying the space of barcodes using Coxeter complexes, With Benjamin Brück.**
Accepted in Journal of Applied and Computational Topology
- 2022 **Stratifying the space of barcodes using Coxeter complexes (extended abstract), With Benjamin Brück.**
Extended Abstract for the 2022 SoCG Young Researcher Forum
- 2022 **A Lattice-Theoretic Perspective on the Persistence Map (extended abstract), With Brendan Mallery and Justin Curry.**
xtended Abstract for the 2022 SoCG Young Researcher Forum
- 2021 **Persistent Homology with Improved Locality Information for more Effective Delineation, With Doruk Oner, Mateusz Koziński, Kathryn Hess and Pascal Fua.**
Preprint (submission December 2021)
- 2021 **The Impact of Changes in Resolution on the Persistent Homology of Images, With Teresa Heiss, Sarah Tymochko, Brittany Story, Hoa Bui, Bea Bleile, and Vanessa Robins.**
IEEE BigData 2021 workshop Applications of Topological Data Analysis to 'Big Data'
- 2021 **From trees to barcodes and back again II: Combinatorial and probabilistic aspects of a topological inverse problem, With Justin Curry, Jordan DeSha, Kathryn Hess, Lida Kanari and Brendan Mallery.**
Preprint (submission end of June 2021)
- 2021 **The persistent homology of dual digital image constructions, With Bea Bleile, Teresa Heiss, Kelly Maggs and Vanessa Robins.**
Submitted to "Research in Computational Topology 2", Women in Computational Topology (WinCompTop) Second Workshop Proceedings
- 2020 **From trees to barcodes and back again: theoretical and statistical perspectives, With Lida Kanari and Kathryn Hess.**
Algorithms 13(12), 335, Special issue on TDA

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- 2020 **Duality in Persistent Homology of Images (extended abstract)**, *With Teresa Heiss, Kelly Maggs, Bea Bleile and Vanessa Robins.*
2020 SoCG Young Researcher Forum
- 2019 **A Topological "Reading" Lesson: Classification of MNIST using TDA**, *With Guillaume Tauzin.*
ICLMA 2019 Proceedings

Talks & Posters

- 2022 **Summer in Topology Conference**, University of Vienna (online).
Stratifying the space of barcodes using Coxeter complexes
- 2022 **ATMCS conference**, University of Oxford.
Poster: From trees to barcodes and back again: Combinatorial and geometric perspectives
- 2022 **SoCG Young Researcher Forum**, Berlin.
Stratifying the space of barcodes using Coxeter complexes
- 2022 **AATRn seminar**, online.
From trees to barcodes and back again: Combinatorial and geometric perspectives
- 2022 **Statistics Seminar**, University of Aarhus.
From trees to barcodes and back again: Combinatorial and probabilistic perspectives
- 2021 **Applied Topology Seminar**, EPFL.
From trees to barcodes and back again: Combinatorial and probabilistic perspectives
- 2021 **Data Science Seminar**, Colorado State University (online).
From trees to barcodes and back again: Combinatorial and probabilistic perspectives
- 2021 **Working group in TDA**, Michigan State University (online).
From trees to barcodes and back again: Combinatorial and probabilistic perspectives
- 2021 **Applied Topology in Albany (ATiA) seminar**, online.
From trees to barcodes and back again: Combinatorial and probabilistic perspectives
- 2021 **Working group in TDA**, Montpellier, online.
Aller-retour entre arbres et barcodes (From trees to barcodes and back again)
- 2021 **APATG Student Talk**, online seminar.
From Trees to Barcodes and Back Again
- 2021 **Statistical Data Science group meeting**, EPFL, online.
From Trees to Barcodes and Back Again
- 2020 **ETH Geometry Graduate Colloquium**, ETHZ, online.
From trees to barcodes and back again: at the melding point of topology, geometry, group theory and probability
- 2020 **Oxford Applied Topology Seminar**, University of Oxford, online.
Noisy neurons and rainbow worms: theoretical and statistical perspectives on trees and their barcodes
- 2020 **SMB minisymposium**, minisymposium on TDA and network science for biological data (Heidelberg, moved online).
Topological Data Analysis for (biological) image analysis
- 2020 **SoCG Young Researcher Forum**, ETHZ (moved online).
Duality in Persistent Homology of Images

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- 2020 **Brain Mind Institute annual report**, EPFL.
Topological Data Analysis for Image Processing
- 2019 **Topology Seminar**, Australian National University.
A Topological Reading lesson: a TDA pipeline in image analysis
- 2019 **Graduate Seminar**, University of Geneva.
Talk aimed at graduate students from all background in mathematics.
Euler calculus and Euler Characteristic Transform.
- 2019 **TopApp Workshop**, IST Austria.
From Euler curves to shapes: going backward
- 2017 **Topology Seminar**, University of Geneva.
Talk on persistent homology and stability theorem.
- 2017 **Workshop on persistent homology**, Institut Alexander Grothendieck, Montpellier.
Two talks on persistent homology and stability theorem.

Awards and Scholarships

- 2020 **Teaching Prime**, EPFL.
For exceptional service to teaching during the last academic year.
- 2016 **Excellence Fellowship**, University of Geneva.
Scholarship for outstanding and highly motivated students during their Master program.
- 2016 **Boninchi Scholarship**, University of Geneva/UCSD.
Scholarship for exchange students.

Languages

French, *Mother tongue.*

English, *Fluent.*

German, *Intermediate.*

Spanish, *Basic.*