

# Arnaud Maret

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## Curriculum vitæ

October 11, 2023

### Employment

- **Sorbonne Université**, Nov 2022 - present  
FSMP Postdoctoral researcher at the Institut de Mathématiques de Jussieu,  
*Mentor*: Prof. Julien Marché.

### Education

- PhD in Mathematics (cum laude), **Universität Heidelberg**, Sep 2018 - Jul 2022  
Thesis title: *The symplectic geometry of surface group representations in genus zero*,  
*Mentors*: Prof. Peter Albers & Prof. Anna Wienhard.
- MSc in Mathematics (with distinction), **ETH Zürich**, Sep 2016 - Jun 2018  
Thesis title: *Forcing relations for periodic orbits of surface homeomorphisms*,  
*Mentor*: Prof. Will J. Merry.
- Exchange program, **University of Waterloo**, Sep 2015 - Jun 2016
- BSc in Mathematics, **EPFL Lausanne**, Sep 2013 - Jun 2016  
Thesis title: *The Hardy-Littlewood Circle Method and the Waring Problem*,  
*Mentor*: Prof. Yu-Ru Liu (University of Waterloo, Canada).

### Research interest

Representations of surface groups, (higher) Teichmüller Theory, symplectic geometry, (complex) hyperbolic geometry, and dynamics on character varieties.

### Papers and preprints

4. *The geometry of Deroin-Tholozan representations*, with A. Fenyés, 2023, to appear.
3. *Proceedings of the Young Researchers Workshop on Positivity in Lie Groups*, with X. Flamm, [arXiv:2212.04339](https://arxiv.org/abs/2212.04339), 2022. Submitted.
2. *Action-angle coordinates for surface group representations in genus zero*, [arXiv:2110.13896](https://arxiv.org/abs/2210.13896), 2022, 38 pages. Submitted.
1. *Ergodicity of the mapping class group action on Deroin-Tholozan representations*. *Groups Geom. Dyn.* **16** (2022), no. 4, 1341–1368. MR 4536432

## Research stays

- **University of Maryland**, Sep 2022 - Oct 2022  
Visiting Prof. William M. Goldman,  
*Funding awarded by SFB/TR 191 “Symplectic structures in Geometry, Algebra and Dynamics”.*
- **Sorbonne Université**, Sep 2021 - Dec 2021  
Visiting Prof. Julien Marché,  
*Funding awarded by RTG 2229 “Asymptotic Invariants and Limits of Groups and Spaces”.*
- **Mathematical Sciences Research Institute (MSRI)**, Aug 2019  
Semester program on *Holomorphic Differentials in Mathematics and Physics*,  
*Funding awarded by MSRI.*

## Teaching

- **RTG Lecture** Character varieties – A symplectic perspective, Spring 2022  
KIT Karlsruhe/Universität Heidelberg.
- Blockseminar Hyperbolische Geometrie, Universität Heidelberg. Spring 2020
- Proseminar Differentialgeometrie, Universität Heidelberg. Fall 2018
- **401-0614-00L** Probability and Statistics (TA), ETH Zürich. Spring 2018
- **MATH-106** Analyse 2 (TA), EPFL Lausanne. Spring 2015
- **MATH-101** Analyse 1 (TA), EPFL Lausanne. Fall 2014

## Invited talks

15. **Symplectic Zoominar, online.** Dec 2023  
*Complex projective spaces and surface group representations.*
14. **Séminaire de théorie spectrale et géométrie, Institut Fourier.** Nov 2023  
*Totally elliptic surface group representations.*
13. **Séminaire de Géométrie, Université Claude Bernard Lyon 1.** Oct 2023  
*Complex projective spaces and surface group representations.*
12. **Workshop on metrics on higher Teichmüller spaces, Fréjus.** Aug 2023  
*Shear coordinates for the Weil-Petersson symplectic form.*
11. **Tuesday Seminar on Topology, University of Tokyo.** Jul 2023  
*Moduli spaces of triangle chains.*
10. **Symplectix, Institut Henri Poincaré.** Apr 2023  
*Action-angle coordinates for character varieties à la Kapovich–Millson.*

9. **Séminaire Géométrie et Topologie, Sorbonne Université.** Feb 2023  
*Representations of surface groups away from Teichmüller space.*
8. **Geometry and Topology Seminar, University of Iowa.** Jan 2023  
*The two natures of connected components of character varieties.*
7. **Geometry-Topology Seminar, University of Maryland.** Sep 2022  
*Compact spaces of surface group representations in genus zero.*
6. **Geometry Graduate Colloquium, ETH Zürich.** Oct 2021  
*Character varieties, mapping class group action and ergodicity.*
5. **Geometry Seminar, ETH Zürich.** Oct 2021  
*Remarkable surface group representations in genus zero.*
4. **Geometry and Topology Seminar, University of Bristol.** Oct 2021  
*Remarkable surface group representations in genus zero.*
3. **Hauptseminar Symplectische Geometrie, Universität Heidelberg.** Jun 2018  
*Forcing relations for periodic orbits of surface homeomorphisms.*
2. **Symplectic Geometry Seminar, JLU Giessen.** Mar 2018  
*Forcing relations for periodic orbits of surface homeomorphisms.*
1. **Oberseminar Dynamische Systeme, Ruhr-Universität Bochum.** Mar 2018  
*Forcing relations for periodic orbits of surface homeomorphisms.*

## Presentations

6. **Ventotene International Workshops: Counting problems,** Sep 2021  
*Lightening talk on Deroin-Tholozan representations.*
5. **CMI-HIMR Dynamics and Geometry Online Summer School, University of Bristol,** Jun 2021  
*Lightening talk on character varieties and mapping class group action.*
4. **Reading Seminar on Anosov representations, University of Virginia,** Apr 2021  
*Characterization of Anosov representations in terms of singular and eigenvalues.*
3. **RTG Seminar on Topological  $K$ -Theory, KIT Karlsruhe,** Oct 2020  
 *$K$ -Theory and stable homotopy groups of spheres.*
2. **Seminar Topological methods in data analysis, Universität Heidelberg,** Nov 2019  
*Differential calculus on persistence barcodes.*
1. **RTG Seminar on Rational Homotopy Theory, KIT Karlsruhe,** Mar 2019  
*Formality of Kähler manifolds.*

## Mentoring and Outreach

- **Mathematical Olympiad,** Fall 2023  
Training of Olympiad coaches in East Africa,  
*Organizer:* Paul Vaderlind.
- **Heidelberg Experimental Geometry Lab,** Spring 2022  
*Project:* Modelization of triangle chains in the hyperbolic plane,  
*Mentee:* Frederik Kolb.

## Organizing

- **Interplay between symplectic geometry and cluster theory,** Spring 2023  
IWH Heidelberg,  
*Co-organizers:* Maria Bertozzi, Alexandre Jannaud.
- **Workshop on Positivity in Lie Groups,** Spring 2022  
IWH Heidelberg,  
*Co-organizer:* Xenia Flamm.
- **RTG Seminar on Dynamics in one complex variable,** Fall 2021  
KIT Karlsruhe/Universität Heidelberg
- **Reading seminar on infinite dimensional symplectic reduction,** Spring 2021  
Universität Heidelberg.
- **Reading seminar on Bridgeland's stability conditions for meromorphic differentials,** Fall 2020  
Universität Heidelberg,  
*Co-organizer:* Beatrice Pozzetti.
- **RTG Seminar on Topological K-Theory,** Spring 2020  
KIT Karlsruhe/Universität Heidelberg.
- **Reading seminar on Dynamics of Teichmüller space,** Spring 2019  
Universität Heidelberg,  
*Co-organizers:* Peter Albers, Anna Wienhard.
- **RTG Seminar on Rational Homotopy Theory,** Spring 2019  
KIT Karlsruhe/Universität Heidelberg,  
*Co-organizers:* Urs Fuchs, Anna-Maria Vocke.

## Conferences and workshops attended

- (Aug 2023) Summer workshop on Metrics on higher Teichmüller spaces, Fréjus, France.
- (Aug 2023) Workshop on Teichmüller Theory: Classical, Higher, Super and Quantum, Oberwolfach, Germany.

- (Feb 2023) Summer school on Topics on the Geometry of Locally Symmetric Spaces, Montevideo, Uruguay.
- (Jan 2023) Workshop on Interplay between symplectic geometry and cluster theory, IWH Heidelberg.
- (Jul 2022) Marc Burger's Prime, Zürich, Switzerland.
- (Jun 2022) Groups, Geometry and Dynamics, A conference in honor of François Labourie, Cargèse, France.
- (Mai 2022) Weak KAM theory - XXV years later, Avignon, France.
- (Jan 2022) Workshop on Positivity in Lie Groups, IWH Heidelberg.
- (Nov 2021) Young researchers meeting of the GDR Platon, CIRM Marseille.
- (Sep 2021) Ventotene International Workshops: Counting problems, Ventotene, Italy.
- (Aug 2021) Workshop on Anosov representations, Aussois, France.
- (Jun 2021) CMI-HIMR Dynamics and Geometry Online Summer School (online), University of Bristol.
- (Jan 2021) Topics at the Interface of Low Dimensional Group Actions and Geometric Structures (online), National University of Singapore.
- (Nov 2020) 15th International Young Researchers Workshop on Geometry, Mechanics and Control (online), Universiteit Utrecht.
- (Oct 2020) Symposium: Mathematics in Sciences, Engineering and Economics (online), KIT Karlsruhe.
- (Oct 2020) Teichmüller Theory: Classical, Higher, Super and Quantum (online), CIRM Marseille.
- (Jun 2020) Nearly Carbon Neutral Geometric Topology Conference (online).
- (Feb 2020) Winter School on Invariant Function Theorems, JLU Giessen.
- (Feb 2020) CAST 2020: XIV Workshop on Symplectic Geometry, Contact Geometry, and Interactions, Universiteit Antwerpen.
- (Nov 2019) Geometric Dynamics Days, RWTH Aachen University.
- (Aug 2019) Workshop on bounded cohomology, Universität Heidelberg.
- (May 2019) Workshop on Geometry, Topology and Computation, Universität Heidelberg.
- (Apr 2019) Graduate school on Geometry of Teichmüller spaces, Simons Center, Stony Brook University, NY.

- (Mar 2019) CAST 2019: XIII Workshop on Symplectic Geometry, Contact Geometry, and Interactions, Humboldt University, Berlin.
- (Mar 2019) Symposium: Geometry, Topology, Analysis and Dynamical systems, Universität Heidelberg.
- (Feb 2019) Geometric Analysis meets Geometric Topology, Universität Heidelberg.
- (Nov 2018) Geometric Dynamics Days, JLU Giessen.
- (Nov 2018) Workshop on Computational Topology and Topological Data Analysis, Heidelberg Institute for Theoretical Studies.
- (Aug 2018) Summer School on Equivariant Symplectic Homology, JLU Giessen.

## **Mathematical Olympiad activities**

- Board member of the Swiss Science Olympiad, Jun 2022-present.
- Academic director of the Swiss Mathematical Olympiad, Dec 2017-Dec 2022.
- Team leader for Switzerland at the International Mathematical Olympiad (IMO), 2016-2018 and 2020.
- Member of the problem selection committee at the IMO 2022 and 2023.

## **Languages**

- French (mother tongue)
- English (fluent)
- German (fluent)