Arnaud Maret

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Curriculum vitæ

November 30, 2024

Employment

- **Université de Strasbourg**,   Nov 2024 - present
  Postdoctoral researcher at the Institut de Recherche Mathématique Avancée,
  Mentor: Prof. Nalini Anantharaman.

- **Sorbonne Université**,   Nov 2022 - Oct 2024
  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 and character varieties, (higher) Teichmüller Theory, symplectic geometry, (complex) hyperbolic geometry, and dynamics on character varieties.

Papers and preprints

6. *Totally elliptic surface group representations*
   arXiv:submit/6034192 [math.GR], 2024. (11 pages)

5. *Mapping class group orbit closures for Deroin-Tholozan representations*
   with Y. Bouilly and G. Faraco. arXiv:2411.10269 [math.DS], 2024. (39 pages)

4. *Tykhyy's Conjecture on finite mapping class group orbits*
   with S. Bronstein. arXiv:2409.04379 [math.DS], 2024. (70 pages)

3. *The geometry of Deroin-Tholozan representations*
   with A. Fenyes. arXiv:2312.09199 [math.GT], 2023. (33 pages)

2. *Action-angle coordinates for surface group representations in genus zero*
   J. Symplectic Geom. **22** (2024). arXiv:2110.13896 [math.GT]. (38 pages)

1. *Ergodicity of the mapping class group action on Deroin-Tholozan representations*
   Groups Geom. Dyn. **16** (2022). arXiv:2012.05775 [math.DS]. (22 pages)

Editorial work

1. *Proceedings of the Young Researchers Workshop on Positivity in Lie Groups*
   with X. Flamm. arXiv:2212.04339 [math.DG], 2022.

Teaching

- **BSc lecture** Multiple, line, and surface integrals   Spring 2025
  Université de Strasbourg, 6h/week, 80+ attendees.

- **Elective course** Character varieties with a symplectic perspective   Spring 2022
  KIT Karlsruhe/Universität Heidelberg, 6h total, 20+ attendees.

- **Student seminar** Hyperbolic geometry   Spring 2020
  Universität Heidelberg, 2h/week, 14 attendees.

- **Student seminar** Differential geometry   Fall 2018
  Universität Heidelberg, 2h/week, 14 attendees.

- **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

Research stays

- **Seoul National University**, May 2024
  Visiting Prof. Gye-Seon Lee.

- **Gakushuin University, Tokyo**, Jul 2023
  Visiting Prof. Ken'ichi Ohshika.

- **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.

Invited talks

20. **Séminaire de géométrie et dynamique, Cergy-Pontoise**. Jan 2025
    TBD

19. **Séminaire de Théorie ergodique, Université de Rennes**. Dec 2024
    Tykhyy's conjecture on finite mapping class group orbits on character varieties

18. **Geometry Seminar, MPI Leipzig**. Oct 2024
    Finite mapping class group orbits on character varieties.

17. **Séminaire Géométrie, Algèbre, Dynamique et Topologie, Université de Bourgogne**. Sep 2024
    Finite orbits on character varieties.

16. **Séminaire Géométrie et applications, Université de Strasbourg**. Mar 2024
    Discrete totally elliptic surface group representations.

15. **Symplectic Zoominar, IAS Princeton (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.

Short presentations

2. **Ventotene International Workshops: Counting problems,** Sep 2021
Lightening talk on Deroin-Tholozan representations.

1. **CMI-HIMR Dynamics and Geometry Online Summer School, University of Bristol,** Jun 2021
Lightening talk on character varieties and mapping class group action.

Mentoring and Outreach

- **Mathematical Olympiad**,   Fall 2023 - present
  Training of Math Olympiad coaches in Bhutan and in Africa,
  Co-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

- (Oct 2024) Conference "20 years of Anosov representations", Leipzig, Germany.

- (Aug 2024) Workshop on Components of character varieties, Aussois, France.

- (Apr 2024) Workshop on Submanifolds of locally symmetric spaces: geometric, analytic and dynamical aspects, Autrans, France.

- (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-Jun 2024.

- 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, 2023, and 2025.

Languages

- French (mother tongue)

- English (fluent)

- German (fluent)