

# ALEXIS MARCHAND

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## RESEARCH INTERESTS

My research is in *geometric group theory*, a field concerned with understanding groups — algebraic structures encoding the symmetries of mathematical objects — by studying their actions on geometric spaces. I am generally interested in understanding connections between group-theoretical structure and *non-positive curvature*.

Keywords: *stable commutator length, bounded cohomology, quasimorphisms, topology of surfaces, hyperbolicity, CAT(0) cube complexes, group rings, free group automorphisms.*

## EMPLOYMENT

*Sep 2025–Sep 2027 · IM PAN, Warszawa · Adiunkt (Assistant Professor)*

Two-year position funded by the NCN Maestro Project *Analysis on Groups*  
Mentor: PIOTR NOWAK

*May–Jul 2026 & 2027 · Universität Regensburg · Humboldt Research Fellow*

Fellowship of twice three months awarded by the Humboldt-Stiftung  
Mentor: CLARA LÖH

*Sep 2024–Sep 2025 · Kyōto University · JSPS Postdoctoral Fellow*

One-year fellowship awarded by the Japan Society for the Promotion of Science  
Mentor: KŌJI FUJIWARA

## EDUCATION

*Oct 2021–Oct 2024 · University of Cambridge · Ph.D. in Pure Mathematics*

Thesis: *Computations and lower bounds for scl and the relative Gromov seminorm*

Defended on July 15, 2024

Funding: EPSRC PhD studentship

Supervisor: HENRY WILTON

*Sep 2017–Aug 2021 · École Normale Supérieure de Lyon · Dipl. ENS*

Funding: ENS studentship awarded by national competitive examination (rank: 16)

*Sep 2020–Aug 2021 · Université Grenoble Alpes · M.Sc. in Mathematics*

Mention Très Bien

Thesis: *Automorphismes extérieurs de produits libres : revêtements abéliens caractéristiques et représentations libres*

Supervisor: FRANÇOIS DAHMANI

*Oct 2019–Jun 2020 · University of Cambridge · M.A.St. in Mathematics*

Pass with Merit

Essay: *Rigidity Theorems for Hyperbolic Groups*

Supervisor: HENRY WILTON

*Sep 2017–Aug 2019 · ÉNS de Lyon / Université Lyon 1 · B.Sc. in Mathematics*

#### RESEARCH PAPERS (PUBLISHED OR ACCEPTED IN PEER-REVIEWED JOURNALS)

- [1] ALEXIS MARCHAND, From letter-quasimorphisms to angle structures and spectral gaps for scl. *Israel J. Math.* (to appear). arXiv:2402.13856
- [2] ALEXIS MARCHAND, Bavard duality for the relative Gromov seminorm, *Enseign. Math.* **72** (2026), no. 1–2, 1–46. DOI:10.4171/lem/1087 · arXiv:2305.02149
- [3] ALEXIS MARCHAND, Isometric embeddings of surfaces for scl, *Groups Geom. Dyn.* **19** (2025), no. 4, 1445–1478. DOI:10.4171/ggd/845 · arXiv:2302.04133
- [4] ALEXIS MARCHAND, Free representations of outer automorphism groups of free products via characteristic abelian coverings, *J. Group Theory* **26** (2023), no. 2, 399–420. DOI:10.1515/jgth-2021-0154 · arXiv:2107.11230

#### EXPOSITORY ARTICLES

- [5] RÉMI COULON AND ALEXIS MARCHAND, Growth and co-growth in negatively curved groups, in DAHMANI, ERSCHLER, HORBEZ, WISE (eds.), Groups acting on fractals, hyperbolicity and auto-similarity, *Panoramas et Synthèses* **63** (2025).
- [6] ALEXIS MARCHAND, Makers of patterns: from Escher to Coxeter, *Eureka* **66** (2020).
- [7] ALEXIS MARCHAND, Géométrie des groupes et courbure négative, *Journal de Mathématiques des Élèves de l'ENS de Lyon* **IV** (2020).

#### AWARDS

- 2025 · Humboldt research fellowship for postdoctoral researchers · Humboldt-Stiftung  
Fellowship of up to two years, hosted by CLARA LÖH at Universität Regensburg  
Project: *Invariants of groups and non-positive curvature*
- 2024 · JSPS postdoctoral fellowship for research in Japan · JSPS  
Fellowship of up to one year, hosted by KŌJI FUJIWARA at Kyōto University  
Project: *Stable commutator length in finitely presented groups*
- 2023 · Smith–Knight & Rayleigh–Knight prize · University of Cambridge  
Grade 3, for the essay *Isometric embeddings of surfaces for scl*

#### RESEARCH VISITS

- 2025 · INI, Cambridge · Three-week visit (programme participant)  
Programme: *Operators, graphs, groups*
- 2025 · RIMS, Kyōto · Two-week small-group workshop (co-organiser)  
Programme: *Spectrum problems for scl via S-machines*
- 2025 · KIAS, Seoul · One-week visit (invited by SANG-HYUN KIM)
- 2025 · University of Hawai'i at Mānoa · Ten-day visit (invited by YASH LODHA)

2022 · **IHP, Paris** · One two-week visit and one three-week visit (programme participant)

Programme: *Groups acting on fractals*

2019 · **IMPA, Rio de Janeiro** · Two-month M.Sc. internship (supervisor: HOSSEIN MOVASATI)

Topic: *Topology of complex affine varieties*

2018 · **KIT, Karlsruhe** · Six-week B.Sc. internship (supervisor: CATERINA CAMPAGNOLO)

Topic: *Geometry of Coxeter groups*

## HIGHER-EDUCATION TEACHING EXPERIENCE

2023–24 · Part III examples classes · University of Cambridge

Teaching assistant for Geometric Group Theory — 8 contact hours

2021–24 · Undergraduate supervisions · Trinity College & Peterhouse College, Cambridge

- Analysis & Topology (IB) — 46 contact hours
- Geometry (IB) — 34 contact hours
- Linear Algebra (IB) — 16 contact hours
- Riemann Surfaces (II) — 31 contact hours

2022–23 · Admissions interviews · Christ’s College, Cambridge

Co-interviewer for undergraduate admissions in mathematics

2021–23 · Part III drop-in sessions · University of Cambridge

Drop-in session leader for Group Cohomology, Mapping Class Groups

2018–19 · Colles · Lycée Aux Lazaristes, Lyon

Oral examiner in mathematics for first-year students in a preparatory class — 44 contact hours

## SCHOOL TEACHING EXPERIENCE AND VOLUNTEER TEACHING

2025 · JSPS science dialogue · Koshi High School, Fukui

Lecture in English and Japanese for a high school science club

2023–24 · High school research project supervision · Rusanivskyi Lyceum, Kyiv (online)

Supervisor of the project of Olha Mykhailyk on inversions and Möbius transformations, who won the second place at the city stage in the Junior Academy of Sciences of Ukraine research competition

2019–20 · Tutoring (Stimulus) · Coleridge Community College & St Faith’s School, Cambridge

Volunteer tutor in mathematics in secondary schools

2017–21 · French as a foreign language · ItinérENS, Lyon

Volunteer teacher of French classes for refugees — more than 100 contact hours

## SERVICE

Refereeing for *Trans. Amer. Math. Soc.*, *Algebr. Geom. Topol.*, *KIAS Springer Ser. Math.*

2025–27 · Analytic & geometric group theory seminar · IM PAN, Warszawa

Co-organiser of the research group’s seminar

2025 · World of GroupCraft V · Online

Co-organiser of the 2025 edition

2024–25 · Reading seminar · Kyōto University

Organiser of a reading seminar on  $L^2$ -Betti numbers

2023–24 · Junior geometry seminar · University of Cambridge

Co-organiser of the graduate students’ seminar in geometry

2023–24 · MCR committee · Trinity College, Cambridge

MCR (Middle Combination Room) committee member in charge of: the MCR's website, mailing list, elections, lunchtime seminars, etc.

2022–23 · Reading seminar · University of Cambridge

Organiser of a reading seminar on generalisations of hyperbolic groups

## INVITED TALKS

*Jun 2026* · Aspherical 2-complexes and their fundamental groups · **ICMAT, Madrid**

*Jun 2026* · Séminaire géométrie, algèbre, dynamique et topologie · **Université Bourgogne Europe**

*Jun 2026* · Séminaire de géométrie différentielle · **Université de Lorraine**

*Nov 2025* · Algebra & geometry seminar · **Newcastle University**

*Nov 2025* · Geometric group theory seminar · **University of Cambridge**

*Jul 2025* · Tuesday seminar on topology · **University of Tōkyō**

*Jul 2025* · Tōhoku University geometry seminar · **Tōhoku University**

*Jun 2025* · KIAS topology seminar · **KIAS, Seoul**

*May 2025* · Kyōto differential topology seminar · **Kyōto University**

*Apr 2025* · Mathematics department colloquium · **University of Hawai'i at Mānoa**

*Apr 2025* · Kanazawa topology seminar · **Kanazawa University**

*Nov 2024* · First MMS workshop for young researchers · **Kyōto University**

*Nov 2024* · Séminaire virtuel francophone groupes et géométrie · **Online**

*May 2024* · Seminari dei baby geometri · **Università di Pisa / Scuola Normale Superiore**

*Apr 2024* · International young seminar on bounded cohomology & simplicial volume · **Online**

*Apr 2024* · Geometry and geometric analysis seminar · **Purdue University (online)**

*Mar 2024* · Geometric group theory seminar · **University of Oxford**

*Dec 2023* · Bristol junior geometry seminar · **University of Bristol**

*Jun 2023* · International young seminar on bounded cohomology & simplicial volume · **Online**

*Apr 2023* · Methusalem junior seminar · **KU Leuven**

*Mar 2023* · Geometry graduate colloquium · **ETH Zürich**

*Feb 2023* · Junior topology & group theory seminar · **University of Oxford**

*Feb 2023* · Geometric group theory seminar · **University of Cambridge**

*Jun 2022* · Séminaire compréhensible · **Université Grenoble Alpes**

*Apr 2022* · Séminaire des doctorants de St-Charles · **Aix-Marseille Université**

## CONFERENCES ATTENDED

*Jan 2026* · Perspectives in ergodic theory, randomness, and geometry · **Uniwersytet Jagielloński**

*Nov 2025* · Stability and probabilistic methods · **INI, Cambridge**

*Feb 2025* · 20th East Asian conference on geometric topology · **University of Tōkyō**

Contributed talk

*Jan 2025* · Geometry and dynamics in low dimensions · **VAST, Hanoi**

Contributed talk

*Apr 2024* · Groups, topology, & applications Gran Bilbao · **UPV / EHU, Bilbao**

*Mar 2024* · Topological & homological methods in group theory · **Universität Bielefeld**

*Feb 2024* · GAGTA · **CIRM, Marseille**

Contributed talk & poster

*Jul 2023* · Postgraduate group theory conference · **Heriot-Watt University, Edinburgh**

Contributed talk

*May 2023* · Geometry of subgroups · **CRM, Montréal**

*Jan 2023* · LMS regional meeting · **University of Southampton**

Contributed poster

*Sep 2022* · Recent advances in bounded cohomology · **Universität Regensburg**

*Jun 2022* · Hyperbolic groups and their generalisations · **IHP, Paris**

*Apr 2022* · Mapping class groups and  $\text{Out}(F_n)$  · **IHP, Paris**

*Apr 2022* · Groups acting on fractals · **CIRM, Marseille**

Note taker for a minicourse (see [5])

*Feb 2022* · Workshop on finiteness properties · **KIT, Karlsruhe**

## LANGUAGES

FRENCH	Native speaker	GERMAN	Advanced (B2)
ENGLISH	Fluent (C2) Passed the <b>CAE (Cambridge)</b>	PORTUGUESE	Advanced (B2)
JAPANESE	Advanced (B2) Passed the <b>JLPT N2</b>	RUSSIAN	Intermediate (B1)
		POLISH	Elementary (A2)

February 17, 2026