

Balthazar Fléchelles

January 2026

Education

- since Oct. 2024 **Postdoctoral researcher at Institut Fourier (Université Grenoble-Alpes)**, under the supervision of Anne Parreau (Institut Fourier)
- Sep. 2024 **PhD degree**, under the supervision of Fanny Kassel (IHÉS, France) and Gye-Seon Lee (SNU, South Korea), Dissertation entitled “*Geometric Finiteness in Convex Projective Geometry*”, IHÉS (Université Paris-Saclay)
- Jul. 2020 **Master’s degree of mathematics**, Sorbonne Université
- Jul. 2018 **Bachelor’s degree of mathematics**, Sorbonne Université
- 2017 to 2021 **ÉNS de Paris**, student of the maths department (DMA), Paris, France

Travel

- Nov. 16, 2025 to Nov. 26, 2025 Visit to Seunghoon Hwang (SNU) and David Xu (KIAS) to work on active collaborations
- May – Jun. 2025 2 months stay at Institut Henri Poincaré (Paris) for the *Higher rank geometric structures* thematic semester
- 2022 – 2024 Three visits (2 + 4 + 2 months) to Gye-Seon Lee (SNU) during my PhD
- Feb. – Jul. 2019 5 months research internship at Heidelberg under the supervision of Gye-Seon Lee and Anna Wienhard on the article *Bowditch’s Q -conditions and Minsky’s primitive stability* by Jaejeong Lee and Binbin Xu

Research interests

- convex projective geometry
- discrete subgroups of Lie groups
- Vinberg theory and Coxeter groups
- (relatively) Anosov representations
- unipotent representations of Lie groups

Written works

Theses and preprints

- Jan. 2026 *Projective reflection groups of finite covolume*, with Seunghoon Hwang (SNU), [arxiv:2601.22067](#)
- Dec. 2025 *On cusp holonomies in strictly convex projective geometry*, [arxiv:2512.00197](#)
- Jul. 2025 *Primitive stability and the Q -conditions for the rank two free group in hyperbolic d -space*, [arxiv:2507.09771](#), submitted
- Sep. 2024 PhD thesis entitled “*Geometric finiteness in convex projective geometry*” under the supervision of Fanny Kassel and Gye-Seon Lee (referees: Daryl Cooper and Olivier Guichard)
- Sep. 2023 *Cubulated hyperbolic groups admit Anosov representations*, with Sami Douba, Theodore Weisman and Feng Zhu (Geometry & Topology 29-9 (2025), pp 4695–4766)
- Sep. 2020 Master’s thesis on *Coxeter tilings in Hilbert geometries* under the supervision of Antonin Guilloux
- Jul. 2018 Bachelor’s thesis about *quasi-periodic functions on topological groups* with Colin Davalo, under the supervision of Patrick Bernard

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In preparation

- *A new family of unipotent representations of unitriangular matrix groups*. Companion paper to “On cusp holonomies in strictly convex projective geometry”
- *Relatively Anosov representations and visible geometric finiteness in convex projective geometry*, with Mitul Islam and Feng Xu
- *Gromov-Hausdorff limits of Vinberg representations of Lannér Coxeter groups*, with Anne Parreau (Institut Fourier)

Talks

- Nov. 18, 2025 **Convex projective geometry and relatively Anosov representations**, ViS-GaT seminar, KIAS, Seoul, South-Korea
- Jan. 16, 2025 **Représentations relativement anosoviennes et finitude géométrique en géométrie projective convexe**, Séminaire de théorie spectrale et géométrie, Institut Fourier
- Nov. 18, 2024 **Geometric finiteness, convex projective geometry and relative Anosov representations**, 2024 meeting of the junior researchers of Plato’s tetrahedron network, École Normale Supérieure de Paris
- Feb. 13, 2024 **Cubulated hyperbolic groups admit Anosov representations**, PS-SNU Geometry/Topology Online Seminar, online (Paris-Saclay Univ. and Seoul National Univ.)
- Jan. 25, 2024 **Représentations anosoviennes pour les groupes hyperboliques cubulables**, Séminaire virtuel francophone de groupes et géométrie, online
- Nov. 6, 2023 **Représentations anosoviennes pour les groupes hyperboliques cubulables**, Ergodic theory seminar, IRMAR, Rennes
- Jun. 21-30, 2023 **Strictly convex cusps with nilpotent holonomy**, Nearly Carbon Neutral Geometric Topology conference, online
- Feb. 8, 2023 **Introduction to convex projective reflection groups and their applications**, Mini-Workshop Reflection groups in Magdeburg, (IHES, France) & (University of Magdeburg, Germany)
- Oct. 10, 2022 **Teichmüller space II**, Arbeitsgemeinschaft : Higher rank Teichmüller theory, MFO, Oberwolfach, Germany
- Jan. 13, 2022 **The Classification of theta positive structures**, Young researcher’s workshop on positivity in Lie groups, IWH, Heidelberg, Germany, joint with Pierre-Louis Blayac
- Aug. 31, 2021 **Anosov representations and strong projective convex cocompactness**, Workshop on Anosov representations, Centre Paul Langevin, Aussois, France

Workshops and conferences

- Jun. 23, 2025 **Low-dimensional phenomena : geometry and dynamics**, Institut Henri Poincaré, Paris, France
- May 19, 2025 **Higher rank geometric structures, Higgs bundles and physics**, Institut Henri Poincaré, Paris, France
- Nov. 18, 2024 **2024 meeting of the junior researchers of Plato’s tetrahedron network**, to Nov. 21, 2024 École Normale Supérieure de Paris
- Nov. 20, 2023 **The young researchers in geometry and dynamics’ meeting**, Institut Fourier, to Nov. 22, 2023 Grenoble, France

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- Jun. 21, 2023 **Nearly Carbon Neutral Geometric Topology conference**, *online*
to Jun. 30, 2023
- Feb. 08, 2023 **Mini-Workshop Reflection groups in Magdeburg**, *online*, from Magdeburg
to Feb. 09, 2023 university, Germany and IHÉS, France
- Nov. 23, 2022 **The young researchers in geometry and dynamics' meeting**, IMO, Orsay,
to Nov. 25, 2022 France
- Oct. 9, 2022 **Arbeitsgemeinschaft : Higher Rank Teichmüller Theory**, MFO, Oberwolfach,
to Oct. 14, 2022 Germany
- Jun. 6, 2022 **Groups, Geometry and Dynamics : a conference in honor of François**
to Jun. 10, 2022 **Labourie**, IESC, Cargèse, France
- Jan. 10, 2022 **Young Researcher's Workshop on Positivity in Lie Groups**, IWH, Heidelberg,
to Jan. 14, 2022 Germany
- Nov. 15, 2021 **The young researchers in geometry and dynamics' meeting**, CIRM, Luminy,
to Nov. 17, 2021 France
- Aug. 28, 2021 **Workshop on Anosov representations**, Centre Paul Langevin, Aussois, France
to Sep. 4, 2021

Teaching and math popularization

- Dec. 2024 **Organization of a reading group on convex projective geometry with**
to Apr. 2025 **Colin Davalo**, *Institut Fourier*
We meet every week to discuss the basics of Hilbert geometry, following my minicourse. We studied Benzécri's theorems, different Gromov hyperbolicity criterion for groups dividing a properly convex domain, and Vinberg theory
- Nov. 7, 2024 **Minicourse for PhD tudents titled “Hilbert geometries and tilings of**
Nov. 21, 2024 **convex sets**”, *Institut Fourier*
I gave an introductory minicourse (three times 2h) on convex projective geometry for PhD students from various scientific backgrounds
- Sep. 2021 **Exercise sessions for physics L2 students about multivariable calculus**
to Jan. 2024 **and linear algebra**, *Université Paris-Saclay*
- Sep. 2022 **Research advisor for a MATH.en.JEANS workshop**, *Collège Alexandre Flem-*
to Apr. 2024 *ming, Orsay*
Every week, the students participating in the workshop work on the research problem they chose in the beginning of the year. I come regularly to guide them in their research, help them learning how to write proofs, and see how far they went.
- Oct. 15, 2022 **Running a mathematical workshop at the “Fête de la science” in Jussieu**,
Oct. 15, 2023 *Sorbonne Université*
I ran along with 2 friends a 2 hours workshop for the popularization of mathematics, in 2022 about the change-making problem, and in 2023 about periodic and aperiodic tilings
- Sep. 2017 **Teaching maths and computer sciences to talented high school students**
to Jul. 2018 **through the association TalENS**
I gave a serie of 5 lectures of 2 hours duration each to a group of 10 high school students about algorithmics, algorithmic complexity, and asymptotics
- Sep. 2017 **Maths oral preparation and examination for students of “classes prépara-**
to Jul. 2018 **toires**”, *Institut Bossuet, Paris*

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