

Pietro Mesquita Piccione

Résumé

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Work experience

2025–2027 **Postdoc**, *University of Gothenburg*, Göteborg, Sweden, Supervisor: David Witt Nyström

Education

- 2022 – 2025 **PhD in Mathematics**, *Institut des mathématiques de Jussieu*, Sorbonne Université, Paris, France
Advisors: Sébastien Boucksom and Tat Dat Tô
- 2021 – 2022 **Master's Degree in Mathematics**, *Institut des mathématiques de Jussieu*, Sorbonne Université, Paris, France
- 2017 – 2021 **Bachelor's degree in Mathematics**, *Universidade de São Paulo*, USP, São Paulo, Brazil
Prize for outstanding performance.

Research projects and grants

- 2022 – 2025 **MathInParis2020**, *Scholarship for a PhD in Paris*, Cofunded by Marie Skłodowska-Curie Actions, Fondation Sciences mathématiques de Paris
- 2021 – 2022 **PGSM Scholarship**, *Scholarship for a Master's degree in Paris*, Fondation Sciences mathématiques de Paris
- 2020 – 2021 **Morse Theory**, *Undergraduate Research Project*, FAPESP
Grant FAPESP 2020/04871-0

Articles

- 2025 **A transcendental non-Archimedean Calabi–Yau Theorem with applications to the cscK problem**, *joint with David Witt Nyström*, preprint, arXiv:2509.09442
Description: We solve the non-Archimedean Monge–Ampère equation for compact Kähler manifolds, generalizing a result of Boucksom–Favre–Jonsson to the transcendental setting. This allows us to derive a valuative criterion for uniform K-stability for models. As a central application, we prove that this stability condition implies the existence of a unique constant scalar curvature Kähler metric.
- 2024 **A non-Archimedean theory of complex spaces and the csc-K problem**, *published*, *Advances in Mathematics*
Description: In this paper I construct a space of valuations attached to a compact complex manifold, that generalize the Berkovich analytification of a projective variety over \mathbb{C} . As an application I get a sufficient algebraic condition for the existence of constant scalar curvature Kähler metrics on a given Kähler class on a Kähler manifold.

Talks

The non-Archimedean approach of the Yau–Tian–Donaldson conjecture

- 2025 **Workshop on Singular canonical Kähler metrics on compact and non-compact manifolds**, Rényi Institute, Budapest, Hungary
- 2025 **Geometry seminar**, Max Plank Institute for Mathematics in the Sciences, Leipzig, Germany
- 2025 **Complex geometry seminar**, Mathematisches Institut, University of Münster, Münster, Germany
- 2025 **MARGE in Brest: Fibrations and Deformations**, Université de Bretagne Occidentale, Brest, France
- 2025 **Geometry Webinar AmSur /AmSul**, Webinar
- 2025 **Séminaire de Géométrie complexe**, Université Toulouse III - Paul Sabatier, Toulouse, France
- 2025 **Séminaire Géométries ICJ**, Université Claude Bernard Lyon 1, Lyon, France
- 2025 **Mathematics Seminar**, Aarhus University, Aarhus, Denmark

- 2024 **Séminaire de géométrie algébrique de Jussieu**, ENS, Paris, France
- 2024 **Séminaire systèmes dynamiques et géométrie**, Université d'Angers, Angers, France
- 2024 **Complex Analysis Seminar**, University of Bayreuth, Bayreuth, Germany
- 2024 **Geometric Analysis Seminar**, BICMR, Beijing, China
- 2024 **KASS Seminar**, Chalmers University, Gothenburg, Sweden
- 2024 **Algebraic Geometry Seminar**, University of Glasgow, Scotland
- 2024 **Any Complex Geometry Seminar**, University of California Berkeley, US
- 2024 **Graduate Student Seminar Series**, SLMATH, Berkeley, US
- 2024 **Séminaire des Thésards**, IMJ-PRG, Université Paris Cité, France
- 2024 **Demi-Journée des doctorant.e.s de l'équipe TGA 2024**, IMJ-PRG, Sorbonne Université, France
- A counterexample for the periodic orbit conjecture**
- 2022 **Groupe de Travail : Dynamiques Sauvages**, IMJ-PRG, Sorbonne Université, France
- 2022 **A5 seminar**, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil
- To the general public**
- 2021 **A Tale of Geometry**, *S4*, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil
- 2020 **Morse Theory in 15 Minutes**, *Senior Thesis Presentation*, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil
- 2020 **Is the Earth flat? A talk about curvature**, *S4*, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil
- 2020 **How to solve any equation, with some conditions**, *S4*, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil

Professional

Teaching Assistantships

- 2025/1 **Introduction to Riemann Surfaces**, Campus Pierre et Marie Curie, Sorbonne Université, France
- 2024/2 **Topology and Differentiable Calculus I**, Campus Pierre et Marie Curie, Sorbonne Université, France
- 2024/1 **Functional Analysis**, Campus Pierre et Marie Curie, Sorbonne Université, France
- 2023/2 **Topology and Differentiable Calculus I**, Campus Pierre et Marie Curie, Sorbonne Université, France
- 2020/2 **Introduction to Algebraic Topology**, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil
- 2019/2 **Introduction to Analysis**, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil
- 2019/1 **Differentiable functions and series**, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil
- 2018/2 **Calculus II**, *Escola Politécnica*, Universidade de São Paulo, Brazil

Scientific Visits

- 2025 **Simons Semester in Analysis and Geometry on Complex Manifolds**, *Erdős Center*, Budapest, Hungary
Three months visit to the program.
- 2024 **Special Geometric Structures and Analysis**, *SLMath*, Berkeley
Two months visit to the program.

Academic Services

- 2021 **Organizer of the A5 Group**, *A student runned academic group*, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil
Over 25 weekly seminars organized
- 2019 **Deputy Student Representative in the Mathematics Department Council**, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil

2018 **Deputy Student Representative in the Mathematics Department Council**, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil

Events Organized

2022 **MaThematical Days : Paul Erdős**, *Universidade de São Paulo*, São Paulo, Brazil

2021 **MaThematical Days : Emmy Noether**, *Universidade de São Paulo*, São Paulo, Brazil

2021 **MaThematical Days : Élie Cartan**, *Universidade de São Paulo*, São Paulo, Brazil

Other Writings

2025 **Autour de la conjecture de Yau–Tian–Donaldson pour une classe transcendante**, *PhD Thesis*, Sorbonne Université

2022 **L^2 techniques in Complex Geometry**, *Master Thesis*, Sorbonne Université

2021 **Morse Theory**, *Undergraduate Thesis*, Universidade de São Paulo

Other Info

Related Activities

2025 **Reading Seminar on Kähler Ricci Flow**, Online

2021 – 2022 **Reading Seminar on Wild Dynamics**, *Groupe De Travail Dynamiques Sauvages*, IMJ-PRG, Sorbonne Université

2021 **Summer IMPA**, *Differential topology graduate course*, IMPA, Rio de Janeiro, Brazil
Online

2020 **Summer IMPA**, *Functional Analysis graduate course*, IMPA, Rio de Janeiro, Brazil
with financial support

2018 **Summer IMPA**, *Real Analysis*, IMPA, Rio de Janeiro, Brazil
with financial support

Languages

Portuguese Native Speaker

Italian Native Speaker

English Fluent

Spanish Fluent

French Fluent

Catalan Intermediate

Links

ArXiv https://arxiv.org/a/mesquitapiccione_p_1

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References

Reference I Sébastien Boucksom

Reference II Tat Dat Tô

Reference III Tamás Darvas

Reference IV Ruadhaí Dervan