Alexis Michelat

Curriculum vitae

Alexis Michelat
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Personal Information

Citizenship : France. **Place of birth:** Versailles (France). **Date of birth:** 31/05/1992.

Positions

01/04/2026— **Assistant Professor (助教)**, *Gakushuin University (学習院大学)*

01/09/2022-31/03/2026 **Bernoulli Instructor**, *EPFL*

01/10/2020-31/08/2022 **Post-doc fellow of the Swiss National Science Foundation (Early Postdoc.Mobility)**, *University of Oxford*, Mentor: Prof. Dr. Andrea Mondino

01/10/2019-30/09/2020 **Post-doc fellow of the Fondation Sciences Mathématiques de Paris**, *Université Paris-Diderot*, Mentor: Prof. Dr. Frédéric Hélein

Visiting Positions Abroad

19/08/2024-20/12/2024 **Research Member in the *Special Geometric Structures and Analysis* program**, *(Simons Laufer Mathematical Sciences Institute)*

Education

03/2016-09/2019 **PhD**, *Department of Mathematics, ETH Zürich*, Title: Morse-Theoretic Aspects of the Willmore Energy, Advisor: Prof. Tristan Rivière

05/2015-07/2015 **Master's research work**, *ETH Zürich*, Final grade : 19/20, Advisor : Prof. Dr. Tristan Rivière

09/2014-06/2015 **Master 2 Mathematics and Applications**, *Université Paris 6 Jussieu*, *Summa cum laude*

09/2013-06/2015 **École normale supérieure diploma**, *École normale supérieure de Paris*, *Summa cum laude*

09/2013-06/2014 **Master 1 Mathematics**, *École Normale Supérieure de Paris*, *Summa cum laude*

09/2010-06/2013 **Bachelor Degree Mathematics and Applications**, *Université Paris-Dauphine*, *Summa cum laude*, Rank : 1/121

09/2010-06/2012 **DEMI2E**, *Université Paris-Dauphine*, *Summa cum laude*, Rank: 1/189

07/2010 **Baccalauréat**, *Lycée Jeanne d'Albret (Saint-Germain en Laye)*, *Summa cum laude* (i.e. mention très bien)

Publications

10. (with Andrea Mondino). Quantization of the Willmore Energy in Riemannian Manifolds. Adv. Math. 489 (2026), Paper No. 110789, 118 pp., 2026
9. (with Tristan Rivière). Morse Index Stability of Willmore Immersions [memoir combining *Morse Index Stability of Willmore Immersions I* arxiv:2306.04608 and *Weighted Eigenvalue Problems for Fourth-Order Operators in Degenerating Annuli*, arxiv:2306.04609]. Memoirs of the European Mathematical Society, 300 p. *to appear*, 2026
8. Morse Index Stability of Biharmonic Maps in Critical Dimension. J Geom Anal 35, 108, 158 p., 2025
7. (with Yilin Wang). The Loewner Energy via the Renormalised Energy of Moving Frames. Arch Rational Mech Anal 248, no. 2, Paper No. 15, 60 p., 2024
6. (with Tristan Rivière). Pointwise expansion of degenerating immersions of finite total curvature. J. Geom. Anal. 33, no. 1, Paper No. 24, 91 p., 2023
5. (with Tristan Rivière). The Classification of branched Willmore spheres in the 3-sphere and the 4-sphere. Ann. Sci. de l'École Norm. Superieure, 4^e série, t. 55, 2022, p. 1199 à 1288, 2022

4. On the Morse Index of Critical Points in the Viscosity Method. Calc. Var. Partial Differ. Equ., Calc. Var. 61:42, 42p., 2022
3. On the Morse Index of Branched Willmore Spheres in 3-Space. Calc. Var. Partial Differ. Equ. 60:126, 97p., 2021
2. On the Morse index of Willmore spheres in S^3. Comm. Anal. Geom., Vol. 28, No. 6, p. 1337–1406, 2020
1. (with Tristan Rivière). A viscosity method for the min-max construction of closed geodesics. ESAIM: COCV Volume 22, Number 4, October-December, p. 1282-1324, 2016

Preprints

3. Alexis Michelat. Morse Index Stability of Branched Willmore Immersions. arXiv:2506.09005, 2025
2. On the Moduli Space of Null Curves in Klein's Quadric. arXiv:1905.04942, 2019
1. Morse Index Estimates of Min-Max Willmore Surfaces. arXiv:1808.07700, 2018

Talks

1. 2025: **Universität Münster**, *Differential Geometry Workshop 2025*, (29 September-1 October).
2. 2025: **ETH Zürich**, *Analysis Seminar*, (13 May), Morse Stability of Branched Willmore Immersions.
3. 2025: **Université Paris Diderot**, *Séminaire de géométrie*, (24 March) Stabilité de Morse des immersions de Willmore.
4. 2025: **Sapienza Università di Roma**, *Calculus of Variations and PDE's in Geometric Analysis* (27-31 January), Fourth-Order Weighted Elliptic Operators and Morse Stability of Willmore Immersions.
5. 2024: **SLMath**, *GMT and Minimal Submanifolds Seminar* (18 September), Morse Index Stability of Willmore Immersions.
6. 2024: **University of Coimbra**, *Regularity theory and free boundary problems: from PDE to interfaces*, A Satellite Conference of the European Congress of Mathematics 2024 (22-26 July); "Harmonic Moving Frames, Renormalised Energy, and Interplay between Loewner and Willmore Energies".
7. 2024: **ETH Zürich**, *CHANGE - CHallenges in ANalysis and GEometry* (17-21 June); "Geometric Aspects of Willmore Immersions".
8. 2024: **Shandong University**, *Geometric Analysis Seminar* (19 January). "Morse Index Stability of Biharmonic Maps in Critical Dimension" (online).
9. 2023: **CIRM**, *Recent progress in Geometric Analysis* (6-10 November); "Morse Index Stability Beyond Minimal Surfaces: Da Lio-Gianocca-Rivière's Theory".
10. 2023: **Université Paul Sabatier**, *PDE, Analysis, Geometry and Physics* (4-9 June), Conference in Honour of Frédéric Hélein's 60th birthday; "Morse Index Stability of Willmore Immersions".
11. 2023: **Université de Lorraine**, Nancy, "Semi-continuité supérieure de l'indice de Morse des immersions de Willmore" (27 April).
12. 2023: **Nantes Université**, "Énergies invariantes conformes des courbes et des surfaces" (10 February)
13. 2022: **University of Oxford**, *Geometry and Analysis Seminar* (9 May) "Conformally Invariant Energies of Curves and Surfaces".
14. 2022: **University College London (UCL)**, *Geometry Seminar* (27 April), "Conformally Invariant Energies of Curves and Surfaces".
15. 2021: **Jeonbuk National University** (online), *4th Geometric Analysis Festival* (October), "Willmore Surfaces: Min-Max and Morse Index".
16. 2021: **University of Oxford** (online), *PDE CDT Lunchtime Seminar* (17 June), "Willmore Surfaces: Min-Max and Morse Index".
17. 2020: **Université Paris-Est Créteil**, *Groupe de travail équations aux dérivées partielles* (12 March), "Sur l'indice de Morse des surfaces de Willmore branchées".
18. 2020: **Queen Mary University of London**, *Geometry and Analysis Seminar* (3 March), "On the Morse Index of Branched Willmore Spheres".
19. 2020: **Université Pierre-et-Marie Curie**, *Séminaire d'Analyse et Géométrie* (28 January), "Sur l'indice de Morse des surfaces de Willmore branchées".
20. 2020: **Université Paris-Diderot**, *Séminaire de Géométrie* (27 January), "Sur l'indice de Morse des surfaces de Willmore branchées".
21. 2019: **Université Libre de Bruxelles**, *Séminaire Analyse non linéaire et EDP* (4 November), "Morse Index of Branched Willmore Spheres".
22. 2019: **CIRM**, *Variational Problems and the Geometry of Submanifolds* (27-31 May), "A Morse-Theoretic Perspective on Immersed Surfaces".
23. 2018: **Institute for Advanced Study**, *Variational Methods in Geometry Seminar*, (13th of November) "Morse-Theoretic Aspects of the Willmore Energy".
24. 2018: **Université Paris Diderot**, *Séminaire de Géométrie*, (12th of March) "Classification des sphères de Willmore branchées dans les sphères de dimension 3 et 4".
25. 2018: **ETH Zürich**, *Graduate Analysis seminar* (22th of February) "Classical Minimal Surfaces and the Klein Correspondence".
26. 2017: **The University of Warwick**, *Analysis seminar* (23th of November) "Classification of branched Willmore spheres in S^3 and S^4".
27. 2017: **ETH Zürich**, *Analysis seminar* (7th of November) "The classification of branched Willmore two-spheres in the three-sphere and the four-sphere".

28. 2017: **ETH Zürich**, *Graduate colloquium* (24th of October) "What is... a Willmore surface?".

Teaching

- EPFL (Lausanne, Switzerland)
  1. 2026: Spring, lecturer for *Algèbre linéaire avancée II* (Advanced Linear Algebra II), a course for first-year physics students.
  2. 2026: Spring, lecturer for *Calculus of Variations*, a course for third-year Master's students in mathematics or theoretical physics.
  3. 2025: Fall, lecturer for *Distribution Theory and Interpolation Spaces*, a course for Master's students in mathematics or theoretical physics.
  4. 2025: Spring, lecturer for *Algèbre linéaire avancée II* (Advanced Linear Algebra II), a course for first-year physics students.
  5. 2025: Spring, lecturer for *Calculus of Variations*, a course for third-year Master's students in mathematics or theoretical physics.
  6. 2025: Spring, lecturer for *Distribution Theory and Interpolation Spaces*, a course for Master's students in mathematics or theoretical physics.
  7. 2023: Fall, lecturer for *Analyse III* (Calculus III). Course given to 349 second-year Bachelor students majoring in engineering.
  8. 2023: Fall, lecturer for *Distribution Theory and Interpolation Spaces*. Master's course given to 14 students (majoring in mathematics or theoretical physics).
  9. 2022: Fall, lecturer for *Analyse III* (Calculus III). Course given to 354 Bachelor students majoring in engineering.
  10. 2022: Fall, lecturer for *Distribution Theory and Interpolation Spaces* (Master's course for 10 students).
- University of Oxford (United Kingdom)
  1. 2022: Spring (Hilary), TA for *C3.11 Riemannian Geometry*, Prof. Dr. Jason Lotay.
- ETH Zürich (Switzerland)
  1. 2019: Spring, TA for the course *Measure and Integration*, Prof. Dr. Josef Teichmann.
  2. 2018: Fall, Organisation of the exercise classes of *Analysis II*, Prof. Dr. Emmanuel Kowalski.
  3. 2018: Spring, Organisation of the seminar *Topics on Minimal Surface Theory*, Prof. Dr. T. Rivière.
  4. 2017: Fall, Organisation of the exercise classes of *Analysis I*, Prof. Dr. Thomas Willwacher.
  5. 2017: Spring, TA for the course *Differential Geometry II*, Prof. Dr. Urs Lang.
  6. 2016: Fall, TA for the course *Differential Geometry I*, Prof. Dr. Urs Lang.
  7. 2016: Spring, TA for the course *Measure and Integration*, Prof. Dr. Francesca Da Lio.

Short-term Invitation

- 2018: Institute for Advanced Study (Princeton). Invitation by Prof. Carlotto and Prof. Codá Marques in the framework of the thematic year Variational Methods in Geometry (4-17 Novembre).

Editorial Activity

- 2018 – present: Referee for *Advances in Mathematics*.
- 2020 – present: Referee for *Journal of Nonlinear Analysis*
- 2020 – present: Referee for *The Journal of Geometric Analysis*.
- 2021 – present: Referee for *Journal of the European Mathematical Society*.
- 2023 – present: Referee for *Calculus of Variations and Partial Differential Equations*.
- 2023 – present: Referee for *Journal of Differential Geometry*.
- 2024 – present: Referee for "*Crelle's Journal*" (*Journal für die reine und angewandte Mathematik*).
- 2024 – present: Referee for *Advances in Calculus of Variations*.
- 2024 – present: Referee for *Archive for Rational Mechanics and Analysis*.
- 2024 – present: Referee for *Compositio Mathematica*.

Reviewing Activity

- 2023 – present: Reviewer for Mathematical Reviews/MathSciNet (6 reviews).
- 2023 – present: Reviewer for zbMATH Open (10 reviews).

Languages, by Order of Proficiency

French (mothertongue), English (fluent), Japanese (日本語能力試験1級JLPT N1, 2024, Summer session), Spanish (∼C1), German (intermediate∼B2), Chinese (beginner∼A2), Russian (beginner∼A1).

Distinction and Grants

- 2020: *ETH Medal* for "outstanding doctoral theses."
- 2019: Early Postdoc.Mobility Fellowship of the Swiss National Science Foundation (2020 – 2022).

- 2019: Fondation Sciences Mathématiques de Paris's post-doc fellowship (2019 – 2020).
- 2013: Master's degree fellowship of the Fondation Sciences Mathématiques de Paris (FSMP).