Curriculum Vitae
Connor Mooney

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UC Irvine
Irvine, CA 92697-3875

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Education:

- Ph.D. in Mathematics, Columbia University, 2015
- B.S. in Mathematics, Stanford University, 2011

Employment:

- Associate Professor, UC Irvine, 2022 -
- Assistant Professor, UC Irvine, 2018 - 2022
- Postdoctoral Researcher, ETH Zürich, 2016 - 2018
- NSF Postdoctoral Research Fellow, UT Austin, 2015 - 2016

Grants and Awards:

- Simons Fellow in Mathematics, 2024 - 2025
- Chancellor's Fellow, UC Irvine, 2022 - 2025
- Alfred P. Sloan Research Fellowship, 2022 - 2024
- NSF CAREER Grant DMS-2143668, 2022 - 2027
- NSF Grant DMS-1854788, 2019 - 2023
- NSF Postdoctoral Research Fellowship, 2015 - 2019
- NSF Graduate Research Fellowship, 2012 - 2015
- Firestone Medal for Excellence in Undergraduate Research, Stanford University, 2011

Publications:

37. Book review for *Regularity Theory for Elliptic PDE*, by Fernández-Real and Ros-Oton. *Bull. Amer. Math. Soc.*, to appear.
36. Bechtel, S.; Mooney, C.; Veraar, M. Counterexamples to maximal regularity for operators in divergence form. Preprint 2024, arXiv:2401.05550.
35. Du, W.; Mooney, C.; Yang, Y.; Zhu, J. A half-space Bernstein theorem for anisotropic minimal graphs. Preprint 2023, arXiv:2312.07519.
34. Hirsch, J.; Mooney, C.; Tione, R. On the Lawson-Osserman conjecture. Preprint 2023, arXiv:2308.04997.

33. Mooney, C.; Rakshit A. Sobolev regularity for optimal transport maps of non-convex planar domains. *SIAM J. Math. Anal.*, to appear.

32. Mitake, H.; Mooney, C.; Tran, H.; Xin, J.; Yu, Y. Bifurcation of homogenization and nonhomogenization of the curvature G-equation with shear flows. Preprint 2023, arXiv:2303.16304.

31. Mooney, C.; Savin, O. Non C^1 solutions to the special Lagrangian equation. *Duke Math. J.*, to appear.

30. Mooney, C.; Yang, Y. The anisotropic Bernstein problem. *Invent. Math.* **235** (2024), 211-232.

29. Bhattacharya, A.; Mooney, C.; Shankar, R. Gradient estimates for the Lagrangian mean curvature equation with critical and supercritical phase. Preprint 2022, arXiv:2205.13096.

28. Mooney, C.; Rakshit, A. Singular structures in solutions to the Monge-Ampère equation with point masses. *Math. Eng.* **5** (2023), Paper No. 083, 11 pp.

27. Mooney, C. Homogeneous functions with nowhere vanishing Hessian determinant. *Ann. Inst. H. Poincaré Anal. Non Linéaire*, to appear.

26. Mooney, C. Hilbert's 19th problem revisited. *Boll. Unione Mat. Ital.* **15** (2022), 483-501.

    Featured in "Editor Top Picks," a selection of key papers that highlight some of the best current research published in *Boll. Unione Mat. Ital.*

25. Mooney, C.; Yang, Y. A proof by foliation that Lawson's cones are A_Φ-minimizing. *Discrete Contin. Dyn. Syst.* **41** (2021), 5291-5302.

24. Mooney, C. Solutions to the Monge-Ampère equation with polyhedral and Y-shaped singularities. *J. Geom. Anal.* **31** (2021), 9509-9526.

23. Mooney, C. Strict 2-convexity of convex solutions to the quadratic Hessian equation. *Proc. Amer. Math. Soc.* **149** (2021), 2473-2477.

22. Mooney, C. Entire solutions to equations of minimal surface type in six dimensions. *J. Eur. Math. Soc. (JEMS)* **24** (2022), 4353-4361.

21. Mooney, C. Singularities of complex-valued solutions to linear parabolic equations. *Int. Math. Res. Not. IMRN* **21** (2021), 4413-4426.

20. Mooney, C. Minimizers of convex functionals with small degeneracy set. *Calc. Var. Partial Differential Equations* **59** (2020), Paper No. 74, 1-19.

19. Ivanisvili, P.; Mooney, C. Sharpening the triangle inequality: envelopes between L^2 and L^p spaces. *Anal. PDE* **13** (2020), 1591-1603.

18. Mooney, C. A proof of the Krylov-Safonov theorem without localization. *Comm. Partial Differential Equations* **44** (2019), 681-690.

17. Mooney, C; Savin, O. Regularity results for the equation $u_{11}u_{22} = 1$. *Discrete Contin. Dyn. Syst.* **39** (2019), 6865-6876.

16. Mooney, C. The Monge-Ampère equation. *Rend. Semin. Mat. Univ. Politec. Torino* **76** (2018), 93-113.

15. Figalli, A.; Mooney, C. An obstacle problem for conical deformations of thin elastic sheets. *Arch. Ration. Mech. Anal.* **228** (2018), 401-429.

14. Mooney, C. Singularities in the calculus of variations. In *Contemporary Research in Elliptic PDEs and Related Topics* (Ed. Serena Dipierro), *Springer INdAM Series* **33** (2019), 457-480.

13. Collins, Tristan C.; Mooney, C. Dimension of the minimum set for the real and complex Monge-Ampère equations in critical Sobolev spaces. *Anal. PDE* **10** (2017), 2031-2041.

12. Mooney, C. Finite time blowup for parabolic systems in two dimensions. *Arch. Ration. Mech. Anal.* **223** (2017), 1039-1055.

11. Figalli, A.; Maggi, F.; Mooney, C. The sharp quantitative Euclidean concentration inequality. *Camb. J. Math.* **6** (2018), 59-87.

10. Mooney, C. Some counterexamples to Sobolev regularity for degenerate Monge-Ampère equations. *Anal. PDE* **9** (2016), 881-891.

9. Figalli, A.; Jhaveri, Y.; Mooney, C. Nonlinear bounds in Hölder spaces for the Monge-Ampère equation. *J. Funct. Anal.* **270** (2016), 3808-3827.

8. Mooney, C.; Savin, O. Some singular minimizers in low dimensions in the calculus of variations. *Arch. Ration. Mech. Anal.* **221** (2016), 1-22.

7. Mooney, C. Harnack inequality for degenerate and singular elliptic equations with unbounded drift. *J. Differential Equations* **258** (2015), 1577-1591.

6. Mooney, C. $W^{2,1}$ estimate for singular solutions to the Monge-Ampère equation. *Ann. Sc. Norm. Super. Pisa Cl. Sci. (5)* **14** (2015), 1283-1303.

5. Mooney, C. Partial regularity for singular solutions to the Monge-Ampère equation. *Comm. Pure Appl. Math.* **68** (2015), 1066-1084.

Conference Proceedings:

4. Mooney, C. The anisotropic Bernstein problem. Oberwolfach Report 32 (2023), to appear.
3. Mooney, C. Singular structures in exterior solutions to the Monge-Ampère equation. Oberwolfach Report 35 (2021), 1884-1886.
2. Mooney, C. Minimizers of strictly convex functionals. Oberwolfach Report 34 (2019), 2061-2062.
1. Mooney, C. Regularity vs. singularity for elliptic and parabolic systems. Oberwolfach Report 35 (2018), 2116-2118.

Conference Talks:

- AIMS Conference Thematic Session "Monge-Ampère type equations and their applications," Abu Dhabi, December 2024
- AIMS Conference Special Session "Recent Advances in Nonlinear PDEs and Free Boundary Problems," Abu Dhabi, December 2024
- ECM Satellite Conference "Regularity theory and free boundary problems: from PDE to interfaces," Coimbra, July 2024
- "Nonlinear PDEs, in honor of Vladimír Šverák," Minneapolis, May 2024
- AMS Special Session "Partial Differential Equations and Convexity," San Francisco, May 2024
- Oberwolfach workshop "Partial Differential Equations," July 2023
- "Non-linear elliptic PDE," ICMAT Madrid, July 2023
- AIMS Conference Special Session "Analysis and Applications of Nonlinear Elliptic and Parabolic Equations," Wilmington, June 2023
- AIMS Conference Special Session "Local and Nonlocal Fully Nonlinear Partial Differential Equations of Elliptic and Parabolic Type," Wilmington, June 2023
- BIRS Workshop "Compensated Compactness and Applications to Materials," April 2023 (online)
- UK PDE Network Workshop "Geometric PDE," Warwick, December 2022
- MSRI Workshop "Regularity Theory for Minimal Surfaces and Mean Curvature Flow," March 2022 (online)
- "Nonlinear Elliptic and Parabolic Partial Differential Equations," Levico Terme, October 2021 (online)
- "Optimal transport revisited," DMV-ÖMG Mini-Symposium, September 2021 (online)
- "Forum of Partial Differential Equations" (12th edition), Bedlewo, September 2021 (online)
- "Regularity Theory for Free Boundary and Geometric Variational Problems," Levico Terme, September 2021

- "Nonlinear Potential Theoretic Methods in Partial Differential Equations," Banff, September 2021 (online)
- Oberwolfach workshop "Partial Differential Equations," July 2021
- "Geometric and Applied Analysis," HCM Bonn, July 2021 (online)
- Fields Medal Symposium, October 2020 (online)
- AMS Special Session "Interfaces Between PDEs and Geometric Measure Theory," assoc. with Maryam Mirzakhani Invited Address by Tatiana Toro, Denver, January 2020
- Oberwolfach workshop "Partial Differential Equations," July 2019
- "Recent Progress in Nonlinear Partial Differential Equations," Beijing, June 2019
- AMS Special Session "Interactions Between GMT, PDE, and Harmonic Analysis," Honolulu, March 2019
- Oberwolfach workshop "Calculus of Variations," August 2018
- AIMS Conference Special Session "Geometric and Nonlinear PDEs," Taipei, July 2018
- "Elliptic Partial Differential Equations of Second Order: Celebrating 40 years of Gilbarg and Trudinger's Book," Melbourne, October 2017
- AMS Special Session "Nonlinear Elliptic PDEs," Orlando, September 2017
- "Calculus of Variations and PDEs," conference celebrating the 70th birthday of Paolo Marcellini, Firenze-Montecatini, June 2017
- "Advances in Geometric Analysis," ETH Zürich, June 2017
- "Transport Problems in Zürich," U. Zürich, April 2017
- "GMT, Shape Optimisation and Free Boundaries," Trieste, October 2016
- AIMS Conference Special Session "Quantitative Geometric and Functional Inequalities," Orlando, July 2016
- "KIAS CMC Conference on Analysis, Geometry and Optimal Transport," Seoul, June 2016
- "Calculus of Variations and PDEs," Columbia U., May 2016
- Midwest PDE Conference, Michigan State U., November 2015

Lecture Series and Short Courses Given:

- European School of Differential Geometry (4 lectures), Granada, June 2024
- UT Austin Research School in PDE (4 lectures), May 2021 (online)
- Xi'an Jiaotong U. (4 lectures), July 2019
- CIMAT Workshop "Differential Equations and the Calculus of Variations" (3 lectures), May 2019
- Oxford PDE CDT Short Course (3 lectures), May 2018
- "Advanced Lectures in Nonlinear Analysis" (2 lectures), U. Torino, May 2018

- MATRIX Workshop "Elliptic Partial Differential Equations of Second Order: Celebrating 40 years of Gilbarg and Trudinger's Book" (5 lectures), October 2017
- INdAM Intensive Period "Contemporary Research in Elliptic PDEs and Related Topics" (3 lectures), U. Bari, April 2017

Seminar and Colloquium Talks:

- Geometry/Topology Seminar, UC Davis, April 2024
- Geometry Seminar, Stanford U., November 2023
- Differential Geometry Seminar, UC Berkeley, October 2023
- PDE Seminar, Ohio State U., April 2023
- PDE Seminar, Beijing Normal U. and Hong Kong U. of Science and Technology, March 2023 (online)
- Geometric Analysis Seminar, U. Chicago, October 2022
- Geometric PDE Seminar, Academy of Mathematics and Systems Science (Beijing), June 2022 (online)
- Geometric Analysis Seminar, Beijing International Center for Mathematical Research, May 2022 (online)
- Analysis and PDEs Seminar, Johns Hopkins U., April 2022
- Geometry and Analysis Seminar, Columbia U., April 2022
- Geometry and Analysis Seminar, Rice U., April 2022
- Differential Geometry Seminar, UC Irvine, November 2021
- AIMS-Cameroon Research Center Colloquium, November 2021 (online)
- Geometric Analysis Seminar, Rutgers U., October 2021 (online)
- Geometric Analysis Seminar, Iowa State U., October 2021 (online)
- Nonlinear Analysis Seminar, Rutgers U., October 2021 (online)
- Geometry and Topology Seminar, Caltech, October 2021
- Geometric Analysis Seminar, UC San Diego, October 2021
- Informal Analysis and Geometry Seminar, MPI Leipzig, July 2021
- Informal Geometric Analysis Seminar, U. Maryland, March 2021 (online)
- PIMS-UBC Rising Stars Colloquium, March 2021 (online)
- Diff. Geom., Math. Phys., PDE Seminar, UBC, March 2021 (online)
- PDE Seminar, Brown U., March 2021 (online)
- DG/PDE Seminar, U. Washington, February 2021 (online)
- OSSUR PDEs Seminar, GSSI L'Aquila, January 2021 (online)
- Calderón-Zygmund Analysis Seminar, U. Chicago, November 2020 (online)
- PDE seminar via Zoom, July 2020 (online)
- Asia-Pacific Analysis and PDE Seminar, June 2020 (online)
- Geometry Seminar, Stanford U., December 2019
- PDE Seminar, Indiana U., November 2019
- Geometry and Analysis Seminar, Columbia U., September 2019
- Differential Geometry Seminar, Princeton U., September 2019

- Colloquium, CIMAT Guanajuato, May 2019
- Differential Geometry Seminar, Harvard U., April 2019
- Analysis Seminar, UC Irvine, March 2019
- Geometry and Analysis Seminar, Columbia U., February 2019
- Analysis Seminar, UC San Diego, December 2018
- CAMS Colloquium, USC, October 2018
- Differential Geometry Seminar, UC Riverside, October 2018
- Analysis Seminar, Heriot-Watt U., May 2018
- PDE Seminar, Oxford U., April 2018
- Special Colloquium, U. Toronto, January 2018
- Analysis Seminar, UT Austin, January 2018
- Colloquium, Indiana U., January 2018
- Special Colloquium, UC Irvine, January 2018
- Special Mathematics Seminar, MIT, January 2018
- Colloquium, UW Madison, December 2017
- Analysis and Probability Seminar, MPI Leipzig, November 2017
- Analysis Seminar, UC Irvine, September 2017
- Analysis and PDE Seminar, UCLA, September 2017
- Analysis Seminar, Courant Institute, May 2017
- PDE and Analysis Seminar, U. Pittsburgh, November 2016
- Geometry and Analysis Seminar, Columbia U., April 2016
- Geometric Analysis Seminar, Harvard U., April 2016
- Analysis Seminar, Northwestern U., February 2016
- Applied Math Colloquium, Fields Institute, December 2015
- PDE Seminar, UW Madison, November 2015
- Analysis Seminar, UT Austin, January 2015
- CAMP-PDE Seminar, U. Chicago, October 2014
- Complex Geometry Seminar, U. Maryland, October 2014
- Geometry and Analysis Seminar, Columbia U., September 2014
- Nonlinear Analysis Seminar, Rutgers U., October 2013

Editorial Boards:

- *Nonlinear Analysis*, 2020 -

Other Service and Professional Activities:

- Referee or opinions (many multiple times) for: *Advances in Mathematics*, *Analysis in Theory and Applications*, *Analysis & PDE*, *Annals of Functional Analysis*, *Annals of Mathematics*, *Annali di Matematica Pura ed Applicata*, *Annals of PDE*, *Annali della Scuola Normale Superiore di Pisa - Classe di Scienze*, *Archive for Rational Mechanics and Analysis*, *Calculus of Variations and Partial Differential Equations*, *Communications in Analysis and Geometry*, *Communications in Partial Differential Equations*, *Communications*

on Pure and Applied Mathematics, *Discrete and Continuous Dynamical Systems*, *Duke Mathematical Journal*, *Geometry & Topology*, *Graduate Studies in Mathematics*, *Indiana University Mathematics Journal*, *International Mathematics Research Notices*, *Inventiones Mathematicae*, *Journal d'Analyse Mathématique*, *Journal of the Australian Mathematical Society*, *Journal of Differential Equations*, *Journal of the European Mathematical Society*, *Journal of Functional Analysis*, *Journal of Mathematical Analysis and Applications*, *Journal de Mathématiques Pures et Appliquées*, *Journal of Nonlinear Science*, *Lecture Notes in Mathematics*, *Mathematische Annalen*, *Mathematische Zeitschrift*, *Nonlinear Analysis*, *Potential Analysis*, *Proceedings of the American Mathematical Society*, *Proceedings of the Royal Society of Edinburgh Section A*, *Pure and Applied Mathematics Quarterly*, *Revista Matemática Iberoamericana*, *SIAM Journal of Mathematical Analysis*, *Transactions of the American Mathematical Society*

- Reviewer for *Mathematical Reviews*
- NSF panelist
- Seminar Organization: Virtual Analysis and PDE Seminar, 2020 - ; UC Irvine PDE Seminar, 2018 -
- Conference Organization: AMS Special Session at UC Riverside, November 2019 (with N. Le); AIMS Special Session in Taipei, July 2018 (with R. Neumayer)
- External thesis examiner for: Tim Espin (U. Edinburgh, 2022)
- Service at UC Irvine:

  Department Committees: Awards (2020-21); Chair Search (2022-23); Chair's Advisory (2023-24); Colloquium (2021-22); Communications (2022-24); Dean's Advisory (2022-23); Graduate Admissions (2018-19, 2021-22); Graduate Studies (2019-21); Inclusive Excellence (2021-24); Outreach (2019-21); Presidential Postdoctoral Fellowship Hiring (2022-23); Real Analysis Qualifying Exam (2019, 2023, 2024 (Chair)); Faculty Hiring (2023-24)

  Advancement to Candidacy Committee for: Carson Collins (UCLA, 2023), Bryan Dimler (Chair, 2023), Arghya Rakshit (Chair, 2023), Yifan Guo (2023), Jooho Lee (2023), Salem Selim (2022), Yi-Lin Tsai (2021), Joe Li (2021), Rain Talosig (Chemistry, 2021), Shirley Chang (Chemistry, 2021), Tin Yau Tsang (2021), Yang Yang (Chair, 2020), Joshua Jordan (2020), Lili Yan (2019), Kirsten Hewitt (Chemistry, 2019)

  Thesis Defense Committee for: Yang Yang (2023), Lili Yan (2022)

- Outreach: AWM Graduate School Panelist at UCI (October 2022); Speaker at UCI Mathcounts (February 2020); UCI Math Circle Leader (May 2019)

PhD Students:

- Yang Yang, UC Irvine, 2019 - 2023 (postdoc at Johns Hopkins U.)
- Arghya Rakshit, UC Irvine, 2021 -
- Bryan Dimler (co-advised by R. Schoen), UC Irvine, 2022 -

Courses Taught:

- 2018-19: Math 295A (Graduate PDE); Math 295B (Graduate PDE); Math 295C (Graduate PDE)
- 2019-20: Math 296 (Topics in PDE); Math 140A (Elementary Analysis); Math 140B (Elementary Analysis)
- 2020-21: Math 140B (Elementary Analysis); Math 296 (Topics in PDE); Math 295C (Graduate PDE)
- 2021-22: Math 296 (Topics in PDE); Math 140B (Elementary Analysis); Math 295C (Graduate PDE)
- 2022-23: Math 121A (Linear Algebra); Math 295C (Graduate PDE)
- 2023-24: Math 295A (Graduate PDE); Math 295B (Graduate PDE); Math 295C (Graduate PDE)

Personal:

- Born May 10, 1989
- Citizen of US