

CONTACT
INFORMATION

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ACADEMIC
POSITIONS AND
EDUCATION

- Professor and David Saxon Presidential Term Chair, University of California, Los Angeles. March 1st, 2023–
- Professor. University of Maryland, College Park. 2019–2023
- Associate Professor. University of Maryland, College Park. 2017-2019.
- Assistant Professor. University of Maryland, College Park. 2014-2017.
- NSF post-doc. Courant Institute, New York University. 2011-2014.
- Ph.D. Mathematics; University of California-Los Angeles. 2011.
- M.S./B.S.. Applied mathematics; Case Western Reserve University. 2007.

AWARDS,
FELLOWSHIPS, AND
GRANTS:

- 2022 Invited speaker at the ICM (International Congress of Mathematics).
- 2022 Nachdiplom lecturer at ETH Zürich, Switzerland.
- NSF DMS Applied Mathematics Grant (DMS-2108633), 2021-2024. (National Science Foundation)
- 2020 Simons Fellow in Mathematics (Simons Foundation)
- 2020 Peter Lax Award (18th International Conference on Hyperbolic problems).
- 2019 IMA Prize (Institute for Mathematics and its Applications)
- 2019 SIAG/APDE prize joint with N. Masmoudi (Society for Industrial and Applied Mathematics).
- NSF CAREER Grant (DMS-1552826), 2016-2021. (National Science Foundation)
- 2015 Alfred P. Sloan Research Fellow in Mathematics (by the Sloan Foundation).
- NSF DMS Applied Mathematics Grant (DMS-1413177), 2014-2017. (National Science Foundation)
- Cathleen Morawetz Postdoctoral Fellowship, 2013-2014 (by the Courant Institute, NYU).
- NSF Mathematical Sciences Postdoctoral Research Fellowship (DMS-1103765), 2011-2014

Other recognition

- Joint work with A. Blumenthal and S. Punshon-Smith featured in SIAM News. October 2021.
- Joint work with P. Germain and N. Masmoudi was emphasized in N. Masmoudi's 2017 Fermat Prize announcement.
- 2014 Bourbaki Seminar on our joint work with N. Masmoudi; given by David Gérard-Varet. 2014.

PUBLICATIONS

Preprints

1. J. Bedrossian. "A note on cascade flux laws for the stochastically-driven nonlinear Schrodinger equation." *arXiv:2306.03251* (2023).
2. J. Bedrossian and M. Latocca. Non-invariance of Gaussian Measures under the 2D Euler Flow." *arXiv:2307.04214* (2023).

3. J. Bedrossian, S. Papathanasiou. "The Vlasov-Poisson and Vlasov-Poisson-Fokker-Planck systems in stochastic electromagnetic fields: local well-posedness." *arXiv:2211.03336* (2022).
4. J. Bedrossian, M. Coti Zelati, M. Dolce. "Taylor dispersion and phase mixing in the non-cutoff Boltzmann equation on the whole space." *arXiv:2211.05079* (2022).
5. J. Bedrossian, K. Liss. "Stationary measures for stochastic differential equations with degenerate damping" *arXiv:2206.02240*. 2022.
6. J. Bedrossian, S. Punshon-Smith. "Chaos in stochastic 2d Galerkin-Navier-Stokes". *arXiv:2106.13748*. 2021.

Accepted

1. J. Bedrossian, R. Bianchini, M. Coti Zelati, M. Dolce. "Nonlinear inviscid damping and shear-buoyancy instability in the two-dimensional Boussinesq equations." *Comm. Pure Appl. Math.* 2021.
2. S. Krishnagopal, J. Bedrossian. "Encoded Prior Sliced Wasserstein AutoEncoder for learning latent manifold representations." *Inter. Joint Conf. on Neural Networks* 2022.
3. J. Bedrossian, N. Masmoudi, C. Mouhot. "Linearized wave-damping structure of Vlasov-Poisson in R^3 ." To appear in *Siam J. of Math. Anal.* 2020.
4. J. Bedrossian, M. Gualdani, S. Snelson. "Non-existence of some approximately self-similar singularities for the Landau, Vlasov-Poisson-Landau, and Boltzmann equations." To appear in *Trans. Amer. Math. Soc.* 2021
5. J. Bedrossian, A. Blumenthal, S. Punshon-Smith. "A regularity method for lower bounds on the Lyapunov exponent for stochastic differential equations." To appear in *Invent. Math.* 2020.
6. J. Bedrossian, P. Germain, B. Harrop-Griffiths. "Vortex filament solutions of the Navier-Stokes equations." To appear in *Comm. Pure Appl. Math.* 2018.
7. J. Bedrossian, A. Blumenthal, S. Punshon-Smith. "Lagrangian chaos and scalar advection in stochastic fluid mechanics." To appear in *J. Euro. Math. Soc.* 2018.
8. J. Bedrossian, A. Blumenthal, S. Punshon-Smith. "Almost-sure exponential mixing of passive scalars by the stochastic Navier-Stokes equations." To appear in *Annals of Probability*. 2019.
9. J. Bedrossian, K. Liss. "Quantitative spectral gaps and uniform lower bounds in the small noise limit for Markov semigroups generated by hypoelliptic stochastic differential equations." To appear in *Prob. Math. Phys.* 2020.
10. J. Bedrossian, A. Blumenthal, S. Punshon-Smith. "The Batchelor spectrum of passive scalar turbulence in stochastic fluid mechanics." To appear in *Comm. Pure. Appl. Math.* 2019
11. J. Bedrossian, W. Golding. "Uniqueness Criteria for the Oseen Vortex in the 3d Navier-Stokes Equations." To appear in *Comm. Part. Diff. Eqns.* 2020.
12. J. Bedrossian, A. Blumenthal, S. Punshon-Smith. Almost-sure enhanced dissipation and uniform-in-diffusivity exponential mixing for advection-diffusion by stochastic Navier-Stokes. To appear in *Prob. Theory and Related Fields*. 2019

13. J. Bedrossian, S. He. Inviscid damping and enhanced dissipation of the boundary layer for 2D Navier-Stokes linearized around Couette flow in a channel. To appear in *Comm. Math. Phys.*. 2019.
14. J. Bedrossian, M. Coti Zelati, S. Punshon-Smith, F. Weber. Sufficient conditions for dual cascade flux laws in the stochastic 2d Navier-Stokes equations. To appear in *Arch. Rat. Mech. Anal.*. 2019.
15. J. Bedrossian. Nonlinear echoes and Landau damping with insufficient regularity. To appear in *Tunis. J. Math.*, 2016.
16. J. Bedrossian, F. Wang. "The Linearized Vlasov and Vlasov-Fokker-Planck Equations in a Uniform Magnetic Field." *Journal of Statistical Physics* 178.2 (2020): 552-594.
17. J. Bedrossian, M. Coti Zelati, S. Punshon-Smith, F. Weber. A sufficient condition for the Kolmogorov 4/5 law for stationary martingale solutions to the 3D Navier-Stokes equations. *Comm. Math. Phys.*, 367(3), pp.1045–1075. 2019.
18. J. Bedrossian, M. Coti Zelati, V. Vicol. Vortex axisymmetrization, inviscid damping, and vorticity depletion in the linearized 2D Euler equations. *Annals of PDE*, 5(1), pp 4. 2019.
19. J. Bedrossian, P. Germain, N. Masmoudi. Dynamics near the subcritical transition of the 3D Couette flow II: Above threshold case. To appear in *Mem. of the Amer. Math. Soc.*, 2015.
20. J. Bedrossian, P. Germain, N. Masmoudi. Dynamics near the subcritical transition of the 3D Couette flow I: Below threshold case. To appear in *Mem. of the Amer. Math. Soc.*, 2015.
21. J. Bedrossian, N. Masmoudi, C. Mouhot. Landau damping in finite regularity for unconfined systems with screened interactions. *Comm. Pure Appl. Math.*, 71(3), pp.537-576. 2018.
22. J. Bedrossian. Suppression of plasma echoes and Landau damping in Sobolev spaces by weak collisions in a Vlasov-Fokker-Planck equation. *Annals of PDE* 3(2), 2017.
23. J. Bedrossian, S. He. Suppression of blow-up in Patlak-Keller-Segel via shear flows. *SIAM J. of Math. Anal.*, 49(6), pp.4722-4766. 2017.
24. J. Bedrossian, P. Germain, N. Masmoudi. On the stability threshold for the 3D Couette flow in Sobolev regularity. *Annals of Math.*, 185(2):541-608, 2017.
25. J. Bedrossian, M. Coti Zelati. Enhanced dissipation, hypoellipticity, and anomalous small noise inviscid limits in shear flows. *Arch. Rat. Mech. Anal.*, 224(3), pp.1161-1204. 2017.
26. J. Bedrossian, M. Coti Zelati, N. Glatt-Holtz. Invariant measures for passive scalars in the small noise inviscid limit. *Comm. Math. Phys.*, 348(1):101-127, 2016.
27. J. Bedrossian, V. Vicol, F. Wang. The Sobolev stability threshold for 2D shear flows near Couette. *J. Nonlin. Sci.*, 1-25, 2016.
28. J. Bedrossian, N. Masmoudi, C. Mouhot. Landau damping: paraproducts and Gevrey regularity. *Annals of PDE*, 2(1):1-71, 2016.

29. J. Bedrossian, N. Masmoudi, V. Vicol. Enhanced dissipation and inviscid damping in the inviscid limit of the Navier-Stokes equations near the 2D Couette flow. *Arch. Rat. Mech. and Anal.*, 219(3):1087–1159, 2016.
30. J. Bedrossian. Large mass global solutions for a class of L1-critical non-local aggregation equations and parabolic-elliptic Patlak-Keller-Segel models. *Comm. Partial Diff. Eqns.*, 40(6):1119-1136, 2015.
31. J. Bedrossian, N. Masmoudi. Inviscid damping and the asymptotic stability of planar shear flows in the 2D Euler equations. *Publ. Math. de l'IHÉS* 122.1:195-300, 2015.
32. J. Bedrossian, R.V. Kohn. Blister patterns and energy minimization in compressed thin films on compliant substrates. *Comm. Pure Appl. Math.*, 68(3):472–510, 2015.
33. J. Bedrossian, N. Masmoudi. Existence, Uniqueness and Lipschitz Dependence for Patlak-Keller-Segel and Navier-Stokes in \mathbb{R}^2 with Measure-valued initial data. *Arch. Rat. Mech. Anal.*, 214 (3): 717–801, 2014.
34. J. Azzam, J. Bedrossian. Bounded mean oscillation and the uniqueness of active scalar equations. *Trans. Amer. Math. Soc.*, 367(5):3095–3118, 2015.
35. J. Bedrossian, N. Rodríguez. Inhomogeneous Patlak-Keller-Segel Models and aggregation equations with nonlinear diffusion in \mathbb{R}^d . *Disc. Cont. Dyn. Sys. B.* 19(5):1279-1309, 2014.
36. J. Bedrossian, I. Kim. Global existence and finite time blow-up for critical Patlak-Keller-Segel models with inhomogeneous diffusion. *SIAM J. Math. Anal.*, 45(3):934–964, 2013.
37. J. Bedrossian. Intermediate asymptotics for critical and supercritical aggregation equations and Patlak-Keller-Segel models. *Comm. Math. Sci.*, 9(4):1143-1161, 2011.
38. J. Bedrossian. Global minimizers for free energies of subcritical aggregation equations with degenerate diffusion. *Appl. Math, Letters*, 24(11):1927-1932, 2011
39. J. Bedrossian, N. Rodríguez., and A.L. Bertozzi. Local and Global Well-Posedness for Aggregation Equations and Patlak-Keller-Segel Models with Degenerate Diffusion. *Nonlinearity*, 24(6):1683–1714, 2011.
40. J. Bedrossian, J.H. von Brecht, S. Zhu, E. Sifakis and J. Teran. A virtual node method for Poisson interface problems in irregular domains. *J. Comput. Phys.*, Vol. 229, No. 18, pg 6405-6526 (2010)
41. C. Geuzaine, J. Bedrossian and X. Antoine, An amplitude formulation to reduce the pollution error in the finite element solution of time-harmonic scattering problems, *IEEE Trans. on Magnetics*, Vol. 44, No. 4 (2008)

Expository papers

1. J. Bedrossian. A brief introduction to the mathematics of Landau damping. *arXiv:2211.13707*. 2022.
2. J. Bedrossian, A. Blumenthal, S. Punshon-Smith. Lower bounds on the Lyapunov exponents of stochastic differential equations. *Proc of the ICM 2022.*
3. J. Bedrossian, P. Germain, N. Masmoudi. Stability of the Couette flow at high Reynolds number in 2D and 3D. *Bull. of the AMS.*, 56(3), pp 373–414. 2019.

4. J. Bedrossian, Y. Deng, N. Masmoudi. The orr mechanism: stability/instability of the Couette flow for the 2D Euler dynamic. *Proc. of the ICM*. 2018.
5. J. Bedrossian. A brief summary of nonlinear echoes and Landau damping. *arXiv:1712.08498 Proc. Journées EDP*. 2017.

Textbooks and monographs

1. J. Bedrossian and V. Vicol; “The mathematical analysis of the incompressible Euler and Navier-Stokes equations: an introduction”. Graduate Studies in Mathematics Series. American Mathematical Society. 2022. (Accepted; currently in production).

JOURNAL

EDITORIAL BOARD POSITIONS

- Archive of Rational Mechanics and Analysis 2020–
- Ars Inveniendi Analytica 2020–
- SIAM journal of mathematical analysis 2021–
- Communications in Partial Differential Equations 2021–

TEACHING AND MENTORING

Current mentees

- Ph.D. students: Chi-Hao Wu 2020–, Ryan Arbon 2023–
- Post-docs: Patrick Flynn 2023–

Previous mentees

- Undergraduate: Charlie Parker 2015-2017 (Ph.D. student at Brown University then NSF post-doc at Oxford).
- Undergraduate: Will Golding 2016-2019 (Ph.D. student at UT Austin).
- Graduate: Kyle Liss 2017–2021 (Post-doc at ICERM then Duke University). Stavros Papathanasiou 2018–2023 (EY senior consultant, quantitative finance).
- Post-doc: Mikael Latocca 2022–2023. (Matre de confrence l’universit d’vry)
- Post-doc: Michele Coti Zelati 2014-2017 (Senior Lecturer, Imperial College London).
- Post-doc: Sam Punshon-Smith 2017-2018 (NSF post-doc Brown, then IAS visitor, then Asst. Prof. Tulane University).
- Post-doc: Fei Wang 2017-2020 (Asst. Professor Shanghai Jiao Tong University).
- Post-doc: Alex Blumenthal 2019–2020 (Asst. Prof. Georgia Tech University).

REU’s and similar programs

- ICTP 1st Latin American Summer School. Advanced undergraduate level week long course on applications of differential equations. (Universidad San Francisco de Quito, Ecuador, June 2019).
- Summer MAPS-REU Module. Ran a module on mixing, fluid mechanics, and numerical PDE in the MAPS-REU within the mathematics department. (UMD, Summer 2016).

Graduate level mini-courses/summer schools

- “Lagrangian chaos and mixing in stochastic fluid mechanics” at EPFL (Lausanne Switzerland, 2023). 4 hour course.
- “Lagrangian chaos and mixing in stochastic fluid mechanics” at Peter Constantin’s 70th birthday conference (Duke, 2023). 4 hour course.
- “The statistical theory of passive scalar turbulence” for Fields Institute Thematic Program on Mathematical Hydrodynamics (virtual, September 2020). 3 hour course.
- “Nonlinear inviscid damping” for Peking University (Beijing, China, January 2019). 4 hour course.
- “Stability at high Reynolds number” for GSSI Intensive Program on Fluids and Waves (L’Aquila Italy, May 2018). 6 hour course.

- “Landau damping: old and new” for conference “Fluids, dispersion and blow-up” at Institut Henri Poincaré (Paris, France, Summer 2017). 3 hour course.
- “Mixing and Dissipation in Fluid Mechanics” for KI-Net conference “Mixing and Mixtures in Geo- and Biophysical Flows: A Focus on Mathematical Theory and Numerical Methods” (UMD, Spring 2016). 4 hour course.
- *MSRI Summer Graduate School 2015*: Vlad Vicol and I gave a two week MSRI summer graduate school “Incompressible Fluid Flows at High Reynolds Number” (Berkeley, CA, Summer 2015).

Reading groups and working seminars

- Spring 2023: 290J on kinetic limits of many particle systems
- Spring 2022–Present: Random and deterministic dynamical systems (virtual). (Co-organized with Alex Blumenthal and Sam Punshon-Smith)
- Fall and Spring 2019: Probability and Stochastics Research Interaction Team. (Co-organized with Alex Blumenthal, Sandra Cerrai, and Leonid Korolov)
- Spring 2017: Turbulence, intermittency, and stochastic 3D Navier-Stokes. (Co-organized with Michele Coti Zelati)
- Spring 2016: Uniqueness of invariant measures in stochastic fluid mechanics. (Co-organized with Michele Coti Zelati)
- Fall 2015: Introduction to stochastic fluid mechanics. (Co-organized with Michele Coti Zelati)
- Spring 2015: Plasma waves (joint with the magneto-fluid dynamics group at the Courant Institute, NYU – co-organized with Lise-Marie Imbert-Gerard).
- Fall 2014: Long time dynamics of kinetic equations.
- Fall 2014–Present. Applied PDE Research Interaction Team. (Co-organized with Dave Levermore).

SCIENTIFIC OUTREACH

- Joint research with Alex Blumenthal and Sam Punshon-Smith was featured in scientific outreach magazine Quanta “<https://www.quantamagazine.org/mathematicians-prove-bachelors-law-of-turbulence-20200204/>”. 2020.
- Joint research with Alex Blumenthal and Sam Punshon-Smith was featured in scientific outreach magazine Cosmos “<https://cosmosmagazine.com/physics/mathematicians-provide-explanation-for-an-uncertain-law-of-physics/>”. 2020.
- General audience talk “Patterns in chaos: vortex motion in fluid motion” (Escuela Politecnica Nacional, Quito Ecuador, June 2019).
- Authored an article for a wide undergraduate and general scientific audience titled “Towards a Mathematical Theory of Turbulence in Fluid Mechanics” for the “Snapshots of modern mathematics from Oberwolfach” series. 2016.

RECENT/UPCOMING MAJOR TALKS, PROFESSIONAL SERVICE, AND SIMILAR ACTIVITIES

- 2023 Plenary Speaker at Equadiff 2023
- Member of the ICERM Scientific Advisory Board 2022–
- Co-organized (with Michele Coti Zelati) workshop “Stability and dynamics in fluid mechanics and kinetic theory”, July 10-14 2023. Imperial College of London.
- Seminar In the Analysis and Methods of PDE (SIAM PDE) webinar on Oct 6th. 2022.
- Invited speaker for the One World Dynamics seminar, September 8. 2022.
- Keynote speaker at “German Probability and Statistics Days 2023” at Essen, Germany. Summer 2023.
- Co-organized (with Jessica Lin and Jean-Christophe Mourrat) workshop “Unifying concepts in PDEs with randomness” for the Thematic Program in Probability and PDEs at the Centre de Recherches Mathématiques, Montreal CA. Spring 2022.
- Co-organized (with Jose Antonio Carrillo, Clément Mouhot, and Jingwei Hu) the-

matic semester “Frontiers in kinetic theory” at the Isaac Newton Institute, Cambridge University. Spring 2022.

- Plenary speaker at “When Kinetic Theory meets Fluid Mechanics” at the Forschungsinstitut für Mathematik (FIM) at ETH Zürich. Summer 2022.
- Invited speaker at the One World PDE seminar, September 28. 2020.
- Co-organized (with Pierre-Emmanuel Jabin and Vlad Vicol) KI-Net/CSCAMM conference “Formation of small scales in nonlinear PDEs”. Fall 2019.
- Co-organized (with Greg Eyink, Yves Le Jan, Katepalli Sreenivasan, and Laszlo Szekelyhidi) IPAM workshop “Turbulent dissipation, mixing, and predictability” in Winter 2017.
- Invited speaker at HYP2016. Aachen, Germany. Summer 2016.
- Co-organized (with Didier Bresch, Pierre-Emmanuel Jabin, and Konstantina Trivisa) KI-Net/CSCAMM conference: “Mixing and Mixtures in Geo- and Biophysical Flows: A Focus on Mathematical Theory and Numerical Methods” in Spring 2016.
- Co-organized (with Nader Masmoudi) AIM Workshop “Mixing and Nonlinear Stability” in Spring 2016.
- Co-organized (with Michele Coti Zelati and Qin Li) a 2015 KI-net Young Researchers Workshop on kinetic theory with applications to physics at UMD.
- Served on NSF panels in 2015, 2018, 2019, and 2021
- Co-organized (with Helena Nussenzweig Lopes) fluid mechanics mini-symposium at Equadiff 2015.
- Co-organized (with Changhui Tan) a 2014 KI-net Young Researchers Workshop on multiscale phenomena hosted at UMD.
- Co-organized (with Danny Tak Wong and Jared Whitehead and Hao Jia) special session on fluid mechanics at the Joint Mathematics Meeting, Baltimore 2014.
- Lectures including: Oberwolfach workshops 2015-2017, invited Speaker HYP2016, Lax prize lecture HYP2021, multiple workshops at IPAM and MSRI, Cambridge UK, MIT, UCLA, UC San Diego, UCSB, Stanford, UC Berkeley, Courant Institute, Beijing University, Brown University, Princeton, Cambridge University, Oxford University, Imperial College of London, Michigan University, Carnegie-Mellon University, Universite Paris Descartes, Universitat Leipzig, CRM Montreal Canada, CIRM Luminy France, and more...
- Served, or currently serving as a referee for a number of journals: Annals of Math., Acta Math., Invent. Math., J. Amer. Math. Soc., Memoirs Amer. Math. Soc., Annals of PDE, Arch. Rat. Mech. Anal., J. Statistical Physics, Comm. Math. Phys., Comm. PDE, Nonlinearity, and many others
- Served on a number of committees at UMD including: tenure-track hiring committee, policy committee, merit pay committee, math and AMSC graduate admissions committees. Temporary committees to re-design honors program and evaluate diversity/equity. A member of the Analysis Group, Applied Math/PDE Group, and Scientific Computing Group.

LANGUAGE SKILLS English (native), French (basic), Spanish (basic).