Keefer Rowan

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Webpage

Academic Interests

Mathematical physics, partial differential equations, turbulence, mixing

Employment

École Polytechnique Fédérale de Lausanne

- Postdoctoral researcher (September 2025–)
- Supervisor: Martin Hairer

Education

Courant Institute, NYU

- Ph.D., Mathematics (May 2025).
- Advisors: Vlad Vicol and Scott Armstrong.

Vanderbilt University

- B.A., Mathematics, Physics, *Summa cum laude* (May 2020).

Preprints

8. **Superexponential dissipation enhancement on T^d.** (2025, arXiv).
7. **Turbulent and intermittent phenomena in a universal total anomalous dissipator** (joint with Elias Hess-Childs). (2025, arXiv).
6. **Exponentially mixing flows with slow enhanced dissipation** (joint with William Cooperman, Gautam Iyer, Seungjae Sun). (2025, arXiv).
5. **A subsequentially fast dynamo on $\mathbb{T}^3$.** (2025, arXiv).
4. **Divergence-free drifts decrease concentration** (joint with Elias Hess-Childs, Renaud Raquépas). (2025, arXiv).
3. **Fourier mass lower bounds for Batchelor-regime passive scalars** (joint with William Cooperman). (2025, arXiv).
2. **A universal total anomalous dissipator** (joint with Elias Hess-Childs). (2025, arXiv).
1. **Exponential scalar mixing for the 2D Navier–Stokes equations with degenerate stochastic forcing** (joint with William Cooperman). (2024, arXiv).

[1] Updated September 2, 2025

Publications

7. **Higher-order propagation of chaos in L^2 for interacting diffusions** (joint with Elias Hess-Childs). (2025, Probability and Mathematical Physics).
6. **Accelerated relaxation enhancing flows cause total dissipation**. (2024, Nonlinearity).
5. **On anomalous diffusion in the Kraichnan model and colored-in-time variants**. (2024, Archive for Rational Mechanics and Analysis).
4. **The No Free Lunch Theorem, Kolmogorov Complexity, and the Role of Inductive Biases in Machine Learning** (joint with Micah Goldblum, Marc Finzi, Andrew Gordon Wilson). (2024, ICML 2024).
3. **Simulation of a hydrogen atom in laser field using the time-dependent variational principle** (joint with L. Schatzki, T. Zaklama, Y. Suzuki, K. Watanabe, and K. Varga). (2020, *Physical Review E*).
2. **Matrix Elements of One Dimensional Explicitly Correlated Gaussian Basis Functions** (joint with L. Schatzki, Y. Suzuki, K. Varga, T. Zaklama, and D. Zhang). (2020, *Few-Body Systems*).
1. **Measurement and modeling of electron-cloud-induced betatron tune shifts at the Cornell Electron-Positron Storage Ring test accelerator** (joint with S. Poprocki, S. W. Buechele, J. A. Crittenden, D. L. Rubin, J. E. San Soucie). (2019, *Physical Review Accelerators and Beams*).

Invited Talks

6. *Fourier mass lower bounds for Batchelor-regime passive scalars.* Minisymposium on Taming PDE with Randomness, SIAM DS25, May 2025.
5. *Exponential scalar mixing for the 2D Navier–Stokes equations with degenerate stochastic forcing.* Clifford Lectures, Tulane University, February 2025.
4. *Exponential scalar mixing for the 2D Navier–Stokes equations with degenerate stochastic forcing.* Analysis Seminar, Stony Brook University, January 2025.
3. *Exponential scalar mixing for the 2D Navier–Stokes equations with degenerate stochastic forcing.* Center for Nonlinear Analysis Seminar, Carnegie Mellon University, November 2024.
2. *Exponential scalar mixing for the 2D Navier–Stokes equations with degenerate stochastic forcing.* Applied and Computational Math Seminar, Tulane University, October 2024.
1. *On anomalous diffusion in the Kraichnan model and colored-in-time variants.* Analysis Seminar, Courant Institute, NYU, November 2023.

Teaching Experience

New York University

- Teaching Assistant, Honors Analysis II (Spring 2024).
- Teaching Assistant, Honors Analysis I (Fall 2023).
- Teaching Assistant, Analysis (two sections, Spring 2023).
- Teaching Assistant, Linear Algebra (two sections, Fall 2022).
- Grader, Topology (Spring 2021).

Organization

- Renormalization reading group, Organizer, Courant Institute, 2024
- Rough paths theory reading group, Organizer, Courant Institute, 2024
- Current topics in mathematical fluids seminar, Organizer, Courant Institute, 2023-2024
- Courant Student Organization, President, 2022-2023
- Distribution theory reading group, Organizer, Courant Institute, 2021

Awards

- Isaac Barkey and Ernesto Yhap Fellowship, Courant Institute (2023).
- Harold Grad Memorial Prize, Courant Institute (2022).
- Newton Underwood Award, Vanderbilt University (2020).
- Richard J. Larsen Award, Vanderbilt University (2020).