Shrey Aryan

shrey183@mit.edu
shrey183.github.io

Research Interests

I am broadly interested in Geometric Analysis, PDEs and Optimal Transport.

Education

MIT, Cambridge, USA 2022 - 2027
PhD, Mathematics, Landis Fellow, Simons Dissertation Fellow
Advisor: Prof. Tobias Colding

ETH, Zürich, Switzerland 2020 - 2022
M.S., Mathematics, ESOP Scholar
Thesis: Stability of Hardy Littlewood Sobolev Inequality
Advisor: Prof. Alessio Figalli

École Polytechnique, Palaiseau, France 2017 - 2020
B.S., Mathematics and Computer Science, Class Valedictorian
Thesis: Existence of two-solitary waves with logarithmic distance for the nonlinear Klein–Gordon equation
Advisor: Prof. Yvan Martel

Publications

1. A Topological Bernstein Theorem for Minimal Hypersurfaces in $\mathbb{R}^4$ confined in space (joint with Alexander McWeeney). arXiv:2607.05755 [math.DG]
2. Spectral Obstructions to Contracting Transport Maps in Curved Spaces. arXiv:2605.24705 [math.DG].
3. On the Calabi–Yau Conjectures for Minimal Hypersurfaces in Higher Dimensions (joint with Alexander McWeeney). arXiv:2602.16048 [math.DG]
4. Continuous in time bubbling and Soliton Resolution for Non-negative Solutions of the Energy-Critical Heat Flow. arXiv:2512.18840 [math.AP]
5. Entropic Selection Principle for Monge's Optimal Transport (joint with Promit Ghosal). arXiv:2502.16370 [math.PR]
6. Soliton Resolution for the energy-critical nonlinear heat equation in the radial case . To appear in Analysis and PDE, arXiv:2405.06005 [math.AP].
7. Free energy minimizers with radial densities: classification and quantitative stability (joint with Lauro Silini).arXiv:2412.03997 [math.AP]

8. Stability of Wu's logarithmic Sobolev inequality via the Poisson-Föllmer process (joint with Yair Shenfeld and Pablo López Rivera). To appear in Electronic Communications in Probability.
9. Concavity for elliptic and parabolic equations in complex projective space (joint with Mike Law). arXiv:2403.16783 [math.AP]. To appear in Calc. Var. Partial Differential Equations.
10. Trend to equilibrium for flows with random diffusion (joint with Matthew Rosenzweig and Gigliola Staffilani), International Mathematics Research Notices (2024), arXiv:2307.03147 [math.AP].
11. Stability of Hardy Littlewood Sobolev Inequality under Bubbling, Calc. Var. Partial Differential Equations 62 (2023), no.8, Paper No. 223, arXiv:2109.12610 [math.AP].
12. Existence of two-solitary waves with logarithmic distance for the nonlinear Klein-Gordon equation, Commun. Contemp. Math. 24, 2050091 (2020), arXiv:2010.04852 [math.AP].

Teaching and Mentoring

1. UROP Mentor, MIT 2026
2. Recitation leader for Multivariable Calculus, MIT 2025
3. TA for a Summer School in Optimal Transport at SLMath (formerly known as MSRI) 2025
4. Research Summer Institute Mentor (RSI), MIT 2024
5. Directed Reading Program Mentor, MIT 2023

Talks

1. Geometric Analysis Seminar, Brown 2026
2. AMS Sectional (Metric, Analytic, and Classical Methods in Differential Geometry), Boston 2026
3. AMS Sectional (Geometric Flows), Boston 2026
4. Analysis Seminar, Yale 2026
5. Probability Seminar, MIT 2026
6. Analysis Seminar, Columbia 2025
7. Colloquium Talk, Indian Statistical Institute 2025
8. Colloquium Talk, KSU 2025
9. Graduate Lecture series in Analysis and PDEs, Brown 2025
10. Harmonic Analysis and Differential Equations Seminar, UC Berkeley 2024
11. Short Contributed Talk at the Nonlinear PDEs Summer School, UC Berkeley 2024

Referee Work

Crelle and Mathematische Annalen.