Joshua L. Flynn

CONTACT INFORMATION

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RESEARCH INTERESTS

Analysis on flat and curved geometries (e.g., hyperbolic spaces) and noncommutative groups (e.g., the Heisenberg group) using Fourier analysis, geometric analysis and PDE methods. Recent works focus on sharp geometric and functional inequalities and problems in several complex variables.

EDUCATION

University of Connecticut

Ph.D. Candidate, Mathematics (expected May 2022)

- Dissertation Topic: sharp geometric inequalities on noncompact rank one symmetric spaces and their boundaries.
- Advisor: Guozhen Lu

University of Washington

B.Sc. in Mathematics, May 2015

PAPERS

A. Burchard, J. Flynn, G. Lu and M.-C. Shaw, *Extendability and the $\bar{\partial}$ Operator on the Hartogs Triangle*, accepted for publication in Math. Zeit, submitted (2021), arXiv:2106.09867.

C. Cazacu, J. Flynn and N. Lam, *Short proofs of refined sharp Caffarelli-Kohn-Nirenberg inequalities*, Journal of Differential Equations, 302, 533-459 (2021).

J. Flynn, N. Lam and G. Lu, *Sharp Hardy Identities and Inequalities on Carnot Groups*, Advanced Nonlinear Studies, 21(2), 281-302 (2021).

J. Flynn, *Sharp L^2-Caffarelli-Kohn-Nirenberg inequalities for Grushin vector fields*, Nonlinear Analysis, 199, 111961 (2020).

J. Flynn, *Sharp Caffarelli-Kohn-Nirenberg-Type Inequalities on Carnot Groups*, Advanced Nonlinear Studies, 20(1), 95-111 (2020).

PREPRINTS

J. Flynn, G. Lu and Q. Yang, *Sharp Hardy-Sobolev-Maz'ya, Adams and Hardy-Adams inequalities on quaternionic hyperbolic spaces and the Cayley hyperbolic plane*, submitted (2021), arXiv:2106.06055.

C. Cazacu, J. Flynn and N. Lam, *Sharp second order uncertainty principles*, submitted to Journal of Functional Analysis (under revision) (2020), arXiv:2012.12667.

J. Flynn, N. Lam, G. Lu and S. Mazumdar, *Hardy's Identities and Inequalities on Cartan-Hadamard Manifolds*, submitted (2021), arXiv:2103.12788.

C. Cazacu, J. Flynn and N. Lam, *Sharp Caffarelli-Kohn-Nirenberg Inequalities for Curl-Free Vector Fields and Second Order Derivatives*, submitted (2021), arXiv:2111.15067.

J. Flynn, N. Lam and G. Lu, *L^p-Hardy Identities and Inequalities with Respect to the*

Distance and Mean Distance to the Boundary, preprint (2021).

J. Flynn, N. Lam, G. Lu, *Hardy-Poincaré-Sobolev type inequalities on hyperbolic spaces and related Riemannian manifolds*, submitted (2021).

J. Flynn, N. Lam and G. Lu, *L^p-Hardy identities and inequalities on manifolds*, preprint (2021).

Talks

(Upcoming) *Sharp Hardy-Sobolev-Maz'ya, Adams and Hardy-Adams inequalities on quaternionic hyperbolic spaces and the Cayley hyperbolic plane*, 2022 Joint Mathematics Meeting, formally at Seattle, WA. (April 2022)

Sharp Hardy-Sobolev-Maz'ya, Adams and Hardy-Adams inequalities on quaternionic hyperbolic spaces and the Cayley hyperbolic plane, 17th Prairie Analysis Seminar, Kansas State University. (November 2021)

Sharp Caffarelli-Kohn-Nirenberg Inequalities for the Grushin operator and Iwasawa Groups, Annual New York State Regional Graduate Mathematics Conference, Syracuse University. (April 2021)

Hardy Identities on Domains, Spring Eastern Sectional Meeting Special Session on Metric techniques in Analysis, Brown University. (March 2021)

Sharp Caffarelli-Kohn-Nirenberg Inequalities for Grushin Vector Fields and Iwasawa Groups, Tenth Ohio River Analysis Meeting, University of Kentucky. (March 2021)

Hardy-Sobolev-Maz'ya and Adams Inequalities on Quaternionic Hyperbolic Spaces, Spring Eastern Sectional Meeting Special Session on Geometric and Functional Inequalities and Nonlinear Partial Differential Equations, Brown University. (March 2021)

Algebraic Aspects of Dunkl Theory, Binghamton University Graduate Conference in Algebra and Topology, Binghamton University. (November 2020)

Sharp Caffarelli-Kohn-Nirenberg Inequalities for Grushin Vector Fields and Iwasawa Groups, Geometric and Functional Inequalities and Applications, international virtual seminar. (November 2020)

Sharp L^2-Caffarelli-Kohn-Nirenberg-Type Inequalities for the Grushin operator and Iwasawa Groups, Fall Central Sectional Meeting Special Session on Geometric Inequalities and Nonlinear Partial Differential Equations, University of Texas. (September 2020)

Sharp Caffarelli-Kohn-Nirenberg Type Inequalities on Iwasawa Groups, 2020 Joint Mathematics Meeting, Denver, CO. (January 2020)

Some Geometric Inequalities by Algebraic Trickery, Mathematics Continued Conference, University of Connecticut. (November 2019)

Conferences and Seminars Organized

2020-present	Co-organizer of the international virtual seminar *Geometric and Functional Inequalities and Applications*. `geometricinequalities.com`
2022	Co-organizing the upcoming Special Session on *Geometric and Functional Inequalities and Applications to PDEs* at the Spring Western Sectional Meeting (formerly at the University of Denver).

	2021	Co-organized the Special Session on *Geometric and Functional Inequalities and Nonlinear Partial Differential Equations* at the Spring Eastern Sectional Meeting (formerly at Brown University).
	2020	Co-organized the Special Session on *Geometric Inequalities and Nonlinear Partial Differential Equations* at the Fall Central Sectional Meeting (formerly at University of Texas at El Paso).
	2020	Co-organized a virtual learning seminar on *Analysis on Groups of Polynomial Growth.*

Awards

2021	Conference Participation Award
2021	Summer Doctoral Dissertation Fellowship
2020	Predoctoral Fellowship
2019	Provost Excellence in Teaching

Referee Services

Communications on Pure and Applied Analysis, Acta Mathematica Sinica

Mentorship and Misc.

2017-present — TA Mentor Network Volunteer

- Mentored incoming graduate students in the mathematics Ph.D. program at the UConn.

2021 — Directed Reading Program Volunteer

- Mentored an undergraduate of mathematics at UConn and guided them in completing a project and presentation on the finite element method and Matlab.

2020 — Prelim Review Summer Position

- Paid Summer position at UConn to hold weekly review sessions and guide graduate students to prepare for the analysis preliminary exam.

Teaching Experience

Fall	2021	Instructor, Technical Writing in Mathematics
Spring	2021	Teaching Assistant, Elementary Differential Equations
Fall	2020	Teaching Assistant, Elementary Differential Equations
Spring	2020	Instructor, Elementary Differential Equations
Fall	2019	Instructor, Calculus for Business and Economics
Spring	2019	Instructor, Elementary Differential Equations
Fall	2018	Teaching Assistant, Calculus I
Spring	2018	Instructor, Elementary Differential Equations
Fall	2017	Teaching Assistant, Calculus I
Spring	2017	Instructor, Calculus for Business and Economics
Fall	2016	Instructor, Calculus for Business and Economics
Spring	2016	Instructor, Calculus for Business and Economics
Fall	2015	Instructor, Problem Solving