Max Hallgren

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Areas of specialization

Ricci Flow, Geometric Analysis

Education

2016-2022 **PhD in Mathematics** (expected graduation May 2022), Cornell University:
–M.S. received in 2018
–Advisor: Xiaodong Cao
–Research Area: Ricci Flow, Geometric Analysis

2017 **Visiting Student**, Fields Institute
–Thematic Program on Geometric Analysis, Fall 2017 semester

2012-2016 **B.A. in Mathematics**, Cornell University

Grants, honors & awards

2019 **Hutchinson Fellowship**, Cornell University
–Awarded for excellence in research, provides one semester of teaching relief

2017 **Eleanor Norton York Award**, Cornell University

2016 **Summa cum Laude**, Cornell University
Harry S. Kievel Prize in Mathematics, Cornell University

Publications & talks

Papers and Preprints

Dates on the left denote the year uploaded to arxiv.

2021 **Ricci Flow with Ricci Curvature and Volume Bounded Below,** https://arxiv.org/abs/2104.03386

2020 **The Entropy of Ricci Flows with Type-I Scalar Curvature Bounds,** arxiv.org/abs/2007.10376

2019 **Local Stability of Einstein Metrics Under Ricci Iteration,** With T. Buttsworth *Journal of Functional Analysis* 280, No. 2 (2021)

2018 **Nonexistence of Noncompact Type-I Ancient Three-Dimensional κ-Solutions of Ricci Flow with Positive Curvature,** *Communications in Contemporary Mathematics* 21, No. 06, (2019)

2017 **A Differential Harnack Inequality for the Newell-Whitehead-Segel Equation,** With D. Booth, J. Burkart , X. Cao, Z. Munro, J. Snyder, T. Stone *Anal. Theory Appl.*, 35 (2019), pp. 192-204.

Talks

2021 **Ricci Flow with a Lower Bound on Ricci Curvature and Volume** Online seminar "Metric Measure Spaces and Convergence" (Fall 2021)
Ricci Flow with a Lower Bound on Ricci Curvature and Volume Beijing International Center for Mathematical Research (Spring 2021)
Ricci Flow with a Lower Bound on Ricci Curvature and Volume City University of New York Geometric Analysis Seminar (Spring 2021)

2020 **Singular Ricci Flows** Cornell Geometric Analysis Seminar (Fall 2020, online)
Entropy convergence of Ricci flows with a Type-I scalar curvature bound University of Wisconson-Madison Geometry and Topology Seminar (Fall 2020)
Almost Splitting Theorem University of California at San Diego Cheeger-Colding Seminar (3-part talk) (Summer 2020, online)
Quantitative Stratification University of California at San Diego Cheeger-Colding Seminar (2-part talk) (Summer 2020, online)

2019 **Entropy convergence of Ricci flows with a Type-I scalar curvature bound.** Rutgers Complex Analysis and Geometry Seminar (Fall 2019)
Entropy convergence of Ricci flows with a Type-I scalar curvature bound. Cornell Analysis Seminar (Fall 2019)

2018 **Backward Uniqueness for Parabolic Equations**. Bonn University Summer School: Unique Continuation and Inverse Problems (Fall 2018)

2016 **Neckpinch Singularities in Ricci Flow.** Cornell Geometric Analysis Seminar (2-part talk) (Fall 2016)
Curvature, Topology, and Pinched Spheres. Cornell Undergraduate Math Club (Spring 2016)

Teaching

2017-2021 **Teaching Assitant**, Cornell University

- Applied Complex Analysis (Fall 2021)
- Graduate Differentiable Manifolds (Fall 2020)
- Graduate Applied Functional Analysis (Spring 2020)
- Partial Differential Equations (Spring 2019)
- Theoretical Linear Algebra and Calculus (Fall 2018)
- Graduate Partial Differential Equations (Spring 2018, Spring 2020)
- Calculus for the Life Sciences (Spring 2017)

2019 **Instructor**, Cornell University

- Calculus I (Fall 2019)

2014-2015 **Tutor**, Cornell University Math Support Center (August 2014-December 2015)

Service

2020 **Mentor,** Cornell University Directed Reading Program (Spring 2021-Spring 2022)

2017 **Co-organizer,** Cornell Olivetti Seminar (Spring 2017)

2016 **Mentor,** Cornell Research Experience for Undergraduates in "Nonlinear Heat Equations" (Summer 2016)