Kenneth DeMason

Email: kdemason@utexas.edu
University of Texas at Austin

DoB: February 22nd, 1998
Department of Mathematics

Goals

Obtain a Ph.D in Mathematics. Research career in Differential Geometry, Geometric Analysis, and the Calculus of Variations.

Education

2020–Present **Ph.D. in Mathematics**, *University of Texas*, Austin, *GPA – 4.0*.

2016–2020 **B.Sc. in Mathematics**, *University of Florida*, Gainesville, *GPA – 4.0*.
Graduated summa cum laude.

2016–2020 **Minor in Chemistry**, *University of Florida*, Gainesville, *GPA – 4.0*.
Majored from 2016–2019.

Honors and Awards

2022 **Frank Gerth III Teaching Excellence Award**, University of Texas at Austin.
Awarded for exceptional teaching service as teaching assistant for M 310P, see Teaching section.

2022 **NSF Graduate Research Fellowship**.
Grant no. DGE 2137420.

2020-2025 **Provost's Graduate Excellence Fellowship**, University of Texas at Austin.

2020 **NSF Graduate Research Fellowship**, *Honorable Mention*.

2019-2020 **CLAS Scholars Program**, University of Florida.
$2500 research and travel stipend.

2016 **National Merit Finalist**.

2015 **Eagle Scout**.

Publications

Research Work

[1] **A Strong Form of the Quantitative Wulff Inequality for Crystalline Norms**.
K. DeMason. Calc. Var. Partial Differential Equations, 63 (174), 2024.

[2] **On the Emergence of Almost-Honeycomb Structures in Low-Energy Planar Clusters**.
M. Caroccia, K. DeMason, and F. Maggi, submitted 2025.

[3] **Successful cardiopulmonary resuscitation following minimally invasive pectus excavatum repair, a case report**.
K. Glithero, J. Tackett, K. DeMason, and C. Burnweit. *Intl. J. Surgery Case Reports* (2019).
DOI: 10.1016/j.ijscr.2019.10.055

Expository Notes

[4] $CD^e(K,N)$ **Spaces and Stability under the Gromov-Hausdorff Convergence**, *Lecture notes from MAT 1502 Topics in Geometric Analysis: Optimal Transport, Geometry, and Dynamics*, Taught by Dr. Robert McCann.
K. DeMason (2022).

Miscellaneous

[5] **Symmetry in the Planar Anisotropic Perimeter**.
K. DeMason. In progress. Expository paper from the 2020 UChicago REU.

[6] **Optimal Mass Transport and the Isoperimetric Inequality**.
K. DeMason (2020). Expository paper from the 2020 UChicago REU.

[7] **The Gauss-Bonnet Theorem Revisited**.
K. DeMason (2020). Senior Thesis.

[8] **Stable Minimal Surfaces**.
K. DeMason (2019). Paper from the 2019 UChicago REU, proves a compactness theorem for stable minimal surfaces via small curvature estimates.

Talks and Presentations

Oct. 2024 A Strong Form of the Quantitative Wulff Inequality for Crystalline Norms.
AMS 2024 Fall Eastern Sectional Meeting (Invited).

Mar. 2024 A Strong Form of the Quantitative Wulff Inequality for Crystalline Norms.
Università degli Studi di Napoli Federico II (Invited).

Mar. 2024 A Strong Form of the Quantitative Wulff Inequality for Crystalline Norms.
Politecnico di Milano (Invited).

Nov. 2023 On the shape of low-energy planar clusters.
UF Analysis Seminar (Invited).

Spring 2023 The Bonnet-Myers theorem and Bishop-Gromov Inequality; An introduction to Gromov-Hausdorff convergence; On the development of Ricci lower bounds in metric measure spaces via optimal transport.
Three talks given to Dr. Ben-Zvi's Literature in Geometry course.

Apr. 2023 On the shape of low-energy planar clusters.
UT Austin's Junior Analysis Seminar.

Dec. 2022 Calculus on Metric Measure Spaces.
UT Austin's Junior Analysis Seminar.

Apr. 2022 Gradient Flows for λ-Convex Functions.
UT Austin's Junior Analysis Seminar.

Dec. 2021 An Optimal Transport Proof of the Sobolev Inequality.
Lecture for Dr. Gualdani's PDE I course.

Nov. 2021 Compactness of Stable Minimal Surfaces.
UT Austin's Junior Analysis Seminar.

Sept. 2020 Visualizing Non-measurable Sets.
Presentation for Dr. Caffarelli's Real Analysis course.

April 2020 Minimal Surfaces and the Variational Formulas.
Lecture for UF's graduate Riemannian Geometry course.

Oct. 2019 Topological Groups.
Lecture for UF's graduate Topology class.

Aug. 2019 Minimal Surfaces and Min-Max Theory.
Talk given at the UChicago REU.

Conferences and Workshops Attended

October 2024 AMS 2024 Fall Eastern Sectional Meeting, *University of Albany*.

July 2023 34° Colóquio Brasileiro de Matemática, *Rio de Janeiro, Brazil*.

June 2023 Topics in Geometric Flows and Minimal Surfaces, *St. Mary's College*.
SLMath Graduate Summer School

Jan. 2023 Joint Meeting in Mathematics, *Boston, MA*.

Nov. 2022 Thematic Semester in Nonsmooth Riemannian and Lorentzian Geometry, *Fields Institute, Toronto, CA*.
Long-term visitor, awarded $2000 CAD. in funding

Mar. 2022 Bob Hardt Retirement Conference, *Rice University*.

Feb. 2022 64th Texas Geometry & Topology Conference, *University of Texas at Dallas*.

May 2021 2021 Summer Program in Analysis & PDE, *University of Texas at Austin*.

Jan. 2021 Joint Meeting in Mathematics, *Virtual*.

Jan. 2020 Joint Meeting in Mathematics, *Denver, Colorado*.

Nov. 2019 AMS Fall Southeastern Sectional Meeting, *University of Florida*.

June 2019 RTG Conference on Geometric Analysis and Diversity in Mathematics, *Princeton University*.

June 2019 RTG Summer School in Geometric Analysis, *Princeton University*.

Teaching

Summer 2022 **Member of Digital Design for Student Success (D2S2) Program**.
D2S2 is a collaborative program between participating Texas universities which selects top professors from various disciplines to create high quality digital courses for the open access website OERTX. Mentored by Dr. Amanda Hager, I created four lessons with accompanying quizzes and homework for the introductory math course MATH 1332, see here, lessons 3.7, 4.4, 5.4, and 5.5.

Fall 2021 **Teaching Assistant**, M 310P: Modern Mathematics for the Plan II Major.
Took initiative to supplement standard teaching duties by
- Creating new, thought provoking lectures and accompanying homework problems;
- Teaching aforementioned lectures.

Mathematical Outreach

2023 AY Organizer of UT Austin's Junior Analysis Seminar.
This seminar gives the graduate students at UT Austin a place to give talks in analysis.

2023 AY – Head organizer of UT Austin's Directed Reading Program (DRP).

2022 AY One of four organizers of UT Austin's DRP.

Summer 2022 Mini-Course Instructor.
Co-Organized and lectured for the two-week long summer mini-course "A Gradient Flow Perspective to the Ricci Flow."

Four semesters Mentored students in UT Austin's DRP in areas like measure theory, optimal transport, and differential topology.
Duties include providing structured materials conducive to independent learning and weekly lectures. Fall 2020, Summer 2021, Spring 2022, Summer 2022.

2021 AY Organizer of UT Austin's Sophex Seminar.
This seminar gives first and second year students a safe space to get experience giving talks.

2020 AY Vice president of University Math Society.
Duties included:
- Creating and organizing the first semi-annual REU info session.
- Co-organizing a LaTeX seminar with UF's Graduate Math Association.
- Working with UF's math department to provide more opportunities for undergraduate students. Developed into a seminar course and research symposium.
- Established a collaborative relationship between the five mathematical organizations at UF: The undergraduate society, graduate association, and AMS, AWM, and SIAM chapters. This environment has lasted to date and provides one of few opportunities at UF for undergraduate students to interact with math grads.

2016–2022 Read and provide criticism for International Baccalaureate Mathematics Internal Assesments.
These are short mathematical expositions on personalized topics.