

JACOB W. ERICKSON

Email: jwericks@umd.edu

EDUCATION

University of Maryland, College Park

Ph.D. Mathematics

2019-2024 (expected)

University of Chicago

B.A. Mathematics (with honors)

2015-2019

WRITING

- Erickson, J. W.: *A Visual Introduction to Cartan Geometries*.
(Expository book on Cartan geometries, draft to be put on AMS Open Math Notes soon. Until then, available at https://math.umd.edu/~jwericks/Parabolic%20Geometries%20RIT/EricksonAVICG_July2023.pdf.)
- Erickson, J. W.: A method for determining Cartan geometries from the local behavior of automorphisms.
(Preprint at arXiv:2303.00561, submitted to *Transactions of the AMS*)
- Erickson, J. W.: Higher rank parabolic geometries with essential automorphisms and nonvanishing curvature.
Transformation Groups vol 27 (2022)
(Preprint at arXiv:2202.08881)
- Erickson, J. W.: Intrinsic holonomy and curved cosets of Cartan geometries.
European Journal of Mathematics vol 8, 446-474 (2022)
(Preprint at arXiv:2109.05350)

TEACHING

- Mentor for Directed Reading Program in Spring 2020; topic was elementary Lie theory
- TA for MATH 240 (“Linear Algebra”) in Fall 2020 and Spring 2021
- Lecturer for MATH 113 (“College Algebra and Trigonometry”) in Fall 2021 and Spring 2022
- TA for MATH 115 (“Precalculus”) in Fall 2022
- Organizer and main lecturer for the University of Maryland RIT (Research Interaction Team) on parabolic geometries (better known as “Parabolic Geometries for People that Like Pictures”) in Fall 2022

AWARDS

- Michael and Eugenia Brin Graduate Fellowship (2019-2023)
- University of Maryland Graduate School Summer Research Fellowship (2022)
- Hauptman Summer Fellowship (2023)

RESEARCH EXPERIENCE BEFORE GRADUATE SCHOOL

- Wright State University** Summer 2014
Employed as research assistant. Studied Hadamard matrices and abelian difference sets.
- University of Chicago REU** Summer 2016
Studied automorphisms of Cartan geometries.
- U.C. Berkeley**
Geometry and Topology REU Summer 2017
Studied quantum invariants of knots and their relation to hyperbolic structures on 3-manifolds.

CONFERENCES, WORKSHOPS, AND TALKS

- University of Lethbridge**
Workshop on Algebraic Design Theory and Hadamard Matrices July 2014
Gave a talk on viewing Hadamard matrices as global maxima of an ‘entropy’ function on $SO(4n)$.
- Banff International Research Station**
Workshop 14w2199 July 2014
Participated in a variety of discussions on open problems in algebraic design theory.
- Ohio State University**
Young Mathematicians Conference August 2014
Presented work on optimization of smooth functions on compact Lie groups that I created to help find Hadamard matrices while employed at Wright State University.
- University of Notre Dame**
Geometry and Topology Workshop August 2018
Gave a talk on my research related to holonomy reductions of Cartan geometries.
- Washington University in St. Louis**
Midstates Undergraduate Research Symposium November 2018
Gave a talk presenting my research on holonomy reductions and curved cosets of Cartan geometries.
- University of Maryland, College Park**
Geometry-Topology Seminar November 2021
Gave a talk about “Building homogeneous parabolic geometries out of curvature”, discussing the construction of curvature trees for higher rank parabolic geometries.
- Université de Strasbourg**
Geometric Structures, Compactifications, and Group Actions June 2022
Presented a talk outlining my work on the global characterization of Cartan

geometries from certain local behaviors of automorphisms, using “sprawls” generated by a given automorphism.

Geilo Winter School

Cartan Geometry and Related Topics

March 2023

Gave an expository talk on Cartan geometries and their intuition.

MISCELLANEOUS

- Eagle Scout
- Vice President of UChicago Math Club (2016-2017)
- Principal organizer of University of Maryland Student Geometry-Topology Seminar (2021-present)