Joseph M Melby

CONTACT INFORMATION

Department of Mathematics
Michigan State University
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RESEARCH INTERESTS

3-manifold topology, knot theory, and data.

EDUCATION

Michigan State University

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

- Advisor: Dr. Efstratia Kalfagianni

University of Minnesota, Morris

B.A. in Mathematics, May 2017, high distinction

- Senior thesis: *Sensor networks and homological coverage criteria*
- Minor in physics
- Budapest Semesters in Mathematics (Fall 2016)

PUBLICATIONS

Atkinson, C. K. and Mallepalle, J. and Melby, J. M. and Rafalski, S. and Vaccaro, J. *Guts and volume for hyperbolic 3-orbifolds with underlying space* S^3. Topology and its Applications **243** (2018), 100-113.

CONFERENCE TALKS

Volume estimates for certain types of hyperbolic 3-dimensional orbifolds. Undergraduate Summer Research Conference, University of Connecticut. (July 2015). Undergraduate Research Symposium, University of Minnesota, Morris. (April 2016)

Poster presentations for the same project at University of Minnesota, Morris (September 2015) and Joint Mathematics Meetings (January 2016).

OTHER TALKS

Various talks in student-run geometry and topology seminars, Michigan State University (2017-present)

Sensor networks and homological coverage criterion. University of Minnesota, Morris (April 2017)

Classification of geometric orbifolds. University of Minnesota, Morris (April 2017)

CONFERENCES ATTENDED

Perspectives on Dehn Surgery. The Institute for Computational and Experimental Research in Mathematics (ICERM). Brown University (Workshop in July 2019)

Graduate Student Topology and Geometry Conference. University of Illinois at Urbana Champaign (March 2019)

Graduate Student Topology and Geometry Conference. University of Illinois at Chicago (April 2018)

Teaching Experience

Fall	2019	Teaching Assistant, Introduction to Proofs
Fall	2019	College Algebra, Trigonometry Lead Teaching Assistant
Spring	2019	Instructor of Record, Survey of Calculus
Spring	2019	Math Learning Center Supervisor/Lead Teaching Assistant
Fall	2018	Instructor of Record, Calculus I
Fall	2018	Teaching Assistant, Calculus I
Fall	2018	Calculus I Review Session Lead Teaching Assistant
Summer	2018	Instructor of Record, Calculus I
2017 –	2019	Math Learning Center Tutor
2014 –	2015	Undergraduate Teaching Assistant, Pre-calculus, Calculus I

Honors and Awards

2015	University of Minnesota, Morris Student Administrative Fellowship
2013-2017	Prairie Scholarship (full-tuition), University of Minnesota, Morris
2013-2017	Dean's List, University of Minnesota, Morris
2012	National Merit Commended Scholar

Extended Professional Travel

June	2019	Mathematical Sciences Research Institute Summer Graduate School, Berkeley, California *Random and Arithmetic Structures in Topology*
Fall	2016	Budapest Semesters in Mathematics, Budapest, Hungary
Summer	2015	Fairfield University Research Experience for Undergraduates in Mathematics, Fairfield, Connecticut

Graduate Coursework

- ❑ Measure Theory
- ❑ Complex Analysis
- ❑ Algebra (2 semesters)
- ❑ Smooth Manifolds
- ❑ Algebraic Topology (3 semesters)
- ❑ Machine Learning
- ❑ Topological Data Analysis and Persistent Homology
- ❑ Knot Theory
- ❑ 3-manifolds
- ❑ Mapping Class Groups
- ❑ Normal Surface Theory

Scientific Research Experience

2019	Games on Graphs. (Graduate Student Mentor for MSU SURIEM). Advisor: Robert Bell, Department of Mathematics, Michigan State University.
2017	Classification of geometric orbifolds. Advisor: C. K. Atkinson, Department of Mathematics, University of Minnesota, Morris.
2016	Vibrations of the clamped and free plate on S^2. Advisor: L. M. Chasman, Department of Mathematics, University of Minnesota, Morris.
2015	Exploration of 3-dimensional orbifolds through guts constructions and tangle decompositions. Advisor: S. Rafalski, Department of Mathematics, Fairfield University.

Relevant Skills

Proficiency in Python, Java, and Mathematica

Academic Service

2019 –	2020	Graduate Studies Committee Representative
Fall	2019	Incoming Teaching Assistant Mentor
Spring	2019	Graduate Employees Union Bargaining Team Member
Spring	2019	Graduate Employees Union Mathematics Steward
Spring	2019	Incoming Teaching Assistant Mentor
Fall	2018	Incoming Teaching Assistant Mentor
Fall	2018	Graduate Employees Union Mathematics Steward

Professional

American Mathematical Society
Association for Women in Mathematics