Curriculum Vitae
Joseph McDonough

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	School of Mathematics	Date of CV:	July 2023
	University of Minnesota		

Education

	Ph.D.	University of Minnesota (expected 2027)
2021—2022		San Diego State University, Mathematics (graduate coursework)
2021	B.S.	San Diego State University, Applied Mathematics (Minor: Computer Science)

Employment

2022 –	Graduate Assistant, UMN
2021 – 2022	Graduate Student Assistant, SDSU
2019 – 2021	Instructional Student Assistant, SDSU
2018 – 2019	Tutor, Mathematics & Statistics Learning Center, SDSU

Awards and Honors

2021	Outstanding Baccalaureate Candidate in Mathematics (SDSU Math Dept.)
2018 – 2019	Putnam Exam Score: 11 (2018), 10 (2019). Top score at SDSU both years.
2017 – 2021	Dean's List, San Diego State University

Research

Publications

2. (with C. Brower, S. Chapman, T. Kulhanek, C. O'Neill, V. Pavlyuk, V. Ponomarenko) *Length density and numerical semigroups* Combinatorial and Additive Number Theory V, Springer Proceedings in Mathematics and Statistics vol. 395, Springer (2023) 79–98 (arXiv:2110.10618)

1. (with T. Kulhanek, V. Ponomarenko) *Dilated floor functions that commute sometimes* The PUMP Journal of Undergraduate Research **2** (2019) 107–117

Ongoing Research Projects

1. Rays of Kunz polyhedron faces with low embedding dimension (with C. Brower, C. O'Neill)

Presentations

2022	May	Length density and numerical semigroups, AMS Western Sectional (Virtual)
——	Apr.	Length density and numerical semigroups, SGPs Research Seminar, SDSU
——	Mar.	A group cone safari II: the rays of doom, SGPs Research Seminar, SDSU
2021	Nov.	A group cone safari: finding extremal rays in the group cone, SGPs Research Seminar, SDSU
——	Oct.	Geometric approaches to studying numerical semigroups, SGPs Research Seminar, SDSU
——	Mar.	The Kunz polyhedra and delta sets of numerical semigroups, SGPs Research Seminar, SDSU
2020	Dec.	The Kunz polyhedra and delta sets of numerical semigroups, SGPs Research Seminar, SDSU
——	Sep.	Length density of numerical semigroups, SGPs Research Seminar, SDSU
——	Aug	Length density of numerical semigroups, REU Presentation

Seminars Organized

2022 Spring Semigroups, Generating Functions, and Polytopes (SGPs) Research Seminar, SDSU

Referee Experience

Involve, A Journal of Mathematics

Teaching and Mentoring Experience

Courses at University of Minnesota, Twin Cities

2023	Fall	Foundations (Math 3283W) (Discussion TA)
2023	Spring	Calculus I (Math 1271) (Discussion TA)
2022	Fall	Calculus I (Math 1271) (Discussion TA)

Courses at San Diego State University

2022	Spring	Discrete Math (Math 245) (Lead TA)
2021	Fall	Discrete Math (Math 245) (Lead TA)
2021	Spring	Discrete Math (Math 245) (TA)
2020	Fall	Discrete Math (Math 245) (TA)
2020	Spring	Discrete Math (Math 245) (TA)
2019	Fall	Combinatorics (Math 579) (Grader)

Computing Experience

Languages: `sage`, `Macaulay2`, `python` (`NumPy`, `SciPy`), `C++`, `Go`, `Java`

General: `git`, `Unix terminal`, `Jupyter notebooks`, LaTeX

Software (on Github `@jmcdonough98`)

numsgps-kunz-functions: Helper functions for graphing and investigating Kunz polyhedra

Euler: Solutions to (roughly 110) computational math puzzles posted on `projecteuler.net`

hsvfilter: Object detector using hsv color filtering

aoc2020: Solutions to Advent of Code 2020

md5collisions: Implementation of the MD5 cryptographic hash algorithm for a cryptography class project

pendulumSim: Simluation of an inverted pendulum on a cart, including an optimal control system

Other Activities

2019 – 2020   Mechatronics Club, SDSU
- Contributed to control system software for the club's autonomous submarine