MARISA GAETZ

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EDUCATION

Massachusetts Institute of Technology *Sept. 2016 – Present*
Junior Undergraduate Overall GPA: 4.9/5.0
B.S. Pure Mathematics, Minor in Philosophy (In Progress)

St. John's Preparatory School (Collegeville, MN) *2012 – 2016*
High School Diploma and International Baccalaureate Diploma Overall GPA: 4.0/4.0

RESEARCH INTERESTS

Combinatorics and representation theory.

REU PROGRAMS

University of Minnesota - Duluth Summer 2018
Combinatorics Research

· Advised by Prof. Joe Gallian.
· Performed both independent and collaborative research in the field of combinatorics on words.
· See solo-authored **submitted paper** and **in progress paper** coauthored with C. Ji.

University of Minnesota - Twin Cities Summer 2017
Combinatorics Research

· Mentored by Prof. Pavlo Pylyavsky.
· Collaborated daily with two group members on an algebraic combinatorics problem.
· See **submitted paper** coauthored with W. Hardt and S. Sridhar.

Boise State University Summer 2016
Combinatorics Research

· Mentored by Prof. Marion Scheepers.
· Collaborated daily with two group members and an advisor on an enumerative combinatorics problem.
· See **in progress paper** with B. Molokach, M. Scheepers, and M. Shanks; see **OEIS Contributions**.

MENTORED RESEARCH

Massachusetts Institute of Technology Oct. 2016 - May 2017
Geometry Research

· Mentored by Prof. Haynes Miller.
· Corresponded weekly with Prof. Miller to develop a classification of Euclidean and hyperbolic surfaces.

College of Saint Benedict Dec. 2014 - Apr. 2016
Group Theory Research

· Mentored by Prof. Bret Benesh
· Corresponded weekly with Prof. Bret Benesh to develop winning strategies for a group-theoretic game played on cyclic, dihedral, and nilpotent groups.
· See **published paper** coauthored with B. Benesh.

PUBLICATIONS

Published Papers

· B. Benesh and M. Gaetz. A q-player impartial avoidance game for generating finite groups, *Internat. J. Game Theory* **47** (2018) 2, 451–461.

Submitted Papers

· M. Gaetz, W. Hardt, and S. Sridhar. Support equalities among ribbon Schur functions, submitted to the *Electronic Journal of Combinatorics* (October, 2018), `arXiv:1709.03011`.

· M. Gaetz. Anti-power j-fixes of the Thue-Morse word, submitted to the *Electronic Journal of Combinatorics* (August, 2018), `arXiv:1808.01528`.

In Progress Papers

· M. Gaetz, C. Ji. Representants of graphs.

· M. Gaetz, B. Molokach, M. Scheepers, and M. Shanks. Quantifying CDS sortability of permutations by strategic pile size.

Online Encyclopedia of Integer Sequences (OEIS) Contributions

· Sequence Entry and Formula: *A281259: Number of elements of S_n with strategic pile of size 6.*

· Formula: *A267324: Number of elements of S_n with strategic pile of size 4.*

PRESENTATIONS

- "Anti-Power j-Fixes of the Thue-Morse Word", 20 minute presentation at the Undergraduate Mathematics Symposium at UIC, planned: Nov. 2018.
- "Anti-Power j-Fixes of the Thue-Morse Word", 20 minute presentation at the Young Mathematicians Conference, Aug. 2018.
- "Support Equalities Among Ribbon Schur Functions", poster presentation at the Young Mathematicians Conference, Aug. 2018.
- "Support Equalities Among Ribbon Schur Functions", poster presentation at the Joint Mathematics Meetings, Jan. 2018.
- University of Minnesota REU Final Symposium presentation, Aug. 2017.
- "Quantifying CDS Sortability of Permutations Using Strategic Piles", poster presentation at the Joint Mathematics Meetings, Jan. 2017.
- "Quantifying CDS Sortability of Permutations Using Strategic Piles", poster presentation at the Idaho Conference of Undergraduate Research, July 2016.
- Boise State University REU Final Symposium presentation, July 2016.
- Boise State University REU Interdisciplinary Seminar presentation, July 2016.

AWARDS

Outstanding Poster Award for the MAA Undergraduate Poster Session at JMM 2017
Saint Cloud Times 2 Under 20 Award 2017
National Merit Scholarship Award 2016
Triple A (Academics, Arts, and Athletics) Region 5A Award 2016

MENTORING, TEACHING, AND GRADING

Associate Advisor for Freshman Advising Seminar Fall 2018 – Present

· Help lead Prof. Haynes Miller's *Algebra of Surfaces* Freshman Advising Seminar.

Teaching Assistant for Nonviolence Philosophy Course Fall 2018 – Present

· Help lead Prof. Lee Perlman's *Nonviolence as a Way of Life* philosophy course at Boston Pre-Release Center correctional facility.

Discover Mathematics FPOP Counselor Aug. 2017, Aug. 2018

· Was a co-head counselor and organizer for MIT's math Freshman Pre-Orientation Program (2018), and a counselor for the same program during its inaugural year (2017).

Math Prize for Girls Grader Fall 2018, Fall 2017

PRIMES Circle Mentor Spring 2018

· Directed the reading of combinatorial game theory for two talented students from urban public high schools of Boston.

· Prepared the students for a conference presentation and expository paper.

USA Mathematical Talent Search Grader Fall 2017

Teaching Assistant for Physics Course Spring 2017

· Helped lead Dr. Tom Peteet's college level physics course, taught at Massachusetts Correctional Institution – Norfolk.

Python and Cryptography Tutor July 2016

· Led a problem solving session for high school students attending a NASA camp.

Mathematics Tutor Spring 2016

· Explained and created Algebra 2 problems for a student at Saint John's Preparatory School (Collegeville, MN).

COMMUNITY INVOLVEMENT

Member of MIT Math Dept.'s Diversity and Community Building Committee . . . . . Fall 2018 – Present
Staff Member of MIT Undergraduate Mathematics Association . . . . . Fall 2017 – Present
Organizer of MIT Student Colloquium for Undergraduates in Mathematics . . . . . Fall 2017 – Present
Vice President of the MIT Prison Education Initiative . . . . . Spring 2018 – Present
Saint John's Preparatory School Mu Alpha Theta President . . . . . Fall 2015 – Spring 2016
Saint John's Preparatory School Mu Alpha Theta Vice President . . . . . Fall 2014 – Spring 2015
Saint John's Preparatory School Mu Alpha Theta Secretary . . . . . Fall 2013 – Spring 2014

RELEVANT COURSES

18.715 Intro. to Representation Theory (ongoing)
18.705 Intro. to Commutative Algebra (ongoing)
18.704 Seminar in Algebra (ongoing)
18.212 Algebraic Combinatorics
18.152 Intro. to Partial Differential Equations
18.702 Algebra II
18.701 Algebra I
18.103 Fourier Analysis
6.006 Intro. to Algorithms
18.400 Automata, Computability, & Complexity
18.100B Real Analysis
6.009 Fundamentals of Programming
18.A07 Geometry of Surfaces
18.022 Calculus

PROGRAMMING AND MARKUP LANGUAGES

LaTeX, Python, C, C++, HTML, CSS