



SHELBY COX


 [shelbycox.github.io](https://github.com/shelbycox)

 Ann Arbor, MI

 East Hall 3080

 spcox@umich.edu

 github.com/shelbycox

 [/shelby-cox-653617103](https://www.linkedin.com/in/shelby-cox-653617103)

SUMMARY

Using tools from algebraic geometry, tropical geometry, and combinatorics, I solve problems in mathematical phylogenetics and algebraic statistics. I frequently use mathematical software to advance my research.

EDUCATION

2018 - 2024 **University of Michigan, Ann Arbor**
Ph.D. Mathematics, *expected May 2024*.

2014 - 2018 **University of Massachusetts, Amherst**
B.S., Mathematics, B.A., Linguistics, May 2018.
summa cum laude, with honors

RESEARCH

2023+ **ML Degree of Brownian Motion Tree Models** **in preparation**
with Jane Coons, Aida Maraj, and Ikenna Nometa.

2023+ **Dimensions of 3-Sunlet Models** **in preparation**
with Elizabeth Gross, and Samuel Martin.

2023+ **The tropical polytope is the set of all weighted tropical Fermat-Weber points** **preprint**
with Mark Curiel.
Available at: [arXiv 2310.07732](https://arxiv.org/abs/2310.07732).

2023 **Classifying Tree Topologies along Tropical Line Segments** **to appear**
Algebraic Statistics, Hawaii 2022. Available at: [arXiv 2302.03611](https://arxiv.org/abs/2302.03611).

2022 **Tree Topologies along a Tropical Line Segment**
with Ruriko Yoshida. Vietnam Journal of Mathematics. 50, 395 - 419 (2022).

2019 **Finding Euler Characteristics of Hilbert Schemes using Colored Young Diagrams**
with Amal Mattoo. Minnesota Journal of Undergraduate Mathematics 5(1) (2019).

GRANTS AND AWARDS

2023 Rackham Research Grant, UMich \$3000

2023 Rackham Travel Grant, UMich \$1150

2023 SIAM Student Travel Award \$800

2020 UMich International Center Grant \$400

2018 - 2023 NSF Graduate Research Fellowship \$138,000

2017 Honorable Mention, Barry Goldwater Scholarship

2017 - 2018 William Field Alumni Scholarship, UMass

2017 Leon Emory Lincoln and Robert Bradley Lincoln Scholarship, UMass

2017 Monahan Student Leadership Award, UMass

Fall 2016 M.K. Bennett Geometry Award, UMass

TEACHING

- | | | |
|-------------|--|---|
| 2019 - 2021 | Instructor of Record | University of Michigan, Ann Arbor |
| | <ul style="list-style-type: none">• Math 116: Calculus II (2 semesters), and Math 115: Calculus I (1 semester).• Classes of 15 - 20 students, meeting for 80 minutes, three times per week.• Designed worksheets, lesson plans, and quizzes. | |
| 2015 - 2018 | Undergraduate Teaching Assistant | University of Massachusetts, Amherst |
| | <ul style="list-style-type: none">• Led recitations for Math 300: Fundamental Concepts of Math (4 semesters),• Office hours and in-class assistant for Math 127: Calculus for Life and Social Sciences, and Math 104: Algebra, Analytic Geometry, and Trigonometry. | |

PRESENTATIONS AND POSTERS

- | | | |
|-----------|--|--------------------------------------|
| Oct 2023 | Homaloidal Polynomials and ML Degree One Models | with Pratik Misra and Pardis Semnani |
| | Apprenticeship Week, IMSI, Chicago, IL | |
| Sept 2023 | Snapshot: ML Degree of Brownian Motion Tree Models | with Ikenna Nometa |
| | Algebraic Statistics and Our Changing World, IMSI, Chicago, IL | |
| July 2023 | Classifying Tree Topologies along Tropical Line Segments | |
| | SIAM AG 2023, Eindhoven, The Netherlands | |
| Nov 2022 | Tropical Phylogenetics | |
| | Matroids Day, University of Wisconsin, Madison, WI | |
| June 2022 | Tropical Turning Points | |
| | Poster Session at CCAAGS-22, University of Washington, Seattle, WA | |
| May 2022 | Tree Topologies along the Tropical Line Segment | |
| | Algebraic Statistics 2022, University of Hawaii, Manoa, HI | |
| July 2021 | Minicourse in Tropical Geometry | |
| | Math Summer Mini-Courses, University of Michigan, Ann Arbor, MI | |
| Jan 2017 | Euler Characteristics of Hilbert Schemes via Colored Young Diagrams | with Amal Mattoo |
| | Joint Mathematics Meeting, AMS Special Session, Atlanta, GA | |
| Jan 2017 | Euler Characteristics of Hilbert Schemes via Colored Young Diagrams | with Amal Mattoo |
| | Joint Mathematics Meeting, MAA Poster Session, Atlanta, GA | |

SERVICE

- | | |
|-------------|--|
| July 2023 | Midwest Research Experience for Graduate Students |
| | Graduate Student Mentor |
| Fall 2021 | Directed Reading Program |
| | Mentor, Topic: Curvature |
| 2019-2023 | Association for Women in Mathematics, UMich Chapter |
| | Executive Board |
| 2016-2018 | Association for Women in Mathematics, UMass Chapter |
| | President |
| 2019 - 2020 | Graduate Student Advisory Committee UMich |
| 2021 - 2022 | Member |