

Jay Yang

Department of Mathematics & Statistics
Washington University in St. Louis

Email: jayy@wustl.edu
URL: <https://www.math.wustl.edu/~jayy/>

Employment

2022-Current Washington University in St. Louis, Postdoctoral Lecturer
2021-2022 McMaster University, Postdoctoral Fellow
2018-2021 University of Minnesota, RTG Postdoctoral Associate

Education

2012-2018 University of Wisconsin - Madison
- Advisor: Daniel Erman
- Ph.D. in Mathematics, August 2018
2009-2012 University of Michigan
- B.S. in Mathematics, 2012

Research Interests

Commutative Algebra, Algebraic Geometry, and Combinatorics

Papers

- Characteristic dependence of syzygies of random monomial ideals
(with Caitlyn Booms and Daniel Erman) to appear *SIAM J. Discrete Math* (2022)
[DOI:10.1137/21M1392474](https://doi.org/10.1137/21M1392474)
- Syzygies of $\mathbb{P}^1 \times \mathbb{P}^1$: data and conjectures
(with Juliette Bruce, Daniel Corey, Daniel Erman, Steve Goldstein, and Robert P. Laudone)
Journal of Algebra 593C (2022)
[DOI:10.1016/j.jalgebra.2021.10.023](https://doi.org/10.1016/j.jalgebra.2021.10.023)
- The SchurVeronese package in Macaulay2
(with Juliette Bruce, Daniel Erman, Steve Goldstein) to appear *JSAG* (2021)
[DOI:10.2140/jsag.2021.11.83](https://doi.org/10.2140/jsag.2021.11.83)
- Homological and combinatorial aspects of virtually Cohen–Macaulay sheaves.
(with Christine Berkesch, Patricia Klein, and Michael C. Loper) *Trans. London Math. Soc.*
8 (2021)
[DOI:10.1112/tlm3.12036](https://doi.org/10.1112/tlm3.12036)
- Virtual Resolutions of Monomial Ideals on Toric Varieties.
Proc. AMS, Ser. B **8** (2021)
[DOI:10.1090/bproc/72](https://doi.org/10.1090/bproc/72)
- Random Toric Surfaces and a Threshold for Smoothness.
Journal of Algebra **524** (2019)
[DOI:10.1016/j.jalgebra.2018.12.023](https://doi.org/10.1016/j.jalgebra.2018.12.023)

- Random Flag Complexes and Asymptotic Syzygies.
(with Daniel Erman), *Algebra and Number Theory* **12** (2018) no. 9
[DOI:10.2140/ant.2018.12.2151](https://doi.org/10.2140/ant.2018.12.2151)
- Conjectures and Computations about Veronese Syzygies.
(with Juliette Bruce, Daniel Erman, Steve Goldstein), *Experimental Mathematics* **29** (2018) iss. 4
[DOI:10.1080/10586458.2018.1474506](https://doi.org/10.1080/10586458.2018.1474506)

Preprints

- Hadamard Products and Binomial Ideals.
(with Büşra Atar, Kieran Bhaskara, Adrian Cook, Sergio Da Silva, Megumi Harada, Jenna Rajchgot, Adam Van Tuyl, Runyue Wang)
[arXiv:2211.14210](https://arxiv.org/abs/2211.14210)
- Asymptotic Degrees of Random Monomial Ideals.
(with Lily Silverstein and Dane Wilburne) to appear *Journal of Commutative Algebra* to appear *Journal of Commutative Algebra* (2023)
[arXiv:2009.05174](https://arxiv.org/abs/2009.05174)

Software

- Contributor to `RandomIdeals.m2`
- Contributor to `NormalToricVarieties.m2`
- Contributor to `SchurVeronese.m2`
- Contributor to Macaulay2 core

Awards

- Thank a Teacher Note (2020,2021), University of Minnesota
A program allowing students to formally recognize instructors who challenge and inspire them.
- Excellence in Research Award (2017), University of Wisconsin - Madison
Awarded annually by the Mathematics Department for exceptional thesis research.

Conference Talks

- 2023 AMS Spring Southeaster Sectional - Special Session on Commutative Algebra and its Interactions with Algebraic Geometry
Virtual Resolutions and Shellability
- 2022 AMS Spring Central Sectional - Special Session on Combinatorial Algebra Geometry
Virtual Cohen–Macaulay Monomial Ideals
- 2021 AMS Spring Southeastern Sectional - Commutative Algebra and its Interaction with Algebraic Geometry and Combinatorics Special Session
Virtual Resolutions of Monomial Ideals
- 2020 AMS Fall Central Sectional - Free resolutions, Combinatorics, and Geometry Special Session
Virtual Resolutions of Monomial Ideals on Toric Varieties

2020 AMS Spring Central Sectional - Combinatorial Algebra and Geometry Special Session
(Canceled due to COVID)

Virtual Resolutions of Monomial Ideals

2019 AMS Fall Central Sectional - Combinatorial Algebraic Geometry Special Session

Virtual Resolutions of Monomial Ideals

2019 SIAM AG - Random Geometry and Topology Minisymposium

Degree of Random Monomial Ideals

2019 Summer School on Randomness and Learning in Non-Linear Algebra

Degrees of Random Monomial Ideals

2017 CMS Winter Meeting - Toric Geometry Session

Syzygies of Random Monomial Ideals

2017 CA+ (2017)

Random Flag Complexes and Asymptotic Syzygies

2017 SIAM Conference on Applied Algebraic Geometry - Core Algorithms in Algebra and
Geometry Minisymposium

Asymptotic Syzygies via Numerical Linear Algebra and High Throughput Computing

2016 HTCondor Week

Computing Betti Tables with HTCondor

Seminar Talks

2023 UC Berkely, Commutative Algebra and Algebraic Geometry Seminar

2022 Washington University in St. Louis, Algebra Seminar

2021 McMaster, Algebra and Algebraic Geometry Seminar

2020 Texas A&M, Algebra and Combinatorics Seminar

2020 Commutative and Homological Algebra Market Presentations

2020 University of Minnesota, Combinatorics and Commutative Algebra Seminar

2019 University of Minnesota, Commutative Algebra Seminar

2018 University of Minnesota, Commutative Algebra Seminar

2016 University of Wisconsin, Algebraic Geometry Seminar

2016 University of Miami, Combinatorics Seminar

2016 University of Wisconsin, Combinatorics Seminar

2016 University of Illinois - Urbana Champaign, Commutative Algebra Seminar

2015 University of Wisconsin, Graduate Algebraic Geometry Seminar

Teaching

Courses Taught at Washington University in St. Louis

Fall 2022 Math 221 *Calculus 3*

Courses Taught at McMaster University

Fall 2021 Math 1ZA3 *Engineering Mathematics 1*

Courses Taught at University of Minnesota

Spring 2021 Math 1572H *Honors Calculus 2*

Fall 2020 Math 1571H *Honors Calculus 1*

Spring 2020 Math 1272 *Calculus 2*

Fall 2019 UMTYMP *Advanced Topics: Computational Algebraic Geometry*

Spring 2019 Math 5385 *Computational Algebraic Geometry*

Fall 2018 Math 4242 *Applied Linear Algebra*

Courses Taught at University of Wisconsin

Spring 2017 Math 490 *Computational Undergraduate Research Lab* TA

Fall 2016 Math 114 *Algebra & Trigonometry* TA

Fall 2015 Math 114 *Algebra & Trigonometry* TA

Spring 2015 Math 217 *Calculus with Algebra & Trigonometry* TA

Fall 2014 Math 114 *Algebra & Trigonometry* TA

Spring 2014 Math 211 *Business Calculus* TA

Fall 2013 Math 234 *Calculus 3* TA

Spring 2013 Math 222 *Calculus 2* TA

Fall 2012 Math 221 *Calculus 1* TA

Mentoring

Summer 2020 University of Minnesota Research Experience for Undergraduates Mentor

Summer 2019 Senior Thesis Mentor

Summer 2017 Computational Undergraduate Research Lab Mentor

2015-2019 Directed Reading Program Mentor

Organization

2023 Co-organizer for AMS Special Session on Commutative Algebra with Connections to Combinatorics and Geometry

2021 Co-organizer for CMS Winter Meeting Special Session on Combinatorial methods in algebraic geometry and commutative algebra

2021-2022 Organizer of the Algebra and Algebraic Geometry Seminar and McMaster

2019-2021 Organizer of the Commutative Algebra Seminar at Minnesota

2018 Co-organizer for Macaulay2 Workshop at Wisconsin

Outreach Work

2022 Putnam Advisor at WUSTL

2015 & 2017 Problem Writer for Mega Math Meet

2014 & 2017 Grader for Mega Math Meet