

# Trevor K. Karn

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CONTACT INFORMATION	Department of Mathematics Texas A&M University College Station, TX 77843 USA	<i>Email:</i> <a href="mailto:tkkarn[at]tamu[dot]edu">tkkarn[at]tamu[dot]edu</a> <i>Web:</i> <a href="https://trevorkarn.github.io">trevorkarn.github.io</a>
RESEARCH AREAS	Algebraic combinatorics, applied topology and geometry, mathematical software	
EXPERIENCE	<b>Texas A&amp;M University, Dept. of Mathematics</b> Visiting Assistant Professor	College Station, Texas, USA starting August 2025
EDUCATION	<b>University of Minnesota</b> Ph.D. in Mathematics  Thesis: <i>Permutation group invariants of exterior and superpolynomial algebras</i> Advisor: Victor Reiner  M.S. in Mathematics	Minneapolis, Minnesota, USA June 2025     March 2022
	<b>U.S. Naval Academy</b> B.S. (with Distinction) in <a href="#">Mathematics (Honors)</a> Minor in <a href="#">Arabic Language</a>  Honors Thesis: <i>Matroid Kazhdan-Lusztig polynomials and Structures of Flags</i> Advisor: <a href="#">Max D. Wakefield</a>	Annapolis, Maryland USA May 2018
PUBLICATIONS	In reverse chronology  6. Superspace coinvariants and hyperplane arrangements (with R. Angarone, P. Commins, S. Murai, and B. Rhoades), <i>Advances in Mathematics</i> Volume 467, May 2025.  5. Ideals preserved by linear changes of coordinates in positive characteristic (with B. Cattell-Ravdal, E. Delargy, A. Ganguly, S. Guan, M. Perlman, and S. Sivakumar), <a href="#">arXiv:2404.10544</a> , to appear in <i>Communications in Algebra</i> .  4. Topological learning in multiclass data sets (with C. Griffin and B. Apple), <i>Physical Review E</i> Volume 109, February 2024  3. Equivariant Kazhdan–Lusztig theory of paving matroids (with G. Nasr, N. Proudfoot, and L. Vecchi), <i>Algebraic Combinatorics</i> Volume 6, 2023.  2. Modeling of a Hidden Dynamical System Using Energy Minimization and Kernel Density Estimates (with S. Petrone and C. Griffin), <i>Physical Review E</i> Volume 100, October 2019.  1. Stirling Numbers in braid matroid Kazhdan–Lusztig polynomials (with M. Wakefield), <i>Advances in Applied Mathematics</i> Volume 103, February 2019.	
PREPRINTS	In reverse chronology  1. Invariant theory for wreath products acting on superpolynomials (with V. Reiner) <a href="#">arXiv:2503.19323</a>	

RECOGNITION	<p><b>Team Winner</b>, Applied Research Laboratory Award for Engineering Excellence, 2021</p> <p><b>Professor Henry M. Robert, Jr. Prize</b>, Department of Mathematics, U.S. Naval Academy, 2018</p> <p><b>1st Place Student Paper</b>, Undergraduate Research Conference Awards, MAA Maryland-District of Columbia-Virginia, 2017, Awarded for talk [2]</p> <p><b>Team Winner</b>, Syn Bio Academies Challenge, Defense Threat Reduction Agency, 2016</p>
TEACHING	<p><b>University of Minnesota</b> Lecturer</p> <p>MATH 5251 Error Correcting Codes, Finite Fields, Algebraic Curves <b>Spring 2023</b> <b>Spring 2025</b></p> <p>MATH 1272 Calculus II <b>Fall 2022, Spring 2024</b></p> <p>Machine Learning Summer Camp <b>Summer 2022</b></p> <p><b>University of Minnesota</b> Teaching Assistant</p> <p>MATH 3283W Sequences, Series, and Foundations <b>Spring 2022</b></p> <p>MATH 1272 Calculus II <b>Spring 2020</b> <b>Fall 2021</b></p> <p>Research Experience for Undergraduates <b>Summer 2021, 2023</b></p> <p>MATH 2243 Linear Algebra and Differential Equations <b>Spring 2021</b> <b>Fall 2020, 2023</b></p> <p>MATH 1271 Calculus I <b>Fall 2019</b></p> <p><b>Summer Heros Youth Program</b> Annapolis, Maryland, USA Math Coordinator <b>Summer 2016</b></p> <p><b>U.S. Naval Academy</b> Midshipman Group Study Leader</p> <p>Fundamentals of Mathematics <b>Spring 2017, 2018</b></p> <p>Probability and Statistics I <b>Fall 2016, 2017</b></p> <p>Calculus II <b>Fall 2015</b></p>
INVITED TALKS	<p>In reverse chronology</p> <ol style="list-style-type: none"> <li>13. <i>Varchenko–Gel’fand and Orlik–Solomon algebras of threshold arrangements</i> Northeastern University, November 2025</li> <li>12. <i>The Varchenko–Gel’fand ring of threshold arrangements</i> AMS Southeastern Sectional Meeting, October 2025</li> <li>11. <i>On the Varchenko–Gel’fand ring of threshold arrangements</i> ICERM Postdoc Seminar, September 2025</li> <li>10. <i>Exterior algebra invariants and characteristic polynomials of orbit posets</i> University of Minnesota Combinatorics Seminar, November 2024</li> <li>9. <i>Superspace coinvariants and hyperplane arrangements</i> Brown University Combinatorics Seminar, November 2024</li> <li>8. <i>Superspace coinvariants and hyperplane arrangements</i> SIAM TX-LA Minisymposium “Hyperplane Arrangements and Polytopes,” October 2024</li> </ol>

7. *Equivariant Kazhdan-Lusztig theory of paving matroids*, Texas A&M University Combinatorics Seminar, October 2024
6. *Applying hyperplane arrangements to study superspace*, United States Naval Academy Math Department Colloquium, August 2024
5. *Equivariant Kazhdan-Lusztig theory of paving matroids*, University of Minnesota Combinatorics Seminar, February 2023
4. *Equivariant Kazhdan-Lusztig theory of paving matroids*, Washington University in St. Louis Combinatorics Seminar, November 2022
3. *Equivariant Kazhdan-Lusztig theory of paving matroids*, Matroid Day Conference, November 2022
2. *Google Summer of Code Report*, Sage Days 112.358, June 2022
1. *Equivariant Kazhdan-Lusztig theory of paving matroids*, University of Wisconsin Combinatorics Seminar, April 2022

#### PROFESSIONAL SERVICE

- Organizer, Minn. Research Workshop in Algebra and Combinatorics **May 2025**  
**May 2024**  
**May 2022**
- Grant Reviewer, UMN Council of Graduate Students **February 2024**  
**April 2025**
- Counselor, Mathematics Project at Minnesota **January 2025**
- Organizer, UMN Reading Group on Poset Topology **Fall 2024** **April 2023**
- Facilitator, Minn. Graduate Student Teaching Assistant Orientation **August 2024**  
**August 2022**
- Organizer, UMN Reading Group on Free Lie Algebras **Fall 2022**
- Camera/Tech support, Open Problems in Algebraic Combinatorics **May 2022**
- Session Chair, Grad. Student Combinatorics Conference **March 2022**
- Session Chair and Recorder, Grad. Student Combinatorics Conference **April 2021**
- Organizer, UMN Student Combinatorics and Algebra Seminar **2020-2021**
- Organizer, UMN Combinatorics Working Groups workshop **Spring 2020**
- Member, UMN [Directed Reading Program](#) organizing committee **2019-2020**

#### OTHER EXPERIENCE

In reverse chronology

6. [COBI](#), Software Consultant, 2025
5. SageMath, Google Summer of Code 2022, [Rewrite exterior algebra, implement Groebner bases, and peelable tableaux for northwest diagrams](#)
4. SageMath, Google Summer of Code 2021, [G-invariants of Orlik-Solomon and Orlik-Terao algebras](#)
3. [Pennsylvania State University Applied Research Laboratory](#), Communications, Navigation, and Information Office, Research and Development Engineer, 2018-2021
2. Johns Hopkins University Applied Physics Laboratory [National Security Analysis Department](#), Internship, 2017
1. Naval Research Laboratory [Center for Biomolecular Science and Engineering](#), Internship, 2016

SUMMER SCHOOLS  
AND OTHER  
EXPERIENCES

**Mathematisches Forschungsinstitut Oberwolfach**, Arbeitsgemeinschaft: Combinatorial Hodge Theory, October 2025, Oberwolfach, Germany  
**ICERM**, Semester Program on Categorification and Computation in Algebraic Combinatorics, September-December 2025, Providence, Rhode Island, USA  
**Hokkaido University**, Schubert Calculus and its Generalizations, August 2023, Sapporo, Japan  
**Institute of Mathematics of the Jagiellonian University**, Algebraic Combinatorics in Kraków 2022, Kraków, Poland  
**University of Oregon**, Workshop on Algebra and Representation Theory, Held on Oregonian Grounds 2022, Eugene, Oregon, USA  
**Institut des sciences mathématiques, Université du Québec à Montréal**, ISM Discovery School: Geometry and Combinatorics of Hessenberg Varieties 2022, Montréal, Québec, Canada  
**Institute for Advanced Study**, Park City Math Institute Undergraduate Summer School 2017, Park City, Utah, USA

ADDITIONAL  
TALKS

In reverse chronology

13. *Combinatorics in matroid Kazhdan–Lusztig polynomials*, University of Minnesota Duluth Graduate Colloquium, March 2023
12. *Combinatorics in Kazhdan–Lusztig polynomials of paving matroids*, Graduate Student Combinatorics Conference, March 2023
11. *The Orlik–Solomon algebra and representation theory*, University of Minnesota Student Algebra and Combinatorics Seminar, March 2022
10. *The combinatorics of card shuffling*, University of Minnesota Student Algebra and Combinatorics Seminar, November 2021
9. *Introduction to SageMath*, University of Minnesota Undergraduate Women in Math, October 2021
8. *Equivariant Kazhdan–Lusztig polynomials and their combinatorics*, University of Minnesota Student Representation Theory Seminar, July 2021
7. *Introduction to SageMath*, University of Minnesota Student Combinatorics Seminar, February 2021
6. *Stirling Numbers in braid matroid Kazhdan–Lusztig polynomials*, Graduate Online Combinatorics Colloquium, May 2020
5. *Stirling Numbers in braid matroid Kazhdan–Lusztig polynomials*, Joint Mathematics Meetings, MAA General Session on Other Topics, January 2019
4. *Persistent Homology for Data Scientists*, Pennsylvania State University Applied Research Laboratory Idea Share, December 2018
3. *Stirling numbers of the first kind in braid matroid Kazhdan–Lusztig polynomials*, USNA CAT (Combinatorics, Algebra, and Topology) seminar, March 2018
2. *The flag counting problem for partition lattices*, MAA MD-DC-VA Section Meeting, April, 2017.
1. *Editing the human microbiome: proactively preventing aerosolized conotoxins*, Office of the Assistant Undersecretary of Defense for Research and Engineering, the Pentagon, Washington, D.C., USA, September 2016.

POSTERS  
PRESENTED

In reverse chronology

2. *Equivariant Kazhdan–Lusztig theory of paving matroids*, Algebraic Combinatorics in Krakow (Krakow, Poland), July 2022
1. *Equivariant Kazhdan–Lusztig theory of paving matroids*, GradMoCCA (Minneapolis, MN), April 2022

STUDENTS  
MENTORED

- Pranjal Dangwal (University of Minnesota Graduate Student) **2023**  
*Graduate Student Peer Mentor*
- Calvin Wojahn (University of Minnesota Undergraduate Student) **2023**  
*Directed Reading Program in algebraic topology*
- Joe McDonough (University of Minnesota Graduate Student) **2022-2023**  
*Graduate Student Peer Mentor*
- Elise Catania (University of Minnesota Graduate Student) **2021-2022**  
*Graduate Student Peer Mentor*
- Angel Chavez (University of Minnesota Graduate Student) **2021-2022**  
*Graduate Student Peer Mentor*
- Ethan Partida (University of Minnesota Undergraduate Student) **2020-2021**  
*Directed Reading Program in applied category theory, independent readings in combinatorial commutative algebra and computational topology*
- LTJG Meghan McDonough (Naval Postgrad. Sch. M.S. Student) **2019-2020**  
*Tutoring in data science and applied mathematics coursework*

SOFTWARE

- Fluent: Python
- Intermediate: C++, Mathematica
- Basic: Rust, MATLAB
- Open Source contributions to SageMath and Macaulay2

OUTREACH

- Counselor, The Mathematics Project at Minnesota **January 2025**
- State Fair Volunteer, UMN Center for Educational Programs **August 2024**
- Instructor, MCFAM Machine Learning Camp for High Schoolers **July 2022**
- Instructor, Saturday Morning Math enrichment **Spring 2022, 2023, 2025**
- State Fair Volunteer, Math-on-a-Stick **August 2021**