Anna Natalie Chlopecki

PhD Candidate

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Education

Purdue University   Fall 2020 – Present
Doctor of Philosophy in Mathematics
Advisors: Uli Walther and Eric Samperton

University of Illinois at Urbana-Champaign   Fall 2016 – Spring 2020
Bachelor of Science in Mathematics *with High Distinction and Cum Laude*
Minor in Criminology, Law, and Society
College of Liberal Arts and Sciences James Scholar

Research Interests

Combinatorial Commutative Algebra
Determinantal ideals, Hilbert function and polynomial, Gröbner bases, matrix Schubert varieties

Computational Algebraic Geometry
Complexity, group cohomology, knots

Awards

Purdue Graduate School Summer Research Grant	Summer 2025
Purdue Department of Mathematics Barbara A. Kunze Award	Spring 2025
Purdue "Make a Difference" Bravo Award	Spring 2024
Purdue Graduate School Ross Fellowship	Fall 2020 – 2024
JMM 2020 MAA Undergraduate Student Poster Session Honorable Mention	Spring 2020
UIUC Lois Lackner Mathematics Scholarship	Spring 2018 and 2019
UIUC Elsie Thomas Fraser Mathematics Award	Spring 2017

Preprints

Antidiagonal Initial Complexes of Infinite Matrix Schubert Varieties are Cohen-Macaulay. With Nathaniel Gallup and Jason Meintjes. Submitted 2026. arXiv:2601.02612.

An elementary proof that linking problems are hard. With Shannon Cheng, Saarah Nazar, and Eric Samperton. Submitted 2025. arXiv:2509.13120.

Permutation Polynomials: Iteration of Shift and Inversion Maps over Finite Fields. With Juliano Levier-Gomes, Wayne Peng, Alex Shearer, and Adam Towsley. 2021. arXiv:1910.12928.

External Talks and Presentations

Macaulay2 Workshop: Madison 2025 Lightning Talk   Madison, WI
Speaker   July 3, 2025
Talk Title: Investigating the Hilbertian Property

Purdue AWM Symposium   West Lafayette, IN
Invited Speaker   April 5, 2025
Talk Title: Investigating the Hilbertian Property

Joint Mathematics Meetings 2020   Denver, CO
Presenter   January 17, 2020
Poster Title: Monic Permutation Polynomials as Generators

External Talks and Presentations (Continued)

North American School of Information Theory (NASIT) 2019 Boston, MA
Presenter July 3, 2019
Poster Title: Entropy Vectors in Distributed Storage
Collaborators: Aubrey Laskowski and Weili Wu

Joint Mathematics Meetings 2019 Baltimore, MD
Speaker January 19, 2019
Talk Title: How to: Create a Community for Undergraduate Mathematicians
Collaborator: Alice Chudnovsky

Champaign County History Museum Champaign, IL
Presenter March 8, 2018
Talk Title: The Four Color Theorem
Collaborators: Cora McVey, Tejo Nutalapati, and Alan Zhou

Internal Talks

Purdue Ideal Conversations (Student Commutative Algebra Seminar) West Lafayette, IN
Speaker February 23, 2026
Talk Title: Infinite Matrix Schubert Varieties are Cohen-Macaulay

Purdue Student Colloquium Seminar West Lafayette, IN
Speaker December 10, 2025
Talk Title: Investigating the Hilbertian Property

Purdue Ideal Conversations (Student Commutative Algebra Seminar) West Lafayette, IN
Speaker April 28, 2025
Talk Title: The Local Hartshorne-Lichtenbaum Vanishing Theorem

Purdue Ideal Conversations (Student Commutative Algebra Seminar) West Lafayette, IN
Speaker November 25, 2024
Talk Title: Bumpless Pipe Dreams and Primary Decomposition

UIUC Undergraduate Friday Seminar Urbana, IL
Speaker November 8, 2019
Talk Title: Edelman Greene Tableaux and Complexity
Collaborator: Jackie Oh

Skills

Proficient in *Java*, *Python*, *SageMath*, and *Macaulay2*
Bilingual (English and Polish)

Collaborative Research and Coding Experience

Macaulay2 Workshop: Madison 2025 Madison, Wisconsin
Code Developer June 30 – July 4, 2025
Project Focus: Elimination Templates Package
Faculty Leader: Tim Duff (University of Missouri)

Fields Institute Workshop on the Applications of Commutative Algebra Toronto, Ontario
Researcher May 26 – 30, 2025
Project Title: Approximation Theory
Faculty Leaders: Mike DiPasquale (New Mexico State Univ.) and Nelly Villamizar (Swansea Univ.)

Macaulay2, Computational Alg. Geometry and String Theory Workshop Salt Lake City, Utah
Code Developer June 1 – 5, 2024
Project Focus: Normal Toric Varieties Package
Faculty Leader: Gregory Smith (Queen's University)

Research Mentorship

Undergraduate Initiative — West Lafayette, IN
Graduate Student Mentor and Researcher — Summer 2025 – Present
Project Focus: Determining the Computational Complexity of Counting Problems
Faculty Leader: Eric Samperton
Undergraduate Researchers: Shannon Cheng (Purdue) and Saarah Nazar (UIUC)

Undergraduate Initiative — Virtual
Graduate Student Mentor and Researcher — Summer 2025
Project Focus: Infinite Matrix Schubert Varieties
Faculty Leaders: Nathaniel Gallup and Jason Meintjes (Northeastern Univ.)
Undergraduate Researchers: Claire MacDonald (Northeastern Univ.)

Purdue Experimental Mathematics Lab (PXML) — West Lafayette, IN
Graduate Student Mentor — Spring 2025
Project Title: Visualizing the Computational Complexity of Knots and Links
Faculty Leader: Eric Samperton
Undergraduate Researchers: Shannon Cheng and Saarah Nazar

Teaching

Purdue Mathematics Department — West Lafayette, IN
Instructor of Record
    Linear Algebra (MA 26500) — Spring 2026
    Applied Calculus I (MA 16010) — Fall 2024 and Spring 2026
Recitation Instructor
    Multivariate Calculus (MA 26100) — Fall 2022 and Summer 2024
    Analytic Geometry and Calculus I (MA 16500) — Fall 2020
Grader
    Elements of Algebra I (MA 45300) — Spring 2023, 2024, and 2025
    Linear Algebra II (MA 35301) — Fall 2023
    An Intro to Proof through Real Analysis (MA 30100) — Fall 2023
    Diff. Eq. and Partial Diff. Eq. for Engineering and the Sciences (MA 30300) — Summer 2022

Freelance Tutor — West Lafayette, IN
Summer 2023 – Summer 2024

Synergistic Activities and Engagement

Purdue Bridge to Research Seminar — West Lafayette, IN
Organizer — Fall 2025 – Present

Purdue Association for Women in Mathematics — West Lafayette, IN
Vice President — Fall 2025 – Present
Mathematics Graduate Student Mentor — Fall 2021 – Present
Secretary — Fall 2022 – Spring 2023

Purdue Bridge for Pursuing Higher Degrees (B4PhD) Scholars Program — Virtual
Organizer — Spring 2025
Mentor — Spring 2025

Purdue Sloan Center for Systemic Change — West Lafayette, IN
Mathematics Department Ambassador — Fall 2024 – Spring 2025

Purdue Mathematics Department Diversity Committee — West Lafayette, IN
Graduate Liaison — Fall 2024 – Spring 2025

Purdue Combinatorial Commutative Algebra Reading Group — West Lafayette, IN
Organizer — Spring 2024
Text Title: Combinatorial Commutative Algebra by Miller and Sturmfels

Synergistic Activities and Engagement (Continued)

Purdue Mathematics Department Graduate Representatives
West Lafayette, IN
Graduate Representative
Fall 2023 – Spring 2024

Purdue Student Colloquium Seminar
West Lafayette, IN
Organizer
Fall 2022 – Spring 2024

Purdue Women in Science Programs
West Lafayette, IN
Mathematics and Statistics Departments' Liaison
Fall 2021 – Spring 2023

Mastery Hour Learning
Virtual
Mathematics Volunteer Tutor
Spring 2021

Summer School and Workshop Participation

Summer CAMP (Commutative Algebra Market Preparation Workshop)
Lincoln, Nebraska
August 12 – 14, 2025

SLMath An Introduction to Recent Trends in Comm. Alg. Summer School
Toronto, Ontario
June 2 – 13, 2025

SLMath Multi. and Diff. Graded Methods in Comm. Alg. Summer School
Moraga, California
July 29 – August 9, 2024

SLMath Recent Developments in Commutative Algebra Workshop
Berkeley, California
April 15 – 19, 2024

GEMS of Commutative Algebra Workshop
Minneapolis, Minnesota
November 10 – 12, 2023

SLMath Comm. Alg. and its Interaction with Alg. Geo. Summer School
Notre Dame, Indiana
May 22 – June 2, 2023

Graduate Research Opportunities for Women (GROW)
Urbana, Illinois
October 4 – 6, 2019

Conference Attendance

Algebra Across Time at Purdue University
April 26 – 27, 2025

Uwe Fest at the University of Notre Dame
August 12 – 16, 2024

URiCA at the University of Nebraska-Lincoln
May 11 – 12, 2024

AMS Central Sectional Meeting at the University of Wisconsin-Milwaukee
April 20 – 21, 2024

Combinatorial Algebra meets Algebraic Combinatorics at LACIM
January 26 – 28, 2024

AlGeCom XXII at UIUC
October 22, 2022

Undergraduate Research Experience

Illinois Combinatorics Lab for Undergraduate Experiences (ICLUE)
Urbana, IL
Researcher
Fall 2017 – Spring 2020
Project Title: An Investigation into Schubert Polynomial Parity
Faculty Mentor: Alexander Yong

Brown University Summer@ICERM Mathematics REU
Providence, RI
Researcher
Summer 2019
Project Title: Finite Field Statistics
Faculty Mentors: Adam Towsley (Rochester Inst. of Tech.) and Wayne Peng (Univ. of Rochester)
Collaborators: Juliano Levier-Gomes and Alex Shearer

Illinois Geometry Lab (IGL)
Urbana, IL
Researcher
Spring 2019
Project Title: Bounds and Optimization for Distributed Storage
Faculty Mentors: Iwan Duursma, Xiao Li, and Hsin-Po Wang
Collaborators: Aubrey Laskowski and Weili Wu

Undergraduate Research Experience (Continued)

Illinois Geometry Lab (IGL)   Urbana, IL
Researcher   Fall 2017
Project Title: The Four Color Theorem: Archival Documentation and Outreach
Faculty Mentors: Jeremy Tyson, Chris Prom, and Bethany Anderson
Collaborators: Xiaohan Liu, Cora McVey, Tejo Nutalapati, and Alan Zhou

Undergraduate Involvement

UIUC MATRIX Math Club   Urbana, IL
President   Fall 2017 – Spring 2020

UIUC Undergraduate Association for Women in Mathematics   Urbana, IL
MATRIX Liaison   Fall 2018 – Spring 2020
Mentorship Chair   Fall 2017 – Spring 2018

UIUC James Scholar Student Advisory Board   Urbana, IL
President   Fall 2019 – Spring 2020
Service Chair   Fall 2018 – Spring 2019
Service Committee Member   Fall 2017 – Spring 2018

Pi Mu Epsilon - Illinois Alpha Chapter   Urbana, IL
Member   Spring 2018 – Fall 2020

Past Work Experience

UIUC Campus Recreation - Ice Arena   Champaign, IL
Figure Skating Instructor   Fall 2017 – Spring 2020

UIUC Computer Science Department   Urbana, IL
Course Assistant
Discrete Structures (CS 173)   Fall 2018

Skokie Park District   Skokie, IL
Tennis Instructor   Summer 2014 – Summer 2016