

JAKE KETTINGER

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RESEARCH INTERESTS

My research interests are in algebraic geometry. I have researched asymptotic resurgence of symbolic powers of ideals of point configurations with Brian Harbourne and Frank Zimmiti. Right now I am interested in geproci configurations of points in projective space, unexpected varieties, superabundance of varieties, and fields of positive characteristic. I have found new configurations of geproci sets of a kind that does not exist in characteristic 0, and I am applying quasi-elliptic fibrations to the study of geproci sets in characteristic 2. I am also interested in studying configurations of points whose ideals provide counterexamples to the Harbourne conjecture.

EDUCATION

University of Nebraska - Lincoln PhD in Mathematics Thesis Advisor: Brian Harbourne Thesis Title: On the superabundance of singular varieties in positive characteristic	<i>May 2023</i>
University of Nebraska - Lincoln Masters in Mathematics	<i>May 2019</i>
University of Wisconsin - Madison Bachelors in Mathematics	<i>May 2017</i>

AWARDS

I have been awarded the Linda Bors Fellowship Award in the Fall of 2021. Awarded annually to 3 UNL graduate students based on scholarship.

PAPERS

The dynamics of the Hesse derivative on the j -invariant. arXiv:2408.04117 (2024), 17 pp.

The geproci property in positive characteristic. *Proceedings of the American Mathematical Society* 152 (2024) 3229-3242, 15 pp. DOI <https://doi.org/10.1090/proc/16809>

Extreme values of the resurgence for homogeneous ideals in polynomial rings *with Brian Harbourne and Frank Zimmiti.* *J. Pure Appl. Algebra* 226 (2022), no. 2, Paper No. 106811, 16 pp.

COMMUNITY INVOLVEMENT

I have attended every KUMUNU and URiCA conference (formerly known as KUMUNU Jr.) between 2018 and 2023.

I presented a talk at the AMS Spring Central Sectional Meeting in Cincinnati, OH in April 2023.

I presented a poster at the Brianfest conference at UNL held in honor of Brian Harbourne in August 2023.

I presented a colloquium talk at Boise State University in January 2024.

I presented a talk at the AMS Spring Central Sectional Meeting in San Francisco, CA in May 2024.

I presented a talk at the workshop on Algebraic Geometry, Computational Commutative Algebra and their effectiveness applications at Galatasaray University, Istanbul, Turkey in June 2024.

I presented a talk at the UMI AMS Joint Meeting in the session on Configurations in projective spaces and related research in commutative algebra and algebraic geometry at Università degli Studi de Palermo in July 2024.

I presented a poster at the Uwefest conference at Notre Dame University held in honor of Uwe Nagel in August 2024.

CSU TEACHING EXPERIENCE: INSTRUCTOR OF RECORD

Math 369: Linear Algebra I *Fall 2024*

Math 369: Linear Algebra I *Spring 2024*

Math 160: Calculus for Physical Scientists *Fall 2023*

UNL TEACHING EXPERIENCE: INSTRUCTOR OF RECORD

Math 221/821: Differential Equations *Spring 2023*

Math 106: Calculus I *Fall 2022*

Math 302: Math Modeling (For Pre-Service Teachers) *Fall 2021*

Math 103: College Algebra & Trigonometry *Spring 2021*

Math 203: Contemporary Math *Fall 2020*

Math 107: Calculus II *Summer 2020*

Math 102: College Trigonometry *Spring 2020*

Math 103: College Algebra & Trigonometry *Fall 2019*

Math 104: Applied Calculus *Summer 2019*

Math 101: College Algebra *Spring 2019*

TEACHING EXPERIENCE: ASSOCIATE CONVENER

Associate Convener and Graduate Teaching Assistant, Math 107: Calculus II

Spring 2022

The Associate Convener is responsible for coordinating recitation instructors, leading weekly instructor meetings, and organizing the course materials.

TEACHING EXPERIENCE: GRADUATE TEACHING ASSISTANT

Recitation Leader, Math 107: Calculus II

Summer 2018

Recitation Leader, Math 107: Calculus II

Spring 2018

Recitation Leader, Math 107: Calculus II

Fall 2017

I have employed an Active Learning strategy when teaching my recitation sections.

SERVICE AND INVOLVEMENT

I have started and organized a Math in Spanish seminar at Colorado State University, where graduate students can practice giving and listening to math talks in Spanish.

I have volunteered to help organize a bilingual math festival in called Cafecito con Matemática at Irish Elementary Escuela Bilingüe in Fort Collins, CO.

AMS Chapter President for the Academic Year Fall 2020 - Spring 2021 at University of Nebraska - Lincoln.

I have run the workshop to prepare graduate students to take the abstract algebra qualifying exam in January 2021 and Summer 2022.

New Student Enrollment for the UNL Math Department in Summers of 2021 and 2022.

I have run a reading course in Algebraic Curves for graduate students at UNL in the 2021-2022 school year.

I have run the Commutative Algebra Reading Seminar at UNL for the 2021-2022 school year.

Each year at UNL I volunteered for UNL Math Day, where high school students from across Nebraska visit UNL's campus to participate in math competitions.

Every year at UNL I tutored undergraduate students taking calculus and pre-calculus courses at UNL's Math Resource Center.

MENTORING

In Fall 2022, I mentored an undergraduate about elliptic curves in a Directed Reading Program.

In Spring 2020, I mentored an undergraduate about p -adic numbers in a Directed Reading Program, where we met weekly.

TALKS AS INVITED SPEAKER

New Perspectives on Geproci Sets *July 2024*
UMI AMS Joint Meeting in the session on Configurations in projective spaces and related research in commutative algebra and algebraic geometry at Università degli Studi de Palermo

New Perspectives on Geproci Sets *June 2024*
The workshop on Algebraic Geometry, Computational Commutative Algebra and their effectiveness applications at Galatasaray University, İstanbul, Turkey

New Perspectives on Geproci Sets *May 2024*
AMS 2024 Spring Western Sectional Meeting in San Francisco, CA

New Perspectives on Geproci Sets *April 2024*
Invited to speak at New Mexico State University

TALKS AT CSU

The Dynamincs of the Hesse Derivative on the j -invariant *February 2024*
Number Theory Lab, Colorado State University

Una Historia de la Notación Matematica *January 2024*
Seminario de las Matemáticas en Español, Colorado State University

TALKS AT UNL

Enumeration Puzzles in Geometry *April 2023*
Commutative Algebra Reading Seminar, University of Nebraska - Lincoln

New Perspectives on Geproci-ness *November 2022*
Commutative Algebra Seminar, University of Nebraska - Lincoln

Unexpected Curves *March 2022*
Commutative Algebra Reading Seminar, University of Nebraska - Lincoln

The Geometry of Elliptic Fibrations Part 2 *November 2021*
Commutative Algebra Reading Seminar, University of Nebraska - Lincoln

The Geometry of Elliptic Fibrations Commutative Algebra Reading Seminar, University of Nebraska - Lincoln	<i>October 2021</i>
The Geometry of Elliptic Fibrations Graduate Students Talking in Groups, Semigroups, and Topology, University of Nebraska - Lincoln	<i>September 2021</i>
Exploring the Wonderful World of Divisors Commutative Algebra Reading Seminar, University of Nebraska - Lincoln	<i>March 2021</i>
Colored Graphical Models and Their Symmetries Graduate Algebraic Geometry Assembly, University of Nebraska - Lincoln	<i>February 2021</i>
The Internal Language of Toposes Commutative Algebra Reading Seminar, University of Nebraska - Lincoln	<i>November 2020</i>
Differential Forms and De Rham Cohomology Graduate Algebraic Geometry Assembly, University of Nebraska - Lincoln	<i>September 2020</i>
Automorphism Groups of Curves and Surfaces Commutative Algebra Reading Seminar, University of Nebraska - Lincoln	<i>March 2020</i>
Triangulated Categories and Derived Functors Commutative Algebra Reading Seminar, University of Nebraska - Lincoln	<i>October 2019</i>
Vector Bundles and Projective Modules Math Literature Seminar, University of Nebraska - Lincoln	<i>June 2018</i>