# 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 Zimmitti. 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.

## EDUCATION

**University of Nebraska - Lincoln**                                                      *May 2023*
PhD in Mathematics
Thesis Advisor: Brian Harbourne
Thesis Title: On the superabunance of singular varieties in positive characteristic

**University of Nebraska - Lincoln**                                                      *May 2019*
Masters in Mathematics

**University of Wisconsin - Madison**                                                     *May 2017*
Bachelor of Mathematics

## 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

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

## 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*

Math 101: College Algebra                                           *Fall 2018*

## 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.

## GRADING EXPERIENCE

Math 325: undergraduate analysis                                    *Fall 2021*
Graded weekly problem sets for two sections of undergraduate analysis.

Math 826: graduate analysis                                         *Spring 2021*
Graded weekly problem sets for a Qualifying Exam preparation course.

Math 817: graduate algebra                                          *Fall 2019*
Graded weekly problem sets for a Qualifying Exam preparation course.

## SERVICE

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

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

Every year I tutor 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 (50 MINUTES)

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                                      *October 2021*
Commutative Algebra Reading Seminar, University of Nebraska - Lincoln

The Geometry of Elliptic Fibrations                                      *September 2021*
Graduate Students Talking in Groups, Semigroups, and Topology, University of Nebraska - Lincoln

Exploring the Wonderful World of Divisors                                *March 2021*
Commutative Algebra Reading Seminar, University of Nebraska - Lincoln

Colored Graphical Models and Their Symmetries                            *February 2021*
Graduate Algebraic Geometry Assembly, University of Nebraska - Lincoln

The Internal Language of Toposes                                         *November 2020*
Commutative Algebra Reading Seminar, University of Nebraska - Lincoln

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| Differential Forms and De Rham Cohomology | *September 2020* |
| Graduate Algebraic Geometry Assembly, University of Nebraska - Lincoln | |
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| Automorphism Groups of Curves and Surfaces | *March 2020* |
| Commutative Algebra Reading Seminar, University of Nebraska - Lincoln | |
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| Triangulated Categories and Derived Functors | *October 2019* |
| Commutative Algebra Reading Seminar, University of Nebraska - Lincoln | |
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| Vector Bundles and Projective Modules | *June 2018* |
| Math Literature Seminar, University of Nebraska - Lincoln | |

## COMMUNITY INVOLVEMENT

I have participated in the Collaborative Undergraduate Research Lab in 2017 at UW - Madison. My group did research on the homology of simplicial complexes of graphs.

I have attended every KUMUNU and URiCA (formerly known as KUMUNU Jr.) since 2018.

I planned on attending the PASCA Conference in Barranquilla, Colombia in July 2020, but this was canceled due to COVID.

I planned on attending the Conference on Rings and Polynomials in Graz, Austria in July 2021, but my plans were canceled.

## GRADUATE COURSEWORK

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| Math 817-818: Introduction to Modern Algebra | *Fall 2017- Spring 2018* |
| Math 825-826: Mathematical Analysis | *Fall 2017 - Spring 2018* |
| Math 871-872: Topology | *Fall 2017 - Spring 2018* |
| Math 911: Theory of Groups | *Fall 2018* |
| Math 918: Finite-Dimensional Algebras | *Fall 2018* |
| Math 901-902: Modern Algebra | *Fall 2018 - Spring 2019* |
| Math 918: Commutative Algebra | *Spring 2019* |
| Math 990: Hyperbolic Geometry | *Spring 2019* |
| Math 918: Lefschetz Properties | *Fall 2019* |
| Math 928: Functional Analysis | *Fall 2019* |
| Math 856: Differential Topology | *Spring 2020* |
| Math 918: Categories of Modules | *Spring 2020* |
| Math 924: Theory of Analytic Functions | *Fall 2020* |
| Math 918: Multiplicities and Chern Classes | *Spring 2021* |
| Math 990: Knot Theory | *Spring 2021* |