

# Zachary J. Flores

## RESEARCH INTERESTS

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Broadly interested in studying finitely generated modules over Noetherian rings. Explicitly, I am interested in the study of Lefschetz properties for graded, finite length modules over polynomial rings, Macaulay duals of families forms (e.g. hyperplane arrangements), and the computation of higher  $K$ -groups for classes of local Cohen-Macaulay rings.

## EDUCATION

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### PhD in Mathematics

Colorado State University, Fort Collins, CO

Aug. 2014 – May 2020

- Dissertation: Finitely Generated Modules Over Noetherian Rings: Interactions Between Algebra, Geometry, and Topology
- Advisor: Chris Peterson

### M.S. in Mathematics

University of Kansas, Lawrence, KS

Aug. 2011 – May 2014

- Thesis: Quillen  $K$ -groups for Rings of Finite Cohen-Macaulay Type
- Advisor: Hailong Dao

### B.S. in Mathematics

Michigan State University, East Lansing, MI

Aug. 2007 – May 2011

## WORK EXPERIENCE

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### Graduate Teaching Assistant

Aug. 2014-July 2020

Colorado State University

Fort Collins, CO

- Primary instructor for Matrices and Linear Equations and Patterns of Phenomena
- Teaching assistant for Calculus II

### Graduate Teaching Assistant

Aug. 2011-July 2014

University of Kansas

Lawrence, KS

- Primary instructor for Business Calculus I and Calculus II
- Teaching assistant for Calculus I and Calculus II

### Undergraduate Teaching Assistant

Aug. 2010-May 2011

Michigan State University

East Lansing, MI

- Teaching Assistant for College Algebra and Trigonometry and Calculus II

## RELEVANT SKILLS

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**Programming Languages:** Python

**Mathematics Software:** Macaulay2, Maple, Mathematica

**Foreign Languages:** Spanish

## PUBLICATIONS AND PREPRINTS

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- Flores, Z., G-Groups of Cohen-Macaulay Rings with  $n$ -Cluster Tilting Objects, *Algebras and Representation Theory* (2019)
- Cisto, C., Dipasquale, M., Failla, G., Flores, Z., Peterson, C., Utano, R., A Generalization of Wilf's Conjecture for Numerical Semigroups, *Semigroup Forum* (2020)
- DiPasquale, M., Flores, Z., Peterson, C., The Apolar Algebra of a Product of Linear Forms, *Proceedings of the 45th International Symposium on Symbolic and Algebraic Computation* (2020)
- Failla, G., Flores, Z., Peterson, C., On the Weak Lefschetz Property for Vector Bundles on  $\mathbb{P}^2$ , *Journal of Algebra* (2020)
- Flores, Z., Symmetry, Unimodality, and Lefschetz Properties for Certain Graded Modules

## INVITED RESEARCH PRESENTATIONS

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<b>Oberwolfach Workshop on Lefschetz Properties via Zoom</b> <i>Lefschetz Properties of Certain Graded Modules</i>	September 2020 Oberwolfach, Germany
<b>Canadian Mathematical Society Winter Meeting</b> <i>Macaulay Duals of Generic Hyperplane Arrangements</i>	Dec. 2019 Toronto, Ontario, Canada
<b>University of Notre Dame Algebraic Geometry and Commutative Algebra seminar</b> <i>The Weak Lefschetz Property for Cohomology Modules of Vector Bundles on <math>\mathbb{P}^2</math></i>	Oct. 2019 Notre Dame, IN
<b>Mediterranea University of Reggio-Calabria Seminar</b> <i>Higher Algebraic K-theory for a Certain Class of Singularities</i>	June 2019 Reggio-Calabria, Italy
<b>University of Messina Seminar</b> <i>Annihilators of Generic Hyperplane Arrangements</i>	June 2019 Messina, Italy
<b>CIMPA Research School</b> <i>Lefschetz Properties of Certain Graded Modules</i>	June 2018 Zacatecas, Zacatecas, Mexico
<b>AMS Spring Central Sectional Meeting Special Session on Lefschetz Properties</b> <i>Lefschetz Properties of Certain Graded Modules</i>	March 2018 Columbus, OH
<b>KUMUNU Jr.</b> <i>The Weak Lefschetz Property for a Graded Module</i>	April 2017 Lincoln, NE

## OTHER PRESENTATIONS

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<b>SLAM</b> <i>The Weak Lefschetz Property for a Graded Module (Poster)</i>	March 2017 Albuquerque, NM
<b>KUMUNU</b> <i>The Weak Lefschetz Property for a Graded Module (Poster)</i>	Oct. 2017 Lawrence, KS
<b>Midwest Commutative Algebra Conference</b> <i>G-Theory of Hypersurface Singularities (Poster)</i>	Aug. 2015 Purdue, IN

## LEADERSHIP AND COMMUNITY OUTREACH

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<b>Organizer and Presenter</b> <i>Math, Science, and Technology Day</i> <ul style="list-style-type: none"><li>Designed and presented interactive mathematics activities for fourth-graders from Fort Collins's most underserved schools</li></ul>	Colorado State University Oct. 2015-Oct. 2018
<b>Founder and President</b> <i>American Mathematical Society Graduate Student Chapter</i> <ul style="list-style-type: none"><li>Founded chapter to receive funding from the American Mathematical Society for graduate student activities</li><li>Organized events for graduate students, such as multiple sessions on helping first-year students find an advisor</li></ul>	Colorado State University Aug. 2017-Aug. 2019
<b>Creator and Organizer</b> <i>SPLINTER Graduate Mathematics Seminar</i> <ul style="list-style-type: none"><li>Created and organized a seminar solely for graduate students to give talks in algebra, geometry, combinatorics and number theory</li></ul>	Colorado State University Aug. 2016-Aug. 2017
<b>Mentor</b> <i>First-Year Graduate Student Mentoring Program</i> <ul style="list-style-type: none"><li>Observed and provided feedback for new graduate teaching assistants in the CSU Mathematics Department</li><li>Organized multiple sessions to help guide new graduate teaching assistant in their teaching practices</li></ul>	Colorado State University Aug. 2018-May 2020

## AWARDS AND HONORS

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**Calvin A. Rogers Memorial Scholarship**

*Colorado State University Mathematics Department*

*Aug. 2019*

**Achievement Rewards for College Scientists (ARCS) Foundation Scholarship**

*ARCS Foundation*

*Aug. 2018*

**Dr. Frank Demeyer Fellowship in Mathematics**

*Colorado State University Mathematics Department*

*Aug. 2018*

**Math in Moscow Scholarship**

*American Mathematical Society*

*Jan. 2010*

**Herbert T. Graham Scholarship**

*Michigan State University Mathematics Department*

*May 2010, May 2011*

**Richard E. Phillips Memorial Scholarship**

*Michigan State University Mathematics Department*

*May 2008*

## EXTENDED PROFESSIONAL TRAVEL

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**Recent Advances in Commutative Algebra**

*Workshop*

*July 2019*

*Levico Terme, Italy*

**Research Meeting with Collaborators**

*Collaboration*

*June 2019*

*Messina, Italy*

**CIMPA Research School**

*Workshop*

*June 2018*

*Zacatecas, Mexico*

**MSRI Summer Graduate School**

*Workshop*

*May 2017*

*Okinawa, Japan*