

# Outstanding Posters for the MAA Student Poster Session at the JMM 2018

Outstanding Posters make up the top 15% of each topical category.

## Algebra

### **8. Completions of Noncatenary Local Domains and UFDs**

- **Caitlyn Booms** University of Notre Dame
- **Chloe Avery** UC Santa Barbara College of Creative Studies
- **Alex Semendinger** Williams College

*Advisor(s): Susan Loepp, Williams College*

### **10. The Sortability of Graphs and Matrices Under Context Directed Swaps**

- **Colby Brown** University of Arizona
- **Claudia Sofia Carrillo Vazquez** University of Rochester
- **Rashmika Goswami** University of Michigan – Ann Arbor
- **Sam Heil** Washington University in St. Louis

*Advisor(s): Marion Scheepers, Boise State University*

### **11. Cycle Transformations and CDR — A Unifying Concept**

- **Cecily Chase** Brown University
- **Olivia Dennis** University of Utah
- **Luke Guatelli** Western Carolina University
- **Jaroor Modi** Rutgers University

*Advisor(s): Marion Scheepers, Boise State University*

### **14. Enumerating $2 \times 2$ and $3 \times 3$ Diagonalizable Matrices over $\mathbb{Z}_{pk}$**

- **Catherine Falvey** Eastern Connecticut State University
- **Rico Vicente** California State University Long Beach

*Advisor(s): Brian Sittinger, California State University Channel Islands*

### **25. Economical Generating Sets of the Monoid of Order-Preserving Partial Permutations**

- **Saul Lopez** California State University Fullerton

*Advisor(s): Scott Annin, California State University Fullerton*

### **31. Generation of 2-Generator Groups by Alternation**

- **James Shade** California State University, Fullerton
- **Christian Do** California State University, Fullerton

*Advisor(s): Adam Glessner, California State University, Fullerton*

## Analysis

### **52. Boundary Value Problems and Green's Functions on Magnetic Graphs**

- **Sawyer Robertson** University of Oklahoma

*Advisor(s): Javier Alejandro Chavez-Dominguez, University of Oklahoma*

### **54. Shift Operators on Directed Infinite Graphs**

- **Elyssa Sliheet** Southwestern University

*Advisor(s): Ruben Martinez-Avendao, Universidad Autonoma Del Estado De Hidalgo*

## Applied Mathematics

### **62. Quantifying the Distribution of Urban Vegetation based on Google Street View Images**

- **Jacob Beihoff** University of Wisconsin - Milwaukee
- **Adam Honts** University of Wisconsin-Milwaukee

*Advisor(s): Istvan Lauko, University of Wisconsin-Milwaukee*

### **67. Comparing Songs Using Matrix Pattern Preservation**

- **Erin Bugbee** Brown University
- **Claire Savard** University of Michigan, Ann Arbor

*Advisor(s): Katherine Kinnaird, Brown University*

### **69. Automatic Conflict Detection in Police Body Worn Video**

- **Jelena Trisovic** University of Belgrade
- **Collin Cademartori** Brown University

*Advisor(s): Jason Xu, UCLA Department of Biomathematics*

### **83. Optimal Investment Strategies and Portfolio Analysis of Leveraged Exchange-Traded Funds (ETFs)**

- **Jalen Harris** Fresno State University
- **Melanie Abel** University of Maryland, College Park
- **Daniel Maes** Williams College
- **Jay Iyer** Washington University in St. Louis

*Advisor(s): Tao Pang, North Carolina State University*

### **84. Scaling and City Substructure**

- **Cate Heine** Centre College

*Advisor(s): Ellen Swanson, Centre College*

### **88. Math Meets Chemistry: Modeling Dicarboxylic Acids Spectra in the Infrared Region**

- **Cameron Hooper** California State University, Fullerton

*Advisor(s): Laura Smith, California State University, Fullerton*

### **91. Slopes: A Graphical View of Differential Equations**

- **Frederick Joubert** Pepperdine University
- **Frank Garcia** Pepperdine University

*Advisor(s): Timothy Lucas, Pepperdine University*

### **106. Using Topological Data Analysis to Aid in the Effectiveness of Conservation Efforts**

- **Levi Lucy** North Dakota State University

*Advisor(s): Robert Allen, University of Wisconsin - La Crosse*

### **114. A Fast-Slow Dynamical System Model of Addiction: Predicting Relapse Frequency**

- **Monica McGrath** Saint Mary's College

*Advisor(s): Jacob Duncan, Saint Mary's College*

### **139. Estimating epidemic arrival times using linear spreading theory**

- **Anne Shapiro** Carleton College
- **Lawrence Chen** Kansas University

*Advisor(s): Matt Holzer, George Mason University*

## **Biomathematics**

### **157. Modeling Fungal Community Dynamics within Chestnut Blight Cankers**

- **Jesica Bauer** Carroll College

*Advisor(s): Anita Baines, University of Wisconsin-La Crosse*

### **165. A game theoretic model of mating strategies of territorial migratory songbirds**

- **Kimberly Dautel** Marist College

*Advisor(s): Suzanne Lenhart, University of Tennessee Knoxville*

### **173. A Joint Model for Bivariate Longitudinal Data**

- **Bridget Harris** College of the Holy Cross

*Advisor(s): Shannon Stock, College of the Holy Cross*

### **174. Name That Bird: Using Neural Networks to Classify Recorded Bird Songs**

- **Russell Houpt** Hope College

*Advisor(s): Darin Stephenson, Hope College*

### **197. Evaluation of Circadian Time Series Analysis Methods Using Simulated Data**

- **Alex Santos** Amherst College

*Advisor(s): Tanya Leise, Amherst College*

## **201. Land cover change shows little effect on migration patterns of Wood Storks and Great Egrets**

- **Johanna Smith** Drake University

*Advisor(s): Robert Allen, University of Wisconsin- LaCrosse*

## **202. Assessing the Role of Temperature in Dengue Fever Outbreak Dynamics with Wolbachia Transinfection Control Methods.**

- **Colton Smith** Dixie State University

*Advisor(s): Vinodh Kumar Chellamuthu, Dixie State University*

## **Combinatorics**

### **207. Cluster Algebras and k-positivity Tests**

- **Anna Brosowsky** Cornell University

*Advisor(s): Pavlo Pylyavskyy, University of Minnesota, Minneapolis*

### **209. The Combinatorics of the Zeckendorf Representation of the Natural Numbers**

- **Dean Dustin** Plymouth State University
- **Paul Lagarde** Mississippi College
- **Rachel Chaiser** University of Puget Sound

*Advisor(s): Tom Edgar, Pacific Lutheran University*

## **Computational Mathematics**

### **221. Graph Representations of Atomic Structures for Materials Data Analysis**

- **Montie Avery** University of New Mexico
- **Ruth Lopez** California State University, Long Beach
- **Miroslav Stankovic** University of Edinburgh

*Advisor(s): Jonny Dadras, University of California, Los Angeles*

### **225. Topology of Positive Zero Sets of n-variate (n+4)-nomials**

- **Sabrina Enriquez** University of Southern California
- **Davina Boykin** Valparaiso University

*Advisor(s): J. Maurice Rojas, Texas A&M University*

## Differential Equations

### **240. An Intuitive Approach to Solving Ordinary Differential Equations: Utilizing Derivative Formulas**

- **Huy Vuong** Pasadena City College

*Advisor(s): Edward Riley, Pasadena City College*

## Dynamical Systems

### **243. Continuity of Entropy for Piecewise Linear Lorenz Maps**

- **Zoe Cooperband** California Polytechnic State University, San Luis Obispo
- **Matt West** California Polytechnic State University, San Luis Obispo
- **Blaine Quackenbush** California Polytechnic State University, San Luis Obispo
- **Jordan Rowley** California Polytechnic State University, San Luis Obispo

*Advisor(s): Erin Pearse, California Polytechnic State University, San Luis Obispo*

## Geometry

### **258. Most Planar Graphs do not Admit Faithful Tropicalizations in the Plane**

- **Sifan Jiang** Smith College
- **Desmond Coles** Ohio State University

*Advisor(s): Ralph Morrison, Williams College*

### **259. The Least-Area Tetrahedral Tile of Space**

- **Arjun Kakkar** Williams College
- **Alejandro Diaz** University of Maryland

*Advisor(s): Frank Morgan, Williams College*

### **262. Line Arrangements: Combinatorics vs. Topology**

- **Baian Liu** Vassar College

*Advisor(s): Moshe Cohen, Vassar College*

### **269. Double Bubbles on the Real Line with Log-convex Density**

- **Nat Sothanaphan** Massachusetts Institute of Technology
- **Eliot Bongiovanni** Michigan State University

*Advisor(s): Frank Morgan, Williams College*

## Graph Theory

### **282. Classification and Characterization of Networks**

- **Emma Ingram** The University of Alabama
- **Adriana Ortiz Aquino** University of Puerto Rico, Rio Piedras
- **James Canning** SUNY Geneseo

*Advisor(s): Karl Schmitt, Valparaiso University*

### **290. Reconfiguration graphs of prime labelings**

- **Robert Scholle** La Salle University

*Advisor(s): Janet Fierson, La Salle University*

### **294. Modeling DNA Self-Assembly Using Graph Theory**

- **Quinn Stratton** Lewis University
- **Keller Dellinger** Lewis University
- **Simon Merheb** Lewis University

*Advisor(s): Amanda Harsy, Lewis University*

### **300. The MIGHTY-est Chicken: A Graphical Investigation of Chicken Pecking Orders**

- **Mikaela Wyatt** Grand Valley State University
- **Ellen Grove** Grand Valley State university
- **Morgan Oneka** Grand Valley State University
- **Samantha Wyatt** Grand Valley State University

*Advisor(s): Lauren Keough, Grand Valley State University*

## Mathematical Education

### **302. Analyzing the Impact of Mastery-based Testing in Mathematics Courses**

- **Christina Carlson** Lewis University
- **Lauren Klamerus** Lewis University

*Advisor(s): Amanda Harsy, Lewis University*

## Number Theory

### **316. On Some Variations of Elliptic and Lucas Type Pseudoprimes**

- **Hyun Jong Kim** Massachusetts Institute of Technology
- **Brad Bentz** Brown University
- **Morad Hassan** Emory University
- **Andr Hernandez-Espiet** University of Puerto Rico at Mayagez

*Advisor(s): Liljana Babinkostova, Boise State University*

### **331. Limiting Distributions in Generalized Zeckendorf Decompositions**

- **Jianing Yang** Colby College
- **Shannon Sweitzer** University of California, Riverside
- **Yujin Kim** Columbia University
- **Eric Winsor** University of Michigan, Ann Arbor

*Advisor(s): Steven Miller, Williams College*

## **Numerical Analysis**

### **335. Radiosity Equation Model for an Interior Space Illumination Design; Mars Project**

- **Hien Ngo** Roger Williams University

*Advisor(s): Yajni Warnapala, Roger Williams University*

## **Probability and Statistics**

### **349. Winning Strategies in Coda**

- **Jack Champagne** College of the Holy Cross

*Advisor(s): Eric Ruggieri, College of the Holy Cross*

### **357. Detecting Bovine Lameness Using Three-Dimensional Limb Movement Variable Analysis to Achieve High Sensitivity and Specificity**

- **William Dula** Morehouse College

*Advisor(s): Nagaraj Neerchal, University of Maryland, Baltimore County*

### **359. Adjacent Levels in the Tridiagonal $_{-}$ Hermite Ensemble**

- **Gopal Goel** Krishna Homeschool

*Advisor(s): Andrew Ahn, MIT*

### **368. Applying the Kelly Criterion to College Football Betting**

- **Jamie Kunzmann** Stony Brook University
- **Keri D'Angelo** The College of New Jersey
- **Joshua Radack** Lafayette College
- **Quyen Do** Millersville University

*Advisor(s): Trent Gaugler, Lafayette College*

### **369. A Monte Carlo measurement of Gerrymandering in Pennsylvania through random tessellation**

- **Benjamin Lieberman** Muhlenberg College

*Advisor(s): James Russell, Muhlenberg College*

## Topology

### **391. A first approach to a general theory of filtration functors**

- **Nathaniel Clause** Vanderbilt University
- **Jose Angel Snchez Gomez** University of Guanajuato

*Advisor(s): Facundo M'emoli, Ohio State University*

### **394. On a Generalization of the Bestvina-Brady Construction**

- **Abhay Goel** Kalamazoo College

*Advisor(s): Michele Intermont, Kalamazoo College*

### **398. Vietoris-Rips Complexes of Regular Polygons**

- **Adam Jaffe** Stanford University

*Advisor(s): Henry Adams, Colorado State University*

### **414. Cohomology and boundaries of relatively hyperbolic groups**

- **Oliver Wang** Cornell University

*Advisor(s): Jason Manning, Cornell University*

### **418. Belted Sum Decomposition of Fully Augmented Links**

- **Cameron Ziegler** SUNY at Geneseo
- **Dean Spyropoulos** Vassar College
- **Porter Morgan** Kenyon College

*Advisor(s): Rolland Trapp, California State University, San Bernardino*

## Other

### **336. Building Series-Parallel Voters**

- **Trung Nguyen** Macalester College

*Advisor(s): Andrew Beveridge, Macalester College*

### **346. Coxeter Nim: A variation on the classic mathematical game Nim to investigate the relationship between triangle Coxeter groups and Nim**

- **Katherine Wu** Boston University - PROMYS
- **Christianna Xu** Boston University - PROMYS

*Advisor(s): Paul Gunnells, University of Massachusetts*

