7. Methods of Relating Types of Canonical Algebraic Curvature Tensors

Elise McMahon, Ave Maria University

Advisor: Corey Dunn, California State University San Bernardino

10. Hall-Littlewood Polynomials and a Twisted Six-Vertex Model

Roger Van Peski, Princeton University

Vineet Gupta, Stanford University

Uma Roy, Boston University – PROMYS

Advisor: Daniel Bump, Stanford University

19. On the divisibility and valuations of the Franel numbers

Samantha VanSchalkwyk, Mount Holyoke College

Adela Yang, Bowdoin College

Abraham Schulte, Northwestern University

Advisors: Herbert Medina, Victor Moll, Loyola Marymount University, Tulane University

30. The Toppling Polynomial of a Graph

Megan Chambers, Youngstown State University

Advisor: Luis Garcia-Puente, Sam Houston State University

34. Error-Correction of Linear Codes via Colon Ideals

Benjamin Anzis, University of Idaho

Advisor: Stefan Tohaneanu, University of Idaho

37. Infinite Products Arising in Paperfolding

Hadrian Quan, University of California, Santa Cruz

Fernando Roman, Kansas State University

Michole Washington, Georgia Institute of Technology

Advisor: Victor Moll, Tulane University

38. A Morphological Classification of the Arithmetic Sum of Two-Parameter Affine Cantor Sets with $C_{1/3}$

Sharat Chandra, University of California, Irvine

Advisor: Anton Gorodetski, University of California, Irvine

50. Polynomial expansion method for the numerical solution of the Lenard-Balescu equation

Andrew Belt, University of Tennessee, Knoxville

Nathan Ng, University of Maryland

Advisor: Susana Serna, Universitat Autònoma de Barcelona

60. Matching video segments with relevant documents

Ilan Morgenstern, Instituto Tecnológico Autónomo de México

Lingxin Zhou, Rutgers University

Advisor: Bin Bi, UCLA

71. Mathematical Modeling and Optimal Control of Alternative Pest Management for Alfalfa Agroecosystems

Cara Sulyok, Ursinus College
Julia Senkevich, Ursinus College
Advisor: Mohammed Yahdi, Ursinus College

78. Linear long wave propagation over discontinuous submerged shallow water topography

Megan Golbek, California State University Monterey Bay
Advisor: Sergei Fomin, California State University Chico

81. Performance Sensitivity in Vertical Geothermal Energy Harvesting Systems

Sophia Novitzky, Virginia Tech
Mahalia Sapp
Samuel Naden, Macalester College
Keenan Hawekotte, Nebraska Wesleyan University
Advisors: Burt Tilley, Suzanne Weekes, Worcester Polytechnic Institute

93. Cellular Automata and Shrinking Cities: A Mathematical Model of Youngstown, Ohio

Eric Shehadi, Youngstown State University
Advisor: Alicia Prieto Langarica, Youngstown State University

100. Barcode Decoding Using M-band Wavelet Transform

Jordan Marquis, Western Connecticut State University
Josh Torres, Western Connecticut State University
Advisor: Xiaodi Wang, Western Connecticut State University

103. Analysis of the Discrete Maximum Principle

Arman Green, Morehouse College
Cassidy Krause, University of Wisconsin-Platteville
Advisor: Johnny Guzman, Brown University

107. A Mathematical Model for the Interaction of the Proteins MMP-1, TIMP-1, and ECM in a Wound

Hannah Pennington, Western Kentucky University
Nitin Krishna, University of Chicago
Advisor: Richard Schugart, Western Kentucky University

116. The Effects of Regional Vaccination Heterogeneity on Measles Outbreaks with France as a Case Study

Nicholas Roberts, Arizona State University
Elaine Alexander
Savanah McMahon
Advisors: Sergei Suslov, Kamuela Yong, D. Burkow, M. Manning, Arizona State University

126. Estimating Bacterial Diversity in Defined Regions

Krista Kernodle, University of California, Irvine
Advisor: Katherine Pollard, University of California, San Francisco

127. A Bio-mathematical Approach to the Stability of HIV and AID

Talon Johnson, Morehouse College
Advisor: Shelby Wilson, Morehouse College

132. K-Knuth Equivalence for Increasing Tableaux

Michelle Mastrianni, Carleton College
Colleen Robichaux, Louisiana State University
Christian Gaetz, University of Minnesota, Twin Cities
David Schwein, Brown University
Advisor: Rebecca Patrias, University of Minnesota, Twin Cities

133. Touch-based Continuous Authentication

Wendy Rummerfield, University of Redlands
Advisor: Kiran Balagani, New York Institute of Technology

138. Experimental and Numerical Studies of Oceanic Overflows

Frederick Hohman, University of Georgia
Thomas Gibson, Baylor University
Theresa Morrison, San Diego State University
Advisor: Shanon Reckinger, Fairfield University

141. Motif-based clustering of directed networks

Thomas Reith, Davidson College
Advisor: Laurie J. Heyer, Davidson College

148. Do Polygons Become Asymptotically Regular under Flow by Curvature?

Ryan Gallagher, University of Connecticut
Jessie De La Cruz Santos, College of the Holy Cross
Sarah Hadaidi, University of Kentucky
Advisor: Andrew Cooper, North Carolina State University

150. Constant Vector Curvature in Three Dimensions

Albany Thompson, Central Washington University
Advisor: Corey Dunn, California State University San Bernardino

167. Saturation Number of Trees in the Hypercube

Kavish Gandhi, Newton North High School
Advisor: Chiheon Kim, Massachusetts Institute of Technology

171. Construction and Optimality of Undirected de Bruijn Sequences

Christie Burris, Colorado State University

Advisor: Patrick Shipman, Colorado State University

184. A Game of Cops and Robbers on Generalized Petersen Graphs

Jonathan Guzman, California State University, Long Beach

Nikolas Schonsheck, Vassar College

Advisor: Robert Bell, Michigan State University

187. Laplacians Associated with Regular Bipartite Graphs and Application to Finite Projective Planes

Jesse Zhang, Fairview High School

Advisor: David B Rush, Massachusetts Institute of Technology

188. Diameters of polytope graphs and an improved upper bound on subset partition graphs

John Gallagher, University of Wisconsin-La Crosse

Advisor: Edward D. Kim, University of Wisconsin-La Crosse

201. Density of Primes Dividing Terms in the Somos-5 Sequence

Bryant Davis, Wake Forest University

Rebecca Kotsonis, Wake Forest University

Advisor: Jeremy Rouse, Wake Forest University

204. On the Distribution of Discriminants over a Finite Field

Soonho Kwon, Princeton University

Jonathan Chan, Bergen County Academies

Advisor: Keith Conrad, University of Connecticut

210. Improving the Speed and Accuracy of the Miller-Rabin Primality Test

Shyam Narayanan, MIT PRIMES-USA, Blue Valley West High School

Advisor: David Corwin, MIT

216. Sequences of *p*-adic valuations of polynomials: an analysis of aperiodic and non *p*-regular behavior

Amber Yuan, The University of Chicago

Alyssa Brynes, Tulane University

Advisor: Victor Moll, Tulane University

223. Counting The Number of Real Roots of Random Polynomials

Joseph Cleveland, Sam Houston State University

Jeffrey Dzugan, Samford University

Anthony Morse

Taylor Schlenk

Advisor: Dhagash Mehta, University of Notre Dame

228. Economical Extremal Hypergraphs for the Erdős-Selfridge Theorem

Emily Heath, Occidental College
Advisor: Eric Sundberg, Occidental College

239. Tauer of Terror: Not as Scary as One Might Think

Elizabeth Matys, Gettysburg College
Advisor: Béla Bajnok, Gettysburg College

243. An Algorithm for Maya Division

Nicholas Heil, Millersville University of Pennsylvania
Advisor: Ximena Catepillan, Millersville University of Pennsylvania

255. Topological Data Analysis - The Use of Non-Parametric Statistical Methods to Distinguish Between the Topologies of Data Sets

Joshua Kiers, Taylor University
Christopher Cericola, Seattle University
Advisors: Inga Johnson, Jordan Purdy, Willamette University

259. On the Probability of Weak Lattice Point Visibility

Rebecca Rachan, North Central College
Advisor: Neil Nicholson, North Central College

260. Tug-of-war games with spatial and temporal dependence in noisy environments

Yair Shenfeld, Massachusetts Institute of Technology
Advisor: Scott Sheffield, Massachusetts Institute of Technology

265. Closing Open Knots with Random Equilateral Polygons

Nicole Lopez, University of St. Thomas
Madeline Shogren, University of St. Thomas
Advisor: Eric J. Rawdon, University of St. Thomas

271. A reduced presentation of the virtual singular braid monoid

Andrew De la Pena, California State University, Fresno
Sarah McGahan, California State University, Fresno
Advisor: Carmen Caprau, California State University, Fresno