

KASSIE ARCHER

CURRICULUM VITAE

Department of Mathematics
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EDUCATION

- Ph.D. in Mathematics, Dartmouth College 2014
Advisor: Sergi Elizalde
Dissertation: *Permutations realized by signed shifts*
A.M. in Mathematics, Dartmouth College 2011
B.S. in Mathematics, College of William & Mary 2009

APPOINTMENTS

- Assistant Professor, University of Texas at Tyler 2016–Present
Visiting Assistant Professor, University of Texas at Tyler 2015–2016
Adjunct Professor, University of Texas at Tyler 2014–2015
Adjunct Professor, Tyler Junior College 2014–2015

PUBLICATIONS

* indicates an undergraduate student co-author and ** indicates a graduate student co-author.

JOURNAL PUBLICATIONS

1. Enumeration of cyclic permutations in vector grid classes
Joint with L.-K. Lauderdale. Accepted to *Journal of Combinatorics*.
2. Classes of uniformly most reliable graphs for all terminal reliability
Joint with Christina Graves and David Milan. Accepted to *Discrete Applied Mathematics*.
3. Unimodal permutations and almost-increasing cycles
Joint with L.-K. Lauderdale. *Electronic Journal of Combinatorics*, 24(3) (2017), #P3.36.
4. Allowed patterns of symmetric tent maps via commuter functions
Joint with Scott M. LaLonde. *SIAM Journal of Discrete Mathematics*, 31(1) (2017), 317–334.
5. Characterization of the allowed patterns of signed shifts
Discrete Applied Mathematics, 217(2) (2017), 97–109.
6. Descents of λ -unimodal cycles in a character formula
Discrete Mathematics, 339 (2016), 2399–2409.
7. Cyclic permutations realized by signed shifts
Joint with Sergi Elizalde. *Journal of Combinatorics*, 5 (2014), 1–30.

PEER-REVIEWED CONFERENCE PROCEEDINGS

8. On the number of λ -unimodal involutions (Extended Abstract)
Joint with Angela M. Gay**, Virginia Germany**, C. Marin King*, L.-K. Lauderdale, Thomas Lupo*, and F. L. Rossi*. To appear in *Séminaire Lotharingien de Combinatoire*, (2018).
9. Patterns of negative shifts and signed shifts
Joint with Sergi Elizalde and Katherine Moore**. *Séminaire Lotharingien de Combinatoire*, 78B.49 (2017), 12 pp.

10. Descents of λ -unimodal cyclic permutations (Extended Abstract)
Discrete Mathematics and Theoretical Computer Science proceedings AS, (2014), 417–428.
11. Periodic patterns of signed shifts (Extended Abstract)
Joint with Sergi Elizalde. *Discrete Mathematics and Theoretical Computer Science proceedings AS*, (2013), 873–884.

SUBMITTED PAPERS

12. Rooted forests that avoid sets of permutations
Joint with Katie Anders. Preprint at arXiv:1607.03046.
13. On the number of cycles in $\text{Av}(312, 4321)$ and $\text{Av}(321, 4123)$
Preprint at arXiv:1803.08959.
14. Involutions and the Gelfand character
Joint with Virginia Germany**, C. Marin King*, and L.-K. Lauderdale. Preprint at arXiv:1804.02490.
15. Pattern avoidance of quasi-Stirling permutations
Joint with Adam Gregory*, Bryan Pennington*, and Stephanie Slayden*. Preprint at arXiv:1804.07267.
16. Vertex-minimal planar graphs with cyclic automorphism groups
Joint with Rebecca Darby**, L.-K. Lauderdale, Asa Linson*, Mariah K. Maxfield*, Charles Schmidt*, and Phung Tran**. Preprint available upon request.

PAPERS IN PREPARATION

17. Some statistics on labeled acyclic digraphs
Joint with Christina Graves.
18. Intersection of maximal subgroups
Joint with Humberto Bautista**, Kayla Cook**, L.-K. Lauderdale, Yansy Perez*, and Vincent Villalobos*.

HONORS AND AWARDS

Academic Innovation Award , University of Texas at Tyler	2017–2018
Texas Project NExT Fellow	2016–2018
Phi Theta Kappa Star Professor , Tyler Junior College	2015
GAANN Fellowship , Dartmouth College	2012–2013
Graduate Fellowship , Dartmouth College	2009–2014
Luther T. Conner Prize , College of William & Mary	2009

GRANTS

Faculty Research Grant (\$10,000) <i>Awarded funding for travel, supplies, and student workers.</i>	2018–2019
AWM-NSF Travel Grant (\$2,190) <i>Awarded funding for travel to <i>Permutation Patterns</i> and <i>FPSAC</i>.</i>	2018
Research Experience for Undergraduate Faculty Continuation Grant <i>Awarded funding for travel and lodging for five people to engage in research at ICERM.</i>	2018
NSF Research Experience for Undergraduates (Senior Personnel, \$254,443) <i>Awarded to host an REU site at the University of Texas at Tyler for three summers.</i>	2017–2020

SELECTED PRESENTATIONS

† indicates an invited talk.

CONFERENCE TALKS

Formal Power Series and Algebraic Combinatorics

† *On the number of λ -unimodal involutions* (poster) 2018

† *Descents of λ -unimodal cyclic permutations* (poster) 2014

† *Periodic patterns of signed shifts* (poster) 2013

Permutation Patterns

† *Pattern avoidance in rooted forests* 2018

† *Descents of λ -unimodal cyclic permutations* (poster) 2014

† *Periodic patterns of the k -shift and a few other maps* 2012

CombinaTexas, Texas A&M University

Pattern-avoidance in rooted trees 2018

Cyclic permutations in the 3×1 grid classes 2016

Joint Mathematics Meetings

Pattern-avoiding cycles 2017

† *Cyclic permutations realized by the signed shift* (AWM poster session) 2014

Descents of λ -unimodal cyclic permutations 2014

Combinatorial results from dynamical systems (poster) 2013

AMS Eastern Sectional Meeting

Descents of λ -unimodal cyclic permutations 2013

SEMINAR TALKS

Math Department Colloquium, Sam Houston State University

† *Pattern-avoidance and cycle type* 2018

Math Department Seminar, University of Texas at Tyler

A bijective proof of Knuth's Theorem K 2017

Pattern-avoiding permutations and cycle type 2016

λ -unimodal permutations in a character formula 2016

Enumerating permutations by cycle type and grid class 2015

Permutations realized by a dynamical system 2015

Cyclic permutations avoiding 321 2014

Math Department Colloquium, College of William & Mary

† *Permutations realized by signed shifts and combinatorial corollaries* 2016

Math Department Colloquium, Dartmouth College

† *Descents of λ -unimodal permutations and periodic patterns of signed shifts* 2014

Algebra and Combinatorics Seminar, DePaul University

† *Permutations and signed shifts* 2013

Combinatorics Seminar, Brandeis University

† *Descents in unimodal cyclic permutations* 2013

Combinatorics Seminar, Dartmouth College

† *Periodic patterns of the k -shift* 2012

STUDENT-ORIENTED AND TEACHING TALKS

Celebration of Innovation Showcase, University of Texas at Tyler <i>Undergraduate research in the classroom</i>	2018
University of Texas at Tyler REU <i>Introduction to L^AT_EX</i>	2017
Math Club, University of Texas at Tyler <i>The story of the Catalan numbers</i>	2016
<i>The mathematics of Penrose tilings</i>	2015
Women in Mathematics in New England, Smith College <i>Permutations from dynamical systems</i>	2013
<i>The shape of cyclic permutations</i>	2012

PROFESSIONAL DEVELOPMENT AND WORKSHOPS

Texas Project NExT Fellow (4 workshops)	2016–2018
UT Tyler Center for Excellence in Teaching and Learning (12 workshops)	2016–2018
Research Experience for Undergraduate Faculty at ICERM	2017
Writing and Designing NSF Proposals Workshop	2016
UT Tyler Center for Teaching Excellence and Innovation (4 workshops)	2015–2016
New Faculty Teaching Workshop at UT Tyler	2014, 2015
AWM Workshop for Graduate Students and Recent PhDs at JMM	2014
Active Learning Institute at Dartmouth College	2013
Institute for Advanced Study Program for Women and Mathematics	2013
Dartmouth Center for the Advancement of Learning (5 workshops)	2012–2013
Dartmouth College Teaching Seminar	2011
TopMath Summer School in Computational Homology at Technical University of Munich	2009

SERVICE TO THE PROFESSION**Textbook Reviewer**

ELSEVIER Education
Taylor & Francis/CRC Press

Journal Referee

Advances in Applied Mathematics
The American Mathematical Monthly
Discrete Mathematics and Theoretical Computer Science
Discrete Applied Mathematics

Conference Volunteer

Session Chair, Texas Undergraduate Mathematics Conference	2017
Registration, Texas Undergraduate Mathematics Conference	2015
Session Chair, Women in Mathematics in New England Conference	2013
Panelist, Women in Mathematics in New England Conference	2012
Acting Department Liason , MAA Texas Section Meeting	2016

SERVICE TO STUDENTS

Awards and Funding

University of Texas at Tyler Co-Curricular Awards (\$1800, \$433)	2016, 2018
Pi Mu Epsilon Prize Grant (\$100, \$100)	2017, 2018
Department of Mathematics Travel Fund (\$495)	2017

Club Advisor

Pi Mu Epsilon Petitioner and Chapter Advisor	2016–Present
Math Club Advisor	2017–Present
COMAP Competition Advisor	2016–Present

Department of Mathematics Student Advisor, University of Texas at Tyler 2016–Present

Student Presentation/Poster Judge

University of Texas at Tyler Lyceum Student Poster Judge	2017, 2018
University of Texas at Tyler Lyceum Student Presentation Judge	2017

MENTORING

Master's Thesis Advisor

Humberto Bautista, <i>Maximal subgroups and the Frattini subgroup</i>	2018–2019
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Senior Capstone Project Mentor

Marin King, <i>On λ-unimodal permutations</i>	2018
Bryan Pennington, <i>Quasi-Stirling permutations</i>	2018
Hunter Barr, <i>Arithmetical structures</i>	2017

Algebra/Combinatorics Undergraduate/Graduate Research Mentor

Kayla Cook, Yansy Perez, and Vincent Villalobos <i>Intersection of maximal subgroups</i>	2017
R. Darby, A. Linson, M. Maxfield, C. Schmidt, and Phung Tran <i>Vertex-minimal planar graphs with prescribed automorphism groups</i>	2017
Angela Gay, Virginia Germany, Marin King, Thomas Lupo, and Francesca Rossi <i>On λ-unimodal permutations</i>	2017
Maria Arce, Paul Difouta Mboula, Paulson Elekuru, Leina Green, and Randall Sadler <i>Fixing sets of dicyclic groups</i>	2017
Hunter Barr, Humberto Bautista, Dusty Johnson, Amer Khalousi, and Fletcher Larkin <i>On critical groups of arithmetical structures</i>	2017

Research Experience for Undergraduates Mentor

Adam Gregory, Bryan Pennington, and Stephanie Slayden <i>Pattern avoidance of quasi-Stirling permutations</i>	2017
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Master's Thesis Committee Member

Ali Chick, <i>Behavior of Petrie lines in certain edge-transitive infinite graphs</i>	2017
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SERVICE TO THE UNIVERSITY

Member, Student Research Faculty Learning Community	2017–2018
Member, Department Ph.D. Cooperative Committee	2018
Member, Department Graduate Committee	2017–2018
Chair, Strategic Planning Work Group for New Academic Programs	2017
Member, Department Curriculum Committee	2016–2017
Representative, Patriots Preview Day	2015
Member, Department Honors Committee	2015

EDUCATIONAL OUTREACH

STEM Like a Girl , Discovery Science Center, Tyler, TX	
Instructor and Project Designer, <i>The Mathematics of Origami</i>	2018
Instructor and Project Designer, <i>Fun with Fractals!</i>	2017
Girl Scout Badge Camp , Discovery Science Place, Tyler, TX	
Volunteer, <i>What Robots Do</i> (Daisies)	2017
Volunteer, <i>Programming and Designing Robots</i> (Brownies)	2017
Guest Lecture Day , Owens Elementary School, Tyler, TX	
Guest Lecturer, <i>Edible 3D Shapes</i> (K), <i>Dice Probabilities</i> (2 nd), & <i>Bouncing Ball Heights</i> (3 rd)	2017
Odyssey Series, Center for Talented Youth , Dartmouth College	
Workshop Leader and Instructor, <i>The Magic and Mystery of Hexaflaxagons</i>	2013
Instructor, <i>Escher, Bees, and Soccer: The World of Tessellation</i>	2013
Science Day, Graduate Women in Science and Engineering , Dartmouth College	
Organizer and Instructor, <i>Pascal's Triangle</i> and <i>Möbius strips</i>	2013
Sonia Kovalevsky Math Day , Dartmouth College	
Workshop Leader and Instructor, <i>Unravelling the Mysteries of the Möbius Strip</i>	2012
Instructor, <i>SET Magic Tricks</i>	2011
Exploring Math , Week-long Math Camp at Dartmouth College	
Instructor and Course Designer, <i>Number Theory</i> (first week) & <i>Math and Games</i> (second week)	2011

COURSES TAUGHT

University of Texas at Tyler

Math 1324: Mathematics for Business and Economics I
 Math 1342: Statistics I
 Math 1343: Statistics II
 Math 2413: Calculus I
 Hnrs 2413: Honors Calculus I
 Math 2414: Calculus II
 Math 3203: Matrix Methods in Science and Engineering
 Math 3315: Linear Algebra
 Math 3351: Probability and Statistics for Engineers and Scientists
 Math 3365: Geometric Systems
 Math 3404: Multivariate Calculus
 Math 3425: Foundations of Mathematics
 Math 4160: Senior Seminar I
 Math 4161: Senior Seminar II
 Math 4336: Abstract Algebra II
 Math 5331: Algebra (graduate course)

Tyler Junior College

Math 1314: College Algebra
 Math 1342: Statistics

Dartmouth College

Math 2: Calculus with Algebra and Trigonometry
 Math 20: Discrete Probability
 Math 23: Differential Equations
 Unsg 100: Graduate Ethics