Kassie Archer — Curriculum Vitae

Department of Mathematics
University of Texas at Tyler
3900 University Blvd.
Tyler, TX 75799

Office: Ratliff Building North 4008
Phone: (903) 565-5839
E-mail: karcher@uttyler.edu
www.uttyler.edu/directory/math/archer.php

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

PEER-REVIEWED CONFERENCE PROCEEDINGS

7. On the number of λ-unimodal involutions (Extended Abstract)
   Joint with Angela Gay**, Marin King*, L.-K. Lauderdale, Thomas Lupo*, Gin Privett**, and Francesca Rossi*. To appear in *Séminaire Lotharingien de Combinatoire*, (2018).

8. Patterns of negative shifts and signed shifts
   Joint with Sergi Elizalde and Katherine Moore**. *Séminaire Lotharingien de Combinatoire*, 78B.49 (2017), 12 pp.
9. Descents of λ-unimodal cyclic permutations (Extended Abstract)
   Discrete Mathematics and Theoretical Computer Science proceedings AS, (2014), 417–428.
10. Periodic patterns of signed shifts (Extended Abstract)
    Joint with Sergi Elizalde. *Discrete Mathematics and Theoretical Computer Science proceedings AS*, (2013), 873–884.

SUBMITTED PAPERS

11. Rooted forests that avoid sets of permutations
    Joint with Katie Anders. Preprint at arXiv:1607.03046.
12. Enumeration of cyclic permutations in 3×1 grid classes
    Joint with L.-K. Lauderdale. Preprint at arXiv:1606.04502.
13. Descents of labeled acyclic digraphs
    Joint with Christina Graves. Preprint at arXiv:1709.00601.

PAPERS IN PREPARATION

14. Pattern avoidance of quasi-Stirling permutations
    Joint with Adam Gregory*, Bryan Pennington*, and Stephanie Slayden*.
15. Descents of λ-unimodal involutions
    Joint with Angela Gay**, Marin King*, L.-K. Lauderdale, Thomas Lupo*, Gin Privett**, and Francesca Rossi*.
16. Vertex-minimal planar graphs with cyclic automorphism groups
    Joint with Rebecca Darby**, L.-K. Lauderdale, Asa Linson*, Mariah Maxfield*, Charles Schmidt*, and Betty Tran**.

GRANTS, HONORS, AND AWARDS

Senior Personnel, NSF Research Experience for Undergraduates ($254,443)	2017–2020
Academic Innovation Award, UT Tyler Center for Excellence in Teaching and Learning *Awarded $2000 to conduct undergraduate research in the classroom.*	2017
Phi Theta Kappa Star Professor, Tyler Junior College	2015
Graduate Student Travel Grant, AMS-MAA Joint Meetings	2014
AWM Workshop Grant, AMS-MAA Joint Meetings	2014
Graduate Student Travel Grant, AMS Sectional Meeting	2013
GAANN Fellowship, Dartmouth College	2012–2013
Graduate Fellowship, Dartmouth College	2009–2014
Luther T. Conner Prize, College of William & Mary	2009

SELECTED PRESENTATIONS

† indicates an invited talk.

CONFERENCE TALKS

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

Formal Power Series and Algebraic Combinatorics
- †*Descents of* λ*-unimodal cyclic permutations* (poster) 2014
- †*Periodic patterns of signed shifts* (poster) 2013

Permutation Patterns
- †*Descents of* λ*-unimodal cyclic permutations* (poster) 2014
- †*Periodic patterns of the k-shift and a few other maps* 2012

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
Undergraduate research in the classroom 2018

Math Club, University of Texas at Tyler
The story of the Catalan numbers 2016
The mathematics of Penrose tilings 2015

Women in Mathematics in New England, Smith College
Permutations from dynamical systems 2013
The shape of cyclic permutations 2012

PROFESSIONAL DEVELOPMENT AND WORKSHOPS

Research Experience for Undergraduate Faculty at ICERM 2017
Topic: *Arithmetical structures*

Texas Project NExT Fellow
Workshop, Texas Undergraduate Mathematics Conference, San Antonio, TX 2017
Workshop, MAA Texas Section Meeting, Commerce, TX 2017
Workshop, Texas Undergraduate Mathematics Conference, Beaumont, TX 2016

Writing and Designing NSF Proposals Workshop 2016

UT Tyler Center for Excellence in Teaching and Learning
Student research faculty learning community 2017
Innovative ideas in the super-sized classroom 2017
Academic integrity 2017
Changing the culture: teaching students how to brand their skills and abilities 2017
Millennial students and digital distractions 2017
Digital storytelling apertures: mobile green screens and beyond 2017
Raising students' metacognitive awareness of reading strategies 2017
Undergraduate research: encouraging collaboration & mentoring 2017
Re-visioning research's think-aloud protocol 2017
Teaching town hall: a celebration of teaching and learning 2016

UT Tyler Center for Teaching Excellence and Innovation
Friday fun day! 2016
Collaboration in group work 2015
Mentoring undergraduate research 2015
Blackboard 101 2015

Active Learning Institute at Dartmouth College 2013

Institute for Advanced Study Program for Women and Mathematics 2013
Topic: *Combinatorics and graph theory*

Dartmouth Center for the Advancement of Learning (DCAL)
Teaching and tenure 2013
Advising the whole student: going beyond course selection 2013
Teaching with information technology 2012
Teaching philosophy workshop (2 sessions) 2012

Dartmouth College Teaching Seminar 2011

MENTORING

Research Experience for Undergraduates Mentor 2017

Adam Gregory, Bryan Pennington, and Stephanie Slayden
Topic: *Pattern avoidance of quasi-Stirling permutations*

Algebra/Combinatorics Undergraduate/Graduate Research Mentor 2017

Each research project was a collaboration between 2–3 undergraduate Algebra II students and 1–2 graduate Algebra I students. Students were mentored by myself and Dr. L.-K. Lauderdale. Undergraduate students are marked with *.

Kayla Cook, Yansy Perez*, and Vincent Villalobos*
Topic: *Intersection of maximal subgroups*

Rebecca Darby, Asa Linson*, Mariah Maxfield*, Charles Schmidt*, and Betty Tran
Topic: *Vertex-minimal planar graphs with prescribed automorphism groups*

Angela Gay, Marin King*, Thomas Lupo*, Gin Privett, and Francesca Rossi*
Topic: *On λ-unimodal involutions*

Maria Arce*, Paul Difouta Mboula, Paulson Elekuru, Leina Green*, and Randall Sadler*
Topic: *Fixing sets of dicyclic groups*

Hunter Barr*, Humberto Bautista, Dusty Johnson*, Amer Khalousi*, and Fletcher Larkin
Topic: *On critical groups of arithmetical structures*

Senior Capstone Project Mentor

Marin King, *λ-unimodal permutations* 2018
Bryan Pennington, *Quasi-Stiriling permutations* 2018
Hunter Barr, *Arithmetical structures* 2017

Masters Thesis Committee Member
Ali Chick, *Behavior of Petrie lines in certain edge-transitive infinite graphs* 2017

SERVICE TO STUDENTS

Awards and Funding

University of Texas at Tyler Co-Curricular Award
Awarded $1800 to travel with 12 students to the MAA Texas Section Spring Meeting. 2018
Awarded $433 to travel with 5 students to Texas Undergraduate Math Conference. 2016

Pi Mu Epsilon Prize Grant
Awarded $100 to host an Integration Bee. 2017

Department of Mathematics Travel Award
Awarded $495 to travel with 5 students to MAA Texas Section Meeting. 2017

Club Advisor

Pi Mu Epsilon Petitioner, Charter Member, 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 Judge
University of Texas at Tyler LYCEUM Student Presentation Judge 2017

SERVICE TO THE UNIVERSITY

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

SERVICE TO THE PROFESSION

Textbook Reviewer

ELSEVIER Education
Taylor & Francis/CRC Press

Journal Referee

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

EDUCATIONAL OUTREACH

STEM Like a Girl, Discovery Science Center, Tyler, TX
Instructor and Project Designer, *The Mathematics of Origami* 2018
Instructor and Project Designer, *Fun with Fractals!* 2017

Girl Scout Badge Camp, Discovery Science Place, Tyler, TX
Volunteer, *What Robots Do* (Daisies) 2017
Volunteer, *Programming Robots and Designing Robots* (Brownies and Juniors) 2017

Guest Lecture Day, Owens Elementary School, Tyler, TX
Guest Lecturer, *Edible 3D Shapes* (Kindergarten) 2017
Guest Lecturer, *Dice Probabilities* (Second Grade) 2017
Guest Lecturer, *Bouncing Ball Heights* (Third Grade) 2017

Odyssey Series, Center for Talented Youth, Dartmouth College
Workshop Leader and Instructor, *The Magic and Mystery of Hexaflexagons* 2013
Instructor, *Escher, Bees, and Soccer: The World of Tessellation* 2013

Science Day, Graduate Women in Science and Engineering, Dartmouth College
Organizer and Instructor, *Pascal's Triangle* and *Möbius strips* 2013

Sonia Kovalevsky Math Day, Dartmouth College

Workshop Leader and Instructor, *Unravelling the Mysteries of the Möbius Strip* 2012

Instructor, *SET Magic Tricks* 2011

Exploring Math, One Week Math Camp at Dartmouth College

Instructor and Course Designer, *Number Theory* 2011

Instructor and Course Designer, *Math and Games* 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 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