

Katie Anders

Curriculum Vitae

Education

- 2014 **Ph.D. Mathematics**, *University of Illinois at Urbana-Champaign*.
- 2010 **M.S. Mathematics**, *University of Illinois at Urbana-Champaign*.
- 2008 **B.S. Mathematics**, *Baylor University*.
Summa cum laude, Phi Beta Kappa, GPA – 4.0

Doctoral Dissertation

- Title *Properties of Digital Representations*
- Supervisor Professor Bruce Reznick
- Area Combinatorial Number Theory

Professional Experience

- 2020– **Associate Professor of Mathematics**, *University of Texas at Tyler*.
- 2014–2020 **Assistant Professor of Mathematics**, *University of Texas at Tyler*.
- 2014–2015 **Project NExT Fellow**, Gold '14 Dot.

Publications

Non-standard binary representations and the Stern sequence.

K. Anders, M.L. Dawsey, R. Gupta, J. Vandehey, submitted, arXiv:2308.07448

Representations of integers as quotients of sums of distinct powers of three.

K. Anders, M.L. Dawsey, B. Reznick, S. Sisneros-Thiry, submitted, arXiv:2308.07252

Generalized graph splines and the Universal Difference Property.

S. Altınok, K. Anders, D. Arreola*, L. Asencio*, C. Ireland*, S. Sarıođlan, and L. Smith*, *Generalized graph splines and the Universal Difference Property*, submitted, * denotes undergraduate co-author

Graphs admitting only constant splines.

K. Anders, A. Crans, B. Foster-Greenwood, B. Mellor, and J. Tymoczko, *Graphs admitting only constant splines*, *Pacific J. Math.*, **304** (2020), 385–400.

Rooted forests that avoid sets of permutations.

K. Anders, K. Archer, *Rooted forests that avoid sets of permutations*, *European J. Combin.*, **77** (2019), 1-16.

Counting non-standard binary representations.

K. Anders, *Counting non-standard binary representations*, *J. Integer Seq.*, **19** (2016), 15 pp.

Odd behavior in the coefficients of reciprocals of binary power series.

K. Anders, *Odd behavior in the coefficients of reciprocals of binary power series*, Int. J. Number Theory, **12** (2016), 635–648.

Congruence properties of binary partition functions.

K. Anders, M. Dennison, J. Lansing, B. Reznick, *Congruence properties of binary partition functions*, Ann. Comb., **17** (2013), 15–26.

Research with Students

- 2019 Senior Personnel, University of Texas at Tyler NSF REU
- 2019 University of Texas System Louis Stokes Alliance for Minority Participation Summer Research Academy

Grants

- 2022–2024 **Texas Undergraduate Mathematics Conference.**
Co-PI, Conference series funded by NSF collaborative grant, Total award: \$42,310
- 2022–2024 **Research Experience for Undergraduate Students.**
Senior Personnel, Summer REU funded by the NSF, Total award: \$311,154
- 2017–2019 **Research Experience for Undergraduate Students.**
Senior Personnel, Summer REU funded by the NSF, Total award: \$254,443

Awards

- Summer 2023 Summer Research in Mathematics Program at Simons Laufer Mathematical Sciences Institute
- Summer 2018 Research Experience for Undergraduate Faculty Continuation Funding from AIM and ICERM
- 2013–2014 Campus Award for Excellence in Undergraduate Teaching for Teaching Assistants, UIUC
- 2013–2014 Liberal Arts and Sciences Award for Excellence in Undergraduate Teaching by Teaching Assistants, UIUC
- Spring 2014 Research Experience for Graduate Students Research Assistantship, UIUC
- Fall 2013 Research Board Research Assistantship, UIUC
- 2012–2013 Departmental TA Teaching Award
- 2008–2013 List of Teachers Ranked as Excellent by Their Students, 10 semesters, 3 times Outstanding, UIUC

Invited Presentations

- June 2022 **Constant splines and operations on graphs.**
Lecture series, Sam Houston State University NREUP
- Feb. 2022 **Graph splines: From the basics to a characterization of graphs admitting only constant splines over \mathbb{Z}_m .**
Department of Mathematics Colloquium, Stephen F. Austin State University

- Apr. 2021 **A Mathematical Smörgåsbord Featuring the Stern Sequence.**
Invited plenary talk, Mathematical Association of America Texas Section Meeting
- Jan. 2020 **Graph Splines and the Universal Difference Property.**
Invited Talk, AMS Special Session on Research in Graph Theory and Combinatorics by Research Experience for Undergraduate Faculty Alumni and Their Students, Joint Mathematics Meetings, Denver. Joint presentation with undergraduate research students Daniel Arreola, Chloe Ireland, and Luke Smith
- Feb. 2019 **Graph splines: From the basics to a characterization of graphs admitting only constant splines over \mathbb{Z}_m .**
Mathematics and Statistics Colloquium, Sam Houston State University
- Sept. 2017 **Rooted forests that avoid sets of permutations.**
Math Department Colloquium, Stephen F. Austin State University
- Nov. 2014 **Asymptotics of sums of non-standard binary representations.**
Invited Talk, Special Session on Connections in Number Theory, AMS Sectional Meeting, University of North Carolina at Greensboro
- Oct. 2012 **An interesting family of polynomials in $\mathbb{Z}_2[x]$.**
Invited Talk, Special Session on Additive and Combinatorial Number Theory, AMS Sectional Meeting, University of Akron

Conference Presentations

- Apr. 2023 **Early results on which integers can be written as quotients of sums of distinct powers of three.**
CombinaTexas, Texas A&M University
- Mar. 2022 **Characteristics of graphs admitting only constant splines over \mathbb{Z}_m .**
CombinaTexas, Texas A&M University
- Jan. 2019 **Characteristics of graphs admitting only constant splines.**
Contributed Paper Session on Combinatorics and Graph Theory, Joint Mathematics Meetings, Baltimore
- Jan. 2018 **Enumerating unimodal rooted forests avoiding the pattern 321.**
MAA General Contributed Paper Session on Graph Theory, Joint Mathematics Meetings, San Diego
- July 2017 **Enumerating unimodal rooted forests avoiding the pattern 123.**
Contributed Paper Session on Graph Theory, Math Fest 2017, Chicago
- July 2017 **Job wanted: Building a Math Club talk about internships and career opportunities.**
Themed Contributed Paper Session Math Potluck: A Student Swap Session, Math Fest 2017, Chicago
- Jan. 2017 **Unimodal rooted forests.**
AMS Contributed Paper Session on Combinatorics and Graph Theory, Joint Mathematics Meetings, Atlanta
- Jan. 2017 **Re-write and re-submit: Multiple attempts at homework problems in abstract algebra.**
MAA Session on Teaching Abstract Algebra: Topics and Techniques, Joint Mathematics Meetings, Atlanta

- Aug. 2016 **Improving and evaluating proof writing in a first abstract algebra course.**
Themed Session on Formative Assessment Techniques for Undergraduate Math Courses,
Math Fest 2016, Columbus
- May 2016 **Odd behavior in the coefficients of reciprocals of binary power series.**
CombinaTexas, Texas A&M University
- Nov. 2014 **Asymptotics of sums of non-standard binary representations.**
Invited Talk, Special Session on Connections in Number Theory, AMS Sectional Meeting,
University of North Carolina at Greensboro
- June 2014 **Sums of generalized binary representations.**
Midwest Number Theory Conference for Graduate Students and Recent Ph.D.'s, UIUC
- Jan. 2014 **Properties of digital representations.**
AMS Contributed Paper Session on Number Theory, Joint Mathematics Meetings, Baltimore
- April 2013 **An interesting family of polynomials in $\mathbb{Z}_2[x]$.**
Midwest Women in Math Symposium, University of Illinois at Chicago
- March 2013 **An interesting family of polynomials in $\mathbb{Z}_2[x]$.**
Poster Presentation, Career Options for Women in Mathematical Sciences, IMA
- Oct. 2012 **An interesting family of polynomials in $\mathbb{Z}_2[x]$.**
Invited Talk, Special Session on Additive and Combinatorial Number Theory, AMS Sectional
Meeting, University of Akron
- Oct. 2012 **An interesting family of polynomials in $\mathbb{Z}_2[x]$.**
Midwest Number Theory Conference for Graduate Students and Recent Ph.D.'s, UIUC
- Nov. 2010 **On generalized binary representations.**
Midwest Number Theory Conference for Graduate Students and Recent Ph.D.'s, University
of Michigan

Seminar Presentations

- Mar. 2023 **Early results on which integers can be written as quotients of sums of distinct powers of tree.**
Texas Number Theory and Combinatorics Seminar
- Jan. 2023 **Non-standard binary representations.**
Math Department Seminar, UT Tyler
- Sept. 2021 **Graphs admitting only constant splines over \mathbb{Z}_m .**
Texas Number Theory and Combinatorics Seminar
- Aug. 2021 **Graph splines and the Universal Difference Property, Part II.**
Math Department Seminar, UT Tyler
- Aug. 2019 **Graph splines and the Universal Difference Property.**
Math Department Seminar, UT Tyler. Joint presentation with undergraduate research
student Luke Smith
- Jan. 2019 **Characteristics of graphs admitting only constant splines.**
Math Department Seminar, UT Tyler
- Aug. 2018 **Graph splines and Y-triangle moves.**
Math Department Seminar, UT Tyler

- Sept. 2017 **Graph splines, Parts 1 and 2.**
Math Department Seminar, UT Tyler
- Mar. 2017 **Rooted forests that avoid sets of permutations.**
Graph Theory Seminar, University of Illinois at Urbana-Champaign
- Sept. 2016 **Counting unimodal forests.**
Math Department Seminar, UT Tyler
- Oct. 2015 **The Stern sequence and growth coefficients.**
Math Department Seminar, UT Tyler
- Feb. 2015 **On the reciprocal of the binary generating function for the sum of divisors by Cooper and Riasanovsky.**
Math Department Seminar, UT Tyler
- Feb. 2014 **Properties of digital representations.**
Math Department Seminar, UT Tyler
- Sept. 2013 **Properties of digital representations.**
Number Theory Seminar, UIUC
- Nov. 2011 **On the disparity in the parity of the counting function for generalized binary representations.**
Women in Math Seminar, UIUC
- Sept. 2011 **Congruence properties of binary partition functions.**
Number Theory Seminar, UIUC, with J. Lansing
- Oct. 2010 **What we did last summer– a report on a successful REGS project.**
Women in Math Seminar, UIUC, with J. Lansing

Outreach Presentations

- Feb. 2023 **STEM Like a Girl.**
Math workshop leader with Kassie Archer, Outreach event for middle school girls, Discovery Science Place, Tyler
- Feb. 2022 **STEM Like a Girl.**
Math workshop leader, Outreach event for middle school girls, Discovery Science Place, Tyler
- Nov. 2019 **No Excuses University Initiative.**
Van Intermediate School
- Sept. 2019 **Prime Numbers.**
Tyler Rotary Club
- July 2019 **Louis Stokes Alliance for Minority Participation Graduate School Workshop.**
Invited panelist, UT Tyler
- Mar. 2019 **What math for my major?.**
Invited panelist, Transfer Advising Workshop, UT Tyler
- Feb. 2019 **STEM Like a Girl.**
Math workshop leader with Kassie Archer, Outreach event for middle school girls, Discovery Science Place, Tyler

- Nov. 2018 **Summer Opportunities.**
Invited breakout session leader, Texas Undergraduate Mathematics Conference
- July 2017 **Groups and Symmetries.**
Invited guest speaker, Summer Illinois Math Camp for high school students, UIUC
- Mar. 2017 **Career paths in academia.**
Invited guest speaker, Association for Women in Mathematics, UIUC Chapter
- Oct. 2015 **What can I do with a math degree?.**
Invited panelist, Texas Undergraduate Mathematics Conference

Math Club Presentations

- Sept. 2022 **Research and Internship Opportunities for STEM Majors.**
Math Club, UT Tyler
- Sept. 2021 **Research Opportunities & Internships for STEM Majors.**
Math Club, UT Tyler
- Oct. 2019 **Internships, Research Opportunities, & Careers.**
Math Club, UT Tyler
- Oct. 2018 **Internships, Jobs, & Careers.**
Math Club, UT Tyler
- Sept. 2017 **What do I do after I graduate?.**
Math Club, UT Tyler
- Apr. 2017 **The Stern sequence.**
Math Club, UT Tyler
- Oct. 2016 **Job Wanted: Internships and career opportunities outside academia.**
Math Club, UT Tyler
- Oct. 2015 **This is the fraction that never ends.**
Math Club, UT Tyler
- Feb. 2014 **The Stern sequence.**
Math Club, UT Tyler

UT Tyler Teaching Experience

- Math 5301, Elementary Number Theory.**
- Math 4301, Elementary Number Theory.**
- Math 4336, Abstract Algebra II.**
- Math 3336, Abstract Algebra I.**
- Math 3425, Foundations of Mathematics.**
- Math 3315, Linear Algebra and Matrix Theory.**
- Math 3351, Probability and Statistics for Engineers and Scientists.**
- Math 3305, Ordinary Differential Equations.**
- Math 3203, Matrix Methods in Science and Engineering.**
- Math 3404, Calculus III and Honors Calculus III.**

Honors 2414, Honors Calculus II.

Honors 2413, Honors Calculus I.

Math 2414, Calculus II.

Math 2413, Calculus I.

Math 2312, Precalculus.

Math 1342, Statistics.

Senior Capstone Projects

- 2022 *Balancing numbers*, Danielle Sims
- 2020 *Graph splines and the search for g_3* , Kodi Garrett
- 2019 *On open questions regarding generalized graph splines*, Luke Smith
- 2018 *The Mathematics of Logic Puzzles*, Callie Crozier
- 2017 *The Mathematics of SET*, Jessie English
- 2015 *The Stern Sequence*, Matt Lane

Professional Service

- 2022-2023 Texas Number Theory and Combinatorics Seminar organizer
- 2022 AMS Special Session on The Intersection of Number Theory and Combinatorics, Co-organizer, Fall 2022 Central Sectional Meeting
- 2021-2022 Texas Number Theory and Combinatorics Seminar organizer
- 2023 AMS-PME Undergraduate Poster Session Judge, Joint Mathematics Meetings
- 2022 Discrete Mathematics referee
- 2020 AMS Special Session on Research in Graph Theory and Combinatorics by Research Experience for Undergraduate Faculty Alumni and Their Students, Co-organizer, Joint Mathematics Meetings
- 2020 MAA Undergraduate Poster Session Judge, Joint Mathematics Meetings
- 2019 Texas Undergraduate Mathematics Conference Local Organizing Committee Member
- 2018 American Mathematical Monthly referee
- 2015 Texas Undergraduate Mathematics Conference Local Organizing Committee Member
- 2015 "What can I do with a math degree?" Panel member at Texas Undergraduate Mathematics Conference
- 2015 "Engaging in undergraduate research: from funding to publishing," Project NExT panel organizer at Joint Mathematics Meetings
- 2014 Number Theory at Illinois: A Conference in Memory of the Batemans and Heini Halberstam Planning Committee Member
- 2014 Midwest Graduate Student Conference on Number Theory Co-organizer

UT Tyler Committee Work

- 2020- Department of Mathematics Tenure and Promotion Committee
- 2023-2024 Department of Mathematics Assistant Professor Hiring Committee Chair

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- 2021-2022 Department of Mathematics Back-to-school Open House Committee Member
- 2018-2019 College of Arts and Sciences Governance Committee Member
- 2023 Department of Mathematics Visiting Assistant Professor Hiring Committee Chair
- 2022 Department of Mathematics Strategic Planning Committee Member
- 2022 Department of Mathematics 4+1 Degree Plan Committee Chair
- 2021 Department of Mathematics Math/CS Double Major Degree Plan Committee Chair
- 2018 Department of Mathematics OnCourse Committee Member
- 2017 Department of Mathematics Teaching Award Development Committee Member
- 2017 UT Tyler Strategic Plan Work Group for New Academic Programs
- 2015 Department of Mathematics Strategic Planning Committee Member
- 4 years Department of Mathematics Graduate Committee Member
- 5 years Department of Mathematics Curriculum Committee Member

UT Tyler Service

- 2017- Pi Mu Epsilon Texas Phi Chapter Permanent Faculty Correspondent
- 2020-2021 Freshman Mentoring Program
- 2020-2022 New Patriot Orientation Mock Class Instructor
- 2018-2019 Career Success Conference Moderator
- 2016-2022 Global Quiz Night Volunteer
- 2022 Honors Program Scholarship Interview Panel Member
- 2022 Department of Mathematics Supervisor of Graduate Teaching Assistants
- 2021 Texas Undergraduate Mathematics Conference Graduate School Fair
- 2021 Top 25% Celebration Academic and Activities Showcase Volunteer
- 2021 New Patriot Orientation Volunteer
- 2019 Great Plains Honors Council Poster Presentation Judge
- 2019 Great Plains Honors Council Excursion Leader
- 2018 UT System Student Success Summit, Bee Cave, TX
- 2017 Louis Stokes Alliance for Minority Participation Poster Presentation Judge
- 2017 Muntz Library Summer Read-In Volunteer
- 6 years Integration Bee Judge
- 5 years Lyceum Student Research Showcase Judge
- 3 years Patriot Premier Volunteer

Illinois Service

- Fall 2013 Department of Mathematics TA Teaching Awards Committee Member
- Fall 2010 Department of Mathematics Teaching Awards Committee Member