

David R. Garth

Division of Mathematics and Computer Science
Truman State University
100 E. Normal
Kirksville, MO 63501

Office: (660)785-4044
Fax: (660)785-4251
E-mail: dgarth@truman.edu
Webpage: www2.truman.edu/~dgarth

Education

Ph.D. in Mathematics, May 2000

Kansas State University, Manhattan, Kansas
Research Area: Analytic Number Theory
Thesis: Limit Points of Sets of Algebraic Integers
Advisor: Dr. Todd Cochrane

M.S. in Mathematics, December 1995

Iowa State University, Ames, Iowa
Research Area: Discrete Mathematics, Algebra
Thesis: Enumeration of Permutation Polynomials of Group Rings Over Finite Fields
Major Professor: Dr. Daniel Ashlock

B.S. in Mathematics with Minor in Computer Science, May 1993

Iowa State University, Ames, Iowa
Graduated with Distinction

Academic Appointments

- Associate Professor of Mathematics, Truman State University, August 2005-Present
- Assistant Professor of Mathematics, Truman State University, August 2000-August 2005

Other Teaching Experience

- Mathematics Instructor, Barton County Community College, Fort Riley, Kansas, Summer 2000.
- Graduate Teaching Assistant, Kansas State University, August 1995-May 2000,
- Tutor, Kansas State University, Department of Family Studies and Human Services, Spring 1999. Helped Head Start teachers from rural Kansas prepare for the Pre-Professional Skills Test using picture-tell desktop video conferencing.
- Mathematics Instructor, Kansas State University Upward Bound Math Science Program, Summer 1997 and Summer 1998.
- Graduate Teaching Assistant, Iowa State University, August 1993 to August 1995.

Courses Taught

- College Algebra, using the texts *Fundamentals of College Algebra*, Ninth Edition, Swokowski/Cole, and *College Algebra*, Fourth Edition, Stewart, Redlin, and Watson.
- Trigonometry, using the text *Trigonometry*, Charles P. McKeague, Fourth Edition.
- Basic Statistics, using *Introductory Statistics*, Neil A. Weiss, Sixth Edition, and *Statistics: Informed Decisions Using Data*, Michael Sullivan III.
- Essentials of Calculus, using *Applied Calculus*, Hughes-Hallett/Gleason/Lock/Flath/Et. Al.
- Calculus III, using *Calculus*, James Stewart, Fourth Edition
- Foundations of Mathematics, using *A Transition to Advanced Mathematics*, Smith, Eggen, St. Andre, Fifth Edition.
- Discrete Mathematics, using *Discrete Mathematics*, Richard Johnsonbaugh, Fifth Edition.
- Linear Algebra, using *Linear Algebra and its Applications*, David C. Lay, Third Edition.
- Algebraic Structures, using *Contemporary Abstract Algebra*, Joseph A. Gallian, Fourth Edition.
- Advanced Calculus I, using *Understanding Analysis*, Stephen Abbott.
- Advanced Calculus II, using *Advanced Calculus*, Gerald B. Folland

Course Development

The Paradoxes of Infinity Developed this course as an interdisciplinary, writing enhanced course to study how the notion of infinity affects various disciplines and cultures. Particular attention is given to the philosophical and mathematical paradoxes of the notion of the infinite, and how thinkers have dealt with these problems throughout the ages. The course deals with problems in the disciplines of Mathematics, Cosmology, Philosophy, and Religion.

Research Interests

- Analytic and Algebraic Number Theory, especially Pisot numbers and their generalizations.
- Polynomials, Theory of Equations
- Symbolic Dynamics, specifically Substitution Dynamical Systems

Undergraduate Research

Mathematics Capstone Projects

- Tia Welsh, "Group Actions, Permutations, and Card Tricks," 2002.
- Ray Shell, "Continued Fractions as an Approximation of Real Numbers," 2003.
- Keagan Thalín, "Summing a Series Using Complex Analysis," 2003.
- Patrick Cronin, "Chaotic Encryption," 2003.
- Jill Hartnett, "Polynomial Equations and Circulant Matrices," 2004.
- Sarah Quick, "The Spectra of Quadratic Pisot Numbers," 2005

- Daniel Smith, “Recurrence Relations and Symmetric Polynomials,” 2005
- Amanda Knott, “Automatic Sequences,” 2006
- Will Rearick, “Unique Factorization in Quadratic Fields,” 2007
- Ashley Schachner, “The Fibonacci Numbers Modulo the Lucas Numbers,” 2007

Summer Research Projects

- Kensity Riley (2005), “On the Frequency and Generation Properties of Sturmian and Cut-and-Project Sequences.” This project was done through Truman State University’s Next STEP Program, supported by the National Science Foundation under Grant No. 0431664.
- David Failing (2005), “On the Complexity and Construction Methods of Substitution Sequences.” This project was done through Truman State University’s Next STEP Program, supported by the National Science Foundation under Grant No. 0431664.
- Adam Gouge (2006), “Affinely Self-Generating Sets and Morphisms.” This project was done through Truman State University’s Next STEP Program, supported by the National Science Foundation under Grant No. 0431664.
- Kensity Riley (2006), “Cut-and-Project Tilings Generated Via the Gram-Schmidt Process.” This work was supported by an undergraduate research grant through Truman State University.
- Joseph Palmer (2007), “Self-Generating Sets, Morphisms, Automatic Sequences, and Sequences of Integers with Missing Blocks.” This project was done through Truman State University’s Next STEP Program, supported by the National Science Foundation under Grant No. 0431664.
- Ha Ta (2007), “Sequences of Integers with Missing Blocks of Digits and Morphisms.” This work was supported by an undergraduate research grant through Truman State University.

Publications (* indicates student undergraduate co-author)

- “Polynomials Generated by the Fibonacci Sequence,” with Donald Mills, Patrick Mitchell, and James Sellers. *Journal of Integer Sequences*, accepted pending revisions.
- “Affinely Self-Generating Functions and Morphisms,” with Adam Gouge*. *Journal of Integer Sequences* **10**, (2007), Article 07.1.5.
- “Comments on the Spectra of Pisot numbers,” with Kevin Hare. *Journal of Number Theory* **121**, (2006), no 2, 187-203.
- “Complex Pisot numbers of small modulus.” *Compte Rendus Mathématique. Académie des Sciences. Paris*, **336** (2003), no. 12, 967-970.
- “On a problem of Cohn for character sums,” with Todd Cochrane and Zhiyong Zheng. *Journal of Number Theory* **81**, (2000), no. 1, 120-129.
- “On limits of PV k -tuples.” *Acta Arithmetica* **90** (1999), no. 3, 291-299.

Presentations

- “Tilings, Infinite Words, and Long Range Order,” (with Kensity Riley, student), Expository Talk Series, University of Missouri at Kansas City, September 2005.

- “Fibonacci Numbers, the Golden Ratio, and Quasicrystals,” Mathematics Colloquium, Truman State University, March 2005.
- “New Results on the Spectra of Pisot Numbers,” Number Theory Seminar, University of Waterloo, Ontario, January 2005.
- “Who Turned the Lights Out,” Mathematics Colloquium, Truman State University, Spring 2002.
- “A Cool Proof of the Mean Value Theorem (and Generalizations),” Mathematics Colloquium, Truman State University, Fall 2000. “Limit Points of Sets of Algebraic Integers,” 2000 Joint Mathematics Meetings, Washington D.C.
- “Limit Points of Algebraic Integers with 2 Conjugates Outside the Unit Circle,” 1999 Illinois Number Theory Conference, University of Illinois at Urbana-Champaign.
- “Symmetric Polynomials, Vandermonde’s Determinant, and Lehmer’s Conjecture,” Graduate Student Seminar, Kansas State University, October 1997. “Enumeration of Permutation Polynomials of Group Rings over Finite Fields,” Graduate Student Seminar, Kansas State University, September 1995.

Service

- Undergraduate Council Representative, Fall 2003-Present
- Athletics Committee, Spring 2003-Fall 2006
- Liberal Studies Program Committee, Fall 2000-Present, Chair, Fall 2002- Spring 2006.
- Endowed Scholarship Selection Committee, Spring 2003-Spring 2005
- Faculty Search Committee, Summer 2003
- Special Speakers Committee, Fall 2001-Present
- Student Recruitment Committee, 2000-2002
- Ad-hoc committee on Attendance Policy, February 2002
- Reviewer for divisional projects that come under the scope of the Institutional Review Board, Spring 2001-Spring 2002.
- Participated in the freshman interview project, 2001.
- Served as a reader for the SWE, Fall 2000

Memberships

- Mathematical Association of America
- Sigma Xi
- Association of Christians in the Mathematical Sciences

Honors and Awards

- Order of Omega, 2005, Golden Apple Award
- 1999 Stromberg Outstanding Graduate Student in Teaching Award.