

Vita of Kenneth G. Monks

Education: Ph.D. Mathematics (Algebraic Topology) - Lehigh University, 1989; M.S. Mathematics - Lehigh University, 1987; B.S. Chemical Engineering - Pennsylvania State University, 1980

Teaching Positions Held: Full Professor (2000), University of Scranton, 1990-present \diamond Visiting Associate Professor of Mathematics, Yale University, Spring 1998 \diamond C.C. Hsiung Visiting Associate Professorship, Lehigh University, Fall 1996 \diamond Assistant Professor, Wilkes University, 1989-1990 \diamond Graduate Teaching Assistant, Lehigh University, 1984-89

Teaching Experience

Undergraduate Research Projects

Mentored eighteen undergraduate student research projects resulting in the following student publications and awards:

Yazinski, Jonathan, *Pseudoperiodicity and the $3x+1$ Conjugacy Function*, honor's thesis, Spring 2003

Riggi, Carla, *Hutchinson Operators in \mathbb{R}^3* , honors thesis, 2001

Kucinski, Gina, *Cycles for the $3x+1$ map on the Gaussian Integers*, submitted

Fraboni, Mike, *Conjugacy and the $3x+1$ Conjecture* (won the 1998 MAA EPADEL section Student Paper Competition)

Fusaro, M.; *A Visual Representation of Sequence Space*, Pi Mu Epsilon Journal, 10 (6), Spring 1997, 466-481 (won the 1997 MAA EPADEL section Student Paper Competition and was awarded a 1997 Richard V. Andree award)

Joseph, J.; *A Chaotic Extension of the $3x+1$ Function to $\mathbb{Z}_2[i]$* , Fibonacci Quarterly, 36.4 (Aug 1998) 309-316 (won the 1996 MAA EPADEL section Student Paper Competition)

Farruggia, C., Lawrence, M., Waterhouse, B.; *The Elimination of a Family of Periodic Parity Vectors in the $3x+1$ Problem*, Pi Mu Epsilon Journal, 10 (4), Spring (1996), 275-280 (was awarded a 1996 Richard V. Andree award)

Teaching Awards: 2002 University of Scranton C.A.S.E Professor of the Year

Internal Grants: Summer Research Grant, 2002 \diamond Faculty-Directed Student Summer Research Grant, 2001 \diamond Teaching Development Grant, 2000 \diamond Teaching Development Grant, 1999

New Courses Developed and Taught: Chaos and Fractals \diamond Fractal Geometry and Number Theory for Liberal Arts Students \diamond Non-Euclidean Geometry for Liberal Arts Students \diamond C and UNIX \diamond Fundamentals of Numerical Mathematics \diamond Surreal Numbers

Existing Courses Taught: Precalculus, Business Algebra, Business Calculus I, Business Calculus II, Calculus I, Calculus II, Calculus III, Complex Variables, Discrete Structures, Linear Algebra, Math for Elementary Education, Modern Algebra I, Modern Algebra II, Numerical Analysis, Topology, Probability, Geometry

Use of Technology: Author of numerous software packages for use in my courses (available at my web site). Use Maple, SWP, the internet, and the blackboard in an integrated manner in my lectures. Currently developing AIM online mathematics assessments (algorithmically generated, self-grading assessments and practice problems)

Publications

Research Publications

Monks, K., Yazinski, J.; *The Autoconjugacy of the $3x+1$ Map*, Discrete Mathematics, 275, (2004) pp 219-236

Monks, K.; *$3x+1$ Minus the +*, Discrete Mathematics and Theoretical Computer Science, 5, no. 1, (2002), 47-54

Monks, K.; *Groebner Bases and the Cohomology of Grassmann Manifolds with Application to Immersion*, Bol. Soc. Mat. Mexicana (3) 7 (2001) no. 1, 123-136

Monks, K.; *Change of basis, monomial relations, and bases for the Steenrod algebra*, Journal of Pure and Applied Algebra, 125 (1998) 235-260

Monks, K.; *The Nilpotence Height of P_i^** , Proc. Amer. Math. Soc., 124 (4), April (1996), 1297-1303

Monks, K.; *Polynomial Modules Over the Steenrod Algebra and Conjugation in the Milnor Basis*, Proc. Amer. Math. Soc., 122 (2), October (1994), 625-634

Monks, K.; *Nilpotence and Torsion in the Cohomology of the Steenrod Algebra*, Trans. Amer. Math. Soc., 333 (2), October (1992) 903-912

Monks, K.; *Nilpotence in the Steenrod Algebra*, Bol. Soc. Mat. Mexicana, 37 (1992) 401-416

Monks, K.; *h_0 -torsion bounds in the cohomology of the Steenrod algebra*, Proc. Amer. Math. Soc., 114 (1992), 5-9

Monks, K.; *A Category of Topological Spaces Classifying Acyclic Set Theoretic Dynamics*, in preparation

Teaching Publications

Monks, K.; *Fractal Themes at Every Level, in Fractals, Graphics, and Mathematics Education*, edited by M. Frame and B. Mandelbrot, MAA Press, (2002), ISBN: 0-88385-1695

Published Artistic Works (Computer Graphics)

Pharoah's Breastplate, cover image for Multifractals and 1/f Noise, by Benoit Mandelbrot, ISBN:0-387-98539-5

Mandelbrot Set Zooms, cover and illustrations for The Nature and Power of Mathematics, by Don Davis ISBN: 0-691-02562-2

Professional Talks: Have given more than 50 professional talks at seminars, conferences, and colloquia including talks at MIT, Princeton, Yale, Northwestern, Johns Hopkins, Lehigh, Penn State, Oaxtapec Mexico, and Eichstatt Germany

Volunteer Work: Asst. ARML Coach - Lehigh Valley team (2002-2004) \diamond MathCounts coach: West Hazleton Elementary Middle School, 2000-01 (won the county competition) \diamond MathCounts coach: Heights-Terrace Elementary Middle School, 2001-02 (second place at the chapter competition) \diamond in-service lecture to local high school teachers on use of the TI-89 calculator

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(Jan 2001) ◇ numerous in-school lectures to 2nd, 6th, 7th, and 8th grade students on various topics

Personal: Sandan Renshi (3rd degree black belt, masters designation) in Bushi no Te Karate Do ◇ Finisher of the New York City Marathon (1988, 1989, 1990, 1991, 1993), Harrisburg Marathon (1994, 1995), Marine Corps Marathon (1996), Steamtown Marathon (1998, 2000, 2001), Boston Marathon 2002, and Laugavegur ultramarathon in Iceland (1998).