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Citizenship: USA

Education:

- 2002 Ph.D. Rensselaer Polytechnic Institute,
Department of Mathematics, Troy, NY
- 1995 M.S. University of Massachusetts Lowell
Department of Mathematics, Lowell, MA
- 1993 B.S. Atlantic Union College (departmental honors),
South Lancaster, MA - Mathematics

Positions Held:

- * 2009 - current Lecturer, University of Pennsylvania, Department of Computer &
Information Science
- * 2008 - 2009 Visiting Scholar, University of Pennsylvania, Department of Mathematics
- * 2008 - 2009 Associate Professor, Mansfield University, Department of Mathematics
and Computer Science
- * 2003 - 2008 Assistant Professor, Mansfield University, Department of Mathematics
and Computer Science
- * 2002 - 2003 Adjunct Professor, The College of Saint Rose
- * 2001 - 2003 Adjunct Professor, Hudson Valley Community College
- * 1995 - 2001 Teaching Assistant, Rensselaer Polytechnic Institute
- * Summer 1998, Summer 1999, Summer 2001, Fall 2001
Instructor, Rensselaer Polytechnic Institute,
- * 1993 - 1995 Teaching Assistant, University of Massachusetts Lowell

Research Interests:

I have usually worked in differential geometry designing interpolary planar NURBS of monotonic curvature. However, I have recently started working on problems relating to bifurcations in the induced cell complexes of a geometric optical wavefront (using a reflection-based model for waves).

Honors:

- * Participation in AWM Workshop for Women Graduate Students and Recent PhDs at the Joint Mathematics Meetings, Atlanta, GA, January 2005. Poster presentation: *Rational Cubic Spirals*
- * National Science Foundation Grant, "Mathematical Sciences: Rensselaer-MITRE Graduate Research Assistantship" for 1997-1998 academic year
- * Departmental Award for Creative Mathematical Thinking: 1992

Memberships:

- * AMS, AMA, SIGCSE

Leadership Positions (Mansfield University):

- * General Education Subcommittee
- * Treasurer of University Senate
- * Faculty Senator for Mathematics
- * Worked on departmental committee for NCATE accreditation
- * Faculty advisor for the Math Club at Mansfield University
- * Instructor for Freshmen Seminar course
- * Content Area Observer for several student teachers (Mansfield University BSE students who will be teaching Mathematics at the Secondary Level upon graduation)

Courses Taught or Now Teaching:

University of Pennsylvania: Department of Computer & Information Science

EAS 105 - INTRODUCTION TO SCIENTIFIC COMPUTING - *This course provides an introduction to computation and data analysis using MATLAB - an industry standard programming and visualization environment. The course covers the fundamentals of computing including: variables, functions, flow control, iteration, and recursion. These concepts are illustrated through examples and assignments which show how computing is applied to various scientific and engineering problems. Examples are drawn from the simulation of physical and chemical systems, the analysis of experimental data, Monte Carlo numerical experiments, and image and audio processing. This course does not assume any prior programming experience but makes use of basic concepts from calculus and Newtonian physics.*

EAS 205 - APPLICATIONS OF SCIENTIFIC COMPUTING - *This course discusses a number of canonical problems and shows how numerical methods are used to solve them. Lectures introduce the underlying theory and the relevant numerical methods. Students are expected to implement solutions to the problems using MATLAB. The course uses the visualization capabilities of MATLAB to provide students with a geometric interpretation of the key ideas underlying the numerical methods. Topics covered include: The solution of systems of linear equations with applications (force balance, global illumination computation). Representing and computing coordinate transformations with applications to problems in graphics, vision, and robotics. Transform Coding with applications to the analysis of audio signals and image compression. Analysis of variance and the search for low dimensional representations for high dimensional data sets. Least Squares model fitting with applications to data analysis. Analysis of linear dynamical systems with applications to understanding the modes of vibration of mechanical systems. The analysis of stochastic systems governed by state transition matrices.*

CIT 590 -PROGRAMMING LANGUAGES AND TECHNIQUES - *Introduction to fundamental concepts of programming and computer science. Principles of modern object-oriented programming languages: abstraction, types, polymorphism, encapsulation, and inheritance. Basic algorithmic techniques and informal complexity analysis. Substantial programming assignments in Java.*

CIT 592 - MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE - *Foundations: Sets, Functions, Summations, and Sequences. Introduction to algorithms. Counting techniques: The pigeonhole principle, permutations and combinations. Discrete probability. Selected topics from Number theory and/or Graph Theory.*

CIT 596 - THEORY OF COMPUTATION - *Relations. Finite automata, regular languages, regular grammars, and applications. Pushdown automata, trees, context-free grammars, and applications. Turing machines. Introduction to computability and complexity theory.*

University of Pennsylvania: Department of Mathematics

MATH 241, Calculus, Part IV. Prerequisite(s): MATH 240. *Sturm-Liouville problems, orthogonal functions, Fourier series, and partial differential equations including solutions of the wave, heat and Laplace equations, Fourier transforms. Introduction to complex analysis.*

Rensselaer Polytechnic Institute

MATH 480, Numerical Computing. *A survey of numerical methods for scientific and engineering problems. Topics include numerical solution of linear and nonlinear algebraic equations, interpolation and least squares approximations, numerical integration and differentiation, eigenvalue problems, and an introduction to the*

numerical solution of ordinary differential equations. Emphasis placed on efficient computational procedures including the use of library and student written procedures using high-level software such as MATLAB.

Mansfield University

MA 1115, Survey of Mathematical Ideas. *A liberal arts course designed to acquaint the student with the nature and scope of modern mathematics. Emphasis is on concepts and understanding rather than the acquisition of technique. Topics included are suitable for the non-science liberal arts student. No extensive background in algebra is required.*

MA 1119, Fundamentals of Mathematical Reasoning. *This course will center on quantitative reasoning skills. The topics include deductive and inductive reasoning, critical thinking, numerical and geometrical reasoning, developing number sense, decision making under uncertainty, and mathematical communication skills. These skills will be presented and developed within the context of classical and everyday mathematical applications.*

MA 1125, Introductory Statistics. *A survey of basic statistical methods for analyzing data. Topics include descriptive statistics, probability, sampling, point and interval estimation, hypothesis tests, linear regression, correlation, and non-parametric tests.*

MA 1128, College Algebra. *Review of ideas in basic algebra, graphs, equations, inequalities, and a strong emphasis on functions (general, polynomial, rational, exponential and logarithmic).*

MA 1165, Pre-Calculus Mathematics. *Intended to prepare students for the study of calculus. Topics include functions, graphs, polynomial and rational functions, exponential and logarithmic functions, trigonometric functions and analytic trigonometry.*

MA 2231 Calculus I. *The purpose of this course is to develop a good understanding of the derivative and its uses, to introduce the definite integral, and to establish the important relationship between the derivative and the definite integral. This course is intended for mathematics, science, and engineering majors.*

MA 3260, Discrete Structures. *Foundations of mathematics, emphasizing fundamental concepts in abstract mathematics and deductive reasoning. Topics will include logic, Boolean algebra, sets, functions, relations, cardinality, number systems, abstract systems, and algorithms.*

MA 3311 Differential Equations I. *Techniques for solving ordinary differential equations, superposition principle, existence and uniqueness theorem, applications.*

MA 3312 Differential Equations II. *Additional work in partial differential equations and boundary value problems, numerical methods, qualitative treatment of differential equation in phase plane, stability issues.*

MA 3329, Modern Geometry I. *An introduction to the foundations of geometry with emphasis on the axiomatic development of the Euclidean system. Prerequisite: MA 3260.*

MA 3332, Applied Combinatorics. *Applied discrete mathematics emphasizing combinatorics and graph theory. Topics will be chosen from counting methods, generating functions, recurrence relations, inclusion-exclusion, the polya enumeration formula, graph theory, covering circuits, trees, and searching and network algorithms. Prerequisite: Calculus I*

The College of Saint Rose

MAT 150, For All Practical Purposes. *This course is designed for the liberal arts students as an introduction to some contemporary topics in mathematics. Topics include, but are not limited to, management science, statistics, and geometry. Especially recommended for elementary education majors. This course is not recommended for students who have had a course in operations research and/or statistics. [Prerequisite: NYS Sequential Mathematics Course 2 or equivalent. Placement contingent on placement test scores.]*

MAT 151, Excursions in Modern Mathematics. *This course is designed for the liberal arts students as an introduction to some contemporary topics in mathematics. Topics include, but are not limited to, social choice, geometry and mathematics in computers. Especially recommended for elementary education majors. May be taken before MAT 150. [Prerequisite: NYS Sequential Mathematics Course 2 or equivalent. Placement contingent on placement test scores.]*

MAT 160, Ideas in Modern Mathematics. *This course is designed for the liberal arts students as an introduction to some contemporary topics in mathematics.*

Hudson Valley Community College

MATH 99, Essentials of Mathematics I. *A basic preparatory course in fundamentals of algebra and trigonometry. Topics include: order of operations, operations with signed numbers, solving first degree equations in one variable and applications, operations and polynomials, solution of right triangles by the use of trigonometry and pythagorean theorem. This course will not be transferable to a four year college.*

MATH 110, Intermediate Algebra. *A review of the principles of algebra and introductory trigonometry. Topics include: operations on polynomials, first degree equations, special products, factoring, algebraic fractions, exponents, radicals, quadratic equations, right angle trigonometry, and graphic linear equations. A scientific calculator may be used. This course may not transfer to a four year institution.*

MATH 120, Real World Mathematics. *A course designed for liberal arts students that emphasizes contemporary applications of mathematics. Topics include, but are not limited to: statistics, data analysis, consumer mathematics, networking, geometry and problem solving.*

Other:

- * After-school tutor for PSSA test-preparation at Charter High School for Architecture and Design (2010- present)
- * PASSHEMA (PASSHE Mathematics Association) Webmaster March 2007 to June 2009
- * Reviewer for Elsevier peer-reviewed journals in field of Computer-Aided Geometric Design (eg: *Journal of Computational and Applied Mathematics, Computer-Aided Design*)
- * Question writer for ETS 2003 - 2009 (GRE, SAT, GMAT)

Publications:

- * "Rational Cubic Spirals", *Computer-Aided Design*, Volume 40 , Issue 1, pp 3-12, Donna A. Dietz, Bruce Piper, and Elena Sebe Elsevier 2007
- * "Logic circuits laboratory for an undergraduate course in Discrete Mathematics" PASSHEMA proceedings 2007 (published online, proceedings)
- * "Three-dimensional manipulatives for undergraduate geometry classes" SSHE-MA proceedings 2004 (published online, proceedings)
- * "Interpolation with cubic spirals", *Computer Aided Geometric Design* Volume 21, Issue 2, pp. 165-180, Donna A. Dietz and Bruce Piper, Elsevier 2004 <http://www.elsevier.com/locate/cagd>
- * Ph.D. Thesis, Rensselaer Polytechnic Institute, August 2002 "Convex Cubic Spirals"