Math Events 2004
at the University of Dayton
November 6, 2004

PROGRAM

All plenary sessions are in the Science Center Auditorium, SC 114

Conversations among Women in Mathematics

8:30 a.m.	**Check-in and folder pick-up begins**	**Auditorium Lobby**
9:00 – 9:05	**Welcome by Dr. Mary Morton** Dean, College of Arts & Sciences, University of Dayton	**Auditorium**
9:05 – 10:15	**Panel Discussion** • **Marjorie August**, General Dynamics Land Systems • **Amy Bellis**, National Security Agency • **Teresa Dean**, Procter & Gamble • **Kathleen Dietz**, Calvert Hall College High School • **Jane Pendergast**, University of Iowa	**Auditorium**
10:15 – 10:40	**Break and Refreshments**	**Auditorium Lobby**
10:40 – 11:55	**Workshops**	
	• **Code Breaking,** Amy Bellis	**SC 150**
	• **Crayons and Computers: Awesome Pictures of Mathematics,** Annalisa Crannell	**SC 62**
	• **Pondering Pebbling Problems,** Aparna Higgins	**SC 377**
	• **Geometry with Geometer's SketchPad,** Becky Krakowski	**SC 311**
	• **I'M MY OWN GRANDPA! Smullyan's Robots, Their Programs, and Undecidability in Mathematics,** Carol Schumacher	**SC 323**
Noon – 1:00	**Luncheon**	**Kennedy Union Ballroom**

The 21st Biennial Alumni Seminar on Careers in Mathematics

1:10 – 1:25	**Welcome by Dr. Paul Eloe** Chair, Department of Mathematics	**Auditorium**
1:25 – 2:25	**The 5th Annual Kenneth C. Schraut Memorial Lecture** ***Beyond Reasonable Doubt: The Role of Statistics in Health Research*** **Dr. Jane Pendergast**, Director of the Center for Public Health Statistics, University of Iowa	**Auditorium**
2:25 – 2:45	**Break with Refreshments**	**Auditorium Lobby**
2:45 – 4:30	**Career Fair**	**Auditorium Lobby**

The **panel discussion** will focus on the benefits of choosing to study mathematics and to pursue careers involving mathematics. The panelists will share their own experiences and discuss the opportunities and challenges they have faced in being women mathematicians.

About the panelists:

- **Marjorie August** earned a B.S. in mathematics from the University of Dayton in 1991. She then received an M.S. in applied mathematics from Case Western Reserve University in Cleveland, Ohio. She is now a senior software engineer at General Dynamics Land Systems in Detroit, Michigan, supporting maintenance and upgrades for the Army tank software.
  Email: augustm@gdls.com
- **Amy Bellis** earned a B.S. in mathematics at the College of Wooster in Wooster, Ohio. She then received an M.S. and a Ph.D. in mathematics from Rice University in Houston, Texas. She has been a cryptologic mathematician at the National Security Agency at Fort Meade, Maryland, since 1996.
  Email: bellis2@erols.com
- **Teri Trimbach Dean** earned a B.S. in mathematics from the University of Dayton in 1979. She received an M.S. in statistics from The Ohio State University in 1981, and is now a senior human resources manager with Procter & Gamble in Cincinnati, Ohio. After a series of assignments with Procter & Gamble, Teri is currently the Training Manager for the Global Business Services division.
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- **Kathleen Dietz** earned a B.A. in mathematics from Mount St. Agnes College in Baltimore, Maryland, in 1969 and an M.S. in mathematics from the University of Dayton in 1971. She served as the chair of the Mathematics Department at the Miami Valley School in Dayton from 1971 to 1974, and as the chair of the Mathematics Department of Carroll High School in Dayton from 1983 to 2000. She is currently a mathematics and statistics teacher at Calvert Hall College High School in Baltimore, Maryland. She has won five teaching awards, including a Teacher of the Year in A Private School Award given by the UD Department of Education in 1990 and an Outstanding Teacher Award from the Ohio Council of Teachers of Mathematics in 1991.
  Email: dietzk@calverthall.com
- **Jane Pendergast** graduated with a B.A. in mathematics from the University of Dayton in 1974, and continued her graduate education at the University of Iowa, earning master's and doctoral degrees in statistics. She began her academic career in the Division of Biostatistics in the Department of Statistics at the University of Florida. In 1999, she came to the University of Iowa as a faculty member in the Department of Biostatistics and Director of the Center of Public Health Statistics. She has been actively involved in teaching and collaborative research in the health sciences for over twenty years, has authored numerous journal articles and was awarded the Collegiate Teaching Award in 2001. Her research has involved many topics, including statistical methods for longitudinal data, issues in child health policy, medication use among the elderly, cancer screening and treatments, and surgery on horses. Besides her colleagues in statistics, she has worked with colleagues in Public Health, Medicine, Pharmacy, Dentistry, Health Related Professions, Veterinary Medicine, and Law. Dr. Pendergast is a Fellow of the American Statistical Association (ASA) and has held numerous leadership positions in professional organizations, including six years on the ASA Board of Directors. She was recently elected to be President of the Eastern North American Region of the International Biometrics Society.
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Abstracts of workshops:

Code Breaking SC 150
Dr. Amy Bellis, National Security Agency
Through several hands-on examples, we will explore two simple methods of encoding information and discuss strategies for breaking codes.

Crayons and Computers: Awesome Pictures of Mathematics SC 62
Dr. Annalisa Crannell, Franklin and Marshall College
It is easy to see, just by looking, that certain kinds of art are beautiful. But how could we "see" beautiful mathematics just by looking? It would help if we could first understand the mathematics that lies within various kinds of visual art. We will take an artistic mathematical tour through Amish quilts (symmetry and tessellations), Japanese woodblock paintings (fractal geometry), and especially Renaissance perspective painting (similar triangles).

Pondering Pebbling Problems SC 377
Dr. Aparna Higgins, University of Dayton
Suppose you want to move some material from point A to point B. You need several steps, and at every step, you lose half of the material. If your goal is to get a certain amount of material to any specified point, how much do you need to start with? More precisely, distribute pebbles (non-negative integers) on the vertices of a graph. Define a pebbling move as: "Remove two pebbles from a vertex, move one pebble to an adjacent vertex, and throw away the second pebble." What is the minimum number of pebbles needed so that any distribution of this number of pebbles will guarantee that one pebble will reach an arbitrary, but fixed, vertex in a finite number of pebbling moves? This number is the *pebbling number* of the graph. In this workshop, participants will get some hands-on experience in finding pebbling numbers for several classes of graphs. In addition, participants will work on some open problems in pebbling and get a taste of doing mathematical research.

Geometry with Geometer's SketchPad SC 311
Dr. Becky Krakowski, University of Dayton
We will go through a brief introduction/review of SketchPad (a dynamic geometry software package) - advanced or beginning users are welcome! We will then explore some interesting applications, such as choosing the best location for a new fire station that will help protect three suburban neighborhoods.

I'M MY OWN GRANDPA!
Smullyan's Robots, Their Programs, and Undecidability in Mathematics SC 323
Dr. Carol Schumacher, Kenyon College
Kurt Gödel's theorems on the incompleteness of formal mathematical systems are among the greatest accomplishments of mathematics. The workshop presents an approach to the ideas in Gödel's work, based on some of the "robot puzzles" of Raymond Smullyan. In an imaginary world, robots build and program other robots, according to the rules laid down in their own programming. Sometimes the "offspring" resembles the "parent" and sometimes not. Other robots roam the world, destroying other robots of a given type. By exploring the ecology of this bizarre world, we can discover fascinating insights into the nature of formal logical systems.

About the workshop leaders:

Amy Bellis (A biographical note is on page 2)

Annalisa Crannell is an Associate Professor of Mathematics at Franklin & Marshall College. She received her undergraduate degree in Mathematics from Bryn Mawr College, and an M.A. and a Ph.D. (1992) in mathematics from Brown University. Dr. Crannell's primary research is in topological dynamical systems (also known as "Chaos Theory"), but she also is active in developing curricular materials for a course on Mathematics and Art. She has worked extensively with students and other teachers on writing in mathematics, and with recent doctorates on employment in mathematics. She especially enjoys talking to non-mathematicians who haven't (yet) learned where the most beautiful aspects of the subject lie.
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Aparna Higgins earned a B.Sc. in mathematics from the University of Bombay, India, in 1978. She received an M.S. in mathematics (1980) and a Ph.D. in mathematics (1983) from the University of Notre Dame. She has been at the University of Dayton since 1984, and is currently a Professor in the Department of Mathematics. She is passionate about teaching and has won several teaching awards. She will be one of only three recipients of the Mathematical Association of America's prestigious Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching of Mathematics for 2005. Her greatest professional satisfaction has come from directing undergraduate students in mathematics research. She is currently a co-director of Project NExT (New Experiences in Teaching), a professional development program of the Mathematical Association of America for new Ph.D. faculty in the mathematical sciences.
Email: Aparna.Higgins@notes.udayton.edu

Becky Krakowski earned a Ph.D. from North Carolina State University in Mathematics Education, and has been an Assistant Professor in the Department of Mathematics at the University of Dayton since 2000. She holds a B.S. degree in mathematics from Allegheny College, and an M.S. in mathematics from North Carolina State University. Her research interests include effectiveness of classroom technology innovations and teacher education.
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Carol Schumacher is Professor and Chair of the Department of Mathematics at Kenyon College in Gambier, Ohio. She received a B.A. in mathematics from Hendrix College in 1982 and a Ph.D. in mathematics from The University of Texas at Austin in 1989. She joined the Kenyon faculty in the fall of 1988. Prof. Schumacher's favorite courses to teach are first semester calculus, Foundations (an introduction to proofs), Real Analysis, and "Surprises at Infinity" (a general-audience course on the mathematics of the infinite). She is the author of "Chapter Zero---Fundamental Notions of Abstract Mathematics," now in its second edition, and is currently working on finishing up "Closer and Closer--An Introduction to Real Analysis." Her current research interests center on the dual themes of self-similarity and self-reference in the mathematics of infinity.
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The 5th Annual Kenneth C. Schraut Memorial Lecture

Beyond Reasonable Doubt: The Role of Statistics in Health Research

by **Dr. Jane Pendergast**
Department of Biostatistics and Director of the Center of Public Health Statistics

Abstract: The foundation of mathematics opens the door to an amazing number of diverse careers and opportunities, one of which is in the area of statistics. While some may associate the term "statistics" with numbers summarizing sports achievements or population demographics, the broader definition of the term characterizes statistics as a mathematical science dealing with the collection, analysis, interpretation, and presentation of data. This talk focuses on the role of statistical reasoning and methods in health research, and how we capitalize on the concept of "chance" to answer our questions.

(A biographical note on Jane Pendergast can be found on page 2)

The Kenneth C. Schraut Memorial Lecture was established entirely with the generous support of alumni donations in memory of Dr. Kenneth C. Schraut. The Memorial Lecture was established for the purpose of sponsoring invited lectures by noted mathematicians for undergraduate students.

Schraut Lectures

2003	Robert E. Lewand, Goucher College How not to get lost on a Random Walk
2002	Paul J. Campbell, Beloit College How to keep up with Mathematics
2001	Richard M. Schoen, Stanford University Geometry in Two and Three Dimensions
2000	Joe Diestel, Kent State University Sums and Series in Vector Spaces

The 21st Biennial Alumni Seminar on Careers in Mathematics

During this career fair, alums and friends of the Department of Mathematics will be available to talk about career paths, internship possibilities and job opportunities. There will be representatives from the following broad fields:

Statistics/Biostatistics

- Jane Pendergast (74), Associate Professor and Director of the Center for Public Health Statistics in the Department of Biostatistics at the University of Iowa
- Tom Filloon (81), Senior Statistician, P&G

Management

- Teresa Dean (79), Senior Human Resource Manager, P&G

Cryptography

- Amy Bellis, National Security Agency

Teaching

- Kathleen Dietz (71), Calvert Hall High School
- Barbara Carruth (68), Sinclair Community College
- Usual collection of UD professors

Engineering

- Marjorie August (91), Senior Software Engineer, General Dynamics Land Systems
- Joe Huelsman (98), Project Analyst/Statistician, Titan Corporation (WPAFB)
- Robert Bolz (66), Vice-President, F/A Sustainment, Lockheed Martin Aeronautics Company

Actuarial Science/Financial Analysis

- Cynthia Morrison (74), Second Vice President, Financial Management, Guardian Life
- Tom Britt (85), Greg Slone, Steve Craighead, Nationwide Financial

Food Safety Advocate

- Barbara Kowalcyk (91), Board of Directors, Safe Tables Our Priority

Information Technology

- Mark Hale, Academic Information Technology Administration, University of Iowa

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