

Abstracts and Biographies of Speakers

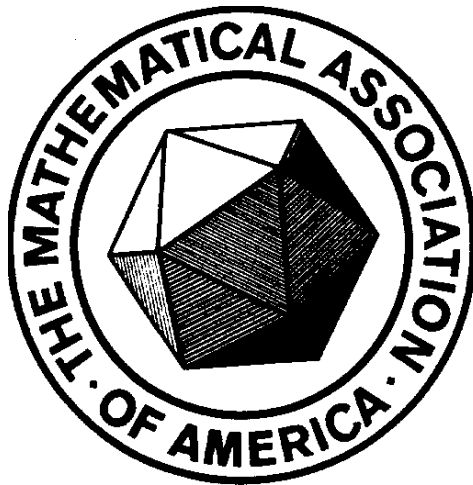
Alice through Looking Glass after Looking Glass: The Mathematics of Mirrors and Kaleidoscopes *Roe Goodman, Rutgers University*

Let us imagine that Lewis Carroll interrupted his research on the condensation of determinants to write a third Alice book with the title *Alice Through Looking Glass After Looking Glass*. The book opens with Alice in her chamber in front of *several* looking glasses. She enters one of them and discovers that she is in a new virtual chamber that looks *almost* like her own. However, she is now left-handed and her books are all written backwards. There are also virtual mirrors in this chamber. Stepping through one of them, she continues her trip through many virtual chambers until, to her great relief, she suddenly finds herself back in her own real chamber. Eager to have new adventures, Alice wonders how many different ways the mirrors could be arranged so that she could have other trips through the looking glasses.

I will solve Alice's problem by describing all possible systems of n mirrors in n -dimensional Euclidean space such that the group of orthogonal $n \times n$ matrices generated by reflections in the mirrors is finite. The mathematical tools are plane and solid geometry, linear algebra (including determinants), basic group theory, and a bit of graph theory. I will also display and give plans for some experimental tools that I have constructed, namely three-dimensional kaleidoscopes that give the symmetries of the Platonic solids.

Roe Goodman is a professor of mathematics at Rutgers University in New Brunswick. He obtained his Ph.D. at M.I.T. in 1963 under the direction of I.E. Segal, was a postdoc at Harvard working with G.W. Mackey, taught at M.I.T., and has been at Rutgers since 1971. His main research interests are the geometry and representation theory of Lie groups. His latest book is 'Representations and Invariants of the Classical Groups' (Cambridge U. Press), with coauthor Nolan Wallach. He has been involved many years in bringing computers into upper-level undergraduate mathematics courses, especially probability (simulation of stochastic models) and linear algebra (MATLAB). He received the Susman award for excellence in teaching from Rutgers in 1985 and the Faculty of Arts and Sciences award for distinguished contributions to undergraduate education from Rutgers in 2000. He has been undergraduate vice-chair (1981) and acting department chair (2000) at Rutgers.

The Mathematical Association of America New Jersey Section



Fall Meeting
Fairleigh Dickinson University
Madison, NJ

Saturday, October 26, 2002

He also plays classical music professionally and is principal bassoonist with the Princeton Symphony Orchestra. The skills needed to make three-dimensional kaleidoscopes by hand are quite similar to those for making bassoon reeds.

A Linear Programming Approach to Genetic Sequence Alignment *Fern Hunt, National Institute of Standards and Technology*

The advent of large scale sequencing of DNA has triggered a massive accumulation of DNA sequence data and data about proteins, the products of the genes encoded by DNA. Multiple sequence alignment is an important technique for determining the function of these genes and to understand protein structure. The algorithms for aligning biological sequences is based on dynamic programming. We recast alignment in terms of a linear programming problem to

which interior-point methods can be applied. This may make it possible to align a large number of very long sequences more quickly than can be done using traditional methods.

Fern Hunt is a native New Yorker and a graduate of the Bronx High School of Science. She attended Bryn Mawr College and obtained an A.B. degree in Mathematics. She then returned to New York for graduate studies, earning and Masters Degree and PHD from Courant Institute, New York University in 1978. She taught in various institutions, including University of Utah and Howard University. Dr. Hunt is presently a mathematician in the Mathematics and Computational Science division of the National Institute of Standards and Technology.

Coordination of Multiple Rhythmic Activities in the Nervous System *Farzan Nadim, New Jersey Institute of Technology*

There have been few studies that show how neuronal networks that produce rhythmic activity interact to produce the coordinated patterns necessary for adaptive behavior. How is it possible to walk and chew gum at the same time? In a recent set of studies, we combined modeling and experiments to address such coordination in neuronal networks of the crustacean stomatogastric nervous system. We modeled coordinated rhythmic activity involving two oscillators with very different frequencies. The predictions of the model, later confirmed experimentally, showed that the faster oscillator completely controls the frequency of the slower one.

Farzan Nadim received his Ph.D. in mathematics in 1993 from Boston University. He then became a Postdoctoral Fellow in Neurobiology at Emory

University, and then a Sloan Postdoctoral Fellow in Theoretical Neuroscience at Brandeis University. He is currently Associate Professor of Mathematics at the New Jersey Institute of Technology, and is also in the Federated Department of Biological Sciences at Rutgers, Newark.

Teachers' Mathematics: A Collection of Content Deserving To Be a Field *Zalman Usiskin, University of Chicago*

Mathematical generalizations and extensions, concept analysis, and problem analysis together comprise a substantial body of mathematics that arises from teaching situations in much the same way that statistics arises from data, financial mathematics arises from investment problems, operations research arises from optimization problems in business, and actuarial science arises out of questions of insurance. We call this body "teachers' mathematics". A huge amount of material falls under this heading. However, this material is usually picked up by teachers only haphazardly-- through occasional articles in journals, by attending conferences, by reading the teachers' notes found in textbooks, or by examining research in history and conceptual foundations of school mathematics. This mathematics is quite broad-based. It covers both pure and applied mathematics, algorithms and proof, concepts and representations. I believe the only way we will get this material to our teachers on a broad scale is if "teachers' mathematics" obtains its own place in college and university curricula, i.e., if it is viewed as its own branch of applied mathematics. For the past four years, a group of us (myself, Anthony Peressini, Elena Marchisotto, and Dick Stanley) have been working under a grant given to the University of California at Berkeley mathematics department by the Stuart Foundation of San Francisco to develop materials for upper level undergraduate or beginning graduate courses in teachers' mathematics for high school teachers. This talk provides examples from the materials.

Zalman Usiskin is Professor of Education at the University of Chicago, where he is in his 34th year as a faculty member. He was born in Chicago and went to Chicago Public Schools for elementary and high school. He received two bachelors' degrees, one in mathematics and one in education, from the University of Illinois. He received a Master of Arts in Teaching degree in mathematics from Harvard, and a Ph.D. from the University of Michigan in education with specialty in mathematics curriculum and instruction.

He has taught in nine high schools in Illinois, Michigan, and Massachusetts. During the 1970s he received government grants for work with applications of algebra, cognitive development in geometry, and applying arithmetic. Since the inception of the University of Chicago School Mathematics Project (UCSMP) in

1983, he has been director of the secondary component of the project. Since 1987 he has been overall director of UCSMP.

For the past 20 years, he has been on the editorial board of the American Journal of Education. From 1984 until 1992, he was a member of the advisory board to the Children's Television Workshop program Square One TV. From 1988 to 1991, he was a member of the Mathematical Sciences Education Board of the National Research Council. From 1995 to 1998 he was a member of the Board of Directors of the National Council of Teachers of Mathematics. He is currently a member of the test development committee for mathematics of the National Assessment of Educational Progress. He is interested in all aspects of mathematics education, with particular emphasis on matters related to curriculum, instruction, and testing; the selection and organization of content; the teaching and learning of mathematics; international mathematics education; teacher education; the history of mathematics education; and educational policy.

He has authored or co-authored 18 books and over 100 articles dealing with mathematics education. His most recent book is due later this month and results from a collaboration with Dick Stanley of the University of California at Berkeley, Elena Marchisotto of Cal State - Northridge, and Tony Peressini of the University of Illinois on a mathematics course for high school teachers. He has received many awards from professional organizations for his work in mathematics education. His wife Karen is also in mathematics education. They have two children, a 21-year-old son in graduate school and a 19-year-old daughter in her sophomore year of college.

Announcements

Lunch discussion tables for Fall 02 meeting

There will be 5 discussion tables at lunch.

1. Computers in Linear Algebra and Multivariable Calculus, led by Roe Goodman, Rutgers University
2. Mathematical Education of Teachers, led by Zalman Usiskin
3. BIG SIGMAA - Mathematics in Industry, led by Jim Beard
4. Statistics Education
5. Department Chair Issues

Those who pre-registered during morning registration have priority at these discussion tables. We look forward to a set of lively and interesting discussions!

DINNER HONORING INVITED SPEAKERS

The Section will honor the invited speakers at dinner following the meeting. Everyone is cordially invited.

Mathematical Association of America New Jersey Section

Fall 2002 Meeting Program

All sessions will take place in the Dreyfuss Lecture Hall

8:30 – 9:30	Registration and Coffee, Dreyfuss Hall Foyer
8:30 – 1:30	Book Exhibits, Dreyfuss Hall Foyer
9:30 – 9:45	Welcome by Dr. Barbara Salmore Dean of the Maxwell Becton College of Arts and Sciences, Fairleigh Dickinson University
9:45 – 10:30	Coordination of Multiple Rhythmic Activities in the Nervous System Farzan Nadim , New Jersey Institute of Technology Presider: Dawn A. Lott, New Jersey Institute of Technology
10:30 – 10:45	Remarks by chair of MAA-NJ Reginald Luke, Middlesex County College
10:45 – 11:30	Intermission (Coffee and Book Exhibits)
11:30 – 12:15	Teachers' Mathematics: A Collection of Content Deserving To Be a Field Zalman Usiskin , University of Chicago Presider: Joy H. Atkin, Elizabeth Public Schools
12:15 – 1:30	Lunch (Book Exhibits end at 1:30)
1:30 – 2:15	A Linear Programming Approach to Genetic Sequence Alignment Fern Hunt , National Institute of Standards and Technology Presider: Lora Billings, Montclair State University
2:15 – 2:30	Remarks by Governor of MAA-NJ Amy Cohen, Rutgers University
2:30 – 2:45	Intermission (Silent Auction bidding ends at 2:45)

2:45 – 3:30	Alice through Looking Glass after Looking Glass: The Mathematics of Mirrors and Kaleidoscopes Roe Goodman , Rutgers University Presider: Amy Cohen, Rutgers University
3:30 – 3:45	Election of officers of MAA-NJ
3:45	Drawing of door prizes and announcement of Silent Auction Winners (must be present to win)
5:00	Dinner honoring Distinguished Teaching Award winner and invited speakers

Election of MAA-NJ officers at Fall 2002 meeting

Candidates:

Chair-Elect: Cathy Liebars, College of New Jersey

Vice-Chair for Two Year Colleges:

Carol Avelsgaard, Middlesex County College

Treasurer: Karen Clark, College of New Jersey

Nominating Committee:

Larry D'Antonio, Ramapo College

Judith Lenk, Ocean County College

Theresa C. Michnowicz (chair), New Jersey City University

Revathi Narasimhan, Kean University

MAA-NJ Spring 2003 Meeting

The Spring Meeting of the Mathematical Association of America, New Jersey Section, will be held at Kean University, Union, NJ on April 5, 2003. Speakers include Joe Gallian, University of Minnesota-Duluth and Ann Watkins, California State University-Northridge.

Call for contributed papers

There will be contributed paper sessions for MAA members at the MAA-NJ Spring 2003 Meeting. Papers will be accepted on a first-come-first-serve basis. Please submit a title and short abstract by February 1, 2003, to Theresa C. Michnowicz, New Jersey City University, tmichnowicz@njcu.edu, 201-200-3219.

Call for student presentations

There will also be one contributed paper session for students at the MAA-NJ Spring 2003 Meeting. Papers will be accepted on a first-come first-serve basis. Please submit a title and short abstract by February 1, 2003, to Lawrence D'Antonio, Ramapo College of New Jersey, 505 Ramapo Valley Road, Mahwah, NJ 07430, ldant@orion.ramapo.edu, 201-684-7714

Call for Nominations for the New Jersey Section Award for Distinguished College or University Teaching

The MAA-NJ Section Distinguished Teaching Award Selection Committee is seeking nominations for the 2003 Distinguished College or University Teaching Award. The winner will be honored during the Spring 2003 meeting of the Section and will be widely recognized and acknowledged within the Section. Documents outlining the nomination process are on the Section's web site at <http://www.maa.org/newjersey>. Please send nomination packets to: Mark S. Korlie, Secretary of the MAA-NJ Section, Department of Mathematical Sciences, Montclair State University, Upper Montclair, NJ 07043, korliem@mail.montclair.edu, 973-655-5300. All nomination packets must be received by January 6, 2003.

MAA-NJ Fall 2003 Meeting

The Fall 2003 MAA-NJ meeting will be held on Saturday, November 8, at Raritan Valley Community College, North Branch, NJ.

2003 PREP Workshops

The list of MAA 2003 Professional Enhancement Program (PREP) Summer Workshops is available at the web site <http://www.maa.org/pfdev/prep/prep.html>.

MAA-NJ Distinguished Teaching Award –2002

Dr. Evan M. Maletsky of the Department of Mathematical Sciences at Montclair State University (MSU) is the recipient of the 2002 MAA-NJ Distinguished Teaching Award. The award was instituted in 1991 to honor college or university teachers who have been widely recognized as extraordinarily successful and whose teaching effectiveness has been shown to have influence beyond their own institutions.

Dr. Maletsky is a frequent speaker at national, regional, state and local meetings, and international conferences for mathematics teachers. He is a leader in in-service workshops for teachers at the elementary, junior, and senior high school levels. He has been a principal instructor at various NSF Summer

Institute held at MSU, Femi National Accelerator Laboratory, and Princeton Plasma Physics Laboratory.

Dr. Maletsky is the co-author of the popular book *Teaching Mathematics—A Sourcebook of Aids, Activities and Strategies*, co-author of the Springer-Verlag books *Fractals for the Classroom—Strategic Activities (Volumes 1,2,3)*, and senior author of the leading series *Harcourt Math (Grades 3,4,5,6)*, and *Math Advantage (Middle School I, II, III)*. He has written many articles and other books, and served as editor of many mathematics education journals.

Dr. Maletsky received the Outstanding Faculty Award from the MSU Alumni Association (1984), the First Margaret and Herman Sokol Faculty Fellow Award at MSU (1991) for excellence as a teacher and researcher, the Outstanding Mathematics Educator Award from the Association of Mathematics Teacher of New Jersey (1991), the Distinguished Teacher Award from MSU (1993), and the Teachers in Excellence Award, given by the Student Government Association of MSU (1998).

Dr. Kenneth Wolff and Dr. Helen Roberts of the Department of Mathematical Sciences, Montclair State University, nominated Dr. Maletsky.

National MAA-AMS meetings

Joint Mathematics Meetings, January 15-18, Baltimore, MD.

MathFest 2003, July 31-August 2, 2003, Boulder, CO.

Joint Mathematics Meeting, January 7-10, 2004, Phoenix, AZ.

MathFest 2004, August 12-14, 2004, Providence, RI.

Joint Mathematics Meeting, January 5-8, 2005, Atlanta, GA.

MathFest 2005, August 4-6, 2005, Albuquerque, NM.

Report from the Summer Meeting of the MAA Board of Governors

The Board met the day before MathFest 2002 in Burlington Vermont. The early registration was higher than expected and the short course was oversubscribed by almost 50%. This increase in attendance is good news: the MAA is meeting the needs of its membership.

The editors reported that the MAA journals and book series are continuing to attract interesting submissions. More MAA books will be available in book stores and on-line. Sales are good.

The new software for maintaining membership records and serving member needs is fully installed. It has been more expensive than expected, but

it is functioning well and is getting good reaction both from members and from staff.

The very conservative investment policy of the budget committee has buffered the Association fairly well from the turmoil in financial markets. Nonetheless, it is important for the Association to build up an endowment which will provide income for new programming as well as protect the MAA from unexpected financial situations.

The most important new issue is how to reconcile MAA practice (which allows Governors who cannot attend Board meetings to send substitutes) with the requirements of our by-laws (which implicitly prohibit voting-by-proxy at Board meetings). This issue has legal and insurance ramifications; our auditors will not let it go unresolved. The discussion at the Board did not reach unanimity. A committee (including the Governor elected from the NJ Section) has been formed to formulate a proposal for further consideration by the Board.

The officers of the Association ask members to be more active in making nominations for MAA prizes and in making suggestions for MAA activities.

Respectfully submitted, Amy Cohen, Governor from the NJ Section.

News from NJ departments

The College of New Jersey is in the second year of teaching a new sequence of two courses which are now required for all (with very few exceptions) elementary education majors. These courses are called "Mathematical Structures and Algorithms for Educators I and II" and are focused on providing prospective elementary teachers with a deeper understanding of the elementary content.

Monmouth University's Mathematics Department welcomes 7 new faculty members this year at Monmouth, three of whom are tenure-track - Joseph Coyle, Amy Szczepanski, Su-Chi Wen - and four instructors - Mary Grace Killmer, Kewal Krishan, Louis Penge, and Kathleen Poracky.

Montclair State University. The Department welcomes three new Assistant Professors: Kimberly Jordan Burch, Youngna Choi, and Mikako Munakata.

Ramapo College has a new faculty member in mathematics, Maxim Goldberg.

Rowan has a new tenure-track faculty member, Dr. Marlena F. Herman

Rutgers. The best news is that enrollment in upper level math courses exceeded our expectations. Our efforts to make our courses more effective and to offer new courses in cryptology and mathematical biology seem to be paying off.

There is a new effort, led by the Rutgers Committee on the Mathematical Education of Teachers, to enhance our course offerings that attract prospective teachers. This committee is drawn equally from the Mathematics Education group in our Graduate School of Education and the Department of Mathematics. Changes have already been introduced in the Math Department course in Geometry and in the GSE course called Modern High School Mathematics. Next term we will introduce the first "connection seminar" intended to make explicit the connections between the content of upper level math courses required of future teachers and the content of the high school curriculum. Our most challenging project, which we hope to pilot by Fall 2003, is a mathematics course which will both be of particular value to future elementary school teachers and satisfy the liberal arts distribution requirements of our undergraduates. The goal will not be to "re-teach" elementary school mathematics; instead we want students to get the deeper understanding of the content which they will need to teach effectively in their own classrooms.

MAA-NJ Officers

Chair	Reginald Luke, Middlesex County College
Past Chair	Judith Schick-Lenk, Ocean County College
Vice Chair for	
Speakers	Dawn Lott, NJIT
Innovations	Theresa C. Michnowicz, NJCU
Two-Year Colleges	Amy Boyd, Union County College
Secretary	Mark Korlie, Montclair State University
Treasurer	Cathy Liebars, The College of New Jersey
Public Information Officer	Hieu Duc Nguyen, Rowan University
Speakers Bureau	Carol Avelsgaard, Middlesex County College
Student Activities Coordinator	Lawrence D'Antonio, Ramapo College
Governor	Amy Cohen, Rutgers University

Organizing Committee Mark S. Korlie, Montclair State University, Dawn A. Lott, New Jersey Institute of Technology, Theresa C. Michnowicz, New Jersey City University

Program Committee Larry D'Antonio, Ramapo College, Bonnie Gold, Monmouth University, Judith Lenk, Ocean County College, Cathy Liebars, The

College of New Jersey, Reginald Luke, Middlesex County College, Hieu Nguyen, Rowan University

Hosting Committee Javad Namazi, Robert Mayans, Bruce O' Neil, Kai Pei, Diane Richton, Kiron Sharma, Robert Shaw and Richard Wagner.

Acknowledgments The MAA-NJ thanks the Mathematics Department of Fairleigh Dickinson University, Madison campus, for their kind hospitality in hosting the meeting.

Past Chairs of the New Jersey section of the MAA

A.E. Meder, Jr.	Rutgers University	1956-57
Bruce E. Meserve	Montclair State College	1957-58
S.S. Wilks	Princeton University	1958-59
Henry O. Pollak	Bell Labs	1959-60
E.P. Starke	Rutgers University	1960-61
George Cherlin	National Health & Retirement	1961-62
S.S. Myers	Educational Testing Service	1962-63
Robert Walter	Douglass College	1963-64
Max Sobel	Montclair State College	1964-65
Joshua Barlaz	Rutgers University	1965-66
A.E. Meder, Jr.	Rutgers University	1966-67
Frank Brooks, Jr.	Mutual Life Insurance	1967-68
Bernard Greenspan	Drew University	1968-69
Frank Sinden	Bell Labs	1972-73
Frederick Almgren	Princeton University	1973-75
Robert Kurshan	Bell Labs	1975-77
B. Melvin Kiernan	St. Peter's College	1977-79
Jean Lane	Union County College	1979-81
Susan Marchand	Kean College	1981-83
S. Ashby Foote	Rutgers University	1983-85
Sr. Stephanie Sloyan	Georgian Court College	1985-87
Evan Alderfer	Ocean County College	1987-89
Thomas Marlowe	Seton Hall University	1989-91
David Boliver, Jr.	Trenton State College	1991-93
Theresa C. Michnowicz	Jersey City State College	1993-95
Kay Gura	Ramapo College of New Jersey	1995-97
Lawrence D'Antonio	Ramapo College of New Jersey	1997-99
Judith Lenk	Ocean County College	1999-2001