NORTHEASTERN SECTION

NEWSLETTER

SPRING 2001

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EXECUTIVE COMMITTEE

CHAIR:
Edward Sandifer
Department of Mathematics/CS
Western Connecticut State University
Danbury CT 06810
(203)837-9351
Sandifer@wcsub.ctstateu.edu

GOVERNOR
Donna Beers
Department of Mathematics/CS
Simmons College;300 The Fenway
Boston, MA 02115
(617)521-2389
donna.beers@simmons.edu

VICE-CHAIR
Ockle Johnson
Department of Mathematics
Keene State College
Keene, NH 03435-2001
(603358-2585
ojohnson@keene.edu

SECRETARY-TREASURER
Ann Kizanis
Western New England College
Mathematics/CS Department
Springfield, MA 01119
(413)782-1784
akizanis@wnec.edu

TWO-YEAR COLLEGE REP.

Kathleen J. Bavelas
Department of Mathematics
Manchester Community-Technical College
Manchester, CT 06040
(860)647-6185
dabavelas@snet.com

PAST CHAIR/NEWSLETTER EDITOR
Frank Ford
Department of Mathematics/CS
Providence College
Providence, RI 02908
(401)865-2635
fpford@providence.edu

NORTHEASTERN SECTION
MATHEMATICAL ASSOCIATION OF AMERICA

FUTURE SECTION MEETINGS

June 8-9, 2001
Norwich University, Northfield, VT
Program Committee: Sarah Mabrouk, Framingham State Colleg
Local Arrangements: Robert Poodiac, Norwich University
(web site:
http://www.frc.mass.edu/smabrouk/NES-MAA_Spring_2001_Meeting_Program.htm)

November 16-17, 2001
Bridgewater State College, Bridgewater, MA
Program Committee: Karen Schroeder, Bentley College
Local Arrangements: Tom Moore, Bridgewater State College

June 20-21, 2002
Williams College, Williamstown, MA (joint with Seaway Section)
Program Committee: Frank Morgan, Williams College
Local Arrangements: Frank Morgan, Williams College

November, 2002(tentative)
Framingham State College, Framingham, MA

OTHER ACTIVITIES

Short Course: Interdisciplinary Lively Application Projects June 17-20 at Western New England College, Springfield, MA (See page 12)
Short Course Committee: Will Stout (stout@salve.edu)
Dennis Luciano (dluciano@wnec.edu)
Dinner Meetings Coordiantor: Lucy Kimball (lkimball@LNMTA.bentley.edu
Awards: NES/MAA Award for Distinguished Teaching(see page 11)
Web page: access it via http:/www.maa.org or directly with
http://scsu.ctstateu.edu/~maa_nes/main.html
webmaster:
Ross Gingrich, Southern Connecticut State University
gingrich@scsu.ctstateu.edu.

Message from the Chair ..... Ed Sandifer

My term as Chair of the Northeastern Section ends in November. My successor, Ockle Johnson, is taking his responsibilities as Chair Elect quite seriously. He got his first taste of the national organization attending the Section Officers meeting at the Winter Meetings in New Orleans. It is unfortunate that this was his first taste of the responsibilities of the Chair, for it isn't the most exciting aspect of the job. Since then, he has accepted the invitation to hold our Fall, 2002 meeting at Framingham State University and will be on the prowl for volunteers to help Sarah Mabrouk organize that meeting.

I've just this morning e-Mailed Ockle to tell him of two of the greatest privileges of the office of Chair of the Section. I am not being facetious when I say that he will really enjoy chairing two committees. One committee will select the winner of the Distinguished Service Award. This is an award sponsored by the national offices of the MAA. Each section is allowed to make an award only once every five years. Previous recipients have been Don Small in 1987, Jim Tattersall in 1992, and the nation's only joint award ever went to Frank Battles and Laura Kelleher in 1997. Ockle's committee's nomination is due in Washington by July 1, but the announcement of the recipient won't be made until sometime next year.

Ockle's second committee chairship will be to nominate the annual Distinguished Teaching Award recipient. It was my turn to chair this committee two years ago, when we nominated Ed Burger. Our Section award winner is automatically nominated for one of three National Awards, and Ed went on to win one of those as well. I really enjoyed serving on that committee. I know lots of good mathematics teachers, but it was a great experience to see documentation showing how really excellent mathematics teachers can be and how much they can influence and improve people's lives and educations.

This year's Distinguished Teacher will be announced at the Spring Meeting in Northfield.

As you will see elsewhere in this Newsletter, the Short Course is back! After years and years at the University of Maine, the Short Courses wandered around for a few years, and even missed a couple of summers. Now, Will Stout and Dennis Luciano have organized what should be an excellent workshop on modeling in June at Western New England College. The Section has contributed some money to the cost of the Short Course in order to make it more affordable to participants. We hope that lots of people will be able to attend. Also, contact Dennis or Will with ideas for future speakers, topics or

locations. If you have ideas for generous sources of funding, that would help, too.

On the National scene, membership in the MAA has started to increase again. Starting in the early 90's, membership had been declining. This was not unique to the MAA. Most organizations were experiencing declining memberships. The Flat Earth Society, for example, saw its membership go from 3000 to one, though I understand that it is back up to about 400 now. In response to its declining membership, the MAA cut some of its staff in Washington DC, reduced, but did not eliminate, its new initiatives, and recently has instituted a membership campaign. Something is working, and membership is almost back to what it was before the decline. Still, more members and more active members would be good things. Please encourage your colleagues who are not MAA members to join, and encourage those who are members to come to the meetings. Why not start with the Spring Meeting at Norwich University in Northfield (*not Norwich*) Vermont. Sarah Mabrouk has put together what looks like an excellent program.

The MAA is also trying to reduce costs and reach a wider audience by using more electronic publications. Some Sections are reducing costs as well by publishing their Newsletters electronically. If you think this is a good idea or a bad idea, talk to our Newsletter Editor, Frank Ford, or your incoming Chair, Ockle Johnson. They will surely have to confront the issue in the next few years.

Many of you have probably visited MAAOnline at www.maa.org, and perhaps even followed the link there to our Section website at scsu.ctstateu.edu/~maa_nes, maintained by Ross Gingrich. You may have noticed that MAAOnline and *Focus* now have the same editor, our own Fernando Gouvea of Colby College. There is also the new *JOMA, Journal of Online Mathematics*, and more electronic journals are being considered. If you think this is a good idea, or if you think this is a bad idea, talk to me, your Chair or your Chair Elect, Ockle Johnson or your Governor, Donna Beers. We also have two important national officers in our section, whose ears you could bend on these or other issues. Frank Morgan of Williams College (and a winner of the National Distinguished Teaching Award) is Second Vice President of the MAA, and Jim Tattersall of Providence College (and a winner of the Section's Distinguished Service Award) is Associate Secretary.

So, with all these people doing all this fine work, I'm looking forward to enjoying an exciting and interesting meeting at Norwich in June. I hope to see you there.

Message from the Governor ..... Donna Beers

Hoping to write the Governor's message while the New Orleans AMS/MAA Meetings were still fresh in my mind, I started writing this message on Monday, January 15, 2001, one day after returning from the Joint Meetings. As I finish this report it is Math Awareness Month, and I've just attended one of the NES/MAA dinner meetings where mathematics and mathematics students were beautifully celebrated. Sincere thanks to Lucy Kimball at Bentley College for coordinating this year's dinner meetings, and congratulations to Lucy, Tom Cecil, and Barry Schiller for hosting successful meetings at Bentley College, College of the Holy Cross, and Rhode Island College, respectively.

The January Board of Governors meeting was filled with interesting developments and lots of good news. Here are some highlights of the meeting:

First, through the industry of the MAA staff, the MAA has been awarded funding for several new initiatives. The grants fall into the following categories:

- An NSF grant to fund the new Mathematical Sciences Digital Library (Math DL). This project includes three elements: a new MAA publication, the Journal of Online Mathematics and its Applications (JOMA), which was launched in January; a catalog of mathematics commercial products that is currently under development; and an online collection of mathematics instructional materials with authors' comments and reader reviews that will be ready for view in Fall, 2001.
- An NSF-CCLI grant for faculty enhancement workshops. A total of twenty-six workshops will be held over the next three years. Each year the program will have 8-10 core events, including, for example, workshops, seminars, and distance-learning courses. These events will provide a full range of professional development

experiences such as innovations in teaching and learning, new mathematical ideas and applications, and career advancement or change. Events will include pre-and post-seminar experiences delivered, at least in part, via distance learning technologies.

- A grant from the Akamai Foundation ("akamai" is a Hawaiian word for "cool" or "neat") to support the American Mathematics Competition (AMC). Competitions will now be called "the MAA American Mathematics Competitions presented by Akamai Foundation." In the past, the AMC competition was primarily a test-taking event, with a banquet and guest speaker, plus award ceremony. Now, it will also be a scholarship program and a mathematics enrichment program.
- A grant from the ExxonMobil Foundation to continue funding of Project NExT in 2002, with matching funds from the MAA.
- Funding from the National Security Agency, the NSF, and the Tensor Foundation for a conference for directors of outreach programs for young women. The conference, "Women Count," is being organized by the Women and Mathematics Network under the auspices of the MAA Committee on the Participation of Women, and will take place in Madison, Wisconsin on August 1, 2001, just before MathFest 2001. The purpose of the program will be to disseminate information about current successful outreach programs for young women and to encourage the establishment of more programs throughout the nation.

The bottom line is that the total external support for programs either awarded to the MAA in 2000 or for which the MAA has been notified that an award will be made amounts to about four million dollars.

Here is other MAA news of interest:

- The MAA held successful membership drives during Fall, 2000 (up 4.52% from a year ago)

- Three new members have been inducted into the Icosahedron Society: Andrew Sterrett, ExxonMobil Foundation, and Microsoft Corporation.
- Two Special Interest Groups of the MAA (SIGMAAS) have now been formed: the SIGMAA on Research in Undergraduate Mathematics education and the SIGMAA on Statistics Education. A third one, SIGMAA for Business, Industry, and Government is close to formation.
- MAA grant writing workshops for faculty are underway.
- As I noted in my report to you last fall, the MAA is leading a national study, under the direction of the CUPM, to write recommendations on the undergraduate program in the mathematical sciences for 2010. Last summer, the CUPM solicited a dozen position papers on the undergraduate mathematics curriculum, and in September 2000 it held a conference with the authors. A study document entitled "Mathematics and Mathematical Sciences in 2010: What Should Students Know?" includes the position papers and some preliminary recommendations resulting from the conference. It is available on MAA Online at http://www.maa.org/cupm_text.html. The Calculus Consortium funded both the conference and the publication for Higher Education (CCHE).
- The US will host the 42nd International Mathematical Olympiad (IMO) in July. Called "the grandest high school mathematics competition in the world," the IMO will take place from July 1 through July 14 in Washington, D.C, and at George Mason University, in Fairfax, Virginia. The theme of the 2001 IMO is "Mathematics Expands Horizons." Five hundred of the brightest high school students from more than eighty countries will come together for this event. This

competition is being hosted and organized by the MAA. The U.S. Department of Energy, the National Science Foundation, the National Security Agency, the Texas Instruments Company, and Wolfram Research, Inc. will sponsor it.

In closing, I urge you to attend upcoming MAA events. At home, in the Northeastern Section, Sarah Mabrouk, of Framingham State, has planned a mathematical feast, with mathematics to suit every taste, at the June 8-9 NES/MAA meeting at Norwich University. Later in the summer, please consider attending MathFest 2001, which will take place at the University of Wisconsin at Madison during the first week in August. This promises to be a lively meeting, with the Hedrick Lecture Series on wavelets to be given by Ingrid Daubechies; invited lectures by Judith Grabiner, Frank Morgan, and Michael Starbird, and Thomas Banchoff; Minicourses on the Mathematics of Decision Making, Making Liberal Arts Mathematics the Most Important Course Students Take to Learn Effective Thinking, Contemporary College Algebra: A Reformed College Algebra Course, An Introduction to Mathematical Card Tricks, Cwatsets: A Research Experience for Undergraduates, and Teaching Introductory Statistics Using a Workshop Approach; and much more. I look forward to seeing you at these and other upcoming mathematics events.

Two-year College Representative's Report ..... Kathy Bavelas

The entire region will help host **AMATYC 2001 in Toronto, Canada, from November 15 - 18, 2001.** The program is wonderful, and we have theater tickets to "The Lion King" and "Mama Mia" reserved for members.

From the Newsletter Editor ..... Frank Ford

Ah, Springtime in Vemont! Come and experience it at the June meeting in Northfield. Sarah Mabrouk has produced an exciting program with many options and Ron Poodiack is setting up the local arrangements. Ron suggested, facetiously, I hope, that he may need people to help shovel paths to

the buildings. The details for the meeting are in this newsletter.

I also want to congratulate Ockle Johnson on his election as Chair-elect of the section and Ann Kizanis on her election as Secretary-Treasurer. Our long-time secretary-treasurer Betsey Whitman is retiring this year and we should all thank her when we see her for a job well-done. Finally, Kathy Bavelas was re-elected two-year college representative and will continue her excellent service.

You have received a mailing on the short course at Western New England State College and the information is repeated in this newsletter. I hope many will attend it.

Student Papers Presented at the Fall 2001 MAA/NES Section Meeting:

Curricular Module for Illustrating a Graph
Alok Shrestha, Connecticut College, Motzkin Paths and
Timothy J. Brzezinski, Central Connecticut

Lattices on Parabolic Trees
Dennis Clark, Harvard University

Analysis of Wireless Data Transmission
Rachel Rubin, Amherst College

The Finite Diophantine Appoximation
Rungporn Roengpitya, Williams College

The Finite Diophantine Appoximation
Julia Snyder, Williams College

On Zero-Sums and a Problem of Erdos
David J. Grynkiewicz, Bates College

Cosets in the Churchtower
Ian Pierce, Fitchburg State College

Polynomial Representations of Trefoil
Lee Stemkoski, Boston University

The Space of Polynomial Knots of Degree
Peter Kim, Massachusetts Institute of

Popping the Double Bubble
Yvonne Lai, Massachusetts Institute of

Isoperimetric Inequality on a Plane.
Kapil Mishra, Connecticut College

Contributed Papers Presented at the Spring 2000 Meeting

Math Learning Games in the College Classroom
Andrew Perry, Springfield College

Preparing Teaching Assistants to Teach University Level Mathematics
Thomas C. DeFranco, University of Connecticut
Jean McGivney-Burelle, Unviersity of Connecticut

Quadrature of a Cubic Segment
Vince Ferlini, Keene State College

Neighborhood Structures: A Generalization of Topologies
Mike Cullinane, Keene State College

Rational Functions Whose Zeros and Poles are Constrained by Conditions Arising in Control
Rebecca Sparks, University of Rhode Island

Natural Functor That Maps Injective Objects of One Category to Injective Objects of Another Category
Christopher Aubuchon, Johnson State College

Hamiltonian cycles in some subgraphs of the hypercubes
Mahmoud El-Hashash, Bridgewater State College

On $x_{n+1}=max\{1/x_n, A_n/x_{n-1}\}$ with a Period 3 Parameter
Michael Radin, University of Rhode Island

On a Rational Difference Equation
Lynn Carole McGrath, University of Rhode Island

A Restriction on Tree-Tolerance Representations for Cycles
Mary Ann Saadi, University of Rhode Island

New Faculty Talks

A brief introduction to lattice theory
Kevin Blount, Boston College

Homological Algebra, Me, and Teaching
C. Joanna Su, Providence College, Rhode Island

Global Behavior of Solutions of $x[n+1] = max\{A, x[n]\}/(x[n]\,x[n-1])$
Chris Teixeira, Rhode Island College

Diagonalization in infinite dimension
Raimondo Kovac, Rhode Island College

Computers in the Classroom: how do they really work?
Kethryn Sanders, Rhode Island College

Jordan algebras, triple systems and pairs

Alain D'Amour, Southern Connecticut State University
Fractal Scaling Properties of Cluster Growth Models
Eric Kuennen, Simmons College
Excursions and the Extension Problem
James Wright, Green Mountain College
The latest research in New Math Teacher Induction.
Ken Matthews

Paul Blanchard of Boston University wins the Northeastern Section Distinguished Teacher Award for 2001

Paul Blanchard became the second professor from Boston University to win the Northeastern Section's Distinguished Teacher award. Only Williams College has won more of these awards in our section. He has written a popular textbook in Differential Equations and has received NSF grants. The most interesting point in his application was the fact that he sat in on an engineering course which his students were taking so he would be able to make the connections between that course and his course. His award places him in contention for one of the three Haimo Teaching Awards which will be chosen at Mathfest. His award also entitles us to hear him speak at the Fall meeting at Bridgewater State. The award will be officially presented at the banquet of the Spring meeting at Norwich University.

Short Course on Interdisciplinary Lively Application Projects June 17-20 at Western New England College, Springfield, MA

Interdisciplinary applications can be used to weld mathematics with the concepts of other disciplines to provide student growth in modeling and problem solving. This workshop will discuss projects that can be used in mathematics courses such as pre-calculus, calculus, differential equations, linear algebra, discrete mathematics, and probability and statistics, as well as address the process of designing and building projects. The applications are related to subjects in chemistry, biology, physics, engineering, economics, technology, and social sciences. Projects are designed to take 4-6 hours of

student effort and can be done in groups or individually. Most projects require computer or calculator use.

The projects have been designed to connect the mathematics curriculum with other disciplines, motivate students to use and reinforce their mathematics, and add student relevance to the mathematics curriculum. There will be hands-on experience, with materials prepared for students and instructors in printed, video, and multi-media formats. Participants will learn about the process of designing and building ILAPs and will be guided in developing projects for their own courses. In addition, discussion of technical writing and instructor grading of projects will take place. Technology will also be addressed and used during the workshop.

Interdisciplinary teams from institutions are encouraged to attend. To a degree, the presenters will gear the problems worked on and discussed to the participant's interest.

Scehdule:
Sunday 5-8 p.m.
Registration - June 17
Monday Morning - June 18
Introduction to INTERMATH (curriculum models, ILAPs)
Integrated Curriculum Models
Content of Curriculum (7 into 4, growth, pedagogy)
History of Interdisciplinary Lively Application Projects

Monday Afternoon - June 18
Some Possibilities: Pre-calculus - Deck, Fitness
Calculus/DE - Accident
Presentations/Videos - Bungee Cord
Process of Developing Your Own ILAP
Selecting an Application or a Mathematics Topic
Student Requirements
Data/Material Needed
Interdisciplinary Assistance
Tuesday and Wednesday Morning - June 19 and 20

Workshop Sessions for Groups to Develop Their Projects and for In-Progress Discussions Pro
Brainstorming Ideas
Choosing One Project and Outlining Project
Develop Project/Determine Additional Information Required and Sources
Intermittent Progress Reports from Groups
Short Discussions on Technical Writing/Use of Technology/Grading

Wednesday Afternoon - June 20

Reports and Plans
Closure (by 3 p.m.)

About the Presenters

Kathleen Snook is an associate professor in the Department of Mathematical Sciences at the United States Military Academy at West Point. She received her doctorate in Curriculum and Teaching (Mathematics Education) from Boston University. She has served as an editor of Interdisciplinary Lively Applications Projects (ILAP) since 1995. She has taught a variety of courses from Pre-Calculus to Differential Equations. Her interests include student understanding, student and teacher attitudes and beliefs, use of technology and faculty development.

Gideon Weinstein earned his doctorate from Indiana University and has been an assistant professor in the Mathematics Departments at American University and the U.S. Military Academy. In addition, he has consulted for three educational technology companies. His scholarly publications and presentations revolve around post-secondary mathematics education, mathematics teacher education, technology in education, and quantitative research methods. He has taught a variety of college mathematics courses ranging from developmental algebra to differential equations and enjoys using interdisciplinary projects, cooperative groups, technological tools, writing assignments, and other innovative techniques in his teaching.

Chris Arney has an undergraduate degree from the United States Military Academy (USMA) and a Ph.D. from Rensselaer Polytechnic Institute. He taught mathematics at USMA for 18 years and is the author of several mathematics textbooks and laboratory manuals. Recently, he edited a book containing applications of mathematics: Interdisciplinary Lively Application Projects (ILAPs) published by the MAA. He is the book review editor of ILAPs for COMAP. His areas of research interest include applied mathematics, numerical analysis, and history of mathematics. His teaching interests include

using computers, writing, and interdisciplinary applications in the mathematics and science curricula. He has given numerous workshops on curriculum reform and the use of technology and applications in teaching and learning mathematics. He is the Dean of the School of Mathematics and Sciences at The College of Saint Rose in Albany, NY.

Accommodations

The participants will be housed in the College's newest residence hall that is centrally air-conditioned. The hall is divided into separate living clusters of four suites surrounding their own open living and study areas. Each suite consists of three doubles with living area, small kitchen area, and bathrooms. Single or double occupancy per room will be available. The Short Course will be conducted within the same residence hall. The main dining hall and an extraordinary athletic center are short walks from the residence hall. Access to computing facilities will also be available.

There will be three full meals on Monday and Tuesday, while on Wednesday, only breakfast and lunch will be provided. A reception is planned for Tuesday evening, followed by a lobster fest.

Cost

Registration, Room and Board (all meals as indicated above) is $250 for single occupancy and $220 for double occupancy. For commuters the cost is $110, which includes registration, lunches, reception, and lobster fest.

Please contact (by May 16th)

Dennis M. Luciano, Chair
Department of Mathematics and Computer Science
Western New England College
Springfield, MA 01119
email: dluciano@wnec.edu **Telephone: (413) 782-1275**

Acknowledgements will be mailed immediately. Acceptances with full instructions and details will be mailed by June 1.

Theme of Fall Meeting at Bridgewater State Is Recreational Mathematics

The Fall meeting of the Northeastern Section will be held at Bridgewater State College, Bridgewater, MA on November 16-17, 2001. The theme of this year's

meeting is Recreational Mathematics. Speakers include:

Mark Ramras, Northeastern University;
James Tattersall, Providence College;
Greg Frederickson. Purdue University;
Bill Ritchie, Binary Arts Toy Company; and
Underwood Dudley, DePauw University.

Richard Guy of the University of Calgary will be this year's Christie Lecturer.

In addition to the usual textbook and software displays, there will be displays of mathematical games and puzzles and an MAA book sale.

The Program Committee is Joseph Cleary, Massasoit Community College; Carlos Curley, Stonehill College; Ward Heilman, Bridgewater State College; Thomas Koshy, Framingham State College; Thomas Moore, Bridgewater State College; and Karen Schroeder (Chair), Bentley College.

Section to Host NSF Grant Writing Workshop

The Program Chair for the Spring 2001 Meeting is pleased to announce that our application to host a NSF Grant Writing Workshop has been approved! The workshop, a professional development opportunity, is designed for faculty interested in obtaining external support, in particular from the National Science Foundation, in order to improve their course or curriculum offerings. The workshop will provide information on the availability of funding, current RFP's (requests for funding), how to write, to prepare budgets for, and to submit proposals, the review and rating process, the deadlines, and the notification process. While anyone is welcome to participate, the workshop will focus on the needs of those who have written no or few successful grant proposals.

The workshop, limited to 25 participants, will be held at the beginning of the Spring Meeting on Friday, June 8, 2001, 9 am – 12 pm. The workshop fee of $20, to cover the costs of the workshop materials, can be paid using the meeting registration form. All institutions in our section are encouraged to send a representative. For more information and to be put on the participant list, please contact Sarah Mabrouk (smabrouk@frc.mass.edu).

Presenter for NSF Grant Workshop: Susan L. Forman
Bronx Community College, CUNY

Susan L. Forman is Professor of Mathematics at Bronx Community College, The City University of New York (CUNY). While on extended leave from the College she served as Senior Program Officer for Education at the Charles A. Dana Foundation (1995-97) and as Director of College and University Programs for the Mathematical Sciences Education Board of the National Academy of Sciences (1992-95). Forman has served as First Vice-President of the Mathematical Association of America (1992-94), Chair of the Metropolitan Section of the MAA (1997-1999), and President of the New York State Mathematics Association of Two-Year Colleges (1985-86). She received her PhD in mathematics education and research from Columbia University in 1980.

From the Colleges

Chris Bernhardt of **Fairfield University** reports that the Master of Mathematics program successfully finished its first year, **Irene Mulvey** was promoted to Full Professor, and **Matt Coleman** received the University's Senior Summer Research Fellowship.

Frank Battles reports that **Massachusetts Maritime Academy** has two new tenure track appointments this year. **Ms. Jessica Devonis** has been at MMA since last fall on a one year appointment and prior to this had taught mathematics in the **Falmouth Public School System**. Jessica received her B.S. in mathematics from **Bridgewater State College** and an M.Ed. from **Lesley University**. **Ms. Muge Kanuni** comes to Mass Maritime from the **University of Connecticut** where she is finishing work on her Ph.D. dissertation under the direction of Professor **Eugene Spiegel.** Muge has earned her B.S. from **Bogazici University** and M. S. from **Uconn.**

George Seligman from **Yale University** reminds us that **Vladimir Rokhlin**, a joint appointment with the Computer Science Department, and his former student **Leslie Greengard** , now at **NYU**, won the presitigous Leroy P. Steele award for a seminal paper at the Joint Meetings in New Orleans. The departments VIGRE grant continues to support research at all levels, including summer work for undergraduates. Finally, a series of visiting lecturers in algebraic geometry has been organized.

Thurmon Whitley is pleased to announce that thanks to a grant of $125000 from United Technologies Corp., the Mathematics Department at

University of New Haven has just completed two multi-media classrooms for mathematics usage, as well as for any other department in the university who wants to use computers in instruction. Each classroom contains 12 student and one instructor computer workstations, linked via wireless technology, to the campus network. Each computer contains MatLab, SPSS, and a couple of smaller mathematics packages, as well as the standard Microsoft Office package. Each room also is equipped with a projector linked to the instructor's computer for instructor demonstrations. The Department is also happy to announce that, in September, they will welcome **Dr. Marc Mehlman** to their faculty as Associate Professor. He is currently at **University of Pittsburgh - Johnstown.** And received the Ph.D. degree from the **University of California at Riverside** under **Professor M. M. Rao.**

Tony Julianelle from the **University of Vermont** tells us that that **Heather Galvas** will be joining the math department as an assistant professor in the fall of 2001. She received her Ph.D. from **Western Michigan University** and for the past several years has been at **Grand Valley St. University** in Michigan. Her main area of mathematical interest is graph theory.

NORTHEASTERN SECTION OF THE MAA
SPRING MEETING: June 8 – 9, 2001
NORWICH UNIVERSITY, NORTHFIELD, VT
THEME: Mathematics Potpourri – Something For Everyone

Web site:
http://www.frc.mass.edu/smabrouk/NES-MAA_Spring_2001_Meeting_Program.htm

Friday, June 8, 2001

9:00 – Noon — Susan Forman, Bronx Community College (CUNY)
NSF Grant Writing Workshop*

12:00 – 1:00 p.m. — Lunch (not included in workshop fee)

2:30 – 6:00 p.m. — Registration

2:30 – 3:30 p.m. — Executive Committee Meeting

3:00 – 3:50 p.m. — Carolyn S. Gordon, Dartmouth College
Isospectral Graphs And Surfaces: What Can You Hear?

4:00 – 4:50 p.m. — Ralph D'Agostino Sr., Boston University"
Development, Validation And Transportability Of The Framingham Coronary Heart Disease Risk Prediction Functions (Case Study Of A Successful Exercise In Mathematical Statistical Methods)

5:00 – 5:50 p.m. — Cathy M. Frey, Norwich University
Developing Mathematical Modules For The World Wide Web

5:00 – 5:50 p.m. — Student Papers

6:00 – 6:40 p.m. — Reception

6:45 – 8:00 p.m. — Dinner

8:00 – 8:10 p.m. — Opening Remarks

8:10 – 9:00 p.m. — Battles Lecture: Thomas Banchoff, Brown University
From Providence To Portugal: Surfaces Beyond The Third Dimension On The Internet

Saturday, June 9, 2001

8:00 – Noon — Registration

8:00 – 8:50 a.m. — Nancy Eaton, University of Rhode Island
When Do Near Packings Exist?

9:00 – 9:50 p.m. — V. Frederick Rickey, United State Military Academy

Calculus Classroom Chronicles: Catenaries, Clepsydrae, And Cycloids

10:00 – 10:30 a.m. Break

10:30 – 11:20 a.m. Ezra Brown, Virginia Tech

Square Roots From 1; 24, 51, 10 To Dan Shanks

11:30 – 12:00 p.m. Business Meeting

12:00 p.m. – 1:00 p.m. Lunch

1:00 – 1:50 p.m. Joe McKenna, University of Connecticut

Thought Experiments With Mechanical Systems: Fun And Games With Rubber Bands And Springs

2:00 – 2:50 p.m. Marilyn Durkin, Bentley College

Observations On The Dynamics Of The Complex Cosine-Root Family

3:00 – 3:50 p.m. Contributed Papers

*Workshop enrollment is limited. Please contact Sarah Mabrouk, Framingham State College, by phone, (508)626-4785, or by email, smabrouk@frc.mass.edu, in order to preregister for either the NSF Grant Writing Workshop with Susan Forman or the mini-workshop with Cathy Frey.

Calls for Participation

Student Papers

Undergraduate students are invited to present 15-minute papers on math, statistics, or computer science. Interested students should send abstracts to ojohnson@keene.edu or by mail to Ockle E. Johnson; Department of Mathematics; Keene State College; Keene, NH 03435-2001. E-mail is preferred. Abstracts should include current address, phone number, e-mail address, and name of a faculty sponsor. Those that are accepted will receive prizes and one presenter for each paper will receive free meals and registration at the meeting. Please send information by May 28th.

Contributed Papers Call

Participants are invited to submit contributed papers for the Spring Meeting. We particularly seek papers appealing to a wide variety of participants. Your presentation should be approximately 15 minutes long. Please send an abstract (indicate any special equipment needed) to Tommy Ratliff, Math/CS by e-mail to tratliff@wheatonma.edu by May 28th.

Abstracts and Biographies

Thomas Banchoff
Brown University
Title: From Providence To Portugal: Surfaces Beyond The Third Dimension On The Internet
Abstract

Internet-based communication changes the ways we do mathematics, the way we teach it, and the way we present it to broad audiences. A project that began in New England travels across the ocean in ways that could not have been imagined before. This presentation will revisit familiar themes in new guises, indicating challenges for teaching and learning and exposition, especially in the area of visualizing geometry in higher dimensions.

Bio

Thomas F. Banchoff, a pioneer in the geometry of the fourth and higher dimensions, has been a professor at Brown University since 1967. He received his B.A. from University of Notre Dame and his Ph.D. in 1964 from the University of California, Berkeley. He was a Benjamin Peirce Instructor at Harvard for two years and a research associate at the University of Amsterdam before coming to Brown. In 1998, he was the Walter H. Annenberg Professor of the Year at Brown University and the G. Leonard Baker Visiting Professor of Mathematics at Yale University. His awards and honors include both the Northeastern Section and the National Mathematical Association of America Awards for Distinguished College or University Teaching of Mathematics. On May 19, 2001, Dr. Banchoff will be awarded the honorary degree of Doctor of Science from Rhode Island College in recognition of his contributions to mathematics education. He has served as an Associate Editor for several journals including *Mathematics Magazine* and *Geometriae Dedicata*. In addition to having served as President of the Mathematical Association of America, Dr. Banchoff served on the boards of Common Cause of Rhode Island and the Society for Values in Higher Education. Currently, he is the Chair of the Conference Board for Mathematical Sciences. Information about some of his many projects can be accessed through his web page at Brown University.

Ezra Brown
Virginia Tech
Title: Square Roots From 1; 24, 51, 10 To Dan Shanks
Abstract

This talk is about (CHOOSE ONE)

(a) The oldest mathematical algorithm
(b) Approximations of square roots throughout history
(c) Calculating square roots by hand
(d) The Shanks-Tonelli algorithm for computing square roots modulo a prime
(e) Forty-five minutes long
(f) All of the above

Answer: (f). And what's 1; 24, 51, 10? Come and find out!

Bio

Ezra (Bud) Brown has degrees from Rice and Louisiana State, and he has been at Virginia Tech since the first Nixon Administration. His main research interests are in number theory, especially computational, and discrete mathematics, but he once wrote a paper with a sociologist. At Virginia Tech, he is Project Director of the Emerging Scholars Program in Calculus, a supplemental instruction program that has been very effective in increasing student success in the engineering calculus sequence. He has received several University-wide teaching awards at Virginia Tech and the 1999 MAA Outstanding Teacher Award for the MD-DC-VA Section. In 2000, he received the George Polya Award for expository writing. He occasionally bakes biscuits for his students.

Ralph B. D'Agostino, Sr.
Boston University

Title: Development, Validation And Transportability Of The Framingham Coronary Heart Disease Risk Prediction Functions (Case Study Of A Successful Exercise In Mathematical Statistical Methods)

Abstract

Coronary Heart Disease (CHD) risk prediction functions have been developed over the years by the Framingham Study investigators. Gender specific CHD risk functions have been produced that involve age, blood pressure, total cholesterol, HDL-Cholesterol, diabetes and smoking status. These functions employed categorical variables for all variables except age following the JNC-V (Hypertension) and NCEP (Cholesterol) guidelines. These functions have been validated within Framingham. Further, their performance on other populations has been investigated. These included consideration of the relation of individual risk factors to CHD (relative risk), the ability to discriminate between CHD cases and non-CHD cases and the ability to produce the

correct absolute probability assessment (calibration) of the risk of CHD. We present the results of this investigation. The Framingham functions have validity and are transportable to whites and Blacks. With a simple adjustment for underlying level of risk they are transportable to groups of Japanese-Americans and Hispanics. The presentation illustrates an important contribution of Mathematical Statistical Methods to the fields of Epidemiology and Medicine. The talk will focus on both the statistical and medical aspects.

Bio

Ralph B. D'Agostino (Ph.D., Harvard, 1968) is Professor of Mathematics/Statistics, Public Health and Law at Boston University. He has over 30 years of experience in teaching statistics at all levels from the elementary service courses to advanced graduate courses. He is the recipient of the Metcalf Award for Teaching Excellence. His major fields of research are multivariate analysis, longitudinal studies, epidemiology, clinical trials and outcomes/effectiveness research. He is a fellow of the American Statistical Association and the Cardiovascular Epidemiology section of the American Heart Association. He has been affiliated with the Framingham Heart Study since 1981 and is presently Co-Principal Investigator of the Core contract and Director of data management and statistical analysis for the study. He has also been affiliated with the United States' Food and Drug Administration (FDA), Center for Drugs and Research (CDER) since 1974 as an Expert Consultant to the Biometrics Division, the Over-the-Counter Drugs Division, the Cardiovascular-Renal Drugs Division and the Gastrointestinal Drugs Division. Further, he has served on a number of Advisory Committees and was the Chair of the Nonprescriptive Drugs Advisory Committee (NDAC). He has twice been the recipient of the FDA's Commissioner's Special Citation (1981 and 1995). He is co-author/editor of four books: Factor Analysis: An Applied Approach, Goodness-of-Fit Techniques, Mathematical Models in Health Services Research, and Practical Engineering Statistics. He has served on the editorial board of the *Journal of the American Statistical Association*, *Biostatistica*, and *Statistics in Medicine*. He is presently the North American editor of *Statistics in Medicine*.

Marilynn Durkin
Bentley College

Title: Observations On The Dynamics Of The Complex Cosine-Root Family

Abstract

Many studies in complex dynamics focus on the Julia sets, or sets of chaotic orbits, for

various functions. It is well known that the orbits of the critical values determine the structure of the Julia sets of critically finite functions. Much of the recent research has centered on functions with only one critical value (such as $f(z) = z^2 + c$ or $f(z)=\lambda e^z$), but what happens when a function has more than one critical value? Is it possible for orbits of two different critical values to have different eventual behavior, and, if so, how does this affect the structure of the associated Julia set? In the case of one such function, $f(z)=\alpha\cos\sqrt{z}$, we see Julia sets with structures similar to both the quadratic and exponential cases. Further, we can predict when each of these structures will occur by plotting a bifurcation set of all possible - values. Here we see shadows of the Mandelbrot set along with the surprising result of "Julia-like" sets throughout the bifurcation set. This talk will progress from the basic ideas behind iteration in the complex plane through the topics listed above. If nothing else, there will be plenty of pretty pictures...

Bio

Marilyn (Lynne) Durkin is currently the Chair of the Mathematical Sciences Department at Bentley College. As such, she doesn't get as much time to pursue research as she once did. However, when time permits, her main areas of interest include discrete dynamical systems with emphasis on complex analytic dynamics, specifically Julia and bifurcation sets, application of dynamical systems techniques to analysis of financial time series, and the integration of dynamical systems and its applications into undergraduate and secondary curricula. She developed an undergraduate dynamical systems course for the general population at Bentley and has managed to teach it successfully for the last ten years. Many of the ideas in this course have been presented in articles and workshops directed to undergraduate and secondary faculty throughout the country.

Nancy Eaton
University of Rhode Island

Title: When Do Near Packings Exist?

Abstract

Let G, H, and K be graphs on n vertices. Suppose G' is a subgraph of K isomorphic to G and H' is a subgraph of K isomorphic to H such that G' and H' have no edges in common. Then (H', G') is a packing of H and G onto K. If G' and H' have only a matching in common, then (H', G') is a near packing of H and G onto K. We will see what conditions on G and H are known to guarantee existence of a packing or near packing of G and H onto the complete graph. We will also explore some conjectures.

Bio

Nancy Eaton is an Associate Professor at the University of Rhode Island. She received her B.A. degree from SUNY New Paltz in 1985 and her Ph.D. from Emory University in 1992. Her research area is Graph Theory. She has written papers and collaborated in the areas of Ramsey Theory, set representations of graphs, the random graph, and packings of graphs. She regularly presents papers at international conferences on combinatorics.

Cathy M. Frey
Norwich University

Title: Developing Mathematical Modules For The World Wide Web

Abstract

The World Wide Web has significantly changed the landscape of graduate and undergraduate education. Student access to the Internet makes distance-learning modules a preferred method of instruction for many students and faculty. Mathematics as a discipline has lagged behind this trend in education. The development of meaningful mathematical modules is critical to distributing mathematics education over the Web. This hands-on workshop will demonstrate websites that have been successful in delivering a variety of mathematical topics from a typical undergraduate Precalculus and Calculus course. The workshop will introduce the tools used to develop the demonstrated sites using Mathematica©, MathType© and JavaScript©. Participants will have an opportunity to develop a web page for presenting mathematics over the World Wide Web. To preview a site created with these methods look at http://www2.norwich.edu/frey/TaylorPolynomials/.

Bio

Cathy Frey has been teaching mathematics at Norwich University since 1985. Her areas of expertise are Actuarial Science and presenting mathematics over the World Wide Web. She has developed several web based instructional modules on a variety of topics covered in undergraduate mathematics courses. At the Joint National Mathematical Meetings in New Orleans this past January, Cathy presented her *Taylor Polynomials Web Site* at the contributed paper session entitled "Projects and Classroom Demonstrations that Make a Difference". At the Association for Vermont Independent Colleges Faculty and Staff Retreat in November of 2000, Cathy led the workshop entitled "Current AVIC Examples of Web-based Instruction". She will be on an

Independent Study Leave during the Fall semester of 2001, to further develop mathematical modules for the Web. Cathy graduated with a M.S. in Mathematics in 1985 and a B.S. in Mathematics 1983 both from the University of Vermont. She has also accumulated 175 of 200 credits necessary for Associateship in the Society of Actuaries.

Carolyn S. Gordon
Dartmouth College
Title: Isospectral Graphs And Surfaces: What Can You Hear?
Abstract
The spectrum of a finite regular graph is the eigenvalue spectrum of the associated adjacency operator. The spectrum of a surface is the eigenvalue spectrum of the associated Laplace operator. For example, if the surface is a plane domain, the eigenvalue spectrum corresponds to the characteristic frequencies of vibrations of the domain, viewed as a drumhead. We compare eigenvalue problems on graphs and surfaces and ask what the spectrum tells us about their geometry.
Bio
Carolyn Gordon received her B.S. degree from Purdue University in 1971 and her Ph.D. at Washington University in St. Louis in 1979. She served as a Lady Davis Postdoctoral Fellowship at the Technion and held faculty positions at Lehigh University and Washington University before moving to Dartmouth College in 1990, where she now holds the position of Benjamin Cheney Professor of Mathematics. Her research focuses on Riemannian geometry with emphasis on inverse spectral problems and on the geometry of Lie groups. She and David Webb were awarded a Chauvenet Prize for their article "You can't hear the shape of a drum" this past January. Her hobbies include Tai Chi and swimming, and her great joy is parenting her 7-year-old daughter.

Joe McKenna
University of Connecticut
Title: Thought Experiments With Mechanical Systems: Fun And Games With Rubber Bands And Springs
Abstract
In this talk, I will discuss many numerical experiments that model mechanical systems and which give rise to beautiful and unexpected periodic solutions. Many of these models are motivated by my research on suspension bridge oscillations. I will discuss the connections, and give suggestions for future undergraduate research on differential equations.
Bio

Joe McKenna was born in Dublin in 1948 and did his undergraduate work in University College, Dublin. He then completed his Ph.D. under Lamberto Cesari at the University of Michigan. His research is mainly in nonlinear partial and ordinary differential equations and especially their periodic solutions. Much of his recent work concerns large nonlinear oscillations in suspension bridges. This has been covered in many science magazines such as *Discover, Science News, Inventions and Technology* as well as several undergraduate textbooks on differential equations. He described some of this in a *Monthly* article in 1999, for which he received the Lester Ford Prize at Mathfest 2000. Having previously worked in the Universities of Wyoming and Florida and University College, Cork, he is currently Professor of Mathematics at the University of Connecticut.

V. Frederick Rickey
United States Military Academy
Title: Calculus Classroom Chronicles: Catenaries, Clepsydrae, And Cycloids
Abstract
History is a marvelous tool in the Calculus classroom for it shows students that the ideas that they are learning have been useful in the past and thus may be useful in the future. The incorporation of history allows students to learn about the great masters of the field, to get glimpses of the works they wrote, to see mathematical modeling in action, and to really see how mathematics is done. This will be a talk of examples of how you can incorporate history in your classroom.
Bio
V. Frederick Rickey, a logician turned historian, earned three degrees from the University of Notre Dame (Ph.D. 1968) and then went to Bowling Green State University where he rose through the professorial ranks to become Distinguished Teaching Professor Emeritus. For the past three years he has been at the United States Military Academy, West Point, NY, where he has been teaching the four core mathematics courses that every cadet takes. He has been on leave five times, most recently in Washington D. C. where he was Visiting Mathematician at the MAA Headquarters. While there he was involved in the founding of Math Horizons, a magazine for mathematics undergraduates; became the first editor of electronic services for the MAA and built its first gopher and web pages (both long departed); and wrote a successful NSF grant for an Institute for the History of Mathematics and Its Use in Teaching. Prof. Rickey received the Mathematical Association of America Award for Distinguished College or University Teaching in 1993, the Outstanding Civilian Service Medal from the Department of the Army in 1990, and the George Polya Award for Mathematical Exposition in 1988 for the paper "Isaac Newton: Man, Myth, and

Mathematics," *College Mathematics Journal*, 18(1987), 362-389. His book about the treasures in the West Point Library, *A Station Favorable to the Pursuits of Science: Primary Materials in the History of Mathematics at the United States Military Academy*, with Joe Albree and David C. Arney, was published last year by the AMS and the London Mathematical Society. He has broad interests in the history of mathematics and especially the development of the Calculus. He is very interested in finding ways to use history in the classroom to inspire and to motivate students. He loves teaching and enjoys giving lectures to mathematicians about the history of their field.

Accommodations

Capital Plaza Hotel -- Montpelier, VT
(about 10 miles from Norwich Univ.)
(802) 223-5252
www.capitolplaza.com
Single - $71, Double - $81
Mention "MAA/Norwich meeting" until 2 weeks prior to get special rate. 15 rooms total.

Comfort Inn - Berlin/Barre, VT
(about 8 miles from Norwich Univ.)
(802) 229-2222
Single - $67.50, Double - $76.50
Mention "MAA/Norwich meeting" until MAY 20th
15 rooms total.

On campus - $40/night; available Thursday and Friday nights

Directions to Norwich University

- **From the south:** I-91 to I-89 to Vermont Exit 5. At the stop sign, take a left onto Route 64 (see below).
- **From the southeast:** I-93 to I-89 to Vermont exit 5. At the stop sign, take a left onto Route 64 (see below).
- **From the southwest and west:** I-90 to I-91 to I-89 to Vermont exit 5. At

the stop sign, take a left onto Route 64 (see below).

- **From the north:** I-89 south to Vermont exit 5. At the yield sign, bear right onto Route 64.
    - **From Route 64:** Follow to junction of Routes 64 and 12. Bear right onto Route 12 north. Follow for 2 miles. The university will be on your left. Follow signs for parking.

Registration is in the Eng, Math, Science Complex

About Norwich University

Norwich University is unique among institutions of higher education. Others may make the same claim, but no other university combines a military tradition of nearly two centuries, five of the more innovative low- and non-residency programs in higher education, and a broad range of traditional undergraduate degree programs.

Norwich serves three distinct populations on three separate campuses.

Students who enroll in the Corps of Cadets follow a disciplined military regimen, while civilian students lead a more traditional collegiate lifestyle. Both groups reside on the Northfield campus, attending classes and participating in sports and other activities together. In keeping with its mission, the University provides opportunities for all students to develop leadership skills and a strong commitment to community service.

Adult students are served by a number of programs on the Montpelier and Brattleboro campuses. Both undergraduate and graduate degrees are offered in brief or no residency models on campuses dedicated to the adult learner.

Pre-Registration Form Spring Meeting of the Northeastern Section- MAA
(Online registration form available after May 15th at www2.norwich.edu/rpodiac/MAA/meeting.html)

June 8-9, 2001 Norwich University

Mail this form to : Rob Poodiac
Mathematics Department
Norwich University
158 Harmon Drive
Northfield, VT 05663
e-mail: rpoodiac@norwich.edu, Poodiask@aol.com

Check should be made to: **NES/MAA**

Please Pre-register! You may register at the meeting; however, itwould help to plan the meeting if you pre-register by mail and it will save you money since the on site registration fees are five dollars more than pre-registration fees. Also, meals cannot be guaranteed unless reservations are received by Friday, June 1, 2001. **It may not be possible to buy tickets to the banquet or lunch at the meeting.** Spouses and guests are welcome at all meals.

PRE-REGISTRATION (please type or print):

Name:_____
Institution:_____
Address:_____
_____
_____
Telephone ( ) _____
E-mail:_____

Pre-registration Fee:
MAA Member ($20.00) ;Non-member ($25.00)
Student or unemployed($5.00) $_____

Meals
Reception and Banquet Friday($20.00) $_____
(Banquet will be buffet style and will include some vegetarian)
Luncheon Saturday ($10.00) $_____

On-campus Housing
(Thursday_____, Friday_____ ($40/night) $_____

TOTAL $_____

Frank Ford, Editor
Department of Math/CS
ProvidenceCollege
Providence RI 02908