NORTHEASTERN SECTION

NEWSLETTER

FALL 1995

VOLUME 17 NUMBER 2

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FUTURE SECTION MEETINGS

November 17-18, 1995: Salem State College
Local Arrangements: Mary Platt
Program Chair: Philip Mahler, Middlesex Community College

June 7-8, 1996: Hampshire College
Local Arrangements: David Kelly
Program Chair: Robert Hayden, Plymouth State College

November 22-23, 1996: UMass-Boston
Local Arrangements: John Lutts

OTHER SECTION ACTIVITIES

Minicourse: Babson College, April 20, 1996
Unifying Themes in Discrete Mathematics
Ralph Grimaldi of Rose-Hulman Institute of Technology.
Coordinator: Gordon Prichett, Babson College

Short Course: University of Maine Orono, June 16-21, 1996
Project CALC, David A. Smith and Lawrence C. Moore, Duke University

Regional Dinner Meetings: Spring 1996
Coordinator: Larry Braden, St. Paul's School

NOMINATIONS

1997 NES/MAA Award for Distinguished College or University Teaching of Mathematics: See Page 6
Committee Chair: Donna Beers, Simmons College

CHAIRPERSON'S MESSAGE

Happy Birthday, Northeastern Section! This fall the NES/MAA celebrates its fortieth birthday, and the upcoming NES/MAA meeting at Salem State College on November 17-18, 1995, provides the perfect occasion for our anniversary celebration. The list of speakers includes Doris Schattschneider of Moravian College, one of the leading authorities on symmetry and tilings, who will give the Dan Christie lecture, and Uri Treisman of the University of Texas at Austin, well known for his work in developing supportive communities for helping students learn mathematics. Thomas Banchoff of Brown University, recipient of the 1995 Northeastern Section Award for Distinguished College or University Teaching of Mathematics, will give the Teaching Excellence Award address. And, Colin Adams of Williams College will do double-duty, giving the banquet address as the legendary Mel Slugbate, Scoutmaster extraordinaire, and the Student Chapter Workshop on Saturday.

Two individuals deserve special mention for all their months of work in planning the Fall 1995 program: Philip Mahler of Middlesex Community College, who is Chair of the Fall 1995 Program Committee and is the Two-Year College representative of the NES/MAA; and Mary Platt of Salem State College, who is Local Arrangements Coordinator for the Fall meeting. Many thanks to Phil and Mary and all members of the Fall 1995 Program Committee for a superb program.

Announcements

It is a pleasure to announce that Clayton Dodge of the University of Maine at Orono has been selected as the recipient of the second Howard Eves Award for Meritorious Service. The Howard Eves Award is given every five years, and was established by the NES/MAA to honor individuals who, like Howard Eves, have made outstanding contributions to the Section. Clayton Dodge will be honored at the banquet on Friday night, November 17, 1995 at the Fall NES/MAA meeting.

As well, several other members of the Section will be honored at the upcoming Fall meeting at Salem State College. Beginning this fall, we will recognize our 25-year members at the Friday evening banquet of fall sectional meetings. We will also recognize Thomas F. Banchoff, recipient of the fourth NES/MAA Teaching Excellence Award. And, we will honor Don Small, formerly of Colby College and now at the U.S. Military Academy at West Point, and Clayton Dodge and Grattan Murphy at the University of Maine at Orono, who have for over fifteen years arranged annual June Short Courses at the University of Maine.

It is a pleasure to announce that Larry Braden of St. Paul's School has accepted appointment as the new Regional Dinner Meetings Coordinator, succeeding Judy Carter of North Shore Community College. Many thanks to Judy for her excellent service these past two years in helping to provide outstanding dinner meetings programs.

Spring Events

Plans are well underway for several sectional events in Spring, 1996. As noted above, Larry Braden is coordinating the NES/MAA spring dinner meetings program. If you would be willing to host a dinner meeting or have ideas for speakers, please contact Larry (St. Paul's School, Concord, N.H. 03301-2591; phone: (603) 225-9104).

Also, please save Saturday, April 20, 1996 to attend the NES/MAA minicourse, *Unifying Themes in Discrete Mathematics*, to be given at Babson College by Ralph Grimaldi of Rose-Hulman Institute of Technology. Dr. Grimaldi has given numerous minicourses at the Joint AMS/MAA programs and is the author of *Discrete and Combinatorial Mathematics: An Applied Introduction*. Gordon Prichett of Babson College is the Local Arrangements Coordinator for the Spring 1996 Minicourse.

The Spring 1996 NES/MAA Meeting will take place at Hampshire College on June 7-8, 1996. Robert Hayden of Plymouth State College is chairing the Program Committee and David Kelly of Hampshire College is the Local Arrangements Coordinator.

Also, we have tentatively planned another sectional Short Course, to take place June 16-21, 1996 at the University of Maine at Orono. The topic for the Short Course will be Project Calc, to be presented by David Smith and Calvin Moore of Duke University. Watch for further details in the Spring 1996 NES/MAA *Newsletter*.

Finally, as I finish my term as Chair of the Northeastern Section, I want to thank all of you who have helped and worked with me for the past two years. I have valued your advice and your friendship as we have worked together to provide worthwhile programs for the Section. For fear of leaving someone out, I will not try to list names, but I would like to thank those individuals who worked on Spring 1995 events. Thanks go to Bill Roberts and other members of the Program Committee for the Spring Meeting at Bates College. Thanks, also, to Robin Brooks and Dick Sampson who had charge of the local arrangements. Many thanks, too, to Don Small and Clayton Dodge who did their usual expert job in planning the June 1995 Short Course.

Please join me in extending very best wishes to Rick Cleary of St. Michael's College, who becomes the new Chair of the Northeastern Section at the conclusion of the Fall 1995 sectional meeting at Salem State College. Surely, together, we pledge Rick our support, and I know he can count on the same generosity you have shown me as he sets about to plan future NES/MAA events. Meanwhile, I look forward to visiting with you at the upcoming Fall meeting.

Donna Beers
Simmons College
Chairperson, NES/MAA

SPRING 1996 MEETING

Planning is already underway for this Spring's NES/MAA Meeting which will be held at Hampshire College in Amherst, Massachusetts on June 7-8, 1996. Mark these dates on your calendar!!

The Local Arrangements Coordinator is David Kelly. The Program Committee is chaired by Robert Hayden of Plymouth State College and includes Dennis Luciano and Ann Kazanis of Western New England College, Lucy Dechene of Fitchburg State College and David Kelly of Hampshire College.

GOVERNOR'S MESSAGE

I'm pleased to report that my medical leave is over and that I have returned to teaching at Bentley. The healing process on my shoulder will continue for about another year but it is progressing on schedule.

I was pleased to be able to attend the Board of Governors meeting on August 5 in Burlington. By all accounts, the Burlington meeting was very successful - an excellent program, delightful social events, including a dinner cruise on Lake Champlain, and over one thousand participants. So, it looks like the Summer Meetings are alive and well, at least for the immediate future. Next summer's meeting will be in Seattle.

The MAA national office has been reorganized. Customer service has now been centralized and ordering publications should be greatly expedited. A taskforce on member services has been established under the leadership of John Kenelly. The program of MAA Department Representatives is undergoing some changes. The Section Governors will no longer appoint the representatives. Instead, in the near future, the MAA national office will send a letter to each Department Chairperson asking him or her to appoint a Departmental Liaison. So, thank you to all who have served as Departmental Representatives in the past. If you would like to continue to serve, please contact your Department Chairperson.

The MAA is now awarding certificates to those who have been members of the Association for twenty-five years. These certificates, which are suitable for framing, will be presented to members of the Northeastern Section at the banquet at the Fall Meeting at Salem State College. Certificates are also available for anyone who has been an MAA member for more than twenty-five years. I recently received the list of the over four hundred 26+ year members of our Section. It is most impressive - a veritable *Who's Who in Mathematics.* There are names of those whose textbooks I used as a student and those whose texts I use with my students now; people who were my teachers, mentors and colleagues; people who have served our Section as officers, program committee members, local arrangement coordinators and in so many other capacities. One person has been a member for sixty-seven years. The twenty-five year members have already been contacted about receiving their certificates at the banquet. If you are a 26+ year member and would like to receive your certificate at the banquet (or by mail), please contact me by mail, phone or e-mail by November 10.

As always, I welcome your suggestions and appreciate your support. I look forward to seeing you at Salem State and at the National Meeting in Orlando.

Karen J. Schroeder
Bentley College
Governor, NES/MAA

MINUTES OF THE LAST MEETING

The Spring Meeting of the Northeastern Section was held on June 9-10, 1995 at Bates College in Lewiston, Maine. There were approximately 100 registrants.

Workshops

Geometry Workshop: Connected Geometry by Al Cuoco, Educational Development Center.

The Pólya Lecture

Witnesses for Composite Numbers by Carl Pomerance, University of Georgia.

Invited Papers

The Missing Foundation by Andy Wohlgemuth, University of Maine.
Whither Discrete Mathematics? by Ken Bogart, Dartmouth College.
Math 101-102: Alternatives to Calculus by Sol Garfunkel, COMAP.
Why Teach any Geometry? by Clayton Dodge, University of Maine.
Introducing Maine K-12 Teachers to Chaos and Fractals by Chip Ross, Bates College.
Mathematics Education in the 21st Century: K-Graduate School by Margaret Cozzens, National Science Foundation.
Do We Need Reform Reform? by Rick Cleary, St. Michael's College.
What is Chance? by Laurie Snell, Dartmouth College.

Contributed Paper Session

An Alternative Complete Solution of the Coconuts Problem in Number Theory by Po Kee Wong and Adam Wong, Boston Public Schools and Systems Research Company.

At the Business meeting, numerous items were discussed which are presented elsewhere in this *Newsletter.*

Lynne Durkin
Bentley College
Secretary/Treasurer NES/MAA

PUBLISHERS

We of the NES/MAA would like thank the following text book publishers who exhibited their latest offerings at the Spring of 1995 Meeting held at the Bates College:

Saunders Publications
Gregory C. Duff
Sales Office
200 Academic Way
Troy MO 63379
(800) 227-8398 x1083

Prentice Hall/McMillan
Dorothy Rosene
P. O. Box 1420
Damariscotta ME 04543
(800) 526-0485
rosen_do@prenhall.com

John Wiley and Sons
Brian McGuiness
(508) 463-0392
(800) 225-8945

TEACHING AWARD

As announced in the Spring 1995 *Newsletter*, the recipient of the 1995 NES/MAA Award for Distinguished College or University Teaching of Mathematics is Professor Thomas F. Banchoff of Brown University in Providence, Rhode Island. A scholar, teacher and mathematician, Dr. Banchoff has shared his enthusiasm and love for mathematics in as many ways as possible in order to motivate others to love mathematics. In letters of support of his nomination, Professor Banchoff is described as using great skill, style and enthusiasm in presenting complex ideas in an accessible manner, and in showing that mathematics can be useful and elegant at the same time. He infects his students with his love of mathematics and has inspired many to become mathematicians and teachers.

Dr. Banchoff received his B. A. from the University of Notre Dame and his M. A. and Ph. D. from the University of California, Berkeley. He taught as a Benjamin Peirce Instructor at Harvard and a Research Associate at the University of Amsterdam before joining the faculty of Brown University in 1967 where he has been ever since. Most of his research and teaching has focused on geometry of higher dimensions and visualization by means of computer graphics. In 1978, with Charles Strauss, he produced the computer-generated film *The Hypercube: Projections and Slicing.* The recipient of several NSF grants, he has often collaborated with undergraduate students, including his project on interactive computer graphics laboratories for differential geometry and calculus of surfaces. His publications include *EDGE: The Educational Differential Geometry Environment* (with R. Schwartz), Educational Computing in Mathematics (1988), *Dimensions* in *On the Shoulders of Giants*, National Academy of Sciences/Mathematical Sciences Education Board (1991), *Linear Algebra Through Geometry* (with John Wermer) (1983 and 1991) and the Scientific American Library Volume *Beyond the Third Dimension.*

Professor Banchoff has served as Associate Editor of *Mathematics Magazine* and the *American Mathematical Monthly* as well as Associate Editor of *Geometriae Dedicata* and Acquisitions Editor for the American Mathematical Society. He received the *Lester Ford Award for Exposition in Mathematics* in 1978, the *Joseph Priestly Medal* from Dickinson College in 1985, and the *Philip Bray Award for Teaching Excellence in Natural Science* from Brown in 1993.

As the recipient of this year's teaching award, Tom Banchoff will be a featured speaker at our Fall meeting at Salem State College. The selection committee for the 1996 Award, chaired by Rick Cleary, is already hard at work considering the excellent nominations which have been submitted. The awardee will be announced in the Spring 1996 *Newsletter.* Contact Donna Beers (address on inside cover) for information on nominating someone for the 1997 award.

TRENDS IN INTRODUCTORY STATISTICS COURSES: TOPICS, TECHNIQUES, TECHNOLOGY

This one-day conference for teachers of Statistics in the New England Area is sponsored by the Boston Chapter of the American Statistical Association which is organizing this conference on recent trends in teaching

introductory applied statistics courses.

When: Saturday, March 23, 1996

Where: Framingham State College
Framingham, Massachusetts

The keynote speaker is David Moore of Purdue University. Other presenters include George Cobb, Jacquelin Dietz, Joan Garfield, Robin Lock, and Jeffrey Witmer. Additional support for the conference is being provided by the Framingham State College Mathematics Department, the ASA Section on Statistical Education, the Connecticut Chapter of ASA, and the Rhode Island Chapter of ASA.

ABSTRACT: As statisticians become more involved in statistics education, more findings from research on how students learn statistics become available, and more students have access to computers, many instructors of introductory applied statistics courses are beginning to rethink how they teach their courses. At the same time, many of these courses are taught by instructors whose training is not primarily in statistics. In high schools, statistics courses most often are taught by teachers trained in mathematics. In both two-year and four-year colleges, instructors include mathematicians, economists, psychologists and sociologists, as well as people trained in other fields. The goal of this conference is to bring together instructors of introductory applied statistics courses from these varied backgrounds and institutions to discuss the recent trends in statistics education.

REGISTRATION INFORMATION: Registration packets will be mailed in January 1996. These packets will include a registration form and more details on the conference including a schedule of the days events, information on the contributed paper session, and information on lodging in the Framingham area. If you would like to receive a registration packet, please either mail or e-mail a request along with your name, affiliation, mailing address, phone number and e-mail address to Anne Sevin, Mathematics Department, Framingham State College, 100 State St., Framingham, MA 01701; e-mail: asevin@mecn.mass.edu; phone: (508) 626-4777

The registration fee for the conference will be approximately $35 for members of the Boston, Connecticut and Rhode Island Chapters of the ASA and $40 for all others, payable when the registration form is returned in January.

NEWS FROM NEMATYC

The new officers of the New England Mathematical Association of Two-Year Colleges are President: Joan Bookbinder, Johnson & Wales University; Vice-President: Elaine Previte, Dean College; Treasurer: Gail St. Jacques, Johnson & Wales University; and Secretary: John Jacobs of Mass Bay Community College. Judy Carter of North Shore Community College continues as Newsletter Editor. This year's meeting will be held at Dean College on March 29-30, 1996 and has as its theme *Mathematics for a New Millennium.* If you wish further information regarding this meeting and are not a member of NEMATYC contact Elaine Previte (voice mail: 508-541-1800; e-mail EPrevite@aol.com).

U. MAINE SHORT COURSE WELL RECEIVED

Paul Zorn and Arnie Ostebee of St. Olaf College in Northfield, Minnesota, authors of the textbook *Calculus from Graphical, Numerical, and Symbolic Points of View*, presented their ideas on calculus reform to a group of 36 participants at the annual NES/MAA-University of Maine short course June 18-23, 1995. Many regular attendees were joined by mathematics teachers from high schools, colleges and universities. Although most of the participants were from New England, some came from as far away as Newfoundland, Florida, and Minnesota.

Funded by the National Science Foundation from a grant obtained by Don Small, the week-long session included a general overview of calculus reform, a careful look at the Ostebee-Zorn two-semester text, discussion of philosophical, pedagogical, and mathematical aspects of calculus reform, hands-on experience with both calculators and computers, and discussion, design, and presentation of sample course materials.

The weather cooperated nicely. It rained twice during the course: a brief, light shower as we walked to our first session Sunday evening, and a quick thunder storm as we sat in class Monday evening. It could not have been better weather for the Wednesday trip to Mount Desert Island. We had an exceptionally clear view from Cadillac Mountain, always a pleasant diversion from the days of concentrated mathematics.

It is clear now that "calculus reform", which began around 10 years ago, is not so much a change in course content as a change in teaching methods. Thus the reform movement has far greater applicability than to just calculus or mathematics courses.

The variety in participants' schools and backgrounds helped all to better understand one another's problems and needs. Comments from attenders were most favorable, praising the course and the lecturers, the cooperation between the participants, and the quality of the service and food at the University of Maine.

Next year the short course will be another calculus reform workshop at the University of Maine. We have tentatively scheduled Dave Smith and Lang Moore of Duke University to present *Project Calc* June 16-21, 1996. Details will be available by early March 1996.

Clayton W. Dodge
Short Course Coordinator
University of Maine

DINNER MEETINGS: SPRING 1996

Another round of Regional Dinner Meetings is being planned for the Spring of 1996. If you would be willing to host a dinner meeting (especially if your region was not represented last year) or have ideas for speakers, please contact the Regional Dinner Meetings Coordinator, Larry Braden (St. Paul's School, Concord NH 03301-2591; phone: (603) 225-9104).

CALL FOR STUDENT PAPERS

Students (and recent graduates) from the Northeastern Section are invited to present papers at the Fall Meeting on topics in mathematics, statistics, or computer science. The presentations will be 15 to 20 minutes in length, on either expository work, research projects, employment experiences, or problems from mathematical periodicals. Prizes will be awarded and the registration fee and cost of meals will be waived for one student presenter per paper at the Fall Meeting.

Almost every college/university has students working on projects, problems, and mathematical research. The success of a student paper session depends primarily on faculty members identifying prospective papers, encouraging their students and arranging departmental financial support when possible. If there are no potential student papers on your campus for the Fall Meeting, we urge you to initiate student projects now for presentation at the Spring Meeting.

Interested students should send an abstract and current address, with phone number, by October 27 to: Joseph C. Witkowski, Department of Mathematics and Computer Science, Keene State College, Keene NH 03431. Telephone (603)-358-2555. All proposals will be reviewed by department faculty members.

CALL FOR CONTRIBUTED PAPERS

Participants are invited to submit contributed papers for either the Fall or Spring Meeting. We are particularly interested in papers which will appeal to a variety of participants. Your presentation should be approximately 15 minutes in length. Please send a typed abstract together with a list of any special equipment you may need to Ed Sandifer, Department of Mathematics and Computer Science, Western Connecticut State College, Danbury CT 061810 (203) 837-9351, or via Internet at Sandifer@wcsu.ctstateu.edu. The deadline for the Fall Meeting is October 27 and for the Spring Meeting is May 14.

INVITED SHORT PAPERS

The format of Invited Short Papers will be similar to that of Contributed Papers, but a concerted effort will be made to coordinate the topics with the main theme of the meeting. Consequently, arrangements for Invited Short Papers will be made well in advance.

We would like to accumulate a list of presenters and topics for possible presentation at future meetings. Papers should be for a general mathematical audience and approximately one-half hour in length. Junior faculty are particularly urged to participate.

If you would like to suggest a speaker or a topic, send your ideas and nominations to Ed Sandifer. (See "Call for Contributed Papers" for his address.) The deadline for submission will be **at least two weeks prior** to the deadline for submission of material to this *Newsletter*.

NORTHEASTERN SECTION OF THE MAA
FALL MEETING: NOVEMBER 17-18, 1995
SALEM STATE COLLEGE, SALEM MASSACHUSETTS

Friday, November 16

1:45-6:00 Registration: Ellison Campus Center

2:00-3:00 Executive Committee Meeting

Rhode Island Calculus Reform Project: (four independent sessions)

3:30-4:00 **Limits**
Helen E. Salzberg, Rhode Island College

4:05-4:35 **Derivatives**
Vivian Morgan, Rhode Island College

4:40-5:10 **Sequences and Series**
Lewis Pakula, University of Rhode Island

5:15-5:45 **Differential Equations**
Michael Latina, Community College of Rhode Island

3:30-4:30 **Incorporating the NCTM Standards into the Classroom**
Roberta Kieronski, University of New Hampshire at Manchester

3:30-4:30 **The Internet for Mathematics Educators and Researchers**
(repeated 4:40-5:40)
Joyce E. Anderson and Kendra Song, Salem State College

4:40-5:40 **Towards a New Precalculus Course**
Mako Haruta and Raymond McGivney,
University of Hartford

4:40-5:40 **The Internet for Mathematics Educators and Researchers**
Joyce E. Anderson and Kendra Song, Salem State College

5:50-6:30 Reception

6:30-7:45 Dinner

8:00-8:10 **Welcoming Remarks**
President Nancy D. Harrington, Salem State College

8:10-9:00 **How to Cheat Your Way to the Knot Merit Badge, by Scoutmaster Mel Slugbate**
Colin Adams, Williams College

Saturday, November 18

7:30-11:00 Registration: Ellison Campus Center

8:00-8:50 Student Paper Session

8:30-3:30 Book Exhibits

9:00-9:50 **Student Workshop: Why Knot?**
Colin Adams, Williams College

9:00-9:50 **Patterns in Eigenvalues**
Persi Diaconis, Harvard University

10:00-10:30 Coffee Break and Tour of Book Exhibits

10:35-11:25 **The Christie Lecture:**
Ingenious Mathematical Amateurs-
M. C. Escher (artist) and Marjorie Rice (homemaker)
Doris Schattschneider, Moravian College,
MAA First Vice-President

11:30-11:55 Business Meeting

12:05-1:00 Lunch

1:10-2:00 **Culturing the Change: Attending to the Critical Dimensions of Mathematical Educational Reform**
Philip Uri Treisman, Charles C. Dana Center for Mathematics and Science Education at the University of Texas at Austin

2:10-3:00 **NES/MAA Teaching Award Presentation:**
Interactive Geometry on the Internet-
Where Will it Lead?
Thomas Banchoff, Brown University

3:10-4:00 **Mathematics, Public Policy and Health Care Reform: A Personal Sampler**
Arlene Ash, Boston University School of Medicine

3:10-4:10 Contributed Paper Session

PROGRAM COMMITTEE:

Chair: Philip Mahler, Middlesex Community College
Marilyn Durkin, Bentley College
Karen Graham, University of New Hampshire
Tom Kyrouz, Salem State College

LOCAL ARRANGEMENTS:

Mary Platt, Salem State College

DIRECTIONS TO SALEM STATE COLLEGE

FROM THE NORTH: I-93, U.S. 1, and U.S. 3 all join Route 128 which circles Boston. Follow Route 128 North to Exit 25E and proceed on Route 114 South to Salem and the College.

FROM THE WEST: I-90 (Mass. Turnpike) U.S. 20, and Routes 2 and 9 all join Route 128 which circles Boston. Follow Route 128 North to Exit 25E and proceed on Route 114 South to Salem and the College.

FROM THE SOUTH: I-95, U.S. 1, and Routes 3 and 24 all join Route 128 which circles Boston. Follow 128 South to the Southeast Expressway and proceed North on the Southeast Expressway to Route 1A. Follow Route 1A North to Salem and the College.

FROM BOSTON: Take the Tobin Bridge or Callahan Tunnel to Route 1A. Follow Route 1A North to Salem and the College.

SALEM STATE COLLEGE

Salem State College is a publicly supported institution of higher learning with a broad mission. The College offers a comprehensive liberal arts education and a variety of professional programs. Degree programs are offered at the baccalaureate and masters level. Also, a wide range of credit and non-credit courses courses are offered in the late afternoon and evening programs. The Mathematics Department offers a Bachelor of Arts in Mathematics, a Bachelor of Science with either an Applied Mathematics Concentration, a Pure Mathematics Concentration, or a Computer Science Concentration. The Mathematics Department also offers minors in Mathematics and in Secondary Education.

ACCOMMODATIONS

For those who need to make overnight accommodations:
PLEASE MAKE YOUR RESERVATIONS BY CALLING DIRECTLY.

Days Inn Salem-Danvers
Rt. 128 EX-24 152 Endicott Street, Danvers 01923
Free Continental Breakfast. Three miles from Salem.
Tel: (508) 777-1030
Refer to the NES/MAA meeting at Salem State College.
Rate: $44.95 plus tax

Super 8 of Danvers
Rt 1 North, Danvers 01923
Country setting. Six miles from Salem.
Tel: (508) 774-6500
Ask for corporate rate for the NES/MAA meeting at Salem State College.
Rate: (single/double) $39.00 plus tax

Additional lodging can be found by contacting the Salem Office of Tourism & Cultural Affairs, Salem City Hall, 93 Washington Street. Tel: 1-800-777-6848 FAX: (508) 741-7539

ABSTRACTS/SPEAKERS

The Rhode Island Calculus Consortium Module Project: Some Samples
Limits, Helen E. Salzberg, Rhode Island College
Derivative, Vivian Morgan, Rhode Island College
Sequences and Series, Lewis Pakula, University of Rhode Island
Differential Equations, Michael Latina, Community College of Rhode Island

The Rhode Island Calculus Consortium is a group of university, college, community college and high school teachers who have met regularly for the past few years to discuss the calculus reform movement and how to prepare free-standing modules which can be used to supplement or replace portions of a traditional calculus textbook. The modules are based on previous NSF projects but are intended for those who might prefer an incremental approach rather than full-scale implementation. At this workshop we will show you some samples from various modules. Each of the four sessions are independent.

Professor Helen E. Salzberg has been a faculty member in the Mathematics Department at Rhode Island College since 1969 and is completing her third term as department chair. She is extremely involved with curriculum matters, attended the early meeting on calculus reform in Washington, D.C. and has tried to integrate calculator and computer use in her own calculus classes. She was one of the editors of the Calculus Module Project. She received her undergraduate degree from Brooklyn College, a master's degree from the University of Wisconsin at Madison, and did doctoral work at Cornell University.

Dr. Vivian LaFerla Morgan has been on the mathematics faculty at Rhode Island College since 1974. Her professional interests are in curriculum and instruction in mathematics at the collegiate level. She was awarded the Maixner Excellence in Teaching Award in 1993-1994. She was one of the co-principal investigators of the (NSF) Rhode Island Calculus Consortium Module Project, and is currently co-chair of the RI Calculus Consortium. She has an Ed.D. degree from Boston University.

Dr. Lewis Pakula has been a mathematics faculty member at the University of Rhode Island since 1973 and has had a long-standing interest in the use of technology in mathematics education. He was principal investigator of the RI Calculus Consortium Module Project. He received a Ph.D. in Mathematics from MIT.

Michael Latina has been a faculty member at the Community College of Rhode Island since 1970. His main teaching interests include calculus and differential equations. He has broad experience in both lecture format and self-paced learning environments. Much of his departmental work has to do with curriculum reform. He was one of the co-principal investigators of the Calculus Consortium Module Project. Dr. Latina received a B.S. in Mathematics from WPI and a master's and doctorate degree in Applied Mathematics from Brown University.

Incorporating the NCTM Standards into the Classroom
Roberta Kieronski, University of New Hampshire at Manchester

For the last three years I have attempted to use different teaching

techniques as described in the NCTM Standards. What choices does an instructor have to make when incorporating these techniques? Samples of group work, discover worksheets, and group quizzes from a Calculus I, Precalculus or Finite Mathematics class will be shared and discussed.

Roberta Kieronski received her Bachelor of Science in Secondary Mathematics Education from Southern Connecticut State College and her Master of Science in Mathematics from the University of New Hampshire. She taught for four years at Pinkerton Academy in Derry, New Hampshire and eleven years at the University of New Hampshire at Manchester. She is extremely interested in helping students overcome their mathematics anxiety and agrees with the NCTM Standards that all students are capable of learning mathematics.

The Internet for Mathematics Educators and Researchers
Joyce E. Anderson and Kendra Song, Salem State College

This session will present the Internet and Internet resources for mathematics educators and researchers. It assumes some basic Internet knowledge. Participants are invited to bring knowledge they have of resources, including web sites, and topics they would like to research to the session. Participants will be given temporary accounts so that they can visit web sites during the session. Each session will be limited to 20; tickets will be issued at the registration desk.

Dr. Joyce E. Anderson is an Associate Professor of Mathematics at Salem State College. She received her Bachelor of Science, Master of Science, and Ph. D. in Applied Mathematics from Brown University. In addition to undergraduate and graduate math courses, she teaches in the ESL and First Year Seminar programs at Salem State. She is interested in statistics, geo-information science, and math education.

Kendra Song is a senior mathematics and computer science major at Salem State College. She is also pursuing certification as a secondary school mathematics teacher. She is employed as the Math Department's Computer and Math Technology Lab Assistant. Kendra is the president of the Mathematics Society, a student organization of math majors and minors. She has been a Supplemental Instruction leader for statistics and calculus.

Towards a New Precalculus Course
Mako E. Haruta, University of Hartford
Raymond J. McGivney, Jr., University of Hartford

Based on experiences with graphing calculators in their calculus sequence, the current high school curriculum in Connecticut, and the NCTM Standards, the presenters have recently designed a revised version of precalculus, which had for many years primarily served business students. The new course, which now attracts many students in the health sciences, covers fewer topics, but each in more depth than usual; integrates 4-6 student labs; and depends heavily on the TI-85 graphics calculator. The syllabus, labs and student reactions will be discussed in this presentation.

Mako Haruta received her A. B. in Mathematics from Smith College in

1984 and her Ph. D. in Mathematics from Boston University in 1992. Her dissertation was in Complex Dynamics, supervised by thesis advisor Robert L. Devaney. During her graduate study she took some time off to teach at Buckingham Browne and Nichols, a private secondary school in Cambridge, MA. For the past three years she has been teaching as an Assistant Professor of Mathematics at the University of Hartford. Her current areas of focus are Precalculus curriculum reform and incorporation of labs and technology, specifically graphing calculators, into the classroom. In related work, she has acted as co-leader for a two-summer NSF funded teachers workshop on lab writing, held at the University of Hartford. She has also co-authored several papers and math-science CBL labs for use in secondary school mathematics courses.

Dr. McGivney received his A. B. and M. A. in Mathematics from Clark University and his Ph. D. from Lehigh University in 1968. After teaching at Lafayette College from 1966 to 1970, he joined the faculty at the University of Hartford where he is now Professor of Mathematics. Dr. McGivney has authored texts on precalculus and college algebra with Wadsworth Publishing Co. and written a dozen articles on mathematics and math pedagogy. During 1992-94, he was part of a team of university and high school math and science teachers that visited thirteen high schools throughout Connecticut for intensive three week on-site, in-service institutes discussing the use of technology and the NCTM Standards. He has been part of a calculus reform project at the University of Hartford since 1989, and more recently, has worked with Professors Mako Haruta and Mark Turpin to redesign the one year precalculus/calculus sequence at the University of Hartford.

How to Cheat your Way to the Knot Merit Badge, by Scoutmaster Mel Slugbate
Colin Adams, Williams College

Hi, my name is Mel Slugbate, and I am going to be talking about knots. That's right, tangled up pieces of string. Why would I want to do that? Because it forms the basis of one of the most aesthetically appealing branches of math? Because it has fascinating applications to physics and biochemistry? Because over the last fifteen years, knot theory has seen a renaissance the likes of which last occurred when someone invented the shoelace? Nope. My purpose is to help you earn your knot merit badge, so you no longer need to hang your head in shame when you go to Scout meetings. Everyone is welcome, no previous knot or scouting background is assumed. I'll be seeing you at the talk.

Colin Adams received his Ph. D. in 1983 from the University of Wisconsin. He has spent the bulk of his time since then at Williams College. His research interest are in knot theory and low-dimensional topology. He is the author of the Knot Book, published in 1994 by W. H. Freeman, which gives an elementary introduction to the mathematical theory of knots. He has actively sought to involve undergraduate students in mathematical research. Although he often denies it, he is the brother-in-law of Mel Slugbate, who will be speaking in his stead.

Student Workshop: Why Knot?
Colin Adams, Williams College

A hands-on investigation into various properties of knots. How many sticks does it take to make a knot? What is the human knot number of a knot? How do we know that there are any nontrivial knots?

Patterns in Eigenvalues
Persi Diaconis, Harvard University

Typical large orthogonal matrices show remarkable structure in their eigenvalue distribution. This same structure occurs in the zeros of the zeta function and in particle scattering data. I will show how a little bit of symmetric function theory can unravel the pattern.

The following appeared in *Mathematical People* (Birkhäuser Boston, Inc.):

> His work in statistics is so good that he recently was named a recipient of a MacArthur Foundation Fellowship. As a MacArthur Fellow, Diaconis will receive $192,000 over the five-year period 1982-1987, tax-free with no strings attached. The purpose of the awards, for which applications are neither solicited nor accepted, is to free people from economic pressures so they can do work that interests them. In spite of his mathematical achievements, Diaconis insists that he is better at magic, his first career, than he is at statistics. At 14 he left his home in New York City to wander the world as a professional magician. After ten years on the road, he decided to try college. At twenty-four, he enrolled as a freshman. Five years later he earned his Ph. D. from Harvard. Diaconis applies mathematics to a wide range of real-world problems, claiming that "I can't relate to mathematics abstractly. I need to have a real problem in order to think about it."

The Christie Lecture:
Ingenious Mathematical Amateurs-
M. C. Escher (artist) and Marjorie Rice (homemaker)
Doris Schattschneider, Moravian College, MAA First Vice-President

It is generally believed in the mathematical community that it is impossible today for someone without formal credentials in mathematics to engage in mathematical research or to make any contributions to mathematics. Yet there are subjects with open problems that need no accumulated mathematical arsenal to understand and to attack. I offer two recent examples to illustrate this phenomenon-one the well-known Dutch graphic artist, M. C. Escher, and the other an unknown San Diego homemaker, Marjorie Rice. Each tackled problems that ask which types of shapes can tile the plane, and in what manner. It is illuminating to see how each made the mathematical problems their own, asking their own questions and developing unorthodox notation that was an essential ingredient of their methodical investigations. Each worked alone, essentially in secret, rewarded by the exhilaration of finding some answers to a large puzzle. It is interesting to contrast their questions and methods with those of mathematicians and scientists who have investigated similar questions. The professionals can learn something from the amateurs.

Doris Schattschneider received an M. A. and Ph. D. in Mathematics from Yale University and is Professor of Mathematics at Moravian College in Bethlehem, Pennsylvania. She currently serve as the First Vice-President of the MAA. Her dual interest in geometry and art led naturally to the study of tiling problems and the work of the Dutch artist M. C. Escher. She has authored many scholarly articles on plane tiling and has acted as "Boswell" to reveal to the professional world the mathematical investigations of homemaker Marjorie Rice and M. C. Escher. She is co-author of a book and collection of geometry models: M. C. Escher Kaleidocycles, Pomegranate Artbooks, 1987, that has been translated into 16 European languages. Her most recent book on Escher, Visions of Symmetry: Notebooks, Periodic Drawings and Related Work of M. C. Escher, W. H. Freeman, 1990, was supported by the National Endowment for the Humanities.

Culturing the Change: Attending to the Critical Dimensions of Mathematics Education Reform
Philip Uri Treisman, Charles A. Dana Center for Mathematics and Science Education at The University of Texas at Austin

A decade ago many believed that the reform of mathematics education in our colleges and universities was a matter of deciding what to teach, how to teach it, and, in a growing number of cases, with what technology. Many hoped that increased clarity about the big roles of the curriculum and powerful technology would "dramatize" mathematics education, limiting its role as a critical filter especially for women and minorities. This talk will examine education change from an anthropological perspective. Suggestions for realizing the goals of reform will be offered with reference to promising practices in many sectors of higher education.

Philip Uri Treisman is Professor of Mathematics and Director of the Charles A. Dana Center for Mathematics and Science Education at The University of Texas at Austin. His research and professional interests are in the areas of mathematics education and educational policy with a special focus on questions of minority participation in mathematics and related fields. He serves on the Advisory Board of the National Science Foundation's Education and Human Resource Directorate and on the Board of Directors of the American Association of Higher Education. He is a member of the Association of American Colleges and Universities' National Panel on American Commitments. Since Summer, 1994, he has served as Executive Director of the Texas Statewide Systemic Initiative. From 1990 to 1993, he chaired the College Board's Council of Academic Affairs and served on the Mathematical Sciences Education Board of the National Research Council. He is currently Senior Advisor to the Education Program of the Charles A. Dana Foundation. During the academic years 1989-1990 and 1990-1991, Treisman was E. M. Lang Visiting Professor of Mathematics and Social Change at Swarthmore College. During this period, he also served as the first National Fellow in Residence of the New Jersey Institute for Teaching and Learning. Treisman's study of Black students in calculus courses at the University of California at Berkeley won him the 1987 Charles A. Dana Foundation Award for Pioneering Achievement in American Higher Education. For his work in developing programs that have helped minority students to excel in mathematics, he was named one of three American educators "on the leading edge of innovation" by *Newsweek* in 1989. In 1990, he received a special commendation from the Mathematical Sciences

Education Board of the National Research Council for his efforts at "Making Mathematics Work for Minorities." In July 1992, he was named a MacArthur Fellow.

NES/MAA Teaching Award Presentation:
Interactive Geometry on the Internet - Where Will It Lead?
Thomas Banchoff, Brown University

Increasing access to the World Wide Web provides intriguing opportunities for the communication of ideas in dynamic visual form, in particular, geometric phenomena changing over time and objects defined in higher dimensions. How will this affect the way we teach subjects like several-variable calculus, and how can we devise ways of using this technology to "publish" mathematical results that depend on visualizations? This presentation will illustrate and explore examples from the calculus, geometry, and topology of surfaces in spaces of three and four dimensions, including interactive computer graphics laboratory material for calculus and introductory differential geometry.

Thomas Banchoff has been teaching at Brown University since 1967. He received his B.A. from the University of Notre Dame in 1960 and his Ph.D. from the University of California, Berkeley, in 1964. He has served as an editor of *Mathematics Magazine, The American Mathematical Monthly,* and *Geometriae Dedicata.* He received the Lester Ford Award in 1978, the Joseph Priestly Medallion in 1987, and the Philip Bray Award for Teaching Excellence at Brown in 1993. He is the author of *Linear Algebra Through Geometry, Beyond the Third Dimension,* and a new introduction to *Flatland.* In 1978, he produced the award-winning film *The Hypercube: Projection and Slicing.* Most recently he has been an associate at the Geometry Center, where he constructed his web page, at http://www.geom.umn.edu/~banchoff.

Mathematics, Public Policy and Health Care Reform: A Personal Sampler
Arlene Ash, Boston University School of Medicine

I will briefly describe some of my experiences applying quantitative methods to public policy issues. The main focus of the talk will be on how I and others are using mathematical models to find better ways to pay health care providers.

Arlene Ash holds a doctorate in mathematics and is an Associate Research Professor in Health Care Research (Department of General Medicine) at Boston University School of Medicine. Arlene's participation as an expert witness in the environmental impact hearings for the Seabrook Nuclear Power plants (1978) was her first exposure to free-lance witnessing and expert witnessing; she has since helped win (or negotiate settlements in) several class action suits on behalf of women teachers and other workers, and consulted to government and industry on a range of topics. Since 1984 she has focused on issues relating to health care delivery, and is an internationally recognized expert in developing models to estimate future costs and other outcomes of patient care (e.g., death) as a function of patient risk. She has advised or consulted with many health insurers and providers, and state and Federal agencies, committees and commissions about the need for, and feasibility of, calculating higher payments to providers who treat sicker patients.

FORTY YEARS AGO

The Fall Meeting of the Northeastern Section of the Mathematical Association of America in November will mark the fortieth anniversary of the Section. By the mid 1940s all of the United States and Canada, except the New England States and the Maritime Provinces, belonged to Sections of the Mathematical Association of America. While there was no lack of associations of teachers of mathematics on the secondary school level, there was no regional organization directed towards mathematics at the college level. Nevertheless, the northeastern area was an officially designated region of the MAA and as such was represented on the MAA Board of Governors. In the early 1950s, George B. Thomas of MIT, author of a widely used collegiate calculus text, served as Governor of the region. The Board convened at the Summer and the Annual Meetings and all governors were expected to attend. The Association paid one-third of the first class fare to all sectional governors for attendance to either the annual or summer meeting, but not for both in the same calendar year. First class fare at the time was defined as "the total cost of Pullman accommodations, including taxes and the cost of a lower berth or parlor car seat."

There had been a number of attempts, beginning in the 1930s, to institute regional meetings on a regular basis. On several occasions meetings of national organizations were held in the northeastern region but due to the existing radial transportation network such meetings were held exclusively in the Boston area. A number of college mathematics teachers felt that an annual meeting similar to those held in various MAA Sections was necessary to improve the teaching of mathematics at both the high school and college levels in the region. In addition, they thought that by organizing into a section they would be better able to deal with common problems arising from inter-relations between the collegiate and secondary levels of instruction. Many felt the mathematical stimulation gained by such an association of colleagues of neighboring institutions would benefit the region as a whole.

At the University of New Hampshire, 25 November 1955, the first Saturday after Thanksgiving, a group of mathematicians met to propose the formation of the Northeastern Section of the Mathematical Association of America. There were about eighty in attendance including forty-eight members of the MAA who signed a petition urging the Association's Board of Governors to establish the Northeastern Section.

Albert A. Bennett of Brown organized the program and Howard Eves of the University of Maine served as chair for the committee on arrangements. Registration was held in the lobby of Kingsbury Hall. Dormitory rooms were available at $1.50 per persons per night. Eves chaired the morning session which began at 10 A.M. Morning speakers included Reverend Stanley Bezuszka, S.J. from Boston College who spoke on *A System of Dynamical Analysis.* Ralph Beatley of Harvard explained how to use the law of sines to solve triangle problems in his talk entitled *Concerning Sines and Cosines.* R.E. Johnson of Smith College ended the morning session with a talk on *The Structure of a Ring.* Johnson discussed six basic operations on a ring which generate new rings. The morning session was followed by a luncheon after which a business meeting was held.

At the business meeting Professor Bennett served as temporary chair. Harry Gehman, secretary of the MAA, had planned to run the meeting, but some last minute business prevented him from attending. At the meeting

Eves was elected chair, Reverend Bezuszka, vice chair, and R. E. Johnson secretary-treasurer. A petition to the MAA for the establishment of a section was circulated and a set of by-laws was adopted. The by-laws were fairly straightforward. The executive committee was to consist of a chair, a vice-chair, and a secretary-treasurer. The vice-chair was responsible for maintaining official contact with other mathematical societies. The secretary-treasurer, the only officer eligible for reelection, was responsible for keeping the books, accounts, and records of the Section as well as submitting a report of the meetings to the *Monthly*. The executive committee's charge was to conduct the affairs of the Section between meetings and was empowered to fill any vacancy among the officers until the next meeting. The Section was directed to hold at least one meeting each year. Programs for each meeting were to be arranged by the chair and an appointed committee on arrangement. Dues were set at twenty-five cents per year.

The afternoon session was chaired by Donald Kearns. Robert A. Rosenbaum of Wesleyan began the session by emphasizing the symbiotic relationship between algebra and geometry in *Some Applications of Matrices*. Dirk Struik, no longer under indictment for attempting to overthrow the State of Massachusetts and free to travel to New Hampshire, discussed a few revolutionary combatants with good mathematical training in *Mathematics of Ticonderoga*. Struik discussed the Vauban polygonal style for fortresses from which, through the work of Monge, modern geometry has grown. Struik's account included many adventures of Louis Antoine de Bougainville. Bougainville, immortalized by Diderot who associated his name with those showy climbers native to South America and found in Southern California, was the author of *Traiti du Calcul Intigral*, the first book devoted exclusively to differential equations. The final talk of the session was delivered by R. F. Clippinger of Raytheon who spoke on *The Use of Computers in Industry*. At the close of the afternoon session a tea was held at the home of the President of the University of New Hampshire.

At its meeting of 29 December 1955 in Houston, Texas, the Board of Governors of the Association voted to authorize the establishment of the six New England States and the four Canadian Provinces of New Brunswick, Newfoundland, Nova Scotia, and Prince Edward Island into the Northeastern Section as the twenty-sixth section of the MAA and to approve its by-laws as adopted in November at Durham.

Jim Tattersall
Historian/Archivist NES/MAA
tat@math.ams.org

EDITOR'S MESSAGE

Tuesday, March 12, 1996 is the date when all information for the *Spring Newsletter* must be received by the editor (address on inside front cover). Many thanks to all the contributors to this issue for their timely and well written input.

This November marks the 40th anniversary of the founding of this Section. A special note of thanks to Jim Tattersall, this Section's Historian-Archivist for his article describing the first meeting of this Section. He is also preparing, for distribution at the Salem State Meeting, a booklet containing the series of articles related to the history of this section which have appeared in this *Newsletter* over the past few years.

PRE-REGISTRATION FORM

FALL MEETING OF THE NORTHEASTERN SECTION-MAA

NOVEMBER 17-18, 1995 SALEM STATE COLLEGE

Mail Registration Form to: Mary Platt
Mathematics Department
Salem State College
Salem MA 01970

Checks should be made out to: MAA/NES

PLEASE PREREGISTER! You may register at the meeting if you wish; however, it would facilitate the organization of the meeting if you pre-register by mail and it will save you money in that on site registration fees are five dollars more than pre-registration fees. In any case, meals cannot be guaranteed unless reservations are received by Thursday, November 9, 1995. **It will not be possible to buy tickets to the banquet or lunch at the meeting.** Spouses and guests are welcome at all meals.

REGISTRATION:

Name:_____

Institution:_____

Institution Address:_____

Correspondence Address (if different):_____

_____

Telephone: ( )_____

E-MAIL:_____

PRE-REGISTRATION FEE:

MAA Member ($20.00)
Non-member ($25.00)
Student or unemployed ($5.00) } $_____

MEALS

Banquet
6:30 p. m. Friday: Number ( ) x $20.00 $_____

Luncheon 12:05 p. m. Saturday: Number ( ) x $15.00 $_____

TOTAL: $_____

Northeastern Section MAA
Department of Basic Science
Massachusetts Maritime Academy
101 Academy Drive, Buzzards Bay MA 02532–3400

40th Anniversary Meeting