NORTHEASTERN SECTION

NEWSLETTER

SPRING 1995

VOLUME 17 NUMBER 1

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FUTURE SECTION MEETINGS

June 9-10, 1995: Bates College
Local Arrangements: Robin Brooks and Dick Sampson
Program Chair: Bill Roberts, Plymouth State College

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

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

OTHER SECTION ACTIVITIES

Minicourse: Simmons College, April 29, 1995
An Introduction to Research in the Teaching and Learning of Undergraduate Mathematics: Examples in Calculus
Coordinator: Donna Beers, Simmons College

Short Course: University of Maine Orono, June 18-23, 1995
The St. Olaf College Calculus Reform Workshop
Coordinator: Clayton Dodge, University of Maine-Orono

Regional Dinner Meetings: See Page 21
Coordinator: Judy Carter, North Shore Community College

NOMINATIONS

Howard Eves Award for Meritorious Service: See Page 5
Committee Chair: Karen J. Schroeder, Bentley College

1996 NES/MAA Award for Distinguished College or University Teaching of Mathematics: See Page 10
Committe Chair: Richard Cleary, Simmons College

CHAIRPERSON'S MESSAGE

With the successes of our fall events still fresh in mind, I want to thank Claire Archambault and Cecilia Welna for expertly handling the local arrangements for *Mathematical Aspects of the Music of Bach* at Regis College and the Fall 1994 NES/MAA Meeting at the University of Hartford, respectively. Thanks, also, to Cecilia Welna and to the Co-Chairs of the Fall 1994 Program Committee, Jeffrey McGowan and Yuangian Chen of Central Connecticut State University, for a very strong program. To quote one member of the Section, "There was just one excellent talk after another!"

Spring Events.

After so many years (forty, to be exact!) of excellent speakers and programs, it is hard to imagine how the Northeastern Section can keep finding fresh ideas for new programs; and yet, our program committees continue to do just that. This spring offers a variety of events that we hope will be of interest to you. First, in March and April there will be six NES/MAA regional dinner meetings, with topics ranging from soap bubbles and undergraduate research to symmetry to bridge courses in the undergraduate mathematics major to interactive hypergraphics (refer to Page 21 of the Newsletter for further information). Next, on Saturday, April 29, 1995, Joan Ferrini-Mundy and Karen Graham of the University of New Hampshire will give a NES/MAA Minicourse, *An Introduction to Research in The Teaching and Learning of Undergraduate Mathematics: Examples in Calculus*, at Simmons College (for complete details, see Pages 23-24 of this Newsletter).

In June, two annual NES/MAA events are scheduled. On June 9-10, 1995, the Spring NES/MAA Meeting will take place at Bates College. The theme for the meeting is *After Calculus Reform, What's Next?*. The Program Committee, chaired by Bill Roberts of Plymouth State College, has assembled an impressive roster of speakers who will look at the changes underway in geometry, discrete mathematics, statistics, and, more generally, in undergraduate mathematics education. Robin Brooks and Dick Sampson of Bates College will take care of local arrangements. A detailed schedule for the Spring Program may be found in this Newsletter. Please note that a special feature of the program will be the Pólya Lecture, given by Carl Pomerance, Research Professor of Mathematics at the University of Georgia. In 1990 the MAA Board of Governors established the Pólya Lectureship to honor George Pólya for the high quality of his mathematical exposition and to encourage this high standard in others. Each Section of the MAA is entitled to a Pólya Lecturer approximately every five years. The NES/MAA is honored to have Carl Pomerance give the Pólya Lecture at the Spring 1995 Meeting. Well known for his research in computational number theory, Professor Pomerance was awarded the MAA Chauvenet Prize for expository writing in 1985 for his article, *Recent Developments in Primality Testing*, which appeared in the Mathematical Intelligencer 3 (1981), 97-105. He will speak on *Witnesses for Composite Numbers* (for an abstract and biographical sketch, see Page 18).

In keeping with their 15-year tradition, Don Small, formerly of Colby College and now at U.S. Military Academy, and Clayton Dodge of the University of Maine-Orono have planned a University of Maine/MAA Short Course on the St. Olaf Calculus Project, to take place June 18-23, 1995 at the University of Maine-Orono. The presenters will be Arnie Ostebee and Paul Zorn of St. Olaf College, exemplary speakers and authors of *Calculus from Graphical, Numerical, and Symbolic Points of View*, published by Saunders College Publishing, Harcourt Brace College Publishers. Pre-registration materials have been sent out. See Page 8 for details.

Announcements

It is my pleasure to announce that Thomas F. Banchoff of Brown University has been selected as the recipient of the 1995 NES/MAA Award for Distinguished College or University Teaching of Mathematics. This award was established to honor extraordinarily successful teaching at the undergraduate level. Thomas Banchoff will be honored at the Fall 1995 NES/MAA Meeting at Salem State College where he will be a featured speaker as recipient of the Section's fourth Teaching Excellence Award.

Warm congratulations to our new Section Officers who were elected at last fall's business meeting (see Page 10), and sincere thanks to members of the Nominating Committee, who prepared a strong list of candidates. The NES is grateful to Miguel Garcia of Gateway Community Technical College for his numerous contributions to the Section as our Two-Year College Representative.

I am also happy to announce that Ross Gingrich of Southern Connecticut State University has accepted appointment as the new Student Chapter Coordinator, succeeding Rick Cleary who is now Vice Chairperson of the NES/MAA. Many thanks to Ross and Rick for all their work on behalf of the Section.

Call for Nominations

Nominations are now being received for two Section awards: the 1996 NES/MAA Award for Distinguished College or University Teaching of Mathematics and the Howard Eves Award for Meritorious Service. The deadline for single page letters of support for Teaching Excellence Award nominations is June 17, 1995. For information on how to make a nomination, see Page 9. The Howard Eves Award was awarded for the first time in 1990 and is given every five years. It was established to honor individuals who, like Howard Eves, have made outstanding contributions to the Northeastern Section. The deadline for making nominations is May 15, 1995, and further information is located on Page 5. Please help to identify worthy candidates for these two important Section awards.

Fall Events

The Fall 1995 NES/MAA Meeting will take place at Salem State College on November 17-18, 1995. Mary Platt of Salem State College is the Local Arrangements Coordinator. The Program Committee, chaired by Philip Mahler of Middlesex Community College, has drawn up a list of speakers that includes Doris Schattschneider, Uri Treisman, Colin Adams, Arlene Ash, and Thomas Banchoff. This promises to be an exciting program. See Page 22 for more details. I hope that the events planned will be challenging and informative for you. Ideas for new programs would be gratefully received. I look forward to visiting with you at upcoming spring events.

Donna Beers
Simmons College
Chairperson, NES/MAA

GOVERNOR'S MESSAGE

This semester, I'm home on medical leave recuperating from shoulder surgery. I'm pleased to report that my recovery is progressing on schedule.

I attended the Board of Governors meeting on January 3 in San Francisco. The primary focus of the discussion at this meeting (and during a working lunch) was the future of national Summer meetings. As you may already be aware, attendance at Summer meetings has been declining over the past several years and reached an all-time low last year in Minneapolis. The costs associated with these meetings and the financial losses incurred by the Association are considerable. A question was raised as to whether the benefits derived justify the costs involved. Most of the Governors thought that there were many aspects of the Summer meetings, such as the Hedrick Lectures and programs for students, which could not be incorporated into the already over-scheduled Winter meetings and that, therefore, the Summer meetings should continue.

There was general agreement that these meetings need to be made cost-effective and to do that attendance needs to be increased and costs need to be cut. Some of the suggestions for cost reduction included processing meeting registrations by using temporary help in the Washington office, instead of using the services of the Mathematical Meetings Services Bureau and possibly holding the meeting at a hotel rather than on a college campus. Some of the ideas the Board discussed for attracting more members to the meetings included: Holding meetings in areas where the MAA membership is large and near airports to make travel easier; changing the focus of the meetings to professional development in the areas of learning and teaching undergraduate mathematics; having working or discussion groups centered on specific topics or issues; incorporating cooperative learning workshops; not making the Summer meetings mini-clones of the Winter meetings; conducting minicourses on teaching styles; holding workshops to assist tenure-track faculty in developing a portfolio; having a one-week short course as an adjunct to the meeting; trying to attract local high school teachers; and polling the membership to determine what would attract them to a Summer meeting.

While the MAA is not going to conduct a national poll on the topic of Summer meetings, I'd be interested in knowing your reactions to the ideas listed above and what other suggestions you have on this issue. If you've attended Summer meetings in the past, what changes would make the meetings more attractive to you? If you've never attended a Summer meeting, what kind of programming would make you want to attend?

Since this Summer's meeting will be held in our Section, this is the perfect time to attend a national meeting. Mark your calendar for August 6-8 in Burlington, Vermont. There will also be Joint Summer Meetings with the AMS in 1996. After that, it will have to be decided as to whether or not these meetings will continue.

By now you should have received the call for nominations for the Howard Eves Award for Meritorious Service. This award will be given at the Fall Meeting of the Northeastern Section. See Page 5 for a reprint of this request.

As always, I welcome your suggestions and appreciate your support. I look forward to seeing you at a Section meeting and at the National meeting in Burlington.

Karen Schroeder
Bentley College
Governor, NES/MAA

HOWARD EVES AWARD FOR MERITORIOUS SERVICE

Nominations, in the form of a brief letter, are requested for the Howard Eves Award for Meritorious Service. This award, which was first given in 1990, is given at the annual Fall Meeting of the Northeastern Section in calendar years which are divisible by five.

Guidelines are as follows:

(i) The recipient should reflect those characteristics of Howard Eves that placed him at a level of high esteem by the entire mathematical community. In particular, he was a spellbinding and entertaining lecturer, an enthusiastic and caring teacher and administrator, an outstanding mathematiciangeometer, and a respected historian of mathematics. He was a person with a great sense of humor who went out of his way to pass on his skills and knowledge to his students and colleagues. The recipient should exhibit several if not all of these Evesean characteristics.

(ii) Howard Eves was instrumental in founding, organizing, promoting, and providing the necessary leadership for the Northeastern Section in its early existence. The recipient should be recognized by his or her outstanding contributions to the Section. The majority of these contributions should have been accomplished at least ten years prior to the awards ceremony.

(iii) Past recipients of this award and past recipients of the MAA Certificate for Meritorious Service are ineligible as are members of the Selection Committee.

Please send a letter of nomination, no later than **May 15, 1995** to

Professor Karen J. Schroeder

Mathematical Sciences Department

Bentley College

175 Forest Street

Waltham MA 02154-4705

E-mail: kschroed@bentley.edu

fax: (617) 891-2457

The Selection Committee consists of Donna Beers, Richard Cleary, Marilyn Durkin, Philip Mahler and Karen Schroeder, Chairperson.

MINUTES OF THE LAST MEETING

The Fall Meeting of the Northeastern Section was held on November 18-19, 1994 at the University of Hartford in West Hartford, Connecticut. There were approximately 170 registrants.

The Christie Lecture

A Balancing Act by Robert Rosenbaum, Wesleyan University.

NES/MAA Teaching Award Presentation

The Mathematics Behind the Mandelbrot Set by Robert Devaney, Boston University.

Student Chapter Workshop

Generalization and Variation by Joe Gallian, University of Minnesota-Duluth.

Invited Papers

New Directions for the Differential Equations Course by Anne Noonburg, University of Hartford.
Baseball Statistics Are Alive and Well (In Spite of the Strike) by Steve Krevisky, Middlesex Community-Technical College.
Math Connections: A Secondary Mathematics Core Curriculum Initiative and College Admission by June G. Ellis, Hartford Alliance for Mathematics and Science Education.
Mathematics and the Other Arts by Ken Hoffman, Hampshire College.
Breaking Drivers' License Codes by Joe Gallian, University of Minnesta-Duluth.
An Introduction to Mathematical Biology by William R. Derrick, University of Montana.
The Mathematics of Simple Voting by Alan D. Taylor, Union College.
You Can't Hear the Shape of a Drum by Carolyn Gordon, Dartmouth College.
Projecting Class by Alice Burstein, Middesex Community-Technical College.

Invited Short Paper

How to Enter and Succeed in the Mathematics Contest in Modeling by Theresa Sandifer, Western Connecticut State University.

Contributed Paper Session

Partial and Total Derivatives in Retarded Force Equations by Domina Eberle Spencer, University of Connecticut, Uma Y. Shama, Bridgewater State College and Philip J. Mann, University of Connecticut.
Partial and Total Derivatives and the Force Between Current Elements by Domina Eberle Spencer, University of Connecticut, Uma Y. Shama, Bridgewater State College and Philip J. Mann, University of Connecticut.
Partial and Total Derivatives and the Hairpin Experiment of Ampere and de la Rive by Shakib Saria and Domina Eberle Spencer, University of Connecticut.
What is Going On in Precalculus Reform: A Report on a Conference: "Functioning in the Real World" by Barry Schiller, Rhode Island College.

Student Paper Session

Mathematical Aspects of Chemical Chirality by Kathyanne Barnett, Lyndon State College.
Mayan Mathematical Procedures by Brian A. Carn, Rhode Island College.
The DNA Helix by Loanne M. Hayes, Lyndon State College.
How We Spent Our Summer Vacation or A Report on Summer Research Opportunities in Mathematics by Sherri DiBernardo, Zijin Shen and Michelle Williams, St. Michael's College.
The Teichmuller Experiment by Deva Van Der Werf, Bowdoin College.

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 following text book publishers exhibited their latest offerings at the Fall of 1995 Meeting held at the University of Hartford:

Actex Publications
140 Willow Street
P.O. Box 974
Winsted CT 06908
(203) 379-5470

AK Peters, LTD.
289 Linden Street
Wellesley MA 02181
(617) 235-2210
(617) 235-2404 (FAX)
kpeters@math.harvard.edu

Addison-Wesley
1 Jacob Way
Reading MA 01867
(617) 944-3700

Prentice Hall
Sandi Hakanson
421 Cedar Ridge Drive
Glastonbury CT 06033
(203) 657-4045
HakanSa@Prenhall.com

Wm. C. Brown Publishers
Erin Flaherty
85 Highgate Road, Apt. C5
Newington CT 06111
(203) 666-1548
erin@wcbc.com

Wadsworth-Brooks/Cole-PWS
Drew Hall
32 Hampden Street
Northhampton MA 01060
(413) 586-0883

Janson Publications
Eric Karnowski
450 Washington Street, Suite 107
Dedham MA 02026
(617) 326-0009
Jansoninfo@AOL.com

West Publishing Company
Kate Grossheart
(203) 632-7129

ST. OLAF CALCULUS FOR SHORT COURSE

Arnold Ostebee and Paul Zorn of St. Olaf College, with funding from the National Science Foundation, will present the short course at the University of Maine June 18-23, 1995. The current wave of "calculus reform" began around 10 years ago. The need for change is widely accepted, and "reformers" consistently call for leaner, more conceptual courses, focused more on ideas than on routine techniques; courses that reflect modern technology, both in content and in pedagogy.

The short course will include five main elements: (1) a general overview of calculus reform, and various projects' strategies to achieve it; (2) a careful look at the Ostebee-Zorn two-semester text, *Calculus from Graphical, Numerical, and Symbolic Points of View*, copies of which will be given to participants; (3) discussion of philosophical, pedagogical, and mathematical aspects of calculus reform; (4) hands-on experience with mathematical computing (both calculators and computers); (5) discussing, designing, and presenting sample course materials. Activities will include (brief) lectures, presentations, group discussion, and small-group work.

Arnold Ostebee is Professor of Mathematics and Chair of the department at St. Olaf College. He received his Ph. D. in mathematical physics from SUNY/Stony Brook in 1977, and has taught at St. Olaf since 1980. He has organized and conducted many workshops in various areas of undergraduate mathematics: pedagogical uses of symbolic computation systems, calculus reform, the use of computer software in differential equations courses, etc. He has served on the MAA/CUPM Subcommittee on Symbolic Computation Systems and is a member of the MAA Committee on Electronic Services. At present, Ostebee is an associate editor of the *American Mathematical Monthly.*

Paul Zorn is Associate Professor of Mathematics at St. Olaf College. He received his Ph. D. in complex analysis from the University of Washington, Seattle. He has taught at St. Olaf since 1981. His special interests, beyond complex analysis, include mathematical expository writing and instructional computing. He has worked on calculus reform projects since the Tulane conference in 1986, where he was an author and participant. He is now associate editor of the *American Mathematical Monthly* and Editor-elect of *Mathematics Magazine.*

Participants pay only their transportation to and from Orono and a non-refundable $20 acceptance fee upon notification of acceptance. For further information contact Clayton W. Dodge, 5752 Neville/Math, University of Maine, Orono, ME 04469; Tel. 207/866-4849 or 207/581-3908 (voice mail); E-mail: dodge@gauss.umemat.maine.edu.

ENHANCING COLLEGE MATHEMATICS WITH COLLEGE MATHEMATICS

From July 31 - August 4, 1995, Rhode Island College in Providence, Rhode Island will host a one week workshop for college faculty featuring "hands-on" use of calculators in teaching and learning algebra through calculus, and statistics. Pedagogical, testing, and implementation issues will be incorporated. The TI-82 and TI-85 graphing calculators will be used extensively.

The workshop will teach faculty how to incorporate graphing calculators into college mathematics classes. Discussions will include how to incorporate graphing calculators into your curriculum, teaching styles, and how to test. Calculator-Based Laboratory (CBL) systems will also be demonstrated.

Dr. Donna Christy, Rhode Island College, is the instructor for this course. The cost is $150 which will include instructional materials, lunches and snacks.

For more information, please contact the local coordinator, Dr. Ann Moskol, Mathematics Computer Science Department, Rhode Island College Providence, RI 02908 EMAIL: AMOSKOL@RIC.EDU

1996 NES/MAA AWARD FOR DISTINGUISHED COLLEGE OR UNIVERSITY TEACHING OF MATHEMATICS

Nominations are now being accepted for the 1996 NES/MAA Award for Distinguished College or University Teaching of Mathematics. Any member of the Northeastern Section may nominate any other NES/MAA member for this award.

Help identify those who should be considered for this award!

Send for a nomination form

or

Send a one page letter in support of an outstanding teacher

and the Selection Committee will ask the candidate's Department Chairperson to complete the nomination form.

Recipients of the Section Awards are eligible to receive a National MAA Award. As established by the Board of Governors, the awards are to be made to teachers of mathematics at the post-secondary level who have been widely recognized as extraordinarily successful. Their teaching effectiveness must be documented and must have had influence beyond their own institutions. Recipients of the National awards must be members of the MAA teaching in the United States or Canada.

Contact: Professor Richard Cleary
Department of Mathematics
St. Michael's College
Colchester VT 05439
(802) 654-2510
CLEARY@SMCVAX.SMCVT.EDU

Single page letters of support should be received by June 17, 1995.
Completed nomination forms must be received by October 1, 1995.

MEET THE NEW SECTION OFFICERS

The following were elected Section Officers at the Fall of 1994 Meeting. Congratulations to each of them!

VICE-CHAIRPERSON: Rick Cleary, St. Michael's College

Rick received his B.S. in mathematics from SUNY-Oneonta in 1978, his M.A. in mathematics from UMass-Amherst in 1980 and his Ph.D. in statistics from Cornell University in 1993. He was in charge of local arrangements for the Section's Spring Meeting in June of 1988, has served as Student Chapters Coordinator since July of 1993 and was coordinator for the Vermont Region's NES Dinner meeting last April. He was a co-presenter of the Section's minicourse *Teaching the Introductory Computer Course held at the College of the Holy Cross in April of 1994*. He is a member of the Board of Directors for the Speaker Bureau of the Vermont Mathematics Coalition.

SECRETARY-TREASURER: Marilyn (Lynne) Durkin, Bentley College

Lynne has served as Secretary-Treasurer of the Section for the past two years. She was Program Chair for the Section's Fall of 1992 meeting at Trinity College and an invited speaker for the Spring of 1993 meeting held at U-Mass-Dartmouth. She has presented a course on *Chaos, Fractals and Dynamics* at a National MAA meeting and for the Texas Section. She co-taught (with Bob Devaney) the student minicourse held at Roger Williams College in the Spring of 1990 and has also presented a similar student course for the Texas Section. She is a member of the MAA Speaker's Bureau.

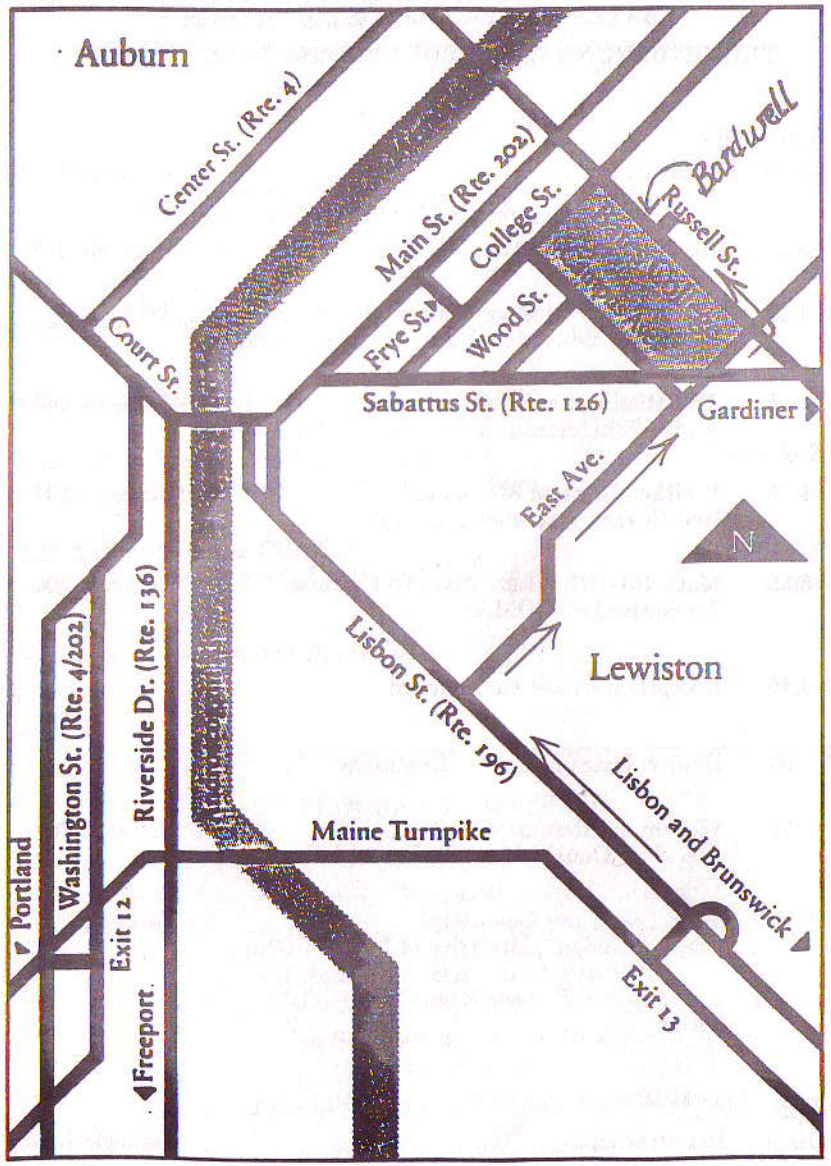
TWO-YEAR COLLEGE REPRESENTATIVE:
Philip Mahler, Middlesex Community College

Phil served as *Newslettery* editor for the Section from 1984 to 1987 and was on the Program Committee for the Spring of 1989 Section meeting held at Keene State College and the Spring of 1983 Section meeting held at Bowdoin College. In the 1970's, he served as Vice-Chairperson for the Michigan Section and was on the Program Committee for the National Meeting of the MAA held in Ann Arbor. He served as the Chair for the annual meeting of the New England Mathematics Association of Two-Year Colleges and is a past- President of NEMATYC. He was in charge of local arrangements for the national meeting of the American Mathematical Association of Two-Year Colleges which was held in Boston in November of 1993. He is Program Chair for the Section's Fall of 1995 Meeting to be held at Salem State College.

NEWS FROM NEMATYC

The annual meeting of the New England Mathematical Association of Two-Year Colleges, **NEMATYC'95**, is being held at Johnson & Wales University on April 7-8, 1995 in Warwick, Rhode Island and is being chaired by Professor Joan Bookbinder of Johnson & Wales. This is the first two-day conference held by NEMATYC.

If you are not attending this meeting but would like to join NEMATYC and receive their *Newsletter* please send $5.00 to: Professor Joan Bookbinder/NEMATYC, Johnson & Wales University, 8 Abbott Place, Providence RI 02903.



NORTHEASTERN SECTION OF THE MAA
SPRING MEETING: JUNE 9-10, 1995
BATES COLLEGE, LEWISTON MAINE
THEME - BEYOND CALCULUS REFORM: WHAT'S NEXT?

Friday, June 9

2:00-6:00	Registration	Carnegie Lobby
2:00-3:00	Executive Committee Meeting	Carnegie 230
3:00-4:55	**Geometry Workshop: Connected Geometry** Al Cuoco, Educational Development Center	TBA
3:00-3:55	**The Missing Foundation** Andy Wohlgemuth, University of Maine-Orono	Carnegie 204
4:00-4:55	**Whither Discrete Mathematics?** Ken Bogart, Dartmouth College	Carnegie 204
5:00-5:55	**Math 101-102: Alternatives to Calculus** Sol Garfunkel, COMAP	Carnegie 204
6:00-6:45	Reception: Chase Hall Lounge	
6:45-8:00	Dinner: Bates Memorial Commons	
8:10-8:15	**Welcoming Remarks** President Donald Howard, Bates College	Carnegie 204
8:15-9:10	**Why Teach any Geometry?** Clayton Dodge, University of Maine-Orono	Carnegie 204
9:15-	Social	

Saturday, June 10

7:30-10:30	Registration	Carnegie Lobby
7:45-8:55	Student Paper Session	Carnegie 111

8:30-3:30	Book Exhibits	Carnegie 219
9:00-9:55	**Mathematics Education in the 21st Century: K-Graduate School** Margaret Cozzens, National Science Foundation	Carnegie 204
10:00-10:30	Coffee Break and Tour of Book Exhibits	
10:35-11:30	**Pólya Lecture** **Witness for Composite Numbers** Carl Pomerance, University of Georgia	Carnegie 204
11:35-11:55	Business Meeting	Carnegie 204
12:00-1:00	Lunch: Bates Memorial Commons	
1:15-2:10	**Do We Need Reform Reform?** Rick Cleary, St. Michael's College	Carnegie 204
2:15-3:10	**What is CHANCE?** Laurie Snell, Dartmouth College	Carnegie 204
3:15-4:10	Contributed Paper Session	

PROGRAM COMMITTEE:

Chair: Bill Roberts, Plymouth State College

Bob Hayden, Plymouth State College

Helene Savicki, Dean Junior College

Bill Berlinghof, Hartford Alliance for Mathematics and Science Education

Dick Sampson and Robin Brooks, Bates College

Ann Kizanis, Western New England College

LOCAL ARRANGEMENTS:

Robin Brooks and Dick Sampson

DIRECTIONS TO BATES COLLEGE

Bates College is located in Lewiston, Maine, 35 miles north of Portland, 140 miles northeast of Boston.

Take the Maine Turnpike to Exit 13 in Lewiston. The College is located approximately three miles from the exit. From Exit 13, proceed on the off-ramp to a stop sign. Turn left at this stop sign, following signs for Lewiston, which will take you onto Lisbon Street (Route 196 West). From here, continue 1.6 miles to a major intersection; turn right onto East Avenue. Go straight through three lights onto Russell Street (following signs to Route 202 and Route 4). Proceed on Russell Street through one more light, and take the next left onto Bardwell Street, which brings you onto the Bates College Campus.

See map on Page 11 for details. Follow signs to Registration area once you reach the campus.

ACCOMMODATIONS AND LOCAL ARRANGEMENTS

A block of forty rooms has been reserved at the Ramada Inn, about three miles from the Bates campus. Those desiring to stay at the Inn should contact the Inn directly at (207) 784-2331.

There are also on-campus dormitory rooms available: forty single rooms and eight double rooms, all in suites. The pre-registration form provides a means for reserving single on-campus rooms. If you are interested in sharing a double, please indicate such and the name of your roommate on your pre-registration form.

Questions regarding local arrangements should be directed to Elizabeth Whitaker, Director of Special Projects and Summer Programs, Bates College, Lewiston ME 04240, Telephone (207) 786-6077, E-mail ewhitake@bates.edu or Robin Brooks, Department of Mathematics, Bates College, Lewiston ME 04240, Telephone (207) 786-6141, E-mail rbrooks@bates.edu.

BATES COLLEGE

The Bates tradition of providing a challenging liberal-arts education for men and women began in 1855. With its roots in the turbulent Civil War era, the College has always been committed to human freedom, civil rights, and emotional and intellectual growth. Bates has the distinction of being the first coeducational college in the eastern United States.

There are 1550 students enrolled at Bates; fifty percent are men, fifty percent are women. They come from forty-eight states, the District of Columbia, Puerto Rico, and twenty-eight other countries.

The Mathematics Department provides a broad training in undergraduate mathematics, preparing majors for graduate study and for positions in government, industry, and the teaching profession. Because computing is an important component of mathematics, the department offers courses which provide a background for students wishing to pursue graduate study or a career in computer science. The faculty's background and research interests include algebra, number theory, topology, geometry, computer science, statistics, operations research, linear programming, game theory, mathematical physics, and the history of mathematics.

ABSTRACTS/SPEAKERS

Geometry Workshop: Connected Geometry
Al Cuoco, Educational Development Center

Connected Geometry is an NSF-funded curriculum development project that is producing student modules and teacher implementation guides centered around geometry and visualization. The goal of the modules is to help students develop what we are calling "mathematical habits of mind." The materials are being used in high schools and teacher preparation programs around the country.

This workshop will focus on the *Optimization* module, which looks at geometric methods (symmetry, reflections, contour lines, etc.) for solving optimization problems without calculus. The workshop will involve the use of dynamic geometry software (Cabri) in ways that integrate deduction with experiment.

Al Cuoco's mathematical interests are in algebra and number theory, specifically in Iwasawa Theory in many variables. He taught mathematics at Woburn (MA) High School between 1969 and 1993. Currently, he codirects two projects in the Mathematics Group at EDC: a curriculum development project, *Connected Geometry*, with June Mark and Paul Goldenberg, and a research and development project in precalculus and linear algebra, *Gateways to Advanced Mathematical Thinking*, with Wayne Harvey. His favorite paper, published in 1991 in the *American Mathematical Monthly*, is described by his wife as an attempt to "connect a number system that nobody understands to a picture that nobody can see."

This workshops is limited to 30 participants. Sign up at the registration desk.

The Missing Foundation
Andy Wohlgemuth, University of Maine-Orono

Mathematics can be thought of in terms of two aspects, (1) discovery/deduction, and (2) description/computation. Deductive mathematics asks "what is true about this thing studied" and "how do we know it is true?" Descriptive mathematics asks us to describe some physical or business situation mathematically, and to compute associated values. Descriptive mathematics now dominates mathematics education from grade 1 through calculus. There are several bad consequences of this -- one being that otherwise educated people fail to understand the nature of mathematics. I have a system for teaching deductive mathematics that is much easier to learn than Euclidian geometry, and that should be introduced into the school curriculum prior to geometry and into courses for prospective teachers.

Andrew Wohlgemuth attended the University of Pennsylvania from 1955 to 1959 and received a B. A. in natural science. He taught high-school mathematics in 1959-1960, failing to find a job teaching physics. While in the Navy, he read Courant and Robins' book *What is Mathematics?* and decided to study mathematics. He taught junior-high mathematics for a year and a half after the Navy while waiting to be admitted to graduate school. He attended Syracuse University from 1965 to 1969 and received a Ph. D. in mathematics. Since then he has been on the faculty of the University of Maine. His main research interest has been in mathematical immunogenetics.

His recent interests have returned to public school mathematics, and he hopes to influence its curriculum.

Whither Discrete Mathematics?
Ken Bogart, Dartmouth College

I plan to do a survey on New England schools about their courses and plans in discrete math.

Professor Bogart was graduated from Marietta College with a B. S in Mathematics in 1965 and from CalTech with a Ph. D in Mathematics in 1968. He wrote a dissertation in Lattice Theory with the supervision of R.P. Dilworth. It was at the Bowdoin Summer Conference in Combinatorics led by G.C. Rota in 1970 that he discovered that his mathematical interests were more combinatorial than algebraic. He began teaching at Dartmouth as an Assistant Professor of Mathematics in 1968; he is currently a Professor of Mathematics and Computer Science at Dartmouth and chair of the Department of Mathematics and Computer Science. His work has been in the application of algebra to combinatorics, in the theory of ordered sets, the theory of matroids,and in the applications of combinatorics to problems in the social sciences, operations research, and computer science. He has written *Introductory Combinatorics*, the second edition of which was published in the autumn of 1989 by Harcourt Brace Jovanovich and *Discrete Mathematics*, a freshman level textbook published in January, 1988 by D.C. Heath and Co. He is a coeditor of *The Dilworth Theorems*, the collected works of R.P. Dilworth with commentaries by the editors and others on the significance of the various works. In addition to his interests in mathematics, Professor Bogart is concerned with and has been active at Dartmouth in academic and financial planning for higher education.

Math 101-102: Alternatives to Calculus
Sol Garfunkel, COMAP

For the past four years COMAP has been working on a project to produce an introductory undergraduate course for mathematics and science majors entitled, "Principles and Practice of Mathematics" (Math 101-102). The expressed purpose of this one year offering is to show students the breadth of our subject as an alternative to the introductory calculus sequence. We see this course as a first step in the redesign of the undergraduate mathematics curriculum.

Sol Garfunkel received his Ph. D. in Mathematical Logic from the University of Wisconsin. He taught at Cornell University and at the University of Connecticut, Storrs. For the past 25 years he has devoted his efforts to mathematics education - specifically, curriculum reform. He is the founder and executive director of COMAP (the Consortium for Mathematics and its Applications). He has been the project director on a number of major NSF funded curriculum projects, including the UMAP and HiMAP programs. He has been the host of two television courses - *For All Practical Purposes* and *In Simplest Terms*. He is currently a co-principal investigator on the ARISE Project (a comprehensive high school curriculum program) and Math 101-102.

Why Teach any Geometry?
Clayton Dodge, University of Maine-Orono

Current trends in education are to reduce the amount of geometry taught at all higher levels, and to make the subject more informal. What should we be doing with geometry in high schools and colleges? Where does proof fit in a geometry course? Are we heading in a good direction? How can we increase student interest in geometry?

Professor Clayton Dodge spent a year and a half as an undergraduate at Harvard and completed a bachelor's degree in mathematics at the University of Maine in 1956. After teaching junior high mathematics and science in Ohio for one semester, he returned to the University of Maine as an instructor and completed a master's degree in mathematics in 1959 under Howard Eves. His formal education concluded with a year of graduate study at Brown under an NSF Science Faculty fellowship. For two years he assisted Howard Eves with the Elementary Problem Department of the *American Mathematical Monthly*. Later he was a member of the University of Maine Problems Group for the seven years that it edited that same problem department. In 1981 he assumed the editorship of the Problem Department of the *Pi Mu Epsilon Journal*. His other mathematical interests include geometry and teacher education.

Mathematics Education in the 21st Century: K-Graduate School
Margaret Cozzens, National Science Foundation

Mathematics education in the early part of the 21 st Century will be different at all levels of the educational spectrum. In the elementary, middle, and high schools, students will be working in groups on problems that have multiple answers, problems that involve the use of the calculator, real data, and are relevant to their lives now or in the future. Colleges and universities will have received as students the first wave of students educated under the paradigms, where the NCTM standards have guided the framework and instruction. These freshmen will demand a new format for undergraduate education as well, and in places where the Calculus reform movement has taken hold, they will not be disappointed, but in other places they will. These students will demand participation in their own learning. At the graduate level, students will be exposed to an education that provides them with the requisite knowledge and skills to succeed in industry, business, higher education, areas of the law, etc. Getting a Ph. D to do research in an ivory tower independent of education responsibility will be in the past. How can we prepare ourselves for these changes so that we become *active participants* in the processes, and so the processes *don't do it to us.*

Dr. Margaret Cozzens came to the National Science Foundation from Northeastern University, in Boston, Massachusetts, in August 1991 as a Program Officer in Instructional Materials Development. In June of 1992, she was appointed Section Head for Instructional Materials Development, and she became Director of Elementary, Secondary, and Informal Education Division in December 1992. She received her Ph. D. degree in Mathematics from Rutgers University and has a Bachelor of Arts degree in Mathematics and English from the University of Rochester. At Northeastern University, Dr. Cozzens was Professor and Chairperson of the Mathematics Department. Besides chairing a department with 55 full-time and 200 part-time faculty, she also chaired the Provost's Academic Priorities Committee and the President's Long Range Planning Committee, among others. Dr. Cozzens has

long been involved in education kindergarten through graduate school. She is most likely recognized as the editor of *CONSORTIUM*, a quarterly newspaper that is published by COMAP, the Consortium for Mathematics and its Applications, and is distributed to every high school and college in the country, and with a circulation of over 40,000. She is the author of five books at both the secondary and the college level.

The Pólya Lecture:
Witness for Composite Numbers
Carl Pomerance, University of Georgia

Given a large number, how quickly can you tell if it is prime or composite? All composite numbers are supplied with plenty of witnesses, that is, numbers by which it is possible to quickly tell if the given number is composite. For example, 2 is a witness for 91, since 2 raised to the power 45 is neither 1 nor -1 modulo 91 as Fermat's Little Theorem would assert if 91 were prime. This kind of test is what computer algebra programs often use to check if an input is prime or composite. We shall discuss the validity of this test and give some extreme examples of composite numbers with no small witnesses.

Carl Pomerance is the national MAA Pólya Lecturer for 1993-1995. He received his B. A. from Brown University in 1966 and his Ph. D. from Harvard University in 1972. He taught junior high school here in Massachusetts from 1970 to 1972 when he went to the University of Georgia where he has been ever since, except for visits to the University of Illinois (1978-79), Bell Communication Research (1984-1985) and the Institute for Advanced Study (1990-91). He is the winner of the MAA Chauvenet Prize in 1985.

Do We Need Reform Reform?
Rick Cleary, Saint Michael's College

In the past several years, the MAA has devoted a large portion of its publications and meeting programs to reform efforts in the undergraduate curriculum. While calculus reform has held center stage most recently, programs to improve the teaching of discrete mathematics, statistics and linear algebra have also attracted a great deal of attention. What can we say about the connections between these efforts? What are the theoretical underpinnings that experts in mathematics education cite to encourage these reforms? What can mathematicians do to apply the best outcomes of these labors in all of their courses, without "re-inventing the wheel" each time we discuss a new course? In this talk we provide an overview of these questions by summarizing the state of affairs in calculus and statistics reform. We hope to encourage discussion of recent efforts and speculation of future directions.

Rick Cleary is Associate Professor of Mathematics, and in 1994-95 has been Interim Associate Dean of the Undergraduate College, at Saint Michael's College. He was an undergraduate at Oneonta State, has a master's in mathematics from the University of Massachusetts at Amherst, and earned a Ph. D. in statistics from Cornell University in 1993. He has been active in the MAA since he arrived at Saint Michael's in 1980, and is currently Vice-Chairperson of the Northeastern Section. In addition to working, Rick runs a lot, eats a lot, and tells a lot of stories.

What is CHANCE?
Laurie Snell, Dartmouth College

Absence of design or assignable cause, fortuity; often itself spoken of as the cause or determiner of events, which appear to happen without the intervention of law, ordinary causation, or providence. OEDA magazine of the American Statistical Society about statistics and its use in society. An introductory mathematics course based on current chance events in the news. A biweekly electronic newsletter abstracting current chance news. A web site for materials useful in teaching a CHANCE course. A way of life.

Professor Snell has been teaching mathematics at Dartmouth College since 1953 when he developed, with Professors Kemeny and Thompson, the Finite Mathematics course. His research and writings have been in Markov Chains and their applications. He is currently directing an NSF project to develop a course called CHANCE.

CALL FOR STUDENT PAPERS

Students (and recent graduates) from the Northeastern Section are invited to present papers at the Spring 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, cost of meals and on-campus housing will be waived for one student presenter per paper at the Spring 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 Spring Meeting, we urge you to initiate student projects now for presentation at the Fall Meeting.

Interested students should send an abstract and current address, with phone number, by May 13 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) 837-9362, or via InterNet at Sandifer@wcsu.ctstateu.edu. The deadline for the Spring Meeting is May 13 and for the Fall Meeting is October 24.

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.

At this time, 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*.

CALCULUS: A STUDENT CENTERED APPROACH

A 5-day workshop will be held to provide 30 participants with both an overview of the calculus reform movement and a tutorial on the use of classroom activities and projects in the teaching of calculus. The workshop will focus on the calculus project and activity materials developed at Ithaca College, and on approaches and materials developed at other institutions. Instructors from 2- and 4-year colleges and selected pre-college calculus teachers will be involved. Participants will be given the opportunity to work with new materials and to collaborate with others about ways to fit new approaches into their curricula. The workshop will include an introduction to ways technology can be used to enhance the teaching and learning of calculus concepts, including the use of graphing calculators and a variety of computer software.

Contact: Diane D. Schwartz, Department of Mathematics and Computer Science, Ithaca College, Ithaca, NY 14850-7208
Phone: 607- 274-3107 Fax: 607-274-3474 E-mail:nsfcalc@ithaca.edu

Application Deadline: March 1995 (tentative) Date(s) of Workshop: June 25-30, 1995 Site: Ithaca College, 212 Williams Hall Ithaca, NY 14850

SYMMETRY AND GROUP THEORY: THE OHIO SECTION SUMMER SHORT COURSE

This course will be presented by Doris Schattschneider of Moravian College from June 15-17, 1995 at the University of Dayton in Dayton, Ohio. The course will emphasize a visual, hands-on approach to understanding the symmetry groups of two- and three-dimensional objects through the use of computer software, patterns and tilings, polyhedral models, and videotapes. Many abstract concepts encountered in a first course in group theory can be illustrated in a graphic manner using this approach. The registration fee is $100, while air-conditioned dormitory suites are available for $20 per night per person. For more information, contact Tam Gantner, Department of Mathematics, University of Dayton, Dayton, OH 45469-2316; phone: 513-229-2511; fax: 513-229-2566; email: gantner@udavxb.oca.udayton.edu.

DINNER MEETINGS

This spring the fourth annual round of NES/MAA Regional Dinner Meetings is being held. Shown below is a list of those meetings which are scheduled:

Connecticut Region (3/2)
Coordinator: Ernest Manfred, U.S. Coast Guard Academy
Speaker: Peter Hilton, SUNY Binghamton, *Code Breaking with Alan Turing.*

Eastern Massachusetts Region (3/30)
Coordinator: Joyce W. Williams, UMass-Lowell
Speaker: Frank Morgan, Williams College, *Soap Bubble Clusters and Undergraduate Research.*

New Hampshire Region (4/5)
Coordinator: Larry Braden, St. Paul's School
Speaker: Daniel Teague, North Carolina School of Mathematics and Science, *Mathematical Modeling in Elementary Calculus.*

Vermont Region (4/12)
Coordinator: Priscilla Bremser, Middlebury College
Speaker: Marjorie Senechal, Smith College, *From Symmetry to Disorder: A Paradigm Shift.*

Central Massachusetts Region (4/20)
Coordinator: Thomas Cecil, College of the Holy Cross
Speaker: Marjorie Senechal, Smith College, *From Symmetry to Disorder: A Paradigm Shift.*

Rhode Island Region (4/27)
Coordinator: Frank Ford, Providence College
Panel Discussion: *The Bridge Course - The First Course in Proofs for Undergraduate Majors.*

We are planning now for another series of such meetings for the spring of 1996. If you are interested in serving as a coordinator (especially if your region was not represented for Spring 1995) or in assisting a coordinator please contact Judy Carter, Regional Dinner Meetings Coordinator, Department of Mathematics, North Shore Community College, Danvers MA 01923, (508) 762-4000 x6664.

MODULAR FORMS, ELLIPTIC CURVES AND FERMAT'S LAST THEOREM

This five-day short course, sponsored by the Allegheny Mountain Section of the MAA, will be presented by Professor Fernando Gouvea of Colby College from June 26-30, 1995 at Allegheny College, Meadville, PA. It will include a discussion of Modular Forms and Elliptic Curves and how these subjects are used in the current work on the proof of Fermat's Last Theorem. For more information, contact George Bradley, Mathematics and Computer Science Department, Duquesne University, Pittsburgh, PA 15282-0001; phone: 412-396-5115; email: bradley@duq3.cc.duq.edu.

FALL 1995 MEETING

Planning is well underway for the upcoming Fall meeting, to be held on November 17 and 18, 1995, at Salem State College, Salem, Massachusetts. Local arrangements are being chaired by Mary Platt of Salem State College. The Program Committee consists of Marilyn Durkin, Bentley College, Karen Graham, University of New Hampshire, Tom Kyrouz, Salem State College, and Philip Mahler, Middlesex Community College, Chair. Phil is also the Two-Year College Representative. Section Chair Donna Beers has also been a tremendous help to the committee.

The following are highlights of the mostly complete program. On Friday Helen Salzberg of Rhode Island College, and others, will talk about how calculus reform is being practiced in Rhode Island. Roberta Kieronski, UNH-Manchester, will talk about applying the NCTM Standards in the classroom. Mako Haruta and Ray McGivney of the University of Hartford will talk about recreating the precalculus course. Additionally, Joyce E. Anderson, of Salem State College, will provide an informal introduction to the Internet for mathematics educators and researchers. Colin Adams, Williams College, will bring his interesting studies in knot theory to bear, speaking after the Friday evening banquet, and doing the Student Workshop on Saturday morning.

On Saturday, Arlene Ash, Boston University School of Medicine, will present on the applications of statistics to public health issues. The Christie Lecture will be given by Doris Schattschneider, Moravian College, and MAA First Vice-President. Uri Treisman, nationally renowned for his work on student retention, will share his experience and expertise in a presentation. In addition, the recently named winner of the NES/MAA Teaching Excellence Award, Thomas Banchoff of Brown University, will be a featured speaker.

EDITOR'S MESSAGE

Tuesday, September 12, 1995 is the date when all information for the *Fall Newsletter* must be received by the editor (address on inside front cover). If your material could come to me on an IBM compatible floppy disk as an ASCII file or as an E-mail message, along with a hard copy, that would be very much appreciated.

This summer we have the pleasure of having a national MAA meeting being held in our region. It will be at the University of Vermont in Burlington on August 6-8. Given the somewhat questionable future of national summer meetings (see the Governor's Message on Pages 4-5) and the usual winter locations of such, this may be the last opportunity to attend a "local" national meeting for quite some time. The program and registration information should be appearing in *Focus* shortly.

Many thanks to all the contributors to this issue for their timely and well written input. I would also like to thank C.J. O'Donnell and Laura L. Kelleher of Massachusetts Maritime Academy for their assistance in the preparation and mailing of this *Newsletter* and Dicken's Press of Wareham MA (508-295-0505) for the splendid job they do in printing this *Newsletter* and our other mailings.

NES/MAA ANNUAL MINICOURSE

The NES/MAA Minicourse, *An Introduction to Research in the Teaching and Learning of Undergraduate Mathematics: Examples in Calculus* will be presented on Saturday, April 29, 1995 at Simmons College, Boston, Massachusetts. The presenters will be Joan Ferrini-Mundy and Karen Graham of the University of New Hampshire.

ABSTRACT

Can better understanding of how students learn, and of how teaching affects learning, lead to more effective undergraduate mathematics experiences? We will encourage the formation of working groups interested in pursing this question. Participants will gain first-hand introductory experience with qualitative research methods by viewing data from research studies of the teaching and learning of calculus and by conducting clinical interviews with undergraduate students. An overview of the literature and resources helpful for those interested in "getting started" in research of this nature will be provided. This minicourse was previously given by Joan Ferrini-Mundy (University of New Hampshire, Durham) and Kathleen Heid (The Pennsylvania State University) at the 1994 AMS/MAA Winter Meeting in Cincinnati and again at the 1995 AMS/MAA Winter Meeting in San Francisco. It should be of interest to all college and high school teachers of the introductory calculus course.

This course is expected to run from 9:30 a.m. to 3:45 p.m. Complete the form below to register. The fee of $40.00 includes a morning coffee break and lunch. There will be no registration on the day of the course.

Registration Form

Name:_____

Institution:_____

Address:_____

Telephone: (W)_____

(H)_____

Please make check for $40 (in US funds, drawn on a US bank) payable to:

MAA/NES

To register for this minicourse send, no later than April 17, 1995, the completed registration form and the registration fee to: Donna Beers, Department of Mathematics, Simmons College, 300 The Fenway, Boston MA 02115. Telephone: 617-521-2389

THE NORTHEASTERN SECTION OF THE MATHEMATICAL ASSOCIATION OF AMERICA ANNUAL MINICOURSE:

"AN INTRODUCTION TO RESEARCH IN THE TEACHING AND LEARNING OF UNDERGRADUATE MATHEMATICS- EXAMPLES IN CALCULUS"

Presenters: Joan-Ferrini Mundy and Karen Graham
University of New Hampshire

Date: Saturday, April 29, 1995

Location: Simmons College, Boston, Massachusetts

Registration Deadline: April 17, 1995

See the other side of this page for further information!

PRE-REGISTRATION FORM

SPRING MEETING OF THE NORTHEASTERN SECTION-MAA

JUNE 9-10, 1995 **BATES COLLEGE**

Mail Registration Form to: NES/MAA
Bates College
163 Wood Street
Lewiston ME 04240

Checks should be made out to: **NES/MAA/Bates**

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 and housing cannot be guaranteed unless reservations are received by Monday, May 22, 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:_____

Address:_____

City, State, Zip:_____

Telephone: (____) _____

E-MAIL:_____

PRE-REGISTRATION FEE:

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

MEALS AND HOUSING:

Reception, Banquet and Social Hour
6:00 p. m. Friday: Number ( ) x $23.00 $_____

Luncheon 12:00 p. m. Saturday: Number ( ) x $10.00 $_____

On Campus Housing for Friday, June 9 only.
Includes breakfast on Saturday: Number ( ) x $35.00 $_____

TOTAL: $_____

Northeastern Section MAA
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Massachusetts Maritime Academy
101 Academy Drive, Buzzards Bay MA 02532–3400