

NORTHEASTERN SECTION



NEWSLETTER

FALL 1998

Volume 20

Number 2

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NORTHEASTERN SECTION MATHEMATICAL ASSOCIATION OF AMERICA

FUTURE SECTION MEETINGS

November 20-21, 1998: Western Connecticut State University, Danbury CT
(see program inside this newsletter)

June 11-12, 1999: Colby College, Waterville ME
(Please note date. It was wrong in last newsletter)

Local Arrangements:

Fernando Q Gouvea

Program Committee:

Philip S. Blau, Boston University, co-chair
Sarah Mabrouk, Boston University, co-chair

November 19-20, 1999: Bradford College, Haverhill, MA

Local Arrangements:

Martha Boles

OTHER SECTION ACTIVITIES

Regional Dinner Meetings: Spring 1999

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Awards: NES/MAA Award for Distinguished Teaching: See page xx

Web page: access it via <http://www.maa.org> or directly with
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Chair's Message

Welcome to the first issue of the newsletter under the new joint editorship of Barry Schiller and me. You'll find a couple of new features including a "News from the Departments" on page 24. The usual features are still present. There's the report on the Keene meeting in June on page 8 which includes the announcement of the Battles Lecture series which inaugurated at Keene and the awarding of the Teaching award to Bob Case which was made formally at Keene. There is a note on the teaching award on page 9 with comments from Bob Case. We are also pleased to announce that Bob will be one of only three recipients of the national teaching award to be given at the San Antonio meeting. Governor Luciano's message on page 4 has the details. Congratulations to Bob and thank him for helping to make our Section look so good.

As always, the newsletter announces our next meeting and gives all the details. This year we will venture to the far Southwest of our Section to Western Connecticut State. Starting on page 10, we have the description of the excellent program prepared for us by Terri Bennet and Ross Gingrich of Southern Connecticut State and details of the local arrangements prepared by Xioadi Wang of Western Connecticut State. Ockle Johnson of Keene State will handle student presentations and Ed Sandifer of Western Connecticut State will handle contributed papers. Ed will also be one of the two candidates for future chair in our election at the Saturday business meeting. The other candidate, Barry Schiller, has his editor's remarks on page 3. We have two excellent candidates and I urge you to come and vote. The full slate is on page 26.

Hope you enjoy this issue of the newsletter and I hope to see you at Western.

Distinguished Teaching Award Nominations Due

Rick Cleary (cleary@orie.cornell.edu), chair of the committee to choose the Section's award winner, asks that preliminary nominations be sent to him by November 1, 1998. Nominators will receive a packet and be asked for additional information by December 1. Candidates should be known as outstanding teachers on their own campuses and their influence should extend to the broader mathematical community. The files of nominated candidates remain open in future years.

From the Co-Editors Frank Ford and Barry Schiller

Besides lots of good examples and good advice, Frank Battles left us a box of newsletters from other MAA Sections which makes interesting reading. Some highlights from nearby sections that we noted:

The Metropolitan New York newsletter featured an article by Shelly and Flo Gordon on "Using Real World Data in Teaching and Learning Mathematics" which summarized a contributed paper session of that name, noting examples of fitting mathematical functions to real data, such as weather, sports, and, this being New York, the number of abandoned cars. At their section meeting we noted Percy Diaconis' talk on "A Generalization of $1 + 1 = 2$." Intrigued? Perhaps these newsletters can give our Program Committees many good ideas.

Eastern Pennsylvania/Delaware featured a mini-course on mathematical finance, the main topics being portfolio optimization (do we have colleagues with a portfolio?) and valuation of options. The Allegheny Section newsletter was one of many with news from many campuses, including a list of MAA liaisons, retirees, new hires, professional activities, and curriculum developments. (Thinking it seems like a good idea, we're starting one in this issue!) The Section meeting included invited talks by Earl Fife on "Mathematical Resources on the Internet" and John Dawson on "In quest of Godel: How I became a biographer."

The New Jersey Section had Laszlo Babai speak on Paul Erdos, and Chamont Wang speak on how close Mendel's experimental results were to the theoretical predictions. They also heard our own Colin Adams selling real estate in hyperbolic space. Other NES members giving talks around the country included Frank Morgan (on the cover of Ohio's newsletters with his soap bubbles), Ed Berger telling MD-DC-VA about how he survived innovative math experiments, Jim Tattersall explaining why Nicomachus Rides Again at the Iowa Section, and Tom Banchoff in California giving "Interactive Geometry on the Internet: Where will it lead?" We apologize if we missed others, please let us know when you give these talks.

The Seaway Section had a meeting that focused on math education. It included Ed Berger's talk, and also Tom Tucker on the role of rigor in calculus,

Harriet Pollatsek on finding math lovers in math-for-poets courses, and Paul Zorn on 70 Years of Mathematics Magazine. Their newsletter had a column about criticism of New York State math curriculum proposals that were seen as dumbing down the curriculum and the Regents exams. We also note that the Rocky Mountain section noted widespread difficulty in getting Distinguished Teachers Award nominations, several sections had nomination forms included in the newsletter to make the process easier. Have you seen those articles by history teachers relating humorous misunderstandings they see in student work (e.g. the French pheasants rebelling in 1789), well the Michigan Section excerpted remarks from their Michigan Mathematics Prize Competition, including this: "This is a big math test. A big math test would not ask us to prove that a false statement is true. Therefore the statement is true"; The newsletter also had a lively debate about math education - one writer suggesting "reform math" should be more accurately called "deformed math!" There also were some fun things to note, such as pizza parties. The Indiana newsletter had a self-guided tour of the Math-in-Art exhibit at the Ball State art museum. Let us know if you would like to look through this box! Let us know if you have suggestions for our newsletter. Information for the Spring 1999 newsletter should be submitted by MARCH 12, 1999 to Frank Ford at fpford@providence.edu

Governor's Message

The Summer MAA Mathfest was held in Toronto, Ontario, July 16-18, 1998. Toronto, the capital of Ontario, has become a financial, industrial, and cultural center. The MAA and AMS think hard about their meeting sites, so that there is always more than just great invited talks by leading mathematicians, special sessions, contributed papers, workshops, mini-courses, and various social activities. Exciting future sites:

San Antonio, Texas, January 13-16, 1999
Washington, DC, January 19-22, 2000
New Orleans, Louisiana, January 10-13, 2001
San Diego, California, January 6-9, 2002

Thomas Banchoff, MAA President Elect, and James Tattersall, MAA Associate Secretary, led the way in getting Providence, Rhode Island, and Brown University as the site for the 1999 Mathfest with dates July 31-August 2,

1999. Project Next will meet just prior to the 31st with Pi Mu Epsilon immediately after the 2nd. I hope the members of the Northeastern Section support this meeting in large numbers, since I am confident that Tom and Jim will make sure that this meeting is unforgettable for all the really good reasons.

Much of the day-long Meeting of the Board of Governors was spent on the topic of whether or not to have a Mathfest 2000, and if so, where and when. There are a number of other mathematical organizations meeting in the summer of 2000: the European Mathematical Congress will meet in July, ICME9 will be held July 31-August 7 at the Chiba Centre in Makuhari, Japan, and the AMS will hold a summer meeting on the UCLA campus August 7-12, with an opening reception at the Getty Museum on August 6th. The AMS meeting will be comprised of plenary sessions, mainly, and it is anticipated to draw large numbers. One can easily understand the concern of the MAA given the competition from the other mathematically significant meetings during this restricted time period. After much discussion and debate, it was voted to hold Mathfest 2000 prior to the AMS Meetings at a site yet to be identified (I am hoping for Boulder, Colorado). The members of the board also gave advice on guidelines to follow when selecting the exact dates, length of the Mathfest, and the site. It is now up to our Executive Secretary, James Tattersall, to pull everything together. Good luck, Jim!

Members of our section reaped more awards and distinction at the Meeting of the Board of Governors. Professor Robert W. Case of Boston University, and recent recipient of 1998 NES-MAA Award for Distinguished College or University Teaching of Mathematics, was identified as one of the three 1999 recipients of the national Deborah and Franklin Tepper Haimo Awards for Distinguished College or University Teaching of Mathematics. There were 29 nominees, each of whom were section MAA award winners. Congratulations to Bob for the well deserved distinction! Since 1993, 25 national teaching awards in mathematics have been given, and five of these national recipients were first identified by our section as being notable and worthy of receiving our section award. I certainly hope this continues! Professor Michael I. Rosen from Brown University was identified as the recipient of the 1999 Chauvenet Prize for his 1995 paper that was published in the American Mathematical Monthly (pp. 495-505) entitled, "Niels Henrik Abel and Equations of the Fifth Degree." Last, but certainly not least, of the eight members of the USA Team that competed very successfully in the 1998 International Mathematical Olympiad, three reside within our section's boundaries. They are: Reid Barton, grade 9, homeschooled, Arlington, MA;

David Speyer, grade 12, Choate Rosemary Hall, Wallingford, CT; Paul Valiant, grade 9, Milton Academy, Milton, MA. There was also a third 9th grader from Oakland, CA! With youth like this, our future IMO success looks very promising.

The Northeastern Section of the MAA has the second largest membership (out of 28 sections) in the nation. The Southeastern Section has combined membership of 2,291, while ours is 1,928. As of July 7, 1998 the total MAA membership was 24,057. The breakdown of membership in our section is as follows:

retired	10.0%	students	9.8%
2-year college	2.6%	Government & Bus.	9.9%
college and univ.	46.0%	None/Other	14.0%
K-12	5.7%		

These percentages are quite close to the national ones, except for the 2-year college category where the national percentage is 5.9. I suspect this is due to the success that AMATYC has had in our region. However, the section should consider ways to attract a larger participation from our two-year college colleagues.

This academic year, my department has an open position to fill in Mathematics for the fall of 1999. Consequently, as chair, I decided to review the most recent (1997) AMS-IMS-MAA Annual Survey relative to doctoral degrees awarded by departments in the mathematical sciences at universities in the United States during the period July 1, 1996 through June 30, 1997. The good news is that the number of degrees granted (1,158) is approximately the same as the prior reporting year, and the unemployment rate for this group dropped to 6.8% from the prior year's 10.1%. This percentage is the lowest since the fall 1990 rate of 5.7%. However, of those doctoral recipients enrolled in the US, only 63.9% hold positions in academia, down from the prior year's adjusted figure of 70.1%. Each of these two changes over the two-year period is significant. Further, of the 1996-97 doctoral recipients, 10.8% either are employed at the same institution that awarded their degree or hold part-time positions, which is up from the prior year's adjusted figure of 8.8%. Thus, it certainly appears that the market has gotten worse for new doctoral recipients who wish to continue in academia. Of course, I am assuming that the desire to do so has remained stable with regard to percentages. The annual survey does not consider tenure track vs non-tenure track position percentages. It is my

opinion that the percentage of non-tenure track positions has increased over the last few years. It would follow that many of these recipients comprising the 63.9% figure will be back competing in the job market again.

In the Notices of the AMS, there has been an interesting discussion emanating from Cora Sadosky's Forum article (December, 97), "On Issues of Immigration and Employment for Mathematicians." It appears that many mathematicians have offered arguments in support of changing current immigration law as it applies to scientists, although I have yet to hear or read any such arguments. There are even hints of accusations of racism within our ranks. One writer mentions how it is "the American way" to give preference to less qualified U.S. citizens, since in just about every profession preferences are given to qualified residents over equally qualified or even more qualified non-residents. This is true of practically all professions except for college and university professors (due to legislation enacted on in 1976 and 1990). Some think these laws should be repealed, but I must admit that I would need a clearer understanding of the benefits to academia from this legislation, as well as more compelling arguments to rescind these laws. Based on the AMS-IMS-MAA Survey mentioned earlier, of the 1,158 doctoral recipients 516 were awarded to U.S. citizens, an increase of 4.5% from last fall, and 642 were awarded to non-U.S. citizens, a decrease of 2.3% from last fall. The percentage of doctoral degrees awarded to U.S. citizens has remained fairly constant during the 90's at about 44%. It is also clear from the data that U.S. citizens have an easier time finding U.S. academic positions than their counterparts do. Of the U.S. citizen doctoral recipients, about 56% found academic employment, while for the non-U.S. citizens, only 28% found such employment. So it appears that the non-U.S. citizen already carries a burden in the competing academic market. Why should we make it even more so?

As Sadosky says, immigration is not the real issue facing our mathematics community. It is only one factor among many that have had considerable impact on the job market for new, and old, Ph.D. recipients. The real issue is how, we as a mathematics community, should react to this long-standing crisis. As Geoff Davis (Dartmouth) says, a change in perspective is in order. Since the universities continue to award these degrees in the same magnitude, why not have their departments compete to insure that their graduates obtain the best possible positions! Great idea, Geoff. This would certainly encourage departmental change in programs and breadth of training. If we choose not to limit the number of doctoral recipients, let us at least make the university departments accountable. As Geoff indicates, full

disclosure would be routine: placement rates, attrition rates, average time to degree, etc.. After all, accountability through full disclosure is a very reasonable first step. Forget about mandating cutbacks or changing immigration laws. Let's just place everyone on equal footing with a clear understanding of the opportunities, or lack thereof, that our graduate programs offer.

I look forward to seeing those of you who I know and I hope to meet many others at the Fall NES/MAA Meeting.

Dennis M. Luciano, Governor NES-MAA
Western New England College

Highlights of Spring Meeting NES-MAA

Another successful spring meeting was held on the beautiful Keene State College campus on June 5, 6 1998. 75 people attended including 10 students. We appreciate Houghton-Mifflin for exhibiting at the meeting, and providing a look at books and some snacks! Thanks. One highlight was the announcement that the section's officers had established the Frank Battles memorial lecture to be given each spring in honor of our long time newsletter editor. Thank you again Frank. The first such lecture was given by Jim Tattersall (Providence College) "Nichomachus Rides Again" where Jim recounted the influence through the centuries of this author's exposition of classical Greek mathematics. There were 24 other presentations including 4 student papers, 4 "new colleague" talks, and 5 contributed papers. A complete program is available from the editors. Much deserved thanks goes to the Program Committee (Ed Sandifer- Chair, Rick Cleary, Lisa Humphreys, Dick Pelosi, and Vince Ferlini, as well as Ockle Johnson and Joe Witkowski for local arrangements). What happens at an Executive Committee meeting? This time they discussed: finances (the Section is OK, it had \$7348.57 on account though since the fall meeting, total income was \$8121.69 while expenses were \$9590.93); a preliminary report of attendance at Keene; a report of the nominating committee for officers (they were still working on it but see the results on page 26); progress on the program for the Western CT meeting; the sites for future meetings, mini-courses and short-courses, and the difficulty of getting Program Chairs (so volunteer!); how to integrate Project Next into the section; the likelihood that the '99 Mathfest will be in Providence and that the Section will be called upon to help; the need to publicize our section web site: http://scsu.ctstateu.edu/~maa_nes/main.html.

Bob Case Wins National Teaching Award

In honor of the national teaching award which Dr. Robert Case of Northeastern University will receive at the Joint Meetings in San Antonio, the editors asked Bob to write a message to newsletter readers. Here it is.

"As we've tried as teachers of mathematics to connect with students who have widely varying learning styles and backgrounds, many of us have become increasingly aware that (1) we've been pretty uncritical about what constitutes effective teaching, and (2) students don't often learn math the way texts are written.

"In particular, the "teacher-as-font-of-information" model has lost a lot of its validity. We're seeing that the basic premise of teaching is that the mathematics must flow from the student rather than from the instructor. Each teacher seeks the style that fits him/her, but basically we are moving in the direction where the instructor is the "intellectual architect" who fosters the conditions in which the student becomes the active center of math learning.

"So effective instruction often includes (a) Socratic questioning (reshaping material from assertions to chains of questions involving various levels of concreteness and abstraction). The process also involves (b) the invitation to conjecture and explain the reasoning (sometimes backed up by the judicious use of technology) and (c) individual and group problem-solving, as well as good applications and (d) student projects. The process reinvigorates math by connecting it to its historic roots in the sciences and to fruitful applications in the natural world and society. The idea is to trigger mathematical insight. This will (hopefully!) foster an intellectual hunger for ideas and a zest for problem-solving (we've all seen students who don't want to leave at the end of class time if they're engaged in a good problem). THE OUTCOME IS THAT THE AUTHORITY OVER THE MATHEMATICS SHIFTS IMPERCEPTIBLY BUT DECISIVELY TO THE STUDENT.

"The instructor as orchestrator, coach, even provocateur, helps free mathematics from its captivity (from a smaller self-selected group with a uniform learning style) to be an instrument for wider and wider constituencies, and for many more student (especially those with a recent history of disenfranchisement) to develop deeper habits of mind along with a love of math and the skill and insight to use it."

Best wishes, Bob.

**NORTHEASTERN SECTION OF THE MAA
PROGRAM OF FALL 1998 MEETING
November 20-21, 1998**

Western Connecticut State University, Danbury CT

Program committee

Terri Bennett (Southern Connecticut State University), Co-chair
Ross Gingrich (Southern Connecticut State University), Co-chair
Miguel Garcia (Gateway Community-Technical College)
Sandro Magliaro (Sacred Heart University)
Xiaodi Wang (WCSU), Local Arrangements Coordinator

(For updates to program, please see Section Webpage).

Applied Mathematics in the Undergraduate Curriculum

Friday, November 20

- 2:00-3:00 pm Executive Committee meeting
- 2:00-6:00 pm Registration (Student Center, #8 on map on page 23)
- 3:00-3:50 pm **Using Spreadsheets in a Computer Classroom**
C. Edward Sandifer, Western Connecticut State
- 3:00-3:50 pm **College Mathematics Departments' Need to Respond to State Frameworks and Mastery Testing**
Kathy Bavelas, Manchester Community Technical College
- 4:00-4:50 pm **Nonlinear Oscillations in Suspension Bridges**
Joseph McKenna, University of Connecticut
- 4:00-4:50 pm **Who Gets What? – Apportionment and Fashion**
Theresa Sandifer, Southern Connecticut State University
- 5:00-6:00 pm Student Papers
- 6:15-6:45 pm Reception
- 6:45-7:45 pm Banquet

- 7:50-8:00 pm Welcoming Remarks
Dr. Eugene P. Buccini, Vice President of Academic Affairs,
Western Connecticut State University
- 8:00-8:45 pm **Succeeding in Industry: What Do We and Our Students Need?**
Paul Davis, Worcester Polytechnic Institute

Saturday, November 21

- 7:30-11:30 am Registration (Student Center, #8 on map on page 23)
- 8:30-3:00 pm Book exhibits/Graduate school information table
- 8:00-8:50 am NEW FACULTY PRESENTATIONS
- 9:00-9:50 am NES/MAA TEACHING AWARD PRESENTATION:
The Crisis in Inner-city Public School Mathematics: What College Math Departments Can Do.
Robert Case, Northeastern University
- 10:00-10:30 am Coffee break
- 10:35-11:30 am CHRISTIE LECTURE: **Cosine Transforms and Wavelet Transforms and Applications**
Gilbert Strang (Massachusetts Institute of Technology)
- 11:30-12:00 pm Business meeting
- 11:45-1:00 pm Lunch
- 1:00-1:50 pm STUDENT WORKSHOP: **Wavelets and Applications**
Vasily Strela, Dartmouth College
- 1:00-1:50 pm **Panel discussion on undergraduate programs that link students to industrial/applied problems**
Paul Davis (Worcester Polytechnic Institute), moderator.
David Chris Arney (United States Military Academy)
James Hefferon (St. Michael's College)
Bogdan Vernescu (Worcester Polytechnic Institute)
- 2:00-2:50 pm **The SLOB in Baseball: A Mathematical Model for Judging Offensive Value**
Helen Salzberg, Rhode Island College, and David Abrahamson, Rhode Island College
- 2:00-2:50 pm **Constraint Modeling Issues for a Restructured Electric Power Industry**
Lucy Kimball, Bentley College
- 3:00-4:00 pm CONTRIBUTED PAPERS SESSIONS

NORTHEASTERN SECTION OF THE MAA

FALL 1998 MEETING

November 20-21, 1998

Western Connecticut State University, Danbury CT
Applied Mathematics in the Undergraduate Curriculum
Abstracts

Friday, November 20, 1998

Using Spreadsheets in a Computer Classroom

C. Edward Sandifer, Western Connecticut State University

In this workshop, we will demonstrate some laboratory exercises for a computer classroom that have been used successfully in various mathematics classes. Exercises include a heat flow problem from Calculus, a cryptography problem from a Liberal Arts Math course, a population problem from a Modeling course, and a financial problem from a Business Math course. The point of the workshop is to show the kinds of problems you can ask students to do in a laboratory and to demonstrate the kind of support and encouragement you have to give students so that they can be successful with those problems. Participants should already know at least a little about Excel. The workshop will be in a computer laboratory/classroom. Bring a disk

Ed Sandifer teaches mathematics at Western Connecticut State University, host of this MAA meeting. He particularly enjoys the history of mathematics, and has taught himself Latin so that he can read and translate the works of Leonhard Euler. He is editing the next edition of the MAA's Basic Library List, the list of 3000 books that the MAA recommends as essential to an undergraduate library collection. He is also an avid runner, and has completed the last 26 Boston Marathons.

College Mathematics Departments' Need to Respond to State Frameworks and Mastery Testing

Kathy Bavelas, Manchester Community Technical College (CT)

This talk will focus primarily on the impact that the recently adopted Connecticut Frameworks in Mathematics, the Connecticut Mastery Tests (CMTs) and the Connecticut Academic Performance Test (CAPT) are having on the K - 12 mathematics curricula. Other states in New England have similar testing programs. We will address as many of the following questions as time

permits. Should mastery certificates affect admissions decisions, placement testing and/or placement in mathematics courses? Do we need to reconsider the questions asked on collegiate placement exams? Do we need to reexamine the course content of developmental courses and college level mathematics courses? Are our pre-service teacher mathematics courses meeting the needs of our prospective teachers? Are these future teachers prepared for the BEST Program? Are these teachers, once hired, able to meet the expectations of the Boards of Education that hired them?

Kathy Bavelas has taught mathematics at Manchester Community-Technical College since 1985. She chaired the Mathematics Department there from 1989 to 1996 and will co-chair it this year. She has a B.A. from the University of Connecticut, an M.S. from Central Connecticut State University, and an M.A.L.S. from Wesleyan University. During her career, she has also taught at the middle-school level, at the high-school level, and part-time at Central Connecticut State University. She is a member of the MAA, NCTM, AMATYC, MATYCONN, ATOMIC, and AWM. In 1996-97 she was the Distinguished Professor in Residence at the Connecticut Academy for Education in Mathematics, Science, and Technology. For the past five years, she has been involved in writing and providing professional development for the field test teachers for Mathematical Connections, a secondary core curriculum project.

Nonlinear Oscillations in Suspension Bridges

Joseph McKenna, University of Connecticut

We review the early history of suspension bridges and especially the famous collapse of the Tacoma Narrows bridge. We show how new insights from computation and nonlinear analysis can explain much of the previously mysterious behavior of the bridge.

P. Joseph McKenna did his undergraduate work in Dublin (at U.C.D.) and his graduate work in Ann Arbor. He is currently a professor of mathematics at the University of Connecticut, having previously worked at the University of Wyoming and the University of Florida. For most of his professional life, he has been involved in research in partial differential equations, applying them to diverse problems in soil physics, fluid dynamics, optics, biology, and most recently on flexing in bridges and ships.

Who Gets What? -- Apportionment and Fashion

Theresa Sandifer, Southern Connecticut State University

Many of the texts that are used to teach Liberal Arts math courses have a chapter on apportionment algorithms. Students could not care less how Congress is apportioned now, let alone in the 1800s! This talk will describe an application of apportionment algorithms that was used in the retail industry. The company that used the algorithm dominated the market during the 1980's. The algorithms themselves are simple, but looking at them in a different context is something that students do not often see. We will look at the problem that needed to be solved and talk about how the algorithm was modified to solve the problem. We will also look at extensions of the problem and talk about how you can encourage students to "think outside the box".

Theresa Sandifer has a Ph.D. in Operations Research from the University of Massachusetts. She has consulted on a variety of mathematical modeling and statistics problems. Terry has written two workbooks for learning statistics using Excel and Minitab and is working on a statistics textbook that will be published in 1999. She has also been a judge for the Contest in Mathematical Modeling for the past three years.

Succeeding in Industry: What Do We and Our Students Need?

Paul Davis, Worcester Polytechnic Institute

Most of our students will be working in business, industry, or government, not teaching or doing research. What skills and attitudes do they need to succeed? Which of those skills can we teach in math classes, especially when the teacher is someone whose entire career has been spent behind ivy covered walls? There are no rigid prescriptions, but there are plenty of ideas and suggestions. Some of them could seem a bit subversive. Others may open up rewarding new classroom experiences. Ultimately, meeting the challenge of preparing students for non-academic work can mean better education and better mathematics. Paul Davis has been a member of the Mathematical Sciences Faculty at Worcester Polytechnic Institute since 1970, when he received his Ph.D. in applied mathematics from Rensselaer Polytechnic Institute. He has worked with various applications of differential equations and, more recently, with optimization problems in electric power networks. Driven by his research interests, by his experience as an industrial consultant, and by his desire to

prepare students for a range of careers, his teaching emphasizes modeling, applications, and open-ended problem solving. He is in the last stages of completing a new differential equations text, *Differential Equations: Modeling with MATLAB*, to be published by Prentice Hall. He is currently Director of WPI's London Project Center.

Saturday, November 21, 1998

NES/MAA TEACHING AWARD PRESENTATION:

The Crisis in Inner-city Public School Mathematics: What College Math Departments Can Do.

Robert Case, Northeastern University

The majority of inner-city secondary students are denied access to strong secondary school mathematics programs. The problem has technical (pedagogy and content), normative (expectations of students, cultural issues), and resource (strength and strategy of schools themselves) dimensions. Colleges and universities have a key role to play in responding. The concrete model of Boston's new calculus courses will be used to provide examples.

Bob Case was chairman of the Department of Mathematics at St. Anselm College from 1967-70. In the seventies, he developed and taught graduate courses in logic at Northeastern University, where he is Associate Professor of Mathematics. In the eighties, he was involved in calculus reform, and in the nineties, he is working with high school teachers in Boston, where state-of-the-art calculus courses have begun in five schools which previously offered no calculus whatsoever. Dr. Case is this year's teaching award honoree for the Northeastern Section. He will receive a National award at the San Antonio meeting.

CHRISTIE LECTURE:

Cosine Transforms and Wavelet Transforms and Applications

Gilbert Strang (Massachusetts Institute of Technology)

Each Discrete Cosine Transform uses N real basis vectors whose components are cosines. These basis vectors are orthogonal and the transform is extremely useful in image processing. The cosine series is quickly computed by the FFT.

But a direct proof of orthogonality, by calculating inner products, does not reveal how natural these cosine vectors are in applications. We prove orthogonality in a different way. Each DCT comes from the eigenvectors of a symmetric "second-difference matrix". By varying the boundary conditions we get the established transforms DCT-1 through DCT-4 (and also four more orthogonal bases of cosines). The boundary condition determines the centering (at a meshpoint or a midpoint) and decides on the entries $\cos [j \text{ or } j+0.5] [k \text{ or } k+0.5] \pi/[N \text{ or } N+...]$. Then we discuss bases from filter banks and wavelets. The key is to create a banded block Toeplitz matrix whose inverse is also banded. We will describe how wavelets are created and how they are used in signal and image processing. They are surprisingly interesting.

Gilbert Strang was an undergraduate at MIT and a Rhodes Scholar at Balliol College, Oxford. His Ph. D. was from UCLA and since then he has taught at MIT. He has been a Sloan Fellow and a Fairchild Scholar and is a Fellow of the American Academy of Arts and Sciences. He is President-Elect of SIAM during 1998 (to take office in 1999-2000). Professor Strang has published a monograph with George Fix, *An Analysis of the Finite Element Method*, and six textbooks: *Introduction to Linear Algebra* (1993,1998), *Linear Algebra and Its Applications* (1976,1980,1988), *Introduction to Applied Mathematics* (1986), *Calculus* (1991), *Wavelets and Filter Banks*, with Truong Nguyen (1996), and *Linear Algebra, Geodesy, and GPS*, with Kai Borre (1997). His web home page is <http://www-math.mit.edu/~gs>

STUDENT WORKSHOP:

Wavelets and Applications

Vasily Strela, Dartmouth College

The purpose of this workshop is to get some insight into why wavelets are useful for many practical applications. We demonstrate that wavelet bases have an ability to analyze signals on different scales. Then we connect mathematical properties of wavelet functions such as approximation order, symmetry, orthogonality, and smoothness with the performance of filter banks in signal processing. The MATLAB Wavelet Tool-box will be used to illustrate the talk, and active participation of the audience is expected. Participants may get an introduction to wavelets by attending Gilbert Strang's talk at 10:35 a.m.

Vasily Strela received his M.Sc. degree in applied mathematics from Moscow

Institute of Physics and Technology in 1992 and his Ph.D. degree in mathematics from Massachusetts Institute of Technology in 1996. Currently he is with the Department of Mathematics at Dartmouth College. His interests include theory and applications of wavelets, signal processing, Toeplitz matrices, and circulant matrices.

Panel discussion on undergraduate programs that link students to industrial/applied problems : how internships and undergraduate research involving industrial/real-world applied problems can be implemented in the undergraduate curriculum.

Paul Davis (Worcester Polytechnic Institute), moderator.

David Chris Arney (United States Military Academy) will discuss the Interdisciplinary Lively Application Projects (ILAPs) written and used by schools in the INTERMATH Consortium.

James Hefferon (St. Michael's College) will discuss the internship program at St. Michael's.

Bogdan Vernescu (Worcester Polytechnic Institute) will discuss WPI's Center for Industrial Mathematics and Statistics (CIMS) and related student projects.

David Chris Arney has an undergraduate degree from the United States Military Academy (USMA) and a Ph.D. from Rensselaer Polytechnic Institute. Jim Hefferon earned his undergraduate and graduate degrees at the University of Connecticut, finishing with a thesis in Logic. He spent three years visiting Union College, and a year in industry and at the University of Connecticut. He has taught mathematics at USMA for 17 years and is the author of several mathematics textbooks and laboratory manuals. Recently, he edited two books containing applications of mathematics: *Interdisciplinary Lively Application Projects (ILAPs)* published by the MAA and *Military Mathematical Modeling*. He is the book review editor for the *Mathematics and Computer Education Journal*. His areas of research interest include applied mathematics, numerical analysis, number theory, and history of mathematics. His teaching interests include using computers, writing, and interdisciplinary applications in the mathematics curriculum. He has given numerous workshops on curriculum reform and the use of technology and applications in teaching and learning mathematics. He is the Head of the Department of Mathematical Sciences at USMA.

James Hefferon has been at Saint Michael's College for eight years and is an Associate Professor. He has been the coordinator of mathematics internships there for two years.

Bogdan Vernescu has been a faculty member in the Department of Mathematical Sciences at Worcester Polytechnic Institute since 1991. He received a Ph.D. in applied mathematics from the Institute of Mathematics of the Romanian Academy. His research work is in the field of applied partial differential equations in continuum mechanics. He has developed and advised several undergraduate and graduate projects with corporate sponsorship. He established and is currently the Director of the Center for Industrial Mathematics and Statistics at WPI. This past summer he organized the first NSF sponsored Research Experience for Undergraduates Program in Industrial Mathematics and Statistics at WPI.

The SLOB in Baseball: A Mathematical Model for Judging Offensive Value

Helen Salzberg, Rhode Island College, and David Abrahamson, Rhode Island College

Wouldn't it be nice if a baseball fan (or scout or owner) could, by looking at an easily interpretable single number, determine a player's contribution to his team's offense? In this talk, we report on such a statistic, present the relationship between it and team runs scored, and compare the correlation coefficient with that of the more usually used offensive statistics.

Helen Salzberg is a professor of Mathematics and Chair of the Department of Mathematics and Computer Science at Rhode Island College. She received her BA from Brooklyn College, MA from the University of Wisconsin, and did doctoral work at Cornell University. She teaches a wide range of courses, with abstract algebra as her favorite. Baseball is a passion since her childhood with the Brooklyn Dodgers.

Dave Abrahamson received his Ph.D. in Applied Mathematics from Brown University in 1981 and has taught at Rhode Island College since 1986. He has been a dedicated fan of baseball, football, and basketball his entire life. His academic interests include differential and difference equations, mathematical modelling, and mathematics education.

Constraint Modeling Issues for a Restructured Electric Power Industry Lucy Kimball, Bentley College

In a deregulated environment an electric power generation company will submit offer prices for which it is willing to supply a given capacity on an hourly basis. These prices will be determined in part by an economic dispatch. The economic dispatch determines the optimal generating level for each generator which minimizes the generation costs, subject to a set of generator and network constraints. Existing economic dispatch algorithms either ignore important constraints such as ramping and energy constraints or treat them in a heuristic manner. An economic dispatch algorithm which includes time coupling constraints as well as transmission constraints will be described. The algorithm can be used to illustrate some caveats to relying on traditional economic dispatch algorithms. Some of its predictions raise issues about operation and modeling that managers of generation companies must consider as they enter the deregulated electricity market. For example, electric power utility planners and system operators typically model water rates, or the efficiency of hydro turbine systems as linear. A close examination of actual hydro-turbine efficiency curves shows that the water rates are not linear. Though the discharge rates are fairly flat, even a small curvature can dramatically change the dispatch and the total generation costs.

Lucy Kimball earned her B.S. from the University of Massachusetts Lowell, and her M.S. and Ph.D. in Applied Mathematics from Worcester Polytechnic Institute. Her research interests include optimization problems for large scale electric power systems. She is currently an Assistant Professor at Bentley College in Waltham, MA, and a Project NeXT fellow.

Western Connecticut State University and its Mathematics/CS Department

WESTERN CONNECTICUT STATE UNIVERSITY, founded in 1903, is located in Danbury, a city in Fairfield County, Connecticut. Characterized by a truly dedicated faculty and a diversified student body, WCSU is a dynamic and forward looking university. The university enjoys a growing reputation for academic excellence in its programs in the arts and science, teacher education and professional studies, and business and career preparation. One clear strength of WCSU is the close relationship between

faculty and students which enhances learning and provides the substantial basis for a university education. As the university prepares students to enter into an increasingly interdependent world, WCSU provides an education that builds on the past and looks to the future in an environment that is personal and caring.

The Mathematics And Computer Science Department consists of 12 full-time members, most of whom hold a Ph.D. from highly regarded universities, as well as 21 part-time members. The department offers the B.A. degree in Computer Science, Mathematics and Mathematics with Computer Science Option, and the B.S. degree in Mathematics, Elementary or Secondary Education. It also offers an M.A. degree in Mathematics and Mathematics with Computer Science Option, and M.S. in Mathematics. A Minor is offered in Computer Science, Mathematics, and Mathematics for Elementary Education. Dedicated to remaining at the forefront of both Computer Science and Mathematics, the department is constantly reviewing its programs to assure they meet the needs of a changing, technology challenging world. The programs can accommodate students planning to continue with graduate studies or pursue a professional career immediately after graduation

Call for Contributed Papers

Participants are invited to submit contributed papers for the Fall meeting. We particularly seek papers appealing to a wide variety of participants. Your presentation should be approximately 15 minutes long. Please send a typed abstract (indicate any special equipment needed) to Ed Sandifer, Math/CS Dept. Western Connecticut State University, Danbury CT 06810, or better, by e-mail to Sandifer@wcsu.ctstateu.edu. The Fall deadline is October 30.

Call for Student Papers

Undergraduate students are invited to present papers at the Fall Meeting on topics in mathematics, statistics, or computer science. The presentations will be 15 minutes long. The meeting will be held on November 20-21, 1998, at Western Connecticut State University. Interested students should send abstracts by October 30th by e-mail to ojohnson@keene.edu or by regular mail to Ockle E. Johnson; Department of Mathematics; Keene State College; Keene,

NH 03435-2001. E-mail is preferred. Abstracts should include current address, phone number, e-mail address, and name of a faculty sponsor. Those that are accepted will receive prizes and one presenter for each paper will receive free meals and registration at the meeting. There will be a student workshop and a table with literature from graduate schools.

Accommodations

Ethan Allen Inn

Price: \$85/room/night including tax and continental breakfast;

Directions: Get off of I-84 at exit 4 and turn right. You are then on Lake Av.. Now you will see Amoco gas station on your left and Gulf gas station on your right by the traffic light. The opposite side of Amoco is 21 Lake Av., Ethan Allen Inn.

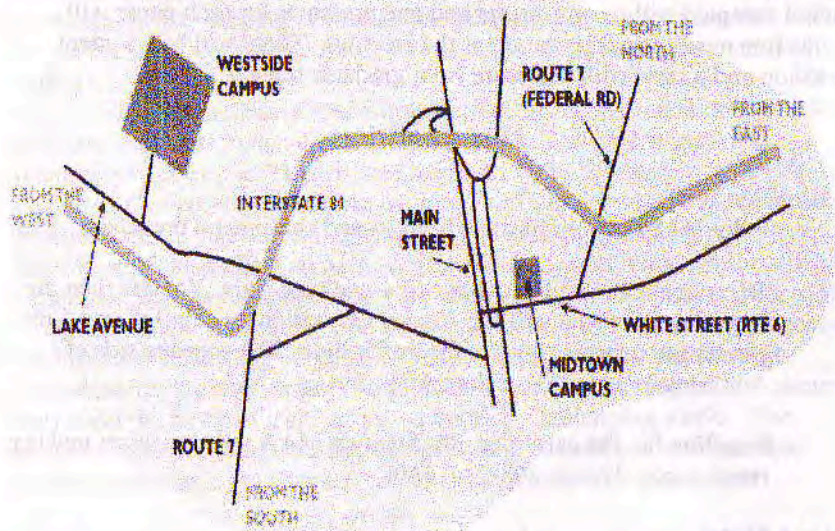
Deadline for the rate: Oct. 30. Mention MAA meeting when making reservations. Phone: 203-744-1776.

Super 8 Motel

Price: \$48.49/night for single bed room and \$52.99/night for double bed room.

Directions: Get off of I-84 at exit 4 and turn right. You are then on Lake Av.. Now you will see Gulf gas station on your right and Super 8 Motel, 3 Lake Av., is behind Gulf.

Deadline for the rate: Oct. 30. Mention MAA meeting when making reservations. Phone: 203-743-0064 or 1-800-800-8000.

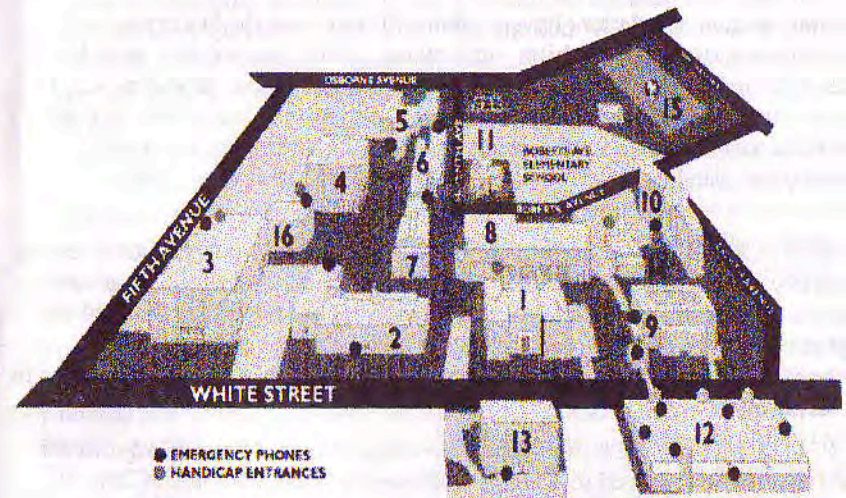


**To get to our Midtown Campus
(From the West)**

- Take Exit 5 off I-84 to first traffic light (Main Street).
- Turn right and continue on Main Street to White Street (fourth traffic light).
- Turn left on White Street and continue 1/2 mile to campus on left.

(From the East)

- Take Exit 5 off I-84 to first traffic light (Clapboard Ridge Road).
- Turn right and continue on Main Street to White Street (fifth traffic light).
- turn left on White Street and continue 1/2 mile to campus on left.



1. Old Main
2. Fairfield Hall
3. White Hall
4. Library
5. Berkshire Hall

6. Higgins Annex
7. Higgins Hall
8. The Student Center
9. Litchfield Hall
10. Newbury Hall
11. Alumni Hall

12. Midtown Parking Garage
13. University Hall
14. Police Department/Maintenance
15. The Colonial Field
16. White Hall Annex (under construction)

News from the Departments

Many section newsletters have a column "News from the Departments" which give updates on new hires, retirements, faculty promotions, awards and/or accomplishments, major curriculum changes, mathematical events, etc. We are trying to start such a column in our section newsletters too. We ask MAA liaisons to please send such items from their campuses for future newsletters! (send to: bschiller@ric.edu or fford@providence.edu)

At BENTLEY COLLEGE, Charlie Hadlock, the former Mathematics Sciences department chairperson, is the new Dean of the Undergraduate College and Associate Dean of Faculty and Lynne Durkin is the new Chairperson of the department. Lucy Kimball was chosen as a Project Next fellow and Paul Blanchard, on leave from Boston University this year, is a Visiting Professor in the department.

At PROVIDENCE COLLEGE, Liam Donahue, who had been an adjunct for several years, was moved to a tenure track position this semester. Clem DeMayo, Director of the MAT Program in Mathematics, was promoted to full professor. Jim Tattersall, Professor of Mathematics, has been very busy with his job as Associate Secretary of the MAA. He frequently gives invited talks, answers streams of e-mail, and must visit sites for possible future meetings. He even had to help open the new convention center in Honolulu, Hawaii. His excuse was that there might be a joint MAA/AMS meeting there sometime! Please be sure to console him when you see him.

RHODE ISLAND COLLEGE welcomes two new faculty members, Mary Sullivan (formerly of Curry College) and Terry Adams (from Ohio State.) Professor Art Smith won the Faculty Award from the Alumni Association for 1998. The College notes it has revised its graduate program, now having an MA program aimed at serving secondary math teachers. RIC also hosted many "Math Awareness" events in April 30 including featured speakers George Hart of Hofstra University talking on "Art from Fabulous Polyhedra", Jim King of the University of Washington explaining how to "Make Geometry Dynamic", and our own section's Ed Sandifer "Fooling With Divergent Series". All were terrific.

SALEM STATE (MA) Mathematics Department welcomes a new faculty member, William Mueller, who comes from the University of Arizona. The Department also welcomes Maura FitzGerald who is a laboratory instructor in

the Math Lab. A team of three students entered the International Mathematical Contest in Modeling sponsored by the Consortium for Mathematics and Its Applications (COMAP). Their entry was entitled "A Mathematical Maneuver to Combat Grade Inflation", receiving a certificate of successful completion. The team also presented its results at the College's annual Undergraduate Research Symposium. The Department is seeking accreditation for its secondary mathematics education program from the National Council for the Accreditation of Teacher Education and has nearly completed its folio for this application. Professor Mary L. Platt currently serves on the Local Arrangements Committee for the MathFest 1999 to be held in Providence, RI. She also is serving a three year term on the MAA Committee on Computers in Mathematics Education (CCIME).

The big news at WILLIAMS COLLEGE was the awarding of the Fields Medal in August to Curtis McMullen, a Williams math major from 1980. Faculty who had him in class were not surprised. The Department welcomes visiting faculty members Steve Wang, a recent PhD in statistics from the University of Chicago who studies handwriting recognition, and Jorge Calvo, a recent PhD from the University of California-Santa Barbara who studies knots constructed from sticks. A record number of 43 sophomores signed on to be math majors this last spring.

News from the Two-Year Colleges

Kathy Bavelas

MATYCONN Fall dinner meeting at Middlesex C-T College in Middletown, CT on October 23.

In July, MATYCONN (Math Association of Two-Year Colleges in CT) co-sponsored with PIMMS (Project to Promote Mastery In Mathematics and Science), for the second summer in a row an OHIO STATE Short course on using the TI 92 to enhance the teaching of calculus that was well attended by college and high school AP faculty.

MATYCONN will sponsor its annual CT Math Contest for students in two-year colleges in CT on April 10 and the spring dinner meeting will be hosted by Manchester Community-Technical College in Manchester CT on April 30.

The first round of the AMATYC Student Math Contest will be held in November and the annual AMATYC meeting is in Portland Oregon from Nov.5 - 8.

MATH MEDLEY ON THE RADIO

Since June 1998 every Saturday from 1 to 2pm there has been a call-in radio show on WALE 990AM in Providence about mathematics hosted by Patricia Kenschaft from Montclair State University. Each week Pat invites a guest to discuss a different topic. MAA-NES participants have included Tom Banchoff (on the role of "proofs" in math), Barry Schiller (math and the environment) and on October 24 Jim Tatersall will discuss "Women in Math." Call him then at (401) 621-WALE if you get this in time!

Student Chapter News

The Northeastern Section student chapters have their own homepage at the following URL address: [HTTP://SCSU.CTSTATEU.EDU/~MAA_NES/STUDCHAP.HTML](http://SCSU.CTSTATEU.EDU/~MAA_NES/STUDCHAP.HTML). The homepage has notes about section activities and other information for students, including links to related websites. The site is still evolving, and suggestions about content and interesting websites are welcome. If your MAA student chapter or math club has a homepage, send us the name and the URL, and we will build a link to your homepage from the Student Chapters homepage. Also, if you have student-related activities that you would like to publicize, send the notices to us and we will post them on the Student Chapters homepage. Any information to be posted should be sent to Ross Gingrich, the Northeastern Section Student Chapters Coordinator, at gingrich@scsu.ctstateu.edu, or by mail to Ross Gingrich, Mathematics Department, Southern Connecticut State University, New Haven CT 06515.

We are continuing to update the list of email addresses for MAA Student Chapter Advisors in the Northeastern Section, so that information may be sent electronically. If you are an advisor for a student chapter in our section, please send your current email address, along with your name and institution, to Ross Gingrich at the email address given above.

If your school does not have an MAA student chapter but you are interested in starting one, you can contact Ross Gingrich for information and help in the application process.

Nominations Committee Report

The following is the slate of nominees for Section Officers as proposed by the Nominations Committee. Included is a brief biographical sketch of each. The 1998 election will be held on Saturday, November 21, 1998 during the Business Meeting of our Fall Meeting at Western Connecticut State University.

VICE-CHAIRPERSON

C. Edward Sandifer, Western Connecticut State University

Ed Sandifer is a Professor of Mathematics at Western Connecticut State University in Danbury, Connecticut. He received an AB in Mathematics from Dartmouth in 1973 and a PhD from UMass Amherst in 1980. He has been the Section's Contributed Papers Coordinator since 1989 and has served as Program Chair for three meetings of the Northeastern Section of the MAA: Spring, 1988 in Winooski, VT, Spring, 1994 in Newport, RI and Spring, 1998 in Keene, NH. He was the after dinner speaker at the Section Meeting at UMass Boston in the Fall of 1997. His current mathematical interests are in the History of Mathematics (especially Euler) and in Combinatorics. He has also completed 26 consecutive Boston Marathons. When asked about his plans for the NES, Ed replied, "By most measures, the Northeastern Section is one of the most successful and well run of all of the sections of the MAA. If I am elected (and even if I'm not) I will do my best not to mess it up."

Barry Schiller, Rhode Island College

Barry Schiller has been teaching mathematics at Rhode Island College since 1966. He received a BS from the City College of New York in 1960 and an MA from the University of California at Davis in 1963. He also studied mathematics at Oregon State and meteorology at Florida State University, taught mathematics in high school, at Upward Bound programs, and at Ohio University. At RIC he has taught about 40 different courses but is most interested in statistics, history of mathematics, and environmental mathematics. He is currently serving as Co-Editor of the Northeastern Section Newsletter. After 35 years of membership, Barry says he thinks he really knows the MAA best by frequently attending (and talking with colleagues at) section and national meetings, workshops and short-courses. However, he has also been involved with MAA Committees! This has included section Program, Local Arrangements, Nominating, and Dinner Meeting committees

and the national's CUPM Service Course Subcommittee, and committees on the Participation of Women in Mathematics, and Environmental Mathematics. If elected, Barry indicates he would try to continue efforts to involve more members (and students) in section activities, cooperate with other professional organizations to the maximum feasible extent, and maintain the high level of professional activities in our section.

SECRETARY-TREASURER

Betsey Whitman, Framingham State College

Betsey Whitman is the newly-elected chair of the Department of Mathematics at Framingham State College. She is currently serving as the Secretary-Treasurer of the Northeastern Section. She also served as Publishers Liaison for the NES from 1992-1996. She is a 30-year member of the MAA, having been active in the Florida Section 1968-1990 while a professor at Florida A&M University and since then in the Northeastern Section. She has enjoyed being a member of the steering committee of the Section and would be glad to serve again in the same role.

TWO-YEAR COLLEGE REPRESENTATIVE

Kathleen Bavelas, Manchester Technical Community College

Kathy Bavelas is a Professor of Mathematics at Manchester Community-Technical College where she currently serves as co-chair of the Mathematics Department, having served as chair from 1989 -1996. She received a BA from UCONN in 1966, a MS from Central CT State University in 1973 and an M.A.L.S from Wesleyan University in 1997. She is currently serving as the Two-Year College Representative for the Northeastern Section. She served on the Program Committee for the 1997 NES Fall Meeting and has been a department liaison to the MAA for the last ten years. She has also been active in the Mathematics Association of Two-Year Colleges in Connecticut, serving as Secretary, 1990-1992, Vice President 1992-1994, President 1994-1996, Past President 1996-1997, Secretary 1997-1998, and workshop presenter. She is an active member of the National Council of Teachers of Mathematics and has served as the State and the MATYCONN Delegate to the National AMATYC Convention.

The Nominations Committee consists of Laura L. Kelleher of Massachusetts Maritime Academy (Chair), Dennis M. Luciano of Western New England College and Michael R. Latina of the Community College of Rhode Island.

Pre-Registration Form

Fall Meeting of the Northeastern Section- MAA

November 20-21, 1998

Western Connecticut State University

Mail this form to :

Professor Xiaodi Wang

Dept of Mathematics/Computer Science

Western Connecticut State University

Danbury, CT 06810

(2 0 3)837-9355

Check should be made to: NES/MAA

Please Pre-register! 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 Friday, Nov 6, 1998. **It may not be possible to buy tickets to the banquet or lunch at the meeting.** Spouses and guests are welcome at all meals.

PRE-REGISTRATION (please type or print):

Name: _____

Institution: _____

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

Reception and Banquet Friday (\$20.00 per person) \$ _____

Luncheon Saturday (\$12.00) \$ _____

Barry Schiller, Co-Editor
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600 Mt Pleasant Ave.
Providence RI 02908

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November 20-21:
WESTERN CONNECTICUT STATE
UNIVERSITY

Western Connecticut State University