*** ROCKY MOUNTAIN SECTION OF THE MATHEMATICAL ASSOCIATION OF AMERICA ***

Officers for 1994-1995

Chair	Janet Heine Barnett, University of Southern Colorado 2200 Bonforte Boulevard, Pueblo, Colorado 81001-4901 [e-mail: jbarnett@meteor.uscolo.edu]	(719)549-2540
Chair Elect	Ed Hawkins, Mesa State College Grand Junction, Colorado 81501 [e-mail: hawkins@mesa5.mesa.colorado.edu]	(303)248-1407
Vice Chair	Pat Hauss, Arapahoe Community College 5900 S. Santa Fe Drive, Littleton, Colorado 80221 [e-mail: sis_phauss@arapahoe.edu]	(303)797-5840
Past Chair	Tom Kelley, Metropolitan State College of Denver Box 038, PO Box 173362, Denver, Colorado 80217-3362 [e-mail: kelleyt@zeno.mscd.edu]	(303)556-2904
Secretary-Treasurer	Bill Ramaley, Fort Lewis College Durango, Colorado 81301 [e-mail: ramaley_w@flc.colorado.edu]	(303)247-7268
Governor	Tino Mendez, Metropolitan State College of Denver Box 038, PO Box 173362, Denver, Colorado 80217-3362 [e-mail: mendezc@mscd.edu]	(303)556-3208
Program Co-Chairs	Bruce Lundberg [e-mail: lundberg@meteor.uscolo.edu] Janet Nichols [e-mail: nichols@starburst.uscolo.edu] University of Southern Colorado 2200 Bonforte Boulevard, Pueblo, Colorado 81001-4901	(719)549-2482 (719)549-2642

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SPRING MEETING of ROCKY MOUNTAIN SECTION
University of Southern Colorado
Pueblo, Colorado
21 -22 April 1995

Held Jointly With
Colorado Council of Teachers of Mathematics
and
Colorado Mathematical Association of Two Year Colleges

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DISTINGUISHED TEACHING AWARD

The Selection Committee has completed its review, and is pleased to announce that Professor Bill Emerson of Metropolitan State College of Denver has been selected as the 1995 Rocky Mountain Section Distinguished Teaching Award Recipient.. Prof. Emerson was nominated by Prof. Charlotte Murphey for the major contributions he has made to the Mathematics program at Metro, and for his contributions to Calculus Curriculum Reform. In particular, he is well known for his successful efforts in the design of *Mathematica* notebooks for calculus.

Prof. Emerson will be presented with the Distinguished Teaching Award at the Friday Banquet at the upcoming April meeting. Please join us in recognizing Bill for the excellence of his work as a mathematics educator.

Special thanks to the DTA Selection Committee members, Ed Hawkins of Mesa State College, Duane Porter of University of Wyoming, and Kathy Merrill of Colorado College for completing this important and difficult Section duty.

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MAA ROCKY MOUNTAIN SECTION GOVERNOR'S REPORT
submitted by C. G. "Tino" Mendez on January 10, 1995.

Cincinnati Meeting:

Cincinnati last winter was frigid cold, but we had a wonderful meeting loaded with an aggressive business agenda, reports on a number of forthcoming professional initiatives, numerous presentations on mathematics research and educational (curricula) reform, and a superb Gibbs' lecture by Robert M. May on deterministic chaos (a tape is available).

The Board of Governors' meeting focused on approval of the MAA Strategic Master Plan, and on launching our new periodical MATH HORIZONS. MATH HORIZONS has done extremely well, and we sincerely appreciate your support in making it a success. Originally it sold in bulk subscriptions only, but individual subscriptions are now available. I ask you to continue to promote it among your students and department. The MAA Strategic Master Plan in Action (your department should have a copy) includes a listing of current MAA initiatives under the appropriate articles of the Plan. I would very much like to have your feedback on the document and the listed initiatives.

This is my second year on the board. It is my best judgment that we have a very strong and capable national leadership team (including our officers and staff). Because of my background in finance, I have been asked to serve in the investment and development committees and can confirm that the MAA is well managed and in a stable financial condition. There are two areas that I have been working on: one is reducing administrative costs and the other one is increasing our endowment (currently at $1.5 million, though it should be somewhere between $5 and 10 million). I am happy to report to you that starting last year and for two years running we have reversed a five-year trend and significantly reduced the percentage of expenditures allocated to and/or spent on administrative salaries and related costs. On the development front, a preliminary study indicates a full-blown endowment campaign is not feasible at this time; instead, we will concentrate our efforts on promoting a planned-giving program.

The most important professional report presented was the recently distributed JPBM's document Recognition and Rewards in the Mathematical Sciences (your department should have a copy). It should have far reaching implications on the evaluation (and the selection and promotion) of mathematical sciences faculty at all levels. The most immediate and direct consequences of this report are the formation of an MSEB Task Force on "Teaching Growth and Effectiveness," chaired by Uri Treisman, a developing AAHE project on "The Evaluation of Teaching," and a number of prospective MAA's CTUM activities dealing with collegiate mathematics teaching. Another important professional document submitted at the meeting was the MAA Circulating Draft of the Assessment of Student Learning for Improving the Undergraduate Major in Mathematics, which we discussed in Rapid City.

NSF communicated that the Calculus and Bridge to Calculus programs are being retired, indicating a funding shift away from Calculus Reform. Two new initiatives are being introduced. The first (Advanced Technological Education) deals with improving math and science education in the technological workforce. The second (Mathematical Sciences and their Applications throughout the Curriculum) is a program directed toward large scale systemic change in undergraduate education involving interdisciplinary projects with the physical sciences and engineering disciplines.

Minneapolis Meeting:

The summer meeting in Minneapolis was great. Sunshine and 70 degree weather made for a fabulous setting at the University of Minnesota near downtown

Minneapolis. The attendance was in the 700's (with the current service/cost structure, we need 900-1,000 to break even). This triggered a board of governors' discussion on the feasibility of summer meetings that has continued through the fall semester. The focus of the meeting was the MAA Strategic Plan and the governance structure of the MAA. It was decided to expand the leadership structure of the MAA and to increase the role played by MAA department representatives within the organization. Tom Kelley (our past-chair) has kindly offered to work with me in this area. We anticipate the reps to be communicating regularly with one another, the sectional officers, and with the national office by an e-mail mailing list or an electronic bulletin board. We envision the reps becoming the grass-roots leadership structure of the section and playing a pivotal role in sectional and national issues related to the mathematical sciences. If you are interested in becoming a rep and/or serving in national committees, please let me know. We will be making appointments this Spring and have scheduled a reps breakfast meeting for Saturday morning at the Pueblo meeting.

The CUPM Subcommittee on Service Courses issued its report on Mathematics for Undergraduate Business Majors and is working on a report on service courses for engineering majors. The CUPM Subcommittee on Quantitative Literacy Requirements is about to issue its report. CUPM/CTUM are considering the question of General Education mathematics courses. See UME Trends, May 1994.

In response to the Guidelines and the Recognition and Rewards documents, the NSF is about to launch a broad systemic initiative to improve the quality of undergraduate education. This NSF program will extend the following MAA initiatives funded by the NSF: Priming the Pump curricular reform initiative, Project NEXT (a mentoring program directed at preparing recent Ph.D. recipients for college teaching), the Case Studies of Undergraduate Mathematics Program, and the Cooperative Learning in Undergraduate Mathematics Education Program. If you or your institution are interested in participating in any of these initiatives, please let me know. Project NEXT PIs have indicated an interest in recruiting prospective participants (especially from research universities) in the Rocky Mountain Section.

Governors' Agenda:

In the last newsletter, I listed a number of issues I wanted to address during my tenure as Governor. Here is a progress report.

a,b) I am very pleased with our efforts to develop stronger professional relationships between the mathematics faculties of elementary and secondary schools, community colleges, four-year colleges, and universities. We have been invited to represent the MAA in the CCTM board of directors, and have attended their meetings regularly for over a year. Moreover, following a motion approved in Rapid City, they have in turn elected Tom Hibbs to represent CCTM in our executive committee.

Many people have worked to make this possible, but I am especially indebted to Janet Barnett, our chair, who contacted COLOMATYC, the Colorado affiliate of the American Mathematical Association of Two-Year Colleges (AMATYC), with an invitation to work together in this coalition. As a result, our sectional meeting this Spring in Pueblo will be held jointly with CCTM and COLOMATYC. CCTM has also independently started to establish a corresponding relationship with COLOMATYC. We hope that this model can be replicated in Wyoming and South Dakota.

c) Our most urgent and important initiative this year will be the expansion of the leadership structure within the section with the appointment of our department representatives. This project should help build an electronic network to facilitate dialogue and interaction within the section and with the national office, should encourage and promote information sharing and collaboration within the mathematical sciences community on research and educational activities, and should streamline

and expedite the conduct of our business. An inventory of faculty activities and department programs in the mathematical sciences that I suggested last year would then easily follow.

d) David Carlson has been working with Richard Gibbs to coordinate all mathematics/mathematics education awards given at all levels in Colorado. Such a proposal is temporarily on hold due to his increased working load in the state department of agriculture. However, the CCTM was successful in organizing and inviting Governor Romer to a similar function to recognize their state and presidential award recipients.

e) Tom Kelley continues to work hard on promoting the development of MAA Student Chapters and Student Papers Sections at our sectional meetings. We would like to have Student Chapters at most institutions.

f) Jim Loats has volunteered to help rebuild our MAA Lecture series. His vision is original and involves reciprocal participation. We will make presentations at K-12 schools, and their faculties will in turn make contributions at our colleges and universities.

g) Ernest J. Cisneros and I applied and received a SUMMA Planning Grant and subsequently submitted an NSF proposal to the Young Scholars program to establish a middle school intervention program for disadvantaged students in the Denver Public Schools. I would hope some of you may become interested in a similar program at your home institution(s). We would be happy to help you in any way we can.

h) In closing, I would like to thank Bill Bosch at UNC for his many years of service as state mathematics coordinator for the MAA American High School Mathematics Competitions. Ernest J. Cisneros has kindly agreed to take on this assignment.

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MAA ROCKY MOUNTAIN SECTION CHAIR'S REPORT

submitted by Janet Heine Barnett on 24 February 1995

Tino is correct about how lovely Minneapolis was last August, but I have to admit I personally preferred San Francisco, rain and all. The lure of the Golden Gate Bridge made it possible to hold an Executive Committe meeting in San Francisco with virtually the entire committee in attendance. Much of the business discussed at that meeting appears in Tino's report. Accordingly, this report will be brief.

The primary item I would like to bring to your attention is the Executive Committee's work on a Mission Statement for the Section. As you may recall, the need for a program of Activities Grants to assist section members in activities supporting MAA goals was discussed in Rapid City. It was agreed that the Executive Committee should prepare guidelines for grant requests, as well as a plan for funding such a program. A Section Mission Statement seemed the logical first step in this process, and the Executive Committee has been hard at work drafting such a statement.

A copy of the Second Draft Mission Statement appears on the next page. In addition to statements of goals, we have identified initiatives which the Section currently undertakes, or plans to take on, in support of each goal. Intitiatives which are either currently in place or currently under development appear in italics. As you can see, there is much good work being done by the Section already.

Your comments on the draft statement are encouraged. Please forward your input to me at the address(es) given on page 1 of this newsletter by 3/24. The Executive Committee will present the Final Draft at the April Business Meeting. We also expect to present a grant program proposal based on the Mission Statement at that time. Hope to see you all there!

SECOND DRAFT: MAA ROCKY MOUNTAIN SECTION MISSION STATEMENT

MISSION: To promote excellence in mathematics education, especially at the collegiate level.

MISSION RELATED GOALS	INITIATIVES
To foster scholarship, professional development, and professional cooperation among the various constituencies of the mathematics community within the region.	*a) Foster professional exchange and development through presentations at Section Meetings.* *b) Foster sharing of expertise through short courses and workshops at Section Meetings.* *c) Disseminate information on professional development opportunities through Section Newsletter.*
To foster the implementation and study of recent research recommendations for the teaching, learning, and assessment of collegiate mathematics.	*a) Foster dissemination of recommendatons through network of Department Representatives.* *b) Foster dissemination of recommendatons through bulletin boards, such as the MAA GOPHER.* *c) Foster discussion of recommendations and implementation issues through presentations at Section Meetings.*
To provide public recognition of quality mathematics teaching, and enhance public understanding of the importance and beauty of the mathematical sciences.	*a) Sponsor and publicize Section Distinguished Teaching Award.* *b) Sponsor and participate in Mathematics Awareness Week activites.*
To support the implementation of effective mathematics preparation programs of prospective teachers at all levels.	a) Maintain Teacher Preparation Electronic Network.(*) *b) Maintain Visiting Lecture Series with CCTM and COLOMATYC.*
To enhance the interests, talents and achievements of all individuals in mathematics, especially of members of underrepresented groups.	a) Foster network of professional mathematicians to serve as mentors.(*) b) Maintain Undergraduate Lecture Series to provide career and graduate school information.(*) *c) Foster student participation in Mathematics Competitions.* *d) Foster student participation in annual meetings.*
To provide regional leadership in the promotion of systemic reform in mathematics education, and in the enhancement of public understanding of the needs and importance of mathematical research and education.	*a) Develop and sustain working relationships with other professional math education organizations (such as state affiliates of the Mathematical Association of Two Year Colleges and the National Council of Teachers of Mathematics).* *b) Maintain Visiting Lecture Series with CCTM and COLOMATYC.* c) Participate in Statewide Systemic Initiatives within the region.(*)

PLEASE REFER TO CHAIR'S REPORT, PAGE 4, FOR MORE ON MISSION STATEMENT
COMMENTS MAY BE FORWARDED TO jbarnett@meteor.uscolo.edu

(*) represents an initiative the section plans to pursue in the future. If you are interested in helping to develop these initiatives, please include this information with your comments.

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MEETING UPDATE

The 1995 Annual Meeting continues to take shape. Response to the first call for papers has been good. The titles of a representative cross-section of the papers accepted to date appears below, as do the titles and abstracts of the Invited Talks. Program highlights of the CCTM and COLOMATYC programs are also listed for your informaton. Complete program listings will be mailed in early April to registered participants.

We are especially pleased with the interest we've received from students, both graduates and undergraduates. Please remind your undergraduates that presentation of papers at the section meeting entitles them to a one year membership in MAA (including one journal of their choice); if they already belong to the MAA, they may select any MAA book instead. Other activities of interest to undergraduates include Prof. Siegel's Banquet Address, "Industrial Mathematics for Fun and Profit", Friday evening. For those Math Clubs who enjoy a challenge, the USC Math Club has voted to buy a Banquet ticket for any USC student who presents a paper at the meeting. We've also heard from a contingent of CU-Denver Math Club members, who have volunteered to assist at the meeting.

We also have the opportunity to host a workshop entitled "Environmental Numeracy", which describes a liberal arts mathematics course designed by Professor Marty Walter of the University of Colorado, Boulder. Prof. Walter has agreed to offer a two-hour version of this workshop Saturday afternoon from 2 - 4. The workshop will be free, with a draft copy of his course notes available at cost (approximately $10). To help us gauge interest, please e-mail *jbarnett@meteor.uscolo.edu* if you are interested in attending. (There is also a space provided on the pre-registration form to indicate interest if e-mail is unavailable to you.) Should there not be sufficient interest to warrant the two-hour workshop, Prof. Walter has graciously agreed to present a 15-minute overview of the course Saturday morning.

A pre-registration form appears on the last page of this newsletter. You may also register for the Friday Banquet (Buffet Style, $15.25 per person) and the Saturday Luncheon (Trio Salad Boat, $7.65 per person) on that form..

INVITED ADDRESSES:

DTA LECTURE: *Slates, Blackboards, Greenboards, Whiteboards, Overheads, Computers, Multimedia: Can We Possibly Survive in Such a Changing World?*

Prof. Duane Porter, University of Wyoming
1994 Rocky Mountain Section Distinguished Teaching Award
Friday, 21 April, 1:15 - 2:00 p.m.

POLYA LECTURE: *Witnesses for composite numbers*

Prof. Carl Pomerance, University of Georgia
MAA Chauvenet Prize Recipient, 1985
MAA Polya Lecturer, 1993 - 1995
Friday, 21 April, 4:00 - 5:30 p.m.

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 means of 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.

BANQUET ADDRESS: *Industrial Mathematics for Fun and Profit*

Prof. Martha Siegel, Towson State College
Editor, *Mathematics Magazine*
Friday, 21 April, Following Banquet at 7:00 p.m.

How can we incorporate industrial mathematics into the curriculum? What types of problems might actually be posed by industrial clients? Some specific case studies will be presented, along with a discussion of the mathematical models involved in the solutions.

KEYNOTE ADDRESS: *"Populating" Mathematics Courses*
Prof. Martha Siegel, Towson State College
Editor, *Mathematics Magazine*
Saturday, 22 April, 9:00 - 10:00 a.m.

Population models, ecology and epidemics from the perspective of what can be done in classes K-16.

MAA CONTRIBUTED PAPERS: A SAMPLE

On Finitely Generated Principal Ideal Domains
Stephen Aldrich, Undergraduate, University of Southern Colorado

Calculation of Three Dimensions
Mary Hughes Treder, Graduate Student, University of Wyoming

Motivational Teaching Techniques Involving Connections Between Mathematics and Art
Ray Tennant, Univesity of Southern Colorado

Using Global Optimization to Discover Icosahedral Structures
Jerry Schulz, Metropolitan State College of Denver

Experiences Using Portfolios in a Calculus III Class
Karen Whitehead, South Dakota School of Mining Technology

COLOMATYC SESSIONS

Data Analysis in an Introductory Statistics Course
Patrick Enright, Arapahoe Community College

Some Approaches to Teaching Calculus II
Organizers: Jeff Berg & Patricia Hauss, Arapahoe Community College

Proposed Changes and Additions to the Core Curriculum
Organizer: Patricia Hauss, Arapahoe Community College

CCTM SESSIONS

High School Sessions: *Integrated Mathematics Curriculum*
Interactive Video in Calculus

Middle School Session: *Assessment Issues in MS and HS*

Elementary Session: *Integrated Math K-8: An All School Cooperative Effort*

Contributed Paper Sesson: "Standards Innovations"

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NEWS FROM DEPARTMENTS

Mesa State College, Edwin Hawkins, Chair

* **Jihad Qaddour**, Assistant Professor of Engineering, and **Philip Kavanagh**, Associate Professor of Mathematics, have joined the faculty.
* **James Brock** and **Timothy Novotny** were promoted to Associate Professor.
* **James Kramer** has retired.
* The department is also participating in the **Colorado Space Grant Consortium.**

South Dakota School of Mines and Technology, Ed Corwin, Chair

* **Ed Kornkven**, who just completed his PhD in computer science at University of Illinois, has joined the faculty.
* **Don Teets** received tenure and promotion to Associate Professor.
* **Manuel Penoloza** received tenure.
* **Karen Whitehead** is now Dean of the College of Systems Engineering
* We had several students take the **Putnam Exam**. This is the first participation by SDSMT in several years.
* Don Teets would also like to thank the many people who contributed to a **successful section meeting** at SDSMT last year. The department enjoyed hosting the meeting. (Editor's note: We enjoyed the meeting also, and thank SDSMT for their hospitality and hard work.)

Adams State College

* New visiting faculty are **Mark Krebiel** from Wichita State University and **Phil Emerick** from UCCS.
* **Ed Adams** was promoted to Full Professor.
* **Ron and Marilyn Loser** are both on leave at University of New Mexico.

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Mathematics Awareness Week
"Mathematics and Symmetry"
April 23 - 29 1995

Mark your calendars now and plan to observe Mathematics Awareness Week in your area, institution, or organization. With the theme of MATHEMATICS AND SYMMETRY, Mathematics Awareness Week provides an excellent opportunity to celebrate the beauty and complexity of the mathematical sciences. Do your part to promote public awareness of mathematics Sunday, April 23 through Saturday, April 29.

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NUMBER THEORY SHORT COURSE

Professor Fernando Gouvea of Colby College, who spoke at our own section meeting in Rapid City, will be presenting a workshop examining the background work necessary to understand the basic mathematics behind the current work in the proof of Fermat's Last Theorem.

The course will be held at Allegheny College, 26-30 June 1995. Course registration will be $120 and room and board will be $140, for a total of $260. For further information and an application contact:

George Bradley, Dept of Math and CS, Duquesne University, Pittsburgh, PA 15282
BRADLEY@DUQ3.CC.DUQ.EDU (412) 396-5115

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SECOND CALL FOR PAPERS

There is still some room in the program for 15-minute contributed talks. Deadline for submission of abstracts is March 20, 1995. Abstracts may be submitted via e-mail to *jbarnett@meteor.uscolo.edu*, or mailed to:

MAA PROGRAM COMMITTEE
Department of Mathematics
University of Southern Colorado
2200 Bonforte Boulevard
Pueblo, CO 81001-4901

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ROCKY MOUNTAIN SECTION ANNUAL MEETING: PRE-REGISTRATION FORM

PLEASE RETURN FORM WITH YOUR CHECK TO:

MAA MEETING REGISTRATION
DEPARTMENT OF MATHEMATICS
UNIVERSITY OF SOUTHERN COLORADO
PUEBLO, CO 81001-4901

NAME _____

INSTITUTION _____

MAILING ADDRESS _____

_____

_____

E-MAIL ADDRESS _____

PHONE NUMBER(S) _____

Are you interested in Marty Walter's two-hour workshop *Environmental Numeracy*, Saturday 2 p.m. - 4 p.m.? If so, please e-mail *jbarnett@meteor.uscolo.edu* and/or mark the space at right and return ASAP. _____

PLEASE MAKE CHECKS PAYABLE TO

USC - MAA CONFERENCE

BY 15 APRIL 1995

Pre-Registration (Students - $2, Others - $6) _____

Friday Banquet ($15.25) _____

Saturday Luncheon ($7.65) _____

TOTAL ENCLOSED _____

On-Site Registration is set at $10.00.
A limited number of tickets for Friday's Banquet and Saturday's Luncheon will be available on site.

Mathematical Association of America
Rocky Mountain Section
Department of Mathematics
University of Southern Colorado
2200 Bonforte Boulevard
Pueblo, CO 81001-4901

William C Ramaley
Fort Lewis College
Dept of Mathematics
Durango, CO 81301