FALL 2006 NEWSLETTER

Section Website **http://www-math.cudenver.edu/~maa-rm**

Fall 2006 Newsletter in HTML Format

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In 1991, the MAA Board of Governors established Section Awards for Distinguished College or University Teaching to recognize excellence in mathematics teaching at the post-secondary level. The Rocky Mountain Section Award is named in honor of Burton W. Jones, a lifelong advocate of excellence in teaching and supporter of the members and programs of the MAA. In addition to receiving a certificate and a check, award recipients deliver the opening address at the following year's spring meeting and become the Section Nominee for the Deborah and Franklin Haimo Awards for Distinguished College or University Teaching of Mathematics.

Criteria for the award require far more than effective teaching. Awardees are expected to be outstanding teachers, widely recognized both within and beyond their institution for extraordinary success in teaching mathematics. Professor Barbara Moskal of the Colorado School of Mines (CSM) easily exceeds each of the high standards set for this prestigious award as evidenced by her efforts in teaching, leading undergraduate and graduate research projects, mentoring, service, and research.

Dr. Moskal has developed a reputation for being an enthusiastic, well organized, and caring instructor. In recognition of her excellence in teaching, she received the Colorado School of Mines Alumni Association Outstanding Faculty Member in Mathematical and Computer Sciences Award in December 2001, based on the vote of all CSM graduating seniors. In May 2003, she received CSM's most prestigious teaching award, the CSM Alumni Teaching Award, which recognizes superior teaching at the undergraduate level over a period of several years and provides encouragement and incentive for teaching achievement.

In May 2004, she received the Alfred E. Jenni Faculty Fellowship which is awarded to a CSM faculty member "who will make institution-wide contributions in teaching effectiveness and educational scholarship during the one-year period of the award. The recipient will have meritorious service in educational program development and will have a vision of how that experience can be brought to bear in institution-wide enhancements in education." Under this award, Dr. Moskal is working to strengthen a partnership between CSM and Colorado Christian University (CCU) which will enable CCU pre-service teachers to complete all of their mathematics courses beyond calculus in the Department of Mathematical and Computer Sciences (MCS) at CSM. It will also provide MCS students interested in pursuing a career in middle or high school mathematics teaching with the opportunity to complete a teacher certification program through CCU while remaining at CSM. Dr. Moskal is working on a similar collaboration with the Metropolitan State College of Denver.

Her background in assessment has allowed her to provide invaluable assistance to her department and the CSM community on issues concerning assessment. Within her department, she is the lead assessment person. She often develops assessment instruments that meet current department needs such as research project evaluations, staff evaluations and student evaluations. She also assists faculty in the development of assessment instruments appropriate for their classroom needs. Recently she developed assessment materials designed to evaluate and improve a faculty member's probability and statistics textbook which has gone to print.

Dr. Moskal's primary research focus is on the development and validation of assessment instruments at the classroom, department, and university levels. She is also interested in the impact gender has upon the assessment process, and is engaged in research that examines the impact that classroom pedagogy and assessment techniques have upon the retention of female students. She has published numerous refereed journal articles, book publications, and conference papers, several by invitation.

Dr. Moskal has been remarkably successful in obtaining external funding which has enabled her to make significant contributions to undergraduate and graduate education at CSM and to K-12 education in local school districts. Currently she is principal investigator or co-principal investigator on grants totaling several million dollars. These awards cover a broad

spectrum of areas including computer ethics and gender issues as well as teacher enhancement. Two NSF grants in particular have direct impact on MCS students: "Science Related Degrees: Improving the Retention of Women and Minorities through Research Experience, Mentoring and Financial Assistance", and "GK-12 Learning Partnerships: Creating Problem Centered, Interdisciplinary Learning Environments".

Through Dr. Moskal's efforts, the number of graduate students working on education-related topics has greatly increased at CSM. She has been particularly successful in attracting and retaining female graduate students. Some of her MS students have gone on to Ph.D. programs. Her graduate students have offered several successful summer technology camps to underprivileged middle school students from Adams County District 50.

In October 2004, Dr. Moskal led the organization of a one-day undergraduate mathematical sciences conference funded by the MAA and the CSM Graduate School. She also played a key role in the development of a proposal to establish a Research Experience for Undergraduates site in Hong Kong, which was recommended for funding by the NSF.

Dr. Moskal was also instrumental in the establishment of the Center for Engineering Education at the Colorado School of Mines in 1999 and served for three years as the Center's first associate director.

The Rocky Mountain Section is fortunate to have a person with Dr. Moskal's enthusiasm and talent for mentoring others and teaching mathematics. It is an honor to recognize her contributions to mathematics education with the 2006 Burton W. Jones Distinguished Teaching Award. Congratulations, Dr. Moskal, and best of luck in the competition for the Deborah and Franklin Haimo Awards for Distinguished College or University Teaching of Mathematics!

Karen Walters, Arapahoe Community College

Past Burton W. Jones DTA Recipients

1992 Professor John H. "Jack" Hodges,
University of Colorado, Boulder

1993 Professor Gerald Diaz,
United States Air Force Academy
1994 Professor A. Duane Porter,
University of Wyoming
1995 Professor William D. Emerson,
Metropolitan State College of Denver
1996 Professor Zenas Hartvigson,
University of Colorado at Denver
1997 Professor Thomas Kelley,
Metropolitan State College of Denver
1998 Professor Monte Zerger,
Adams State College
1999 Professor Bill Briggs,
University of Colorado at Denver
2000 Professor Barbara Bath,
Colorado School of Mines
2001 Professor Jim Loats,
Metropolitan State College of Denver
2002 Professor Gene Abrams,
University of Colorado at Colorado Springs
2003 Professor Hugh King,
Colorado School of Mines
2004 Professor Don Teets,
South Dakota School of Mines and Technology
2005 Professor Bryan Shader,
University of Wyoming
2006 Professor Barbara Moskal
Colorado School of Mines

Section Students Recognized for Mathematics Excellence

On May 24, 2006, the Eleventh Annual Colorado Mathematics Awards Ceremony was held at the Grant-Humphreys Mansion in Denver. Organized by **Dick Gibbs**, Emeritus Professor at Fort Lewis College, and **David Carlson**, President of Resource Analysis, Inc., the event recognized 53 Colorado students and 29 teachers for outstanding performances on six national mathematics competitions: MATHCOUNTS, the American Mathematics Contests 8, 10, and 12, the William Lowell Putnam Mathematical Competition, and the Mathematical Contest in Modeling. The AMC 8, AMC 10, AMC 12, and Putnam Competitions are sponsored programs of the MAA, which also provides support for the other three

competitions. The Rocky Mountain Section is an educational sponsor of the Colorado Mathematics Awards Ceremony.

Other MAA members on the Awards Steering Committee include **David Larue** (Mines) and **Lou Talman** (Metro). Special thanks to David for his AMC 10, 12 website: http://www.mines.edu/amc/. Pictures of this year's CMA can be found there.

The American Mathematics Contests 10 and 12 awards were presented by **David Larue**, the Mathematical Contest in Modeling awards and the William Lowell Putnam Mathematical Competition awards were presented by section Governor **Jane Arledge** (MSC).

Again his year a team from University of Colorado at Boulder excelled in the Mathematical Contest in Modeling. Team members were **Brian Camley, Pascal Getreuer,** and **Bradley Klingenberg,** coached by Prof. **Bengt Fornberg**. The team received the **Outstanding** designation for their solutions. 'Outstanding' is the highest award level possible, reserved for those papers which provide excellent analysis, thoughtful insights and exceptionally clear exposition. Only 11 of 748 teams worldwide achieved it in 2006. This very same team received an Outstanding designation in 2004 and 2005. Quite an accomplishment!

Colorado State University and the University of Colorado at Boulder shared Putnam Competition honors. Individual top Putnam scorers were **Ben Joeris**, **Kyle Thayer**, and **Bethany Springer** from CSU, and **Thomas Mark Bailey, Brian Camley, Michael Ruston**, and **Charles Shannon** from CU-Boulder. CSU had the top Putnam team, comprised of **Elizabeth Delk, Ben Joeris, and Jonathan Troup.** The CSU coach was Prof. **Alexander Hulpke,** and the CU-Boulder coach was Prof. **Gordon Brown**.

In addition to supporting the Colorado Mathematics Awards Ceremony, the Section also recognizes top section scorers on two exams. This year, the Rocky Mountain **Section Putnam Exam Top Score** belongs to **Ben Joeris**, CSU. The Rocky Mountain **Section AMC 12 Top Score** was achieved by **Andrew Scacco**, a senior at Smoky Hill High School in Aurora. Congratulations, Ben and Andrew!

Prof. **Barbara Moskal** (CSM), recipient of this year's Rocky Mountain Section Burton W. Jones Distinguished Teaching Award, was recognized by section Governor **Jane Arledge**.

Special thanks to the CMA Steering Committee for identifying and recognizing these outstanding young mathematicians.

Dick Gibbs, Fort Lewis College

Colorado Math Team Wins 1st Place at ARML Competition

The Colorado ARML math team, composed of 15 high school students from around the state, competed at the American Regions Mathematics League (ARML) competition in June and won First Place in the B Division, outscoring 80 teams from around the country and abroad. Overall Colorado placed 18th out of 113 teams, an impressive result for a new team. The contest was held on June 2-3, 2006, at the University of Nevada, Las Vegas, one of three regional sites that simultaneously hosted the competition for over 1500 participants. (The other sites were at Penn State University and the University of Iowa.)

With support from the Department of Applied Mathematics at the University of Colorado at Boulder, the Colorado ARML team met monthly throughout the year at the CU Boulder campus to prepare for the competition. The meetings brought together top Colorado high school students who share a passion for mathematics. Through math discussions and collaborative problem solving, team members learned how to work as a unit, which contributed to their victory.

The annual ARML competition, founded in 1976, brings together the nation's finest math students for a challenging four-round contest that requires creativity, ingenuity and collaborative teamwork. Some of the problems can be solved quickly while others require writing proofs. There is even a relay round where one team member solves a problem and then passes the answer to a teammate, who uses it to solve the next problem. Unlike most math contests, success at ARML depends on teamwork, with all 15 members contributing to the team's solutions, often collaborating on a single answer.

The (volunteer) team coaches were **Brad Alpert** and **Silva Chang** from Boulder. They are the parents of team member **Hannah Alpert**. Chaperones for the team were parents **Rocke**

and **Myra Verser, Bruce Galler**, and **David Morton**.

The Colorado ARML team members hail from nine different Colorado high schools:

Boulder High School: **Sam Galler**

D'Evelyn Jr/Sr High School: **Eric Conner, Conner Rogers, Kyle Wolma**

Fairview High School: **Hannah Alpert, Marshall Carpenter, Thomas Davids, Vicky Li, Victor Li, Norris Xu**

George Washington High School: **Jesse Morse**

Poudre High School: **Sam Elder**

Rangely High School: **Michael Morton**

Steamboat Springs High School: **Charlie Stoddard**

Thompson Valley High School: **Amber Verser, April Verser**

Wheat Ridge High School: **Ben Kurtz**

Dick Gibbs, Fort Lewis College

Chair's Report

Earlier this year, I had the privilege of attending the national joint AMS/MAA meeting in San Antonio, Texas. In addition to enjoying the river walk, seeing some of the sites and generally being professionally rejuvenated by the conference, I was impressed by the presence of Rocky Mountain Section members at this prominent national meeting. I was continually bumping into section members. Most of the section members that I spoke with were attending to stay abreast of national trends and to network with fellow mathematicians, mathematics educators, and students. Some were also presenting a poster or talk, organizing and conducting thematic poster or parallel paper sessions, participating in panel discussions, and/or participating in the governance of the national organizations. Noticing all of the activities and involvement of the members of our section reinforces the fulfillment I feel belonging to the Rocky Mountain Section.

The Executive Committee has decided to present the American Association of University Professors 1940 Statement of Principles on Academic Freedom and Tenure with 1970 Interpretive Comments to the membership at the 2007 annual business meeting for potential endorsement. Endorsement of this statement of principles would document our principles and guard against future legislative, governing body, and administrative dictates contrary to these principles. Please review the statement at http://www.aaup.org/AAUP/pubsresearch/policy docs/1940statement.htm and formulate your thoughts and opinions prior to our April 2007 business meeting. I would appreciate any member who would email me his/her thoughts and opinions on this matter at jeff.berg@arapahoe.edu prior to the meeting.

I have been working with **Bill Briggs** and **Karen Walters** to establish a system to allow presenters at the Rocky Mountain Section conferences to post presentation material on the section website. If successful, this system will allow the section to begin to develop a more detailed history of section conference activities. We are planning on testing the system at our next section meeting. Anyone that intends to present a talk at this meeting can indicate what material they would like to post when they submit their speaker response form. **Janet Barnett** janet.barnett@colostate-pueblo.edu and **Janet Nichols** janet.nichols@colostate-pueblo.edu will be collecting electronic copies of material to be posted until shortly after the meeting.

In a related article on section student activities in this newsletter, after nearly three years of service **Kyle Riley** has indicated he has committed to other responsibilities and intends to step down as RMSMAA Student Activities Coordinator following this academic year. The Section is indebted to **Dr. Riley** for his work with student activities and the momentum he has generated as he has further defined the position and will miss his efforts as coordinator. The Student Activities Coordinator is currently an advisory position on the Executive Committee. If you are interested in the opportunity to serve as the next Student Activities Coordinator, please contact me or any other section officer.

Please mark April 13-14, 2007 on your calendars for the 34th annual Rocky Mountain Section Conference at Colorado State University Pueblo. The program promises to be interesting and full with a theme commemorating Euler's 300th birthday, and the Mathematics Department at Colorado State University Pueblo will undoubtedly live up to its reputation of being well-organized and gracious conference hosts.

Jeffrey V. Berg, Arapahoe Community College

Governor's Report

The MathFest Governor's meeting was held on August 9, 2006, in Knoxville, Tennessee. Some issues that may be of interest to members of the Rocky Mountain Section include the following.

- Janet Heine-Barnett was awarded the Rocky Mountain Section Meritorious Service award for many years of excellent contributions to the section. Congratulations, Janet!

- MAA is searching to fill two new positions. One is the Student Activities Coordinator, who would be working with Michael Pearson. Notice that our section is ahead of the curve, as we created that position last year! The other is Director of Publications, previously held by Don Albers. He will now be in charge of MAA books, while the new person will have the responsibility for MAA journals. See the MAA web page if you want more information http://maa.org/news/051606newpositions.html .

- Interested section members are encouraged to apply for grants under the auspices of the MAA. More information can be found at http://www.maa.org/ABOUTMAA/handbook/pi_manual01.html, and from appropriate committees (go to About MAA, Organizational Directory, Committees, or link to https://enterprise.maa.org/ecomtpro/timssnet/Login/tnt_login.cfm?mo=y&redirect_location=http://www.maa.org/ecomtpro/members/committees/index.cfm?loc=index2.cfm (a members-only link in either case).

- Section members are encouraged to talk to their congressional representatives about the need to increase funding to the NSF Division of Mathematical Sciences and the Division of Undergraduate Education. For more information, see http://www.maa.org/sciencepolicy/index.html

- There are institutional bulk subscription rates for Math Horizons; email the MAA at maaservice@maa.org for more information.

The Joint Meetings in New Orleans will be Friday, January 5 through Monday, January 8. You are advised to arrange your travel early, since there is some competition for hotels and flights from football fans; apparently the Sugar Bowl is Wednesday, January 4.

Please send me names and email addresses of any new faculty members in your department; we try to send them a personal welcome to the section. (arledge@mesastate.edu)

As always, it is a pleasure serving you. Please email me if you have any questions or concerns.

Respectfully submitted,
Jane Arledge

Section Officer's Meeting Report

As secretary/treasurer I attended the section officer's meeting at MathFest in Knoxville, Tennessee. Below are the highlights:

1. The biggest discussion item was by-law changes. National would like to have each section review their by-laws every 10 years. Sections would be on schedules and every 10 years each section would make major changes to by-laws; minor changes could occur in between. National would like each section's mission to reflect the MAA mission. This is an opportunity for us to review our by-laws thoroughly every 10 years.

2. The second item dealt with section meeting registration fees. National has the capability to handle these registrations for a fee. We may want to pursue this in our section.

3. A third item, which may be of interest to some institutions, is the idea of hosting the MAA American Mathematics Competitions (AMC). This is a great opportunity to bring bright young students onto campus and a wonderful service to the community. AMC is also looking for mathematicians to write problems for the competition. Please contact Professor Elgin Johnston (ehjohnst@iastate.edu) for more information.

Sincerely:
Hortensia Soto-Johnson
MAA RMS secretary/treasurer

Section News

Arapahoe Community College

Debbie Grant is our new full time faculty member. She replaced **David Heddens** who

moved to a community college in Albuquerque, NM.

Norman LeMay is co-chairing the State Mathematics 2-2 Faculty committee with Cathy Pellish from Front Range CC.

The Colorado Mathematical Association of Two Year Colleges will meet on Friday, March 2, 2007 at the Community College of Denver. Contact mary.sloan@arapahoe.edu for more information. Two year and four year math faculty are more than welcome to attend and even present!

Matt Gianneschi from CCHE has sent out a proposed foundation for a possible Secondary Mathematics articulation agreement. One of the proposed courses that would be taught at the community college level is Discrete Mathematics. **Marsha Driskell** from AIMS CC, **Terry Reeves** from Red Rocks CC and **Mary Sloan** from Arapahoe CC are on the syllabus writing team. If you have any comments or input, please contact mary.sloan@arapahoe.edu.

CSU - Pueblo

Our faculty continues to change, along with many other things on campus. **Gil Orr** retired in May 2006 after many years of service to our program and students. Fellow algebraist, **Jim Derr,** will join him in retirement at the end of the current semester, much to the dismay of students past and present. We wish them both well in their future endeavors.

Our best wishes also go out to **Bruce Lundberg** for a productive sabbatical leave during the 2006 - 2007 academic years and to **Jim Louisell** on his application for sabbatical during the 2007 - 2008 academic year. Statistician **Igor Melnykov** is now in his second year with the department and continues to do well. Many of you may know **Tammy Watkins** as the Director of the Math Learning Center, but she has just completed her first year as a lecturer in the department and is looking forward to another year in which she can devote her energies to teaching. **Mary Middleton** is starting her second year as Director of the Math Learning Center where students now sign in electronically with a swipe of their student ID.

Thanks to the Herculean efforts of our department chair**, Paul Chacon**, vacancies caused by unsuccessful faculty searches last spring have been filled with full-time visiting faculty for the coming year. Visiting lecturer **Adrianne Bremer** moved to the Pueblo region following Hurricane Katrina, and is helping to meet our current demand for lower division course instructors. Visiting assistant professor **Hugo Rodríguez-Ordóñez** recently completed his doctorate at the University of Oregon in August 2006. Originally from Toluca, México, Hugo's research interests include algebraic topology, harmonic maps, and nonassociative algebras. Visiting assistant professor **Jonathon Poritz** completed his doctorate in 1992 at the University of Chicago under the direction of Karen K. Uhlenbeck; he has since held various academic positions, including 2 years with the Swiss Federal Institute of Technology. Jonathan's current research interests includes computer security and privacy, theoretical cryptography, quantum computation, and the use of computer visualization to explore phenomena of actions of discrete groups in low dimensions. A lecturer position has been split and is being shared by **Michael Payne** and **Byron Hurley**.

In other news, **Janet Barnett** received two campus awards in spring 2006: the University Excellence in Teacher Award and the Outstanding Woman of the Year Award from the CSU-Pueblo Women's Studies Program. She recently co-organized a successful regional Mathematics for Prospective Elementary Teachers with **Janet Nichols** (now the senior member of our department!). The department also hosted the Pikes Peak Regional Undergraduate Conference in February. Both conferences were supported in part by funds provided by the national MAA.

Mesa State College

Mesa State College is pleased to introduce its three new faculty members, one each in the areas of Statistics, Mathematics, and Mathematics Education.

Rick Ott comes to our department from a visiting assistant professor position at the University of Missouri - Columbia. Rick received his Ph.D. from Rice University in May 2005 in extreme value theory (statistics) under the direction of Javier Rojo. Before his Ph.D. studies, Rick worked in Mission Control at the Johnson Space Center specifically on the Space Shuttle landing team. Besides statistical applications to engineering problems, Rick is an avid golfer and former member of the PGA of America. He volunteers at Tiara Rado golf course children's clinic and enjoys being active

with the Catholic Newmann Center on the college campus.

Markus Reitenbach received his Ph.D. from Syracuse University in 2005 in representation theory under Mark Kleiner. He spent the last year completing a postdoctoral experience, also at Syracuse. Markus was chosen as a national Project NExT Fellow (sepia dot). He enjoys the beautiful blue skies in Grand Junction and is happy that he found a golf partner in Rick Ott, our new statistics professor.

Dan Schultz-Ela received his M.Sc. from Brown University and his Ph.D. from the University of Minnesota, both in the geosciences but with a strong quantitative focus. After 15 years at the University of Texas at Austin numerically modeling the evolution of rock structures, he retooled to obtain a teachers license and spent an interesting year teaching 8th grade. Dan is now teaching the math education courses at Mesa State College and greatly enjoying again being close to family and all of the outdoor opportunities in western Colorado.

Red Rocks Community College

Our long-time department chair, **Rick Reeves**, has accepted a promotion. He is now a Dean of Instructional Services. Unfortunately, he cannot be <u>our</u> dean, since his wife is a member of our department. So, he has gone over to the other side; Rick is the dean of Humanities, Communication, Foreign Languages, History, etc.

To replace Rick, **Terry Reeves** was elected as our new department chair. To take over Rick's teaching load, a new full-time math instructor, **Laith Haddad**, was hired. In addition to Terry and Laith, our department consists of **Dean Barchers**, **Marty Calderone**, **Heather Duncan, Tom Niehoff, Chuck Smith**, and **Bill Thompson.**

Red Rocks offers an "Endowed Teaching Chair" award to its faculty. In addition to the prestige, the award provides $22,500 in salary enhancement and professional development funds over a three year period. Last Spring, **Chuck Smith** was honored with this award. Of the ten Chairs awarded since the inception of the program five years ago, Chuck is the third recipient from the math department. **Rick Reeves** and **Terry Reeves** have been recipients in past years, and **Tom Niehoff** was among the finalists for last spring's Chairs.

Regis College

The Regis College Mathematics Department has a new faculty member, **Tim Trenary**, who joined us this Fall. He received his PhD from Colorado State University in Nonlinear Functional Analysis and Optimization (1998). He was recently working for IBM Printing Systems, and is delighted to be back in academia. We are delighted to have his enthusiasm and positive attitude in our department!

We are also proud of our student's recent accomplishments, including a 10 on the Putnam, a Meritorious Winner in the MCM, an undergraduate research paper published in the Rose-Hulman Undergrad Math Journal, and several students participating in REUs (that will hopefully lead to interesting talks at upcoming meetings).

South Dakota School of Mines and Technology

The South Dakota School of Mines has several items we would like to share with the section. For the second straight year, our Putnam team has managed to be ranked in the top 150 of all the teams competing. We believe this great honor is all the more impressive when one considers the size of our school and the applied nature of our program. Our terrific students certainly deserve a great deal of the credit, but the Putnam coaches (**Ed Corwin** and **Travis Kowalski**) are also a crucial part of this success. Professor **Laura Geary** was recently honored with the campus wide teaching award. This award was founded to recognize outstanding teaching and the ability to inspire students, which is probably the perfect way to describe the teaching efforts of Professor Geary. Our efforts to mentor undergraduate research was particularly productive last year with two students giving presentations at the section meeting AND two additional students giving presentations at the Mathematics on the Northern Plains Conference.

University of Colorado at Boulder

Prof. **Larry Baggett** has now retired. Long time MAA member Professor Emeritus **Burnie Meyer** died last March at the age of 85. We have a new faculty member this fall: **Stephen Preston** whose field is Differential Equations .

University of Wyoming

The Student Math Association of Wyoming (our local MAA student chapter) had a busy spring. Club members presented papers at undergraduate research conferences in Pueblo and in Denver. At regular meetings, members heard about ideas and opportunities in mathematics and statistics. They also inaugurated the annual Math Club speaker series, which features a recent graduate whose accomplishments and adventures can inspire math majors. The 2006 speaker was **Bill Koppelman**, who participated in an REU at Texas A&M, did graduate work in mathematical biology at the University of Utah, and then joined the New York City Teaching Fellows program. The 2006-2007 year started out with a well-attended and popular ping-pong tournament, and it looks like the membership will continue to grow this year.

The 2006 Rocky Mountain Mathematics Consortium Summer School on Computational Number Theory and Applications to Cryptography was wonderful experience for the over 80 participants. The program included a public lecture entitled "Cryptography--the Art of Secret Writing" given by **Renate Scheidler** from the University of Calgary, which attracted a varied audience from both on and off campus. Next year's RMMC Summer School topic will be Flow through Porous Media.

In the spring, we will host the annual Wyoming Mathematics, Statistics, and Computer Science Articulation Conference which brings together UW and Wyoming community college departments. Events will include a session on Assessment, and special invited speaker **Eli Maor**.

Is news from your school missing?

Send your news to your department liaison now with a request to forward it to the Linda Sundbye, Newsletter Editor for inclusion in the next issue.

Student Activities

It was great to see so many students at our last section meeting and a relatively large number of students gave talks at the meeting. There are several news items I would like to pass along to you regarding student activities in our section.

The mathematical awareness month poster contest has been discontinued. However, I am looking for some other student activity that we could have at the section meeting and there are a few suggestions I can offer:

- Undergraduate Research Poster Session
- Math Jeopardy (A contest that was demonstrated at the last Mathfest)
- A Friendly Mathematics Competition (as described in a book by Rick Gillman)
- A puzzle table that goes with the book displays

Please let me know if your school is interested in any of these activities and look for news in the spring newsletter on any activity we end up pursuing. If there are any ideas or suggestions you might have on a good student activity we could have at the section meeting then please feel free to contact me.

There has been interest in creating a website to post the student papers, and/or the PowerPoint slides, from the student presentations at the section meeting. I would be willing to support this activity, but I would like to make it perfectly clear that this process should not be considered a refereed publication in any shape way or form. If you have had some experience with students presenting at our section meeting then please let me know your thoughts on the feasibility of this proposal. It is my guess that any website would be created some time after the section meeting since that is the most likely time that all papers and/or slides would be completely finished.

Have you ever considered starting an MAA student chapter at your school? There isn't any additional charge to start a chapter at your school and your students get a reduced membership fee if they join as a student chapter member. Additional information on student chapters and the MAA student chapter newsletter can be found at http://www.maa.org/students/chapter_index.html

Another project we are working on is increasing the involvement of graduate students in our section. A graduate student can get a membership in the MAA for as little as $50. A graduate student might find several benefits in joining the MAA since they will have: access to the national newsletter, one of the journals is included with membership, reduced registration rates at MAA meetings, and a chance to interact

with potential employers. Our section meeting also presents a wonderful opportunity for a graduate student to give a talk to a regional audience of mathematicians. If you have any contact with graduate students then please encourage them to consider joining the MAA.

The last item I would like to mention is that I plan to step down as student activity coordinator at the end of this academic year. I think the section has yet to decide if this position will become an elected member of the executive committee, but the section officers have definitely been very supportive regarding this position. If you are interested in the position of Section Student Activity Coordinator then please contact our Section Chair (Jeff Berg), or the Secretary/Treasurer (Hortensia Soto-Johnson).

Sincerely,
Kyle Riley
Section Student Activity Coordinator

4th Annual Pikes Peak Regional Undergraduate Mathematics Conference
United States Air Force Academy
Saturday, February 24, 2007

The fourth annual **Pikes Peak Regional Undergraduate Mathematics Conference** (PPRUMC) is scheduled to take place on **24 February 2007** at the U. S. Air Force Academy in Colorado Springs.

PPRUMC is a one-day mathematics conference held each spring at one of several host institutions in the Pikes Peak region. The focus of the conference is to give undergraduate mathematics students the opportunity to present in a professional setting. This is also an occasion for students to become acquainted with other students, to become aware of opportunities for undergraduates in mathematics, to investigate the possibility of graduate school, and to learn more about career options in mathematics.
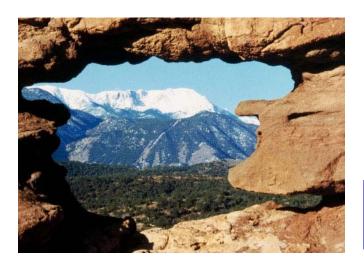
Faculty, now is the time to start working with students on projects for presentation next February!!! Presentation topics could include the results of classroom, independent study, REU or other research projects; both research and expository topics are welcome.

Student talks will be scheduled for 15-minutes each in parallel sessions throughout the day. The conference will also feature a morning keynote address by a noted mathematician, and an afternoon panel discussion or other fun math activity. The conference day lasts roughly from 8:30 – 5:00, with time allotted for some guided tours of the Academy. The steering committee expects that lunch will again be provided for all participants and that travel stipends will be available for students traveling longer distances, pending renewed funding from the MAA Undergraduate Mathematics Conferences Program (NSF Grant DMS – 0241090).

Details on conference scheduling and registration will be available in the Rocky Mountain Section Spring Newsletter. The **steering committee also seeks faculty volunteers** at Rocky Mountain Section schools to assist us in locally disseminating conference information to students, and in encouraging other faculty to undertake supervision of undergraduate research projects and/or independent study courses with students who are interested in presenting at the conference.

To volunteer as a local contact, or for more information about the conference, please contact mike.brilleslyper@usafa.edu or janet.barnett@colostate-pueblo.edu.

3rd Annual Pikes Peak Regional Undergraduate Mathematics Conference Report

The Third Annual Pikes Peak Regional Undergraduate Mathematics Conference was held on 25 February 2006 on the Colorado State University – Pueblo campus. This conference again provided an opportunity for students to gather for a day of mathematics. A record-breaking 91 participants attended this year's conference, including 22 student speakers, with a total of 14 institutions represented. Since organizing undergraduates is a bit like herding cats, the high turn-out is indeed a tribute to the efforts of local faculty who helped with conference registrations at their home institutions, as well as the efforts of faculty sponsors who assisted student speakers with their projects.

Program highlights included a thought-provoking keynote address *Quantitative Literacy: What Is It and Why Should We Care?* by Professor Bill Briggs, University of Colorado at Denver, and a panel discussion entitled *Finishing Touches to Increase Your (Math) Appeal: Research Opportunities, Internships and More* featuring panelists Jennifer Bailey (Mines), Vishaal Hariprasad (USAFA), Gary Olson (UCD), Eric Schmidt (Trane Corporation), and Deanna Turk (UN-Lincoln). Lunch and door prizes were also big hits, especially the beautiful framed fractal images which were personally created and donated as door prizes by Paul Chacon (CSU-Pueblo). Special prizes were also awarded to student and faculty participants from Emporia State University (Emporia Kansas) and Nazareth College (Rochester NY) in recognition of their long-distance travel.

Funding for the conference was provided by the MAA Undergraduate Mathematics Conferences Grant Program (supported by NSF grant DMS-0241090), the MAA Rocky Mountain Section (Chair Jeff Berg), the University of Nebraska – Lincoln Department of Mathematics (Chair John Meakin), and the CSU-Pueblo Bookstore (Manager Cindy Hall,), Offices of Admissions (Director Joe Marshall), College of Science and Mathematics (Dean Kristy Proctor), and Department of Mathematics and Physics (Chair Paul Chacon).

Janet Barnett receives MAA Meritorious Service Award

The Rocky Mountain Section is very pleased to recognize Janet Heine Barnett as the recipient of the MAA Certificate of Meritorious Service Award.

Janet Barnett completed her Ph.D. in Mathematics in 1990 at the University of Colorado, Boulder, and subsequently joined the Department of Mathematics at Colorado State University, Pueblo. She became a member of the Rocky Mountain Section of the MAA as a graduate student in 1988, and since then has been creative, diligent, and tireless in her work to fulfill the Section's mission to "promote excellence in mathematics education, especially at the collegiate level." In her many years of service, Janet has been the heart of our section. She has been an excellent role model, getting people involved in section activities and ensuring that our Section flourished and will continue to do so.

Janet served the Section as Chair for two years, Secretary/Treasurer for six years, Liaison Coordinator for eight years, CCTM Representative for two years, Newsletter Editor for four years, Book Sales Coordinator for seven years, and Program Chair for the 1995 meeting and our upcoming 2007 meeting. She has also

organized various sessions at our section meetings and at MathFest. Nationally, she was the Rocky Mountain Governor for three years, was a member of the Ad Hoc committee on Advising for two years and of the Committee on Department Liaisons Program for five years, and is currently a member of the Committee on Minicourses.

An International Research Experiences for Undergraduates in Computational Mathematics: A Collaboration among Hong Kong Universities and the Colorado School of Mines

This past summer, five male and five female undergraduates from universities across the United States participated in an eight week Research Experiences for Undergraduates (REU) Program in Hong Kong supported by the National Science Foundation (NSF). The purpose of an REU site in Hong Kong is to provide undergraduate mathematics students with the opportunity to contribute to the exciting research that is being conducted in numerical analysis and scientific computing at an international level. The participating Hong Kong universities were Hong Kong Baptist University (HKBU), The Chinese University of Hong Kong, and City University of Hong Kong. The lead institution in the U.S. was the Colorado School of Mines (CSM).

The ten U.S. undergraduates were selected through a competitive application and review process and were drawn from the following institutions: Colorado School of Mines, Colorado State University at Pueblo, Davidson College, Illinois Institute of Technology, Loyola College in Maryland, New College of Florida, Regis University, Taylor University, and the University of California at Berkeley. The program was supported by the National Science Foundation grant, "United States-Hong Kong REU in Numerical Analysis and Scientific Computing with Applications in Applied Science and Engineering" of which Dr. Graeme Fairweather, Head of the Department of Mathematical and Computer Sciences (MCS) at CSM, is the Principal Investigator, and Dr. Barbara Moskal of

MCS is the evaluator. The program was centered at HKBU, where the students stayed in the Ng Tor Tai (NTT) International House, which is conveniently located for shopping, dining and transportation. The grant covered the students' travel and living expenses, and provided each with a stipend of $2,500. Dr. Fairweather traveled to Hong Kong with the students as their U.S. faculty adviser.

Before their departure, the students were assigned to research teams comprising a faculty member from a participating Hong Kong university and two or three U.S. undergraduates. The host institutions provided each student team with an office and computing facilities. The four research projects on which the students worked were: 1) the development of wavelet algorithms for high-resolution image reconstruction, 2) the examination of subspace clustering methods for high-dimensional data, 3) a spectral analysis of differentiation matrices, and 4) numerical challenges for resolving spike dynamics for reaction-diffusion systems. The students had the opportunity to participate in additional academic activities, such as attending the 2nd International Workshop on Structured Matrices at HKBU. This experience provided them with exposure to international mathematical research that was being conducted beyond their team projects, and a chance to interact with internationally recognized researchers. They also attended seminars presented by visiting speakers and a Ph.D. thesis defense. In addition, the students found time to visit many of Hong Kong's historical attractions and to shop at various street markets.

At the conclusion of the program, each student team submitted a written report and completed a public presentation. Formative assessment activities, which included weekly student reflections, and focus group activities, were embedded in the experience and used to inform program improvement. Once students returned to the U.S., they were asked to write a final reflection on their REU experiences. Following is a sample of these reflections:

- It opened my eyes so much and it made me realize how lucky I am to be a woman in mathematics and be appreciated for it.
- Thank you again for one of the best summers of my life and for the life changing experiences.
- This Hong Kong experience has been the most enlightening and worthwhile of my life.

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I have grown personally and professionally, and I so enjoyed the country that I would consider living there after I get my doctorate.

- Participating in the REU increased my confidence in my mathematical abilities and love for the field in general.
- ...the summer I spent in Hong Kong will forever be remembered by me as one of the greatest times of my life. It is a memory that I will always hold and cherish, and I would like to thank you so much for giving me that opportunity.

For more information concerning this project and its future activities, contact Dr. Graeme Fairweather, Department of Mathematical and Computer Sciences, Colorado School of Mines, gfairwea@mines.edu.

Graeme Fairweather and Barbara Moskal, Colorado School of Mines

Nominees Sought

Nominees for Section Vice Chair

Nominations are now being sought for the MAA Rocky Mountain Section vice-chairperson. This is a two-year position starting spring of 2007. Responsibilities include: acting as a contact with two-year and community colleges, attending all executive committee meetings, serving on the Program Committee, serving on the Distinguished Teaching Award Committee and serving on the Committee on Profession Linkages. Nominations should be sent to Gudryn Doherty at gudryn.doherty@ccd.edu. Elections will be held at the spring meeting at Colorado State University-Pueblo.

MAA's 5th Annual Mathematical Study tour Land of the Ancient Maya December 6, 2006 – January 2, 2007

For pricing information, itinerary and registration, visit http://maa.org/mexico or contact Lisa Kolbe at lkolbe@maa.org. The tour is limited to 30 participants.

CSU - Pueblo to Host 2007 Meeting

What better time for a mathematics gathering than the weekend of the 300th anniversary of the birth of Leonhard Euler (1707-1783)? Mark your calendars now for the Spring Section Meeting at Colorado State University - Pueblo on 13 – 14 April 2007 - and come prepared for a celebration!

Planning for the scientific meeting is progressing nicely. **Dr. Barbara Moskal** (Colorado School of Mines) will open the meeting with her Burton W. Jones Distinguished Teaching Invited Address *Assessing Mathematics: Historical Significance and Future Directions*. Our two other featured speakers - **Dr. Jim Tattersall** (Providence University) and **Dr. Robin Wilson** (Open University, England) - will continue the historical theme.

Rounding out the scientific program will be talks contributed by intelligent, involved and inspirational people like you! Talks on all topics mathematical - especially those related to the **Euler Celebration theme** - are welcome. A **New Colleagues Special Session** (organized by Hortensia Soto-Johnson) and **Undergraduate Student Papers Special Session** are also planned. For more information about these sessions, or to submit a talk for the general session, please see the **First Call for Papers** and **Speaker Response Form**.

Additional topics under consideration for inclusion in the program are **K - 12 Teacher Preparation, Innovative Teaching Ideas for Undergraduates,** and **Interesting Ideas in Number Theory and Geometry.** Volunteers to organize special sessions or panel discussions around these or other themes of interest to the section membership are welcome! The Program Committee especially **invites proposals for a Friday Morning Workshop** from individuals within the Rocky Mountain Section. To submit a workshop proposal, a suggestion concerning the program, or your favorite birthday celebration idea, please contact Program Co-Chair janet.barnett@colostate-pueblo.edu.

The CSU-Pueblo mathematics program is excited about this opportunity to host the section meeting again next spring. We've seen lots of changes on our campus and in our faculty since the last section meeting held here in 1995. We hope you and your students will come see what's new down here in the south - and don't forget your party hat!

Invited Addresses

Burton W. Jones Distinguished Teaching Award Invited Lecture
Assessing Mathematics: Historical Significance and Future Directions
Dr. Barbara M. Moskal, Colorado School of Mines

This presentation will examine the historical significance of the K-12 educational movement within the United States and the impact of this movement on higher education. The specific emphasis will be on the growing demand for assessment and evaluation at all levels, pre-college and university. This discussion will include the potential benefits of assessment as well as the potential challenges. Significant efforts to prepare the mathematics community to meet these demands, such as the "Supporting Undergraduate Assessment in Mathematics" project, will also be discussed. This presentation will conclude with an example of both the macro and micro assessment efforts that are currently underway in the Mathematical and Computer Sciences Department at the Colorado School of Mines.

Friday Keynote Address
Euler -- 300th anniversary lecture
Dr. Robin Wilson, Open University, England

Leonhard Euler (born 15 April 1707), the 'Mozart of Mathematics', was probably the most prolific mathematician of all time. He contributed to an extraordinarily wide range of areas, both theoretical and practical, yet remains largely unknown, except to mathematicians. Who was he, what did he do, and why do mathematicians rate him so highly?

Friday Banquet Address
Vignettes in Number Theory
Jim Tattersall , Providence College

We will focus on the properties and the history of several sets of numbers. The numbers we discuss lend themselves naturally to undergraduate research projects. Topics include Demlo numbers, polite numbers, sad numbers, decimal Columbian numbers, Smith numbers, and Niven numbers.

Saturday Keynote Address
The Early Lucasions
Jim Tattersall , Providence College

In 1663, Henry Lucas, the long-time secretary to the Chancellor of the University of Cambridge, made a bequest, subsequently granted by Charles II, to endow a chair in mathematics. A number of severe conditions were attached to the Chair. Among the more prominent early Lucasian professors were Barrow and Newton. In this talk we focus attention on two very intriguing characters Nicholas Sanderson and John Colson. Many early Lucasians were very diligent in carrying out their responsibilities but as we shall see that was not always the case. In the process, we uncover several untold stories and some very interesting mathematical results.

About Our Featured Speakers

Barbara M. Moskal received her B.S. in Mathematics Education from Duquesne University in 1989, her M.A. in Mathematics from the University of Pittsburgh in 1991 and her Ed.D. in Mathematics Education with a minor in Quantitative Research Methodology from the University of Pittsburgh in 1997. Currently, she is an associate professor in the Mathematical and Computer Sciences Department at the Colorado School of Mines. Dr. Moskal has been an invited speaker at local and national conferences, both within mathematics and across the broader area of science, technology and engineering. She has a strong publication record and has received prior awards in both teaching and research.

Robin Wilson is Professor of Pure Mathematics at the Open University, UK, and Gresham Professor of Geometry, London (the oldest mathematical Chair in England, dating from 1597). He is also Fellow in Mathematics at Keble College, Oxford University, and Visiting Professor at Colorado College, Colorado Springs. He has written and edited about thirty books in topics ranging from graph theory and combinatorics, via the history of mathematics, to philately, the Gilbert & Sullivan operas, and Sudoku. He is well known for his awful taste in puns and bright clothes.

Jim Tattersall received his undergraduate degree in mathematics from the University of Virginia, a Master's degree in mathematics from the University of Massachusetts, and a Ph.D. degree in mathematics from the University of Oklahoma. On a number of occasions he has been a visiting scholar at the Department of Pure Mathematics and Mathematical Statistics at Cambridge University. He spent the summer of 1991 as a visiting mathematician at the American Mathematical Society. In 1995-1996, he spent eighteen months as a visiting professor at the U.S. Military Academy at West Point. He was given awards for distinguished service (1992) and distinguished college teaching (1997) from the Northeastern Section of the MAA. He is former President of Canadian Society for History and Philosophy of Mathematics, Archivist/Historian of Northeastern Section of the MAA, and currently serves as the Associate Secretary of the Mathematical Association of America.

First Call for Papers

The **deadline** for submission of abstracts for the 2007 Spring Section Meeting is **February 24, 2007.** Proposals received from students and MAA members after this date will be scheduled on a first-come, first-scheduled, space-available basis. Proposals from non-members sponsored by MAA members must be received by the deadline.

Although talks on all topics mathematical are welcome, special sessions are being organized around the following themes:

Celebrating Euler
Organized by Janet Barnett (CSU - Pueblo) and George Heine (Bureau of Land Management)
In honor of the 300th anniversary of Euler's birth on 15 April 1707, this session invites talks (mathematical or historical) on topics broadly related to his life, his work and its influence on mathematics both in his own time and today.

New Colleagues
Organized by Tensia Soto-Johnson (UNC)
This session invites faculty new to the Rocky Mountain Section to present their work and research. Talks should be addressed to general mathematics faculty.

Undergraduate Student Papers
Organized by CSU-Pueblo Program Committee
Are you supervising a student research project? Encourage your student to present their results at the meeting! Registration is free for all students, and student speakers receive a complimentary one-year membership in the MAA, including the journal of their choice.

The default talk length will be 20 minutes, with every effort made (within the constraints of the schedule) to accommodate requests for longer talks and other scheduling preferences. **Please submit special requests early.**

For non-electronic submissions, please use the Speaker Response Form located on the following page. **E-mail equivalents of this form are encouraged!** Please be sure to include all requested information if using e-mail.

Additional topics under consideration for inclusion in the program are **K - 12 Teacher Preparation, Innovative Teaching Ideas for Undergraduates,** and **Interesting Ideas in Number Theory and Geometry.** To volunteer to organize special sessions or panel discussions around these or to suggest other themes, please contact Program Co-Chair janet.barnett@colostate-pueblo.edu, 719 - 549 - 2540.

.

Speaker Response Form – Due February 24, 2007

Speaker Name _____

Affiliation _____

Mailing Address   (Please include affiliation if needed for U.S. mail)

_____

_____

Email Address _____   Phone Number _____

Faculty Sponsor[*] _____

MAA Member Sponsor[**] _____

Title: _____

Abstract (100 words or less):

Is this talk intended for any of the following special sessions?

Euler Celebration Session   _____
New Colleagues Session   _____
Student Paper Session   _____
        Students: Are you a graduate or undergraduate?   _____

Special Equipment Needs: _____

Schedule Preference Request: _____

Special Talk Length Request: _____

Do you anticipate providing handout material from your talk for posting on the section website? If so, please indicate the format. Electronic materials must be received by **Janet Barnett** janet.barnett@colostate-pueblo.edu) prior to April 20,2007 to ensure posting

Format: _____

PLEASE E-MAIL ELECTRONIC MATERIALS, AND RETURN THIS FORM OR AN E-MAIL EQUIVALENT TO:

Janet Barnett
Department of Mathematics and Physics
Colorado State University - Pueblo
2200 Bonforte Boulevard
Pueblo, CO 81001 - 4901
janet.barnett@colostate-pueblo.edu

[*] For student speakers only   [**] For non-MAA members/non-students only

2006 Section Meeting Report

The Department of Computer Science, Mathematics and Statistics at Mesa State College hosted a joint meeting of the Rocky Mountain and Intermountain Sections of the MAA. The meeting was held at Mesa State College in Grand Junction, Colorado on April 7-8, 2006. A special theme of the meeting was undergraduate research. To launch this theme, a workshop entitled Supervising Undergraduate Research, led by Dr. Tracii Friedman of Mesa State College, took place on Friday morning from 9:30 to 11:30am. Topics covered in the workshop included techniques for recruiting students, preliminary preparation of students and supervision of undergraduate research.

In keeping with tradition, the meeting was officially opened Friday afternoon with a special address by the 2005 Burton W. Jones Distinguished Teaching Award Recipient, Dr. Bryan Shader of University of Wyoming. In his talk, *Some Favorite Mathematical Hors D'oeuvres*, Dr. Shader presented a marvelous sampler of savory mathematical appetizers that are served to mathematics majors at University of Wyoming before their full course of upper division mathematics courses.

Friday afternoon, Professor Robin Wilson from Open University, UK, gave a Special Address on *Sudoku*. In this entertaining talk, he outlined the history of the mathematical puzzle, gave some elementary hints for solving sudoku puzzles, and mentioned some of the combinatorial problems that arise.

The 2005-2006 MAA Pólya Lecturer, Dr. Steven Rudich of Carnegie Mellon University, gave the Friday Banquet Address. His talk, *A Bird's Eye View of the P vs NP Problem,* contained a survey of the history, meaning and significance of the P vs NP question. Professor Rudich also performed several entertaining magic tricks.

On Saturday morning, Dr. Allen Schwenk from Western Michigan University, gave the Keynote Address. Professor Schwenk presently serves as editor of Mathematics Magazine. In his outstanding talk, *Beware of Geeks Bearing Grifts*, Dr. Schwenk presented nontransitive dice that have a further paradoxical property that he has dubbed "perverse reversal". This fun talk illustrated that you cannot rely on intuition to select the best choice.

Rounding out the scientific program were 56 contributed talks, including 30 by students, and an open discussion on Mathematics for Prospective Elementary Teachers. Other meeting features included a Mathematics Awareness Month Undergraduate Poster Session that was organized by Dr. Kyle Riley of the South Dakota School of Mines and Technology, an extensive sales display of MAA books, Business and Departmental Liaisons Meetings for both Sections and a Department Chairs Luncheon hosted by MSC's Dr. Timothy Novotny.

Thanks go out to the students and faculty members in the Department of Computer Science, Mathematics and Statistics at Mesa State College for their many hours of volunteer work and gracious hospitality throughout the meeting.

Contributed Papers

STUDENT PAPER SESSIONS

Benjamin Herrington, South Dakota School of Mines and Technology
Mathematics and Music: Not-So-Distant Relatives
Faculty Sponsor: Janet Burgoyne

Nathan Wakefield, Metropolitan State College of Denver
Music and Chaos
Faculty Sponsor: Linda Sundbye

Meghan De Witt, Brigham Young University
Finding a Galois Representation Attached to a Hecke Eigenclass
Faculty Sponsor: Darrin Doud

A J Waski, Brittany Strautman, Bridges High School
History of Angle Trisection
Faculty Sponsor: George Austin-Martin

Zachariah Milby, Michael Corson, Bridges High School
Geometric Constructions of Kochansky and Archimedes
Faculty Sponsor: George Austin-Martin

Tom Collins, Keble College, Oxford
Modern Music's Mathematical Renaissance
Faculty Sponsor: Robin Wilson

Jeff Gjere, Fort Lewis College
Vector Fields on Lie Groups
Faculty Sponsor: Erich McAlister
Matt Burkman, Fort Lewis College
The Euler Beta Function and It's Applications to String Theory
Faculty Sponsor:
Dianne Neff, Fort Lewis College
The Electron Localization Function
Faculty Sponsor: Carl Leinert
Jason Grout, Brigham Young University
Using Flowcharts to Teach Compositions of Functions
Faculty Sponsor:
Michael Uhrig, Anthony Giordano, Regis College
Coming Face to Face with Pattern Recognition
Faculty Sponsor: Jim Seibert
Sarah Morgan, Regis College
Applications of Markov Processes to Population Dynamcis
Faculty Sponsor: Suzanne Caulk
Chester Ismay, South Dakota School of Mines and Technology
Ranking Methods: Determining the Best NFL Team Using Several Mathematical Techniques
Faculty Sponsor: Roger Johnson
Gretchen Rimmasch, Brigham Young University
Tropical Algebraic Geometry
Faculty Sponsor: Tyler Jarvis
Nathan Grigg, Brigham Young University
The Fundamental Theorem of Tropical Algebra
Faculty Sponsor: Tyler Jarvis
Natalie Wilde, Brigham Young University
Recovering Tropical Polynomials from Balanced Graphs
Faculty Sponsor: Tyler Jarvis
Julian Tay, Brigham Young University
Slope and Derivative of a Tropical Polynomial
Faculty Sponsor: Tyler Jarvis
Nathan Manwaring, Brigham Young University
Graphing Tropical Polynomials in Two Variables – Unlocking the Duals
Faculty Sponsor: Tyler Jarvis
Margie Leopold, Regis College
Polynomials in Tropical Mathematics
Faculty Sponsor: Suzanne Caulk
Keirsten Myers, Westminster College
On Visualizing Linear Algebra
Faculty Sponsor: Richard Wellman
Gregory Miller, Brigham Young University
Visualization of Minimal Networks on Surfaces of Constant Curvature

Faculty Sponsor: Denise Halverson
Katie May, Brigham Young Unviersity
Comparison of Minimal Path Networks on the Torus
Faculty Sponsor: Denise Halverson
Melissa Mitchell, Brigham Young University
Minimizing the Length of Degenerate Trees of Three Points on the Torus
Faculty Sponsor: Denise Halverson
Keith Penrod, Brigham Young University
Bounds on the Steiner Problem in the Torus
Faculty Sponsor: Denise Halverson
Dustin Gerrard, Southern Utah University
Numerical Solutions of a Convolution Model for Phase Transitions (part 1)
Faculty Sponsor: Jianlong Han, Sarah Brown, Derek Hein
Caroline Nielson, Southern Utah University
Numerical Solutions of a Convolution Model for Phase Transitions (part 2)
Faculty Sponsor: Jianlong Han, Sarah Brown, Derek Hein
Larisa Ekenstam, Southern Utah University
Linear Algebra Connected to Nutrition
Faculty Sponsor: Sarah Brown
Aaron Wiseman, Jason Lathrop, Rush Carter, Pikes Peak Community College
The Effect of Atmospheric Drag on a Satellite's Orbit
Faculty Sponsor: Jeff Berg

GENERAL SESSIONS
Donald Teets, South Dakota School of Mines and Technology
The Mathematics of GO TO Telescopes
Dean Allison, Nathaniel Miller, University of Northern Colorado
Generalized Baseball Curves: Three Symmetries and You're In!
Lou Talman, Metropolitan State College of Denver
Reflections of Circumcircles
Zhifu Xie, Brigham Young University
Regularization of Simultaneous Binary Collisions And Periodic Solutions with Singularity in the Collinear Four-Body Problem
Faculty Sponsor: Taincheng Ouyang
Donald Robinson, Brigham Young University
A Proof of Cauchy's Theorem that Provides an Upper Bound on the Moduli of Zeros of a Polynomial
Scott Lewis, Utah Valley State College
Farey Addition in Mediants and Cascades
Sarah Tekansik, Mesa State College

A Midy-Type Theorem
Faculty Sponsor: Jane Arledge
Phil Gustafson, Mesa State College
Number Noise: What Do Irrational Numbers Sound like, and Can Their Fourier Transform Tell Us Anything?
Mike Grady, Southern Utah University
Combinatorics, Computing and Groups
Nels Grevstad, Metropolitan State College of Denver
Statistical Analysis in Employment Discrimination
David Ruch, Metropolitan State College of Denver
A Backward Biorthogonalization Technique with a Statistical Connection
Shahar Boneh, Metropolitan State College of Denver
An Unfair Coin Tossing Game

MATHEMATICS EDUCATION
Bryan Bornholdt, David Brown, Utah State University
Fostering Mathematical Maturity in Undergraduate Students
Tamas Szabo, Weber State University
Alternative Model for Student Teaching
Mike Brilleslyper, United States Air Force Academy
Web-Based Reading Forms for Enhanced Classroom Discussion in Mathematics
Vencil Skarda, Brigham Young University
Ideas for Teaching Absolute Convergence
Janet Heine-Barnett, Janet Nichols, Colorado State University – Pueblo
Mathematics for Prospective Elementary Teachers: An Open Discussion
Janet Nichols, Colorado State University – Pueblo
Are Our Students Failing or Are We Failing Our Students?
Brooke Evans, Metropolitan State College of Denver
Visual Comprehension in Algebra, Statistics, and Calculus
David Wright, Brigham Young University
Preparing Secondary Teachers in Geometry
Ann Marie Harris, Brigham Young University - Idaho
The Dreaded Arithmetic Flu – Is It Lurking at Your Campus?
Troy Goodsell, Brigham Young University - Idaho

The Modified Moore Method for Secondary Education Courses
Karen Walters, Arapahoe Community College
Who's the Man? Research Project for Liberal Arts Class
Derek Hein, Southern Utah University
The Root Test for Absolute Convergence

MATHEMATICS, SOCIETY AND CULTURE: PAST AND PRESENT
Milan Lukic, University of Northern Colorado
Variae Observationes Circa Series Infinitas
Erica Johnson, Arapahoe Community College
College Algebra: A Great Books Approach
George Heine, Bureau of Land Management
2000 Years of the Stereographic Projection
Janet Heine-Barnett, Colorado State University – Pueblo
Mathematics is a Plural Noun: The Case of Oliver Byrnes
Lee Badger, Weber State University
Remembering Kurt Godel
Bill Bynum, Westminster College
Mathematics and the Postmodern
Chris Davis, Westminster College
Factorial Base Representation of Integers
Faculty Sponsor: Richard Wellman

2006 Section Business Meeting Minutes

MAA Rocky Mountain Section
Saturday, April 8, 2006
Section Chair, Jeff Berg (Arapahoe Community College) called the meeting to order at 8:00 a.m. Minutes from the 2005 section meeting were approved. Jeff Berg then introduced the executive committee, he also introduced other committee members.

Carl Lienert, the chair of the nominating committee from Fort Lewis College introduced the nominees for section chair-elect. The nominees were Michael Brilleslyper from The United States Air Force Academy and Don Teets from South Dakota School of Mines and Technology. Both of the nominees were given an opportunity to state their goals for the section. Michael Brilleslyper commented on his involvement with Project NExT, his desire to continue to be involved with the MAA and that the MAA met his mission in the profession. Don Teets commented that he has been involved

with the section for 18 years. His goal is to maintain what we have as a section, as well as to get more students involved. Carl Lienert handed out ballots. With the assistance of Karen Walters, the votes were counted and Michael Brilleslyper was voted in as the new chair-elect. He will serve as chair-elect for one year, as chair for 2 years and then as past chair for 1 year.

Hortensia Soto-Johnson provided the financial report that was provided to National in January. She also provided an up to date summary of the budget. (See Below)

Financial Report
March 30, 2006

Balance 12/31/05	Money Market: $10,036.54 Checking Account: $1,378.14	11,414.68
Expenses	Newsletter & Postage: $325.69	
Income	Money Market Interest: $24.76	
Balance 3/30/06		11,113.75

Dick Gibbs announced the upcoming 11th annual Colorado Mathematics Awards Ceremony to be held in Denver on May 24, 2006. He reported that CSU received the top scores for the Putnam and CU received the top awards for the Modeling Competition. He asked that we send names of any other students who had done well on the Putnam.

Jeff Berg gave the chair's report. He commented on the representation from the section at the San Antonio January meeting. He reported that he would like to see more on the web such as: the by-laws, handouts for presentations given at section meeting, and history of the section. Jeff reported on the executive committee meeting. He informed those present about the centennial activities and asked for anyone interested in serving as the section representative for the centennial festivities. He indicated that he and Soto-Johnson would begin going through boxes this summer. Berg intends to interview members such as Bill Ramaley, Charlie Brace, Burnett Myers, Jack Hodges and Duane Porter in order to obtain historical information regarding the

section. Jeff Berg also informed the members present of the executive committee's decisions to:

- Not have the newsletter editor and student activity coordinator as voting members,
- Not to separate the roles of secretary and treasurer,
- Approve $250.00 for the Colorado Mathematics Awards Ceremony, and
- Endorse the AAUP statement of academic freedom and the decision to take action on this matter at next year's business meeting.

Kyle Riley, the section's student activity coordinator announced that 19 students from the Rocky Mountain Section gave presentations at the meeting. He announced that he is uncertain of the future of the Poster Session, although there were 3 posters presented. There are discussions of changing the poster to a research poster session, and possibly get graduate students involved. The results of the poster competition were as follows:

- Best in Show: Black Hills State
- Best Use of Mathematics: Southern Utah
- Most Creative: Mesa State.

Linda Sundbye, the section newsletter editor announced that the post cards are working nicely in announcing that the newsletter is available on the web. Only seven postcards were returned in the spring mailing. The newsletter is available in both PDF and HTML format. She will make the HTML format as the primary format, for easier viewing.

Allen Schwenk, the editor of *Mathematics Magazine*, gave the report from national. He gave a slide presentation on CUPM Curriculum Guide, PREP (12 programs), Project NExT, Project ACCESS, Math Olympiad Summer Program, Science Policy Initiatives, Journey to China, Berlin in 2007, new MAA books. Schwenk also announced the dates for the MathFest meeting to be held in Knoxville, TN.

Jane Arledge, the section governor gave her report. She completed her first year as governor, which she enjoyed. The MAA dues will go up through-out the next few years. The increase in dues will depend on the journals to which one subscribes. Arledge announced that the joint meeting to be held in New Orleans is still on, but the dates have been changed from a Thursday-Sunday to a Friday-Monday, due to the Sugar Bowl. She advised to make reservations early. She recommended that we visit the MAA

website to find journal articles via JOMA. She also invited anyone to contact her if he/she is interested in becoming more involved in the section MAA.

Graeme Fair-weather from Colorado School of Mines wanted to know why life-membership dues were so high. Soto-Johnson commented that MAA makes their money from dues, thus they must be higher than for example the AMS dues.

Jeff Berg announced that Barbara Moskal was the 2006 Burton W. Jones Distinguished Teaching Award Recipient. He also solicited nominations for the 2007 DTA award. He announced that the 2007 section meeting will be held in Pueblo, Colorado (CSU-Pueblo) on April 13-14 and that the 2008 section meeting will be held in Spearfish, South Dakota (Black Hills State). Discussions are still taking place for the 2009 location, but it appears that it will take place in Golden, Colorado (Colorado School of Mines). Janet Barnett will be a co-program chair for the 2007 meeting and she requested that members send her any requests or questions for next year's meeting.

There was a motion to thank Mesa State for hosting the 2006 Rocky Mountain Section Meeting. All were in favor. The meeting closed with the passing of the section banner from Cathy Bonan-Hamada to Janet Barnett.

Respectfully Submitted –
Hortensia Soto-Johnson,
Secretary/Treasurer

Grants Available

Section Activity Grants Available

Applications for Section Activities Grants are again being accepted to assist Section members with projects in support of the Section Mission. Proposals may request up to $500; matching funds are preferred, but not required.

The project director(s) must be a current member(s) of MAA, and the proposal must be clearly tied to one or more of the Rocky Mountain Section Mission Goals. A copy of these goals appears on the inside back cover of this newsletter. All applications must include the following:

(a) Description of project (no more than one page);
(b) Statement of how project supports Section Goals (no more than one page);
(c) Estimated budget, including description of matching funds available, if any;
(d) Vitae of project director(s).

Upon completion of the project, the director(s) of the funded projects are required to file a brief report (no more than one page), and to present a project report at the next meeting of the Section.

Two non-officer members of the Section will review applications; the Executive Committee on the basis of the reviewers' reports will make final funding decisions. Although applications are accepted at any time, please note that notification of funding decisions may take up to two months following receipt of the application by the section secretary.

Student Recognition Grants Available

The establishment of a Student Recognition Grant Program was approved by the section membership at the 2003 Annual Business Meeting. In support of this program, the Section will set aside $500 every calendar year. From these monies, the Section will make grants for the purpose of recognizing superior achievement in mathematics on the part of (1) students enrolled in post-secondary institutions within the geographic region served by the Section and (2) high school students whose school districts, or other appropriate political subdivisions, substantially intersect the geographic region served by the Section.

Proposals for such grants must

1. Originate from a member of the Rocky Mountain Section of the Mathematical Association of America on behalf of an agency, institution, or organization whose stated purposes are consistent with recognizing or encouraging superior academic achievement at the high school level;
2. Be in the hands of the Chair of the Rocky Mountain Section no later than March 15 of the year in which the proposed recognition is to be made;
3. Include the criteria under which superior achievement in mathematics is to be recognized, together with the time and the manner of such recognition;
4. Report, insofar as possible at the time of the proposal, other potential sources of support together with proposals or requests made or intended; and
5. Be limited to a maximum amount of $250.

The Executive Committee will review all proposals for grants under this policy and will make such grants as, in its sole judgment, it deems proper. In keeping with the section mission, funding priority will be given to grants that include recognition of undergraduate students. Funding decisions will be announced no later than the Annual Business Meeting of the Section. Monies not expended during any particular year shall revert to the Section's general fund.

Section Logo Shirts Available

First unveiled at the 2002 Spring Section Meeting in Laramie, Rocky Mountain Section Logo shirts are now available in two styles: a **long-sleeved button-front denim shirt** and a **short-sleeved white polo shirt**. Both styles are 100% cotton and feature the section logo in high-quality color embroidery on the front left.

In order to promote awareness of the MAA and the Rocky Mountain Section, prices have been set in order to recover production costs, just **$35 for denim** and **$30 for polo**. Proceeds, if any, will be used to support section activities.

If you are interested in obtaining one of these special shirts, please contact **Janet Barnett,** janet.barnett@colostate-pueblo.edu, with information on desired quantities and sizes.

About Our Logo

The logo for the Rocky Mountain Section of the Mathematical Association of America was created in by Mark Petersen in 2001. A graduate student in the Applied Mathematics Department at the University of Colorado at Boulder at that time, Mark says of his design:

"The mountain symbols were chosen because analysis is the foundation for all of mathematics. The equation $e^{i\pi} + 1 = 0$ must rank among the most beautiful formulas in mathematics. It connects the five most important constants of mathematics with the three most important operations - addition, multiplication, and exponentiation. These five constants symbolize the four major branches of classical mathematics: arithmetic, represented by 0 and 1; algebra, by i; geometry, by π; and analysis, by e. (Quoted from Eli Maor's *e, The Story of a Number*). I chose to portray this equation as a train because rail has historically been the life blood of the American West, and trains are complementary to any mountain scene."

Meetings Calendar

Joint Mathematics Meetings, New Orleans, LA; January 5-8, 2007
ICTCM; Boston, MA; February 15-18,2007
NCTM annual meeting; Atlanta, GA; March 21-24, 2007
MAA Rocky Mountain Section Meeting Colorado State University - Pueblo; April 13-14, 2007
MAA Mathfest; San Jose, CA; August 3-5, 2007

Joint Mathematics Meetings, San Diego, CA; January 6-9, 2008
NCTM annual meeting; Salt Lake City, UT; April 9-12, 2008
MAA Rocky Mountain Section Meeting; Black Hills State University; Spearfish, SD: April 2008
MAA Mathfest; Madison, WI; July 31 – August 2, 2008

Joint Mathematics Meetings; Washington, DC; January 7-10, 2009
NCTM annual meeting; Washington, DC; April 22-25, 2009
MAA Mathfest; Portland, OR; August 6-8, 2009

Joint Mathematics Meetings; San Francisco, CA; January 6-9, 2010
NCTM annual meeting; San Diego, CA; April 21-24, 2010
MAA Mathfest; Pittsburgh, PA; August 5-7, 2010

Joint Mathematics Meetings; New Orleans, LA; January 5-8, 2011
NCTM annual meeting; Indianapolis, IN; April 13-16, 2011

Joint Mathematics Meetings; Boston, MA; January 4-7, 2012
NCTM annual meeting; Miami, FL; April 25-28, 2012

Joint Mathematics Meetings; San Diego, CA; January 9-12, 2013
NCTM annual meeting; Denver, CO; April 17-20, 2013

The Rocky Mountain Section of
The Mathematical Association of America

Burton W. Jones Award
for Distinguished College or University Teaching of Mathematics

Burton W. Jones Award Nomination Form

Name of Nominee _____
(First name first)

College or University Affiliation _____

College or University Address _____

City _____ State _____ Zip: ____

Is the nominee a member of the MAA? _____

Number of years of teaching experience in a mathematical science _____

Has the nominee taught at least half time in a mathematical science
for the past three years (not counting a sabbatical period)? _____

In the space below, please briefly describe the unusual personal and professional qualities of the nominee that contribute to her or his extraordinary teaching success.

Name of Nominator) _____
(first name first)
Address of Nominator _____

_____

Email Address _____

Telephone: Work _____ Home _____ Fax _____

Nominator's Signature _____

Nomination form should reach Section Secretary by December 1.
Complete nomination materials should reach Section Secretary by January 30.
Please consult section webpage (http://www-math.cudenver.edu/~maa-rm/) for complete guidelines and address of Section Secretary.

Voluntary Section Dues

Many thanks to those members who have made a voluntary dues contribution to the section along with their Spring Meeting Registration!

Although the section has found itself in good financial health in recent years, additional funds are always needed in order to pursue special initiatives suggested by the membership. The successful John Fauvel Memorial Conference and William Dunham Special Lecture, both supported in part by the Section Activity Grant program, provide excellent examples of what can be done with even a small amount of funding to support our section mission and goals.

A voluntary section dues contribution from you now can help build up funds in support of similar initiatives!

To submit your dues, simply return the coupon below with a check for any amount you wish - every little bit will help, and all contributors will receive a letter acknowledging the contribution for their financial records.

MAA Rocky Mountain Section Voluntary Dues Contribution Form

Name　　　_____

Address　_____

　　　　　_____ **ZIP** _____

Please indicate in the space provided how you would like your dues to be used:

_____　　Undergraduate Student Initiatives
_____　　Graduate Student Initiatives
_____　　Burton W. Jones DTA Fund
_____　　Section Activity Grant Program
_____　　Wherever needed most
_____　　Other: _____
_____　　**TOTAL DUES PAID ($10 recommended)**

Please make check payable to: **MAA Rocky Mountain Section** and return to: Hortensia Soto-Johnson, MAA Rocky Mountain Section Treasurer: UNC School of Mathematical Sciences, Campus Box 122, Greeley, CO 80639

MAA Rocky Mountain Section
Mission Statement

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

Mission Related Goals

1. To foster scholarship, professional development, and professional cooperation among the various constituencies of the mathematical community within the region.

2. To foster the implementation and study of recent research recommendations for the teaching, learning and assessment of collegiate mathematics.

3. To support the implementation of effective mathematics preparation programs of prospective teachers at all levels.

4. To enhance the interests, talents and achievements of all individuals in mathematics, especially of members of underrepresented groups.

5. To provide recognition of the importance of mathematics, mathematical research and quality mathematics teaching, and promote public understanding of the same.

6. To provide regional leadership in the promotion of systemic change in mathematics education, and in the enhancement of public understanding about the needs and importance of mathematical research and education.