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ROCKY MOUNTAIN SECTION OF THE MATHEMATICAL ASSOCIATION OF AMERICA

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$e^{i\pi} + 1 = 0$

Spring 2017 Newsletter

Section Website: http://sections.maa.org/rockymt

Spring 2017 Newsletter in PDF Format for Printing

Click on the following link for PDF document that is formatted for printing.

http://sections.maa.org/rockymt/newsletters/spring2017news.pdf

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Following a long and distinguished list of past winners of the Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching of Mathematics, that include the likes of Joe Gallian, Frank Morgan, Paul Halmos and Bob Devaney, to name just a few, the Rocky Mountain Section's own **Janet Heine Barnett** from Colorado State University – Pueblo received one of the three 2017 Haimo Awards at the Joint Mathematics Meetings Prize Session in Atlanta, GA, January 2017. In addition, Janet gave the MAA Teaching Award Recipient Invited Presentation "*Drinking straight from the source: Learning today's mathematics through its historical roots.*"

Congratulations Janet!
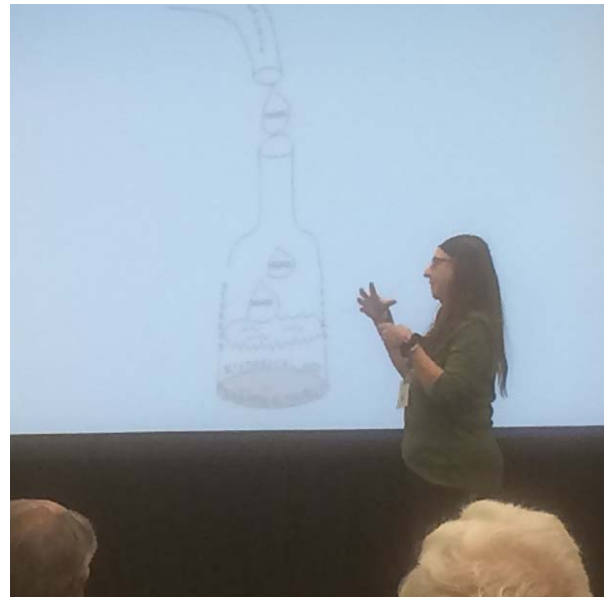
Deborah and Franklin Tepper Haimo Award

In 1991 the Mathematical Association of America instituted Awards for Distinguished College or University Teaching of Mathematics in order to honor college or university teachers who have been widely recognized as extraordinarily successful and whose teaching effectiveness has been shown to have had influence beyond their own institutions. In 1993 the MAA Board of Governors renamed the award to honor Deborah and Franklin Tepper Haimo. Each year at most three college or university teachers are honored with this award. Recipients of the Haimo Award receive $1,000 and a certificate of recognition.

For additional information, including excerpts from Dr. Barnett's citation, be sure to check out the RM MAA section newsletter:
http://sections.maa.org/rockymt/

Michael Jacobson, UC Denver
Chair, Rocky Mountain Section

Each year, the section recognizes one outstanding teacher of collegiate mathematics with an award named in honor of Burton W. Jones, a lifelong advocate of excellence in teaching at all levels. In addition to an honorarium, a certificate and an invitation to deliver the opening lecture at the next Section Meeting, the recipient is eligible to be the section's nominee for the Deborah and Franklin

Haimo Awards for Distinguished College or University Teaching of Mathematics. These national awardees (at most three) are honored at the MAA winter meeting with a certificate and $1000 check. All nominators also receive a certificate of in recognition of their efforts to support the section mission of promoting excellence in teaching; nominators and nominees both receive free meeting registration at the next section meeting. To begin the nomination process for an outstanding teacher that you know, simply submit the **one-page nomination form** (available at our website: http://sections.maa.org/rockymt and in this newsletter) by **15 December 2017**. **Complete nomination materials** (described on the website) are due **15 January 2018**.

2018 Early Career Teaching Award Call for Nominations

The Rocky Mountain Section of the MAA approved in 2015 a new teaching award for faculty early in their career. The award was inspired by the Henry Adler Award, which has been active at the national level since 2004. We hope to use this section program as an opportunity for recognition for faculty members that are early in their career and this program makes a wonderful companion to the section Distinguished Teaching Award. To be eligible the candidate must:

- Hold a doctorate degree
- Be college or university teachers who have held a full-time faculty appointment in a college department of mathematical sciences in the Rocky Mountain Section for at least two, but not more than seven, years since receiving the doctorate. A nominee who has just started the eighth year of teaching at the time of the application is still eligible for the award. If a nominee has held his or her doctorate for more than seven years, then the nominator must indicate on the nomination form the times that the nominee was not teaching. Common exceptions to the 7-year limit are maternity, paternity, family, or medical leaves. Sabbaticals and postdoctoral fellowships are exceptions only if they involved no teaching and the application does

not include accomplishments made during these times.
- Hold membership in the Mathematical Association of America

Nominees should be recognized for excellence in teaching at the undergraduate level and have a demonstrated influence outside their own classrooms. The award includes a small cash prize and a plaque, plus the person will also be recognized at the next section meeting. This is an excellent opportunity for you to get recognition for the excellent teachers in your department and also for the mathematics community to recognize the teaching contributions people can make early in their career.

Complete nomination guidelines and the one-page nomination form are included in this newsletter. To begin the nomination process for an outstanding teacher that you know, simply submit the **one-page nomination form** (available at our website:

http://sections.maa.org/rockymt and in this newsletter) by **15 December 2017**. **Complete nomination materials** (described on the website) are due **15 January 2018**.

Chair's Report

Greetings Section Members! I hope your spring has gotten off to a good start. It has been a few weeks since the JMM in Atlanta, which I was able to attend – it was rather nostalgic for me. I attended my first MAA/AMS National Meeting, nearly forty years ago, in Atlanta. For those of you old enough to remember, the year before (1977) the meeting was held in St. Louis, where the temperature never got above 10 degrees (maybe, never got above 0, my memory is sketchy). The MAA & AMS thought that the winter meetings should be held in warmer climates (Atlanta - 1978 and Biloxi - 1979). Well, this year, it was quite amusing to see the city shut down, with the impending threat of snow on Friday (albeit, the city was quite a mess a few years ago when they did receive a few inches of snow), but that didn't happen this time. There were some slick roads, and cars struggling to make their way down Peachtree Street, and many delayed and canceled flights, but the school closures on Thursday night (for Friday) was maybe a bit premature. Anyway, the meeting was HUGE, spanning the both the Marriott and

the Hyatt Regency, which made planning what sessions to attend AND where, an imperative. One important item of note, was that there was a vote on new MAA bylaws, which passed and officially, discontinued the Department Liaison program. With the prevalence of electronic mail and technology, communicating with section members, should be easier.

One of the highlights for our section in Atlanta, was the introduction and presentation of the Deborah and Franklin Tepper Haimo Award to our own **Janet Heine Barnett**, from Colorado State University – Pueblo and the host of this year's centennial section meeting (see pictures). After careful planning to efficiently traverse three floors of the Hyatt Regency and two floors in the Marriott, I was able to get to the hall, just in time, to see MAA President Francis Su introduce Janet. Janet then gave a captivating presentation "*Drinking straight from the source: Learning today's mathematics through its historical roots*" (more information and the citation can be found on the section web page).

On a smaller scale, planning for the centennial Rocky Mountain Section meeting is proceeding well and be held at CSU-Pueblo, April 21-22. The plenary speakers will be **Hortensia Soto**, Professor of Mathematics at University of Northern Colorado and the Rocky Mountain Section's 2016 Burton W. Jones Distinguished Teaching Award Recipient, **Timothy Chartier**, MAA Second Vice President and Professor of Mathematics at Davidson College and **Brian Hopkins,** Editor of College Mathematics Journal, Saint Peter's University. We look forward to a fun and exciting meeting in Pueblo. In addition, initial planning for the 101st section meeting, which will be held at University of Northern Colorado on April 13-14, 2018, has already started, with **Oscar Levin** and **Nathaniel Miller** taking the lead on organizing for UNC.

Special thanks to everyone who helps to make the communications within the section meaningful and informative, to **Linda Sundbye** for her work to organize and chase down the laggards (I being probably the worst offender) for the newsletter, to **George Heine** for his continued effort to make the section website friendly and usable, the section Executive Committee for keeping items like reports and section information up to date and in particular, continued thanks to **Heidi Keck** and **Kyle Riley**, without who's personal organization and understanding of

section tradition, I would be totally lost (that doesn't mean that I am not clueless most of the time - anyway.)

Respectfully submitted,
Michael Jacobson, UC Denver
Chair, Rocky Mountain Section

Governor's/ Representative's Report

With the approval of the new Articles of Incorporation and the new By-Laws at the Joint Mathematics Meetings in January, I am no longer a Governor and am now a Representative to the Congress. The Congress will replace the old Board of Governors but will no longer have a fiduciary responsibility for the Mathematical Association of America. The Congress will still meet at both the Joint Mathematics Meetings and at MathFest each year but the primary role of the Representatives will be to represent their sections and provide a communication link between the sections and the MAA officers and staff.

Former President **Francis Su** and his students have developed an App called MathFeed which is now available at the Apple App Store for iPhones and iPads. This app provides easy access to MAA journals and magazines as well as a newsfeed highlighting stories about mathematics from papers, blogs and feeds.

MathFest attendance has grown by roughly 50% over the last decade.

As we have seen with newspapers and magazines, publishing is undergoing rapid changes and this applies to the MAA as well. The officers indicated that we can no longer rely on publications as a driver of revenue. I would also like to point out that our membership dues constitute less than 15% of revenue for the MAA

The American Mathematics Competitions has been moved from Lincoln, Nebraska to the MAA headquarters in Washington, D.C. resulting in lowered costs.

The national officers indicated that they are committed to finding a way to include all applicants for membership in Project Next. Currently, the MAA is not able to support everyone who applies.

Please congratulate **Janet Barnett** on her receiving the national Haimo award and

presenting a paper for the occasion at the Joint Math Meetings in Atlanta in January 2017.

My term as Governor/Representative comes to an end on June 30, 2017. I would like to thank the section for giving me the opportunity to serve over the last three years.

Respectfully submitted,
Bill Emerson, MSU Denver
Governor, Rocky Mountain Section

22nd Annual Colorado Mathematics Awards Ceremony/Reception

Plans are in the works for CMA XXII – the 22nd Colorado Mathematics Awards Ceremony and Reception to be held on Thursday, May 18 at the Grant - Humphreys Mansion in Denver. At the school level we'll be recognizing the top ten participants on MATHCOUNTS, the AMC 8, 10 and 12 contests, and the members of the 2017 Colorado American Regions Mathematics League team. At the collegiate level we'll be recognizing all Section Putnam scorers in the top 500, and the top team(s) on the Mathematical Contest in Modeling. We expect to recognize between 50 and 60 winners. With the winners, parents and teachers, we expect between 120 and 130 to attend the event.

We appreciate the support that the Rocky Mountain Section has provided for this event over the years.

Other sponsors of the Colorado Mathematics Awards are the Professional Engineers of Colorado, and individual and past members of the Colorado Mathematics Awards Steering Committee.

Suggestions for additional sources of funding are always welcomed. Please contact me at:
gibbs_d@fortlewis.edu
Dick Gibbs
Emeritus Professor of Mathematics
Fort Lewis College

Section News

Colorado Mesa University

The Colorado Mesa University Math Club hosted their 19th annual Math Extravaganza on February 9, 2017. The event brought over 170 high school students from nine schools for a day of fun and interactive math and computer science. The students played with Hilbert's hotel, the Josephus problem, and artificial intelligence. CMU professor **Karl Castleton** gave the keynote address, "*Aritificial Intelligence: You'll know it when you see it.*"

Assistant Professor **Eric Miles** coauthored a textbook with **Renzo Cavalieri** (Colorado State University) entitled *Riemann Surfaces and Algebraic Curves: A First Course in Hurwitz Theory*. This book was published in October 2016 by Cambridge University Press.The text discusses the cooperation of analysis, topology, group theory, and representation theory in Hurwitz Theory and is aimed at advanced undergraduates or beginning graduate students.

Colorado State University - Pueblo

Dr. **Janet Heine Barnett**, professor of Mathematics at CSU-Pueblo delivered an invited address "*Drinking straight from the source: Learning today's mathematics through its historical roots*", Friday, January 6, 2017 at the Joint Mathematics Meeting (JMM) in Atlanta Georgia. This presentation was in conjunction with her receipt of one of the three 2017 Mathematics Association of America Tepper Haimo Awards for Distinguished University Teaching at the JMM. See:
http://www.maa.org/programs/maa-awards/teaching-awards/haimo-award-distinguished-teaching
http://sections.maa.org/rockymt/

The Department of Mathematics and Physics at Colorado State University-Pueblo held its 39th Annual Math Day, including its Swanson and Math Bowl competitions, held on campus Thursday, Nov. 17, under the leadership of **Janet Nichols** (her 39th!), who also writes the Math Bowl materials. A total of 16 high schools including over 200 students participated. The Math Bowl Competition requires two three-person teams to go head-to-head in a 15-minute race for points. Each team alternately is given a mathematical question The 2016 Math Bowl winner required three exciting tie-breakers to determine. The Swanson Competition, named after past long serving chair **Clarence Swanson**, constructed by Dr. **James Louisell**, involves in-depth problem-solving high school mathematics levels. Visits to laboratories and demonstrations in physics, biology, chemistry, and engineering were also available to students and sponsors. An

excellent talk on exploration in geometry, and a lunch-discussion session with teachers was led by mathematics adjunct **Pat Mara**, with support from **Bruce Lundberg**.

The American Mathematical Society's Waldemar J. Trjitzinsky Memorial Fund has provided a $3,000 scholarship to CSU-Pueblo, one of three nationally. This has been awarded to a math student based on an AMS application process showing merit and need.
See: http://www.ams.org/news?news_id=3188

Dr. **Tracey Gorham Blanco**, Mathematics Learning Center Director at CSU-Pueblo, earned her Ph.D. in Mathematics Education from the University of Wyoming in May 2016. Her recent presentation: *Statistics Education of Elementary Teachers: Pre-service Teachers' Statistical Reasoning and Misconceptions* at the School Science and Math Association (SSMA) Annual Conference, Phoenix, AZ. Oct. 2016.

Dr. **James Louisell** has a recent publication: *Matrix Polynomials, Similar Operators, and the Imaginary Axis Eigenvalues of a Matrix Delay Equation*, SIAM J. on Control and Optimization, 53(1).

Dr. **Bruce Lundberg**, professor of mathematics and department chair, is the keynote speaker, and a panel member, at TORUS (TX & OK Research Undergrad Symposium), February 25, 2017.

Dr. **Corey Lyons** will be visiting professor of mathematics during AY17-18, his second year with us. A new Ph.D. from Kent State, Corey is doing research in Character Theory.

Dr. **Igor Melnykov**, associate professor of Mathematics is on leave for AY 16-17 to Nazarbayev University in Kazakstan, helping them set up graduate programs in mathematics and in statistics. A recent publication is: *Semi-supervised model-based clustering with positive and negative constraints*, Advances in Data Analysis and Classification, Vol. 10, Issue 3, 327 – 349.

Dr. **Jonathan Poritz**, associate professor of mathematics, will be on leave at institutions in Europe for AY 17-18. A recent publication is: *Education is Not an App: The future of university teaching in the Internet age*, Routledge, London, UK, 2016.

Dr. **Frank Zizza** has returned from his sabbatical leave, and is now chairing a search to fill an open tenure-track position in mathematics.

South Dakota School of Mines and Technology

We recently received news that a proposal to the NASA Space Grant Consortium was funded.Dr. **Donna Kliche** headed the development of this proposal to offer enrichment activities to K-12 students and teachers. The project includes three components: several two-day computational astronomy workshops for teachers; bi-weekly computational astronomy sessions for middle and high school students; and night sky exploration for students. It will be open to students and teachers from Rapid City and neighboring school districts. The workshops for K-12 science and math teachers will connect specific mathematics computational models to astronomy and space exploration, with the goal of taking it back into the classrooms. The other faculty members involved in this project includes: **Don Teets, Travis Kowalski, Peter Grieve**, and **Roben Rudy-Hinker**.

University of Northern Colorado

This year the UNC statewide Math Contest celebrated its 25th birthday. It was founded by **Richard Grassl** (Professor emeritus UNC), and is currently directed by **Ricardo Diaz**, with the assistance of many enthusiastic volunteers (including **Dean Zeller, Rocky Verser**, and **Katie Diaz**). Approximately 2000 students participated online in in the first round, which was held in late October of 2016. Two hundred students from around the state of Colorado were invited to the second round, which was held on the UNC campus in mid-January. Approximately 70 supportive parents and teachers attended a concurrent solution seminar. If you know of a talented middle-school of secondary student who enjoys challenging mathematical puzzles and problem solving, invite them to consult the contest's website for some sample problems: https://uncmathcontest.wordpress.com
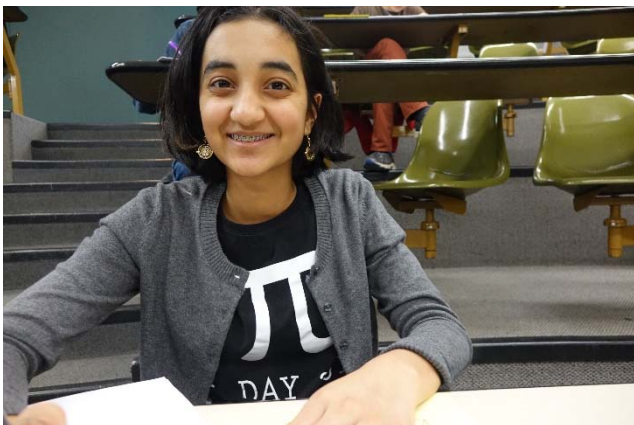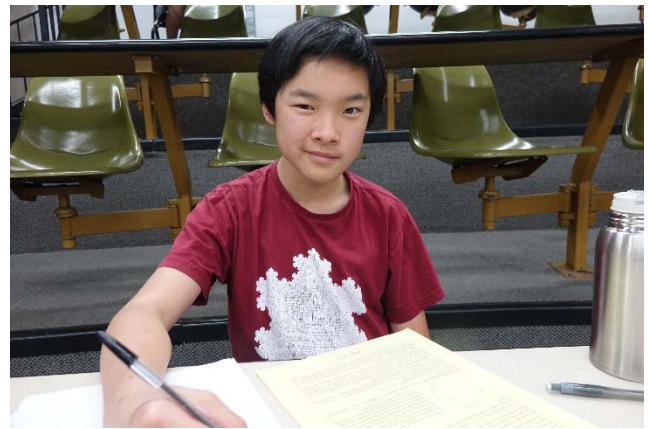
Gulden Karakok and **Katie Morrison**, the co-directors of the Northern Colorado Math Circles (NoCOMC) program, continue to host monthly evening sessions on mathematical problem solving for middle school mathematics teachers and 4th-8th grade students. Teachers' circle session on February 27 Monday will have Dr. **Richard Grassl** as a guest facilitator, and Dr. **Paul Zeitz** will facilitate the session on March 27 Monday. We will have our 5th week-long summer institute for middle school teachers on June 26-30, 2017 at YMCA, Winter Park, CO. The application form will be available online in February and selection of participants will start early in April. Summer camp is open to all middle school mathematics teachers in CO and we also encourage 4th-9th grade teachers to apply. For more updated information: visit our webpage: http://www.unco.edu/nhs/mathematical-sciences/math-circles/index.aspx.

We will also host our second Student Math Circle Summer Camp for local 5th through 8th graders during June 13-15, 2017 at UNC Campus. This 3-day camp is for local students.

Discrete Mathematics: An Open Introduction entered its second edition in August

2016. This free online textbook (with an inexpensive paper option) is used at universities across North America. UNC Assistant Professor **Oscar Levin**, author of the text, welcomes comments and contributions to this effort to provide quality and affordable course materials to our students.

Katie Morrison is the sole co-PI on a $1.1 million NIH BRAIN Initiative grant with PI Carina Curto of Pennsylvania State University. This grant will support research on mathematical models of neural activity with the aim of understanding how neural connectivity shapes the resultant patterns of neural activity.

The National Science Foundation has awarded a $300,000 grant to UNC researchers for a pilot project to implement and evaluate a teacher leader development model for improving STEM education. Mathematics faculty **Jodie Novak** and **Catherine "Frieda" Parker** will employ a two-tier model, similar to the approach used in management, that will include professional development for elementary math teachers. "Teacher leaders receive training and mentoring to develop their knowledge, skills, and dispositions to engage in their tier of teacher leadership activities," the researchers state in their project proposal. "Tier I teacher leadership activities have a close proximity to and thus directly influence teachers' instruction. Tier II teacher leadership activities are those that leverage teacher leaders' knowledge, experience, and motivation to improve systems that support effective instruction." Novak and Parker also state that the model has the potential to inform teacher leadership development and effectiveness across STEM (science, technology, engineering and math).

Every year the UNC College of Natural and Health Sciences selects the recipients for the Excellence Awards. This year, **Dean Allison** was presented with the award for Excellence in Leadership, **Jodie Novak** was presented with the award for Excellence in Scholarship, **Rob Powers** was presented with the award for Excellence in Advising, and **Hortensia Soto** was presented with the award for Excellence in Graduate Mentoring.

Section Nominating Committee Report

The nominating committee is seeking strong leaders with a desire to serve the MAA to run for **Chair Elect** and **Secretary/Treasurer** of the Rocky Mountain Section.

Both of these positions are vital to the organization and operation of the Rocky Mountain Section.

The **Chair Elect** serves a one-year term (typically preceding a two-year term as Chair) and is expected to perform the following duties:

1. Watch and learn.
2. Attend all Executive Committee Meetings.
3. Act in place of Chairperson if that officer cannot fulfill his/her position.
4. Serve on Program Committee
5. Chair the Distinguished Teaching Award Committee

The **Secretary/Treasurer** serves a three-year term and is expected to perform the following duties:

1. Making all the officers aware of their duties.
2. Assisting officers in the performance of their duties.
3. Responsible for Section funds and

preparation of reports.

4. Responsible for preparing and distributing minutes of all Section and Executive Committee meetings.
5. Help with call-for-papers and other mailings.
6. Preparation and distribution of Section Newsletter
7. Archivist for Section.
8. Serve on Program Committee
9. Handle details not assigned to other officers.
10. Serve as co-signer for bank account once one is past secretary.

If you have an interest in running for one of these positions or would like to nominate a colleague who would be an outstanding candidate, please contact any member of the nominating committee:

Gus Greivel (Colorado School of Mines),
ggreivel@mines.edu
Gulden Karakok (UNC),
Gulden.Karakok@unco.edu
Bruce Lundberg (CSU-Pueblo),
bruce.lundberg@csupueblo.edu

Elections will be held during the business meeting at the MAA Rocky Mountain Section annual meeting to be held at Colorado State University-Pueblo, April 21-22, 2017.

Note: Elected officers of the section must be members of the MAA.

With Gratitude,
The Nominating Committee

Section NExT

Section NExT is a professional development program similar to Project NExT, but run at the section level. Our current Section NExT has not been active for the past couple of years, so some of us MAA Rocky Mountain Section members are interested in reviving the program. Some examples of professional development activities could be panels related to promotion/tenure or workshops on effective teaching practices. If you are interested in participating in future (2018 and beyond) Section NExT activities, organizing future Section NExT activities, or mentoring Section NExT participants, please contact Dr. **Rebecca Swanson** at swanson@mines.edu.

Rebecca Swanson
Colorado School of Mines
Section NExT Committee Chair

Mathematics Awareness Month: April 2017

Information on this year's Math Awareness Month will be available soon at:
http://www.mathaware.org

Colorado State University - Pueblo
to Host the
100th Anniversary Meeting
of the
Rocky Mountain Section of the MAA
April 21 - 22, 2017

Colorado State University – Pueblo is excited to host the 100th Anniversary Meeting of the Rocky Mountain Section of the Mathematical Association of America, on Friday April 21 and Saturday April 22. We are equally delighted to have Pueblo Community College join us by hosting the Friday evening banquet. Don't miss this opportunity to celebrate the first 100 years of the Rocky Mountain Section of the Mathematical Association of America!

Conference registration, abstract submission, hotel information and much more will soon be available on the section website (http://sections.maa.org/rockymt/).

Some important planning information and deadlines to keep in mind:

- Abstract Submission deadline is **Wednesday, March 29th.**
- **Early Registration** ends on **Friday, April 7th**.
  Up to this date, a discount on the registration fee will be available.
- **Reception & Banquet Tickets** must be purchased on or before **Friday, April 14th.**
- **Reservations** for the Friday Pre-Conference **Department Chairs Luncheon**
  also due on or before **Friday, April 14th.**
- **Space is limited** for the **pre-conference workshop "*Active Learning Boot Camp*"**
  with UCD's RaKissa Manzanares and Gary Olson – sign up early!
- **Hotel reservations** deadlines for **guaranteed conference rates** vary from
  March 20 to April 6 – reserve early to get the best rates at the best hotels.

Additional conference information, including special activities for students, appears below. Questions or additional program suggestions? Contact janet.barnett@csupueblo.edu.

Plenary Speakers

Friday Opening Address

Dr. Hortensia Soto-Jonson, Professor of Mathematics at University of Northern Colorado and Rocky Mountain Section's 2016 Burton W. Jones Distinguished Teaching Award recipient.

Making & Moving in order to Perceive, Imagine, and Mathematize
Many mathematics educators explore the cognitive development of mathematical concepts through a lens that ignores Piaget's first stage of cognitive development – the sensorimotor stage. The theoretical lens of *embodied cognition* embraces the belief that <u>learning is doing</u>, where doing entails action in the physical or virtual environment. Embodied cognition is receiving increased attention in mathematics education because of its potential to link research and practice with both in- and out-of-school activities. In this presentation I provide a brief over-view of embodied cognition and then showcase how I *move* this philosophy into my undergraduate mathematics courses. As with all theoretical perspectives, there are some challenges in trying to implement such a philosophy and I will discuss how implementing *on purpose and with a purpose* activities may alleviate such challenges. The audience should bring their fun-meters and be prepared to *move*.

Speaker Biography:
Hortensia is a professor in the School of Mathematical Sciences at the University of Northern Colorado. She has published in various areas of mathematics education including assessment, mathematical preparation of elementary teachers, outreach efforts for high school girls, and especially in the area of teaching and learning of undergraduate mathematics. Her current research efforts are dedicated to investigating the teaching and learning of complex analysis, where she adopts an embodied cognition perspective. Since her days as an undergraduate student, Hortensia has mentored young women and promoted mathematics via summer outreach programs. She frequently facilitates professional development for K-12 teachers in Colorado and has also taught teachers from rural Nebraska (where she was raised) as part of the University of Nebraska-Lincoln NSF-funded project, *Math in the Middle*. Hortensia is a working member of the Mathematical Association of America (MAA) and just finished her term as the Associate Treasurer as part of the executive committee. She is now a member-at-large of the Board of Directors. She is also a co-PI on an MAA NSF-funded project aimed at creating Instructional Practices Guide for Undergraduate Mathematics. Most importantly, she is the mom of a good-hearted young man named Miguel.

Friday Evening Banquet Address

Dr. Brian Hopkins, Editor of *College Mathematics Journal* and Professor of Mathematics at Saint Peter's University.

The Symmetric Group and Fair Division: Does Knowledge Matter?
Sports drafts and divorce settlements are examples of situations where players take turns selecting indivisible goods. Like other topics in fair division, the situation is made more interesting because people may value the goods in different ways. In this talk, we focus on the case of two players, where the machinery of permutations is surprisingly applicable. How many possible outcomes are there? In what circumstances do both players get their best possible outcomes? How can one best take advantage of knowing the other's preferences? What happens when a player's motivation switches from greed to spite, the common good, or selfless

altruism? In this colorful talk, we'll sample some applied algebraic combinatorics and address these issues along with the provocative question of the title.

Speaker Biography:
Brian Hopkins is a professor of mathematics at Saint Peter's University in Jersey City, New Jersey, and has taught game theory and fair division at New York University as an adjunct in the department of politics. He is also active in teacher professional development, especially with the Institute of Advanced Study's Park City Mathematics Institute. Research interests include combinatorial number theory, Ramsey theory on the integers, and mathematics applied to social sciences. Hopkins is the editor of *The College Mathematics Journal,* received the 2015 Deborah and Franklin Tepper Haimo Award for Distinguished Teaching of Mathematics, and was a visiting scholar at Bangkok's Mahidol University International College last semester.

Saturday Morning Keynote Address

Dr. Timothy Chartier, MAA Second Vice President and Professor of Mathematics at Davidson College

Mathematical Celebrity Look-Alikes
Who is your celebrity look alike? LeBron James? Jackie Chan? Adele? Rihanna? Vectors norms enable us to discern what celebrity looks most like a selected individual. Linear algebra allows us to explore what linear combination of celebrity photos best approximates a selected photo. Would you describe yourself as a cross between Ben Stiller and Hugh Jackman or possibly Marilyn Monroe and Jennifer Aniston? In this talk, we learn how to answer this question using linear algebra and on the way get a sense of how math aids in facial recognition.

Speaker Biography:
Dr. Tim Chartier is Vice President of the MAA and a Professor of Mathematics and Computer Science at Davidson College, who specializes in sports analytics. He frequently works on data analytics projects with groups such as ESPN's Sport Science program, NASCAR teams, the NBA, and fantasy sports sites. He, along with a team of about two dozen student researchers, supplies analytics to Davidson College sports teams. Dr. Chartier is a recipient of the Alder Award and his research and scholarship were recognized with an Alfred P. Sloan Research Fellowship. He authored the book "When Life is Linear: From Computer Graphics to Bracketology," which won the Beckenbach Book Prize as a distinguished, innovative book. Dr. Chartier also authored "Math Bytes: Google Bombs, Chocolate-Covered Pi, and Other Cool Bits in Computing". Dr. Chartier serves on the Editorial Board for Math Horizons. He was the first chair of the Advisory Council for the National Museum of Mathematics. He has also worked with Google and Pixar on their K-12 educational initiatives. Dr. Chartier has served as a resource for a variety of media inquiries, including appearances with Bloomberg TV, NPR, the CBS Evening News, USA Today, and The New York Times.

Contributed Paper and Panel Sessions

The following sessions are currently part of the scientific program – watch the section website for possible additions to this exciting slate of offerings!

Contributed Paper Sessions:
- *College Algebra: Successes and Challenges*
- *IBL Methods in the Classroom*
- ***Mathematics Education, featuring Highlights from ICME and its Satellite Meetings***
- *Mathematics in K-8 Teacher Preparation*
- *History of Mathematics and Its Associations*
- *Research by Graduate Students*
- ***General Session:*** *Talks on any mathematics related topic are welcome!*
- ***Undergraduate Student Presentations***

Panel Sessions
- *Elementary Math Specialists State Endorsement*
- *A tribute to MAA-RMS in its first 100 years: A Panel Reflecting on Events and Experiences in the Rocky Mountain Section*

Friday Pre-Conference Workshop:
Active Learning Bootcamp

In this workshop, we will share sample active learning activities and the pedagogy surrounding them. These activities were designed to engage students with the content and foster mathematical discourse. Participants will be able to have a first-hand experience with a variety of activities including various forms of TACTivities and scaffolded activities. There will also be time devoted to brainstorming activities for your own courses.

Facilitator Biographies
RaKissa Manzanares is an Assistant Professor C/T in the Department of Mathematical and Statistical Sciences at the University of Colorado Denver (UCD) where she has been a faculty member since 2007. She completed her Ph.D. in Mathematics Education at the University of Northern Colorado in 2006 and her undergraduate studies at Colorado State University - Pueblo in 1999. Dr. Manzanares' research areas focus on four primary areas: mentoring, innovative teaching, embodied cognition, and the development of attitudes and beliefs about mathematics and the learning of mathematics. In 2013, RaKissa received the Excellence in Teaching award for the College of Liberal Arts and Sciences, as well as the campus award for UCD. Dr. Manzanares is a co-PI for the Promoting Success in Early College Mathematics through Graduate Teacher Training (PSECM-GTT) project funded by the NSF. She is also highly involved and committed to the mathematical education of pre- and in-service teachers. RaKissa's interests extend beyond the classroom to empowering young people to become self-advocates and leaders in their lives and communities. She spent four years volunteering for Colorado Youth at Risk (CYAR) mentoring, coaching, and facilitating workshops designed for high school students and their mentors. RaKissa was awarded the 2011 Circle of Champions award for her continued dedication and contributions to CYAR.

Gary Olson is a Senior Instructor and the Director of Service Courses in the Department of Mathematical and Statistical Sciences at the University of Colorado Denver where he has been a faculty member since 2006. He teaches both mathematics courses for undergraduates and professional development courses for in-service teachers. His current pedagogical interests have focused on the development and implementation of tactile active learning activities for the precalculus and calculus classroom. He is also actively involved with the MCM and ICM mathematical modeling competition and has coached teams to the top award the last two years. In 2010 & 2015 Gary received the Excellence in Teaching award from the College of Liberal Arts and Sciences as well as the campus award for Excellence in Teaching in 2015. Gary is involved in a number of graduate teacher training initiatives at CU-Denver and is a co-PI for the Promoting Success in Early College Mathematics through Graduate Teacher Training (PSECM-GTT) project funded by the NSF.

Student Activities

Please join us at the Rocky Mountain Section Meeting in April. Enjoy these great activities!

Free lunch and games session on Friday April 21.
When you arrive at the conference, there is a free student lunch and board games session (pizza for most; allergen friendly food available, especially if you email me with specific allergies). Please come and join us! Please direct student lunch questions to Beth Schaubroeck, beth.schaubroeck@usafa.edu.

Give a talk!
This conference is a great place to give a talk to fellow students and faculty members. Prepare your talk and sign up to present in a student session! Please direct questions to Beth Schaubroeck, beth.schaubroeck@usafa.edu.

This is Jeopardy!
Everyone loved Jeopardy so much last year that we're going to continue it this year! Get together a team of 4-5 students from your school; or sign up to be put on an "inter-school" team. There is a limited number of teams; they will be entered in the competition on a first-come, first-served basis. There is also a limit of five students on the inter-school team, so register early! Details will be available at the conference website.

MAA Rocky Mountain Section
Suggestions for Speakers

The Rocky Mountain Section would like to offer the following suggestions, especially to first-time speakers, regarding preparation of a talk at the conference.

1. The standard talk length is 20 minutes, (with longer times available upon request, subject to the limitations of the program). Thus, you should prepare your presentation to fit the time allotted. If possible, plan to leave a few minutes at the end of your presentation for questions.

2. A moderator will be assigned to facilitate each session of presentations. The moderator will introduce the speaker, assist in distribution of any handouts, signal the end of the presentation, and ask for questions from the audience.

3. If handouts are to be provided, give them to the moderator prior to the beginning of the session including your talk. Plan to bring about 35 handouts and be prepared to give attendees your e-mail address in case the supply runs out. It may also be possible to arrange for posting of electronic materials from your talk on the section website. Check with program organizers concerning this possibility.

4. Do not include too much detailed technical material in your presentation. Focus on providing the audience with insight into your topic and its key notions. Remember that most members of the audience will not be experts in the field you are discussing, and that the audience is likely to include students.

5. All session rooms will be equipped with a projector and a laptop hook up. Accordingly, you can present your talk using Power Point slides, PDF, or similar, which will greatly enhance the pace of a presentation. However, make sure that notes on the slides or transparencies are typed in a font big enough and with spacing adequate to be seen clearly 50 to 100 feet away.

Grants Available

Section Activity Grants Available

The purpose of the Section Activity Grants program is to assist Section members in funding projects in support of Section Mission. These projects must be clearly tied to one or more of the Rocky Mountain Section Mission Goals and the project director must be a member of MAA. Grants will not exceed $750 per project. Matching funds from host institution are preferred, but not required. To apply for a Section Activity Grant, submit the following to the Section Secretary/Treasurer:

(a) Description of project (no more than one page);

(b) Statement of how project supports Mission Goals (no more than one page);

(c) Estimated budget;

(d) Description of matching funds available, if any;

(e) Vitae of project director(s).

If funded, a report on the project will be filed by the Project Director upon completion (no more than one page) and a report will be made at the next meeting of the Section. Complete details on the selection process and application guidelines are posted on the section website. Grants will be reviewed once a year. All application materials are due November 1st of each year.

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.

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

ICTCM; Chicago, IL, March 9-12, 2017
NCTM annual meeting; San Antonio, TX
    April 5-8, 2017
**MAA Rocky Mountain Section Meeting;
    Colorado State University - Pueblo
    Grand Junction, April 21-22, 2017**
MAA MathFest; Chicago, IL; July 26-29, 2017

Joint Mathematics Meetings; San Diego, CA
    January 10-13, 2018
**MAA Rocky Mountain Section Meeting;
    University of Northern Colorado
    Greeley, April 13-14, 2018**
NCTM annual meeting; Washington DC
    April 25-28, 2018
MAA MathFest; Denver, CO; August 1-4, 2018

Joint Mathematics Meetings; Baltimore, MD
    January 16-19, 2019
NCTM annual meeting; San Diego, CA
    April 3-6, 2019
MAA MathFest; Cincinnati, OH;
    July 31-August 3, 2019

**Joint Mathematics Meetings; Denver, CO
    January 15-18, 2020**
NCTM annual meeting; St. Louis, MO
    October 21-24, 2020
MAA MathFest; Philadelphia, PA;
    July 29-August 1, 2020

Joint Mathematics Meetings; Washington DC
    January 6-9, 2021
NCTM annual meeting; Atlanta, GA
    September 22-25, 2021
MAA MathFest; Sacramento, CA;
    August 4-7, 2021

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)

Email Address _____

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)? _____

On a separate page, briefly describe the unusual or extraordinary 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 forms should reach Section Secretary by December 15 of each year.
Complete nomination materials should reach Section Secretary by January 15 of each year.

Section Secretary: Heidi Keck, hkeck@western.edu
Western State Colorado University; Hurst Hall; Gunnison, CO 81231.

Please consult the Section webpage (http://sections.maa.org/rockymt) for complete guidelines.

The Rocky Mountain Section of
The Mathematical Association of America

Early Career Teaching Award
for Excellence in Teaching in the Mathematical Sciences

Early Career Teaching Award Nomination Form

Name of Nominee _____
(First name first)

Email Address _____

College or University Affiliation _____

College or University Address _____

City _____ State _____ Zip _____

Is the nominee a member of the MAA? _____

Has the nominee taught at least half time in a mathematical science
for at least two but not more than seven years? _____

On a separate page, briefly describe the unusual or extraordinary 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 forms should reach Section Secretary by December 15 of each year.
Complete nomination materials should reach Section Secretary by January 15 of each year.

Section Secretary: Heidi Keck, hkeck@western.edu
Western State Colorado University; Hurst Hall; Gunnison, CO 81231.
Please consult the Section webpage (http://sections.maa.org/rockymt) for complete guidelines.

Early Career Teaching Award Guidelines

Part of the core mission for the Rocky Mountain Section is to provide recognition for quality mathematics teaching. The Early Career Teaching Award was established to recognized excellence in teaching in the mathematical sciences for faculty that are early in their career.

Eligibility
Nominees must:
- Hold a doctorate degree
- Be college or university teachers who have held a full-time faculty appointment in a college department of mathematical sciences in the Rocky Mountain Section for at least two, but not more than seven, years since receiving the doctorate. A nominee who has just started the eighth year of teaching at the time of the application is still eligible for the award. If a nominee has held his or her doctorate for more than 7 years then the nominator must indicate on the nomination form the times that the nominee was not teaching. Common exceptions to the 7-year limit are maternity, paternity, family, or medical leaves. Sabbaticals and postdoctoral fellowships are exceptions only if they involved no teaching and the application does not include accomplishments made during these times.
- Hold membership in the Mathematical Association of America

Guidelines for nomination
Nominees for the award may be made by any member of the Rocky Mountain Section of the MAA.
Nominees should:
- Be recognized as extraordinarily successful in their teaching
- Have effectiveness in teaching undergraduate mathematics that can be documented
- Have had influence in their teaching beyond their own classrooms
- Foster curiosity and generate excitement about mathematics

Nomination form is due December 15
Complete nomination packet is due January 15

Nomination Packet
A complete nomination packet should consist of the following documentation as it is described below.

1. **Nomination Form *and One-Page Summary*** - Describe the unusual and personal and professional qualities of the nominee that contribute to his or her extraordinary teaching success, and attach to this completed nomination form.

2. **Narrative (Up to 2 pages)** - Describe the nominee's extraordinary success in teaching by providing a narrative of the nominee's background, experience, teaching style, special contributions, other teaching awards, and any additional evidence of the nominee's unusual achievement in teaching. Note especially effectiveness in teaching undergraduate mathematics and influence beyond the nominee's own classrooms. The narrative should not exceed two single-spaced pages.

3. **Additional Documentation (Up to 2 pages)** - Submit no more than two pages of further evidence to document the nominee's extraordinary teaching success. This documentation will vary greatly from institution to institution, but may include summaries of peer or student evaluations, comments on teaching, possible increases in numbers of majors in mathematics (with clear evidence of the nominee's substantial responsibility for them), possible student success in mathematics competitions (with clear evidence of the nominee's substantial responsibility for them), success in

research in mathematics conducted by undergraduate students under the direction of the nominee, production of superior quality honors theses by undergraduate students under the direction of the nominee, development of curricular materials successfully used by colleagues, adoption of the nominee's teaching methods or techniques by experienced colleagues, service as a respected adviser for a student group, etc.

Nominators should bear in mind that the selection committee for the award might view a nomination more positively if it is accompanied not just by carefully chosen testimonials from a few selected students and faculty, but also reports comments and criticism which is representative of the whole spectrum of opinion among students and faculty on the nominee's teaching.

4. **Letters of Recommendation (Each letter is one page. Maximum of 5 letters.)**
    o Two letters from the nominee's present or former students.
    o One letter from the nominee's colleagues (could be the department chair).
    o At most two additional letters from anyone qualified to comment on the nominee's extraordinary teaching success, including additional students and/or colleagues.

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: Heidi Keck, MAA Rocky Mountain Section Treasurer/Secretary: Western State Colorado University, Hurst Hall; Gunnison, CO 81231

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.