# Spring 2020 Newsletter

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

## Spring 2020 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/spring2020news.pdf**

# Table of Contents

**Current term of service in parentheses; The Chair serves for 4 years – one as Chair Elect, two as Chair, one as Past Chair; All other positions are 1 year terms unless otherwise noted**

## Section Executive Committee Officers for 2019 – 2020

| | | |
|---|---|---|
| **Chair**<br>(2017 - 2021) | Alexander Hulpke<br>Colorado State University<br>Fort Collins, CO 80523 | alexander.hulpke@colostate.edu<br>970-491-4288 |
| **Chair-Elect**<br>(2019-2020) | Dan Swenson<br>Black Hills State University<br>Spearfish, SD 57799 | daniel.swenson@bhsu.edu<br>605-642-6425 |
| **Vice-Chair**<br>(2018-2020) | Shawna Mahan<br>Pikes Peak Community College | shawna.mahan@ppcc.edu<br>719-502-3268 |
| **Secretary/Treasurer**<br>(2017-2020) | Mona Mocanasu<br>MSU Denver<br>Denver, CO | mmocanas@msudenver.edu<br>303-615-0747 |
| **MAA National Rep**<br>(2017-2020) | Debra Carney<br>Colorado School of Mines<br>Golden, CO | dcarney@mines.edu<br>303-273-3977 |
| **Program Co-Chairs** | Mona Mocanasu<br>John Ethier<br>Lindsay Packer<br>Metropolitan State University of Denver | mmocanas@msudenver.edu<br>jethier@msudenver.edu<br>lpacker@msudenver.edu |

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## Other Committee Members and Representatives

**Section Nominating Committee**

| | |
|---|---|
| Greg Oman (Chair), UCCS | goman@uccs.edu |
| Kyle Riley, SDMST | kyle.riley@sdsmt.edu |
| Gulden Karakok, UNC | gulden.karakok@unco.edu |

**DTA Awards Selection Committee**

| | |
|---|---|
| Daniel Swenson (Chair), BHSU | Daniel.Swenson@bhsu.edu |
| Rob Tubbs (UCB) | Tubbs@Colorado.edu |
| Travis Kowalski (SDSMT) | Travis.Kowalski@sdsmt.edu |
| Jennifer Holmes, PPCC | jennifer.holmes@ppcc.edu |

**ECTA Awards Selection Committee**

|  |  |
|---|---|
| Daniel Swenson (Chair), BHSU | Daniel.Swenson@bhsu.edu |
| Rob Tubbs (UCB) | Tubbs@Colorado.edu |
| Ken Monks (FRCC) | Kenneth.Monks@frontrange.edu |
| Jennifer Holmes, PPCC | jennifer.holmes@ppcc.edu |

**Section Awards Coordinator**
(2017-2020)   Jeremy Muskat, Western State Colorado University jmuskat@western.edu

**Section Student Activity Coordinator**
(2020-2023)   Divya Vernerey, UC Boulder                                    divya.vernerey@colorado.edu

**Higher Education Representative on CCTM Governing Board**
(2019-2021)   Guilden Karakok, UNC                                           guilden.karakok@unco.edu

**Section Book Sales Coordinator**
(2018-2021)   Janet Heine Barnett, CSU - Pueblo                      janet.barnett@csupueblo.edu

**Section NExT Committee**
 (2019-2022)   Rebecca Swanson, Colorado School of Mines      swanson@mines.edu
                      Amanda Schaeffer-Fry, MSU Denver                  aschaef6@msudenver.edu

**Public Information Officer and Section Liaison Coordinator**
(2017-2020)   Mona Mocanasu, MSU Denver                            mmocanas@msudenver.edu

**Website Editor**
(2019-2021)   George Heine, Math and Maps                            gheine@mathnmaps.com

**Newsletter Editor**
(2019-2022)   Pam Peters                                                           pam.peters@ppcc.edu
                      Pikes Peak Community College                          719-502-3640
                      Department of Mathematics
                      5675 S. Academy Blvd
                      Colorado Springs, CO 80906

## Chair's Corner

Dear Members and Friends of the Rocky Mountain Section,

As it is early January and I am writing this, my fourth and last chair letter before passing the position on to Dan Swenson, my thoughts go back to what we have done in the last two years. Much of what has been successful was thanks to the work of others, and I am grateful to all of you who helped. I would like to thank in particular the organizers of the sectional meetings in the last few years: Nathaniel Miller, Oskar Levin and Jeffrey King in Greeley; Laura Scull and Veronica Furst in Durango; and Mona Mocanasu (who also serves as section secretary!) and John Ethier for the upcoming meeting in Denver!

In this, as with basically any other activity -- teaching awards, activity grants, newsletter, student activities -- the contribution of section members is what makes the activity with the formal section setup will act as best as a catalyst.

This involvement of membership is, together with the geographical extension, probably the biggest issue facing our section.  I am writing this to encourage you to get more involved (and encourage your colleagues to get more involved as well) in the sectional activities.

The section is essentially its members and their activities and it is infeasible to consider it the task of the few elected officers to find volunteers for the many named positions the bylaws and procedures manual formally specify. While the bylaws talk about volunteer positions as being

"named by" particular section officers, this really needs to be understood in practice as "volunteers will be confirmed by" rather than making it the task of section officers to find volunteers.

Thus I'd like to encourage you to think about increasing your involvement: Vote in the sectional elections. Nominate a colleague for an award. Run a regional activity (the section is supporting a small number of such activities, but we would love to be able to reach all areas). Apply for an activity grant. Consider hosting a meeting.

Talking about meetings, you probably will be aware that the Joint Mathematics Meetings will change. The meeting in Denver (which by the time you receive this newsletter will be over and I hope will have been a great success, showcasing that the Mountain West is a great place for mathematics) will have been the second-to-last.

Instead the plan is to provide resources to increase activities at sectional meetings. There will be more frequent Polya lecturer as well as speakers sponsored by AWM and NAM, effectively providing an external speaker every year for the sectional meeting (in addition to the section visitor).
There also will be funds for local career activities (in conjunction with, or disjoint of the sectional meeting). Contact me if you are interested!

Our next sectional meeting will be April (17/18) at Metropolitan State University in Denver.

This year we are lucky to have a number of excellent invited speakers:
- Travis Kowalski, South Dakota School of Mines and Technology, 2019 Burton Jones Awardee
- Carol Schumacher from Kenyon College, Vice President of MAA.
    • Kristin Lauter, Microsoft Research, 2020 Polya Lecturer.
    • A section NEXT activity by the 2019 Early Career teaching awardee, Ken Monks.

I hope I will meet many of you there!
 Alexander
    *Alexander Hulpke, CSU*
    *Chair, Rocky Mountain Section*

## Section News

### Colorado School of Mines

   Lindsey Nield and Miika Jarvela received the Outstanding Graduating Senior Award. The Mines' AMS department presented Outstanding Graduating Senior Awards to two students in recognition of their academic excellence and their service to the department, university and community.
   Lindsey was involved in a variety or departmental and university groups as a student, worked as a TA and grader, and spent two years doing research in the Nuclear Science and Engineering Program. She also worked at the Colorado School of Public Health at Anschutz Medical Campus and was awarded a DAAD RISE scholarship to do research in Hamburg, Germany, last summer. Lindsey will be returning to Mines to finish an MS in Statistics.



   Miika worked as a grader and TA in the department, as well as in the AMS Learning Center. Miika enjoyed working on undergraduate research with Dr. Leiderman and Dr. Mannan as an undergraduate and spent last summer in an internship at Nokia. Miika will also be returning to Mines to complete an MS in Computational and Applied Mathematics.

## SIAM 16ᵗʰ Annual Front Range Applied Mathematics Conference University of Colorado - Denver March 7, 2020

The SIAM student chapters of Colorado host the annual SIAM Front Range Student Conference in Applied Math (FRAMSC).  The conference is usually held the first Saturday in March on the CU Denver campus. This event allows students, at both the undergraduate and graduate level, to learn about research being done locally and to promote interest in applied mathematics in general. This year's conference will be our sixteenth and will be held March 7, 2020.  Additional information, as it becomes available, will be posted here:

https://www.colorado.edu/amath/2020-siam-front-range-student-conference

All of the talks, except for the keynote address, are given by students.  Generally, there are about 30 twenty-minute talks with several parallel sessions.  We also have a special session for students to present their solutions to the Mathematical Contest in Modeling problems.  A nominal donation is requested to help defray the costs of the refreshments and lunch.

This year's Keynote Address, entitled *Gerrymandering: What is it, how can we measure it, and what can we do about it?,* will be delivered by Prof. Jeanne Clelland **(**CU Boulder)**.**  In her talk, Prof. Clelland will describe how gerrymandering works and some of the mathematical tools that are being developed to detect it, with a focus on outlier analysis.  She will also talk about an ongoing effort to collect data and perform this type of analysis for as many states as possible in advance of the next round of Congressional redistricting in 2021.

If you want, you can find information on last year's conference here:

https://www.colorado.edu/amath/2019-siam-front-range-student-conference

Anne Dougherty
University of Colorado

# TRIUMPHS

**More Opportunities for RMS Members to Participate in TRIUMPHS!**

**TRansforming Instruction in Undergraduate Mathematics via Primary Historical Sources (TRIUMPHS)** is an NSF-funded effort dedicated to teaching and learning undergraduate mathematics from primary historical sources. As we near the end of our grant window, we are offering a **week-long workshop on authoring Primary Source Projects** at **Central Washington University in Ellensburg WA** on **May 18 – 22**.

Primary Source Project (PSP) authors are members of a growing network of teacher-scholars who are:

- interested in developing curricular materials that engage students with mathematics in ways that promote meaningful learning;
- fascinated by the mathematical thinking of others, both that of today's students and that of the historical mathematicians who came before them; and
- eager for the scholarly and creative challenges of wedding historical research with pedagogical insights, and the deeper understanding of both that can be achieved through PSP authorship.

Workshop participants will take part in sessions and discussions on such topics as:
- understanding a source and its potential for student learning;
- writing fruitful student tasks based on primary source readings;
- how PSPs are used by instructors and students in the classroom; and
- the impact of PSPs on instructor teaching and student learning and attitudes.

The week will also set aside time for participants to start writing their first project, and for writers' workshops with other attendees and experienced authors.

**Funding for travel, on-campus dormitory lodging, and meals** during the author workshop will be **provided** to all selected participants, but **space is limited**. **The PSP Author Workshop application form is open until Monday March 2**, and can be found on TRIUMPHS website:
https://blogs.ursinus.edu/triumphs/

TRIUMPHS will also be supporting classroom testing of PSPs for one final year. Our collection of freely-available curricular materials now includes 34 full-length PSPs and 33 shorter "mini-PSPs" on core topics in courses ranging from pre-calculus and introductory statistics, to linear algebra and number theory, to abstract algebra, analysis and topology. Official site testers who complete all required surveys and implementation reports receive a small stipend, and may also request travel funding for a consultation visit to one of the PI sites, or to have a grant team member visit your home institution. **Site tester application deadlines** for AY 20-21 are **June 15 for the Fall** and **October 15 for the Spring.**

Questions about the workshop or site testing? Contact janet.barnett@csupueblo.edu

# Section Nominating Committee Report

The nominating committee is pleased to report that Tracii Friedman of Colorado Mesa University is a nominee for Section Representative for the Rocky Mountain Section of the MAA. Deb Carney is currently serving in this position, and her term ends July 1, 2020; we thank her for her service in this important role.

**The nominating committee is soliciting nominees for the positions of Secretary/Treasurer and Vice-Chair.** A description of the duties for these positions follows below .

**Vice - Chairperson** (two year term, ending in even numbered years)
1. Be associated with a two-year school and represent the interests of the two-year colleges and encourage two-year college faculty members to participate in MAA activities and programs.
2. Act as contact with two – year and community colleges.
3. Attend all Executive Committee Meetings.
4. Assume the duties of the Chairperson if the Chairperson is absent or incapacitated.

5. Serve on Program Committee and arrange for programs for two –year and community college faculty.
6. In each year during which the Officers of the Section include a Past-Chairperson, appoint a member for a two year term to the Teaching Award Committee. This individual must be associated with a two-year school. |
7. Appoint the Student Activities Coordinator.

**Secretary / Treasurer** (three year term)
1.  Ensure that all officers aware of their duties.
2.  Assist other officers in the performance of their duties.
3.  Responsible for Section funds and preparation of reports.
4.  Responsible for annually updating this Procedures Handbook (following the Annual Business meeting).
5.  Responsible for preparing and distributing minutes of all Section and Executive Committee meetings.
6.  Appoints individuals to serve in the following positions: Section Award Coordinator, Newsletter Editor, Web master. See page 5 of this handbook for appointment dates.
7.  Serves as ex-officio member of all standing committees.
8.  Assist Program Chairperson with call-for-papers and other mailings.
9.  Serves as Archivist and Public Information Officer for Section.
10.  Serves on Program Committee ex-officio.
11.  Handle details not assigned to other officers.

The nomination committee will continue to accept nominations and all nominated candidates will be presented at our next section business meeting, April 17-18 in Denver, CO. At the business meeting, we will also accept nominations from the floor and then close nominations. The actual election will be held electronically with section members contacted via email to vote following the same procedures that are used for the elections conducted for our congressional representative.

If you have anyone you would like to nominate then please feel free to contact any member of the nominating committee:

Nathaniel Miller (University of Northern Colorado) Nathaniel.Miller@unco.edu
Kyle Riley (South Dakota School of Mines and Technology) Kyle.Riley@sdsmt.edu
Greg Oman, Chair (University of Colorado, Colorado Springs) goman@uccs.edu
Note: Elected officers of the section must be members of the MAA.

> **Respectfully submitted,**
> **The Nominating Committee**

# The 2020 Rocky Mountain Section Meeting
# April 17 - 18, 2020

The 2020 Rocky Mountain Section meeting will be held April 17-18, 2020 on the campus of Metropolitan State University of Denver, Denver, CO. The meeting promises two days of engaging speakers, student activities, book sales, and more. More info to follow.

For more information, contact the Program Co-Chairs:
**Dr. Mona Mocanasu**          (mmocanas@msudenver.edu)
**Dr. John Ethier**            (jethier@msudenver.edu)
**Dr. Lindsay Packer**         **(**lpacker@msudenver.edu)

# Student Activities

Students, please join us at the Rocky Mountain Section Meeting of MAA on **April 17-18, 2020 in MSU Denver**.  Details will be available at the conference website, or contact our RM-MAA student activities coordinator, Dr. Vernerey at divya.vernerey@colorado.edu for more information.  Enjoy the following activities.

**Give a talk!**
This conference is a great place to give a talk (20 minutes talk with 5 minutes for questions/ changeover) to fellow students and faculty members. If you would like to give a talk, please submit your proposal as described in the general announcement for the meeting.  Works from a new result, a new proof of a known result, REU, independent study, senior seminar, innovative solutions to a Putnam problem, or a purely expository topic are all welcome.

**This is Jeopardy!**
We will continue the ever-popular student Math Jeopardy, first stated in Spring 2016! Get together a team of 4-5 students from your university/college; or sign up to be put on an "inter-uni" team. There are 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-uni team, so register early!

**Free student lunch and games session!**
At the April conference, there will be a free student lunch (pizza and gluten-free options available) and a board-games session.  Bring your favorite math or logic game, and play games with other students or just come to socialize.  Details to come!  Join us!

**_Students and Advisors:_** Attending the section meeting is a great way to meet students from other schools, attend talks where you may learn some new and interesting mathematics, and present the results of your own research. Start thinking now about a presentation topic for the April 2020 conference.

## Rocky Mountain Section History of Mathematics Special Interest Group of the MAA History of Mathematics Student Poster Contest At the 2020 Rocky Mountain Section Meeting

This is a great opportunity for students at any stage of their mathematical studies–from College Algebra through Topology–to participate in the annual section meeting and learn more about mathematics while doing so. No prior background in the History of Mathematics is needed–just a topic, a faculty sponsor and some research! Faculty, please share the Contest Flyer with interested students, and see the full Contest Guidelines for complete details (including the Evaluation Rubric).

**Submission Guidelines**
1. A **poster abstract** (up to 250 words) must be submitted **on or before March 27**.
   - Please also include the poster title, the names and school affiliations of its author(s), and the name and e-mail address of the poster's faculty sponsor.
   - **Email** your **abstract** to **janet.barnett@csupueblo.edu**
2. Poster authors must also provide an **electronic copy of their final poster** to the contest organizers **no later than April 13**. Details for doing this will be provide to contestants at least a week prior to the deadline.

**Presentation Guidelines**
1. All contest entries must be displayed at the meeting during the time specified for the official judging.
   - Poster authors are responsible for setting up their poster prior to the judging period, and also for its removal per guidelines to be provided at a later date.
   - Authors should be present at their poster during this time in order to answer questions from judges and interested observers.
   - In some years, contest posters are also displayed at other times during the meeting; in this case, details concerning time and location will be provided at a later date.

2. Details concerning poster size and mode of display will be available at a later date. Please be sure to obtain this information from the contest organizer before you begin designing your poster!

3. All material must be accessible without having to lift or turn pages. A list of sources should be included; use of a relevant primary source is strongly encouraged, but not required. Credit must be given on the poster for any outside assistance.

Judging
Posters will be evaluated by a team of judges. Judging criteria are based solely on the content of the poster. Authors may be present during judging only to answer questions posed by the judges, but shall not make a formal presentation.  Judges will consider questions such as:
   • Does the poster address the proposed topic?
   • Is the mathematical and historical content at an appropriate level?
   • Is the mathematical and historical content presented clearly and correctly?
   • Is the presentation appealing? Does it pique the interest of the audience?
   • Is the overall design easy to follow, and does it convey the information well?

**Awards will be announced during the meeting (time and place to be announced)**
Contestants need not be present at the announcement in order to receive an award; winning contestants who are not present at the announcement should contact Janet Barnett prior to the close of the meeting to pick up their prizes

# Section NExT-RM

## Call for Participants for 2020 Section NExT-RM

**What is Section NExT-RM?**
The Rocky Mountain Section of the New Experiences in Teaching program (NExT- RM) is a smaller scale version of the national Project NExT program serving the members of the Rocky Mountain Section of the Mathematical Association of America (MAA). The goals of Section NExT-RM are to support faculty in the first five years of their academic career and to establish links among faculty in the section.

**Who is eligible?**
Section NExT-RM is open to non-tenured faculty members in the Rocky Mountain Section who are within the first five years of teaching at a university, four-year college, or two-year college within the Rocky Mountain Section of the MAA.

**When is the meeting?**
Our first meeting for the Section NExT-RM Fellows will be part of the Rocky Mountain MAA Section meeting that will be held April 17-18, 2020 at Metro State University in Denver. The Section NExT-RM sessions will occur both just prior to and just following the annual section meeting, beginning at noon on the 17th and ending by 5pm on the 18th. At this workshop, participants will discuss topics of special relevance to beginning faculty via sessions, panels, or workshops.

**What are my expectations as a fellow?**
Section NExT-RM Fellows will remain in contact with one another via an electronic network, and are expected to attend both the Spring 2020 and Spring 2021 Rocky Mountain MAA Section meetings. In particular, they will take part in the planning of some of the 2021 Section NExT-RM sessions.

**Does this cost me anything?**
Section NExT-RM is a selective professional development program—an application is required. We will provide the fellows with lunch on Friday and Saturday of the work- shop, and expect fellows to obtain travel and the remaining funding (approximately $150 for one night's hotel, registration, and banquet) from their departments or other sources.

**How do I apply?**
Submit the following to https://forms.gle/2w2r1d6vGmZMg7Vp7 by March 1st, 2020:
• A personal statement, not to exceed 2 pages, about your teaching and/or research background, indicating what you hope to gain from Section NExT-RM and any topics you particularly hope will be discussed in the meeting
• CV
• Letter of support from your department chair (Although departmental travel support is not required for acceptance, make sure your department chair indicates in the letter whether or not the department is providing travel support.)  Such a letter can be submitted to the above site OR can be submitted to aschaef6@msudenver.edu.

Questions? Contact the Section NExT-RM Coordinators Mandi Schaeffer Fry, MSU Denver (aschaef6@msudenver.edu) or Rebecca Swanson, Colorado School of Mines (swanson@mines.edu).

# 25<sup>th</sup> Colorado Mathematics Awards Ceremony and Reception

Plans are underway for CMA XXV -- the 25th Colorado Mathematics Awards Ceremony and Reception to be held on Thursday, May 14 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, Moody's Mega Math Challenge, and the members of the 2019 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 include present and past members of the Colorado Mathematics Awards Steering Committee. Special thanks to David Larue and S and P Global which has generously double-matched David's Contribution.

Suggestions for additional sources of funding are always welcomed. Please contact me at gibbs_d@fortlewis.edu.

# 17<sup>th</sup> Annual Pikes Peak Regional Undergraduate Mathematics Conference Colorado State University - Pueblo Saturday, February 22, 2020

**Website:  http://sections.maa.org/rockymt/PPRUMC/pprumc2020.html**

The focus of this one-day conference is to give undergraduate mathematics students an opportunity to present their work in a professional, supportive setting.  It is also an occasion for students to become acquainted with other students from the region, and to learn more about the mathematics profession, including graduate school and career opportunities.

We are delighted to feature UNC's **Dr. Katie Morrison,** a specialist on the application of mathematics to neuroscience, as our **Keynote Speaker**. Additional information about Katie's talk ***Graphs, Neural Networks, and Emergent Dynamics in the Brain*** appears below, or use this link to access a shareable pdf.

We are also pleased to announce that our fund raising efforts for this year have gone well, and we are once more be able to offer **conference registration, including lunch, at no cost to participants**. Please note, however, that advance registration is required to attend lunch.

Regrettably, there will be **very limited funding for travel reimbursement**. ***Accordingly, faculty should try to arrange for your home school to provide travel funds for your students, if possible.*** If you

have questions or require more information about travel funds, or other conference details, please contact janet.barnett@csupueblo.edu.

**Registration is now open via the [conference website](#)**. Information on local lodging and program details will be posted there as it become available; a preliminary schedule appears below. The **deadline for talk submissions is Monday, February 10**; the **deadline for lunch reservations if Monday, February 17**.

Please use the **Conference Poster** ([11x 14](#), [11x17](#)) to advertise this opportunity at your school, share the **Conference Flyer** ([flyer](#)) with your students, and encourage them to give talks as well! **Student talks related to topics in mathematics, mathematics education and the history of mathematics could include the results of classroom or independent study, as well as REU or other research projects. Both research and expository talks are welcome.**

**Students who do not wish to present are also encouraged to attend**, and learn more about the mathematics profession, including graduate school and career opportunities. Based on past participation, several dozen student presenters and over one hundred attendees from Colorado, Wyoming and other neighboring states are expected–don't let your students miss out on this opportunity to meet other students from the region who share their interest in mathematics!

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**PPRUMC 2020 Keynote Talk:**

*Graphs, neural networks, and emergent dynamics in the brain*

**Dr. Katie Morrison, University of Northern Colorado**

Networks of neurons in the brain often exhibit complex patterns of activity that are shaped by the intrinsic structure of the network.  For example, spontaneous sequences of neural activity have been observed in cortex and hippocampus, and patterned motor activity arises in central pattern generators for locomotion. In this talk, we will begin with an introduction to some of the neuroscience phenomena informing our work, and then focus on



a simplified neural network model known as Combinatorial Threshold-Linear Networks (CTLNs) in order to understand how the pattern of neural connectivity shapes the resultant neural activity. Specifically, the connectivity of these networks is encoded in a directed graph, and we will develop a series of *graph rules* characterizing how the graph structure shapes the neural dynamics by way of controlling the stable and unstable fixed points of the network.
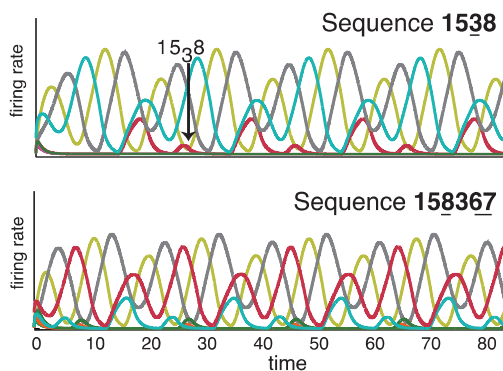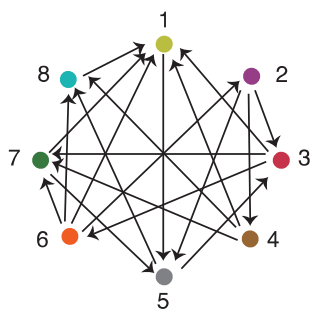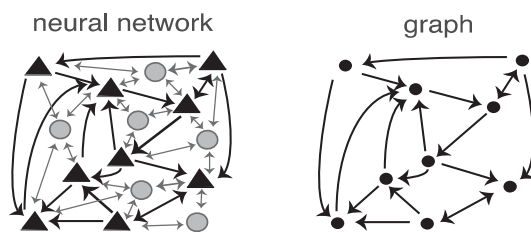
**About our Speaker:** Dr. Katie Morrison is an Associate Professor in the School of Mathematical Sciences at University of Northern Colorado. She received her BA from Swarthmore College, double majoring in mathematics and psychology, and her PhD in mathematics from the University of Nebraska. Her dissertation work was in algebraic coding theory, but she has since transitioned into mathematical neuroscience. Dr. Morrison's current research focuses on the mathematical theory and analysis of neural networks and neural codes, using tools from algebra, discrete mathematics, and topology.

**Preliminary Conference Schedule**
**All sessions to be held on the CSU-Pueblo campus.**

**9:00 - 9:15  Registration**

**9:15 - 9:30  Welcome & Opening Remarks**

**9:30 - 10:30 Keynote Address by Dr. Katie Morrison, University of Northern Colorado**
*Graphs, neural networks, and emergent dynamics in the brain*

**10:40 -11:55 Student Presentations in Parallel Sessions** (15 minutes each, with 5 minutes between talks)

**12:00 -1:00 Lunch**

**1:00 - 2:00  Panel Presentation:  *Beyond an Undergraduate Mathematics Degree***

**2:00 - 4:30  Student Presentations in Parallel Sessions** (15 minutes each, with 5 minutes between talks)

**4:30        Closing Remarks and Door Prizes**

# Report on the 16ᵗʰ Annual Pikes Peak Regional Undergraduate Mathematics Conference
# U. S Air Force AcademySaturday, March 2, 2019

The 16th PPRUMC took place on Saturday, March 2, 2019 at the U.S. Air Force Academy. We had 98 registrants, but an impending snow storm kept 22 of these individuals home that day. Dr. Chad Westphal, Wabash College (current DVP at USAFA), delivered a keynote address on " $\pi!$ and Fractional Derivatives, a Tale of Mathematical Generalization." We held a panel discussion "Beyond an Undergraduate Mathematics Degree," with 4 panelists from UCCS, USAFA, and Salt Lending (a cryptocurrency financial firm). There were 11 student talks held in parallel sessions.

This year's conference was again offered at no cost to participants, due to generous funding from the US Air Force Academy Gift Funds and an MAA-RMS activity grant of $750. Thanks to the MAA-RMS support, we were able to provide travel reimbursement to our invited panelists and an honorarium to our keynote speaker. Door prizes were donated by the Athletics Department at USAFA (42 USAFA jerseys), the MAA-RMS (three MAA books) and by Dr. Beth Schaubroeck (two books). The PPRUMC Steering Committee is also grateful to the USAFA cadets who volunteered to help at the conference and to the faculty who contributed their time and expertise to preparing student presenters, recruiting student participants and moderating conference sessions.

Registered participant numbers (student and faculty) by institution were as follows:

5 from UCCS
17 from Western Colorado University
12 from Pikes Peak Community College
9 from University of Northern Colorado

28 from U.S. Air Force Academy
1 from CSU Pueblo
3 from Colorado College
2 from CSU Fort Collins
1 from CSU global

6 from Metro State University
1 from Coronado High School
4 from Laramie County CC
6 from Regis University
1 from Salt Lending
1 from University of Colorado

The student presentations were:

- Laney Bowden, Colorado State University
  *Numerical Range of a Composition Operator on the Hardy Space*
- Heather Kocher and Alex Morones, Pikes Peak Community College
  *A Rudimentary Exploration: Frequency and Sound*
- Michael Lynch, Colorado State University
  *The Supersingularity of Hurwitz Curves*
- Taylor Allen, Western Colorado University
  *Molecular Cages*
- Leigh Foster & Brittany Bianco, Metropolitan State University of Denver
  *Automorphisms and Characters of Finite Group*
- Cole Biedermann, U.S. Air Force Academy
  *Mathematical models of cyclically competitive species with asymmetric diffusion*

- Sophie Aiken, Colorado College
  *Hall t-chromaticity and weak Hall t-chromaticity of the Petersen Graph and of wheels with odd numbers of spokes*
- Cristian Hernandez, Regis University
  *Combating Tuberculosis (TB): Using Time-Dependent Sensitivity Analysis to Develop Strategies for Treatment and Prevention*
- Maria Lopez, Western Colorado University
  *Origami and Polynomials*
- Erik McMillan, United States Air Force Academy
  *Solving Pucci's Nonlinear Partial Differential Equation*
- River VanIwaarden, Western Colorado University
  *Infinity is Weird*

# Spring 2019 Rocky Mountain Section Meeting

The Rocky Mountain Section Meeting was held at Fort Lewis College in Durango, CO on April 5-6. The meeting had 93 registered participants, including mathematicians, educators and students.   The meeting opened with a welcome from associate vice president of academic affairs and mathematician Dr. Anne McCarthy, followed by a plenary talk by Burton Jones Award winner Dr. Jeanne Clelland (University of Colorado Boulder) entitled *Gerrymandering:  what is it, how can we measure it, and what can we do about it?*    The program also featured plenary talks by MAA executive director Dr. Rachel Levy on *Mathematical Modelling:  from kindergarten to industry*, and Early Career award winner Dr. Ian Pierce from the USAFA on *Another example of the ubiquitous nature of eigenstuff.*

The scientific program included sessions on History of Mathematics, Mathematics Education, and General Mathematics and Student Research, with a total of 34 contributed talks, including 12 student talks with a total of 18 student presenters or co-presenters.  Faculty workshops on Active Learning, Supervising Undergraduate Research and Flipped Classrooms were also part of the program.

In addition to the session for talks, undergraduate student work was showcased via a history of mathematics poster session featuring twelve student projects on the history of mathematics. Students also took part in a careers panel as well as the return of a student lunch and Math Jeopardy.

The Fort Lewis organizing committee consisted of Veronika Furst, Laura Scull, Kirsten Stor and Matthew Welz.  The committee would like to thank all of those who assisted us in this endeavor, including Alexander Hulpke and Janet Barnett for support and advice, and Beth Schaubroek for organizing student activities.

# Contributed Talks, Workshops and Panels Spring 2019 Rocky Mountain Section Meeting

## General Math
- **Michael Brilleslyper** and **Ethan Berkove**
  United States Air Force Academy and Lafayette College
  *Coprime Labelings of Complete Bipartite Graphs*
- **Tracii Friedman,** Colorado Mesa University
  *GirlsDoMath in Western Colorado*
- **Richard Gibbs,** Fort Lewis College
  *After Much Thought, the Proof IS Obvious*
- **Doug McKenna.** Mathemaesthetics, Inc.
  *On the Continuum, Subdividing the Square, Fractal Pinwheel Tiles, MetaMotifs, Non-Fractal Half-Dominos, Gaskets, Self-Negative Tendril Growth, and ... Native American Craft Designs*
- **Erik Packard.** Colorado Mesa University
  *The order of $k$ mod $m_1$ mod $m_2$.*
- **Kirsten Stor.** Fort Lewis College
  *Pattern Matching with Wildcards and Length Constraints*

- **Dan Swenson,** Black Hills State University
  *Measuring Bias in Electoral Redistricting*
- **Jeffrey Winter,** Black Hills State University
  *Creating a Random Generating Video Game in Excel*

## History of Mathematics
- **Janet Barnett** Colorado State University-Pueblo
  *Gnomonic Explorations: A Primary Source Project in Number Theory for Mathematics Majors, Elementary Teachers and Others*
- **Jeffrey Berg** University of Colorado at Denver
  *Mining the History of the Rocky Mountain Section*
- **Phil Gustafson** Colorado Mesa University
  *Enriching a Numerical Analysis Course with Historical Connections*
- **George Heine** Math and Maps
  *Historical Materials on the Section Website*
- **Carl Lienert** and **Cinnamon Hobbs** Fort Lewis College
  *Primary source vs. textbook presentation.*
- **Roger L. Mansfield** Astronomical Data Service
  *What are Universal Variables? How Do They Describe the Path of the First Known Interstellar Asteroid, 'Oumuamua?*
- **Dan May** Black Hills State University
  *With Quick Steps and Light Feet These Solutions I Found: A Brief Introduction to Mathematical Poetry*
- **Donald Teets** South Dakota School of Mines and Technology
  *Lagrange and the James Webb Space Telescope*

## Mathematics Education
- **Meredith Anderson,** Adams State College
  *Using Superfactorials as a Vehicle for Mathematical Practice*
- **Kelly Flaherty,** University of Denver
  *The Impact of "Sense of Community" in the Undergraduate Mathematics Classroom*
- **Leslie Goldstein,** Fort Lewis College
  *Visual Mathematical Patterns*
- **Eric Miles,** Colorado Mesa University
  *Go Walk On a Hill: a 15 minute field trip for Calculus III*
- **Jonathan Poritz,** Colorado State University - Pueblo
  *The Best Things in Life Are Free – And That Includes Math Books*

## Student Talks
- **Colleen Amori,** Regis University
  *Creating Walk Sequences of Directed Graphs*
- **Jordan Armstrong,** United States Air Force Academy
  *Devil's Staircase: Infinite Function Composition*
- **Nicholas Chmielewski,** South Dakota School of Mines and Technology
  *Orbit determination from astrophotographs using the Laplace Method*
- **Will Cooper,** United States Air Force Academy
  *Coprime Labelings of Complete Bipartite Graphs*
- **Christopher Flynn** and **Brittany Quick Bear,** Fort Lewis College
  *$P_{n;2}$ to Marked Tableaux*

- **Samuel Fulton** and **Stephen O'Connor-Seville**, Fort Lewis College
  *$P_{n;2}$-tableaux and Marked tableaux: A Combinatorial Bijection*
- **Ian Hanigan** and **Audrey Stansberry,** Fort Lewis College
  *Counting Hook $P_{n;2}$-tableaux of Shape* $(1 + k; 1^n)$
- **Burkelee Kenefick-Aschoff,** Black Hills State University
  *Singular Value Decomposition and Photography*
- **Harry McMahon**, United States Air Force Academy
  *GPS Satellite Positioning Using a Genetic Algorithm*
- **Diego Novoa** and **Jonathon Thompson,** Fort Lewis College
  *Defining $\pi_0$ for Graphs*
- **Ayla Rodriguez** and **Parthasarathi Nag,** Black Hills State University
  *Perspectives in Quantization*
- **Madison Tung,** United States Air Force Academy
  *Modeling Public Opinion*

## Workshops and Panels
- *Active Learning Workshop*
  Organizers: **Mike Mikucki** (Colorado School of Mines), **Ashlyn Munson** (Colorado School of Mines), **Ashley Meek** (Adams State University), **Lindsey Reiten** (University of Northern Colorado)
- *Career Panel*
  Panelists: **Alyssa Gottshall** (NSA), **Rachel Levy** (MAA), **Daisy Matthews** (Durango High School), **Matt Welz** (Fort Lewis College)
- *Flipped Classrooms Panel: Why and How, A Discussion of Methodology, Successes, and Pitfalls*
  Organizers: **Meredith Anderson** (Adams State University), **Jon Schauble** (Metropolitan State University), **Tristan Lehmann** (South Dakota School of Mines)
- *Getting Started with Undergraduate Research Workshop*
  Organizers: **Forest Mannan** (Colorado School of Mines), **Ryan Grady** (Montana State University), Shelley **Rohde** (Metropolitan State University), **Clay Shonkwiler** (Colorado State University)
- *Undergraduate Research Panel*
  Panelists: **Mandi Shaeffer Fry** (Metropolitan State University of Denver), **Christa Hayes** (Montana State University-Bozeman), **Laura Scull** (Fort Lewis College)

# Spring 2019 Rocky Mountain Section Meeting History of Math Student Poster Contest

The First Annual Section History of Mathematics Student Poster Contest took place at the Annual Meeting at Fort Lewis College on April 5-6, 2019.

This new student activity was a great opportunity for students at any stage of their mathematical studies – from College Algebra through Topology  – to participate in the annual section meeting and learn more about mathematics while doing so.

We were pleased to have a total 12 entries in the inaugural contest! Posters were judged by a panel of specialists for content, originality and presentation during the late Friday afternoon break, with prizes awarded at the Friday Banquet.  Meeting participants then had the opportunity to view the

posters again during throughout the day on Saturday. The posters and the presentations by the students who created them added a lovely new dimension to the overall meeting program!

Contestants receiving an honorable mention or one of the top three awards each received a copy of the highly-recommended book *The History of Mathematics: A Very Short Introduction* by Jacqueline Stedall (publisher Oxford Press). The top three contest winners also received a second MAA-published history of mathematics book of their choice.

Thanks go out to the contestants' faculty sponsors Marlow Anderson (Colorado College), Beth Schaubroeck (USAFA) and Matthew Welz (FLC) ; to judges Jim Loats (MSU-Denver) and Shawna Mahan (PPCC); to Janet Barnett (CSU-Pueblo) for the donation of prizes, judging and general organizational work; to Veronika First (FLC) and Laura Scull (FLC) for their assistance with organization and logistical details; and, most of all, to the contestants themselves!

**First Place:**
- Edgar Santos, Colorado College
  *Victor Neumann-Lara Biography and Dichromatic numbers of a Digraph*

**Second Place:**
- Walter Stepanek, Fort Lewis College
  *Developing Secret Communication - The Navajo Code Talkers*

**Third Place**
- Abigail Ezell, Colorado College
  *Julia Robinson and Hilbert's Tenth Problem*

**Honorable Mention**
- A. Sophie Aiken, Colorado College
  *Ada Lovelace: On Flying, the Analytical Engine, and Early Computing*
- Haley Colgate and Sam Kottler, Colorado College
  *Emmy Noether and Differential Invariant Theory*

**Additional Entries**
- Jerrell Cockerham, Colorado College
  *Sophie Germain*
- Malcolm Gabbard, Colorado College
  *Evolution of Mathematical Philosophies*
- Thomas Galligani, United States Air Force Academy
  *The Numbers Your Math Teacher Never Told You About:*
  *Turing the Tables on a Mathematical Community that Can't Find All the Numbers*
- Damon Hardwick and Marta Nowotka, Colorado College
  *Grace Hopper: Visionary Computer Scientist with Mathematical Contributions*
- Cinea Jenkins, Colorado College
  *The Life of Emmy Noether*
- Vladimir Vintu, Colorado College
  *Jakob Steiner and Steiner's Porism*
- Ying Wang, Colorado College
  *Controversy on the Certainty of Mathematics in Sciences Revisited:*
  *An application of Duhem-Quine Thesis*

# 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.

## Meetings Calendar

NCTM Centennial Meeting; Chicago, IL
  April 1-4, 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
Joint Mathematics Meetings; Seattle, WA
  January 5-8, 2022
MAA MathFest; Washington DC;
  August 3-6, 2022
Joint Mathematics Meetings; Boston, MA
  January 4-7, 2023
MAA MathFest; Tampa, FL;
  August 2-5, 2023

# 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 Awards Coordinator by December 15 of each year.
Complete nomination materials should reach Awards Coordinator by January 15 of each year.

Jeremy Muskat, Section Awards Coordinator,
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 Awards Coordinator by December 15 of each year.
Complete nomination materials should reach Section Awards Coordinator by January 15 of each year.

Jeremy Muskat, Section Awards Coordinator,
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 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

**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.

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.

Contributions may also be made in support of the Pikes Peak Regional Undergraduate Mathematics Conference; simply choose "Other" on the coupon below, and specify "PPRUMC" in the space provided.

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.

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## 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

_____ Teaching Award Fund (Burton W. Jones DTA and ECTA)

_____ 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:

Mona Mocanasu
MAA Rocky Mountain Section Treasurer/Secretary
Metropolitan State University of Denver
Department of Mathematical and Computer Sciences
Campus Box 38; PO Box 173362
Denver, CO 80217

**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.

## 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 $\pi$; 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."