



Upcoming Local Events

October 15, 2019

Annual Technical Symposium (ATS)
Abstracts Due

November 6, 2019

Program: Bye Aerospace
Englewood, Colorado—[Register Link](#)

November 19, 2019

8th Annual Technical Symposium
Boulder, Colorado—[Register Link](#)

AIAA National Events

October 21-25, 2019

International Astronautical Congress
Washington, D.C.

January 6-10, 2020

SciTech 2020
Hyatt regency Orlando, Orlando, Florida

Note from the Chair

Dr. Merri Sanchez, *Aerospace Corporation*

Hello Rocky Mountain Section!

Fall is in the air! I hope everyone had a great summer and that you are ready to get involved in AIAA. Your AIAA section council is working hard developing programs and activities for this year. We have already had several exciting events including Apollolooza for our K-12 outreach, Trajectories for our college outreach, corporate membership events at Ball Aerospace and Lockheed Martin, several monthly programs, and recently a tour of F.E. Warren AFB in Wyoming. Your team is also working on an exciting lineup for our Annual Technical Symposium which will be November 19 at the University of Colorado. The Programs committee continues to bring you monthly programs at various locations across the Front Range. Unique spring events to be looking for include science fair judging, Congressional Visits Day in March, and our Annual Honors and Awards Banquet. We have active committees for Education and STEM, Honors and Awards, Membership, Programs, Public Policy, and Young Professionals. If you are interested in volunteering for any of these committees let us know. The strength of our programs and events depends on volunteers. If you have interest in any special topics or locations for a monthly program let us know and we will work to add it to our event list.

Continued on page 3

In this Newsletter

Topic	Page
8th Annual Technical Symposium	3
Apollopalooza: AIAA Celebrates Apollo 11 and Beyond!	5
Recap: AIAA Young Professionals Movie and Lecture	8
Astronaut Scott Kelly to Speak in Colorado Springs	8
Colorado Springs Recognizes AIAA for STEM Education	9
Recap of Trajectories 2019	10
AIAA RM Speaker Series May Program: Reaction Engines	11
AIAA RM Speaker Series September Program: Connectors, Cables, Composite Accessories, Braid and Tools—Glenair,	12

Section Officers

Elected

Section Chairman	Dr. Merri Sanchez
Vice Chair	Tracy Copp
Secretary	Kevin Mortensen
Treasurer	Dr. Taylor Lilly
Vice Chairman – North CO	John Marcantonio
Vice Chairman – South CO	Dr. Todd Nathaniel
Vice Chairman – MT	Erik Eliassen
Vice Chairman – WY	Mark Kettles

Committees

Fellow-At-Large	Gene Dionne
Member-At-Large	Pamela Burke
Education and STEM	John Marcantonio
Honors and Awards	Stacey DeFore
Membership	Marshall Lee
Newsletter Editor	Adrian Nagle
Public Policy	Tracy Copp
Programs	Chris Zeller
Technical Committee Liaison	John Reed
Webmaster	John Grace
Young Professionals	Alexandra Dukes

We Need You! If you are interested in increasing your participation in AIAA Rocky Mountain Section, we need your help with positions in any of the committees. If you have an interest, please contact: Kevin Mortensen – kevin.mortensen@baesystems.com

Colorado Springs Recognitions August as STEM Education Month due AIAA and other organization's efforts! On August 14, the Colorado Springs City Council passed a resolution designating August as STEM Education Month. Your Vice Chair, Tracy Copp, addresses the City Council on behalf of AIAA-RMS and eloquently shared the tremendous work done by AIAA throughout the state of Colorado. See page 9 for more details.

The American Institute of Aeronautics and Astronautics

Rocky Mountain Section presents the:

8th Annual Technical Symposium



Tuesday November 19th 2019

University of Colorado at Boulder

UMC Ballroom

The Annual Technical Symposium, brings together the regional leaders, technical experts, and academia in the aerospace and aeronautics industry. ATS is a forum to help shape the future of the industry, a place for people in all stages of their career to gather, network, and collaborate. It is a place to learn a new process, gather inspiration, and make the connection to turn that inspiration into reality.

This day-long symposium is in its eighth year and will be held on Tuesday, November 19th at the University of Colorado, Boulder.

[Register now](#) for early bird pricing!

[Abstract Submission](#) (**Deadline: October 15**)

Call for abstracts: ATS is now accepting abstract submissions for technical and poster presentations in the following subject areas:

- Astrodynamics and Satellite Navigation Systems (ASN)
- Autonomous Systems (AUT)
- Bioastronautics and Human Spaceflight (Bio)
- Fluids, Structures and Materials (FSM)
- Remote Sensing, Earth and Space Science (RSESS)
- Proliferated Low Earth Orbit (pLEO) Satellite Constellations
- Space Resources
- Poster

Full Symposium Agenda: <https://www.aiaa-rm.tech/2019-agenda/>

Chair comments, continued

I have a personal interest in working to help our section members with membership advancement to Senior Member, Associate Fellow, and Fellow. I have asked our council, and am now asking you for help in identifying worthy members eligible for member advancement. We have so many talented and deserving members in our section and I want to help them get the recognition they deserve. I have also asked our council to bring bold ideas to a strategic planning workshop we will hold to identify ways that we can provide better value for our section members. If you are interested in participating in this strategic workshop let me know. I want your help in shaping this section to meet our members needs. Some of the topics we'll tackle are: How do we add value to the membership for young professionals and new members starting their aerospace careers? How do we better retain student members converting to full membership? How do we better draw on our senior career members as mentors for our Young Professionals? Is there a unique role for our Fellows in advising, mentoring, etc.? How do we increase membership advancement? And there are even more questions!

In closing here are a few reminders from national. With the new national leadership structure you can only vote for national Technical Committee Chairs in areas that you have selected as your professional interest area codes. If you are wanting to vote in other areas you need to add them to your interest code selections. The AIAA Board of Trus-

tees have approved three strategic theme areas for the Institute. These are Transformative Flight, Building the Space Economy, and Autonomy & Air Mobility. These themes will help guide future AIAA focus and growth areas.

There will be a dues increase of \$5 starting November 1. As a reminder of dues options, you might want to consider Lifetime Member which is 15 times the annual dues rate and can be paid in up to eight installments. There are also reduced dues available for fully retired members, students transitioning to full membership, and free dues for Emeritus members who have been a continuous member for 50 years. Please contact AIAA Customer Service if you are interested in any of these options. If you are interested in Lifetime Member and if you initiate it prior to November 1 it will be based on the current dues rate. I personally highly recommend Lifetime Member.

The Rocky Mountain Section exists to serve you as members. If you would like to get involved or provide inputs or suggestions on programs, events, strategic thinking, etc., please send us a message via the form at <https://engage.aiaa.org/rockymountain/contactus> or to me directly. I look forward to seeing you at our events throughout the year!

Regards,

Merri



Apollopalooza: AIAA Celebrates Apollo 11 and Beyond!

Karolyn Evans, *Sierra Nevada* and Sue Janssen, *ULA (retired)*

In July, the Wings Over the Rockies Museum invited AIAA RMS to participate in Apollopalooza – a week-long regional celebration of the 50th anniversary of the moon landing and future human space exploration. The Educational Outreach and Membership committees jumped in with both feet at this opportunity to talk with the public *and* play with kids. The excitement of the activities is best shown with photos.

We manned a membership table throughout the week. Enticed by the cool “schwag” adults and students stopped by to talk with members about our organization.

Adjacent to the membership table, we organized a felt storyboard and asked students to tell their space exploration story by making felt shapes of planets, astronauts and spacecraft. This activity was extremely popular with the younger kids.

On Sunday, 14 July, over 450 kids of all ages made rubber-band powered foam rockets and launched them at planet targets. Those who hit the targets were awarded posters donated by Lockheed Martin and Sierra Nevada.

Every morning we challenged people (kids, parents and grandparents alike) to design, build and test a



AIAA members represent the Rocky Mountain Section in the main hanger.

sturdy, but light-weight “Lunar Lander” of gumdrops and toothpicks. Once constructed, the completed design was weighed and the result recorded. The lightest design was merely 4 grams! Then the “engineers” were invited to drop-test their design. A design was considered successful if it did not break and if the capsule did not fall out of the structure. “Engineers” were allowed to go back to the drawing board and improve their design. Bonus: You can eat the gumdrops that you did not use in the design. We had over 200 “engineers” participate.

We offered 2-hour “Orbital Confusion” workshops for high school students (and one third-grader who was very interested and engaged!). The workshop began with the geometry of ellipses and hands-on activities that demonstrated important aspects of Newton’s and Kepler’s Laws. Next, there was an overview of typical orbits. Finally, each student constructed a model of earth orbits to take home.



Apollopalooza: AIAA Celebrates Apollo 11 and Beyond!

We also held a half-day workshop for teachers as part of “Apollo University,” a week-long continuing education program organized by April Lanotte, Director of Education at Wings Over the Rockies AND AIAA Educator Associate member. The teachers completed the orbits workshop and the gumdrop lander activity and learned about AIAA. As a result of our interaction with the group, we have at least 6 new Educator Associate members!

Wow! That was a fun and busy week for AIAA RMS. Thanks to all who volunteered: Martin Begay, Sarah Bolton, Heather Chluda, Elizabeth Corbett, Barbara De Figueiredo, Lenny Demchak, Anita and Shomir Dighe, Gene Dionne, Vicky Eberhardt, Elaine and Hal Feldman, Sally Hanley, Durga Hiroula, Kaley Hassell, Charlie Haupt, David Hopper, Tom Horn, Peter Hufford, Julie Hughes, Brian Katilius, Julia Kirby, Jennifer Kurtz, Scott Lambert, Marshall Lee, Tamara Maxwell, Micael Menendez, Maggie Mueller, Stephanie Mufic, Mike Nance, Carolyn Overmyer, Karen Paulson, Carlos Pinedo, Paula Pinkley, Chris Raatz, Anita Ramos, Kristen Sebella, Jeff Smith, Koreyanne Smith, Jonathan Swavelly, Brooke Vails, PJ and VJ Valkand, Tyler Walston, Eric Wilson, Cheryl Yermasek, and Michael Zhang. (Apologies if we have missed someone.)



See my Saturn V?



Assembling foam rockets



The AIAA tables kept busy during the week of events.



3... 2... 1... Liftoff!

Apollopalooza: AIAA Celebrates Apollo 11 and Beyond!



Drop-testing landers



Constructing models



Building a lander



Measuring distance traveled in a time increment



Equal areas in equal time increments



Finished models

Recap: AIAA Young Professionals Movie and Lecture

Alexandra Dukes, *Lockheed Martin*

Thank you to everyone who participated in the 2nd Annual AIAA Young Professionals (YP) Movie Night! This movie night was made possible by the hard work of the AIAA YP committee, council members, and, most of all, the participants, and we are thrilled with the result of the event.

This year's event featured Robert Zimmerman, a renowned space journalist and historian, and the documentary *Apollo 11* to celebrate the 50th anniversary of the Moon landing. Robert Zimmerman is an AIAA distinguished speaker and presented his lecture titled "Unknown Stories from Space: Astronaut adventures that did not reach the press" which gave wonderful insight

into the activities of Russian astronauts after the Moon landing. Zimmerman is a humorous and passionate speaker and this lecture was no exception! We were honored to host him for our event, and the lecture and movie could not be better timed with the Apollo 11 50th anniversary.

Thank you again to everyone who supported and took part in our annual Movie Night event! If you are interested in becoming more involved in the Young Professionals committee, please contact the YP Chair: Alexandra Dukes at dukes.alexandra@gmail.com. We look forward to seeing you at future Young Professionals events!



Astronaut Scott Kelly to Speak in Colorado Springs

The University of Colorado at Colorado Springs (UCCS) hosted a special Fall 2019 speaker event featuring Scott Kelly, a world-renowned astronaut who spent a year in space. Scott Kelly captivated the world and seized the imagination of millions during his record breaking voyage—provide that the sky is not the limit when it comes to the potential of the human spirit.

This special event took place on Tuesday, September 24, 2019 at the Gallogly Events Center at UCCS.



Ticket sales began on Monday, August 12, 2019 at the University Center information desk and online.

There was also an AIAA student club meeting before the lecture for AIAA members to meet each other and mingle. For more information, contact Lynnane George (lgeorge2@uccs.edu).

Colorado Springs Recognizes AIAA for STEM Education

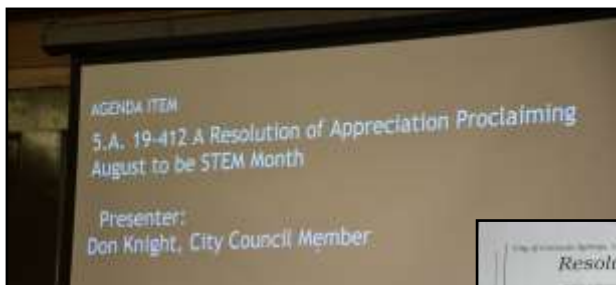
Kevin Mortensen, *BAE Systems*

Last December, several service organizations along the Front Range teamed together to co-host a holiday party that had many government, military, and industry leaders in attendance. During the speeches part of the evening, then-Chair of the AIAA Rocky Mountain Section, Dr. Rusty Powell, shared words of good cheer with the assembled guests but he also highlighted the great work the Council was doing in the region, included in his remarks was the great work that was done in the RMS in STEM education. The co-hosts from the other service organizations also highlighted their STEM education achievements.

It was later learned that one of the holiday party attendees was Colorado Springs City Councilman, Don Knight. Councilman Knight was so impressed with AIAA, and the other organizations, that he

led an effort to designate August as STEM Education Month.

Council Knight invited leaders from each service organization to attend the City Council meeting on August 14th, where a Resolution was passed declaring August as STEM Education Month. AIAA-RMS' Vice Chair, Tracy Copp, represented the Section and eloquently shared with the Colorado Springs City Council the great STEM education work being done by AIAA's Rocky Mountain Section all across the State of Colorado.



TRAJECTORIES 2019: Expanding Horizons

Sally Hanley, *Ball Aerospace*

AIAA RMS and the Mines Aerospace Interest Group (MAIG) made the 3rd annual event, TRAJECTORIES 2019, a great success. This free aerospace networking and panel discussion event was held on Friday, September 6th, at the Colorado School of Mines in Golden, Colorado.

In honor of the 50th anniversary of the Apollo 11 moon landing, this year's event centered on the past, present, and future of human space exploration.

The event was well attended by both students and AIAA professional members, and included an distinguished panel of experts that fueled imagination and expanded horizons. The night's panelists included:

- John Grunsfeld: Former NASA Astronaut and NASA Chief Scientist
- Paul Marshall: Orion Deputy Program Manager, NASA Johnson Space Center
- Rob Chambers: Business Development Director, Lockheed Martin Space Systems

- Justin Cyrus: CEO, Lunar Outpost
- George Sowers: Professor of Mechanical Engineering for the Space Resources Program at the Colorado School of Mines

The panelists led a lively discussion that covered many topics including reasons for space exploration, NASA's Artemis, Orion, and Lunar Gateway programs, the future of space resources, and the contribution of small businesses in aerospace.

The panelists also offered valuable advice to students as they prepare to enter the aerospace workforce. Rob Chambers offered the importance of teams to the future of the space program. "For those of you who don't like working on group projects, get over it. It takes the will and skill of everybody to pull this off."

After the conclusion of the panel discussion, many students and professionals remained for networking and to continue discussing their thoughts for the future of aerospace.



AIAA RM Speaker Series May Program: Reaction Engines

Chris Zeller, *Ball Aerospace*

In honor of the Reaction Engines of Abingdon, UK toured their Test Facility 2 at Colorado Air and Spaceport in Watkins Colorado at a dinner meeting for the May installment of the Rocky Mountain Section speaker's series. Daniel Larson, Engineering Projects Manager, and Adrian Tansing Compliance Manager for the US subsidiary of the UK based company Reaction Engines presented to the section on their company's plans to design and develop the technologies needed for a new class of innovative hypersonic propulsion system – the Synergetic Air-Breathing Rocket Engine (SABRE). This engine is planned to be used in future aircraft that will fly over five times the speed of sound in the atmosphere and allow space launch vehicles to be built that will radically improve the affordability and responsiveness of access to space.

Members were treated to a dinner at the Aviator Bar & Grill followed by an introduction to Colorado Air and Spaceport by the airport director David Ruppel. The airport plans to develop the capability to launch and land dual propulsion vehicles making horizontal takeoff and landings at their facility east of Denver International Airport. Following the Spaceport overview, Adrian Tansing briefed the members on the SABRE engine and the company's plans to integrate the engine into future single-stage to orbit vehicles.

Following the presentation, members carpooled out to Reaction Engine's Test Facility 2 located on the airport where Daniel Larson toured the new high temperature test facility where it is currently running a test program to validate the performance of the pre-cooler heat exchanger technology. Purpose of the test is to expose the pre-cooler test article (HTX) to the high-temperature airflow conditions in excess of 1000°C that are expected during high-speed flights up to Mach 5. To

replicate conditions the pre-cooler will experience at hypersonic speeds, the TF2 test facility uses a General Electric J79 turbojet engine formerly used in a McDonnell Douglas F-4 Phantom aircraft to provide high-temperature airflow.

In recent ground-based tests the pre-cooler successfully quenched the 420°C (~788°F) intake airflow in less than 1/20th of a second and achieved 1.5 MW of heat transfer equivalent to the energy demand of 1,000 homes. The intake temperature replicates thermal conditions corresponding to Mach 3.3 flight, or over three times the speed of sound. The tests are the first phase in an extensive test program which will see the pre-cooler test article (HTX) exposed to high-temperature airflow conditions in excess of the 1,000°C (~1800°F) expected during Mach 5 hypersonic flight.

Mr. Larson took members through the entire test facility from the control room to the various stages of the test stand. It was clear that this was a rare opportunity to be up close with the future of space transportation.



AIAA RM Speaker Series September Program: Connectors, Cables, Composite Accessories, Braid and Tools—Glenair, Supplier to the Stars

Chris Zeller, *Ball Aerospace*

Glenair Interconnect Solutions presented to the Rocky Mountain section at our September program to kick-off the 2019-2020 season at the Colorado School of Mines campus in Golden, Colorado. Chris Van Soests, VP of Fiber Optics and Flex Assemblies and Jason LaRock Field Application Engineer for Ruggedized Photonics presented on the company's history, products and the future of electronics in aerospace applications. Mr. Van Soests detailed the company's founding in 1956 in Glendale, CA to where they are today as a full-spectrum interconnect provider offering over a dozen product lines designed to meet every interconnect requirement, including a broad range of space, military, and civil aviation qualified connectors. Mr. Van Soests went on to describe the future of electronics interconnects with the company's photonics solutions that are capable of providing copper-to-fiber conversion technologies with speeds up to 10 Gbps per lane and beyond in harsh conditions including harsh radiation exposure, extreme temperatures, vacuum exposure, and high levels of vibration and shock. From the presentation, it was clear that



Glenair has a solution to any aerospace interconnect problem in your system.

Contact program chairperson Christopher Zeller with program ideas and suggestions.