

# CO-WY AMP Commentary

SPRING 2019



## UNC JOINS CO-WY AMP

CO-WY AMP recently added the University of Northern Colorado as a partner institution. UNC is a comprehensive baccalaureate and specialized graduate research university with 46 bachelors, 45 masters, 2 specialists, and 21 doctoral accredited programs, including bachelor's degree programs in biological sciences, chemistry and biochemistry, earth and atmospheric sciences, physics, and mathematics. Founded in 1889, UNC has more than 12,000 students enrolled from all 50 states and 49 countries.

Consistent with national population changes, student demographics at UNC are also shifting. In the time span from 2009 to 2016, the University has seen sizable increases in the percentage of female students (from 60% to 64%), minority students (15% to 30%), first generation students (31% to 37%), and transfer students (24% to 27%). In 2016, 11% of first-time freshmen declared a STEM major (244 of 2163 students); 45% of the first-time freshmen STEM cohort were first generation students and 38% were students of color.

CO-WY AMP at UNC will reside under the new STEM Inclusive Excellence Collective (STEM IEC). The mission of the STEM IEC is to make excellence inclusive in STEM by engaging administrators, faculty, and students in policy making, advocacy, and purposeful practice in teaching and learning. STEM IEC focuses on providing administrator and faculty professional development opportunities, advocating for changes in institutional policies, and directly impacting student success in a triad of foci to change the expectations for inclusion, equity, and diversity while increasing STEM student retention and success.

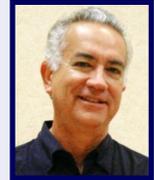
UNC will bring a distinctly unique perspective to the CO-WY AMP program. Welcome, University of Northern Colorado!



## CO-WY AMP LEADERSHIP



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Principal Investigator



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Co-Principal Investigator  
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CO-WY AMP is funded through the NSF Louis Stokes Alliance for Minority Participation (HRD 1619673).



## CO-WY AMP INTERNATIONAL RESEARCH EXPERIENCES



### CENTRAL WYOMING COLLEGE STUDENTS IN TANZANIA

CO-WY AMP students from Central Wyoming College traveled to East Africa for a 28-day scientific adventure that began in early January. Students who participated as part of CO-WY

AMP's International Research Experience (IRE) were Bailey Lewis and Gabriel Spoonhunter. The expedition required students to develop a scientific research project and implement their plan on the flanks of Mt. Kilimanjaro, East Africa's highest peak. Participants spent several days at more than 17,000 feet to learn about research methods in glaciology and apply those methods to the high elevation glaciers. As students ascended and descended the mountain, they learned and applied scientific methodologies associated with learning more about plant morphology and microbiology. The students collected data about the changes they observed across climatic life zones on Mt. Kilimanjaro.

Lewis (pictured at right) started her CO-WY experience in scientific research through CWC's Interdisciplinary Climate Change Expedition. "The Tanzania Scientific Research Expedition was a phenomenal experience, one I will remember for the rest of my life," Lewis said. "Leadership skills—whether on the trail or during field sampling—were a very valuable part of my personal development. I feel I gained the right tools and techniques to be an effective leader not just in the field, but in other areas of my career."

CO-WY participant Gabriel Spoonhunter (pictured at left) who is Northern Arapaho and Oglala Lakota said he hopes to inspire others. "I am proud of what I accomplished. On Mount Kilimanjaro I learned so much that benefited me. It was awesome to learn and understand the necessity of the scientific research. I can't wait to possibly use that in what I do on the Reservation. It was an amazing life altering experience."



Bailey Lewis, Gabriel Spoonhunter, and CWC students during The Tanzania Scientific Research Expedition January 2019.



"Why should our students not reach as high and strive to go as far as any other students from other institutions across the nation?" said Jacki Klancher, CO-WY AMP site coordinator, CWC faculty mentor, and Director of Instruction and Research at CWC's Alpine Science Institute.

"With tremendous input and support, we are taking these students to places they never imagined they could go, both literally and figuratively."

The CWC students are planning a public presentation on their expedition.

*Photos courtesy of Jacki Klancher and Gabe Spoonhunter, CWC.*

### ASHLEIGH NAKATA—COSTA RICA

Metropolitan State University student Ashleigh Nakata participated in an International Research Experience at Lomas Barbudal Biological Reserve in Liberia, Costa Rica. The Reserve protects 2279 hectares of freshwater river and tropical dry forest habitat. Nakata worked on sampling and analyzing DNA from convict cichlids, a fish species native to Central America. "I will cherish this experience and use this as a tool to help me work through difficult challenges in the future," Nakata said.





# CO-WY AMP COMMENTARY

## CO-WY AMP INTERNATIONAL RESEARCH EXPERIENCES



### AMBER TORRES—HONDURAS

Colorado State University student Amber Torres (pictured far right) participated in an 8-day research experience to Roatan, Honduras, where she studied animal behavior, animal physiology, and conservation methods at the Roatan Institute for Marine Science. Torres designed an experiment to observe the behavior of a pod of 19 dolphins. "This trip helped me identify if research is something I want to pursue with my degree and the various ways on how to get there," Torres said.



Amber Torres (right) in Honduras over winter break 2019.

*Photo courtesy of Amber Torres.*



### GABY CARBONELL—TODOS SANTOS, BAJA CALIFORNIA SUR, MEXICO



Gaby Carbonell (pictured at left) completed an International Research Experience at Todos Santos, Baja California Sur, Mexico, the international extension of Colorado State University. "I feel that I gained a varied set of technical and professional skills out in the field, something that would not have been possible in a classroom. Going out to different sites every day and using actual field equipment to set up the experiments we devised ourselves was an invaluable experience," Carbonell said. "Aside from garnering technical skills, working in the field allowed me to better understand the scientific process and its applications. Overall, I feel stronger about myself as both an academic and professional because of the positive experiences. I would say that this study abroad has fundamentally changed my academic and professional career."



*Photo courtesy of Gaby Carbonell.*



### FORT LEWIS COLLEGE STUDENTS IN MYANMAR

Four students from Fort Lewis College were sponsored by CO-WY AMP to participate in an International Research Experience (IRE) in Than Thuang, Myanmar, where they completed a water system project. Fort Lewis students plan to continue partnering in summer 2019 with impoverished communities in Myanmar through what is called the Village Aid Project (VAP) at Fort Lewis. VAP is a student-centered, humanitarian organization whose mission is to find sustainable solutions to critical engineering problems in the developing world. In addition, VAP is training a new generation of students who understand the need for sustainable systems and who value the concept of responsible global citizenship.



KeNeda Randall, left, and James Sumpter

*Photo courtesy of Jessica Rupe, Fort Lewis College*

KeNeda Randall, a CO-WY AMP engineering student (pictured above at left), found healing from post-traumatic stress disorder through traveling to Myanmar with the VAP and seeing a developing country through her own lens versus the experience she had while on combat tours in the U.S. Army. "Volunteering with VAP was a way back to sanity and a way back to standing on my own two feet," Randall said. "I thought to help myself, I must first begin by helping others."

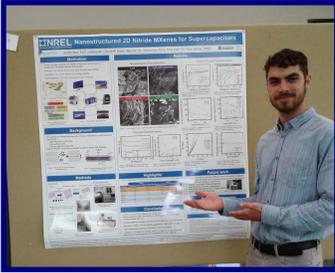
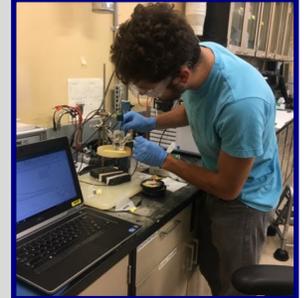


## CO-WY AMP SUMMER RESEARCH EXPERIENCES

### FORT LEWIS COLLEGE STUDENT ANDRE BOS EARNS RECORD OF INVENTION WITH NREL RESEARCHERS

Andre Bos earned a New Record of Invention: ROI-19-47 “High Performance Supercapacitors via Pseudocapacitive Storage in Nitride MXenes using Mg-Ion Electrolytes” along with his NREL mentor Dr. Abdoulaye Djire, and NREL manager Dr. Nate Neale. “Interning at National Renewable Energy Laboratory was one of the best experiences in my life,” said Bos, a student from Fort Lewis and participant in CO-WY AMP’s Summer Research Initiative (SRI). Bos presented his final deliverable as a poster project (pictured at left) titled, “Nanostructured 2D Nitride MXenes for Supercapacitors.”

“The internship at NREL exceeded all my expectations. The great community and relationships I made with my mentor and other interns provided me with a new set of skills and knowledge I can take to future experiences.”



Photos courtesy of Andre Bos.



### CU BOULDER STUDENT TRINITY PAYNE RETURNS TO NREL FOR SECOND YEAR

Trinity Payne, CO-WY AMP civil engineering student from the University of Colorado, Boulder, returned to the National Renewable Energy Laboratory for a second summer to continue her research with Dr. Judith Vidal on concentrating solar power (CSP). “The skills I gained while working at NREL will serve me throughout the rest of my education, as well as in my career,” Payne said. Payne learned how to operate a differential scanning calorimeter (DSC) and perform thermal-gravimetric analysis on various molten chloride salt compositions. Her project was titled, “Thermophysical characterization of chloride molten salts as heat transfer fluids for generation-3 concentrating solar power.”

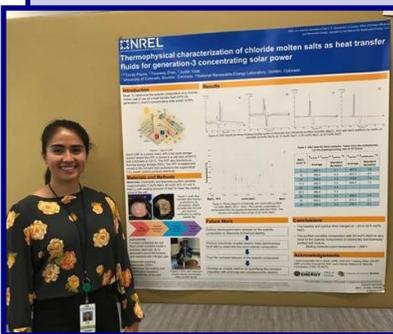


Photo courtesy of Trinity Payne.

### ROCKY MOUNTAIN SUSTAINABILITY AND SCIENCE NETWORK

Three CO-WY AMP students participated in the Rocky Mountain Sustainability and Science Network (RMSSN) in summer 2018. Ryan Gomez (pictured at bottom right, University of Colorado, Boulder) and Jordanne Pelkey (pictured at bottom left, Fort Lewis College) participated as Pollinator Hotshots and completed their project titled, “GoPollinators: A Citizen Science and Technology Approach to Pollinator Studies within the Greater Yellowstone Ecosystem.”

Gomez traveled to the Ecological Society of America in New Orleans, LA, to present the project’s poster. Blanca Gonzalez (pictured at top right, Metropolitan State University) studied pica and marmot interactions by observing the presence of both species physically in one site, and with a transect for signs of both mammals. Gonzalez said, “I am thankful for the opportunity to be a part of this experience. It has shown me how much I am passionate about going into my field of wildlife biology.”



Photos courtesy of Blanca Gonzalez, Jordanne Pelkey, and Ryan Gomez.



# CO-WY AMP COMMENTARY

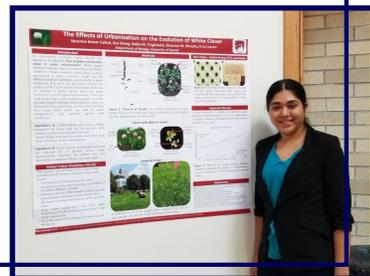
## CO-WY AMP SUMMER RESEARCH EXPERIENCES

### UNIVERSITY OF DENVER'S SUMMER RESEARCH PROGRAM

Five students from the University of Denver completed summer research projects with support from CO-WY AMP's Summer Research Initiative (SRI). Projects included: RNA recognition motifs in TDP-43 and their influence on protein aggregation; How do honey bees decide which flower to visit? (Elizabeth Pacheco with poster pictured at left); Effects of urbanization on the evolution of white clover (Veronica Huizar Cabral with poster pictured at right); Effects of anthropogenic noise on singing insects in Colorado; and The EEE Project: Elevating engineering education.



How do honey bees decide which flower to visit? (Elizabeth Pacheco with poster pictured at left); Effects of urbanization on the evolution of white clover (Veronica Huizar Cabral with poster pictured at right); Effects of anthropogenic noise on singing insects in Colorado; and The EEE Project: Elevating engineering education.



Photos courtesy of University of Denver.

### CU BOULDER STUDENT COMPLETES REU IN COMPUTER SCIENCE AT CSU-FORT COLLINS

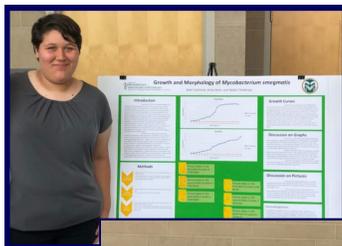
Andrea Chamorro Quillupangui, a freshman University of Colorado Boulder student, was mentored by Dr. Laura Moreno from the Computer Science Department at Colorado State University. Her REU project was titled, "WikifyDocs: Addressing Ambiguity Through Definitions in Application Programming Interface Documentation." Quillupangui presented her research at the Institute of Electrical and Electronics Engineers (IEEE) Wireless Communications and Networking Conference: Leading the Way to 5G and Beyond in Barcelona, Spain, and at two McNair National Conferences.



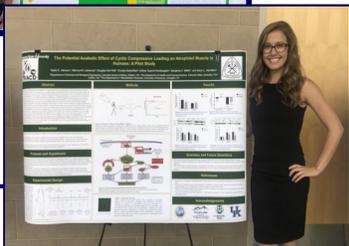
Photo courtesy of Andrea Chamorro Quillupangui.

### MOLECULAR BIOSCIENCES REU & TRACD LABORATORY AT CSU-FORT COLLINS

Kylie Contreras (Colorado State University-Fort Collins student, pictured top left) and Taylor Johnson (Colorado School of Mines student, pictured bottom left) participated in REU and laboratory experiences at Colorado State University-Fort Collins.



Contreras' poster was titled, "Growth and Morphology of Mycobacterium smegmatis." Johnson participated at the Translational Research on Aging and Chronic Disease (TRACD) Laboratory. Her poster was titled, "The Potential Anabolic Effect of Cyclic Compressive Loading on Atrophied Muscle in Humans: A Pilot Study."



Photos courtesy of Kylie Contreras and Taylor Johnson.

### ADAMS STATE STUDENT COMPLETES REU IN CHEMISTRY AT CSU-FORT COLLINS

Sam Reid (pictured on right) is a student at Adams State University who was accepted in the CSU-Fort Collins Department of Chemistry REU – Chemistry Applied to Real World Problems under the direction of Dr. Matthew Shores (pictured on left). Reid's project was titled: "Metal Organic Frameworks Improving Water Quality." According to Reid, "This was a wonderful experience where I was able to learn about Metal Organic Frameworks and safety. It was a good introduction to what organic labs consist of in a PhD program."



Photo courtesy of Sam Reid.



## CO-WY AMP STUDENT NEWS



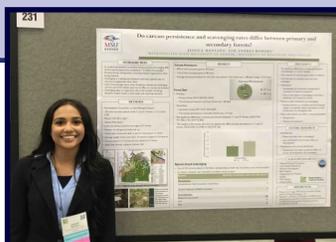
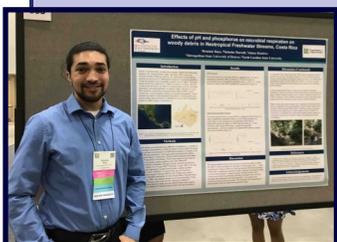
### METRO STATE STUDENTS ATTEND SACNAS 2018

CO-WY AMP supported six students from Metropolitan State University of Denver to attend the 2018 SACNAS National Conference "The National Diversity in STEM" in San Antonio, TX. Founded in 1973, SACNAS celebrated 45 years of highlighting the unique contributions and perspectives of Hispanics/Chicanos and Native Americans in science. Three students participated in the SACNAS Conference poster session: Kevin McQuirk (not pictured): "The mitochondrial gene order of springsnails," Jessica Montano: "Do carcass persistence and scavenging rates differ between primary and secondary forests?" and Dominic Baca: "Effects of pH and phosphorus on microbial respiration on woody debris in Neotropical Freshwater Streams, Costa Rica." (pictured below).



Pictured (left to right): Jessica Montano, Kevin McQuirk, Juan Flores-Garcia, Brandon Garcia, Maria Flores-Garcia, Thanh Nguyen, Dr. Hsiu-Ping Liu, CO-WY AMP Site Coordinator.

Photos provided by Dr. Hsiu-Ping Liu, Metropolitan State University



### ADAMS STATE STUDENTS INVOLVED IN RESEARCH PROJECTS

Pablo Maldonado (pictured at right) conducted research at Adams State University in 2018 on the prevalence and determinants of antibacterial resistance, in which data collected could be used to track trends of antibiotic resistance in the environment and could help combat potentially deadly human infections. Maldonado has also been placed with the Chemistry Applied to Real World Problems (REU) at Colorado State University-Fort Collins for summer 2019.

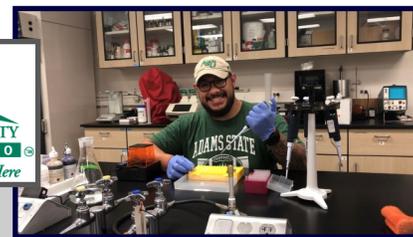


Photo courtesy of Renee Beeton, ASU.



Casey Carnaghi, also from Adams State University (not pictured), conducted research with Hanson Robotic's Einstein robot, which worked to recognize human emotion using computer vision with OpenCV. Carnaghi was able to get laptops to communicate back and forth with the Raspberry Pi that operated the Einstein robot using web socket technology. Carnaghi also worked with Intel's Neural Compute Stick to make the Einstein robot a more efficient, autonomous, and artificially intelligent robot.

CO-WY supported students, Erika Ibarra-Garibay and Jose Mix (not pictured), from Adams State to complete a research project titled, "Use of Abandoned Mines by Wildlife." With data from remotely placed trail cameras, Ibarra-Garibay and Mix looked at several questions, including whether wildlife that use abandoned mines in the Sangre de Cristo Range might be a vector for spreading the fungus *Pseudogymnoascus destructans* that causes white-nose syndrome, a fatal disease that has devastated bat populations.



### TSJC SPACE GRANT PROJECT

Two CO-WY students from Trinidad State Junior College, Noelle Gallegos and Mya Jimenez, took part in the Colorado Space Grant Consortium in 2018 to explore how balloon payloads were designed. The TSJC team of Gallegos and Jimenez was honored for one of the COSGC Challenges: Making High Altitude Balloon Payloads Sustainable. Gallegos and Jimenez developed a process to use starch packing "peanuts" as insulation on all structure walls, and proved that this material maintained heat during flight and was not adversely effected by extreme environments at the edge of space. The TSJC team included biological samples in the payload in addition to the required electronics and sensors, which were successfully retrieved and analyzed post-flight.



Photos provided by Judy MacLaren, TSJC.



# CO-WY AMP COMMENTARY

## CO-WY AMP STUDENT NEWS (continued)



### FLC STUDENTS PARTICIPATE IN SOLAR SPRING BREAK

For a second year, Fort Lewis College students participated in "Solar Spring Break" (March 2019) by installing solar systems on the Ojo Encino Counselor Chapter House, the main community-gathering place, and on three residences. Ojo Encino is a small "chapter," which is similar to a township, with a dispersed population of about 700 people in the southeastern corner of the Navajo Nation in New Mexico. For CO-WY Engineering students at FLC, this is their senior design project, which they have spent the school year assessing, sizing, designing, and then installing. The Ojo Encino project was sponsored by GRID Alternatives, a nonprofit solar installer based in Oakland, CA, that gives college students opportunities to install solar projects in underserved communities.



Photo provided by Jessica Rupe, Fort Lewis College

## CO-WY AMP NEWS

### PROFESSOR ERNEST CHAVEZ NAMED PROFESSOR LAUREATE

In 2018, Professor Ernest Chavez and CO-WY AMP Director, was awarded the title of Professor Laureate, the highest professorial title awarded by the College of Natural Sciences at Colorado State University-Fort Collins. The awards ceremony honored Professor Chavez as a role model to the college with contributions to the entire campus. Professor Chavez's laureate lecture, "Expectativas de los Sueños (The Expectations of Dreams)," explored the importance of cultural backgrounds in both learning and teaching, as well as the critical role of faculty as student mentors. "I am both humbled and honored by receiving the designation of professor laureate from the College of Natural Sciences," Professor Chavez said. "I am reminded of a quote from Althea Gibson, one of the first African American professional tennis players, 'No matter what accomplishments you make, somebody helped you.' This is dramatically true of this designation and in my professional life in general, I have been helped by many fellow faculty members, graduate students, and undergraduates throughout my career, and any honor such as this one requires acknowledgement of the team effort in all of my endeavors."



### NSF AWARDS \$ 1.5 MILLION FOR METRO DENVER STEM ALLIANCE

The National Science Foundation awarded the Community College of Aurora (CCA) a three year, \$1.5 million Louis Stokes B2B Alliances for Minority Participation (LSAMP) grant. The project is led by CCA and establishes the Metro Denver STEM Alliance, a partnership among CCA and four other community colleges serving the metro Denver area: Arapahoe Community College, Community College of Denver (previously a CO-WY AMP partner institution), Front Range Community College, and Red Rocks Community College. The Metro Denver STEM Alliance will increase the number of underrepresented minority students enrolling in STEM programs at two-year institutions, transferring to four-year STEM baccalaureate programs, and ultimately embarking on successful STEM careers. The grant will also support collaborative projects to foster STEM student success, addressing systemic barriers, and promoting a unified agenda with four-year university partners.





## CO-AMP 2018 SPRING MEETING UNIVERSITY OF COLORADO DENVER Denver, CO

To address engagement programs that reduce our attrition rates and promote activities that assist students in developing a scientific identity, the CO-WY AMP 2018 SPRING MEETING was held at the University of Colorado Denver campus. Dr. Ernie Chavez, CO-WY AMP Director, introduced future plans and groundwork that highlighted student research, international research/field experiences, and summer bridge programs to enhance, retain, and graduate underrepresented populations in STEM. Dr. LeRoy Jones II, Program Director at NSF, gave the Keynote Address which outlined future NSF funding solicitations and also outlined NSF's plan for building a foundation of pioneering research and pilot activities with a \$300 million investment in: "10 Big Ideas" – Future of Work at the Human-Technology Frontier; Growing Convergence Research; Harnessing the Data Revolution; Mid-scale Research Infrastructure; Navigating the New Arctic; NSF 2026; NSF INCLUDES; Quantum Leap; Understanding the Rules of Life; and Windows on the Universe. More information can be found at: [https://www.nsf.gov/news/special\\_reports/big\\_ideas/](https://www.nsf.gov/news/special_reports/big_ideas/)



University of Colorado Denver

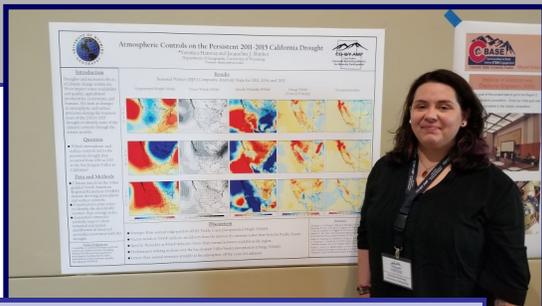


Dr. LeRoy Jones II, Keynote Speaker from NSF

Dr. Juan Lucena, Professor and Director of Humanitarian Engineering at Colorado School of Mines, introduced a panel of students who participated in International Research Experience (IRE) projects. Cinthya A. Lopez (from Colorado School of Mines traveled to Guatemala), Elise Martinez (from University of Colorado, Boulder traveled to Brazil), and Richard (Dudley) Ortecho (from University of Colorado, Boulder traveled to Peru). They comprised a three-student panel to address the issue of how we can recruit URM/STEM students to IRE. The students pointed out that it is very important for other student recruits to see photos of students participating, so they can picture themselves doing the same thing (presenting posters, conducting research, attending professional meetings), and encourage student organizations to make programs visible by disseminating information and having guest speakers from industry. Students unanimously said that IRE projects heightened further interest in their field of study, which often resulted in adding majors/minors and other internships. In addition, the students said that IRE also created a community of like-minded connections with other people outside of school and careers.



Dr. Ernie Chavez introduces Dr. Juan Lucena and student panelists.



Veronica Hanway from University of Wyoming presented her poster, "Atmospheric Controls on the Persistent 2011-2015 California Drought."



CSU-Pueblo student Miguel Galaviz presented his research on Color Sorting Robots.



# CO-WY AMP COMMENTARY

## CO-WY AMP PARTNERS: Serving Colorado and Wyoming





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# CO-WY AMP COMMENTARY

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# Announcements

## 2019 CO-WY AMP SPRING MEETING

UNIVERSITY OF DENVER

<https://www.du.edu/>

FRIDAY, APRIL 12, 2019



## CO-WY AMP WEBSITE RESOURCES

Check out these links for additional CO-WY AMP resources and opportunities!

### Student Opportunities

<http://www.cowyamp.colostate.edu/opportunities.shtml>

### Site Coordinator Resources

<http://www.cowyamp.colostate.edu/sitecoord.shtml>



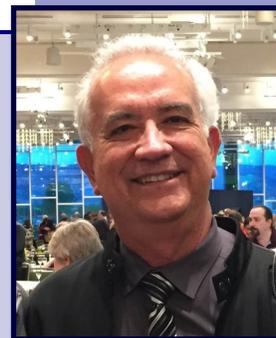
<http://www.cowyamp.colostate.edu>

## Note from the Co-Principal Investigator:

Dear CO-WY AMP Colleagues and Friends,

The Colorado-Wyoming Alliance is in its twenty-third year of funding, making it one of the senior-level Alliances in NSF. Our goal of increasing the number of underrepresented students in STEM has resulted in significant progress over our twenty-three years of funding. Once again, we have sixteen Colorado-Wyoming Alliance partner schools with the addition of the University of Northern Colorado to our Alliance family. UNC replaces Community College of Denver, which is now a member of the Louis Stokes B2B Metro STEM Alliance. Our growth as an Alliance and our success in recruiting and retaining underrepresented students in STEM is due entirely to our site coordinators and their diligent work at their institutions. Due to the site coordinators' dedication to students, we continue to see dramatic increases in the number of students majoring and graduating in STEM. Last year over 11,000 underrepresented students were enrolled in STEM majors at our partner institutions and over 1400 graduated with STEM bachelor's degrees. In 2018, the Alliance placed ten of our students in REU programs through CO-WY's Summer Research Initiative. In addition, despite political unrest in a number of previous field locations, CO-WY was able to facilitate the placement of nine students through our International Research Experience program and service learning activities.

With our goal of inclusive excellence in STEM, it is with great pleasure that we share our Spring 2019 Newsletter which highlights these and other accomplishments. Our site coordinators remind me of a quote from an unknown author, "If you want to walk fast, walk alone, but if you want to walk far, walk together." We have walked far together in our twenty-three years.



**Dr. Ernie Chavez**

CO-Principal Investigator  
and Program Director of  
CO-WY AMP

*Dr. Ernie Chavez*