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CO-AMP
Impact Report:
15 Years of
Changing Students'
Lives Through Quality
STEM Education
in Colorado
1996 — 2011



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THE LOUIS STOKES COLORADO ALLIANCE FOR MINORITY PARTICIPATION: **15th YEAR IMPACT REPORT**

TABLE OF CONTENTS

Foreword	2
Executive Summary	3
Economic Impact	5
CO-AMP Leadership	6
CO-AMP Governing Board	7
Introduction	8
Accomplishments	9
CO-AMP Tribal Partners	10
Partner Institutions	
Adams State College	11
Aims Community College	12
Colorado School of Mines	13
Colorado State University – Fort Collins	14
Colorado State University – Pueblo	15
Fort Lewis College	16
Metropolitan State College of Denver	17
Trinidad State Junior College	18
University of Colorado – Boulder	19
University of Colorado – Colorado Springs	20
University of Colorado – Denver	21
New Partner Institutions	
Community College of Denver	22
Northeastern Junior College	22
Otero Junior College	23
Pueblo Community College	23
Bridge to the Doctorate	24
International Connections	28
Research Symposiums	32
Keynote Speakers	35

FOREWORD

The Louis Stokes Colorado Alliance for Minority Participation (CO-AMP) is proud to represent fifteen Colorado institutions of higher education as part of the National Science Foundation's framework of colleges and universities that comprise the LS-AMP network. Since its inception in 1996, CO-AMP has been an innovative consortium of institutions increasing the quality of education for underrepresented minorities in STEM fields and has built an infrastructure for collaborative programs and activities. Over the years, CO-AMP has continued to integrate minority students into college life, initiate early STEM advising and mentoring, enhance state of the art interventions to increase the number of underrepresented STEM students, and increase communication of effective programming across our partner institutions.

This impact report begins with profiles of our program with its history, accomplishments and statistical review over the past fifteen years. The following sections spotlight each of our fifteen institutions, including four new partners that recently joined CO-AMP. For each partner, a section is devoted to the institution, its site coordinator and an outstanding student or student activity. The report also highlights our leadership, Governing Board members, the Bridge to the Doctorate Fellows, international connections, student research symposiums and keynote speakers who have all graciously contributed their expertise and professional experiences to the CO-AMP alliance.

It is with great pleasure that we share "CO-AMP Impact Report: 15 years of Changing Students' Lives Through Quality STEM Education in Colorado 1996-2011" highlighting some of our accomplishments and the impact that has been felt, not only within Colorado, but also nationally and internationally. Although it is impossible to feature every success, it is our hope that this publication will serve as a resource, as well as a tribute, to our growing alliance of dedicated individuals who through commitment and tireless effort support CO-AMP students each and every day.



Dr. Rick Miranda
Colorado State University
Provost & Executive Vice-President
CO-AMP PI

Dr. Ernest Chavez
Colorado State University
Professor
CO-AMP Co-PI

EXECUTIVE SUMMARY

During the last fifteen years, the LSAMP program in Colorado (CO-AMP) has significantly impacted participants to make profound and successful changes in their academic careers and their lives. The number of underrepresented students enrolled in STEM programs at CO-AMP partner institutions rose from 1,922 students (in 1996) to last year's figure of 3,539 students (an 84% increase). Likewise, the number of URM students earning a Bachelor's degree grew from 215 to 407 (an 89% increase) during the same time period. Since its inception, CO-AMP has established numerous programs and activities at partner institutions that have now institutionalized many of them. CO-AMP partners have achieved a high-level of systemic change for underrepresented STEM students in Colorado.

In 1996, CO-AMP was awarded Phase I funding from the National Science Foundation to establish the LS AMP program in Colorado. From NSF's vision of a national program to increase the number of underrepresented students in STEM fields, the following CO-AMP goals have been implemented:

- facilitates smooth student transitions from high school to college; from 2-year to 4-year institutions; from academic to professional careers or graduate school
- provides undergraduate research information and opportunities to develop professional skills, critical thinking, and hands-on experiences through research
- provides faculty professional development to enhance the diversity awareness of faculty involved with program activities
- provides curriculum development to develop effective teaching strategies in the sciences by restructuring STEM courses
- recruits underrepresented minorities to increase the number of high school students and associate degree transfer students into baccalaureate degree STEM programs
- provides retention programs for academic tutoring, workshops, faculty and peer mentoring, stipends, and minority conference attendance
- provides graduate placement, outreach, and tracking

EXECUTIVE SUMMARY (continued)

Based on a great need for evaluation of math skill-building programs to determine which are most effective and which best prepare students for advanced level mathematics, CO-AMP recently developed a Problems-Based Learning Intervention study to address and enhance future program delivery and evaluation. Initially, the intervention study will be conducted at Key Academic Communities with predominately minority student populations on the CSU campus. Key Communities are highly diverse first and second year residential learning communities designed to assist students with their transition to and through the university. Based on active and experiential learning through interdisciplinary classes, service-learning, academic and career exploration, undergraduate research and leadership development, Key Communities aim to increase retention and academic performance of participants, encourage campus and community involvement, and promote diversity awareness. CO-AMP is currently poised to provide evidence-based recommendations to our partners for successful math skill building programs.

During the past fifteen years, CO-AMP has remained an innovative consortium of institutions of higher learning that has increased the quality of education for underrepresented minorities in STEM fields and has built an infrastructure for collaborative programming and activities.

- CO-AMP fills a critical gap by delivering programs to underrepresented students in STEM fields.
- No other entity in Colorado has assembled the number of higher education institutions to collaborate on coordinated programs to underrepresented minority students in STEM fields.
- CO-AMP has become an academic leader in Colorado for coordinated efforts in minority STEM education programming.

CO-AMP partners have achieved a high level of systemic change for underrepresented STEM students in Colorado.

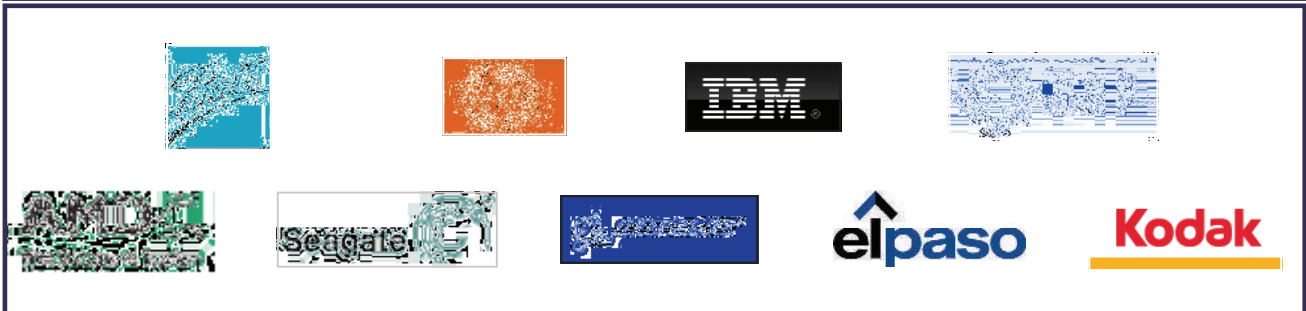
ECONOMIC IMPACT

CO-AMP's mission to serve underrepresented students in STEM fields began in 1996. Over the last fifteen years, CO-AMP has been an innovative consortium of institutions that has built an infrastructure for collaboration, integration, enhancement, and initiation of state-of-the-art programs to enroll and graduate underrepresented minority students in STEM fields. Our commitment to academic vitality is demonstrated through clear and measurable examples of our accomplishments (see figures 1-3, page 9). But CO-AMP's commitment can also be seen in ways that are less concrete but equally significant – in the enrichment of students' lives. You don't have to look far to hear comments from students like: "I have hope for my future"; "Without CO-AMP I wouldn't have graduated"; "Through CO-AMP I learned to compete with other students on the same level"; and "CO-AMP really helped me believe in myself again". On this last point, CO-AMP's contribution to the state is unquestionable, as a significant number of our graduates stand proud on their graduation day.

In Colorado, increasing the percentage of workers with a 4-year college degree by only one percentage point (about 5,372 new college workers) increases the average earnings of all college educated workers by \$481 per year. The income gap between workers with a college degree and those without a degree is also growing. In 1980, the average income of U.S. workers with a 4-year college degree was about 60% more than that of those with only a high-school degree. Consider that, since 1983, among prime-age workers between the ages of 25 and 54: earnings of high school dropouts have fallen by 2 percent; earnings of high school graduates have increased by 13 percent; earnings of people with some college or an Associate's degree have increased by 15 percent; earnings of people with Bachelor's degrees have increased by 34 percent; and earnings of people with graduate degrees have increased by 55 percent. The extent to which the income effects of a college degree exceed their private returns can be thought of as an "educational spillover." By increasing innovation capacity, growth in the college-educated workforce "spills over" to other sectors, increasing the productivity of all workers. With rising productivity, wages increase for workers of all education levels. Thus, the benefits of individual higher education extend across society.

Perhaps the most important purpose of this report, then, is to demonstrate the value of CO-AMP and the need for continued growth as we look to build cultural awareness and understanding as preparation for an economically competitive, globally engaged workforce of future generations.

CO-AMP Industry Partners





CO-AMP LEADERSHIP



Dr. Omnia El-Hakim
PI
1996—2008



Dr. Tony Frank
Chair, Governing Board
2008 —



Dr. Rick Miranda
PI
2008 —



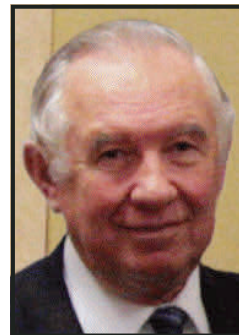
Dr. Ernest Chavez
Co-PI
2008 —



Mr. David Aragon
Management Team
1996 —



Dr. Hector Carrasco
Management Team
1996 —



Dr. Larry Johnson
Management Team
1996 —



Dr. Beverly Marquart
Program Manager
2007 —



Dr. Don May
Data Manager
1996 —



Dr. Rose Shaw
Evaluator
1996 —



Dr. Cheryl Beseler
Research Coordinator
2010 —



Ms. Erin Whipple
Program Support
2009 —

CO-AMP GOVERNING BOARD



Dr. David Svaldi, President
Adams State College



Dr. Marsi Liddell, President
Aims Community College



Dr. Bill Scoggins, President
Colorado School of Mines



Dr. Tony Frank, President
Colorado State University



Mr. Joe Blake, Chancellor
Colorado State University
System



Dr. Julio Leon,
Interim President
Colorado State University —
Pueblo



Mr. Cliff Richardson,
Interim President
Community College of Denver



Dr. Dene Kay Thomas,
President
Fort Lewis College



Dr. Stephen M. Jordan, President
Metropolitan State College
of Denver



Mr. Scott Stump,
Interim President
Northeastern Junior College



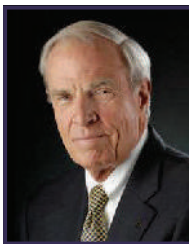
Mr. James T. Rizzuto,
President
Otero Junior College



Ms. Patty Erjavec,
President
Pueblo Community College



Mr. Felix Lopez,
President
Trinidad State
Junior College



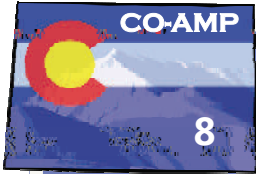
Mr. Bruce D. Benson,
President
University of Colorado
System



**Dr. Pamela Shockley-
Zalabak**, Chancellor
University of Colorado —
Colorado Springs

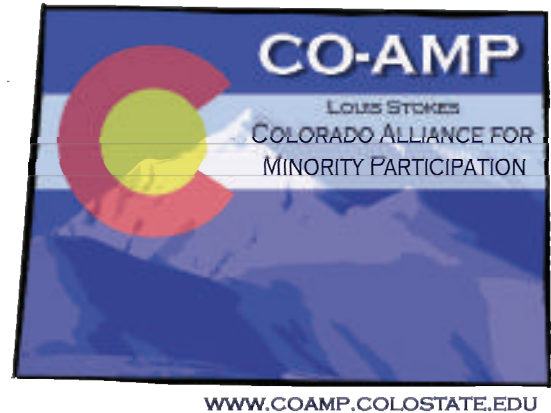


Dr. Jerry Wartgow,
Chancellor
University of Colorado —
Denver



INTRODUCTION

CO-AMP is a consortium between fifteen institutions of higher education including: nine 4-year institutions (Adams State College; Colorado School of Mines; Colorado State University – Fort Collins [lead institution], Colorado State University – Pueblo; Fort Lewis College, Metropolitan State College of Denver; University of Colorado at Boulder, Denver, and Colorado Springs); three community colleges (Aims Community College; Community College of Denver; and Pueblo Community College); three junior colleges (Northeastern Junior College, Otero Junior College, and Trinidad State Junior College). CO-AMP also partners with four tribes (Jicarilla Apache, Navajo, Southern Ute, and Ute Mountain Ute), along with partners from numerous corporations, governmental agencies, professional membership organizations, and community members.

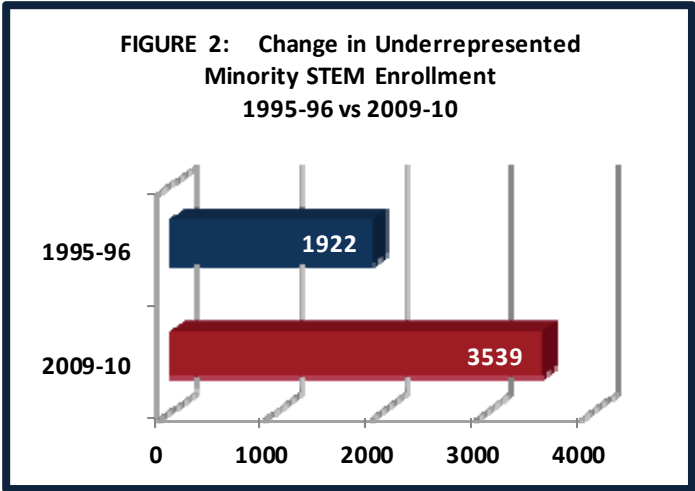
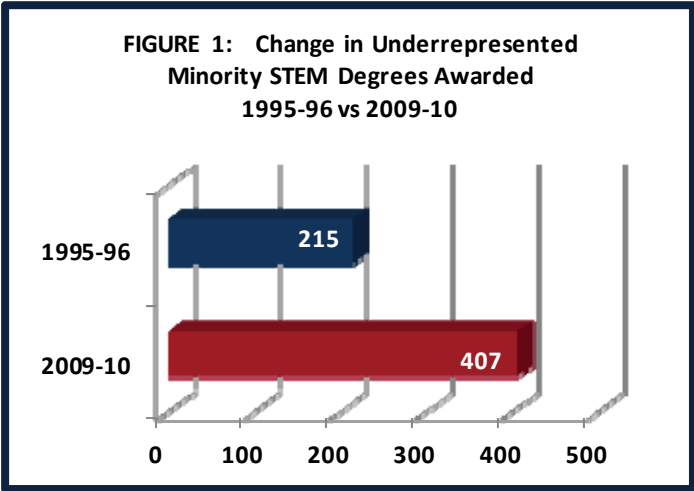


These partnerships and collaborations continue to provide insight into the ever-changing direction of technology and offer career opportunities and internships to underrepresented minority students. CO-AMP is currently represented by all six Hispanic Serving Institutions (HSI) in Colorado: Adams State College, Colorado State University – Pueblo, Community College of Denver, Otero Junior College, Pueblo Community College, and Trinidad State Junior College. Fort Lewis College is one of only three Native American-Serving Non-Tribal Colleges that accept American Indian students regardless of state residency, and awards 13.5% of all STEM degrees earned by Indian people, more than any other college.

ACCOMPLISHMENTS

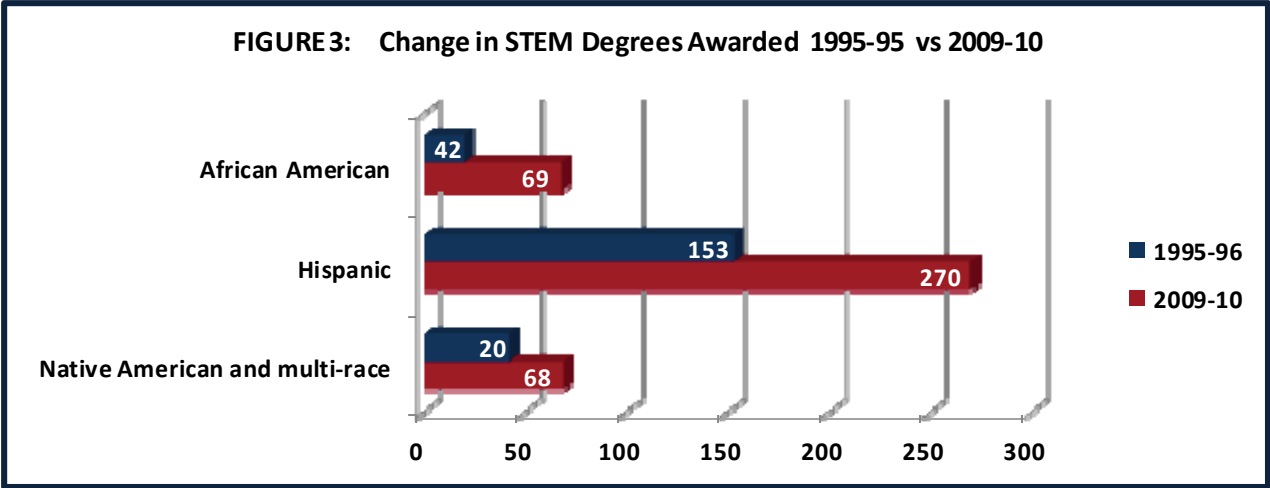
CO-AMP REPORT CARD SINCE 1995-96:

- 89% Increase in UREP STEM degrees awarded
- 84% Increase in UREP undergraduate minority STEM enrollment



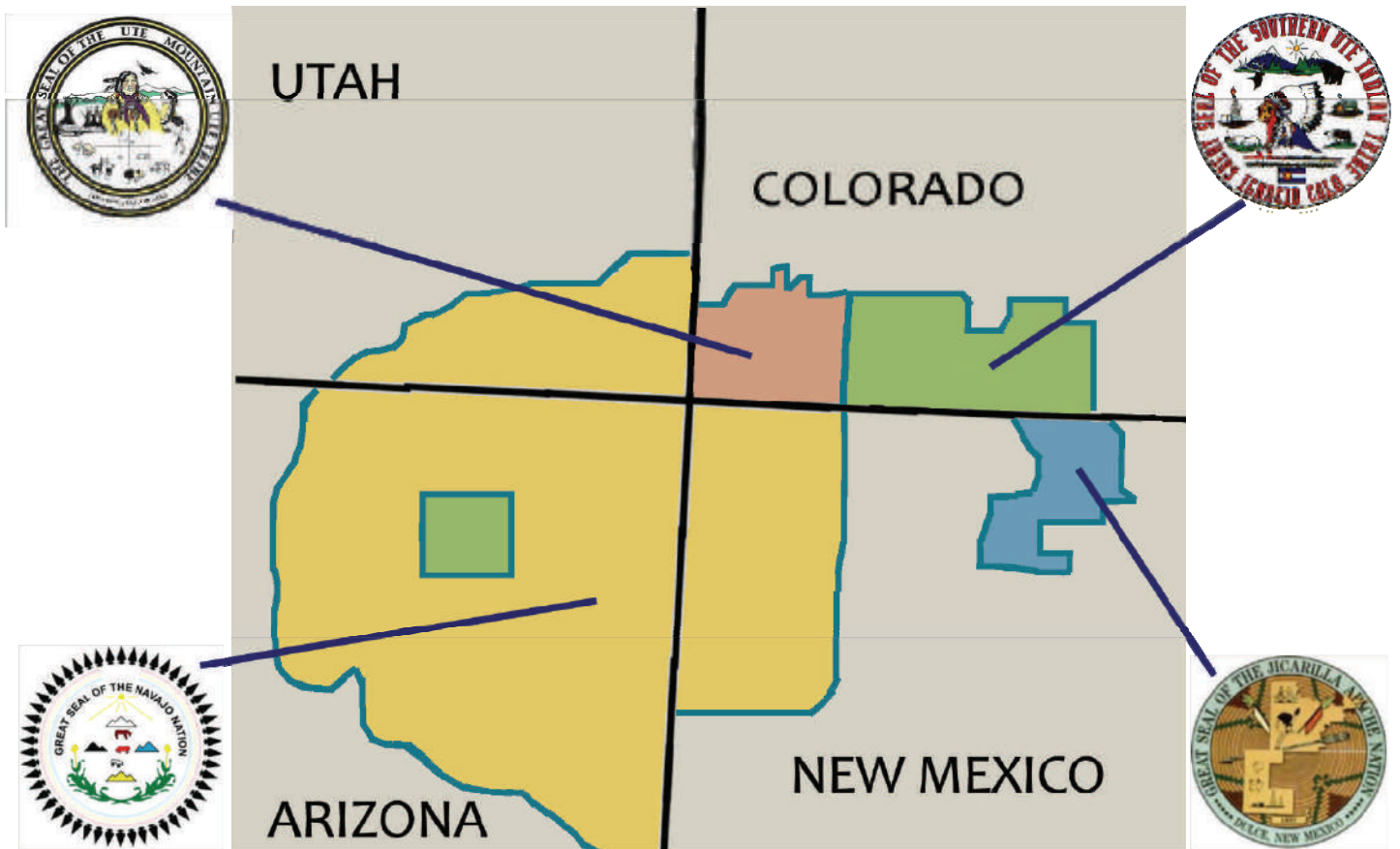
STEM B.S. degrees awarded to CO-AMP students since 1995-96 by ethnic breakdown:

- 240% Increase in number of African American students graduating in STEM fields
- 76% Increase in number of Hispanic students graduating in STEM fields
- 64% Increase in number of Native American and multi-race students graduating in STEM fields



CO-AMP TRIBAL PARTNERS

CO-AMP partners with four tribes - Jicarilla Apache, Navajo, Southern Ute, and Ute Mountain Ute. Students pictured at right are representatives to the American Indian Science & Engineering Society (AISES) conference held at Fort Lewis College in Durango.



ADAMS STATE COLLEGE

Adams State College in Alamosa is a 4-year, Hispanic Serving Institution with an enrollment of 29% Hispanic and 38% ethnic minority. Adams State has an exemplary degree completion rate at 90% that of majority students. In a 2007 study by the American Association of State Colleges and Universities (AASCU), Adams State had the third highest Hispanic graduation rate of all 435 AASCU institutions.



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STUDENT PROFILE: RACHEL RAGUINDIN

Rachel Raguindin is a “bright star” in the CO-AMP community. Raguindin is a senior at Adams State College and will graduate with her B.S. in Chemistry in 2012. As a McNair scholar at CSU and an undergraduate researcher at Adams State, she worked on projects that examined the possibility of polymerizing -products in the manufacturing of biodiesel. She has presented posters from these projects at two consecutive national American Chemical Society meetings. Her posters were entitled: “Separation of C₆₀ Derivatives Carrying Perfluoroalkyl Substituents Using High Performance Liquid Chromatography” and “Characterization of Products and Potential uses of By-Products from a small Scale Biodiesel Plant”.

Raguindin is also active on the Adams State campus. She is a work-study student at the Testing and Learning Center. She is also involved in student senate, working with the senate’s finances and on their webpage; is active in the Earth group; and has been an officer in the chemistry club for the past two years. Raguindin was also the recipient of a CO-AMP stipend last year and presented her research at the CO-AMP Steering Committee meeting held at Colorado State University-Pueblo. She has aspirations of attaining a Master’s degree and possibly a Ph.D. in chemistry; her interests are specifically related to environmental chemistry.

Raguindin, from a single parent family, came to Adams State College from Guam. Most of her family still resides there.





AIMS COMMUNITY COLLEGE

Aims Community College in Greeley is a 2-year institution with 8,000 students on four campuses. Aims is an emerging Hispanic Serving Institution with 24% Hispanic enrollment. Aims identifies CO-AMP students and involves them in the college's STudent Achievement and Retention (STAR) program via tutoring and mentoring. Retention efforts include: STAR student advising, academic probation follow-up and advising, Academic Improvement Reports (AIR) advising, Stop-Out (missing two consecutive weeks of class without notification) advising, iFocus (educational) workshop series, and recently established Emerging Scholars Program.



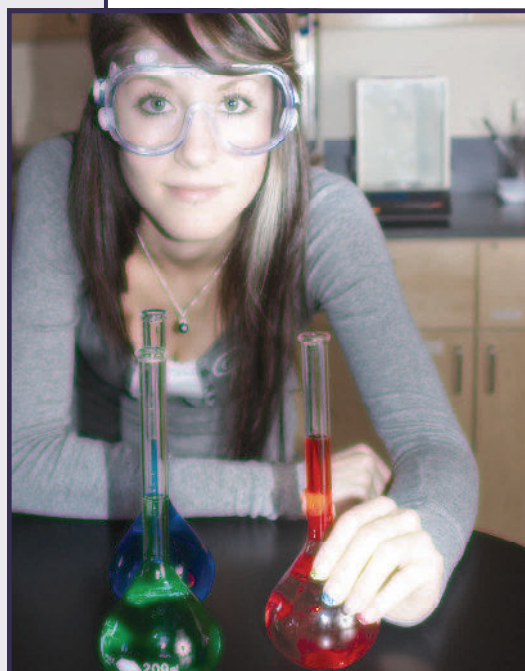
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Grant Specialist
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STUDENT PROFILE: LYDIA TENA

Lydia Tena's life has not followed the typical road map to success, but she's not letting that slow her down. In her senior year of high school, she found out she was pregnant. Because she would miss too much school to graduate through the traditional route, she completed high school through the Aims Diploma Program. She knew she needed a job to support her daughter, so she earned her Certified Nurse Aide license through a program at Aims. It hasn't been easy balancing work, school and raising a child, but Tena is the first in her family to earn an associate degree. Originally, Tena said she wanted to be an architect, but realized there were more career opportunities in engineering. After that decision, she discovered that COAMP stipends might be available to her. "It's [the stipend] what was keeping me in school," she said, adding that the stipend allowed her to cut back her work hours and focus on a particularly demanding semester of calculus, calculus-based physics and chemistry. "[It] has been very hard, but I just know I will get to the other side." She is currently enrolled at Colorado State University and has plans to study either mechanical or aerospace engineering. She knows it won't be easy, but she also knows she has the motivation and intelligence to succeed—with support from programs like CO-AMP. "Growing up, neither of my parents had an education, so they couldn't help me with my homework," she said. "I know that I'm going to be able to give that to my daughter, along with a better quality of life." And that is what CO-AMP is all about.



COLORADO SCHOOL OF MINES



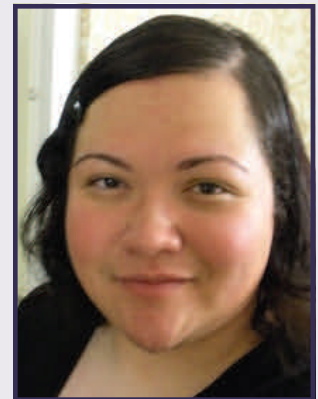
Colorado School of Mines (CSM) in Golden is a 4-year, public research university devoted to engineering and applied science. It has the highest admissions standards of any public university in Colorado and among the highest of any public university in the U.S. Research activities for students at Colorado School of Mines extend from traditional areas such as fossil energy and geophysical exploration to new frontiers in renewable energy and micro fluidic devices. CSM was awarded the NSF funded Bridge to the Doctorate program (2010-2012).



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STUDENT PROFILE: EVA SALAS

Eva Salas, a 2009 graduate of Colorado School of Mines, won third place for her oral presentation, “Solid oxide fuel cell fabrication methods using tape casting and co-firing”, at the 2008 national American Indian Science and Engineering Society (AISES) conference held in Anaheim, California. Also in 2008, Salas completed a 10-week summer fellowship while at the National Energy Technology Laboratory (NETL) in Morgantown, WV, (Department of Energy’s Office of Fossil Energy) as part of the Mickey Leland Energy Fellowship Program. Mentored by scientists and researchers, Salas was assigned a specific project related to her skills and qualifications and wrote, presented and published a paper at program’s end. The fellowship provided the opportunity for her to develop professional, technical, leadership and communication skills, while promoting a career in fossil fuel research and development. Salas worked with NETL researcher, Kirk Gerdes, to investigate the effect of common syngas trace elements on the performance of solid oxide fuel cells (SOFC). Ms. Salas also worked with Dr. Neal Sullivan, director of the Colorado Fuel Cell Center and Colorado School of Mines engineering professor, helping to conduct corrosion analyses on SOFCs. Salas received her B.S. in Mechanical Engineering in 2009 and is currently an engineer with Air Liquide America in Houston, Texas.



COLORADO STATE UNIVERSITY — FORT COLLINS

Colorado State University in Fort Collins serves as the lead institution for LSAMP in Colorado. Colorado State is a land-grant, Carnegie Doctoral/Research University-Extensive institution, and one of our nation's leading research universities with research in infectious disease, atmospheric science, clean energy technologies, and environmental science. In AY 2010-2011, CSU awarded 5,800 degrees with 30% of all the state's STEM majors pursuing degrees at CSU.



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CSU SACNAS CHAPTER RECEIVES CHAPTER OF THE YEAR AWARD

For the fifth year in a row, the society of scientists dedicated to Advancing Hispanics/Chicanos and Native Americans in Science, or SACNAS, has honored Colorado State University with another major award. Colorado State is one of only eight chapters out of 60 nationwide to be recognized with the Role Model Chapter Award for its Outstanding Chapter and Regional Leadership. The chapter is managed in the College of Natural Sciences by Arlene Nededog, director of Undergraduate Retention Programs and CO-AMP Site Coordinator.

The award was based on numerous factors including: extensive analysis of the chapter's annual report and the types of activities accomplished. The chapter was recognized for, among other accomplishments, leadership development and overall cohesiveness of the chapter, the chapter's extensive facilitation of the Rocky Mountain Regional Meeting, mentoring and tutoring with the Colorado Science and Engineering Fair and the Triunfo/Triumph Leadership Program – a partnership that matches undergraduate CSU tutors with underserved K-12 students in the Poudre School District, and involvement and funding support of Colorado Alliance for Minority Participation.

"The committee was especially impressed with how the chapter connected and partnered with various departments and programs within CSU and with other SACNAS chapters in Colorado. Your example has made the Colorado group an outstanding and unique chapter - one that we look forward to learning more from," said Tanya Beat, program manager for the national SACNAS organization.

"The chapter and Ms. Nededog's team continue to be honored for their tireless work to encourage ethnically diverse students to pursue advanced degrees in science and engineering and to prepare them for leadership in research and teaching careers," said Colorado State Provost and CO-AMP PI Rick Miranda. "We are delighted with this most deserved recognition."

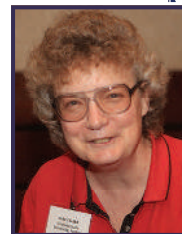


The 2009-2010 CSU chapter of SACNAS at last year's awards ceremony. The chapter will be formally recognized at this year's SACNAS National Conference in San Jose, California, in October 2011.

COLORADO STATE UNIVERSITY — PUEBLO

Colorado State University-Pueblo was named the top Hispanic Serving Institution among 206 HSI members of the Hispanic Association of Colleges and Universities (2008) because of its commitment to the success of Hispanics in higher education. CSU Pueblo has developed a First-Year Program that engages newly enrolled CO-AMP students in supportive academic advising and services, including early alert (faculty members report first year students not performing well), grade checks, study skills, time management, tutoring, and counseling referrals. Colorado State University-Pueblo also received a five-year, \$2.8 million grant from the U.S. Department of Education to increase the number of Hispanics earning graduate degrees. CSU-Pueblo was one of 22 institutions to receive this funding under the Promoting Postbaccalaureate Opportunities for Hispanic Americans Program. This five-year grant expands post baccalaureate educational opportunities for and improves the academic attainment of Hispanic graduate students through enhanced program delivery methods and student services. CSU Pueblo and CSU Fort Collins have partnered to create a mentorship program to help minority students achieve advanced science degrees at both the masters and doctorate levels.

**Colorado
State
University
PUEBLO**



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STUDENT PROFILE: BONITA NUÑEZ

Bonita Nuñez (pictured with president of Colorado State University-Pueblo, Dr. Julio Leon), a CO-AMP participant and true scholar-athlete who has excelled both on the field and in the classroom, was named the 2011 recipient of the Threlkeld Prize for Excellence at Colorado State University-Pueblo. As the Threlkeld recipient, Nuñez received the first diploma of the ceremony when she graduated with a major in biology, minor in chemistry, and a pre-med emphasis. She is the first in her family to graduate from college.

The Threlkeld Prize is awarded to a graduating senior who demonstrates excellence in academic and co-curricular activities as well as in service to the University and to the community.

Nuñez emerged as a leader and exemplary student in the research laboratory of Assistant Biology Professor Dr. Jeff Smith, who is studying a protein that could help eliminate paralysis in stroke patients. She has tutored students in both math and science classes and was a lab assistant in the anatomy and physiology lab. She interned at the CU School of Medicine Heart Lung Research Lab, which resulted in authoring a scholarly article.

After graduation, Nuñez plans to attend medical school and return to the research laboratory at CU School of Medicine. She believes in giving back to her heritage as well as the programs and communities that gave her the opportunities to become successful. As a medical student, she plans to specialize in emergency medicine and trauma surgery and aims to help the people of her Native American heritage by providing medical treatment on reservations that many need, but cannot afford.

“My grandmother Mary Gallegos was Native American, and she taught me strength, determination to strive for greatness, and the ability to reach for my fullest potential,” Nuñez said.

FORT LEWIS COLLEGE

Fort Lewis College in Durango has for the past 100 years provided tuition-free college education to American Indian and Alaska Native students who comprise 20% of the enrollment at FLC (representing 122 American Indian tribes and Native Alaskan villages from 30 states). FLC is one of only three Native American-Serving Non-Tribal Colleges that accept American Indian students (tuition free) regardless of state residency. FLC awards more undergraduate degrees to American Indian and Native American students than any other college, and graduates approximately 16.4% of all Native American students nationally. In 2009, FLC awarded 13.5% of all STEM degrees earned by Native students, more than any other college.



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Professor
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STUDENT PROFILE: LEON CLAH

Leon Clah graduated from Fort Lewis College in 2010 with a B.S. in Biology and a Chemistry minor. Leon was also part of an undergraduate diabetes research team at Fort Lewis that looked at biological indicators of diabetes in Native and non-Native students on the Fort Lewis campus, linking those indicators to situations in the students' lives, and comparing similar Native and non-Native students for the effects of those college-life circumstances. Clah believes that the research will be an asset to Native students at Fort Lewis and elsewhere. Explains Clah, "Insulin resistance and type 2 diabetes are a huge problem to my Native American tribe and many other Native American tribes across this country. In being able to show that this could possibly be a genetic issue and not one of lifestyle will lead health care practitioners to re-evaluate this disease." Clah is currently enrolled in the Ph.D. program at Purdue University in Biological Sciences. His area of interest is Cancer Research. Clah's impact from his CO-AMP participation at Fort Lewis is far reaching.



METROPOLITAN STATE COLLEGE OF DENVER



Metropolitan State College of Denver enrolls the highest number of students of color (more than 5,600 in fall 2009, nearly 25% of its student population) than all 4-year colleges in the state. Hispanic Outlook in Higher Education consistently ranks MSCD among the top 100 colleges and universities in the nation for graduating Hispanic students and



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Diverse: Issues in Higher Education ranks MSCD among the top 100 institutions in the nation in awarding baccalaureate degrees to students of color. MSCD ranks second in the state by graduating 25% of Hispanic students. In 2007, *The Chronicle of Higher Education* cited Metropolitan State College of Denver as having the most ethnically diverse faculty in Colorado. According to Dr. Stephen Jordan, Metro State President, "Since 2004, tenured and tenure-track faculty of color have grown by 58 percent, with African American faculty increasing by 92 percent and Latino faculty by 64 percent."

STUDENT PROFILE: CHIDEBELE DURU

Chidebele Duru who was born in the United States and raised in Nigeria, completed her associates degree at Community College of Denver and then transferred to Metropolitan State College of Denver with a major in chemistry. Said Duru when she was a CO-AMP participant at Metro State, "When [students] see programs like this where they have people behind them saying, 'Go ahead, you can do it,' they can actually do anything." Duru graduated with a BS from Metro State and is currently a Predoctoral Fellow at the Department of Biochemistry and Molecular Genetics at University of Colorado School of Medicine. Her research interests include evolution of DNA and proteins. For Dr. Larry Johnson, CO-AMP Site Coordinator, who mentored Duru and invited her to present her undergraduate research at a CO-AMP Steering Committee meeting in 2008, "The goal is graduation – not anything short of that." Johnson was instrumental in the initial meetings with Dr. Omnia El-Hakim to get CO-AMP off the ground. Johnson became involved in CO-AMP because, as former dean of arts and sciences, he saw the graduation rates for minority students and "they were abysmal." Johnson says, "I feel that if we give support, more will graduate; and that's definitely happening." Programs like CO-AMP are essential for students like Duru and so many others.



TRINIDAD STATE JUNIOR COLLEGE

Trinidad State Junior College in Trinidad is a Hispanic Serving Institution and was awarded a

Title V Student Success Center grant to increase graduation and retention rates of Hispanic and other minority students by providing intake testing, technology assistance, intervention counseling, career skills development, and transfer advising. CO-AMP at Trinidad State Junior College has established strong relationships with the Student Support Services and Montana State University-Billings (MSUB) staff to funnel underrepresented students through the 2-year college pipeline into 4-year institutions.

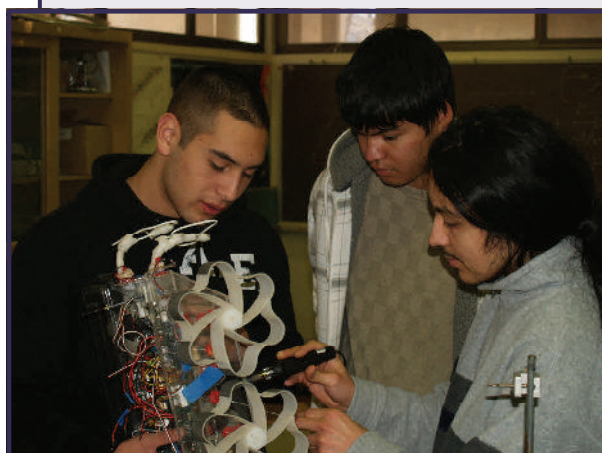
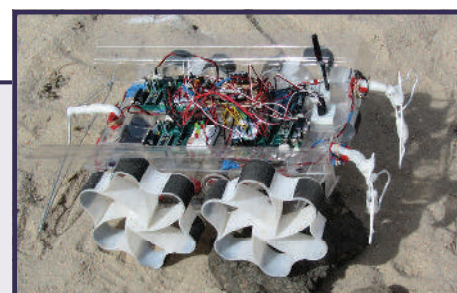


Derek Grubb
Director

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CO-AMP STUDENTS COMPETE IN COLORADO ROBOT CHALLENGE

Trinidad State Junior College CO-AMP students (L to R) Onorio Franco, Edgar Meraz, and Daniel Alvarado work on their entry for the Colorado Robot Challenge. CO-AMP students at both Trinidad State Junior College and Colorado State University – Fort Collins built robots for the (NASA judged) Colorado Robot Challenge held at the Great Sand Dunes National Park, a landscape similar to what can be found on Mars. Teams learned about electronics, programming and operating in a difficult terrain. CO-AMP students tested and evaluated their robots to function in a range of temperatures and environments – wind, ground vegetation, sand, and other not-found-in-the-lab challenges that can render many sensors and movement systems non-functional.



Out of all the entries, only TSJC's robot was built from raw materials (other robots were either remote-controlled toys or built from Erector sets). At the end of the competition, only robots from the two CO-AMP schools – TSJC and CSU-Fort Collins – were still functioning.

The Colorado Robot Challenge not only improves student understanding of autonomous robots but encourages them to study key science and technology disciplines needed by our country. Autonomous robots are required in situations where the environment is too dangerous for people. These student-built robots may lead to new ideas that can address that need. The Colorado Robot Challenge is a CO-AMP sponsored event where students gain valuable experience in merging sciences and technologies.

UNIVERSITY OF COLORADO — BOULDER

University of Colorado at Boulder is classified as a Carnegie Doctoral/Research University-Extensive institution and is one of only 34 US public research universities invited to join the Association of American Universities (AAU). CU-Boulder is ranked as a Tier 1 research institution with four Nobel laureates and more than 50 members of prestigious academic academies. CU Boulder offers 85 majors at the bachelor's level, 70 at the master's level, 50 at the doctoral level, and more than 90 research centers, institutes, and laboratories.

Colorado
University of Colorado at Boulder



Dr. LaRuth McAfee
Director

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STUDENT PROFILE: DANIELLE GRIEGO

CO-AMP Student Makes Impact through Energy-Efficient Building Technologies



As a teenager attending Denver's East High School, Danielle Griego hadn't really known what a career in engineering would be like. With her interest in physics, as well as biology and other sciences, she was advised to try it, so she applied to CU-Boulder. Griego couldn't be happier about her choice. "It's all I could have hoped for—and even more," she said. "I've always been into 'save the planet,' use less resources, recycle what you can...so learning more about how much energy buildings consume, I became interested in managing electrical and mechanical loads in buildings to conserve on energy resources. In 2005, Griego attended the five-week transitional Summer Bridge program co-sponsored by CO-AMP and the Multicultural Engineering Program. Through that experience, she became more familiar with the engineering disciplines and chose architectural engineering as her major.

As a participant in the concurrent BS/MS program, she received both her bachelor's and master's degrees in May 2011. Her plans include applying her engineering degree internationally—particularly in disadvantaged, third-world countries. Griego worked with CU Professor Mark Hernandez in his laboratory as a research assistant after first gaining some experience through the Summer Multicultural Access to Research Training (SMART) program. During her 10-week SMART internship, Griego helped to inventory greenhouse gas emissions. In 2008, Griego presented her research, "Measuring and reducing greenhouse gas emissions in a small destination-resort city: A case study of Central City, Colorado" at the CO-AMP Steering Committee meeting.

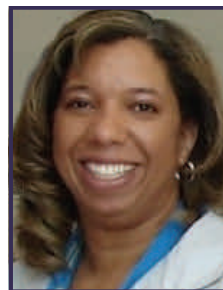
Griego was also an active participant in the BOLD Center—a grouping of programs under the umbrella Broadening Opportunity through Leadership and Diversity—which she says provided a sense of community, friends, and a lot of good contacts with faculty and staff. Through the

BOLD Center, she also had an opportunity to give something back by serving as a role model for younger students—showing them by example that an engineering education is within reach for students from all backgrounds.



UNIVERSITY OF COLORADO — COLORADO SPRINGS

University of Colorado at Colorado Springs is the fastest growing campus in Colorado and among the fastest growing in the nation. UCCS has a diverse student body consisting of 19% ethnic minority students. Partnership in Innovative Preparation for Educators and Students (PIPES) recently developed a new partnership with the Pre-Collegiate Development Program which has a 26-year track record in working with underrepresented minorities by assisting them to pursue a college education. The goals of the partnership are: to create a seamless pipeline for students to pursue STEM fields of study from middle school to post-secondary study; to evaluate what strategies work best in attracting and retaining students in STEM disciplines; and to develop supportive partnerships with parents and families to assist their student in pursuing a college education in the STEM disciplines.

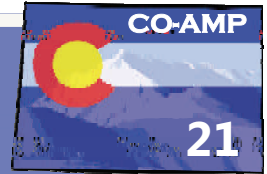


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STUDENT PROFILE: MARCUS GARCIA

Marcus Garcia left the United States Coast Guard to pursue a different kind of mission: an engineering degree from the University of Colorado at Colorado Springs. Garcia accomplished that mission as part of the UCCS Class of 2006 but didn't don a cap and gown at UCCS commencement exercises. Instead, Garcia tended his post as an intelligence specialist, second class stationed in Ar Ramadi, a U.S. Navy special warfare camp three hours west of Baghdad. Though not walking across a stage to receive a diploma or enjoying a graduation party in his honor, commencement day remained a triumphant accomplishment for Garcia. UCCS gave him many tools he's relied on in shouldering intense responsibility, pressure, and grueling work hours in a war zone. "I take all the valuable lessons I learned, from my leadership abilities and classes to serving others, and used them to bring something to the table in Iraq." Garcia served on UCCS Student Government for two years and was president of the Latino Student Union. Upon returning from his Iraq tour, Garcia put his Bachelor of Science in Mechanical Engineering to use as a project engineer for the US Army Corps of Engineers, Civil Engineer Corps at United States Navy Reserve. Garcia is currently working as a Civil Engineer for the United States Navy where he is helping build Tactical Infrastructure for US and Coalition Forces (NATO) in Southern Afghanistan.

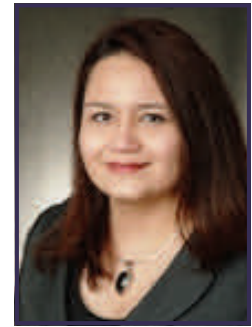




UNIVERSITY OF COLORADO — DENVER

UNIVERSITY OF COLORADO DENVER

University of Colorado at Denver, with two campuses in the metro Denver area, offers more than 115 programs in 13 schools and colleges at the undergraduate, graduate, and doctoral levels to over 15,000 students. The Princeton Review ranked UCD among Best Western Colleges and Best in the West, 2007-2008. Denver Transfer Initiative (DTI) is a collaborative Title V grant between UCD and the Community College of Denver aimed at increasing the likelihood of students (Hispanic, underserved and first generation) transferring from CCD to UCD. With a case management system and articulation agreements being utilized, progress is tracked and peer mentoring is established. A Transfer Center located mid-way between CCD and UCD, staffed by both CCD and UCD personnel, allows for an environment that fosters successful transition for underrepresented students.



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CO-AMP STUDENTS HOST HIGH SCHOOL ENGINEERING CONFERENCE AT UCD

CO-AMP students from the University of Colorado Denver SHPE (Society of Professional Engineers) student chapter organized the third annual High School Conference to encourage students to explore a career in engineering. CO-AMP and SHPE students hosted 130 students from eight Colorado high schools at UCD on February 5, 2010, to learn and interact with university professors and engineering students. Conference participants experienced “Green Engineering” through professional speakers, presentations by UCD professors, and various hands-on workshops in electrical, mechanical, and civil engineering. Workshops included Windturbine electricity, Enviro batteries, Thermodynamics in Mechanics (solar powered cooking, as shown in the photo), and Waste to Taste! Green Water Filtration.

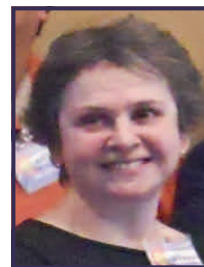


Colorado High School students assemble solar cookers as part of the Thermodynamics in Mechanics workshop facilitated by CO-AMP students at the University of Colorado Denver.

NEW PARTNERS: CCD AND NJC

COMMUNITY COLLEGE OF DENVER

Community College of Denver recently joined the CO-AMP alliance in 2011. CCD is the only Hispanic Serving Institution in the Denver-metro area, and the leading point of entry to higher education for the City and County of Denver. CCD counts more than 200 business/education partnerships for engaging CO-AMP students in internships and career opportunities. With over 13,000 students enrolled, CCD offers more than 125 programs that prepare students for a career, job advancement, or transfer to a 4-year school.



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NORTHEASTERN JUNIOR COLLEGE

Northeastern Junior College in Sterling joined the CO-AMP alliance in 2010. NJC is Colorado's largest public, 2-year college serving over 4,000 students, and has doubled the number of minorities enrolled since 2005. NJC's graduation rate is twice the national average and is one of the highest in Colorado among both 2-year and 4-year colleges. NJC has a stellar transfer record with approximately 55% of full-time students planning to go on to a 4-year institution.



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NEW PARTNERS: OJC AND PCC



OTERO JUNIOR COLLEGE

Otero Junior College in La Junta recently joined CO-AMP in 2011. OJC is a Hispanic Serving Institution with more than 1,500 students enrolled in 25 degree programs. Over 97% of OJC students are employed upon graduation or transfer to 4-year colleges or universities. OJC maintains transfer agreements with Colorado colleges and universities to facilitate the transferability of its academic programs.



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PUEBLO COMMUNITY COLLEGE

Pueblo Community College in Pueblo is a Hispanic Serving Institution and 2-year comprehensive community college offering a broad range of general, personal, vocational, and technical education programs as well as providing two-year transfer programs to qualified students for admission to 4-year colleges and universities. Offering more than 50 certificate and Associate Degree programs across two campuses, PCC serves more than 1,700 students every year.



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BRIDGE TO THE DOCTORATE: CSU COHORT 1 (2006-2008)



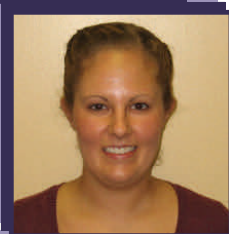
Herman Bravo
Dept. Mechanical Engineering
B.S. Mechanical Engineering 2005
University of California-Berkeley



Elizabeth Castelbaum
Dept. Soil & Crop Science
B.S. Rangeland Ecology 2006
Colorado State University



John Edwards, III
Dept. Computer Science
B.S. Computer Science 1996
University of Missouri- Rolla



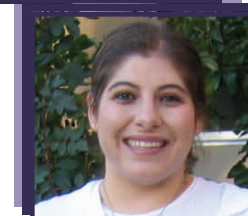
Rachel Garcia
Dept. Civil Engineering
B.S. Civil Engineering 2006
Colorado State University



Shantell Hinton
Dept. Electrical Engineering
B.S. Engineering 2006
Vanderbilt University



Miriam Galeas Loeffler
Dept. Ecology
B.S. 2002, M.S. Biology 2005
Colorado State University



Shay Perea-Boettcher
Dept. Biochemistry
B.S. Biochemistry 2001
Colorado State University



Elizabeth Perrault
Dept. Cell & Molecular Biology
B.S. Chemistry 2005
Fort Lewis College



Janet Locklear
Dept. Chemistry
B.S. Chemistry 2005
University of North Carolina-
Pembroke

Colorado State University received support from NSF in 2006, 2007 and 2008 to fund the first three cohorts of Bridge to the Doctorate Fellows. NSF funding helped support a dynamic plan that grew the number of LSAMP underrepresented minority students earning PhD degrees in STEM fields. CO-AMP has since established an infrastructure with its Colorado partner institutions and LSAMP members nationwide to collaboratively support highly qualified, globally competitive scholars to enter the BD program and be successful role models for other diverse students.

BRIDGE TO THE DOCTORATE: CSU COHORT 2 (2007-2009)



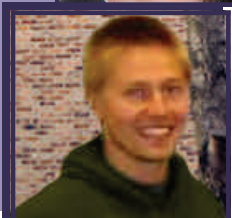
Jacob Barker
Dept. Mechanical Engineering
B.S. Mechanical Engineering 2007
Colorado State University

Lorene Martinez
Dept. Microbiology
B.S. Biology 2004
Colorado State University



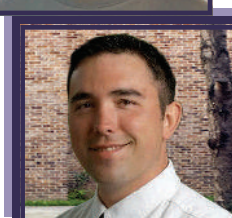
Natalia Cordova Sanchez
Dept. Mathematics
B.S. Mathematics 2007
University of Puerto Rico-
Rio Piedras

Matthew Martinez
Dept. Electrical Engineering
B.S. Electrical Engineering 2007
New Mexico State University



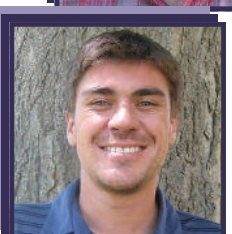
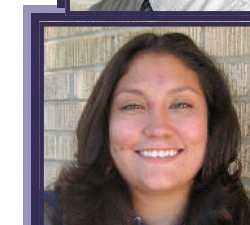
Derek Dalton
Dept. Chemistry
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Santano Mestas
Dept. Biomedical Engineering
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Colorado State University



Miguel Galvez
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B.S. Electrical Engineering 2006
Colorado State University

Michelle Sanchez
Dept. Chemistry
B.S. Chemistry 2007
Regis University



Carlos Herrera
Dept. Biochemistry
B.S. Biology 2007
University of Puerto Rico

Ruffin Swain
Dept. Mathematics
B.S. Mathematics 2007
California State University-
Dominguez Hills

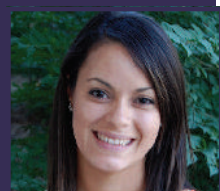


William Johnston
Dept. Physics
B.S. Physics 2007
Texas A & M University-
Commerce

Philip Wheeler
Dept. Chemistry
B.S. Chemistry 2004
University of California-
Santa Cruz

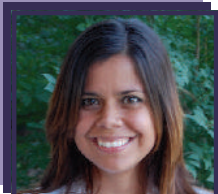
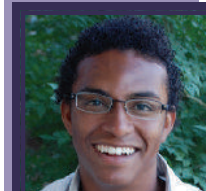


BRIDGE TO THE DOCTORATE: CSU COHORT 3 (2008-2010)



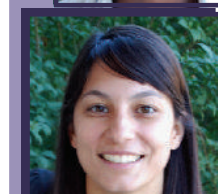
Gladys Bonilla
Dept. Geosciences
B.S. Physics 2008
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Mark Goodwin
Dept. Environmental & Radiological
Health Sciences (Toxicology)
B.S. Biochemistry 2008
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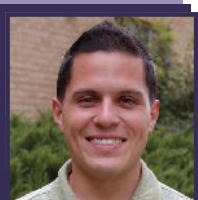
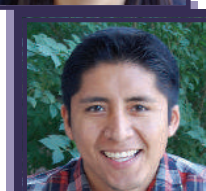
Katherine Davila Olmo
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Jacqueline Harding
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Southern Illinois University-Carbondale

Brian Leon
Dept. Chemistry
B.S. Chemistry 2008
University of CA- Irvine



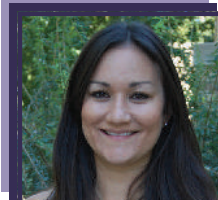
Daniel Feliciano
Dept. Biochemistry &
Molecular Biology
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University of Puerto Rico-
Rio Piedras

Contessa Majors
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Julia Figueroa
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Alejandro Trujillo
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B.S. Biology 2007
New Mexico State University



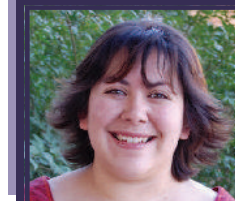
Krystle Frahm
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Dezaray Varland
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B.S. Cell & Molecular Biology 2008
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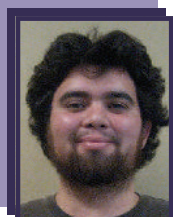


Katrina Gillette
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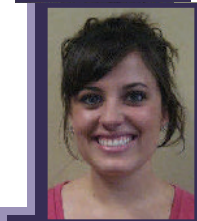
Lisa Wolfe
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Immunology & Pathology
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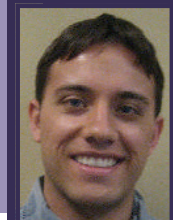
BRIDGE TO THE DOCTORATE: MINES COHORT 4 (2010-2012)



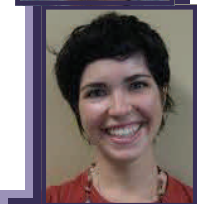
Daniel Cano
Engineering Systems
B.S. Electrical Engineering 2010
Colorado School of Mines



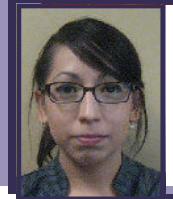
Andrea Casias
Metallurgical & Materials Engineering
B.S. Metallurgical & Materials
Engineering 2010
Colorado School of Mines



Brendan Geels
Engineering Systems
B.S. Mechanical Engineering 2010
New Mexico Tech



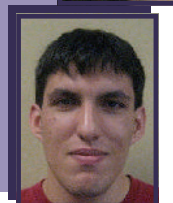
Kerri Hickenbottom
Environmental Science & Engineering
B.S. Civil Engineering 2010
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Stephanie LaCrue
Civil Engineering
B.S. Civil Engineering 2010
Colorado School of Mines



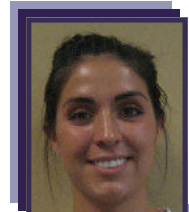
Susana Macias
Environmental Science & Engineering
B.S. Environmental Engineering 2010
University of Colorado — Boulder



Manuel Montano
Chemistry
B.S. Chemistry 2010
Colorado School of Mines



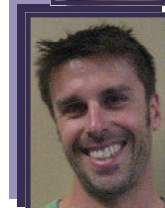
Ashley Nagle
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B.S. Civil Engineering 2010
Colorado School of Mines



Margarite Parker
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B.S. Chemical Engineering 2010
University of Colorado — Boulder



Shay Robinson
Mechanical Engineering
B.S. Engineering Physics 2010
Colorado School of Mines



David Walter
Nuclear Engineering
B.S. Engineering Physics 2010
Colorado School of Mines



Colorado School of Mines was awarded the Bridge to the Doctorate (BD) grant for 2010-2012 from the National Science Foundation to recruit and support underrepresented minority students interested in pursuing doctoral degrees in STEM graduate research programs. Research and education at Mines are founded on the conviction that future infrastructure and societal developments are dependent upon the availability of energy, the sustainable development of the Earth's resources, and the environmental consequences of these processes and their interactions. This foundation at Mines embraces a responsibility to attract, shape and provide engineering and scientific talent, like these BD Fellows, to help address the world's technological and societal challenges.

INTERNATIONAL CONNECTIONS

Costa Rica, South America



During the summer of 2009, Sheryl Manygoats, CO-AMP student at Fort Lewis College, participated in the Study Abroad Program at Duke University. The Organization for Tropical Studies (OTS) and the Office of Study Abroad (OSA) at Duke offered this exciting opportunity for students to study tropical biology in Costa Rica. Based at OTS Field Stations, this undergraduate course provided access to a broad array of tropical ecosystems, including lowland wet forest at La Selva, dry forest, wetlands at Palo Verde, and premontane moist forest at Las Cruces. This international experience also included tropical ecosystem design, implementation, and interpretation which prepared Manygoats to conduct her own independent projects at the research facilities. Projects ranged from seed dispersal, population studies (flora and fauna), and comparisons of different habitats.



Jaymus Lee (right), Jennifer Ulrich (left, bottom) and Audrianna Lee (left), all CO-AMP students at Fort Lewis College, also participated in NSF's NAPIRE (Native American and Pacific Islander Research Experience) 2010 program at the Las Cruces Biological Station to study tropical biology in Costa Rica. Based at Organization for Tropical Studies (OTS) Field Stations, this undergraduate course provided access to a broad array of tropical ecosystems, including lowland wet forest at La Selva, dry forest, and wetlands at Palo Verde, and premontane moist forest at Las Cruces in Costa Rica. This international experience also included tropical ecosystem design, implementation, and interpretation which prepared these students to conduct their own independent research projects.



Two CSU CO-AMP students, Nicole Kenote (sophomore in biomedical science, at left, and bottom left) and Deidra Newbrough (junior in environmental health, bottom right) traveled to Costa Rica in 2011 as part of an internship program sponsored by the Organization for Tropical Studies (OTS). OTS is a nonprofit organization that provides leadership in education, research and the responsible use of natural resources with a primary focus on the tropics. Kenote and Newbrough participated in the NAPIRE Program, which is designed specifically to expose Native American and Pacific Islander undergraduate students to the biodiversity of the tropics. The students worked with industry leaders to conduct hands-on research based on data gathered in the field and worked with professors in designing, implementing and interpreting data based on research models they developed during the course of the internship. At the end of the summer, Kenote and Newbrough presented their research findings in formal reports and oral presentations.



The internship program also included lectures, seminars and field activities with an emphasis on conservation biology, the effects of deforestation, and island biogeography.

INTERNATIONAL CONNECTIONS (continued)

Costa Rica, South America

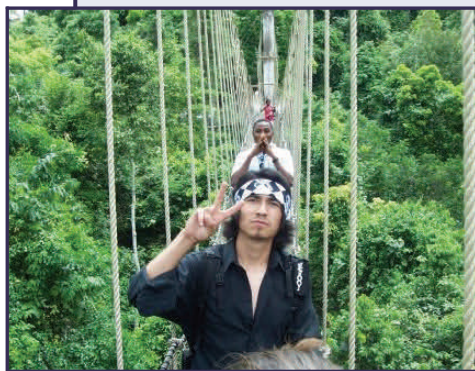


Colorado Alliance for Minority Participation biology research interns at Trinidad State Junior College (TSJC), Jesse Johnson (pictured at right) and Jess Trujillo (pictured below), presented original research at the American Indian Science and Engineering Society (AISES) 2008 national conference held in Anaheim, California. Johnson's research titled, "Dewlap size, morphology, and behavior in *Norops aquaticus*" was a result of his NSF Native American/Pacific Islander Research Experience (NAPIRE) in Costa Rica during the summer of 2008. Johnson and Trujillo's research presentations were supported by the Colorado Alliance for Minority Participation; Organization for Tropical Studies - Native American/Pacific Islander

Research Experience (NAPIRE) program; USDA Cooperative State Research, Education and Extension Service; and the Colorado Division of Wildlife.



Ghana, Africa



Two Trinidad State Junior College (TSJC) graduates, Jess Trujillo (left) and Jesse Johnson (pictured above), participated in a National Science Foundation – REU internship at the University of Cape Coast, Ghana Africa in 2009. This NSF-REU provided participants the opportunity to conduct research in ecology, environmental science, and conservation biology in tropical sub-Saharan Africa. Trujillo, former president of TSJC's Phi Alpha chapter of the Tri-Beta biological honor society, was awarded a USDA \$50,000 Biology Transfer Scholarship and is currently a conservation biology major at the University of New Mexico.

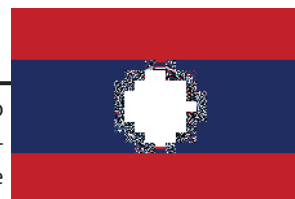


INTERNATIONAL CONNECTIONS *(continued)*

Ban Nam Hom, Laos

Fort Lewis CO-AMP student Rachel Medina is a junior in geosciences and has been involved in two Engineers Without Borders (EWB) Water Supply projects in Laos and Ecuador sponsored by CO-AMP. In Ban Nam Hom, Laos, Medina helped build a water system which included providing intake for the system at the water source, collecting GPS data, and gathering drinking water. "Being a

part of this [EWB] experience has affected my life forever. I think that having the chance to do these projects and build lasting relationships is what really makes sustainability," Medina said. In Ecuador, Medina gained hands on experience in GPS mapping and running work crews who were constructing water tap stands. These intercultural and international experiences combined with technical projects have deepened her commitment to the sciences and her motivation to assist people of other cultures in developing countries.



Geneva, Switzerland

Duke University/World Health Organization Institute —

Katrina Gillette, a BD3 student in Soil and Crop Science, was chosen as an intern for the Duke University/World Health Organization institute in Geneva, Switzerland. Duke University's Program on Global Policy and Governance at the World Meteorological Organization in Geneva prepares graduate students from around the world to deal with the policy and institutional issues at the heart of global governance. The program provides exceptional experiential education through intensive courses taught by leading global policymakers and through internships at Geneva-based international agencies, non-governmental organizations (NGOs), and government delegations.

Program participants took one of three intensive, week-long courses (Environment and Sustainable Development, Global Economic Governance and Trade, Human Rights and Humanitarian Assistance). Each of these seminars included discussions with top experts, visits to leading organizations in the field, and practical exercises or policy simulations. Ms. Gillette, a descendent of an original Aleut tribe, has focused her research on cellulosic biofuel production from forage grasses.

Program participants took one of three intensive, week-long courses (Environment and Sustainable Development, Global Economic Governance and Trade, Human Rights and Humanitarian Assistance). Each of these seminars included discussions with top experts, visits to leading organizations in the field, and practical exercises or policy simulations. Ms. Gillette, a descendent of an original Aleut tribe, has focused her research on cellulosic biofuel production from forage grasses.



INTERNATIONAL CONNECTIONS (continued)

Perth, Western Australia



Miriam Galeas Loeffler was a Colorado State University Fellow in the Bridge to Doctorate program during 2006-2008. In the Fall semester of 2007 Miriam traveled to Perth, Western Australia to visit Murdoch University.

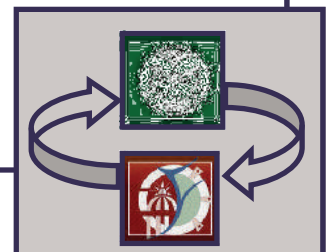
At Murdoch she was a visiting researcher in the lab of Richard J. Hobbs, the editor of the journal, *Restoration Ecology*. While in Australia she also worked closely with Dr. Rachel Standish in projects ranging from rehabilitation assessment to climate change experiments. The rehabilitation project involved assessing efficacy of rehabilitation efforts, following mining activities by the large aluminum company Alcoa in the jarrah forest of southwest Australia. Climate change experiments included monitoring changes in plant communities following alterations of precipitation patterns and nutrient alterations in the Banksia woodlands of Australia.



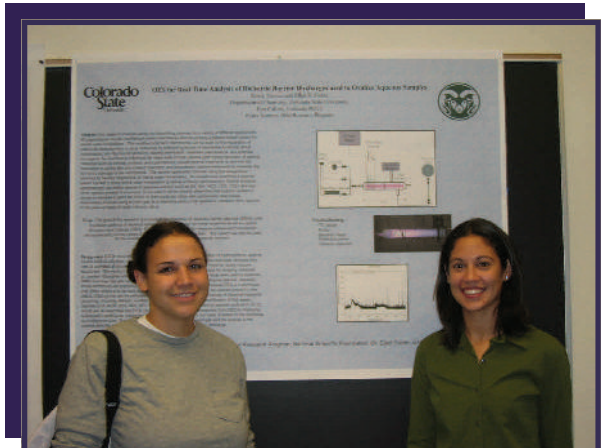
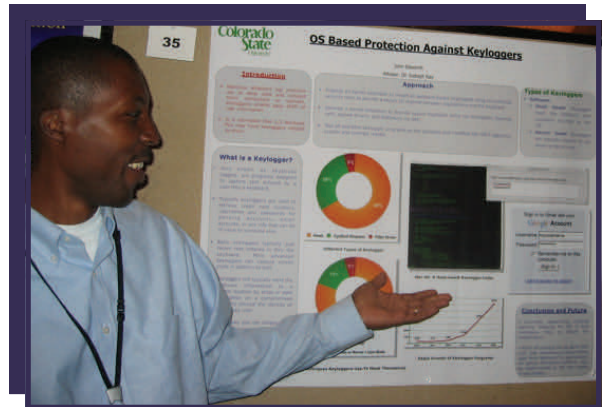
Post-Doctoral Scholar From Fayoum University, Egypt



Dr. Samiha Attia (left) was appointed as a Post Doctoral Scholar at Colorado State University (CSU) through an International Memorandum of Understanding (IMOU) between CSU and Fayoum University, Fayoum, Egypt. Dr. Lise Youngblade (right), Professor and Department Head of Human Development and Family Studies, served as Dr. Samiha's advisor. Dr. Samiha received her Ph.D. in Childhood Studies from Ain Shams University, Cairo, Egypt, and is a member of the faculty at Fayoum University where she teaches Childhood Socialization, Communication Skills, and Play Psychology.

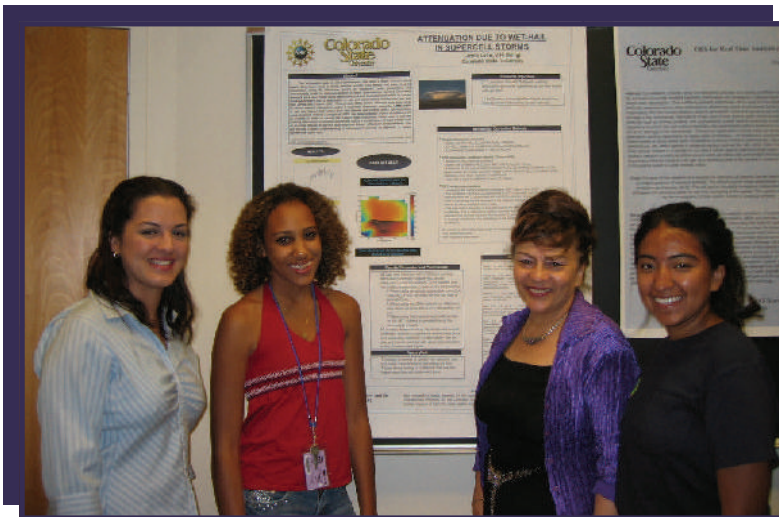


RESEARCH SYMPOSIUMS

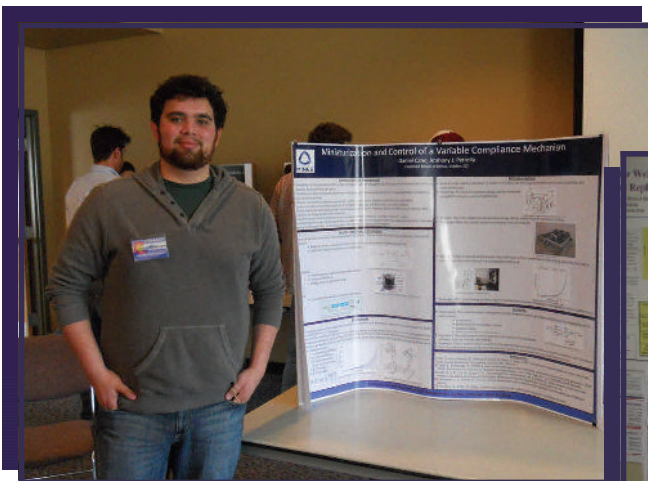


CO-AMP students presenting original research

RESEARCH SYMPOSIUMS (continued)



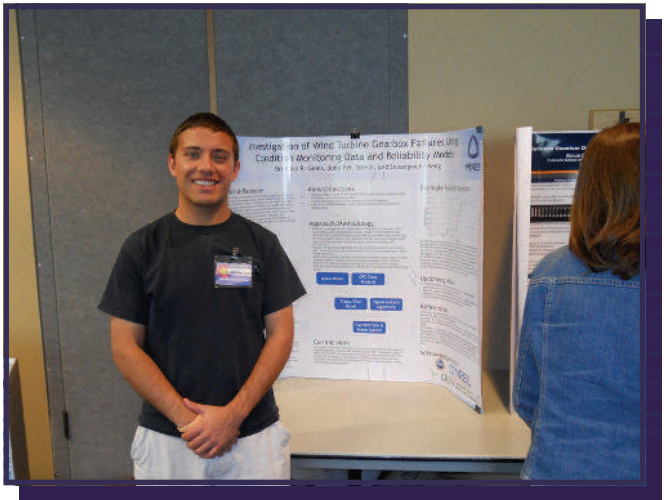
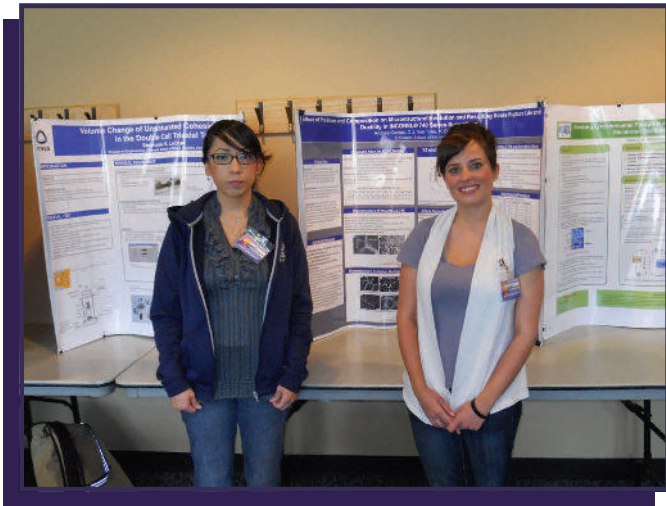
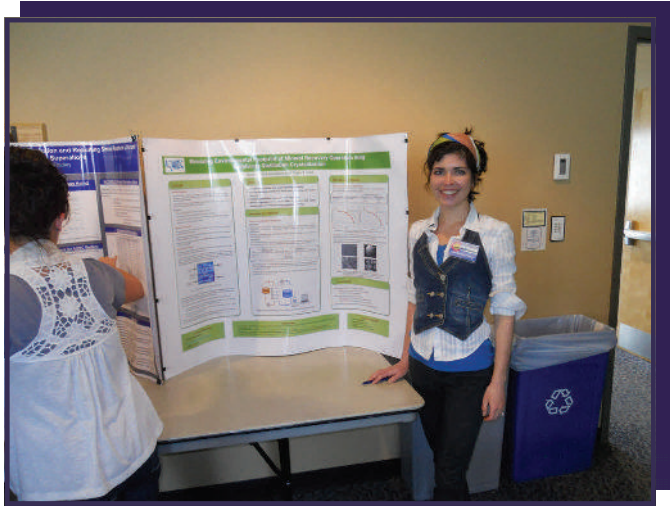
CO-AMP students presenting original research



RESEARCH SYMPOSIUMS (continued)

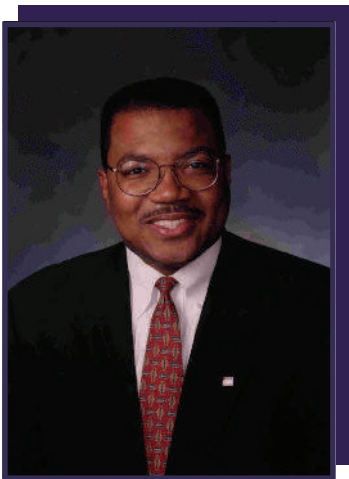


CO-AMP students presenting original research



KEYNOTE SPEAKERS

Keynote speakers who have all graciously contributed their expertise and professional experiences to the CO-AMP alliance.



Joe Rogers
Former Colorado
Lt. Governor



Bob McCluskey
Former Colorado State
Representative, District 52



Bob Bacon
Colorado State Senator
District 14



Dr. A. James Hicks
NSF Program Director
Louis Stokes Alliances
for Minority Participation



Dr. Caesar Jackson
NSF Program Director
Historically Black Colleges
and Universities

KEYNOTE SPEAKERS



Randy Fischer
Deputy Majority Whip
Colorado State Representative,
District 53



Dr. Ed Galindo
Professor, Biology
Idaho State University
University of Idaho



Dr. Margaret E. M. Tolbert
NSF Senior Advisor
Office of Integrative Activities
(OIA)

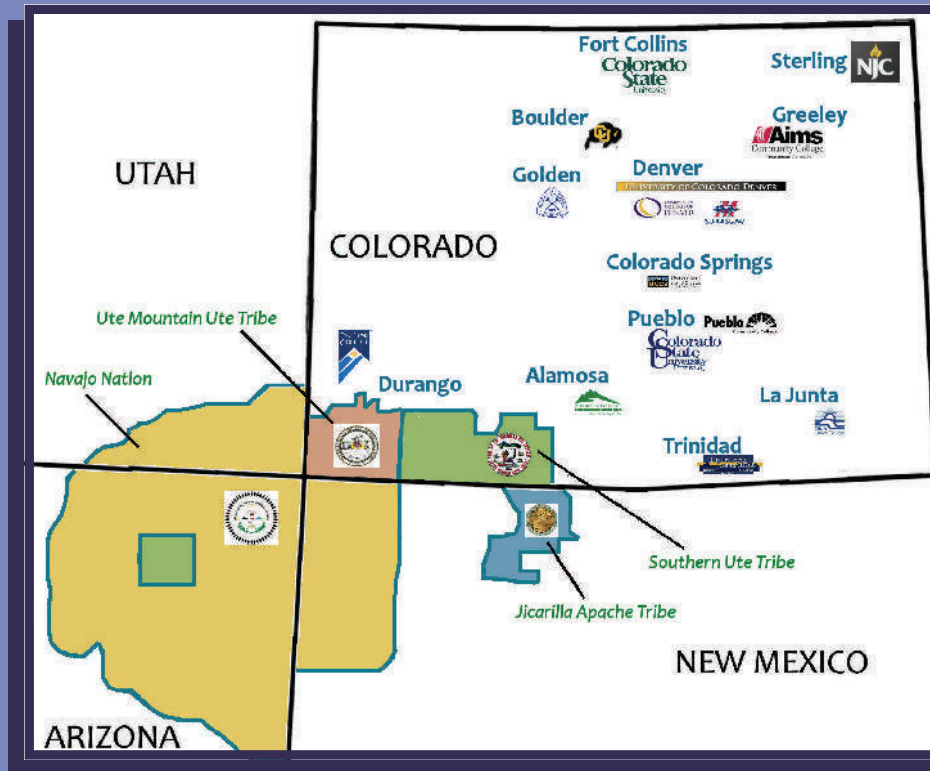


Dr. Sylvia Celedon-Pattichis
Co-Principal Investigator
Center for the Mathematics
Education of Latinos/as (CEMELA)



Dr. Omnia El-Hakim
NSF Director for Diversity and
Outreach in the Directorate
of Engineering

Keynote speakers who have all graciously contributed their expertise and professional experiences to the CO-AMP alliance.



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