

New Mexico AMP

ALLIANCE FOR MINORITY PARTICIPATION



2014-2015

Project Impact Statement



National Science Foundation
Grant Number HRD-1305011

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Table of Contents

History of New Mexico AMP	4
Leveraged Funding	6
Leadership Development	8
Sustainability of New Mexico AMP	10
Focus on Community College	12
SCCORE Outcomes	13
Bridge to the Doctorate Program.....	14
Economic Impact of New Mexico AMP	18
Impacting Students' Lives	20
• Student Achievements	20
• NSF GRFP Awardees.....	23
• A Family Affair	25
• Helping Students Become Global Scholars Through International Experiences	27
Global Scholars.....	30-31
Program Outcomes	32-33
Publications.....	34



History of New Mexico AMP

Since 1993, the statewide partnership of the New Mexico Alliance for Minority Participation (New Mexico AMP) has impacted the lives of students throughout the state. Program activities are designed to achieve program goals to increase student retention in science, technology, engineering, and mathematics (STEM) and to support academic and professional development of students, including encouragement and support to pursue STEM graduate degrees. The Alliance emphasizes participation in opportunities that encourage students to understand first-hand the rewards and responsibilities of becoming our nation's engineers and scientists, to continue their education at the graduate level, and to participate in international, national, and local conferences, exchange programs, and internships. Through these opportunities, New Mexico AMP students are enabled to broaden their perspectives and inspired to persist in their academic and personal goals.



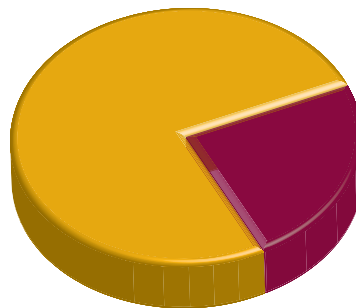
Dr. Brian Pasko, ENMU IC

Since New Mexico AMP's inception, the number of STEM degrees awarded to underrepresented minorities has more than doubled, from 253 in 1992-93 to 779 in 2013-14, with over 10,000 STEM degrees awarded over the life of the program. During this time, the representation of minority degree recipients has increased from 24% of the total number of STEM B.S. degrees awarded in 1992-93 to 44% of the total in 2013-14.



2015 Institutional Coordinators

New Mexico AMP Institutional Coordinators (ICs), who serve as the backbone of the Alliance, organize and lead program activities and events at partnering two-year and four-year institutions throughout the state. Critical to the success of the program, ICs develop inter-institutional partnerships to facilitate student transfer from two-year to four-year STEM degree programs and meet two times per year to share information and discuss program successes and challenges. One meeting



1992-1993
Awarded STEM Degrees

24% (N=253)
Underrepresented Students (URM)

is held in Las Cruces during the fall semester in conjunction with the New Mexico AMP Student Research Conference, and the other is held in Albuquerque during the spring semester, thus spanning the state north to south. An external Advisory Board provides additional support, chaired by NMSU Provost and Executive Vice President, who is also the New Mexico AMP Principal Investigator. Advisory Board membership incorporates the perspectives and interests of multiple stakeholders, representing K-12 education, community college, University, graduate education, industry, and national laboratories.

New Mexico AMP has also managed such programs as the Hewlett Foundation Recruitment and Retention Program; the NSF Computer Science, Engineering, and Mathematics Scholarship (CSEMS); the Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) program; the NSF STEM Talent Expansion Program (STEP); the Bridge to the Doctorate program; and the Bridges to Engineering Education (BEE), which have brought additional resources to support STEM education and student achievement in New Mexico. These and other programs have resulted in a statewide network that has become part of the fabric of higher education in the state, allowing for the managing and leveraging of human and monetary resources, and for quick and accurate dissemination of information and opportunities. These efforts help ensure that participating students are well prepared in STEM and provided with a variety of support systems and the encouragement, incentive, and motivation to persist in their academic goals. New Mexico AMP is committed to supporting individual student retention and degree completion, increased student progression to graduate school entry, and the promotion and replication of best practices, both within New Mexico and nationally, through professional conference presentations and other publications and professional development events.



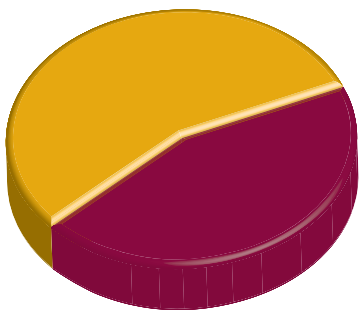
Dr. Vince Lombrana,
NMSU-Alamogordo IC



Dr. David Torres, NNMIC IC



Robyn Hayes, NMSU-Carlsbad IC



2013-2014
Awarded STEM Degrees

44% (N=779)
Underrepresented Students

Leveraged Funding

Building from the base of support provided through LSAMP funding, the New Mexico AMP has leveraged multiple student support projects, as well as industry and institutional funding, to the program. Prominent among these are the NSF Collaborative for Excellence in Teacher Preparation (CETP), the William and Flora Hewlett Foundation Engineering Schools of the West Initiative (ESWI), the NSF STEM Talent Expansion Program (STEP), and the U.S. Department of Education Student Support Services Science, Technology, Engineering, Mathematics, and Health Sciences (SSS STEMH).

Industry relationships provide equipment, student internships, professional development workshops, sponsorship of the annual Student Research Conference, and advisory board representation. New Mexico AMP has worked with the following industrial partners:

- Raytheon Missile Systems Company
- Northrop Grumman
- Apple Inc.
- Boeing
- Hewlett Packard
- Greater Cincinnati Foundation
- Agilent Technologies
- Excel Energy
- Intel
- United Space Alliance
- General Motors
- U.S. WEST Foundation
- Lockheed Martin
- Los Alamos National Laboratory
- NewTech
- Sandia National Laboratories
- Department of Interior Bureau of Land Management
- New Mexico Department of Transportation

In total, from the \$5 million base grant of the program, New Mexico AMP has leveraged over \$40 million in federal, corporate, foundation, and institutional funding, equipment, and in-kind contributions to support student achievement in New Mexico.

New Mexico AMP	\$19,541,799	1996-2018
NSF New Mexico Bridge to the Doctorate (BD)	\$7,654,000	2003-2012
NSF Collaborative for Excellence in Teacher Preparation.....	\$5,000,000	1997-2002
Industry Grants and Contributions.....	\$798,135	1996-2015
William and Flora Hewlett Foundation	\$1,100,000	2003-2008
NSF Advance Technology Education (ATE)	\$300,000	2001-2004
NSF Bridges to Engineering Education (BEE).....	\$100,000	2003
NSF Computer Science, Engineering, and Mathematics Scholarships (CSEMS)	\$395,992	2004-2008
NSF Scholarships in STEM (S-STEM)	\$599,923	2008-2012
American Indian Education Fund.....	\$12,000	2002-2004
New Mexico Department of Agriculture.....	\$10,000	2006
STEM Talent Expansion Program.....	\$2,000,000	2007-2012
U.S. Department of Education Student Support Services (SSS) STEMH	\$1,100,000	2015-2020
State of New Mexico.....	\$6,833,317	1996-2016
Institutional Support	\$699,402	2008-2009

New Mexico AMP Partner Institutions and Institutional Coordinators have leveraged additional resources to conduct research and education projects that benefit underrepresented students in STEM, including the following:

Dr. Laura Crossey, Professor of Earth and Planetary Science at the University of New Mexico (UNM) has worked for some time with other colleagues on the design and installation of the **Trail of Time**, one of the world's largest geoscience exhibits. The Trail of Time is an interpretive walking timeline focusing on Grand Canyon vistas and rocks, inviting visitors from across the globe to explore the geologic time and stories. Dr. Crossey has been involved in a number of additional research and education projects, including the UNM Integrative Graduate Education and Research Traineeship (**IGERT**) in Integrating Nanotechnology with Cell Biology and Neuroscience and the **New Mexico EPSCoR**. *See more about Dr. Crossey's leadership on page 9.*

Dr. David Torres, Chair/Professor of the Department of Mathematics and Physical Science, at Northern New Mexico College (NNMC), and Dr. Ajit Hira, Professor of Physics, received a grant from the **NSF Computer and Information Sciences and Engineering (CISE)** directorate (2009-2014, \$150,913). The project provided 108 computer cores, which are used for both research and education projects. Dr. Torres is also involved in the **NSF Robert Noyce Teacher Scholarship Program** (2010-2015) that awards scholarships to STEM majors who also pursue a teaching career in secondary schools.

Dr. Brian Pasko, Associate Professor of Mathematics at Eastern New Mexico University (ENMU), coordinates several leveraged scholarships for New Mexico AMP students, including funds provided by ENMU's Vice President for University Relations and Enrollment Services for dorm costs to incoming minority freshman. Brian also coordinates the selection and funding of New Mexico AMP students who receive academic scholarships from **Xcel Energy**.

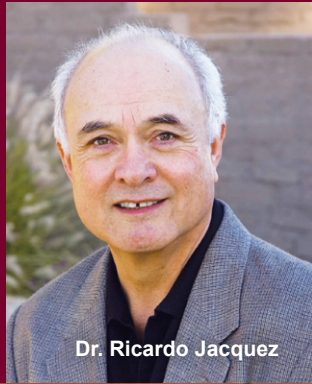
Phyllis Baca, Director of NM STEM Initiatives and Professor of Engineering at Santa Fe Community College (SFCC), and New Mexico AMP Community College Co-Director, provides leadership and service in the state of New Mexico. Ms. Baca serves on several committees at the state level and is a Principal Investigator for an initiative in the EPSCoR Energize New Mexico grant. *See more about Ms. Baca's leadership efforts in the Leadership Development section page 9.*

Central New Mexico College (CNM) provides funding for Institutional Coordinator, **Dr. Heather Fitzgerald**, to devote herself full-time to STEM recruitment and programming. Collaborations have been established with UNM faculty, and transfer pathways have developed between the two institutions. The New Mexico AMP SCCORE program, the U.S. Department of Education STEM UP program, and New Mexico EPSCoR play critical roles in this partnership.

New Mexico AMP partner institutions have leveraged U.S. Department of Education Hispanic-Serving Institutions - Science, Technology, Engineering, and Mathematics (**HSI STEM, Title III**) grants to increase the number of Hispanic and low-income students earning degrees in STEM and create transfer pathways and articulation agreement between two- and four-year institutions. Grantees include Mesalands Community College, Eastern New Mexico University, New Mexico Highlands University, New Mexico Institute of Mining and Technology, NMSU-Alamogordo, Northern New Mexico College, University of New Mexico, and UNM-Valencia.

Leadership Development

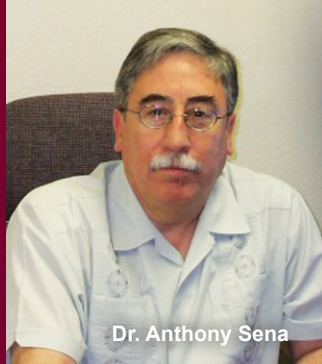
New Mexico AMP has provided professional development opportunities to a number of individuals in New Mexico who rose to leadership positions within their respective institutions. Serving in positions of leadership has allowed them to explore and develop approaches to student support and development and to impact institutional practices and policies in these critical areas.



Dr. Ricardo Jacquez



Dr. J. Phillip King



Dr. Anthony Sena

Dr. Ricardo Jacquez, Founding Director of New Mexico AMP, served as the New Mexico AMP Program's director and Co-Principal Investigator from 1993-2015. Dr. Jacquez also served as Dean of the College of Engineering at NMSU and as NMSU Interim Associate Provost and Interim Department Head of Civil Engineering. He retired from NMSU in July 2015 to relocate to California State University-Chico, where he currently serves as Dean of the College of Engineering, Computer Science, and Construction Management (ECC). Dr. Jacquez, honored as Regents Professor of Civil and Geological Engineering, was **the 2006 recipient of the prestigious Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring (PAESMEM)**. He was also honored as the 2012 recipient of the CADE Distinguished Service Award by the Association of Public and Land-grant Universities' Commission on Access, Diversity, and Excellence. Dr. Jacquez is Founding Director of the New Mexico Bridge to the Doctorate program; the Collaborative for Excellence in Teacher Preparation (CETP); the Hewlett Foundation Engineering Schools of the West Initiative; the Computer Science, Engineering, and Mathematics Scholarship Program (CSEMS/S-STEM); the Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP); and was the Principal Investigator (PI) of the Reaching the Pinnacle Program (RTP). Dr. Jacquez also served as Director of Education and Research Program of the Waste-management Education and Research Consortium (WERC) at NMSU.

Dr. J. Phillip King was recently appointed New Mexico AMP Project Director by NMSU Provost Dan Howard, New Mexico AMP PI, and Dr. A. James Hicks, NSF Program Officer. Dr. King is John Clark Professor and Associate Department Head of Civil Engineering at NMSU. He has experience with the NSF, including an American Association for the Advancement of Science fellowship at NSF and service as the Principal Investigator for Reaching the Pinnacle, a Regional Alliance supported by NSF to recruit and retain students with disabilities in STEM fields. He has also served as a Peace Corps volunteer in Malawi, Africa. In his current role as professor and administrator in a STEM area and AMP Director, Dr. King can influence decisions and lives and serve as advocate for student success.

Dr. Anthony Sena, who recently retired from Northern New Mexico College (NNMC), served as Institutional Coordinator for many years. He later served as Provost; College of Engineering Dean; Math, Science, and Engineering Department Chair; and Biology professor. He served as reviewer for NSF and mentored undergraduate students at NMCC and in collaboration with Los Alamos National Laboratory.

Dr. Bernadette Montoya, Vice President of Student Affairs and Enrollment Management, served as Institutional Coordinator at NMSU-Grants and NMSU-Doña Ana Community College for several years. Dr. Montoya's experience includes more than 20 years of teaching and higher education experiences, starting her career teaching in public schools before service in various roles at NMSU-Grants, the Doña Ana Community College campuses, and NMSU-Main. In her present role, Dr. Montoya is positioned to influence decisions and direction for staff and students. Dr. Montoya looks back on her experience with New Mexico AMP: *"Having the opportunity to be involved in New Mexico AMP early in my professional career provided many opportunities for me. Some of these included involvement in professional grant writing, teaching opportunities, student and faculty engagement, and the opportunity to learn the many exciting facets of the STEM field. It has continued to be a privilege to be involved with NM AMP!"*

Phyllis Baca is the Director of NM STEM Initiatives and Professor at Santa Fe Community College (SFCC), and Co-Director of New Mexico AMP for Community Colleges. Ms. Baca has served as Institutional Coordinator for New Mexico AMP for many years at SFCC. Her chemical engineering B.S. and work background, coupled with an M.S. in industrial engineering and alternative teaching licensure, allows for a unique perspective to serve the students of New Mexico. Ms. Baca serves on several state-level committees and statewide grants that influence educational decisions in New Mexico, including the Higher Education Department's Engineering Articulation Task Force, the New Mexico AMP Advisory Board, the Public Education Math & Science Advisory Committee, the STEM Impact Team, and Principal Investigator for an initiative for the EPSCoR Energize New Mexico grant. Ms. Baca was honored with the Seventh Annual IMPACT! Award by the New Mexico Network for Women in Science and Engineering ((NMNWSE) in 2013. Her passion is to present STEM opportunities to at-risk students, especially women and Hispanics. Ms. Baca says of her experience with New Mexico AMP: *"Coming from industry, I was very fortunate that one of my first educational experiences was attending and taking students to the New Mexico AMP Research Conference. The bar was set! I was surrounded by New Mexico's 'Cream of the Crop' in regards to educational leadership, STEM diversity research, and faculty role models who eventually became my mentors. The program was foundational in what I've been able to accomplish at Santa Fe Community College and throughout New Mexico."*

Dr. Laura Crossey, Chair and Professor of the Department of Earth and Planetary Science at the University of New Mexico (UNM) and New Mexico AMP Institutional Coordinator, was recently recognized for her outstanding 30-year mentoring effort by the NMNWSE with the Ninth Annual IMPACT! Award. Dr. Crossey directly mentored over 100 undergraduate and graduate students in her discipline as well as serving as a leader in local and statewide K-12 through graduate level STEM support programs. She also served on the New Mexico Governor's committee to establish Science Standards and has been an active participant in development of policies and programs that support inclusive participation and success in STEM across the campus, improving the college experience of thousands of students.



Dr. Bernadette Montoya



Phyllis Baca



Dr. Laura Crossey

Sustainability of New Mexico AMP

As evidenced by the following examples of sustainability and institutionalization, New Mexico AMP has supported the sharing of resources and information, including funding, student activities, and program models, which has enabled the development of student interventions, additional grants, and programming support at Alliance partner institutions.

New Mexico AMP was granted statutory status by the New Mexico Legislature in 2007, establishing the Alliance as a permanent line item in the New Mexico State University budget request to the New Mexico State Legislature to support STEM student achievement in New Mexico. Supporting long-term sustainability, this designation allows the Alliance to receive state funding as well as gifts, grants, and donations from public or private sources. Further supporting the institutionalization of this important program, the majority of program staff are supported by institutional funds or designated state funding. Alliance activities at partner campuses are also reaching a level of sustainability and institutional support that will continue as a legacy to the investment made by the National Science Foundation and the State of New Mexico. Several of these are described below.

The Student Research Symposium (SRS), which is open to undergraduates, has become a mainstay at New Mexico Tech, inspired in part by the need for New Mexico AMP students to present their research at a university-wide event. The event provides practice for the New Mexico AMP Student Research Conference as well as other conferences.

According to Phyllis Baca, who serves as Co-Principal Investigator of an initiative in the **Experimental Program to Stimulate Competitive Research (EPSCoR)**, the New Mexico AMP IC, and the STEM Director at SFCC, the New Mexico AMP Institutional Coordinator model was used to structure the network of coordinators at EPSCoR institutions. She also credits New Mexico AMP's use of IC training webinars as the model used to help with developing training workshops and webinars for EPSCoR coordinators. In the program's third year, EPSCoR staff leaders present webinar training known as 'micro-messaging,' proprietary content of the National Alliance for Partnerships and Equity (NAPE). The EPSCoR coordination network disseminates STEM opportunities, events, and activities, including those of New Mexico AMP.

In 1999, through leveraged corporate and private foundation donations, New Mexico AMP helped to establish two computer labs at New Mexico State University (NMSU) and one at the Las Cruces Court Youth Center, now a charter school. In addition, the William and Flora Hewlett Professional Development and Success Center was also established at NMSU in 2008, providing a permanent student support center.

Over the lifetime of the program, New Mexico AMP has brought \$43 million in direct program funding to the state of New Mexico, significantly impacting student experiences in STEM learning and professional development; faculty and teacher development and training; and direct student funding through research assistantships, scholarships, and research and travel support.



SMET 101 and the Integrated Learning Communities (ILC) Model

In 1997, New Mexico AMP developed the **SMET 101 (Introduction to STEM)** course. From 2007-2013, the **Integrated Learning Communities (ILC)** project was offered at NMSU. SMET 101 was designed to help students become better learners and more focused in their disciplines. Cohorts of ILC students were co-enrolled in SMET 101, Freshman Composition & Rhetoric (ENGL 111), Algebra (Math 120 and Math 121), General Chemistry (CHEM 111) and a new engineering orientation course, EE 109 (The Engineering of How Things Work). Using several strategies of active learning and a writing-across-the disciplines approach, the course encouraged collaborative learning, personal reflection, as well as faculty collaboration to leverage assignments, integration of course content, and peer mentoring.

- Targeted pre-calculus engineering students (at risk for engineering retention)
- Engineering graduation rates for the earliest cohorts is **41%** compared to a historic rate of **30%** prior to implementation of the project
 - 51 students served
 - 25 students (50%) earned degrees
 - 21 engineering degrees (84% of all degrees earned, representing 41% of all students served)

Building on this success, the NMSU College of Engineering implemented the **Engineering Freshman Year Experience (E-FYE)** for all entering engineering students regardless of mathematics placement in Fall 2014. The project serves between 350-400 freshmen each year and has maintained collaborations with the Departments of English, Mathematics, and Chemistry. Significant outcomes to date include the following:

- The one-year retention rate for Fall 2014 E-FYE students (Fall to Fall) increased to **74%** compared to **63%** prior to implementation of the program
- Adapted from the ILC and E-FYE models, the **NMSU College of ACES** also implemented learning communities in Fall 2014 and Fall 2015, pairing sections of Animal Science 100 and English 111G to “build community and integrate writing and animal science.”

In addition, after several years of teaching the original course, elements of SMET 101 have been integrated into the retention efforts at two community colleges:

- At **SFCC**, primary elements of the SMET 101 curriculum are used in the recently reintroduced **STEM 111** course, now offered as a component of the SFCC **Freshman First Year Experience** program, adapted for both technical and non-technical students.
- In Fall 2015, **Luna CC** incorporated elements of SMET 101 into **STEM 117**, a new course with transferrable credits for all STEM majors.



Focus on Community College



Rafael Garcia, NMSU Transfer Student from NMSU-Carlsbad



NMSU-Alamogordo STEM Club Participants



Luna Community College STEM Club Participants



Rachel Ridgeway, NMSU Transfer Student from Luna CC and Pete Campos, NM State Senator



Davi and Jose Mondragon, ENMU Transfer Students from Luna CC



Wendi Cole (far left), UNM Transfer Student from SIPI



Professional Development Workshop Participants Reflect on their Conference Experiences

Community Service Projects

The New Mexico AMP STEM Club at NMSU-Carlsbad Community College (NMSU-C) held a Community Open House at which the public are invited to visit various departments to experience typical learning activities. At left, **Rafael Garcia**, New Mexico State University (NMSU), Engineering (NMSU-C Transfer and SCCORE Participant) demonstrates how sunscreen shields from ultraviolet radiation. Also, students attended Section of the American Nuclear Society of Carlsbad. They also participated in the Department of Energy “Lie Down and Be Counted Program,” allowing individuals to be counted for radioactivity.

NMSU-Alamogordo Community College (NMSU-A) STEM Club participants Eddie Kemp and Andres Osorio performed outreach work for the Forest Service with Americorps. NMSU-A students also served as Mentors for the North Elementary School Robotics Club and helped with the Sacramento Elementary School Discovery Day.

The New Mexico AMP Luna Community College (Luna CC) STEM Club assisted with activities at the “Fall for Luna” community event that was sponsored by the Luna CC Faculty Senate. The successful event was a collaborative effort of various clubs and organizations at Luna CC to help make the community more aware of Luna CC.

State and Federal Level Recognition of Students

Rachel Ridgeway, NMSU, physics (2012 SCCORE participant and Transfer student from Luna CC), was recognized as a Coca-Cola All-State Academic Team Silver Scholar Award by the NM Legislature. She is (Pictured with Pete Campos, NM State Senator and President of Luna CC.)

Davi and José Mondragon, Eastern New Mexico University (ENMU), engineering, (SCCORE and Transfer students from Luna Community College), were honored by the Board of Trustees at Luna CC for their active role in the Higher Learning Mission Accreditation process as Student Ambassadors. The brothers also served as Science Fair Judges for Cimarron Middle and High Schools.

Wendi Cole, University of New Mexico (UNM), engineering, (Transfer from Southwestern Indian Polytechnic Institute (SIPI), was inducted into the All-State Academic Team by the NM Legislature on National Community College Day. She was also selected for the 2013 All USA Community College Academic Team out of 1800 applicants. She was part of a national roundtable discussion hosted to support Native American/Alaskan Native STEM education and careers.

Community College Professional Development Workshops

The 2015 Community College Professional Development Workshop attendees learned more about navigating the conference, and they reflected in groups about the impacts of the conference.

Outcomes of Summer Community College Opportunities for Research Experience (SCCORE)

From 2002-2015, a total of 167 pre-transfer students have participated in the SCCORE program:

- **167 participants**
 - 31 students (19%) are unaccounted for, earned an Associate's degree and immediately went to work, or have changed to a non-STEM track
 - 21 students (13%) are on track in their STEM pre-transfer programs
 - 115 students (69%) have transferred to a STEM degree program
- **Of the 115 student who have transferred to a university**
 - 39 (34%) students have earned a Bachelor's degree, 32 (28%) of these in STEM and 7 in Non-STEM disciplines
 - 63 students (55%) are on track to graduate with a STEM degree
- **Of the 39 students who have earned a Bachelor's degree**
 - 16 (41%) students have gone on to graduate programs
 - 10 of these students (63%) have earned the M.S. degree
 - 2 students (13%) are on track to graduate with the M.S. degree
 - 2 students (13%) took a Non-STEM graduate path: 1 student earned the M.A. degree; 1 student is on track to graduate with an M.A. degree
 - 4 students (25%) entered Ph.D. programs (2 of these earned the M.S. degree; 2 of these entered a Ph.D. program without the M.S. degree)
 - o 1 student earned a Ph.D. in STEM-H
 - o 3 students are on track to complete the Ph.D. in STEM

In Summer 2015, 27 community college students participated at 5 universities:

- Host institutions included **NMSU, UNM, ENMU, NMHU, NM Tech**
- Participants were enrolled at 8 community colleges: **DACC, NMSU-Alamogordo, NMSU-Carlsbad, Clovis CC, CNM, SFCC, Luna CC, UNM-Taos**
- 5 high school students also participated with support and collaboration of the NSF Engineering Research Center on urban water renewal, **ReNUWit**

The SCCORE program has a post-transfer STEM retention rate of 83% and an overall retention rate of 81%,(STEM and non-STEM), including pre-transfer students.



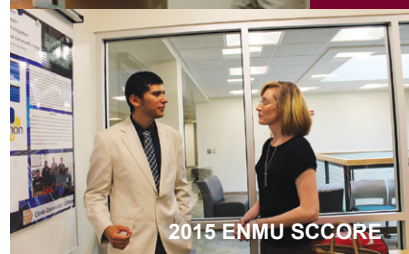
SCCORE Professional Development includes field trips, lab tours, STEM professional speakers, and poster presentation training and experience.



2014 NMSU SCCORE



2014 NM Tech SCCORE



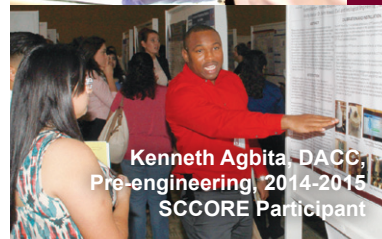
2015 ENMU SCCORE



2015 UNM SCCORE



Priscilla Solis, ENMU Biology (NMSU-C Transfer), 2012 SCCORE Participant



Kenneth Agbita - DACC, Pre-engineering, 2014-2015 SCCORE Participant

Bridge to the Doctorate Program



Cohort 1 (2003-2005)



Cohort 2 (2004-2006)



Cohort 3 (2005-2007)



Cohort 4 (2006-2008)



Cohort 5 (2007-2009)



Cohort 6 (2008-2010)



Cohort 7 (2009-2011)

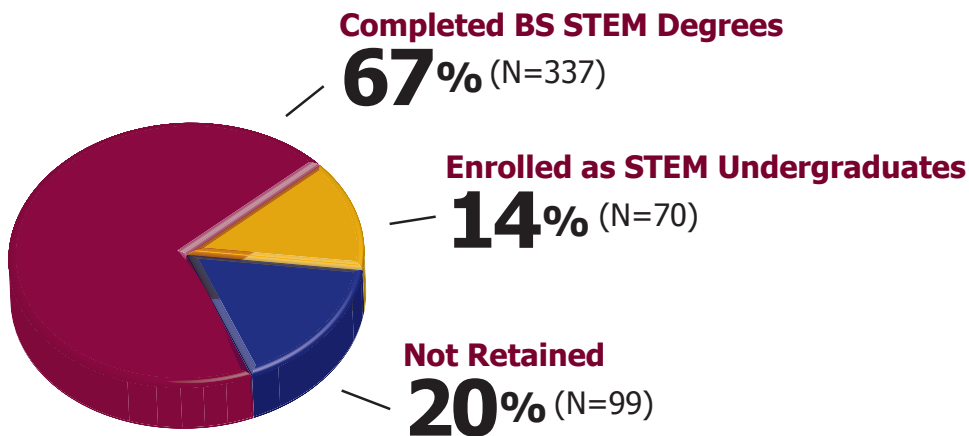


Cohort 8 (2010-2012)

Graduate School Progression

An analysis of 506 individual student records entered in the LSAMP WebAMP reporting system (2004-2014) for New Mexico State University (NMSU) revealed the following:

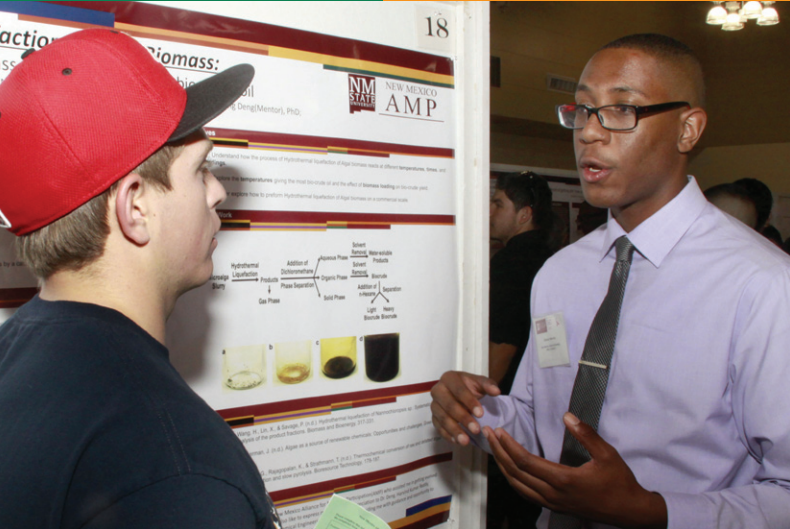
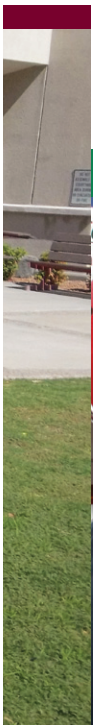
- 407 NMSU students (80%) were retained in STEM
 - 70 (14%) are currently enrolled as STEM Undergraduates
 - 337 (67%) have earned their B.S. degrees
- Of the 337 BS STEM Degree Recipients
 - 94 earned post baccalaureate degrees (28%)
 - 59 STEM post baccalaureate degrees at NMSU
 - 5 non-STEM post baccalaureate degrees at NMSU
 - 30 post baccalaureate degrees outside of NM
- 99 students (20%) were not retained in STEM at NMSU
 - Insufficient data are available to determine the number of these students who entered and/or graduated from STEM programs at other institutions.
- 15 currently enrolled in STEM graduate programs at NMSU
- 21 enrolled in continuing education (post-baccalaureate)
- A total of 130 students who earned a B.S. degree have pursued post- baccalaureate education (39%)





NEW MEXICO AMP





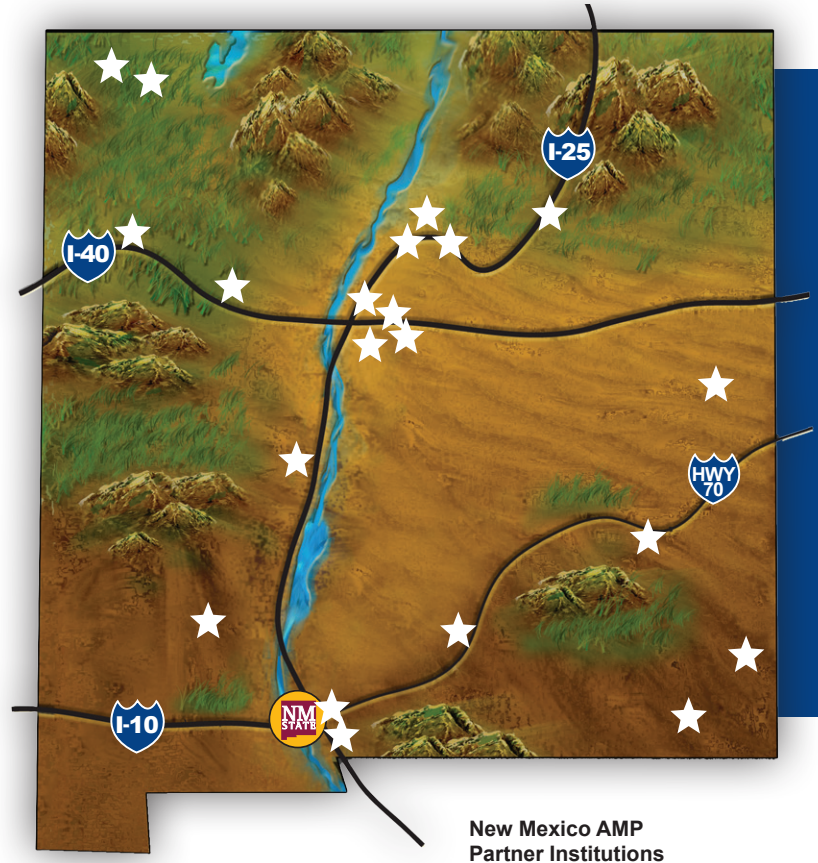
ECONOMIC IMPACT 0

New Mexico AMP has facilitated change and development in the educational fabric of New Mexico through state-level efforts, leadership development, institutional programming at partner colleges and universities, and individual student support. Collectively, these efforts have resulted in measurable economic impacts to New Mexico. “Economic impact analysis is an attempt to measure the net change in economic activity in a given geographic area that results from a change in economic activity. . . . The main idea behind economic impact analysis is that a new dollar spent in a local area results in more than one dollar in economic activity in the area.” Such change is measured in “direct” and “indirect” impacts. For this analysis, direct impact measures the higher earnings of STEM graduates remaining in the state, while indirect impact measures the associated results – i.e., additional jobs created as a result of those higher earnings and the associated labor income. *The following Analyses are presented in 2013 inflation adjusted dollars and presented for a single year.*

Direct Impact

To measure the direct impact of New Mexico AMP, New Mexico State University economist and Regents Professor James Peach and his colleagues at the Arrowhead Center,¹ the economic and business development leader for NMSU, examined the Census Bureau’s 2013 American Community Survey data for earnings differentials between STEM Occupational and Degrees versus Non-STEM (any degree) for New Mexico. Based on the increase over the base year in STEM graduates (253 in 1992/93), the following assumptions and calculations were made:

1. STEM degrees to underrepresented minorities increased by a total of 5,187 degrees after factoring out the baseline of 253 degrees per year over the lifetime of the program.
2. Based on the 2013 American Community Survey, the differential for STEM versus Non-STEM occupations was \$36,459.
3. Using NMSU alumni data as a reasonable estimate, we assume that 52% of STEM graduates reported in #1 above reside in New Mexico.
4. The Labor Force Participation Rate of college graduates ages 25-64 in New Mexico is 0.8383. This rate is drawn from the 2013 American Community Survey.
5. Based on the earnings differential of \$36,459, we estimate that STEM graduates residing in New Mexico had \$82,272,736 in higher earnings than would have been the case without a STEM degree. The earnings of STEM graduates who have left the state of New Mexico are not included in this conservative estimate.



¹ Definition and economic analysis provided by Arrowhead Center, Inc., New Mexico State University.

² All data in this section is drawn from U.S. Department of Commerce, Economics and Statistics Administration, ESA Issue Brief #03-11, July 2011.

NEW MEXICO AMP

KEY IMPACTS AT A GLANCE

- The State of New Mexico has invested \$6,833,317 to date (1996/97–2015/16) to support program sustainability and enable New Mexico AMP to attract additional funds to the state.
- Adding to the initial investment of \$5 million from the National Science Foundation, the State of New Mexico's investment of nearly \$7 million over time has enabled New Mexico AMP to attract an additional \$33 million in funding to support STEM student development and support.
- Increases in the number of STEM degrees awarded and the participation of STEM graduates in the New Mexico workforce has resulted in \$82,272,736 in higher earnings in the state than would have been the case without a STEM degree. An additional 570 jobs resulted from the higher earnings of STEM graduates, producing an additional \$20,623,434 in labor income in the state.
- STEM workers experience lower rates of joblessness – 5.3% in 2010 compared to almost 10% for non-STEM workers – and earn 20% more than their non-STEM counterparts.

Indirect Impact

To measure indirect impact of New Mexico AMP, Dr. Peach and his colleagues used IMPLAN Pro Version 3 economic modeling software to estimate that an additional 570 jobs resulted from the higher earnings of STEM graduates, producing an additional \$20,623,434 in labor income in the state.

Attracting Additional Resources to Support New Mexico Students

In addition to the economic impact described above, the New Mexico AMP has leveraged nearly \$7 million to date from the New Mexico State Legislature (1996/97–2014/15) to support the goals of the program. The program enjoys “statutory status” with the legislature, establishing the Alliance as a permanent line item in the NMSU budget request to the New Mexico State Legislature to support STEM student achievement in New Mexico. Supporting long-term sustainability, this designation allows the Alliance to receive state funding, as well as gifts, grants, and donations from public or private sources.

The Economic Importance of the National LSAMP Program

As reported by the U.S. Department of Commerce Economics and Statistics Administration (ESA),² the growth of STEM jobs over the past decade has been three times that of the non-STEM workforce, representation 1 in 18 workers in the United States. The report further projects that the growth in STEM occupations will continue to increase by 17% between 2008 and 2018 – almost twice the rate of growth for non-STEM occupations, projected to grow at 9.8% for the same time period. In addition to the growing demand in the STEM occupations, the following conditions for STEM workers demonstrate additional positive economic outcomes:

- STEM workers experience lower rates of joblessness – 5.3% in 2010 compared to almost 10% for non-STEM workers.
- Nationally, STEM workers holding STEM degrees earn 20% more than their non-STEM counterparts (regression adjusted earnings premium for 2009, factoring out age, marital status, race, ethnicity, region, and industry).
- STEM workers aged 16 and over achieve higher levels of educational attainment, with 68% of STEM workers holding a bachelor's degree or higher, compared to 31% for all other workers in the same age group.

Impacting Students' Lives

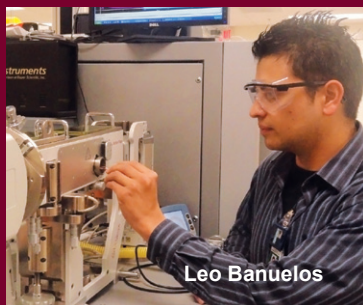
For many New Mexico students, the New Mexico AMP program has provided the opportunity to travel abroad, to perform research that has implications for thousands of lives around the globe, and to realize the economic and personal benefits of STEM education within their own lives and families. In the following sections, we share just a few of these stories.

Student Achievements

Jose "Leo" Banuelos, former New Mexico State University (NMSU) Undergraduate Research Scholar (URS) participant and Bridge to the Doctorate Cohort II participant, received a B.S. and Ph.D. in Physics from NMSU. Leo completed his postdoctoral work at the Geochemistry and Interfacial Sciences Group in the Chemical Sciences Division of Oak Ridge National Laboratory in Oak Ridge, Tennessee. After his postdoctoral work, Leo was hired as a Larmor Instrument Specialist at Rutherford Appleton Laboratory in the United Kingdom, where he currently is employed. Leo's research interests include the interfacial structure and dynamics of complex fluids, nano-confinement effects on biological macromolecules and alkanes, protein folding and stabilization, the development of novel sample environments and instrumentation for multi-length scale, and time-resolved structural analysis.

Zachary Hendren, Bridge to the Doctorate Cohort I participant, received his M.S. degree in 2006 from New Mexico State University (NMSU) before completing a Ph.D. in Environmental Engineering at Duke University. Zachary is now employed as a Water Technology Research Engineer at the Research Triangle Institute in Durham/Raleigh, North Carolina. His research interests include development of novel membrane technologies for water/wastewater treatment and desalination technologies, with a focus on the incorporation of nanomaterials to develop next generation membrane materials.

Ruben Rivera, Northern New Mexico College (NNMC) graduated in December 2013 with a Bachelors of Engineering in Information Engineering Technology. After graduating, Ruben developed two mobile applications, PediApp Finder for the Dominican University of California and Keep Up Yogi in partnership with Simran Khalsa. While developing the latter application, Ruben also taught the fundamentals of computer programming and the Java language for the EECE 152L class at NNMC. Currently, Ruben is working for the Judicial Information Division of the Supreme Court of New Mexico as a Software Applications Developer, where he is developing a Simple Object Access Protocol (SOAP) Web Service that is used to mirror business events between case management systems. As an undergraduate, Ruben presented his Capstone research work at the



Leo Banuelos



Zachary Hendren



Ruben Rivera

IEEE International Conference on Computing, Networking and Communications (ICNC) in Honolulu, Hawaii. His paper entitled “A Comparative Study of Routing Metrics for Reliable Multi-Path Provisioning” proposed a novel optimization model, based on linear programming, for multi-path provisioning in computer networks. IEEE ICNC is a premier conference in the field of computing and communication networks. With an acceptance rate of approximately 30%, Ruben was one of the very few undergraduate students publishing in that venue.

Isabella Acevedo-Rodriguez, Undergraduate Research Scholar (URS) at New Mexico Institute of Mining and Technology (New Mexico Tech), will graduate with a B.S. in Mechanical Engineering from New Mexico Tech in May 2016. Isabella works with New Mexico AMP URS mentor, Dr. Nadir Yilmaz. Isabella earned First Place for her oral presentation at the 2013 New Mexico AMP Undergraduate Student Research Conference and tied for 3rd Place at the 2015 Conference. From 2012 to 2014, she was a volunteer and group member for the American Institute of Aeronautics and Astronautics (AIAA) Design Build Fly Project, which allowed her to create and execute an conceptual designs of the wing configuration, tail configuration, landing gear, materials, and power plant of a model airplane. She then went on to compete at the AIAA international competition in 2013 and 2014. Also in 2014, she secured an internship at the Aerospace Corporation-Space Innovation Directorate in El Segundo, CA. She is a team member of the Society for Automotive Engineers (SAE), a group that will compete at the October 2015 Aero Design West competition in Van Nuys, CA. Isabella has also attended working operation meetings at the NASA Langley Research Center to assist in the coordinated flying of an A-Train Constellation Satellite. After graduation, Isabella hopes to continue research by pursuing a M.S. in Aerospace Engineering with a focus on Orbital Mechanics.

Ben Rael, former Bridge to the Doctorate fellow at the University of New Mexico (UNM), defends his Ph.D. dissertation, *Optimizing Powder Metallurgy Methods: Carbon Nanotube Metal Matrix Composites*, in December 2015 to earn a doctoral degree in Mechanical Engineering. Ben began his academic career at UNM and received a B.S. in Physics before transitioning into the Ph.D. Program. Ben is a recipient of the 2014 UNM Outstanding Graduate Student Award in Mechanical Engineering, the Charlotte and William Kraft Graduate Fellowship, and the Miller Metal Company Endowed Fellowship. In addition, Ben is a National Science Foundation (NSF) Integrative Graduate Education and Research Traineeship (IGERT) Fellow. Ben has also mentored students through the NSF Western Alliance to Expand Student Opportunities (WAESO). He received Third Place for a Doctoral Research Poster Presentation at the 2013 More Graduate Education at Mountain State Alliance/ WAESO Conference. Ben was also an alternate for the Fulbright Scholarship and traveled to Nantes, France to conduct research at the French National Institute for Agricultural Research. Currently,



Isabella Acevedo-Rodriguez



Dr. Laura Crossey and Ben Rael



(left to right in) Wendi Cole; Dr. Nader Vadiee, SIPI Instructor of Electronics; Dorothy Wester, Administrator at SIPI; and SIPI student Calvin Silas (transferred to NMSU) in the State Capitol Building in Santa Fe, NM.



Alexandra Minitriz and Chris Hirani, winners at NMAS



Reece Broughton and Dr. Salim Bawazir



Dr. Danielle Miranda

Ben works at Intel in Rio Rancho, NM as a Ph.D. Process Engineer in Lithography. In the future, he hopes to gain a full-time position at Intel conducting similar work.

Wendi Cole earned an Associate's Degree in Pre-Engineering from Southwestern Indian Polytechnic Institute (SIPI) in fall 2013 and received a New Mexico AMP Transfer Scholarship and Freeport McMoran Foundation Scholarship to attend New Mexico Institute of Mining and Technology (New Mexico Tech) as a Mineral Engineering major, with a specialization in explosives. More recently, Wendi was invited to participate in a national roundtable discussion that was hosted by the Department of Energy to promote and support Native American and Alaskan Native STEM education and careers. *See more information about Wendi's leadership efforts on the Focus on Community College page.*

Christopher Hirani, former Summer Community College Opportunity for Research Experience (SCCORE) participant who started his academic career at Central New Mexico Community College (CNM), received the New Mexico AMP Transfer Scholarship in fall 2015 for his transfer to the University of New Mexico (UNM). While a student at CNM, Christopher received the New Mexico Credit Union Education Foundation scholarship, the CNM Advantage Scholarship, and the CNM Career and Technical Programs Scholarship. Christopher's research interests include nano-sciences, electrochemistry, and environmental engineering. He presented research at the New Mexico Academy of Science (NMAS) Research Symposium, at which he was awarded First Place for his poster presentation. Chris hopes to continue his success and maintain his 4.0 GPA while progressing toward his B.S. in Chemical Engineering at UNM.

Reece Broughton received the New Mexico AMP Transfer Scholarship to attend New Mexico Institute of Mining and Technology (New Mexico Tech) in fall 2015. Reece attended New Mexico State University-Alamordo Community College (NMSU-A), receiving the Associate's of Science. At NMSU-A Graduation in May 2015, Reece was recognized as the NMSU-A Division Honor Graduate for both the Mathematics, Engineering, Science, and Health (MESH) and the Professional Occupations, Technologies and Fine Arts (PROTECH) Divisions. He was also recognized as the Gold Cord Graduate for 2015, a 2015 Crimson Scholar Graduate, a Meritorious Graduate for 2015, Member of the PTK Honor Society, and he was the recipient of the Jim Griggs Technology Endowed Scholarship.

Danielle Miranda, New Mexico AMP Summer Community College Opportunity for Research Experience (SCCORE), Undergraduate Research Scholar (URS), and New Mexico AMP Transfer Scholarship recipient, was awarded the Ph.D. in Translational Science at Mayo Clinic in Scottsdale, Arizona in May 2015. Danielle has recently taken a position as a research protocol specialist in the Clinical Studies Unit at Mayo Clinic. In this work, she is involved in multiple

clinical studies and also assists physicians with development of their clinical protocols. In this experience, she is learning about ongoing research while also becoming more familiar with the business aspect of Clinical Studies. She began her academic career at New Mexico State University-Alamogordo Community College and transferred to New Mexico State University, where she earned the B.S. degree in Microbiology.

Amanda Lara, 2013 Summer Community College Opportunity for Research Experience (SCCORE), participant and transfer student from New Mexico State University-Carlsbad Community College, is currently majoring in Civil Engineering at New Mexico State University (NMSU). Amanda participates in the Reinventing the Nation's Urban Water Infrastructure (ReNUWiT) program at NMSU with Faculty Mentor Dr. Nirmala Khandan, Professor of Civil Engineering. The ReNUWiT program is an interdisciplinary, multi-institution research center funded by National Science Foundation. Amanda presented her research as well as her experience as a SCCORE participant at ReNUWiT's Annual Meeting at Stanford University. At NMSU, Amanda is a member of the Golden Key International Honor Society and the Alpha Tau Beta Pi Chapter of the Honor Society of Engineers. In May 2015, Amanda received an Associate of Science degree at the graduation ceremony at NMSU-Carlsbad that she earned with a back-transfer of credits. At the event, Amanda was recognized as the Outstanding Science Student for the year at NMSU-Carlsbad.

NSF Graduate Research Fellowship Program (GRFP) Awardees

New Mexico AMP has had many of its students honored as Graduate Research Fellowship Program (GRFP) awardees, including the following students from the University of New Mexico (UNM) and New Mexico State University (NMSU):

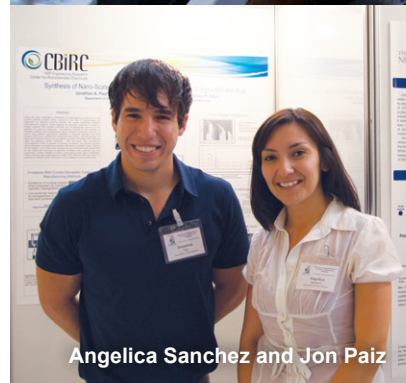
Gerardo Martinez, NSF Graduate Research Fellowship Program (GRFP) recipient and former Undergraduate Research Scholar (URS), received a Mechanical Engineering B.S. and M.S. degree from New Mexico State University (NMSU). After receiving the M.S. degree, Gerardo worked as a Technology Commercialization Associate at the NMSU Arrowhead Center while also working toward the M.S. in Electrical Engineering. He is currently employed as a Research and Development Mechanical Engineer at Sandia National Laboratory in Albuquerque, New Mexico. Throughout his academic career at NMSU, Gerardo mentored many New Mexico AMP URS participants and Summer Community College Opportunity for Research Experience (SCCORE) participants. While an undergraduate at NMSU, Gerardo participated on a payload research team at NMSU that was selected by NASA to prepare and load experiments on a UP Aerospace rocket. The payload on which his team worked was carried on a launch of UP's SpaceLoft-8 sounding rocket. The rocket reached an altitude of approximately 73 miles — roughly 385,000 feet — and provided the technologies with nearly four minutes of microgravity.



Amanda Lara

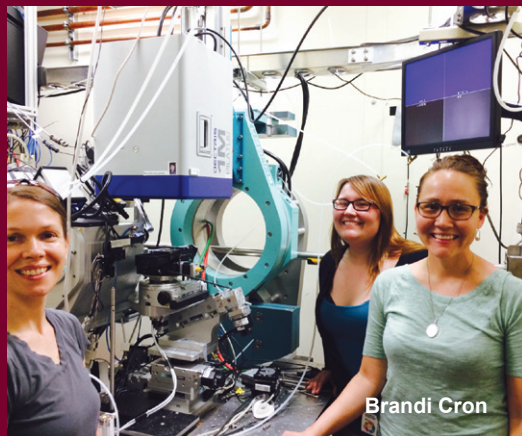


Gerardo on left and team member Milton Winkles (electronic/computer engineer) on right



Angelica Sanchez and Jon Paiz

Angelica Sanchez-Benediviz, Bridge to the Doctorate Cohort VI participant and Graduate Research Fellowship Program (GRFP) recipient, is now in a post-doctoral program as a visiting scientist at Sandia National Labs, where her research focuses on electrochemical sensors. Angelica graduated with a Ph.D. in Chemical Engineering from the University of New Mexico (UNM) in May 2015 after earning the B.S. in Chemical Engineering from UNM in 2009. In 2010, Angelica traveled to San Paulo, Brazil to present research at the Fifth San Luis Symposium on Surfaces, Interfaces, and Catalysis Conference. The event was aimed at uniting Latin American and U.S. scientists in the area of surface science. Regarding the impact the Bridge to the Doctorate program had on her career, Angelica states *“The AMP BD program has not only provided me with the opportunity to attend graduate school but also to gain research experience internationally.”*



Brandi Cron

Brandi Cron, Bridge to the Doctorate VI participant at the University of New Mexico (UNM) in Earth and Planetary Science, was awarded the Graduate Research Fellowship Program (GRFP) fellowship in 2010. Brandi is in the final year of her Ph.D. studies at the University of Minnesota (UM). Brandi, a former Undergraduate Research Scholar (URS), received her B.S. and M.S. at UNM before beginning her Ph.D. career at UM in the Department of Geosciences. Brandi's research focuses on the particle geochemistry of two novel deep-sea hydrothermal vent systems and spectroscopy techniques used to characterize iron-rich aggregates, particle-by-particle, in hydrothermal vents in the Caribbean Sea at the Mid-Cayman Rise. Additionally, she has compiled a set of complementary nano-scale chemical measurements at the Advanced Light Source (Lawrence Berkeley National Laboratory) and the Advanced Photon Source (Argonne National Laboratory). Recently, Brandi received a UM Doctoral Dissertation Fellowship that will allow her to focus on publishing her research findings. After graduation, she hopes to secure a post-doctoral position in academia that will allow her to utilize X-rays to study environments similar to the Mid-Cayman Rise, as well as answer other important environmental research questions in the field of Earth Science.



Alexander Nereson

Alexander Nereson, Bridge to the Doctorate VIII participant and Graduate Research Fellowship Program (GRFP) recipient, earned a B.S. in Geology and an M.S. in Earth and Planetary Sciences from the University of New Mexico (UNM) and is currently working toward the Ph.D. in Earth and Planetary Sciences at the University of California-Santa Cruz. At UNM, Alex received the Outstanding Master of Science Graduate Award and the Alexander and Geraldine Wanek Graduate Scholarship. He authored scholarly publications, peer-reviewed academic articles, and presented at several conferences. His research consists of applying remote sensing, digital spatial analyses, and field studies to complex natural systems in academic, research, and industry settings, and he worked as an Earth Science Intern for Chevron in Houston, Texas.



Brandi Cron, Angelica Sanchez-Benediviz, and Juanita Trevino

Juanita Trevino, Bridge to the Doctorate VI Fellow at the University of New Mexico (UNM), received the Graduate Research Fellowship Program (GRFP) fellowship in 2010 and the Integrative Graduate Education and Research Traineeship (IGERT) Fellowship. Juanita, who is currently employed at Sandia National Laboratories, working in the area of MicroElectric Mechanical Systems (MEMS), earned the B.S. and M.S. in Mechanical Engineering from UNM. As an undergraduate, she was active in Engineers Without Borders (EWB), the Hispanic Engineering Science Organization (HESO), Pi Tau Sigma, and the Society of Automotive Engineers (SAE). In EWB, she helped to install a photovoltaic power generator unit in Ramah, a low-income town in New Mexico with a significant Navajo population. As an undergraduate, Juanita received the Leonard Engineering Scholarship, the S-STEM scholarship, and the SMART Grant.

A Family Affair

Ruben Altamirano and **Alexandra Minitrez**, are more than just stepfather and stepdaughter — they also have in common that they both served as Undergraduate Research Scholars (URS) participants for New Mexico AMP. Ruben, NMSU graduate in Mechanical Engineering Technology, currently works for Sunoco Logistics in Sugarland, Texas. Alexandra is currently pursuing a B.S. in Earth and Planetary Sciences at UNM while also serving as an intern at Sandia National Laboratories. The two attended the New Mexico AMP Student Research Conference in 2014, with Alexandra serving as a presenter, and Ruben looking on as a proud supporter. Alexandra also presented at the New Mexico Academy of Science Research Symposium (NMAS) in November 2014, where she received Second Place in the Undergraduate Poster Division.

Jose and **Juan Solis**, who are brothers, Ph.D. students in Civil Engineering, and former Undergraduate Research Scholars (URS) and Summer Community College Opportunity for Research Experience (SCCORE) participants, are New Mexico State University (NMSU) alumni on their way to earning their doctoral degrees. Jose, the older of the two, received a B.S. and M.S. in Civil Engineering from NMSU. Jose, a Bridge to the Doctorate fellow, just defended his dissertation *Riparian Evapotranspiration Estimation Using a Subsurface-Surface Water Balance Approach* and is awaiting award of his Ph.D. in Civil Engineering from University of Colorado-Boulder. Jose's brother Juan is a Graduate Research Fellowship Program awardee who received his M.S. in Water Resources from NMSU in May 2014 and anticipates receiving his Ph.D. in 2017 in Civil Engineering. Juan works with the Reinventing the Nation's Urban Water Infrastructure (ReNUWiT) program with faculty mentor Dr. Salim Bawazir, Associate Professor of Civil Engineering. The ReNUWiT program is an interdisciplinary, multi-institution research center funded by National Science Foundation. His research work with ReNUWiT and conference presentations keep Juan very busy. Recently, he presented at the 12th Annual Rocky Mountain Water Environment Association (RMSAWWA/RMWEA) Student Conference at NMSU, and in 2014, at the 21st Institute on Teaching and Mentoring/Compact for Faculty Diversity Conference at the Omni CNN Center in Atlanta, Georgia.



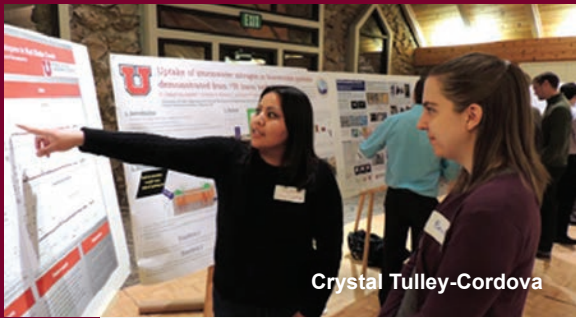
Ruben Altamirano and
Alexandra Minitrez



Jose Solis



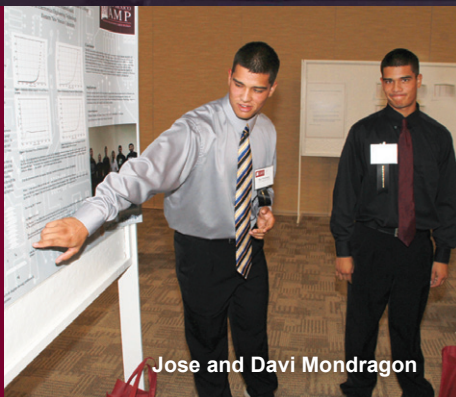
Juan Solis



Crystal Tulley-Cordova



Nikki Tulley



Jose and Davi Mondragon



Dr. Nadir Yilmaz and Francisco Vigil

Crystal Tulley-Cordova and **Nikki Tulley** are sisters and former Undergraduate Research Scholars (URS) at the University of New Mexico (UNM). **Crystal**, the older of the two, earned the B.S. in Earth and Planetary Science and M.S. in Water Resources in Hydrosience from UNM. Crystal is now a Ph.D. student in Geology at the University of Utah, where she also serves as the President of the Society for Native American Graduate Students and a member of the Society for the Advancement of Native American and Chicanos in Science and the InterTribal Association. She is also the Senior National Representative for the American Indian Science and Engineering Society. Crystal's sister, **Nikki**, earned a B.S. in Environmental Science at UNM and is now working towards an M.S. in Water Resources UNM. In addition to her studies, Nikki helped organize the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) Conference at UNM. She has taught in the summers in a program funded by the Utah Department of Workforce Services for middle-school children on the Blanding campus of Utah State University. The program is dedicated to helping underprivileged Native American students from Navajo and Hopi reservations stay on track and excel in STEM education. Serving as role models for the students, Nikki and other Native Americans participated as teachers, applying creative ways for the young students to learn to use and love mathematics and to think critically.

José and Davi Mondragon, twin brothers, participated in the 2015 ENMU Summer Community College Opportunity for Research Experience (SCCORE) program. They both recently graduated from Luna Community College with an Associate Degree in Pre-Engineering. Both brothers received the New Mexico AMP Transfer Scholarship and are attending ENMU in Fall 2015. While at Luna Community College, José and Davi were student ambassadors for the college and members of the baseball team. Additionally, they were recognized by the institution's Board of Trustees for their role in the Higher Learning Mission Accreditation process as Student Ambassadors.

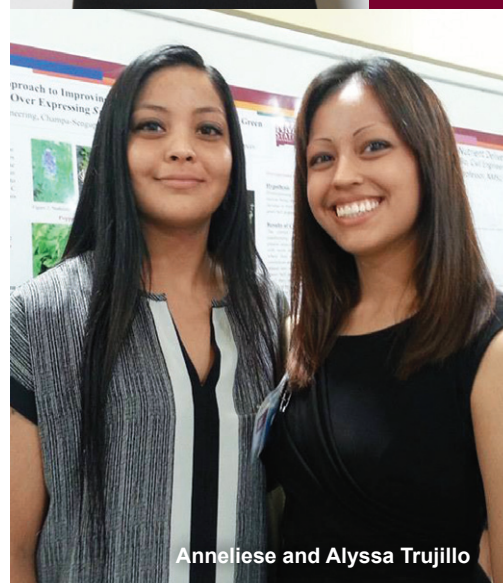
Husband and wife **Francisco Vigil and Maquel Trujillo** are former Undergraduate Research Scholars (URS) participants who both graduated from New Mexico Institute of Mining and Technology (New Mexico Tech) with a B.S. and M.S. in Mechanical Engineering and who both hold full-time jobs at Los Alamos National Laboratories. During his undergraduate career, **Francisco** received many honors and awards, including the New Mexico Tech Student Appreciation Award in 2013, the New Mexico Tech Scholar Award in 2012, the DOE Visiting Faculty Program Fellowship at Sandia National Labs, and selection to participate in the Summer Research Opportunity Program at the University of Illinois-Urbana Champaign in 2012, where he received an award for Outstanding Academic Scholarship. As a New Mexico AMP URS, Francisco worked from 2011 to 2013 with faculty mentor, Dr. Nadir Yilmaz, Associate Professor and Associate Department Chair of Mechanical

Engineering. **Maquela Trujillo**, Francisco's wife, recently received the M.S. in Mechanical Engineering from New Mexico Tech, researching with faculty mentors Dr. Yilmaz and Dr. Ghosh. Similar to her husband's story of success, Miquela received recognition and honors while an undergraduate at New Mexico Tech. She was named the New Mexico Tech Engineering Student of the Year in 2013 and New Mexico Tech Scholar in 2012. In addition, she served as Vice President of the New Mexico Tech SAE Student Chapter in 2012-13 and was named the Los Alamos National Laboratory Foundation-Bronze Scholar in 2010. She also received the New Mexico Space Grant Consortium Scholarship in 2011. Miquela participated in the Summer Research Opportunity Program at the University of Michigan in 2012 and works currently as a research and development engineer at Los Alamos National Laboratory. Miquela comments, "[New Mexico] AMP exposed Francisco and I to research at the university level at an early stage of our undergraduate degree. This gave us the experiences needed for graduate school and opened up numerous opportunities for us. The skills we gained from participating in AMP are very valuable skills that are used today in our current jobs. Last year Francisco and I, along with Dr. Yilmaz, Dr. Ricardo Jacquez, and some other AMP students published an article for the ASEE Annual Conference that discussed the impact of AMP on minority students in engineering." Miquela also excitedly shared that they are expecting a baby boy, who will, no doubt, also be an "AMP-er" one day!!



Maquela Trujillo

Anneliese and Alyssa Trujillo are sisters who both participate in the Undergraduate Research Scholars (URS) program at NMSU. Anneliese is a Chemical Engineering major who plans to graduate in Spring 2018. Her faculty mentor is Dr. Champa Gopalan, Professor of Plant and Environmental Sciences, and her research focuses on the improvement of plant performance by manipulating sucrose levels with a genetic engineering approach. Anneliese was awarded First Place for her poster presentation at the 2015 New Mexico AMP Student Research Conference. Her sister, Alyssa Trujillo, is a Civil Engineering major, who works with faculty mentor, Dr. Craig Newton, Professor of Civil Engineering, on research that focuses on renewable energy. Alyssa will graduate in December, 2015.



Anneliese and Alyssa Trujillo

Helping Students Become Global Scholars Through International Experiences

New Mexico AMP has a continuing commitment to provide opportunities for students to engage in international research and education activities. These international opportunities facilitate cross-cultural understanding and the development of the global perspectives that are so critical to the future of the STEM workforce. Through the International Research and Education Participation Global Scholars Program, New Mexico AMP helps students with awareness of international opportunities and assistance in assembling a package of travel support.

Felly Montelya, 2008 Summer Community College Opportunity for Research Experience (SCCORE) participant and Undergraduate



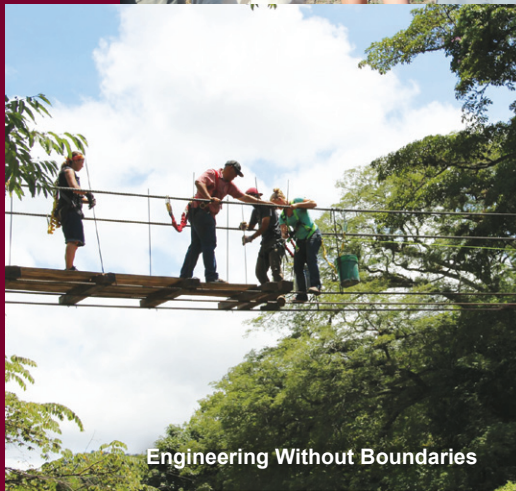
Felly Montelya



Bayo Falase



NMHU Students in Venezuela



Engineering Without Boundaries

Research Scholar (URS) participant, graduated with a B.S. degree in 2011, and will receive her M.S. in Environmental Engineering in December 2015 from New Mexico State University (NMSU). Felly has had the opportunity to research in multiple disciplines including physics, environmental engineering, and biology. Felly works with Reinventing the Nation's Urban Infrastructure (ReNUWIt) program with faculty mentor Dr. Nirmala Khandan, Professor of Civil Engineering and Community College Education Lead and Campus Co-PI of ReNUWIt at NMSU. Felly traveled to South Korea in the summer of 2014 to research algal biofuels at the Korean Advanced Institute of Science and Technology under the NSF East Asia Pacific Summer Internship. She is a NSF IIA Fellow, and recently co-authored "Feasibility of Algal Systems for Sustainable Wastewater Treatment," which was published in *Bioresources Technology*. Felly completed a summer internship at the New Mexico Consortium Lab at Los Alamos National Laboratory in summer 2015. In November 2015, Felly attended the EPSCoR National Conference in Portsmouth, New Hampshire.

Akinbayowa (Bayo) Falase, Bridge to the Doctorate Cohort VI participant, works as Process Engineer for Intel Corporation in Leixlip, Ireland, where he serves as a Seed Engineer. Bayo earned the Ph.D in Chemical and Nuclear Engineering from UNM in 2011, with a research emphasis that is reflected in the title of his dissertation: *Nano-structured Platinum-based Catalysts for Complete Oxidation of Ethylene Glycol and Glycerol*. His research focused on finding a pathway to completely oxidize ethylene glycol and glycerol, using a combination of inorganic and organic catalysts. Bayo enjoys working in an international location with Intel and credits the National Science Foundation Bridge to the Doctorate program for his success during his graduate career.

Lisa McBride, Rose Peralta, Justin Saiz, and Stephen Salinas, and Gabrielle Vigil, Undergraduate Research Scholars (URS) participants at New Mexico Highlands University (NMHU) researched anacondas in Munoz, Venezuela with their faculty mentors, Dr. Jesus Rivas, who is NMHU Associate Professor of Biology and Dr. Corey Rivas, who is NMHU Assistant Professor of Biology. Over a three-week period, the team captured, studied, and released 54 green anacondas. In addition to the anaconda research, further studies were conducted through surveys of tropical waterfowl and mammals. Rose Peralta and Lisa McBride went on a second international journey to Mexico with the professors, where Rose did a study with birds and long-term recolonization of forest patches and Lisa worked with the community of frogs in the understory of the forest. Gabrielle Vigil went to Mexico as well, working with density of frogs in the forest, similar to Lisa's project.

Engineering Without Boundaries (EWB), is a student organization in the Department of Engineering Technology and Surveying Engineering at New Mexico State University, whose mission is to

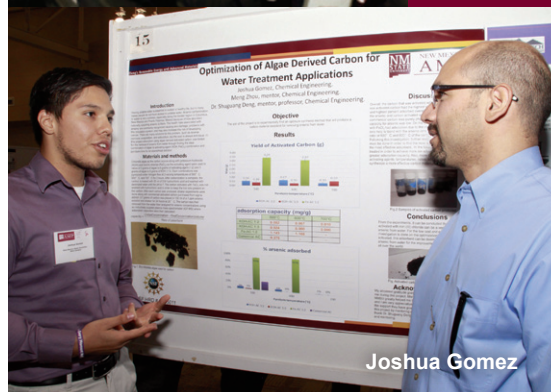
partner with developing and local communities for the purpose of improving their quality of life through the implementation of environmentally sustainable, equitable, and economical engineering projects. In August 2014, EWB traveled to Queretaro, Mexico and successfully implemented a community center that will now serve as a school, church, and doctor's office. More recently, EWB, in collaboration with Bridges to Prosperity (B2P), built a 53 meter suspended bridge in Oyanca, Nicaragua. The bridge will now serve two small communities by allowing access to urban areas with medical clinics and schools. The New Mexico AMP International Research and Education Participation (IREP) program helps to leverage funding for New Mexico AMP students who are involved with EWB.

Mauricio Garcia, Fall 2014 New Mexico AMP URS, conducts research on Ergonomic Analysis of a Portable Assisted Mobility Device. This research recently led Mauricio to the 2014 Partners for the Advancement of Collaborative Engineering Education (PACE) Conference in Turin, Italy, where his presentation was honored as "Best Presentation on Industrial Design." In 2014, he traveled to New Orleans, LA for the Hispanic Engineer National Achievement Awards Corporation (HENAAC) Conference, and to Los Angeles, CA for the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) Conference. Mauricio was also one of 32 students, nationwide, invited to the Exxon Mobile Future Leaders Academy. In addition in 2014, Mauricio was named the University Innovation Fellow by the National Center for Engineering Pathways to Innovation, known as Epicenter. As a Fellow, he attended the Innovation Fellows Meet-up, toured Google, and visited Stanford University. The fellows also had the opportunity to attend a panel discussion featuring speakers from the White House, Google, Design for America, 3 Day Start-up, and Google X.

Joshua Gomez, current New Mexico AMP Undergraduate Research Scholars (URS) participant, works with Dr. Shuguang Deng, Chemical Engineering Professor at NMSU and with the New Mexico Water Resources Research Institution ((NMWRRI) on a project to develop a filter that removes arsenic and fluoride from the water in Palomas, Mexico. The unique aspect of this project is that the research team ensures the teachers and community members in Palomas learn how to make the filter themselves and acquire the materials, so they can maintain the filter when the team leaves. Joshua presented this at the American Institute of Chemical Engineers Annual Meeting in November 2014 in Atlanta, Georgia. Joshua is currently working on two new projects: the development of activated carbon from algae for arsenic and fluoride absorption, which is related to the project in Palomas. In addition, he is working to develop a carbon filter to purify the water for astronauts on the International Space Station, and he is receiving support for this from the New Mexico Space Grant Consortium.



Mauricio Garcia



Joshua Gomez

INTERNATIONAL



Martha Martinez-Grimes,
Daniel Ramirez, Alfonso Islas, NMSU
Chihuahua, Mexico



Jesus Sigala, NMSU
United Kingdom

Gerardo Martinez, NMSU, Vancouver, Canada

Sofia Verduzco, NMSU, Canada

Joshua Gomez, NMSU, Palomas, Mexico

Gerardo Moreno-Crespo, NMSU
Dublin, Ireland

Shelley Vigil, NMSU
Juarez, Mexico



Kareen Prade, UNM
Iceland

Kenly Maldonado, NMSU
Ruiz de Ancones, Mexico



Kareen Prade, UNM
Costa Rica

Jorge Dominguez, NMSU, Nicaragua

Matthew Meyers, NMSU, Nicaragua

Paul Candelaria, NMSU, Nicaragua

Jacob Trujillo, NMSU, Nicaragua

Julian Davis, UNM, Honduras

Theodore Mansfield, NMSU
Peru



Lisa McBride, Rose Peralta,
Justin Saiz, Stephen Salinas, NMHU
Venezuela

Gabrielle Vigil, NMHU
Venezuela

Jeff Garcia, NMSU
Bolivia



Angelica Sanchez-Benevediz, UNM
Brazil



Engineering Without Boundaries
Nicaragua



Daniel Ramirez, NMSU
Chile



Jeffrey Samson, UNM
San Borja, Bolivia

GLOBAL SCHOLARS

Akinbayowa "Bayo" Falase, UNM, Ireland

Jane Gallegos, UNM, Greenwich, England

Brandi Cron, UNM, England



Jose "Leo" Banuelos, NMSU
United Kingdom



Ricardo Medina, NMSU
Budapest, Hungary

Ben Rael, UNM, France

Keith Salais, NMSU, Japan

Miranda Campos, NMSU, Greece

Andrea Salazar, NMSU
South Korea

Angela Chacon, NMSU
Kyoto, Japan



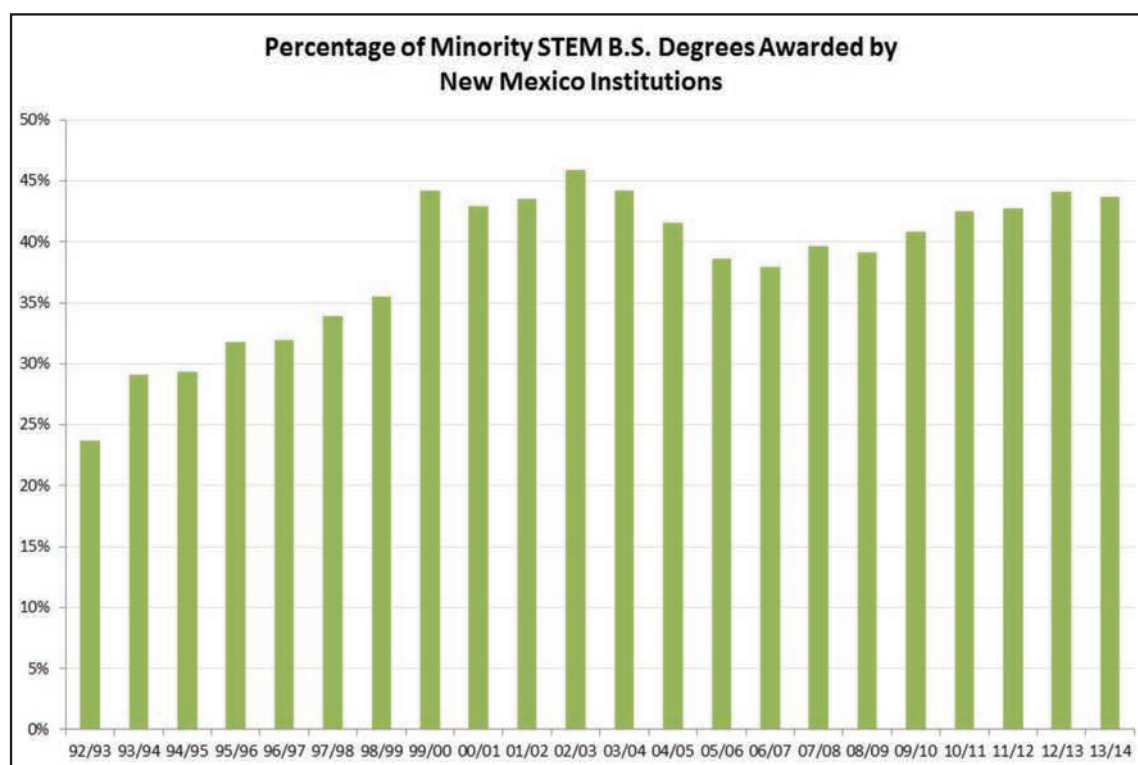
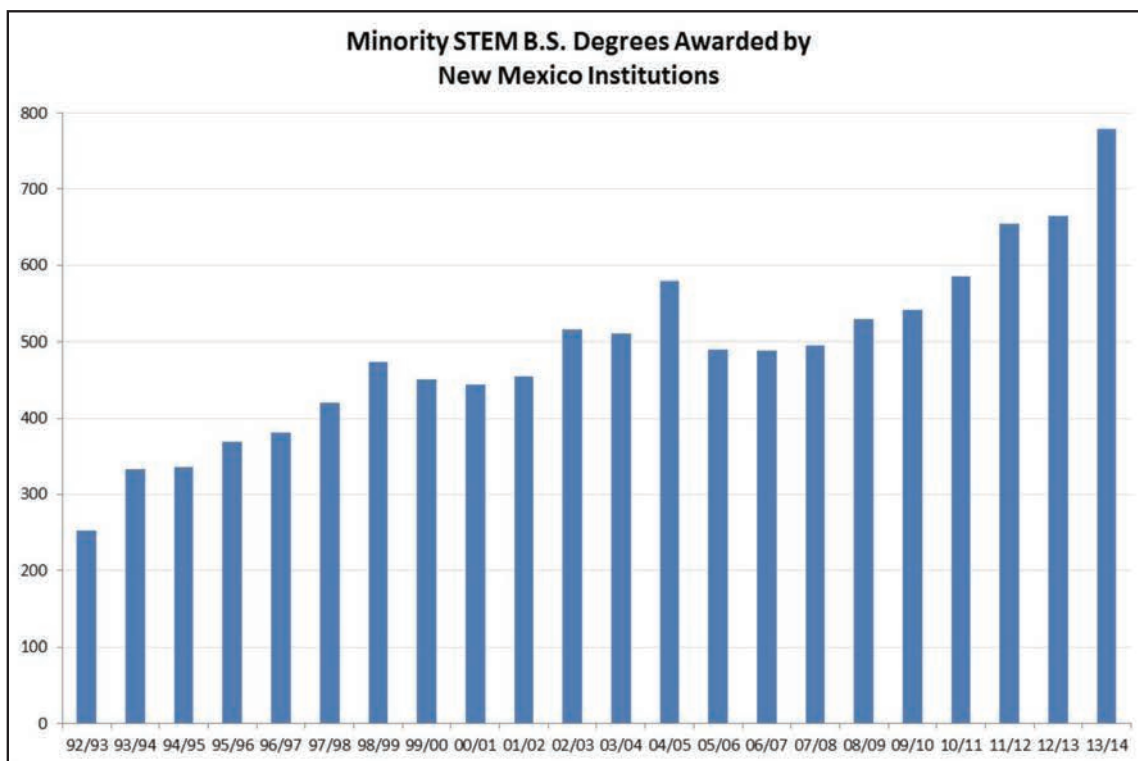
Mauricio Garcia, NMSU
Italy

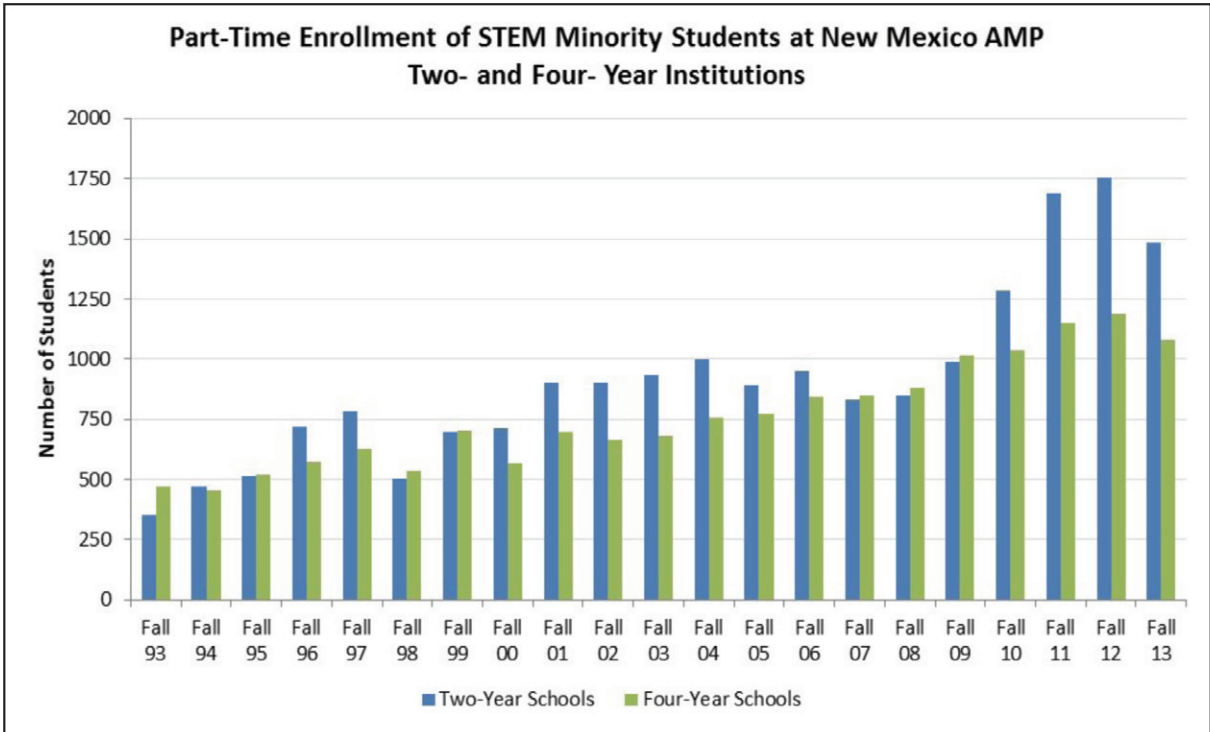
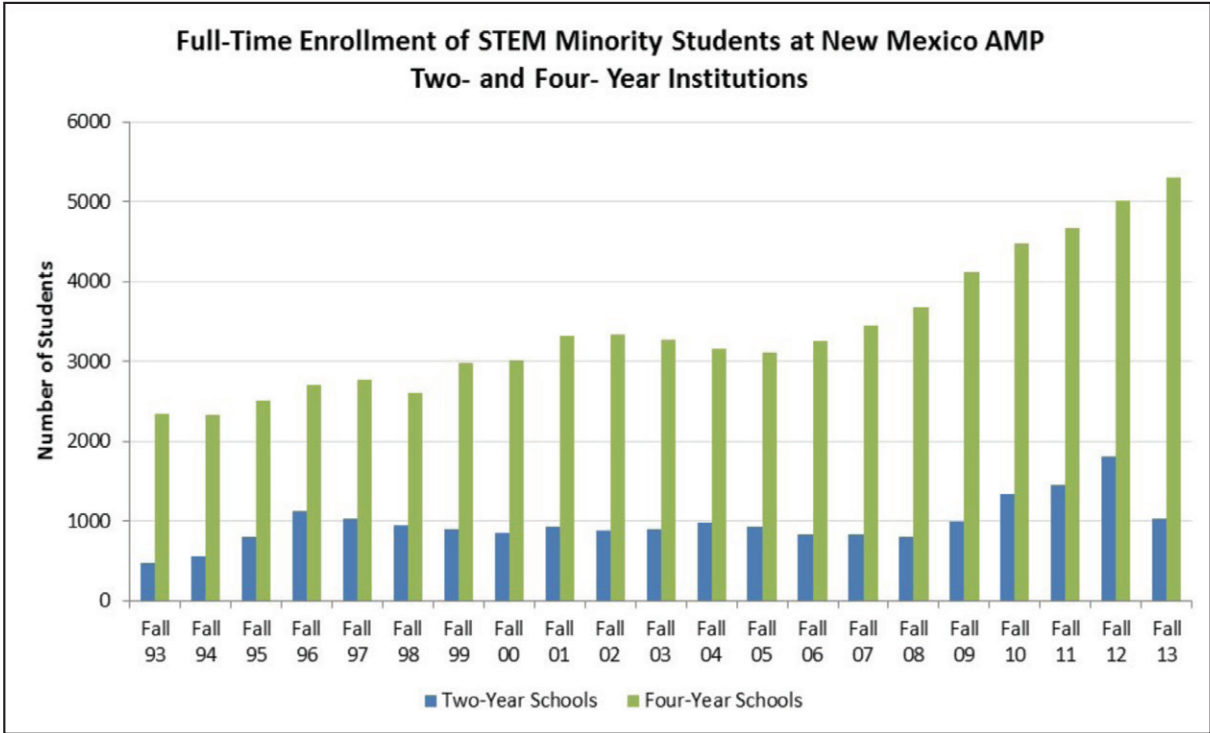


Felly Montelya, NMSU
Korea

Program Outcomes

Since New Mexico AMP's inception, the number of STEM degrees awarded to underrepresented minorities has more than doubled, from 253 in 1992-93 to 779 in 2013-14, with over 10,000 STEM degrees awarded over the life of the program. During this time, the representation of minority degree recipients has increased from 24% of the total number of STEM B.S. degrees awarded in 1992-93 to 44% of the total in 2013-14.





Publications and Presentations

New Mexico AMP staff and faculty disseminate program models and outcomes in poster sessions, presentations, workshops, and papers. These products include, but are not limited to the following:

- Garland, Jeanne, Michele A. Auzenne, Ricardo B. Jacquez (2015). *The Summer Undergraduate Research Bridge Experience for Community College Students: Providing Connections from Community College to the Four-Year Institution*. 122st ASEE Annual Conference. Seattle, WA, June 2015.
***Recognized as 6th Best of 25 papers nominated in the Diversity category.**
- Yilmaz, N., Vigil, F.M, Trujillo, M., Acevedo-Rodriguez, I., Jacquez, Ricardo B., "Influence of NSF Funded Undergraduate Research Assistantships on Minority Students." *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference & Exposition in Indianapolis, IN, June 16-18, 2014.*
- Burnham, Chris, Ricardo B. Jacquez, and Michele Auzenne. "Writing in the STEM Disciplines." NMSU Teaching Academy Workshop, New Mexico State University, Las Cruces, NM, March 2008.
- Frehill, L. M., Lain, M. A., Jacquez, Ricardo B., Ketcham, L., Luces, K., and Jeser-Cannavale, C. "Contextual Factors Affecting Graduate Student Mentoring." *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference and Exposition, Honolulu, Hawaii, June 24-27, 2007.*
- Frehill, L. M., Lain, M. A., Jacquez, Ricardo B., Ketcham, L., Luces, K., and Jeser-Cannavale, C. "Mentoring Experiences: A Comparison of Women and Men Graduate Students in Engineering and Natural Sciences," *Proceedings of the National Women in Engineering Programs & Advocates Network (WEPAN) Conference, Lake Buena Vista, Florida, June 10-13, 2007.*
- Jacquez, Ricardo B., Gude, V.G, M. Auzenne, A. Hanson, "Enhancing Critical Thinking Skills of Civil Engineering Students Through Collaborative Learning Methods in Supplemental Instruction," *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference & Exposition in Honolulu, Hawaii, June 24-27, 2007.*
- Burnham, Chris, Ricardo B. Jacquez, and Michele Auzenne. "Storying Identity: Using Storytelling in a Freshmen Engineering Seminar to Explore Pre-professional Identity," 57th Annual Conference on College Composition and Communication, New York, NY, March 2007.
- Frehill, L., Jacquez, Ricardo B., Ketchum, L., Pena, R., "Moving High Performance URM Students Into the Professoriate: The NMSU AMP Bridge to the Doctorate Program," *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference, Chicago, IL, June 18-21, 2006.*
- Jacquez, Ricardo B., Auzenne, M., Gude, V.G., Hanson, A.T., Burnham C., Garland, J., "Integrating Writing to Provide Context for Teaching the Engineering Design Process," *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference, Chicago, IL, June 18-21, 2006.*
- Burnham, C., Auzenne, M., Jacquez, Ricardo B., "Negotiating Pedagogical Change in a WAC-Based Engineering Curriculum Revision" Panel Presentation, Eighth International Conference Writing Across the Curriculum (WAC) Conference, May 18-20, 2006.
- Jacquez, Ricardo B., Auzenne, M., Green, S., Burnham, C., "Building a Foundation for Pre-Calculus Engineering Freshmen Through an Integrated Learning Community." *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference, Portland, OR, June 13-15, 2005.*
- Jacquez, Ricardo B., Garland, J., King, J.P., Auzenne, M., Peralta, S., Rubio, H., "The Minority Engineering Transfer and Articulation Program: Building Stronger Pathways and Developing Student Achievement." *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference, Portland, OR, June 13-15, 2005.*
- Auzenne, A. Michele, and Jacquez, Ricardo B., "SMET 101, A Course Designed for Retention and Transfer of Science, Mathematics, Engineering, and Technology Students." Presentation at the Freshman Year Experience Conference, Houston, TX, February 2001.



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