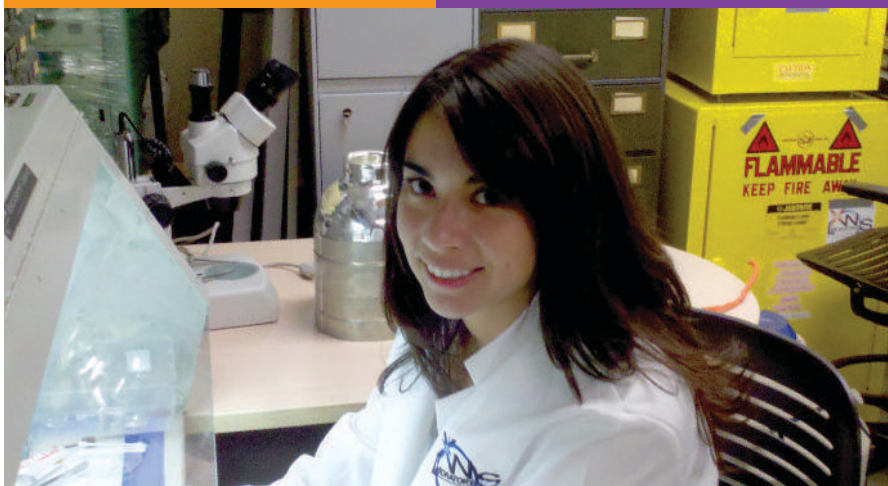


# NEW MEXICO AMP

## ALLIANCE FOR MINORITY PARTICIPATION

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### Program Impact Statement 2010-2011



National Science Foundation

Grant Number HRD-0803171

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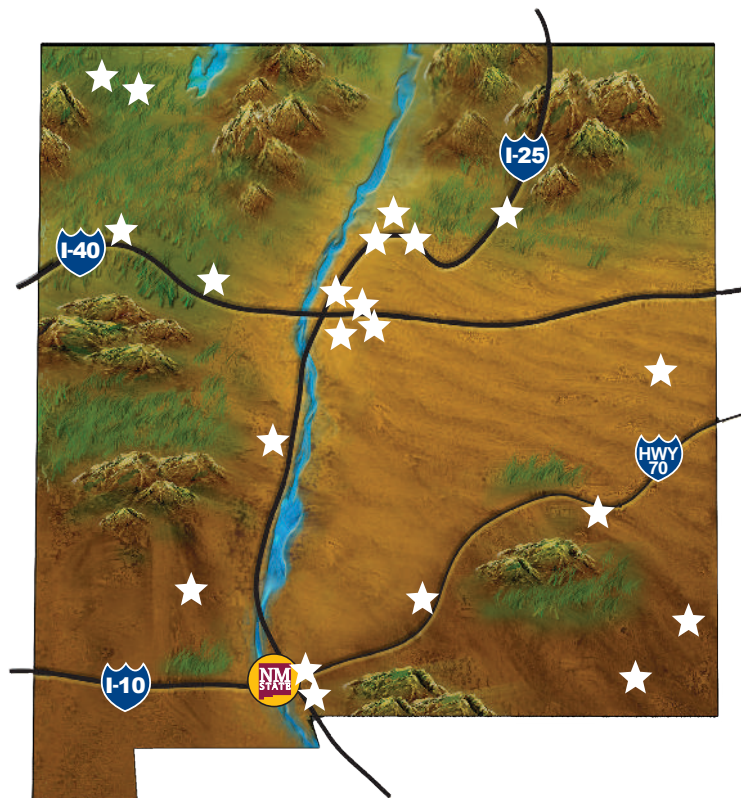
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National Science Foundation

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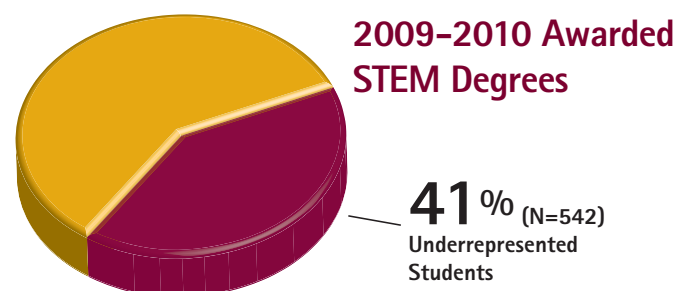
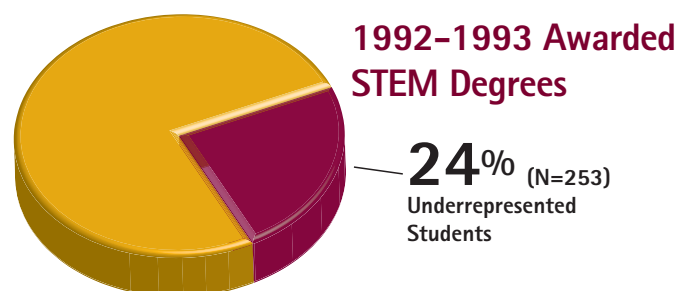


# History of New Mexico AMP

Over the years since its establishment in 1993, the New Mexico Alliance for Minority Participation (New Mexico AMP) has impacted the lives of students in New Mexico, their retention in science, technology, engineering, and mathematics (STEM), as well as their professional development and progression to graduate school. This reflects the thrust and goal of New Mexico AMP to increase the number of B.S. degrees awarded to minorities traditionally underrepresented in STEM and encourage them on to graduate studies. Since New Mexico AMP's inception, the number of STEM degrees awarded to minorities has more than doubled, from 253 in 1992/93 to 542 degrees in 2010, with a total of 7,285 STEM degrees awarded over the life of the program.

The New Mexico AMP is a partnership representing the state's public two-year postsecondary institutions, including two federally funded institutions serving American Indian students, and the state-supported four-year universities. New Mexico AMP is aligned with other National Science Foundation (NSF) programs in New Mexico who share a common vision, including the Reaching the Pinnacle (RTP) program for students with disabilities, Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) program, the NSF STEM Talent Expansion Program (STEP), and the Bridge to the Doctorate program. In its years of operation, 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), and the Bridges to Engineering Education (BEE). 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. Collectively, these collaborations and the individual programs managed by New Mexico AMP are concerned with developing an array of student interventions and multiple lines of inquiry into the issues of effective STEM education. These combined efforts help ensure that participating students are well prepared in STEM and provided with the encouragement, incentive, and motivation to pursue graduate education. Program activities are designed to attend to individual student retention and progression as well as to understanding the aggregation of student progression to graduate school entry and promoting the replication of best practices, both within New Mexico and nationally through professional conference presentations and other publications and professional development events.

In all of its research and scholarship programs, New Mexico AMP strongly emphasizes participation in opportunities that encourage students to understand first-hand the importance of progress to graduate school and the Ph.D. By participation in international, national, and local conferences, exchange programs, and internships, individual New Mexico AMP students have broadened their global perspectives that inspire higher academic and personal goals. Through these experiences, the following reflects just a few of the impacts that have resulted in broader networks and connections, impacting students' perspectives of and influence on the worlds in which they live in considerably more sophisticated ways than would otherwise have been possible.





# Significant Impacts

Since its inception, New Mexico AMP has influenced change through statewide initiatives and leadership development. Further, New Mexico AMP's programs and activities have encouraged student retention in STEM and student progression from community college to university and beyond to graduate school. Reflected in the stories and experiences of our students, New Mexico AMP has helped students across a range of STEM disciplines to see their potential and better their chances of success.

## Statewide Initiatives:

Through its efforts for long-term sustainability, New Mexico AMP has worked to impact statewide and institutional practices and policies, reflected in the following specific outcomes with the New Mexico Higher Education Department and New Mexico Legislature.

In February 2000, the New Mexico Commission on Higher Education (CHE — now the New Mexico Higher Education Department) invited New Mexico AMP to host the first “New Mexico Student Persistence and Retention Summit” in tandem with the long-standing New Mexico Assessment Association (NMAA) Conference. The effort established a statewide forum for the discussion of student persistence and retention issues and sharing of best practices. As a result, the NMAA Conference and the Student Persistence and Retention Summit were permanently combined in 2001. Now known as the New Mexico Higher Education Assessment and Retention (NM HEAR) Conference, the event takes place each February. From 1993 to 1999, the Alliance also participated with the New Mexico CHE to establish and disseminate statewide articulation agreements; the “general core” and several discipline-specific transfer modules remain in use throughout the state.

Importantly, New Mexico AMP was granted statutory status by the New Mexico Legislature in 2007, 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.



# Leadership Development

New Mexico AMP has provided professional development opportunities to a number of individuals in New Mexico who have now risen to leadership positions within their respective institutions. They include Ricardo B. Jacquez, Anthony Sena, Bernadette Montoya, and Phyllis Baca. Drs. Sena and Montoya were involved for many years as faculty members as Institutional Coordinators of their institutions, and Dr. Jacquez has been the New Mexico AMP Principal Investigator and Director of New Mexico AMP since its inception. Each of these individuals are now in positions of leadership, allowing them to explore and develop approaches to student support and development and to impact institutional practices and policies in these critical areas.



**Dr. Ricardo B. Jacquez**, who has been Director of New Mexico AMP since it was established in 1993, was appointed Dean of the College of Engineering at NMSU in April 2010. Dr. Jacquez served NMSU in the past as Interim Associate Provost and as Interim Department Head of Civil Engineering. Dr. Jacquez is also Regents Professor of

Civil and Geological Engineering. Importantly, Dr. Jacquez is the 2006 recipient of the prestigious Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring (PAESMEM). Over the course of his career, Dr. Jacquez has earned a respected reputation for broadening

student opportunities, establishing important pathways to graduate studies, providing research and transfer assistance to community college students, and providing underrepresented high school students reasons to aspire to STEM post-secondary education. He 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 the Principal Investigator (PI) of the Reaching the Pinnacle Program (RTP). Dr. Jacquez also served as the director of the education and research program of the Waste-management Education and Research Consortium (WERC) at NMSU.



**Dr. Anthony Sena**, Provost at Northern New Mexico College (NNMC), served as Institutional Coordinator as a faculty member for many years. Dr. Sena was named Provost of NNMC in August, 2005. His career with NNMC began in 1981 as an instructor of biology in the Department of Arts and Science, then as Chairman of the Math,

Science, and Engineering Department from 1983-2005. His research interests are in DNA repair and recombination, as well as the ecology and genetic diversity of New Mexico whiptail lizards. Dr. Sena has served as a regular reviewer for the National Science Foundation (NSF) since 1983, and he has mentored dozens of undergraduate science students at NNMC and also in collaboration with the Biosciences Division at Los Alamos National Laboratory. In 1999, Dr. Sena was recognized with the National Community College

Mentor award by the Society for Chicanos and Native Americans in Science (SACNAS). He was also named to the Science Hall of Honor at Eastern New Mexico University (ENMU) and was inducted to the University of New Mexico (UNM) Chapter of Sigma Xi, the Scientific Research Society of North America. Dr. Sena's current assignment is as Provost and Vice-President for Academic Affairs at NNMC.

Dr. Sena asserts, *"A great value of AMP is in providing mechanisms for interaction between students, faculty and staff among the participating Colleges and Universities. This creates a synergy of motivation and awareness among all participants on the potentials that exist, both at the small and larger institutions, for students and faculty. For example, AMP support of faculty-directed undergraduate research opportunities has had an amplifying effect in opening avenues for educational and STEM career pathways, which in turn leads to increased numbers of role models and exemplars of success among underrepresented groups."*



**Dr. Bernadette Montoya**, the NMSU Vice President of Student Success, 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. She started her career teaching in public schools

before service in various roles at NMSU-Grants, the Doña Ana Community College campuses, and NMSU-Main. Most recently, Dr. Montoya served NMSU-Main as Associate Vice President for Enrollment Management in NMSU's Division of Student Success. In this capacity, she oversaw University

Admissions, the University Registrar's Office, and the Office of Financial Aid and Scholarships, Business Support Systems, Student Information Management, and Enrollments Services at the Albuquerque Center. In her new role as Vice President of Student Success, Dr. Montoya is positioned to influence decisions and direction for all the staff and students involved in the Division of Student Success. 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 fields. It has continued to be a privilege to be involved with New Mexico AMP!"*



**Phyllis Baca** is the Director of NM STEM (Science, Technology, Engineering, and Math) Initiatives at Santa Fe Community College (SFCC) and the newly appointed Co-Director of New Mexico AMP for Community Colleges. Ms. Baca served New Mexico AMP for the past four years as Institutional Coordinator at SFCC as a faculty

member. Aligning herself with the American Competitiveness Initiative, her overarching goal is to double the number of underrepresented minorities and women graduating in STEM programs. Her chemical engineering background, coupled with her alternative teaching licensure, allows for a unique perspective in serving the students of New Mexico. Ms. Baca serves on several state-level committees that influence educational decisions in New Mexico, including the Higher Education Department's Engineering Articulation Task Force,

the Higher Education Department's Computer Science Task Force, and the Higher Education Department's Co-Chair of the General Articulation Committee. Ms. Baca is also on the Advisory Boards of both the New Mexico AMP and the Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP), and SFCC's President's Diversity Task Force, The Math and Science Advisory Committee, The Santa Fe Alliance for Science Advisory Board, and the NM Innovate-Educate Education Advisory Board. 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."*





## Expanding Opportunities for Students in New Mexico – New Mexico AMP's Programs

New Mexico AMP has had remarkable success in a state that historically includes low socio-economic conditions, a high number of first generation and minority students, and geographic isolation. Our experiences of the past eighteen years have resulted in a targeted recruitment, progression, and retention strategy that focuses on the achievement of individual students from the community college through the Bachelor's degree, with strong encouragement and support for students to matriculate to graduate studies in the STEM disciplines. Based on our experience, combined with our understanding of the national literature on student retention and progression strategies, we support "intrusive" interventions that provide exceptional one-on-one support to individual students with a strong emphasis on supporting and engaging students in faculty-mentored research. Additionally, we cast a broad net through several activities to attract, encourage, retain, and support STEM students from a broad range of experiences and levels of educational preparation and attainment. Finally, because New Mexico AMP emphasizes the involvement of faculty and administrators, institutional changes are being realized throughout the statewide partnership.

New Mexico AMP's core programs, the Integrated Learning Communities (ILC), the Bridge to the Doctorate (BD) program, the Undergraduate Research Assistantship (URA) program, the Summer Community College Opportunities for Research Experience (SCCORE) program, and the New Mexico AMP Undergraduate Research Conference have impacted student retention in STEM and progression to the B.S. degree and graduate school by providing a network of support for students from the freshman year to graduate school.

### Integrated Learning Communities

The Integrated Learning Communities (ILC) at NMSU aid the transition of students who are not calculus-ready to university studies and the study of engineering to ensure that they develop a strong foundation in mathematics, writing, and problem-solving skills, and a conceptual understanding of professional ethics and engineering design and analysis. The ILC project was piloted from 2003-2006 to address the historically low graduation rate for students entering the engineering program at the algebra level of mathematics – approximately 30% of these students graduated with an engineering degree over a ten-year period. Following the pilot period, the ILC was established in 2007 as a component of the NMSU College of Engineering's freshman retention program. Since that time, a total of 275 students have participated in the STEP ILCs



(2007=64; 2008=67; 2009=75; 2010=69). The current engineering retention for the first three cohorts (2007, 2008, 2009 collectively) is 57%. Importantly, the current institutional retention rate (all majors) for these cohorts is 74% (all majors). (Photo, previous page, upper left: ILC SMET 102 students present at year-end event.)

### Bridge to the Doctorate

The Bridge to the Doctorate program provides academic, financial, and research support through the first two years of graduate study and encourages professional development and progression to the Ph.D. Participating students have access to a variety of project components including financial support, faculty-mentored research, professional development workshops, a graduate seminar that fosters success in graduate school and directs students to the Ph.D., and other support elements, including networking with faculty, identification of additional fellowships and grant opportunities, and travel assistance to professional conferences. There have been eight cohorts of the program, including six cohorts at New Mexico State University, and two cohorts at the University of New Mexico.

Several New Mexico AMP students from the University of New Mexico (UNM) and New Mexico State University (NMSU) were awarded fellowships through the National Science Foundation Graduate Research Fellowship Program (NSF GRFP). The UNM recipients include Bridge to the Doctorate VI participants, Angelica Sanchez, Brandi Cron, and Juanita Trevino, who received the GRFP in 2010; and Bridge to the Doctorate VIII participants, Alex Nereson and Jeffrey Samson, who received the GRFP and Honorable Mention, respectively in 2011. Angelica Sanchez is a Ph.D. candidate in Chemical Engineering/Nonomaterials Science at UNM; Brandi Cron will begin her Ph.D. studies in the Dept. of Geosciences at the University of Minnesota in Fall 2011; and Juanita Trevino is working toward the Ph.D. in Mechanical Engineering, with a minor in Nanoscience and Microsystems (NSMS) at UNM. Alex Nereson, who received a GRFP award, is currently working toward the P.D. in Earth and Planetary Science at UNM, and Jeffrey Samson, who received a GRFP Honorable Mention, is working toward the Ph.D. in Civil Engineering at UNM. GRFP recipients from NMSU include Bridge to the Doctorate II participant, Sarah Gibson, who completed the Ph.D. in Chemistry in summer 2010 and Gerardo Martinez, former New Mexico AMP URA Mechanical Engineering major, who earned the B.S. in May, 2011 and is currently attending graduate school in Mechanical Engineering at NMSU. This award provides three (3) years of support for the Ph.D., in addition to a \$30,000 annual stipend and other benefits. (More information about each of the GRFP fellows are documented later.)

(Photos: Previous page, upper left: ILC student project. Upper right: Dan Colman, BD 6; Current page, upper left: BD 6 Fellows at JAM. Upper right: Aaron Allen and his research team, BD 8.)





### Undergraduate Research Assistantships

The Undergraduate Research Assistantships (URA) program, available on several campuses statewide, supports students in faculty-mentored research projects and provides training for research presentation and preparation for internships, graduate school, and/or the workforce. The program also provides oral and poster presentation symposium experience that encourages attendance and presentations at national conferences, including the New Mexico AMP Student Research Conference each fall. The URA program directly impacts retention in STEM as well as students' progression to graduate school. *(Photo, upper left: URAs presents posters at the URA Symposium.)*

### Summer Community College Opportunity for Research Experience

The Summer Community College Opportunity for Research Experience (SCCORE) program, started in 2001, provides an annual summer bridge program for statewide community college students. Growing out of the NSF's Advanced Technology Education (ATE) Minority Engineering Transfer and Articulation (META) program, the goal of SCCORE is to develop the talent of community college students by providing them opportunities to conduct research with university faculty and to heighten students' awareness about campus resources and university life. The program targets students in all STEM fields, providing research opportunities, fostering student success, and assisting students in the transition to New Mexico AMP baccalaureate-granting institutions. Students in SCCORE live on campus, attend a 1 credit-hour class, and serve as research assistants to NMSU faculty mentors in their related fields. They also receive training on development of an abstract and poster, and they present their research at a program end symposium attended by the students, staff, faculty mentors, and campus dignitaries and at the New Mexico AMP Student Research Conference in the subsequent fall semester. *(Photo, upper right: Students presenting at SCCORE Symposium.)*

Of the 99 students who have participated over the years, 61% have transferred to university four-year degree program (N=60) - 95% of students who have transferred remain in STEM disciplines (N=57). With another 13% of the total participants currently "on track" in their pre-transfer STEM studies (N=13), the SCCORE program has an overall STEM retention/progress rate of 71% (N=70 of 99). Additionally, of the 30 students who have already earned their STEM B.S. degrees, 7 have earned a M.S. degree, 3 students are in progress toward the M.S., and 2 students are currently applying to M.S. programs, giving the program a graduate school matriculation rate of 40% (N=12 of 30). Of these 12 students, 25% are currently progressing in their respective STEM Ph.D. programs (N=3).

### Student Research Conference

Since 1996, the Student Research Conference brings together students and faculty from New Mexico's colleges and universities as well as students and teachers from the New Mexico Math, Engineering, Science Achievement, Inc. program (NM MESA). The conference provides an annual opportunity each fall for students to present research, gain presentation experience, network with other students and faculty, and participate in workshops and panels. The workshops, panels, and





other opportunities afforded by the conference directly impact student retention in STEM and focus on student and faculty professional development, as well as progression to graduate school. *(Photo, upper left: Dining at Conference.)*

### Community College Professional Development Seminars

By participating in the Community College Professional Development Seminars, students from New Mexico AMP's two-year partner campuses are provided pre-and post-conference workshops to provide an understanding of the goals and purposes of the conference and to help them navigate conference opportunities and activities for the best conference experience. In 2010, 306 students and faculty attended the conference from around the state and nation, and 29 students attended the pre-and post-conference workshops. Outcomes of the community college activities to date are as follow:

- Total participants: 97 (unduplicated) students (37 in 2007; 19 in 2008; 22 in 2009; and 19 in 2010) *(Photo, upper right: Community college students collaborate on tasks at post-conference workshop.)*
- 38% of workshop participants have transferred (of the 81% responding to a survey of 2007, 2008, and 2009 participants)
- 80% of those who transferred majored in STEM
- An additional 22% of workshop participants are completing pre-transfer work at the community colleges
- 92% (22 of 24) of STEM transfer students have been retained at the university level; 21% (N=5) of STEM transfers have graduated to date

### STEM Clubs

STEM Clubs are also in place at several community colleges; these provide a forum for peer support and continued professional development of AMP students. Community college students are also recruited to participate in the Summer Community College Opportunities for Research Experience (SCCORE) program and the New Mexico AMP Student Research Conference.

### New Mexico AMP Transfer Scholarship

The New Mexico AMP Transfer Scholarship is available to students transferring from a two-year to a four-year institution to pursue a degree in a STEM discipline. The scholarship is available to community college students as they begin their first semester at a four-year institution, providing important financial assistance during the student's first semester at the university. Since the establishment of New Mexico AMP, Transfer Scholarships have been provided to students of alliance partners across the state, providing assistance to students at critical transition points between New Mexico's 2- and 4-year institutions.

## SMET 101 for Community College Students

SMET 101, “Introduction to Science, Mathematics, Engineering, and Technology,” a course developed by the New Mexico AMP, is designed to help students become better learners and more focused in their discipline. Using several strategies of active learning and a writing-across-the-curriculum approach, the course encourages collaborative learning, personal reflection, and long-term planning. SMET 101 helps students gain a greater critical understanding of their major and how successful professionals in their discipline conduct their work and solve problems in the lab or in the field. As a result of students having developed a better understanding of the expectations, demands, challenges, and requirements of their discipline and how to better address them as students, the course helps improve student retention. Finally, because SMET 101 helps students become more confident in their choice of major and more focused on their discipline, the course helps students avoid taking unnecessary coursework and time to complete their degree. Students enrolled in SMET 101 complete a personal “Academic Achievement Plan” as part of the course. This allows each student to evaluate his or her strengths and weaknesses, explore one or more STEM fields of interest, and determine a course of study most appropriate to the students’ personal and professional goals.

For community college campuses offering the course, SMET 101 has an explicit interest in facilitating transfer to four-year STEM degree programs. This is maintained by ensuring that SMET 101 instructors at all our partner institutions receive training on the course methods, philosophy, and materials. Currently, the course is offered at Santa Fe Community College and at Luna Community College.

## SMET 101 Community College Instructor Training

From 2002 forward, Instructor Institutes and/or training sessions have been held each summer for instructors of SMET 101 across the state. Institute workshops focus on critical thinking, problem-solving, and writing-to-learn strategies. Guest speakers at these Institutes have included Dr. Christopher Burnham, NMSU Regents Professor of English; Dr. Richard M. Felder, Professor Emeritus of Chemical Engineering at North Carolina State University; and Dr. Rebecca Brent, Co-director of SUCCEED.

**Outcomes of Training:** A qualitative study of training outcomes for faculty revealed that several of the strategies and approaches of the SMET 101 course were transferring to instructor’s other courses. Five specific areas of development were explored in the study, including pedagogy transfer, modification of teaching methods, writing-to-learn, critical thinking/ problem solving, and assessment. The most prominent pedagogy transfer occurred in the areas of writing and problem solving/ critical thinking, and modified understanding of learning styles. Importantly, many instructors reported that writing-to-learn strategies help them to more effectively teach students the connections between subjects, and one-half of the instructors noted they are much more aware of how to engage students with critical thinking and problem-solving skills, which transfers to teaching in all of their classes. Another finding that resulted in pedagogy transfer is the instructor’s heightened awareness of the different learning styles of students, with 64% of the instructors maintaining that this awareness has improved their teaching and perspective on student learning.

Most recently in summer 2010, an information/ training session was presented at NMSU-Carlsbad and at UNM-Los Alamos for instructors who might be interested in teaching the course at their institutions. Five (5) instructors attended the session at NMSU-Carlsbad and eighteen (18) STEM instructors from SFCC, Luna CC, UNM-LA, and Mesalands CC attended at UNM-Los Alamos.

## Institutional Coordinator Meetings

In addition to the focused training opportunities described above, New Mexico AMP holds two Institutional Coordinator (IC) Meetings each year for partner institution ICs in the southern and northern parts of the state. One IC meeting is held at the New Mexico AMP Research Conference at NMSU and one meeting is held each spring, usually via video conferencing to accommodate more of the IC’s teaching schedules.



## Impact on Institutional Resources and Infrastructure

**Students and faculty in STEM have been greatly impacted by leveraged efforts of New Mexico AMP. Leveraged funding has enabled New Mexico AMP to improve physical resources, to develop innovative curriculum components that led to the institutionalization of a freshman retention program, and to impact learning and professional development in STEM in our partner institutions.**

### Physical Resources:

In 1999, through leveraged corporate and private foundation donations, New Mexico AMP helped to establish two computer labs at New Mexico State University and one at the Las Cruces Court Youth Center, now a charter school. The William and Flora Hewlett Professional Development and Success Center was also established at New Mexico State University in 2008, providing a permanent STEM-focused student support center. *(Photo, upper left: Dr. Kenneth White, Former Chair of NMSU Civil Engineering Dept. presenting workshop to New Mexico AMP students in the Center.)*

### Curriculum Development:

In 2007, the Integrated Learning Communities (ILC) project was established as a component of the NMSU College of Engineering's freshman retention program. Built on the Alliance's successful SMET 101 course ("Introduction to STEM"), the ILC project was piloted in 2003 and currently serves 75-85 students each year. The SMET 101 course is also a required component of the pre-engineering curriculum at Santa Fe Community College and Luna Community College.

Through its collaborative efforts with the Department of English, the NMSU Integrated Learning Communities (ILC) has been a catalyst for change in the curriculum for the ILC sections of Freshmen Composition and Rhetoric course (ENGL 111). ILC sections specifically focus on engineering rhetoric and, most recently, students develop extended argument papers around topics selected from the National Academy of Engineering's (NAE) "Grand Challenges." The curriculum has been successful in demonstrating to students the importance of rhetoric and writing in the engineering professions. Partly due to the success of the project, the Department of English is considering the potential to offer additional discipline-specific courses for NMSU students. *(Photo, upper right: ILC students present project designs.)*

### Program Funding:

Over the lifetime of the program, New Mexico AMP has leveraged over \$25 million in direct program funding and \$95,000 in equipment and in-kind contributions, 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.





## Partner Institutional Coordinator Funding

Leveraged support ensures that students across the statewide partnership enjoy a broad range of interventions and resources. Many of the New Mexico AMP Institutional Coordinators negotiate leveraged support, establishing directions for ongoing research on effective strategies and models for improving student access and programs that effectively combine research and education. The following are a few of such leveraged efforts.

### University of New Mexico (UNM)

**Dr. Laura Crossey**, Professor of Earth and Planetary Science at the University of New Mexico (UNM), is UNM Bridge to the Doctorate Coordinator and Institutional Coordinator for New Mexico AMP for many years. Dr. Crossey earned three degrees in the field of geology, a B.S. degree from Colorado College (1977), an M.S. degree from Washington University (1979), and a Ph.D. from the University of Wyoming (1985). She has research interests in geoscience in the Southwest and the Rockies and has collaborated with 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 to explore the geologic time and stories. Several of Dr. Crossey's AMP students participated in the project. A ribbon-cutting ceremony was held at Grand Canyon National Park on October 13, 2010. *(Photo upper left: Dr. Crossey served as Keynote Speaker at the New Mexico AMP Conference in 2009.)*

### Northern New Mexico Community College

**Dr. David Torres**, Professor and Director of Mathematics and Institutional Coordinator at Northern New Mexico Community College, earned a B.S. degree in Mathematics and in Physics from New Mexico Tech, an M.S. in Applied Mathematics from the University of Arizona, and a Ph.D. in Mathematics from the University of New Mexico. He is currently involved in a National Science Foundation (NSF) grant at NNMC entitled "Parallel Computing to Promote Research and Education Opportunities at NNMC." Dr. Torres is also involved with two other grants, including the Army High Performance Computing Research Center grant, 2010-2011, 2011-2012. Through this grant, students have the opportunity to work on solving parallel computational fluid dynamics problems, including AMP URA Ruben Rivera. Dr. Torres is also involved with the Robert Noyce Teacher Scholarship Program, 2010-2015 that awards scholarships to STEM majors who also pursue a teaching career in secondary schools.

Dr. Torres believes that New Mexico AMP affords important leveraging opportunities with these and other projects, asserting, *"New Mexico AMP has supported research between students and faculty at Northern New Mexico College (NNMC). We have seen significant benefits from the one-on-one interaction students receive with faculty. Students have presented the results of the research at the New Mexico AMP conference and at the NNMC's Thinko de Mayo poster session. Students have also acquired the skills they need to work under other grants awarded to NNMC, adding value and creating important synergy between AMP and other grant programs."* *(Photo upper center: Dr. Torres presenting his research at the New Mexico AMP Conference.)*

**Dr. Ajit Hira**, Northern New Mexico College (NNMC), Professor and Co-Institutional Coordinator, received a grant from the NSF Computer and Information Sciences and Engineering (CISE) Directorate (2009-2014). The “Parallel Computing to Promote Research and Education Opportunities at Northern New Mexico College” project is a five-year Computing Research Infrastructure (CRI) grant. The project provides for 108 computer cores at NNMC, currently being used for student training in effective use of the power of parallel computing in processing and visual representation of large volumes of data. The computers are being used for both research and educational projects. Dr. Hira and his colleagues are conducting research in a variety of areas, including modeling of the nanotechnology of semiconducting materials and their applications to solar devices, simulations of incompressible fluid flow and surface tension, scientific visualization, and mapping of the subsurface of Mars. Research areas of interest to other faculty include a database of local pollen counts, the design of feedback control systems, the performance of solar photovoltaic systems, and the reliability of computer storage systems. This project involves New Mexico AMP students as research assistants.

This project has the potential to increase learning to students across of range of disciplines and backgrounds and will better their chances of succeeding in STEM. This project encourages interdisciplinary collaboration within the institution to advance learning and teaching. It also stands to promote innovation and partnerships with industries to stimulate the development of new technologies and processes to further U.S. economic competitiveness, which will one day benefit the state and nation.

*(Photo previous page upper right: Students receive training in the computer lab.)*

### New Mexico Institute of Mining and Technology and Luna Community College

New Mexico AMP partner institutions New Mexico Institute of Mining and Technology (New Mexico Tech) and Luna Community College were awarded a Minority Science and Engineering Improvement Program (MSEIP) grant from the U.S. Department of Education in 2004. The program, entitled the New Mexico Science, Technology, and Engineering Partnership Program, supported the recruitment of students to Luna Community College, and then encouraged and facilitated these students’ transfer to a four-year university to complete their degrees in STEM disciplines. The program contributes to the objectives and goals of the New Mexico AMP, including such activities as tutoring and mentoring, transfer assistance, and communication and leveraging with New Mexico AMP and other programs. MSEIP students have also expressed interest in other New Mexico institutions, and the New Mexico AMP ICs at these campuses are supporting transfer and articulation of coursework and assisting the students to transition into their respective campuses and programs.

In 2004, when the MSEIP grant was first funded, Hilario Rubio served as the Institutional Coordinator at Luna Community College and coordinated the recruitment, retention, and transfer activities for the grant. The current IC at Luna CC is **Dr. Andrew Feldman**, who now coordinates these efforts at the institution. Dr. Feldman joined Luna CC as a faculty member and was later named the Academic Director for the Department of Science, Mathematics, and Engineering Technology. He earned the B.S. in Geology in 1997 (with Honors) and the Ph.D. in Geology from Florida State University in 2004. His research interests include Micropaleontology, Climate Change, and Alternative Energy Solutions. The New Mexico AMP events and activities that Dr. Feldman coordinates at Luna CC include the College Night Event, the New Mexico AMP Awards Banquet, SMET 101, and the Undergraduate Research Assistants (URA) program.

Institutional Coordinator at New Mexico Tech is **Allison Costello**, who was **IC when the MSEIP was funded**, and she continues to be involved in recruitment and retention at the university level. Ms. Costello has worked for over 23 years at New Mexico Tech as the Associate Director of Admission, with responsibilities that range from running the Albuquerque Admission Office and high schools and community colleges in the central area of the state to the college’s multicultural programs and parent programs. She coordinates a very active New Mexico AMP program at New Mexico Tech that includes such activities and events as Exploration Day, Research @ Tech Day, Proud Parent Weekend, Night with New Mexico Tech program in Albuquerque and Santa Fe, and Teacher/Counselor Visit Day. Ms. Costello earned a B.A. in Geology from the State University of New York (SUNY)-New Palz in 1987 and the M.A. in Educational Administration from University of New Mexico (UNM) in 1992.

## Eastern New Mexico University (ENMU)

**Dr. Brian Pasko**, Eastern New Mexico University (ENMU) Assistant Professor of Mathematics is the Institutional Coordinator of New Mexico AMP. Dr. Pasko earned the A.A.S. degree in Chemical Technology from Milwaukee Area Technical College, a B.S. in Mathematics from Marquette University, and an M.S. and Ph.D. in Mathematics from Kansas State University. Brian's area of specialty is Algebraic Topology, and he also holds an interest in applied math problems suitable for undergraduate level understanding. In his role as IC, Dr. Pasko 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, another leveraged scholarship opportunity.

During 2004, Eastern New Mexico University (ENMU) received an NSF CSEMS grant to provide scholarships to academically talented and financially needy students majoring in computer science, electronics engineering technology, and mathematics. The Principal Investigator for the CSEMS grant, Dr. Tom Brown, Associate Professor of Mathematics at ENMU, has served as a research mentor for the New Mexico AMP at ENMU. Those experiences and the collaboration with the former ENMU New Mexico AMP Institutional Coordinator, Dr. Regina Aragon, contributed to the successful effort that resulted in the CSEMS Program. The philosophy of the CSEMS Program and much of the program's structure are a direct outcome of the experiences of the New Mexico AMP. Collaborative efforts are continuing between the two programs to maximize funding at ENMU to continue supporting underrepresented students majoring in the STEM disciplines.

In 2011, Dr. Pasko and Dr. Brown, presented at the New Mexico Higher Education Assessment and Retention (NMHEAR) Conference in Albuquerque, NM on February 24-25, 2011. The two presented "Louis Stokes Alliance for Minority Participation (LSAMP) Programs as a Vehicle for Minority Retention," a look at the processes and outcomes of the New Mexico AMP program at ENMU.

Dr. Pasko submitted a proposal in 2011 for an ENMU Internal Research Grant to gather data from professional racquetball matches. This data will be used by New Mexico AMP ENMU URA students for a project on which Dr. Pasko will serve as faculty mentor. Last spring, they worked on modeling of racquetball racquets by finding the center of mass and point of maximum deflection. In the fall, they will model racquetball serves, after which they will model and optimize rally play by balancing the risk of a particular shot with the likelihood of winning the point. In addition, this data will benefit an outgrowth of this URA project on which Dr. Pasko and a colleague are working. They are using Markov processes and game theory to decide optimal play strategies. *(Photo next page upper left: Dr. Pasko presents research at the New Mexico AMP Conference entitled, "Spectral Sequences in Group Theory.")*

## Indian Polytechnic Institute (SIPI)

**Dr. Nader Vadiiee**, faculty member and Institutional Coordinator at Southwestern Indian Polytechnic Institute (SIPI) was named the 2009 New Mexico Professor of the Year by the Carnegie Foundation for the Advancement of Teaching and the Council for Advancement and Support of Education. Dr. Vadiiee was selected from more than 300 top professors in the United States. He has established state-of-the-art learning facilities and curricula at the SIPI, a national tribal community college located in Albuquerque, New Mexico to educate future engineers who can compete in the 21st century global workforce.

Dr. Vadiiee works with high school students through an engineering career pathway at Bernalillo High School (BHS) where fifty percent of the student body is Native American. In this project, Dr. Vadiiee creates project-based learning opportunities in which BHS high school students work with SIPI community college students and graduate engineering students from the UNM and New Mexico Tech. These student teams interact with industry representatives as they implement their projects such as designing wind turbines, electric bicycle charging stations, or robotic kits for the statewide RoboRave competition.

Student mentoring projects between UNM and SIPI started as early as 1997-98 with the New Mexico AMP-supported SIPI-UNM Mentoring Project in which SIPI students were mentored by UNM students. In that early project, the SIPI and





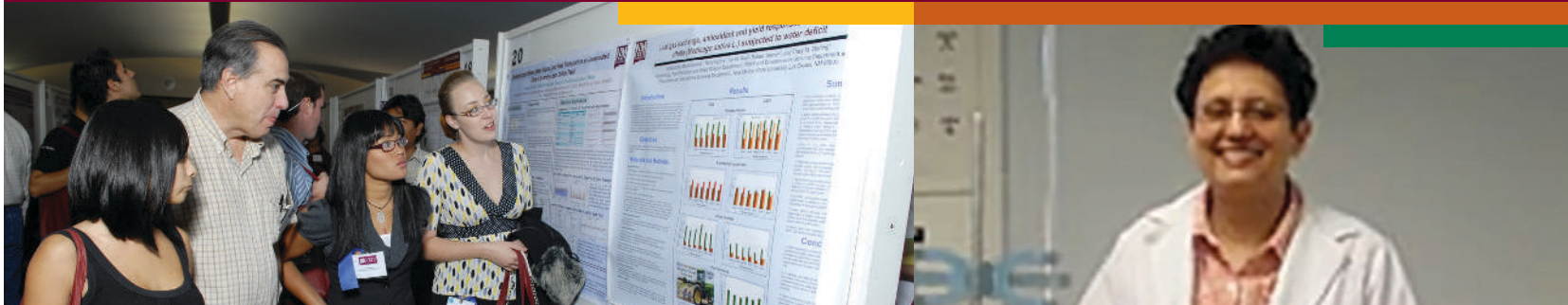
UNM students participated in a three-day orientation at the UNM campus that included presentations by guest speakers, faculty and staff, Native American Programs, and representatives from campus student organizations. Semester activities included workshops, a SIPI Parent's Night, team building experiences, and other events. The program grew from the involvement of 15 students at each institution to as many as 50 students at each institution in 2000-01.

As Dr. Vadiee continues to build inter-institutional collaborations, he has successfully assisted students to leave SIPI highly motivated and armed with the academic and practical skills to successfully transfer to four-year institutions to complete their bachelor's degree and to participate in various New Mexico AMP activities. For example, in Summer of 2011, Dr. Vadiee recruited Calvin Silas, a rising engineering student from SIPI to participate in the New Mexico AMP SCCORE program as research assistant on a bio-fuels project in civil engineering. (Some information courtesy of Press Release of Southwestern Indian Polytechnic Institute, Valerie Montoya, Contact.) *(Photo upper center: Dr. Vadiee, first on left, with SIPI students and faculty.)*

### NMSU Carlsbad

**Robyn Hayes**, New Mexico AMP Institutional Coordinator and Instructor of Chemistry began her teaching career at Northern New Mexico College before joining the NMSU Carlsbad faculty. She earned a B.S. degree in Chemistry from New Mexico Tech and an M.S. in Chemistry from the University of Nebraska-Lincoln. Currently, she is involved in ongoing research focused on determining students' perspectives on science laboratories by analyzing survey responses regarding students' past and current laboratory experiences. As IC, Ms. Hayes assists students with advising in STEM, guiding them to STEM careers by discussing transfer issues, college choices, and professional STEM areas. She brings students to the New Mexico AMP Student Research Conference each year, at which she also attends the community college workshop for students and faculty. She has learned more about transfer issues by attending the workshops.

In her words, *"I have become pretty passionate on my campus, NMSU-C, about getting students to think ahead to transferring to four-year institutions. In particular, I learned a lot from Bernadette Montoya at the 2009 workshop and from Phyllis Baca of Santa Fe Community College at the 2010 workshop. Dr. Montoya's own history of starting at a community college was very inspirational to me and encouraged me to think that my students may one day have graduate degrees too. . . . I have started working with the head of our advisement center, Karla Thompson, to take possible transfer students to NMSU-Las Cruces for a visit. We took a group of six students last semester, Fall 2010, and we took another group to NMSU on April 1, 2011. Since Carlsbad is very isolated physically from the rest of the state, the visits provide students with the opportunity to visit NMSU and envision themselves as students attending there. I have also met people involved in STEM education from all over the state at the Undergraduate Research Conference. Some are from the other community colleges and others from the four-year institutions. I have enjoyed the conversations I have had with them as we discuss common issues as educators."* *(Photo upper right: Robyn Hayes listening to oral presenter at the New Mexico AMP Conference.)*



## NMSU-Alamogordo

**Dr. Vincent Lombrana**, New Mexico AMP Institutional Coordinator and Professor of Biology and Regents Professor at NMSU-Alamogordo has seen the influence and impact of New Mexico AMP on his students' progression to university and graduate school. Dr. Lombrana earned the B.S. degree in Biology from the University of Texas at El Paso (UTEP) in 1981, the M.S. degree in Biology from UTEP in 1985, and the Ph.D. in Biology from NMSU in 1992. After earning the Ph.D., he immediately started teaching biology at NMSU-A and has been one of our most dedicated IC's for several years. He has been the recipient of the NMSU-A Teaching Excellence Award three times and has also received the Regents Professorship Master Teacher Award. Dr. Lombrana has been the recipient of the prestigious Donald C. Roush Award for excellence in teaching three times, with his latest Roush award presented to him at the 2010 NMSU Spring Convocation. Many students have benefitted from working as Dr. Lombrana's research assistants, several of whom have transferred to university and to graduate school, including Danielle Miranda, Ph.D. student at Mayo Clinic and Bethany Davis, Mechanical Engineering major who is concurrently interning at NASA and finishing up her degree at NMSU. To support the impact of New Mexico AMP at NMSU-Alamogordo, Dr. Lombrana asserts, *"The New Mexico AMP Program has for years been instrumental in encouraging our students and other community college students to successfully transfer to NMSU-Las Cruces (or other four-year schools) and from there progress to, excel in, and eventually complete graduate school. The Program, through its student conferences, summer undergraduate research program, and transfer scholarships, has provided me with a valuable tool for encouraging NMSU-Alamogordo students to consider looking beyond the associate's degree and, in many cases, beyond Alamogordo, New Mexico. The Program has made a difference in the professional lives of several of my former students."* Many outstanding students have benefitted from participation in the AMP programs as well as Dr. Lombrana's guidance and mentorship. (Photo, upper left: Dr. Lombrana with NMSU-Alamogordo students at the New Mexico AMP Conference.)

## UNM-Gallup

**Dr. Kamala Sharma**, longtime Institutional Coordinator and Associate Professor of Math and Science (Chemistry) at UNM-Gallup, has been very successful at leveraging efforts. Dr. Sharma has a Ph.D. in Biochemistry from Oregon Graduate Institute of Science and Technology. Dr. Sharma received a five-year grant in 2004 from the National Institute of Child Health and Human Development (NICHD) of the National Institutes of Health (NIH) in the amount of \$248,400 to support faculty and student research activities in the biomedical and social sciences at the UNM-Gallup campus. Dr. Sharma's experiences with the New Mexico AMP URA program led her to establish a requirement within the NICHD grant that all supported faculty must employ undergraduate students as research assistants. This is an excellent example of how the URA program has been integrated at the community college level within New Mexico institutions.

Dr. Sharma received the 2005 Society for Advancement of Chicanos and Native Americans in Science (SACNAS) award. She was formally recognized at the annual meeting of SACNAS in Denver in September, 2005. Dr. Sharma participates in a National Institute of Health-supported Bridge Program entitled the Bridges to Native American Students in Community Colleges. The NIH Bridges Program is a research assistance program for students at community colleges that seeks to foster the transition of American Indian students from community colleges to four-year institutions for completion of the Bachelor of Science degree. She has recruited and helped nearly 50 American Indian students to make the transition to four-year universities. *"This record stands among the very best in the USA for successful enhancement of American Indian students at the post-secondary level in the sciences,"* said Dr. Glenn D. Kuehn, a colleague of Sharma's from NMSU who is the Principal Investigator for the program, *"Her transferred students are completing B.S. degrees with 48 percent success. Thus, her students perform slightly better than the average college enrollee in the state of New Mexico once they transfer to a four-year institution. This performance is better than twice the national rate of B.S. degree-completion for all American Indian students in all disciplines."* (Photo, upper right: Dr. Kamala Sharma.)





Economic Impact  
of  
**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.<sup>1</sup>” Such change is measured in “direct” and “indirect” impacts. For this analysis, direct impact measures the higher earnings of STEM graduates, 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 2009 inflation adjusted dollars and are presented for a single year.*

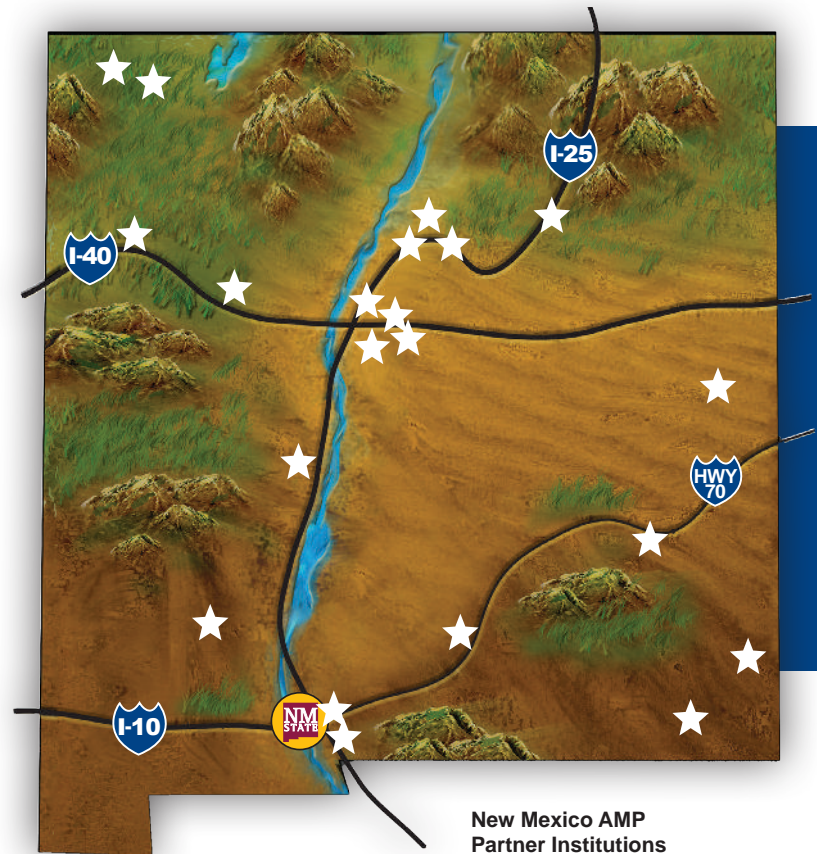
## Direct Impact

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, the economic and business development leader for NMSU, examined the Census Bureau’s 2009 American Community Survey data for earnings differentials between STEM Occupations 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 3,415 degrees after factoring out the baseline of 253 degrees per year over the lifetime of the program.
2. Based on the Census Bureau’s 2009 American Community Survey, the differential for STEM versus Non-STEM occupations was \$23,105.
3. Using NMSU alumni data as a reasonable estimate, we assume that 50% of STEM graduates reported in (1) above will remain in New Mexico.
4. The Labor Force Participation Rate of college graduates Ages 25 to 53 in New Mexico is 0.8285. This rate is drawn from the 2009 report referenced in (2) above.
5. Based on the earnings differential of \$23,105, we estimate that STEM graduates remaining in New Mexico had \$33,633,455 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.

## Indirect Impact

To measure the indirect impact of New Mexico AMP, Dr. Peach and his colleagues used IMPLAN Pro Version 3 economic modeling software to estimate that an additional 285 jobs resulted from the higher earnings of STEM graduates, producing \$9,496,311 in labor income in the state.



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

<sup>2</sup>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

- From an initial investment of \$5 million from NSF, the state's investment of nearly \$6 million over time has enabled New Mexico AMP to attract an additional \$25M million in funding over the life of the program.
- An additional 285 jobs resulted from the higher earnings of STEM graduates, producing \$9,496,311 in labor income in the state.
- New Mexico AMP program has leveraged \$5,012,800 to date from the New Mexico State Legislature (1996/97–2009/10).
- The combined support of NSF funds (base New Mexico AMP program) and the leveraged state dollars have enabled New Mexico AMP partner institutions to attract to New Mexico an additional \$25 Million in federal funds.
- STEM workers experience lower rates of joblessness – 5.3% in 2010 compared to almost 10% for non-STEM workers.

### Attracting Additional Resources to Support New Mexico Students

In addition to the economic impact described above, the New Mexico AMP program has leveraged \$5,012,800 to date from the New Mexico State Legislature (1996/97-2009/10) to support the goals of the program. The New Mexico AMP 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.

Finally, the combined support of NSF funds (base New Mexico AMP program) and the leveraged state dollars have enabled New Mexico AMP partner institutions to attract to New Mexico an additional \$25 Million in federal funds to support STEM student achievement. These additional federal dollars have impacted institutional leadership and decision-making, student resources and support, and curriculum and faculty development, thereby extending and expanding the breadth and depth of STEM support in immeasurable, yet critically important, ways.

### The Economic Importance of the National LSAMP Program<sup>2</sup>

As reported by the U.S. Department of Commerce Economics and Statistics Administration (ESA), the growth of STEM jobs over the past decade has been three times that of the non-STEM workforce, representing 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 and Enabling their Future Success and Influence

The New Mexico AMP program is impacting the lives and work of students in ways they never imagined possible. New Mexico is a state facing severe challenges: The first state to reach minority-as-majority-status, (56.7% Hispanic)<sup>3</sup> New Mexico is one of the poorest states in the nation with repeating cycles of inter-generational poverty.<sup>4</sup> Severe economic challenges are documented for 13.7% families who live below the poverty line compared to 9.9% reported for the United States Census Bureau, 2009.<sup>5</sup> Ranked as the third poorest area of the country, the majority of public school students qualify for free or reduced lunches and come from homes where the median annual income for a family of four is \$20,000.<sup>6</sup> 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.

## Impacting Technology with Exceptional Talent and Pushing Doors Open for Others:

Former New Mexico AMP participant, **Dr. Shakti K. Davis** received the B.S. degree in 1999 from NMSU and the Ph.D. from the University of Wisconsin in 2006 in electrical and computer engineering. Dr. Davis was named Most Promising Engineer or Scientist for 2010 at the U.S. Black Engineer of the Year Award conference held February 18-20, 2010 in Baltimore, MD. Dr. Davis has demonstrated tremendous potential for technical contributions. In her short career, she has published in five refereed journals, delivered papers at six conferences, and received a U.S. patent for microwave-based examination of medical conditions using hypothesis testing. Dr. Davis was a 2004-2006 National Institutes of Health Postdoctoral Fellow and was selected for the Graduate Engineering Research Scholars Program, as well as the AT&T Laboratories Fellowship Program from 2000 to 2006. She won an IBM Almaden Research Internship Award in 1999, and was a New Mexico State University Crimson Scholar for four years between 1994 and 1999.

During graduate studies at University of Wisconsin, Davis did research on the use of microwave technology for breast-cancer detection and analysis. After receiving her Ph.D., she published a paper, "Breast Tumor Characterization based on Ultra-Wideband Microwave Backscatter." In a brief period, this young engineer has had a significant impact on the detection and treatment of a disease that afflicts so many. Following the completion of her doctorate in electrical and computer engineering in 2006, she joined the Massachusetts Institute of Technology's Lincoln Laboratory, where her research interests include adaptive-array signal processing and its radar applications. Dr. Davis has contributed to significant advances in the field of digital signal processing. Her work in support of space-borne radars led to algorithm improvements that formed the core of future radar capabilities. Dr. Davis has also moved to promote the growth of women and minorities within the MIT Lincoln Lab. She is active in the lab's Technical Women's Network and works toward the advancement and opportunity for networking among women in science, technology and engineering across the laboratory. Faculty at Dr. Davis' alma mater, New Mexico State University, believe her potential for

<sup>3</sup>Ibid. <http://www.ped.state.nm.us>

<sup>4</sup>Santos, R. and Tiano, S. Southwest Center for Research on Poverty. Albuquerque, NM: University of New Mexico, 2002

<sup>5</sup>United States Census Bureau, 2009. <http://factfinder.census.gov/servlet/>

<sup>6</sup>New Mexico Public Education Department, 2009. <http://www.ped.state.nm.us>





Shakti K. Davis



Jessica Houston



Leo Banuelos



Zachary Hendron

further accomplishment is unlimited and were proud to nominate her for this early-career award. Jay B. Jordan, former Associate Vice President for Research and Professor Emeritus, Electrical and Computer Engineering, wrote: *“During her undergraduate years (1994-1999) ... it was immediately apparent to those of us on the faculty who knew Shakti that she was a person of exceptional talent.”* (Photo upper left, information and photo, courtesy of USBE & IT magazine and NMSU, Feb. 23, 2010)

### Impacting Future Generations: LSAMP Faculty and Post-Doc Appointments

**Jessica Perea Houston**, earned the B.S. degree in Chemical Engineering at NMSU and participated in undergraduate research. She earned the M.S. in Chemical Engineering as a Bridge to the Doctorate participant at Texas A&M, where she also earned the Ph.D. in Chemical Engineering. In 2009, Dr. Houston accepted a position as Assistant Professor in Chemical Engineering position at NMSU, where she is currently expanding a research program in bioengineering. Dr. Houston, the recipient of a Sony Young Faculty Scholarship Award, has served as Faculty Mentor to New Mexico AMP URAs.

**Leo Banuelos**, former NMSU URA and Bridge to the Doctorate II participant, completed the Ph.D. in Physics from NMSU in December 2010. Leo is currently a member of the Geochemistry and Interfacial Sciences Group in the Chemical Sciences Division of Oak Ridge National Laboratory in Oak Ridge, Tennessee. His current research involves conducting atomic and nanoscale studies of the interfacial structure of novel electrode and electrolyte materials for energy storage applications. The results from this research are enabling the development of high energy storage density supercapacitor and advanced battery systems to meet our country’s increasing energy demands.

Leo attributes much of his success to research involvement through New Mexico AMP, stating, *“My early introduction to research in the New Mexico AMP Undergraduate Research Assistantship (URA) provided a concrete direction to follow regarding the importance of simultaneously excelling in academics and engaging in research. I developed the discipline early on to manage life, academics and research. In addition, I attribute part of my success in securing my current postdoctoral research associate position to some of the people I met and worked with during my time as a Bridge to the Doctorate Fellow.”*

**Zachary Hendron**, Bridge to the Doctorate I Cohort participant who earned the M.S. degree in 2006 from NMSU, successfully completed the Ph.D. in Environmental Engineering from Duke University in summer 2011. Zachary has accepted an offer at Research Triangle Institute in Durham/Raleigh, North Carolina, where he will participate in an effort to develop a water engineering research program.



## The Impact of Mentoring and Support at the Graduate Level: NSF Graduate Research Fellowship Program (GRFP) Awardees

**Angelica Sanchez (BD VI)**, was awarded a fellowship from the Graduate Research Fellowship Program (GRFP) in 2010. Angelica is a Ph.D. candidate in Chemical Engineering/Nonomaterials Science at UNM. Angelica, who earned the B.S. in Chemical Engineering from UNM in 2009, presented her research entitled “The role of nucleation sites on the stability of nanoparticles during Ostwald ripening” at the Fifth San Luis Symposium on Surfaces, Interfaces, and Catalysis Conference in September, 2010 in San Paulo, Brazil with Jon Paiz (BD VIII). The event is the fifth in an April series of symposia targeted to unite Latin American and U.S. scientists in the area of surface science. The symposium was organized by University of California-Riverside and the Federal University of Sao Carlos, Brazil to foster new collaborations between researchers from the U.S., Latin America, and Europe for research in the chemistry of surfaces, with particular emphasis on heterogeneous catalysis. Angelica provides the following reflection on her experience with the BD program: *“The AMP BD program has not only provided me with the opportunity to attend graduate school but also to gain research experience internationally. Through funding from this program, I was able to attend a two-week summer school and conference in Sao Pedro, Brazil. During that time, I met and interacted with the experts in my field from all around the world.”* (Photo, upper left: Angelica Sanchez with BD student Jon Paiz.)

**Brandi Cron**, Bridge to the Doctorate VI participant at University of New Mexico, Earth & Planetary Sciences major, was awarded the GRFP fellowship in 2010. A former UNM URA who earned the B.S. in 2008, Brandi will begin the Ph.D. program in the Department of Geosciences at the University of Minnesota in Fall 2011. Brandi has applied recent advances in autonomous environmental sensors and molecular genetics. From her tribal home of Gallup, NM, Brandi travelled to England’s Bristol University to examine biomarkers and journeyed to the Lost City hydrothermal field in the mid-Atlantic on the Roger Revelle global-class research vessel to obtain samples. She also worked a summer at Smithsonian National Museum. Brandi reflects on the value and impact of New Mexico AMP and the BD on her life and decisions: *“The funding from LSAMP[and]BD not only supported me financially while I was earning my Master’s degree, but it also helped me present my research at both AGU and GSA. Both of these experiences helped me meet and interact with people working in my field and to get feedback on my own research and improve my understanding of the field in which I am pursuing a career in (geomicrobiology). The speakers at the JAM 2009 conference in Washington, D.C. strongly encouraged me to continue a career in the sciences, not only as a female but also as a Native American.”* (Photo, upper center: Brandi Cron performing field research.)

**Juanita Trevino**, Bridge to the Doctorate VI Fellow at UNM, received the GRFP fellowship in 2010 and the Integrative Graduate Education and Research Traineeship (IGERT) fellowship. She earned the B.S. in Mechanical Engineering from UNM and is now a Ph.D. candidate in Mechanical Engineering, with a minor in Nanoscience and Microsystems (NSMS). While 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. (Photo upper right: Juanita Trevino.)





Alex Nereson

Sarah Gibson

Gerardo Martinez

**Alex Nereson**, Bridge to the Doctorate VIII participant at University of New Mexico (UNM) was awarded the Graduate Research Fellowship Program (GRFP) fellowship in May 2011. Alex earned the B.S. in Earth and Planetary Science and is currently working toward the Ph.D. in the same major. From high school on, Alex has been involved in environmental science and activism, frequently volunteering with the National Park Service, writing grants to fund fledgling recycling programs, and even being nominated and confirmed by his hometown city council to serve on Oakdale's Environmental Management Commission. Alex's research is focused on tectonic geomorphology, fueling his questions of landscape evolution in New Mexico. He is interested in the western Great Plains as a place of a dynamic landscape. Specifically, he is addressing how flow within the earth's mantle may be shaping surface topography by driving recent and dramatic erosion in New Mexico and Colorado. Once he finishes the Ph.D., Alex plans to work for a federal government agency, with a focus on influencing public policy. Grateful for the opportunity AMP has allowed him, Alex asserts, *"As a first-generation college student, my graduation represented not only a personal achievement, but a family milestone. . . [My] decision to continue my academic career means much more than simply chasing personal intellectual ambitions. . . I reaffirmed a commitment to my personal values. In fact, there is an ancient verse that rang loudly and repeatedly in my mind that goes, 'To whom much is given, much will be required.' And as someone who has already been 'given much,' I look forward to fulfilling my responsibility by contributing to significant scientific advancements while practicing good stewardship of Earth's resources and providing a valuable service to my community through civic engagement."* (Photo, upper left: Alex Nereson performing field research.)

**Jeffrey Samson** received a GRFP Honorable Mention in 2011, and his story appears in the International section.

**Sarah Gibson**, fellow in the Bridge to the Doctorate Cohort II, received a National Science Foundation Graduate Research Fellowship Award in 2006. Sarah received her B.S. in Chemistry NMSU in 2004 and the Ph.D. in Chemistry in 2010. Her research interests are in the area of synthesis of biologically active molecules with applications in the development of new pharmaceuticals and the preparation of natural products. Sarah's graduate advisor was Dr. Aravamudan Gopalan, Academic Department Head, Chemistry and Biochemistry. (Photo, upper center: Sarah Gibson.)

**Gerardo Martinez**, URA undergraduate engineering major at NMSU, was recently awarded the NSF Graduate Research Fellowship Program (GRFP) for 2011-12. Gerardo, a first-generation college student, performs experimental research by designing, manufacturing, testing, and implementing specialized hardware. In summer 2010 and 2011, he served as Graduate Mentor to four Summer Community College Opportunity for Research Experience (SCCORE) students and has also mentored high school and undergraduate students. Gerardo plans to continue to the Ph.D., with a goal of entering the professoriate. In summer 2010, his research team mentored two community college students through the New Mexico AMP SCCORE program, and they are currently mentoring two high school students. The lab in which he works is open to other undergraduate students who want to get involved in their research activities. Gerardo comments on the benefits of this experience, *"Getting them [the students] involved in the research really motivates them to further their training and education. Not only do I acquire teaching practice but also self-fulfillment and satisfaction by mentoring high school, community college, and other undergraduate students."* (Photo upper right: Gerardo presenting poster at New Mexico AMP Conference.)



Jesus Sigala



Ricardo Medina



Ollivier, Ayala, Espino, Rosendo

## Impacting Our World: International Activities

**Jesus Sigala**, Bridge to the Doctorate VII participant, presented two research presentations at the 13th International Symposium on Microbial Ecology in August 2010. He presented a poster entitled “Significance of wastewater source on the bacterial and antibiotic resistance diversity in the environment,” and a collaborative poster presentation entitled, “Depth distribution of thermophilic bacteria in sedimentary geological layers in the northern Chihuahuan desert.” Part of his research on antibiotic resistance in wastewater was presented earlier in August 2009 at the New Mexico Water Research Symposium at New Mexico Institute of Mining and Technology (New Mexico Tech). Further, in November 2009, Jesus presented a paper entitled, “Assessment of the contribution of wastewater sources to the diversity of antibiotic resistance in wastewater treatment plants” at the 14th European Biosolids and Organic Resources Conference in Leeds, UK.

Jesus has worked as a research assistant in both his undergraduate and graduate programs with faculty mentor, Dr. Adrian Unc, Assistant Professor of Plant and Environmental Sciences at NMSU. Jesus has also served as a Graduate Mentor to several students in the SCCORE program. He will complete the M.S. in Environmental Science in August 2011, after which he plans to pursue a Ph.D. in Environmental Microbiology. A former URA in the New Mexico AMP program and a current participant of the Bridge to the Doctorate program, Jesus reflects on the impact that both programs have made on his decisions: *“Through the research I have conducted, along with the mentoring that I have been provided by my advisor as well as the faculty and staff who work in these programs, I have developed important skills to become a better researcher as well as a more prepared student. Through the research experiences in these programs, I have gained a better knowledge of my field and found an exciting research area I enjoy. I owe a big part of my graduate success, as well as the desire to continue to the Ph.D., to the guidance I received in the BD program seminars and workshops. I’m very grateful for the funding I’ve received from these programs that have allowed me to participate in activities I might not have experienced otherwise, such as attending national and international research conferences, writing a research grant, and developing and presenting research papers.”* (Photo, upper left: Jesus in research lab.)

**Ricardo Medina**, former URA who graduated in May 2011 in Mechanical Engineering from NMSU, will enter graduate school at University of California at San Diego (UCSD) in fall 2011. As an undergraduate, Ricardo participated in an internship at the 2009 Army High Performance Computing Research Center (AHPARC) Summer Institute for Undergraduates at Stanford University and as an **Exchange Student at the Budapest University of Technology and Economics**. At UCSD, he hopes to have a research concentration of thermodynamics and fluid mechanics and eventually, to follow in the footsteps of his father, an entrepreneur with an engineering background. Interestingly, Ricardo’s brother, Luis Medina, was a Bridge to the Doctorate student.

Ricardo sums up the impact of New Mexico AMP: *“The workshops I attended through New Mexico AMP helped me to learn about opportunities and scholarships at NMSU as well as other national and international opportunities. These workshops have broadened my network and made me aware of programs I could be a part of, like the Budapest Exchange opportunity in fall 2010 and the internship I did at Stanford University in summer 2009. These research experiences helped me to see the importance of graduate school, and I plan to get a graduate degree in Mechanical Engineering, with a focus on Fluid Dynamics or Thermodynamics.”* (Photo, upper center: Ricardo, performing research.)

In fall of 2008 and 2009, students from the **Universidad Autonoma de Chihuahua (UACH)** in Chihuahua, Mexico participated in the New Mexico AMP Student Research Conference. In fall 2008, eleven (11) students from UACH presented their research in oral and poster formats in the disciplines of engineering, computer science, physics, and mathematics. In fall





Grimes, Ramirez, Herrera, Cruzado, Alvarez, Olague, Valles, Islas



Kareen Prade

2009, seventeen (17) students from UACH attended the conference, with fourteen (14) of them presenting posters of their engineering research. A group of four of the UACH students tied for 3rd Place in the conference poster competition. Efforts continue to develop connections by involving UACH students and faculty, such as the conference opportunity. *(Photo previous page, upper right: Ismael Ollivier, Carlos Ayala, Antonio Espino, and Emmanuel Rosendo, Engineering, Universidad Autonoma de Chihuahua.)*

Several NMSU dignitaries, faculty, and Bridge to the Doctorate students attended the International and Intercultural Education Fair and Forum in Chihuahua, Mexico from October 16-18, 2008. The mission of the event was to provide a forum for international and intercultural educators to share ideas and best practices and to develop connections and partnerships. Attendees from NMSU included former Interim President, Dr. Waded Cruzado; Dr. Delia Valles, Assoc. Professor of Industrial Engineering; Dr. Robert Moulton, Former Interim Provost of NMSU; Dr. Imelda Olague, New Mexico AMP staff member; and three Bridge to the Doctorate graduate students: Martha Martinez Grimes, Molecular Biology; Daniel Ramirez Gordillo, Biology; and Alfonso Islas, Animal Science.

The event offered panels focused on international education presented by campus presidents and other dignitaries from the United States, Mexico, Brazil, Venezuela, Peru, China, Japan, and Spain. Dr. Cruzado participated on two panels, and various NMSU departments and organizations took part in a career fair, including the College of Engineering, the College of Arts and Sciences, the Graduate School, the New Mexico AMP, the USDA, and the NMSU Confucius Institute. The experience offered NMSU attendees the opportunity to network with international faculty and dignitaries and, according to the NMSU graduate students who attended, the event offered them a chance to get to know NMSU's own dignitaries better and to learn more about international research. *(Photo, upper left: Martha Martinez Grimes, Daniel Ramirez, Oscar Herrera, (UACH Dean of Engineering), former NMSU Interim President Dr. Waded Cruzado, Blanca Madrazi de Alvarez (NMSU Alumni and resident of Chihuahua), Dr. Imelda Olague, Dr. Delia Valles, and Alfonso Islas.)*

**Kareen Prade**, Bridge to the Doctorate Cohort VI participant at the University of New Mexico, has traveled to international locations for research sampling and for research training. Kareen conducted research in Costa Rica by collecting biology samples from an acid stream in the crater of the active Poas Volcano. The earthquake (now known as the Cinchona Earthquake) was quite catastrophic for Costa Rica and the death toll fairly high. The epicenter was 5km from the volcanic crater that she and her advisor were in, and it destroyed their path out; however, all of the members of the team eventually made it out safely.

Her current research focuses on observing the geochemical and nitrogen isotope systematics throughout Iceland's volcanic zones to see if there is a geochemical or isotopic difference in the volatiles based on their mantle source. She traveled to Iceland for this research in August 2008, where she collected many volcanic gas samples throughout the entire country. In addition, Kareen attended a field school in Greece in September 2009.

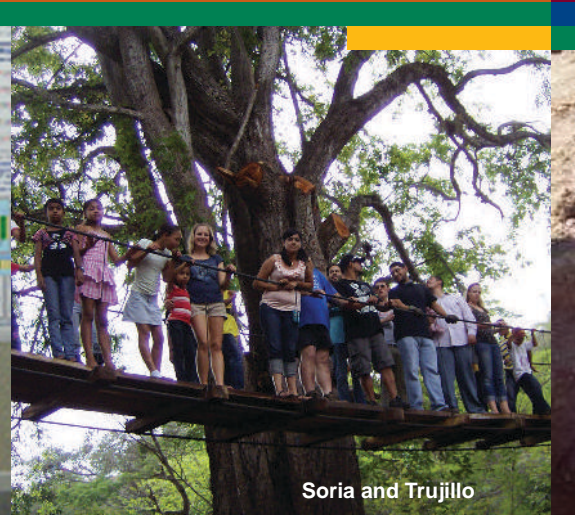
Kareen will complete the M.S. in spring 2011, with future plans to pursue a Ph.D. and continue a research career in volcanology with a focus on volatile geochemistry. She states that *"[t]he BD program gave me the opportunity to travel to Greece to participate in a volcanology field school. Through that field school, I gained valuable first-hand field experiences, including detailed mapping of volcanic terrains and real-time sample collection in an active volcanic system. Additionally, through the lectures and field excursions, I got the opportunity to learn from and interact with some of the top scientists in the field."* *(Photo, upper right: Kareen collecting volcanic gas samples in Iceland.)*



Victoria Carpenter



Daniel Gordillo



Soria and Trujillo

**Victoria Carpenter**, NMSU URA Biology major who graduated with a B.S. in May 2011, will attend Duke University in fall 2011 in Cellular and Molecular Biology, with tuition paid, to earn the Ph.D. Victoria's research focused on using RNAi-mediated knockdown experiments to functionally characterize the role of a family of amino acid transporters on a nutrient signaling pathway in the Yellow Fever mosquito. Victoria has presented research at conferences attended by international researchers and collaborators who are advancing global health: the 59th Annual Meeting of the American Society for Tropical Medicine and Hygiene in Atlanta, Georgia and the Center for Disease Vector Research Symposium at the University of California-Riverside. She also earned Third Place at the New Mexico Student Research Conference for her oral presentation, "CATs and HATs: the SLC7 family of amino acid transporters and their role in nutrient signaling." She has two publications under review.

In addition to Victoria's participation as a URA during her years as an undergraduate, she was awarded the Howard Hughes Medical Institute research scholarship. These research experiences, and her service as Peer Instructor and Mentor for a biology workshop, have shaped her career goals of obtaining the Ph.D. in molecular biology and entering the professoriate.

Victoria reflects on the impact of her involvement in AMP: *"The New Mexico AMP program has been instrumental in my academic success. The program has not only afforded me the ability to apply the knowledge I've learned in classes within a research setting, allowing me to learn its practical applications, but it has also given me several much-needed tools for my professional development and long-term academic goals. Additionally, AMP-sponsored workshops and conferences throughout my years in the program have structured, refined, and elevated my presentation skills, both oral and poster, as well as my communication, research, and professional writing skills. The support and knowledge provided by the program has sincerely helped to shape and achieve my goal of continuing on to graduate studies."* (Photo, upper left: Victoria in her research lab.)

**Daniel Ramirez Gordillo**, former NMSU URA and Bridge to the Doctorate V fellow, is currently a Ph.D. student at NMSU on an NSF Integrative Graduate Education and Research Traineeship (IGERT) Fellowship through the NMSU Computer Science Department and the Biology Department. Daniel began undergraduate studies in the College Assistance Migrant Program (NMSU CAMP), which provides freshman year support and assistance to students whose families travel throughout the region as seasonal agricultural workers. Daniel presented at the Annual Biomedical Research Conference for Minority Students (ABRCMS) in Orlando, Florida, the Systems Biology of Human Disease 2009 Conference in Boston, MA., and took a short course at the 2010 Fifth International Meeting of the Latin American Society for Developmental Biology (LASDB) in Santiago, Chile. (Photo, upper center: Research presentation in Florida).

In May 2011, **Gerardo Soria and Jacob Trujillo**, two New Mexico AMP students who participate in the NMSU Engineers Without Borders (EWB), joined the team effort to complete a pedestrian bridge project in the small town of Hondura Azul, Nicaragua. This was a significant project because during the rainy season, three villages of approximately 600 people each





Kenly Maldonado



Theodore Mansfield



Jeffrey Samson

become inaccessible due to flooding of the nearby rivers, cutting the townspeople off from food, supplies, and medical care, as well as the local school. Built in partnership with the international governmental organization Bridges to Prosperity, the 200 foot suspended bridge will allow the local people to safely cross the river during times of flooding, and it will improve the health and safety of the communities. Students in the EWB organization are currently working on a community benefit project in Anthony, New Mexico with the Colonias Development Council.

**Kenly Maldonado**, 2008 SCCORE participant and Transfer Scholarship recipient, traveled to Ruiz de Ancones, Mexico, during Spring Break 2010 with a team from Engineers Without Borders and other student organizations to construct a new well for the small community of about 80 residents. The previous well was contaminated with nitrates and was making the residents ill. Before this project, the students built a bridge for the village of Las Boquillas, enabling residents of that community to traverse a stream that floods several times each year, isolating them from food and other necessities. Both of these communities (Ruiz de Ancones and Las Boquillas) are about 80 miles south of the US/Mexico border. Kenly transferred from NMSU-Alamogordo to NMSU in 2009 and currently attends Austin Peay State University in Clarksville, TN, where he is completing a B.S. degree in Engineering Technology. *(Photo, upper left: Kenly Maldonado working on a water well project in Mexico.)*

**Theodore (Ted) Mansfield**, former AMP student at NMSU, participated in a Engineering Without Borders project in Peru in summer 2011 to improve a well for the community (see photo). Ted is currently a graduate student working on dual Master's degrees in city and regional planning and environmental engineering at the University of North Carolina at Chapel Hill. Concurrently, Ted works as a Research Associate at the Center for Transportation and the Environment at North Carolina State University. A former National Merit Scholar, Ted graduated with highest honors from the NMSU College of Engineering in December 2008 and participated in the NSF 2008 Engineering Cities Research Experience for Undergraduates (REU) program at Drexel University in the emerging field of urban engineering. Ted will graduate from the University of North Carolina in May 2012. He plans to pursue a career in transportation policy, focusing on integrating land use and transportation decision-making processes to create dynamic, sustainable, and resilient urban environments. *(Photo, upper center: Theodore Mansfield working in Peru.)*

**Jeffrey Samson**, Bridge to the Doctorate VIII Fellow at UNM who received Honorable Mention by the GRFP, is involved with Engineering Without Borders, and his last project was focused on bringing clean water to two small villages in the San Borja region of Bolivia, especially meaningful to Jeffrey because he was born in a small village near Bogota, Columbia. Jeffrey, a civil engineering major, serves as the student representative on UNM's Sustainability Council. In addition, he has enjoyed mentoring local high school students interested in science and engineering as they prepare to transition into university, with his involvement in the Hispanic Engineering and Science Organization (HESO). Jeffrey presented his research entitled, "Water resources of the Cimarron River watershed" at the 2010 New Mexico Water Research Symposium held at New Mexico Tech. After completing of the Ph.D., Jeffrey plans to enter the professoriate and continue research, with a specialization in water resources engineering and ecohydrological issues. *(Photo, upper right: Jeffrey Samson working on project.)*



### The Impact of Facilitating Transfer: Community College Student Achievements

**Danielle Miranda**, former New Mexico AMP participant and NMSU graduate who earned the B.S. in Microbiology, was one of three fellowship participants in the nation selected for her specific Ph.D. program at Mayo Clinic in 2009. Danielle is currently conducting her research at Mayo Clinic/Scottsdale, Arizona and at Arizona State University on the development of diabetes and insulin resistance and plans to graduate in 2013. She is working with faculty mentor, Dr. Lawrence Mandarino, who has a joint appointment at both Mayo and ASU.

Danielle worked with Dr. Denise Galloway, developer of the Gardasil HPV vaccine, in one of two internships she completed at the Fred Hutchinson Cancer Research Institute. The impact of her undergraduate experiences is reflected in her own words, *“New Mexico AMP’s symposiums and conferences gave me the opportunity to interact and network with like-minded students and helped me envision the possibilities for my own research and career, such as participating as an intern at Fred Hutchinson Cancer Research Center for two summers, attending and presenting at many national conferences, and targeting the goal of becoming a medical scientist, a career focused on the combination of research and clinical care.”* (Photo, upper left: Danielle Miranda, far right.)

**Theresa Fresquez**, former URA from at Northern New Mexico College (NNMC) is currently enrolled in the NMSU Molecular Biology Ph.D. program. Theresa graduated from NNMC in 2007 with an Associates of Applied Science in Laboratory Biotechnology and a B.S. in Biology in 2009. Theresa was able to combine academic credits from NNMC, UNM, and ENMU. After earning the B.S. degree, Theresa interned in the position of Post-Baccalaureate IRTA in 2010 in the Intramural NIAID Research Opportunity (INRO), Laboratory of Immunology in NIAID, National Institutes of Health, Bethesda, MD. (Photo upper center: Theresa presenting research at NNMC.)

**Iris Olivas** is a 2007 SCCORE participant and Biology major at UNM. Iris received the Transfer Scholarship upon her transfer from NMSU-Alamogordo Community College, where she earned the Associate of Medical Laboratory Technology in 2008. Iris participated in the AMP URA program in Spring 2011 with faculty mentor Dr. Ravi Durvasula, Chief of Medicine at the Veteran’s Administration (VA) in Albuquerque, where Iris started as a volunteer for class credit and is now participating in an ongoing internship that is funded by the UNM MARC program. Her current research in Dr. Durvasula’s lab involves development of a paratransgenic approach to neutralize the cytotoxins excreted by the bacteria *Clostridium difficile* using a mouse model. *C. difficile* associated disease (CDAD) is thought to result from the disruption of normal flora and overgrowth of *C. difficile* after prolonged use of antibiotics. This work involves use of molecular cloning techniques. Iris is considering attending graduate school after earning the B.S. from UNM. (Photo, upper right: Olivas speaking at SCCORE.)

**Calvin Silas**, who is enrolled in the pre-engineering program at Southwestern Indian Polytechnic Institute (SIPI), was selected as the recipient of the President Obama Scholarship program in Fall 2010. Calvin participated in the first Bureau of Indian Affairs (BIA)-Argonne Indian Education Renewable Energy Challenge in 2009, and his team placed first. At SIPI, Calvin was on the President’s List and named SIPI Student of the Year for 2010-11. Calvin participated in the 2011 Summer Community College Opportunity for Research Experience (SCCORE) program on the NMSU campus in the area of biofuels with faculty mentor Dr. N. Khandan. Calvin plans to transfer to a four-year institution in electrical engineering in 2012. (Photo next page upper left: Calvin Silas conducting biofuels research during SCCORE.)





Calvin Silas

Mark Seger

Jose Solis

**Mark Seger**, NMSU Molecular Biology graduate student, will complete the Ph.D. in 2011. Mark, who transferred from New Mexico Military Institute (NMMI) to NMSU, participated at NNMI in the New Mexico AMP STEM Club, then received the AMP Transfer Scholarship, leading to enrollment in SMET 101 and a URA award at NMSU. As an undergraduate in 1999, Mark performed an internship at Los Alamos National Lab in Los Alamos, New Mexico. He participated in the New Mexico Alliance for Graduate Education and the Professoriate (AGEP) and currently is in the NIH Minority Biomedical Research Support-Research Initiative for Scientific Enhancement (MBRS-RISE) Program. Mark hopes to obtain a post-doc, continuing research in plant biotechnology. *(Photo upper center: Mark in research lab.)*

### Impacting Lives: A Family Affair

**Jose A. Solis**, BD III participant who earned both his B.S. and M.S. degrees in Civil Engineering at NMSU, currently attends University of Colorado-Boulder in the Civil Engineering Ph.D. program. Jose has a long history with New Mexico AMP, starting out as a New Mexico AMP student at Santa Fe Community College in its pre-engineering program and transferring to NMSU after participating in the New Mexico AMP Minority Engineering Transfer and Articulation (META) program that extended into the current SCCORE program. After his transfer to NMSU, Jose was awarded a New Mexico AMP Transfer Scholarship, and then served as a research assistant with Dr. Salim Bawazir, Associate Professor of Civil Engineering in the New Mexico AMP URA Program, on projects funded by EPSCoR, the U.S. Bureau of Reclamation, and Sierra Soil and Water Conservation District of New Mexico. After earning the B.S. degree, Jose participated in the Bridge to the Doctorate program, in which he earned the M.S. degree in Civil Engineering.

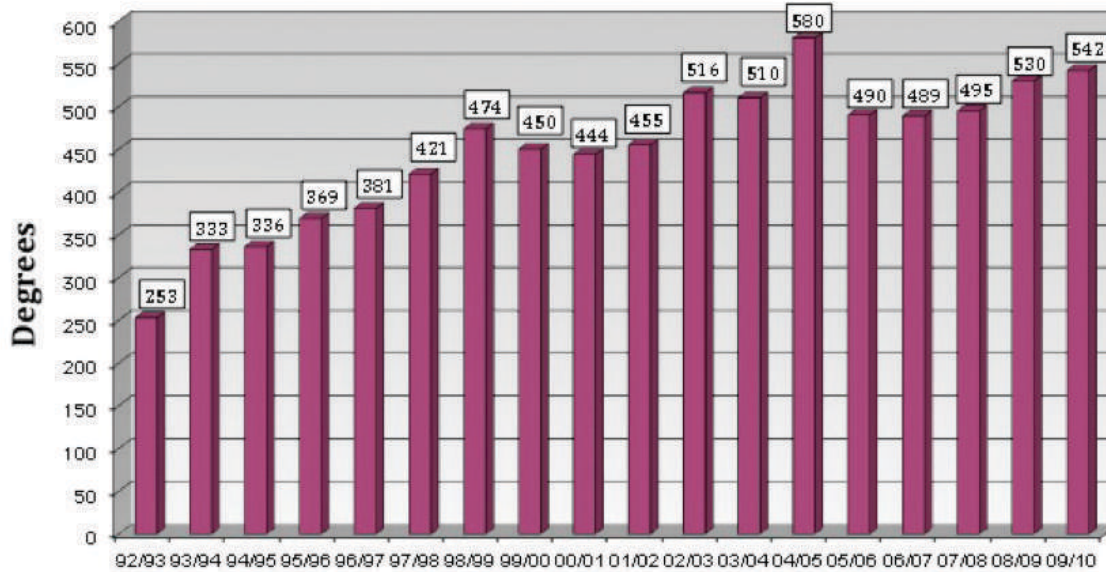
In his Ph.D. program at University of Colorado-Boulder, Jose focuses on a research concentration of riparian evapotranspiration in a collaborative project with the University of Colorado-Boulder, Kansas Geological Survey (KGS), and the University of Iowa. *(Photo, upper right)* Jose's faculty mentor at University of Colorado-Boulder is Dr. Harihar Rajaram, Professor of Civil Engineering.

Jose is the first in his family to attend college, and his success encouraged his younger brother Juan to seek an engineering degree. Juan has also been involved in the New Mexico AMP program as a SCCORE and URA participant and will graduate from NMSU in Spring 2011 in Civil Engineering and continue on to graduate school. In addition, Jose met his wife Andrea Chavez Solis at NMSU, where she also participated in BD III program. Andrea is currently pursuing a Ph.D. in civil engineering at the University of Colorado-Denver.

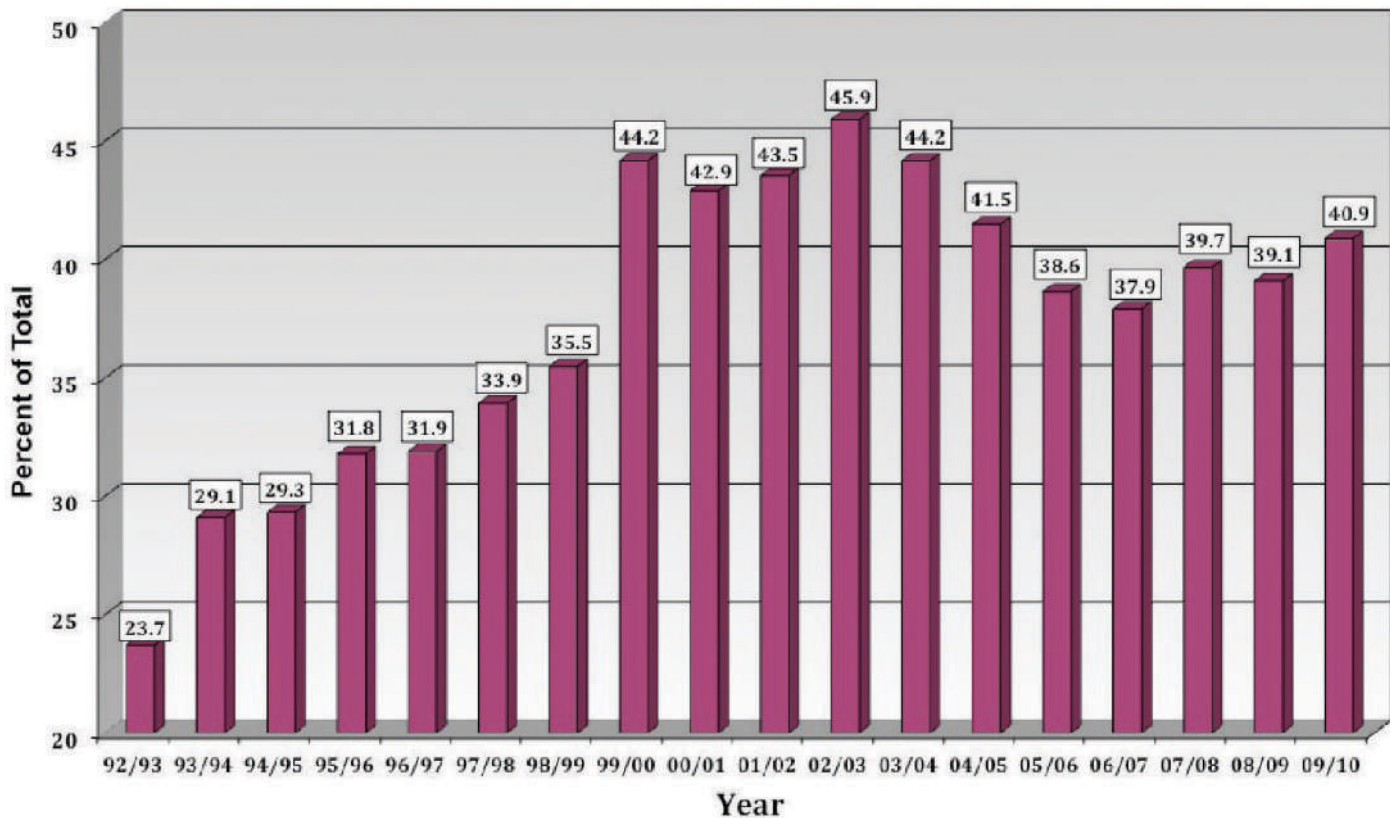
Reflecting on his years of involvement with New Mexico AMP, Jose asserts, *"I can see how New Mexico AMP influenced my decisions all the way from the community college to my current Ph.D. program. As an SFCC student, I participated in the META/SCCORE program, and I was given the opportunity to explore the majors in engineering and do research, which helped me identify my strong interest in civil engineering. Then as a URA, the research I conducted with Dr. Bawazir helped me recognize my potential as a researcher and my interest in evapotranspiration because of its potential to help farmers and the general population with water management. My mentor and my parents encouraged me to go for a master's degree, and the Bridge to the Doctorate program provided the final push I needed to continue on for a Ph.D. AMP has strongly influenced my educational career. The research experiences and the opportunities to present my research at various conferences developed my self-confidence and helped me recognize that I had the potential to one day earn a Ph.D."*

# Program Outcome

## Minority STEM B.S. Degrees Awarded by New Mexico Institutions

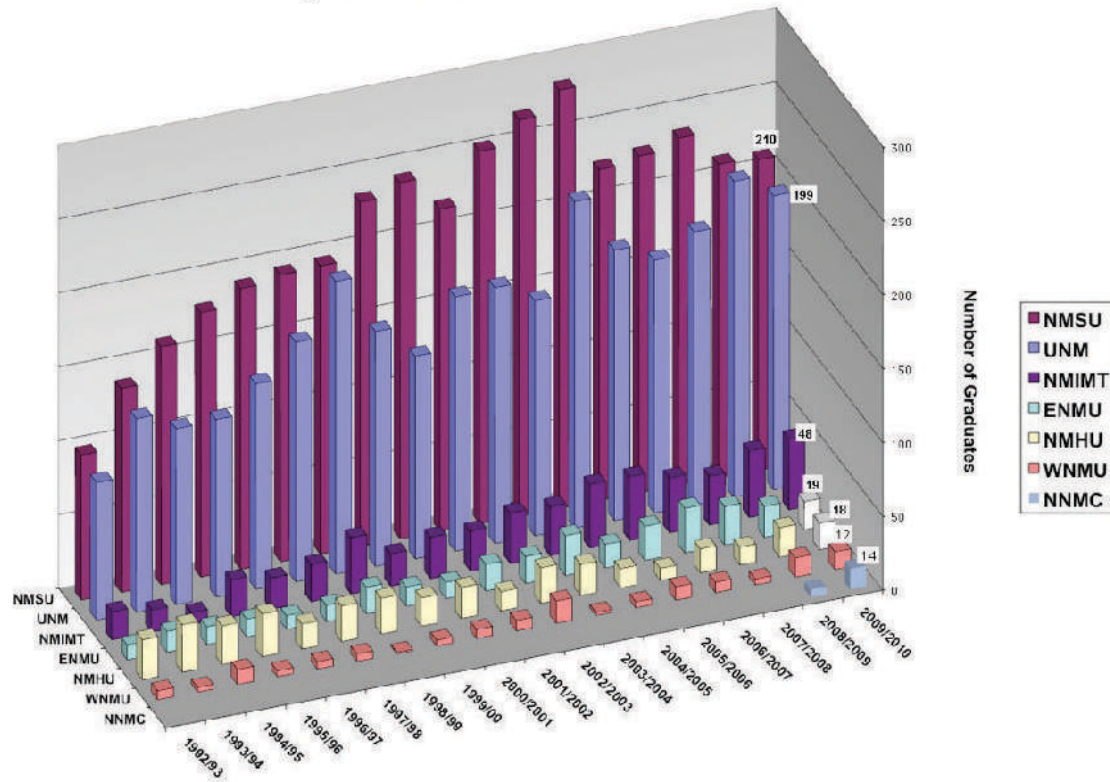


## Percentage of Minority STEM B.S. Degrees Awarded by New Mexico Institutions

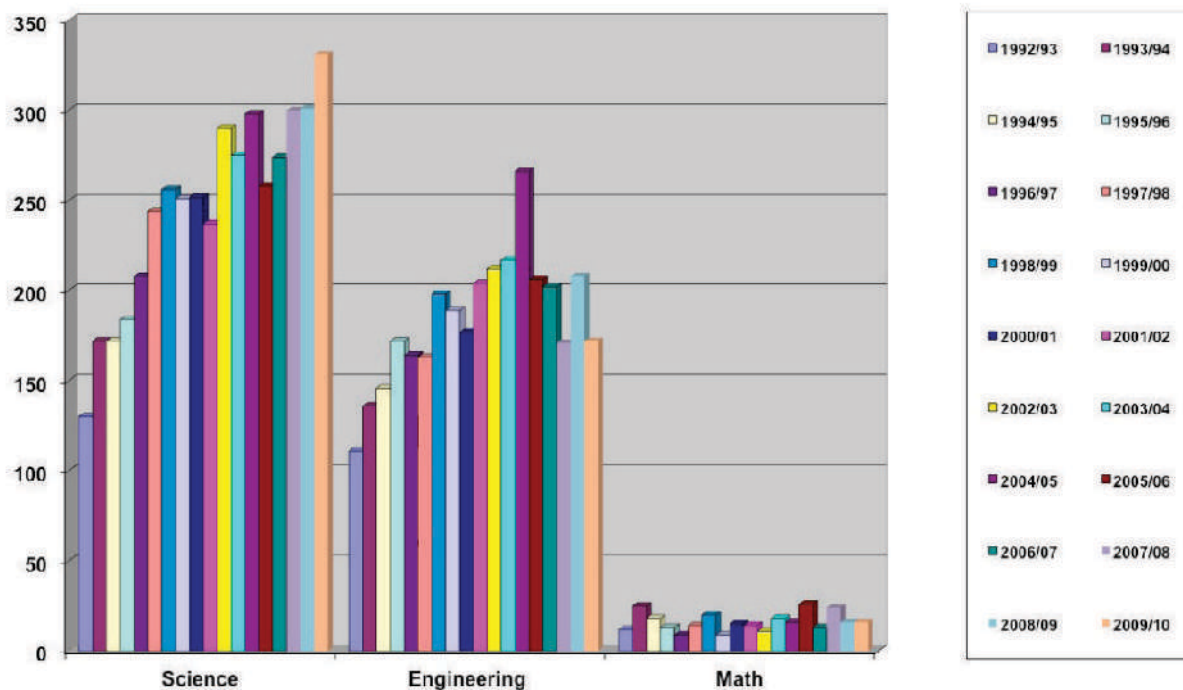




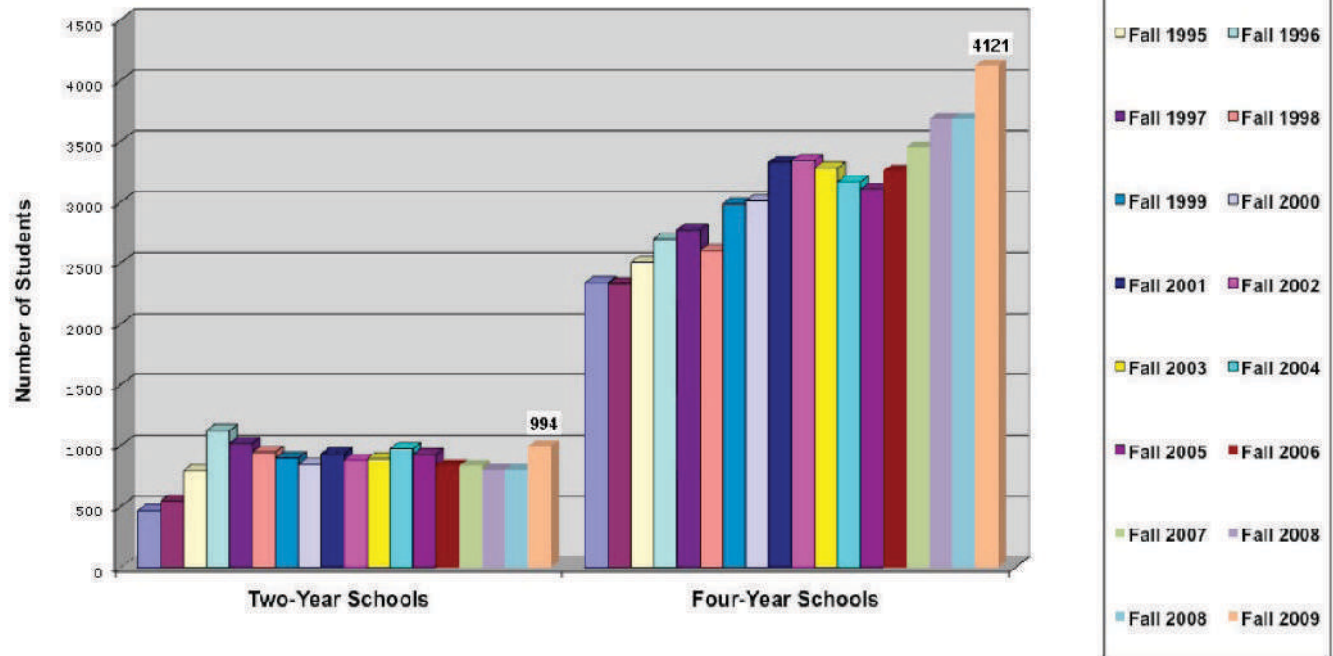
**Total STEM B.S. Degrees Awarded to Minorities  
by New Mexico AMP Institution**



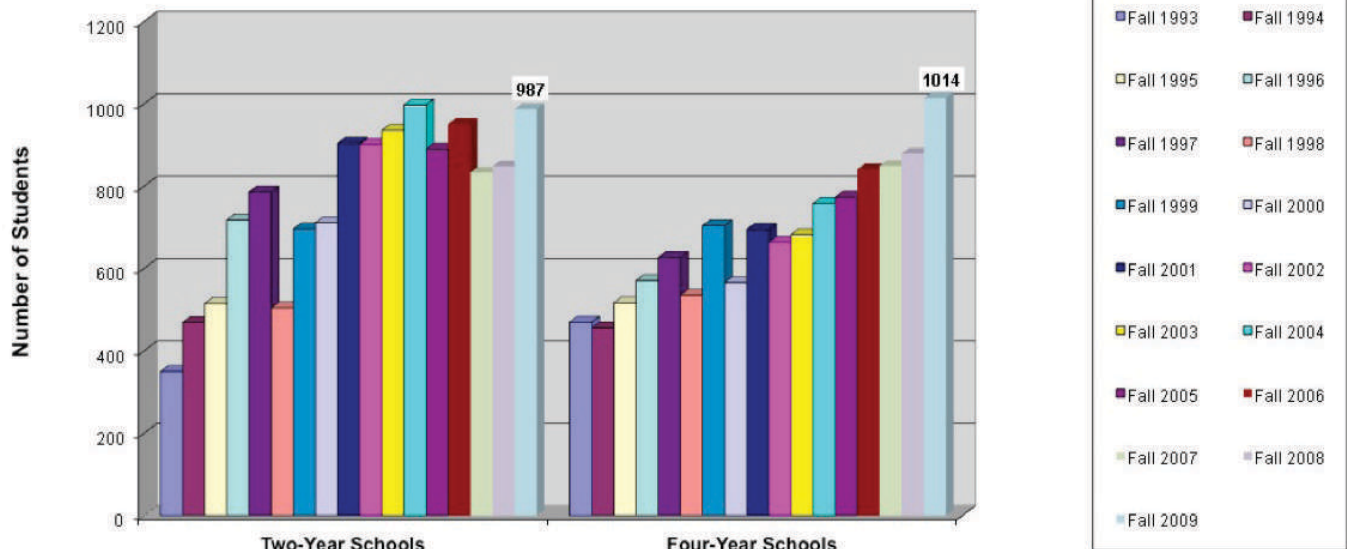
**STEM B.S. Degrees Awarded to Minorities by New Mexico AMP Institutions by Discipline**



## Full-Time Enrollment of STEM Minority Students at New Mexico AMP Two- and Four- Year Institutions



## Part-Time Enrollment of STEM Minority Students at New Mexico AMP Two- and Four- Year Institutions







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