

Horizons

**Expanding Horizons in Science, Technology,
Engineering, and Mathematics**
Sponsored by the National Science Foundation

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Expanding Horizons: Visualizing the Possibilities and Making Connections

The 2012 New Mexico AMP Student Research Conference at New Mexico State University was held on October 5th, with 260 New Mexico AMP community college and university students, staff, faculty, and administrators and representatives from the New York City LSAMP in attendance. In addition, high school juniors, seniors, and advisors from the New Mexico Math, Engineering, Science Achievement, Inc. (New Mexico MESA) program attended the event. The University Research Council (URC) held faculty poster presentations concurrently with the conference, providing an excellent opportunity for conference participants to network and learn more about research at NMSU.

Dr. Van D. Romero presented the keynote address that kicked off the conference. Dr. Romero serves as Vice President for Research; Professor of Physics; and the Chief Officer of the Research and Economic Development Division at New Mexico Institute of Mining and Technology (New Mexico Tech). Dr. Romero, who has extensive research experience, has appeared on three episodes of the Discovery Channel's *MythBusters* and has helped produce five additional episodes. Dr. Romero held the interest of the students by explaining the process of setting up various experiments at New Mexico Tech for the show, sharing the purpose for the show is to set up experiments to test various myths to prove or disprove their validity. With several examples of myths they have tested, Dr. Romero illustrated the preparation,



Aaron Garcia, Chief Executive Officer of SiliconMesa Corporation, focused on entrepreneurship, explaining how his educational and work experience provided the skills, training, and incentive to start his own business.

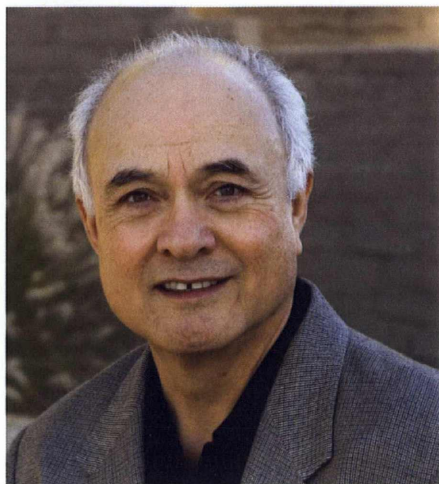


*Dr. Van Romero, Vice President for Research and Professor of Physics and New Mexico Tech, shared the institution's involvement with the Discovery Channel's *MythBusters*.*

effort, and outcomes of the experiments. Dr. Romero ended his talk by encouraging students to continue in science, technology, engineering, and math (STEM) research, reminding them of the difference they can make, both locally and globally. At the conference luncheon, Aaron Garcia, Chief Executive Officer of SiliconMesa Corporation, provided the Luncheon Address. Mr. Garcia shared how his background as a student in engineering at NMSU and his 18 years of leadership and management experience at Intel Corporation provided skills, knowledge, training, interest, and passion to run his own business. He asked the students to consider the many possibilities for their future, calling them to think

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A Message from the Director: Looking Forward



Ricardo B. Jacquez, Ph.D. P.E.
Director of New Mexico AMP

Another year has passed, a very successful year once more for New Mexico AMP! We have continued to plan, develop, and deliver engaging opportunities for New Mexico students in science, technology, engineering, and mathematics (STEM). And, very importantly, we have submitted a proposal to National Science Foundation (NSF) for continued funding of New Mexico AMP, a statewide program in its 20th year of partnership efforts!

As we look forward to transitioning to our next Senior Alliance phase of funding, we continue to make efforts to fulfill the goal of increasing the quantity and quality of underrepresented students in New Mexico who complete STEM baccalaureate degrees. To accomplish this goal, we will continue to encourage and motivate our students to pursue graduate education, preparing them to enter the STEM workforce with the best training and experiences possible.

At the community college level, we will continue to strengthen pathways and increase transfer-focused interven-

tions and opportunities. The Summer Community College Opportunity for Research Experience (SCCORE) program will continue to offer an annual summer bridge experience that helps students develop academic and research skills and encourages transfer. Professional development opportunities will continue to be offered to help students gain a better understanding of the culture of the university and of STEM, and that create aspirations leading to a successful transfer. These include activities at community college, such as field trips, STEM Clubs, Transfer Advising, and the planned STEM E-Community effort, led by Phyllis Baca (Santa Fe Community College) and Jonathan Herbert (NMSU-Grants), that will increase the use of distance technologies to build and extend the STEM student community. The New Mexico AMP Transfer Scholarship will continue to provide financial assistance in the first semester of transfer to students who are transferring to the four-year institution to pursue a B.S. degree.

At the university level, New Mexico AMP will continue to offer the undergraduate research assistantship (URA) program to develop students' research skills and to nurture, encourage, and support the progression of individual students to graduate studies. In addition, opportunities for professional development activities and leadership will be disseminated, such as internships, professional conferences, encouragement of co-authorship of publications with faculty mentors, peer research, and learning communities.

New Mexico AMP will also continue to develop and extend alliance-wide activities, such as the annual New Mexico

AMP Student Research Conference that is held each fall, offering STEM and conference exposure to high school NM MESA students and research experience to statewide community college and university students. The Community College Professional Development Workshops and Stipend Program, a component of the annual Student Research Conference, will continue to help pre-transfer students to better navigate the conference experience and provide transfer guidance. The associated Faculty Professional Development Workshops focus on transfer support and student retention and persistence. Lastly, New Mexico AMP will continue to provide opportunities for students to engage in international research, education, and exchange activities.

We are excited about the possibilities for this next phase of New Mexico AMP. This is an outstanding alliance, and I am grateful for the commitment to our students of our faculty mentors, institutional coordinators, and staff. We see the impact of New Mexico AMP and its programs on the lives of students and faculty, and their institutions!

SAVE THE DATE!

Mark Your Calendar Now
For the 2013 New Mexico AMP
Student Research Conference
on October 4, 2013!

Visit the conference
website at [www.nmsu.edu/~nmamp/
conference](http://www.nmsu.edu/~nmamp/conference)

Note: Pre-and post-conference workshops for
community college students on October 3 and
October 5.

Expanding Horizons: Visualizing the Possibilities and Making Connections

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outside of the box and asking them to consider how they could connect their science and engineering skills with entrepreneurship. Using his own example, he shared how his education and work experience provided what he needed to form a company that met a real need in the medical industry. SiliconMESA provides Cloud-based software and secure data storage solutions, and their flagship product SiliconMesa EHR, is an affordable, highly secure, and fully integrated Electronic Health Records (EHR) and Practice Management solution that is customized to fit the existing workflow of medical practices. By illustrating with his own example, students were encouraged to visualize their own possibilities.

Student research presentations took place throughout the day, with 12 oral and 30 poster presentations. Eight (8) oral presentations and all the poster presentations competed for awards. Oral Presentation winners included Lucas Guaderrama and Arwen Gwyneth Hubbard, Tie for First Place; Miquela Trujillo, New Mexico Tech, Engineering, Second Place; and Marco Dunwell, NMSU, Chemical Engineering, Third Place (not pictured). Poster award winners included Lisa Martinez, Eastern New Mexico University (ENMU), Chemistry, First Place; Shawn Charles, City College of New York, Mechanical Engineering, Second Place; and Rachel Ridgeway, Luna Community College, Physical Science, Third Place.



Community college students participated in workshops before and after the conference to provide the most impacting and engaging conference experience.



Josh Bowen, Head of Engineering Operations for LIMBS International at UTEP, sharing how fulfilling it is to use his engineering degree to make a difference in the lives of amputees.



Conference participants enjoy networking with other students and faculty.



Elizabeth Juarros, Professor of Physical Science at Luna Community College, presented a seminar to the NM MESA students that included various demonstrations to explore the Ultracold Realm.



The Undergraduate Research Council (URC) recognized outstanding faculty researchers at the Conference Luncheon. seminar to the NM MESA students that included various demonstrations to explore the Ultracold Realm.



Ricardo Jacquez congratulates Oral Competition Winners.



Dr. Jacquez awards the winners of the poster presentation awards.

Students viewed posters and met with NMSU faculty members to discuss their research during the University Research Council (URC) Poster Presentations. Dr. Elizabeth Juarros, Professor of Physical Science at Luna Community College, presented a seminar to the NM MESA students that explored the ultracold realm. Josh Bowen, Head of Engineering Operations for LIMBS International at the University of Texas at El Paso

(UTEP) spoke to all the students about his work with LIMBS International, focusing on the profound difference that those who use their STEM education and training can make in the lives of others. Twenty statewide community college students from seven partner institutions attended the 2012 Pre- and Post-Conference Workshops to help them have the best conference experience.

People, Places, and Things

Rachel Ridgeway, 2012 SCCORE participant, was recognized as a Coca-Cola All-State Academic Team Silver Scholar Award at the NM Legislature (Roundhouse) in Santa Fe on Community College Day on February 20, 2013. For the award, Rachel will receive a full transfer scholarship to any New Mexico four-year institution to finish out her undergraduate degree. The Coca-Cola Scholars Foundation sponsors the award. Rachel also recently represented Luna Community College as the Beta Mu Nu Chapter President at this year's Phi Theta Kappa International Convention in San Jose, California on April 4-6, 2013. At the Convention, Rachel attended the general sessions, educational forums, the Phi Theta Kappa Academy, and she was recognized along with the other members of the Coca-Cola Community College Academic Teams, and other scholar awardees. Rachel commented, "I took so much applicable knowledge from the convention, and was overall inspired to continue on with my academic career, strive for excellence, and to continue to live my life, no matter where it may take me, as a servant leader." In the SCCORE program, Rachel worked with faculty mentor, Dr. Jacob

Urquidi, NMSU Associate Professor of Physics, on a project entitled, "Surfactant Free Emulsions." Rachel graduated from Luna Community College in May, 2013 and plans to attend NMSU in fall 2013.

Luna Community College's **Physics Professor Elizabeth Juarros**, teaches **SMET 101** – Introduction to Science, Mathematics, Engineering, and Technology – a course that was developed by New Mexico AMP in the spring of 1997. SMET 101 focuses on critical thinking and problem solving skills as well as helping students clearly determine their academic and career plans and address articulation and transfer issues. In her SMET 101 class, Dr. Juarros supplements the New Mexico AMP-authored curriculum with a seminar that offers a series of talks by STEM professionals and experts. The talks cover a wide variety of topics to appeal to the wide interests of the class. Along with these presentations, Dr. Juarros asks the class to do a series of projects that help them to interpret journal articles and abstracts to help prepare the students for the New Mexico AMP Student Research Conference that many of them attend.

Engineers Without Borders (EWB),

a non-profit student organization at NMSU that specializes in providing sustainable engineering projects for those in need, traveled to Azerca Cancha, Bolivia in August 2012 to construct a 50-meter-long, suspended pedestrian bridge for the town of approximately 100 residents in the small Bolivian town that has a river that runs through its center. During the rainy season in Azerca Cancha, the river would rise and leave the town divided between one side that housed the health center and that provided access to other communities and the other side that housed the school. The EWB members who constructed the bridge included 16 students and a few NMSU alumni, led by Kenny Stevens, Engineering Technology Professor and Sonya Cooper, Associate Dean of the College of Engineering, both of whom have served as New Mexico AMP Faculty Mentors. The construction of the bridge has allowed community members to be able to access both sides of the town and to transport their animals and supplies during the rainy season.

The New Mexico State University Alamosordo MESH (Math, Engineering, Science, and Humanities) Division, under the direction of Cathy Aguilar-



Luna Community College President Dr. Pete Campos and Rachel Ridgeway



STEM Club students from the NMSU-A



NMSU - Alamosordo Community College students at Holloman Air Force Base.

Morgan participated in a **STEM workshop, specifically for female high school students interested in Science, Technology, Engineering and Math.**

Dr. Gloria Villaverde, Jennifer Smith, Rob Klinger, Dr. Rita Eisele and Cathy Aguilar-Morgan directed hands-on presentations to students at Mescalero High School. Girls in attendance were thrilled at learning more about astronomy, biology and math, as well as hearing from female role models in Science, Engineering, and Math, which many of the staff represented. Christina Sarabia Stroud presented students with outreach materials on the tutoring services, facility upgrades, internships and service learning NMSU-A is spearheading.

On March 28, **STEM Club students from the NMSU-A Community College** were granted access to classified sections of Holloman Air Force Base (HAFB) to meet with various engineers and technicians working at the Base. Students were granted access to an F-22 Raptor and to interview professionals who maintain and pilot the aircraft. Students also met with professionals working with MQ-1/MQ-9 Remotely Piloted Aircraft (RPA's), often referred to as drones, as they explored the aircrafts and observed RPA live video feeds. STEM Club Mem-

bers also learned about the 846th Test Squadron, which houses the longest sled track in the world. Here, engineers explained how the track is used to test potential commercial space transportation technologies using realistic flight velocities. Personnel at the 846th not only have the capability to design and engineer their creations, but also fabricate, test and analyze new technologies. Overall, students were excited about the fascinating career opportunities available for engineers right here in New Mexico.

Shawnmarie Manheimer's first introduction to a research conference took place when she attended the New Mexico AMP Student Research Conference in 2011 with her mentor, NMSU-Grants Professor Jonathan Carter Hebert. Professor Hebert was impressed with Shawnmarie, a young Navajo female student, because of her demonstrated positive attitude and willingness to try new things, so he hired her as his student assistant. In the course of the year, Professor Hebert encouraged and helped Shawnmarie to apply for several summer research programs, including the NM EPSCoR Summer Research Program at New Mexico Tech. She was accepted to the EPSCoR program and was assigned to research on a project led by a doctoral

student in Chemical Engineering. As a result of her demonstrated abilities, work ethics, and cooperative attitude, she was offered a student position in the Chemical Engineering Department in the fall of 2012, upon her transfer to New Mexico Tech. At that time, she was also awarded a New Mexico AMP Transfer Scholarship. Shawnmarie has since traveled to several conferences, including the New Mexico AMP Conference in 2012 and a research conference in Seattle. In addition, she presented her summer research in Anchorage Alaska.

New Mexico State University (NMSU) **Undergraduate Research Assistantship (URA) program students presented posters at the 2013 Emerging Researchers National (ERN) Conference in STEM** from February 28th-March 2nd, 2013 in Washington, D.C., including Amber Medina (Physics), Michael Carlock (Industrial Engineering), Cristina Villa (Industrial Engineering), and Mercedes Maldonado (Mechanical Engineering/Aerospace). The American Association for the Advancement of Science (AAAS), the Education and Human Resources Programs (EHR) and the National Science Foundation (NSF) hosted this Conference. The objectives of the conference were to help un-



Shawnmarie Manheimer

URA students Amber Medina (NMSU), Waled Tayib (Tennessee State University), Sean Pickthorn (St. Johns University), Mercedes Maldonado (NMSU), Christina Villa (NMSU), Michael Carlock (NMSU)

dergraduate and graduate students to enhance their science communication skills and to better understand how to prepare for science careers in a global workforce

At the ERN Conference, **Amber Medina**, a junior physics major, won First Place in the Nanoscience and Physics category for her poster presentation, receiving \$300 for her accomplishment. Amber won for her poster entitled, "Determination of the dielectric function of germanium as a function of temperature." Her faculty mentor for the ERN project was Dr. Stefan Zollner, Academic Department Head of the Physics Department. According to Dr. Zollner, "the data from Amber's research provided the basis for a research proposal submitted to the Air Force Office of Scientific Research, which was funded over a three-year period in the amount of \$450,000, with subcontracts to Arizona State University and the University of Delaware." Amber also performs research with faculty mentor, Dr. Chris Churchill, NMSU Associate Professor of Astronomy. Importantly, Amber has been selected to participate this summer in a Research Experience for Undergraduates (REU) at Harvard University. Her future plans include progression to graduate school, with the goal of completing

the Ph.D. and serving as a university professor and researcher, at which time she would like to perform research on the evolution of galaxies, with a focus on the relationship between galaxy and stellar formation.

The New Mexico Society of Professional Engineers (NMSPE) honored a **New Mexico AMP student from New Mexico Technical Institute of Mining and Technology, Miquela Trujillo, as the Engineering Student of the Year** on Friday, February 22, 2013 in Albuquerque. The NMSPE provides the award to engineering students from the three New Mexico research universities each year at its annual banquet. Miquela, who is from Espanola, NM, completed two internships at Los Alamos National Laboratory and also participated in the competitive Summer Research Opportunity Program at the University of Michigan in the summer of 2012, where she conducted experiments on the performance of shape-memory alloys. She was also named the 2nd Place awardee of the Oral Presentation competition at the New Mexico AMP Student Research Conference at NMSU in October, 2012. Miquela has been accepted into three doctoral programs, including the University of Illinois. Her goal is to earn a Ph.D. one day, with focused research in thermal

fluids. In addition, **Dr. Nadir Yilmaz, Associate Professor of Mechanical Engineering** and New Mexico AMP Faculty Mentor at New Mexico Tech, won the Young Engineer of the Year Award at the NMSPE event.

A team of Southern Indian Polytechnic Institute (SIPI) students from the Engineering and Natural Resources Programs presented three workshops at the 2013 AISES Region III Conference, which was held at the University of New Mexico, on March 7-9, 2013. The students were accompanied by their faculty advisors, Dr. Nader Vadiiee and Dr. Jennifer Pascal. The workshop presentations focused on the Jemez Pueblo Geoscience Project, the Biomedical Engineering Module at SIPI, and SIPI Instructional Wind Tunnel Design and Manufacturing for Civil Engineering Applications. Five members of the team will graduate from SIPI in 2013 in Engineering and Engineering Technology Programs.

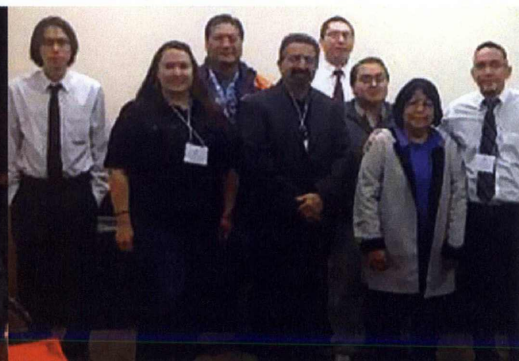
Wendi Cole and former SCORE participant, Calvin Silas, were inducted into the All-State Academic Team at the NM Legislature (Roundhouse) in Santa Fe on February 20, 2013 on National Community College Day. The students will receive full transfer scholarships to any New Mexico four-year institution to finish out their



Amber Medina



Miquela Trujillo and Dr. Nadir Yilmaz



Engineering and Natural Resources Programs SIPI students

undergraduate degrees. Calvin graduated from SIPI in fall 2012 in the first graduating class of the pre-engineering programs and transferred to NMSU in spring 2013 in Mechanical Engineering. Wendi will graduate from SIPI in fall 2013 and plans to transfer to UNM in engineering.

Wendi Cole was also selected as one of the 20 members of the 2013 All USA Community College Academic Team. She was selected out of 1800 applicants nationwide and is the only recipient from New Mexico. For this honor, she will receive a \$2500 scholarship. Further, Wendi will receive an additional \$2000 scholarship for her recognition as Coca Cola New Century Scholar, an honor bestowed on the top scorer in the State of New Mexico. Wendi was featured in USA Today for her accomplishments and honors. Wendi recently attended the American Association of Community Colleges (AACC) Convention with Val Montoya, SIPI Vice President of Academic Programs.

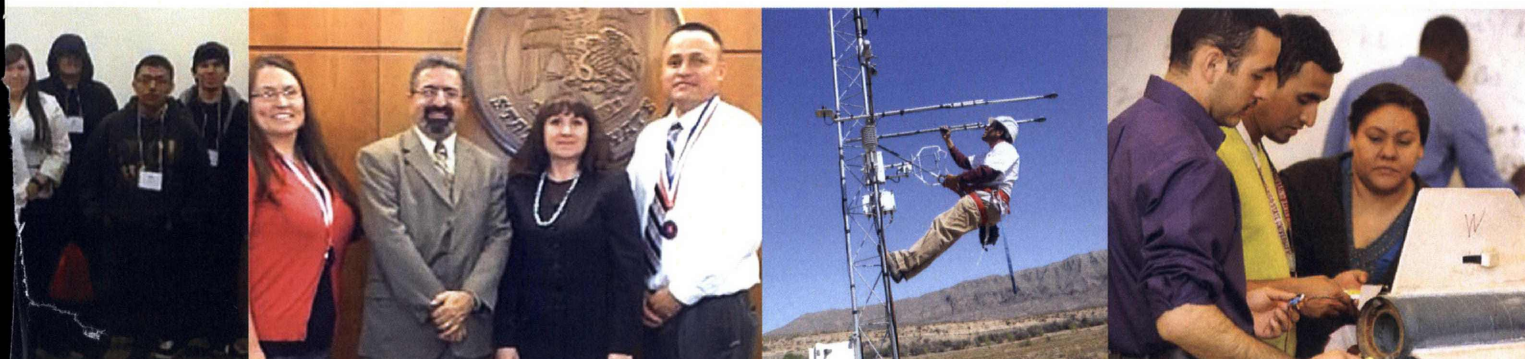
Juan Solis, NMSU Civil Engineering graduate student who got his start in research in the New Mexico AMP SCCORE and URA programs, was recently awarded the 2013 National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP)

Fellowship. Juan's selection was based on his "outstanding abilities and accomplishments" and his "potential to contribute to strengthening the vitality of the U.S. science and engineering enterprise." For the fellowship, Juan will be awarded \$30,000 per year for a maximum of three years.

Juan's faculty mentor is Dr. Salim Bawazir, Associate Professor of Civil Engineering at NMSU, and the project on which he is working is entitled, "Management of Riparian Zones to Conserve Water and Improve Water Quality and Improve Habitat." This project is a joint-research collaboration between three other universities in the National Science Foundation-sponsored ReNUWIt (Re-inventing the Nation's Urban Water Structure) with Stanford University, UC Berkeley, Colorado School of Mines, and NMSU. Juan has presented research at many conferences, with the most recent, the 57th Annual New Mexico Water Conference at NMSU and the 12th Annual University Research Council (URC) Research and Creativity Activities Fair at NMSU. In 2012, Juan was awarded the Charles Abernathy Scholarship and the Conrad G. Keyes Scholarship. Juan plans to complete the M.S. degree in Civil Engineering in Fall of 2013, after which he plans to continue at NMSU

to pursue the Ph.D. and continue his research with the ReNUWIt joint-collaboration project.

Former SCCORE Students, Edgar Gonzalez and Crystal Escamilla participate with other electronics and computer engineering technology students in the Atomic Aggies. For the second year in a row, the Atomic Aggies earned the right to participate in the NASA University Student Launch Initiative (USLI) competition that challenges university students to design, build, and launch a reusable rocket with a scientific or engineering payload to one mile above ground level. Students in the group develop the design work, prepare reports and presentations, and also conduct community outreach to middle school students. This year, the Atomic Aggies taught these students to make rockets out of film canisters. The competition takes place in Alabama on April 20, 2013, and they will have the results within several weeks. The project serves as a senior capstone design course, engaging them in scientific research and real-world engineering processes with NASA engineers. The group presented their proposal and preliminary designs to NASA this past August. (Story courtesy of the NMSU Home Page, www.nmsu.edu.)



(Left to right) Wendi Cole, Dr. Nader Vadiee; Dorothy Wester, Chair of the SIPI ATE Dept.; and Calvin Silas

Juan Solis

NMSU Atomic Aggies

New Mexico AMP Administrative Offices

New Mexico Alliance for Minority Participation

MSC-3AMP

New Mexico State University

P.O. Box 30001

Las Cruces, NM 80003-8001

Telephone: (575) 646-1847

FAX: (575) 646-2960

email: amp@nmsu.edu

www.nmsu.edu/~nmamp

Director:

Ricardo B. Jacquez, Ph.D., P.E.

Co-Director:

Dr. Delia Valles-Rosales

Program Manager:

A. Michele Auzenne

Student Programs Coordinator:

Josie Elaine Lannert

Data Coordinator:

Susana Venegas

Program Accounts Coordinator:

Gloria Vasquez

Public Info/Stu. Dev. Coordinator:

Jeanne Garland

Records Specialist:

Cheri Coffelt

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National Science Foundation Louis Stokes Alliances for Minority Participation

4201 Wilson Boulevard

Arlington, VA 22230

Acting Director, NSF

Dr. Cora B. Marrett

Deputy Director,

Dr. Cora B. Marrett

LSAMP Program Director

Dr. A. James Hicks



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New Mexico AMP Institutions

Universities

Eastern New Mexico University

Brian Pasko, Assistant Professor of Mathematics,
(575) 562-2367

New Mexico Highlands University

Craig Conley, Assistant Professor, Natural Resources
(505) 426-2267

New Mexico Institute of Mining and Technology

Lillian Armijo, Director, Student Affairs
(575) 835-5780

New Mexico State University

Michele Auzenne, Program Manager
(575) 646-1847

Northern New Mexico College

David Torres, Chair, Math and Science
(505) 747-2174

University of New Mexico

Laura Crossey, Professor, Earth & Planetary Sciences
(505) 277-5349

Western New Mexico University

Zenaido (Tres) Camacho, Assistant Professor, Biology
(575) 538-6251

Community Colleges and Branch Campuses

Diné College

New Mexico AMP Program Manager
(575) 646-1168

Central New Mexico Community College

Heather Fitzgerald, Instructor, Biology
(505) 220-3247

Clovis Community College

Larry Powell, Chair, Mathematics and Science
(575) 769-4935

ENMU-Ruidoso

Stephen Miller, Program Coordinator, Information
Systems
(575) 257-2120

ENMU-Roswell

Robert Bowman, Vice Pres. for Student Affairs
(575) 624-7159

Luna Community College

Elizabeth Juarros, Professor, Physical Science
(505) 454-5358

Mesalands Community College

Phillip Kaatz, Instructor, Mathematics/Physical Science
(575) 461-4413

New Mexico Junior College

Kelly Halladay, Dean of Business, Mathematics, and
Science
(575) 492-2801

New Mexico Military Institute

Richard Kestner
(575) 624-8096

NMSU-Alamogordo Community College

Christina Serabia Stroud/J. Smith
(575) 439-3764

NMSU-Carlsbad Community College

Robyn Hayes, Instructor, Chemistry
(575) 234-9343

NMSU-Doña Ana Community College

Tarcholan Dhillon, Professor, Technologies
(575) 527-7586

NMSU-Grants Community College

Jonathan Carter Heber
(505) 287-6653

San Juan College

New Mexico AMP Program Manager,
(575) 646-1168

Santa Fe Community College

Phyllis Baca, Professor, Technologies
(505) 490-1557

Southwestern Indian Polytechnic Institute

Nader Vadiie, Coordinator, Engineering Program
(505) 792-4618

UNM-Gallup

Kamala Sharma, Assistant Professor, Chemistry
(505) 863-7585

UNM-Los Alamos

Cedric Page, Executive Director
(505) 662-0330 x330

UNM-Taos

Richard Niemeyer, Head of Sciences/Brooke Zanetelli,
Instructor, Math and Science
Niemeyer: (505) 737-6250 Zanetelli: (575) 770-6830

UNM Valencia

Miriam Chavez, Science Dept. Chair
(505) 925-8613