



Horizons

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



In this Issue:

| | |
|--|----|
| From the Director | 2 |
| People, Places & Things | 3 |
| New Mexico AMP Faculty Awards | 4 |
| & Student Recognition | 5 |
| Celebrating Excellence— the 2001 Conference | 6 |
| AMP Student Research Activities | 8 |
| New Mexico AMP Participating Institutions .. | 11 |

“Celebrating Excellence”

The 2001 New Mexico AMP/WERC Student Research Conference

had a record attendance, with 372 students, faculty, staff and administrators participating, including students and mentors from the California State University Alliance for Minority Participation, and the University of Texas System – El Paso. Held on September 14-15, 2001, the conference theme was “Celebrating Excellence.” NMSU President Jay Gogue welcomed the participants along with

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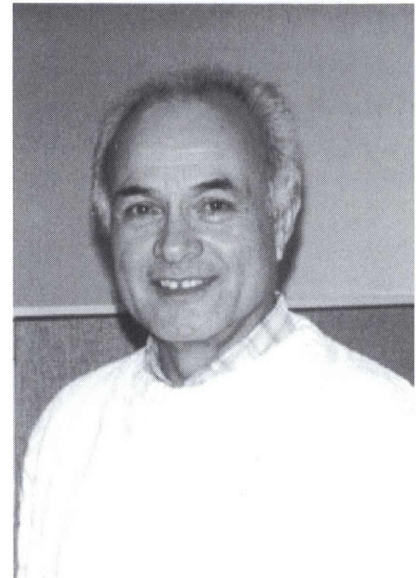
From the Director

This issue of Horizons marks the end of another successful student research conference and another successful year for the Alliance and its partners and students. New Mexico AMP has always believed that communication and presentation skills are a key to academic and professional success and our conference and undergraduate research activities are designed to promote and develop those skills. You will note as you read the articles that the focus of this issue is faculty and student research.

Those who are familiar with New Mexico AMP know that the annual student research conference remains at the heart of our program. With participants ranging from high school juniors and seniors through graduate students and university faculty and administrators, the conference's goals & objectives are 1) to provide undergraduate SMET minority students an opportunity to present their research to gain presentation experience and to serve as role models and inspiration for other minority students; 2) to provide students majoring or thinking of majoring in SMET programs the workshops and panel presentations that help them (a) plan their academic and professional careers and (b) acquire the necessary advice and strategies to help them achieve success in those careers; and 3) to interest and encourage community college students to continue their SMET studies at the Baccalaureate level and to provide them with the skills and strategies to successfully make the transfer from the two-year college to the university.

The educational mission of the conference is not only to provide an outlet for students to present research, but also to learn about professional activities in SMET and the important links between academic and professional life. To that end, the AMP conference strives to link its featured speakers, workshops, and panels so that students see the connections between what they do now as students and what they will be doing in their careers after graduation. The conference also provides professional development workshops and activities for SMET community college and university faculty. In addition, the conference serves as a vehicle for both student and faculty networking and as a forum for SMET students, instructors, and industry professionals to share information, ideas, experiences, and advice.

The quality of the students and faculty participating in the Alliance is recognized by the awards they received (page 4-5). The resulting quality of the conference (page 6-7) reflects the hard work of the students and the calibre of faculty mentoring at both the two and four-year campuses (page 8-9). We are proud to showcase their work.



Ricardo B. Jacquez, Director

People, Places, and Things

The SIPI AMP Club held its second meeting of the Fall trimester, October 26.

Officers are Joe Busch (Semi-Conductor Manufacturing Technology), President; Genevieve Eros (Computer Science), Vice President; Naomi Calabaza (Liberal Art-Science major), Public Relations-Senate representative. Joan Goodman, SIPI adjunct faculty member, spoke to the SIPI AMP students during their October meeting about notetaking, test preparation and basic study techniques. Dr. Horton Newsom, UNM Earth and Planetary Department research professor talked to the group at the November meeting.

AMP students are busy with study groups, tutoring sessions, and monthly meetings. SIPI AMP members have been involved in SIPI's 30 year anniversary celebration. A time capsule was planted in September. AMP was represented by contributing newsletters that document AMP activities and a NM AMP t-shirt.

Students have also volunteered their time so far this trimester in helping at SIPI cross country meets, mentoring the Upward Bound/NASA high school students at Saturday Academies in mathematics and English; helping at the Albuquerque Indian Community Pow Wow and creating SIPI's State Fair Float.

Twelve SIPI students are participating in the UNM AMP Collaborative.

Students from SIPI have UNM mentors who are SMET majors. Carolene Whitman, UNM

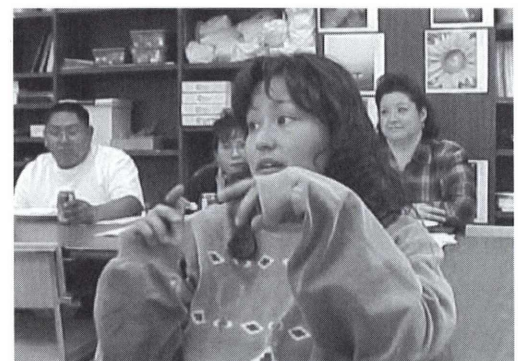


Above: AMP Club members Naomi Calabaza, Genevieve Eros, Lavina Clay and Lorinda Wauneka enjoy a time to get together for lunch and conversation at an AMP Club meeting.

Coordinator, met with the SIPI students in September sharing an overview of the AMP collaborative project and UNM information. The students email each other weekly and establish time for campus visits and shadowing activities.

On October 20, the students participated in a high ropes course at UNM. They definitely learned about trust during this one!

Barbara Arnold, UNM admissions officer, was at SIPI for an AMP sponsored visit on October 30. Barbara evaluates transcripts, provides transfer guidance to students and processes transfer applications. On November 3 the SIPI students met their UNM mentors for a morning of exploration at the New Mexico Museum of Natural History and had an opportunity to see a Dynamax showing.



Below: AMP Vice President Genevieve Eros shares a comment about the high ropes course she participated in as part of the UNM Collaborative. AMP Club members Tadd Garcia, Carey Garcia and faculty member Denise Chavez are in the background.

continued on page 10

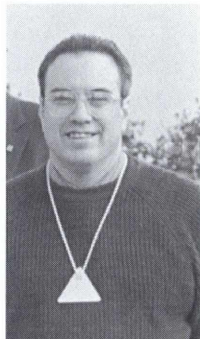
New Mexico AMP Faculty Awards

New Mexico AMP believes the activities of its faculty and students reflect on the success of the Alliance as a whole. As part of the annual Web-AMP and GPRA reports to NSF, New Mexico AMP included recognition of the following faculty and students during the 2000-01 reporting period:

FACULTY AWARDS

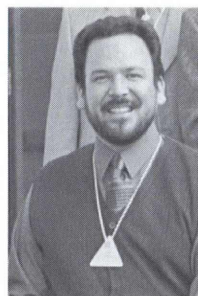
Vicente Lombrana, NMSU-Alamogordo, Math, Science and Technologies Division, and AMP Coordinator, was honored with the Donald C. Roush Award for Teaching Excellence awarded January 2001. Other AMP associates receiving the award were **Oscar A. Perez Jr.**, electronics technology, Dona Ana Branch Community College who works with IC Mike Adams on AMP activities; **Kenny Stevens**, Assistant Professor in Engineering Technology and AMP URA mentor; and **Steve Warburton**, Associate Professor of Biology who assisted in the making of the first College of Arts and Sciences videotape for SMET 101.

Gabe Garcia, NMSU assistant professor, mechanical engineering, received the National Science Foundation's Career Award. This is NSF's most prestigious honor for junior faculty members. The award includes a grant to



*Vicente Lombrana,
Assoc. Professor,
NMSU-
Alamogordo*

*Oscar Perez,
Asst. Professor,
NMSU-Dona Ana*



*Terry Cook,
Assoc. Director,
NMSU Center for
Learning
Assistance*

*Jerry Schickedanz,
Dean, NMSU
College of
Agriculture and
Home Economics*



support Garcia's research in "Intelligent Self-Monitoring Nondestructive Evaluation System for Quantitative Global Assessment of Bridges."

Terry Cook, Associate Director of NMSU's Center for Learning Assistance, received the Fort Bliss Federal Credit Union's professional staff achievement award at the opening ceremony for NMSU's 2001-2002 academic year. Ms. Cook is a long time AMP supporter and was the first SMET 101 instructor at NMSU.

The Society of American Foresters (SAF) granted certified forester status to Professor **David Hacker**, chairman of the Department of Natural Resources Management and associate professor of environmental science at NMHU. Hacker is one of only four certified foresters in the state and the only one connected with an educational institution.

Jerry Schickedanz, Dean of the College of Agriculture and Home Economics at NMSU, received a Secretary's Honor Award from U.S. Secretary of Agriculture Ann Veneman for enhancing service to rural, Hispanic and Native American populations. He is one of only three or four New Mexicans in history to receive this award.

(photos by Michael Kiernan, University Communications, NMSU)

& Student Recognition

STUDENT RECOGNITION

A group of engineering students at NMSU who call themselves "The Flying Aggies" rode the NASA KC-135 jet that simulates weightlessness in space last July.

The six engineering students who designed the project are **Omar Mireles**, mechanical engineering major (and former AMP URA student); **Kendall D. Mauldin**, electrical engineering; **James Childress**, mechanical engineering; **Brian Rodriguez**, civil engineering technology (current AMP URA student); **Sanjeev Nirmalakhandan**, computer science; and **Mike P. Schoenfeld**, mechanical engineering major. Their proposal was accepted for testing by NASA's Reduced Gravity Student Flight Opportunities Program and was one of only 35 such projects accepted in 2001.

NMHU student **Marcelina Gallegos'** presentation on "Frequency Deviation Monitor" was presented at the IEEE's spring conference and won second place out of 12 papers presented.

Lawrence Tafoya, also from NMHU, presented "A Fuzzy Adaptive Delta Modulator" during IEEE's fall 2000 Region 6 conference and placed third out of ten western states.

"The Flying Aggies" (l to r) Sanjeev Nirmalakhandan, Kendall Mauldin, Mike Schoenfeld, Brian Rodriguez, Omar Mireles, and James Childress.



Tomas Sanchez presented a poster at the Sixth Annual Undergraduate Research and Creative Arts Symposium held at NMSU. His research is "Autoignition Characteristics of Diesel Engine Fuels." This annual symposium is sponsored by the University Honors Program, Ronald E. McNair Post-Baccalaureate Achievement Program, the Research Initiative for Scientific Enhancement (RISE), New Mexico AMP, and the Minority Access to Research Careers (MARC) Program.

Former SMET 101 student **Jared Lujan** was part of a team that placed second in their category at an international hydropower design contest in July in Salt Lake City, Utah. Lujan, **Daniel Lamb**, and **Jason Stauffer**, all civil engineering majors, beat out five other teams to take second place in the junior division, power class, of the Hydro Power Contest held in conjunction with Waterpower XII, a biannual hydropower industry conference. It was the first time a team from NMSU had entered the contest. Phil

King, civil engineering, was the team's faculty mentor.

Rosalyn Rael was the first WNMU student selected to participate in the eight-week Mathematical & Theoretical Biology Institute Summer Research Program for Undergraduates at Cornell University. Rael's research group looked at the pesticide resistance of a corn pest.

New Mexico Tech senior, **Michael Ray Johnson**, a computer science major, recently was named as one of about 40 students nationwide accepted as protégés in the University Corporation for Atmospheric Research's (UCAR) Significant Opportunities in Atmospheric Science and Research program (SOARS). This intensive internship program is designed to increase the number of minority students enrolled in graduate programs in atmospheric sciences and related fields. Johnson is a SIPI graduate, and attends Tech on a New Mexico Tech Transfer Excel Scholarship and a New Mexico AMP scholarship.

Celebrating Excellence

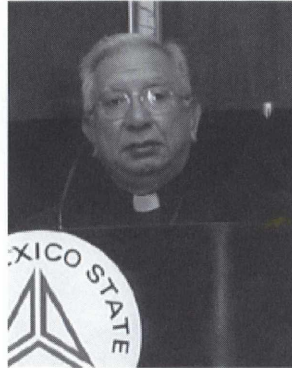
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College of Engineering Dean Jay Jordan, and the Directors of both the AMP and WERC programs. The Most Reverend Ricardo Ramirez, Bishop of Las Cruces, offered the invocation which included a moment of silence to remember the tragic events of September 11th.

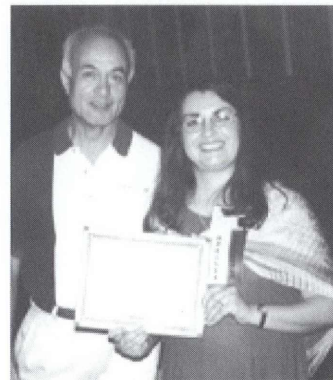
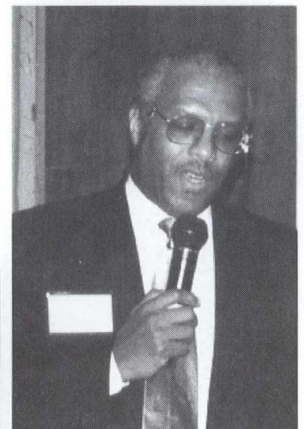
Students from the AMP and WERC programs presented their research in 25 oral presentations and 41 poster presentations. Community college and New Mexico MESA students had 16 posters in a non-competitive category which showcased a variety of interesting and challenging projects.

Workshops ranged from a ropes challenge course (the new AMP Games) to a graduate panel discussion for the research presenters. Expansion of the conference program included the internship and employment workshops given by a variety of industry representatives including Raytheon Missile Systems, Hewlett-Packard Company, the Bureau of Land Management, Los Alamos National Laboratory, and General Dynamics.

New Mexico AMP and WERC appreciated the flexibility of the students and presenters in adjusting the program to accommodate the events of September 11, and thank them for their active participation and enthusiasm.



Clockwise: Bishop Ricardo Ramirez; Opening keynote speaker Dr. Reo Yoshitani, Technical Director, Raytheon Missile Systems (center) with Ricardo Jacquez and Juan Silva, Raytheon Missile Systems; dinner keynote speaker Dr. Roosevelt Johnson, Program Director for the NSF Alliance for Graduate Education and the Professoriate; and awards lunch keynote speaker Dr. Patty Lopez, Software Imaging Design Engineer at Hewlett-Packard Company.



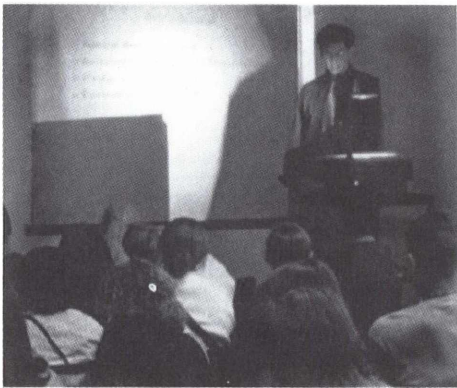
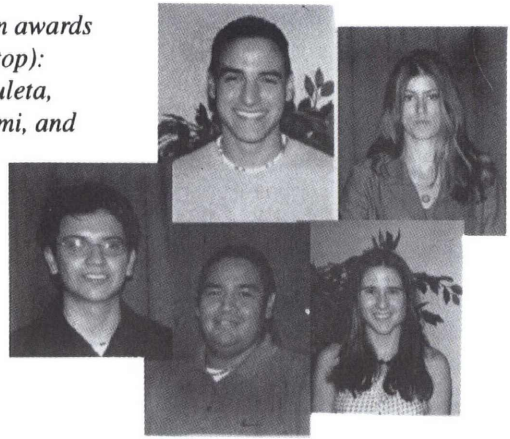
The Registration/Check-In Team: (l to r) Nancy Ritter, Sylvia Torres, Gina Gutierrez, Marty Lopez, Gloria Vasquez, and Barbara Valdez. Not pictured: Sylvia Herrera, Jazmine Saenz, Diana Uribe, Anita Tafoya, and Gabriela Cisneros.





The AMP Games Ropes Course was facilitated by the NMSU Center for Counseling and Student Development.

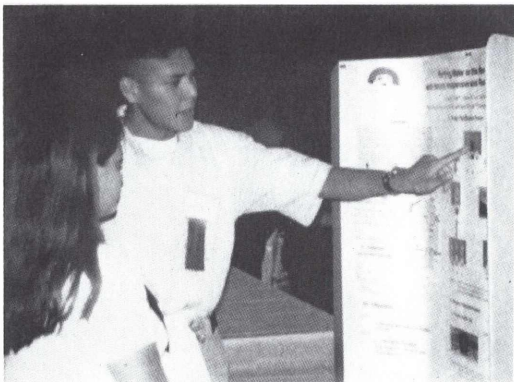
Oral presentation awards (clockwise from top): 1st, Daniel Archuleta, 2nd, Angela Carmi, and Amy Marie Sattler (tie), 3rd, Thomas Dodge, and Jose Leo Banelos (tie) all from NMSU.



WERC student Ben Foster presents his research on "Building the Future with Pecan Shells."



Poster presentation awards (l to r): 1st, Norma Sanchez and Vivian Galicia (team), California State University—Los Angeles; 2nd, Christopher Martinez and Miguel Gonzales (team), California State University—Los Angeles; 3rd, Leroy Martinez, and Frank Jurado (not pictured) (tie) from NMSU.



Johnathan Tom, UNM-Gallup, explains his research on "Purifying Water on the Navajo Reservation with Inexpensive Materials."



Hands-on work with plastic building bricks demonstrated manufacturing concepts at the Manufacturing Technology display.

Conference 2001



Photos by Linda Fresquez, Pamela Caudill, Michael Dougherty, and Karen Luces

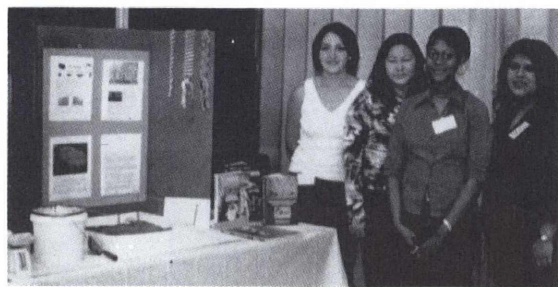
AMP Student Research Activities . .

As a core program of New Mexico AMP, the Undergraduate Research Assistantships (URAs), are a strong initiative at several of our university partners. Now, the community colleges are adding or augmenting existing research activities. Northern New Mexico Community College has had a strong research component for its two-year students for many years.

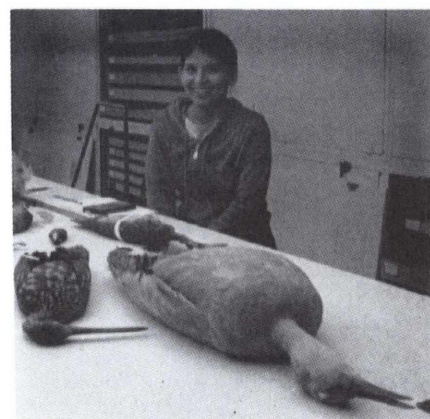
San Juan College has added the URA experience with three students doing a summer research under the mentorship of Dr. Eric Miller in the Chemistry Department. They presented their research in an oral presentation at the 2001 conference. New Mexico Junior College was represented by a poster project. Luna Community College recently developed a URA partnership with the Engineering Department at New Mexico Highlands University.



San Juan College team members (l to r) Mitchell Betonie, Lawendra Atcity, and Derek Chavez did an oral presentation "Continuing Studies on the Electrodeposition of Silicon onto Aluminum."



New Mexico Junior College students (l to r) Angelica Molina, Deysi Favela, Taliah Gibson, and Angela DeLeon are shown with Deysi's poster presentation "Archaeology Today."



Above: Yolanda Chacon is shown with the birds she studied during her summer internship. They are called Gruiformes, or more commonly cranes, rails and coots. Below, she prepares a slide for study.



AMP director Ricardo Jacquez and student Yolanda Chacon (a sophomore biology student at NMSU), attended the 2001 Winter Workshop at the Smithsonian Institution in Washington, D.C. The purpose of the workshop was to assist the National Museum of Natural History in developing a recruiting plan for increasing diversity in their summer internship program. All attendees participated in brainstorming sessions as well as tours of research facilities "behind the scenes" of the exhibits. Yolanda was able to spend time with her assigned science mentor who is doing research in her area of interest. The workshop concluded with development and presentation of a plan for recruiting AMP students.

Excited by her trip and experience at the Smithsonian, Yolanda applied to and was selected for an internship in the National Museum of Natural History. She was the only AMP student selected and one of approximately 20 students nationwide who participated in the summer program.

The Undergraduate Research Assistantship (URA) at NMSU is a semester-long project eligible for renewal in subsequent semesters. This allows for the long-term involvement of project participants as well as those who prefer a short-term project.

Students participating in the NMSU program attend writing workshops, produce several written reports, and attend and present at a mini-symposium as well as the New Mexico AMP Annual Student Research Conference (fall) or the NMSU Creative Arts and Research Symposium (spring). Students are encouraged to submit their abstracts to other professional conferences such as SHPE, NSBE, AISES, and SACNAS.

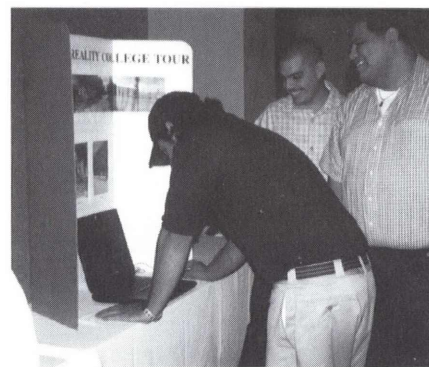
Faculty mentors are asked to participate in the first meeting of the semester as well as attend the mini-symposium. Graduate students are also involved in many of their projects. This design allows and encourages a significant amount of "tiered" mentoring to occur.

Participation in the program prepares students for and helps them to anticipate the expectations of industry and government internships since students are more likely to have specific areas of interest to pursue, ask more pertinent questions, and be more "savvy" in assessing the information they are given about their role in the project.

Right and below: Each semester, NMSU URA students and their mentors are recognized at a mini-symposium and awards luncheon. Students prepare posters for the symposium as part of the writing workshops facilitated by Dr. Cheryl Nims, NMSU Department of English.



Right: Brian Rodriguez (left) and Marco Gonzales (center) take a "virtual tour" of the NMSU campus with the poster and hands-on display done by Ricardo Ortiz (right).



Each summer students from Diné College present math proofs consisting of concepts in set theory, number theory, and other disciplines developed as a part of the Summer Science Honors Program. These first-year tribal college students take summer classes in Physics, Speech, and Discrete Mathematics. Concepts such as deductive reasoning and set theory are emphasized to give the students a strong background in mathematical proofs. The students present their math proofs and background research at UNM, Tech and NMSU.



Sawyer Peterman (second from right), demonstrates "The Principle of Mathematical Induction" which concentrated on the theorem that gives the number of line segments that can be constructed between any number of points.

People, Places, and Things

continued from page 3

The AMP students at UNM-Gallup and AMP Institutional Coordinator Dr. Kamala Sharma, took part in Earth Week events in April. They had a table display at Career Day and recruited 13 students who are interested in and eligible for their AMP program. Part of their display included brochures designed by the students. Students also planted flowers as part of the UNM-Gallup Beautification Day portion of the week long event.

New Mexico Highlands University's National Society for Professional Hispanic Engineers (SHPE) sent a trio of representatives to the Regional Academic Olympiad at the University of Colorado in Denver on Saturday, October 21. In a proud moment for SHPE and NMHU, Natalie Salazar (Highlands SHPE Chapter President), Steve Ortega, (Engineering), and Bridget Buu (Chemistry Department and American Chemical Society's Highlands Chapter President) took first place in the competition overall. This was the third time the Highlands chapter of SHPE was sent to compete in the national competition against divisions that include such Ivy League schools as Harvard, Princeton and Stanford to name a few. In

attendance at the conference (though all SHPE region three schools were invited) were University of Colorado-Denver, Colorado School of Mines, Kansas State, University of Kansas, and the University of Wyoming, among others. Highlands was the only New Mexico Chapter present. The competition began with a challenging written examination completed by team effort (each team consisting of three members) within an hour. Of the 68 multiple-choice questions encompassing math, physics, chemistry, thermodynamics, statics, and a host of different genres of engineering questions, the results were grim. No team scored higher than 36 correct questions and the top four scoring teams were invited to compete in a Jeopardy style oral competition. Interspersed between written and oral competitions were the SHPE Regional Southwest meeting and two guest speakers. Lunch was provided by Ratheon, a company currently employing two former SHPE members who lobbied to have the event sponsored. After the speaker's presentations, the oral competition commenced, in two rounds. This time the two top scoring teams went on to oral competition round two. The questions for the oral competition were to be answered within 15 seconds and also covered a range of technical

questions covering math, physics, chemistry, electrical engineering, chemical engineering, civil, and mechanical engineering, and finally SHPE and American history. The final round was intense, Highlands against UCD, and in the end it was Highlands with 300 points and UCD in the red. The Highlands trio will have their registration fees for the National Technical Career Conference (NTCC) in Minneapolis, Minnesota, paid (to the tune of \$230 per registration) and a travel stipend. In addition, they will compete again for the national title and each will be given a palm pilot for their achievement.

(Written by Bridget Buu, AMP tutor and President, NMHU's American Chemical Society Chapter)

The New Mexico State Legislature has approved funding for New Mexico AMP at \$457,200 for FY 2001-02. This represents an increase of 32% over last year's appropriation of \$345,600. This was again accomplished with the support of CHE, the NMSU Board of Regents, NMSU's President, the Dean of the College of Engineering, the New Mexico AMP Board of Governors, and senators and representatives statewide.

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