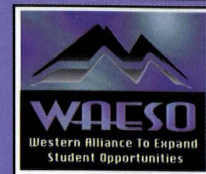


# Western Alliance to Expand Student Opportunities



NSF sponsored undergraduate component of the  
Coalition to Increase Minority Degrees



Volume 1

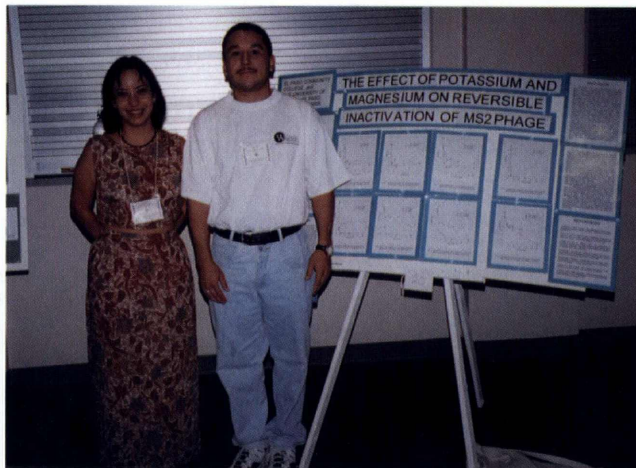
From 1991-1996, our Phase I alliance (known as the Southern Rocky Mountain AMP) exceeded our stated goal by more than doubling the annual rate of underrepresented minority SMET baccalaureate production. Based on our Phase I success, we have expanded our use of advanced computer technology to support and sustain successful activities such as:

- peer study groups (local and over the Internet);
- summer bridge programs;
- faculty-directed undergraduate student research; and
- graduate preparation, mentorships, and research conference participation.

During 1997, we intensively served 467 students throughout our region, which includes institutions in Arizona, Colorado, New Mexico and western Texas (El Paso Community College), Nevada, and Utah.

## Faculty-Directed Research Project “Reversible Inactivation of Viruses”

All WAESO students who engage in Faculty-Directed Research activities provide written reports on their research projects. Each year, WAESO students



Carlos Villreal presenting his poster at the National AMP Conference, July 26, 1997.

also present their research results at regional, national, and international conferences. The New Mexico Alliance for Minority Participation, New Mexico State University, and the National Science Foundation held the 5th Annual National Science Foundation Alliance for Minority Participation Research Conference in Las Cruces, NM. At this conference, WAESO students participated in showcasing their undergraduate research. They also enjoyed the opportunity to continue to expand their peer network and to seek out excellent role models, thus expanding their career opportunities.

During 1997, WAESO projects funded in part with NSF support included Faculty-Directed Undergraduate Research Projects, Peer Study Groups, Summer Bridge Programs, AMP-NET: The Electronic Peer Study Network, and Graduate Preparation Institutes. WAESO has been able to cost-effectively operationalize these projects by creating competition among the participating institutions' faculty. Once an application for funding is submitted to WAESO, it is then sent for peer review by the relevant operational committee comprised of faculty, administrators, and scientists from participating institutions. All applications are reviewed by at least three committee members from three different institutions. The committees make recommendations for project funding to the co-project directors, who then make final funding selections. Funded projects' faculty and students must provide a final project report upon project completion.

For the past year, WAESO received 252 applications for funding from the thirty-five participating institutions. Of these applications, 187 were funded. The following are representative samples from some of the final project reports received in 1997:

## Faculty-Directed Undergraduate Research Project

### “The Analysis of the Reversible Inactivation Phenomenon at the Molecular Level”

WAESO students are continually exposed to the rigors and rewards of scientific research. During the past spring and summer semesters, El Paso Community College (EPCC) freshman Ricardo Amador, along with sophomores Neyda Gonzalez and Carlos Villarreal, had the opportunity to develop and apply research skills by working on a faculty-directed undergraduate research project. The project, entitled “*The Analysis of the Reversible Inactivation Phenomenon at the Molecular Level*” was conducted under the supervision of Dr. Maria Alvarez, professor at the Biology Department at EPCC.



From left to right: Dr. Maria Alvarez, Neyda Gonzalez and Carlos Villarreal

The students conducted studies which included analyzing viruses and viral components by isoelectric focusing, electrophoresis, density gradient centrifugation, chromatography using the Pharmacia SMART system, and electron microscopy. Their research results stressed the complexity of the interactions of ions with the virus and/or with the inactivating species. These findings may lead to synergistic or antagonistic effects that may be used for virus inactivation.

“I believe the experience of seeking information, evaluating performance of the University of Arizona power unit, drawing the parts, reporting his project experiences and working with experienced researchers provided Johnny [Hordge] with a picture of research that will assist him in determining whether research is a desirable future activity, and it should help him in upper-division courses requiring completion of independent projects.”

**Dr. Dennis L. Larson, Associate Professor**  
Dept. of Agricultural and Biosystems  
Engineering  
The University of Arizona

“This research project allowed me to gain insight into thermal energy and small solar engines. In addition, it also placed me in a situation in which I am able to get one-on-one attention from Dr. Larson. I find this important at a major university. Since the University of Arizona is so big, I would not normally get that one-on-one attention.”

**Johnny Hordge, Undergraduate Assistant**  
Dept. of Agricultural and Biosystems  
Engineering  
The University of Arizona

“The foundation gained through this research will allow for more complicated experiments to be conducted, and for refinement of a control algorithm using Linear Stochastic Estimation LSE for adaptive optics control.”

**C. Randall Truman, Mechanical Engineering**  
University of New Mexico

“The results of Jessica’s work are of potential significance in expanding the pool of organ donors to include non-heart-beating donors.”

**Dr. Judith B. Ulreich, Molecular/Cellular**  
Biology  
University of Arizona

“The student made impressive progress, and now that he has finished his final report for this project he has expressed an interest in planning the next project, which will culminate in the development of a better initial strain gauge bonding system.”

**Dr. J.A Szivek, Ph.D., Research Professor  
Orthopedic Research Laboratory  
University of Arizona**

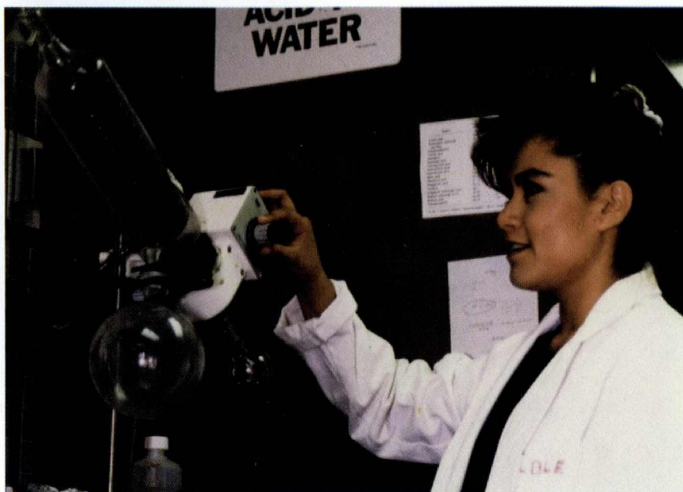
“Tom gained valuable experience with flow injection analysis, thin layer electrochemical cells, electroanalysis, and data manipulation. . . He constructed a superbly performing system that we are currently using in new experiments, demonstrating a talent for instrument design.”

**Dr. Greg M. Swain, Assistant Professor  
Utah State University**

“When we got started. . . in May, we changed the focus of her [Ilima Willing] research from ion beams to pedagogy [physics education], specifically issues in the teaching of physics to beginning university students. I have been gaining more interest in this topic and was glad to have a student to help me research this.”

**Dr. David Allred, Professor  
Department of Physics and Astronomy  
Brigham Young University**

## **Faculty-Directed Research Project “Characterization of Phosphy-Thiocarbonyl Imides”**



**Tammy Lopez working in the research lab**

Faculty-Directed Undergraduate Research Projects have as their primary goal to provide underrepresented students with the opportunity to serve as apprentice researchers collaborating in a faculty member’s research project. These projects, rather than relegating the student’s participation to a mere ancillary role, emphasize the student’s active role in a capacity that genuinely prepares him or her for research at the graduate level.

The problems being tackled by these research projects are of a substantive nature and have real-world applications. An excellent example of this was the experience of Tammy Lopez as Undergraduate Student Researcher in the project titled “Characterization of Phosphy-Thiocarbonyl Imides” under the guidance of Dr. Susan M. Schelble at the University of Southern Colorado. The major goal of this study was to prepare compounds of phosphyl-thiocarbonyl mixed imides. As potential agents against replication-competent retro-viruses these inhibitors are in high demand in the fight to control retro-viruses such as HIV.

Tammy spent a substantial amount of time doing hands-on work such as laboratory set-up, computerized summary of chemicals, learning the background chemistry of the project, and purification and characterization of compounds. “My experience this summer doing research has helped solidify my desire to pursue a career in this field. It has helped me understand concepts and technical aspects of chemistry. The thing that was most important was that I was able to learn one-on-one with Dr. Schelble. She has increased my knowledge of the subject substantially. This has helped me get ahead and has made me more confident because I have hands-on experience. . . .”

**“ This project provided me with an opportunity to see first-hand what the design process entailed. It showed me how a collaboration of efforts among different disciplines within engineering is useful, and often essential in design. It enabled me to gain insight into research methods and showed me what skills I still need to improve for a future in graduate school and, ultimately, the medical devices industry.”**

**Marie L. Moralde, Undergraduate Assistant  
Arizona State University-East**

“Jason Rodriguez worked with me and Xiaowei Zhang on the preparation of a naturally occurring protease inhibitor. Their efforts resulted in the submission of a manuscript to the *Journal of Organic Chemistry*. Jason also had the opportunity to perform some molecular modeling experiments to learn how the inhibitor fits within the active site of HIV-protease.”

**Dr. Michael R. Peña, Assistant Professor**  
Arizona State University

“The research conducted this term by the student researchers has contributed considerably to the ongoing research on the Tsaile Creek Water Shed, and to the research on the correlation of roughness coefficients with stream flow using Manning’s Formula.”

**Carlton G. Ami, Professor**  
Navajo Community College



1997 Summer Bridge Program students

“The project really pushed the students into science topics they knew little about. As a new faculty member, I also benefited because I was able to work on my mentoring and advising skills.”

**Dr. Michelle Hall-Wallace, Geosciences Department**  
University of Arizona

“The project has been approved as my senior thesis. It is the final course to fulfill my educational requirements for a Bachelor of Science degree at the University of Utah. It has helped me realize how education applies toward real-world applications and solutions.”

**Veronica De Hart, Undergraduate Assistant**  
University of Utah

“We received positive feedback from the students, and all participants expressed interest in pursuing further research opportunities. One of the participants will enter the physical therapy program in the fall of ‘97, and the other two are continuing on a premedical track and plan to apply to medical school or a graduate science program. . . .”

**Dr. Thomas Samuel Shomaker, M.D., J.D., FCLM**  
Associate Dean for Curriculum & Minority Affairs  
University of Utah School of Medicine

“I think Dalia and Victor did get a good review of Math 3109, which will help them in the future. I have found in talking with them that they will look at a course differently now, in a manner that is more general, trying to understand what will be needed in further courses.”

**Dr. Joanne Peeples, Professor**  
El Paso Community College



## **National Science Foundation**

**Dr. Luther S. Williams**  
Assistant Director for  
Education and Human  
Resources

**Dr. Roosevelt Calbert**  
Division Director  
Human Resources Development

**Art Hicks**  
Director  
Alliances for Minority  
Participation (AMP)

## **Western Alliance to Expand Student Opportunities (WAESO)**

**Dr. Antonio García**  
Project Director and  
General Editor  
WAESO-AMP

**Dr. Gary D. Keller Cárdenas**  
Co-Project Director  
WAESO-AMP

**Dr. Albert McHenry**  
Co-Project Director  
WAESO-AMP

**Dr. Fred Begay**  
Co-Project Director  
WAESO-AMP

**Leticia Soto**  
Distribution Manager  
WAESO-Newsletter

**David G. Martínez**  
Graphic Designer  
WAESO-Newsletter

“The WAESO support allows me to continue to increase the number of underrepresented minorities in my laboratory each year and also gives undergraduates the opportunity to do supervised research in the chemical sciences. This opportunity is very important to their careers and I appreciate the continued support tremendously.”

**Dr. Lorraine Deck, Department of Chemistry**  
University of New Mexico

“Jessica presented her research in poster form at the Society of Toxicology in March in Cincinnati. She was sponsored by WAESO to present her data in Las Cruces, New Mexico this summer. Funding through WAESO has been instrumental in providing Jessica with a significant research experience.”

**Dr. Judith Ulreich, Director of Research Labs**  
University of Arizona

“In this project we have explored some techniques of assessing damage to the polyethylene inserts as well as continuing to develop the wear particle analysis technique.”

**Dr. John A. Szivek, Biomaterials  
& Biomechanics**  
University of Arizona

“Give students hands-on research experience that will inform them about the scientific process and give them experiences that will increase their interest in attending graduate school. Through participation in our WAESO-sponsored research project, Rico is well on his way to accomplishing these goals.”

**Dr. José Nañez, Social and Behavioral Sciences**  
Arizona State University

“Mr. Leyba has greatly contributed to the research project and has benefited greatly from the experience.”

**Dr. George W. Morgenthaler, Professor**  
University of Colorado at Boulder

## Summer Bridge Program "1997 Quest Summer Bridge Program"



1997 Summer Bridge Program students

Summer Bridge Programs assist incoming freshmen or community college students hoping to major in math, science or engineering-related fields in increasing not only the level of post-secondary study among minority students, but also their college survival skills in an effort to help the students make the transition to college life.

An example of a successful project is the Quest Summer Bridge Program at Weber State University. This eight-week college summer program consisted of university living experience, as well as regular college courses in math, science, and study skills. Besides academic coursework, an integral part of the program included seminars and workshops on career exploration, career assessment, college survival skills, diversity issues, cultural issues, leadership skills, and health issues.

The participating students went through a rigorous daily schedule which included a study hall during both afternoons and evenings.

"Each student has learned the basics of medical imaging, acoustics, signal processing, and fluid mechanics. Both anticipate receiving BSE degrees in Spring 2000. WAESO support is greatly appreciated."

**Dr. Dick Greene, Engineering**  
New Mexico Highlands University

"Practical and scientific experience was gained from this research project and I thank WAESO and the University of Southern Colorado for this opportunity."

**Brian Monroe, Chemical Engineering, Student**  
University of Southern Colorado

"Two undergraduate students participated in our controlled ecological life support system (CELSS) research program with the support of WAESO. Both worked well with our interdisciplinary CELSS research team . . ."

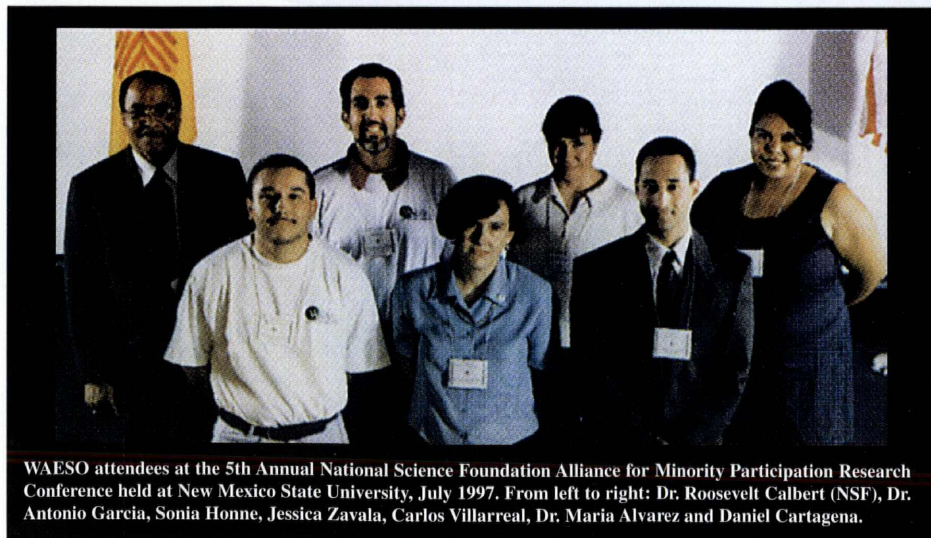
**Dr. Bill Taylor, Associate Professor**  
New Mexico Highlands University

"The two minority students involved in this research benefited from numerous interactions with experienced experts in the field. To this point, the research project has helped develop the two students' understanding of the state-of-the-art in current thinking and research in this field of interplanetary exploration, giving them an excellent foundation for future research in this important and highly technical field."

**Dr. George Morgenthaler, Aerospace Engineering**  
University of Colorado at Boulder

"Both students were integrally involved in the experimental design, subject management, data acquisition, data reduction, and statistical analysis. Each has learned the basis of medical imaging, acoustics, and fluid mechanical aspects of the human cardiovascular system."

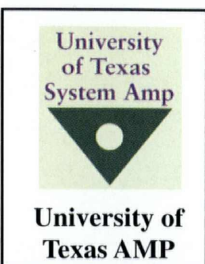
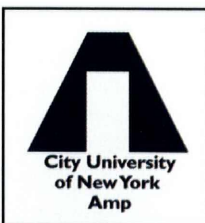
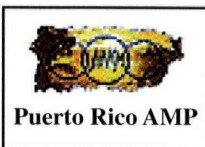
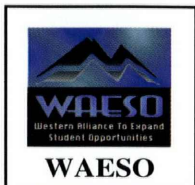
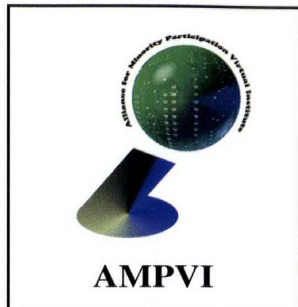
**Dr. E.R. Green, Engineering Department**  
New Mexico Highlands University



"It has been shown that students who participate in programs such as this and who become more vested in a university are more likely to graduate. Since minority numbers are low, it is important to help these students not only graduate but also be positive about the university so that they can become role models and spokespeople to encourage minority participation."

**Dr. Rosemary S. Gray, Director, Bioscience Undergraduate**  
University of Utah

WAESO attendees at the 5th Annual National Science Foundation Alliance for Minority Participation Research Conference held at New Mexico State University, July 1997. From left to right: Dr. Roosevelt Calbert (NSF), Dr. Antonio Garcia, Sonia Honne, Jessica Zavala, Carlos Villarreal, Dr. Maria Alvarez and Daniel Cartagena.



# Alliance For Minority Participation Virtual Institute

## ALLIANCE FOR MINORITY PARTICIPATION VIRTUAL INSTITUTE

<http://mati.eas.asu.edu:8421/~ampvi>

The AMP Virtual Institute (AMP-VI) is an integrated network of six specialized Virtual Centers (VC) that are connected by a common set of objectives. The AMP-VI represents a unique opportunity to greatly expand the range of institutions, agencies, and groups, as well as the number of individuals, positively impacted by the National AMP enterprise both directly and indirectly. It provides a vehicle by which to exponentially increase communication and collaboration among the diverse alliances within the AMP family. It will also provide a strong tool with which newer AMPs can quickly reach parity of efficiency and success with more established AMPs and thus avoid having to "reinvent the wheel." In addition, the AMP-VI will set the stage for building a strong foundation toward institutionalizing the best practices of the AMP programs which were learned at a great expenditure of time, money, and expertise.

During AMPVI Phase I (January 1, 1998-June 30, 1999), each AMP Virtual Center will develop and produce a worldwide web site with a specialized focus in one of the following areas:

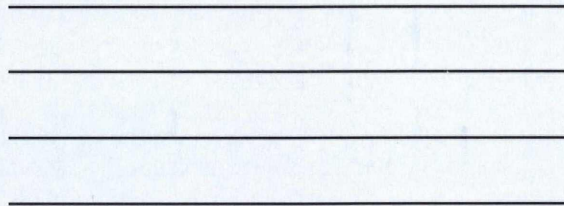
- Technology-Assisted Interactive Learning (WAESO)
- SMET Undergraduate Curriculum (Puerto Rico AMP)
- AMP Data Studies (Oklahoma AMP)
- Transfer & Articulation Between Community/Junior Colleges and Universities (Texas [A&M] AMP)
- Urban Education (City University of New York AMP)
- Formative Evaluation (University of Texas System AMP)

At an initial AMP-VI meeting held on March 6, 1998 at Arizona State University, East Campus, the Virtual Centers met to discuss, plan and organize how to proceed in carrying out their mission and accomplishing their goals. The following was decided:

- There will be a "neutral" AMPVI "top page" (maintained by WAESO) that will have links to each of the participating six AMP Virtual Centers and NSF's AMP program.
- Each of the six AMP Virtual Centers will be responsible for maintaining its own web site, and linking it to each of the other five AMP Virtual Centers, to the neutral AMPVI home page, and to NSF's AMP program.
- To the extent possible, the AMPVI and the six AMP Virtual Centers' worldwide pages will utilize a consistency of design.
- In general, the AMPVI and the AMP Virtual Centers should:
  - a) Highlight AMPs many successes;
  - b) Provide useful resources for others, and
  - c) Assist in their own unique ways with the institutionalization of AMP programs/activities.
- To the extent possible, each AMP Virtual Center will earnestly undertake the technical challenge of providing content accessible to users of *both* state-of-the-art *as well as* older, less sophisticated hardware and software.

**Western Alliance to Expand Student  
Opportunities**  
c/o Hispanic Research Center  
Arizona State University  
PO Box 872702  
Tempe, AZ 85287-2707

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## Western Alliance to Expand Student Opportunities

(formerly known as the Southern Rocky Mountain-Alliance for Minority Participation)

### Participating Institutions of Higher Education

**Arizona:**

Arizona State University  
University of Arizona  
Maricopa County Community College System  
Cochise College  
Navajo Community College (Tsaile Campus)

**Colorado:**

Colorado State University  
University of Colorado at Boulder  
Colorado School of Mines  
University of Southern Colorado  
Regis University  
Mesa State College  
Pikes Peak Community College  
Pueblo Community College

**Nevada:**

Southern Nevada Community College  
University of Nevada, Las Vegas  
University of Nevada, Reno

**New Mexico and Western Texas:**

University of New Mexico  
New Mexico Institute of Mining and  
Technology  
New Mexico Highlands University  
Eastern New Mexico University  
Northern New Mexico Community  
College  
Santa Fe Community College  
Navajo Community College (Shiprock  
Campus)

El Paso Community College  
Western New Mexico University

**Utah:**

University of Utah  
Utah State University  
Brigham Young University  
Southern Utah University  
Weber State University  
Salt Lake Community College  
Utah Valley Community College

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