
## 3rd Annual National Science Foundation AMP Research Conference

*Showcasing Undergraduate Research*

# ARC-CALIFORNIA

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## 1995 CONFERENCE PROCEEDINGS

Hosted by **CAMP**
California Alliance for Minority Participation
in Science, Engineering and Mathematics

*University of California, Irvine*

*The California AMP Program gratefully acknowledges the support of*

**The National Science Foundation**

Dr. Luther S. Williams, Assistant Director
Education and Human Resources
Dr. Roosevelt Calbert, Deputy Division Director
Human Resource and Development
Dr. William E. McHenry, Program Officer
Alliances for Minority Participation

*with additional funding from*

Southern California Edison
President Jack Peltason & the UC Regents' Diversity Initiative
Chancellor Laurel L. Wilkening, UCI
Executive Vice Chancellor Sidney H. Golub, UCI
and Vice Chancellor Manuel N. Gómez, Student Services, UCI

## GOALS OF THE 1995 AMP RESEARCH CONFERENCE

- Encourage undergraduate research
- Bolster student skills as scientists and communicators
- Provide a forum for students to interact with faculty and peers
- Set the national standards for undergraduate research presentations

National AMP
Alliance for Minority Participation

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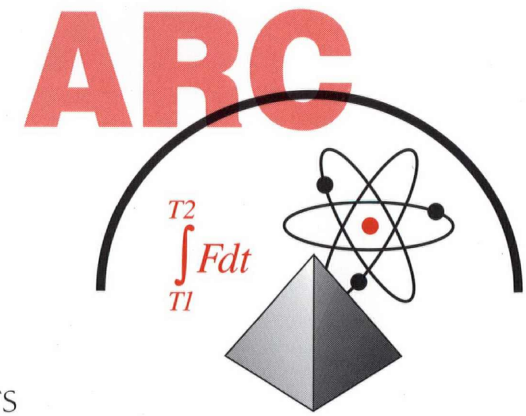



*On the front cover: Diego Carlton, Illinois Institute of Technology, receives congratulations from Dr. Luther Williams for his first place prize in Math/Computer Science. On the back cover: Marjorie DeMartino and Moisés Torres display conference T-shirt; Winston Wilson (Midlands Technical College), first place winner in Math/Computer Science, enjoys credit card tug-of-war with Drs. Juan Francisco Lara and Frederic Wan.*

# ARC: Where No Alliance has Gone Before

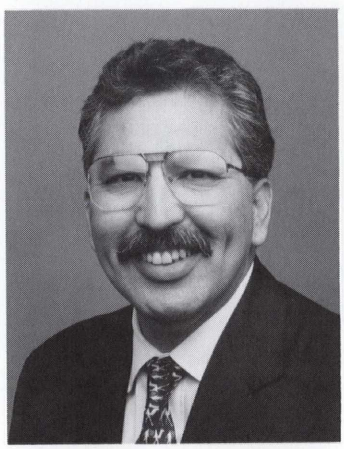
On behalf of CAMP, it is a pleasure to present the proceedings of the 1995 AMP Research Conference, ARC-California, highlighting undergraduate achievement. This national conference marked a hallmark of the first four years of the California Alliance, and exemplified the collective spirit of the AMPs. We were honored to welcome our distinguished guests from the National Science Foundation, Drs. Luther Williams, Roosevelt Calbert, and William McHenry. Their presence added significantly to the conference's success, and embodied the synergy of the alliances coming together for student development.

Faculty and students from 16 National Alliances for Minority Participation converged at Irvine for an exciting undergraduate research competition. These highly motivated and determined young scientists and engineers won accolades and certificates of excellence for merit in discipline-specific categories. Their success derives directly from the commitment of faculty. The awards ceremony was a highlight for the students and the judges who so carefully critiqued both the oral presentations and poster sessions.

Collectively, AMP directors and faculty have endeavored to shape the vision of purpose that includes undergraduate research and internships, bringing real world flavor to classroom learning. ARC's ambition was no less than that of CAMP, to set the highest standards for undergraduate research. Encouraging students to apply scientific knowledge crystallizes what the AMP program is ultimately about and accurately reflects the tradition of the University of California and the nature of our research mission.

If a vision describes what an undergraduate education should provide, we know that expectations create the building blocks for that vision, directly translating into specific abilities and knowledge. As I visit affiliated institutions, the research experience is brought home as a pivotal influence on an undergraduate's future and a platform for graduate education. From conversations around the state and the nation, I am convinced that it influences career choices in a way that nothing else can touch.

It is gratifying to support the career aspirations of our science, engineering, mathematics and technology majors and to know that through the Alliances they are in good hands. I thank all those who traveled from across the nation to attend ARC in Southern California and hope you enjoy revisiting that excitement through these proceedings.



**Manuel N. Gómez**
*Vice Chancellor, Division of Student Services, UCI*
*Statewide Director, CAMP*

# CHANCELLOR'S WELCOME

*Welcome to "ARC,"* the University of California's national scientific conference spotlighting undergraduate research supported by the Alliances for Minority Participation.

CAMP and our companion alliances constitute a very important venture. Together we endeavor to improve our capacity to effectively mine talent — the talent of promising scientists and mathematicians who have much to offer in the coming century. Together we have made substantive achievements in addressing barriers faced by underrepresented groups. In our mutual goals, I am pleased to affirm that our first and primary strategy in science, engineering and mathematics education is a shared commitment to excellence.

*"I too was an undergraduate researcher, and it provided a gateway to my career in science."*

Through the alliances for minority participation, we have a multi-tier enterprise, engaging the entire scientific community. It's an intergenerational approach: faculty mentoring undergraduates who in turn have opportunities to serve as role models for high school students planning a college career.

We know that CAMP works because we have produced graduates who are not only degree recipients, but going places with their degrees — to graduate and professional school, to private industry, to the greater community. Our students have won internships in the nation's most prestigious institutions: MIT, Harvard, Rutgers, Marquette, Berkeley, Cornell, and in the national laboratories: JPL, Argonne, and the Lawrence Berkeley Laboratory.

At a recent conference here at Irvine, one participant (who happened to be a woman and an engineer) said, "What politics gives, politics can take away." But we have something that politics can never remove — the dedication and commitment of individuals who are here to stay and work toward the common good. Our faculty are among the best, and they care deeply about the progress and ultimate success of students. The problem of underrepresentation is not intractable; it is subject to solutions. The AMPs certainly make up one of those solutions, making higher education a better place for all of us.

I want to extend a special welcome to all those who traveled from across the country to join us for ARC. I also want to add my congratulations to all the student presenters. This experience is a valuable step in your university education. We know that there is a strong correlation between undergraduates engaged in research and those who eventually become scientists. I myself was an undergraduate researcher, and it provided a gateway to my career in science. Best wishes to you and, once again, welcome to the scientific community. Have a great conference at UCI!

**Laurel L. Wilkening**
*Chancellor, UCI*

# Integrating Science for the Knowledge-Based Economy of the 21st Century

Dr. Luther Williams' keynote speech at the plenary Session of the third annual Alliances for Minority Participation (AMP) Research Conference presented a vision for the 21st century. Placing the program in the context of major economic trends, he pointed to its role and contributions in preparing students for participation in a primarily knowledge-based work force—one in which knowledge has largely replaced capital and labor as the most critical of resources. He challenged the project directors to work with him to expand the AMP program's track record as a profitable investment in the nation's economic well-being. As a vehicle for enhancing the United States' intellectual capital in science and mathematics, the AMP program will forge new partnerships with public and private sector institutions and will play an expanded role in linking research and education.

Dr. Williams was introduced by Dr. Frederic Wan, Vice Chancellor for Research and Graduate Studies at the University of California, Irvine, who referred to Dr. Williams as "the most influential person in science and mathematics education in the U.S. today." In his introduction, Dr. Wan pointed to a number of Dr. Williams' seminal achievements including, for example, creating a vision of education reform that recognized the need for improvements to be "systemic in order to be consequential."

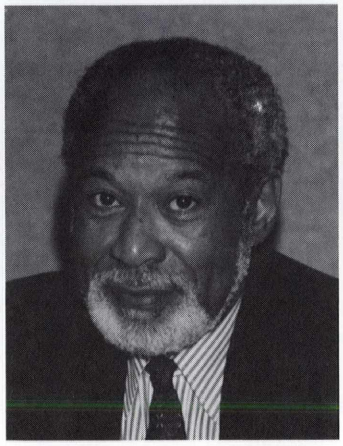
Dr. Williams noted that, as Assistant Director for Education and Human Resources, responsible for directing $600 million of program funds, he has emphasized "excellence, equity, opportunity for all, accountability, and measurement of outcomes." He spoke specifically about the AMP program and pointed out that the return to society from the program has been far greater than the investment made. He noted that the program "broke rank" with earlier "failed" efforts in categorical education programs. The program has "established high expectation, a high level of accountability, an emphasis on results, outcomes and indicators by which we measure progress."

In examining the significance of NSF education programs, Dr. Williams noted the "dismal" performance of 13-year-olds in the United States in science and mathematics compared with the performance of students in other nations with which we compete economically. He cited the resources—hundreds of billions of dollars—that are lost annually in the U.S. as a result of graduates of our education system not being prepared to perform the functions that are required in the nations's work force. Further, despite the fact that the nation invests a great deal of resources in education—over $540 billion annually—only a small fraction of these funds are invested in science and mathematics education. Dr. Williams emphasized the critical importance of systemic K-12 reform, of attention to diversity, and of ensuring quality preparation for a knowledge-based work force. He spoke of the role of the AMP program as a vital component in the fabric of the U.S. economy.

What attributes will increasingly characterize the AMP program as it moves into its sixth year? These include: expanded partnerships with business and industry and with the research sector; more integration between research and education; an expanded focus on the development of intellectual capital; and attention the necessary infrastructure for achieving these ends.

As we move into the 21st century, academia will continue to play a central role in creating and transmitting knowledge. This role will require increased integration and better linkages between research and education. The AMP program is one that can contribute substantially to this endeavor and which "we have every reason to be proud of but has only just begun."

*"We have every reason to be proud."*



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

## CONFERENCE AGENDA

### SUNDAY, JULY 30 - TUESDAY, AUGUST 1, 1995

***Sunday Evening, July 30***

"Just Desserts" Reception

Greeting by
Vice Chancellor
Manuel N. Gómez

Introduction of
Dr. Arthur Benjamin,
*Mathemagician*, by
Dr. Kenneth Millett,
UC Santa Barbara

***Monday, July 31***

Welcome by
Chancellor Laurel L. Wilkening

Introduction of
Dr. Luther Williams by
Vice Chancellor Frederic Wan

Plenary Session Keynote:
Dr. Williams

Student Oral Presentations and
Poster Sessions

Lunch — Mariachi Style!

Student Oral Presentations and
Poster Sessions, continued

Student Panel,
*Private Lab Experience*
Professor Elma Gonzalez,
Moderator

Student Panel,
*Teaching as an Option*
Sonia Mucarsel,
Project SMART, Moderator

Group Photos!

Awards Banquet

Student Awards Presented by:
Dr. Luther S. Williams
Dr. Roosevelt Calbert

***Tuesday, August 1***

Faculty Presentations:

*"Deep Ocean Drilling, ODP Leg 160"*
Dr. Michael Howell,
University of South Carolina,
and Dr. Andrew Roberts,
UC Davis

*"From Molecular Biology to Molecular Medicine"*
Dr. Melvin Green,
UC San Diego

*"Scanning Probe Microscopy"*
Dr. Antonio A. Garcia,
Arizona State University

## STUDENT PRESENTERS

### POSTER SESSIONS

#### Morning

***Biological Sciences:***
Jacquelyn Collins, Tuskegee University
LaToya M. Sawyer, Tuskegee University
Jason Taylor, University of California, Santa Cruz
Wendy Velasco, University of California, Irvine

***Engineering:***
Ed Milligan, University of California, Davis
Steven Fonseca, University of California, Davis
Karuna Warren, Northwestern University
Rachel Walsh, New Mexico State University
Anderozzi Esdaille, Stanford University
Fermin A. Samorano, University of Arizona
Donald Nega University of Texas - Pan American
Monica Hernandez, University of Texas, El Paso

***Math/Computer Science:***
Claudia Inman, Occidental College
Diego Carlton, Illinois Institute of Technology
Trena Covington, N.C. A&T State University

***Physical Sciences:***
Roberto Amador, Occidental College
David Irick, So. Carolina State University
Earl Stone, University of Texas, San Antonio

#### Afternoon

***Biological Sciences:***
Jamie R. Rowe, Tuskegee University
Moncenya Chatman, Auburn University
Walter Lech, University of California, Los Angeles
Tyrone Perrin, Chicago State University
Miguel Rocha, New Mexico State University

***Engineering:***
Jessica Almaraz, University of California, Los Angeles
Deborah Apodaca, New Mexico State University
John D. Romo, Borough of Manhattan CC
Miguel A. Rosa, University of Puerto Rico, Mayagüez
Mark DeHerrera, Arizona State University
Estrella Anchondo, University of Texas, El Paso

***Math/Computer Science:***
Conrad Taylor, University of Illinois
Othniel Williams, City College of New York

***Physical Sciences:***
Madeline S. León, University of Puerto Rico, Mayagüez
Terry Green Claflin, College

### ORAL PRESENTATIONS

***Biological Sciences:***
Tori Evans, University of California, Santa Cruz
Esteban Linares, Loyola University
Sandra Arellano, California State University, Sacramento
Norman Moore, University of California, Los Angeles
Jacqueline Jacobsen, University of California, Davis
Sandra Gonzalez, University of Puerto Rico, Mayagüez

***Engineering:***
Vladimir Sierra, University of Texas, Austin
Antonia M. Romero, New Mexico State University
Nicholas D. Gardner, University of Southern Mississippi
Gilberto Mosqueda, University of California, Irvine
Angelica Robles, Arizona State University
Richard Coronado, University of Texas, El Paso
Miguel Green, Stanford University
Jeffrey Rivas, University of Texas, El Paso

***Math/Computer Science:***
Nnenna Nwanju, Polytechnic University
Winston Wilson, Midlands Technical College
Sharlene Heyward, Voorhees College
Frederick Cooper, Clemson University

***Physical Sciences:***
Kevin Thigpen, University of Southern Mississippi
Jackeline Santiago, University of Puerto Rico, Humacao
Carrie Noriega, University of California, San Diego
Nicole Scarborough, Chicago State University
David Vargas, Queensboro CC

*"A showcase of student research."*
—*Faculty, New Mexico AMP*

## STUDENT PANELS

***Private Lab Experience***

*Moderator:*
PROFESSOR ELMA GONZALEZ
Department of Biology
University of California, Los Angeles

GILBERT MOSQUEDA
University of California, Irvine
*Argonne National Lab*

VLADIMIR SIERRA
University of Texas at Austin
*Jet Propulsion Laboratory*

JESSICA ALMARAZ
University of California, Los Angeles
*University of Nevada, Las Vegas*

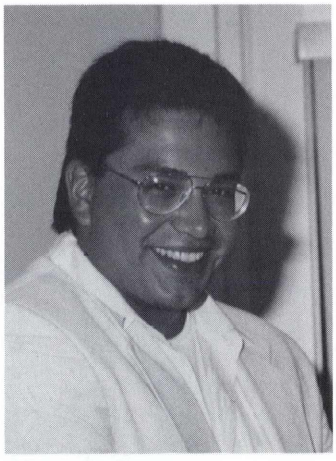
MICHAEL SICK,
Guilford College, N.C.
*Lawrence Livermore National Lab*

***Teaching as an Option***

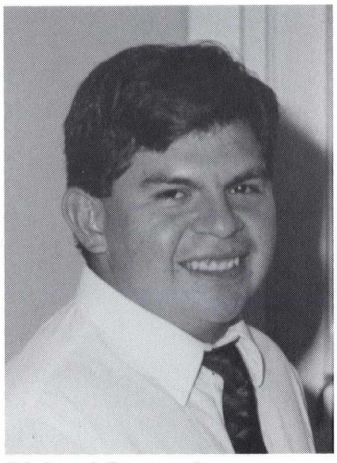
*Moderator: SONIA MUCARSEL, Project SMART*
University of California, Irvine

Juan Pommier, Mathematics
Miguel Hernandez, Physical Sciences
Maria Torres, Biology
Lourdes Almeida, Mathematics
Steve Curiel, Physical Sciences
Druemeka Irving, General Science

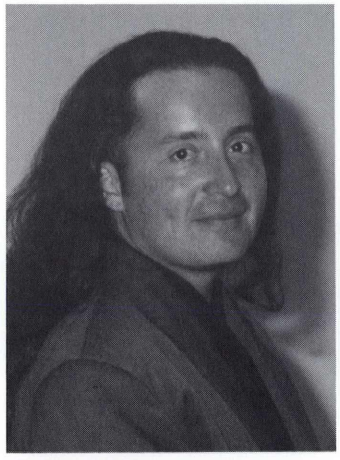
## FIRST PLACE WINNERS



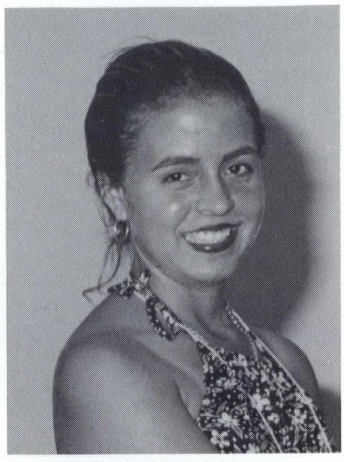
***Diego Carlton***



***Richard Coronado***

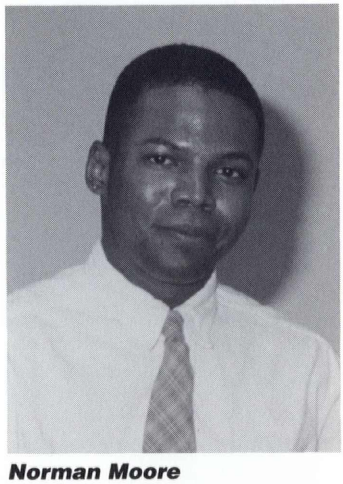


***Walter Lech***

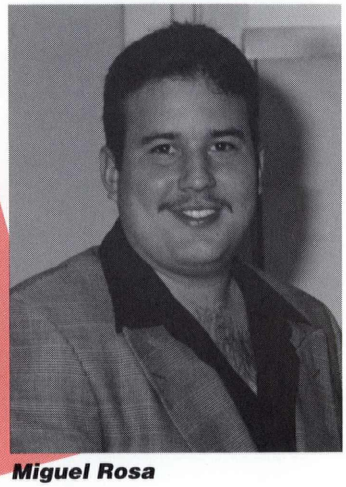


***Madeline León***

***Nicole Scarborough receiving plaque from Dr. Luther Williams.***



***Norman Moore***



***Miguel Rosa***

*"The cooperative spirit and friendliness was an overall good feature."*

*—Undergraduate, North Carolina AMP*

**Presenter:** RICHARD CORONADO
**Institution:** *University of Texas at El Paso*
**Discipline:** *Engineering*
**AMP Region:** *University of Texas System*
**Faculty Mentor:** *Dr. Jorge Lopez*
**Place:** *1st Place*

## GRAVITATIONAL WAVE SIGNATURES IN SATELLITE TRACKING DATA

Satellite tracking is done with an electromagnetic link between an earth tracking station and the satellite. A signal is sent from earth to the satellite, which in turn receives and transmits the original signal back. The signal could be altered by a passing gravitational wave in space. The detection of such a wave would be a major step as astrophysics. In this work, the tracking data is studied through autocorrelation, correlogram, and periodogram analysis techniques to detect the presence of a gravitational wave in al altered signal. This study is done in collaboration with the Jet Propulsion Laboratories.

**Presenter:** SANDRA GONZÁLEZ-RAMÍREZ
**Institution:** *University of Puerto Rico, Mayagüez Campus*
**Discipline:** *Biological Sciences*
**AMP Region:** *Puerto Rico*
**Faculty Mentor:** *Duane A. Kolterman and Gary J. Breckson*
**Place:** *2nd Place*

## PHENOTYPIC VARIATION IN GESNERIA PAUCIFLORA URBAN (GESNERIACEAE), A RARE PLANT ENDEMIC TO SERPENTINE IN THE MARICAO FOREST, PUERTO RICO

*Gesneria pauciflora* Urban (Gesneriaceae) is a serpentine endemic plant limited to three river drainages in the Maricao Commonwealth Forest, located in western Puerto Rico. It has been proposed for listing as a threatened species by the U.S. Fish and Wildlife Service. Analysis of variation within and among populations was conducted using leaf morphometric studies. The morphometric analysis showed that leaf size differs significantly between sun and shade populations; this variation was attributed to phenotypic plasticity. Considerable among-population variation was found in leaf shape, primarily in the length / width ratio, indicating that there is genetic variation among populations. Electrophoretic studies of foliar isoenzymes are being conducted to test these findings.

***Sonia Mucarsel and Maria Torres at the awards dinner.***

*"The most outstanding feature was the participation of undergraduates from all over the United States and Puerto Rico."*

*—Graduate Student, UCLA*

**Presenter:** NORMAN MOORE
**Institution:** *University of California, Los Angeles*
**Discipline:** *Biological Sciences*
**AMP Region:** *California*
**Faculty Mentor:** *Dwayne D. Simmons*
**Place:** *1st Place*

## NEUROTRANSMITTER DEVELOPMENT IN THE INNER EAR

As neurons grow toward their target cells during development, they synthesize specific neurotransmitters that are important for mature function. Previous immunocytochemical studies of developing olivocochlear neurons in the brainstem have suggested a possible scheme by which the cochlea becomes innervated by this efferent feedback system. The focus of this study was to corroborate this developmental scheme and to suggest further the role that neurotransmitters may have. Using antibodies against the synthetic enzymes choline acetyltransferase (ChAT) and glutamate decarboxylase (GAD), the developmental expression of acetylcholine and g-amino butyric acid, respectively, was thus implied. In the brainstem superior olive, ChAT expression was not found until postnatal day (P) 5 within cell bodies, which, was consistent with the ChAT expression found within cochlear axons. At P4, ChAT-positive label was found consistently in basal regions of the cochlea in areas such as the intraganglionic spiral bundles (IGSB) and also weakly below inner hair-cell receptors. By P8 ChAT expression in the cochlea was adult like, that is, positive label was found within the IGSB as well as below inner hair cells and outer hair cells. In both the brainstem and cochlea, GAD-positive label was found at P12 but not at either P4 or P6. In the cochlea, label was found in two areas: below the inner hair-cells and between Deiters cells. At both P20 and P25, GAD-positive label was weaker than at P12. These results are consistent with the hypothesis that the first efferent neurons to grow into the cochlea are ones which eventually contact cochlear outer hair cell receptors.

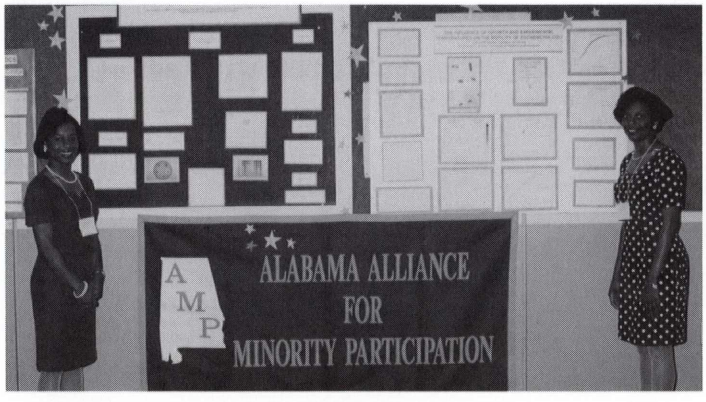
**Presenter:** SHARLENE HEYWARD
**Institution:** *Voorhees College*
**Discipline:** *Math/Computer Science*
**AMP Region:** *South Carolina*
**Faculty Mentor:** *Dr. Ajit Randhawa*
**Place:** *2nd Place*

## SOFTWARE METRICS: MEASURING PASCAL PROGRAMMING SOFTWARE

In the summer of 1994, I had the opportunity to research the concept of software metrics under the instruction of Dr. Caroline Eastman at the University of South Carolina in Columbia. Provided by the South Carolina AMP, the opportunity allowed me to research ways that I believed would be easy and understandable ways for novice programmers to chart the difficulty of programs set before them and for instructors to chart the progress of programming assignments.

Using only Pascal programs, the tools used to measure these programs were the number of source lines of code, the looping structure, the block-IF looping structure, and the ease of transferring these programs form Pascal language to Basic language.

The research did show that these tools were efficient for measuring the progress in assignments while at the same time showing that the compilation time and run time increased as the codes became longer and the looping structures increased its number of executable lines. The portability tool showed that transferring a program from one language to another increases the number of source lines of code, but the number of major change to fit the design of the language were few.




**Presenter:** GILBERTO MOSQUEDA
**Institution:** *University of California, Irvine*
**Discipline:** *Engineering*
**AMP Region:** *California*
**Faculty Mentor:** *Prof. Roberto Villaverde*
**Place:** *2nd Place — Tie*

## EFFECTS OF A ROOF-MOUNTED DAMPER OF THE SEISMIC RESPONSE OF STRUCTURES

The seismic response of a model steel structure will be tested to determine the effectiveness of damping devices located on the roof supports, as a means of increasing the structures damping. Previous studies indicate damping appendages with specific mass and damping characteristics sufficiently reduce the seismic response of structures. Currently, in practice, dampers are being used at the base of structures. However, the location proposed herein offers to reduce the risk of failure of dampers by reducing the loads to which they are subjected. Furthermore, the structures vibrations should decrease with only an increase in the roof vibrations. The seismic response of a 5-story damped structure will be experimentally calculated and compared to the response of a similar undamped model. The testing will be done on shaking tables set simulate previous earthquakes, in particular, the Northridge earthquake of 1994. A numerical analysis study will also be conducted by modeling the structure with finite elements.

**Presenter:** NICOLE SCARBOROUGH
**Institution:** *Chicago State University*
**Discipline:** *Physical Sciences*
**AMP Region:** *Chicago*
**Faculty Mentor:** *Justin Akujieze*
**Place:** *1st Place*

## RAPID SYNTHESIS OF COPPER OXIDE BASE SUPERCONDUCTORS

Conventional ceramic techniques for synthesizing single phase cuprate superconductors typically involve multiple high-temperature (800C) firings with intermediate mixing and grinding. Yielding particle sizes of several microns to tens of microns.

Such large particle sizes have been implicated in grain connectivity problems, particularly in wire fabrication. Low temperature (600C) synthesis from highly reactive metal hydroxide precursors solve this problem in two ways: First, the precursors powders have extremely fine (submicron) particle size, and, second, the low temperature of the reactions minimizes loss of materials and ensures homogeneity in the sample matrix. We describe synthetic methods for forming high quality powders of $T1_2Ba_2CuO_6$ (T1-2201), $T1_2Ba_2CaCu_2O_8$ (T1-2212), $Bi_2Sr_2CaCu_2O_2$ (Bi-2212), $YBa_2Cu_3O_7$- (Y-123) at low temperatures and/or extremely short reaction times (10 hr). The effect of nominal composition, temperature, and time on synthesis and superconducting transition temperature are discussed. Presently, superconductivity has not been found in Y-123 with this method but research in this area is ongoing.

**Presenter:** VLADIMIR SIERRA
**Institution:** *University of Texas at Austin*
**Discipline:** *Engineering*
**AMP Region:** *North Carolina*
**Faculty Mentor:** *Dr. Robert Bishop*
**Place:** *2nd Place — Tie*

## COMETARY MISSION DESIGN USING LOW-THRUST SPACECRAFT

Comets, asteroids and other small bodies make up a considerable percentage of the solar system. Because of their comparatively small sizes, comets are likely to have escaped the complex processes that transformed the larger bodies. They are, therefore, believed to be the most primitive objects remaining in the solar system. It is thus clear that an adequate knowledge of our solar system merits close study of these

smaller wandering bodies. Various types of space missions, then, must be designed to accomplish this task. Because comets have, in general, such elliptical orbits, (some of which come within 70 million kilometers of the sun and which go beyond the orbit of Pluto) a great deal of fuel mass is needed to reach them. Mission studies made in the late 1970's showed that the most feasible type of mission that could be designed was a low-thrust mission which made use of a then experimental ion engine. In this talk, it is proposed to use the now developed ion propulsion technology to perform a rendezvous with the sun-orbiting Comet Encke.

The purpose of this talk is to show the different aspects involved in the preliminary design of a low-thrust cometary mission. In order to better understand the rationale behind the design of such a mission, a brief look at cometary science is taken. A major part of the research was spent in the design of the trajectory, and thus a proportionate amount of this talk is dedicated to explaining the methods used in the design of the optimal trajectory, as well as detailing the results obtained to date.

*"The private lab research helped me the most. I am a freshman and would not even have tried to apply for an internship, but now I know I will."*

*—Attendee, UC Riverside*

**Presenter:** KEVIN THIGPEN
**Institution:** *The University of Southern Mississippi*
**Discipline:** *Physical Sciences*
**AMP Region:** *Mississippi*
**Faculty Mentor:** *Dr. Lon J. Mathias & Dr. Duygu Avci*
**Place:** *2nd Place — Tie*

## SYNTHESIS AND PHOTOPOLYMERIZATION OF ESTER DERIVATIVES OF ETHYL μ-HYDROXYMETHYLACRYLATE

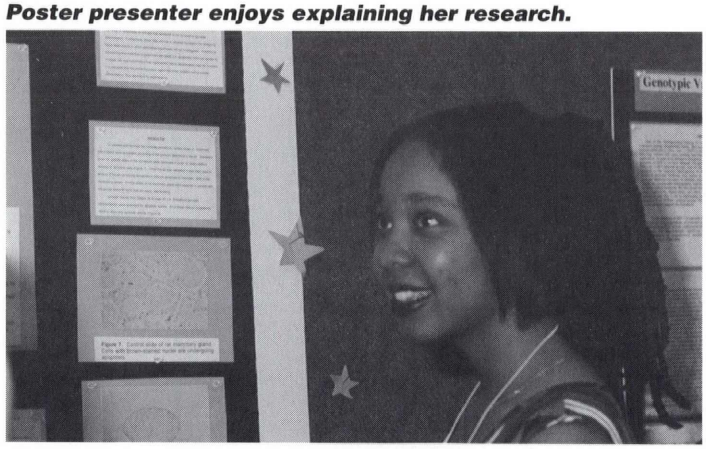
New para substituted benzoate ester derivatives of ethyl μ-hydroxymethyl acrylate were synthesized using phase transfer catalysis. Derivatives made include the p-fluorobenzoate, p-methoxybenzoate, p-methylbenzoate and p-nitrobenzoate. Reactivities of these monomers in photopolymerizations was investigated using photodifferential scanning calorimeter and 2,2-dimethoxy-2-phenylacetophenone as initiator, results were compared with those of the nonaromatic ester derivatives (formate, acetate, hexanoate). Overall reactivities of the nonaromatic esterderivatives increased with the length of the side chain (hexanoate > acetate > formate). Aromatic ester derivatives are more reactive than nonaromatic derivatives with the photopolymerization rate decreasing in the order p-methoxybenzoate > p-methylbenzoate > p-flurobenzoate > benzoate > alkyl esters.

**Presenter:** DAVID VARGAS
**Institution:** *Queensborough Community College*
**Discipline:** *Physical Sciences*
**AMP Region:** *New York City*
**Faculty Mentor:** *Dr. Frank Scalzo*
**Place:** *2nd Place — Tie*

## TRACKING STORMS: OBSERVATIONS AND SIMULATIONS

To assess the future impact of climate change, one must investigate climate variability. Climate variability represents how the state of the atmosphere has changed over time. This study uses sea-level pressure data from 1957 to 1989 to construct a climatology containing the tracks and frequency of storms, as well as the location of the most severe storms. In order to investigate storm track variability, the climatology is organized by season and El Niño strength. To evaluate the use of storm tracks as a tool in future climate impact studies, a comparison of seasonal storm tracks between observation and the NASA Goddard Institute's general climate model is also presented. Preliminary results from this research show a tendency for a higher frequency of storm tracks for non-El Niño years in the Western U.S., and a higher frequency of storm tracks for strong El Niños in the Eastern Pacific, and off of the East Coast of the U.S. In addition a marked difference in storm frequency between the model and observation was found, possibly due to a phase shift in the planetary wave.

***Poster presenter enjoys explaining her research.***



**Presenter:** WINSTON WILSON
**Institution:** *Midlands Technical College*
**Discipline:** *Math/Computer Science*
**AMP Region:** *South Carolina*
**Faculty Mentor:** *Dr. Ronald L. Drayton*
**Place:** *1st Place*

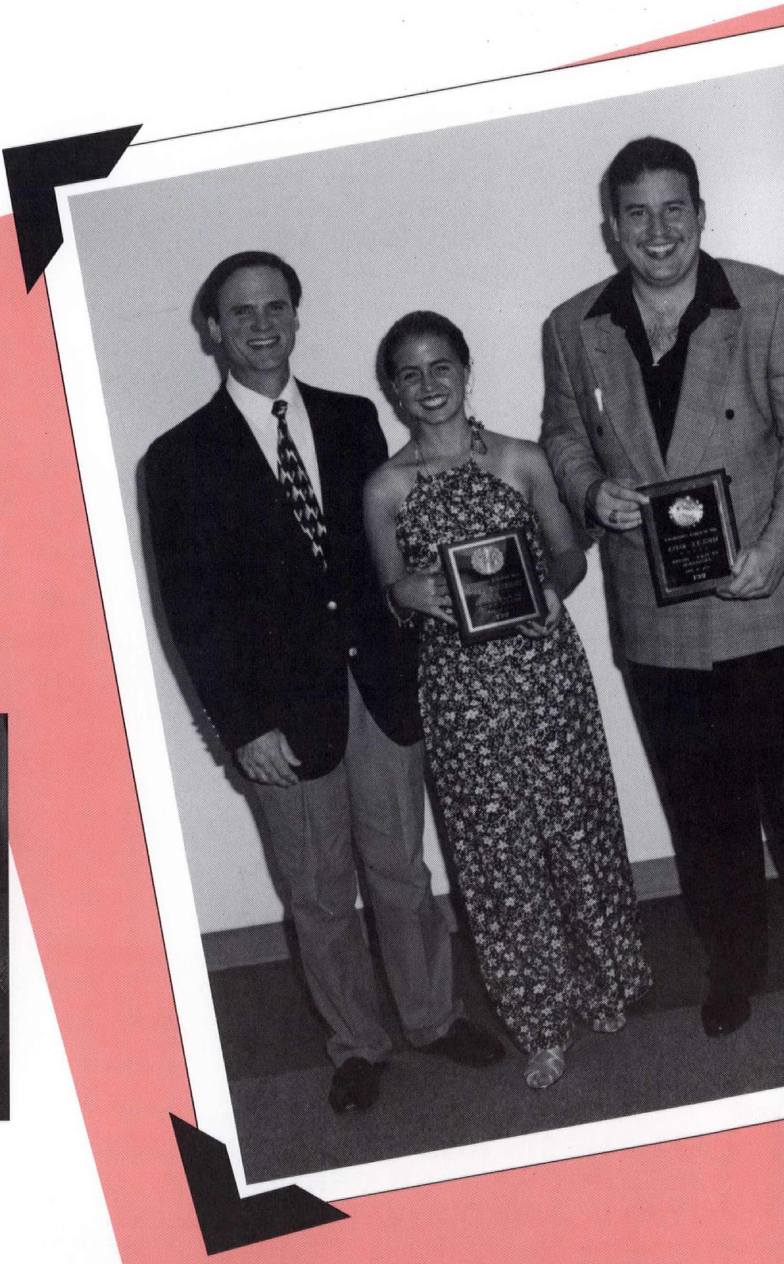
## ARTIFICIAL INTELLIGENCE SOFTWARE

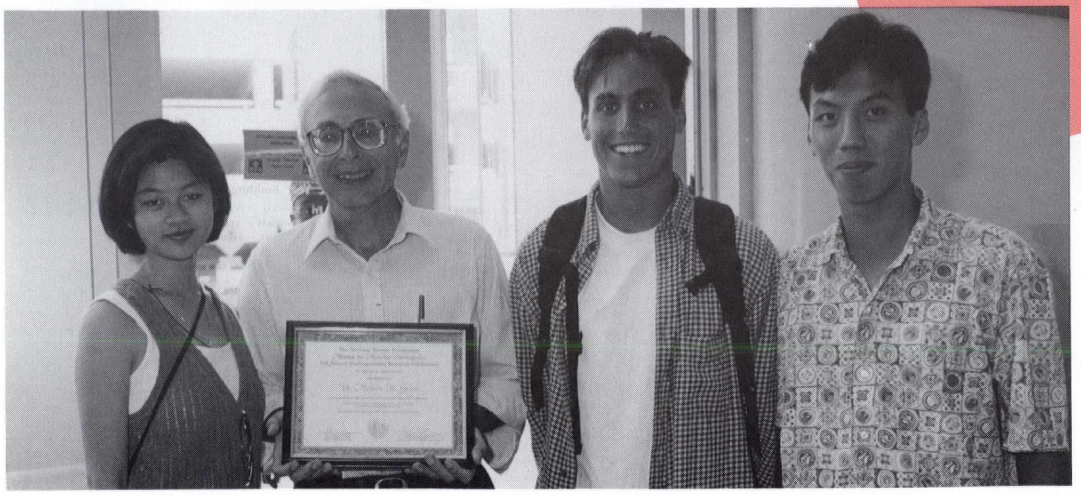
My oral presentation will address the use of Artificial Intelligence software which will allow an individual to use the computer as a consultant. My program will act as a computer configuration expert and assist in selecting an appropriate computer configuration. The decisions made by the computer will be tied into preset configuration categories which include Multi-Media, Programming, Database, CAD/CAM, and Desktop Publishing.

# CONFERENCE

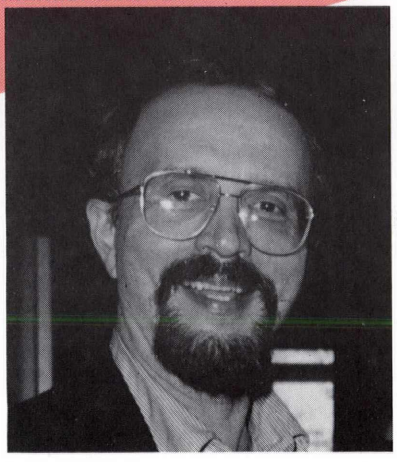
***Clockwise from left, Elma Gonzalez, Marilyn Moriarty, Julia Wan.***

***Below, Melvin Green with San Diego contingent.***

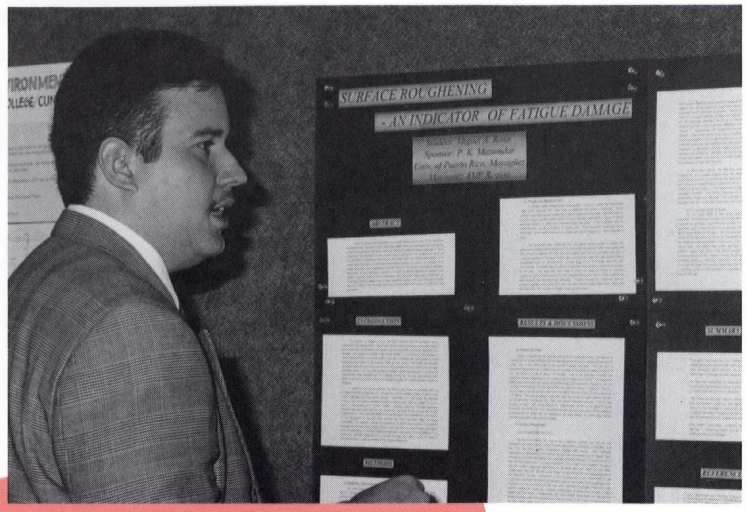




***Manuel Gómez***



# HIGHLIGHTS




*"Just Desserts started things off with a vibrancy and enthusiasm that held up throughout."*

*—UC Santa Barbara Attendee*

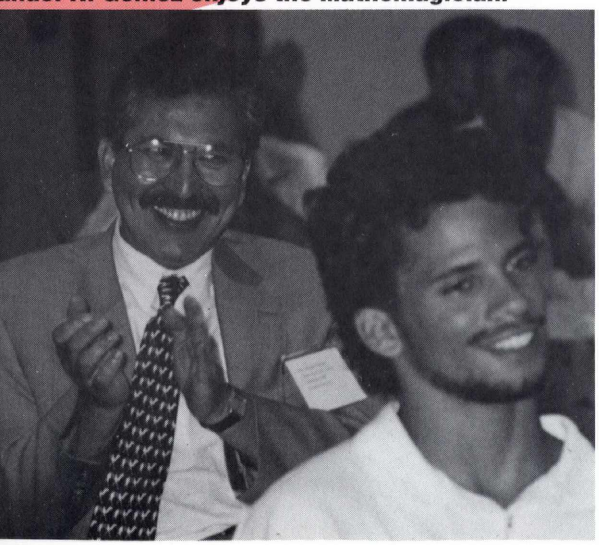
*"It was helpful to see the direction NSF is heading in their funding and the reasons for their financial support."*

*—New York City AMP Attendee*

*"Learning to love the lab was great."*

*—Puerto Rico AMP Participant*

**anuel N. Gómez enjoys the Mathemagician.**



***Distinguished guests from NSF: Drs. Luther Williams, Roosevelt Calbert and William McHenry.***

**Presenter:** DEBORAH L. APODACA
**Institution:** *New Mexico State University*
**Discipline:** *Engineering*
**AMP Region:** *New Mexico*
**Faculty Mentor:** *Dr. Adrian Hanson*
**Place:** *2nd Place*

## THE REMOVAL OF LEAD FROM SOIL USING PEIC, A CHELATING WATER SOLUBLE POLYMER

The main focus of this research is the remediation of lead-contaminated soil. The soil being used in this study is taken from Cal-West, a Superfund site where operation of a lead battery recycling plant has resulted in greater than 10,000ppm lead contamination in the soil. This weathered soil is being used as a surrogate for soils found on DOE sites in the arid southwest, such as the Los Alamos Meson Physics Facility (LAMPF). The most common cheating agent for lead removal is EDTA, ethylene diaminetetraacetic acid, and excellent lead binder. However, there are several problems with EDTA, in particular the difficulty posed when trying to regenerate the chelator. We are investigating the water soluble polymer PEIC for lead removal. PEIC, which is synthesized by functionalization of polyethylenimine (PEI from BASF Corporation) with bromoacetate, is EDTA-like in its lead-binding capabilities. However, because PEIC is easily separated by ultrafiltration, potential for regeneration and reuse is high.

**Presenter:** DIEGO CARLTON
**Institution:** *Illinois Institute of Technology*
**Discipline:** *Math/Computer Science*
**AMP Region:** *Chicago*
**Faculty Mentor:** *Dr. James Karriannes*
**Place:** *1st Place*

## INTERACTIVE TUTORIALS USING HYPERCARD

While interactive tutorials have existed at the grammar and high school levels for some time now, there is still little material on the market at the college level, especially in the area of Physics and Engineering. The aim of this project is to develop interactive tutorials for students in college level courses through the use of Hypercard. Hypercard allows for the easy integration of multimedia into tutorials, which is often a necessity in getting the concepts in advanced material across to students. A base template will be developed so that instructors in any class can create custom tutorials to serve the needs of their students. These tutorials will allow students to view topics an many levels as well as to cross reference between topics. The hope is to develop a self paced learning experience that will serve students at all academic levels.

**Presenter:** JACQUELYN COLLINS
**Institution:** *University of Alabama in Huntsville and Tuskegee University*
**Discipline:** *Biological Sciences*
**AMP Region:** *Alabama*
**Faculty Mentor:** *Dr. Suzanne E. Ross and Dr. Adriel Johnson*
**Place:** *2nd Place*

## IDENTIFICATION OF IN VITRO ANTIMICROBIAL ACTIVITY AND LYMPHOCYTE CYTOTOXICITY IN EXTRACTS OF AUSTRALIAN TROPICAL PLANT SPECIES

The emergence of new microbial diseases and increasing antibiotic resistance in existing organisms of medical importance makes the discovery of new antimicrobial medicinal agents imperative. Ethanol extracts of leaf and bark materials collected from a variety of plants from the tropical rain forests of North Queensland Australia (including members of the families Euphorbiaceae, Lauraceae, Mimosaceae, Burseraceae, Myrtaceae, and others) were tested in vitro for antimicrobial activity against important human pathogens *Escherichia coli, Staphylococcus aureus, Enterococcus, Pseudomonas aeruginosa, Candida albicans* and Mycoplasma. Both disk diffusion and broth microdilution techniques were used to assess the therapeutic potential of the plant materials. Active components of extracts which show promising results will be identified using chromatographic techniques and their structures determined. In addition, cytoxocity of the extracts showing antimicrobial activity for normal lymphocytes and their effect on normal lymphocyte proliferative responses were examined. As model medicinal agents, these results on a highly unique segment of the world's flora can provide a starting point for synthetic modifications aimed at enhancing their potency and therapeutic potential for the treatment of human disease.

***Madeline León, first place winner for Physical Sciences/ Poster division, answers questions about her work for Puerto Rico's AMP Project Director Manuel Gómez.***

**Presenter:** WALTER J. LECH
**Institution:** *University of California, Los Angeles*
**Discipline:** *Biological Sciences*
**AMP Region:** *California*
**Faculty Mentor:** *Andrew H. Kaplan, M.D.*
**Place:** *1st Place*

## GENOTYPIC VARIATION OF HIV-1 PROTEASE: MUTATIONS RELATED TO DRUG RESISTANCE IN UNTREATED PATIENTS

One of the distinguishing features of retroviral biology is the high degree of diversity witnessed among independent strains. In particular, formation of genetic variants of human immunodeficiency virus type 1 (HIV-1) result from selective pressures exerted by the immune system and from random errors introduced by the viral reverse transcriptase. In contrast, viral heterogeneity is decreased during selection of those variants that are most efficient at replication. These factors undeniably affect the pathogenesis of HIV infection through generation of variants resisting protease inhibitors, escaping the host immune response and infecting various cell types.

To evaluate the consequences of these factors on the heterogeneity of HIV-1 quasispecies, we characterized the coding domain of p6, the protease, and the V4 region of the envelope from uncultured PBMC s of 14 HIV+ donors receiving no protease inhibitor therapy. Viral burden was measured by quantitative DNA PCR and was found to correlate well with heterogeneity in the envelope region studied, but not with p6 or protease. Most importantly, with the aid of computer modeling, we report the characterization of viral variants with mutations associated with drug resistance, despite the lack of such therapy. We therefore conclude that selective pressures act differentially on the HIV genome and that variants related to drug resistance are preexisting in untreated patients.

*The amazing presentation by math professor Art Benjamin—Mathemagics!"*

*—Undergraduate, New Mexico AMP*

**Presenter:** MADELINE S. LEÓN
**Institution:** *University of Puerto Rico at Mayagüez*
**Discipline:** *Physical Sciences*
**AMP Region:** *Puerto Rico*
**Faculty Mentor:** *Prof. José E. Cortés*
**Place:** *1st Place*

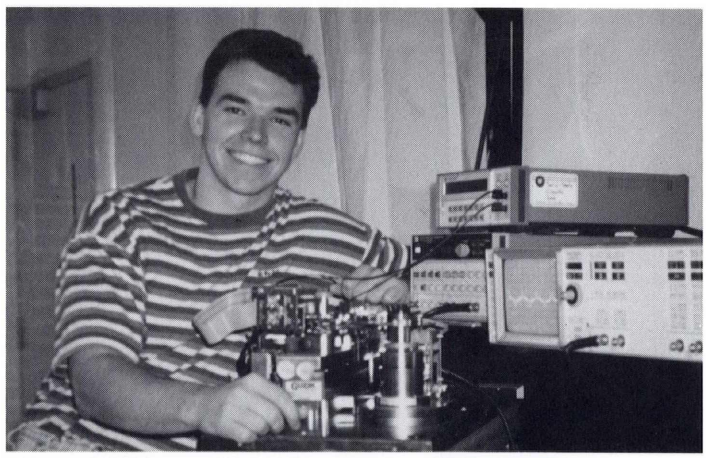
## ORGANOMETALLIC MODELS OF C-H BOND ACTIVATORS

One important general problem in organometallic chemistry is the binding and activation of the small molecules in Nature. This work is about the fundamental events involved in the conversion of CO, $CO_2$, and small alkanes into useful materials by catalytic reactions involving transition metals. Better catalytic materials are necessary to make efficient use of the limited global supply of hydrocarbons. In this work will be presented X-ray structure, spectroscopy evidence, kinetics, and thermodynamic information about the formation of hydrogen-metal and OC-metal bonds. The formations of these bonds are key steps in the catalytic conversion of CO, $CO_2$, and inert hydrocarbons into reactive and useful organic compounds. The knowledge of the mechanisms of these conversions is necessary to make of hydrocarbons a renewable resource.

**Presenter:** MIGUEL A. ROSA
**Institution:** *University of Puerto Rico at Mayagüez*
**Discipline:** *Engineering*
**AMP Region:** *Puerto Rico*
**Faculty Mentor:** *Dr. Pranab K. Mazumdar*
**Place:** *1st Place*

## SURFACE ROUGHENING - AN INDICATOR OF FATIGUE DAMAGE AND FAILURE

One of the consequence of the formation of persistent slip bands (PSBs) in fatigue, driven by the irreversible plastic strain that accumulates with cycles, is to produce surface roughness. Since PSBs form continually with cycles until specimen attains its saturation the roughness can be presumed to increase with cycling. This makes *roughening* (i.e., roughness difference) an issue and as this results in direct response to the damage that prevails locally, what could measure damage tentatively and, subsequently, the failures the roughening that the surface experiences and not the roughness that develops in N cycles. Furthermore, as failure is conceivable from a location suffering maximum roughening, this approach may prove to be a valuable basis by which to assert damage and locate specimen's failure non destructively. This work explores this possibility by conducting relevant fatigue and surface roughness tests on aerospace quality aluminum, and aluminum-lithium alloys.



***Edward Milligan, UC Davis, shown with equipment for "collection of analog read channel data for digital magnetic recording."***

**Presenter:** EARL G. STONE
**Institution:** *University of Texas at San Antonio*
**Discipline:** *Physical Sciences*
**AMP Region:** *University of Texas System*
**Faculty Mentor:** *Dr. Stephan Bach*
**Place:** *2nd Place*

## FOURIER TRANSFORM INFRARED SPECTROSCOPY MATRIX ISOLATION OF A NITRIC OXIDE WATER COMPLEX

Recently there has been significant interest concerning NO in-vitro. NO is also known as an environmental pollutant. In all of these studies water is a common denominator. A great deal of literature can be found on MI/FTIR analyses of either NO or water, but nothing indicating any reaction complexes of the two and the related physical chemistry. Using the matrix isolation technique coupled with fourier transform infrared spectroscopy evidence has been found of a NO-$H_2O$ complex. The matrix isolation technique was utilized in order to isolate the reaction products so that the complexes IR spectrum could be obtained. The reactants and matrix gas (argon) are co-deposited onto a KCl window which is maintained at approximately 8K. Complex absorptions were observed as shifts from the parent NO and $H_2O$ absorptions. The absorptions from the complex were used to determine the strength of the interaction between the two reactants. The IR absorptions for the complex were observed at approximately 3608 $cm^{-1}$ for the OH stretch, and approximately 1833 $cm^{-1}$ for the complex NO stretch. In addition to the experimental work, ab-initio calculations have been performed to determine a reasonable structure that agrees with the observed spectra.

***Earl Stone, University of Texas, won second place in Physical Sciences.***

*"Being able to meet scientists working in the field was thrilling and encouraging."*

*—Presenter, Alabama AMP*

**Presenter:** OTHNIEL WILLIAMS
**Institution:** *The City College of New York*
**Discipline:** *Math/Computer Science*
**AMP Region:** *New York City*
**Faculty Mentor:** *Prof. Yiannis Andrepoulos*
**Place:** *2nd Place*

## AERODYNAMICS OF A SKI JUMPER

Aerodynamic effects are critical to good ski jump performances. It is observed that, the angle of the ski jumper relative to the skis, the angle of the skis relative to each other and the angle of the skis relative to the air's velocity. These angles play a remarkable role on the distance of the jump. I am investigating the positive effects of these angles on the lift and drag forces acting on the ski jumper. The lift and drag forces on the ski jumper are evaluated for various combinations of these angles, to determine which angles that will give the longest jump distance. Finite element analysis is used to determine the velocity and pressure distribution around the body of a typical ski jumper. These values are then integrated to determine the lift and drag forces acting on the jumper.

# ARC '95: Convening the Brightest Minds of the National Alliances

## Selection Process

*Four students from each AMP, two oral presenters and two poster presenters, were selected to compete at ARC. Students must have submitted their ARC preliminary applications to their local AMP office by May 1, 1995; each AMP selected their top four students. Joint student projects were not eligible. As space allowed, additional students attended. Students had to be prepared for questions from judges and other attendees. Undergraduates entered posters or oral presentations in the following categories: biological sciences, physical sciences, mathematics and computer science, and engineering.*

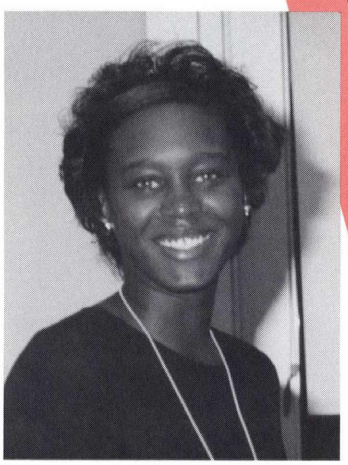
## CERTIFICATES OF EXCELLENCE

**Deborah Apodaca**

**Jacquelyn Collins**

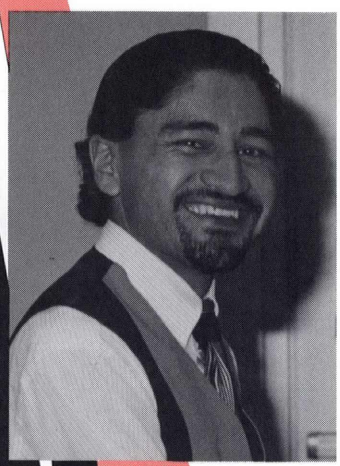
*"The enrichment I got from observing students present their research and of course the fun—the dance, field trips, welcome reception and the awards banquet."*

*—Undergraduate, Southern Rocky Mountain AMP*

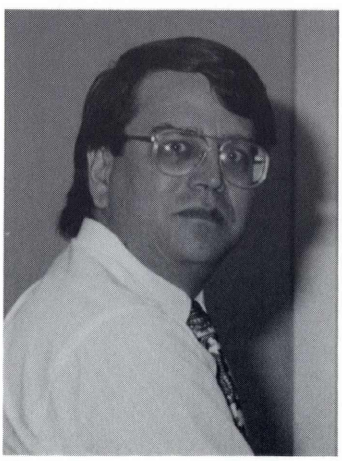


**Sharlene Heyward**

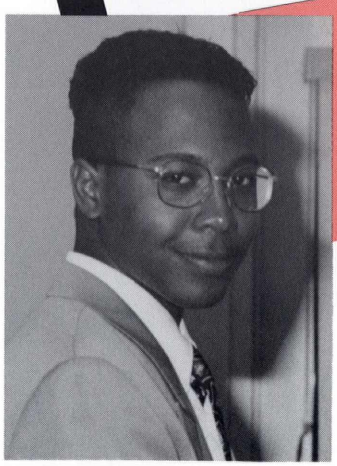
**Right is Sandra Gonzalez receiving her certificate from Dr. Roosevelt Calbert.**



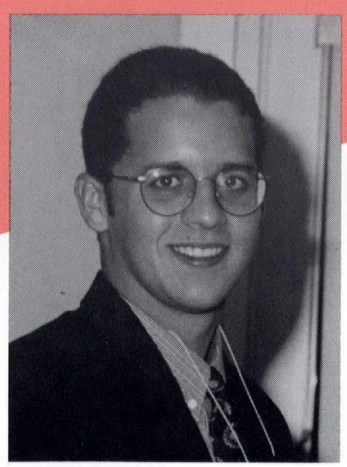
**Vladimir Sierra**



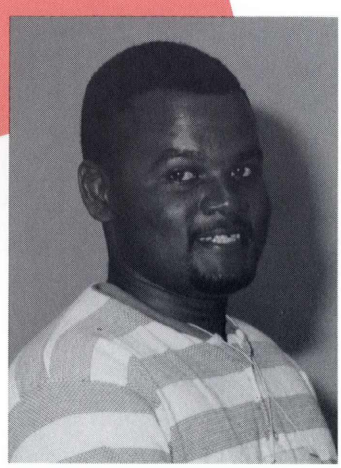
**Earl Stone**



**Kevin Thigpen**



**David Vargas**



**Othniel Williams**

DR. MELVIN H. GREEN
Department of Biology
University of California, San Diego

## FROM MOLECULAR BIOLOGY TO MOLECULAR MEDICINE: HOW I AVOIDED BECOMING A SPECIALIST AND LEARNED TO LOVE THE LAB.

What is molecular biology? How does one decide to become a molecular biologist, and then how does one go on to become one? How has this field changed during the past forty years? What have you accomplished during your career as a molecular biologist? Although my answers to these frequently asked questions may at first seem restricted to one narrow field of science, I hope you will find them of value during this time when you are considering a career in research, regardless of your area of specialization.

DR. ANTONIO A. GARCIA
Chemical, Bio & Materials Engineering
Arizona State University

## SCANNING PROBE MICROSCOPY AS A TOOL FOR STUDYING BIOPOLYMER SELF-ASSEMBLY

Structural biopolymers play important roles in organisms when, through a series of chemical interactions, they create assemblies. Learning the relationship between molecular and assembly structure is important in order to engineer biopolymers with specific performance characteristics. A type of scanning probe microscopy, Tapping Mode Atomic Force Microscopy (TM-AFM), allows for the study of molecules and assemblies under near-native conditions.

This presentation will illustrate the power of TM-AFM for studying beta-glucans (structural polysaccharides which can be found in yeast cell walls) and collagen (a structural protein found in all higher animals). Beta-glucan images show that highly branched glucans can form tree-like networks while unbranched glucans form long strand bundles. A commercially produced collagen is shown to assemble into amorphous mats at neutral pH. The mat porosity depends on the size-distribution of individual collagen molecules. TM-AFM techniques and computational and image analysis tools used in these studies will be discussed during this presentation.

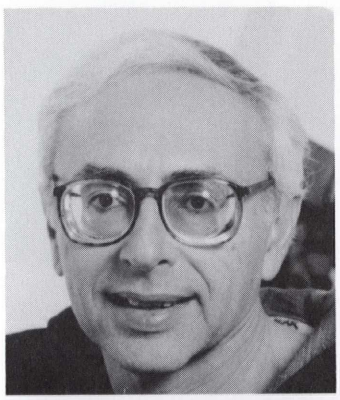
DR. MICHAEL W. HOWELL
Marine Science Program
University of South Carolina,
Columbia

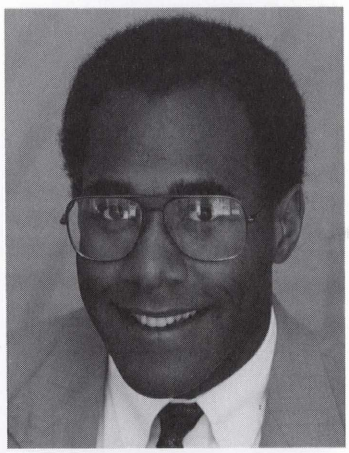
DR. ANDREW ROBERTS
Department of Geology
University of California, Davis

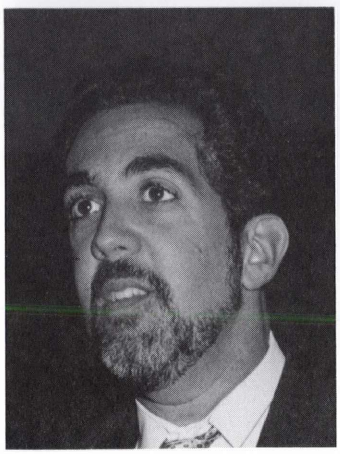
## OCEAN DRILLING PROGRAM LEG 160: UNCOVERING THE HISTORY OF THE EASTERN MEDITERRANEAN SEA

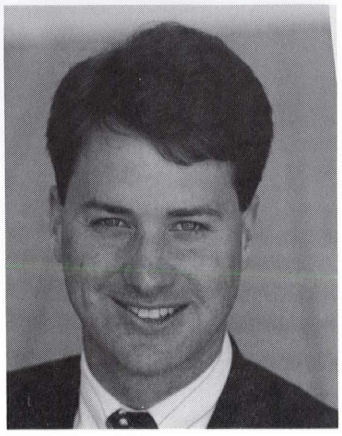
Ocean Drilling Program leg 160 cruise took place from March to May of 1995 and focused on the tectonic and paleoceanographic history of the eastern Mediterranean Sea. Approximately 7 km of deep-sea cores were collected form 10 sites in order to investigate various geological phenomena including regional collision processes, mud volcanism and the origin of organic-rich sapropel deposits.

This presentation will mainly focus on the cruise objectives related to the paloceanographic and paleoclimatic events associated with the Mediterranean sapropels. Current theories of sapropel formation, various analytical techniques and ongoing post-cruise research on these unusual deep-sea deposits will be discussed. In addition, an overview of the National Science Foundation's Ocean Drilling Program will be presented.



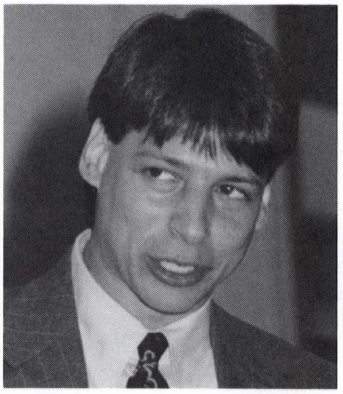


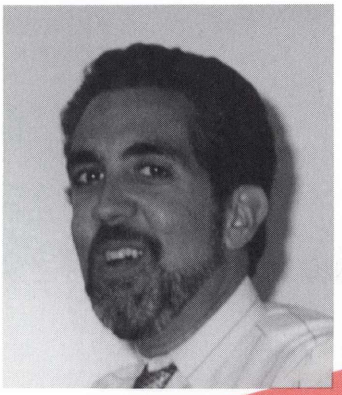




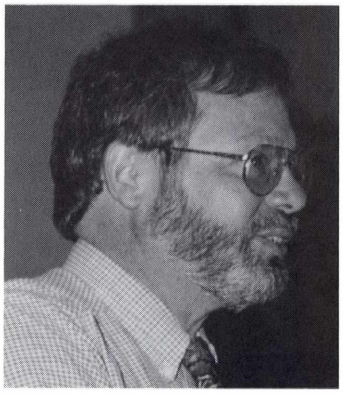
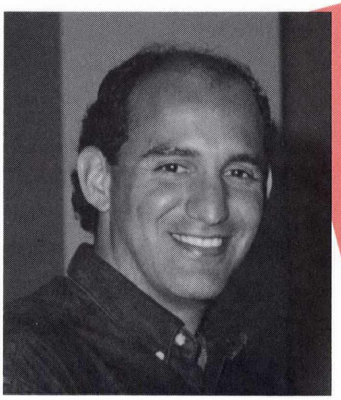
***Photos clockwise from top left: Melvin Green, Michael Howell, Andrew Roberts, Antonio Garcia.***

## JUDGES



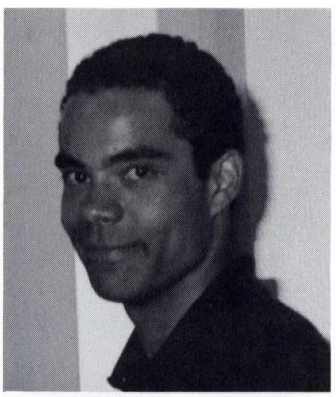



***From the right: the Mathemagician, Dr. Arthur Benjamin; Diane Crabtree; Dr. Antonio Garcia; Judy Gobert.***

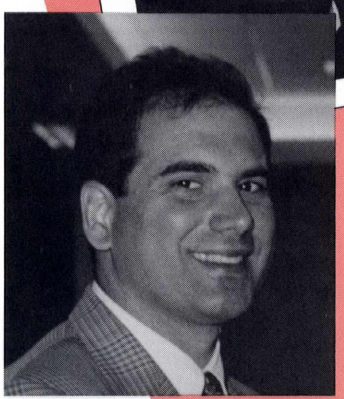



***From left, Barry Goldman, Arnold Guerra. Far right, Dr. Robert Andrews, left in photo, is congratulated by Alan Thornhill (soon-to-be "Dr. Alan Thornhill") for his service as a judge.***

***Dr. Kenneth Millett***



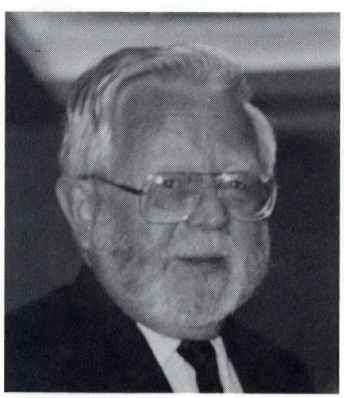
***Ryan Mitchell***



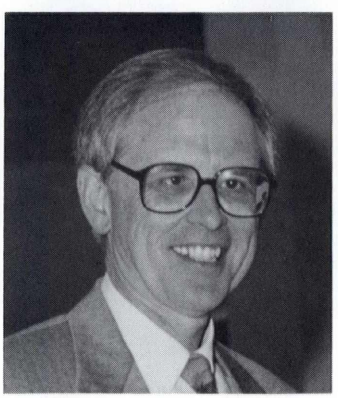
***Dr. Jamil Momand***

*"Meeting bright minds and their handsome careers."*

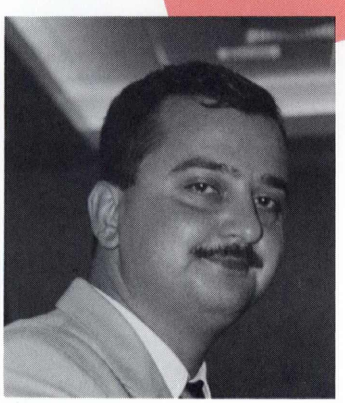
*—American River College Student*



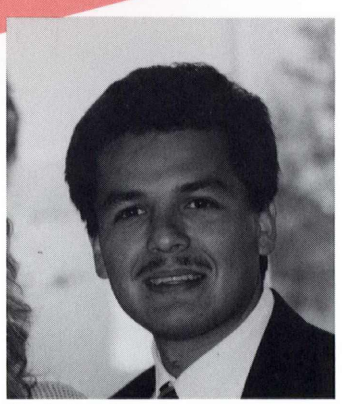
***Dr. J. Keith Oddson***



***Dr. James Shackelford***



***Said Shokair***



***Moisés Torres***

## JUDGES

DR. ARTHUR T. BENJAMIN
*Harvey Mudd College (M/CS)*

DIANE CRABTREE
*University of California, Los Angeles (BS)*

DR. ANTONIO GARCIA
*Arizona State University (ENG)*

JUDY GOBERT
*Salish Kootenai College (M/CS)*

BARRY GOLDMAN
*Lawrence Livermore National Lab (BS)*

MR. ARNOLD GUERRA III
*University of California, Irvine (PS)*

DR. WILLIAM JACKSON
*University of California, Davis (PS)*

LARRY LIM
*University of Southern California (ENG)*

DR. KENNETH MILLETT
*University of California, Santa Barbara (M/CS)*

MR. RYAN MITCHELL
*University of California, Davis (BS)*

DR. JAMIL MOMAND
*City of Hope National Medical Center (BS)*

DR. J. KEITH ODDSON
*University of California, Riverside (ENG)*

DEREK DUNN-RANKIN
*University of California, Irvine (ENG)*

DR. ANDREW ROBERTS
*University of California, Davis (PS)*

DR. JAMES SHACKELFORD
*University of California, Davis (ENG)*

SAID SHOKAIR
*University of California, Irvine (ENG)*

ROBERT SIMONS
*University of California, Los Angeles (BS)*

MOISÉS TORRES
*University of California, Irvine (M/CS)*

## CONFERENCE ATTENDEES

### ATTENDEES BY AMP

***National Science Foundation***
*Dr. Luther Williams*
*Dr. Roosevelt Calbert*
*Dr. William McHenry*
*Mr. Njuguna Kabugi*

***Alabama***
*Dr. Louis Dale*
*Dr. M. Carolyn Braswell*
*Ms. Moncenya Chatman*
*Ms. Jacquelyn Collins*
*Ms. Jamie R. Rowe*
*Ms. LaToya M. Sawyer*

***All Nations***
*Ms. Judy Gobert*

***Chicago***
*Dr. Justin Akujieze*
*Mr. Lawrence Bowie*
*Mr. Diego Carlton*
*Ms. Beatriz Jamaica*
*Dr. Peter Johnson*
*Mr. Esteban Linares*
*Mr. Tyrone Perrin*
*Ms. Karmin Robinson*
*Ms. Nicole Scarborough*
*Mr. Conrad Taylor*
*Mr. Karuna Warren*

***Florida-Georgia***
*Dr. Lynette Padmore*

***Greater Newark***
*Ms. Hilda Rosario*

***Louisiana***
*Dr. Robert Ford*

***Metropolitan Detroit***
*Dr. Hanley N. Abramson*

***Mississippi***
*Dr. Richard Sullivan*
*Dr. Gerald A. Mattson*
*Mr. Nicholas D. Gardner*
*Mr. Kevin Thigpen*

***New Mexico***
*Dr. Ricardo Jacquez*
*Mr. Anthony Parra*
*Ms. Deborah Apodaca*
*Ms. Carla Aragon*
*Mr. Miguel Rocha*
*Ms. Rachel Walsh*

***New York City***
*Ms. Nnenna Nwanju*
*Mr. John D. Romo*
*Dr. Louise Squitieri*
*Mr. David Vargas*
*Mr. Othniel Williams*

***North Carolina***
*Dr. Vivian H. Hampton*
*Dr. Cheryll Hawthorne*
*Ms. Eileen Covington*
*Ms. Trena Covington*
*Ms. Anderozzi Esdaille*
*Mr. Miguel Green*
*Mr. Vladimir Sierra*

***Puerto Rico***
*Dr. Manuel Gómez*
*Mr. Alberto García-Moll*
*Ms. Sandra Gonzalez*
*Ms. Madeline S. León*
*Dr. Ana Piñero*
*Mr. Miguel A. Rosa*
*Ms. Jackeline Santiago*

***South Carolina***
*Dr. Michael Howell*
*Mr. Frederick Cooper*
*Mr. Terry Green*
*Ms. Sharlene Heyward*
*Mr. David Irick*
*Mr. Winston Wilson*

***Southern Rocky Mtn***
*Dr. Antonio Garcia*
*Mr. Mark DeHerrera*
*Ms. Angelica Robles*
*Ms. Antonia M. Romero*
*Mr. Fermin A. Samorano*

***University of Texas***
*Dr. Pablo Arenaz*
*Dr. Scott A. Starks*
*Ms. Estrella Anchondo*
*Mr. Richard Coronado*
*Ms. Monica Hernandez*
*Mr. Donald Nega*
*Mr. Jeffrey Rivas*
*Mr. Earl Stone*

### CALIFORNIA ATTENDEES BY INSTITUTION

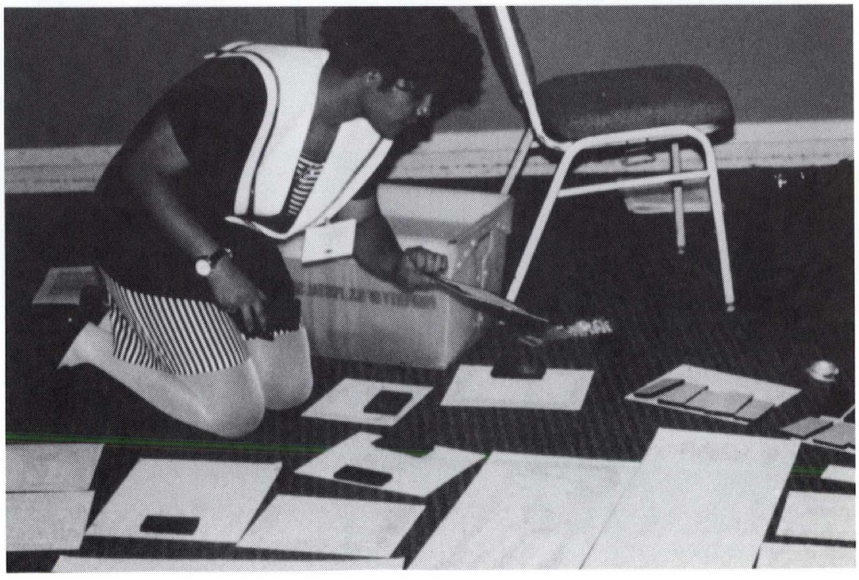
***California State University, Sacramento***
*Ms. Sandra Arellano*

***Occidental College***
*Mr. Roberto Amador*
*Ms. Claudia Inman*
*Ms. Celena Smith*

***Sacramento City College***
*Mr. Don Rodriguez*

***University of California, Davis***
*Dr. James Shackelford*
*Dr. William Jackson*
*Mr. Ryan Mitchell*

*Mr. Steven Fonseca*
*Ms. Jacqueline Jacobsen*
*Mr. Ed Milligan*



***Dr. Carlton Bovell, Regional Director, UC Riverside, brought a cohort of science-minded high school students for an exciting university experience.***

***University of California, Irvine***
*Dr. Joan Bissel*
*Ms. Peggy Garcia Bockman*
*Ms. Kathleen Cruzen*
*Ms. Marjorie DeMartino*
*Dr. Ellie Ehrenfeld*
*Ms. Susie Forbath*
*Ms. Kika Friend*
*Mr. Manuel N. Gómez*
*Dr. Juan Francisco Lara*
*Ms. Nancy Minear*
*Dr. Marilyn Moriarty*
*Ms. Sonia Mucarsel*
*Ms. Gina Paiz*
*Dr. R. Scott Simpson*
*Ms. Llyn Smith*
*Dr. Allen Stubberud*
*Mr. Alan Thornhill*
*Mr. Moisés Torres*
*Dr. Luis Villarreal*
*Dr. Frederic Wan*
*Ms. Elaine Wheeler*
*Dr. Laurel L. Wilkening*

*Ms. Lourdes Almeida*
*Mr. Pedro Anlas*
*Ms. Linda Bagatourian*
*Mr. Richard Bailey*
*Mr. Sirak Belachew*
*Mr. Dan Borash*
*Mr. Hiram Channell*
*Mr. Steve Curiel*
*Ms. Vanesha Davis*
*Ms. Jenny Espinoza*
*Mr. Anthony Frederick*
*Ms. Jennifer Fuentes*
*Ms. Judith Garcia*
*Mr. Marquis Griffith*
*Mr. Miguel Hernandez*
*Ms. Patricia Hernandez*
*Ms. Druemeka Irving*
*Ms. Kara Lisa Jones*
*Mr. Monica Litch*
*Ms. Angelica Lopez*
*Ms. Julie Marquez*
*Mr. John Medina*
*Mr. Gilberto Mosqueda*
*Mr. Alvaro Ortiz*
*Ms. Wendy Paredes*
*Ms. Jackie Pimentel*
*Mr. Juan Pommier*
*Mr. Andres Ramirez*
*Ms. Norena Shaw*
*Mr. Fred Simmons*
*Mr. Carlos Solorzano*
*Ms. Maria Torres*
*Mr. Chris Vargas*
*Mr. Vladimir Vasquez*
*Ms. Wendy Velasco*
*Mr. Peter Velasquez*
*Ms. Jennifer Wongyai*

> *"I enjoyed the opportunity to hear presentations about recent research. I also enjoyed networking with other AMP members and learning about how other programs operate."*
>
> *—Undergraduate, Chicago AMP*

***University of California, Los Angeles***
*Ms. Diane Crabtree*
*Prof. Elma Gonzalez*
*Ms. Stephanie Stern*

*Ms. Jessica Almaraz*
*Mr. Walter Lech*
*Mr. Norman Moore*
*Ms. Yemisi Olukanmi*

***University of California, Riverside***
*Dr. Carlton Bovell*
*Ms. Teresa Cofield*
*Dr. Robert Wild*

*Ms. Adriana Aguayo*
*Mr. Collin Donnelly*
*Mr. Donny Dumani*
*Mr. Joshua Gallegos*
*Ms. Maria Garcia*
*Ms. Denise Gentles*
*Ms. Awilda Jimenez*
*Mr. Jose Lemus*
*Ms. Melissa Leon*
*Ms. Rene Lloyd*
*Ms. Maria Martinez*
*Mr. Carlos Melgar*
*Ms. Casscia Murray*
*Ms. Silvia Palacios*
*Mr. Efrain Ramos*
*Mr. Enrique Rodriguez*
*Ms. Adriana Rubalcaba*
*Ms. Lakrecia Sanders*
*Ms. Renee Seale*
*Mr. Silvestre Zamudio*

***University of California, San Diego***
*Dr. Melvin H. Green*
*Ms. Antionette Jones*
*Ms. Erica Perry*

*Mr. Thomas Baker*
*Ms. Erin Buell*
*Mr. Arturo Carrasco*
*Ms. Rose Cesena*
*Mr. Nathaniel Nguyen*
*Ms. Carrie Noriega*
*Ms. Analia Reynaga*
*Mr. Miguel Rivera*
*Ms. Bisrat Woldemichael*

***University of California, Santa Barbara***
*Dr. Kenneth Millett*

*Mr. Jaime Castillo*
*Ms. Angela Grissom*
*Ms. Oralia Loza*
*Mr. Diego Pedreros*
*Mr. Alberto Perez*
*Ms. Marisa Ramirez*
*Mr. Jorge Salas*
*Mr. David Salazar*
*Mr. Manuel Salcido*

***University of California, Santa Cruz***
*Ms. Jan Yvette (Tori) Evans*
*Mr. Jason Taylor*

***Special Guests***
*Dr. James T. Ashurst*
*Ms. Rosa Choi*
*Dr. Olivia de la Roche*
*Mr. Allen Dietz*
*Dr. Neil Gretsky*
*Mr. Gerhard Helmbrecht*
*Dr. Herbert Killackey*
*Ms. Noelle Peay*
*Mr. David Pham*
*Mr. Michael Sick*
*Ms. Bianca Ulibi*
*Ms. Elizabeth Wajnberg*

**CALIFORNIA COMMUNITY COLLEGE SUMMER INSTITUTE ATTENDEES**

***American River College***
*Ms. Charlotte Foran*
*Mr. David Gray*
*Ms. Catherine Gumbo*
*Mr. David Jones*
*Mr. Chan Mainor*
*Freya Murphy*
*Daniel Tor*

***Cerritos Community College***
*Filiberto Sanchez*

***Chabot College***
*Simon Bhangal*

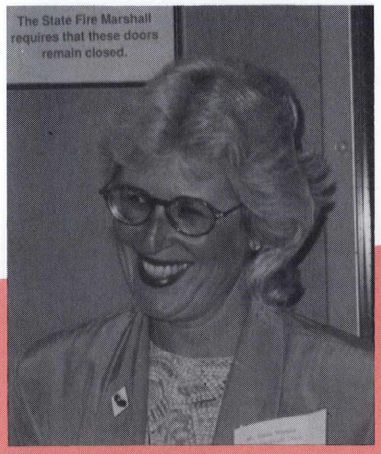
***College of the Sequoias***
*Juan Carlos Montañez*
*Ericka Navarro*

***Modesto Junior College***
*Jesse Orozco*
*Carlos Sandoval*

***Sacramento City College***
*Arthur Hernandez*
*Debra Robertson*

*"Masterfully organized.
Lots of helpers, lots of planned activities."*

*—Texas AMP*




***Elaine Wheeler***

***Kathleen Cruzen***

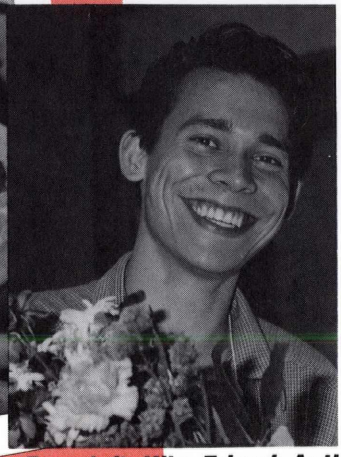
***Gina Paiz***

***Judith Garcia***

***Llyn Smith***

***Susie Forbath, conference coordinator***





***From left: Kika Friend, Anthony Frederick, Jenny Espinoza***

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CALIFORNIA
Alliance FOR Minority Participation