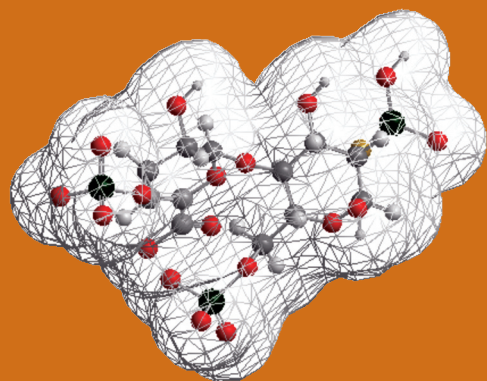
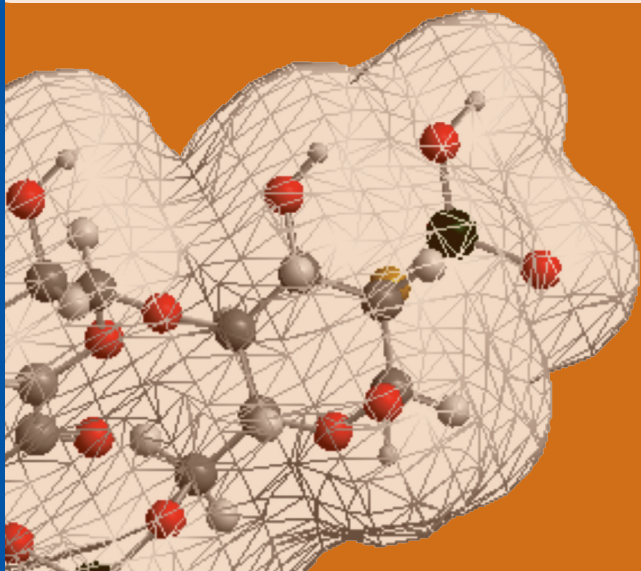




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**THE ACS COMMITTEE ON PROFESSIONAL TRAINING
THE ACS COMMITTEE ON MINORITY AFFAIRS**

Workshop on Increasing Participation of Hispanic Undergraduate Students in Chemistry



FINAL REPORT

**ACS Committee on Professional Training
and
ACS Committee on Minority Affairs**

Workshop on Increasing Participation of Hispanic Undergraduate Students in Chemistry

November 14-16, 2008

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Workshop on Increasing Participation of Hispanic Undergraduate Students in Chemistry

Executive Summary

Over the past four years, the American Chemical Society (ACS) has hosted a series of three workshops focusing on increasing minority participation in chemistry. Participants in these three workshops have sought to identify issues faced by minority students in the African American, Native American, and Hispanic populations and develop strategies to attract underrepresented minorities to careers in chemistry and to help them attain academic success.

This workshop was organized by the ACS Committee on Professional Training and the ACS Committee on Minority Affairs and brought together a diverse range of people involved with Hispanic undergraduate students at two-year colleges and four-year degree programs across the United States and Puerto Rico. U.S. Census Bureau statistics¹ indicate that by 2050 approximately 30 percent of the population will be of Hispanic origin. Traditional methods of teaching chemistry must be responsive to cultural differences in order to better serve Hispanic undergraduate students. This workshop focused on identifying issues among heterogeneous Hispanic populations and developing successful strategies for ACS to implement.

Participants identified significant barriers to the recruitment and retention of Hispanic undergraduate students: family socioeconomic conditions, immigration status, a cultural reluctance to move away from family, poor academic preparation in high school, a low level of parental education, the perception that chemistry is a difficult subject, a lack of chemical industry in some regions, a general lack of student knowledge regarding careers available in chemistry, and a lackluster chemistry curriculum that students have trouble applying to real life.

Workshop participants found that many of the strategies identified for use with Hispanic undergraduate students are simply good teaching practices in general. Despite the commonality of issues, however, these challenges often present more significant barriers to recruitment and retention of Hispanic students since they occur more frequently and with greater severity. Discussions stressed the importance of mentoring relationships between Hispanic students and faculty, the significant impact of participating in undergraduate research, and the need to acknowledge and work against implicit or other bias in the hiring of minority faculty.

The following recommendations provide a framework for ACS efforts to advance the education and participation of Hispanic undergraduate students in chemistry. These recommendations are described in detail in the text and are summarized here.

Recommendations for the ACS Board of Directors

- Expand the ACS Scholars Program.
- Create an ACS communication center, including social networking and a directory of contact information, directed to Hispanic students in all levels of postsecondary education.

Recommendations for the ACS President

- Inform ACS Councilors of the recommendations from the workshops with minority-serving institutions to increase participation of underrepresented minorities in chemistry.
- Encourage involvement of industry in publicizing careers in chemistry and increasing the number of internships available to underrepresented minority students.

Recommendation for the ACS Division of Chemical Education

- Develop and promote mechanisms for calibrating performance of students transferring from two-year colleges to four-year degree programs.

Recommendations for the Society Committee on Education

- Develop workshops and programming to promote the interest and retention of Hispanic students in science/chemistry through professional development of educators at all levels.
- Develop or expand existing mentoring programs that assist faculty with the development of successful grant proposals.
- Support focused efforts to create and sustain chemistry clubs in high schools and ACS student chapters in two-year colleges and four-year degree programs that enroll large numbers of Hispanic students.
- Develop a recognition program for two-year colleges aligned with the *ACS Guidelines for Chemistry at Two-Year College Programs*.

Recommendations for the ACS Committee on Minority Affairs

- Establish a peer mentoring program that connects ACS Scholars to high school students.
- Create a Web site focused on increasing the participation of Hispanic students in chemistry and increasing the visibility of Hispanic role models at all levels.
- Seek funding for travel awards for Hispanic educators and students to attend professional meetings.
- Provide input to the revision of the guidelines for high school teachers to address the needs of underrepresented minorities.
- Pilot a “science culture” program in a primarily Hispanic school district that highlights the benefits of science education to parents, teachers, and administrators.
- Partner with appropriate minority-serving organizations (such as the Society for Advancement of Chicanos and Native Americans), scientific societies, and the industrial community to increase interest in chemistry careers among Hispanic students and raise awareness of successful retention strategies.

Recommendation for the ACS Petroleum Research Fund Board

- Create a grant program targeting research activities at two-year colleges with the goal of increasing retention of Hispanic students in chemistry.

Recommendation for the ACS Committee on Professional Training

- Incorporate a regular column on student transfer issues and communication strategies between two-year colleges and four-year degree programs into the CPT Newsletter.

The workshop participants also identified several recommendations that provide opportunities for two ACS governance bodies to collaborate on projects that promote recruitment and retention of Hispanic students in chemistry. These joint recommendations follow.

Recommendation for the ACS Committee on Minority Affairs and the ACS Division of Chemical Education

- Explore opportunities to create new categories of awards that recognize contributions of Hispanic chemistry students and professionals.

Recommendations for the ACS Committee on Professional Training and the Society Committee on Education

- Propose an ACS Presidential Event on K-12 teacher preparation to highlight the relationship between course content and pedagogy and increasing the participation of underrepresented minorities in chemistry.
- Develop a supplement to the guidelines for two-year colleges and for baccalaureate programs in chemistry that emphasizes appropriate preparation for general chemistry courses and inclusion of engaging and relevant content.
- Conduct a survey on the role of two-year colleges in the preparation of chemistry majors with particular attention to success factors for retention of underrepresented minorities.
- Promote communication between two-year colleges and four-year degree programs to facilitate successful transitions and retention of Hispanic students in chemistry.

Increasing Participation of Hispanic Undergraduate Students in Chemistry

History and Objectives of the Workshop

The chemistry profession has become increasingly concerned with enhancing diversity, particularly regarding the inclusion of underrepresented minorities.²⁻⁶ In 2002, a Task Force on Minorities in Academe was appointed by the ACS Board of Directors to consider ways to increase the number of minority faculty in chemistry at institutions of higher education, especially the top 50 research universities. This Task Force adopted the following vision statement to guide its work:

“The American Chemical Society recognizes the need to develop fully the academic potential of all the nation’s citizens. The ACS will, therefore, develop and implement programs that will increase the participation of underrepresented minorities in the chemical academic community to a level that reflects their representation in the country’s population.”⁷

The ACS Task Force, chaired by the late Dr. Stanley C. Israel (Texas State University) and co-chaired by Dr. Joseph S. Francisco (Purdue University), considered its charge in the broader context of crucial decision-making junctures along the educational and professional pathways that lead to a successful academic career and defined the following objectives⁸ for its work:

- Increase the number of underrepresented minority undergraduate students choosing to pursue graduate work in chemistry;
- Increase the number of underrepresented minority graduate students choosing an academic career; and
- Increase the number of underrepresented chemistry faculty who become tenured.

The Task Force made 14 recommendations to the ACS Board of Directors that were eventually endorsed and accepted with an implementation timeline of three years. These recommendations fell into six categories:

- Develop partnerships to facilitate these goals within, across, and beyond the profession;
- Add value by reshaping boards and other bodies of leadership within the profession to be more inclusive;
- Achieve educational outreach through a series of activities;
- Collect and disseminate better data on the participation of underrepresented minorities in chemistry;
- Enable mentoring; and
- Establish financial incentives to facilitate the participation of underrepresented minorities in higher education in chemistry.

The appointment and work of the ACS Board Task Force on Minorities in Academe paralleled exactly in time discussions within a subcommittee of the Committee on Professional Training (CPT) on the underrepresentation of minority-serving institutions (MSIs). Two members of CPT, Dr. Jeanne E. Pemberton (University of Arizona) and Dr. Carlos Gutiérrez (California State University, Los Angeles) had been appointed as members of the Task Force on Minorities in Academe and served as conduits for expression of CPT’s concerns about lagging minority student participation in chemistry at the undergraduate and graduate levels and the underrepresentation of minority-serving institutions on the list of ACS-approved undergraduate programs in chemistry.

One recommendation requested that the ACS Committee on Professional Training organize a workshop with representatives from minority-serving institutions to foster a better understanding of the incentives and barriers to ACS approval of their undergraduate programs and to increase participation of underrepresented minorities in chemistry. After further discussion, CPT concluded that the diverse challenges faced by MSIs could not be addressed in the context of one workshop. To allow more focused discussions, a series of three workshops were

held with the African American, Native American, and Hispanic academic communities. This workshop focused on institutions with large populations of Hispanic undergraduate students. The specific goals for this workshop were:

- To discuss the challenges associated with recruitment and retention of Hispanic students in chemistry;
- To identify and promote exemplars of successful undergraduate programs serving significant numbers of Hispanic undergraduate students;
- To identify actions that ACS in general, and CPT specifically, could undertake to improve the profession's success in this arena;
- To devise strategies for disseminating practices that work in developing strong chemistry programs that educate significant numbers of Hispanic students; and
- To develop other specific recommendations for action by CPT, CMA, or other ACS bodies that will facilitate the greater participation of Hispanics in chemistry.

Participants at this workshop were faculty and chairs recruited from a cross-section of two-year colleges and four-year chemistry programs that enroll large numbers of Hispanic students. Institutions were also chosen to be geographically representative. A complete list of workshop participants and their affiliations is provided in Appendix A.

The workshop consisted of three sessions interspersed with keynote speakers and several short introductory presentations to stimulate and frame discussions that occurred in subsequent breakout groups. The workshop agenda can be found in Appendix B. Breakout group compositions are listed in Appendix C. Participants rotated the responsibility for reporting from each group, and a scribe was assigned to each group to take notes.

Session 1: Challenges and Strategies in Retention of Hispanic Undergraduates in Chemistry

Panel Topic: Student Retention and Success in Science: The Social Science Research Perspective
Moderator: *Carlos Gutiérrez*, California State University, Los Angeles
Speaker: *Araceli Espinoza*, Rossier School of Education, University of Southern California

This session identified recruitment and retention issues among Hispanic undergraduate students. Participants also discussed effective strategies for recruiting and retaining students in chemistry.

Session 2: Models that Work: Effective Strategies for Retention of and Excellence by Hispanic Undergraduates in Chemistry

Panel Topic: Student Retention and Success in Science: The Perspective of Chemists and Biochemists
Moderator: *George Negrete*, University of Texas at San Antonio
Panel: *Michael Johnson*, Department of Chemistry and Biochemistry, New Mexico State University
Scott Donnelly, Department of Chemistry, Arizona Western College
Richard Weiss, Department of Chemistry and Biochemistry, University of California, Los Angeles

Participants identified specific strategies for increasing Hispanic student retention and success in chemistry.

Session 3: Strategies for Increasing Participation of Hispanic Undergraduates in Chemistry

Panel Topic: The Role of Mentoring
Moderator: *Jeanne Pemberton*, University of Arizona
Panel: *Zaida Morales-Martinez*, Professor Emerita, Department of Chemistry and Biochemistry, Florida International University, ACS Scholars Mentoring Consultant
Jose Núñez, Department of Chemistry, Texas A&M University and University of Texas at El Paso
David Brown, Department of Chemistry, Southwestern College

Participants considered specific strategies for use by ACS to increase Hispanic undergraduate student participation in chemistry.

The Rationale for Concern

The lack of diversity in our nation's science, technology, engineering, and mathematics (STEM) workforce has been the focus of considerable attention in recent years.²⁻⁶ Such attention stems from the realization that the scientific and technical problems facing this nation require diverse solutions that can only come from an equally diverse scientific and technical workforce. The nation's population is becoming proportionately less white Caucasian and more African American, Asian American, Native American, and Hispanic.¹ Despite these population changes, minorities remain significantly underrepresented in the nation's STEM workforce with potentially negative, long-term consequences for the country's economic health, standard of living, homeland security, and national defense.

One critical juncture in the pathways of potential participants from these underrepresented groups to the STEM workforce occurs at the undergraduate level. In 2001, the percentage of baccalaureate degrees in STEM awarded to each minority group was significantly lower than their occurrence in the general population.⁹

Minority Group	Percentage of Population (2000)	Percentage of STEM Baccalaureate Degrees Awarded (2001)
African American	12.9	8.1
Native American	0.9	0.7
Hispanic	12.5	7.0

Although these statistics have many complex underlying causes, unequal access to and unsuccessful navigation of postsecondary pathways to baccalaureate degrees in STEM are significant contributors to the underrepresentation of these groups. As these minority groups grow within the general population, their members will wield increasing socioeconomic and political power. Educational institutions best able to adapt to the needs of these growing minority populations will play a greater role in the intellectual development of tomorrow's workforce.

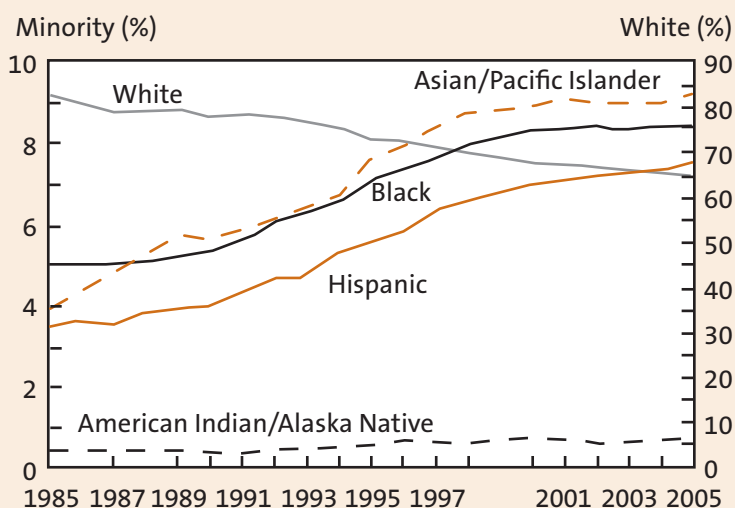
This workshop focused on identifying issues among heterogeneous Hispanic populations and developing successful strategies for the ACS to implement. It brought together a diverse range of chemists involved in the education of Hispanic undergraduate students from institutions across the United States and Puerto Rico.

Posing the Challenge

Overview of Keynote Presentation

Dr. Luis Echegoyen, Director of the Chemistry Division of the National Science Foundation, began his address by focusing on diversity at the faculty level. The overwhelming majority of the chemistry faculty in the top 50 universities is composed of white males. They have yet to be convinced that racial diversity is not only about social justice but is also a matter that affects our social and economic survival as a nation. He shared a question raised by Paul Walter, a past President of ACS and of the American Association of University Professors: if the proportion of Blacks and Hispanics among chemists does not keep up with the proportion of these groups in the general population, then who will do chemistry in the future? Educating the emerging minority is the challenge of our time with college enrollments projected to be one-third Hispanic by the year 2050. The graph below shows a shift in ethnic composition of those earning science and engineering bachelor's degrees over the past two decades, reflecting population changes and increasing college attendance by members of minority groups.¹⁰

Minority share of science and engineering bachelor's degrees, by race/ethnicity: 1985-2005



NOTE: Data not available for 1986, 1988, and 1999.

SOURCES: National Center for Education Statistics, Integrated Postsecondary Education Data Systems, Completions Survey; and National Science Foundation, Division of Science Resources Statistics, WebCASPAR database, <http://webscpar.nsp.gov>. See appendix table 2-28.

Science and Engineering Indicators 2008

Between 1985 and 2005, the proportion of science and engineering degrees awarded to white students declined from 82% to 65%. The proportion awarded to Hispanic students increased from 4% to 8%. By 2015, college enrollments are expected to increase by only 5 percent for whites, 23 percent for African Americans, and 73 percent for Hispanics. Dr. Echegoyen concluded his remarks by urging participants to be alert to the impact of implicit bias when hiring faculty and emphasized that the majority population must be convinced that it is important for them and their institutions to increase diversity.

Overview of Keynote Presentation

Dr. John Alderete, Associate Vice Provost for Research at Washington State University, conveyed “the fierce urgency of now”¹¹ in the fight against racial prejudice. He called on participants to forgo partisanship and forge ahead to solve our educational challenges. He described Hispanic education as a massive problem that everyone must work hard to solve.

Today’s students expect to learn the relevance of chemistry and the impact that it will have on their own lives. Yet educators are discouraging introductory and general chemistry students. Of the first-generation Hispanic students who express aspirations to STEM careers, half change their majors in the first semester because of poor performance in math or chemistry, often a consequence of poor high school preparation. In the country’s 50 largest cities, only one half of Hispanic students will graduate from high school. He observed that Hispanic students typically enter college underprepared to succeed in math and science, but they are often urged to participate in outreach activities rather than concentrate on their studies. Colleges and universities need to encourage students to focus on academics and develop solid foundations in science and mathematics so they can participate in American science at the highest levels. The United States also needs a science-educated citizenry capable of making informed choices. He concluded by outlining the many ways that educators at every level can provide solutions to these challenges.

Accepting the Challenge

Session 1: Challenges and Strategies in Retention of Hispanic Undergraduate Students in Chemistry

Brief Overview of Presentation

Araceli Espinoza, a graduate student from the Rossier School of Education at the University of Southern California, described the factors affecting academic performance of Latino undergraduate students in STEM. Students often decide in the first 3-6 weeks of their studies whether they are going to stay in their major or in college. Among STEM students, student leadership activities were negatively correlated with student GPAs, although the students themselves reported great enjoyment from their activities. She postulated that this might well be a time management issue for them and that the solution might lie in moderation (e.g. one student organization instead of five) and suggested that this correlation might be reversed if the leadership activities occurred within the STEM context. “Cultural capital,” familiarity with the dominant cultural activities on campus, is an important factor in students adapting to college life. It is very difficult, especially for students who are the first members of their families to attend college, to modify family expectations and adapt to a completely new way of life. She discussed the concept of “cultural incongruity,” which is the influence of different socioeconomic backgrounds on student values. The wider the mismatch between a particular student’s values and the dominant culture’s values, the greater the student’s adjustment must be to campus life. Latino culture also tends to value cooperation versus competition that often conflicts with the “do or die” ethos among students in many STEM programs.

Breakout Group Discussions

Breakout group discussions in this session were guided by the following questions:

- What are the barriers and challenges to recruiting Hispanic undergraduate students to chemistry?
- What are successful strategies for recruiting Hispanic undergraduate students to chemistry?
- Can introductory chemistry courses be more engaging and relevant to Hispanic undergraduate students?

Participants identified the following ideas for improving recruitment of Hispanic undergraduate students to chemistry. The comments captured here represent the collective input from all participants and should not be interpreted as the consensus of the group.

Knowledge of chemistry career pathways. Students are unfamiliar with educational opportunities beyond the baccalaureate degree. Clinical professionals are the only people with advanced degrees commonly found in many communities, and many students are unaware of the career paths open to Ph.D. chemists. Participants recommended that ACS enhance their career materials and programs by identifying the beneficial effects of chemistry on people's lives, as well as developing resources specifically targeted toward the Hispanic community. Materials should broadly target all segments of the community associated with the K-12 system (students, parents, teachers, administrators, guidance counselors) and community leaders (priests, ministers, politicians, business owners).

Role models. Participants also requested that ACS heighten the visibility of Hispanic chemists as role models within these communities by increasing their outreach activities and partnering with government agencies and the chemical industry to promote positive career images.

Math readiness. Inadequate or highly variable high school preparation, especially in mathematics, makes it very difficult for Hispanic students to complete the rigorous undergraduate core within a four-year chemistry curriculum. Counselors, who are generally not chemistry faculty members, tend to recommend that students take biology rather than chemistry in order to avoid math or at least have time to develop their math skills before plunging ahead with general chemistry. Most chemistry programs require algebra as a necessary prerequisite to chemistry. Institutions should offer curricula suitable to their students' needs. If the majority of students entering an institution are not calculus-ready, then algebra and trigonometry should be offered. One participant from a two-year college described his institution's solution to the algebra prerequisite: the first year of chemistry is separated into a qualitative first semester and a quantitative second semester. This allows students to enroll in chemistry while still giving them time to sharpen their math skills. Faculty in two-year colleges and four-year degree programs must communicate with teachers at their feeder high schools to make expectations clear regarding mathematics and science achievement levels that are prerequisite to college-level work.

Chemistry preparation. Students' high school preparation in chemistry was also considered highly variable. Participants emphasized the need for increased training opportunities for high school teachers. In 2003, only 47.9% of high school chemistry teachers held a chemistry degree and teaching certification in chemistry.¹² In addition, there is no uniformity in the qualifications necessary to teach chemistry between states. Teaching chemistry should require a special credential, and school districts should not allow the course to be taught by unqualified personnel even in an "emergency" situation.

High school chemistry teachers are expected to include laboratory work in their courses, but there is often not an adequate infrastructure or fiscal support in place to conduct a pedagogically sound and safe laboratory program. Federal safety requirements are poorly enforced, and minimal professional teacher training on safety issues is provided. Applied, hands-on training for all students should be required and supported at all levels as necessary pedagogy for learning science. This training is not possible if school facilities are inadequate or unsafe. Hands-on learning increases retention for all students and is absolutely critical for students simultaneously struggling to acquire English language skills as well as scientific concepts. The relative lack of safe facilities and a more

general lack of funding for teacher preparation and ongoing professional development are serious issues in all schools, but are generally aggravated in those that serve Hispanic populations. Participants recommended more communication between institutions of higher education and their feeder high schools as a way to both articulate curricula and promote discussion on safety issues. Participants also advocated summer workshops and industrial summer employment for high school teachers as part of corporate partnerships. ACS could provide and publicize awards for teachers who develop and implement innovative strategies for teaching chemistry in schools that serve large number of Hispanic students.

Recruitment. Recruitment with follow-up by faculty members was also recommended as a way to increase the number of Hispanic undergraduates majoring in chemistry. Early connections with students would provide an opportunity for faculty to make contact with students' parents to monitor any potential roadblocks (such as the need for financial assistance or academic advice) so that timely intervention can be provided.

Advising and mentoring. At each stage of their education, students require clear, structured pathways toward a career in chemistry. Students need appropriate guidance to navigate successfully through critical academic transitions such as the move from high school to college or from a two-year to a four-year degree program. When attrition among students with an interest in science is very high, skilled mentors can facilitate student success at these transitions by helping them to identify roadblocks and overcome obstacles. Undergraduate students in general often lack an understanding of chemistry either as a discipline or as a profession. Participants recommended training specific to chemistry majors be provided for counseling professionals, who often advise students from many non-science as well as science majors.

Quality of introductory and general chemistry courses. Undergraduate courses, especially introductory courses, are often uninspiring. Course content needs to be current and, if possible, readily applicable to real life. Students expect to understand the connection of a discipline to the reality of their lives. The hierarchical nature of science, in which a broader understanding is often not experienced until the advanced level of study, causes students to lose interest in core disciplines. Participants also debated the virtues of a traditional versus a non-traditional approach in introductory courses. They recommended that ACS collect statistics on successful introductory chemistry courses and the content and pedagogy used.

Faculty are often unaware of advances in cognitive science and learning theory that would allow them to teach chemistry more effectively to a diverse cohort of students. This problem is exacerbated by the fact that a significant fraction of faculty at many institutions of higher education are not native-born U.S. citizens and may not appreciate the nuances of American culture and its influence on the current generation of students. Part-time faculty hired to teach introductory courses can also contribute to this problem, since they are generally not as connected with their students. Colleges and universities should hire and professionally develop full-time complements of chemistry faculty who are sufficient to teach most of the undergraduate chemistry curriculum. Part-time faculty members might be hired to teach specialty courses where that expertise is not available among the full time faculty, but they should not be given responsibility for teaching foundation chemistry courses.

Financial and academic support. Students need protected time to devote to their studies. Hispanic students are often from families of modest means. Sufficient financial support must be available so they are not unduly burdened with extensive work responsibilities to support themselves. Adequate financial assistance must be provided including tuition, room and board, books, and supplies. Furthermore, institutions must provide sound academic and career advice, mentoring through meaningful interaction with faculty members, and training in study skills and time management for their students to be successful in a demanding undergraduate chemistry curriculum.

Immigration. One participant noted that some of his students are having a difficult time obtaining financial aid since their births were never registered in Mexico or in the United States. Since they cannot claim citizenship anywhere, these students struggle to get a social security number and a legal job in either country regardless of their academic talent or their work ethic. Many workshop members encouraged support of legislation that provides a pathway to citizenship for students who are not citizens by birth but are Americans by experience and culture.

Professional opportunities for students. Workshop participants noted the necessity of providing students with professional experiences, such as undergraduate research and industrial internships, early in their undergraduate careers. These opportunities allow students to engage in the discipline and experience the excitement and relevance of chemistry by applying recently acquired skills and knowledge from the classroom. ACS student chapters are a valuable support structure for undergraduate chemistry majors. They can also lend a more professional perspective to the undergraduate experience by encouraging students to present their research findings at their meetings.

Faculty development. Increased opportunities and funding for faculty professional development, such as sabbaticals, workshops, summer research, and funded travel, are essential for faculty to be able to maintain and convey the excitement of modern chemistry to students in their classrooms. Expanding these opportunities may require partnering with corporations, government laboratories, research universities, and government funding agencies.

Overview of Keynote Presentation

Dr. Eloy Rodriguez, Perkins Professor of Environmental Studies at Cornell University, is from southern Texas, where his family has made their home for over three hundred years. He noted that despite years of effort, the numbers of Hispanic students and faculty members at the nation's elite research universities remains very low. He shared his frustration at the apparent intractability of this problem. Whether a consequence of neglect, indifference, or implicit bias, this is a situation that must be remedied. It is poor social and economic policy to exclude large numbers of any minority group from the nation's flagship institutions. He urged funding agencies to consider ethnic and racial diversity among graduate students and faculty when awarding grant money. He also made the following recommendations on how to prepare for postdoctoral positions or assistant professorships at research institutions:

- Research the top institutions.
- Become acquainted with top research scholars in your field.
- Spend a summer learning a new technique.
- Become acquainted with the program managers at federal agencies.
- Develop strong international ties with colleagues.
- Develop your own unique education program targeting a specific minority group.

By implementing these recommendations, chemical educators can counter the effects of ethnic and cultural bias and expand their own career horizons.

Session 2: Models that Work: Effective Strategies for Retention of and Excellence by Hispanic Undergraduate Students in Chemistry

Brief Overview of Presentations

Dr. Michael Johnson, professor of biochemistry and chemistry at New Mexico State University (NMSU), began his remarks by noting that whites are in the minority in New Mexico. This state has already encountered the demographic changes sweeping across the United States. Enrollment statistics are reflective of the overall population.

NMSU has a long tradition of supporting minority student success in the sciences through involvement in undergraduate research. Furthermore, the university has instituted a teaching strategy that is yielding good results with all students but especially with minority students. With each major science or mathematics course, the university has a parallel, one-unit supplementary instruction section that provides students the opportunity to gain mastery of the subject through group work and additional time on task. Notably, this approach targets all students in high-risk courses rather than focusing exclusively on at-risk students. Supplementary instruction sections are

proactive rather than remedial, and they are voluntary courses conducted by former successful students who earn a stipend for their time. This supplementary instruction program has had a demonstrated benefit: failure rates have decreased by 40% in important gatekeeper courses that must be taken by chemistry majors.

The university also offers a course focused on preparing students for careers in biomedical research. Students learn and practice public speaking by serving in an outreach program to local high schools. The course also advertises summer internship opportunities and provides advice to students filling out graduate school applications. Other activities that support minority student success at NMSU include question-and-answer programs where students can meet with their deans and other university officials. Departmental activities include individualized faculty academic advising, administrator-student socials, and Chemical Olympics. NMSU also has a minority program office for help with financial and immigration issues. He concluded by saying that they simply try to interact with their students by closely mentoring and advising them so they can best meet their needs.

Dr. Scott Donnelly, professor of chemistry at Arizona Western College, gave a presentation on the chemistry program at this two-year college. The college is located in a remote corner of the southwestern Arizona desert adjacent to California and the border with Mexico. Approximately 52% of the students are Hispanic. Instruction in one year of general and one year of organic chemistry is offered. Having a budget for the 2008-09 school year of approximately \$24 per student, he expressed gratitude for NSF funding that allows his students access to over \$420,000 in modern scientific instrumentation. He has used field work to great advantage and incorporates a hands-on approach into his laboratory courses that allows students to explore and analyze their natural desert environment. This gives his courses a sense of excitement and reinforces the idea that chemistry is literally all around us. In the classroom, he relies on Internet sites and Web searches to access the latest news in chemistry (e.g., pubs.acs.org/cen/critter/critterchemistry.html). He considers virtual chemistry courses and laboratories to be less effective at recruiting students to the discipline and emphasized the importance of hands-on approaches. He urged ACS to establish a competitive, juried fund for community colleges to build up their laboratory instrument inventory.

Dr. Richard Weiss, professor of biochemistry from UCLA, shared his experiences teaching in an institution where the majority population is Asian, constituting approximately 40% of the student body. The Hispanic population comprises approximately 16% of the student body.

He described the Program for Excellence in Education and Research in the Sciences (PEERS) as an intensive program committed to promoting academic excellence and professional development for students dedicated to careers in the life or physical sciences or mathematics. One objective of the program is to increase the number of students who acquire a strong foundation in the sciences and make teaching and/or research a part of their life's work. PEERS offers:

- Personal academic advising
- Collaborative learning workshops for science and math classes
- Career planning and awareness workshops
- Preferential enrollment in science classes
- Seminars with UCLA faculty experts regarding the latest “hot” research topics
- Social events with other science students
- Preparation and support for undergraduate research
- Research scholarships, employment, and traineeship

He and his faculty colleagues have established an extensive undergraduate research program available to all undergraduates but heavily used by minority students. This program offers motivated students the opportunity to train under the mentorship of world-class scientists.

Breakout Group Discussions

Breakout group discussions in this session were guided by the following questions:

- What are the barriers and challenges to retaining Hispanic undergraduate students in chemistry?
- What are successful strategies for retaining Hispanic undergraduate students in chemistry?
- Are strategies for developing talent in Hispanic undergraduate students similar or different than for other students?
- How could the preparation of the Hispanic undergraduate students at your institution be improved to increase success in introductory chemistry?
- How can communication and transfer between two-year and four-year programs be improved?

Participants identified the following strategies for retention of Hispanic undergraduate students in chemistry. The comments captured here represent the collective input from all participants and should not be interpreted as the consensus of the group.

Mentoring programs. The workshop participants agreed that mentoring of students increases student retention. A three-tiered approach involving senior undergraduate students, graduate students, and faculty is an effective model. Student chemistry clubs and science cafés, where presentations open to the public are held at local venues such as coffee houses, were recommended to increase mentoring opportunities.

Undergraduate research. Student participation in undergraduate research is generally viewed as having an enormous impact on Hispanic student retention. Not only does it allow for close mentoring relationships to develop within a scientific environment, but it also promotes the creation of new scientific knowledge. In addition to traditional undergraduate student research projects, other collaborative models of student research were discussed. One participant described a collaborative undergraduate research center,¹³ developed with NSF support to engage first- and second-year undergraduates in research. Research projects are conducted within traditional laboratory courses as part of the mainstream curriculum. The approach uses “modules”, developed by university research faculty, which contribute to their own research. The center provides students with Internet access to advanced instrumentation from remote locations. Undergraduate peer leaders provide workshops on research skills as students develop the laboratory techniques necessary to proceed with their own projects.

Parental outreach. Participants discussed the financial difficulties faced by many families when their children move away to attend college. They noted that many students are expected to contribute to the financial support of their families. Family counseling and college visitation seminars were identified as mechanisms to educate parents that higher education is a better long-term choice for their children than immediate entry into the work place after high school. There was a discussion on ways to distribute information on career options to Hispanic families (churches, high school and college counselors, an “ambassadors program” where undergraduate Hispanic students return to their communities as role models). Participants agreed that better promotion of career options in chemistry and the benefits of a college degree on quality of life and earning potential could substantially increase Hispanic enrollment in undergraduate STEM majors.

Early support and guidance. Participants noted that inappropriate advice from well meaning, but generally uninformed, counseling staff often has a negative impact on retention of Hispanic undergraduate students in STEM majors. Some participants felt that counselors may discourage students from taking “hard” chemistry courses or encourage them to delay the start of math courses until it is too late in a student’s academic career to complete a major within a reasonable time. Chemistry departments should maintain good communication with counselors and other advisors so that these individuals can foster student success by understanding departmental expectations with respect to the role of prerequisite courses and the curriculum structure.

Careful selection of faculty to teach introductory and general chemistry. Some participants were astonished by the research data showing that most undergraduate students make their decisions to stay in a STEM major or in a particular institution within 3-6 weeks of their entry into the program. This heightens the importance of assigning the most engaging and stimulating faculty members to teach the chemistry courses that are the gateway to the major. Many participants observed that general chemistry courses are the most likely to be taught by part-time or temporary faculty who do not have strong connections to the department and are not readily available to mentor students outside of the classroom or laboratory. Institutions should be encouraged to hire dedicated full-time faculty in sufficient numbers to teach the chemistry curriculum. A primary expectation for an effective educator should be solid communications skills, both linguistically and culturally.

Better promotion of careers in chemistry using Hispanic role models. Participants suggested that ACS provide career materials in podcast or video formats that can inform students and educate counseling staff about career paths in chemistry. Hispanic role models should be highlighted throughout these materials.

Overview of Keynote Presentation

Dr. Carlos Gutiérrez, University President's Distinguished Professor of Chemistry at California State University, Los Angeles, believes minority groups, whose participation in leadership positions in science is disproportionately low, represent a largely untapped source of intellectual talent to the profession. He described an intensive student development program, funded through grants from the National Institutes of Health and the National Science Foundation, that offers research participation to undergraduate students. The goal of the program is the preparation of motivated minority students for success in top graduate programs across the United States. The key is to identify students who want to do science and have high expectations of academic and research lab achievements, while simultaneously providing sufficient support so that students can meet their career expectations. An underlying assumption, shared explicitly with students in the program, is that science is enriched by differences in gender, race, ethnicity, and culture among practitioners. He urged workshop participants to allow their students to develop their own understanding of objective reality based on knowledge and experimentation. It is necessary to collect creative efforts from a variety of perspectives to develop a better understanding of molecular, cellular, and behavioral phenomena and to foster scientific progress.

Session 3: Strategies for Increasing Participation of Hispanic Undergraduate Students in Chemistry

Brief Overview of Presentations

Dr. Zaida Morales-Martinez, Professor Emerita at Florida International University, is a native of Puerto Rico. As a mentoring consultant for the ACS Scholars Program, she focused participants' attention on the importance of developing mentoring relationships with students. She explained that in order for the relationship to exist, the mentor must possess the three c's: caring, concern, and commitment. She went on to explain the five stages of a relationship:

- Apprehension—this occurs on the part of both participants in the relationship.
- Testing—a phase in which the protégé tests the relationship to learn where the boundaries are and feel secure in the mentor's commitment to that relationship.
- Developing trust in the relationship—The key for the mentor is to let the protégés know that their goals and dreams are important and valuable. This is a holistic approach that signals you find value in them as a person.
- Setting goals for the relationship—These goals must be realistic and concrete. Be specific in what you think each student can achieve.
- Predictability in the relationship—This is a time when the mentor can give constructive criticism and the protégé's feelings are more accessible.

She also noted that sometimes relationships must end. When this is necessary, it is important to be honest with the protégé about why the relationship must end (e.g., not enough time, a change in interests, or even the protégé surpassing the mentor's accomplishments). She advised participants to review what was accomplished and say "good-bye."

Dr. David Brown, professor of chemistry at Southwestern College, described approaches he has taken to build a community of chemistry scholars at this community college in Chula Vista, California. Just eight miles from the border with Mexico, the college has a student body that is 60% Hispanic. The chemistry department serves about 1000 students annually. Grants for instrumentation and research, as well as partnerships with those in industry and other academic institutions, have allowed him to direct approximately two dozen undergraduate researchers over the past ten years. His students have published in peer-reviewed journals and presented at national, regional, and local meetings. He overcame the challenges of heavy teaching responsibilities and limited resources to develop novel approaches to engage students in the study of chemistry. Time, funds, and facilities are challenges that many faculty at community colleges face. He noted the importance of a campus culture that embraces originality; flexibility is the key to success. Many of his students have family and military service obligations, and they must earn money to pay for their education. His students also encounter language and immigration issues. It is important to be flexible and supportive as students deal with difficult issues. He suggested that ACS consider inclusion of Filipino students in the ACS Scholars Program. Role models and professional opportunities that are appealing to students are needed to recruit and retain students. It is important to instill a sense of service, confidence, and pride in students.

Dr. Jose Núñez, currently a postdoctoral fellow at Texas A&M University, talked about academic life from an immigrant student's perspective. He emigrated with his family from rural El Salvador to Los Angeles. After attending a community college and considering a law career, a lecture by a Hispanic chemist stimulated his interest in chemistry. Mentoring relationships were extremely important during his academic preparation and greatly influenced his ultimate career choice. He offered participants the following advice:

- Make information about programs and careers in chemistry readily available to students and their parents.
- Target capable students and recruit them early.
- Involve students in undergraduate research projects so they see that they are a significant part of the research community.
- Identify and develop culturally experienced academic mentors who can help students bridge the cultural gap that exists between their parents and the American system of higher education.
- Develop images of chemists that better reflect the reality of the profession to use as a recruitment tool.

Breakout Group Discussions

Breakout group discussions in this session were guided by the following questions:

- What specific actions might ACS undertake in the short term to increase the participation of Hispanic undergraduate students in chemistry?
- What specific actions might ACS undertake in the longer term to increase the participation of Hispanic undergraduate students in chemistry?
- What other groups or organizations should ACS partner with to develop resources, activities, and policies to increase the participation of Hispanic undergraduate students in chemistry?

Participants discussed the following ideas for ACS involvement. The comments captured here represent the collective input from all participants and should not be interpreted as the consensus of the group.

Establish partnerships with other scientific organizations and corporate sponsors. Participants strongly recommended that ACS partner with corporations and other organizations to promote Hispanic role models and career pathways available to chemists through the use of commercials and podcasts.

Expand the ACS Scholars Program. Participants felt that this program needed to be expanded and promoted more effectively. They suggested that ACS local sections become more involved in raising awareness of the program. The students who receive scholarships are a natural source of role models who should be encouraged to visit local high schools to stimulate interest in chemistry and science.

Establish an ACS Undergraduate Research Awards Program. Participants recommended that a three-tiered (local, regional, and national) ACS Research Awards Program for undergraduate students be established. This program could address several different needs: public recognition and financial rewards for motivated students, role models of underrepresented minorities, and visibility for ACS resources and services.

Provide an outreach toolkit for ACS student chapters. Participants noted that members of many ACS student chapters perform community outreach activities, serve as role models, and gain leadership experience while promoting a positive image of chemists. Development of a toolkit targeted to the Hispanic community would facilitate the effectiveness of these outreach activities.

Provide workshops for educators. Participants recommended that ACS organize professional development workshops for educators at all levels to raise awareness of successful strategies for recruitment and retention of Hispanic students in science and chemistry.

Provide stipends to qualified high school chemistry teachers. Participants suggested that additional stipends be made available as incentives for chemistry teachers willing to teach in designated, low-income areas. These incentives could be provided through partnerships with agencies of the federal government.

Form partnerships with other science and science advocacy organizations. Participants recommended that ACS form partnerships with other math and science organizations to advocate for stronger math and science education at the K-12 level. Collaboration with other organizations, such as Teach for America, was suggested as a mechanism for training of greater numbers of qualified high school chemistry teachers.

Promote and support the ACS Diversity Partners Program. Currently under development, this program provides a mechanism to increase participation of Hispanic undergraduate students in chemistry.

Promote communication between faculty. Participants recommended that ACS study the transitions of students from two-year colleges to four-year degree programs to identify and promote successful strategies. Regular meetings between the chemistry faculty at two-year and four-year programs are needed to facilitate student transfer, assess course content and rigor, and establish standards for successful transitions. The CPT Newsletter can be used to highlight the need for communication and promote mechanisms for calibrating student performance (e.g., ACS Exams). The ACS guidelines for two-year colleges need to be shared with faculty and administrators at all levels at both two-year and four-year institutions. Since these guidelines are voluntary, a recognition program could foster their use.

Establish an ACS communications center for Hispanic chemistry students. A virtual space can serve as a network and a clearinghouse for scholarships and other useful information. The center should include:

- Information on career pathways in chemistry
- Scholarship and employment opportunities for undergraduate through postdoctoral levels
- Access to information on job fairs in chemistry
- Summer internship opportunities
- Access to chemical databases and information
- Chat room for students to exchange ideas
- Social networking
- Online mentoring with role models currently working in the field.

Such a community center has the potential to:

- Provide a new and effective way to market the ACS Scholars Program to students.
- Generate revenues from advertising space.
- Verify that the quality of information distributed to students is unaffected by geographical, racial, or gender bias.
- Raise visibility of ACS resources with emerging professionals.
- Increase ACS membership.

The impact of an online community and other activities could be enhanced and demonstrated by:

- Establishing a central database of students (undergraduate students through postdoctoral fellows) that can provide current and continuous insight into trends in undergraduate education and be used to develop new outreach programs at the regional or national levels.
- Tracking students to provide student contact data and strategies for dealing with emerging trends.

Develop an ACS certification program for high school chemistry teachers. This could take many forms, including an online program established through partnerships with organizations such as the American Board for Certification of Teacher Excellence (ABCTE) or the National Council for Accreditation of Teacher Education (NCATE).

Develop ancillary materials for Chemistry in the Community in Spanish. The ACS textbook for high school students, *Chemistry in the Community* (now in its 5th edition), is used across the country. In areas where English is the second language of many students (e.g., Texas, California, Puerto Rico) it is important to have these materials available in English and Spanish to facilitate English language acquisition while learning chemistry.

Pilot a “Science Culture” program. By working with a school district, the benefits of science education can be conveyed to administrators, teachers, and parents. This program could be developed as a joint project for the Committee on Minority Affairs and a selected ACS local section.

Many organizations and agencies were identified as possible partners to implement the recommendations developed at this workshop.

- American Association for Community Colleges (AACC)
- American Board for Certification of Teacher Excellence (ABCTE)
- American Mathematical Association of Two-Year Colleges (AMATYC)
- American Mathematical Society (AMS)
- Department of Energy (DOE)
- Federation of American Societies for Experimental Biology (FASEB)
- Food and Drug Administration (FDA)
- League for Innovation in the Community College
- National Association of Multicultural Engineering Program Advocates (NAMEPA)
- National Council for Accreditation of Teacher Education (NCATE)
- National Institutes of Health (NIH)
- National Institute of Standards and Technology (NIST)
- National Science Foundation (NSF)
- National Science Teachers Association (NSTA)
- Project Kaleidoscope (PKAL)
- Science, Technology, Engineering, and Mathematics Education Coalition (STEM-Ed)
- Society for Advancement of Chicanos and Native Americans (SACNAS)
- Teach for America
- U.S. Department of Education

Participants considered the workshop to be a significant step towards the long-term goal of developing the academic potential of all the nation's citizens. The workshop presentations, discussions, and recommendations highlighted that increasing academic participation and success among Hispanic undergraduate students is a multifaceted challenge. Given the importance of the goal and the nature of the needs to be addressed, ACS should play a key role in providing resources and engaging the chemistry community.

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APPENDIX A

Workshop Participants	Affiliation
John Alderete	Washington State University
Dolores Aquino	San Jacinto College Central
Renee Beeton	Adams State College
David Brown	Southwestern College
Carlos Cabrera	University of Puerto Rico-Rio Piedras
Alan Champion	University of Texas at Austin
Brandon Cruickshank	Northern Arizona University
Scott Donnelly	Arizona Western College
Ronald Drucker	City College of San Francisco
Melvin Druelinger	Colorado State University-Pueblo
Luis Echegoyen	National Science Foundation
Araceli Espinoza	University of Southern California
Raymond Esquerra	San Francisco State University
Raegen Flinkingshelt	American Chemical Society
Wilson Francisco	National Science Foundation
John Freitas	Los Angeles City College
Michael Giordano	Columbia University
Carlos Gutiérrez (CPT)	California State University, Los Angeles
Christopher Hadsall	Stevens Institute of Technology
Gerald Hammond	National Science Foundation
Cecilia Hernandez	American Chemical Society
Chris Hollinsed	American Chemical Society
Robert Hughes	American Chemical Society
Michael Johnson	New Mexico State University
Mary Kirchhoff	American Chemical Society
Ram Lamba	University of Puerto Rico at Cayey
Tom Lane (ACS President-Elect)	Dow Corning Corporation
Cindy Larive (Vice Chair, CPT)	University of California, Riverside
Javier Macossay-Torres (CMA)	University of Texas-Pan American
Eric Marinez	California State University, Long Beach
Zaida Morales-Martinez	Florida International University
Carlos Murillo	National Science Foundation
George Negrete (CPT)	University of Texas at San Antonio
Cathy Nelson	American Chemical Society
José Núñez	Texas A&M University
Enrique Peacock-López	Williams College
Jeanne Pemberton (CPT)	University of Arizona
Eloy Rodriguez	Cornell University
Daniel Romo	Texas A&M University
Maria Rosenthal (Acting Chair, CMA)	Chemical Abstracts Service
Jorge Salinas	Miami Dade College-Kendall Campus
Paul Shin	California State University, Northridge
Herb Silber	San Jose State University
T. Daniel Stack	Stanford University
Paris Svoronos	Queensborough Community College
Richard Weiss	University of California, Los Angeles
Jodi Wesemann	American Chemical Society
Donald Wink	University of Illinois at Chicago

APPENDIX B

AGENDA

Friday, Nov 14

6:00 – 7:00 PM	Social Hour
7:00 – 7:10 PM	Welcoming Remarks, <i>Cindy Larive</i> , Vice-Chair, CPT and <i>Maria Rosenthal</i> , Acting Chair, CMA
7:10 – 7:30 PM	Welcoming Remarks, <i>Mary Kirchhoff</i> , Director, ACS Education Division Workshop Goals, <i>Carlos G. Gutiérrez</i> , Consultant to CPT
7:30 – 8:15 PM	KEYNOTE SPEAKER: <i>Luis Echegoyen</i> , Director, Chemistry Division, National Science Foundation
8:15 – 9:00PM	Dessert and Coffee

Saturday, Nov 15

7:30 – 8:00 AM	Continental Breakfast
8:00 - 8:10 AM	<i>Tom Lane</i> , ACS President Elect
8:10 – 8:40 AM	KEYNOTE SPEAKER: <i>John Alderete</i> , Associate Vice Provost for Research, Washington State University
8:40 – 8:55 AM	Looking Ahead: Small Group Discussion on Important Issues Identified from Presentations or Other Areas Not Represented on Agenda
8:55 – 9:10 AM	Reports on New Issues from Pre-Workshop Questionnaire or Small Group Discussion

Session 1:

Challenges and Strategies in Retention of Hispanic Undergraduates in Chemistry

9:10 – 10:00 AM	Panel-Student Retention and Success in Science: The Social Science Research Perspective Moderator: Carlos Gutiérrez, California State University, Los Angeles <i>Araceli Espinoza</i> , Rossier School of Education, University of Southern California
10:00 – 10:15 AM	Break
10:15 – 11:00 AM	Breakout Session 1: Challenges and Strategies in Recruitment of Hispanic Undergraduates in Chemistry: Biggest Issues for Chemistry and ACS Role
11:00 – 11:45 AM	Reports from Breakout Groups & Full Group Discussion
11:45 – 1:00 PM	Lunch, KEYNOTE SPEAKER: <i>Eloy Rodriguez</i> , James A. Perkins Professor, Cornell University

Session 2:

Models that Work: Effective Strategies for Retention of and Excellence by Hispanic Undergraduates in Chemistry

1:00 – 2:00 PM	Panel-Student Retention and Success in Science: The Perspective of Chemists & Biochemists Moderator: George Negrete, University of Texas at San Antonio <i>Michael Johnson</i> , Department of Chemistry and Biochemistry, New Mexico State University <i>Scott Donnelly</i> , Department of Chemistry, Arizona Western College <i>Richard Weiss</i> , Department of Chemistry and Biochemistry, UCLA
2:00 - 2:45 PM	Breakout Session 2: Challenges and Strategies in Retention of Hispanic Undergraduates in Chemistry: Best Approaches for Chemistry and ACS Role
2:45 – 3:00 PM	Reports from Breakout Groups
3:00 – 3:15 PM	Break

Session 3:

Strategies for Increasing Participation of Hispanic Undergraduates in Chemistry

3:15 – 4:15 PM

Panel-The Role of Mentoring

Moderator: *Jeanne Pemberton*, University of Arizona

José Núñez, Department of Chemistry, Texas A&M University and

University of Texas at El Paso

David Brown, Department of Chemistry, Southwestern College, Chula Vista, CA

Zaida Morales-Martinez, Professor Emerita, Department of Chemistry and Biochemistry,

Florida International University, and mentoring consultant ACS Scholars Program

4:15 – 5:15 PM

Breakout Session 3: Recommendations for Targeted ACS Action

5:15 – 5:30 PM

Wrap-up and Preparation for Second Day

5:30 - 7:00 PM

Break

7:00 PM

Workshop Banquet, KEYNOTE SPEAKER: *Carlos G. Gutiérrez*, University President's

Distinguished Professor of Chemistry, California State University, Los Angeles

Sunday, Nov 16

7:30– 8:30 AM

Breakfast Buffet

8:30 - 8:40 AM

Overview of Strategic Plan Development

8:40 – 9:30 AM

Reports from Breakout Groups

9:30 – 10:15 AM

Development of Proposed Strategic Plan for ACS and Timeline

10:15 – 10:30 AM

Break

10:30 – 11:45 AM

Development of Proposed Strategic Plan for ACS and Timeline (continued)

11:45 – 12:00 Noon

Final Remarks and Adjourn

APPENDIX C

Workshop Breakout Session Groups

November 15, 2008

Breakout Session 1: SATURDAY MORNING

Group 1	Group 2	Group 3	Group 4	Group 5
Larive (F)	Negrete (F)	Gutiérrez (F)	Pemberton (F)	Kirchhoff (F)
Aquino	Beeton	Brown	Cabrera	Cruickshank
Donnelly	Drucker	Druelinger	Campion	Giordano
Francisco	Marinez	Johnson	Esquerra	Lane
Hadsall	Núñez	Lamba	Freitas	Murillo
Macossay-Torres	Rosenthal	Peacock-López	Hammond	Romo
Morales-Martinez	Stack	Silber	Hollinsed	Salinas
Shin	Wesemann (S)	Weiss	Svoronos	Wink
Nelson (S)		Hughes (S)	Flinkingshelt (S)	Hernandez (S)

Breakout Session 2: SATURDAY AFTERNOON

Group 1	Group 2	Group 3	Group 4	Group 5
Larive (F)	Negrete (F)	Gutiérrez (F)	Pemberton (F)	Kirchhoff (F)
Cabrera	Aquino	Beeton	Donnelly	Campion
Freitas	Esquerra	Brown	Druelinger	Cruickshank
Hollinsed	Johnson	Hadsall	Giordano	Drucker
Peacock-López	Lane	Macossay-Torres	Hammond	Francisco
Romo	Morales-Martinez	Murillo	Marinez	Lamba
Weiss	Shin	Núñez	Rosenthal	Silber
Nelson (S)	Svoronos	Hughes (S)	Salinas	Stack
	Wesemann (S)		Wink	Hernandez (S)
			Flinkingshelt (S)	

Breakout Session 3: SATURDAY AFTERNOON

Group 1	Group 2	Group 3	Group 4	Group 5
Larive (F)	Negrete (F)	Gutiérrez (F)	Pemberton (F)	Kirchhoff (F)
Campion	Donnelly	Brown	Beeton	Aquino
	Drucker	Cabrera	Freitas	Esquerra
Giordano	Druelinger	Lane	Johnson	Francisco
Lamba	Hollinsed	Marinez	Macossay-Torres	Hadsall
Stack	Shin	Romo	Peacock-López	Morales-Martinez
Svoronos	Weiss	Salinas	Silber	Núñez
Nelson (S)	Wink	Hughes (S)	Flinkingshelt (S)	Rosenthal
	Wesemann (S)			Hernandez (S)

(F) = Facilitator

(S) = Scribe



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