



Tapping Student Potential

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A rich opportunity exists in the development of science, technology, and engineering professionals: minority populations represent a gold mine of untapped potential for educational institutions. With approximately 47 percent of the U.S. population estimated to be of minority origin by 2050,¹ the involvement of minorities is crucially important to the technological infrastructure of the United States and to our ability to compete on the global scientific stage.

In 2004, the Committee on Professional Training held the first in a series of three workshops focused on identifying issues and developing strategies to increase underrepresented minority participation in chemistry, beginning with African Americans. In 2008, the second and third workshops, on Native American and Hispanic communities respectively, were organized by the Committee on Professional Training and the Committee on Minority Affairs. These workshops brought together diverse groups of participants from institutions across the United States and Puerto Rico for strategic discussions on how to increase minority participation in chemistry and help students attain greater academic success. All three workshop reports are available at the ACS web site: www.acs.org/cpt. This article focuses on the

two workshops held in 2008. Selected strategies and recommendations for change developed by workshop participants are listed below.

Responding to Complex Factors

The percentage of baccalaureate degrees in science, technology, engineering, and mathematics (STEM) awarded to African American, Native American, or Hispanic groups in 2001² was significantly lower than their occurrence in the general population.

Those institutions able to adapt to growing minority populations will have greater economic viability.

Although the statistics below reflect many complex underlying factors, unequal access to and unsuccessful navigation of postsecondary pathways to baccalaureate degrees in STEM, as well as a more general lack of knowledge and interest in chemistry, are significant contributors to the underrepresentation of these groups.

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

As these minority groups grow within the general population, their members will wield increasing socioeconomic power over educational institutions. Those institutions best able to adapt to the needs of these growing minority populations will have a larger customer base and greater economic viability in the educational marketplace.



- Financial difficulties obtaining tuition, textbooks, and other living expenses which sometimes result from a lack of awareness of the total costs associated with higher education
- Negative institutional signals, such as no encouragement from either faculty or mainstream students to join the institutional community as well as a general ignorance of cultural differences

Exploring Diversity within Diversity

The Committee on Professional Training recognized the diverse challenges faced by institutions serving different student populations. At each of the workshops, participants discussed the differences between and within minority cultures. Perspectives reflected a variety of regions and backgrounds. In Native American culture, 562 different tribes are identified by the Bureau of Indian Affairs with an average of fewer than one student per tribe obtaining a bachelor's degree in chemistry during the past ten-year period. The Hispanic workshop also included participants from a wide variety of cultural perspectives; they came from the United States, El Salvador, Puerto Rico, and Mexico. Some of them were recent immigrants to the United States, and some came from families that have lived in Texas for the past 250 years.

Workshop on Increasing Participation of Native Americans in Chemistry

With only 65 Native Americans receiving chemistry baccalaureate degrees in 2005, even small gains in the number of chemistry graduates each year would be proportionally significant. Increasing participation requires that a number of barriers be addressed:

- A lack of role models from the Native American community, either faculty members or other students
- A lack of knowledge regarding the careers available in chemistry, how chemistry is applied, and how it connects with students' lives
- The student perception that chemistry is "difficult" and "too abstract"
- A poor academic preparation or experience in elementary, middle, and high school, especially in math
- Few employment opportunities near their family
- Negative pressures from a student's family and peers when returning home for visits, the challenges of not appearing superior to the tribal elders, and a general lack of encouragement from family and/or community

Simply stated, Native American students do not think they can succeed in chemistry. Participants emphasized that students need to have someone else believe in them until they can believe in themselves. They recommended mentoring as an effective strategy for both recruiting and retaining students. For Native American students, connections to the land and family are culturally important, and they need to be emphasized in the curriculum.

Workshop on Increasing Participation of Hispanics in Chemistry

Workshop participants discussed the barriers to recruitment and retention of Hispanic undergraduate students. Although experienced by other students, these challenges often present more significant barriers to the recruitment and retention of Hispanic students than to the general population since they occur more frequently and with greater severity.

- A general lack of student knowledge regarding careers available in chemistry
- A chemistry curriculum that students have trouble applying to real life
- The perception that chemistry is a difficult subject
- Poor academic preparation in high school
- A cultural reluctance to move away from their family
- Challenging family socioeconomic conditions
- Immigration status

Participants emphasized that many of the obstacles faced by minority students confront all students, and therefore, actions to address these barriers would improve chemistry education overall.

Pursuing a More Diverse Chemical Workforce

These workshops are a significant step toward the long-term goal of developing the potential of all the nation's citizens. The workshop presentations, discussions, and recommendations highlight the necessity of responding to our nation's changing demographics. The entire chemical community – academic institutions, industry, and scientific societies – must work together to increase academic success among minority undergraduate students.

Recommendations from both workshops fell into several categories:

<i>Fostering Interest in Chemistry</i>	<i>Facilitating Transitions</i>	<i>Retaining Students</i>
<ul style="list-style-type: none">• Highlight successful careers of minority chemists.• Share materials that facilitate teaching of introductory chemistry within a culturally appropriate context.• Examine how pedagogy can be adapted to increase minority participation.• Pilot a science culture program in a primarily minority school district that highlights the benefits of science education to parents, teachers, and administrators.• Encourage industry involvement by publicizing the career opportunities available in chemistry and increasing the number of internships available to underrepresented minority students.• Establish peer mentoring programs connecting ACS Scholars and ACS Student Chapters to high school chemistry students in their area.	<ul style="list-style-type: none">• Promote communication between two-year colleges and four-year degree programs to facilitate successful transitions and retention of students in chemistry.• Develop a recognition program for two-year colleges aligned with the <i>ACS Guidelines for Chemistry in Two-Year College Programs</i>.• Develop a supplement to the guidelines for both two-year and four-year chemistry programs that emphasizes appropriate student preparation for general chemistry courses as well as inclusion of engaging and relevant content in general chemistry courses.• Develop and promote mechanisms for calibrating performance of students transferring from two-year to four-year institutions.• Identify and support ACS members willing to assist with grant writing and serve as mentors to minority-serving institutions.• Create a grant program to support student-faculty research projects at minority-serving, two-year institutions.	<ul style="list-style-type: none">• Support focused efforts to create and sustain chemistry clubs in high schools and ACS Student Chapters.• Develop mentoring relationships between students and faculty.• Promote postsecondary social networking through online professional networks.• Expand and promote the ACS Scholars Program.• Seek funding for travel awards for minority educators and minority students to attend professional meetings.• Expand existing international programs to include chemistry and to target minority students.• Organize programming at regional and national meetings to attract and engage minority students.• Engage underrepresented minority students in undergraduate research.

Science is enriched by differences in gender, race, ethnicity, and culture among practitioners. Creative efforts from a variety of perspectives are needed to foster scientific progress. It is the underlying richness of this variety of perspectives that enables the United States to be the scientific leader of today. Tapping into the rich potential of minority students will enable it to maintain its position in the future.

References:

1. U.S. Census Bureau, Census 2000, Table 4. www.census.gov/population/www/projections/files/nation/summary/np2008-t4.xls (accessed 4/23/09).
2. Division of Science Resources Statistics, *Characteristics of Recent Science and Engineering Graduates: 2001*, NSF 04-302, Project Officer, J. Tsapogas, National Science Foundation: Arlington, VA, 2003, Table A-1a. (www.nsf.gov/sbe/srs/nsf04302/start.htm; accessed 12/18/2008.)

Changes in CPT Membership

In 2009, the Committee on Professional Training welcomed three new members: **Dr. Bob A. Howell**, **Dr. Robin L. McCarley**, and **Dr. Barbara Sawrey**. **Dr. Howell** conducts research in the science of polymeric materials and is a faculty member in the Department of Chemistry at Central Michigan University. **Dr. McCarley** is an analytical chemist in the Department of Chemistry at Louisiana State University in Baton Rouge. **Dr. Sawrey** specializes in chemical education and serves as the Associate Vice Chancellor of Undergraduate Education at the University of California, San Diego.

Dr. Cynthia K. Larive assumed leadership responsibilities as chair of CPT in January 2009. Congratulations to **Dr. Suzanne Harris** from the University of Wyoming, who was elected by the Committee to serve as vice chair.

The Committee would like to express its appreciation for the many contributions of two members who concluded their terms of service: **Dr. Ruma Banerjee** and **Dr. Carlos G. Gutierrez**.

A special thank you is also due **Dr. Joseph Francisco** who resigned his position on CPT as he moved to his new role as President Elect of the American Chemical Society.

WASHINGTON, DC

ACS National Meeting

Monday, August 17, 8:00 to 10:00 PM

Sci-Mix

AEI Poster Session

If you are planning to hire new faculty in your department, you are invited to attend the AEI Poster Session at Sci-Mix, where academic recruiters will meet with academic candidates.

At Sci-Mix, the popular interdisciplinary poster session, candidates seeking faculty positions will present posters about their research or expanding on their research interests, teaching philosophy, and experience. Faculty recruiters will have the opportunity to meet as many candidates as reasonably possible.

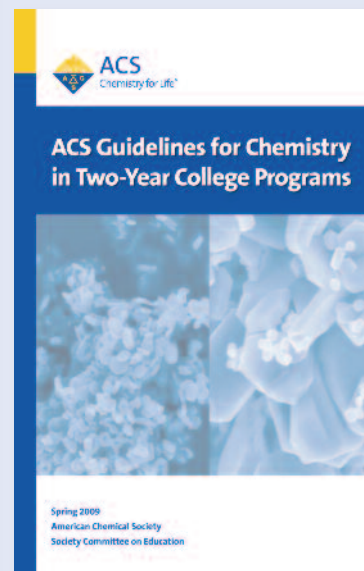
Please write to the ACS Office of Graduate Education at GradEd@acs.org if you have any questions regarding the Academic Employment Initiative, or visit our web site at www.acs.org/AEI. Biographical sketches of the candidates will be available at that web site in July.

Congratulations!

The Committee congratulates the following schools on their newly ACS-approved bachelor's degree programs in chemistry:

- **Claremont McKenna, Pitzer, and Scripps Colleges**
- **University of Mary Washington**
- **University of Minnesota-Morris**
- **Monmouth College (Illinois)**
- **Prairie View A&M University**
- **Utica College**
- **William Paterson University**

The current number of ACS-approved programs is 652.



Introducing the New ACS Guidelines for Chemistry in Two-Year College Programs

Prepared by the Society Committee on Education, the new guidelines for two-year programs complement those for bachelor's degree programs. The guidelines are designed to help strengthen programs by:

- engaging faculty in professional development,
- emphasizing student transfer, and
- encouraging partnerships between two-year and four-year institutions.

An electronic version of the new guidelines and additional information can be obtained at www.acs.org/2Yguidelines. Send your comments or questions to CommCollChem@acs.org.

Preparing for Life After Graduate School (PFLAGS)

How can chemistry graduate students and postdocs prepare for entering the workforce?

PFLAGS is a two-day workshop designed to inform chemistry graduate students and postdocs about their career options after graduate school and how to prepare for them. About two-thirds of the PFLAGS workshop is directed toward nonacademic careers in business and industry. This complements other ACS programs targeted toward graduate students and postdocs seeking academic careers. Broadly defined, the workshop covers three topics: careers for chemists; nontechnical skills and knowledge needed for career success (with an emphasis on industry); and employment opportunities (including postdoctoral positions). A third optional day includes mock interviews and resume reviews.



In its pilot year, the PFLAGS workshop was presented at the University of Wisconsin–Madison, Princeton, Purdue, and Texas A&M. Since then, over a dozen more workshops have been held at various institutions and universities across the nation. These workshops have received outstanding evaluations from the graduate student participants.

The PFLAGS workshop is available to chemistry departments at PhD-granting universities through the ACS Office of Graduate Education. If you would like more information, or if your department is interested in finding out more about hosting a session of PFLAGS, please contact the ACS Office of Graduate Education at GradEd@acs.org or 202-872-4588.

Certificates for ACS Certified Graduates



Chemistry majors who receive a baccalaureate degree from an ACS-approved program and complete the course work described in the ACS Guidelines may be certified to the Society by the head or chair of the approved institution. When requesting certificates for certified graduates, please include the students' current mailing addresses. If you would like to have certificates available for presentation to your certified graduates, please include the number of certificates that you would like and the date that you need them. *Send all requests to the Office of Professional Training, American Chemical Society, 1155 Sixteenth St., NW, Washington, D.C. 20036 or by email to cpt@acs.org*

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