Morning Session

8:50 a.m. Opening Remarks

9:00 a.m. Excellent Chemistry Students Require Excellent Chemistry Programs
Carlos Gutierrez

It takes an excellent chemistry program to develop the career of an excellent chemistry student, or help a motivated student strive for excellence. The attributes of excellent students are largely learned. They are curious, passionate about a molecular understanding of reality; resilient and understand that chemistry requires much dedicated hard work to master. They are creative in learning and doing chemistry, questioning where knowledge comes from. They enjoy doing chemistry, and rate their participation in research among their most positive experiences; but frequently find too great a disparity between how chemistry is taught in the classroom and how it is discovered in the research laboratory. An excellent undergraduate education presents not only the disciplinary content, but perhaps more significantly is a study in epistemology: how do we know what we know? Participation in research then becomes a natural consequence and complement, rather than counterpoise or antidote to course work.

9:30 a.m. Diversity Equity is a Figure of Merit
Rigoberto Hernandez

The United States' undergraduate educational system has been widely lauded for its international excellence. It is often argued that this primacy arises from the reliance on meritocracy in its evaluation system. The underlying measures of academic quality are invariably argued by practitioners as being quantifiable and accurate. The presence of international diversity in the undergraduate population, for example, is widely used as a figure of merit in evaluating the overall health of the American undergraduate pool. It is also used to assess the relative strength of individual universities. In both cases, larger international student pools are presumed to be a marker for merit as they reflect access to larger
populations. Paradoxically, the American academy has historically given access to a smaller population of students by limiting the domestic diversity with respect to gender, race and ethnicity. Moreover, the U.S. competitive position in the international marketplace is strongly undermined by our failure to provide undergraduate training to its entire and diverse domestic talent pool. I will argue that the only way to correct this imbalance is to recognize that diversity equity is a figure of merit that needs to enter all objective functions related to evaluating people in the academic meritocracy.

10:00 a.m.  Using the 2008 ACS Guidelines to Promote Excellence and Improve Rigor in Undergraduate Chemistry Education  
Will Polik

Dramatic changes are occurring in the chemistry profession, in chemistry education, and in chemistry students. Chemistry is more multi-disciplinary and addresses increasingly complex problems. Educators are demonstrating new pedagogical approaches that enhance student learning. Students are more diverse in their ethnic and educational backgrounds, and they are demanding an education that is engaging and pertinent. Surrounded by these changes, many chemistry departments are considering what actions to take in order to remain relevant and serve their students in the best possible way. The 2008 ACS Guidelines for Undergraduate Chemistry Programs promote excellent undergraduate chemistry programs that offer their students modern and rigorous chemistry education. Beyond specifying infrastructure, faculty, and curricular requirements, the guidelines offer increased flexibility to promote innovation, support development of students skills necessary to be successful in professional life, and expect regular departmental self-evaluation for the purpose of continual improvement. Creative and hard working chemistry educators can use these guidelines to improve student learning and enhance the professional success of their graduates.

10:30 a.m.  Post-Bologna Process Undergraduate Chemistry Curricula in Europe  
Anthony Smith

The European Higher Education Area, encompassing 47 European countries, was officially launched in March 2010 after 10 years of development (the Bologna Process).

This presentation will outline the effects of this Process on the structure of Higher Education, in particular undergraduate studies, in Europe and the resulting changes in the chemistry curriculum that have occurred.

The presentation will discuss the following aspects:
The change to curricula based on learning outcomes rather than content; to a system that facilitates recognition within Europe but which still presents some problems with worldwide recognition; to a system that should facilitate the mobility of students and professional chemists; and to a system which promises to increase the employability of our undergraduate chemists.

**11:00 a.m. Atlantis: An International Exchange Program for Undergraduates Majoring in Chemistry from the United States, Ireland, and Germany Susan Lunte**

The University of Kansas (KU) is a partner with Dublin City University and the University of Regensburg in the EU Atlantis Chemistry Program. As part of this program, students from KU spend one semester in Ireland and second semester in Germany. At the same time, students from Regensburg and Dublin spend a year at KU. The program offers training and research opportunities in drug development, environmental chemistry, nanotechnology, and bioanalysis. Students take classes and join a research group in their area of interest. The program not only allows the exchange students to experience a different culture but also enhances the global perspective of chemistry students at the home institution. In addition to the exchange of talented undergraduates, the Atlantis program has lead to increased interactions between the universities at all levels including research collaborations among faculty and exchange of graduate students.

**Afternoon Session**

**1:20 p.m. Opening Remarks**

**1:30 p.m. America’s Great Idea: Advancing Community College Education in the U.S. and Abroad John Clevenger**

Since 1901, when Joliet Junior College was founded in Illinois, community colleges have been playing important roles in US higher education. Responsive to community and workforce needs, these institutions have thrived, and now enroll at least half of the undergraduate students in the country. Their diverse student bodies and contributions to workforce development have generated increasing attention. Strategies for supporting continued development and globalization of community college programs will be discussed, highlighting opportunities for higher education in the US and abroad.
2:00 pm  Improving Student Engagement in the Laboratory: An Initiative across all Australian Universities
Scott Kable

The Advancing Science by Enhancing Learning in the Laboratory (ASELL) project is a successful Australian initiative contributing to quality improvements in undergraduate laboratory curricula nationwide. The project has four goals: to provide professional development of science academics by expanding their understanding of issues surrounding learning in the laboratory environment; to build a community of practice of laboratory educators by providing mentoring, workshops and activity at conferences; to build a shared database of educationally validated experiments; and to conduct research into learning and teaching in the laboratory.

Recently, ASELL has entered into a partnership with the Australian Council of Deans of Science to evaluate the student experience across whole laboratory programs in chemistry, physics and biology across the Australian tertiary education system. As part of this investigation, the Deans are being engaged to explore how we can build a sustainable mechanism to embed this cultural change as standard institutional practice.

Slides from Presentation

2:30 pm  The Integration of Research and Teaching in the Classroom
Jim Gentile

For more than a decade, reports from expert panels around the world have called for improvements in science education across all disciplines. There is general agreement that science courses consisting of traditional lectures and cookbook laboratory exercises need to be changed. What is required instead is "scientific teaching," teaching that not only mirrors science at its best—experimental, rigorous, and based on evidence— but also integrates real science, and the expectation of discovery, into the classrooms and laboratories. In this presentation we will talk about models of 'research-integrated education' as a new basis for science education.

4:00 p.m.  Enriching Undergraduate Education in Chemistry to Achieve Global Competitiveness: The Value of an International REU Program
Lourdes E. Eschegoyen

In a recent report, the National Science Board (NSB) has urged action to sustain U.S. world leadership in science & engineering (SE) research in response to growing SE capacity around the world. One of the recommendations of the NSB is to promote intellectual exchange. In fact, although the U.S. distinguishes itself in preparing SE college graduates in some critical areas, the average chemistry college graduate in the U.S. is unprepared to face the mobility imposed by today's global job marketplace. This presentation will address the importance of broadening the curriculum
of our students to include “global knowledge” from an early age and the critical role that international research experiences for undergraduates are playing to tackle this challenge.

Slides from Presentation

4:30 p.m.  
**Think Globally: Study Abroad Opportunities for Science Undergraduates**  
Morton Hoffman

Science undergraduates have historically been extremely underrepresented among American students who study abroad. The reasons why students in non-scientific disciplines are attracted to study language, literature, politics, economics, and culture overseas are well known: besides the attractiveness of the experience and the obvious connections to their educational interests, there is the matter of curricular flexibility and administrative support in addition to faculty enthusiasm and an historical basis for such an activity. Despite the recognition of the increased globalization of the sciences and the extent of their international connections, many science faculty often do not see the added value of the study abroad experience to the students’ overall education. A real problem to the student is the fact that highly specialized courses and research fill the junior and senior years when most travel abroad has been traditionally done. While it is possible for American undergraduates to enroll directly in a university in another country, there are a number of serious deterrents: instruction in the local language, difficulties in transferring credits, the lack of coincidence of the academic calendars at the foreign and home institutions, the incompatible expectations of the instructors with regard to the background and maturity of the American and local students. An appropriate alternative to the total immersion approach is to have the American science courses replicated at a foreign site. The details of new Boston University international programs in Dresden, Germany, and Grenoble, France, will be presented as a model that affords students the opportunity to study abroad as a science major (e.g., chemistry, biochemistry, biology, pre-health professions, etc.) while avoiding the common obstacles.

Slides from Presentation