



Committee on Professional Training

American Chemical Society | 1155 Sixteenth Street, N.W. | Washington, D.C.

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Draft ACS Guidelines for Approval of Undergraduate Chemistry Programs

The American Chemical Society (ACS) Committee on Professional Training (CPT) is charged with developing and administering the ACS Guidelines for approval of baccalaureate chemistry programs as a means for promoting excellence in chemistry education. In response to ongoing changes in the chemistry profession and in higher education, CPT has undertaken a major revision of these guidelines. The goals of the current revision process are to simplify the guidelines and procedures for approval, provide flexibility to departments for designing certified degrees, encourage innovation and improvement in curriculum and pedagogy, and define faculty and infrastructure requirements that support excellence.

The proposed revisions were widely distributed, and many announcements, articles, and editorials invited public comment.

Timeline. The revision process began in 2005 with a broad call for the chemistry community to identify important issues and possible directions for change. CPT used this input to release a set of proposed revisions in 2006. The proposed revisions were widely distributed, and many announcements, articles, and editorials invited public comment. The Committee also organized symposia, presentations, and open meetings to further public participation in the process of developing new guidelines. In response to these efforts, CPT received and considered numerous supportive responses and useful suggestions. As a result, in March of this year, CPT released a draft of the ACS Guidelines, which has been broadly distributed for review by the chemistry community. After considering additional feedback, the Committee anticipates making final changes to the draft and adopting the new ACS Guidelines in 2008.

Draft Guidelines Overview. Under the draft guidelines, the curriculum required for a certified degree will consist of *foundation* course work in analytical, biochemistry, inorganic, organic, and physical chemistry to provide breadth; *in-depth* course work to provide rigor, specialization, and integration; and laboratory experience, which can include undergraduate research.

Chemistry programs will have increased opportunities for innovation by designing their own *degree*

CPT OPEN MEETING

Please mark your calendar to attend the extended CPT Open Meeting at the ACS National Meeting in Boston. It will be held from Noon to 2 p.m. on Sunday, August 19, in the Hilton Back Bay Hotel, Maverick A/B room. CPT invites you to join the Committee members to discuss the draft ACS Guidelines and answer questions about the transition and implementation of the new guidelines in 2008. A light lunch buffet will be available. If you know your plans in advance, please e-mail your R.S.V.P. to cpt@acs.org

tracks or *concentrations* that meet the foundation, in-depth, and laboratory requirements. Degree tracks will offer departments the opportunity to incorporate emerging areas of chemistry, take advantage of faculty expertise and specialization, and match departmental and institutional missions. These department-defined degree tracks will replace the current ACS-defined option degrees.

The draft of the ACS Guidelines also recognizes that, in addition to formal course work, students should learn skills like problem solving, oral and written communication, teamwork, safety, and ethics in order to succeed in their future careers.

The new guidelines also call for regular department self-evaluation for the purpose of continual improvement.

Few changes have been made with regard to faculty or infrastructure requirements. The draft of the ACS Guidelines retains the current requirement of four full-time permanent faculty members at an approved chemistry program. The teaching contact hour limit applies to all faculty and instructional staff. Professional development opportunities

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should be available to and used by faculty and instructional staff. Instrumentation, library, and *Chemical Abstracts* requirements are similar to the current requirements.

In addition to the changes in the requirements for student certification, the draft includes more clearly defined and streamlined procedures for initial approval and periodic review of chemistry departments by CPT. Flowcharts summarize the steps involved in the initial approval process and the periodic review procedures for ACS-approved programs. Finally, the Committee hopes that the chemistry community will find the draft guidelines more concise and better organized than the current guidelines.

Implementation. Although CPT anticipates that most currently approved curricula could map onto the draft guidelines, a major goal of the guidelines revision is to provide opportunity and encouragement for curricular innovation. To provide departments time to plan and implement curricular changes, the Committee will defer collection of five-year reports by approved chemistry programs by one year after the new guidelines are adopted. This deferred schedule will allow the Committee time to develop resources supporting implementation of the new guidelines. For example, the Committee will revise the initial approval application and five-year report forms and develop supplements on degree tracks and department self-evaluation. However, the annual report process, which includes data collection on chemistry graduates, will not be interrupted. **Staying Involved.** The draft of the ACS Guidelines already reflects considerable input from the chemistry community. Additional comments on the draft guidelines are valued and welcomed, as they will inform the Committee's work on the new guidelines to be adopted next year. Education is a shared concern of the entire chemistry community, and CPT wants to hear as many opinions as possible on the draft guidelines.

The draft ACS Guidelines have been distributed by mail to the chair of every ACS-approved chemistry department with a request for departmental comment. You may download the document from the CPT website: www.chemistry.org/education/cpt.

Please contribute to the guidelines revision process and e-mail your comments on the draft ACS Guidelines to cpt@acs.org with a subject of "ACS Guidelines Revision" by October 1, 2007.

We invite you to join the CPT members for a discussion of the draft ACS Guidelines during an extended open meeting, which is scheduled from noon to 2 p.m. on Sunday, August 19, at the Fall 2007 ACS National Meeting in Boston. A lunch buffet will be available. Mark your calendar now for this event! ■

HBCU Workshop Outcomes Update

In November 2004, the American Chemical Society (ACS) Committee on Professional Training (CPT) organized and held a workshop with representatives from Historically Black Colleges and Universities (HBCUs) and African American-serving institutions. Through this workshop, CPT specifically sought to initiate a dialogue with the African American chemistry community on actions that ACS could take to engender greater participation of African American undergraduates in chemistry and to increase participation of

African American-serving institutions in the ACS approval process. Participants at this workshop were recruited from a cross-section of chemistry departments at HBCUs and other African American-serving institutions, with representation from both ACS-approved departments and those departments not holding ACS approval of their programs. In addition, workshop participants included six CPT members, five ACS staff members, and several distinguished guests. The final report can be accessed from the CPT website at www.chemistry.org/



Events of Interest during the upcoming Fall 2007 ACS National Meeting in Boston:

Monday, August 20

Being a Responsible Chemist—Ethics, Politics, and Policy

9:00 am to 4:45 pm

Sheraton Boston—Fairfax A

A series of presenters will discuss topics including ethics in research and teaching, intellectual property, funding issues, workplace diversity and several other areas of the chemical professional's career life.



AEI Poster Session

8:00 to 10:00 pm
Sci-Mix

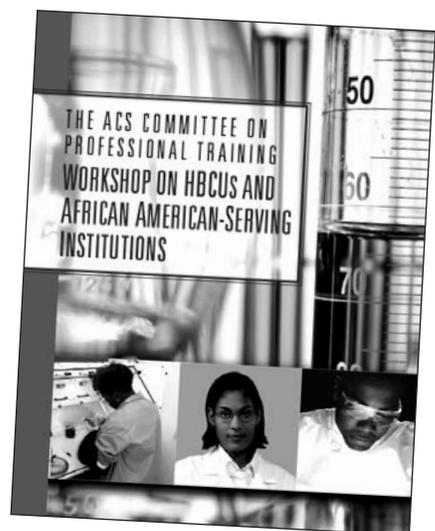
Will your department be hiring new faculty this year?

If so, plan to attend the Academic Employment Initiative (AEI) to meet with potential new faculty candidates at the Sci-Mix poster session held at the ACS National Meeting, Monday evening, August 20, from 8–10 PM. At the Fall 2007 ACS meeting in Boston, 128 candidates seeking faculty positions will use the AEI Poster Session at Sci-Mix to present posters about their current research, which will expand on their research interests, teaching philosophy, and experience. Faculty recruiters are invited to take advantage of this opportunity to meet as many candidates as possible. Brief biographical sketches of each of this year's candidates with links to their abstracts will be available at the beginning of July at chemistry.org/aei.html. Further information can be found at that website or by writing to GradEd@acs.org.

Starting Salaries for New Graduates

Janel Kasper-Wolfe, *Research Associate with the ACS Department of Member Research & Technology*

Megan Henly, *Independent Consultant*



education/cpt by clicking at CPT Resources in the left-hand navigation panel. You can request print copies of the report by contacting the Office of Professional Training (OPT) at cpt@acs.org.

The workshop generated an expansive list of valuable and insightful recommendations for specific actions that could be taken, either by CPT or by other governance groups within ACS, to improve the state of undergraduate education in chemistry for African Americans. This article provides a report on the current state of progress by ACS governance groups on these recommendations.

The majority of the workshop recommendations were directed toward CPT. Indeed, at every CPT meeting since this workshop, the Committee has considered ways to implement the many excellent suggestions for improving communication with the HBCUs as well as to increase the number of HBCUs that hold ACS approval of their undergraduate chemistry programs. One tangible outcome of the implementation of these recommendations is the increase in the number of HBCUs with ACS-approved chemistry programs from 20 to 24 since the workshop was held. Several more HBCUs are currently at various stages within the approval application process.

Workshop participants also made recommendations about ways to improve the application process, and CPT has made considerable headway in implementing these suggestions. For example, participants requested the addition of a Frequently Asked Questions section to the CPT website that would contain clear, easy-to-find information about the approval process, describing how to apply and how to fill out the initial application forms. In addition, they recommended that the Office of Professional Training (OPT) increase its mentoring of programs applying for approval and facilitate greater communication between schools seeking approval and comparable institutions holding approval. OPT has attempted to do this through tele-

Results of the 2005 Starting Salary Survey, which documents salaries and employment characteristics for new graduates, indicate that the workforce has stabilized somewhat (please see *C&EN*, August 7, 2006, 84 (32), 57-64). This is good news after a slight downturn in salaries in the early part of the decade. Salaries varied only slightly depending on the type of employment, type of work, and size of employer.

Starting salaries for recent chemistry graduates with less than a year of work experience were up in 2005. The average salary for inexperienced bachelor's degree recipients was \$35,202, or about 3.6% higher than the average starting salary in 2004. However, after adjusting for inflation, the 2005 average is only marginally higher (0.2%) than that of the prior year. Master's degree and Ph.D. recipients in chemistry reported considerably larger salaries in 2005 as compared to the 2004 graduating class. The real increase was 3.8% for chemistry M.S. degree recipients with little or no work experience

and 5.2% for chemistry Ph.D. recipients. The 2005 average starting salary was just over \$48,000 at the master's degree level and just under \$69,000 at the doctorate level.

While this increase over last year is promising, in terms of constant dollars, salaries still fall short of those earned by graduates in the year 2000. The job market was strong in the late 1990s to 2000, and salaries for scientists and engineers rose quickly during this period. From 2002 to 2004, salaries in chemistry stagnated, even declining in terms of real dollars. However, data from 2005 indicate that starting salaries for chemists may be back on track.

Students and new graduates can further explore salaries by accessing the ACS Salary Comparator, which allows them to factor experience, sub discipline, geographic area, and other variables that influence salaries in chemistry. The ACS Salary Comparator can be accessed at www.chemistry.org/careers under the section titled "Employment Trends." ■

\$ Thousands	BA/BS		M.S.		Ph.D.	
	Current	Constant	Current	Constant	Current	Constant
1995	\$25.0	\$32.0	\$36.0	\$46.1	\$50.0	\$64.1
1996	25.0	31.1	34.1	42.4	45.0	56.0
1997	28.0	34.1	37.5	45.6	54.0	65.7
1998	29.5	35.4	38.5	46.1	59.3	71.1
1999	30.0	35.2	42.0	49.2	61.0	71.5
2000	33.5	38.0	41.1	46.6	64.5	73.2
2001	32.2	35.5	43.0	47.4	69.5	76.6
2002	31.0	33.7	45.0	48.9	67.5	73.2
2003	32.0	34.0	44.5	47.2	63.3	67.2
2004	32.5	33.6	43.6	45.1	65.0	67.2
2005	35.0	35.0	45.0	45.0	72.4	72.4

phone calls, by arranging meetings between OPT staff and institutional representatives at national meetings, and by providing contact information to schools in the application pipeline about appropriate knowledgeable individuals at comparable institutions who can serve as mentors throughout the application process. CPT has also attempted, whenever possible, to send a Visiting Associate to HBCUs seeking approval at the earliest possible stage of the approval process. Workshop participants also requested that the CPT Newsletter be mailed to all HBCUs, not just approved programs, and this change was implemented with the sum-

mer 2005 issue.

The workshop participants made many recommendations that have been addressed in the draft of the ACS Guidelines that CPT released to the community in March 2007. Specifically, the draft guidelines explicitly mention the expectation for regular program self-evaluation with the hope that programs will routinely define goals for student outcomes and assess the extent to which these goals are being met. In addition, the draft guidelines include stronger statements about the pedagogical rationale behind certain requirements, such as the need for modern instrumentation and chem-

ical information resources. A clear statement on the use of modern pedagogies for delivery of chemistry content has been included that cites the effectiveness of strategies, such as problem-based and service learning. In a related activity, CPT is considering sponsorship of a symposium on service learning at the 2008 ACS National Meeting in New Orleans. Finally, as recommended, a statement about the need for adequate student support services has been added to the draft guidelines, and a question about such services will be added to the application for approval. Several workshop recommendations for improvements in the approval application process will be considered once the new guidelines for ACS approval are adopted. Specifically, CPT has begun developing a Web-based pre-application that would precede the full application yet would receive a formal response from CPT. The Committee also plans to develop a series of sample application forms for schools to use as models and to enhance the Frequently Asked Questions section of the website to further assist schools seeking approval.

Other workshop recommendations requested CPT assistance with identifying sources of used instrumentation from industry and government labs that might be made available to HBCU departments. Dr. Joseph F. Francisco, a member of CPT, has been working during his tenure as President of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) with the NOBCChE Board of Directors to establish an instrumentation clearinghouse on the basis of this recommendation. As technology continues to enhance the ability of the community to offer excellent chemistry programs, CPT will continue to consider appropriate changes to the guidelines that will allow approved programs to best take advantage of these improvements.

CPT has long been a proponent of appropriate ACS cost management for chemical information resources, including *Chemical Abstracts* access and electronic journals, for academic institutions, especially small schools and institutions with limited resources. Over the past five years, Chemical Abstracts Service has been responsive to CPT calls to meet the needs of small schools in providing innovative programs for consortial arrangements for access to *SciFinder Scholar*. One example of where such consortia have been especially effective is the Atlanta consortium of HBCUs.

Recommendations were also made to other groups within ACS, and progress has been made on these recommendations as well. The Committee on Minority Affairs (CMA) has enthusiastically embraced the challenge to become more proactive in monitoring and encouraging applications for approval from minority-serving institutions

and established a subcommittee expressly for this purpose. Additionally, CMA has made substantial changes to the selection process for ACS Scholar award recipients. This year, all 113 ACS Scholars were selected solely on the basis of merit, with the award amount determined on the basis of financial need. Dr. Linette Watkins, the Chair of CMA, noted the crystallizing effect of this recommendation from the HBCU workshop, which prompted the change in CMA's perception of the need for this change to the process.

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CMA is also working through its communications subcommittee to heighten the visibility of African American role models within the African American community. One notable success along these lines was their significant role, along with the Percy Julian Task Force, in developing and cosponsoring a full-day symposium at the ACS national meeting in San Francisco that accompanied the release of the NOVA film on public television commemorating Dr. Julian's life and contributions. Additional actions to enhance the visibility of appropriate role models using modern technologies are under

Five-year Report Submissions Deferred

CPT plans to release the new guidelines for ACS approval early in 2008. In order to minimize any confusion that might arise during the transition to the new guidelines, CPT voted to defer collection of all 2007 five-year reports, and shift the review schedule forward one year. School reviews that are already in progress, including applications, will continue. The shift in schedule will also allow CPT members and staff sufficient time to develop new report forms and procedures for program evaluation under the new guidelines. Collection of five-year reports will resume with contacts to the department chairs in December 2008 with a deadline of June 1, 2009 for submission.

active consideration by the CMA communications subcommittee.

Two recommendations were made to the Petroleum Research Fund (PRF): 1) to consider using "impact on diversity" as one criterion in awarding funding and 2) to establish departmental development grants for programs that serve large numbers of underrepresented minority students. Although PRF is supportive of the spirit of the recommendations, after serious consideration by

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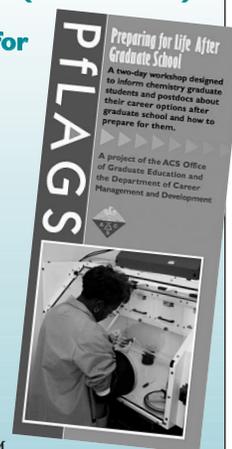
Preparing for Life After Graduate School (PFLAGs)

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 to graduate students and postdocs seeking academic careers. Broadly defined, the workshop covers three topics: defining careers for chemists; some nontechnical skills and knowledge needed for career success (with an emphasis on industry); and finding employment opportunities (including a postdoc). 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. These workshops have received outstanding evaluations from the graduate student participants, and already three more workshops have been planned for this year, including one at the ACS Central Regional Meeting in Cincinnati.

The PFLAGs workshop is available to chemistry departments at Ph.D.-granting universities through the ACS Office of Graduate Education and the Department of Career Management and Development. If you would like more information or your department is interested in finding out more about hosting a session of PFLAGs, please contact the ACS Office of Graduate Education: GradEd@acs.org; 202-872-4588.



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the PRF Board, both were found to fall outside of the PRF Charter that defines the fund's spending authority. The PRF staff will be gathering Equal Employment Opportunity Commission and gender data on the performance of their practices and will seek policy guidance from the PRF Advisory Board if the data suggest any shortcomings with respect to participation of institutions serving significant numbers of students from underrepresented minorities.

The Society Committee on Education (SOCED) also provided thoughtful feedback and commentary on the recommendations from workshop participants that were directed to them. Specifically, SOCED is working to increase the number of robust Student Affiliates (SAACS) Chapters at minority-serving institutions. SOCED is also engaged in activities related to two-year colleges that have the potential to positively impact

CPT continues to work within the Society to better clarify the roles and responsibilities of different governance and staff groups with respect to enhancing participation of underrepresented minorities in chemistry through the Society's education activities.

HBCUs. The Committee is currently revising its guidelines for two-year colleges and is exploring opportunities for ACS to facilitate the transition of students from one type of institution to another. Finally, as noted above, CPT is exploring the possibility of a symposium on service learning at a future ACS National Meeting for which SOCED co-sponsorship would be sought.

Finally, CPT continues to work within the Society to better clarify the roles and responsibilities of different governance and staff groups with respect to enhancing participation of underrepresented minorities in chemistry through the Society's education activities. The goal of increased participation is not one that will be easily reached in the near term. However, CPT remains committed to the principle and to the use of ACS program approval as a mechanism for positively influencing the level of excellence in undergraduate programs that serve underrepresented minorities. As always, CPT encourages your comments, suggestions, and feedback and welcomes your continued engagement in both CPT's and the Society's attempts to improve the participation of underrepresented minorities in chemistry. ■

Changes in CPT Membership

In 2007, three new members were appointed to CPT: Dr. Ron W. Darbeau, Dr. George R. Negrete, and Dr. Lee Y Park. Dr. Darbeau is an organic chemist, who is a Professor in the Department of Chemistry at McNeese State University. Dr. Negrete is an organic chemist, and a Professor in the Department of Chemistry at the University of Texas at San Antonio. Dr. Park is an inorganic chemist, and a Professor in the Department of Chemistry at Williams College.

The Committee would like to express its appreciation for the many contributions of the following members, who concluded their terms of service on CPT at the end of 2006: Dr. Charles E. Carraher and Dr. Ellen Keiter.

Resources for Students Considering Graduate Study

If you are advising students considering graduate work in the chemical sciences, please refer them to two online resources produced by the ACS Committee on Professional Training:

- *Planning for Graduate Work in Chemistry* guide available at www.chemistry.org/education/cpt/graduatework

The newly updated guide *Planning for Graduate Work in Chemistry* provides both domestic and international undergraduate students with advice on how to prepare for successful work in graduate school, how and when to apply for admission, and to some extent, what to expect once enrolled in graduate school.

CPT asks for your help in preparing the next edition of the *Planning for Graduate Work in Chemistry* website. Are there any other questions or topics that your students might be interested in? Please send your comments related to this resource to cpt@acs.org

- The online *ACS Directory of Graduate Research (DGRweb)* available at www.chemistry.org/education/DGRweb

With DGRweb students can explore research programs available in graduate departments by finding the biographical information for faculty members, their areas of specialization, titles of papers published within the last two years as well as statistical summaries on departments, including numbers of faculty, post-doctoral appointments, graduate students, and master's and doctoral degrees granted. The 2007 edition of the ACS Directory of Graduate Research (DGR) and DGRweb will be released later this fall.



ACS Committee on Professional Training 2007

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