ACS Chemistry for Life™

CPT
Committee on Professional Training

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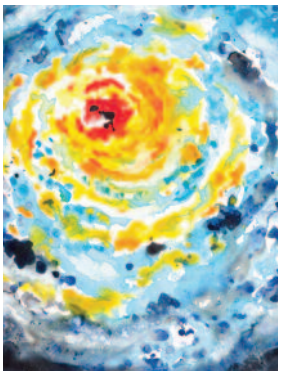
Recovering from Katrina and Rita



The year 2012 will be remembered for several events: both famous and infamous. The ferocity of Hurricane Sandy and its impact on the Eastern Seaboard of the United States and the 2012 Presidential Campaign will remain talking points for decades. Sandy's devastating blow on a population and infrastructure unaccustomed to such an onslaught is tragic; we all sympathize. The storm, however, does force one to wonder how the southeastern US manages to handle and survive such devastation on an alarmingly regular basis.

In 2005, two devastating hurricanes, separated by a mere 26 days, wreaked havoc on the Gulf Coast of the United States leaving a swath of destruction that would forever alter the economy, politics, population, and social fabric of Louisiana. In their immediate wake, images and stories emerged, ranging from abject despair to courage and heroism. Today, seven years later, in the shadow of Hurricane Sandy, we revisit the disasters of Hurricanes Katrina and Rita using the region's chemistry departments as indicators to gauge the extent of recovery and to map the difficult return to normalcy in the region.

Hurricane Katrina, the worst of the Atlantic hurricanes of 2005, was the most costly natural disaster in US history. On the morning of Monday, August 29, Katrina slammed into New Orleans, relentlessly buffeting the city with high winds, torrential rain, and a massive storm surge. Much of what survived the initial onslaught was laid low when the levees, not built to withstand this unprecedented degree of punishment, gave way and released the raging Lake Pontchartrain to empty mercilessly into the city.

New Orleans is home to Loyola University, Tulane University, the University of New Orleans, Dillard University, and Xavier University: none were spared. Damage to buildings, power systems, and air-handling

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CPT Open Meeting

We invite you to attend the CPT open meeting at the 245th ACS National Meeting in New Orleans on April 7, 2013, from Noon-1:30PM. The focus of this meeting will be the presentation and discussion of the proposed changes to the ACS Guidelines. Light lunch will be served.

CPT Symposium in New Orleans

You are invited to attend the symposium "Evolution of the ACS Approval Process: Moving Beyond the 2008 Guidelines" at the ACS National Meeting in New Orleans on Monday, April 8, 2013. Members of the ACS Committee on Professional Training will make formal presentations on the curriculum for a certified degree, the infrastructure necessary for an approved program, and the skills undergraduates should gain as part of their education. Each presentation will be followed by a discussion session with the members of the audience. The Committee welcomes feedback from the chemistry community as we revise the 2008 ACS Guidelines. The location has not been determined at this time. Please check the guidelines revision page on our website for updates (www.acs.org/guidelinesrevision).

ACS Guidelines Revision Process

A unique aspect of undergraduate chemistry education in the United States is the existence of the ACS approval program. This program, which has been in existence since 1936, provides a mechanism for maintaining excellence in chemistry education through a set of Guidelines for Bachelor's Degree Programs (the Guidelines) that define the attributes an approved program must meet. It also describes the experiences a student must have in order for his or her degree to be certified to the ACS. These Guidelines are administered by the Committee on Professional Training (CPT).

Currently, there are 668 approved chemistry programs. There are also a number of programs that are at various stages of seeking approval. Approved programs range in size from those with as few as four chemistry faculty and graduate a handful of majors annually, to the largest universities in the country. The Guidelines provide a bar that non-approved programs can work to meet. They also provide a mechanism for programs to explain to their institutions the requirements for exemplary chemistry education. This can be particularly useful when these requirements are seen as costly to the institution. To keep the ACS approval program current, CPT must, from time to time, revise the Guidelines. The current version of the Guidelines was adopted in 2008, and in January 2012, we began the process of developing the next revision of the Guidelines. We expect that this revision will be adopted in mid-2014.

The 2008 and 2014 guidelines. The 2008 Guidelines represented a significant departure from earlier versions. For many chemistry programs, the most significant area of change was in the description of the curriculum that is to be taken by a certified major. Specifically, the Committee moved away from a detailed description of the courses a student must take to a more flexible approach in which the 2008 Guidelines state: "Certified majors must have instruction equivalent to a one-semester course of at least three semester credit hours in each of the five major areas of chemistry: analytical chemistry, biochemistry, inorganic chemistry, organic chemistry, and physical chemistry." In addition, certified majors take four in-depth courses that build on the foundation course work. The laboratory portion of the requirements no longer includes general chemistry. The 2008 Guidelines require that a certified major complete at least 400 hours of laboratory instruction or experience. Rather than specifying which experiences the students take, these 400 hours must include foundational laboratory experiences in at least four of the five areas of chemistry, listed above.

Along with the increased flexibility in the curriculum, the 2008 Guidelines provide an increased emphasis on the development of student skills. These skills range from ethics and safety to teamwork and communications. Finally, the 2008 Guidelines provide a clearer structure for how CPT works with the periodic reports from approved programs and applications for approval from non-approved schools. An important part of the changes in the 2008

Questions ?

What else can or should CPT do to best promote and encourage departments in their continued quest for excellence?

How have the changes in the flexibility provided by the 2008 ACS Guidelines affected the educational experience delivered by approved programs?

What are the ways that would be most appropriate for CPT to assess the development of student skills as well the attributes of excellence and rigor in your program?

What is the appropriate balance between exposure to the subdisciplines of chemistry and to emerging areas of chemistry? What are the critical skills and experiences students should have acquired to be able to move into these emerging areas?

To maintain an excellent program, should there be a limit on the fraction of courses taught by instructional staff? What should be the limit? Should it apply only to classroom courses, labs, or both? To what types of courses should it apply?

How could and should the CPT encourage curricular innovation in your undergraduate program (as well as others) to include new pedagogies, technology, and the incorporation of emerging fields?

Should contact hour limits be allowed to be different for faculty and for instructional staff who teach primarily laboratory classes? The current ACS Guidelines limit weekly teaching contact hours to a maximum of 15, with some minor flexibility. Assuming 15 contact hours will remain the absolute limit for faculty, should the maximum contact hours of instructional staff be increased?

revisions was the introduction of a pre-application for programs that are seeking approval. This pre-application provides a short process to assess whether a program has many of the infrastructural components in place before beginning the full application process. The full application process then involves an extensive self-study as well as a meeting with CPT.

As we look ahead toward the 2014 guidelines, we expect that the changes will be minor compared to the 2008 revision. The changes will be focused on specific issues where additional clarity is needed in the Guidelines or where changes in chemistry education require a reevaluation of the specific requirements. Some of the areas that are being discussed include clarifying the expectations of the roles of non-tenure-track faculty in approved programs. We have also discussed how the guidelines should evolve based on changes in technology. This includes changes in the mechanisms for course delivery as well as changes in the skills that students need to have as they interact with instrumentation or the chemical literature. While we do not anticipate significant changes in the curricular requirements, we are continuing to discuss the balance between the need for students to be exposed to specific topics in the five traditional subdisciplines in chemistry along with the need for them to also be educated in more specialized topics.

Revision process. The Committee on Professional Training began our discussions for the 2014 revision of the Guidelines by developing a survey, which was sent to the chairs of all ACS-approved programs. The feedback from that survey has been very useful and informed our discussion of the revisions so far. In January 2012, we also published a Comment Column in *C&EN* to solicit additional feedback. In June, CPT met to discuss the revisions. During that time, we began to define the areas where changes to the Guidelines likely will be made. We also identified where additional input is needed from the community. Several areas where such input is desired are described in the box on page 2. In the summer, CPT ran a symposium at the Biennial Conference on Chemical Education (BCCE), where we had lively discussions with the participants about possible revisions. We have continued to solicit feedback, most recently through a second Comment Column, which was published in the September 24 issue of *C&EN*.

The next phases of the revision process will continue with Committee discussions of the Guidelines in our meeting in January. We expect that by the Spring ACS National Meeting in New Orleans we will have disseminated a more detailed description of the anticipated revisions. During the New Orleans meeting, we will be holding a symposium entitled "Evolution of the ACS Approval Process: Moving Beyond the 2008 Guidelines." This symposium is scheduled for Monday afternoon, April 8, 2013, as part of the programming in the Division of Chemical Education (CHED). The symposium will include talks by current CPT members along with ample time for discussion. In addition to the symposium, we will be hosting an open meeting on Sunday, April 7, devoted to the Guidelines revision. A second open meeting dedicated to guidelines discussions will be held at the ACS National Meeting in Indianapolis. We will continue to provide updates on the revision process through this newsletter, Comment Columns in *C&EN*, and through the CPT website.

All of these communications and events have been organized to obtain as much feedback from the community as we can. We also welcome direct feedback, which may be sent to cpt@acs.org. While we have listed some areas where we have specific questions, please do not limit yourself to these issues. The education of our students is a shared responsibility, and we hope to obtain input from as many people as possible. ■

ANNOUNCEMENTS

CPT Symposium in New Orleans

You are invited to attend the symposium "Evolution of the ACS Approval Process: Moving Beyond the 2008 Guidelines" at the ACS National Meeting in New Orleans on **Monday, April 8, 2013**. Members of the ACS Committee on Professional Training will make formal presentations on the curriculum for a certified degree, the infrastructure necessary for an approved program, and the skills undergraduates should gain as part of their education. Each presentation will be followed by a discussion session with the members of the audience. The Committee welcomes feedback from the chemistry community as we revise the 2008 Guidelines. The location has not been determined at this time. Please check the guidelines revision page on our website for updates (www.acs.org/guidelinesrevision). ■

systems was widespread. Downed trees and power lines as well as scattered debris, made access difficult and perilous. First floors were flooded, some with several feet of standing water that covered electrical outlets, floated furniture, and drowned equipment. (At Loyola, the basement – a rarity in Louisiana – was completely flooded.) Many instruments not damaged or ruined from the incursion of water, succumbed as they sat in humid rooms for weeks or months. NMRs quenched (although heroic efforts by faculty at Tulane, for example, avoided this problem), and other pieces of equipment were compromised from fallen debris, flooding, or extended power loss. At Xavier, perishables including enzymes and lines of cell cultures were lost.

The impact on faculty and students varied from bad to severe. At Xavier, for example, several faculty including Department Head, Maryam Foroozesh, lost their homes while for many others, their homes were left in unlivable conditions. In response, the administration secured FEMA trailers for use by their faculty, turning one of their larger parking lots into a FEMA trailer park. At Loyola, almost one-third of the faculty lost their homes. The campus was in the midst of preparing documentation for review by the SACS (Southern Association of Colleges & Schools) commission when Katrina hit – many returned to campus within two weeks to meet deadlines.

Like faculty, students' lives were also upended. Many scattered to other parts of Louisiana, to stay with family and friends. Many of those students returned to their homes in New Orleans weeks later to begin the heartbreaking and arduous task of salvage and rebuilding. Some student evacuees left to continue their classes at other universities in north and southwest Louisiana and in several other states as far flung as New York and California. However, for the hundreds who sought to continue at McNeese State University in Lake Charles, three hours to the west, they would be in for yet another shock.

Hurricane Rita, the fourth-most intense Atlantic hurricane ever recorded, made landfall on September 24, 2005, as a category 3 hurricane causing $12 billion in damage to southwest Louisiana. The McNeese campus was devastated. Dorms were lost, buildings lost roofing and power, and several instruments in the chemistry department, including the NMR were ruined. The Katrina evacuees who had barely settled into their new classes were scattered once more, some never to return to Louisiana. Indeed, to this day, seven years after the storms, the populations of southeast and southwest Louisiana are nowhere near their previous levels. To southwest Louisiana, Katrina was their best friend and worst enemy. Fear of a Katrina-like event spurred evacuation so the loss of life was minimal, but media coverage was bereft of pictures of desperation. When massive aid flooded into New Orleans, it only trickled into southwest Louisiana. Even today, when concerns are expressed about the 2005 hurricane season, Rita, "the forgotten storm" is often an afterthought.

While the sting and sorrow of the storms still linger, chemistry programs have, like the phoenix that adorns the ACS crest, risen from the ashes of disaster and have been reborn.

So, where are the chemistry departments now? What is the extent of recovery and by what mechanisms have these recoveries been effected? Encouragingly, all departments enthusiastically report a full recovery in terms of infrastructure and equipment. They credit responsive administrations, FEMA, federal, state, and local grants and the unwavering support of alumni. At McNeese, for example, over $60,000 of college, departmental, and student funds were spent over three years on an unsuccessful repair of their 300-MHz spectrometer. With their five-year report to CPT due in 2012, they finally procured a 400-MHz unit (installed in August 2012) from state and campus funds.

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The number of faculty lines, however, did not usually fare quite as well. At Xavier, some faculty permanently relocated to California and Atlanta, one took a one-year postdoctoral position, and four were let go due to financial exigency, although they were rehired subsequently. Loyola used the opportunity to emerge as a leaner department with roughly 90% the previous faculty complement. McNeese lost one faculty member post-Rita to early retirement and another to cardiac arrest. Tulane's fortune differed; they rebounded well and currently enjoy three more faculty positions than prior to Katrina.

After the hurricanes, a prevalent fear among many faculty and administrators was that student evacuees would not return to their home institutions, enrollment would suffer, and consequently rebuilding efforts (fiscal, social, and otherwise) would be slowed. They need not have worried. The affected universities report pleasant surprise at the large numbers of students who showed loyalty, courage, and dedication by returning. Yes, many did not come back for fear of nature's wrath, or because they had no place to live upon return, or because they had already settled into new lives elsewhere — but the majority came back. The months that followed were tough on everyone. With graduations pending, eligibility for financial aid requiring the completion of a certain number of hours in an academic year, and with faculty, staff, and administrators needing a return to their livelihood and to some semblance of normalcy, campuses reopened either that fall or in the following spring. Through nothing less than sheer will and commitment to a single, shared purpose, they forged ahead with the business of education.

At McNeese, classes resumed just four weeks after Rita and with extended class hours (and decreased time between classes) ran into late December to finish the semester. Many classes were taught in FEMA trailers located in a trailer park north of campus, and faculty and students often sprinted from one class to the next. At Tulane, which reopened in mid-January, the entire fall and spring semesters were taught in the spring and an interim session that took place prior to the summer. Similarly, at Loyola the spring was extended (and summer cancelled) into a Spring I and Spring II term in which the entire academic year was taught. Departments worked with Registrar's Offices and were very flexible in transferring credits from institutions that temporarily hosted student evacuees. For the less instrument-intensive research faculty at Tulane, the hiatus was a mere speed bump. Several were "adopted" by labs across the country (including Washington University in St. Louis, the University of Washington in Seattle, and Texas A&M).

The aftermath was also not without some institutional turmoil. The Loyola administration was censured by the AAUP for termination of 17 professors and several programs (chemistry was not among them) as part of their "Pathways" plan to increase programs' effectiveness post-Katrina. The censure and multiple lawsuits resulted in significant turnover of upper-level personnel at the university leading to a reversal of the Pathways plan and removal of censure.

The year 2005 will no doubt be remembered for the double-barreled hurricane assault on Louisiana. And yet, while the sting and sorrow of the storms still linger, chemistry programs have, like the phoenix that adorns the ACS crest, risen from the ashes of disaster and have been reborn. Yes, some stresses remain and some facets lost will never be recovered, but the inexorable march to normalcy has been all but completed. Departments are much better prepared for emergencies, and among the faculty who went through the disaster and its aftermath, there exists an unmistakable undertone of appreciation for their departments that served as a fixed reference point in tumultuous times. The appreciation extends to the many who assisted, to the many who returned, to the many who triumphed, and to the many who still care. ■

The Role of Research in the Certified Chemistry Major

Anyone who has participated in an undergraduate research experience recognizes how rewarding it can be for the student and the mentor. The value of an undergraduate research experience goes well beyond the new knowledge that the student creates in the project. The one-on-one interaction between student and mentor is difficult to achieve in other areas of the curriculum, particularly in larger programs. Skills developed in a research experience serve students well, no matter what their career path. For undergraduate students considering a research-focused career, either through work in industry or through pursuit of an advanced degree, a research experience provides an opportunity to explore this direction without making a long-term commitment.

The 2008 ACS Guidelines and associated supplemental documents from the Committee on Professional Training give prominence to the role of research in the undergraduate curriculum. The Guidelines mandate that a certified chemistry major complete five foundation courses, four in-depth courses, and 400 hours of laboratory experiences beyond general chemistry. Student participation in research can be used to satisfy one of the in-depth courses and up to 180 of the laboratory hours. If a research experience is used toward student certification, the student must complete a comprehensive written report on the project. A poster or oral presentation cannot substitute for the written report. CPT has a supplemental document on the qualities expected in a written research report. Another feature of the 2008 Guidelines is an emphasis on the development of professional skills in students: communication in oral and written forms, working in teams, asking questions, designing experiments, interpreting results, thinking in innovative ways, exhibiting leadership, developing a desire for lifelong learning, behaving in an ethical manner, and exercising proper safety procedures. The Guidelines also emphasize the importance of excellence and rigor in educational practices, and supplemental documents from CPT are available on these topics. The Guidelines and supplemental documents set a high standard by stating that undergraduates should participate in original research that develops new knowledge. Furthermore, the intent of the project should be to publish the work in a peer-reviewed professional journal.

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Statements in the Guidelines and various supplemental documents provide further support for the value of research in the undergraduate curriculum. The Guidelines state that undergraduate research allows students to integrate learning experiences and participate directly in the process of science. The supplement on rigor states that undergraduate research has the potential to facilitate in students a mastery of independent thought and self-direction. The supplement on undergraduate research says it can be the most educationally valuable experience for students and that students participating in research have the potential to grow professionally and personally in a manner not possible through traditional classroom and instructional laboratory experiences. Finally, the supplement on student skills states that research is one of the most powerful opportunities for students to learn problem-solving skills, provides a unique opportunity for students to develop oral and written communication skills, and provides an opportunity to reinforce and develop safety skills.

The Guidelines speak to the value of developing professional skills in the curriculum through a progression of learning opportunities. Students should be able to develop testable hypotheses, design experiments, interpret data, and draw appropriate conclusions: in other words, participate in laboratory experiments that are research-like in their approach. The Guidelines emphasize the importance of support staff for stockroom administration and equipment maintenance, limit weekly contact hours to a maximum of 15, provide expectations for the physical plant and facilities, and express the need for a suite of modern instrumentation and the importance of professional development opportunities for faculty. Each of these areas helps departments support research activities, although CPT recognizes that many faculty members with 15 instructional contact hours a week will have a difficult time integrating a vibrant research program into their schedule.

The 2008 ACS Guidelines and various supplemental documents provide ample evidence of the value placed upon the participation of undergraduates in original research experiences intended for publication in a peer-reviewed professional journal. The Guidelines and supplemental documents referenced in this article are available on the CPT website at www.acs.org/cpt. ■

Preparing for Life After Graduate School

A career development workshop from ACS

This two-day workshop is designed to inform chemistry graduate students and postdocs about their career options and how to prepare for them:

- Examining careers for PhD chemists
- Describing careers in business and industry
- Knowing critical non-technical skills
- Finding employment opportunities

To bring this workshop to your department, see www.acs.org/gradworkshop or contact GradEd@acs.org; 202-872-4588.

This program is supported by the Graduate Education Advisory Board, with members appointed by CPT, SOCED, and YCC.

Congratulations!

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

Benedictine College

New Jersey Institute of Technology

The current number of ACS-approved programs is 668.

Changes in CPT Membership

In Fall 2012, Dr. Jeffrey N. Johnston was appointed as a new member to CPT.

Dr. Johnston is a Professor in the Department of Chemistry at Vanderbilt University.

The Committee would like to express its very special appreciation to Dr. Ron Estler (Fort Lewis College), Dr. John Kozarich (ActivX Biosciences), Dr. Graca H. Vicente (Louisiana State University) for their contributions to the work of CPT. All of these members concluded their terms of service on CPT in 2012.

Certificates for ACS-Certified Graduates

Chemistry majors who receive a baccalaureate degree from an ACS-approved program and complete a curriculum described in the ACS Guidelines may be certified to the Society for membership purposes by the head or chair of the approved program. If you would like to have certificates available for presentation to your certified graduates, please contact the office by email at cpt@acs.org.

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