The Magazine for ACS Student Members
February/March 2011

inChemistry

Chapters

Successful Practices

ACS Chemistry for Life™

IYC 2011 International Year of CHEMISTRY

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XAVIER UNIVERSITY OF LOUISIANA


MORGAN STATE UNIVERSITY

Cover art: Dreamstime Stock Images: Microscopic background of water crystals. Inset photo: South Texas College (McAllen) members celebrating Mole Day.

The Future of Chemistry Is in Your Hands

By Nancy B. Jackson


KYLE ZIMMERMAN

After you finish your studies, whether at the undergraduate or graduate level, many of you will find jobs at companies or institutions with diverse international interests.

In fact, in today's expanding global marketplace, fewer and fewer organizations have only narrow domestic interests. My job with Sandia National Laboratories, for example, routinely takes me to the Middle East, Southeast Asia, and North Africa to discuss chemical safety and security with colleagues in professional societies and academia.

Given the trend in globalization, in addition to obtaining academic grounding in the chemical sciences, another key to success is learning as much as you can about other cultures and languages. I took only a year of French in college and didn't use it for a long time. But when I recently went to Morocco on business, it was remarkable how much came back to me and how much people appreciated the few words I tried to say in French.

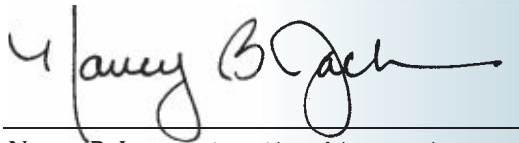
I encourage you to expand your horizons, take some cross-cultural classes, and seek opportunities to study and do collaborative research in other countries. One such opportunity is through the National Science Foundation-funded program run by the ACS Office of International Activities. This (or any other opportunity to live or work overseas) will pay off for you for the rest of your life.

There is also a very important event taking place this year in which I hope you will participate: the International Year of Chemistry, or IYC 2011. An initiative of the International Union of Pure and Applied Chemistry and the United Nations Educational, Scientific and Cultural Organization, IYC 2011 is designed to increase public appreciation and interest in the central sciences and enhance international cooperation.

Communicating science to the public, a major goal of IYC 2011, is something we must all make a priority. Professional scientific organizations like ACS have tremendous resources and expertise that are focused on public communication. We must continue to tweak and refine these assets to find the best way of reaching the various publics whose understanding and support we seek.

As students of chemistry, the future of chemistry will be in your hands. The challenges your generation will face regarding environmental issues and sustainable energy will require many smart and dedicated chemists to develop solutions. Addressing these challenges will take science and research, and an ability to advise the public on the technical options and challenges. The pursuit and advancement of science research, and chemistry in particular, will help improve the lives of all our planet's inhabitants.

Best of luck in your studies and future endeavors. iC



Nancy B. Jackson is President of the ACS and manager of the International Chemical Threat Reduction Department in the Global Security Center at Sandia National Laboratories.

Five FAQs about Presenting at an ACS National Meeting Undergraduate Poster Session

By Robin Lindsey

Have questions about ACS student chapters or other programs at ACS? If so, e-mail us at undergrad@acs.org — we'll find your answers!

Q I am presenting a poster at the Undergraduate Poster Session in Anaheim, CA. How big can my poster be?

A Each horizontal poster board should measure no more than 4′ tall x 6′ wide, including frame (if it has one).

Q What's the best way to transport my poster to the meeting?

A Heavy-weight cardboard tubes are excellent for transporting a large, single-sheet poster. If your poster consists of separate sheets, pack it in a crush-resistant container that keeps the sheets flat and unwrinkled. Label the poster or poster tube with your name, cell phone number, and hotel name, address, and room number (especially if the room is not registered in your name), as well as your college/university name and the poster session number. Also, back up a copy of your poster to a USB flash drive or CD and bring it with you to the meeting. If you lose your poster, you can easily reprint it at a local quick-copy center.

Q The Undergraduate Poster Session is two and a half hours long. Will I be presenting my poster for the entire time?

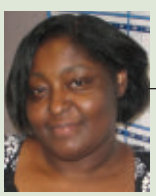
A No. Authors who are assigned even-numbered posters (see the "final poster number" indicated in your e-mail confirmation from ACS) will present their posters during the first half of the session, and authors who have odd-numbered posters will present theirs during the second half.

Q I am presenting my poster during the first half of the Undergraduate Poster Session. Can I take it down after my presentation time is over?

A You should set up your poster before the opening of the session and leave it in place until the close. Although you are presenting for only the first half of the session, we encourage you to stay at the session and visit other posters during the second half. (Likewise, if you're presenting during the second half, we recommend spending some time viewing other students' posters during the first half.)

Q I submitted a poster abstract for the ACS national meeting, but I am unable to attend. How can I withdraw my poster?

A Please e-mail the Undergraduate Programs Office at undergrad@acs.org or call us at 1-800-227-5558, ext. 6166 to let us know if you are unable to attend the meeting and need to withdraw your poster. iC



Robin Lindsey is Lead Program Associate in the ACS Undergraduate Programs Office.

Share what's going on in your chapter! If your chapter would like to be featured in the ACS Student Chapter Spotlight, please contact Audley Burke at 800-227-5558, ext. 4565, or a_burke@acs.org.

COMPILED BY AUDLEY S.V. BURKE

Ripon College
Ripon, WI

Chapter president: Heather Nennig
Number of chapter members: 16
Number of ACS student members: 6
Institution environment/ composition: Small, private, rural, 4-year institution

Q How do you ensure a smooth officer transition from year to year?

A We have an ACS chapter operations binder that is passed down from one president to the next. Usually the new president has been strongly involved in the chapter activities and the chemistry department itself during the previous year, so smooth officer transitions are not a problem.

Q Do you have any unique positions?

A We have chapter mascots. Each year, one or two energetic and optimistic individuals are chosen for this position. Their job is to put a smile on your face (and inspire you) when you arrive in the chemistry department.

Q What are your most popular or unique chapter activities?

A Probably our most unique (and popular) activities are our chemistry intramural co-ed floor hockey team and annual educational/ recreational trip to the Miller Brewery and Brewers game in Milwaukee, WI. Our student members and three faculty/staff members form our hockey team and compete against other teams in the league. (Last year, we won the championship!) For the Brewers trip, we tour the Miller Brewery, tailgate at Miller Stadium, and attend a Brewers game.

COURTESY OF RIPON COLLEGE

Q What types of activities do you sponsor?

A For each chemistry seminar guest speaker, we host a lunch discussion and a casual coffee conversation with the students before the guest speaker presents his or her lecture. We also plan fun activities, such as an end-of-the-year softball game and picnic and a holiday party (complete with "Secret Santa" gift exchange for faculty and students) at the end of the fall semester.

Q Do you collaborate with other clubs on campus on activities?

A This year, we have collaborated heavily with the Ripon College biological honor society, Beta Beta Beta. We, along with the biology and physics departments, host many events.

Q What is your most successful fund-raiser to date?

A Every year, we plan a pizza sale Superbowl weekend. We buy frozen pizzas and then cook and deliver them to student football fanatics (and there's quite a few at Ripon College) before and during the game. We usually raise about $300-500 each year.

Faculty advisor
Colleen Byron, 19 years

Q Why did you become a faculty advisor?

A It's important to build involvement in a community of students, faculty, and staff. This is also one of the most enjoyable parts of being a chemistry faculty member.

Q What challenges have you faced in your position?

A I have not faced many challenges as a faculty advisor. The biggest is probably that the number of student members can change dramatically over a short time at a small college, and the expectations of activities may need to be adjusted.

Q What has been the most rewarding aspect of your service as a faculty advisor?

A I highly enjoy helping the students organize field trips that expose them to the role of chemistry in the broader world, such as attending an ACS national meeting or touring the research laboratories at the Miller Brewery. There is something new to learn for every participant, and the bonding that occurs among the students, faculty, and staff lasts a lifetime. Plus, the trips are a total blast.

University of South Alabama

Mobile, AL

Chapter president: C.J. Gaston
Number of chapter members: 25
Number of ACS student members: 5
Institution environment/composition: Medium, public, suburban, 4-year institution
Chapter website: http://www.southalabama.edu/acs/

Q How do you ensure a smooth officer transition from year to year?

A The person who holds the president-elect position must be a junior so that he or she can serve as president the following year. This creates continuity from year to year by ensuring at least one officer serves again.

Q Do you have any unique positions?

A We have a student-at-large position. This person supervises contact with the outside community and aids other officers when needed.

Q In what ways does your chapter give back to the community?

A We do chemistry demonstrations at local primary schools and help with the Girls Exploring Math and Science Fair. At the regional Science Olympiad for middle and high school students, we run and judge the pentathlon event, which is a timed competition consisting of five academic and five athletic challenges.

Q What methods do you use to retain members from year to year?

A Our chemistry department offers scholarships, and one of the requirements is that recipients must be active members of our chapter.

Q What are your most popular or unique chapter activities?

A We have Mole Day picnics and crawfish boils to honor graduating seniors and scholarship recipients. These events enable students and faculty to come together outside of class. Everyone in the department participates, including students who are not chapter members. Graduating seniors receive gifts, and the faculty provide a few parting words to the graduating seniors.

COURTESY OF UNIVERSITY OF SOUTH ALABAMA

Q How involved is your chapter on campus?

A Our chapter is actively involved in recruiting students to the university through Campus Preview Day, and we field teams to compete in intramural sports.

Faculty co-advisor
Diane Roe, 10 years

Q Why/how did you become a faculty advisor?

A I had been a member of this very chapter as an undergrad. We have always been very active, so I volunteered.

Q What challenges have you faced in your position?

A Keeping students involved and motivating them to keep the chapter active.

Q What has been the most rewarding aspect of your service as a faculty advisor?

A Getting to know the students on a level other than just as their instructor.

Q What advice can you offer those new to the advisor position?

A Be patient. Chemistry majors have an extremely demanding academic schedule, so they really value their free time. To have an active chapter, sometimes you have to push the students. Good officers make all the difference!

Faculty co-advisor
Scott Miller, 2 years

Q Why did you become a faculty advisor?

A Since I was chair-elect of the local ACS section, I felt it would be a great opportunity to forge a better integration among students and professional chemists.

Q What has been the most rewarding aspect of your service as a faculty advisor?

A I enjoy having the personal interaction with the students and learning about their future career plans. It's very rewarding to help them get in touch with people who can help them achieve their goals.

Q What advice can you offer those new to the advisor position?

A Patience is important, as is identifying the key students who can motivate and coordinate the other students for events. Advise and suggest, but allow the students a chance to interact as a group and as officers/managers so they can develop team skills for their future careers. inC

A Guide to Successful MEMBERSHIP RECRUITMENT

COURTESY OF XAVIER UNIVERSITY OF LOUISIANA

Chapter Officers and Faculty Advisors Share Their Best Ideas for Obtaining New Members

By Lori Betsock

PEOPLE ARE THE HEART OF ANY ACS STUDENT chapter. Without new members to take on active roles, chapters can languish as older members graduate and move on. New members infuse vitality, skills, and experience that can benefit the chapter itself, the institution, and the broader community. Recruiting new members for your ACS student chapter can sometimes seem like a daunting challenge on a college campus, but having an active recruitment program is vital for your chapter's success.

For many successful chapters, the first step is to form a membership committee charged with creating a recruitment strategy (sometimes, this same committee is also responsible for carrying out the planned recruitment activities). These activities are as varied as the chapters themselves, and this article explores some of the many ways chapters are successfully recruiting new members.

Photo above: The student chapter at Xavier University of Louisiana begins its recruiting efforts before the fall term begins, targeting incoming freshmen.

Target freshmen

Consider recruiting incoming freshmen as chapter members. While many upperclassmen are overextended with activities, freshmen are often an eager, but untapped, resource with few extracurricular commitments.

Some chapters begin recruiting freshmen during the summer, weeks before the fall term begins. Recruitment activities at the **University of St. Thomas** in Houston, TX, begin in July during the Science and Mathematics Summer Institute for entering freshmen. The chapter also has a booth at the Freshman Orientation Fair in August, before classes start. At both events, prospective members receive a brochure describing the advantages of becoming a chapter member and a listing of past activities and planned activities for the upcoming year.

ISTOCK

COURTESY OF SOUTH TEXAS COLLEGE

Membership recruitment is an ongoing process at South Texas College.

The student chapter at **Xavier University of Louisiana** in New Orleans also extends the welcome mat to freshmen before classes begin, sending invitations to all incoming chemistry majors to join the ACS student chapter and participate in the university's mentoring program for first-year students.

Veteran chapter members at the **University of Detroit Mercy** (UDM) in Michigan add a personal touch to encourage freshmen majoring in chemistry and biochemistry to join the chapter by contacting them through Facebook or by e-mail. The members introduce themselves and attach their photo. If the freshmen later attend a meeting, they will see at least one familiar face and feel welcome. The chapter also teams up veteran members with new members during magic shows and other events. This also helps to break down the "age barrier" between freshmen and upperclassmen.

Believe it or not, *sugar* can also be used to attract freshmen to your chapter. At the **University of Maryland Baltimore County** (UMBC), freshmen are invited to attend the student chapter's Saccharide Social. This fall event gives freshmen an opportunity to check out the chapter in an informal setting while enjoying sweet treats. Members set up a small fire pit so guests can make s'mores. They also provide caramel apples, apple cider, and a few other treats for prospective members to enjoy.

The UMBC chapter also pairs potential members with experienced members and takes advantage of the ACS Member-Get-A-Member program. Not only do the students enjoy receiving the periodic table of elements blanket throws and backpacks; it's also a way for members to interact with one another as well as meet some of the chemistry faculty.

Visit chemistry classes

The ACS student chapter at **South Texas College** in McAllen begins its membership recruitment activities on the first day of classes each semester. Members visit the general chemistry and organic chemistry classes and talk to the students about the chapter and the benefits of becoming a member. They distribute ACS membership applications and copies of *C&EN* and *inChemistry* to the students and pass around sign-up sheets so they can later contact interested students. Because the South Texas College ACS student chapter is at a two-year college, there is a greater student attrition rate than at a four-year institution — making member recruitment an ongoing necessity.

Participate in student involvement fairs

Involvement fairs also provide wonderful member recruiting opportunities. Each fall, the **Campbell University** student chapter in Buies Creek, NC, participates in a campus street fair organized by the university. All university clubs and many organizations and companies from the surrounding area participate. The fair primarily serves as a way to introduce incoming students to the various clubs and opportunities around the campus. Chapter members pass out informational flyers and talk with students about joining the chapter. Participating in this event helps to bring in new members and increase the chapter's visibility among students, faculty, and the community.

Provide incentives to join

Extra credit in chemistry class and food can also lure new members. At UDM, the ACS student chapter holds an annual fall recruitment barbecue, providing free hot dogs, soda, and other treats to passersby. To encourage science majors to attend, students from freshman- and sophomore-level courses have the opportunity to participate in a drawing to get one to three bonus points for attending the barbecue, signing up on the club list server, and having a short meet-and-greet with a veteran club member.

BOTH PHOTOS COURTESY OF UNIVERSITY OF DETROIT MERCY

ISTOCK

Above: Prospective members at UDM sign up for chapter activities. Right: The UDM chapter members added five coats of paint and new decals, and laid new flooring in their chapter meeting space.

Create a welcoming atmosphere

Providing a comfortable, inviting space for chapter members to meet and hang out has been a boon for attracting new members to the UDM chapter. Last year, members completely remodeled their meeting space. They added five coats of paint and new decals, laid new flooring, and replaced some of the furniture, and a bright, fresh space emerged. Members also purchased new furniture and added an old, out-of-tune piano. Everyone has enjoyed using the refurbished space, and it has evolved into a popular gathering place. Many members hang out in the room studying, chatting, and just having fun.

Veteran members at the **University of Arizona** in Tucson actively strive to create a friendly atmosphere for incoming new members. The veterans realize that devising a membership strategy that brings new members into their chapter is just the first step of an ongoing membership process. Every officer is encouraged to "meet and greet" new faces after each meeting is adjourned. This goes a long way toward retaining new and old members alike and keeping the chapter strong and active.

Whether you use some or all of these recruitment activities — or come up with effective ones all your own — it's important to the health of your chapter to keep attracting new members. Not only will they make the activities you undertake this year more fun and rewarding … they'll also be there to carry on the momentum you created after you move on to the next phase of your career!

Create good buzz

When potential members hear good things about a chapter from a trusted source, they are very likely to join. **East Stroudsburg University** in Pennsylvania uses word of mouth to spread the word to potential members about the chapter. Chapter members invite their friends to become members, and instructors of junior- and senior-level courses encourage their students to join the chapter. The East Stroudsburg University student chapter also holds its meetings in a public space, and it has recruited several passersby to join.

Begin chapter activities right away

It also pays to recruit members before they commit themselves to other campus activities. At the start of the fall term, the Xavier University of Louisiana chapter begins its first fund-raising activity: visiting all of the general chemistry lectures and lab courses to sell periodic tables and rulers to students. Members introduce themselves to the students and invite them to attend the first chapter meeting. Adding to the momentum, the first meeting takes place the first week of school. Last fall, more than 100 students attended the meeting.

Contributing to this article were **Michael R. Adams** (Xavier University of Louisiana), **Ludivina Avila** (South Texas College), **Tara Carpenter** (UMBC), **Ben Dyer** (Campbell University), **Thomas B. Malloy, Jr.** (University of St. Thomas), **Matthew J. Mio** (UDM), **Brett Stoll** (University of Arizona).

Tap into Some Real SYNERGY!

The Why's and How-to's of Collaborating with Your Local Section

By Eric Stewart

ONE OF THE BEST-KEPT SECRETS OF SUCcessful ACS student chapters is active collaboration with their local section. The recent change in the ACS membership structure has altered the relationship between student chapters and local sections, once seemingly unconnected parts of the society, according to LaTrease Garrison, Assistant Director of the ACS Office of Local Section and Community Activities. "Students can become members of ACS itself, and when they do, they automatically become members of their local sections."

Even so, it takes a certain amount of strategy and foresight for student chapters to make the connection initially and keep it up and running. Luckily, other ACS student chapters and their faculty advisors are eager to share tried-and-true methods, strategies, and tips to ensure that your chapter gets the most out of collaborating with your local section.

Collaboration works!

There are many ways in which working with your local section can benefit your chapter — and you personally. Your chapter will probably be able to have more impact collaborating as a group than you could alone. For example, many local sections are constantly looking for ways to reach out to the community during National Chemistry Week (NCW) and Chemists Celebrate Earth Day (CCED), and your chapter is the perfect partner for them. It's likely that the local section can provide financial resources to help with purchasing supplies — while your chapter has the "people power" needed to put the plan into action, by planning and performing demos, helping with publicity and event planning, and so on.

CHRISTINE SCHMIDT

Brett Stoll (back row, third from left), with undergraduate attendees, was at the 2009 ACS Leadership Conference when he first met the chair of the Southern Arizona local section of the ACS, who later became his mentor and collaborator for chapter/local section events.

It opens doors!

Interacting with your local section can also give your chapter members opportunities to participate in activities that you might otherwise never do. At the **University of West Florida** in Pensacola, for example, faculty advisor Tim Royappa recalls how he and a chapter member enjoyed the experience of accompanying some fellow local section members when they visited the local office of their congressman to urge for more support for basic science.

It helps you personally!

In addition to the benefits your chapter will get from working more closely with your local section, you can also benefit personally in a number of ways:

Get valuable contacts — As you interact with other members of your local section, you'll start making professional connections with working chemists who could become valuable resources during your job-hunting, or might even become your future employers.

Learn new skills — By working side by side with your fellow members, you'll hone your skills in brainstorming, teamwork, and putting plans into action. In addition, if you gain experience in managing volunteers on a committee, you'll have a much easier time later on in your career, when you may be managing fellow employees.

Polish your networking skills — The more you get involved with local section members, the more comfortable you'll feel talking and networking with working chemists. "It's never too early," says Royappa with a laugh, "to learn to start schmoozing!"

At the **University of Arizona** in Tucson, student chapter president Brett Stoll and president-elect Emily Simpson formed a strong relationship with Terry Matsunaga, the chair of the Southern Arizona ACS (SAZACS) local section when Stoll and Simpson attended the ACS Leadership Conference in Fort Worth, TX, in 2009 and Matsunaga served as their mentor. Stoll and Simpson now regularly attend SAZACS executive board meetings, where they report on student member needs, concerns, and successes. This relationship led to continued support and cooperation from the SAZACS local section at major events, such as the Tucson Earth Day Festival.

COURTESY OF MORGAN STATE UNIVERSITY

Students at Morgan State University meet and network with fellow members at a local section meeting.

Charlee McLean, president of the **Morgan State University** (MSU) ACS student chapter in Baltimore, MD, is also a fan of her local section. The group approved her application for financial help to attend this year's ACS national meeting, she recalls, and she has also benefitted from speaking and networking with chemists, professors, and other students at local section events. Scheduled to graduate in December 2010, McLean observes, "It's been exciting and motivating to learn from others who have already experienced what I'm going through, and I've also gotten useful insights about my own career path."

The more interaction, the better!

There was a time, recalls Louise Hellwig, faculty advisor for the MSU chapter, when the only occasion at which her students and local section members got together was an annual meeting where the local section gave an award to the top senior from each institution in the area.

"In more recent years, my students have been attending more local section meetings, partly because the topics have become more accessible — such as the collapse of the Twin Towers, the chemistry of chocolate, and others — basically, subjects students could easily relate to."

One Success Story

Where can collaboration take you? Consider the example of the **Ball State University** (BSU) student chapter, in Muncie, IN. According to faculty advisor Jason Ribblett, soon after he started working with the chapter, two students came up with an idea for an honors project that resulted in "Science on the Greenway." The first year, the event consisted of a handful of students conducting science demos for a small crowd of children and families.

The following year, the chapter members decided they wanted to hold the event again, this time as an actual chapter event — but had only a few hundred dollars to buy supplies and generate publicity for the event. A breakthrough came when a member of the Indiana local section who worked at Eli Lilly and Company came to speak with BSU department members about another topic. During the visit, he mentioned that Lilly had some funds set aside for community outreach and, when Ribblett described the chapter's planned Greenway event, the visitor immediately said Lilly would be interested in funding the event. With a budget almost three times the size of the previous year's, the event grew in size. The next year, the local section itself asked if it could take over the funding.

The event has grown each year since then, says Ribblett, and this year attracted more than 800 attendees, including kids and family members. Best of all, the costs are paid by the local section, with the student chapter handling the planning and execution.

COURTESY OF BALL STATE UNIVERSITY

A Ball State University student conducts a chemical demonstration during the Science on the Greenway event.

COURTESY OF UNIVERSITY OF ST. THOMAS

Chapter members from the University of St. Thomas (TX) posing with Kerry Spilker, Chair of the ACS Greater Houston Local Section, after a collaborative outreach event at a local museum.

For example, senior Rudy Dehaney, vice president of the MSU student chapter, has attended several meetings of his local section. "Going to meetings and networking with chemists working in the field has helped me," says Dehaney. While the idea of talking with local section members might make some students feel nervous at first, he adds, it's still worth doing. "After all, they're just people, like anybody else. Talking with them helps you broaden your choices and also makes it easier to get your foot in the door after you graduate."

New collaborations can also be spurred by events on your own campus. For example, Hellwig recently applied for a Bridging-the-Gap Nanogrant with the specific goal of helping students at regional institutions become more involved with the local section. "Originally we were going to have a quiz bowl competition," Hellwig recalls, "but we got feedback from students and even some of the professionals that they didn't want to put themselves in an awkward competitive situation. So we toned it down to feature noncompetitive chemistry games and added a 'Speed Dating for Chemists' event where participants had two minutes to talk with people they don't know."

The meeting, held last March, was a great success, Hellwig notes. "We got a lot of positive feedback from attendees; I'd say it was definitely $250 well spent by ACS."

The **University of St. Thomas** in Houston, TX, also enjoys a close relationship with its local section. Thomas B. Malloy, Jr., the chapter's faculty advisor, also serves on the executive board of the Greater Houston Local Section. The contacts and interactions with the local section have been essential for obtaining grants and for finding venues for community service activities. Through connections with the local section, the chapter became involved with volunteering at Hospitality Apartments, which provides free temporary housing for families receiving treatment from the Texas Medical Center. Notes Malloy, "When the student chapter and local section support each other, we all benefit."

More tips for collaborators

Be proactive — Take the initiative to contact your local section first, says Hellwig. The local section may have needs that your group can help meet, such as organizing a poster session at your campus, hosting speakers, helping with NCW or CCED, etc.

Make connections to plan events — If you're thinking about finding a representative from a local industry who can speak at your school, Garrison suggests going through your local section. Local section members can easily help you with names and contact information and can also help you broaden the target audience for the event. By building a relationship with fellow local section members, you don't have to work as hard and reinvent the wheel each time you want to plan a new event.

Share information — Start communicating with your local section. Hellwig, for example, responded to the request of her local section newsletter's editor for items about local student chapter activities. "It keeps us on their minds in terms of ways we may be able to help with each other's upcoming programs," she notes, "and also becomes an easy addition to our annual report on our chapter activities."

Attend local section events — Since you're a member of your local section, you're welcome to attend any or all of its meetings — and some sections even offer reduced or free registration for students. By simply showing up, you might hear that they're looking for a venue for an upcoming program … and your chapter could help by finding a space on your campus to hold the program, and help advertise it. If transportation to meetings is a problem, ask whether any travel assistance is available.

Use ACS resources — Last but not least, check out the ACS web resource, Get Involved, Stay Involved (**www.acs.org/getinvolved**). According to Garrison, the page includes ideas for getting involved in NCW, CCED, and more. There's also a link to find out about your local section, including contact information for officers. "A great first step is to contact the program chair and get on their radar screen," she says. "If you have an idea for a new program, make a suggestion and offer to help."

Time to start collaborating!

However your chapter gets started working with your local section, the benefits are almost sure to follow. The two member groups of ACS already have very similar goals — and it's highly likely that you also each have something the other party can use. "In my experience, collaborating with our local section has been a very synergistic relationship," observes Royappa. "There's really been a lot of cross-pollination." ic

ERIC STEWART is a freelance writer and editor based in Arlington, VA.

Creating Positive Chemistry on Campus

How Student Chapters Can Make an Impact through Department and Campus Service

By Nicole Di Fabio

WHAT HAS YOUR CHAPTER DONE FOR your department or college lately? If you're looking for ideas, there are plenty of ways to get started. As undergraduate students and chapter members, you have great potential for contributing in positive ways — and impacting both current and future chemistry students, as well as your entire campus community.

Department and campus service is one of the essential categories recorded in student chapter annual reports, thanks to its huge potential for impact. By planning and executing activities and events, you can help your chapter gain visibility and increase awareness among students and faculty regarding your approachability, accessibility, intensity, and commitment to chemistry. This, in turn, could lead to an increase in chapter membership — and more motivated people to help reach your chapter goals. Perhaps the impact on your department or campus will extend even further and have a positive effect for years to come.

Compiled here are some suggestions for service ideas and some examples of chapters that contributed service, in large and small ways, to increase the vitality of their campuses.

Increasing visibility and engagement

Last year, chapter members at the **University of South Alabama** in Mobile made a big statement (literally) by painting a periodic table wall mural in the chemistry building on campus. The group dedicated an entire weekend to creating this piece so that fellow students could see the finished product when they returned to classes Monday morning.

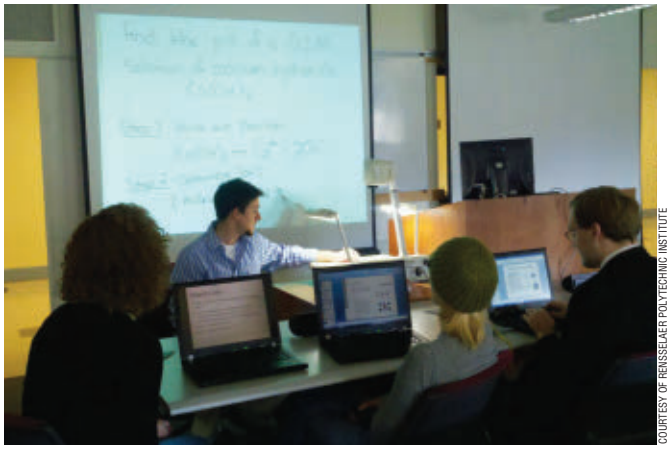
The members of the **Morgan State University** chapter in Baltimore, MD, increased their visibility and served their campus community by holding a "Demo Day." The event enabled students to experience and engage with chemistry in ways not normally found in a general chemistry course.

The student chapter at **Utica College** in New York made quite a few strides this past year — including increasing its chapter membership. Simultaneously (and perhaps not coincidentally), the number of students graduating with degrees in chemistry at Utica College doubled. To recognize all of these successes, chap-

ter members designed a chemistry stole (including buckyballs and a nuclear decay cartoon!) that was presented as a gift to all chemistry graduates as a way to recognize their outstanding achievements during their short time together.

Providing resources

Chemistry isn't an easy discipline; some students need more study time, while others may prefer to have a few chemistry lessons outside of the classroom to stay on top of their course material. To meet these needs, many ACS chapters offer chemistry tutoring as a service to both the students and their department. A tutoring service is one of the fundamental (and less costly) ways for chapters to provide department service.



COURTESY OF: RENSSELAER POLYTECHNIC INSTITUTE

RPI chapter members created instructional videos for the general chemistry students.

The student chapter at the **University of Southern Indiana** (USI) in Evansville took the concept a step further by piloting a mentoring program called CheMentors. The program began by asking students interested in becoming mentors to apply. Once approved, each student mentor was paired with a freshman interested in majoring in chemistry. After mentors and mentees were introduced at an initial meeting, they stayed in contact with each other individually, as needed. Mentors provided information about classes offered by the chemistry department, and also suggested studying tips and strategies for approaching professors for advice.

In addition, the USI chapter compiled a guidebook that oriented new chemistry majors to their department and invited them to the first ACS chapter meeting of the year. Their "Beginner's Survival Guide for Chemistry Classes" offered tips and guidelines for succeeding as a chemistry major at USI as well as department information, biographies and photos of faculty members, contact information, and a list of the benefits of becoming a student member of ACS.

Chapter members at **Rensselaer Polytechnic Institute** (RPI) in Troy, NY, are creating a series of instructional supplements for the Chemistry I courses offered on their campus. The group has created PowerPoint presentations and videos that map out conceptual frameworks and applications — specifically for students in the introductory class. These resources will enable RPI chemistry students to see each step of a calculation, develop problem-solving skills, and, so the hope goes, struggle less with homework and do better on chemistry exams.

Fun, learning, and productivity?

Yes, it's possible to achieve all three simultaneously!

Becoming an ACS student chapter member should be fun and engaging, so why not plan service activities that also function as social events? the **California State University Fresno** (CSU) chapter hosted a "Meet Your Professor Series" to enhance the relationship between students and faculty. The series allowed students to participate in chemistry activities and discussions outside the typical classroom environment. The chapter achieved its goal of breaking down formal classroom barriers by hosting a night to watch the TV show "CSI" with an analytical/forensics professor. The chemistry department chair also participated in the "Meet Your Professor Series" by hosting a "Chemistry of Cooking" barbecue in his home. Since this service experience was successful, the chapter hopes to expand upon the concept and encourage other departments to take advantage of the "Meet Your Professor Series" idea for their own students.

Many ACS student chapters try to conduct more informal meetings to ensure that chapter members enjoy their

Above: This wall mural in the chemistry department was created by members of the University of South Alabama chapter.
Below: The Utica College chapter designed a chemistry stole for graduating seniors.

COURTESY OF UTICA COLLEGE


ISTOCK

time spent with the chapter, while also promoting membership and retention. Some chapters offer events, such as liquid nitrogen ice cream socials, as a part of regular meetings to encourage students to become chemistry majors and members of the chapter. Although the meetings have a social component, the chapter leaders also discuss chapter activities and other business to balance productivity and socializing.

The "Classroom Luncheon Series" was an idea that originated at the **University of Richmond** student chapter. A special guest was invited to each luncheon for a question-and-answer session with chapter members at the Virginia institution. The sessions were exclusively for students to network, learn about chemistry careers, and hear about the career paths of the invited guests while enjoying lunch together.

Local action, global impacts

The impact of some service endeavors extends beyond the chemistry department. To take advantage of a general heightened awareness, some chapters are providing environmentally friendly services to their schools.

Chapter members at **South Texas College** in McAllen teamed up with biology club members to become certified by the Texas Stream Team to test the quality of water in local streams, rivers, and other bodies of water. Periodically, the chapter also received requests from citizens of the greater McAllen area to test lakes on their ranches.

COURTESY OF UNIVERSITY OF SOUTH ALABAMA


COURTESY OF SOUTH TEXAS COLLEGE

South Texas College members became certified by the Texas Stream Team to test the water quality at local streams and rivers.

COURTESY OF CALIFORNIA STATE UNIVERSITY FRESNO

The CSU Fresno chapter made spill kits for chemistry teaching labs.

The CSU Fresno chapter made spill kits for chemistry teaching labs, hoping to eventually expand the program by providing spill kits to labs in other departments on campus. In doing so, the members wanted to have a positive impact on their campus community as well as the environment, and consulted with their campus Department of Environmental Health and Safety about how to include only eco-friendly contents in the kits.

Of course, if you don't have the resources to assemble entire spill kits, there are more basic ways to help your department reduce its carbon footprint. Setting up recycling stations in places that previously did not have the means to recycle, or introducing more environmentally safe alternatives to disposing of chemical waste are simple initiatives that help your department, your campus, and the environment.

No better time to start

The ideas offered here for department and college campus service are some of the activities collected from the 2009-2010 chapter reports. Some of these may be effective on your campus, or perhaps they will help to stimulate new ideas that you can adapt to your own needs and capabilities. Regardless of the activity, these examples demonstrate the importance and benefit of introducing multiple service activities on your campus. We hope to see some more rewarding accomplishments in the coming year! iC

NICOLE DI FABIO is a senior education associate in the ACS Undergraduate Programs Office.

Photo Chemistry

Capturing the energy and enthusiasm of ACS student members... showcasing the activities, events, and accomplishments of their chapters.

COMPILED BY LORI BETSOCK

COURTESY OF OLIVET COLLEGE

"Top 10 Chemistry Pick-up Lines" — as revealed by the Gruen Chemistry Society ACS student chapter of Olivet College (MI)

COURTESY OF BRIGHAM YOUNG UNIVERSITY

"We'll Kick the H Out of You!"— The Deprotonators, an Ultimate Frisbee intramural team from the Brigham Young University (Provo, UT) chapter

COURTESY OF SOUTH TEXAS COLLEGE

"We Are Elemental" — South Texas College (McAllen) members celebrating Mole Day

COURTESY OF NORTH CAROLINA A&T STATE UNIVERSITY

"ACS NOBCChE Chemistry Club" — North Carolina A&T State University (Greensboro) members encouraging voters to perform their civic duty

COURTESY OF THE UNIVERSITY OF NORTHERN KENTUCKY

"Chemically Dependent" — Northern Kentucky University (Highland Heights) members posing with Past ACS President Tom Lane at the ACS national meeting in San Francisco, CA

COURTESY OF CALIFORNIA STATE UNIVERSITY FRESNO

"Fellowship of the Ring" — California State University Fresno members enjoying a few Wii moments

COURTESY OF CATAWBA COLLEGE

"Chemists Keep It Hot" — Catawba College (Salisbury, NC) members discussing demos in a chapter meeting

COURTESY OF WINTHROP UNIVERSITY

"True Life – I'm a Chemistry Major" — Winthrop University (Rock Hill, SC) members gathering at a chapter event

COURTESY OF UNIVERSITY OF ST. THOMAS

"UST ACS" — University of St. Thomas (Houston, TX) chapter members and organizers of the Education Rainbow Challenge math contests enjoying a light moment after appearing with Deborah Duncan, host of the KHOU "Great Day Houston" television program

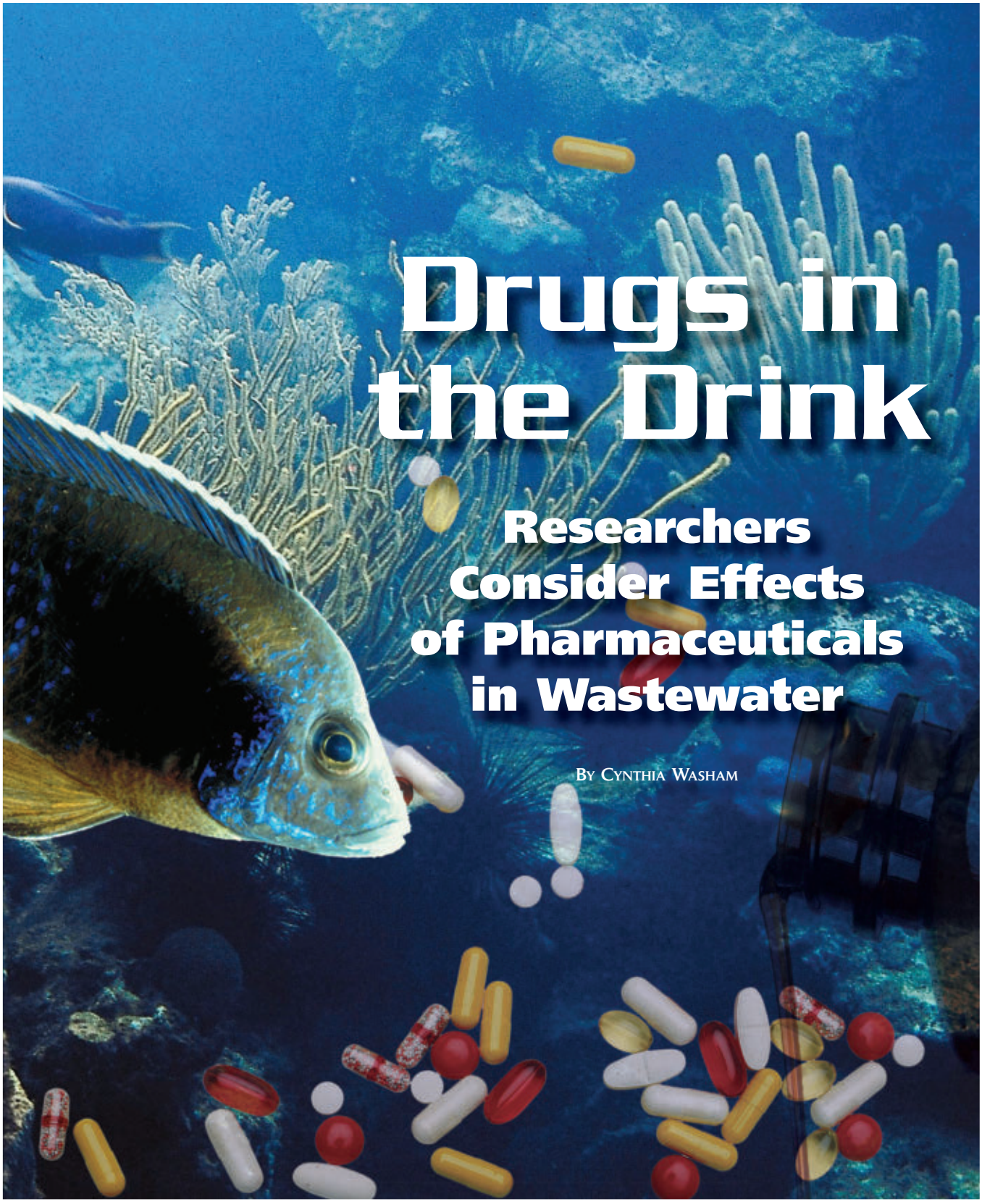
Be Candid!

Get Your Chapter Photo in inChemistry *Magazine!*

To get your picture published in a future issue of *inChemistry* magazine, send your high-resolution photos of ACS student members engaged in chapter activities to Lori Betsock at l_betsock@acs.org.

International Year of CHEMISTRY 2011

This special feature is presented in recognition of the International Year of Chemistry and efforts to bring a worldwide focus to issues concerning water in the environment.



Drugs in the Drink

Researchers Consider Effects of Pharmaceuticals in Wastewater

By Cynthia Washam

PHOTOS.COM

ANGLERS IN THE MID-1990S WERE THE FIRST TO notice something odd about the fish in Lake Mead near Las Vegas, NV — some of which had both male and female sex organs. U.S. National Park Service personnel appealed to Shane Snyder for help. The University of Arizona professor and co-director of the Arizona Laboratory for Emerging Contaminants had been developing bioassays to screen for chemicals in water. Snyder discovered that the fish were affected by synthetic estrogen from birth-control pills. He traced the estrogen upstream to Las Vegas, where women on the pill unknowingly threatened fish in Lake Mead every time they flushed the toilet.

Like most drugs, birth-control pills are only partly metabolized in the body; what's left is excreted in urine and feces. Human waste is piped to and treated in sewage treatment plants. Solids left after treatment are used as fertilizer, and the effluent is released into streams. Treatment removes some, but certainly not all, drugs.

Snyder's discovery inspired a flurry of research. Scientists wanted to know the types and quantities of drugs that escape into waterways, what effects they have on aquatic life, and how the effects could be minimized. They also wondered about the fate of pharmaceuticals beyond the river or lake. As rivers flow into reservoirs that provide drinking water., water treatement plants remove bacteria and other contaminants. Researchers wondered whether the treatment plants were also removing pharmaceuticals, or were the drugs seeping into the water we drink?


JAMES C. DAVIS, SOUTHERN NEVADA WATER AUTHORITY, LAS VEGAS

Shane Snyder

Drugs go with the flow

A first step was assessing just how commonly pharmaceuticals occur in waterways. In 1999 and 2000, the U.S. Geological Survey (USGS) sampled water from 139 streams in 30 states. Eighty percent were contaminated with pharmaceuticals and other compounds, including insecticides and fire retardants. Drugs found included many of the most widely used antihistamines, antidepressants, antibiotics, and pain medications.

"We've identified more than 100 pharmaceuticals [in U.S. waterways]," Snyder said. One drug class of particular interest is antidepressants, which are very common and persistent in waterways. "We knew that [the brain chemical] serotonin, which a number of these drugs modulate, is common across a wide range of species," said Denver-based USGS researcher Edward Furlong.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As reported in the journal *Environmental Toxicology and Chemistry*, Furlong found that minnows exposed to four popular antidepressants lost their instinct to avoid predators. Researchers speculated that such an effect could threaten the species' ability to survive in a water body tainted by antidepressants. "We're trying to figure out what the implications are," Furlong said.


COURTESY OF ILENE RUHOY

Ilene Ruhoy

A recent discovery was that the toilet isn't the only major source of drugs in wastewater. Researchers Ilene Ruhoy, director of the Institute for Environmental Medicine at **Touro University** in Nevada, and Christian Daughton of the U.S. Environmental Protection Agency's National Exposure Research Laboratory in Las Vegas, reported at the spring 2010 ACS national meeting that pharmaceuticals also enter the waste stream through bathing, showering, and laundering. Many are topical products used to treat such problems as acne, fungal infections, and burns. Others are medications that are swallowed and excreted in perspiration.

"It's very difficult to determine the precise source of any identified pharmaceutical compound in water studies," Ruhoy said. "But it's reasonable to assume [topical products] may prove to be a significant one."


COURTESY OF ERIC VANCE, US EPA

Christian Daughton

More questions than answers

While ecologists continued studying the effects of pharmaceuticals on aquatic life, other researchers turned their attention toward the tap. Snyder and his colleagues raised eyebrows in 2009, when they reported that dozens of pharmaceuticals were in drinking water distributed by 19 major utilities across the country. As an article in *Environmental Science & Technology* noted, the most common included the painkiller naproxen, meprobamate (marketed as Miltown or Equanil), carbamazepine (Tegretol), and the hormone estrone.

Although their finding sounds like a "drugstore in a drop," Snyder emphasized that quantities in the samples were far below the therapeutic dose.

"The highest concentration of any pharmaceutical we detected in U.S. drinking water is approximately 5 milion times lower than the therapeutic dose," he told a U.S. Senate subcommittee investigating water quality. "One could safely consume more than 50,000 8-ounce glasses of this water per day without any health effects [from the pharmaceuticals present]."

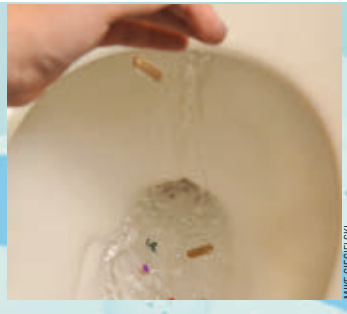
Researchers wonder, though, if those minute doses, taken day after day, year after year, might put us at risk. In recent decades, human fertility has declined. Men have lower sperm counts and a higher incidence of reproductive abnormalities. Girls are reaching puberty at a younger age than ever before. Scientists suspect these changes are influenced by endocrine disruptors but can't say what role, if any, pharmaceuticals in water play.

"We don't know the health effects of long-term exposure," said Herb Buxton, coordinator of the USGS Toxic Substances Hydrology Program. Nor do researchers know the effects of the combination of pharmaceuticals in water. "This is a key focal point of new studies," Snyder said. "Mixture toxicity is largely not studied."

Ozone outshines chlorine

The drinking-water study revealed that the type of water treatment strongly affects the levels of pharmaceuticals that escape in drinking water. Chlorine, the most common wastewater disinfectant, removes only some drugs. Eighty percent of psychoactive drugs, including Prozac and other antidepressants, escape chlorine treatment. Chlorine poses the additional

Forget the Flush: What You Can Do



MIKE CIEPIELSKI

For generations, the toilet was considered the best place for unused medications. It kept them from being consumed by pets, young children, and garbage-scavenging drug addicts. However, flushing doesn't make drugs disappear. They often reemerge in freshwater bodies, where they threaten the health and survival of fish and other aquatic life. To minimize the environmental risk, the U.S. Fish and Wildlife Service and drug manufacturers created the following guidelines for disposing of medications that are expired or no longer needed.

Take your outdated prescription and over-the-counter medicines to a local law enforcement agency (as recommended by the National Take-Back Initiative).

COURTESY OF KELLY WOODEN

Boone County Boone County (IA) Project SAFE

Never flush or pour drugs down the drain unless the accompanying patient instructions advise you to.

Return unused drugs for safe disposal at take-back programs, sometimes sponsored by pharmacies and hazardous-waste collection sites. Call your local pharmacy or waste-removal service for more information.

If you must dispose of drugs at home, remove them from their original containers and mix them with an unappetizing substance such as sawdust, kitty litter, or coffee grounds. Better yet, crush the pills first, put the mixture in a sealed plastic bag or container, and throw it in the garbage. Also, remove the label from the original bottle or use a permanent marker to block out the prescription number and all personal information. This discourages illicit refills.

A team of researchers from several drug companies put the trash can disposal advice to the test. Over time, pharmaceuticals in landfills decompose and leach into groundwater. But the quantities that escape landfill liners are a mere fraction of those that enter water bodies from sewer systems. The researchers estimated that unused drugs flushed down the toilet make up 6% to 17% of the total volume of drugs that end up in surface water. The rest comes from excretion. The same quantity of drugs brought to a landfill makes up less than 0.2% of drugs in surface water.

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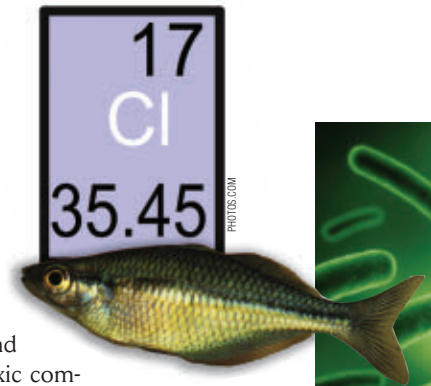

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risk of reacting with some drugs to produce new, more toxic compounds.

"You can chlorinate a molecule and change its geometry to be more toxic than it was," Snyder noted. "You can form chlorinated aromatic rings; for example, acetaminophen and chlorine can react to form a more toxic compound."

A study Snyder participated in showed that triclosan, an antibacterial found in countless household products, reacts with chlorine to form monochlorinated triclosan and dichlorinated triclosan. According to an article in *Environmental Science & Technology*, acetaminophen reacts with chlorine to form several products, including 1,4-benzoquinone and *N*-acetyl-*p*-benzoquinone imine (NAPQI), the cause of death in acetaminophen overdoses.

The most promising alternative to chlorine is ozone, which removes 80% of pharmaceuticals within 5 minutes, including estrogens, according to the journal *Ozone: Science & Engineering*. "The byproducts tend to be far more biodegradable and much different from chlorine byproducts," Snyder explained.

Municipalities largely abandoned ozone treatment 20 years ago because of its high energy cost. Snyder expects a resurgence with new technology that operates more efficiently. An ozone water-treatment plant under construction in Las Vegas is the first in the country designed to maximize removal of pharmaceuticals and other endocrine disruptors. Snyder and his colleagues are exposing fish to wastewater treated with ozone and wastewater treated with chlorine to compare the effects.

Microbes to the rescue

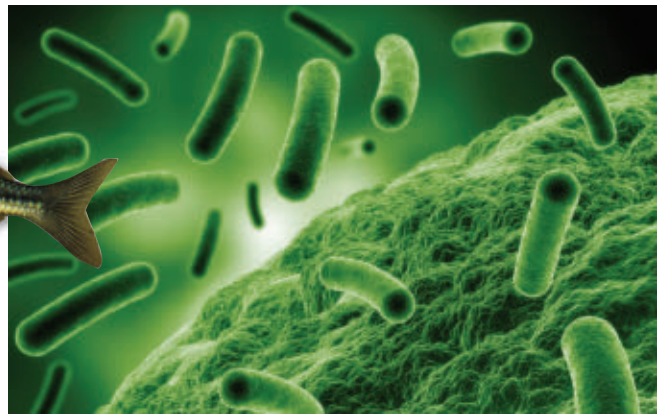
Some of the newest studies on reducing pharmaceuticals in water capitalize on microbes — also known as "nature's janitors." Kung-Hui Chu, an assistant professor of environmental engineering at **Texas A&M University** in College Station, is examining strains of bacteria that consume water contaminants. She began by culturing bacteria in wastewater sludge on an estrogenic growth medium. A strain she dubbed KC8 thrived on the medium (indicating it completely broke down the estrogen).


LIANGDER.JOU

Kung-Hui Chu

Now, as she explains in an article in *Environmental Science & Technology*, she and her cohorts are trying to figure out how to apply their laboratory discovery to water-treatment plants. "How can we create an environment where this strain can thrive and degrade estrogen?" she asked rhetorically. "Can it grow fast enough to outcompete other strains?"

Some members of her team are experimenting with pH levels and aeration to see what fosters the best environment for KC8. Others are searching for bacteria that degrade antibiotics and ibuprofen.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"It's impossible for one microorganism to degrade them all," Chu observes. Better water treatment, drug-degrading bacteria, and consumer efforts (see "Forget the Flush," on page 18) might go far toward minimizing pharmaceuticals in water. But, Snyder cautions, they'll never remove every trace.

"Ultimately, it will come down to people deciding how pure they want their water to be," he said. "The most economical solution might be to provide pure drinking water and less pure water for bathing, the toilet, and clothes washing." IC

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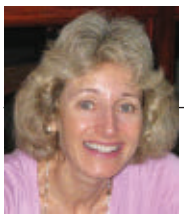
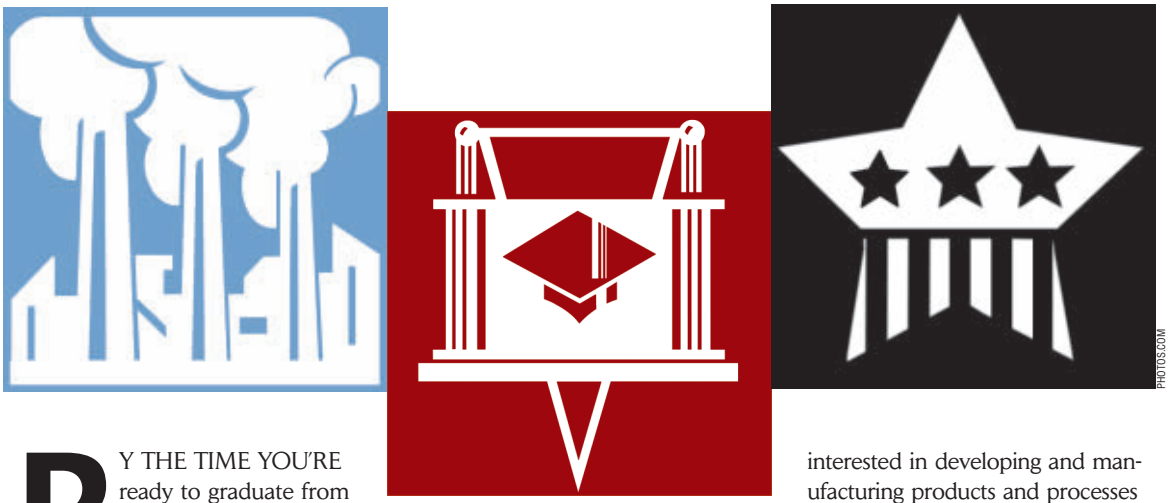


Cynthia Washam is a freelance writer and one time pharmacy major. She's also a South Florida runner who probably washes more than her share of deodorant, sunscreen, and liniment down the drain.

Which Job Sector Is Best for You?

How Chemists Work in Industry, Government, and Academia

By Lisa M. Balbes



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BY THE TIME YOU'RE ready to graduate from college, you've spent the majority of your life in school. You may think you've had enough, and be anxious to get into the "real world." You know how to be a student — but do you know how to be an employee and in which sector you wish to work?

When you move into the working world after earning your bachelor's degree, there are three main sectors to choose from — industry, academia, and government. As you start to think about the next step in your professional career, you will do well to consider your own skills, strengths, and desires — and determine which type of employer will be the best fit for your needs and talents.

Industry

Statistically, industry is where you are most likely to go, since approximately 60% of bachelor's-level chemists work in the private sector. Industrial chemists are interested in developing and manufacturing products and processes that increase their companies' sales and profits. Industrial research to develop new products is fast-paced since the faster the product reaches the market, the sooner it will produce income for the company. Adding to the pressure is the fact that many industries are highly regulated and must comply with a variety of regulations, including Current Good Laboratory Practices (cGLP) and Current Good Manufacturing Practices (cGMP). But the pressure does come with rewards as industrial salaries have traditionally been higher than those in other sectors.

Dawn Powell is a research associate at Akermin, a small materials company, where she runs assays to test compositions for their ability to sequester CO_2. Powell enjoys working at a small company since it allows her to learn many new skills and do different types of work (or tasks) every day. Especially at small companies, you will be expected to pitch in and do whatever is necessary to move a project forward. Small companies need generalists, while employees of

The Federal General Schedule Plan

Most salaries of federal employees are established by the General Schedule (GS) plan. Under this system, jobs are rated at 15 different levels, also known as grades, based on qualifications needed to fill the position and the job requirements. Specific salaries are set at each level. The base salaries for the GS plan are shown to the right, but salaries for many federal workers are often higher by 14% to 35% because the federal government adjusts GS salaries for locality and hard-to-fill fields. Experienced government employees also build higher salaries by within-grade increases, or step increases.

According to the U.S. Office of Personnel Management, B.S.-level chemists entering the federal job sector typically start out at a GS-5 level. However, if you maintained at least a 3.0 grade point average or have experience, you could start out at the GS-7 level. Chemists who have a master's degree directly related to the job opening could qualify for a GS-9 rating.

2010 General Schedule – Starting Salaries

Grade	Step 1
1	$17,803
2	$20,017
3	$21,840
4	$24,518
5	$27,431
6	$30,577
7	$33,979
8	$37,631
9	$41,563
10	$45,771
11	$50,287
12	$60,274
13	$71,674
14	$84,697
15	$99,628

Source: U.S. Office of Personnel Management

larger companies tend to become more specialized over time.


TODD PULVIRENTI

Dawn Powell

Aside from research and hands-on science, there are many other career opportunities and activities for chemists in industry, including work in manufacturing and production, quality control, sales, marketing, regulatory affairs, purchasing, human resources, and other nonlaboratory careers. Some companies hire as many bachelor's-level chemists to do sales and marketing as they do to work in their laboratories. Once you leave the lab, however, it can be hard to go back since your skills and knowledge can become outdated quickly.

One of the biggest surprises to many who move into industry is the fact that virtually all projects are done by teams. Often, these teams have very diverse backgrounds and can be distributed geographically. In school you may have done a few group projects, but for the most part your grades were determined by your own work. In industry, your success or failure often depends on the people around you and how well you can all communicate and interact with each other.

Being able to communicate effectively and efficiently with a wide variety of people is crucial in industry. In school, you may interact with people who have backgrounds similar to your own, but in industry, you'll deal with many cultural and language differences. Your manager will expect you to be able to explain your ideas both orally and in writing, to others on your team and to those who know nothing about your project.

The better you are at clearly and concisely communicating your ideas and needs, the more your ideas will be heard and the more you will make yourself a valuable member of the team. Powell says she wishes she had sought out opportunities to write more technical documents while an undergraduate, since applying for and winning grants is very important to her company's success.

All this teamwork requires leadership, so leadership skills are also highly valued in industry. Any experience you can get while you are in school — organizing an event, chairing a committee, or starting a project — will be valuable. Such activities build your skill set and also provide specific examples to talk about during the interview process.

Finally, in industry you will have more independence and control over your own projects than you did as a student. It will be up to you to ask for help and to be on the lookout for new opportunities and challenges.

Government

Approximately 10% of all chemists work in government jobs at the federal, state, or local level, but this percentage is slowly increasing. Government is generally considered the most stable sector, since it is unlikely to go out of business, and the benefits are good. Salaries are typically lower than in industry.

At the state and local levels, salaries vary greatly from one state to another and can also vary according to the branch of government or department. To find out the salaries for jobs in your local area, check government websites or inquire with human resources departments.

Federal agencies such as the Centers for Disease Control and Prevention

(CDC), Food and Drug Administration (FDA), National Institutes of Health (NIH), U.S. Department of Agriculture (USDA), National Institute of Standards and Technology (NIST), and many more hire chemists to conduct research, regulatory affairs, and engage in public policy work. Staff members from these agencies often work in multiple locations. State and local governments also hire scientists (most forensic work, for example, is done at the state and local levels). Cindy Ngo, a physical assistant at the FDA, notes, "In the laboratory, you learn how to apply the information you learned in school and how to perform various techniques and run instrumentation. I had to learn many new instrumental methods." She says she likes that she is able to learn about the new issues that the agency is addressing and the new techniques they are developing. Most government positions require U.S. citizenship or a successful security clearance, so check before you apply.

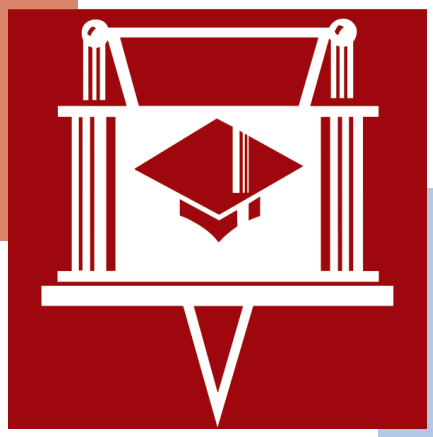

SAMUEL WAPPELHORST

Caitlin Fischer

Government employees are expected to work efficiently, but since there is less chance of layoffs or downsizing, there may not be the same level of pressure as that found in industry. The hiring process is notoriously slow, and it can take up to a year for a government agency to fill an advertised position. Depending on the position, a background security check may be required. Visit the federal government website, **usajobs.gov**, for current openings, and the various websites of state and local governments.

Academia

Perhaps you enjoyed your time as an undergraduate so much you don't want to leave academia. About 40% of chemists at all degree levels work in academic settings. Academia is all about educating the next generation of students and increasing the general body of knowledge.



There are more than 4,000 institutions of higher education in the United States, from research-intensive universities to liberal arts colleges to community colleges. Scientists with bachelor's degrees help set up and run teaching labs and assist with research.

"Working in the lab is very hands-on, and I am free to set my own schedule," says Caitlin Fischer, a laboratory technician at Saint Louis University. "I can work 2 hours one day and 12 the next, as long as the work gets done. Sometimes it's easier to plan hours around when other people will not be working, so we can spread out and not get in each other's way."

The pace of the work for those supporting teaching labs corresponds to the academic calendar. Academic research also ebbs and flows, requiring more attention when deadlines for grant applications or conference submissions approach. Research projects follow the interests of principal investigators and generally progress at a slower pace than industrial research.

Working in secondary education is also an option for chemists with bachelor's degrees. Requirements for teachers vary by state, but certification is generally required by public high schools. You may be able to teach chemistry at a private high school or provide support for tutoring and other academic assistance programs without certification.

Whether you are teaching at the high school level or helping to run teaching labs at the college level, it is important to provide students with a high-quality, up-to-date educational experience. You will be responsible for keeping up with discoveries and rapid changes in the field of chemistry and in related sciences, including biology and physics.

Experience you gain now by participating in chapter outreach events to K-12 students or the general public will help you with your communication of scientific concepts.

How to prepare

No matter which sector you choose, one of the best things you can do while still in school is to get as much laboratory experience as possible, preferably in the sector in which you plan to work. The specific type of experience you get doesn't matter as much as making sure that you learn instrumentation, laboratory techniques, scientific calculations, and so on. Take advantage of opportunities to learn and practice other skills, such as managing your own time and communicating with others. "There is a lot of on-the-job training," says Fischer, "but you need to be capable of keeping your own schedule, keeping a good laboratory notebook, recording observations completely and accurately, storing data properly, communicating your work with others, and so on." All these skills will come in handy, no matter which sector ends up being right for you. IC

Lisa M. Balbes is founder of Balbes Consultants LLC, author of *Nontraditional Careers for Chemists*, published by Oxford University Press, and a freelance scientific communication consultant. She also blogs on career development for scientists.

International Year of CHEMISTRY 2011

Putting Chemistry on the Calendar!

2011 Is Designated as the International Year of Chemistry

By Terri M. Taylor

FOR AN ENTIRE YEAR — 365 days, 8,760 hours, or 525,600 minutes — chemists and chemistry enthusiasts the world over will simultaneously celebrate and highlight the transforming power of our discipline. Are you ready to celebrate? This is YOUR year!

On December 30, 2008, the United Nations passed a resolution, submitted by Ethiopia, that designated 2011 as the International Year of Chemistry. This historic, year-long celebration is designed to highlight the achievements of chemistry and its contributions to the well-being of humankind. This worldwide initiative is being led by the International Union of Pure and Applied Chemistry (IUPAC) and the United Nations Educational, Scientific and Cultural Organization (UNESCO).

IYC 2011 celebrations will offer a range of interactive, entertaining, and educational activities for all ages across the globe. These activities will be aligned with the celebration's theme, "Chemistry – our life, our future," and will focus on:

- Increasing public appreciation of chemistry in meeting global needs
- Increasing interest in chemistry among young people
- Generating enthusiasm for the creative future of chemistry
- Celebrating the contributions to chemistry of Marie Curie and other women.

Join the celebration!

National and international societies, institutions, organizations, and individuals have been encouraged to plan and conduct IYC-related programming. The ACS is enthusiastically joining this effort and will provide resources to support ACS student chapters and their members in celebrating during this historic year.

Take advantage of resources

IYC Student Chapter Grants are designed to help ACS student chapters conduct projects and activities that celebrate one or all of IYC's quarterly themes (see sidebar). Grants will be awarded to ACS student chapters for the spring and fall 2011 semesters to support projects and activities that seek to promote the outreach themes of IYC 2011. (Note: The application deadline for spring 2011 has passed.)

Electronic Toolkits, featuring ideas and templates for planning activities to engage various communities, are available at **www.acs.org/iyc2011**. There are three toolkits –"Planning Your IYC Event," "Recognizing Event Donors, Volunteers, and Participants," and "Getting the Word Out About IYC." Each includes a variety of guidelines, templates, and ideas.

365: Chemistry for Life was launched online on January 1, 2011. This web-based initiative highlights a different topic (person, place, molecule, element, etc.) every day throughout the year. Feel free to drop in every day, week, or month to celebrate and learn about the many ways chemistry contributes to our lives!

Throughout IYC, stay tuned for even more IYC-related resources.

Engage the community

IYC 2011 will provide the worldwide chemistry community with a historic opportunity to celebrate the many ways that chemistry improves people's lives. We need *you* to join the effort!

How will you engage your local community in celebrating IYC? What bridges might you build during 2011? How will you deliver the IYC message? There are many answers to these questions. The difficulty may lie in choosing which answers — and activities — to pursue! Whatever you decide, we look forward to celebrating with you in whatever way you choose!

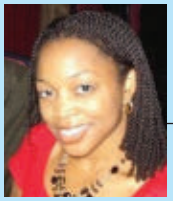
For more information, visit **www.acs.org/iyc2011** or e-mail **iyc2011@acs.org**. iC

IYC Themes

During 2011, ACS will provide resources for a full year of outreach activities linked to IYC's quarterly themes:

- **1st Quarter: Water in the Environment.**
- **2nd Quarter: Alternative Energy Sources.**
- **3rd Quarter: Materials – Recycling, Properties, and Nanomaterials.**
- **4th Quarter: The Chemistry of Health and the Positive Impact of the Chemical Sciences on Nutrition, Hygiene, and Medicine.**

Resources for hosting outreach activities related to each quarter's theme are available online at **www.acs.org/iyc2011.**



Terri M. Taylor is the ACS assistant director of K-12 science.

EXPERIENCE THE CHEMISTRY!

241st ACS National Meeting
Undergraduate Program

SUNDAY, MARCH 27

Undergraduate Hospitality Center
8:00 A.M. – 5:00 P.M.
Disneyland Hotel

Making the Most of Your First ACS National Meeting
8:00 – 8:45 A.M.
Disneyland Hotel

Careers in Chemistry—"Environmental Concerns/ Alternative Careers"
9:00 – 10:30 A.M.
Disneyland Hotel

Professional Development Symposium—"Get Inspired to Develop Your Career Now!"
9:00 – 11:00 A.M.
Disneyland Hotel

Chem Demo Exchange
10:30 A.M. – 12 NOON
Disneyland Hotel

Graduate School Reality Check
11:00 A.M. – 12:30 P.M.
Disneyland Hotel

Networking Social with Graduate School Recruiters
1:30 – 3:00 P.M.
Disneyland Hotel

Making Demos Matter Workshop
3:30 – 4:30 P.M.
Disneyland Hotel

ACS Student Chapter Awards Ceremony
7:00 – 8:30 P.M.
Disneyland Hotel

Undergraduate Social
8:30 – 11:00 P.M.
Disneyland Hotel

MONDAY, MARCH 28

Undergraduate Hospitality Center
8:00 A.M. – 5:00 P.M.
Disneyland Hotel

Graduate School Recruiting Breakfast
8:00 – 10:00 A.M.
Disneyland Hotel

Outreach Workshop: NCW Ideas
9:45 – 11:15 A.M.
Disneyland Hotel

Technical Symposium: Chemistry of the Gulf Coast Oil Spill
9:45 – 11:15 A.M.
Disneyland Hotel

Undergraduate Research Poster Session
12 NOON – 2:30 P.M.
Anaheim Convention Center

Eminent Scientist Lecture: "A Little Light Relief"
Presented by Dr. David Phillips, President, Royal Society of Chemistry
3:00 – 4:00 P.M.
Disney Paradise Pier

Networking Session with Industrial Chemists
4:00 – 5:30 P.M.
Disney Paradise Pier

The Kavli Foundation Sustainable Energy Symposium
5:45 – 6:45 P.M.
Anaheim Convention Center

Sci-Mix/Successful Student Chapters Poster Session
8:00 – 10:00 P.M.
Anaheim Convention Center

ACS
Chemistry for Life™

ANAHEIM, CA
MARCH 27-31, 2011

Explore Graduate School Opportunities

The graduate school events provide a great opportunity for undergraduates to network with graduate students and recruiters representing a diverse variety graduate programs and to learn about meeting the challenges of graduate school.

Attention: Graduate School Recruiters!

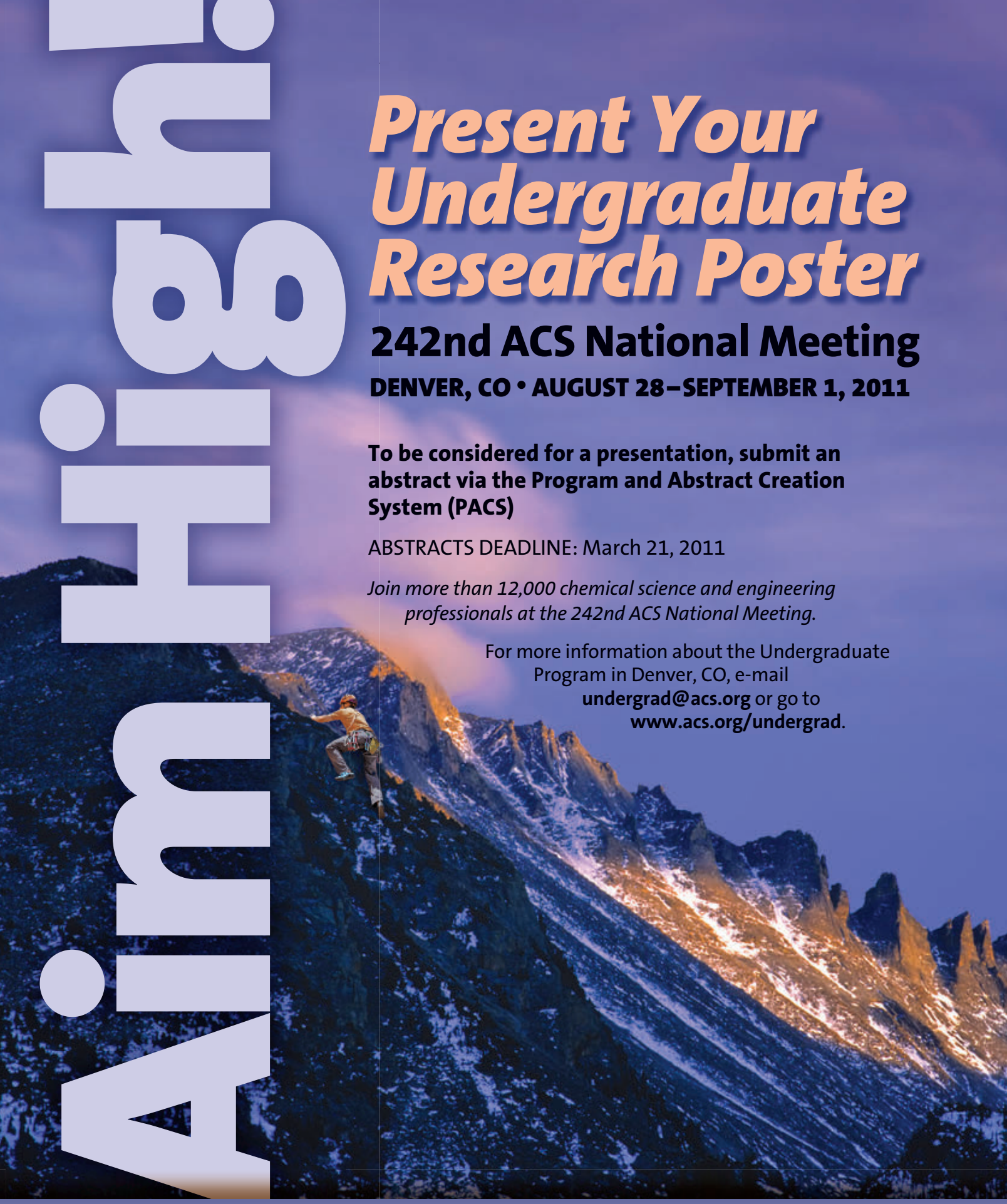
Network with top quality undergraduate students who are interested in learning more about your graduate school programs. Register to participate in the graduate school recruiting events. For more information contact Lori Betsock at l_betsock@acs.org.

Featuring special symposia on the chemistry of our natural resources...

All events are sponsored or co-sponsored by the Society Committee on Education Task Force on Undergraduate Programming.

Chair: Charles Baldwin, *Union University, Jackson, TN.*
Program Chair: Angela Winstead, *Morgan State University, Baltimore, MD.*

For more information, contact the ACS Undergraduate Programs Office at 1-800-227-5558, ext. 4480, or undergrad@acs.org.



Present Your Undergraduate Research Poster

242nd ACS National Meeting

DENVER, CO • AUGUST 28–SEPTEMBER 1, 2011

To be considered for a presentation, submit an abstract via the Program and Abstract Creation System (PACS)

ABSTRACTS DEADLINE: March 21, 2011

Join more than 12,000 chemical science and engineering professionals at the 242nd ACS National Meeting.

For more information about the Undergraduate Program in Denver, CO, e-mail **undergrad@acs.org** or go to **www.acs.org/undergrad**.

ACS Chemistry for Life™

www.acs.org

ACS
Chemistry for Life™

www.acs.org/scholars

American Chemical Society Scholars Program

Pathways to Success in the Chemical Sciences

Inviting African-American, Hispanic, & Native American students to apply for renewable scholarships for the 2011-2012 academic year.

Up to $5,000 will be awarded to underrepresented minority students who want to enter the field of chemistry or chemistry-related fields, such as environmental science, toxicology, and chemical technology. High school seniors and college freshmen, sophomores, or juniors are eligible to apply.

Eligible applicants include those who are interested in:

- pursuing four-year degrees in the chemical sciences
- transferring from two-year colleges to four-year colleges to pursue chemical science degrees
- pursuing two-year degrees in chemical technology.

For more information, and to access the online application form, visit:

www.acs.org/scholars

Application deadline is March 1, 2011.

Approximately 100 scholarships will be awarded.

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