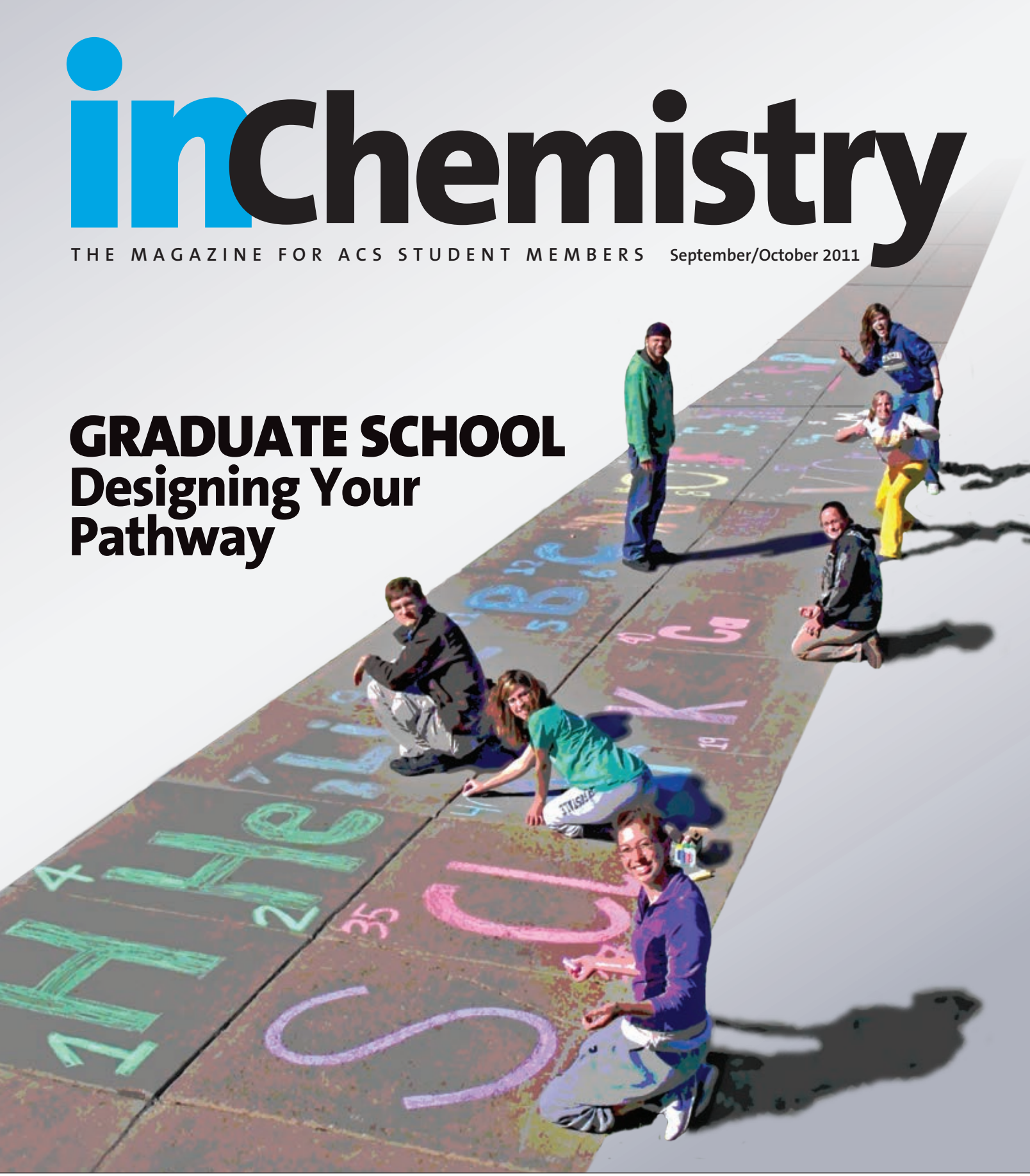
inChemistry

THE MAGAZINE FOR ACS STUDENT MEMBERS September/October 2011



GRADUATE SCHOOL
Designing Your Pathway

ALSO IN THIS ISSUE

- Hosting Successful NCW/Mole Day Events
- Preparing for Graduate School Visits
- Exploring the Chemistry behind NASA Spin-offs
- Scrubbing Your Online Image

ACS Chemistry for Life®

IYC 2011 International Year of CHEMISTRY

inChemistry

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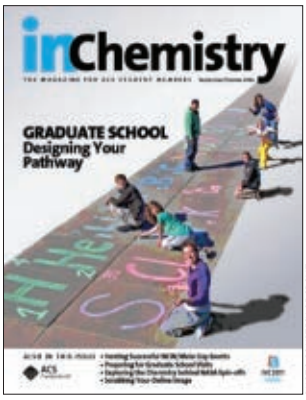

PHOTO COURTESY OF SDSMT

During NCW, ACS student chapter members chalk the campus sidewalks with elements. 31

IN MEMORIAM
Julia Rutherford
1989–2011

This issue of *inChemistry* (*iC*) is dedicated in memory of Julia Rutherford, who died July 3, 2011 while hiking in the Cascade mountains. Julia was a senior who majored in chemistry and physics at Pacific Lutheran University (PLU) in Tacoma, WA.

She thrived on challenging herself and strove for excellence in all she took on— whether it was pursuing coursework or undergraduate research, engaging in the outdoors, playing the clarinet, or helping to lead the ACS student chapter at PLU. Earlier this year, Julia received a Student Leadership Award to attend the 2011 ACS Leadership Institute and co-wrote an article about this experience for *iC*, which appears on pages 4 and 5.

Julia's passion for learning and fearless spirit will be missed by all who knew her.

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EDITORIAL: **Preparation for Graduate School Starts *Now***

BY CYNTHIA LARIVE

If you're considering graduate school, there is a lot you can do to ensure your success... and it's never too early to start.

Most important is completing a rigorous undergraduate curriculum, such as one that meets the requirements of an ACS-certified degree. Since chemistry research is becoming increasingly interdisciplinary, taking electives in other scientific areas of interest can be good preparation for interdisciplinary graduate work.

While your B.S. curriculum is likely to be course-intensive, graduate programs, especially those leading to the Ph.D., place less emphasis on courses and more on research. Therefore, completing an undergraduate research experience is excellent preparation. As a researcher, you will learn how chemistry is practiced, experience the challenges of asking scientific questions and designing experiments, and gain important skills and experience working in the lab as part of a research team.

Consider applying to an NSF Research Experience for Undergraduates (REU) program, which offers summer research experiences and provides a stipend that will allow you to live and work at another university in the U.S. or abroad. Alternatively, you could take advantage of summer internship opportunities at a corporate or government lab.

In graduate school you will be expected to give seminar presentations, write papers, and prepare a thesis or dissertation describing your research. Therefore, it's helpful to look for opportunities to hone your communication skills by presenting your undergraduate research results on campus and at regional or national ACS meetings.

Some students have trouble choosing one particular area to focus on in graduate school. To learn more about the different areas of chemistry, attend (or start) a seminar program in which students give presentations on their research or recent literature developments. Reading the scientific literature will also give you a better grasp of modern chemistry and the leading researchers in your field of interest. The ACS Directory of Graduate Research (dgr.rints.com) is a great (and free) online tool that can help you find professors working in different areas of chemistry and related fields.

A great opportunity to build leadership and teamwork skills is to become involved in your student chapter and in the ACS. Volunteer or work as a chemistry tutor, or organize a group of students to do chemistry demonstrations at a nearby school.

All of these activities will help you develop the skills you need to be successful in graduate school and beyond. The sooner you take charge of your own professional development, the better you will ensure your success as a future M.S. or Ph.D. student.

Cynthia Larive *is chair of the ACS Committee on Professional Training and professor of chemistry at the University of California Riverside.*

ASK ACS

Do you have any questions relating to ACS student chapters or other programs at ACS? If so, e-mail us at undergrad@acs.org and we'll find your answer.

Q: This year I am living off-campus, so I have a new address. How do I notify ACS?

A: You can update your address by sending an e-mail to service@acs.org or by logging in to www.acs.org to edit your member profile. Click on Show Account Details and then Edit My Profile.

Q: Is *inChemistry* magazine available online?

A: You can access the current issue and past issues dating back to 2006 by clicking on the inChemistry *cover photo icon at www.acs.org/undergrad. Recently added features include a searchable archive.*

Q: Are chapters eligible to receive grants from ACS?

A: All active ACS chapters in good standing may be eligible to apply for five types of grants that are offered by the ACS Undergraduate Programs Office:

Undergraduate Programming at Regional Meetings Grant — *Receive up to $2,800 to develop undergraduate events and activities for ACS regional meetings. Proposal deadlines: late September 2011 for the ACS spring 2012 regional meetings; early November 2011 for the ACS fall 2012 regional meetings.*

Starter Grant for ACS Student Chapters at Two-Year Colleges — *Receive up to $500 to start or reactivate an ACS student chapter at a two-year college. Deadline: November 7, 2011.*

National Meeting Travel Grant — *Receive $300 to help ACS student chapters cover registration fees, lodging, and/or transportation costs associated with ACS national meetings. Deadlines: mid-January 2012 for ACS spring 2012 national meeting; mid-June 2012 for ACS fall 2012 national meeting.*

Community Interactions Grant — *Receive up to $500 to help improve the science learning experience of minority children through community interaction and projects. Deadline: June 2012.*

Innovative Activities Grant — *Receive up to $500 in matching funds to support new and innovative chemistry-related projects. Deadline: June 2012.*

For more details on these grants, please visit www.acs.org/undergrad.

Robin Lindsey *is a program administrator in the ACS Undergraduate Programs Office. She finds Ask ACS answers for you.*

How ACS Helps You Prepare for and Thrive in Graduate School

BY ACS STAFF

To get into graduate school, you'll need to work hard to master chemistry fundamentals and seek out enriching experiences. While mastering chemistry fundamentals is largely your responsibility, many enriching resources and experiences are available from ACS if you become an active member and take advantage of your member benefits.

Become active in an ACS student chapter

Participating in a wide range of ACS student chapter programs and activities will help you to begin networking and connecting with the chemistry community and building your scientific skills. By challenging yourself to volunteer at chapter events and become a chapter officer, you'll build professional skills — such as leadership, speaking, project management, and organization — that will give you an edge when applying to graduate school. **www.acs.org/undergrad**

Seek out experiential opportunities

Professors who review graduate school applications look for applicants who have research experience and laboratory skills. The federal government, the chemical industry, and academic institutions offer Research Experiences for Undergraduates, co-op positions, summer jobs, and other chemistry-related work to help you gain experience.

ACS Get Experience Online Database – www.getexperience.dreamhosters.com

SCI Scholars Summer Industrial Internship Program for Undergraduates – www.acs.org/sci

ACS International Research Experiences for Undergraduates – www.acs.org/ireu

Participate in undergraduate programming at ACS meetings

Present your research at special national-, regional-, and local-level oral and poster sessions and participate in symposia, workshops, graduate school recruiting events, and other activities. **www.acs.org/undergrad**

Learn more about graduate school options with DGRweb

Use this free, searchable database of the Directory of Graduate Research (DGR) to help you choose a graduate school and find out about doing research that matches your interests. **www.acs.org/dgrweb**

Read up on graduate school

Graduate School Reality Check — Prepare yourself for the challenges you will likely face in graduate school, and receive tips and strategies from faculty and graduate students. Hard copies are available by e-mailing **undergrad@acs.org**.

Planning for Graduate Work in Chemistry — Get advice on how to choose a program and find a graduate school mentor. Learn about testing, school visits, financial support, and more. Available online at **www.acs.org/grad**. Hard copies are available by e-mailing **undergrad@acs.org**.

Connect with and learn from experienced chemists

Younger Chemists Committee (YCC) — Attend scientific, professional development, and social activities and events sponsored by the YCC for younger chemists at ACS regional and national meetings and in ACS local sections. Your ACS local section may also have a YCC. **www.acs.org/ycc**

Women Chemists Committee (WCC)— Tap into the wealth of networking mentoring opportunities. The WCC is a leader in attracting, developing, and promoting women in the chemical sciences. **http://womenchemists/sites.acs.org**

ACS Local Sections — Connect with your local section to network with other chemists and chemical engineers in your geographic area, enhance your professional development, build leadership skills, effect change in your local community through outreach, and contribute to the public's understanding of chemistry in your community. Find out more about your local section! **www.acs.org/localsections**

Once you're in graduate school, your needs will change. Your membership in ACS will continue to help you in new ways.

Establish a supportive network

Graduate Student Bulletin — Gain a broader perspective on the chemical world, especially as it pertains to graduate students. The ACS Graduate Student Bulletin is an online publication that features news and events of interest to graduate students. **www.acs.org/gradbulletin**

Online Communities — Tap into electronic communities for ACS graduate students and postdoctoral scholars on Facebook and the ACS Network to share information, discuss topics of interest with fellow students and chemistry professionals, and become an advocate for the chemical sciences.

PHOTO: ISTOCK

Participate in specialized programming at ACS meetings

Attend the special Graduate Student and Postdoc Reception, ACS technical division events, Younger Chemists Committee events, and more. **www.acs.org/meetings**

Let ACS help you prepare for — and thrive in — graduate school. Undergraduate students, recent graduates, and graduate students all receive their benefits of ACS membership at heavily discounted dues rates. If you haven't already done so, join ACS or renew your membership so that you can continue to take advantage of all the benefits that ACS has to offer!

60 Hours of Insight

Our Memorable Experiences at the ACS Leadership Institute

BY JULIA RUTHERFORD AND SHANNEN CRAVENS

Leading an ACS student chapter can be a very rewarding experience, but it can also be a real challenge. We, along with 15 other student chapter leaders, had the unique opportunity to travel to Fort Worth, TX, last winter to attend the 2011 ACS Leadership Institute.

We applied for the Leadership Award hoping to learn effective leadership techniques, network with other student leaders, and meet local section leaders from across the country. It seemed like a great way to learn valuable skills that would not only benefit our chapters but also aid us in our future endeavors.

PHOTO: ORNELLA NELSON

Student members form close bonds with one another as they progress through the Leadership Institute.

The networking experience started the moment we arrived simultaneously at the Dallas/Fort Worth airport from different states and happened to board the same airport shuttle. Noticing other students on the shuttle, to break the ice, one of us asked, "ACS?" — and suddenly we had a world of things to talk about! That was our first indication that this two-and-a-half-day event would help us improve our leadership capabilities and introduce us to incredible individuals.

Meeting the ACS local section leaders

The first evening of the Leadership Institute, our student leaders group joined the local section track for a session on planning effective events. During this time, we were asked to come up with new events or ways to improve current local section events.

Local section leaders and student leaders were seated according to geographic region, so we could each meet local section leaders from our own area. We focused on planning undergraduate events and collaborating with our local sections. While we discussed various strategies, we were repeatedly asked questions about how to interest students in local section activities.

Student chapters and local sections can sometimes feel alienated from one another, so one of the main goals of this session was to help the two sides increase their involvement with one another. We were pleased to see that local section leaders were as interested in collaborating with us as we were with them!

From this exercise, we learned that the local sections are often excited about aiding students to further their education and experience — but don't know how to connect with students. One goal we each took away from the Leadership Institute was to reach out to our local sections. Using the skills explored here, we believe that we can plan events that bring together different generations and excite undergraduates about developing themselves further as chemists and leaders.

Engaging and motivating leaders

All of the student leaders attended a course on engaging and motivating volunteers. This course is part of the ACS Leadership Development System, devised for ACS volunteers with various leadership needs and experience levels. In the engaging and motivating session, we examined roles within our organization — in this case our ACS student chapters — and looked at how to match skill sets with chapter positions and help create a positive volunteer experience.

Our instructor led us through the stages of the volunteer process. Each stage was separated into steps in

PHOTO: ARI CUPERFEIN

Last year, 17 undergraduate students received Leadership Awards to attend the 2011 ACS Leadership Institute. Submit your application by early November 2011 to attend the 2012 ACS Leadership Institute. For more information, go to www.acs.org/undergrad.

PHOTO: TAYLOR C. HOOD

The ACS Leadership Institute teaches valuable skills that will help you in your student chapter roles and continue to provide value as you progress in your career.

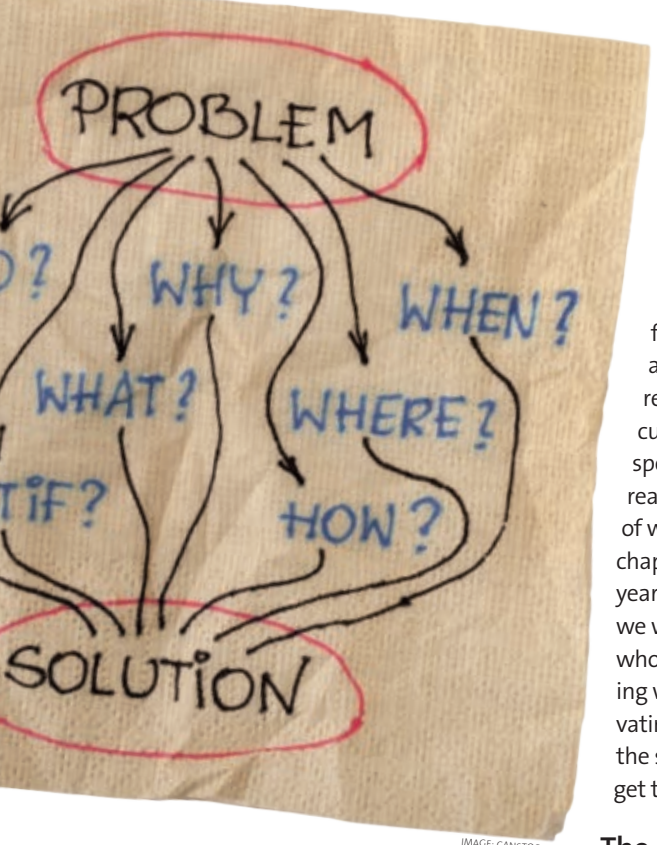

IMAGE: CANSTOCK

which we defined chapter positions, planned how to recruit volunteers, and learned how to ensure rewarding experiences and promote continuing commitment among volunteers. Student leaders and other ACS members formed small groups to problem-solve during the presentation. Rousing discussions were held on our previous experiences and our reactions to each stage of this process.

In the process, we gained confidence that we can balance support for new leaders with the freedom they need to work as they choose. We also developed an increased appreciation for what motivates others to volunteer. Because of this, we are now able to reach out to others more effectively. This was a very enlightening experience.

Student leader pow-wow

After the leadership course, the student leaders came together to discuss the challenges we all face in trying to sustain functional and highly involved ACS chapters. We then split up into groups and discussed various methods of fund-raising, different outreach events our chapters participate in, and what strategies we use to retain members. This was perhaps the most beneficial aspect of the weekend we spent at the Leadership Institute.

It is incredible how much we learned from each other. For example, we shared several ideas about new outreach activities and how to develop an easy transition for incoming officers. It was great to get feedback from fellow student leaders before actually implementing ideas once we returned to our chapters. Our discussions really put things into perspective for each of us and helped us realize that there is a lot to be proud of when we look back at what our chapters have accomplished over the years. It was also comforting to know we were not the only student leaders who were having difficulty collaborating with their local sections or motivating volunteers. We all go through the same issues... and the best way to get through them is to share ideas.

The end of a successful journey

The closing remarks that ended our weekend were not only motivating and interesting speeches but also a call to action. In addition to inspiring words from leaders of ACS, a thought-provoking video clip on speaking simply about chemistry was shown. As avid participants in community outreach and supporters of chemistry education, this spoke to us deeply. In this short movie, participants explained their research— at first, in scientific terms. Then, after some coaching, they tried again and explained their work simply, and more powerfully.

Our hope is that others are as inspired as we were by this experience. By speaking simply about our science, we can expand communication about our research to those outside of our field. This effective communication can in turn spread knowledge and understanding of chemistry to others.

By the end of the weekend, we established new goals for our chapter, including helping younger chapter members rise into leadership positions, better involving our members in planning new activities for our chapters, and increasing interactions between our chapter and our local section. We gained insight on the work and necessary delegation that goes into planning successful events and how to better motivate our chapter volunteers. And finally, we made plans for our respective chapters to meet and participate in Green Chemistry activities at the 243rd ACS National Meeting in San Diego in March 2012. Overall, it was a great experience to meet and garner support from fellow student leaders facing the same challenges.

Julia Rutherford *was a senior chemistry and physics major at Pacific Lutheran University in Tacoma, WA. She died July 3, 2011 while hiking. A tribute to Julia appears on page 1.*

Shannen Cravens *graduated from the University of San Diego last spring and was president of the USD student chapter. She is now a first-year graduate student at Johns Hopkins University in Baltimore, MD.*

Apply for a 2012 Leadership Award

Are you a leader in your student chapter who is interested in attending the 2012 Leadership Institute?
Apply today for a 2012 Student Leadership Award, which will pay the entire cost for undergraduate students to attend the 2012 Leadership Institute.

While all ACS student members may apply for these awards, preference will be given to sophomores and juniors who demonstrate strong interest in ACS student chapter activities and aspire to become more effective chapter leaders and ACS members.

After the application deadline (tentatively scheduled for early November 2011), the ACS Society Committee on Education Task Force on Undergraduate Programming will review all applications received and make selections. Award-winning students will be notified by the end of 2011 to allow time to make travel plans.

Information will be sent to all chapter faculty advisors about the application process.

If you're interested in applying for a 2012 Student Leadership Award, please ask your faculty advisor for details, or check the website at www.acs.org/undergrad.

Be an Essential Element...

Present Your Undergraduate Research Poster

at the Spring 2012 ACS National Meeting and Exposition

San Diego, CA
March 25–29, 2012

Abstract Deadline: October 17, 2011.
Submit Your Abstract at http://abstracts.acs.org

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

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- **Health Insurance Brokerage Service:** Connects you with over 100 basic medical insurance plan options, tailored to fit your lifestyle.
- **Auto & Homeowners Plus:** For vehicles, rentals, homes, and other personal property.
- **Group Term Life*:** For just pennies a day, get the coverage you need to help the loved ones you leave behind.

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As the Hour Draws Near...

A Timeline for Considering — and Applying to — Chemistry Graduate School

BY JOHN K. BORCHARDT

Attending graduate school in chemistry is a momentous decision that could affect the rest of your life. The process of getting a master's degree in chemistry usually takes two to three years, while four to six years is the usual time needed to get a Ph.D. Adding up your time in classes and doing research, you can probably count on working 40 hours per week, often more.

Before making this big commitment, it makes sense to learn how to decide whether graduate school is right for you and — if the answer is yes — how and when to apply. There are many questions you'll want to find answers to, and at the same time, you have your undergraduate studies and research, so it makes sense to start early and pace yourself.

Sophomore and junior years

One of the most basic questions you need to answer is whether graduate school is a good fit for you, your interests, and your skills. John Fackler, Distinguished Professor of Chemistry at Texas A&M University, advises students to ask themselves, "Do I enjoy research and have some competence for it? Is obtaining new knowledge exciting?" Ray O'Donnell, professor of chemistry at the State University of New York Oswego, advises students to consider whether they have a drive for continued studies.

> *"Ask yourself: Do I enjoy research and have some competence for it? Is obtaining new knowledge exciting?"*
> **John Fackler**

"The more time you allow yourself to check out the possibilities, the more chance you have to test your aptitude and commitment," advises Louis Kirschenbaum, professor of chemistry at the University of Rhode Island. The second half of your sophomore year isn't too early to begin thinking seriously about graduate school. Talk to your chemistry department faculty advisor and other chemistry majors, especially seniors, about graduate school and careers in chemistry. If your department has an ACS student chapter, becoming a member can help you meet such colleagues. If your department has a graduate program, discuss these matters with chemistry graduate students as well. Your current and former teaching assistants in your laboratory courses are a good place to start.

Do your research — Provided that you maintain a high grade point average, the sooner you begin doing undergraduate research, the better. You may wish to begin as soon as your sophomore year. Only then will you know what working in a lab is really like. (By the way, if you *do* decide to go forward with graduate school, your undergraduate research will be even more helpful. First, the people who will read your graduate school application will be impressed and, second, the experience will help you get off to a stronger start when you begin your thesis research in graduate school.)

Your junior year is the time to really get serious. "In general, we ask that students start considering graduate school toward the beginning of their junior year, when they still have time to make curriculum changes," advises Laurel Goj, assistant professor of chemistry at Rollins College (Winter Park, FL). "Students should plan to complete the ACS-approved program or the equivalent courses."

Reach out for advice — Expand your discussions about graduate school by networking with members of your ACS local section, and particularly members of the Younger Chemists Committee who went through graduate school recently. Continue your discussions with your department's faculty members and graduate students. Begin asking about specific graduate schools and their chemistry departments' programs, and what these individuals liked most and least about their own graduate experiences. In the process, you'll get valuable ideas about where to focus your efforts.

Another source of input is the group of educators and colleagues with whom you interact while working on your own research project. Talk to your research supervisor and the students with whom you share your laboratory about graduate school and careers in chemistry. Begin attending department seminars in which faculty, department researchers, and chemists from other universities discuss their research.

IMAGE: ISTOCK & A. PHIFER

The summer after junior year

Goj recommends that "by the end of their junior year, students begin to compile a list of schools that they are interested in applying to." The summer break is a good time to do this. Begin by searching online with the ACS DGRweb. Also use your network of professors, working chemists, and fellow students. Explore the websites of various chemistry departments and even faculty members whose research interests you.

Based on your research, begin requesting application materials from programs you are interested in. Also begin preparing a personal essay in which you describe your interests in chemistry, why you want to pursue graduate education in chemistry, and your chemistry career goals.

Senior year

Continue talking to chemistry department faculty members and graduate students to get additional ideas about chemistry graduate schools. For example, you will want to apply to schools that vary in difficulty of gaining admittance, so learning about their relative acceptance rates will be helpful. O'Donnell recommends you also consider which advanced chemistry discipline best matches your interests and talents.

As you're considering whom to ask for advice on graduate schools, Kirschenbaum recommends, "First and foremost should be your undergraduate research advisor. He or she is the one who knows you the best. If you want to stay in the same or related field, you can get very specific advice on the quality of various institutions and the availability of particular research opportunities."

Identify possible research supervisors— Another decision to make is about which professor you think would be the best fit as your research supervisor and mentor (the most important person in your academic life). In advising students, Goj notes, "I ask that they try to identify at least three faculty members whose research is of interest. You never know who will be retiring, moving, or no longer accepting students." Keeping your options open could also be important if it turns out that you have a personality conflict with a certain professor whose research interests you. You may have to wait until you visit graduate schools after being admitted before beginning to assess your personal compatibility with professors whose research appeals strongly to you.

"The more time you allow yourself to check out the possibilities, the more chance you have to test your aptitude and commitment."

Louis Kirschenbaum

Last but hardly least, during your senior year you need to focus strongly on doing research and write a senior thesis. Fackler believes, "Nothing is better than doing undergraduate research, unless you're planning to attend graduate school in law or a non-chemistry field." Goj adds, "It is most important to have some type of research experience outside the classroom to demonstrate that you have a sense of what it is like to work in a research laboratory. When you're being interviewed, it is common to be asked about such experiences."

Apply to graduate departments — Writing a personal essay is an essential part of many graduate school applications. Review your essay with your undergraduate research advisor and other trusted faculty members who know you well. It is a good idea to customize your personal essay to the requirements of each graduate program before submitting it.

Sign up to take the Graduate Record Exam (GRE) and the

advanced test in chemistry. Meet the requirements and deadlines for applying to each graduate school on your final list. It is usually best to do so in December or January. Order transcripts and other required documents at this time. Ask faculty members who know you well to write letters of recommendation at least a month in advance of the deadline and give them background material to help make their letters compelling. The strongest, most meaningful recommendations usually come from professors for whom you've done undergraduate research.

Your application will be evaluated by a chemistry department admissions committee— not the central admissions office of the university. Admission criteria vary from one department to another. However, admissions committee members' primary criterion always is whether they think you'll make an excellent chemical researcher. For this reason, although your undergraduate research experience need not be in the same area as your targeted graduate research field, what your research supervisor has to say about it is particularly important.

Watch for acceptance (and rejection) letters — From February to early April, you'll begin to hear from schools regarding your applications. Arrange to visit each department that has admitted you. Some departments invite admitted students to visit, and schedule events and tours on specific dates. Even if graduate departments that have admitted you don't do this, contact the chairperson of the admissions committee or the department chairperson to set up a date for a visit. Ask to meet with potential research supervisors, members of their research groups, and other chemistry graduate students. Many departments pay at least some of your travel expenses.

Speaking of expenses, a few words about money. Unlike when job hunting, money is seldom a factor when choosing a graduate department. Nearly all doctoral programs and most master's degree programs support chemistry graduate students through research fellowships and teaching assistantships. These provide enough to cover modest living expenses. In addition, graduate programs customarily pay your tuition.

"It is most important to have some type of research experience outside the classroom to demonstrate that you have a sense of what it is like to work in a research laboratory."

Laurel Goj

Evaluate your options — Discuss your graduate school options again with your undergraduate research advisor, faculty advisor, and other trusted faculty members. Then use everything you have learned to make a decision.

After making your choice, inform the department of your choice by letter. Also, contact the other departments that admitted you, and politely tell them you'll be attending graduate school elsewhere.

Good luck in graduate school! A wise choice will result in one of the most professionally exciting times of your life, and a sound foundation for your future chemistry career.

John K. Borchardt *is an industrial organic chemist, freelance writer, and former high school chemistry teacher. He holds 30 U.S. and more than 80 international patents and is the author of more than 120 peer-reviewed technical papers. He was awarded the Henry Hill Award for his contributions to the chemical profession.*

Meet Alveda Williams: Living Proof that There Is No Substitute for Experience

Alveda Williams is now a Ph.D. chemist and Global R&D Strategic University Leader for Dow Chemical. However, once upon a time, she was a fledgling undergraduate chemistry student with no particular goal or pathway in mind. Fortunately, after she gained hands-on experience through several undergraduate research opportunities and internships, all of that changed...

The summer after her freshman year, Williams worked at a local water treatment plant, primarily testing samples at different stages in the water treatment process and conducting home visits and sampling when people were having problems with their water. Williams remembers, "This for me represented real experience working in a government facility... even though it was just at the local level."

With her curiosity now piqued to explore chemistry opportunities in other areas, Williams landed a summer REU the following year at the University of Pittsburgh working on a project using high-temperature Fischer-Tropsch. The position also afforded Williams the opportunity to explore academic research in chemical engineering. Williams also notes, "I was a chemist, and was trying to get a feel for whether I wanted to pursue engineering in graduate school." By the end of the summer, Williams knew that she wanted to pursue a chemistry degree in graduate school, but she was unsure whether she wanted to work in government, academia, or industry afterwards.

After her junior year, Williams landed an industrial internship working at Rohm and Haas Company developing new acrylic polymers for adhesives applications. During her spare time she researched graduate schools and sought advice about graduate school programs from many of the Ph.D. researchers at Rohm and Haas.

At last, after having gained experience working in three different job sectors, Williams knew her future was in industry. She applied to graduate school in the fall of her senior year, ultimately deciding to attend the University of Illinois to earn a Ph.D. in chemistry. After completing her senior year and graduating with a B.S. degree in chemistry, Williams returned to Rohm and Haas for the summer before moving to the Midwest to attend graduate school. And the rest... is herstory!

Making the Most of Graduate School Visit Weekends

BY AMY M. HAMLIN

PHOTO: ISTOCK

When you receive graduate school acceptance letters, you'll likely feel relieved that your future as a graduate student is secure. But now comes the big decision: Which graduate school will be the best fit for you?

Many factors go into deciding which school to attend, including specific research interests, location, and the size of the department. While at first glance it may seem overwhelming to gather this information about each school that has accepted you, all of this information is readily available online through ACS's DGRweb 2009 at http://dgr.rints.com. This searchable database provides comprehensive information on chemical research and researchers at universities in North America. Take the time to check this resource. Being well prepared for a visit weekend can help make the visit much more productive.

Many Ph.D. programs will pay for part or all of your travel expenses and hotel for the weekend — but remember, these road trips are *not* a vacation. Rather, the purpose of visit weekends is for a student already accepted into a program to gather information about the institution and the department before deciding whether or not to accept the offer. It is a unique opportunity for you to interview the professors and current graduate students.

The right frame of mind

On a weekend visit, you don't need to worry about getting rejected. You're no longer the one being judged; rather, it is the chemistry department's turn to impress *you*. Remember too, you are not competing with the other visiting students.

Instead, you are now the interviewer, and taking on this role requires doing the proper research. Before you leave for

the visit weekend, you should be prepared with the questions you want to ask and the information you want to gather about the department. Most departments post information online, such as the requirements for the different degrees and statistics about the program. Do your best to learn about the specific program before the visit weekend; this will better prepare you to ask questions. Be sure to do some research into the groups that interest you, read a few of the recent publications, and explore the various groups' websites to get a feel for the different research opportunities available. This is also a good time to decide which factors — such as prestige, location, research interest, and facilities,— are the most important to you when choosing which school you want to attend.

What to expect

Every graduate school's visit weekend is a little different, but in general the events are pretty casual. I would not recommend wearing your lab T-shirt full of holes, but you do not need to break out your fancy suit either; a nice pair of pants and shirt will be fine. Most visit weekends will include a presentation about the department, which will include information such as the requirements for the program and other general information about the department. You will also have time to meet with the professors and current graduate students to hear about their research and ask questions about their group. Some programs may also include facility tours, a social event, or a city tour as part of the visit weekend schedule.

Getting to know the professors

One of the most important aspects of the visit weekend is meeting with the professors. It is very important that you choose a graduate school and a research group that will allow you to pursue your research interests.

During the weekend you will have the opportunity to meet with several of the professors either individually or in a small group. The professors will probably ask about your research interests and past research experiences, and will possibly ask what you are looking for in a research group. Based on this information, they will discuss with you the projects in the group that may be of the most interest to you, and why you should consider attending that school.

From the mouths of graduate students

Even though the meetings with the professors are very important, the current graduate students will probably provide you with the most valuable information. While professors are only going to share with you positive aspects of the department and their group, the graduate students will not hide anything. If there are weaknesses in the program, graduate students will not hesitate to share these with you if you ask. Graduate students will be honest about the things they like about the program and their group, and the things they are unhappy with. Talk to as many graduate students as you can. They are filled with information about what it is really like to work in a specific group and how well-equipped the facilities actually are.

Location, location, location

Another very important aspect to look into during the visit weekend is the community in which the school is located. Some schools will offer tours of the local area or of typical graduate student housing. The location of the school is more important for some prospective students than for others. Remember: you will be living here for the next several years and will become part of the community; it is important that you can feel at home.

Look at the cost of living in the area and ask current graduate students what they can reasonably afford with the stipend to determine if you can afford the lifestyle

Keep Your Eyes And Ears Open: *Be Observant and Ask the Right Questions*

Your interests may match those of a graduate program group on paper... but you will not know if the group will be a good fit for you until you actually meet the professors and some of the current graduate students. Make sure you feel comfortable and that you get a positive "vibe" from the experience. Be observant of your surroundings and the interactions among professors, staff, and students.

Look around the laboratory and take note of the range of experiences and backgrounds among the students and professors. Look in the professors' offices and note if there are personal items or family photos. While you are visiting, do people stop into the offices? Are the offices close to the labs? Go into the labs with the professors and observe the interactions between the professors and the graduate students.

When you meet with professors or graduate students, be sure to ask questions.

QUESTIONS TO ASK INCLUDE:

- Do graduate students work together on projects or does each person have his or her own project? Describe the culture of the chemistry department.
- What are the typical hours and days that the members of the groups work?
- What is the average time it takes for graduate students to complete their degrees?
- How much time per week do professors spend in the lab with graduate students?
- How often do graduate advisors have meetings with graduate students?
- What are the funding sources for the laboratory? Are graduate students responsible for seeking funding?
- What are the laboratory protocols?
- How many graduate students and postdocs are typically in each research group?
- What equipment is available to graduate students?
- If I have an issue on a research project, what steps would I take to resolve it?
- How are conflicts resolved?
- What is the publication process for the lab? Who are the authors, co-authors, etc.?
- What types of professional development opportunities are provided to graduate students, including conference and meeting attendance, career training, and job placement assistance?
- How is personal leave or emergency leave handled? Are there flexible work arrangements?
- Would you please describe your current research projects?
- How do you maintain diversity in the laboratory? Describe the work environment of your laboratory.

This list is not exhaustive; don't be afraid to ask any question that may come to mind. Listen to the questions others ask; they may come up with great questions you may not have thought of and make observations of things you have not noticed.

you desire during graduate school. Maybe being close to family is important to you, or maybe you want to be close to a skiing area, or in a big city; these are all things you should consider when looking at the location of the school. I recommend spending some time during the weekend to explore the area around the school on your own.

Digesting the experience

Visit weekends may feel overwhelming, but it is important that you gather as much information as you can about each school you visit. Even visit weekends that go poorly can teach you a lot about what you want in a graduate school. After the visit weekend is over, keep in touch with professors and graduate students you met at the schools that still interest you. They will be happy to answer any further questions you may have in making your decision.

Try to enjoy the visit weekend and relax a little bit—but do your best to make a good first impression; one conversation during the weekend may greatly influence your decision. During the visit weekend process, keep an open mind about each school you visit. If you make up your mind about a school before you visit, you may miss out on a great opportunity.

Amy M. Hamlin *is a graduate student at the University of California Berkeley studying synthetic organic chemistry. She graduated from the University of Detroit Mercy in 2009 with a B.S. in chemistry.*

PHOTO: ISTOCK

VOICES OF EXPERIENCE

In this issue, graduate students offer tips to help you succeed in graduate school.

COMPILED BY LORI BETSOCK

Know What You're Getting into

When I first realized that graduate schools would pay me to attend, I thought I was set. I worked part-time jobs throughout my undergraduate years, so I was imagining all the extra time I was going to have to complete research. The reality turned out to be quite different. My advisor didn't have funding to pay for my research work, so I ended up becoming a teaching assistant (TA). Don't let the words fool you: there's not much assisting going on there; you're basically the teacher. In my case this meant teaching undergraduate laboratory sections all of my semesters at school (even during the summers). Each week I'd spend at least 20 hours doing TA things (labs, grading, tutoring, etc.). This did not leave quite as much research time as I'd hoped. My advice is to ask other graduate students at schools you're considering what is expected of TAs so that you're prepared; also, do your best to find an advisor with funding so you have the option to teach or not.

RANDALL HART *is a second-year inorganic chemistry master's student at California State University Fresno working on an organometallic molecular synthesis project. After graduating, he plans to work for a year while considering doctoral studies.*

The Answer May Be Practical Idealism

Choosing a graduate school and research lab is never easy. There seem to be so many factors to consider — the job market for different fields, the ability of a supervisor to support you, stipends, rankings... the list might seem unending. However, I believe one factor to be much more important than the rest: your research should be something you're passionate about.

I strongly feel that an idealistic view toward science and research, tempered with a practical approach to day-to-day work, is a powerful recipe for success. From what I've seen, people who possess perseverance and creativity and who balance pragmatism with idealism tend to do well in grad school. Balance between following out-of-the-box ideas and sticking to what you know. Strive for a balance between speed and being careful, or just between publishing your work quickly and doing a complete and exhaustive investigation.

One thing guaranteed in research is that you will get stuck, and at times it will feel frustrating and even hopeless. Students with genuine passion for their work never stop trying, while those who view their research as an obstacle find motivation a problem. Honestly, if you get tired of your research, all the peripheral reasons you had for choosing a lab might seem irrelevant.

If a decision regarding grad school is on your horizon, I hope you use every resource at your disposal to find information. I also hope you never forget the exhilaration of gaining new knowledge and never lose the childlike curiosity and excitement which are still the basis of all science.

UDAYANA RANATUNGA *obtained his bachelor's degree from the University of Peradeniya, Sri Lanka, and is currently a fourth-year graduate student at the University of Texas at Dallas.*

Beginning the Journey

My decision to pursue graduate school was influenced by undergraduate chemistry research programs and my mentor. Every year, a research program would organize a conference, where panels of graduate students shared their experiences. Practically every panelist told the audience, in one way or another, "This will be a difficult journey, but it can be accomplished!" I can attest to this difficulty, because after my first semester I wanted to give up! Nonetheless, going into my third year, I have faith in obtaining a Ph.D.

If you are considering graduate school, make sure you are willing to spend an additional 4–5 years in school for a Ph.D. Do not pursue this degree merely because someone told you to do so. Furthermore, do not base your decision on the fact that most graduate schools will pay for your education and provide you with a stipend. Go to graduate school because you have a strong desire to further your education and conduct independent research.

Another important point about graduate school... make sure you choose your advisor and research group wisely, because this can make or break you. More importantly, follow your instinct — and never let anyone steer you away from your passion and goals.

BRITTNY HUMPHREY *is currently a third-year graduate student at Howard University, with a focus in organic chemistry.*

Find Your People

Graduate school, no matter which program, discipline, or lab you choose, can be one of the most challenging and important times of your life. You are moving away from being a student in the traditional sense of balancing courses in many different subjects to committing yourself to one field and one project in which you become an expert. It can be incredibly exciting to move on to this phase, but it can also be difficult. There will be days, weeks, and months when your experiments do not work and you don't know why. There will be times when you are this close to completing a paper, but the results of your last experiment throw a monkey wrench into the entire project. Or, your advisor may run out of funding, forcing you to rethink your experiments and your graduation timeline.

Then there are those days when you have been fighting for months to make an experiment work and it finally does and — most miraculously — gives you the expected results. Sometimes, your project gets funded, or you win a fellowship, or your results are so good that you are first author on a paper in a major journal. Through all of these ups and downs, the people who can best understand and relate are those who have been there. When you get to graduate school, try to find "your people" — those folks who will celebrate all of your successes, scientific and otherwise, and who will buy you a beer and let you rant when things don't go your way. When you choose a lab, consider the other graduate students and postdocs there. These are the folks who you will be sitting next to and sharing ideas with for the next 4–7 years, and they can make all the difference.

MEGHAN BLACKLEDGE *is a sixth-year graduate student at Duke University. She is a bio-organic chemist focusing on investigating novel antibiotics.*

Making the Right Choices

Graduate school has been one of the most wonderful experiences of my life. It is important to be prepared to make decisions that will lead to a better graduate school experience.

First, focus on choosing the right school. It is very important to set your priorities before choosing a school based on criteria such as research, central facilities, size of the program, level of diversity, and fellowships available. One of the websites for ranking schools based on your priorities is www.Phds.org.

Another important decision is choosing a research area. I came in as an organic major with an interest in drug design. In the inorganic division at my institution, a professor was working on chemical and biological effects of NO and HNO. Originally, I thought of NO as only a toxic gas in the atmosphere, but after interacting with her, I came to appreciate its involvement in various patho-physiological processes. It was so intriguing that I decided to work on nitrogen oxide-releasing prodrugs. So, while it is important to have some idea of the area you would like to focus on, it is also important to have an open mind.

Along with your research area, it is also extremely important to choose your advisor wisely. To make an informed decision, you must interact with the graduate students and the principal investigator. Be clear about your expectations. If at some point, you feel that the decision was not right, it's better to switch groups early rather than suffering for five years.

Graduate school is the stepping-stone toward a bright future. It can be fun as well as an opportunity to explore various aspects of knowledge and research.

DEBASHREE BASUDHAR *completed her Ph.D. at the University of Arizona in April 2011, after earning an M.S. in chemistry from the Indian Institute of Technology Delhi. She plans to pursue postdoctoral research.*

Collaboration versus Independence

There is one piece of information I wish I had investigated before choosing a graduate school and research advisor: whether labs were structured with inter-lab collaborations or with individuals working independently on unrelated projects. There are pros and cons for both, and each person should identify which environment he or she is most likely to succeed in.

In a highly collaborative lab, every person is thinking, talking, and offering insights that can lead to overcoming hurdles more efficiently. Additionally, collaboration can become so tightly knit that another researcher's progress directly depends on your own. Depending on the individual, this either motivates or adds stress. You must have confidence in the dedication of every one of your peers, because your success depends on those around you, and vice versa. The obvious con to this type of lab environment might be working with an individual who doesn't contribute equally. Additionally, you run the risk of becoming an expert in a limited number of techniques or instruments, without gaining a wide breadth of experience.

Conversely, in the independent project atmosphere, only you and your advisor understand the goals and daily struggles of your research. Other lab members might think about your research only during your presentations, or when you specifically seek them out for advice. However, a successful project is immensely satisfying — because you set up every reaction and made each discovery. The desire to invent or learn something new is your daily motivation.

Hopefully, no lab is completely collaborative or totally independent, and you'll get a chance to experience both during your graduate tenure. Ideally, you find a way to succeed in both. However, starting off in a desirable work environment can provide the motivation you need to successfully begin your scientific career.

GLENN ELDRIDGE *is a fifth-year graduate student at the University of California Irvine. His research is focused on the discovery of new site-specific protein labeling strategies.*

NASA Spin-offs

How We All Benefit when Materials Chemistry Collides with Rocket Science

BY WENDY HANKLE

This special feature is presented in recognition of the International Year of Chemistry and efforts to bring worldwide focus to issues concerning alternative energy sources.

IYC 2011 International Year of CHEMISTRY

If you've ever slipped a pair of "Toasty Feet" insoles into your hiking boots and hit the trail, you've traveled with a pretty well-known companion: NASA.

Toasty Feet insoles are but one commercial use for NASA-derived aerogel, a flexible, composite material with show-stopping insulating properties. Aerogel had been around for decades. Featuring a chemical structure similar to glass and nanoscale pores, the material claimed the title of having the lowest thermal conductivity of any known solid.

But as amazing as aerogel was, there were a few roadblocks to unlocking its fuller potential. "Aerogel is neat stuff," says Dan Lockney, NASA technology transfer program executive. "It's one of the best insulators known to man. The problem was, it's prohibitively expensive to manufacture."

Until NASA researchers and private industry partners dug in, that is. First, they developed a flexible, durable, and easy-to-use version of the material. Next up: finding applications for the technology. While NASA still prizes the material for its cryogenic applica-

PHOTOS: NASA.GOV

ABOVE LEFT: **While at first glance aerogel resembles a hologram, it is a highly porous solid material that has the lowest density of any known solid. It is 1,000 times less dense than glass and is also known as "solid blue smoke."**

ABOVE RIGHT: **The crayons on top of the aerogel are not melting because the aerogel protects them from the flame underneath. Mixed with silicon dioxide and a solvent, aerogel is 99.8% air.**

tions, the partnership put it into the hands of the general public... and into the insoles of shoes that have trekked all over the world.

Aerogel is only one example of how the benefits of advanced materials developed in NASA labs make life better beyond the launch pad. And it's a great example of how NASA partnerships bring new materials to the market.

"It's one of NASA's missions to transfer technology for the public benefit," Lockney explains. "Some general examples include weather technologies; spacecraft; air transportation; computers; and solar, wind, and other renewable energies. In fact, the cameras in your cell phones are direct descendents of NASA technology."

Since NASA's inception in 1958, technologies crafted in NASA labs have seeped into the private sector, either through formal contractual agreements between NASA and private industry, or through the simple diffusion of knowledge as personnel move from one job to another, taking their Knowledge and experience along for the ride. But no matter how the technology is transferred, it has a very real impact on daily life.

Here's a look at some other NASA spin-offs that have put chemistry to work for the nation.

TEEK

Insulation on external shuttle propellant tanks is a big concern at NASA. The tanks store supercooled liquid propellant, which needs to be protected from the high temperatures of ignition and launch. NASA researchers developed a polyimide foam insulator called TEEK to be applied to the cryogenic propellant tanks. But the technology had much greater potential, which was realized when a company called PolyuMAC came on the scene.

Together, NASA and PolyuMAC researchers worked on altering the chemical properties of the foam, making it flexible, lighter in weight, and cheaper to produce.

While the researchers addressed the needs of the shuttle structures, they also kept an eye on commercial applications. Sold under the name Polyshield, the TEEK-derived technology is now about one-fifth of its original cost to manufacture and also has improved flexibility and durability. Like TEEK, Polyshield is a flame retardant and a thermal and acoustic insulator. It can be applied to things like gaskets, seals, and vibration damping pads, and can also be used for sound and cryogenic insulation and fire protection.

Polyimide resins

Temperature mitigation is a near-constant challenge for NASA researchers. Protecting equipment from the effects of atmospheric re-entry alone means enabling it to withstand temperatures over 2,000°F. And rocket engines aren't exactly chilly, either, with temperatures reaching upwards of 5,000°F. At the Langley Research Center, NASA scientists have harnessed the power of polyimides to take on this challenge.

Researchers developed a high-temperature composite material, called RP-46. It's a polyimide resin that was created as an environmentally friendly product that can be processed for use as an adhesive, composite, resin molding, coating, foam, or film. The uses for the shuttle program are numerous, but it wasn't until the technology was licensed to a private organization that its potential was explored to a much greater degree.

The NASA-developed technology found its way to Unitech, a company that was looking for ways to create an application-specific insulation for an all-electric ship being developed by the U.S. Navy. Unitech needed a fire-resistant material that could take a jolt of anywhere from 8,000 to 250,000 volts of electricity. Independent testing demonstrated that RP-46 could endure temperatures up to 2,300°F — a finding that made the material appropriate for the Navy application.

RP-46 has a veritable laundry list of actual and potential uses: as a coating for rolls of Kevlar fabric; thermal skins on aircraft, aerospace engines, exhaust duct systems, and rocket nose cones; and on vehicles racing around the tracks at NASCAR and Formula One competitions.

Water-based coatings

Glenn Research Center, in Cleveland, OH, is home to NASA's Structures and Materials Division. There, polymer research abounds with the intent to build and discover high-perfor-

mance materials to reduce the weight and boost performance of components for space missions and aircraft engine components.

But beyond these large, lofty applications, researchers at the polymer branch also know how to dig down to the finer points. And it doesn't get much smaller than electronics. In the never-ending quest to build the smallest, lightest, and least expensive products, NASA's polymers have played a role.

When circuit boards are manufactured, the production line ends with a coating to protect the boards... a coating whose solvent-borne nature is responsible for releasing volatile organic compounds into the atmosphere. To make this finishing touch a bit less detrimental, the Glenn Research Center worked with an industry partner to develop an advanced water-based polyimide coating, to offer an environmentally and worker-friendly way to get the same job done — with a more positive impact.

Looking ahead

Although the shuttle program is coming to an end, NASA's work is far from over. The organization has been charged with the challenge of sending astronauts to an asteroid by 2025 and to Mars by 2035. There's still plenty of research to be done — and plenty of ways those discoveries can benefit the greater community.

"Just like the space shuttle program provided new knowledge and capabilities that enable our future missions," Lockney observes, "NASA is going to continue to develop technology and innovations that will benefit society and our lives right here on earth." inC

Wendy Hankle *is a freelance writer and communications professional who lives in Ithaca, NY.*

PHOTO COURTESY OF NASA

Meet Luke Roberson, NASA Research Scientist and ACS Member

It's a Wednesday afternoon at NASA's Kennedy Space Center, and Luke Roberson is on his way to his office. The wind whips across the seaside Florida campus, but the noise is no match for the sound of an astronaut buzzing overhead in his personal aircraft.

"I have a cool job," Roberson says. Indeed, he does. Roberson's a research scientist at NASA's Chemical Analysis Branch. He's been there for a little more than five years, and his day-to-day tasks are as varied as, well, the solar system itself. "My job's different every day, which is what makes it so exciting," Roberson says. "One day I'm in the lab. The next day, I'm working on the launch pad, and maybe the next day I'm formulating ideas or writing publications."

Roberson is responsible for shepherding new technologies and materials from infancy to application, whether that application is at the launch pad or in the private sector. NASA researchers like Roberson can work on internal projects specific to their organization, or help private industry partners develop technologies of their own.

"Most of the time people come to us for an idea or with a problem that needs to be solved, and we can dive in and solve that problem, then they spin that off into industry," Roberson explains. Alhough the bulk of Roberson's assignments come through these avenues, there's a lot of elbow room. "Here, you're allowed to take your own ideas and run with them," Roberson says. "It's very joyful and humbling to say 'That's my idea.' You helped create this new invention that no one's ever thought of before."

It doesn't take long for Roberson to name a few projects he's proud to have been involved in. One, AeroPlastic, is a composite that infuses aerogel into thermoplastic materials, reducing thermal conductivity and improving flame retardant properties. And there's chemochromic hydrogen detectors, a composite that changes color as a result of exposure to hydrogen. In tape, paint, or paste form, it is superior to air sensors because of its ability to pinpoint the exact physical location of a leak. It is unaffected by environmental factors and does not require power.

"These are my two favorites because I've been able to take those from the lab to full application and deployment at the launch pad," Roberson says, adding, "That's one of the greatest things about working here: you get to see something you worked on really make a difference in the world, in the solar system." Roberson graduated in 2005 with a doctorate from Georgia Institute of Technology — the same place he earned both his master's and bachelor's degrees. All of his degrees were in chemistry, and he focused on polymers (undergraduate), organic chemistry (master's), and materials chemistry (doctorate).

After he got his bachelor's degree, Roberson had a few realizations about his future. "I knew that I wanted to be more in a leadership role, but I didn't know what it took to do that." So he worked at Lucent Technologies while getting his master's degree. "While doing this, I learned very quickly that if I wanted to be a decision-maker or an influencer of technology, I needed a doctorate degree. That was the only way I could move up."

Roberson also counts internships as critical to his success and doesn't hesitate to urge others to consider that option. "It's good and it's bad, because it teaches you that you don't get to do science all the time, you have to go to meetings, and deal with human resources, IT, and all that kind of stuff," he says. "But it also teaches you that there is really good science and people working hard to make the world a better place." inC

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Upgrading Your Online Image

Transforming Yourself from College Student to Scientific Professional

BY LISA B. MARSHALL AND ZOE M. OGILVIE

Social and professional networking is dramatically changing how people look for jobs and prepare for interviews. As you make the transition from college to career, it is essential that you create a great first impression with potential employers — and not only face-to-face. Receiving a job offer in today's market often requires effective use of personal online strategies that make you stand out from the crowd.

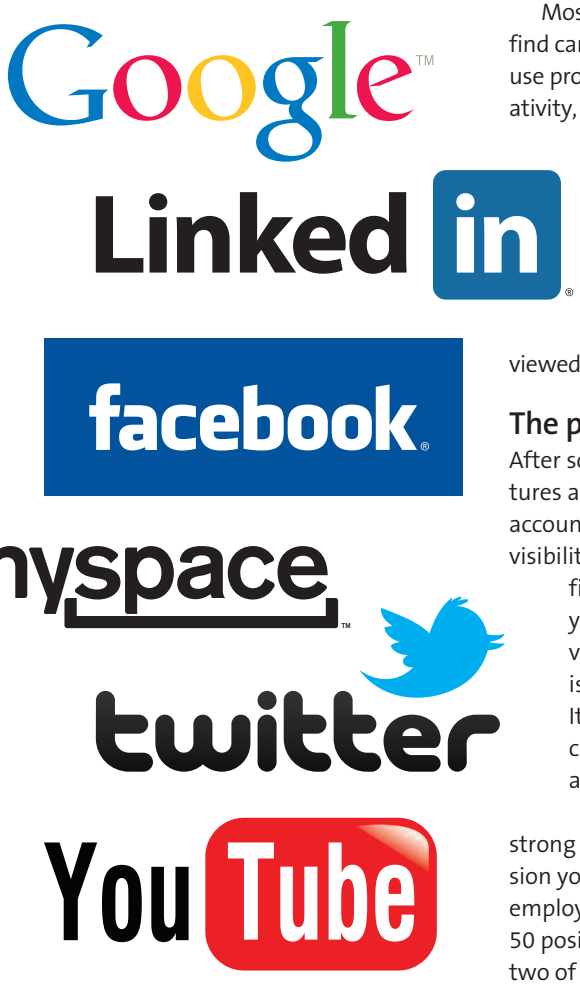
These days, employers rarely hire candidates based solely on their technical competence. Rather, they look for a complete package: a well-rounded person who possesses both technical and professional skills and who also will be a good fit with the team and company. That's why employers are increasingly checking your online presence to get a more complete picture of you.

In general, your online presence refers to your activity on the Web through personal websites, blogs, articles, profiles, forums, and comments. Ask yourself, "What does my online image communicate?" Will your online image get you eliminated as a potential candidate for a job? Or will your online presence help to convince someone to hire you?

Find the answer by Googling yourself. You may be surprised to find out what's floating around in cyberspace about you! If unflattering images are currently part of your online presence, take the time to scrub them from your profiles. Similarly, friends may have tagged you in photos that you don't want prospective employers to view. Take care to get those images scrubbed as well.

She said *what?*

In one recent article, Gail, a Fortune 500 recruiter, is quoted as saying, "You'd be surprised at what I've seen when researching candidates... We were having a tough time deciding between two candidates until I found the profile of one of them on Facebook. It boasted a photo of her lounging on a hammock in a bikini, listed her interests as 'having a good time' and her sex as 'yes, please.' Not quite what we were looking for."



A short while ago, I asked a potential candidate to send me his Skype ID, so that I could interview him remotely. I received the following message via e-mail: "My Skype ID may be a bit offensive and I would like to apologize beforehand — it's 'fukitt.'" I was astonished; and no, we didn't interview the candidate!

At a minimum, it's important to create a professional networking profile. (LinkedIn in the U.S. and Canada and Xing in Europe and Asia are currently the most popular.) If you don't have one, you'll miss opportunities; it's that simple.

Most organizations use these profiles to find candidates; for their part, professionals use profiles to demonstrate leadership, creativity, and effective communication. Creating a profile enhances your professional image — but only if you keep your profile professional. Be wary of the "photos from the weekend" syndrome. Remember that anything you put online can potentially be viewed by a prospective employer.

The power of recommendations

After scrubbing the inappropriate pictures and profiles from your social media accounts and boosting your credibility and visibility through your professional profiles, the single most effective thing you can do to facilitate a job interview after graduating from college is to ramp up your online references. It's a great way to highlight positive character traits as well as transferable skills.

Recommendations are very strong social proof. Imagine the impression you would make if your prospective employer opened your profile to find over 50 positive references, especially if one or two of them were from well-known professionals? Now imagine the impression with no references at all.

Right now, LinkedIn is the place to collect professional references. The benefit of using LinkedIn is that the background and reputation of the person giving the reference can also be quickly reviewed. Really,

it's that simple. Ask your previous managers, peers, professors, colleagues, or leaders in a volunteer organization you've been involved with... even your piano instructor who has been giving you lessons for the past eight years.

If you feel you've made a positive impression on someone who's had the opportunity to get to know some aspect of you in some significant way, then ask for a recommendation. Great recommendations will build instant professional credibility with a hiring manager before he or she even meets you in person. Sweet!

Build your brand

Lastly, if you really want to stand out — and even have potential employers contact you before you contact them — I suggest developing even more of an online presence.

> [Prospective employers] look for a complete package: a well-rounded person who possesses both technical and professional skills and who also will be a good fit with the team and company. That's why employers are increasingly checking your online presence to get a more complete picture of you.

Consider expanding to Facebook and Twitter, if you haven't already. Think of these as a blend of your professional and personal networks. Update often, and respect the difference between personal and professional — keep your info PG-13. Also consider blogging or podcasting. (Wordpress, Blogger, and Typepad are popular apps for creating blogs and posting podcasts.)

You can start a job search blog, which is like any other blog except the focus is your job search. Post your résumé, writing samples, photos, documents, and stories of your search. The key is to remain upbeat and positive and stay away from "controversial" subjects such as sex, politics, or religion. (If you want to see an extreme example of a creative and resourceful job search blog, visit Sean Aiken's One Week Job website at www.oneweekjob.com.)

Instead of a job search blog, you may prefer to create a blog with content related to your profession or industry. In this type of blog, your focus may be industry-related news, interviews, or expert tips. Create posts that are consistent, well written, and creative. The idea is to create or enhance your personal brand, making it so powerful that jobs come to you instead of you having to find jobs.

If you create a powerful online image, your transition from college student to scientific professional will be seamless. Remember to be careful what you post... and take the time to make your new professional network work for you! These first impressions you make will travel with you for the rest of your life, so it is important to stay upbeat, focused, and above all, professional.

Your Online Presence: Seven Deadly Faux Pas to Avoid

Of course, it's important to have an online presence, but it's more important to have the right online presence. Job candidates get eliminated all the time for making these faux pas:

- ***Displaying poor communication skills***
- ***Bad-mouthing a previous employer, employee, or even a friend***
- ***Sharing or showing anything that indicates alcohol or drug use***
- ***Displaying inappropriate photos or information***
- ***Misrepresenting qualifications***
- ***Using an unprofessional screen name***
- ***Sharing confidential information about past employers***

Lisa B. Marshall *is a communication expert, host of "The Public Speaker" podcast, and author of* The Public Speaker's Guide to Ace Your Interview: 6 Steps to Get the Job You Want *(Macmillan Audiobooks) and the e-book* Ace Your Interview.

Zoe M. Ogilvie *works in the Office of Student Life at Fairleigh Dickinson University in Teaneck, NJ, where she is also earning a master's degree in professional communications and media.*

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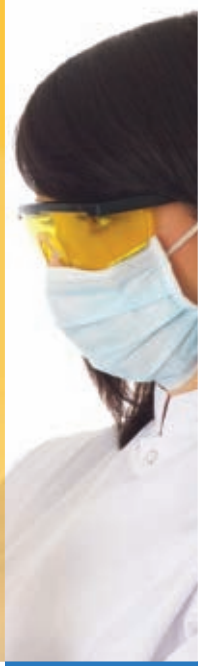

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SPOTLIGHT

West Virginia State University

Institute, WV

COMPILED BY ACS STAFF

Chapter president: Joshua Kim **Number of chapter members:** 18 **Number of ACS student members:** 10
Institution environment/composition: Small, public, suburban, minority-serving, 4-year institution

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

A: It's in our officers' job descriptions to mentor their replacements for the following year. Whenever possible, our students who are returning officers help provide on-the-job training for the new officers during the first couple of months of the new academic year.

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

A: We have been actively working with local scout troops to help them earn their science merit badges, belt loops, and Try-Its. Last summer we participated with the Boys and Girls Club of St. Albans and many local elementary schools in helping to enhance science education in the community. The group has also hosted several blood drives that exceeded the expectations of the American Red Cross.

Q: **What are some of the interesting ways your chapter recruits its members?**

A: We are actively recruiting elementary education majors to help in our child outreach activities. These are the people who have expertise in teaching children. We want to get these future teachers excited about science now, so that they will be effective science teachers in the future. They are often the unsung heroes in educating our future scientists.

Q: **What is your most popular chapter activity?**

A: One of our most popular activities is the Careers in Science Seminar series. The speakers in this series are determined by the members, who choose speakers with careers that are of interest to students. We arrange to have these speakers talk about their career choices and job descriptions to students here at the university, and also to local high school students who attend the lectures. We invite speakers to speak about once each month during the academic year.

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

A: We have worked with several organizations. Our chapter works with the Student Environmental Action Coalition most frequently, monitoring water quality issues and other environmental monitoring programs. We have begun to work with the Communications Club to help us better advertise our upcoming activities and better report on the success of previous events. The Student Teachers Group has been vital in encouraging education majors to become active in our club by visiting the local schools with us.

Q: **What is the most effective communication tool that your chapter uses to promote chapter activities?**

A: The most effective way that our chapter members communicate with each other is through Facebook. Since most of our students and others have Facebook pages, we use Facebook to pass along information and maintain contact with widespread alumni.

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

A: Our most successful fund-raiser is the use of the Kroger Cares Cards. Our local Kroger grocery store donates 5% of face value of every gift card to the nonprofit group that sells it. In the two years we have been a part of this program, Kroger has donated several hundred dollars to our chapter.

PHOTO COURTESY OF WVSU

WVSU chapter members pose with Mary Kirchhoff, director of the ACS Education Division, at the chapter awards ceremony at the ACS Spring 2011 National Meeting in Anaheim, CA.

Faculty Advisor:
Michael Fultz, 2 years

Q: **Why did you become a faculty advisor?**

Fultz: Because I know the benefits that I received as a student in career preparation and community service, and I wanted to pass that on to the next generation of chemists.

Q: **What challenges have you faced in your position?**

Fultz: The greatest challenge has been maintaining an adequate budget to do all of the outreach and service projects that the organization accomplishes every semester.

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

Fultz: I have enjoyed seeing my students learn that giving back to the community through participation in elementary school and scout projects is enjoyable, and seeing their desire to lead more community service projects.

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

Fultz: Be patient. It can take a while to build contacts in schools and community organizations as well as an active student chapter to accomplish the many great things that your members can dream of.

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SPOTLIGHT
Olivet College Olivet, MI

COMPILED BY ACS STAFF

Chapter president: Candace Igert **Number of chapter members:** 20 **Number of ACS student members:** 7
Institution environment/composition: Small, private, rural, 4-year institution

Q Do you have any unique positions?

A Olivet College has a strong emphasis on service, so we have a service coordinator to help us organize service projects once per semester. We have also created the position of historian to help us maintain a photographic record of our activities as a chapter.

Q What is your chapter doing to celebrate 2011 as the International Year of Chemistry?

A For the fall semester, we plan to create posters to promote chemistry to the campus community and raise money for the "Pennies for PUR Water" project that ACS is organizing.

Q How does your chapter celebrate National Chemistry Week? Chemists Celebrate Earth Day?

A We celebrate NCW by participating in Chemistry Day at Impression 5, a children's interactive museum in Lansing, MI. The Michigan State University ACS local section hosts this event, and we partner with them. We do three interactive activities for the children who attend: an alchemical symbol matching game, special effects from the movies (chemiluminescence and fake blood), and dry ice rockets (always a hit). We also host an on-campus Chemistry Day where we do demonstrations. For Earth Day, chapter members pick up trash from around campus and then socialize with a pizza party afterwards.

Q What is your most successful recruiting event/method?

A At the beginning of the fall semester, we attended a departmental seminar and explained what our club is and what we do. We also include all chemistry majors in our e-mail communications to encourage new students to attend our meetings.

Q What is the most effective communication tool that your chapter uses to promote chapter activities?

A We use e-mail as our main communication tool to promote activities within the department, and flyers to promote them to the rest of the campus. We have recently put together a bulletin board outside of the chemistry labs to post announcements and upcoming events.

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

A We sell periodic-table-themed crispy rice cereal squares for our Chemistry Day. We have one square for each element on the periodic table and some squares with alchemical symbols. We also use different flavors of crispy rice cereal for the different parts of the table (main group metals/nonmetals, transition, and inner transition metals).

PHOTO COURTESY OF OLIVET COLLEGE

The ACS student chapter at Olivet College re-activated two years ago and named itself the Gruen Chemical Society, honoring the former faculty advisor of the chapter when it was chartered in 1970.

Faculty Advisor: Susanne Lewis, 2 years

Q: Why/how did you become a faculty advisor?

Lewis: I have been the Gruen Chemical Society faculty advisor since the reactivation of our ACS student chapter. We named ourselves for the former professor who was the faculty advisor for the initial chapter, which was chartered in 1970. I have continuously been an ACS member since I was an undergraduate, and I wanted to give my students the same kinds of experiences and networking opportunities that I had when I was an undergraduate member. I also wanted to help make connections in our area public schools for our chemistry and integrated science education majors, as well as showcase the college to prospective students.

Q: What challenges have you faced in your position?

Lewis: My main challenge is finding the time for our chapter to meet on a regular basis to plan and hold both professional and social activities. Our students are often involved in more than one student organization and/or on an athletic team, so getting members to be active can be a challenge.

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

Lewis: My advice is to be passionate about being a chemist and teaching chemistry, regardless of what your career plans are. Find ways that allow your students to interact with chemistry professionals in all fields, and don't forget that social events are just as important in developing a sense of community as professional events are.

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Tips, Techniques, and Timing

Strategies for Successful NCW and Mole Day Celebrations

BY ALLISON PROFFITT

Some ACS student chapters look to the third week in October with great anticipation, while others view it with apathy, if not outright dread! National Chemistry Week (NCW) and Mole Day can be the highlight of your chapter's calendar, or they can be sources of stress and uncertainty for new officers early in the academic year. For chapters that excel at these events, the keys are planning, consistency, tradition, and a sense of humor.

The theme of NCW changes every year, and many chapters host a range of events that include traditional favorites of members and special new events that are theme-related.

Demos in the dark

The University of Mary Hardin-Baylor (UMHB) in Texas has been celebrating NCW with a bang (literally) every year since 1991. The student chapter's annual event — Demos in the Dark: Things

COURTESY OF WESTERN KENTUCKY UNIVERSITY

That Go Bang and Boom in the Dark — happens twice during NCW, on Tuesday and Thursday. The show starts at dusk, and students conduct a host of chemical demonstrations that glow in the dark, produce controlled fires, or cause colorful explosions. Some examples of the demonstrations are Methane Mambo, the UMHB Fire Jug (Swoosh Bottle), Glow-in-the-Dark Toothpaste, and Exploding Hydrogen Balloons. After the show, kids have the opportunity to pick up an NCW balloon, enjoy a liquid nitrogen slushy, and make some slime. High school chemistry teachers who attend the event each get a copy of the Merck Index.

Darrell Watson, dean of the College of Sciences, is also the student chapter sponsor and the NCW coordinator for the ACS local section. Watson believes the event is successful because of its consistency. "There are many different variations each year, but basically that's the same celebration we have had for at least the past few years," Watson says.

The outdoor event attracts 450 attendees per night in good weather. "We hear from people throughout the year," Watson explains, "who say, 'Remind us again when you are having Demos in the Dark. We don't want to miss that!'" For admission to the event, the chapter charges one canned food item; after NCW is over, the chapter donates what it has collected to a local food bank with which the chapter has a relationship. "We started a long time ago with one of the NCW themes that dealt with the chemistry of food. It kind of carried on after that, and we now raise quite a bit of food every year to take to our food pantry."

PHOTO: REBECCA MEYER

Having a consistent NCW tradition means that students can start practicing and planning early and that many of the logistics associated with a large event get easier each year.

Even the local fire department joins the fun. "One of our policies on campus is to notify our fire marshal about anything we do that could be considered a little bit dangerous. In the past several years, we have also invited the fire department to attend our performance," Watson says. "Usually you will see a fire truck at our events, complete with paramedics and everything. Fortunately, they are just sitting and watching the show."

Cupcake lab

At the University of Colorado (UC) Boulder, Mole Day (celebrated annually on October 23) has a long-standing tradition as well. Every Mole Day, the student members build a Periodic Table of Cupcakes to sell for a penny a proton for each element, up to 50 cents apiece.

"We don't make as many hydrogen cupcakes, because at their price, they sell out really quickly," say Alyssa Wiener and Jackie Stonebraker, co-presidents of the UC Boulder chemistry club. "We usually make enough for every single element; also, because some research groups want to buy specific elements they work with, we'll make some special-request cupcakes as well."

The cupcakes are baked by faculty members ("They have kitchens," explains Wiener) and sold by students at a table set up outdoors at a centrally located spot with a lot of student traffic. The money raised from the sale is donated partly to the Christopher Severy Memorial Fund for Undergraduate Research and partly to award a prize at an undergraduate poster symposium that the club hosts in April.

The Mole Day cupcake sale has been a tradition at UC Boulder for 10 years. The annual event, with the added incentive of its proceeds funding the student memorial scholarships, reaches not only chemistry students but the larger campus as well.

Cupcakes are something that all students can relate to, Wiener says. She acknowledges that non-majors don't usually remember how to calculate the number of protons for an element, but most do know the periodic table and recognize some of the elements. "I think that if people do something that's not too esoteric, something that non-majors can relate to, that's always a good thing."


PHOTO COURTESY OF UC BOULDER

During NCW, faculty members at the University of Colorado, Boulder bake for the Periodic Table Cupcakes sale and chapter members decorate and sell the cupcakes. The proceeds go partly to the Christopher Severy Memorial Fund.

The pageant and the piñata

Similar to UC Boulder, Union University also offers a Periodic Table of Sweets, but using cookies rather than cupcakes. "We

PHOTO COURTESY OF UNION UNIVERSITY

At Union University (Jackson, TN), NCW and Mole Day events — such as crowning the Mole King and Queen and the NCW semiformal dinner — have grown into fun and unique annual traditions.

used to do cupcakes," Charles Baldwin, chapter advisor, says, "but cookies are easier."

Whereas the cookies are for everyone on Union University's Jackson, TN, campus, some of the institution's NCW and Mole Day traditions are specifically for chapter members and have grown into fun and unique traditions. After nominations and voting during NCW, the Union University ACS student members crown a Mole King and Queen, and celebrate with a Mole piñata (or "Mole-ata") and a Mole Day cake.

"This is an idea that has gained momentum throughout the years," Baldwin says. "Initially it was kind of a cheesy idea, but now the junior and senior members of the chapter are really interested in running for Mole King and Queen."

The chapter's Mole Day coordinator makes up a ballot of all junior and senior chemistry majors and distributes it in all of the chemistry classes for voting. The winners are crowned (with actual crowns and scepters) at a ceremony held outside on the Student Union patio. After the King and Queen are named, they're invited to take the first swings at the Mole-ata.

"To customize our Mole-ata, we started with a Blue's Clues piñata," says Jill Frank, chapter president for 2009–2010. "By cutting off the big dog ears and eyes, spray-painting the whole thing brown, and then reattaching the eyes, the Mole-ata becomes a Mole Day masterpiece!"

Although the event isn't necessarily an outreach event, it is held centrally on campus. "All of the students are walking by as they change classes, and they stop to check to see what's going on, so it's not uncommon to have 40, 50, 60, even 100 people standing around," says Baldwin.

If the Mole-ata doesn't release its loot after the King and Queen take a swing at it, it's open to anyone. "I try to even the playing field for the mole," Baldwin laughs, "by putting the thing on a pulley. That way, people don't have an easy time of hitting the poor little mole."

The Mole King and Queen then invite the campus community to the chapter's semiformal NCW closing dinner, over which they preside. The event also features a guest speaker, and it wraps up the week's festivities.

If the official date of Mole Day is inconvenient for the celebration, the club simply shifts the date by a few decimal points. "If Mole Day falls on, say, a Saturday, we have no reticence about declaring that we're going to celebrate MegaMole Day instead! Then we just move it six days out so it's 10^{29}," says Baldwin. "One year, we celebrated DecaMole, and another we celebrated Millimole." The tradition is the most important part and ensures that club members and chemistry students are engaged and having fun.

Baldwin credits effective planning efforts with Union University's successful NCW. The club elects officers in March for the following academic year, and two key positions are the NCW coordinators. Planning for October's festivities starts early.

"It is impossible for one person to coordinate all of NCW and Mole Day well. They need help," agrees Frank. "As Dr. Baldwin says, 'Many hands make light work.' By delegating each NCW/Mole Day event to a point person, the NCW coordinators can ensure that more members are involved and committed to making NCW/Mole Day the best. By planning during the summer and relatively relaxing first few weeks of the semester, we allow for work groups to be formed and put into action for the big week!"

But the single most important thing to remember? Enthusiasm, says Frank. "Enthusiasm in leadership positions will be mirrored in the members. In other words, GET EXCITED! This is one week devoted to celebrating chemistry, embracing our nerdiness, and having so much fun along the way!"

Allison Proffitt *is a writer and editor based in Singapore covering science all over the world. When she's not writing, she's traveling as much as she can.*

PHOTO CHEMISTRY

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

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The University of Houston (TX) chapter hosts events throughout NCW. They have begun a new tradition where they literally wear their pride of chemistry— chapter members and faculty wear their lab coats to all of their classes during NCW. The chapter also sponsors a mole contest to celebrate Mole Day. Students submit drawings and sculptures to represent either Avogadro's number or a mole (the animal) and the creator of the winning entry is awarded a gift card.

Chapter members from the University of Puerto Rico-Mayagüez Campus celebrate NCW by holding a Periodic Table cookie sale. Additional events include green chemistry demonstrations, the Chemistry Research Lab tour of the chemistry department's research labs, and "Goofy Games: How Much Do You Know About Chemistry?" In Puerto Rico, all of the ACS student chapters also participate in the island-wide celebration of NCW— Festival de la Química— hosted by the Puerto Rico ACS Local Section.

At Virginia Tech (Blacksburg), the Chemical Illusions show is an ongoing NCW tradition organized by the student chapter. Activities include eating liquid nitrogen and making slime. Demos show the color and sound of chemistry using burning salts, gummy bears, and more. A $2.00 entrance fee paid by participants raises money for materials used during this show and at workshops held throughout the year.

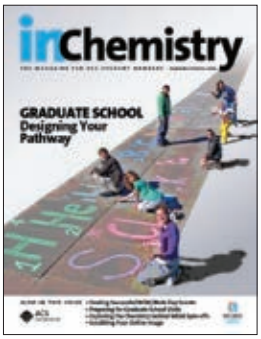
Students from the Tennessee Tech (Cookeville) student chapter worked together to construct a giant 18-foot-tall buckyball out of balloons during NCW in honor of the 25th anniversary of the discovery of C_{60} fullerenes. The chapter celebrated Mole Day with an ice cream making event and a party.

During NCW, the South Dakota School of Mines & Technology (SDSMT) (Rapid City) student chapter members chalk the campus sidewalks with elements. The chapter also hosts a movie night for its members and a bingo night for all students, with local businesses donating a variety of gift cards and coupons. To give back to the community, the SDSMT chapter sponsors an NCW campus blood drive.

The University of Kansas (KU) Lawrence student chapter's Frozen Flames Show is the signature event of the Carnival of Chemistry, an annual NCW event sponsored by KU, the Wakarusa Valley ACS Local Section, and others. This Broadway-style production includes singing, dancing, and audience participation. The show features large-scale demonstrations that can be performed easily in an auditorium, such as methanol rockets.

During Florida International University's (Biscayne Bay) "Behind the Sciences of Magic Tricks" event, chapter members demonstrated how magic tricks — such as creating a vacuum in a bottle — involve chemistry. They further explained how the chemical reactions are caused by the unique characteristics of each element.

The University of the Sciences (Philadelphia, PA) hosts a Periodic Table of Brownies sale. Other events include hosting a local section meeting and "Find the Mole" event, where members hide chemistry question cards and students win prizes for finding the cards and correctly answering the questions.



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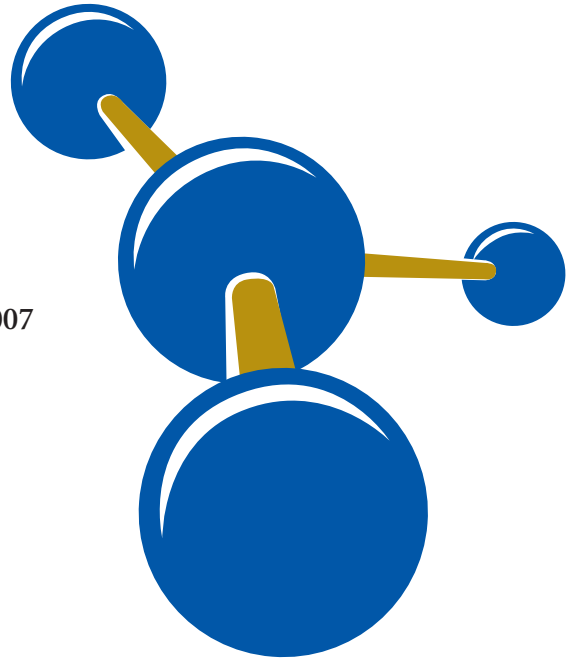

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