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February/March 2010

# in Chemistry

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# contents



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MIKE DIEBELSKI

Cover art courtesy of Robert B. Alcott, [www.crystallineartistry.net](http://www.crystallineartistry.net). Image created with a mixture of compounds on glass. Inset photo: Jorge Santiago Ortiz is a senior at the University of Puerto Rico-Mayagüez, where he is majoring in chemical engineering.

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UNIVERSITY OF PUERTO RICO-RIO PIEDRAS

<b>ON THE WEB</b>	<b>2</b>
<b>EDITORIAL</b>	
To Be Competitive, You Need a Global Education By Joseph S. Francisco	<b>2</b>
<b>ACS STUDENT CHAPTER SPOTLIGHT</b>	<b>3</b>
Compiled by Audley S.V. Burke	
<b>CHAPTERS</b>	
The Lowdown on Chapter Reports By Pamela K. Kerrigan	<b>5</b>
<b>FEATURES</b>	
Real World 101: Acing the Job Interview By Lisa B. Marshall	<b>8</b>
Careers in Pharmaceutical Chemistry By Wendy Hankle	<b>10</b>
The Drug Development and Approval Process By John Kelly	<b>12</b>
Conference Presentation No-No's By Denise Lynn Merkle	<b>13</b>
<b>RXN'S AND SLN'S</b>	
Blogging about Finding an Entry-Level Position in Challenging Economic Times Compiled by Lori Betsock	<b>16</b>
<b>ACS RESOURCES</b>	
ACS Career Consultants: Career Advice Is Yours for the Asking By Lisa M. Balbes	<b>18</b>
<b>MEETINGS</b>	
Collaboration Breeds Success By Olbelina Ulloa	<b>20</b>
Sun, Sand, Sea, and...SERMACS! By Emily Robles	<b>22</b>
Undergraduate Program: 239th ACS National Meeting	<b>24</b>
Call for Papers: 240th ACS National Meeting in Boston, MA	<b>26</b>



## Interesting Websites

### USA Jobs

Here's a one-stop link to jobs with the federal government that gives advice on how to land a job with the feds — a process that is trickier than obtaining jobs in other job sectors.

There are more procedures to follow and buzzwords to know, as well as more paperwork to submit. This user-friendly website covers all of that and more.

[www.usajobs.gov](http://www.usajobs.gov)

### Chronicle of Higher Education Careers

This site provides easy access to the *Chronicle of Higher Education's* career advice and open positions. It's geared toward people entering academia and describes many fields, including science.

[www.chroniclereaders.com/section/jobs/61/](http://www.chroniclereaders.com/section/jobs/61/)

### O\*Net

This U.S. federal government site gives you access to a wealth of unbiased data on professions, including knowledge and skills necessary for success, wage statistics, and employment trends in particular professions. The data come straight from the Bureau of Labor Statistics and are presented in a user-friendly format.

[online.onetcenter.org/](http://online.onetcenter.org/)

## Interesting Articles

### The Five Questions Every Research Talk Should Address

Françoise Chanut provides a list of questions your talk should cover, and also offers tips for developing and delivering a dynamic research talk.

[www.career.ucsf.edu/lifesci/samples/ResearchTalkTips.pdf](http://www.career.ucsf.edu/lifesci/samples/ResearchTalkTips.pdf)

### Five Don'ts for College Seniors Approaching Graduation

College is great, but then it's over, and it's time to move on. Don't thwart your dreams by making the five mistakes described in this article.

[www.knockemdead.com/job-search-articles/dont-stay-too-long-at-the-party.html](http://www.knockemdead.com/job-search-articles/dont-stay-too-long-at-the-party.html)

Compiled by Blake Aronson,  
Senior Education Associate, ACS.

## To Be Competitive, You Need a Global Education

BY JOSEPH S. FRANCISCO



COURTESY OF JOSEPH S. FRANCISCO


Today's chemistry students will make tomorrow's discoveries and develop the innovations to protect our planet and improve the health and well-being of its inhabitants. You will carry on the mission of the ACS "to advance the broader chemical enterprise and practitioners for the benefit of Earth and its people." As ACS president, one of my goals is to give you a competitive edge in an increasingly global chemical enterprise.

In a survey of executives at 400 companies, nearly 75% said recent four-year graduates displayed only "adequate" professionalism on ethics, creativity, innovation, and critical thinking and problem solving. Yet, as Tamara J. Erickson points out in her book *The Outlines of Your Generation: Demographic Characteristics of Generation Y* (Harvard Business Publishing), these are key factors for hiring. Given these facts, what will current and future chemistry students need to do to be competitive and get jobs in the U.S. and global marketplaces? As I wrote in the *Journal of Chemical Education* (2008, Vol. 85, p. 1338), "The bottom line is: Global skills are important in getting the job, keeping the job, and getting ahead in the job." So, how do you acquire such skills?

It is no longer sufficient to simply to go school and learn the basics of chemistry and chemical engineering. If you dream of making contributions on the world stage, your studies should include observing and collaborating with scientists around the world. I strongly encourage you to explore and take advantage of the ACS International Research Experiences for Undergraduates program for chemical science majors.

During the coming year, key players from industry, academia, and government will outline the training students need to be competitive candidates in the international workplace. A working group is currently exploring the creation of an ACS International Center to promote an international exchange of students and scientists with the goal of providing experiences and innovative ideas to our students. The International Center would help keep the chemistry student pipeline populated and encourage the flow of groundbreaking research into our country.

This pipeline of chemistry students needs to include all demographics of American society. ACS has several excellent diversity initiatives, such as Project SEED, ACS Scholars, Diversity Partner, and diversity awards, but we must still be on the lookout for further opportunities to reach out to all segments of our society.

Today, while teachers have never been more essential, the focus needs to shift dramatically from imparting content knowledge to empowering students with fundamental key processes to enable them to conduct their own learning and compete globally. If you need more information, go to <http://web.ics.purdue.edu/~francisco/>, or you can also contact me at [joe francisco@sbcglobal.net](mailto:joe francisco@sbcglobal.net). 

JOSEPH S. FRANCISCO is president of ACS, a chemist, and the William E. Moore Distinguished Professor at Purdue University.

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

COMPILED BY AUDLEY S.V. BURKE

## Ocean County College Toms River, New Jersey

Chapter president: Erine O'Connor  
Number of chapter members: 18  
Number of ACS student members: 6  
Institution environment/  
composition: Small, public,  
suburban, 2-year institution  
Chapter website: [http://www.ocean.edu/academics/programs\\_of\\_study/science/OrganicChemistryClub.htm](http://www.ocean.edu/academics/programs_of_study/science/OrganicChemistryClub.htm)

### Q How have you "put a human face on chemistry"?

**A** Our students created a video last year where they targeted students from K-2. It was a simple video that brought chemistry to this younger audience. Since young children love bright colors and happy songs, chapter members sang a catchy song and created fun projects that facilitated learning.

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

**A** The chapter raised money and made a donation to St. Jude's Christian Children's Fund. Members also collected non-perishable items during the holidays to help St. Francis of Assisi Food Pantry, and we entered a bike-a-thon to raise money for the American Cancer Society.



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

**A** Chapter members collaborated with Phi Theta Kappa to build a rain garden. Students attended planning meetings and began the digging for this project over the summer. Matching funds were received by Barnegat Bay National Estuary Program that supports this cause.

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

**A** Every semester, our members host a bake sale. Students donate their time and sweets to this cause. Through this simple and effective fund-raiser, we have helped fund admission to aquariums and small scholarship funds.



Faculty Advisor  
**Maria Tamburro, 2 years**

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

**A** I thought starting an ACS student chapter would give the students a sense of pride and purpose. These students are some of the hardest working students around.

### Q What challenges have you faced in your position?

**A** Limited funding is always an issue.

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

**A** I love to see students build strong relationships with their peers. This is facilitated when they are working on something fun like a video or bake sale. These personal relationships are very important.

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

**A** Keeping a good line of communication between you and your members is of utmost importance. Students can be certain that I respond to their e-mail within 24 hours. This builds trust and security.

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[undergrad.ACS.org](http://undergrad.ACS.org)

## CORRECTIONS

In the November/December 2009 issue (Volume 19, Number 2), in the chapter award listings, the following information was incorrect. It should have read:

### Chapter Awards

**Eastern Illinois University**, Charleston, IL, recognized as a Commendable chapter. The faculty advisors are Edward Treadwell and Svetlana Mitrovski.

**University of Wisconsin-Whitewater** recognized as a Commendable chapter. The faculty advisors are Hephzibah Kumpaty and John Ejnik.

**Stern College for Women-Yeshiva University**, New York, NY, recognized as an Honorable Mention chapter. The faculty advisors are Donald Estes and Evan Mintzer.

### Happy 400th Anniversary

Adolph Butenandt received the Nobel Prize in Chemistry in 1939 for his work on sex hormones, not polymethylenes and higher terpenes.

## Fairleigh Dickinson University, College at Florham Madison, New Jersey

### Chapter president:

Gregory F. Pirrone

Number of chapter members: 22

Number of ACS student members: 5

### Institution environment/

**composition:** Small, private, suburban, minority serving, 4-year institution

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

**A** We hold elections every year, with the officer seats open to all students. Thus, the board is not solely comprised of seniors. Sophomores and juniors are encouraged to take positions.

### Q Do you have any unique or specialty positions?

**A** We have a session coordinator who arranges and coordinates exam review sessions for the general and organic chemistry students.

### Q How did you celebrate National Chemistry Week?

**A** Our chapter prepared an exhibit on the elements and made an interactive periodic table for children at the Liberty Science Center in Jersey City for National Chemistry Week. We also painted "The Rock," an icon of the campus used by various clubs to advertise/celebrate events.

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

**A** Our chapter often goes to day-care centers and elementary schools to perform chemical demonstrations and try to spark an interest for science in younger children.

### Q What is your most successful recruiting event/method?

**A** At the beginning of the semester, all the officers and some of

course join our chapter. Also, laboratory assistants recruit students through the general chemistry labs.

### Q What is your most popular chapter activity?

**A** The "Coffee and Chemistry" events, which are review sessions that the officers provide to general and organic chemistry students. Refreshments are also provided at these events.



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the faculty speak to prospective members. We provide free pizza and hold a raffle for door prizes, including ACS beaker mugs and personalized lab coats. The professor for organic chemistry is also the advisor for the chapter, so many of the students from her

### Q What is your most effective communication tool?

**A** With the ease of electronic communication, e-mail is the most effective way to communicate. On occasion, cell phones are used to communicate events. The most creative communication tool is a

large Facebook group that all the members are invited to join.

## Faculty Advisor Amber Flynn Charlebois, 4 years

### Q Why did you become a faculty advisor?

**A** I was hired to teach organic chemistry at FDU, and the faculty member I replaced was the previous advisor, so it seemed like a natural thing. I love the position and can't imagine not being the student chapter advisor.


### Q What challenges have you faced in your position?

**A** The most challenging thing is to make sure that the chapter has a good, strong, and reliable executive board.

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

**A** Allowing the students to promote the student chapter, the chemistry major, and chemistry in general at events held both on campus (Major's Day, Club Fair, review sessions) and off campus (demonstrations at local day-care centers and the Chem Expo at the Liberty Science Center for National Chemistry Week).

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

**A** Encourage good, strong students to become involved in the chapter, and it will be effective and fun. 

## GOT FACEBOOK?!

We have developed a Facebook page, complete with group and fan pages. Student members can access this page to learn about happenings at ACS, view pictures from meeting events, and network with other student members nationwide. Just look up Audley "UNDERGRADPROGRAMS" Burke in the search box and send us a friend request.

*Why Wait? Join Now!*



# THE Lowdown on CHAPTER Reports

*How to Write Them, Why  
They're Important*

BY PAMELA K. KERRIGAN

**I**T'S THAT TIME OF YEAR: DURING the next several months, ACS student chapter members and advisors will collaborate on writing their annual reports for ACS. The due date for this year's report is May 26, 2010.

You might also be asking yourself, "Does anyone even read these reports?" The answer is yes! Faculty advisors and the staff of the Undergraduate Programs Office spend a lot of time going through everything they receive. I, myself, have been reading annual reports for more than 10 years.

## Understand the benefits

You might be asking yourself, "Why write about what we did over the past year?" There are several practical reasons for submitting a chapter report. Most importantly, the annual report must be submitted at least once every three years to maintain your chapter's active status with the national headquarters. Only active chapters can apply for several types of grants from the Undergraduate Programs Office, such as travel grants for the national meeting, Innovative

Activities Grants, and Community Interaction Grants.

Writing a report is also a way of informing the national headquarters of all the wonderful things your chapter is doing. Your chapter may also have some unique ideas that could be shared with others.

By filing a report annually, not only will your chapter receive national recognition for its activities, your college will too. This is very important to the programming of your chapter. You may even be able to use this recognition to get additional funding from student government and from outside sources, such as chemical companies. Businesses in the chemical industry enjoy being recognized for their work with area colleges and communities.

In addition, completing chapter reports

benefits current and future chapter officers. As scientists, we all know the importance of documenting what we do in the laboratory, so learning how to keep accurate records will give you a professional edge. As you advance in your career, you will likely be asked to write an annual report for your employer or as a participating member of a professional organization. That is why filing your report is especially critical.



Student chapter members from Utah State University show their spirit at homecoming.

## Take photos to document events

The reports also bring recognition to your chapter on a national level. Did you know that many of the articles you read in *inChemistry* magazine are inspired by information gleaned from chapter reports,



Chapter members from Aquinas College in Grand Rapids, MI, hold an annual crawfish boil.

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campus-related, and so on. Also, keeping track of paid student membership is crucial in order to meet the national eligibility requirements of having six paid ACS student members on the chapter roster.

## Appoint a record keeper

It's easy to forget details of events that took place six months earlier!

Don't try to re-create all the statistics at the time the report is due. Your chapter officers should keep track of membership records and statistics, including event dates and locations, chapter participants, and audiences served throughout the year, as the events occur. This will make the report writing much easier to complete in the spring. It will also be more useful to your chapter and create a more

accurate picture of your strengths and challenges.

## Use the report template

How your report is presented is important. Make sure you use the report template that is found on the ACS website at [www.acs.org/undergrad](http://www.acs.org/undergrad). It has step-by-step, easy-to-follow instructions.

Be concise but thorough. Many chapters list their activities but include only the briefest of descriptions in the summaries, leaving reviewers with few insights. Use the summary space to describe your chapter's role in the events. Did you plan the activity as well as help to present it? What challenges did members need to overcome? Were there any extenuating circumstances you feel the reviewers should know about?

or that the images shown in the chapter video presented at the ACS spring national meeting are most often obtained from the chapter reports?

## Make it a team effort

The main objective in writing a chapter report is to be as efficient and effective as possible. Teamwork plays a large role when writing the report, and the entire process should be a collaboration involving you, other chapter members, and your faculty advisor. Consider having different officers write specific sections.

## Keep accurate records

This process begins with the chapter officers, who should record all the activities that took place during the past academic year, such as attendance and participation in events, who was involved in planning, whether the events were community- or

### Award-Winning Chapters

- Reflect on the year and its successes and challenges, describing how they overcome their challenges.
- Foster involvement and interactions among chapter members.
- Evenly distribute chapter responsibilities.
- Make an effort to recruit and retain members.
- Hold effective, regularly scheduled chapter meetings and officer meetings.
- Have a variety of funding sources — including their college, department, local section, local industry, and grants — and provide details on available funds and expenditures.
- Leverage career resources outside of their institutions.
- Demonstrate integration and interaction within their chemistry departments and encourage faculty participation.
- Communicate regularly to members and reach their audiences through a variety of media.
- Demonstrate extensive involvement in the community.
- Attend local, regional, and national meetings and events, participating in those held on their campuses.
- Celebrate NCW, Mole Day, and Earth Day at their school and in their communities.



## Beware of duplicate listings

Perhaps the most common mistake chapters make is listing the same events in multiple sections of the report. The only time you can list an item more than once is if the function can count as a green chemistry activity, which is judged by the Green Chemistry Institute. If you are not sure of an answer, write N/A in the answer blank and use the comments space to elaborate.

## Include supporting documents

You can include up to two supporting documents per category. The documentation could be flyers, newsletters, advertisements, and so on. But please do not overwhelm the reviewer with an overabundance of attachments.

## Understand the review system



The Halloween Safe Night is a popular community service activity at Spelman College in Atlanta, GA.

The most successful chapters include at least one activity in each of these major areas: community service, National Chemistry Week, Mole Day, Earth Day, and speakers/tours. When rating a chapter for an Outstanding chapter award, reviewers will be looking for multiple activities in all categories.

Generally, chapters that earn Commendable or Honorable Mention awards have mentioned activities in some of the major categories but not in all of them. A chapter receiving a Commendable award may have multiple activities in most of the sections but not all, while one receiving an Honorable Mention may have one activity in only one of the primary sections.

Generally, chapters that earn Commendable or Honorable Mention awards have mentioned activities in some of the major categories but not in all of them. A chapter receiving a Commendable award may have multiple activities in most of the sections but not all, while one receiving an Honorable Mention may have one activity in only one of the primary sections.

## Show member support

Be sure to include the number of chapter members who participated in



Chapter members from Illinois Valley Community College monitor pollutants at a local stream.

each event. This is an important bit of information because it tells us a lot about your chapter and its events. For example, if your chapter is small but all of the members are consistently involved in events, this tells the reviewers that your members are highly interested and engaged in activities and that your chapter is strong. On the other hand, if your chapter has a large membership but low member turnout for all of its events, this may indicate to reviewers that the chapter is run by just a few highly involved members and that overall participation in the chapter is low.

## Describe the impact of events

The public's involvement in your events is also a very important piece of informa-



A chapter member from the University of Tennessee Chattanooga paints a birdhouse at a Habitat for Humanity fund-raiser.


tion. The reviewers look at this as one way to determine the overall impact of an event — that is, how much of the community at large is affected by your events. It's also important to note if the event reached members of minority groups considered to be under-represented in the sciences. The more information you give the reviewers, the better they can evaluate your chapter.

## Put awards into perspective

The level of award you receive is not the most important reason to participate in an ACS student chapter. Receiving any of the awards signifies a great accomplishment and is a national recognition for all of your hard work! It is an honor not only for you but for your school and your community as well! What's more important are the

intangible benefits you and those around you receive.

You are helping to increase science literacy and shape the scientists of tomorrow. The professional contacts you make while working as part of your chapter are also important, as are the "soft skills" you gain, such as public speaking, organization, and learning to work as part of a team.

Your chapter activities also give you a better appreciation for the chemistry you are learning and a better understanding of the impact it has on society and the environment. That is what participation in an ACS student chapter program is all about! 



**PAMELA K. KERRIGAN** is an associate professor of biochemistry in the Division of Natural Sciences at the College of Mount Saint Vincent. She has been a student chapter faculty advisor for more than 15 years.



# Real World 101: the Job Interview



BY LISA B. MARSHALL

**STILL REMEMBER MY FIRST “REAL” INTERVIEW.** IT was at General Electric. Believe it or not, the interviewer, Jay, only asked me one thing: “What questions do you have for me?” Thankfully, I had prepared a long list of questions that filled up our interview time. The key to my success in interviewing was preparation. Today, with such intense competition for fewer and fewer positions, preparation is ever more critical. Yet the number one complaint from recruiters is that too many people come unprepared to do interviews. I think that most people want to be prepared; they just don’t know how to do it. Here are a few tips to help you.

## Be prepared

Research, research, research! You should learn as much as you can about the industry, the organization, the key leaders, and the specific people who will be interviewing you. At a minimum, get the name and title of the person doing the hiring, but try to get this information for everyone.

Obviously the best place to start your research is the organization’s website, but don’t stop there. Google everyone who will be part of your interview process. Your goal is to discover common ground that you can use to build rapport quickly during the interview. In addition, this information will help you to create responses that are specific to the position and company.

Of course the recruiters are also doing their homework. They’re Googling you, so you’ll need to review what you’ve posted. Do you share or show anything that indicates alcohol or drug use? Do you have photos that are inappropriate for a professional work environment? Do you use poor grammar or spelling? Have you bad-mouthed a previous employer, employee, or even a friend?

If so, the obvious advice is to remove pictures and content that send the wrong message to potential employers and/or to adjust your privacy settings so that only designated friends can view your personal content.

## Your online presence

Not only do you want to get rid of the bad stuff, but also you’ll want to beef up the good stuff. At a minimum, create a

LinkedIn professional profile ([www.linkedin.com](http://www.linkedin.com)), and become a member of the world’s largest professional networking site. Use this profile to clearly convey all the skills and experiences you currently have and how they can benefit an organization.

Especially as a new graduate in the current economy, you’ll want to highlight all of your successes, skills, and experiences and how they can benefit an organization. Did you participate in sports? Were you active in any volunteer work, or did you work on any projects or entrepreneurial ventures outside of class? Were you involved with Greek or student government? Did you participate in a comedy open mike, or do you have any musical talents?



**Clearly convey all the skills and experiences you currently have and how they can benefit an organization.**

A profile is less formal and reflects your personality. Enhance the profile by including documents, presentations, or videos. For example, you could include an awesome slide presentation that you created for a difficult class or include a sample of your writing. Or maybe you’ll want to include a video that highlights your skills and abilities. Use the flexibility of the format to creatively represent yourself.

However, most importantly, you will want to be sure your professional profile includes many glowing recommendations. Ask your professors, student leaders, or school administrators to write you a recommendation. This is a great way to highlight character traits such as integrity, leadership, and flexibility as well as transferable skills such as business acumen and problem solving.

## Professional sound bites

Developing an impressive profile will also help you to develop some of your job search sound bites. These are your prepared and practiced responses to common interviewing questions such as, “Why should I hire you?” and “What are two or three accomplishments that have given you the most satisfaction — and why?”

Allocate extra time for this step. You’ll need to refine and rehearse as much as you can. Just like your profile, refine your sound bites so that they’re clear, concise, and compelling. Practice them several times a day in short bursts, so that when you deliver them, they sound spontaneous and not rehearsed.

## Practice, practice, practice

Most interviews start with, “Tell me about yourself.” Your goal is to share your most relevant experiences and character traits in an organized, efficient (2–3 minutes), and compelling manner.

Start with three character traits that are a good match for the position. Then tell a very quick story

that is an example of those traits. Next, you’ll want to highlight relevant work or volunteer experience. Very briefly describe the responsibilities of the position(s), your goals, and the results you achieved. Finally, describe your college experience — again, sharing your goals and your results at a high level.

In addition, you might hear questions like: “Give me a specific example of a time you dealt with team conflict.” The premise behind behavioral questions like this is that past performance is the best predictor of future performance.

The response to this type of question requires you to describe three things: a specific situation, the actions you took, and the outcome. The more detailed, specific, and honest you are, the more successful you’ll be.

Review the job description for desired characteristics. Also, think about characteristics that would be desirable for that organization or for that position in general. Then, from your experience, prepare and practice example stories that could be adapted to convey several different characteristics. Finally, practice telling your stories concisely. That’s where many people go wrong.

## Appearances count

Let’s face it, we quickly judge other people by outward appearances. Before your interview, have a trusted colleague give you honest feedback on your handshake. If you’ve never been trained, there’s a pretty good chance you’re doing it wrong.



JUPITERIMAGES

## Developing Your Personal FAQs

Consider creating and sending a professional FAQs. This is a document that asks and answers the commonly asked interview questions in the form of FAQs. You should create a master list of 25–35 questions and answers. Then, once you’ve done your research on the company and position, you can choose which 10 you’d like to include.

For example, you might choose and respond to the following 10 questions:

- How would you describe yourself?
- What do you see yourself doing in five years?
- Why did you choose this career?
- What do you consider to be your greatest strengths and weaknesses?
- How do you define success?
- What was your favorite class, and why?
- What was your least favorite class, and why?
- Describe your favorite professor or favorite supervisor.
- How would you describe your leadership skills?
- Do you think college changed you as a person? If so, how?

A well-crafted list of professional FAQs can create a great impression and help you stand out by anticipating what your interviewer wants to know.


## Most interviews start with, “Tell me about yourself.”

To convey confidence and professionalism, your handshake needs to be firm (but not crushing) and full-handed.

At the interview, wear well-fitting, wrinkle-free professional attire. It’s a safe bet to wear something somewhat dressier than what the employees wear to work. Be sure you have excellent posture and your smile is genuine. Wait a moment and let the interviewer initiate the shake.

Pay close attention to his or her name. Finally, your first words should be respectful and thankful. Something like, “Maria, thanks for scheduling this interview.”

Your body language impacts how others perceive you. When you walk down the hallway, keep your shoulders back, your chest out, and your stomach in. Oh, and walk a little faster. Good posture and slightly faster walking communicate self-confidence. Once you sit down, don’t forget the advice from your grandmother when she told you to sit up straight ... this communicates confidence too!

Remember the five P’s when it comes to interviewing for your first job — proper preparation prevents poor performance. Follow these five tips and come to the interview prepared. You’ll be sure to ace your interview. 



MIKE CHIESIELSKI



**LISA B. MARSHALL** ([www.lisabmarshall.com](http://www.lisabmarshall.com)) is a communication expert, host of “The Public Speaker,” and the author of *Crush the Competition: Today’s Tips and Tricks to Turn Your Interview into a Job*.



## The surprising reality

“One concern for many entering the industry is that they’re going to be in some kind of mundane or routine position,” Jones says. “Fortunately, that does not describe what I do at all.”

Jones is a research scientist at AMRI, an organization that provides drug discovery and pharmaceutical development services. He made the decision to stay a few more years at UNI to earn a professional science master’s degree in analytical chemistry and biochemistry.



Ryan Jones

COURTESY OF RYAN JONES

# Careers in Pharmaceutical

BY WENDY HANKLE

WHEN RYAN JONES WRAPPED up his bachelor’s in chemistry at the **University of Northern Iowa (UNI)**, he was confronted with a dilemma: continue his education, or look for a job in his field? It’s a well-worn crossroads for students studying any subject, but for those with an eye on entering the pharmaceutical industry, perceptions about what education you need can make things complicated.

“As a contract research organization, AMRI is constantly dealing with different molecules and projects at various phases within the drug development process,” he explains. “So I can be working on the development of a drug not even in its first GMP (good manufacturing practice) campaign and, at the same time, working on a Phase III drug.” Biotech and pharmaceutical companies follow good manufacturing practice to ensure proper control and management of manufacturing and quality control of their products. These processes involve a significant amount of documentation and validation of materials and methods used in the development process, typically learned on the job.

Jones shares an alma mater and a chosen professional industry with UNI alum Chad Delp – but that’s where the similarities end. Though Delp began his career as an analytical chemist in the pharmaceutical industry, he now works as a field service engineer for Waters Corporation, a company that designs, manufactures, sells, and services laboratory equipment used by pharmaceutical and other research and development organizations.

His job is based in New Jersey, but Delp travels all over the region repairing and installing scientific instrumentation and teaching clients how to use it.

“It’s almost like being a superhero,” Delp says about his current position. “I’ll come in, figure out what the problem is, then correct it. You’ve got to be personable and have a sense of humor to do this job.”

Delp earned both a bachelor’s and master’s in chemistry at UNI. He thought about continuing his education and getting a Ph.D. — he even applied and was accepted to a program — but decided it wasn’t for him. “I didn’t want to be that specialized, forced into something,” Delp says. “That’s why I stopped at the master’s level.”



Chad Delp

COURTESY OF CHAD DELP



## Exploring other paths

While the prospect of getting pigeonholed by a Ph.D. convinced Delp to take a different route, Nadine Ritter's doctorate provided a solid foundation for her to pursue a range of career options. In 1988, she earned her Ph.D. from **Rice University** in molecular and cellular biology right after completing a bachelor's in biology and chemistry.

"It wasn't my intention to go into the biotech industry when I started my career," Ritter says. "It didn't even exist as an option."



Nadine Ritter

COURTESY OF NADINE RITTER

dating quality analytical methods. Bush earned a biochemistry bachelor's degree from **Union College**, focusing his studies on macro-level chemistry. He toyed with the idea of applying to medical school but, in the end, decided to enter the field.

"Working in the industry, everything is more experience-based," Bush observes. "College prepared me more for the thought process than anything else."

He started his career in the pharmaceutical industry at an entry-level post developing Phase III-ready analytical methods. He says two strategies have helped him advance over the past five years: performing his job well and networking.

"I found my job pretty interesting," Bush says of his first position. "I worked with other departments developing analytical methods and writing protocols and reports."

Bush credits a lot of his career development to a mentor who helped train him at that first job. And when she moved to another organization, Bush went with her.

# Chemistry

Nevertheless, that's where Ritter finds herself today. Currently, she's a consultant with **Biologics Consulting Group**, providing strategic guidance to organizations taking products to market, from pre-Phase I to commercialization. Her job can encompass reviewing product regulatory submissions, conducting quality audits of laboratories, and troubleshooting analytical methods.

Ritter also spent six years with **Abbott Pharmaceuticals**. She began her career there on the bench, worked her way up through management, and then moved to a lab director role with another organization. She made the switch to consulting in 2001. Her career trajectory is a far cry from her initial goal of becoming a college professor.

"I took a chance and I never looked back," Ritter says. "It's never been boring, ever. I do more in one day than I used to do in one month."

As is the case for Ritter, dull moments on the job are few and far between for **Jim Bush**. He's a quality control scientist at **AMAG Pharmaceuticals**, developing and vali-



Pharmaceutical manufacturing.

JUPITERIMAGES

**Bruce Ganem** is the Franz and Elisabeth Roessler Professor and Stephen H. Weiss Presidential Fellow at **Cornell University's** Department of Chemistry and Chemical Biology. He's been on the Cornell faculty since 1974 and has advised his fair share of chemistry students looking to make their mark in the pharmaceutical industry.

Having worked as a consultant for **Ciba-Geigy** (now **Novartis**) for nearly 20 years, Ganem knows what it takes to find success in the industry — with any level of education.

"With our undergrad majors, many know they want to go to graduate school, but they ask me if there's a benefit to working at a company before beginning a graduate program," he says. "The answer is 'yes.'"

But some chemists opt to stick with on-the-job experience in lieu of an advanced degree. **Nicole Meekins**, a scientist with generic drug manufacturer **Roxane Laboratories** (a **Boehringer Ingelheim Corporation** subsidiary) is one of them. She earned a bachelor's in chemistry from **Ashland University** and uses her degree in the company's analytical development department.

"I definitely have the job I want," Meekins says. "I am looking into doing some graduate work specific to the pharmaceutical industry, but in the end, if you work hard, the amount of time you would spend doing a master's program will get you to the same position you'd start out at with an advanced degree."

As a student at **Ashland**, Meekins took advantage of opportunities to get



Bruce Ganem

JON REIS



Jim Bush

JESSICA PARKINSON



Nicole Meekins

CHRISTOPHER MEEKINS

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# The Drug Development and Approval Process

By JOHN KELLY

THE U.S. SYSTEM OF NEW DRUG APPROVALS IS PERHAPS THE MOST RIGOROUS in the world. On average, it costs a company \$802 million to get one new medicine from the laboratory to U.S. patients, according to a November 2001 report by the Tufts Center for the Study of Drug Development.

It takes 10 to 15 years on average for an experimental drug to travel from the lab to U.S. patients, according to the Tufts Center for the Study of Drug Development, based on drugs approved from 1994 through 1998. Only 5 in 5,000 compounds that enter preclinical testing make it to human testing. And only one of those five is approved for sale.

Once a new compound has been identified in the laboratory, medicines are developed as follows.

## Preclinical testing

A pharmaceutical company conducts laboratory and animal studies to show biological activity of the compound against the targeted disease, and the compound is evaluated for safety.

## Investigational New Drug applications (IND)

After completing preclinical testing, a company files an IND with the U.S. Food and Drug Administration (FDA) to begin to test the drug in people. An IND becomes effective if the FDA does not disapprove it within 30 days. The IND shows results of previous experiments; how, where, and by whom the new studies will be conducted; the chemical structure of the compound; how it is thought to work in the body; any toxic effects found in the animal studies; and how the compound is manufactured. All clinical trials must be reviewed and approved by the Institutional Review Board (IRB) where the trials will be conducted. Progress reports on the clinical trials must be submitted at least annually to the FDA and the IRB.

## Clinical trials, phase I

These tests involve about 20 to 100 normal, healthy volunteers. The tests study a drug's safety profile, including the safe dosage range. The studies also determine how a drug is absorbed, distributed, metabolized, and excreted, as well as the duration of its action.

## Clinical trials, phase II

In this phase, controlled trials of approximately 100 to 500 volunteer patients (people with the disease) assess a drug's effectiveness.

## Clinical trials, phase III

This phase usually involves 1,000 to 5,000 patients in clinics and hospitals. Physicians monitor patients closely to confirm efficacy and identify adverse events.

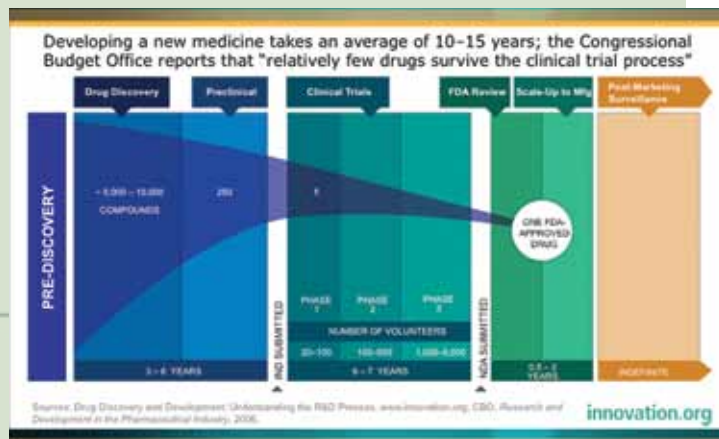
## New Drug Application (NDA)

Following the completion of all three phases of clinical trials, a company analyzes all of the data and files an NDA with the FDA if the data successfully demonstrate both safety and effectiveness. The NDA contains all of the scientific information that the company has gathered. NDAs typically run 100,000 pages or more. By law, the FDA is allowed six months to review an NDA. The average review time for new molecular entities approved in 2001 was 16.4 months.

## Approval

Once the FDA approves an NDA, the new medicine becomes available for physicians to prescribe. A company must continue to submit periodic reports to the FDA, including any cases of adverse reactions and appropriate quality control records. For some medicines, the FDA requires additional trials (Phase IV) to evaluate long-term effects.

Discovering and developing safe and effective new medicines is a long, difficult, and expensive process. The research-based pharmaceutical industry invested more than \$30 billion in research and development in 2001.



JOHN KELLY is senior vice president for scientific and regulatory affairs at the Pharmaceutical Research and Manufacturers of America.

real-world experiences prior to graduation through a National Science Foundation Research Experiences for Undergraduates opportunity at **Wellesley College**. "The experience made me confident that research is what I wanted to do," Meekins says. "It provided me with better understanding of work/life situations."

Saradha Chandrasekhar points to professional opportunities that served as guideposts during her education. But, unlike Meekins, Chandrasekhar's real-world experience came as a result of her graduate education. Chandrasekhar works at Novartis, carrying out assays for formulations that are developed for different kinds of vaccines. She has a professional science master's in biotechnology from **Northeastern University**, where she had the opportunity to do a co-op at EMD Serono, a biopharmaceutical company in Rockland, MA.

"When I got the offer from Novartis, I realized that I already had experience with some of the things they were doing," she recalls. She also points to non-science courses offered during her professional science master's program as giving her a leg up at her job.

"I took business courses at Northeastern, which I would say have helped me look at things from a different angle," she says. "I don't just know about research, I understand what else is going on in the company."

It takes teams of individuals from a variety of backgrounds to successfully complete the drug development process and get a product to market. The good news is that chemists in both traditional and non-traditional roles are an integral part of that team, from drug discovery through approval and post-market phases. Many exciting and interesting careers are available to chemists at all levels from associate's degree to Ph.D. **IC**



WENDY HANKLE is a freelance writer and communications professional who lives in Ithaca, NY.

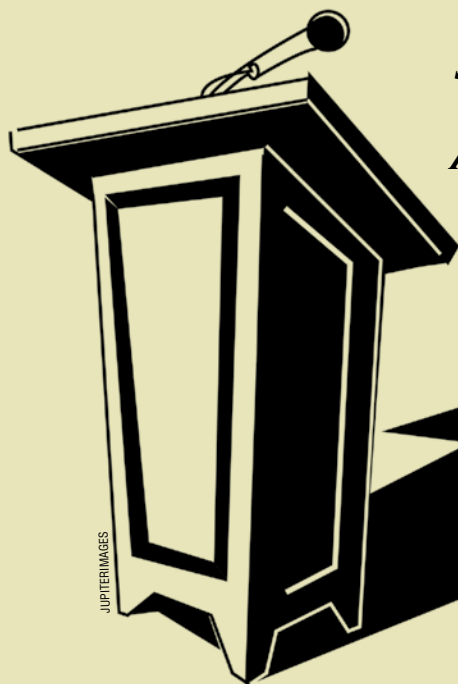


**U**ndergraduates in the early stages of their careers are sometimes forced beyond the exciting world of their studies and are requested (or required) to present at scientific meetings. Often students travel to their first meetings, thumb drive and notes in hand, without knowing what a meeting even is, let alone what presenting a poster or talk entails. This article provides an overview of meetings and more specific advice on giving talks.

Although a 10-minute talk or a poster on brand-new data may not seem like a big deal, it is. If you're not now a fourth-year graduate student with employers lined up to hire you the second you defend, one day you may be. Do not minimize the significance of your work or yourself (or your mentor's work!) by a sloppy poster or careless presentation.

On the following pages is a list of 12 common mistakes beginning speakers unwittingly make that torment their listeners — followed by suggestions on how to avoid them.

# CONFERENCE PRESENTATION NO-NO'S



## ***Surefire Strategies to Ruin Your Presentation and Anesthetize Your Audience***

BY DENISE LYNN MERKLE

## 12. Rappers and rhymers

Even if you can rhyme with the best of them — don't. Plan your talk and talk your plan. Face your listeners — not the screen — and give them the reasons you did the research. Include your hypothesis. Present the methods, then the data, and then draw conclusions from the data collected.

## 11. Where's the respect?

Respect your listeners, colleagues, and peers. Save the "I'm job hunting" advertisements for last, until after the "We appreciate our funding agencies" slide. It's science, not the classifieds!

## 10. And then I'll...

Unless required to, don't spend a lot of time discussing the outline of your talk! Simply offer a quick, concise overview and then move on. Use the valuable time to give data or explain a unique method. The existence of a conclusion at the end of a talk should not surprise anyone.

## 9. R, DEKYP? PN!

Define acronyms! Also define any terms that will make it easier for the attendees to understand what you're talking about.



Offer a quick, concise overview of your talk and then move on.

MIKE GIEBELSKI



## 8. Ego — ergo, uh-oh!

There is a fine line between being confident and being a jerk, and there is a hierarchy of where a speaker can sit on that line. A Nobel laureate can justifiably interject a lot more authority into a seminar than an undergraduate student should. Be aware of your attitude.

## 7. I'll show you that later

Do not play hide-and-seek with your data. Don't tell your audience that the data have been collected but aren't being presented, or are on a slide you don't have time to show, or that they're back in the lab! If a talk has more than one statement indicating that something important will be revealed



Meetings are ideal opportunities to get experience presenting data and results.

## What to Expect at a Scientific Meeting

**S**CIENTIFIC MEETINGS (CONFERENCES) ARE important venues for presenting research and discussing projects and conclusions with other scientists. They are hosted by universities, government agencies, professional organizations — any group that wishes to disseminate knowledge. Meetings are ideal opportunities to get experience in presenting data and results.

Meetings can focus on a specific topic (e.g., neurobiology of the hippocampus), or can include all aspects of a field (e.g., chemistry), and can range from fewer than 100 attendees to a nearly overwhelming 20,000 people. The American Chemical Society's meetings webpage ([www.acs.org/meetings](http://www.acs.org/meetings)) gives an idea of the many diverse opportunities for showcasing important projects.

## Talks versus poster sessions

The length of talks is proportional to the significance of the work or the prestige of the speaker. A Nobel laureate might speak for two hours, whereas a sophomore chemistry student might have 10 minutes, max.

A smaller meeting of 150 attendees could consist of two days of sequential talks attended by all registrants. A large meeting may offer many days of concurrent sessions, in which only the highest-regarded scientists will have time slots that do not coincide with other sessions. In this type of meeting it's important to figure out which topics you want to hear about — before the talks start!

Poster sessions showcase new work — work that is not yet ready for an entire talk, or research by students, who are often first-time presenters. Information is displayed on boards in a large room containing rows and rows of posters. Presenters stand beside their posters and answer questions posed by meeting attendees who wander through, often carrying snacks. (Try not to cringe if someone is chewing celery and talking at the same time.) If a poster viewer critiques your work, don't take it personally!

later, it's not formatted correctly. Please don't tease your listeners. Just give them the data in a logical format.

## 6. Where, oh where, has my data point gone?

Modern applications allow speakers to arrange slides full of more information than anyone ever dreamed possible. Data from months-long experiments can be packed into one slide and projected, larger than life — but harder to read. If you do not want your audience's brains to run out their ears, decide which data are pertinent to your talk (required to support your conclusions) and show those data in a clear, understandable format.





Impart information—don't just read the data from your poster.

Preview the projected slides before subjecting others to them. Graph dark lines on light backgrounds, and avoid using many lines with colors that are separated by only a few wavelengths. Connect the data points! Excel spreadsheets are wonderful tools but should not be presented in toto; no one wants to squint for hours on end.

If you have to say, "You can't see this, but...", your data are not presented in an effective way that validates all the hard work you've done. Oh, and for Pete's sake — Label your axes! Label the rows and columns! You know what you're graphing! You do, don't you?

### 5. The laser light show

Don't fidget with the laser pointer, either. There's no need to nauseate, aggravate, or hypnotize your listeners by random, repetitive, unnecessary use of the laser pointer, nor is blinding them, even if momentarily, a characteristic of a good speaker. Green laser pointers are especially uncomfortable if used improperly. Be careful!

### 4. Where's the credit?!

Always include an acknowledgments slide to thank and credit individual lab members and other collaborators who provided data or helped advance your project. If someone performed experiments that inspired yours, acknowledge them when you cite their data. Your listeners are highly educated people who want to know who "they" are, if "they" performed experiments that inspired yours. Acknowledge "them" when you cite their data. If others worked on the project with you, acknowledge them, too.

### 3. OK, you know, um, you know...

No! No! No! Practice your talk and remove the spacers! Know what you want to say, so your listeners are not distracted by ums

and uhs, or rapid delivery that leaves them boggled, or a slow pace that makes them wonder if you're making it up as you go.

Remember to speak clearly. Do not mumble. Use the microphone, even if you have a voice like Zeus! Few things lead to inattention faster than an inaudible speaker!

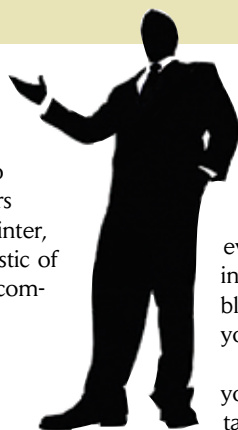
### 2. Fidget. Wiggle. Nibble.

Standing up in front of a bunch of people you don't know — or you do know and wish you didn't — is nerve-wracking. Stand still and allow your audience to focus on your talk. Don't bite your nails — especially while speaking. Leave your keys alone in your pockets, without adding kinetic energy. Your listeners do not need that kind of distraction. Don't flip or twirl your hair. Don't tug on your hems, blouse, neckline, tie, collar, or other objects within reach. Don't wear your beach shorts, your flip-flops, or your nightie. Do not dress up as Einstein or a giant lobster. Let the data have all the attention!

Remember to speak clearly. Do not mumble. Use the microphone, even if you have a voice like Zeus!



Provide your audience with data in a logical format.



### 1. Bedtime stories, anyone?

Unless you are conducting compliance training in which the seminar attendees must certify that they've heard every single word, Don't Read Your Slides! If everything that's important about the project is projected in text on the screen, your audience will need pillows and blankets faster than you can say immunoglobulin. Use your slides as a guide and give the seminar.

Impart information, don't just read! Remember that your fellow scientists will not be able to judge the importance of your data or your level of skill if your talk puts them to sleep! Enjoy the meeting!

Many thanks to those who responded to the author's "Pet Peeve e-Poll": M. E. Anderson, P. Cappelletti, W. F. Carroll, J. Cavanaugh, N. E. Claytor, M. R. Fraelich, J. Hatfield, C. M. Hendrickson, S. Schlitzer, E. Shane, P. Smith, T. Smith, T. Strom, R. Walter, and N. Williams. **FC**

**DENISE LYNN MERKLE** is president and consultant at SciConsult, Inc., in Fort Worth, TX, and chair-elect 2009 of the Dallas-Fort Worth Local Section.

# Rxn's and Sln's

ACS Career Consultants offer tips on how to find an entry-level position in challenging economic times.

COMPILED BY LORI BETSOCK

## → BLOG



### The Recession and Your Job Search

It is true that the recession is still here and businesses and government organizations are hiring less in an effort to cut costs. But entry-level chemist positions are still available. Needless to say, you will have to work extra hard to search for a position now; you may need to take up a temporary position for a few months, or complete another internship,

or take a technician position for the time being until a chemist/scientist position opens up. One problem is that companies do not pay for relocation for entry-level positions so, unless you can afford to relocate, your best option is to restrict your job search to your local area.

Research all viable areas, including chemical, pharmaceutical, biotech, and healthcare. Visit companies' websites and look at their career/employment sections. Many organizations post open positions on their websites. They are usually in a rush to hire, so apply as soon as you can. Use websites like monster.com and careerbuilder.com, and use sites for local jobs only, such as careerboard.com. Search for keywords like chemist, scientist, technician, temporary, internship, BS chemistry, etc. Also, search for analytical techniques such as HPLC, IR, titration, UV, and any other techniques you know. Jobs that list any of these techniques as a requirement will come up.

Sign up for a LinkedIn account. Employers use this site to look for candidates. Network as much as possible. Attend the local ACS meetings and approach the chemists of your local section for help. Most importantly, do not give up on your job search. Remember: chemists are always in demand.

Posted by Samina



### Networking: It's Not Who You Know, It's Who Knows You

When you have a question, you ask your friends. For restaurant recommendations or a good movie, you tap the collective wisdom of people you know. Others do the same thing, only in the business world. Therein lies the secret: the more people you know in a professional capacity, the more questions you

will get asked, and the more opportunities you will hear about. I often wish someone had told me earlier in my career just how important a robust professional network is to career satisfaction and success.

The best way to build your own professional network is by volunteering: finding ways to help others and share your skills and knowledge. By being professionally active, you will meet other scientists and learn about what they do, and they will learn

about you. Once you make a real connection, you will be able to call on them for advice and information. It doesn't matter how many connections you have on LinkedIn; what really matters is who knows you and who will remember you favorably when they hear about an opportunity.

That's all there is to networking — making professional friends and maintaining the relationships over time. After all, you can never have too many friends!

Posted by Lisa



### Always Have Your Business Card Handy

You should use business cards to begin building your professional network. At any meeting of professionals, exchanging business cards is expected and accepted, and provides a rapid and convenient way to give information. You have many opportunities to give out your card: at local and national ACS meetings, at events with visiting speakers, etc. You never know when you'll meet someone who could develop into an important business contact. Having a business card tells a person that you are serious about your career and your profession.

Office supply stores sell blank business cards with a clean (unperforated and professional-looking) edge that can be printed with laser or ink-jet printers. You can print small quantities in this way at very little cost, so you aren't stuck with a bunch of out-of-date cards when you graduate.

A business card is obviously not a résumé. Your card at this stage of your career should have your school and logo — you are part of the institution, after all — and your professional contact information (name, address, phone, and professional-sounding e-mail address). Be sure to proofread your text for spelling and grammar.

Business cards are miniature billboard advertisements for you! Store them in a small, protective case to keep them clean and handy. A scuffed-up card isn't going to present the image that you want.

When you receive a business card from someone, write on the back of the card when and where the contact was made, and the topic of conversation. Store the cards you receive in a central location that is readily available. Send a short note (an e-mail is acceptable) to the person who gave you the card to thank them for their time and reinforce their recollection of you and your conversation. You've started to network!

Posted by Peter



### The Value of Informational Interviews

People love to talk about themselves, which is why informational interviews are a low-stress and fun way to find a job. Informational interviews can help you decide which jobs, companies, etc., best suit you, find jobs that are not advertised, and expand your network. Use your network to identify contacts. You can even call the corporate headquarters and

say, "I am a student looking for career advice. Could you please give me contact information for the person in charge of the chemistry lab?" People are flattered to be asked, and will usually go out of their way to answer a few brief questions. Give a brief overview of your strengths and interests (not your résumé — that is for applying for a specific job), and ask about the sorts of jobs you are suited for. Find out what they look for when hiring, what advice they have for you, if they know of any openings, and if they can recommend others whom you could interview. Thank them, and then send a thank-you card in the mail. This is how I got my dream job!

Posted by Kurt



### You're Selling Yourself

Pursuing a job is similar to selling a product. You've got to understand the product (yourself) and then sell the features and benefits to the purchaser (the employer).

Consider what you did in any previous position (even volunteer or part-time) or in class research, and then present details that are relevant to the specific prospective

employer. Make a realistic analysis of your education, and present meaningful highlights and accomplishments along the way. Oh, and don't forget the most important part of what makes up your personal "product": you.

How do you stand out? We are all special in our own way. Maybe you are very hands-on/mechanical, or you can draw. Do you have a language or cultural skill, or maybe even a fine sense of smell/taste? Were you a "human GC" in your qualitative analysis class? That might put you on track as a flavorist or fragrance developer, as an example. Tell your whole story and vary it gauged to what will most interest an individual employer. Remember: an attractively packaged product gets the buyer's attention first. Make it good, and after you make a great first impression, they will want to see more of you, and in their employ!

Posted by Tony



### Who Are Your References?

Developing personal references for your résumé is a lifelong activity that should begin now, as an undergraduate. You need to maintain an active list of people who can provide potential recommendations for graduate school or when you enter the job market. A reference should know your strengths and

be prepared to explain to a prospective employer how you meet the requirements for a potential position. The reference should have a current copy of the résumé you sent to the company, and a sense of the position description and what interests you about the position.

Choose people who will honestly speak highly of you. References from people who are highly respected in the chemical field are beneficial. Having been involved in interactions with your references also helps. Some companies have employee referral programs that encourage employees to recommend outside candidates for open positions. This "indirect" reference is one of the best references you can have.

Instructors, undergraduate research directors, and guidance counselors who have observed your work and have seen you work on teams to complete projects and assignments can be references. Coaches, staff, club or activity advisors, and administrators who have encountered you demonstrating workplace and leadership skills are also possible references.

Be sure to confirm that each person you choose as a reference will provide a good reference for you and be readily available. I suggest accumulating a master list of six references from which to choose, along with their contact information: the person's full name, title, professional affiliation, professional address, professional e-mail, telephone number, and relationship to you.

When company officials receive a reference list with your résumé, some choose to contact them immediately — even before the interview. Others use the reference list at the same time they do due diligence on candidates with verifying services and the Internet. Either way, this list, if assembled with care and sent to hiring managers and contacts, will do its job to get you a job.

Posted by Dan

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**LISA M. BALBES**, of Balbes Consultants, is a freelance technical writer and author of *Nontraditional Careers for Chemists*, published by Oxford University Press (2007). She blogs on Career Development for Scientists.

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MIKE CIESIELSKI

Career consultant Laurel Goj facilitating a training session at the Fall 2009 ACS National Meeting.

## ACS Career Consultants: Career Advice Is Yours for the Asking

BY LISA M. BALBES

**“H**OW DO I GET WORK experience to put on my résumé when I have only been in school?” This is a question I hear frequently from undergraduate students. But a far more important question is “Whom should I ask for career advice?”

Have you ever wished you had a mentor — someone older and wiser who knew what you were going through in your career? Someone who would serve as a sounding board for your career plan? (You *do* have a career plan, don't you?) Someone who had been there, done that, and could provide advice and tips on what you might want to do, not do, and consider? Well, if you're an American Chemical Society (ACS) member, you already have a whole group of mentors willing and eager to help you.

For almost 20 years, ACS members who volunteer as career consultants have helped other ACS members with career insights, advice, and resources. There are currently more than 80 career consultants, who collectively answer more than 2,000 requests per year.

John Borchardt, a longtime ACS career consultant, says the most common question he gets from undergraduate students is, “What can I do if I don't want to go to graduate school?” He suggests trying

some sales or marketing courses while still in college to see if you like that or, if you've already graduated, finding a job with a company that will pay for continuing education in business courses. He also tries “to ascertain [the students'] interests and suggest a couple of non-lab careers” in which they might be interested. Since there are literally hundreds of such jobs, he feels it's important to first find out what students like and what they're good at — and then he can make better career recommendations that take advantage of those skills and interests. Sometimes, he observes, just articulating their wants, needs, and plans out loud to a neutral third party makes students stop and think about what they really want out of their careers, and their lives. Career consultants are there to listen and ask insightful questions to take the discussion even further.

Career consultants have years of professional experience, and many of them hire chemists on a regular basis, so they can really provide the inside scoop on what employers want. Career consultants go through annual training in current employment trends, hiring practices, new interviewing strategies, and much more.

Typical questions that consultants answer include:

- How do I write a résumé?
- How do I find a job?
- I have an interview next week. How should I prepare?
- I received a job offer for a new position, but I want more money. How do I get them to raise their offer?
- Can I use Facebook to find a job?

If this sounds like a service that you could use, visit the ACS website ([www.acs.org](http://www.acs.org)), and click on the Careers tab at the top of the page. On the page that appears, click on Career Advice, then on the link to Career Counseling. This takes you to a database of currently active career consultants.

From there, you can search in 39 fields of specialization (analytical, organic, materials, law/patents, etc.) and 8 sectors (government, industry, academia, non-profit, self-employed, consulting, postdoc, and small business).



MIKE CIESIELSKI

## “How do I get work experience to put on my résumé when I have only been in school?”

BY DAN EUSTACE

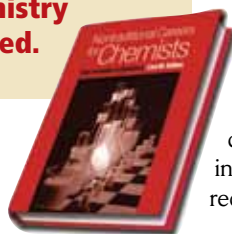
EXPERIENCE IS A RELATIVE COMMODITY. It is also a “rated commodity,” in that all experience is not created equal. For example, two years of academic research in a postdoctoral position is generally judged equivalent to one year of industrial experience. What potential employers care about most is relevant experience. Look hard at the job description and surmise what the role entails, and make sure you have experience doing something very similar, if not identical. Roles that provide experience can include internships, co-op programs, or undergraduate research under the direction of a professional aimed at achieving specific goals. When describing your experience, talk about the three main aspects — the program, the professional, and the goal of the project. Paid positions are better, but unpaid positions may also qualify. Be aware that a volunteer position — organizing an ACS student member event, for example — may not qualify as technical experience. However, it still demonstrates leadership and affiliation, two nontechnical skills that employers are also looking for in new hires.

You can read the bios and backgrounds of all the career consultants with expertise in the subject areas you selected, and pick the one best qualified to answer your particular question. Then you send the consultant a message, which usually includes your résumé and the details of your particular situation and question.

The consultant will get back to you within 48 hours, and the conversation begins. Consultations take place via e-mail or telephone, and can be as short as one or two e-mails or can extend to many phone conversations over a number of months, depending on the complexity of your situation.

Volunteer career consultants also serve ACS members in other ways. At both national and regional ACS meetings, members can sign up for a 30-minute one-on-one session with a career consultant to have their résumés reviewed, discuss job searching strategies, practice interviewing, or talk about any other career-related issues.

**A chemistry background can prepare you for much more than just a career at the bench. Non-traditional opportunities in chemistry are discussed.**



At national meetings, career consultants also offer half-hour mock interviews, in which they will interview you, make a video recording of you answering their questions, and provide constructive criticism about your interviewing skills. The recording is yours to

take home to watch later with popcorn and friends (or not!).

All these services are available free of charge to any ACS member. They are completely confidential — no one but the career consultant you select will see your résumé or know what was discussed.

If you don't know what to ask, or want to read some general information to help frame your specific questions, ACS can help there, too. The society publishes a number of articles and provides data to guide you in your search for career success. Visit [chemistry.org](http://chemistry.org), click on the Careers tab at the top of the page, and you'll see links to four categories of information:

- **Career Advice** — Includes the career consultant program, as well as a huge list of publications on how to conduct a job search, write a résumé, prepare for an interview, negotiate an offer, and much more.
- **What Chemists Do** — Includes descriptions of 30 different fields of chemistry, as well as profiles of chemists in those professions, and resources for chemical technicians.
- **Salaries & Surveys** — Includes highlights of survey results, including salary, demographics, and employment status data.
- **Ethics & Professional Guidelines** — Professional guidelines, codes of conduct, and so on.

While general articles can give you a great start, they are no substitute for personal advice and discussing your specific situation with someone who knows more than you do and is willing to share their expertise and experiences. For chemists with career questions, that person is an ACS career consultant. **ic**



**LISA M. BALBES**, of Balbes Consultants, is a freelance scientific communication consultant and author of *Nontraditional Careers for Chemists*, published by Oxford University Press (2007). Her blog is titled, Career Development for Scientists.

**DAN EUSTACE** is a longtime ACS career consultant and author of the NESACS blog (<http://blog.nesacs.org/>).



UNIVERSITY OF CONNECTICUT

Undergraduate students register for the 36th Northeast Regional Meeting held in Hartford, CT.

## Collaboration Breeds Success: The Undergraduate Program at NERM

BY OLBELINA ULLOA

OUR STUDENT CHAPTER at the University of Connecticut (UConn) put together the undergraduate program at the 36th ACS Northeast Regional Meeting (NERM), which was held in Hartford, CT, October 9–10, 2009. We developed a symposium, “The Chemistry of Everyday Life,” sponsored a career forum, and marketed the program to undergraduate students throughout the region.

For us, what still stands out about the 2009 NERM are the experiences our chapter gained and the valuable lessons we learned about planning events and collaborating with other groups.

We were thrilled that our undergraduate program attracted more than 90 student attendees. Even more exciting was the overall response from the students who attended. Many talked about how relevant and interesting the events were, and how the presenters reinforced and expanded upon what students were studying in their undergraduate chemistry courses.

### A group effort

We invited all students to attend a career workshop on Friday, October 9. It was organized by Professor Amy Howell from UConn and sponsored by our chapter. The workshop was well attended and set the stage for the next day's undergraduate program events. The workshop showed students how to market their skills and conduct an effective job search. The presenters were a great source of information about the current job market. This event was the result of great collaboration between graduate and undergraduate students, with Howell serving as the driving force.

### A successful program

The main undergraduate program began on Saturday morning with “The Chemistry of Everyday Life” symposium. Speakers included Robert Volkmann from SystaMedic, Inc., in Groton, CT, who described a new method for making pharmaceuticals. His presentation was not only interesting but it also provided students with a unique perspective on where the field of chemistry can lead them. In addition, Nicholas Meanwell from Bristol-Myers Squibb R&D in Wallingford, CT, talked about his research in respiratory viruses, which piqued the interests of many

attendees. UConn's own Gregory A. Sotzing presented one of the most popular lectures, on color-changing electrochromic textiles. He was very enthusiastic about partnering on his project with various companies, including Victoria's Secret. Other speakers included Peter Gabriele from ARmark Authentication Technologies, LLC, in Glen Rock, PA, who spoke of the incorporation of physical-chemical identifiers for solid-state drugs to combat counterfeiting of pharmaceuticals. Last but not least, Steven L. Suib, also from UConn, spoke about solid-state inorganic materials such as semiconductors, catalysts, and ceramics; the methods for creating these inorganic materials; and the challenges of making different sizes and shapes.

After the morning session, NERM's board members attended a luncheon with the invited speakers, undergraduate volunteers, and graduate program recruiters. Our team members had formed relationships with local section and area industry representatives while planning the



NERM attendees discuss chemistry during regional meeting event.

UNIVERSITY OF CONNECTICUT

undergraduate program, and this luncheon provided an opportunity for us to network with these professionals and strengthen our relationships.

The afternoon portion of the undergraduate program included a combined poster session and graduate school recruiting fair. This was a great opportunity for undergraduates to present their research to practicing chemists, graduate students, fellow undergraduates from the region, and graduate school recruiters.

Ultimately, the undergraduate program at NERM was a very successful and worthwhile endeavor for our chapter. But getting this program together definitely presented some challenges that we hadn't anticipated.

### The best laid plans

We started our planning in the spring, more than six months before the actual meeting. Once we assembled a group of student volunteers, we assigned tasks for each event as outlined in the guidelines submitted with our grant proposal. As the director of the symposium, I and another volunteer, Stephanie Schuyler, met during the summer to contact company representatives from research and development departments to speak at "The Chemistry of Everyday Life" symposium. We wanted to offer a symposium that exposed undergraduates to the chemistry behind the well-known products. We hoped to line up enough speakers to present an all-day symposium.

### Expectation meets reality

We're very glad we built in a six-month lead time to plan the program, because recruiting speakers for the symposium proved to be more challenging than we first anticipat-

ed. For multiple reasons, many companies contacted were unable to provide speakers to participate in the symposium. Some companies were no longer doing these types of outreach activities. Other, smaller companies, such as local dairy farms, could not afford the travel expense, and because of our own funding limitations, we could only cover the speakers' registration fees. We even applied for funding from the UConn student government to supplement the ACS grant, but our proposal was rejected. At that point, we re-planned the entire symposium and began targeting speakers from larger



Top photo: Symposium speaker Steven L. Suib receives an award from Anne O'Brien. Photo above: Undergraduate student presents poster during the Northeast Regional Meeting Undergraduate Poster Session.

companies that could fund their own expenses.

### Reaching out to our local section

By August, just two months before NERM, our planning committee still had not been able to obtain the proposed six speakers for the symposium. Recognizing that we simply did not have a strong enough network of professional contacts to draw the speakers we needed, we turned to members of the ACS Connecticut Valley Local Section for help.

As the director of "The Chemistry of Everyday Life"

symposium, I was invited to attend the Connecticut Valley Local Section NERM planning meeting in September 2009. There, I met with NERM General Chair Julie Smist (Springfield College) and members of the planning committee. This meeting gave



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me an insight into the bigger picture of the meeting and all the work that is required to plan an event of this magnitude. Tyson A. Miller, NERM's program co-chair and our student chapter advisor, was a great source of connections for some of the companies we were targeting.



**OLBELINA ULLOA** is a senior chemistry major at the University of Connecticut and plans to attend graduate school to study inorganic chemistry. She has served as president and vice president of the UConn student chapter.

The Connecticut Valley Local Section members were instrumental to the success of our undergraduate program. By forming a collaborative team with the section members, we were able to provide undergraduates a very strong panel of compelling speakers and topics.

### Spreading the word

Our chapter was also responsible for publicizing the undergraduate poster session to students and encouraging them to attend. To reach potential student attendees, we placed an ad in *inChemistry* magazine and publicized the meeting while networking with students at the ACS national meeting in Washington, DC, in August 2009. We also advertised locally on the UConn campus to our chapter members and to science majors. In addition, to further encourage our chapter members to attend NERM, we used funds from the regional meeting grant we received from ACS to subsidize the registration fees of chapter members who attended the meeting.

Undergraduate students had a strong presence at NERM, and our symposium played a major part in that. We feel our chapter members developed a new appreciation of the importance of ACS meetings and the effort that goes into planning a successful program. We are building on our experiences from NERM to be part of future national and regional meetings. **IC**



UNIVERSITY OF PUERTO RICO-RÍO PIEDRAS

The University of Puerto Rico-Río Piedras ACS student chapter poses with ACS Past President Bruce Bursten (left), ACS President Tom Lane (center), ACS District Director Eric Bigham (right), and mascots.

## Sun, Sand, Sea, and... SERMACS!

BY EMILY ROBLES

**W**hat comes into your mind when you think of Puerto Rico—sun, sand, sea??

What if I say SERMACS? SERMACS in Puerto Rico! While temperatures in the U.S. mainland were cooling, here we still had the perfect weather to go to the beach... after the conferences, of course!

### Convening in paradise

For the first time in history, the 61st Southeast Regional Meeting of the ACS (SERMACS) was held in San Juan, Puerto Rico. SERMACS was a total success, with 1,335 participants, including 446 undergraduate students (a SERMACS record). Among the 775 scientific papers presented, there were 185 undergraduate posters and 30 undergraduate oral presentations. Eighteen symposia and six workshops were also featured.

Planning of the logistics for the undergraduate program, which was a particularly important part of the meeting, was led by Juan Suárez (a fac-

ulty member at the University of Puerto Rico-Humacao) and the chapter advisors of 10 Puerto Rico ACS student chapters. Several committees were formed and assigned to handle specific tasks and responsibilities.

Preparing for a regional meeting requires continuous communication! Getting confirmation from invited speakers, representatives for the graduate school fair, sponsors, and other invited guests required contact by letters,



Student members show young visitors that chemistry is fun and interesting.

UNIVERSITY OF PUERTO RICO-RÍO PIEDRAS

e-mails, and phone calls. It was essential to follow up with the invited participants by making phone calls when possible. We knew that per-

sonal communication would increase volunteer participation and help planners see where additional efforts were needed.

Promoting the meeting was vital to attracting registrants, college representatives, and sponsors. We sent e-mail updates and publicized the event by distributing SERMACS bookmarks and other information at ACS national and regional meetings. This gave us the opportunity to speak directly with colleagues and personally invite them to our meeting. We also created an e-mail list of people who inquired about SERMACS.

Having an attractive and useful webpage was essential to promoting an activity as multifaceted as SERMACS. We kept our webpage updated with information and helpful links for housing arrangements, travel, maps, and convention center details, as well as information for sponsors and exhibitors. The site also included detailed information on the events, the technical program, graduate school programs, and

resources for abstract submission and registration. Today, this webpage continues to be useful, offering general information on Puerto Rico and a photo gallery of the event and its participants. This page will be active for at least the next three years.

Volunteers were key to the success of each phase of the meeting — from promoting the meeting, to providing logistical and event support, to cleaning up afterwards, and every step in between.

### Nobel laureate lectures

Two plenary lectures were given by Nobel laureates: “The Chemical Imagination at Work in Very Tight Places” by Roald Hoffmann and “Architecture in NanoSpace” by Sir Harold Kroto. Undergraduates had amazing opportunities to interact with these speakers at a luncheon, poster session, and various social activities. During the luncheon, the laureates delivered very motivational presentations. Afterwards, the student chapters from Puerto Rico



recognized the speakers with plaques.

### Undergraduate presentations

One of the biggest challenges we encountered while organizing this meeting was the large number of undergraduate posters and oral presentations. Because of space constraints, we had to partition off several areas and assign days and times for people to display their posters. The undergraduate presentations were judged by more than 60 professors. Organizing the evaluation results of 185 undergraduate posters and 30 undergraduate oral presenters was a challenge, but with teamwork and organization, the evaluations were tabulated and winners selected in less than two hours. The undergraduate poster and oral presentations, and the winners were recognized at the social event “Puerto Rican Night” with a certificate and cash prizes.

### Festival de Química

For the past four years, the Puerto Rico Local Section has held an annual celebration called Festival de Química (Chemistry Festival) at the Paseo de la Princesa in Old San Juan. Normally this huge outreach event is the opening of National Chemistry Week (NCW). But this year it was much more significant, because it coin-



High school students participate in chemistry demonstrations at Festival de Química.



Conference participants relax after meetings with an evening of salsa lessons.

ceded with SERMACS and it was the Presidential Event. The Festival de Química was a major event in which ACS volunteers from several mainland chapters joined with local ones to teach chemistry under the theme, “It’s Elemental.” More than 500 students from private

Southeast Region to participate. We recruited volunteers island-wide by personally inviting students, sending e-mails to chapter members, and using Facebook. The result: almost 250 individuals volunteered and were eager to participate.



Participants at the joint SERMACS/AAAS Caribbean Division conference gather for a group photo.

and public schools across the island participated, mostly representing grades 9 to 12. (This participation was phenomenal, considering that classes were canceled in some schools because of the fire in the Capeco [Gulf refinery less than 10 miles away.)

At this event, each chapter demonstrated the importance of a particular element in everyday life. Thirteen ACS student chapters showed the importance of chemistry and their pride in being chemists. We began planning the event by inviting the chapters of the ACS

### Coloring with Carbon Chemistry Workshop

As part of the NCW celebration, Sister Mary Orna organized a workshop for 4th- through 6th-grade students. More than 40 children participated and painted pieces of art with Vaseline-based colors. Nilka Rivera, faculty advisor of the University of Puerto Rico-Mayaguez, coordinated the volunteers for this event.

### Tour of our alma mater

As part of the undergraduate program, we hosted a tour of our alma mater, the

University of Puerto Rico-Río Piedras, with then-ACS President Tom Lane as a surprise visitor. The tour was coordinated by the chemistry department’s Graduate Student Association and included the historic areas of the campus as well as the research facilities.

As you can imagine, organizing the undergraduate program at SERMACS was really a learning experience in many ways. We had to learn to master Tom Lane’s “Seven Cs” — to be **committed** to the project, to have the **courage** to overcome unexpected problems, to establish an effective **communication**, to **collaborate** involving as many other chapters and

advisors as possible, and to be **creative** in the way that we designed the logistics. Finally, as an outstanding chapter for the last 17 years in a row, we gained an even better understanding that as student members of ACS, we have been trained and developed skills that make us **competent** undergraduate students — and perhaps more **competitive** as well! **IC**



EMILY ROBLES is a chemistry and biology major and past president of the ACS student chapter at the University of Puerto Rico-Río Piedras.

239TH ACS NATIONAL MEETING

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## Discover amazing chemistry at the Undergraduate Program!

**Sunday, March 21**

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### **Undergraduate Hospitality Center**

8:00 a.m. – 5:00 p.m.

### **Making the Most of Your First ACS National Meeting**

8:00 – 8:45 a.m.

### **Technical Symposium: Chemistry of Wine**

9:00 – 10:30 a.m.

### **Careers in Chemistry: Green Jobs**

9:00 – 10:30 a.m.

### **Chem Demo Exchange**

10:30 a.m. – 12:00 noon

### **Graduate School Reality Check**

10:30 a.m. – 12:00 noon

### **Networking Social with Graduate School Recruiters**

1:30 – 3:00 p.m.

### **Making Demos Matter Workshop**

3:30 – 5:00 p.m.

*Co-sponsored by ACS Kids & Chemistry*

### **ACS Student Chapter Awards Ceremony**

7:00 – 8:30 p.m.

### **Undergraduate Social**

8:30 – 11:30 p.m.



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For more information contact Lori Betsock at [l\\_betsock@acs.org](mailto:l_betsock@acs.org) or go to [www.acs.org/undergrad](http://www.acs.org/undergrad)

All events are sponsored or co-sponsored by the Society Committee on Education Task Force on Undergraduate Programming.  
Chair: Charles Baldwin, Union University, Jackson, TN. Program Chair: Matthew J. Mio, University of Detroit Mercy.

## **Monday, March 22**

### **Undergraduate Hospitality Center**

8:00 a.m. – 5:00 p.m.

### **Graduate School Recruiting Breakfast**

8:00 – 10:00 a.m.

### **Community Outreach Workshop**

9:45 – 11:15 a.m.

*Co-sponsored by the ACS Committee on Community Activities*

### **Technical Symposium: Everything You Want to Know about Chocolate**

9:45 – 11:15 a.m.

*Co-sponsored by the ACS Division of Agricultural & Food Chemistry*

### **Undergraduate Research Poster Session**

12:00 noon – 3:00 p.m.

*Co-sponsored by the ACS Divisions of Analytical, Environmental, Inorganic, Medicinal, Physical, & Polymer Chemistry, Biochemistry, & Geochemistry.*

### **Eminent Scientist Lecture Featuring Daniel G. Nocera**

*"Personalized Energy: A Carbon-Neutral Energy Supply for 1(x 6 Billion)"*

3:30 – 4:30 p.m.

### **Undergraduate Networking Session with Industrial Chemists**

4:30 – 6:00 p.m.

*Co-sponsored by the ACS Committee on Corporation Associates.*

### **Sci-Mix/Successful Student Chapter Poster Session**

8:00 – 10:00 p.m.

*Program format and times are subject to change. Please consult the final program.*

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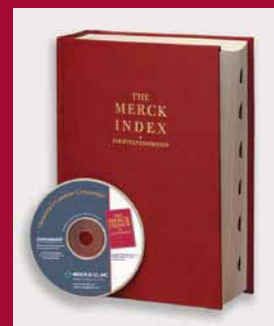
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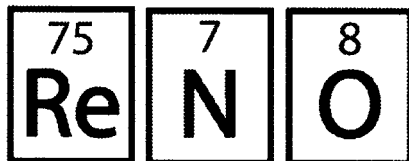


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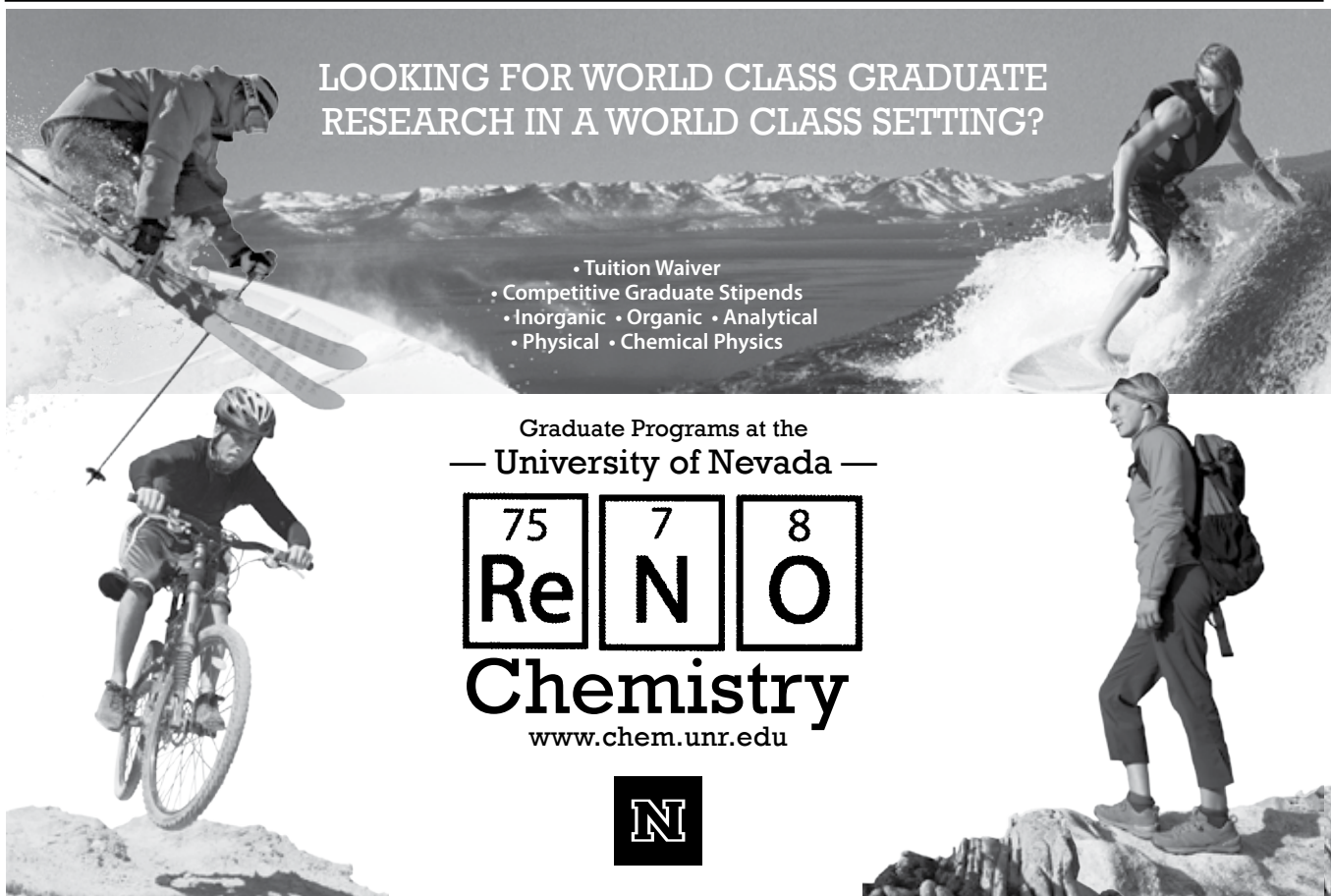
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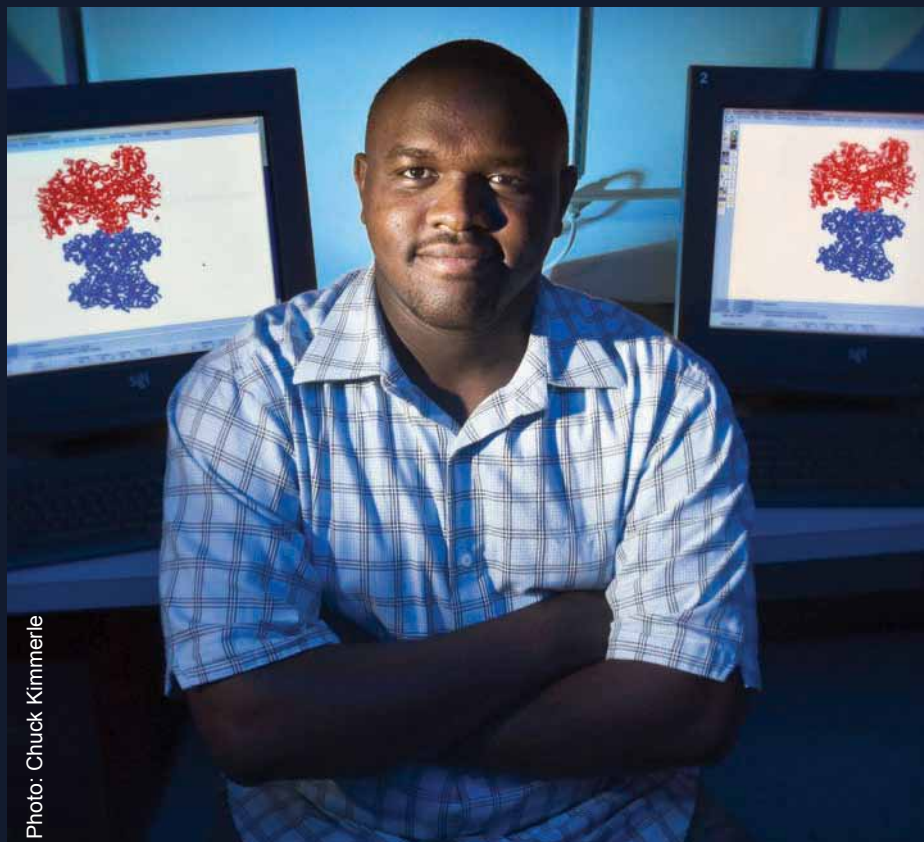


Photo: Chuck Kimberle

**Neville Forlemu, Ph. D.**  
Researcher, Icahn Medical Institute, NY  
UNCF/Merck Science Initiative Fellow '08  
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