



chemistry

The ACS Student Member Magazine

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Preparing for
the ACS National
Meeting

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Volunteering =
Résumé Magic

Crazy Busy & Staying Sane

Pg.
22

11–11:50 AM

Lab group
project
meeting

10–10:50 AM

Instrum.
analysis
lecture

8–9:30 AM

P-chem
class

12:15–3:15 PM

Instrum.
analysis
lab

4–7 PM

Evening
shift at
coffee shop

SMART SCHEDULE MANAGEMENT



ACS
Chemistry for Life



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Snag the Perfect
Recommendation Letter

FOOD ENERGY & WATER



ACS
Chemistry for Life®



255TH ACS NATIONAL MEETING & EXPOSITION

STUDENT PROGRAM

March 18–20, 2018 • New Orleans, LA • Ernest N. Morial Convention Center

SUNDAY, MARCH 18, 2018

- 8:00 AM – 5:00 PM** Hospitality Center
Hall D1/D2
- 8:30 – 11:30 AM** Undergraduate Research Papers
*New Orleans Downtown Marriott at the Convention Center, Magnolia Room
- 8:30 – 9:15 AM** Making the Most of Your First National Meeting
Hall D1/D2
- 9:30 – 11:00 AM** Symposium: Where Can My Chemistry Degree Take Me?
Cosponsored by the ACS Division of Professional Relations
Room 356
- 10:30 – 11:30 AM** Graduate School: The Ins and Outs of Getting In
Cosponsored by the ACS Division of Professional Relations and Younger Chemists Committee
Room 255-257
- 11:00 AM – 12:30 PM** ChemDemo Exchange
Great Hall D
- 12:15 – 1:30 PM** The Graduate School Experience: What to Expect
Cosponsored by the ACS Division of Professional Relations and Younger Chemists Committee
Room 255-257
- 1:00 – 5:00 PM** Grad School Fair
Hall E2/E3
- 1:30 – 3:00 PM** Workshop: Networking 101
Cosponsored by the ACS Division of Professional Relations and Younger Chemists Committee
Room 356-357
- 2:30 – 3:30 PM** Two-Year to Four-Year College Transfer Survival Guide
Room 255-257
- 3:30 – 4:45 PM** Stories from Successful ACS Student Chapter Grants
Room 255-257
- 7:00 – 8:30 PM** ACS Student Chapter Awards Ceremony
Great Hall A
- 8:30 – 10:30 PM** Undergraduate Social
Hall B1

MONDAY, MARCH 19, 2018

- 8:00 AM – 5:00 PM** Hospitality Center
Hall D1/D2
- 8:30 – 11:30 AM** Undergraduate Research Papers
*New Orleans Downtown Marriott at the Convention Center, Magnolia Room
- 9:00 – 10:30 AM** Workshop: Around the World in ACS International Student Chapters: A Chapter Event Planning Exchange
Room 343
- 9:00 – 10:15 AM** Workshop: Improving Scientific Communication Skills
Room 210
- 10:00 – 11:30 AM** Symposium: The Chemistry that Keeps America Safe
Cosponsored by the ACS Division of Professional Relations
Room 344
- 10:30 – 11:45 AM** Networking Lab
Cosponsored by the Younger Chemists Committee
Hall E2/E3
- 12:00 – 2:00 PM** Undergraduate Research Poster Session
Hall D
- 2:30 – 4:00 PM** Eminent Scientist Lecture – Featuring Dr. Mary Jo Ondrechen, Northeastern University
Room 356-357
- 4:00 – 5:15 PM** Workshop: Chemists Celebrate Earth Week
Sponsored by the Committee on Community Activities
Hall E2/E3
- 5:15 – 6:15 PM** The Kavli Foundation Lecture
Great Hall A
- 8:00 – 10:00 PM** Sci-Mix Successful Student Chapter Poster Session
Hall D/E

Find out more at <http://www.acs.org/undergradmeetinginfo>



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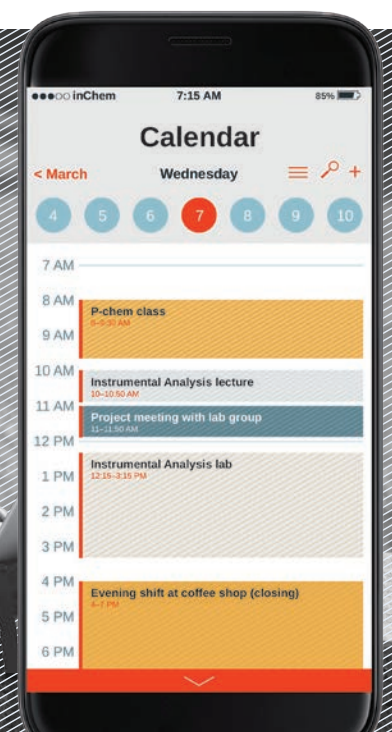
College Life

Snag a Glowing Recommendation

Get advice from two expert recommenders.



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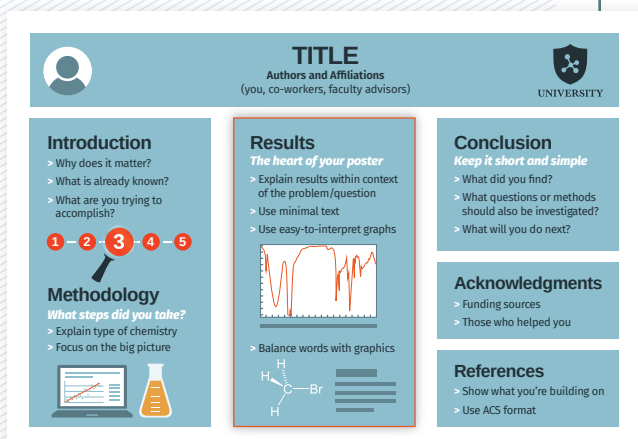


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ACS & You

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Sage advice for putting your best foot forward and making the most of your experience.



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Careers

Volunteering = Résumé Magic

Your professional skills matter just as much as your chemistry knowledge.



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Careers

Industry Landscape

Where do you see yourself?





Chapters

Baptist College of Health Sciences

Faculty Advisor
Charity Brannen

Location
Memphis, TN

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Sidney Long

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FACULTY PROFILE **Charity Brannen**

Why did you become a faculty advisor?

I facilitated the start of this chapter because it was important for the biomedical sciences students to have this resource.

What challenges have you faced?

Being recognized as a new student organization by the college has been a long process; however, it has been worth it to be an official part of student life on campus.

What has been most rewarding?

The most rewarding part of being the ACS faculty advisor is hearing and seeing the students' excitement as they plan events and activities. They are so enthusiastic and creative.

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

I would tell anyone in the process of getting approved by their institution to be patient and that it will be worth it once you are active on campus.

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

As a newer organization, our chapter has only gone through one officer transition. The new officers were elected to fill positions left by students who graduated. Our officers are responsible for understanding the roles performed by each office and will collaborate on their duties. This ensures that the officers who did not graduate can teach new officers their duties and assist during the beginning of their term.

In what ways does your chapter contribute to the community?

Our chapter was given the opportunity to judge science fair projects for middle and high school students. Members judged in a variety of categories, including chemistry, biology, physics, and biochemistry,

and were accompanied by professors from Baptist College and professionals in the community. In the future, we look forward to participating in similar events with local schools. We're planning to expand these activities to include chemistry demonstrations for elementary or middle school students.

What's your most unique activity?

Stress-Free Chemistry is the most unique event that our chapter has planned. The purpose of the event is to provide a fun and relaxing study break for the chemistry students during the week leading up to final exams. This year breakfast was provided for the students, and they were able to take a study break while making "stress relief putty", playing with slime, and hanging out with friends. This event also provided an opportunity for members of the chapter to get to know the newer students and promote the organization.



How involved is your chapter on campus?

During the past year, our chapter has focused on contributing to our campus community by participating in educational events such as the annual heart fair, where we discussed electrolytes and the heart. Our chapter also hosted events for the student body to attend with the goal of showing students that chemistry can be fun.

Do you collaborate with other clubs on campus?

We are planning to collaborate with our Colleges Against Cancer

organization for an event called Relay for Life. Relay is one of the biggest fundraising events of the year for the American Cancer Society, and our chapter is planning to participate in on-campus fundraising. We'll be helping to set up and run the Baptist College tent on the day of the event.

What fun social events does your chapter participate in?

Members of our chapter attended a local event called Taste of Science. The purpose of the event is to bring scientists out of the lab and into casual settings to


talk about their work with members of the community over food and drink. This was an educational event, but our members had the opportunity to talk with professionals in fields that were of interest to our students: a physician and researcher from St. Jude Children's Research Hospital.

What's the most challenging thing your chapter has faced?

We faced our biggest challenge last year when five out of our seven members were graduating. We recognized the need to recruit more members

before the end of the year. Because of this, we worked hard to target new students on campus during our events.

What career-related events does your chapter hold?

Last summer, our chapter organized a tour at St. Jude Children's Research Hospital. We were given the opportunity to tour the research labs and other areas of the institution. Baptist College is a medically focused college, and many of the students in our chapter are interested in careers that involve patient care and research. The event was very beneficial for the students who attended. 



University of Puerto Rico at Bayamón

Faculty Advisor
Laura Santiago

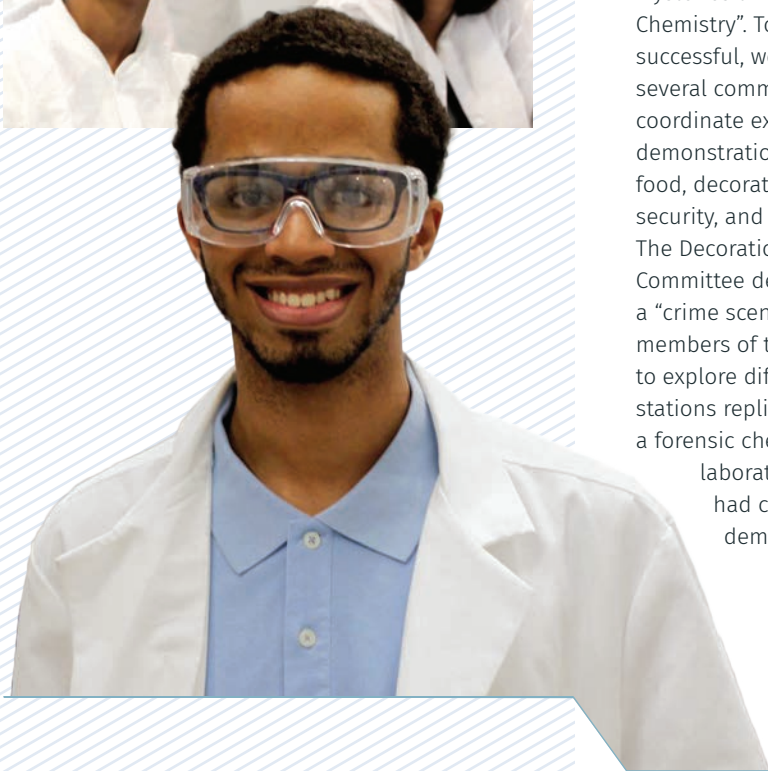
Co-Advisor
Jessica Oyola

Members
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Chapter Presidents
**Jahn Carlos Estarellas San Miguel,
Rosymar Gracia Colón**



www.facebook.com/acsupr.bayamon



How did you celebrate National Chemistry Week?

One of the goals for our chapter is to have an impact on all types of people through our knowledge and experience. We have participated in several chemistry festivals for National Chemistry Week (NCW). Last year's festival theme was "Solving Mysteries through Chemistry". To be successful, we created several committees to coordinate experiments, demonstrations, games, food, decoration, security, and cleanup. The Decoration Committee designed a "crime scene" for members of the public to explore different stations replicating a forensic chemistry laboratory. We had chemistry demonstrations

of chromatography, blood indicator, densities, and a small microscope that the young people could look through to appreciate the size of a hair follicle. We also offered a Pharmacy College Admission Test (PCAT) workshop performed by the Kaplan company and hosted a Chemistry Game Day featuring: Chemistry Battleship, Create the Molecule, Functional Groups, Build the pH Scale, and Locate the Elements on the Periodic Table.

How does your chapter contribute to the community?

Our chapter has visited 20 schools to educate people about how chemistry protects human health and the environment. We performed experiments for preschool children to help them learn chemistry concepts in a fun way. In collaboration

LENDING A HAND

Members volunteer at the local Boys and Girls Club.



with the ACS Green Chemistry Institute and the ACS Division of Chemical Education, we gave seminars and demonstrations to high school students. And we have volunteered at cancer organizations and the Scuba Dogs Society.

How do you recruit new members?

We use different methods to captivate students. We use social media and have informative tables in the science building to do the recruitment. On social media, we post pictures and describe activities to entice students to join our chapter and inform them about planned activities. We also emphasize community work that our chapter does to

improve people's lives, as well as how our chapter seeks to give members professional development opportunities that lead to gaining knowledge and leadership skills.

What are your most popular or unique chapter activities?

Our chapter decided to participate in the EcoExploratorium, a fair organized by the Science Museum of Puerto Rico held at Plaza Las Américas, one of the most popular shopping malls in Puerto Rico. The fair raises public awareness about environmental issues, climate change, technology, and science. About 30 schools along with the Boy and Girl Scouts of Puerto Rico and members of the general

public visited our booth, where we conducted experiments and allowed everyone from toddlers to seniors to participate in demonstrations. At one point, the current governor of Puerto Rico, Dr. Ricardo Rosselló, passed through the science fair and congratulated our chapter for our demonstrations and our efforts to explain chemistry. It's never too late to understand that chemistry can be fun and is found everywhere!

Do you collaborate with other clubs on campus?

Our chapter has collaborated with the Pedagogy Association in order to educate preschool children through simple chemistry

demonstrations. We have also participated with other student associations for National Coastal Cleanup Day and with the Pharmacist Association for the PCAT orientation.

What are your chapter's most effective promotional tools?

Our public relations representatives, chapter secretaries, historian, and other members promote our events. The historian and the public relations representatives create flyers and advertisements to post on Facebook and Instagram. The secretaries are in charge of the chapter email, and they send various communications,



University of Puerto Rico at Bayamón



Want to be featured?

Let us know you want the spotlight at inchemistry@acs.org.

information, and formal letters. Some of our members take care of the News Wall in the science building at our university. We use the wall to post flyers and pictures. We also ask other student associations to post announcements about our activities on their social media pages. This has been very effective because we get more responses and attendance at the events we host.

What is your biggest challenge?

One of the biggest challenges is maintaining good communication with all members. The secretaries created a group chat using the WhatsApp application to keep all participants informed of events. The most important decisions are made in person, but the final details and reminders are done through the group chat.

What was your most successful fundraiser?

Our most effective form of fundraising is the pizza sale. We're able to attract students who are in a hurry and have less time to eat before

classes. In addition, we have raised money by selling cake pops and frappés. The money we raise helps to fund our trips to the ACS national meeting. 🍷



Members volunteer at the local Boys and Girls Club.

FACULTY PROFILE Laura Santiago

Why did you become a faculty advisor?

The chapter president asked me to become their faculty advisor. I thought that it would be an excellent opportunity to teach chemistry with another perspective to the students and the community outside the classroom.

What challenges have you faced in your position?

The most difficult challenge I face is getting students to work as a team. As we know, science students always want to work alone in a competitive way, and inside the chapter, we need to work as one. Also, my schedule is

very demanding. My academic responsibilities take up a lot of my free time. Sometimes, the members want more of my attention, and I can't give it to them.

What has been the most rewarding aspect of being a faculty advisor?

I have had many rewarding moments as a faculty advisor. Seeing the chapter members working hard to accomplish their goals is very gratifying. Last year, they presented their chapter work at an ACS local section meeting in Puerto Rico as well as at the ACS national meeting in San Francisco.

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

Be patient and enjoy the work with your students.



Chapter Reports: Six Ways to Success

1. Get a head start

Use the **ACS Student Chapter Management System** as a tool to help you plan throughout the year. By getting a head start, you'll have far less information to enter when the chapter report deadline is approaching. Enter events, expected event dates, and short descriptions, and then fill out the details after the event happens. Without the last-minute rush, you'll save time and be able to add key details, edit, and polish as needed.

2. Write for the reader

You may have every aspect of your events and activities stored in your brain, but the reader on the other end needs to understand your goals, the purpose behind your activities, and outcomes.

Faculty reviewers want clear and succinct descriptions and summaries. Not only does this help them to determine your award level, but it gives reviewers the opportunity to provide the kind of feedback that can help you identify future improvements and the direction of your chapter.

3. Ask an advisor to proof

The best students, employees, writers, and researchers all have someone whom they can ask to review their work. Inevitably, because we're human, we will introduce errors into our work. Maybe they're as simple as typos, or maybe there isn't enough clarity in the point you're trying to convey. **Your faculty advisor can help by reviewing** all of your entries before your final submission in May. And, again, the earlier you work on your report and plan your events, the more time you will have to perfect it.

4. Share the load

Don't feel that coordinating and doing all the administrative work is yours to tackle alone. Break up the responsibility by delegating certain events to other chapter members before they happen or assigning roles to people for future events.

Spreading the workload also gives others a chance to take on leadership roles in the chapter.

5. Make a smooth handoff

Planning ahead sets a good example for future officers or those who are considering the role. Make the position manageable for officers who will be filling your shoes, and leave them with the records that will help them understand past activities and opportunities for the future. **A good handoff will help with your chapter's continuity.** If your chapter is faced with a drastic change in its membership makeup, the chapter report record and the notes you've left behind will make the transition more seamless and will, hopefully, lead to sustained success.



studentchaptersonline.acs.org

6. Remember—you're building valuable skills

The **Student Chapter Management System** isn't just a tool to record and track events, get feedback, or win an award. As a future leader, you will benefit from participating in the tracking, writing, and reporting functions you've performed. As you move into graduate school or look for a career, you can share your experience as a fantastic planner who can keep good documentation, which will be incredibly valuable to your future grad program or employer.





ACS & You

Getting Ready for Your First ACS National Meeting

BY MICHELLE BOUCHER and AMY KEIRSTEAD

Your abstract has been accepted, your student chapter is getting an award, and you're excited to meet and network with chemistry professionals from all over the globe. But are you really ready for your first ACS national meeting? Let us help you get the most out of your experience and put your best (professional) foot forward.

I've been to ACS local section and regional meetings before. How will this be different?

An ACS national meeting is a big deal, sometimes drawing as many as 18,000 attendees. Events are everywhere—the convention center, surrounding hotels—and everybody has their own agenda. While some events, like the Expo and Sci-Mix, are huge, bustling events where you can feel lost in the crowd, technical sessions and poster sessions are smaller (25–100 people). You might even rub shoulders with some famous chemists! If you are prepared to be the enthusiastic budding professional chemist that you are, this is a very good thing. The trick is to be noticed for all the right reasons. This means your professionalism is important.

The program looks so overwhelming—how do I know what to attend?

ACS national meetings offer something for everyone, and it would be impossible to attend every session that piques your interest. Fortunately, every meeting has a program just for undergraduates that focuses on your specific needs and interests. From the graduate school sessions and recruiting fair to career workshops to a special lecture by a renowned scientist, you can find it all in the undergraduate program. Even better, stop by the Hospitality Suite on Sunday morning to meet and mingle with program organizers, student leaders, and ACS staff, and make sure you stick around for the informative session, *Making the Most of Your First National Meeting*.

Looking beyond the undergraduate program, you can search the technical program or use the scheduling app to find people or topics that you might be interested in, whether it's a potential graduate advisor or just a research field that is intriguing to you. The app can help you keep track of your schedule. Both the technical

program and the app are available at www.acs.org/meetings.

Tip: Be sure to build in a little buffer for traveling to sessions. Some events are not located in the convention center, and you'll want to account for travel time as well as the fact that other attendees can crowd the hallways and escalators during breaks.

What should I wear? Do I need to buy a suit?

A good rule of thumb is to dress as though you will meet your future employer at any given moment and make a good first impression. Most people are dressed in business casual. Slacks, a skirt or dress, and a professional top (button-down, blouse, or sweater) are all safe choices.

For posters and oral presentations, dress in professional attire. This is your time to impress people with a look that says, "I'm a professional." You don't have to sacrifice your personal style; however, you should avoid clothing and footwear that's too revealing or that looks shabby (e.g., ripped jeans, crop tops, sandals, and flip flops).

Anatomy of an Ace Research Poster

Your poster is an illustration of your research story.

Make it clear. Make it easy to understand. Make it a visual joy.



TITLE

Authors and Affiliations
(you, co-workers, faculty advisors)



UNIVERSITY

Introduction

- > Why does it matter?
- > What is already known?
- > What are you trying to accomplish?

1 — 2 — 3 — 4 — 5



Methodology

What steps did you take?

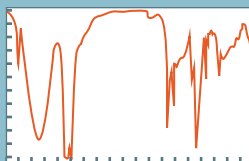
- > Explain type of chemistry
- > Focus on the big picture



Results

The heart of your poster

- > Explain results within context of the problem/question
- > Use minimal text
- > Use easy-to-interpret graphs



- > Balance words with graphics



Conclusion

Keep it short and simple

- > What did you find?
- > What questions or methods should also be investigated?
- > What will you do next?

Acknowledgments

- > Funding sources
- > Those who helped you

References

- > Show what you're building on
- > Use ACS format

Sections

- > Chunk content into easy-to-identify sections



Fonts

Aa Aa Aa

- > For better readability, use sans serif fonts such as Arial, Helvetica, and Calibri
- > Make font sizes large enough to read from a short distance

Design

- > Simple borders
- > Neutral backgrounds
- > Cohesive color scheme



Images



- > Use clear imagery and graphs to convey meaning



Tip: Thrift and consignment shops are great places to pick up suits, blazers, or other professional clothing on a tight budget. And most dry cleaners offer budget-friendly alterations services for that all-important well-tailored fit.

Tip: Be sure to wear comfortable, supportive shoes—you will be walking a lot on concrete floors and pavement. Break in your shoes before the meeting, and save the heels for your presentation.

Tip: Finally, make sure to have a good, sturdy bag that you can carry around all day for your notebook, water bottle, extra shoes, and, of course, all the swag you'll pick up at the Expo!

How should I do my poster?

Each poster will have its own dedicated poster board that is 4' tall by 6' wide (including the frame), so your poster must fit within those dimensions (buckets of pushpins are available, so you don't have to bring your own). Many students take advantage of the large poster printers at their institutions and bring their posters rolled up in tubes, but it's also possible to bring a digital copy and print it at an office supply or print shop in the city (this is obviously something you need to plan). You can even print individual panes on letter-size paper and neatly tack those up—this doesn't look as professional but it can be a useful work-around.

ACS.ORG
Be sure to prepare
your poster
according to the
presenter guidelines.



As far as layout and content, check out the infographic on page 11 for tips. You will need to include key information, such as a title, authors and their affiliations, an introduction, methods, results, discussion, a conclusion that covers future work, acknowledgments, and references. Remember that you will be present at your poster, and figures and graphics are much better starting points for discussion than paragraphs, so try to limit the amount of text by using just enough to help tell your story. Any figures, images, and text should be large enough to read clearly from a few feet away.

Every poster board will have a number that corresponds to the abstract number in the program, so find yours and tack it up. This takes less than five minutes, and you'll have access to the room 30 minutes before the session start time, so don't stress about the time. Beware! Posters put up before the designated set-up time will be removed.

What should I expect at my poster session?

A poster session is a place to share your science with others. Everyone who comes to view your poster is looking to hear about your science

and learn about your discoveries. There will be an ebb and flow of foot traffic, with some people simply reading your poster and others wanting to talk to you a little bit about it.

Don't judge yourself by how many people visit you; one or two meaningful conversations with good mentors can be more important than a bunch of students stopping by to say "hi".

If there is a lull in the foot traffic around your poster, it is completely appropriate to talk with the poster presenters around your poster; in fact, this is a great opportunity to practice your short research introduction with a peer!

How much should I share about my research?

The biggest challenge for many students is determining how much information to share with people. The best rule of thumb is to start small and expand if your audience wants to hear more or has questions. Be prepared to have a brief (1–2-minute) introduction as to what you have done and why you did it. Many guests at your poster will start with, "Why don't you tell me a little bit about your work?", but bear in mind that there are a lot of posters to visit, so "a little bit" means short!

The most successful poster presenters are those who can focus on the "take-home" messages of their research project and

*stay **in** the know*



chemistry

The ACS Student Member Magazine

Innovative research
Advice on grad school
Navigating the job market
Student experiences
Student chapter highlights
ACS resources

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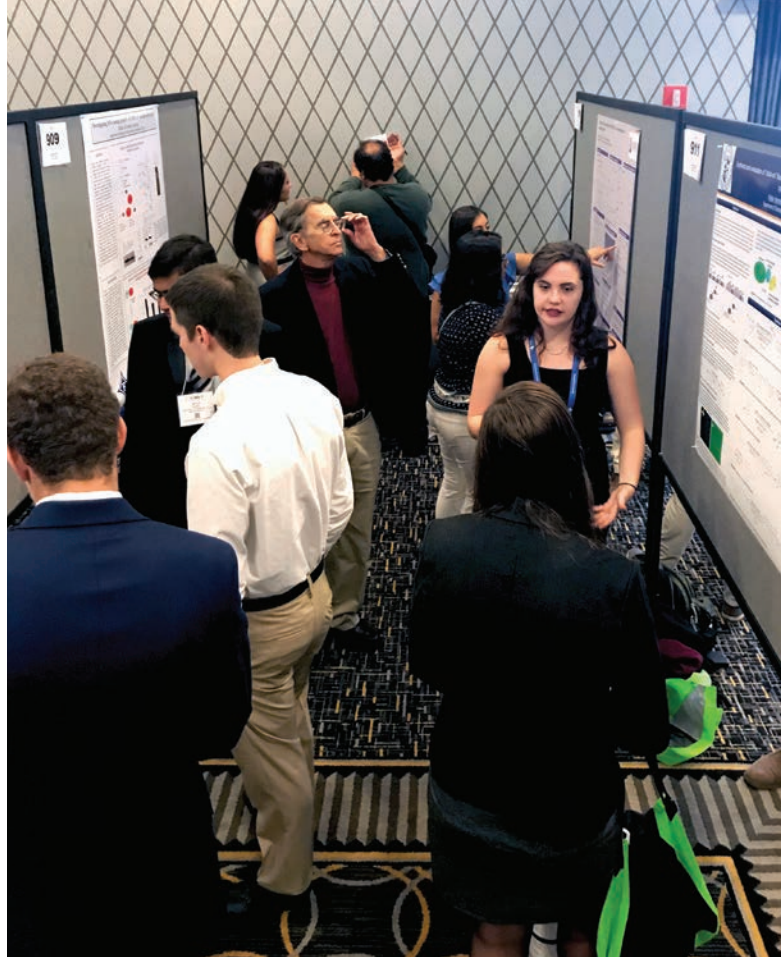


communicate those messages in a short amount of time. What did you do/study (in simple broad terms, 1-3 sentences)? Why should the listener care (again, 1-3 sentences)? Once you give your brief elevator speech of your project, you can gauge how much more your listener wants to know. Ask them if they want you to go into more detail about anything, or ask them questions about their background so that you know how specific you should be when answering additional questions.

My oral presentation is at 9:00 a.m., but I want to meet my friends afterwards to go to the Expo. Can I leave when I'm done?

Congratulations on giving an oral presentation! This is a major accomplishment and opportunity for you to present your research. Oral sessions are conducted in blocks of four or five talks (40-50 minutes) with short intermissions in between each block. As a presenter, you need to arrive either at the start of the session or during the break immediately preceding your block. Be sure to introduce yourself to the chair of the session and other presenters, and load your presentation onto the computer.

It is also good practice for you (and the rest of your squad) to stay after your talk, at least until the next intermission. Not only will you have the opportunity to learn about some other high-caliber research projects, but this is also a way to



There are literally thousands of people who have the same passion for chemistry that you have. It is exhilarating to discover all the shared experiences..."

show support and camaraderie for the other presenters in your block.

What's the Awards Ceremony like?

One of the biggest highlights of the meeting for students is the ACS Student Chapter Awards Ceremony. Nothing can compare to being in a room full of your peers with active chapter members from all over the country and the world celebrating chemistry and each other.

The ceremony is a semi-formal event in a professional space, so this is the time to dress up (in formal attire, not nightclub gear). In addition, while the awards are handed out, try to be as enthusiastic when you support other chapters as you will be when you celebrate your own. It's a wonderful gesture that your peers will appreciate.

And do stay for the entire event. Everyone is excited about the recognition, so be considerate and let everyone have their moment to shine.

I heard there's free food and drink. Is this true?

There are definitely events at ACS meetings that offer refreshments. You can get breakfast at the Student

Hospitality Suite (although you'll want to arrive early to enjoy it). In addition, snacks are offered at many student events. The Student Social, which takes place after the ACS Student Chapter Awards Ceremony at spring national meetings, has food and non-alcoholic beverages.

The Sci-Mix poster session includes popcorn and two drink tickets. Just remember that Sci-Mix, like all social events at professional meetings, is intended to promote networking and social interactions with a diverse array of presenters and disciplines. Trying to present a poster while inebriated (or with a mouthful of food) looks bad. Potential future employers and colleagues are everywhere, so know your limit or avoid drinking while presenting in order to put your best foot forward.

There are back-to-back talks at opposite ends of the convention center that I want to attend. Can I enter a talk late?

Sure, if you are discreet. Enter quietly, pushing the door open slowly (you don't want to knock into anyone near the door) and being careful to close the door behind you (don't let it slam!). Slip into an available chair, if you can do it without climbing over anyone. Otherwise, move to the side of

For more info

on ACS meetings and advice on presenting your research, visit acs.org/undergradmeetinginfo

the room. Once the speaker has finished, you can look around and quickly find a seat before the next speaker starts. Likewise, if you see an attendee come in late and you can easily scooch over to free up a seat, please do so.

I'm so excited to see a talk by [bigwig chemist's name]. Can I ask them a question during or after their talk?

Absolutely. Here are some tips:

Tip: Save your question for the end when the speaker asks for questions.

Tip: Speak loudly and enunciate your words so that the speaker, moderator, and others in the audience can hear your question clearly the first time.

Tip: Keep your question short and focused on the topics covered in the talk.

Tip: Ask them something that only they, or a similar expert, would know the answer to, not what you would expect them to know.

You also can talk with a speaker after their talk. If there is a small crowd of people asking questions, politely ask your question as time permits. If the speaker needs to rush off, ask if you can contact them by email later, and be sure to follow up on your request.

One of the best things about attending a national meeting is the sudden realization that you are not alone. There are literally thousands of people who have the same passion for chemistry that you have. It is exhilarating to discover all the shared experiences, from the first time leaving lab with your goggles on to late nights in the library to surviving P-chem. Battle stories from labs gone by (Grignard reaction, anyone?) are always great for a groan and a laugh.

You will discover that the "geekier" you are and the more you enjoy chemistry as a field and as your major, the more you will fit in, which is thrilling.

The consensus from students who have come before you is that their first ACS national meeting was a turning point in their professional lives. Taking this important step toward your education, career, and future as a member of the professional chemical community will surely be unforgettable. We hope that your experience at your first national meeting is positive and meaningful, and we look forward to seeing you there! 🍷

Michelle Boucher is an associate professor of chemistry at Utica College, a member of the ACS Undergraduate Programs Advisory Board, and a longtime student chapter advisor. Amy Keirstead is a professor of chemistry at the University of New England. She is also an ACS student chapter faculty advisor and serves on the ACS Undergraduate Programs Advisory Board.



How to Snag a Glowing Recommendation Letter

BY MICHELLE BOUCHER and AMY KEIRSTEAD

Whether you're applying for an internship, a scholarship, a summer job, or graduate school, you are likely going to require at least one letter of recommendation. Two experienced recommenders—professors Michelle Boucher and Amy Keirstead—are here to answer questions that may be looming in your mind.

Whom should I ask to write a recommendation letter for me?

Keirstead: You want someone who can write about your teamwork and leadership skills, strength of character, and work ethic. As a professor, I value the student who earned a B in my class but who came to Office Hours every week for help, allowing me to get to know them as a person and demonstrating their dedication to learning. Lab instructors can also provide unique perspectives about your teamwork, preparation, focus, and lab skills if these are important considerations for your application.

Boucher: It is important that most of your letter writers be science professors if you are applying to programs in the sciences (internships, grad school, etc.). You can certainly consider one letter from a coach or the head of tutoring,

but you will want most of your letter writers to be people who can speak to your potential as a scientist.

When and how should I ask for a letter of recommendation?

Boucher: Hopefully, you know your professor (or other reference) fairly well, just as they know you. Approaching your professor for a letter should be no different from the way you approach them for homework help or advice. Contrary to what some students believe, it is not a big deal to ask for a letter; this is part of our job, and we are happy to help you move to the next stage in your career. Do you stop by Office Hours regularly? If so, stop by and simply ask. Do you plan meetings by e-mail ahead of time? Then e-mail your professor to schedule time to talk about a recommendation letter.

Typically, professors will want to talk to you about your letter. If they feel that they cannot write a solid and supportive one, they will tell you. In such a case, don't panic. The reason might be as simple as them wanting you to look for someone who knows you better. They want you to have the best letter possible, even if it does not come from them.

Keirstead: I appreciate as much lead time as possible. This helps me schedule dedicated time, and it gives me the chance to better compose my thoughts or even observe the student in a different way. Personally, I won't write a recommendation letter for a student if they give me less than two weeks' notice. A last-minute request suggests that they are not serious about the application. Also, don't ever presume that your professor is going to write you a letter before they've agreed to it. It's important (and courteous) to get confirmation from your recommender before inserting their e-mail address into a centralized application service.

What information should I provide so that my professor can write me an accurate letter?

Boucher: We have a lot of experience writing letters that are tailored to particular programs and fields. If we know what opportunities you want and why you are seeking them, we can be sure to highlight the attributes that those programs want to see. Providing a full list of programs with a few notes about what you like about them and why, deadlines, and how the recommendation letter should be



delivered (e.g., application link, e-mail address) is the best way for me to be as accurate as possible.

Keirstead: I ask for a copy of the student's résumé and have them answer a series of questions about the application process, what they're applying for, why they want to earn the position or award, their strengths and weaknesses, and why they think they deserve a strong letter from me. The responses help me evaluate the student's written communication skills, their motivation, and their sense of self (do their strengths and weaknesses align with my observations?).

This method formalizes the process and gives students a chance to do a self-evaluation, which they tell me is very helpful. The most useful information I glean from the questions is often an anecdote of an interaction I had with the student,

or one of the experiences they had in my class. Anecdotes allow me to lend a more personal element to the recommendation letter.

What does a letter of recommendation look like anyway? What goes into one specifically?

Keirstead: There are a few key points that are always required of the recommender.

- **A description of how they know you and for how long.** This gives the committee a sense of the writer's ability to evaluate you.
- **Your performance in their class, research lab, or another venue.** These are the "behind the scenes" or the finer details of what is on a transcript or résumé. For a research

student, I'll outline their research project, the skills and techniques they have learned, and any research projects. For a chemistry club student, I'll talk about the activities in which they participated and any leadership roles.

- **Your professor's perspectives/ observations about your personal characteristics.** Does the student have excellent time management skills? How are their oral communication or problem-solving abilities? Are they adaptable? Do they show good judgment? Are they receptive to constructive feedback? In my opinion, this is the most important section to write, and I strive to back up my perspective with examples or anecdotes.

If your professor has any reservations or feels the need to acknowledge any weaknesses, those may also be included in the letter. Negative comments are fairly minor and can actually strengthen the letter because they give the many positive comments more clout.

Boucher: In recommendation letters, I speak to the strengths that I have personally seen and place them within the context of what the



position the student is applying for needs. For example, if I am writing for a student who is applying for a bench chemist position, I will be certain to emphasize how many lab classes (or other lab-related experience) the student has done with me. I will be looking for examples where the student showed independence or a commitment to safety.

Why do I need a recommendation letter?

Keirstead: Your transcript and résumé are important parts of your application, but they don't tell the whole story. Even if you are an A student, the admission/scholarship committee also wants to know who you are as a person. Will you fit in well with the existing community? Will you represent the organization well? Do you have the personal characteristics necessary to succeed in this career or graduate program?

This is where your letter writer can add important perspectives as well as an expert opinion on your academic and technical skills and strengths. Some of my favorite letters to write are for students who did not earn an A in my class but who demonstrated dedication, work ethic, personality, and grit. I am always pleased to be able to provide insight that puts a letter grade in perspective.

Boucher: In many ways, a transcript only tells the reader how well a

student does at being a student. It is good to get A's and B's, but your GPA does not tell an employer how safely you work in a laboratory setting; nor does it tell a graduate school how well you help general chemistry students in group tutoring. There is much more to you than your GPA, and your letter writers can share some of that with your future programs and employers.

What can I do to make sure that my professor writes the best possible letter for me?

Boucher: Be the best student you can be, which is more than doing well on exams. Ask questions, be involved, be a leader. Focus on careful and safe work in the laboratories, and consider starting a research project with one of your professors. Not only is it great experience, but it also gives your professor a better look at how well your skills are developing.

Keirstead: In a small class or extracurricular setting, it's much easier to get to know a student, but in a larger class, I can write the best (most accurate and most descriptive) letters for students who have taken the initiative to let me get to know them. Ask and answer questions in class, or if you're shy, come to Office Hours. Demonstrate your teamwork skills and ability to stay on task when we do in-class group work activities, and show your organizational

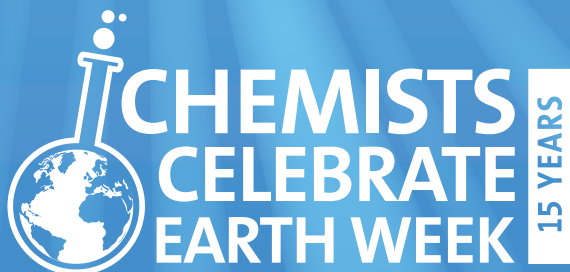
and time management skills by submitting complete work on time. Stand out among the crowd (in a positive way) and these efforts will not go unnoticed.

What else should I consider when asking a professor to write me a letter?

Keirstead: Ask your professor if you need to waive the right to view your recommendation letter (this is a click-box on a centralized application). Many professors will request that you do this so that they can write candidly about you, which makes for a stronger, more honest letter. Also, while we are happy to write letters for students, being thanked with a written note or a card is very much appreciated. In fact, this is good etiquette in general. Follow up with us to let us know if you were accepted (we love to share in your success) and, most importantly, pay it forward. We professors are able to write recommendation letters for our students because our professors took the time to write letters for us.

Boucher: Make it easy and clear for the professor to know what you need and when you need it. Don't be afraid to gently remind them as the deadline approaches. Just because they are busy doesn't mean that they don't care. It is sometimes difficult to keep track of all the deadlines. A gentle reminder can be a lifesaver. ☺

Michelle Boucher is an associate professor of chemistry at Utica College, a member of the ACS Undergraduate Programs Advisory Board, and a longtime student chapter advisor. Amy Keirstead is a professor of chemistry at the University of New England. She is also an ACS student chapter faculty advisor and serves on the ACS Undergraduate Programs Advisory Board.



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A System for Dealing with Ethical Dilemmas in the Research Lab

BY **RALPH STUART**

As a chemistry student, you are faced with ethical considerations all the time. These questions are likely familiar to you: Do you report all of your experimental data or delete the outliers? Do you share your teammate's data or just report your own? Do you need to cite information you got from social media?

As you advance in your career, you will need to prepare yourself for even bigger ethical questions down the line: Who gets credit for research—you or your research advisor? Does it matter where your grant funding comes from? How are animals used in your research (if at all)? How responsible are you for how others use your findings?

By systematically looking at each scenario as it arises, you can work through these sticky situations.

Here's a scenario to consider:

Tom is taking an upper-level chemistry lab class with Dr. Doe, a well-known analytical chemist. Dr. Doe is nationally known and manages a group of 20 graduate students and 5 undergraduates. During class, Tom becomes interested in applying some of the methods he learned to a novel set of samples. He asks Dr. Doe for permission to use her lab's

equipment for this work. She is interested and says yes, as long as he doesn't disrupt the work of other people in the lab and he lets her know what he has learned.

After three weeks of work, some of Tom's data differs from related data in the literature. After reviewing his procedures carefully and rerunning several samples, Tom is convinced that his "odd data" are sound. Concerned that including the anomalous data will confuse his report, Tom considers excluding these figures from his report to Dr. Doe. Would Tom be guilty of falsification of research results by omitting these data?

When you get odd results in class, it's usually because you messed up the experiment. But in research, odd results may or may not mean you've stumbled onto something new. So, what do you do?

TACTIC 1: DO THE MATH

Statistical analysis is the most straightforward method of determining whether your odd data are outliers or something worth reporting. Tom has not done this math before, but he knows that statistical tests require a significant number of data points, and his data set might not support such an analysis.

Ideally, Tom would take the time to perform more experiments and collect the needed data. But this is not an official research project, and it is not worth his time or Dr. Doe's resources to continue the experiments.

TACTIC 2: CHECK THE ETHICAL GUIDELINES

There are many documents that address ethical questions in chemistry research. For example,



the **ACS Chemical Professional's Code of Conduct** describes expectations for the chemist's responsibility to chemical science and its stakeholders. It specifically states that "scientific misconduct, such as fabrication, falsification, and plagiarism" are incompatible with the code.

But Tom isn't a professional chemist. He's an undergraduate student doing some ad hoc experiments. So Tom also checks the **ACS Academic Professional Guidelines**, which provide guidance for both professors and students. This document tells Tom that "laboratory notebooks should be complete, and all data should be properly recorded and analyzed.... all results should

// Good science requires open communication and ethical behavior from everyone."

be discussed with the primary investigator...".

This helps to answer Tom's question, although he still must figure out the best way to approach Dr. Doe. Tom hasn't seen Dr. Doe since the day she accepted his idea. Where else can he turn?

TACTIC 3: CHECK WITH FELLOW RESEARCHERS

When in doubt, get a second opinion. Other students in the lab might be a useful source of advice. They could review his procedures or try to reproduce his results themselves.

In this case, no grad student has been conducting the same analysis as Tom, and after making a few inquiries of other grad students, it's clear that they aren't in a position to help him.


TACTIC 4: CHECK WITH THE PRIMARY INVESTIGATOR

If Tom's results are interesting enough to publish, he will need Dr.

Doe's help, if for no other reason than she provided the equipment he used. Although Tom can expect to be named as coauthor on a paper based on the work he has performed, Dr. Doe will likely be an author on this work as well. For this reason, she needs to understand the complete set of data that their paper is based on. Thus, it's necessary and appropriate for Tom to discuss his question with Dr. Doe herself.

Tom decides to use the first three tactics to help frame the question for Dr. Doe in a direct conversation. He composes an e-mail describing his observations and concerns and then asks for a meeting to discuss the results in more detail. During their meeting, Dr. Doe is able to provide a new perspective on the data, and she and Tom develop the next steps together.

Dr. Doe also recommends that Tom develop a formal data management plan before beginning his next line of research. The data management plan will also help him keep the data organized in a way that will make publication of his results much easier, if and when that time comes.

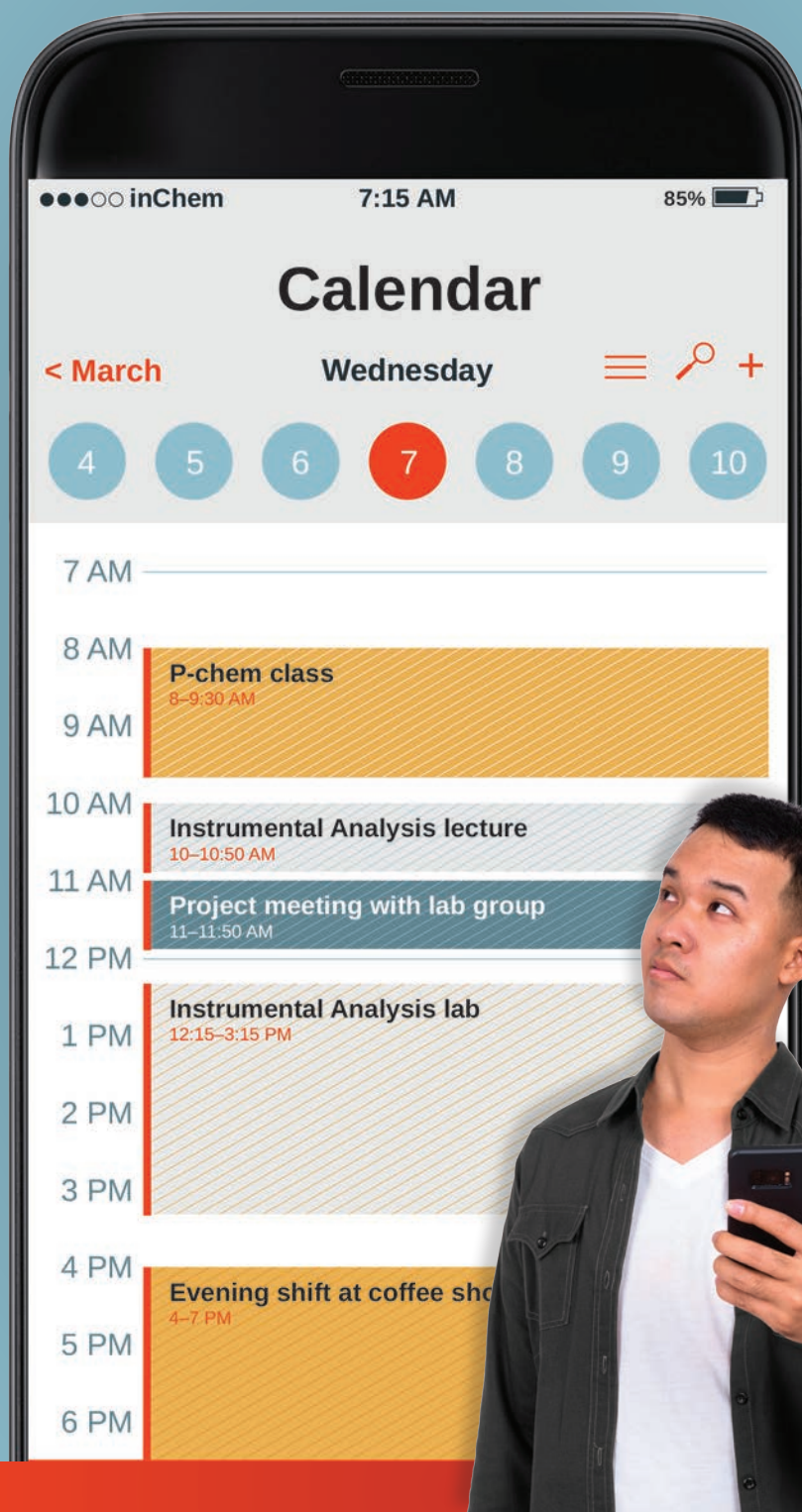
Good science requires open communication and ethical behavior from everyone. As you learn about ethical aspects of scientific research, you can more confidently contribute to the success of your work, to that of your colleagues, and to science as a whole. 



VISIT WWW.ACS.ORG
for the Chemical Professional's Code of Conduct and Academic Professional Guidelines.

Ralph Stuart is the Chemical Hygiene Officer at Keene State College in Keene, NH. He is the 2018 chair of the ACS Committee on Chemical Safety.





DON'T LET your calendar overwhelm you. Here are some SOLID STRATEGIES TO HELP you manage your HECTIC SCHEDULE. **By Amanda J. carroll**

Crazy Busy & Staying Sane

Tips to balance school, work, and life

College is incredibly time-consuming, especially for students in STEM fields. Between lectures, labs, homework, lab reports, tutorials, research, plus the amount of time you have to devote to understanding material, studying chemistry is no joke. Compound all the demands of your course load with a full- or part-time job, family needs, and extracurricular activities (to round out your résumé), and the pressure can feel downright intense.

Colleges generally recommend dedicating at least three hours to your studies outside of class for every hour you spend in class. To a student who has to work between, before, and after school, it may seem that there is never enough time to accomplish everything—and do well.

But it is possible to create a successful balance between your coursework and your job if you have solid strategies and a positive outlook.

Flex your schedule

Whether you're working full-time or part-time, you would be surprised to know how many employers allow for flexible schedules. Many students are able to schedule for either weekdays only or weekends only. If you're on a full-time schedule and have classes that meet during the day, you can negotiate working around your classes and still get your hours in.

Talk to your boss or the human resources department. Often, they are willing to work with you to accommodate an unconventional schedule.

Another idea to consider is scheduling longer hours on certain days so that you can devote more time to studying on days that you're off.

When you have to work, use every opportunity to get some studying in—during a lunch break, on a commuter bus or train, or standing in line at the bank. Your time is valuable, and every second counts.

As long as you carve out enough time to complete school tasks, you should be in good shape to stay on top of your schoolwork. Just be sure to honor your limits by being kind to yourself.

Reboot yourself

Everyone feels overwhelmed by heavy workloads that require a lot of time and energy to complete. That's why once those midterms are over and you've gotten through a particularly tough segment of the semester, it's totally normal to want to unwind, relax, hang out with friends, and enjoy some well-deserved downtime.

You need these breaks. You are human. Humans are social beings and need time to maintain their social connections. And your brain needs a break to recharge.



Author

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Almost no one can study eight hours straight, but setting aside time for short “me breaks” (meditate, exercise, or make a phone call) is a much more effective and less stressful approach. Just take your breaks responsibly. It’s one thing to catch an episode or two of your favorite Netflix original. But binging on an entire season robs you of the time you need to prepare for the work that will be due soon.

It’s important to know yourself when making decisions about how to spend free time. If you can’t read a book without finishing the entire story, maybe flip through a magazine (like *inChemistry*) instead. If you can’t watch one or two episodes of a show without finishing the season, consider watching a movie.

Plan the action

One of the best strategies for balancing work and school is to plan effectively. With so many things on your plate, it is easy to forget about an assignment, an upcoming quiz, or an exam. Get a planner (or a planning app) and write everything down as you find out about assignments.

The key to successful planning is consistency. Be rigorous about recording your assignments and study times until it becomes a habit. Some students even write down their classes for each day so they don’t forget to go to them. You can use colored highlighters to keep different classes or types of assignments such as homework, lab reports, quizzes, or exams organized. Whatever methods you choose, be sure to include study time in your schedule.

If you write everything in your planner and consult it on a regular basis, you’ll have a better idea of how to divide your work over the upcoming days or weeks and prioritize

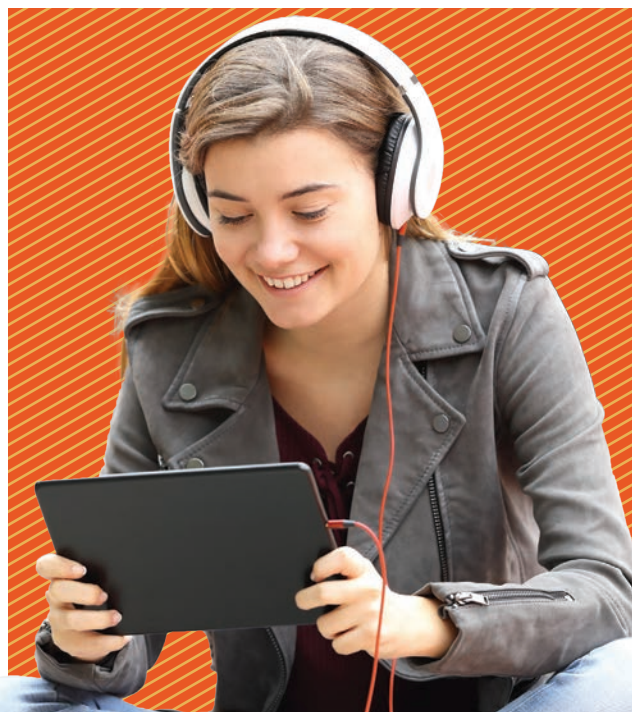
efficiently. This also makes you less likely to forget about something until the last minute or, worse, forget about it completely.

The semester has a rhythm to it, and although at times it can seem as if your professors are plotting against you, if you know you have three exams, a lab report due, and a 20-hour workweek coming up, you can stay on top of it all by getting ready early (as opposed to trying to live off of coffee and energy drinks for a week).

Staying organized and informed helps you prepare and prioritize how to allocate your time, and makes you less likely to pick up an extra shift only to realize you have a homework assignment due the day after you’ve worked all night.

Sneak in extra study time

Another key to success is using your time wisely. It is surprisingly easy to lose valuable time and not realize it. If you have an hour between classes, leave those social media apps alone! You’ll end up in a rabbit hole. Instead, pull out your notes and look over the material for your upcoming quiz. If one of your classes gets canceled, skip that trip to an off-campus coffeehouse and use the time for homework instead. If you have downtime in



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Read more
College Life articles
on the iC website.

FIND TIME TO RELAX YOUR BRAIN

Catch up on a new episode or two of “Jessica Jones” on Netflix. Just don’t binge the entire season!

// A few minutes here and there may not feel like much, but this is actually valuable study time that you can use to your advantage if you seize these opportunities.”

USE YOUR TIME WISELY

Slow day at work? Time between classes? Use this downtime to look over your notes instead of checking Instagram.



lab (everyone has spent an hour boiling water for an experiment), use that time to go over flash cards, quiz friends about exam material, or work on calculations for the end of the lab (but don't forget about your water!).

Some employers don't mind if you study during a slow period, as long as you're able to get back to work quickly when you're needed. Some jobs may not allow this, but it never hurts to ask, especially since many employers realize the time struggles that working college students face. A few minutes here and there may not feel like much, but this is actually valuable study time that you can use to your advantage if you seize these opportunities.

Manage your expectations

Balancing work and school can be very frustrating and discouraging. “Some people don't understand what it's like to have that 20-plus-hour workweek throughout the duration of the semester where you may work most nights/days when assignments are due or when exams are scheduled,” says Lana Nitti, a student at Utica College in New York. “Unfortunately, I haven't fully mastered it myself, and it always seems like something is getting neglected or I'm not performing at my very best.”

For people like Lana, who has found it hard to overcome some of these challenges, it's

important to use all the tools available to be as successful as possible ... and then let go. When everything is happening at the same time, it can feel like you aren't doing anything well enough. The fact is, you are likely doing far better than you give yourself credit for.

When you are juggling school, work, friends, family, and relationships, it is important to stave off self-criticism and celebrate what you have accomplished, rather than dwelling on what you didn't.

And avoid comparing yourself to others. Whether you are talking face-to-face or following someone on social media, you only get a partial glimpse into their lives, so comparisons are meaningless. Know that you are doing the best you can on your own path. Remember that you are, in fact, giving your best; it just looks different from everyone else's best.

Last note

There is no magic way to create more hours in the day, so use the ones you have wisely. Do what makes the most sense for you and that doesn't compromise your performance.

Everyone struggles with feelings of inadequacy, but by taking care of yourself physically and mentally, and planning smart for every assignment and exam, you can relieve some of the pressure and keep ahead of the game. 📚



Grad School

JOURNEYING TO HIS PH.D.

Isaiah Bolden hiking in the Swiss Alps in 2013.



A Peek Inside the Life of a Geochemistry Grad Student

BY MICHAEL TINNESAND

Isaiah Bolden is a research fellow at the University of Washington in Seattle. He graduated from Bowdoin College in Brunswick, ME, with a degree in earth and oceanographic science and a minor in chemistry. As an undergraduate, he interned at Scripps Institution of Oceanography, at Woods Hole Oceanographic Institution, and also at the National Oceanic and Atmospheric Administration (NOAA).

Bolden is continuing his work on geochemistry and paleoceanography as he works toward a Ph.D. at the University of Washington. ACS's *ChemMatters* magazine talked to Bolden about his journey to his current position and the research he's doing on changes in our oceans.

You went to high school in Nashville, TN, at Martin Luther King Jr. Academic Magnet High School but also attended the School for Science and Math at Vanderbilt University (SSMV). That part of the country is pretty far from any ocean. What was it that led you to this strong interest in the Earth's ocean environment?

I get this question all of the time from my family and friends, and to be honest, it even puzzles me from time to time. I think I can ultimately attribute my interests in both

oceanography and climate science to early exposure to scientific research during my time at SSMV. At SSMV, I worked on a variety of research projects that sought to use chemistry as a method for weaving important environmental stories—from investigating the impacts of pesticides on the global amphibian population decline to studying the linkages between residential fertilizer usage and greenhouse gas emissions. Simply put, my first experiences in how to ask and investigate my own scientific questions about the environment occurred as a high school student. By the time I was ready to start college, I was eager to learn more about how chemistry can be used to frame the changes that we see in the Earth's climate today in the context of natural climate variability, both on past and future time scales. At Bowdoin, I quickly learned that the oceans act as Earth's global climate-control system, and whether I lived near one or not ultimately had very little bearing on the necessity to investigate and communicate ocean-climate interactions in the era of anthropogenic climate change. I've been letting that idea guide my career since.

Your current research is taking place in French Polynesia on the atoll of Tetiaroa. What is the goal of your project?

My research broadly focuses on understanding the complex biogeochemical cycling of carbon, oxygen, their isotopes, and trace metals in coral reefs—this includes investigations of seawater chemistry and the geochemistry of coral skeletons. Coral reefs are locations where seawater chemistry can vary significantly over very short time scales, primarily as a function of productivity and calcification. Our ability to resolve the often subtle differences between the biogeochemical fingerprints of this natural variability and stressors, such as ocean acidification and sea-surface warming, will ultimately lead to more accurate models of future reef productivity and calcification under changing ocean conditions. The ultimate goal of my research is to develop geochemical tools from which the calcification and productivity dynamics of reefs under climate-related stressors can be closely monitored and addressed in a more precautionary than reactionary fashion. Accessible, historically pristine, and home to a scientific field station for our

Michael Tinnnesand is a science writer and education consultant who lives in Portland, OR.



studies, Teti'aroa atoll offers an ideal location in which to explore biogeochemical cycling within reef environments in different locations over time. It is my aim to apply the tools developed from the studies of Teti'aroa's biogeochemistry to reefs around the world—including those highly impacted by human activities.

Why is your current research important for the rest of the world?

Again, a question I'm often faced with... especially when speaking with my landlocked friends and family members! Coral reefs are known as "marine rainforests", because they house about 25% of marine biodiversity in less than 0.1% of the surface area of the ocean. That's a lot of life that depends upon a disproportionately small amount of space. Unfortunately, due to the combined impacts of human-influenced sea-surface warming, ocean acidification, and coastal runoff, this 0.1% is getting smaller and smaller, with some models estimating that all reefs around the world will be in a state of net dissolution by 2100. This threat of dissolution could translate to habitat loss for a plethora of marine organisms and subsequent social and economic impacts on fishery-dependent small island nations and communities. My research contributes to our understanding of the ecosystem-level interactions that may govern how environmental stressors actually manifest themselves on reefs. I am attempting to develop leading indicators of calcification, dissolution, and productivity to identify early signs of transitions,

// My research contributes to our understanding of the ecosystem-level interactions that may govern how environmental stressors actually manifest themselves on reefs."

quantify the rates of the shifts where they occur, and help manage the impacts of changing ocean conditions on the Earth's natural marine rainforests.

While you were working on Teti'aroa, you had a remarkable surprise visit. Can you tell us a bit about that?

During our March 2017 field campaign on Teti'aroa, our lab group had an opportunity to share a bit of our research with vacationing former president Barack Obama! Talk about a wonderful experience to have as a graduate student. The highlight of the visit was the former president's knowledge of ocean acidification and its impacts on marine organisms. In one exchange, my doctoral advisor explained the goals of some of our research on Teti'aroa and why it is an ideal site for such investigations on reefs, and the former president responded by juxtaposing our research with previous studies he had read on the impact of natural volcanic CO₂ on marine life in the Mediterranean Sea. Of course, we were collectively astounded, but it was a moment of great reflection and appreciation, as it reminded us that our research on corals has a tangible impact on the world and, when communicated properly, can leave a meaningful mark on the public even at the highest levels of government.

Do you remember any turning point or defining moment when you felt like you went from being just a student to feeling like a "real" scientist?

I think that part of feeling like a "real" scientist is realizing that you never really stop being a student. You simply grow in your abilities to investigate questions you have as a student, and it's an ongoing process—for me at least. I've always thought of science as a public good, especially in the geosciences in the modern era. The times I've felt like a "real" scientist are defined by moments when I applied a variety of analytic and communication tools to use science as a way to address the public's concerns from many perspectives. For example, while working with NOAA, I synthesized Congressional briefing documents on the impacts of ocean acidification on the economies of coastal New England states. It was an amazing experience working with public officials to use science to directly address the concerns of constituents.

What's the biggest difference between undergrad and grad school?

I think the biggest change from undergrad to grad was the huge increase in flexible, unstructured time... and the increase in responsible communication practices that accompanied it! People will often say that you are mostly in charge

of your own research schedule as a graduate student. That's been pretty true in my own experience. However, it's extremely important this time is used wisely and efficiently, such that your own, your advisor's, and your program's expectations of you are fulfilled. Communication is key to success in grad school!

What is the coolest part of what you do now?

By far, the numerous opportunities for conveying research through teaching, outreach, and communication are the coolest part of what I do as a geoscientist. Whether it's to high school students, undergraduates, the broader public, or my own family, I try to embrace every opportunity to engage in a discussion on oceanography and climate science and its impact on society. I know how crucial early exposure to these fields was in forming my own career path, and I feel it is my duty to do my part in advocating the need for and benefits of Earth science research to as many audiences as possible.

What do you feel is the biggest problem with our oceans worldwide?

It's my opinion that the warming associated with anthropogenic fossil fuel emissions of CO₂ is the biggest problem our oceans face today, with tangible impacts on coral reefs and a multitude of other marine ecosystems. Warming contributes to steric (spatial arrangement of atoms affected by reactions) sea-level rise and the melting of ice at the poles. With this meltwater comes the freshening of the surface ocean and the potential for ocean stratification,

which can have detrimental impacts on current circulation. Because ocean currents distribute both heat and nutrients within the interior of the ocean and throughout the globe, excess heating of the surface ocean from CO₂ emissions has the potential to disrupt the balance of the entire global climate system. Thus, coral reefs are only one of many ecosystems that face threats from increased warming.

Is there anything the average person can do to help?

Absolutely, and on multiple scales. Whether you are landlocked or not, your individual carbon footprint is still a fraction of the total excess greenhouse CO₂ that contributes to the bleaching of coral reefs, sea-level rise, and global climate change. On an individual level, doing whatever you can to curb your emissions and carbon footprint is a large step in the right direction. Recycling whenever possible, promoting and using low-emission methods of transportation, and reducing overall energy usage are all great practices that aid in reducing one's impact on the Earth's climate system. I implore people to ask more questions and to be more curious about their environment! Don't hesitate to engage in discussions about why the oceans and climate matter with your friends and family. The more people who know why we should be concerned about our practices the better.

What are your goals for graduate school and for your career?

Access to education in the science, technology, engineering, and

mathematics (STEM) fields should not be a privilege, and I try to spend a significant amount of my time as a graduate student working toward increasing educational accessibility and diversity in the geosciences. This has so far taken multiple forms—from facilitating workshops on climate variability for local populations in the equatorial Pacific region to serving as an "expert" judge and mentor for Seattle science fairs. Outreach, communication, and education are facets of an academic career that are as important as research and publication. My main goal for graduate school and beyond is to continue to let this idea guide my research endeavors in oceanography, redefining what it means to be a scientist along the way.

What advice would you give to high school or undergraduate students interested in pursuing a career in science?

Don't be afraid to ask questions, seek out research and enrichment opportunities, find out what makes you passionate, and pursue it!

What sorts of things do you like to do when you aren't at work?

I love living in Seattle, and I try to get out and take in the natural beauty of the area as often as possible—yes, even in the Seattle rain. To balance out the physical activities, I'm also a fan of eating my way around the city and exploring different cuisines. My more indoor-oriented pastimes include playing board games and escape-the-room games with friends, and I also compete in weekly trivia contests on a team with other graduate students. ☺



Volunteering Makes Job Résumé Magic

BY JOSEPH MARTINO

Put down that chemistry text for a minute. Sit back. Relax. Daydream a little bit. You do well in your classes and enjoy them. You are captain of the intramural soccer team and president of the chess club. Okay, maybe you don't want to brag about being president of the chess club. Soccer team. That's it.

Now picture yourself sitting across the desk from a hiring manager. She has your résumé and is interrogating you about what's in it. "Let's see... President of the chess club. What does this have to do with chemistry?"

I detect your mind may have gone blank, or that you might now be out of your daydream and in a cold sweat. No worries. Those of you who will be graduating this spring may be a little freaked out that you won't have an answer to such an interview question. *inChemistry* is here to help you prepare for interviews using your volunteer activities as a springboard to landing your first job.

Volunteer activities are important, and here's a secret: companies actually care as much about your people skills as your chemistry knowledge, if not more. You can know all of the chemistry in the world, but you won't get a job if you can't play nice in the sandbox.

This is where your volunteer activities can work to your advantage. Read on to learn how you can improve your résumé and make a big impact in interviews using skills you've already gained through volunteering.

Volunteering is actually work

Well, it is! Volunteering is literally a job. You might not be getting paid for it, and you may have a great time doing it, but it is a real job. So, you're going to treat your volunteer work on your résumé just as if you were describing a real job that actually brings in a paycheck.

Let's go back to your role as president of the chess club. Sure, this really has nothing to do with chemistry. But let's say you were responsible for coordinating a traveling tournament schedule, were supervising the activities of a three-member leadership team comprising a publicity manager, a treasurer, and an event coordinator, and were responsible for coaching your teams on the latest and greatest chess moves. All of these experiences demonstrate



leadership skills and management skills, which are relevant to any job.

Here's another example: You're in charge of putting together the monthly event programming for your ACS student chapter. Five of your fellow chemistry majors help you. You're responsible for a department budget, and you have successfully applied for an ACS grant. Here, you not only have leadership and management skills to showcase but also relevancy in supporting chemistry at your school.

How to put it on your résumé

Since we're treating volunteering as if it were a job that pays, let's start out with a blank piece of paper. Think about what made you proud in each one of those volunteer experiences. For this example, let's use chess. You're going to write

// Volunteer activities are important, and here's a secret: companies actually care as much about your people skills as your chemistry knowledge, if not more."

CHESSE? HECK, YES!

Be proud of your volunteer and leadership experience—it'll help you land the job.

down on paper two or three stories of things you did that made you proud. Perhaps you led a successful fundraising event to allow your chess team to travel to different schools. Okay, let's use this.

In job interviews, you invariably get questions that start with the phrase "Tell me about a time when...".

One way to make an impression on the interviewer is to use this format:

1. **The challenge** that you faced
2. **The action** that you took to overcome the challenge
3. **The result** of your action

The information in your challenge–action–result response will show a hiring manager how you bring value to a position.

Let's jump-start this process and do it on your résumé. Write that story on a blank piece of paper using the challenge-action-result format and take as much space as you need.

Now here's the tricky part: try to condense that story to three or four lines. Once you've written a condensed version, you'll have a

bullet point for your résumé that might read:

Organized a fundraiser to support travel expenses for a chess club of 10 participants. Fundraiser consisted of three pizza parties where food was donated by the university food services department and the venue was donated by the student center. Raised \$2000 for travel to the regional chess tournament.

Or, the example of arranging programming for the ACS student chapter could read:

Arranged a schedule of speakers for the ACS student chapter by contacting local professors and graduate students to speak about their experiences in chemistry, and coordinated with our chemistry department to fund the speakers' travel. Awarded an ACS Salute to Excellence by the local ACS chapter.

Each example, in just a few lines, shows a challenge, an action, and a result. The key is the result. Notice there is something tangible and measurable to the result that shows value. Conveying tangible value in your volunteer work on your résumé demonstrates how it is relevant to the job you're applying for and will go a long way in putting you ahead of the other candidates applying for the same role.

Let's get back to that daydream:

"President of the chess club? What does this have to do with chemistry?"

The hiring manager is looking at your résumé. She sees that you have chemistry coursework, research experience at your university, and a summer internship at a local pharmaceutical company. You share how you have reached out to prominent professors and promising grad students to speak at your monthly ACS student chapter meeting, you have persuaded your chemistry department to fund your speakers' travel, and your chess team is going to the national tournament because you have raised money through your leadership in organizing fun pizza parties.

You go on to tell her how these endeavors have helped your time management skills and, along with what you learned in chemistry class, you have become adept at solving problems independently and creatively. "And did I mention how I coached my intramural soccer team to an in-house university championship?"

The hiring manager looks at you. "Wow. When can you start?"

May your career daydreams come true. ☺

Joseph Martino is an ACS Career Consultant and presenter for the ACS Career Pathways series of workshops and is also a member of the Board of Directors and chair of the Career Services Committee of the ACS Philadelphia Section. He earned an M.S. in chemistry from Villanova University and has worked in chemical manufacturing and pharmaceuticals.



The Chemical Industry Landscape

Industry employs approximately **75% of all chemists** and chemical technicians. If you're considering a job in industry, use this landscape to get a feel for where you might find your niche.



Research & development

Creates, analyzes, and develops new products and processes



Product development

Refines products and processes for affordable mass production



Manufacturing & supply chain

Acquires raw materials and converts them into products

Quality control & regulation

Ensures products and processes are up to business standards; ensures compliance with government regulations



The U.S. chemical industry

comprises
10,000 companies

produces
70,000 products

nets
\$800 billion per year

employs
811,000 workers

affects
2.7 million workers
in allied fields



Considering a career in industry? We'll help you get started:

 acs.org/industry

Sales & marketing

Sells products/processes, interacts with customers, identifies new markets



Support

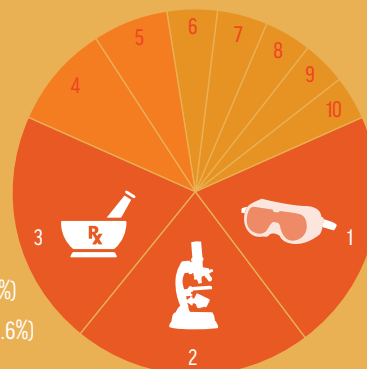
All other functions that support a business, such as human resources, accounting, patents and licensing, chemical information, public relations, and technical support



Top 10 Employers

- 1 Testing laboratories and engineering services (17.5%)
- 2 Research and development services (17.2%)
- 3 Pharmaceutical manufacturing (17.0%)

4. Basic chemical manufacturing (7.5%)
5. Waste management/remediation services (5.5%)
6. Paint, coating, and adhesive manufacturing (3.6%)
7. Wholesale trade (3.6%)
8. Resin, synthetic rubber, artificial synthetic fibers, and filaments manufacturing (3.4%)
9. Management of companies/enterprises (3.3%)
10. Soap, cleaning compound, and toilet preparation manufacturing (3.0%)



1. www.selectusa.gov/chemical-industry-united-states 2. <https://www.bls.gov/opub/mlr/2016/>

Puzzle

FEELING SWEET? Try this friendly puzzle. Answer the clues, then transfer the letters to the corresponding number in the grid below the puzzle. If you do it right, you'll get a cute little story about molecular kindness.

Element 82, once:							... and its current name (and symbol):					
											()
47	30					51	62	63	26	6	40	20

Common labware, or a Muppet:						and type of glass it is usually made of:				
	11	18		44	55	29	3	19		

What the speed of light divided by frequency gives you:									
1	59	15	39		49	7		8	36

An electron-pair acceptor, by definition:									
	28	33	69	53		13	17		24

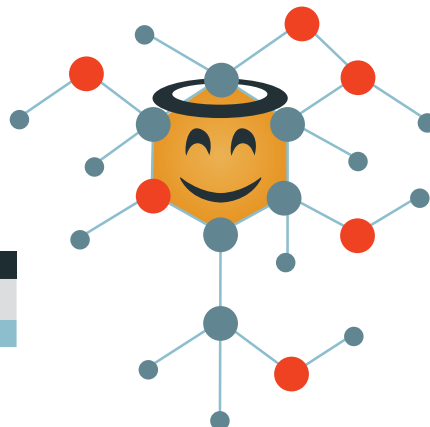
It states that $V_{\text{el}} = kT$ at constant pressure:									
68	38	61	52		16	60		31	58

Element named for the inventor of the cyclotron:							
	67		48		65	50	34

Hydrogen's radioactive isotope:						Location of the ACS Spring 2019 National Meeting:					
57	25		35	56		41			12	70	54

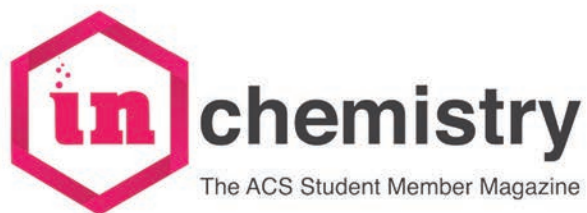
General Chemistry experiment where pink signals the end:									The Δ that's often called "the heat of reaction":							
43	14	9					45	66	46			37	2	64		23

Winner of the 1964 Nobel Prize in Chemistry:											
4	21			27	22	32		10	42		5



Answer

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46		
47	48	49	50	51	52	53	54	55	?	56	57	58	59	60	
61	—	62	63	64	65	—	66	67	68	69	70				



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