



# Yea or Nay: Deciding where (or whether) to go to graduate school

## Questions & Answers

**Note:** the following questions and answers were compiled from the chat and Q&A sections of the workshop, “Yea or nay: Deciding where (or whether) to go to graduate school.” Visit <https://bit.ly/YeaNayHO> for the complete recording and handouts.

### Application

- 1) How important is it to have applications in by the early deadline (such as December 15th for this year)?**
  - Often this allows you to “compete” in a smaller pool of early applicants. Sometimes this also gives you access to further opportunities for funding whose deadlines are earlier.
  - Super!!! This is more critical for programs with rolling admissions as they fill the spots as the applications come along.
- 2) Can you possibly put recommended rankings websites in the chat if we are at all interested in looking at those?**
  - [US News](#) is frequently referenced. However, remember that the “best” program is the one that is best for you!

### Financial Assistance

- 1) Is there any assistance available for first-generation college students? Are there maybe scholarships for this that I could apply to graduate school?**
  - Most universities have them. Some are program specific and some are university-wide. There are also resources through the ACS.
  - One of them is the [Bridge Program](#)
- 2) Can taking a break before applying to grad school decrease the funding a PhD program provides?**
  - It should not affect the level of funding for the PhD program

### Biochemistry courses

- 1) Is taking biochem/bio courses required to be admitted to top schools?**
  - Probably not required, but not a bad idea to have a well-rounded preparation, for any program. I'd say that most (all?) chemists should know some biochemistry. Indeed, the ACS guidelines for the BS degree in Chemistry include a biochemistry requirement as well.



- While this seminar is less about the application package for graduate school (it is all about if you want to apply and where you might want to apply), I will say that it does somewhat depend on what sort of program you are interested in. If you are hoping to go to graduate school in physical chemistry, you would not need as much biochem/biology (but perhaps more math and even more physics). If you are interested in biochemistry or medicinal chemistry, having more biology would be useful. And as another panelist has said, having *\*some\** biochemistry (and an ACS certified degree) is certainly a great thing.

## Break or gap year

- 1) **I want to take a few years off after graduating undergrad and before going into a PhD program. Will these COVID changes to the application process still exist for me (your best guess)? Also, types of opportunities would you recommend to a young chemist passionate about research, great with teamwork, and trying to make an impact on the world?**
  - Try to get a job as a lab tech or lab support in an academic lab or industry.
- 2) **Is it ill-advised to wait a couple years and gain work experience in the mean time?**
  - It depends on the career path you want. Both can work.
- 3) **Can taking a break before applying to grad school hurt your chances at being accepted?**
  - Not necessarily. It depends what you do and how you phrase it in your essay when you apply.

## Degree Type

- 1) **I don't know what pathway I want to go or what opportunities I may have, but I've been accepted to my current school for graduate school since they offer a 5th year master's program. I have research that I am currently doing with my advisor and wondering if I should ride the wave for another year, or try somewhere else where it could take a couple years longer? Is it just worth it to just invest the year, get my masters and then focus somewhere else if I want a PhD or not?**
  - It might be a safe transition into a PhD program to stay there.
- 2) **I am debating about going into a PhD or a PhD/MD program. What is major difference between them? What should I think about when making that decision?**
  - A good to check the difference is to try to do a summer research experience in a clinical-type research and then you will see the difference.
  - I'd say that the focus of the MD/PhD is on biomedical research, with strong clinical aspects.
- 3) **I have undergraduate degrees in both marketing and chemistry. I have been teaching high school chemistry for two years now as well as performing marketing research work for the institution. I have an equal love for both and would love to enter into more of the business side of chemistry. Any advice as far as master's routes are concerned?**



- You might want to explore different MS (terminal masters or professional masters) and compare with PSM (professional science master) that have a business or law component.

## Research

- 1) For the research portion, does it have to be NEW research and discoveries? Can it be work that builds upon previous experiments/studies?**
  - On the one hand, all research work builds upon existing knowledge. However, on the other hand, original contributions are most prized at the graduate level, and are pretty much required to earn a PhD.
- 2) At the point of knowing that I want to apply to a PhD program but still having a variety of interests within and outside of chemistry— most of the advice I've received has been to find a program with research groups in a couple of areas that interest me. Is there a better way to find those other than just googling individual institutions and reading each groups information?**
  - Use SciFinder, Web of Science, Google Scholar, or other science-focused search engines to search for publications in the area of your interest, restrict it to the last five years or so, then look up the corresponding author for that work. That might narrow down the field for you!
- 3) I suppose the transition is not the hardest part for me. I graduated during the pandemic and therefore lost my closest professors. Additionally I did 2.5 years of ungraduated research so will that transition well or will that experience deteriorate over time as I spend more time in industry?**
  - Undergraduate research experience is great, no matter when it happened! It is particularly important to highlight the "product" of that research, i.e. presentations, papers, posters... that came from your work.
- 4) What paths/programs would you recommend to someone who is very interested in a PhD program but not sure what sub-division of Chemistry I want to pursue? Especially given I will not have the opportunity to have any further internships in my undergraduate.**
  - Some programs let you decide which area of chemistry you will specialize once you join the program. You might want to apply to areas that your academic record is the strongest. Most schools will want you to say who you would like to work with so you might need to do your homework. Try to explore research and find out about areas.
  - Along the lines of the live discussion, your research penchants when you enter graduate school may very well change dramatically as you learn more about each research group. Also, often your specific focus will change during the course of your graduate studies as your research progresses. In short, don't fret about the choice of field too terribly!
- 5) If I'm not very sure if I want to specialize in food, cosmetics, or polymers but I know I want to work in an R&D department developing products which path would you recommend me?**
  - Try to go to a program that has good relationships and partnerships with those types of companies. In the research project you learn skill that you can easily translate to those areas.



**6) How do I look for the research they offer?**

- Go to the Department's website, look for the Faculty listings. Each faculty typically has at least a short blurb on their current research.

**7) So for the research/thesis and the potential for it to fail...If the research I did weren't to go anywhere, would I have to start over before I could get my degree? Or could I still get a degree despite the failure?**

- The research project is process. If your project is not working, your mentor / advisor and you will make adjustments along the way.

**8) Is there a list of schools and the areas they offer? I am specifically looking to do research in spectroscopy?**

- You might want to do a literature search in the area you are interested and see where the groups are.

## Careers

**1) What career options are available outside of the traditional research path?**

- I was inspired to pursue my own career path by [Careers for Chemists: A World Outside the Lab](#). You can also check out [Nontraditional Careers for Chemists](#) by Lisa Balbes or the ACS publication, [Alternative Careers in Science](#).
- Another useful site that a panelist suggests to look at is <https://www.onetonline.org/> for career searches

**2) The presentation spends time on selling undergraduates on going to grad school. I need to know if I should try again. 2 failures, only 1 my fault, but B.S. Chem is becoming obsolete.**

- I understand completely that the focus does seem on graduate school because we are showing you an overview of the various options (of which the Ph.D. is only one). That doesn't mean that you can't do any number of amazing things with a B.S. Chem degree (that will be another webinar!). If you really want graduate school, it is worth trying again....and there are many resources at the ACS to help you craft an application that highlights your strengths. (and determination? and involvement? are both amazing strengths that you seem to have)
- A good way to think about your career path is to do an Individualized Development Plan with your mentor. You can get more information about these from [ACS Webinars](#).

**3) I think I want to go into science policy. I'm not sure exactly what that looks like yet or even where to start. Should I attend graduate school or go straight into the workforce? Or how should I about looking for opportunities outside of research when a lot of my academic experience is in chemistry and research?**

- You will need a strong science background in an area and also learn about policy.
- If you are interested in science policy, AAAS has a [science policy fellowship](#) for PhD graduates



## Changing concentration

- 1) **Hi, this isn't really a question but I have my bachelors in chemistry but I want to get my masters in astronomy. I am a little worried about not being as qualified as pure physics degree holders.**
  - You could check what the future program required. If you do not have the pre-req, take additional courses now to prepare for that program.

## Chemical Engineering

- 1) **Are these [employment and salary] percentages similar for chemical engineering?**
  - Chemical engineering salaries are generally higher than chemists, but indeed the region of the country and part of industry matter. AIChE.org has great information on this. Usually the June edition of "chemical engineering progress" has data on the chemical engineering salaries.  
Thanks for asking.
- 2) **I'm interested in pursuing a career in a department of R&D in an industry such as Nestle, Henkel, etc. Is it wise to study a master's in Chemical Engineering?**
  - It depends what you would like to do. That is a pathway, but Food Chemistry might help you if you want to focus on the "food" part. Depending on the position that you ultimately would like to occupy, you might need a PhD.
  - Chemical engineering does prepare you for a lot, including a great deal of...but certainly decide how much "food part" you want as you look at positions. Yes, chemical engineers with an MS do research in industry, but as was suggested before, there may not be the leading role of the lab with the MS degree, that may be reserved for PhD level education.
- 3) **What is the biggest difference between pursuing chemistry versus chemical engineering in grad school?**
  - In general, chemical engineers work on scale up from bench to industry scale as well as control of chemical process--"how to get it done" is a largely the chemical engineering's task. In general chemists examine why something is happening and bench scale.

## Decision to apply

- 1) **I am planning to apply and want confirmation that I'm making the right decision.**
  - Thank you for sharing - I hope that this webinar helps give you the information to feel confident about your decision. There never is a "right" decision, only a right-for-you...and this webinar will show you many options for you to help inform your choice.

## Specializations in grad school



- 1) **If I want to pursue food science in graduate school, from the Chemistry major in my undergraduate study. Do I have to get more experience on food science, like research internship in food before I apply for graduate school?**
  - That will depend in the program and the emphasis. Chemist are highly regarded in the Food Chemistry world. Doing an internship in a company can certainly work. You might want to check if the program that you would like to go to have specific food-related courses and try to take them as electives.
- 2) **If I want to pursue food science, specifically flavor chemistry, would it be better to go into grad school as a biology-chemistry double major or just a chemistry major? I'm still deciding whether or not I should change my major?**
  - Graduate "majors" are not quite the same as undergraduate ones. You typically don't really "double-major" per se, but instead find or craft a program / group / department that matches your focus and interest. You typically will formally reside in one single department, but each path to a graduate degree can be very different and tailored to your interests!
- 3) **Do you know of an online MS program that would specialize in spectroscopy that you would recommend?**
  - You will need to do a search. I guess that type of program will work best if you are trying to do computational work.
- 4) **I wanted to do forensic science.**
  - There are specific programs for that. Temple University has a master's degree. You need to check what is the "chemistry" emphasis of these programs. These might not be in the chemistry department.
- 5) **I wanted to do medicine/medical chemistry research**
  - That opens to the areas of organic, biological/biochemistry and computational.
- 6) **I wanted to do Environmental science!**
  - Environmental is very interdisciplinary and you have many areas whiting chemistry and environmental that you can explore.
- 7) **I wanted to do project management for government organizations (FDA, EPA, DOE).**
  - Having a science background gives you an advantage in industry in those types of positions. Do your homework regarding the certifications to check for return on investment.

## GPA

- 1) **How do you know what GPA you need for the grad program?**
  - It depends. Typically at least 3.00 but more competitive programs look at much higher GPAs. That is not the only criteria so do not be discouraged.



- Each school will list their requirements. Look for their Graduate School website, or for the Graduate section of their website: they typically have an "How to apply" page with that information.

## Grad School

### 1) I wanted to ask if you could share your favorite day or moments as a graduate student.

- For me, it was chatting with other graduate students (folks who shared my love of chemistry, teaching, and desire to pursue faculty career) and allowing ourselves to think and dream BIG. It was so important for me to realize that my goals were indeed attainable and others shared and were supportive of them.

### 2) What is it like having to defend a dissertation? That is honestly the idea that scares me the most about getting a PhD even though I absolutely love doing research as an undergrad.

- Typically that is not nearly as scary as it sounds. You will have had multiple year-long discussions with your advisor, your committee, and your colleagues. You will NOT be presenting new and unproven material to a bunch of strangers!
- Writing the thesis is much harder. By then you probably know what they will ask you. You will do fine!

## GRE

### 1) COVID changes such as not requiring a GRE and/or having altered expectations regarding internship experiences?

- The GRE is going a bit out of fashion, so there may be fewer and fewer schools requiring it. On the other hand, research experience will always be an important consideration, so I'd expect programs to put great emphasis on that when students can get back to it.

## Internships

### 1) This might be a silly question, but are there still opportunities to do internships in other labs during graduate school (like during the summer or something)?

- Typically only during the first semester or so. Once you have selected a group and have your own research project, you typically want to focus on that. That might very well mean working WITH others in other groups though!

## Publications

### 1) How important are publications in your name, either first author or co-author, important in getting a cancer research or government career?



- Honestly, they are critical. As Ana-Rita Mayol mentioned, your publication/dissemination/IP track record is very important.

## Salary

- 1) **I was wondering what gender inequalities might be found in industry with regards to rising in the ranks and, of course, salary and the daily work environment.**
  - The [salary survey](#) that Sam referenced at the beginning of his presentation includes an overall gender breakdown, and, yes, women earned less. On the more positive side, the most recent salary survey showed that salaries are the same for early career chemists. You can find more salary info at [ACS Careers](#).

## Teaching

- 1) **So is being a TA a requirement? Will I be able to skip the teaching portion if tuition is paid out of pocket?**
  - If there is a teaching requirement, you will most likely have to fulfill it regardless of the source of funding.
  - This may be different between MS and PhD programs. Most PhD programs have some teaching requirement that typically has to be fulfilled independently of the source of your funding. MS programs, on the other hand, are more flexible: you may not have to teach at all if you are self-supported or externally supported.
- 2) **Are teacher assistantships only available in PhD programs or masters programs as well?**
  - Many programs that offer graduate studies at the MS level, but not at the PhD level are more likely to provide some form of support to MS students.
  - Absolutely depends on the program - check out each program website because it varies a great deal.

## Transcript

- 1) **If I took a summer class at another school, do I have to report my transcript/grade?**
  - Most graduate schools request that you send a transcript from any schools from which you take a certain number of credits. For instance, Alabama asks that you attach a transcript from any school from which you earned 15 or more credits, but this may vary. You will want to ask the school for specific guidance!

## Work-life Balance

- 1) **How might the work-life balance of a (PhD) graduate student compare to someone who goes directly into industry?**



- Work-balance is tricky for all of us.

## Writing

### 1) **What can I do to strengthen my research writing skills? I like being in a lab and doing the work, but I struggle in writing reports and papers on a topic.**

- One answer is to do a lot of reading. The more you are comfortable reading the chemical literature (or honestly anything well written!) the better you will be able to write professionally. Reading C&E News is something you can do weekly, and then follow up some articles now and then with the peer reviewed articles that C&EN highlights. You can also take writing courses, regular old English courses, to refine your writing skills - these things transfer!