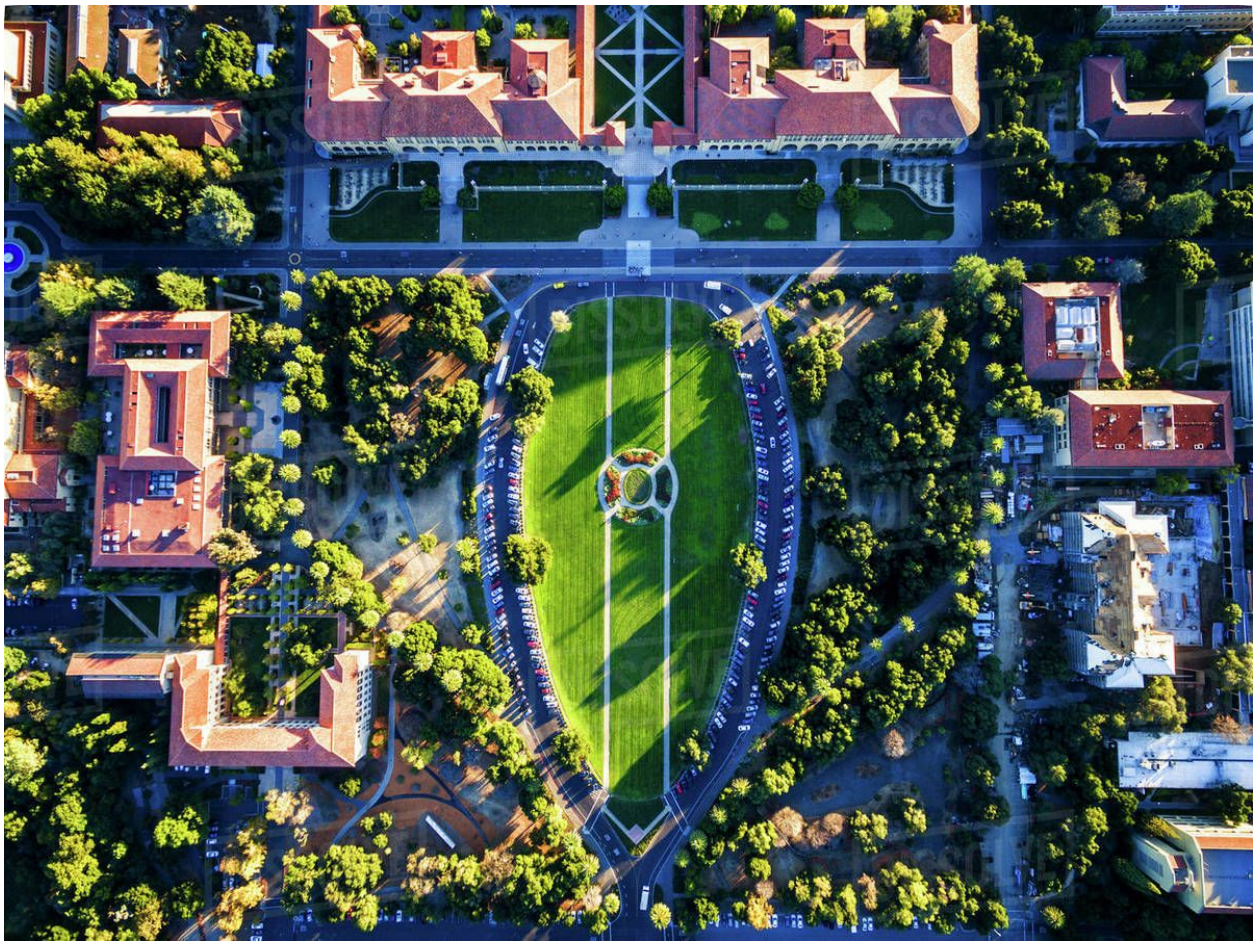
Adam's Graduate School Application Guide



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The Application Process by Adam M. Simpson

Here's My Story:

Dear Reader,

I was a Chemical Engineering student at Carnegie Mellon, class of 2016. During my junior year I was in a dilemma because I was not sure what I wanted to do after graduation. I knew that I wanted to pursue my PhD, however, I was not sure in what field. I also hated attending the career fairs; I felt that the job seeking process didn't give me enough space to demonstrate my true abilities. To be perfectly clear, I loved my research which involved organic chemistry synthesis with Professor Danith Ly, whose lab was located in the Mellon College of Science. I focused mainly on synthesizing g-modified peptide nucleic acids to develop a new family of broad-spectrum antibiotics. However, I wanted to bring my graduate school work closer to home.

What do I mean by home? I was born and raised on the island of Jamaica where my family owns a water well drilling company named Jamaica Wells and Services Ltd. I had a great motivation to find ways of benefiting my island and its economy by incorporating my graduate school research to that purpose. It took me until mid-summer between junior and senior year to figure out that I wanted to pursue Environmental Engineering for my PhD. The main reason for my decision was because of the focus on water – which had a direct link to my parents' business and is a main concern for Jamaica. At that point, I sought out many resources on the internet to find information on how to apply to graduate school. I was a lost sheep trying to find some advice to go forward.

During my junior year summer I was on a research scholarship in Kiel, Germany where I studied at the Christiana Albertina University of Kiel in the Otto Diels Institute for Organic Chemistry. If you've had the opportunity to do Nuclear Magnetic Resonance research, you already know there are long wait times between experiments. Taking advantage of this downtime, I could focus on reading for my graduate school applications. Through my readings I developed a plan and course of action that guided me for the following five months as I planned to apply to graduate school. I will be

documenting this plan and how it evolved throughout this manual. I hope it can help you as you go forward.

As a disclaimer I identify as an Afro-Caribbean dual Jamaican-US citizen. I am cis-gender and use He/Him pronouns. This document was written with minority students in mind (i.e., African-American, Latinx and LGBTQ to name a few but by no means exhaustive) as I hope to see students and future professors in higher education be as beautifully diverse as this country's population. However the information is useful for all applicants that read it. Thank you!

Sincerely,

Adam

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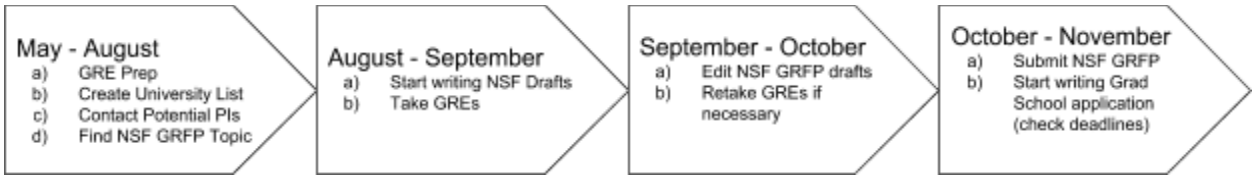
The Key Things to Consider:

- Please note that I emphasize the National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP) a lot in this document. There are many other fellowships to apply for, but this is most popular one for graduate students and I highly recommend that you do.
- If you are a minority student please also apply for a GEM Fellowship. However, you should note that this fellowship makes it mandatory that you have an internship during the summer of your Master's degree.

Separations from the text such as this from henceforward signifies my opinion or a colloquial take on what I am trying to explain.

Potential Timeline



MS vs. PhD?

You may already know the difference but, in case you don't, **what is the difference between master's and PhD**? In general, a master's degree is a higher-order review of a certain area of discipline. It usually builds upon the core curriculum of a bachelor's degree and goes into more detail by lifting off the surface assumptions and theories that were previously understood and delving into why and how these are accepted to work. It provides a more keen and truthful representation of the area of study. A master's degree is recommended for students that will appreciate an in-depth perspective of a field. Master's degrees can also accelerate one's trajectory once hired into a company or give a person a wider breadth of knowledge by getting a master's from another field of study than that achieved in their bachelor's degree.

While most engineering PhDs require a master's degree as part of the program (even when students are admitted directly to the PhD), this is not generally true for all disciplines. For instance, many pure sciences such as Chemistry, Physics, Biology and Biochemistry offer direct PhD admissions without a master's degree being awarded along the way. This of course is a blanket statement and should be investigated prior to accepting a position within a prospective graduate school.

Besides degree awards, a PhD or Doctor of Philosophy is a body of work written in the form of a dissertation that is meant to contribute original research to a field of study. I always tell people outside of academia that those students pursuing their PhD are those that are writing the textbooks of tomorrow. PhDs usually last a minimum of four years to completion and allow students to immerse themselves within a niche topic in a field of study. Although program requirements may vary, by submitting and defending your dissertation, you are usually considered to be an expert within your niche.

Lastly, why do a PhD? The reasons for pursuing a PhD are numerous and there is no way for me to touch upon all. However, if you enjoy the act of investigating topics within your field and have the motivation to be an expert in a research topic that is completely your own, then a PhD is right for you. Besides teaching and conducting research in academia, persons with PhDs are usually hired by companies to take charge of the meat of the fundamental area of expertise that a company has to offer. For instance, a consulting firm may hire a person with a PhD that studied the biodiversity of soils in their dissertation - this person would oversee many projects relating to bettering or remediating agricultural soils. Thus directing a team to find which aspects of the soil can be supplemented to produce a better crop yield. In essence having a PhD may give you more say in the technical direction of a company.

My reasons for pursuing my PhD are a bit broader. I am interested in the act of learning how to learn. This is my interpretation of what PhD students are doing everyday in the pursuit of their research. However career-wise I am at a crossroads of picking between Academia (to become a professor at an R1 institution), pursuing a Postdoc (to advance my research expertise toolkit), working at a water quality focused start-up (to be part of a growing business which will teach me how to start my own), or venturing into non STEM fields (i.e., screenwriting, finance, data science). The beauty of it is, being in my third year of my PhD, and having 2 - 3 more years to finish my dissertation, I have time to figure this out as long as I actively pursue these possibilities and form connections with people doing the same.

Research

This is the most important field to consider before applying to graduate school, as the main criterion for getting into a PhD program at most institutions is your prior research work. This does not mean that you cannot apply to graduate school without research experience, however you must shine in other aspects of your application if you have not yet pursued research in your undergraduate career. If you are reading this guide during your junior year (or earlier), think about getting involved in a research lab that interests you to gain experience and help determine if you do, in fact, want to pursue research-based graduate school.

If you are unsure of what research area that you are interested in, follow these steps:

Figuring out your field of study and universities to apply to:

A. Many students do not continue the same area of research that they pursued in their undergrad career when pursuing their PhD (and indeed this is a good opportunity to change your focus and direction to something you're passionate about). Although your prior research is very important for your admission into a PhD program, professors are more interested to know if you understand the research process and how you may handle adversity and technical challenges in a research setting.

B. You should pick where you apply to graduate school based on the research you find interesting and if you can see yourself contributing to this field. Pursuing your PhD is a sacrifice for a very satisfying reward.

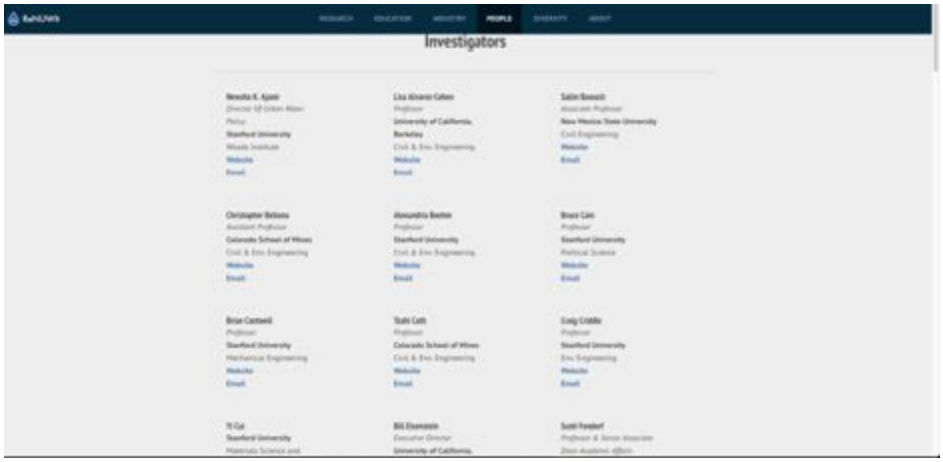
C. It is also important to use the resources available to you. Ask professors at your home institution with research that nears what you are interested in to suggest possible research groups. I found setting up a meeting with the professor to be the best approach. Your academic advisor may also help in this arena. Do not bombard professors with too many emails though as they are extremely busy; you will realize this more when you become a PhD student.

D. How to pick your research field and a possible principal investigator (PI). **Basically your academic parent for the duration of your PhD. They fund you, advise you and recommend you going forward in your career to produce competition against themselves – academia has a very funny life cycle*.

    1. First look for university lists that have research in the field you are interested in. I started by looking at "Environmental Organic Chemistry & Water Resources" – there are many websites that recommend programs online. However, I discovered ReNUWIt (Reinventing the Nation's Urban Water Infrastructure) a National Science Foundation (NSF) engineering research center (ERC). By reading this website, I discovered researchers from its major campuses and associated schools. I was particularly interested in finding investigators from many universities and made a running list of schools that I would read up on. (Website: http://renuwit.org/)

I recognize that I stumbled on ReNUWIt serendipitously and finding an ERC will not be the case for most people. To create a running list you will have to use trial and error to search for university faculty in your line of research interests. To shorten this list, I recommend that you speak with your academic advisor and faculty with similar research interests to find certain criteria for shortening your list of universities to apply to.

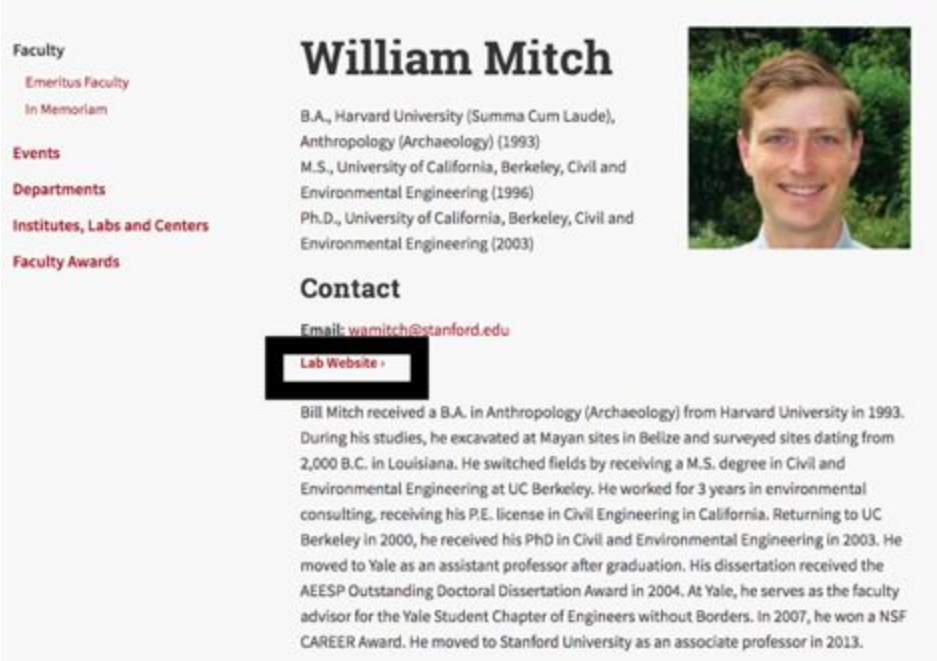
I took note of researchers and the universities they came from to create a running list for my further investigation.



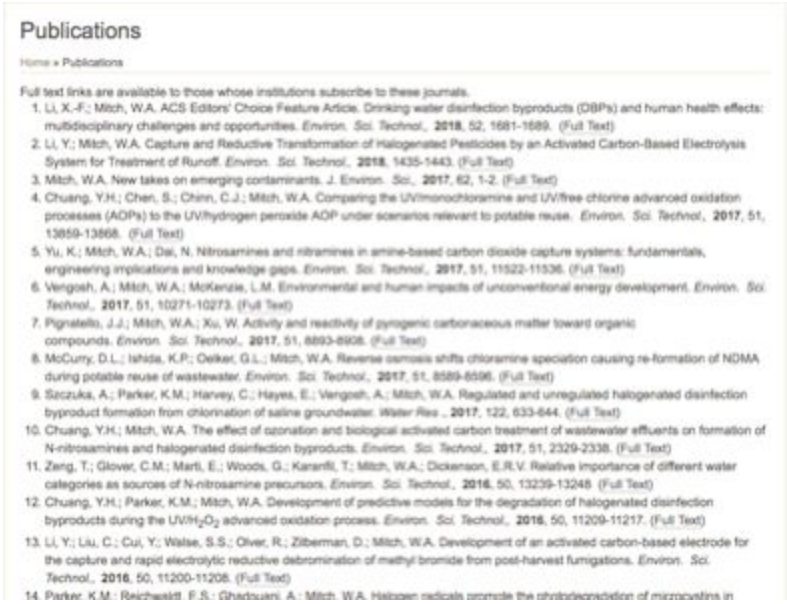
I also looked at the ReNUWIt Investigators page, which introduced me to an even broader list of potential PIs and universities for further investigation.

2. After I created a running list of institutions, I started to investigate universities that appealed to me. I had a master list of about 20 institutions to investigate. At this point I did not care about ranking; my main focus was if I liked a PI's research.

3. To investigate a PI's research area, you should look up their profile and research group website. For even closer investigation, I recommend that you research journal abstracts to figure out what kind of research your potential PI pursues. Here is a walk-through the process that you may perform. I am using my current PI as an example.



I went to Stanford's Environmental Engineering program page and looked at faculty. I then read up on various faculty members and looked at their Lab Websites.



Publications

Home » Publications

Full text links are available to those whose institutions subscribe to these journals.

1. Li, X.-F.; Mitch, W.A. ACS Editors' Choice Feature Article. Drinking water disinfection byproducts (DBPs) and human health effects: multidisciplinary challenges and opportunities. *Environ. Sci. Technol.*, **2018**, 52, 1681-1689. (Full Text)
2. Li, Y.; Mitch, W.A. Capture and Reductive Transformation of Halogenated Pesticides by an Activated Carbon-Based Electrolysis System for Treatment of Runoff. *Environ. Sci. Technol.*, **2018**, 1435-1443. (Full Text)
3. Mitch, W.A. New takes on emerging contaminants. *J. Environ. Sci.*, **2017**, 62, 1-2. (Full Text)
4. Chuang, Y.H.; Chen, S.; Chinn, C.J.; Mitch, W.A. Comparing the UV/monochloramine and UV/free chlorine advanced oxidation processes (AOPs) to the UV/hydrogen peroxide AOP under scenarios relevant to potable reuse. *Environ. Sci. Technol.*, **2017**, 51, 13859-13868. (Full Text)
5. Yu, K.; Mitch, W.A.; Dai, N. Nitrosamines and nitramines in amine-based carbon dioxide capture systems: fundamentals, engineering implications and knowledge gaps. *Environ. Sci. Technol.*, **2017**, 51, 11522-11536. (Full Text)
6. Vengosh, A.; Mitch, W.A.; McKenzie, L.M. Environmental and human impacts of unconventional energy development. *Environ. Sci. Technol.*, **2017**, 51, 10271-10273. (Full Text)
7. Pignatello, J.J.; Mitch, W.A.; Xu, W. Activity and reactivity of pyrogenic carbonaceous matter toward organic compounds. *Environ. Sci. Technol.*, **2017**, 51, 8893-8908. (Full Text)
8. McCurry, D.L.; Ishida, K.P.; Oelker, G.L.; Mitch, W.A. Reverse osmosis shifts chloramine speciation causing re-formation of NDMA during potable reuse of wastewater. *Environ. Sci. Technol.*, **2017**, 51, 8589-8596. (Full Text)
9. Szczuka, A.; Parker, K.M.; Harvey, C.; Hayes, E.; Vengosh, A.; Mitch, W.A. Regulated and unregulated halogenated disinfection byproduct formation from chlorination of saline groundwater. *Water Res.*, **2017**, 122, 633-644. (Full Text)
10. Chuang, Y.H.; Mitch, W.A. The effect of ozonation and biological activated carbon treatment of wastewater effluents on formation of N-nitrosamines and halogenated disinfection byproducts. *Environ. Sci. Technol.*, **2017**, 51, 2329-2338. (Full Text)
11. Zeng, T.; Glover, C.M.; Marti, E.; Woods, G.; Karanfil, T.; Mitch, W.A.; Dickenson, E.R.V. Relative importance of different water categories as sources of N-nitrosamine precursors. *Environ. Sci. Technol.*, **2016**, 50, 13239-13248. (Full Text)
12. Chuang, Y.H.; Parker, K.M.; Mitch, W.A. Development of predictive models for the degradation of halogenated disinfection byproducts during the UV/H_2O_2 advanced oxidation process. *Environ. Sci. Technol.*, **2016**, 50, 11209-11217. (Full Text)
13. Li, Y.; Liu, C.; Cui, Y.; Walse, S.S.; Oliver, R.; Zilberman, D.; Mitch, W.A. Development of an activated carbon-based electrode for the capture and rapid electrolytic reductive debromination of methyl bromide from post-harvest fumigations. *Environ. Sci. Technol.*, **2016**, 50, 11200-11208. (Full Text)
14. Parker, K.M.; Reichwaldt, E.S.; Ghadouani, A.; Mitch, W.A. Halogen radicals promote the photodegradation of microcystins in

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Of particular interest to me was the publications page where I could discover the potential PIs research interests and how frequently they published papers. This gave me an idea of laboratory productivity (number of publications per year), which is important when considering your career trajectory after you complete your PhD. It is important to note that across fields productivity may vary, so you should compare lab productivity amongst researchers in the same field.

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a) At this point, I created a new shortened list of universities and potential PIs that I was interested in working with for my PhD. My next task was to contact PIs based on their research so that they knew about my interest. I applied to universities based on a Professor's response to my emails. However, if you do not get a response by a PI to your email, it doesn't mean that you should not apply. Professors get thousands of emails and you may simply be overlooked.

How to write a research interest email to a potential PI

The Email can be structured as follows:

I. Subject Line:

A. Make this an attention grabber, not something they will automatically delete or place in a junk box.
Example: "Skilled Disinfection Byproduct Researcher | PhD Applicant | Senior Student"

**Ensure to include a catchphrase for your area of research.*

II. Salutation
III. Introduction
IV. You could include:
   A. First Paragraph
      1. Current institution or work status
      2. Current research and or past research
      3. Research interests for your PhD and career goal
      4. That you are interested in pursuing your PhD
   B. Second Paragraph (For this section, I highly recommend that you read a couple journal articles written by your potential PI so that this paragraph is unique and, when your potential PI reads the email, they understand that you devoted time and effort to contact them.)
      1. Tie in why your research interests for your PhD ties into the potential PI's work.
      2. How pursuing your PhD with this PI will benefit your career goals.
   C. Third Paragraph
      1. Reiterate your research goal.
      2. Mention how you will benefit from pursuing research with your potential PI.
      3. Mention why and how your past research and experiences will benefit your potential PI's research group and pursuits.
      4. State that if your potential PI is accepting students in the following academic year, you are interested.
   D. Your CV (You will see a copy of mine in the appendix)
   E. Your unofficial transcript (not necessary but if you have a strong transcript, why not?)

I highly recommend that you write these in a Word document first so that you can proofread. Keep a template as you will be sending quite a few emails. See an example of an email that I have sent below. I used a similarly formatted email during my application process. I saved one for you to read below. Although I do

not follow the format as seen above, if you follow the format that I suggest it will be easier to retrofit an email to any PI. All you have to do is change the second paragraph and slightly alter the third paragraph.

***NOTE** I sent these emails rather late which is why I mention that I already submitted my NSF Graduate Research Fellowship Program (GRFP) proposal which is usually due in late October. Please check the website for dates. I will expound on this topic in the **Applying for Fellowships** section. I recommend that you start sending out emails during the summer between junior and senior year. However, if you decide to apply to a university last minute, don't panic; you can send it at any time. Also, this example below is very long; try to make it more concise than I did when I applied.*

Dear Professor XYZ,

I am a dual-citizen of the USA and Jamaica, studying Chemical Engineering at Carnegie Mellon University. I have read upon your research and I believe that your group would be the right fit for me as a prospective graduate student. I recently submitted and NSF fellowship based on "Bioactive Wetland Geotextile Barriers for Sustainable Enhanced Water Treatment." The motivation for this research proposal was due to the pending stricter regulations on nutrient discharges in water, and the recent plights for greater energy conservation and harvesting biomass as fertilizers to feed the world's growing population. Ultimately, I would like to take the knowledge gained in your group, to bring knowledge and new sustainable technologies to Jamaica in an effort to create economically favorable water treatment processes. Jamaica's recent rise in water nitrate levels due to agricultural runoff and improper waste management systems have caused increased worry about water security on the island. I hope to one day create a consortium of US and Jamaican Engineers to increase the research scope of researchers in the US and expand the breadth of knowledge of those in Jamaica.

Upon reading your research, which is mainly focused on developing and testing novel interventions and technologies in order to mitigate the spread of human pathogens distributed by water contamination, I was drawn to contact you. My research interests in developing and extracting empirical correlations for water treatment wetlands also have the applicability to purify water of human pathogens and dissolved organic carbon. Furthermore, my application for developing water treatment systems in a developing country also aligns with your research motives. My passion for this field is as a result of my upbringing in a family that owns and runs a water well drilling company in Jamaica. I have experienced the need firsthand, and I would like to contribute to the area of water purification that has low-energy consumption.

My past research experience has been in Organic Chemistry with the Professor Danith Ly Group. I am involved in a research study to develop a new family of antimicrobial drugs based on RTD-1 a defensin isolated from the leukocytes of Rhesus Macaques and Baboons. I also had the opportunity to take part in a Protein Engineering project at the Christiana Albertina University of Kiel in Kiel Schleswig-Holstein, Germany. I worked with the Professor Frank Sönnichsen group on a project to study the stabilizing efficacy of a chimer approach involving the Amoebapore A alpha-Helix II and the Tryptophan-Cage protein (tc10b). Although my past research is not directly related to environmental engineering and water research, the analytical techniques utilized in my works are quite applicable, namely (LC/MS) mass-spectrometry and NMR. Furthermore, with my engineering background, I believe that I am adequately equipped.

Please peruse through my curriculum vitae and my transcript.

Sincerely,
Adam Simpson

Taking the GRE

The GRE or Graduate Record Exam is a standardized test that many graduate schools require you to take in order to test your general ability. It tests quantitative reasoning, analytical writing and verbal reasoning. Many people overstate that the GRE is “easy.” Some people are natural test takers and others may not be so well equipped for standardized tests. I therefore recommend that you start taking this exam into consideration early (the beginning of the summer before senior year) so that you can have enough time to prepare for it if you have some difficulty with standardized tests.

Many top institutions may or may not publish GRE score requirements; however, it is important to not get too hung up on your score if other aspects of your application are strong. If you would like to learn more about GRE score averages according to some of the USA top institutions please look at this website (https://magoosh.com/gre/2016/gre-scores-for-top-universities/). For instance, if you have a strong GPA, and strong research experience, then your GRE scores may not be that important. However, if you know that your score has room to improve and you have the time to prepare for it, then I believe you should try a second time.

STEM fields and particularly those in engineering may place greater weight on your quantitative score than on the other sections. Therefore other resources that you may seek are through GRE prep books or websites.

Don’t obsess over your GRE score; I did average and got into the program of my dreams.

Great GRE Resources

There are many test prep programs for you to use. In my opinion, I found **Magoosh**, an online test prep software, to be the most beneficial. The website has online video tutorials and explanations for doing particular questions. It also has a video for learning how to solve every practice question.

Magoosh also has a running calculation of your GRE score based on the outcome of the practice questions, and multiple practice tests for you to practice with. I found that

Magoosh has the most similar type questions to what was actually on the GRE exam. It is also slightly harder than the real exam.

You may also download the vocabulary app for free on your phone so that during your free time or before bed, you can run through the vocabulary list. The words really do show up on the exam.

(Website: https://magoosh.com/)

Other great resources for GRE preparation are:

Quantitative Reasoning:

- (Website: https://www.varsitytutors.com/gre_math-practice-tests)

Verbal Reasoning:

- (Website: https://www.varsitytutors.com/gre_verbal-practice-tests)
- (Website: http://gre.tyrannosaurusprep.com/)

Analytical Writing:

- (Website: http://www.ets.org/gre/revised_general/prepare/analytical_writing/issue/pool)

Applying for Fellowships

Most graduate school applications will have a checkbox to ask whether or not you have applied to external fellowships to fund your PhD. Some applications even have dropdown menus to ask for specific fellowships that you applied to such as the NSF GRFP (mentioned above), the Ford Fellowship, or the Hertz Fellowship. They ask this question to help gauge your commitment to completing your PhD. I recommend that you apply to the NSF GRFP (National Science Foundation Graduate Research Fellowship Program) before applying to your graduate school of choice.

The NSF GRFP application asks you to answer all of the relevant questions that are crucial to be included in your graduate school application. Furthermore, by writing the NSF GRFP personal statement and research proposal and requesting recommendations from professors, you will have all the necessary information to submit your graduate school applications. Just note that there are many resources available to you to utilize when writing your proposal.

What exactly is the NSF GRFP? In the most general terms, it is a competition amongst students interested in research for a PhD or Masters degree that are also U.S. Citizens or Residents (Green card holders). The NSF GRFP gives three years of funds to pay for your tuition and stipend (for your living expenses), which helps to alleviate the financial burden on your PI or department. It also gives you a bit more wiggle room as to the direction of your research since you are not tied to a grant that your PI will have to write in order to get funding. In essence, your PI applies for a grants that will pay for the cost of your research, tuition and stipend. If you have your own funding source to pay for your tuition and stipend, this takes a burden off of your PI's hands and helps to reallocate funds on their grants to other research areas or funding other graduate students. Approximately 14% of 12,000 applicants are expected to win the award each year.

What is expected of me? In general, you must submit a research proposal for a novel topic in your area of interest. This proposal is no more than two pages and must highlight your research hypothesis, objectives, methods, and most importantly your **Intellectual Merit** and **Broader Impacts**. You must also submit a three page personal statement where you expound on your career goals and how obtaining the award will facilitate you obtaining that goal. You must again emphasize your **Intellectual Merit** and **Broader Impacts**.

Please read through these pieces of information when considering to apply.

NSF GRFP Information:

- Please reference "The NSF GRFP Application Process & Tips for Success" written by my collaborators Emily Cook and Casey Finnerty for adequate tips on how to apply for this proposal.

Requesting Letters of Recommendation

This is an art because an ideal letter of recommendation stands out from the others and highlights different positive things about yourself. You do not want three letters of recommendation to repeat the same information. I recommend that you guide your recommenders into writing the things that you want them to highlight specifically so that each recommendation letter is interesting and shows your best sides. You can think of your graduate school application as another NSF GRFP application that you must submit. If you decide to submit a GRFP, you should inform your recommender that on top of being a recommender for your GRFP, that you would also like them to be a

recommender for your graduate school application so they can save the GRFP recommendation for the graduate school application submissions.

How to request a recommendation letter

You will request a recommendation at least two weeks in advance of your GRFP or Graduate School application deadline. I recommend that you ask four weeks in advance. You should ask via email and in person if possible.

Who to ask for a recommendation?

Ask three to four of the following:

- Research Advisor – currently working with
- Research Advisor – worked with in the past
- Academic Advisor
- Professor of a class you performed outstandingly well in (and they know you personally)
- Advisor from a past internship that you demonstrated exceptional technical skills towards (note that industry recommendations will tend to be shorter than academic recommendations so only use these if you know that the recommendation will be outstanding.

There are many nuances that will affect your choice of recommender. The overarching criteria for choosing a recommender is that they are dependable

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Do not ask:

- Parents or siblings
- Neighbor
- Friend
- Someone that does not have an academic or technical relationship to your field of interest

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I know these are obvious but I have to make this clear or else you might waste effort with the application.

Recommendation Request

I. Subject Line: Graduate Application/ NSF GRFP Application Recommendation Request

II. Salutation

III. Contextualize by informing them of your intentions to apply to graduate school and or the NSF GRFP.

IV. Ask them if they can be a recommender for your graduate school application and or the NSF GRFP.

V. Inform them that you will provide an abridged history and CV for them to peruse through to make writing the recommendation easier for them.

VI. Thank them regardless of whether or not they believe they are fit to write your recommendation.

VII. Closing

Dear Professor XYZ,

How are you doing at CMU? I am glad to tell you that working in your lab has prepared me very well here with my work. Since my first year of work I am on my way to publish my first paper, albeit second author due to method development by the postdoc I worked with. Although I have three years of funding already I am planning on applying for the NSF GRFP once again this year in order to cement 5 years of funding which provides me with more freedom in which projects I would like to work on. Right now my interests are in chlorohydrin formation in unsaturated fatty acids found in processed foods. The focus will probably be on the analytical chemistry method development side or on the toxicological side or both. I would therefore like if you could be one of my references for my proposal? I can send you all the relevant information later on if you have the time to write me a reference letter. Thank you for all that you have done for me so far in my academic career.

Sincerely,
Adam Simpson
asimpso2@stanford.edu

This is an actual email that I sent to my undergraduate research advisor for the second time that I applied to the NSF GRFP. It follows a similar format to that shown above.

Once your recommender agrees to write your recommendation letter, you must send a follow-up email with your qualifications in an abridged format.

What to include in the follow-up email for Recommender

Remember that you will highlight different things:

- Context of your working relationship
    - How you met the recommender and pursued research or internship responsibilities with them.
- Your accomplishments during your tenure with the recommender
- Qualities that you exhibited during your tenure with that particular recommender that they can endorse
- Any inconsistencies that they can vouch for in your application
    - You definitely want to cover any inconsistencies in your application that could work against you. You should include explanations in your personal

statements as well. Many applications even ask you to explain these inconsistencies. Remember to present these in a positive light. Examples of inconsistencies:

- A random C grade in your transcript that may have been caused by a difficult circumstance. **Explain the situation you were in, but show that you learned from this experience and it demonstrated your resilience as you were able to get back up and produce work at your normal standard.*
- An additional year taken to graduate from your undergraduate institution.
- Any legal issues caused by a misjudgment that you must report in your application.

I will show two examples of these emails so that you can see how each email is different. I sent these emails for professors to write recommendations for my second submission of an NSF GRFP.

Example 1

Dear Professor XYZ,

Thank you for agreeing to write my letter of recommendation for me as I attempt to get the NSF GRFP. I will summarize my experiences with you and attach related documents to make this process as easy as possible.

1. I began corresponding with you about research within my Sophomore Spring (2014) when I enrolled in your Organic Chemistry II class and attended group meetings weekly. As I was intrigued by your teaching style I became more attentive in your class. Aiming to work closely with you throughout the semester. I especially enjoyed working on the, "**Molecular Design Grand Challenge**," where my group designed an alternative to Fosamprenavir which aimed to treat HIV patients with viral mutations. We eventually won that challenge to much of our delight!

2. Due to the fondness I had in your class I decided to join your lab that **summer of 2014** by applying to the **Howard Hughes Medical Institute Summer Research Fellowship** program. I worked with both **Bushra Memon and Julia Atwood** on different angles of that project. Towards the end of that summer, I successfully synthesized the Boc-Leucine-Gama PNA monomer for the project.

3. As I continued in your lab, I started to gain more responsibilities, eventually **leading a group of undergrads** with Julia Atwood on the Antibiotics project. In my responsibilities I held our undergrad meeting every Friday morning with Julia, Cat Mao, Kevin Long and Emily Horowitz. I also managed the logistics of the project to order chemicals and reach certain deadlines. We won a small undergraduate research SURG grant for $1000 to buy equipment. Within my tenure in your group working on the RTD-1 project, we synthesized six monomers before my graduation.

4. For my graduation I had the honor of winning the **Geoffrey D. Parfitt award for Excellence in Research in the field of Colloids, Polymers and Surfaces** (2016), under your recommendation.

5. I also won the **McCabe Society Award for unparalleled Dedication to Carnegie Mellon University Community**, (2016) and **University Honors** for my high academic achievement.

6. In order to pass the project on correctly, I wrote an over 20-page manual for the next set of undergraduate students to receive so that they could build upon the work that we did.

7. With dedication to my project that I worked with, I decided to study abroad for the summer on the DAAD Rise Summer Research Fellowship in Germany to learn 2-D NMR techniques for molecular conformation in 3-D space. This gave me my first conference presentation experience at the Heidelberg Meeting. Reference below:

8. Simpson, A.M. (2015, August). *Observing the Stabilizing effects of the Trp-Cage (tc10b) mini-protein on the Amoebapore A HII protein sequence.* Presented at the 2015 RISE Heidelberg Meeting, Heidelberg University, Heidelberg, Baden-Württemberg, Germany.

9. I hope that this information is enough. I have the 4th draft of my NSF GRFP proposal attached here and I also have my personal statement draft. They are by no means the final copy and I am working to have them relate to each other more. However I believe that you can get a good taste of my current research. I will also attach my CV for you to see. Thank you!

Sincerely,
Adam Simpson

Example 2

Hey XYZ,

I am writing this email to make the process easier for you while writing my recommendation for the NSF GRFP. I will write some information so that I can summarize our working relationship. I will also attach the current draft of my proposal, my current unedited draft of my personal statement and my CV below.

1. I worked under you to learn the methodology for the lettuce/spinach disinfection with free chlorine project and briefly on the gamma-radiolysis project.

2. During the time that you taught me, I learned the experimental techniques for acid digestion, AQC derivatization, carrying out the chlorination experiments accurately, volatiles extraction, homogenization, maintenance of the glovebox, SPE cleanup and your procedure for LC/MS analysis and interpreting the GC data.

3. After you made the methods and taught me how to perform experiments, I continued the project so that you could get results so that we are currently collaborating on a paper with yourself as the first author.

4. We also collaborated on the Gordon Research Conference poster, which was my first official conference. This helped to expose my area of research and expand the broader impacts of the future projects that I will work in and demonstrates the intellectual merit of current proposal that I have brought forward for the GRFP.

5. My current prospective thesis theme is on proteins and the degradation of biomolecules in food and drinking water during disinfection. I am currently

working on a proposal to analyze unsaturated lipids for chlorohydrin moieties using methodology similar to that of yours for the spinach/lettuce project.

6. As you know, I did not perform as well as I wanted to last spring quarter and this was due to the fast pace of learning and training that I had to undergo to learn your methodology within the expected time frame. I know that when they see the slightly lower grades from last spring quarter they will want a comment on it and I was thinking that it would help to rectify the slight blunder if you could say something about it. (Although I must say, I enjoyed every minute of working with you! It has made me a better scientist and I hope to be able to have the stamina and analytical skills as you some day!)

7. During my time at Stanford, I have been involved in the Graduate Student community working in the Black Graduate Student Association as the Co-academic Chair (2016-2017) and currently as the Financial Officer, which is a social/academic/outreach program that plans events for the enrichment of black students on campus and also an outreach organization which aims to mentor high school students to attend college through the program “Challenge Accepted.”

8. I am also a member of the Graduate Leadership Committee for CEE at Stanford, which is a group of students that act as liaisons between graduate students and faculty to bridge the gap of communication due to hierarchies and other obstacles.

9. I am involved in the ReNUWIt (Reinventing the Nation’s Urban Water Infrastructure) Student Leadership Council (SLC) serving as the treasurer on the Grants Committee which allocates funds to Graduate Students and Postdocs at Stanford University, UC Berkeley, Colorado School of Mines, and New Mexico State University.

- Please let me know if you need any other information.

Sincerely,
Adam Simpson
asimpso2@stanford.edu

Submitting the Graduate School Application

Provided that you have decided to submit the NSF GRFP, completing a graduate school application will be quite simple and can be completed in less than an hour once you get the hang of it. There are only certain small differences to your personal statement that you should include and change from your NSF GRFP Personal Statement.

1. Usually graduate school applications require a two page personal statement rather than a three page personal statement. I recommend focusing on your most relevant research and how your career goals make pursuing your specific field of research at that institution worthwhile.

2. You should alter the introduction of your essay to include the university name and department that you are applying to.

3. In your summary paragraph, you should indicate two to three names of research faculty at the institution that you are interested in working with and why. Many applications ask you to do this as well, but it is customary because your application will be directed to those faculty of interest in most cases.

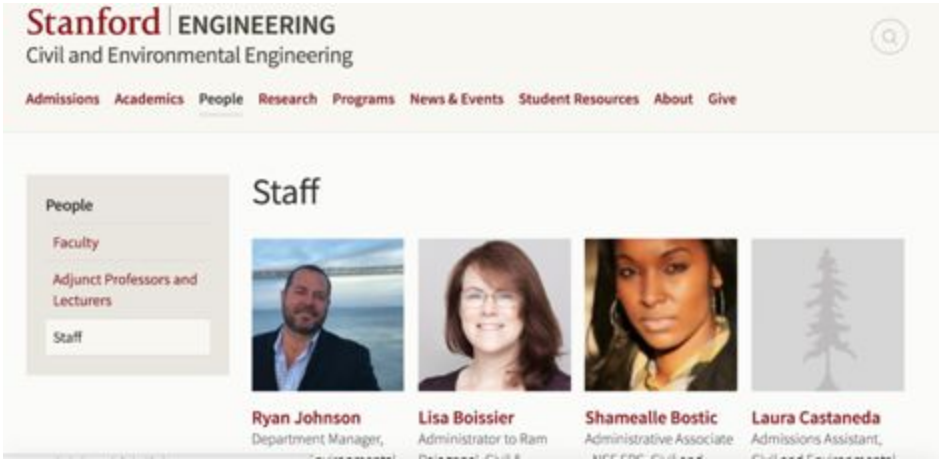
See an example of my NSF GRFP application essay of 2016 and 2018 in the Appendix.

DO NOT FORGET TO SEND A FOLLOW UP EMAIL TO REMIND FACULTY WHOM YOU CONTACTED IN THE SUMMER THAT YOU RECENTLY SUBMITTED AN APPLICATION TO THEIR DEPARTMENT. THIS PUTS A NAME TO THE APPLICATION AND HELPS WITH SCHOLARSHIP AND FELLOWSHIP CONSIDERATIONS.

It is worth knowing that it is customary to apply to five graduate school programs. I recommend applying to 5-8 programs. You should only apply to programs with research that you are interested in pursuing. Do not chase a university for name alone. Once you find a research field that interests you, then you can take rankings and research caliber into consideration.

Before applying to institutions, you should contact graduate school administrators for the department that you are interested in applying to for application fee waivers. Application fees can be quite expensive and having access to a fee waiver does not put

you at a disadvantage. To find their contact info, go to the department website and search for Staff contact info. Click their name or picture and you will have access to their work email.



Look for administrative staff on department websites.

Closing Remarks

These guidelines are not absolute and there are probably other good advice that you can use while applying for graduate school. However, it is my experience that those students that are willing to put themselves out there are the most successful in getting into the program that they wanted. I hope my advice helps!