

One of the most challenging parts of the graduate admissions process is drafting the personal statement or essay. When considering your statement keep in mind the purpose of your writing. You are trying to let the committee see what kind of scientist you currently are and what kind of scientist you hope to be. Are you interested in become someone who writes code and algorithms for high throughput analysis of Big Data? Do you want to go into biomedical genetics? Work in industry? Become an evolutionary biologist?

First and foremost make sure your research interests are clear. You may not know that you specifically want to study the biochemistry of *COXI* in heat shocked yeast. Still, we would hope that you know whether you're interested in evolutionary genetics of the rock hyrax or the microbiome of cystic fibrosis patients. If you can't answer that question, you may want to take more time to consider what you want before signing up for graduate school. These research interests should make it clear by the end of your essay which 1-3 labs you are most interested in even if you do not name names.

Second, mention any relevant research experience. The number one goal of graduate school is to learn how to do research in a lab. This is very different from lectures or test taking. Some of it will be frustrating. Occasionally it will be thrilling. Having previous experience working in a lab is the best way to decide whether you want this to be your career. I know one person who loved scientific ideas until working in a lab. He immediately switched to become a philosophy major. We don't want that to happen to you half way through graduate school.

Mention how you chose this program. What can it offer you that is a good fit for your goals. Are you a molecular biologist who wants to learn to code and analyze data? Are you a CS major who is interested in new opportunities for big data analysis in biology? Would you like to work in writing code for security and compliance in biomedical operations? If you want to gain experience in ecology and field work of Kookaburras, we aren't the right fit. Similarly if you want to do clinical trials in cancer therapy, we may not be it either. Make the case that you should be here.

Finally, make sure you email potential advisors before you submit. Professors are busy and bombarded with emails, so don't be afraid to write more than once. When you do, mention exactly why you would want to choose their lab. Look at their website. What ongoing projects are you most excited about? Is there a similar project you might be interested in doing in their lab? Include a copy of your CV/resume. Make sure it has your GPA and major listed as well as your references. Hopefully they will write back. If they don't, go find other labs that do similar exciting science. In the end, you are likely to find an opportunity somewhere to help you do the science you enjoy most.

Take a look at the (shortened) example essays below. They may help you draft your own grad admissions essay.

Best of luck!
Rebekah Rogers

Suboptimal essay

Ever since I was young, I have loved nature. At the age of 6, I would run around the yard, jar of crickets in hand, chasing every bug I could find. My room was covered with paper and pins, each specimen carefully labeled as “Really Big One” or “The green thing.” As I grew older I would go on camping trips and hikes. My friends and I would look around the forest in awe to see trees so high above our heads. Never without my binoculars I would call out every bird I could find. Sometimes as many as three in one day were added to my life list.

In college the only clear choice was to become a Cell Biology major. As I sat in my classes I could not help but think back to all those days in the woods. How the diversity of life with trees and birds and slugs and mushrooms was all driven by simple membranes and cellular machines. I think there is beauty in the cytoplasm. My senior year my close relative got sick with the flu. At the same time, I had to deal with a horrible breakup with my significant other of six months. After weeks of crying on the floor of my bedroom, I decided that the best path forward was to focus on my studies. I was resolute in my determination to pursue science.

I believe that science is the only way to improve the human condition. That is why I am dedicated to pursuing a PhD in bioinformatics at UNCC. The cell and the forest can only be understood through genome sequence data. I am passionate about this new venture in research and computer programming. I hope to begin my new role as a graduate student working with one of your top advisors soon.

What is problematic with this graduate admissions essay? First, it’s overly vague. Looking at it I have no idea what this person’s scientific interests are or why they are applying to our program. I’m also pretty sure every scientist I know could tell similar stories. There is no indication that the student has the experience necessary to decide whether they really want to do research. Research is different from listening to lectures or chasing bugs. They also don’t make the case for why they want to be in a bioinformatics program instead of a molecular biology program or ecology department.

The essay also contains irrelevant personal information. We all have negative life events that make our lives harder. If you really have a personal factors that influenced your productivity, it’s ok to say that. Keep it brief. Remember that the people reading this are going to work with you for the next several years. You may not want to share very private information.

Improved essay

I started my scientific career at the age of 12. My science fair project on goldfish color preference yielded nonsignificant results. I could not tell if they preferred yellow or green buckets. Still, I was hooked on research. I knew that I wanted a future career in biology. I went to college looking forward to my chance to pick up pipettes in the lab. In organic chemistry class, I learned to control organic synthesis reactions and improved my yield 20% over the semester. I also enjoyed my introductory and advanced genetics labs where we learned lab skills like PCR, gel electrophoresis, cloning, and plant transgenics. I even took a programming class just for fun. I walked away being able to write programs that can parse data tables and perform statistical analysis.

As a senior I landed an opportunity to do research on sea spiders in Dr. Gobo's lab. I collected animals, measured their weights and dimensions. I then purified proteins from leg tissues to measure the amount of ubiquitin in a color-based assay. I enjoyed my undergraduate research and began to think about what areas held the most interest in the future. I am applying to UNCC's department of bioinformatics so that I can pursue my new interests in genome sequence analysis. I hope to study the evolution of gene families in the sea spider *Nymphon brevitarise*, a resident of the North Sea. I hope to establish whether selection is driving new gene formation in this species. I believe that the training program at UNCC can give me exactly the training I need to pursue this research.

This essay does several good things. First, it mentions lab skills and programming experience that would be relevant to getting research done. It also has a very clear direction. The student wants to study evolution of gene families in sea spiders. The student has experience working with sea spiders, but no genomics on sea spiders. We can infer from the lab and programming skills mentioned that the student could learn that type of analysis. We would want to see good grades in those classes if the student is emphasizing them in the essay.

There are also a few shortcomings. The goldfish science fair project is not novel research and was probably not envisioned independently. It doesn't pertain to any of the other research goals. I personally love science fairs. If you mention them, it should only be from truly novel research, ideally with a published abstract at a minimum. The real undergraduate research experience is fairly limited and not directly related to the area of study. Most faculty recognize that the right opportunities may be harder to find at other schools. Still, I would encourage this student to get more experience as a lab tech before committing to a long PhD.

The biggest problem is that our faculty has absolutely no one working on sea spiders and no grant to fund that specific research. While I might consider the student for a Masters, they likely would find better opportunities in other graduate programs.

Even better essay

My research interests focus on the evolution of gene expression. How do gene duplications lead to regulatory changes? How do those regulatory changes influence the diversity of life? I am applying to UNCC so that I can gain experience in high throughput molecular genetics and evolutionary genomics. My background as a Biology major has prepared me for this goal. My coursework has trained me in molecular genetics, evolution, ecology, and introductory statistics.

As an undergraduate, I had opportunities to perform research in two laboratories working on the evolution of gene expression. In two years working in the Wembley lab I determine expression patterns of the *GOI1* and *GOI2* paralogs in two species of sea spiders. I found that selection has driven expression divergence of *GOI1* and *GOI2* in the germline and soma, respectively. I also found these genes had high ratios of dN/dS suggesting positive selection after duplication. This work offered me training in molecular protocols such as PCR, RT-PCR, *in situ* hybridization and cloning. As a senior working in the Mokey lab I tackled larger-scale questions in gene regulation, working with whole genome RNA-seq data for 5 species of yeast. I found that duplicate genes often show less constraint on mRNA levels across the phylogeny. This work required me to learn to submit jobs to the university's high performance computing queue, a challenging task. These results may have interesting implications to explain how selection acts on gene regulation.

In the future, I would like to continue to explore the role of expression changes in evolution of gene duplications in animals. I also hope to expand my repertoire in bioinformatic sequence analysis and evolutionary theory. UNCC would offer an ideal environment to pursue these goals. I am enthusiastic about exploring the opportunities on campus for research and education.

This is the best essay of the three. First, in contrast to the previous essay, it fits better with ongoing research in our department. It does not specifically parrot the work of any one lab, making me believe the student is genuinely interested in the topic. They have more than enough undergraduate research in the areas that they would be working on in the future. It does not have any irrelevant information.

The student emphasizes their strengths in molecular genetics, but it sounds like they may be weaker in computer programming or statistics. That is ok. Part of graduate school is learning new things. Other students may come in with more programming expertise but less biology. We would like to see those applications as well.

Importantly, the student's previous work is in sea spiders, but they seem to be open to exploring the same genetic phenomenon in other organisms. There are advisors at UNCC who are likely to be interested in working with this kind of student.