

UVA Diversifying Psychology Visit Day 2022 - Neuroscience Area Transcript

Taylor Byron: Hi everyone, we are the systems and behavioral neuroscience representatives for UVA's Diversifying Psychology Visit Day. I'm Taylor Byron.

Josh Danoff: And I'm Josh Danoff. And we're here to tell you about our department's neuroscience area, which focuses on understanding the neurobiology underlying behaviors with a particular focus in our department on sensory systems, development, and specific mechanisms.

Taylor Byron: So, a little bit more about me is that I'm in my first year of the program. I'm currently part of the Interdisciplinarity Fellowship in the Quantitative Neurobiology of Behavior program. My primary advisor is Dr. Dan Meliza. And my research interests include the effects of early life experience on the development of sensory systems. In particular, I focus on auditory processing.

Josh Danoff: And I'm Josh Danoff. I'm currently a fifth year student primarily advised by Jessica Connelly, although I've also done work with Alev Erisir. My research interests are epigenetic regulation of gene expression and particularly how this is affected by early life parental care. And to tell you a little bit about how we got here: so I applied to graduate school right out of undergrad and my undergraduate research was actually in developmental biology. So I was interested in [inaudible] but became really interested in how gene expression can affect really complex phenotypes. When my interests were moving away from the embryology more towards behavior. So I applied to many programs with faculty looking at genetics and behavior, both in psychology departments like ours as well as medical school neuroscience graduate programs. And I ended up here at UVA in part because I preferred the psychology departments. So they tended to be a little bit smaller and less competitive and with more focus on investing in the students. As well as, specifically, I really wanted to work with Jess Connelly because I felt that this- the science that she does is really at the cutting edge of the field and she would give me the kind of training that I wanted out of graduate school.

Taylor Byron: So I took a slightly different path. I did my undergraduate degree at Algoma University in psychology. I then went and did a master's degree at McMaster University, also in psychology. And now I'm doing a PhD in psychology. So it's a bit more of a continuous path. So a couple of things is that I've always done auditory research. I started in Dr. Laurie Bloomfield's lab studying [inaudible] processing with black-capped chickadees. So when I first, kind of, came across a tweet about UVA's programs, and they posted a frequently asked question Q & A period a couple years ago and I looked at that and I saw that and I then looked at the webpage for the faculty and saw Dr. Dan Meliza and I thought this is a perfect fit. So I reached out to him to talk a little bit about myself and the work that I had done. And he encouraged me to apply through a couple different programs, which we're just going to talk about now.

So there's a couple different ways to apply to UVA in the psychology department. You can put in just a general application for psychology where you'll list off your area of interest. If you're interested in SBN, definitely pick SBN as your area of interest. However when you- you should reach out to faculty. And when you do, they may also ask you to apply to the Quantitative Neurobiology of Behavior fellowship. It's just an extra program where you have to put in, like, a half page to a page of why you want to be part of the fellowship and what you plan to get out of it. So the idea is that it gives you a little bit of extra training and some extra mentorship to, sort of, build and develop not only skills in quantitative neuroscience but also to, kind of, build some programming capabilities that you can use throughout your career.

So, depending on which way you come in through, that kind of also depends on what sort of requirements might have. So for psychology, there's just a general statistics, ethics, and area lunch requirements for courses. For neuroscience, in particular, you have the Molecules to Minds course. It's kind of in addition to the psych requirements. For QNB the requirements, in addition to the neuroscience requirements, are that you take either Computational Neuroscience or Quantified Cognition, that you take an Internship in Teaching Neuroscience course, and that you do two to three lab rotations during your first year.

Josh Danoff: And then you have the opportunity to take elective courses. So, one of the nice things about our program is that there are not too many required classes. And you can take neuroscience courses of your choosing from our department, the biology department, or even the medical school to supplement your education and really tailor that to your research interests. So for example, I took a functional neuroanatomy course in our department, as well as molecular neuroscience in the medical school's neuroscience department. And then due to my interest in gene expression, I also was able to take chromatin courses to teach me epigenetics and that was through the medical school's biochemistry department.

Taylor Byron: So during this time as a graduate student here you are what are called milestones. These are just things that you do to, kind of, guide you along your path to the final dissertation. So these include things like rotations in your first year here in the QNB program. If you're just in general psych, you can decide whether or not rotations are right for you with the- with your faculty member. So, you can decide on doing rotations. I do rotations in the Meliza lab, the Deppmann lab, and the Liu lab where I learned different techniques in all of them. Each were about six to eight weeks long. And I worked on a project either by myself or with a current student in the lab. They're great fun.

So then once you've finished your first year, you've done that, you move into second year where you have your pre-dissertation. So, in the second year the pre-dissertation is basically just a journal style research paper about the research completed over the first two years of your degree.

You- you sort of talk a little bit about that and show that you're more or less able to kind of move forward with your research program.

Josh Danoff: And then in the middle of your third year, you'll be doing a comprehensive exam, which is to write a grant application in the style of NRSA, which is an NIH fellowship for graduate students. So this includes a specific aims page and a six page research strategy that will detail the experiments that you plan to complete over the next few years with the idea that you can turn this into an actual NRSA application and use that to apply for external funding.

And then finally, you'll have your dissertation which is the sum total of all of the research that you've completed. Which, of course, you'll write and defend in front of your committee. So I'm in the process of writing my dissertation proposal which will focus on how early life parental care impacts gene expression and early development, both in animal models and in humans. So, part of it includes work that I've done to study how early life parental care affects our epigenetic outcomes in prairie voles, which are our models of interest. So, looking at DNA methylation of the oxytocin receptor, as well as genome wide work in the same model using RNA sequencing and follow up neuroanatomy experiments to look at how neurodevelopment is impacted by early life care. And then finally, in collaboration with Joe Allen in the clinical area here I have looked at how experiences as adolescents affects epigenetic aging outcomes later in life and really understanding the role of the social environment for your overall health.

So in addition to all of these requirements, every year you will be required to give a research talk to the area students and faculty. We do this at our area launch and you'll just give a talk about the research you've completed over the past year. And you can get feedback on this before you, you know, turn that into a paper or something like that. And it's really just a time to practice communicating your work to others.

Taylor Byron: So when you do rotations, you're able to, kind of, join other labs for a couple weeks and learn some different techniques. We've listed quite a few here. These are not all the techniques available in the department. However, we thought it could give you kind of an idea as to what sort of things are regularly used and, sort of, the different [inaudible] that are in different labs. So you can see that it's all the way from molecular work all the way up to looking at, like, fMRIs with humans. So it really does span the full range of neuroscience techniques and they're all available to all students. Particularly if you do rotations, you can learn techniques from other labs. And you can even foster collaborations moving forward between different labs based on the techniques that you might be interested in, which is really awesome. The faculty here are really great at collaborating and they really encourage it.

Josh Danoff: So in addition to our department, we also have a larger neuroscience community here at UVA that we wanted to tell you about. So, one program that we have is the Program in

Fundamental Neuroscience, or PFM, which is a College and Graduate School program aimed at uniting neuroscientists from different departments. So, members include the Department of Psychology as well as faculty in biology and chemistry with the goal of fostering collaborations between neuroscientists from different departments and allowing for us to communicate with each other and really get a sense of what other neuroscientists outside of our own department are doing. And in addition to that, the medical school has a Brain Institute which is, kind of, structured similarly by uniting neuroscientists across UVA, although many of these neuroscientists do come from the medical school and- and tend to be a little bit more disease focused than the PFN neuroscientists. But nonetheless, it's a great way to communicate with neuroscientists in the medical school. And, in addition, the Brain Institute provides funding to graduate students. So I was awarded a fellowship through the Brain Institute as well as seed funding for research projects to faculty that can help you if you wanted to do something that required some pilot money just to get it off the ground. And lastly, I wanted to talk about the Expand program, which is a National Science Foundation funded program, in part led by our departments and Jess Connolly. And this is a training program aimed at providing integrative training in biology to graduate students really aimed at understanding the phenotype from all kinds of levels, from molecular all the way up to behavioral or evolution or ecology. And through this program you will be able to learn from folks in the biology department who have a different approach, but are, kind of, interested in many of the same things as us. As well as the Expand program specifically it is interested in career development. So you have the opportunity to take classes focused on things like writing an academic CV or giving a good research talk, as well as industry jobs. So things like what- what does the industry job market look like? And you can even, through the Expand program, do an internship with a local biotech company.

And so, you might be wondering what you do with a degree in neuroscience. And for the most part, there are two routes: an academic route and an industry route. If you're interested in staying in academia this will probably include doing a postdoctoral fellowship in- in a different lab to gain some other skills before going on the market for a tenure track job at a university. But if you're interested in teaching, there's also opportunities for teaching at smaller liberal arts schools and things of that nature. And then if you're interested in industry, you will have the skills to work an industry job in biotech or pharma using the, kind of, lab skills that you get here. As well as data science skills that will help you in a wider range of industry jobs including just, you know, working with large datasets for some company. And lastly, you might be interested in things like science policy or science writing and you'll definitely come out of this program with the skills to do that kind of work too.

Taylor Byron: So here's some contact information if you have any more questions or would just like to, you know, ask any more details about the program in particular. So that's there. There's also UVA related content and accounts on other kind of forums that you can check out. So thank you for tuning in. And yeah, thank you

Contact info from slides:

Josh's email: danoff@virginia.edu

Josh's Twitter: [@JoshDanoff](https://twitter.com/JoshDanoff)

Taylor's email: utn9ca@virginia.edu

Taylor's Twitter: [@TaylorMByron](https://twitter.com/TaylorMByron)