Dr. Vladimir Geneus

2009 major, Mathematics major Statistics concentration with Biology minor.

Tell us a bit about yourself — where did you grow up, what year did you graduate and in what concentration(s), and what do you do now? I'm from Boston, Massachusetts. I am the son of Haitian immigrants, so I actually grew up in Haiti as well. I am class of '09; I graduated with a major in Mathematics, and a minor in Biology. My concentration for math was Statistics. Today I'm a research scientist in the pharmaceutical industry, and I currently work for *Eli Lilly and Company* at their Headquarters in Indianapolis.

How did you decide to major in math/stats? While being raised in Haiti, I went to a very science and math-oriented school, and math was the subject that I felt most comfortable with. It was a natural decision to major in math. The high school I went to in Haiti was a Catholic school, and actually everything was taught in French.

What were your favorite classes (math/stats or others) and/or extracurriculars at UMass? As far as math classes go, I loved *Professor Murray Eisenberg's* Calc 1 and Calc 2 (Math 131 and 132). Those classes were instrumental for me in terms of fundamentals. I really loved *Professor Nate Whitaker's* Vector Calculus class. That was a class where I felt like "I get the math, I can do it, and this is really for me". Last but not least, *Professor Daeyoung Kim's* stats classes. I took three stats classes with Professor Kim for my concentration, and those were great.
In terms of extracurriculars: I was an RA sophomore through senior years. I was part of the Haitian American Student Association (HASA). That really helped me feel comfortable and have a piece of home, and to meet and talk to students with my background. I also tutored at Du Bois Library.
College for me was very transitional. I was born in Boston, but there was a lot of back and forth between Boston and Haiti. Having spent ages 10-18 in Haiti, coming to UMass was difficult, and there was a longer adjustment period than I expected. I figured "I'm used to Boston, I've spent a lot of time in Boston," but no, it wasn't easy to adjust, so college was very transitional. So I think that most of my time, I felt like I was just adjusting. But it was a great time, nonetheless.

How did you decide what graduate programs to apply for? I knew that math would open a lot of doors for me, but even after my junior year I still didn't know what I wanted to do with my life. Okay, math opens a lot of doors, but which door should I choose? So rather than going back home after college and figuring it out, I said, why not go for a masters degree? Perhaps it will give me more career options to consider. Northeastern had an amazing Applied Math program. I didn't know it at first, but it ended up exposing me to biostats and operations research. I spent two years at Northeastern getting a Masters in Applied Mathematics.

How did you find your first job after college/ grad school? After my masters program, I was still narrowing down what I wanted to do. Northeastern exposed me to biostatistics and applied statistics, and I knew I wanted to be in that area. I ended up getting a job as a Data Analyst, which is an entry level industry job, at *Interscope Research*, which was a very small company. While working there, I got the feeling that more math and stats were needed at the company, and I wanted to be a part of that. I realized that in order to have that impact, I needed more education. That's what led me to get my doctorate in Statistics at Florida State. Initially, my goal was to get my doctorate and come right back and help solve those questions at Interscope that I thought could be answered with statistics. In my first year in my PhD program, I told my advisor that I wanted to do my research related to those problems from Interscope Research. I remember my advisor told me, "Okay, that's a possibility, but don't be surprised if you end up finding other interests." And I did! My focus in my dissertation ended up being computationally efficient methods for nonparametric change-point detection using wavelets. I fell in love with that area of statistics. Doing my PhD, I ended up realizing that there were even more ideas and opportunities that I didn't know about beforehand, which eventually led me to Eli Lilly.

How do you use math/stats in your job? Unfortunately, I haven't had a chance to use my dissertation work in my current job, which I guess happens to a lot of people. Throughout the five years of my Phd, I had the chance to do a few summer internships in the pharmaceutical and healthcare industry. Eli Lilly liked that I had those prior experiences in the pharmaceutical industry. As a Research Scientist, I'm the lead statistician on clinical studies. My job includes setting up clinical study designs – ensuring that the trials are valid in terms of number of participants, the length of trial, the statistical analyses that will be used, and so on. It also involves supporting disclosures – manuscripts, abstracts, posters, any type of talks that our medical colleagues will give – we have to make sure that the stats are valid, and that they understand how to share it with the scientific world. Everything that I've learned in statistics, all the way back to Prof. Kim's classes, comes up in my job. I still have notes and textbooks from my classes that I use as references!

What would you say are the most important skills and/or qualities of college graduates looking to enter your profession? You don't need to know everything! You're not expected to know everything when you start. But you should know how to *find* things. That's what we call research. It's expected that you'll learn new skills on the job, but it's also important that your knowledge of the fundamentals is sharp.

Do you have any other advice for students? Take opportunities as they come. Don't shy away from opportunities, and don't think that an opportunity might be too difficult because you don't have the right background. Try to fill every summer, every break with some sort of opportunity to learn a skill or to grow. If you're still trying to figure out what you want to do, having skills on your resume will only help you, even if you don't know exactly how. Industry internships can be hard to find. Also – don't overlook other departments on campus. Many departments (Education, Psychology, etc.) need people to help analyze data. I didn't do as many internships as I wish I had during undergrad, but I made up for it in graduate school.

What does your day to day work look like? My role is 3-4-fold, there is portfolio work and research work that we do with priority to portfolio work. Portfolio work means being for instance lead statistician in studies.

Day to day, I am leading multiple clinical trials. At the beginning of the trial, I write a Statistical Analysis Plan, then write the stats portion of the proposal, answering regulatory questions of FDA or EMA, and present material to senior statisticians. When the trial is running, I monitor issues with trials. When the trial is finished, I make sure the analysis is properly coded –I have to review the statistics from the raw data to the final analysis. This involves a lot of double checking.

The second fold is working with medical researchers that have lots of stats/math ideas. I find myself evaluating what is possible, or working with them to make reasonable studies. Sometimes I have to say "this is not possible," other times we have to be innovative. I do analysis on the back-end. For publications, I need to respond to statistical reviewers for peer review of manuscripts. When we go to conferences where physicians present the work, I am the guy that answers the statistics questions from the crowd. For this, you make sure you double check your work, make sure you have considered all options, and even if there is an option you did not consider, you take it into consideration the next time.

The third fold is preparing and overseeing the statistical analysts in general and reviewing other statisticians work as an independent reviewer. The fourth fold is independent research or special projects with statistics Fellows at Eli Lilly, with projects from Masters-level research and mini-PhD level. This is more like grad school.