Interview Questions for Devin Ott:

1. What made you choose Electrical Engineering as an Undergrad?

   I had been interested in electronics from a very early age, and I was fortunate to have attended a high school with an extensive electronics technology program. My electronics teacher was a professional electrical engineer & educator with a B.S.E.E. from Penn State. I completed numerous courses under his instruction, including ELECTRONICS 1, ELECTRONICS 2, ROBOTICS, COMPUTER NETWORKING, and two classes of INDEPENDENT STUDY.

   I completed the first class (ELECTRONICS 1) during my sophomore year and it gave me enough background knowledge to go to Barnes & Noble during that following summer and pick out a "basic electronics" book to start studying on my own. By the end of that summer, I had already covered most of the material in the ELECTRONICS 2 curriculum. I conveyed this to my electronics teacher and he allowed me to spend that year following along with the rest of the ELECTRONICS 2 class while also expanding on the material by doing additional reading, lab experiments, and projects.

   For example, part of the ELECTRONICS 2 curriculum was the study of basic power supply circuits, including a project where each student would assemble (i.e. solder together) a simple adjustable 0-9V power supply. But since I had already spent the summer learning about power supplies, I instead wanted to make a much better power supply (higher voltage and higher output current capacity) that I could use for a variety of lab experiments. So instead of simply soldering together a predesigned power supply kit (such as this), I decided to apply what I had learned by designing my own bench-top power supply and building it from scratch. My electronics teacher was very supportive and happily agreed to let me do it. The power supply I produced was much better than the simple kits assembled by the rest of the students, and it served as my main laboratory power supply until only two years ago when I decided to purchase a professional one. This was my first *significant* electronic design project; it is documented here on my Penn State personal website.

   Through the rest of high school, I devoted much of my time to the study of electronic circuits and design, all the while taking full advantage of my instructor's seemingly endless supply of electrical engineering expertise. I got lots of experience designing and constructing electronic circuits and projects during that time, culminating in an advanced final project (my graduation project) in which I made an elaborate bass-activated red/blue light system to install in my car.

   At that particular point in my life, I was learning so much about circuits so quickly that by the time I would finish designing and constructing a given project, I had already thought of a bunch of ways in which I could improve on the design and add more functions. After graduating from high school, I started taking a couple summer classes at PSU, then during the three weeks between summer classes ending and fall classes beginning, I spent day and night designing and

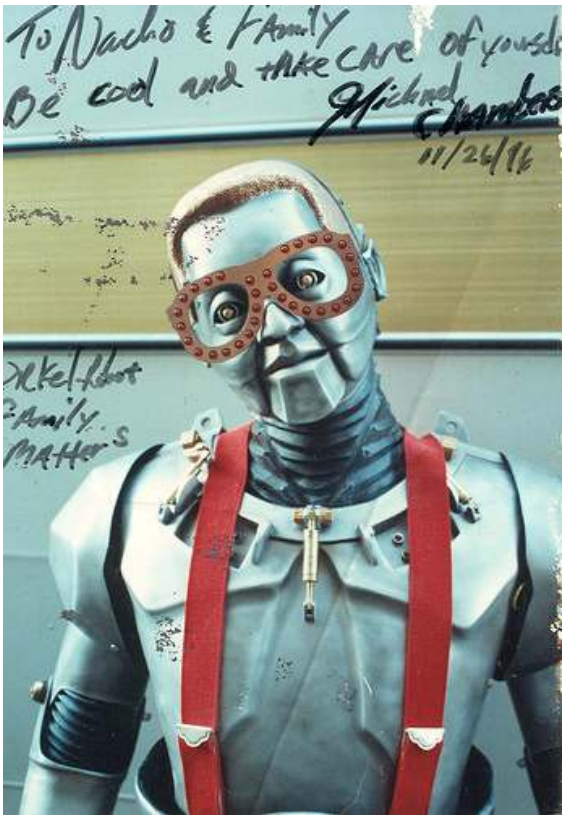
constructing a new & improved bass-light system for my car, featuring more lights, more colors, more functions, and an overall improved circuit design.

Now, everything I've said thus far should make it pretty clear as to why I chose electrical engineering when I came to Penn State. I was very fortunate to have had an intensely passionate interest in electronics starting from a very early age; and interest I pursued throughout my youth eventually leading me to the point at which I knew that EE was exactly what I wanted to do (because I had already been doing it for so long).

Since I made the choice to study EE long before entering college, perhaps I might address your question more directly by singling out the underlying point; that is, what was it that first attracted me to the field of electrical engineering in the first place?

Simply put, I was attracted to the power of technological creation.

Growing up, I was a typical adventurous little kid who was excited by powerful, dangerous things like fireworks and weapons. I also happened to be very creative, thanks in no small part to the fact that my parents bought me lots and lots of LEGOs and LEGO Technic kits. Anyway… Inspired by movies like Wayne's World, Short Circuit, and Johnny Mnemonic (see pictures below), I loved the idea of having high-tech gadgets and the ultimate would be to have my own robot. I was probably 6 or 7 years old when I began to think about stuff like that and electronics was a natural part of it.



I've gone on long enough on this issue, and I've reached a point where I'm having trouble finding the words to articulate the exciting feeling of being an adventurous kid daydreaming about high-tech gadgets. I'll simply close out this response with some examples.

Remember how awesome it was when you got your first remote control toy car. I used to spend a lot of time looking around in RadioShack while my parents were grocery shopping. They always had lots of really cool RC cars and trucks on display. I was very much attracted to the idea of controlling the car from a distance. Wouldn't it have been cool if you had a couple more buttons on the controller that could launch little *ESTES* model rockets from the roof of the RC car. And if those model rockets had a little bit of black powder in their body, that would make for a pretty awesome military attack car. --- This was the kind of stuff that I would day dream about as a very young kid.

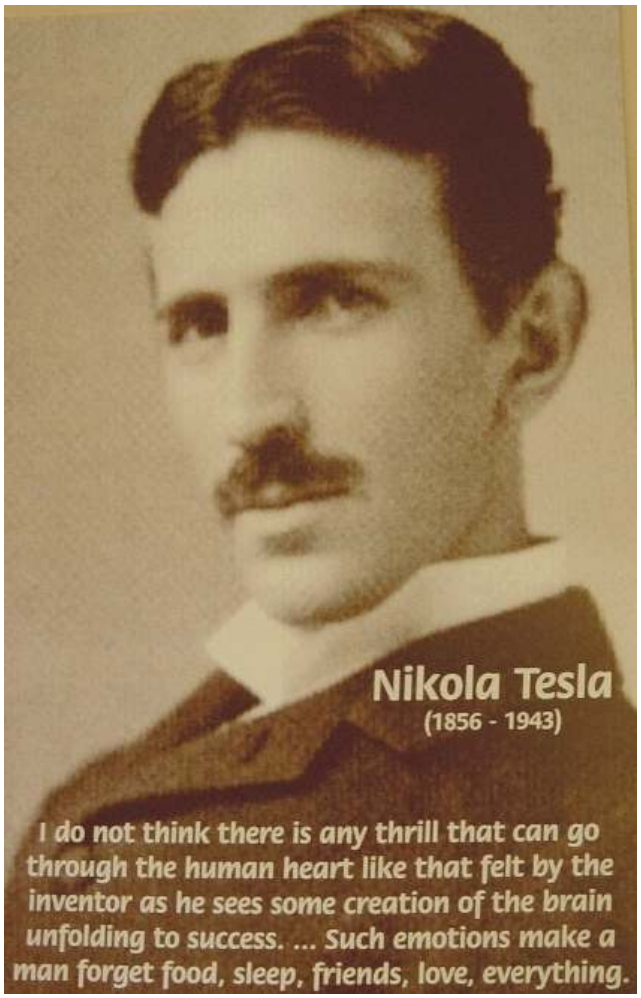
Another fun thing I was interested in was high-voltage electricity. Sparks! Wouldn't it be cool to have a little black box that made sparks when you pushed a little button on the side of it. --- This was the kind of stuff I would think about.

Finally, allowing me to draw a connection between these childhood fascinations and the type of things I think about now as an adult. Ultimately, the main theme of all this is *the power of technological creation*; the ability to design a project (an electronic application) to do whatever

you want it to do. For me, it's all about the thrill of designing and constructing some cool application that performs a task you find desirable. Whether you want super-bright neon lights to turn on when the bass in your car reaches a certain level; or maybe you want those lights to respond to your engine speed by turning on as you begin to apply throttle, and reaching maximum brightness as you rev your engine into high RPMs. … Well… I designed & constructed electronic circuits to do all of this!

So, in conclusion, what attracts me to EE is the ability to use electronics to do practically anything you want, in whatever way you want. It's the power to design completely custom applications to perform whatever awesome or odd task you desire. And playing with the finished product isn't the only fun part. As most experienced designers will tell you: designing it is half the fun!

On that note, I've also included a poster-quote hanging in my office of Nikola Tesla, arguably the greatest inventor of the 20th century.



2. Are you involved in any extracurricular activities?

Yes. When I first came to Penn State, I joined the SPIRIT-3 program (SPIRIT=Student Projects Involving Rocket Investigation Techniques). It was a three-year project in which students from diverse engineering backgrounds (e.g. electrical, aerospace, mechanical) were all working together to develop a rocket payload that would be carried up into the atmosphere by a NASA rocket. The rocket was launched from the northern tip of Norway (in the Arctic Circle) to gather experimental data from within the ionosphere, a layer of the atmosphere that hosts electromagnetic phenomena we have yet to fully understand (like the aurora, or *northern lights*).

SPIRIT was a great project that gave students an excellent opportunity to get real experience working as part of a design team on a large-scale, long-duration project. I was on the Power & Wiring team responsible for providing power to the various experiments in the rocket payload. We were also responsible for monitoring power parameters of each experiment circuit board and measuring the temperature at various points inside the rocket.

SPIRIT is just one of the many extracurricular engineering projects that students can join and contribute to. It's great to meet people in your field and work together with them to complete a project. It's an opportunity to apply the skills you've learned in your courses to an engineering development challenge that is real and meaningful. It's also an opportunity to develop new skills and learn from the people around you, including experienced upperclassmen and distinguished faculty advisors.

SPIRIT-III ended in 2006 with the trip to Norway and the rocket launch. It was the third SPIRIT program at PSU and I was really hoping to join SPIRIT-IV, but unfortunately that program never got going (I believe it was largely due to funding issues). By the fall of 2007, I was really hoping to find a cool team project to invest my time in and I saw the PSU Audio Engineering Society as being an organization that might be interested in sponsoring a project. So I joined PSU AES and a few weeks later I launched what would become a two-year project (the PSU AES Amplifier Design Project) to design and construct a high-performance 50W audio power amplifier. I recruited five other PSU AES members, all of whom were EE students, and we began an exciting team project that challenged us to study new concepts (mostly related to power amplifier circuit design) and we all gained tremendous experience from it.

My leadership role in the PSU AES Amp Project led me to become a PSU AES officer, a position which I still hold today. I meet regularly with my fellow PSU AES officers and our faculty advisors to organize and sponsor events, including technical seminars by students and industry

professionals from top companies in audio and acoustics. For more info about what PSU AES is all about, visit the PSU AES website.

The SPIRIT programs were based in the Student Space Programs Laboratory (SSPL) located on the third floor of EE-East building. Visit their website to learn about their exciting project work that is currently open to student participation.

3. Have you ever had or looked into a co-op/internship? If so where? Was it a good experience? Would you recommend it?

   I have not participated in a co-op/internship, but I know many who have and they have all found it to be very beneficial. It gives students an opportunity to gain real-world experience and also gives them a real foot-in-the-door with the particular company they work for. I would say that a significant percentage of students who participate in an internship/co-op are eventually offered full-time positions in that company when they graduate.

   I would definitely recommend it, especially to students who don't have a lot of *real* technical experience. Experience is very important when you're ready to start looking for full-time jobs. Another nice thing about co-ops and internships is that it presents very little risk to the employer because it is a temporary work situation that doesn't cost them very much. They also like it because they get to know the students and how well they would fit in with company. That is why they are so likely to offer full-time positions to former interns, because they already know you and it's less of a risk than hiring an applicant they don't really know and who has never worked for them.

4. Do you feel that teamwork is an essential part of being successful in the long run? Why?

   Yes, absolutely! It takes a team of engineers to accomplish anything of significant consequence. EE is a diverse field, but the vast majority of EE work can be accurately characterized as *the development of complex systems*. These complex systems require the dedication of a team (and often multiple teams) of engineers, each working to develop a particular aspect of the system. There are too many tasks for any one person to effectively complete; the workload must be broken into smaller and more manageable pieces that individual team member can be responsible for. The work gets done much quicker and much more efficiently than if a single engineer tried to tackle it all by him/her self. Not only is it daunting (or simply impossible) to do everything yourself, but different tasks often require different expertise and must be performed by professionals with different skill sets.

   In conclusion, a small team of engineers will be more efficient at designing complex systems, and the end product will be better than if a single mind had produced it (b/c a single mind

usually cannot poses all the necessary expertise as a team of engineering specialists). So a student better learn how to be a good member of a team if he/she wants to succeed as an engineer.

5. Are you interested in going to get your Masters? Why?

   Yes, because I love electrical engineering and I want to be the best engineer that I can be. However, I am an engineering workaholic who isn't happy unless I am working on some type of advanced EE project. I am much more interested in working for a few years before considering the pursuit of a MSEE degree. In addition, there are many companies who will pay part or all of the tuition expenses for their employees to get advanced degrees. All I know is that I would much rather get a job doing what I love than to be a poor student for another 2-3 years.

6. How often do you talk to professors or advisors? Do you feel that more undergrads should interact more with professors/advisors?

   Due to my interests in EE and the extracurricular EE work that I do, naturally I have established relationships with several EE professors and faculty members. They have extensive experience in various aspects of EE and engineering in general, and can offer valuable insight in a variety of areas. In my undergraduate career, I have benefitted greatly by consulting with them regarding advanced EE topics. These are experienced professionals who are eager to lend their expertise in discussions with motivated students.

   I would certainly advise students to develop relationships with all of their professors, but especially with professors who have a background in the area of EE that the student is most interested in. As I've said, professors are experienced professionals with often great advice and a wealth of knowledge to share with interested students, and they can become something of a mentor to the student.

   Due to my history of extracurricular electrical engineering work, there is a particular bit of advice I would like to emphasize that I believe has contributed to the good rapport I have with my professors. Simply put, if a student decides to seek the technical expertise of an experienced professor, I would strongly encourage him/her to do a lot of research beforehand.

   When I launched the PSU AES Amp Design Project, none of us knew anything about how to design an amplifier, so we read books on the subject (or, at least I did). While working with my team, one thing I noticed was that many of my teammates were often quick to suggest that we ask one of our professors about how to design a given part of the amplifier, without having tried very hard to figure it out on their own. That is not a good way to become a successful engineer.

Rather, I would advise students to research the matter and try to figure it out on their own before seeking faculty advice. This way, you will often discover the solution by yourself while learning a whole lot in the process. And if you have done lots of research but still aren't sure of the solution, then when you finally discuss it with the professor you'll already have an idea of the possible solutions and can engage in an advanced discussion on the subject.

In the above scenario, you not only gain more from the discussion by having thoroughly researched the matter beforehand, but you will also earn the respect of the faculty member as they will see the seriousness with which you have approached the challenge (by doing lots of research). Also, the more research you do, the more knowledge you'll have when you go to seek advice, so it'll be easier for the professor to explain it to you and you'll have more insightful questions to ask which will help you to understand it even better. You'll go a long way if you can be a self-starter and avoid being too quick to ask for help; you'll often realize that you can figure most things out on your own.

7. How many hours per week do you spend in class? Studying? Other?

That is a very difficult question to answer as it varies from semester to semester and depends on the courses I'm taking and whether or not I have an exam(s) coming up. Perhaps the best I can do is to consider my time as a whole and estimate how it is divided between class, studying, etc.

During a normal semester with a full course load, I would estimate that I spend roughly 20% of my time in class, and the rest of my time is spent studying the course material, completing homework assignments, and any remaining spare time I have is usually devoted to the extracurricular projects and/or research I might be working on.

For me, being an engineering student is a full-time, day-and-night job. And by "full-time" I mean that I am always working on it. I have always been involved with ambitious project work that consumes a great deal of my time and can make it very difficult to spend time doing anything else. Most students focus on their courses and don't get involved in extracurricular engineering work so they generally have more extra time than I do. However, I do what I do because I love it. It is truly a thrill! *refer to the Nikola Tesla poster.

8. What do you think that average GPA for this major is?

I'm not sure what the average GPA is for EE students, but I know that if your cumulative GPA is at least 3.0, then you won't have any trouble getting job interviews, and you'll have a good chance of getting into a good graduate school.

However, another metric would be your *major* GPA which is often more important to employers than your cumulative GPA. EE courses tend to be pretty challenging for a lot of students so if you can get good grades in those courses, that will say a lot to employers about your abilities as an electrical engineer.

9. How many of your courses are taught by Graduate Students? Is it as effective having them teach as it is to have a professor teach?

   Virtually all of my EE courses have been taught by highly-qualified EE professors. Graduate students usually serve as teaching assistants for recitation/laboratory components of the course, and many of them can offer good assistance and answer questions, but there has always been a highly-qualified professor who administers the course and gives the lectures.

10. What courses do you feel are weed out courses students in Electrical Engineering?

    I suppose all of the physics and math courses serve to weed-out the first and second year engineering students. Then once you are accepted into the major of Electrical Engineering, EE 310, 330, and 350 are the main three "core" EE courses you must take. By far the class that gives students the most trouble is EE 350, Continuous-Time Linear Systems. But as you move through the EE curriculum, students become much more comfortable with the material and EE 350 doesn't seem so bad in hindsight.

    I guess EE 210 might be a weed-out class for some people because it is the first core EE class in the curriculum and it is often their first introduction to the field of EE. That is usually when people decide either YES, I like this stuff and want to learn more; or NO, I don't like this stuff and maybe I should consider pursuing a different field of engineering.