Advice to Undergraduates: On Research Opportunities and Fellowships

JAMES FAGHMOUS, Class of 2006, Major: Computer Science

INTRODUCTION:

2006 City College alum James Faghmous shares his thoughts about how to make the most of undergraduate research opportunities. Now a Ph.D. student at the University of Minnesota, Twin Cities, Faghmous was awarded a National Science Foundation Graduate Research Fellowship (2007) for his innovative approach to studying Alzheimer’s Disease, machine learning, and computational neuroscience. In 2006, Faghmous was also a recipient of the National Institutes of Health Graduate Fellowship. That year, he won the Grove School of Engineering Outstanding Leadership Award.

Attending City College isn’t about collegiate athletic fame or Greek parties. It’s about self-discovery. By interacting with the many cultures and personalities on campus, you have the chance to discover who you are and what you want to become. This learning process is often non-linear and revolves around making the most out of opportunities at CCNY. Unfortunately, not all opportunities are created equal. Sometimes, you will have to make your own opportunities from situations that, on their face, don’t seem to offer much. A bad class, for example, can be an opportunity to develop the ability to self-teach new materials, and while it might be a struggle at the time, it will pay dividends later on at your job or in graduate school.

When I first enrolled at CCNY, I was a 21 year-old freshman who wanted to program computers for a living. By the time I graduated, I had the opportunity to work on a software project to detect cancer, another to prevent heart attacks, and one to autonomously scan large books. The highlight of my learning experience was not programming, however. Rather, it was what I learned from other disciplines I studied, because these opened the door to endless opportunities for a computer scientist who once dreamed of wearing a suit and writing software from inside a cubicle.

It’s important for all engineering students to understand what computer science is and how it can be useful. I find that too often, students don’t know what to expect from a computer science degree. The most common myth about computer science is that it’s all about programming. Programming is only a tool—granted, a very useful one—but it is only a means, not an end. After all, you need not attend university to become a programmer, but you must do so to become a computer scientist. Computer scientists are expected to be citizens of the world, engineers well-versed in many disciplines while also aware of the promises and limitations of the tools at their disposal. It’s the Swiss army knife of engineering, if you will.

Technical communication is perhaps as valuable as engineering expertise. No matter how brilliant your ideas might be, if you are unable to present them to your peers and the general public, and if you are unable to generate excitement about these ideas, they won’t make it far outside your own brain. One class I had a particularly hard time with was the technical communications course offered at CCNY. I was extremely frustrated at my performance in the class and could not see its benefits. Five years later, an incredible opportunity came knocking on my door when my current department asked me if I could teach the technical writing component of a computer science course.

A City College educational experience is only worth what you invest in it. You must take advantage of the talented faculty and educational programs in your department, since competition for research positions at CCNY is usually mild compared to some other major research institutions. Peer-learning is also essential. While an instructor could spend countless hours presenting a topic, studies have shown that students learn more when probing their peers. I encourage you to take advantage of the talented students around you. When you find a study group, make sure that you have the same goals and expectations. For instance, figure out if your group members want an A in the course, and how they expect you to prepare for meetings.
Of course, the most prestigious academic scholarships and fellowships get media and alumni association attention. But even without such honors, you can still pursue graduate studies for free. Securing a free ride through graduate school is like putting money away in your savings account—you must start saving early. In order to improve your chances at securing funding for graduate education, you need to start gaining research experience immediately. Working with a faculty member during your freshman and sophomore years will give you enough experience to be a competitive candidate for other summer research opportunities during your junior and senior years.

Once you’ve gained enough experience during your first two years of college, you may join specialized research programs at CCNY and elsewhere. The City College fellowship program, for instance, offers research opportunities for students in science and engineering during the academic year, while national summer research experiences for undergraduates (REUs) are a better venue for more in-depth research experience during your summer break. You will need to apply to such programs in December of your junior year, so you need to accumulate enough research experience by then so that you’ll be a competitive candidate. One great program is the NIH-NSF Bioengineering and Bioinformatics Summer Institute, where students from all science and engineering disciplines converge to about ten colleges around the U.S. to work on challenging bioengineering and bioinformatics problems.

Gaining such research experience will certainly make you a more desirable candidate to most graduate schools in the U.S. This means that you will be well-positioned to secure funding from universities in the form of teaching or research assistantships. These appointments, however, come at a cost. In exchange for funding, you will have to teach or conduct research for your advisor. Having your own external funding can sometimes free you from these regular graduate student duties. That way, you can concentrate on the research of your choice. Such opportunities include university-wide fellowships, for which you may have to apply individually or your department might have to nominate you for. So that you’re aware of funding opportunities, ask your potential graduate institutions about such opportunities before applying.

Other funding sources include national graduate fellowships, such as the NSF Graduate Research Fellowship (NSFGRF). It is well worth applying for one during your senior year. For your application, seek assistance from current and former mentors, especially those at CCNY. Most faculty members are very supportive and enjoy helping motivated students to attain their goals. The keys to the NSFGRF are a strong, realistic research proposal and strong letters of recommendation. Make sure you seek the advice of your CCNY professors for your research proposal.

Obviously, this isn’t the sole route to advancing your career. Seeing opportunity in every experience, however, opens you up in ways that might be pleasantly unexpected.

2008-9 NSF Graduate Research Fellowship Winners from GSOE

National Science Foundation Graduate Research Fellowships provide a generous stipend and tuition for three years of graduate studies in the fields of science, technology, engineering, mathematics, and even history and philosophy of science.

- Leah Christine Acker, class of 2006, is now a graduate student in Harvard-MIT’s Health Sciences and Technology program.

- Jennifer M. Walz, class of 2007, is pursuing a doctorate at Columbia University in the Laboratory for Intelligent Imaging and Neural Computing.

- Jumie N. Yuventi, who graduated in February, 2008, now studies electrical engineering at Stanford University.

- Je Hi An, class of 2009, will attend Duke University to pursue a Ph.D. in biomedical engineering.

Other sources of funding for graduate studies in engineering include the U.S. Department of Defense (DOD), the Department of Energy (DOE), the National Institutes of Health (NIH), and various private companies. Students interested in finding out more about research fellowships should visit the website of American Society for Engineering Education at www.asee.org and contact Dr. Yuying Gosser, the director of student research and scholarship at ygosser@ccny.cuny.edu.