

NUScience

Northeastern University's First Science Magazine

FALL 2011

N(you) Science

A special issue featuring the College of Science

Welcome new students!

I'm Murray Gibson, Dean of the College of Science, and I'm delighted to participate in this magazine to welcome new students and orient them to the College and University.

The magazine was put together by a cluster of our outstanding students who volunteer to produce an *NU Science* magazine several times a year, stuffed full of great content that they generate in their "spare" time. I love the energy and creativity that they bring.

This issue is an experiment in collaboration. We wanted a magazine that would help introduce new students to the College and to the opportunities – for research, co-op, education and recreation – that are available. With a little support from the College, Kristina Deak and her team agreed to put together this issue. I think they did a fantastic job, and I hope that you find it both useful and interesting.

What does an Academic Dean do? Well maybe a day in the life will explain it:

- 9:00 a.m. Meet with a new faculty candidate for biology who has exciting research ideas in drug discovery
- 10:00 a.m. Consult with my Associate Dean on approaches to improve the teaching of Mathematics to Engineers
- 11:00 a.m. Plan renovation project to provide new lab and classroom space
- Noon: Lunch with an alumnus who is a potential donor for co-op research fellowships
- 1 p.m. Meet with other deans to determine university strategy for online education
- 2 p.m. Meet with junior professor to discuss career development
- 3 p.m. Listen to graduate student council raise issues
- 4 p.m. Discuss large-scale grant proposal for an energy research center
- 5 p.m. Work on my personal research paper
- 6:30 p.m. Pizza with the biochemistry club

The University gives Deans considerable autonomy to manage the Colleges. My boss is the University's Provost, Steve Director, who reports to the President. I feel very lucky to have this job and work with the faculty, students and staff to strengthen the College and University.



It is so energizing to work with young people – we have a sensational group of students. Our mission is to make your experience as fulfilling as it can be, and allow you to flourish and develop through your experiential education. My job is to figure out how to use resources to make that as effective as possible. Feel free to pass on your ideas.

Let me give you some advice from my perspective. While I was a freshman a long time ago in a galaxy far, far away, I still remember the excitement of getting to determine my own future, of living away from my parents and of the incredible number of choices on how I could spend my time. My first piece of advice is to make conscious choices. By that I mean, don't agree to do too many things and then discover that you don't have time to do any of them well – instead choose and commit, and of course your number one commitment must be to study. But make sure to enjoy other opportunities too. I believe one of the most important things you learn in college is self-discipline and focus. Yes, we all make mistakes, and I certainly did, but try to learn from them.

Second piece of advice – if you don't know, ask. Don't be shy. We have incredible resources in the University at your disposal – faculty, advisers and staff. The saddest thing as a faculty member is to see no one show up when you have office hours.

Last piece of advice – have fun. This should be the best time of your life. Each phase of life has riches to offer, but at no point are you learning or developing as much. If you are not doing what you want to do, change it!

I wish you all the best as you grapple with the choices and challenges that we set before you. And remember, the smart person asks for help! All of us – faculty and staff – are always willing to talk with a student – that's why we're here.

LETTER FROM THE EDITOR

Dear Readers,

Welcome to NU! (Or welcome back!) Time for another academic year to begin, filled with new ideas, new challenges, new people, and new successes. Here at *NUSci* we have a few goals in mind for the 2011–2012 semesters and I hope you will help us to fulfill them.

To start, you'll notice this issue is a departure from our typical content. We were fortunate to collaborate with Dean Gibson this past summer to create a Special Issue on the College of Science and all of the opportunities therein. We've created a rough guide for students entering the CoS, to give a brief outline of what to expect during your time at NU. The main point you'll realize as you peruse these pages, however, is that everyone will ultimately chart their own path through their five years in Boston, and no two students will ever have the same academic experience. It's an exhilarating journey and I hope this magazine will help you generate ideas and inspiration for embarking on your own.

Our next issue will be a return to the normal *NU Science* vibe. That is, it will have a more "PopSci" feel, where we will be writing based on our personal interests on virtually any topic associated with science and research. We will begin writing in early September, so if you're interested in getting involved, shoot us an email and stop by our meetings. We also are working on creating an ongoing lecture series, as well as sort of "lab-side" chats where a topic is decided upon one week and we discuss it the following; which could be anything from the future of nanoparticles to how slugs reproduce.

Over the next year we would like to continue to expand and improve as a publication and as a resource for students on campus. Not only will we strive to keep you up-to-date on what's going on in the sciences on-campus, in Boston, and around the world, but we also want to serve as a creative and intellectual outlet for students. We will continue our quest for publishing interesting, thought-provoking, and academically important articles and see only an upward trajectory in both the quality and depth of our journalistic pursuits. But we'll also keep writing about sharks and vegans and the psychology music and whatever else suits the fancy of our membership.

Think of *NUSci* as a great place to get creative, get innovative, and get a bit intellectual. We hope to become a resource for the NU community at large and look forward to new collaborations and new courses for the evolution of our publication throughout the next year. Most importantly, we look forward to working with you!

All the best,
KRISTINA DEAK
Editor-in-Chief
Founder, *NU Science* Magazine

President
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Editor-In-Chief
Kristina Deak, Biochemistry, 2012

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Get Involved!

Are you interested in writing about your passions in science, interviewing leaders in the field, or designing a publication that will be available to the entire NU community? Do you want to be part of a dynamic, enriching group that serves as both a creative outlet and an intellectual resource for our university?

Join *NU Science* Magazine!

We publish twice a semester and are constantly looking for new writers, photographers, graphic designers, bloggers, etc. You name it, we would be happy to highlight your talents!

Email us at nuscience@nu.edu, follow us on Facebook, join our OrgSync group, or stop by one of our weekly meetings. You can find us on Mondays at 7:30 pm in 245 Ryder Hall.

5 Years of N(you)!

Freshman Year

Welcome to college. Your first year in Boston will be one to remember. The roommates, the first time you get lost downtown, navigating the T, and getting through those intro courses; it'll all add up to an incredible and noteworthy experience. It's a time to find yourself and to become the person you want to be, not necessarily the person you were in high school or in your home town. Try out new things, join new clubs, and be open to every new challenge. Few times in your life will you be somewhere so vibrant and so novel. Embrace it!



freshman

Sophomore Year

When you return to campus for the second round, you may think it's all old hat. But the truth is, you're still just beginning. Whether you've decided to switch majors from your first year, or you're continuing down the same academic path, things are assuredly going to get a bit more difficult. You'll spend more time in the library, but it also means you're delving into your major and your interests more thoroughly. Start some positive habits, like reading *Nature* or *Science* every week. You'll have the foundation to understand most of the general articles, and it will help you feel more confident when talking to professors, advisors, and potential employers.

sophomore



Middler Year

Ah, the curious "middler" year. (You WILL get sick of explaining this to everyone you meet. It's easier to just say "third year.") This is generally the year to dive into your first co-op. You'll get a small dose of the real world, which after two years of classes, is usually greatly anticipated. This is an excellent time to figure out if your career path is what you thought it would be and to see if you're on the right track academically. It may be stressful to find a co-op and start work in a new place, but the benefits of working are tremendous and your resume will thank you.

middler

Junior Year

By now, your friends who went to four-year schools will be applying to grad school or med school or seriously contemplating their impending graduation. Although you still have another year, this is the time to start evaluating your life as well. Seriously weigh your options and talk to colleagues and professors about their paths and opinions. It's also the time for a second or third co-op and your schedule will probably open up for some upper division elective courses. The 5000 and beyond classes are a challenge, so only take the ones you are genuinely interested in or that will suit your career goals. You'll spend a lot of time studying and working for these courses, so choose carefully.

junior



Senior Year

Finally. You've made it. You probably feel pretty good at this point. Your resume is padded, you've already had 12–18 months of work experience, and you can officially call yourself a resident of Boston. Academically, there are still some challenges ahead, but the courses are rewarding and the end of the tunnel is near. Enjoy the last few months of college and the obstacles they bring; the real world is out there lurking. Luckily, you're at NU, so you'll be ready to face it.

senior

N(you)

This is an outline of the basic experience you can expect at Northeastern. But in reality, it's all up to YOU. You've been accepted to a very unique school, where each student charts their very individual path through an engaging and rewarding five-year experience. No one takes the same classes, participates in the same co-ops, or even has the same co-op schedule. You could wind up in Africa, or down the street in one of the top pharmaceutical companies in the nation. You could be working in a hospital and getting ready for med school, or giving presentations on penguins at the aquarium and pursuing a music industry minor to add to your biology degree. Your experience here will be what you make of it, and the possibilities and outcomes are virtually endless. In this issue you'll find some helpful advice on how to navigate the College of Science, as well as numerous interviews from students, faculty, and staff about their paths at Northeastern. Read them and explore them, but realize that your journey can be completely different. Take these five years to become exactly who you want to be. Explore, learn, and grow; you'll have the entire Husky community to support you. Welcome to N(you).

— Kristina Deak, Biochemistry 2012

Surviving and Thriving During Freshman and Sophomore Year

The quest for a college degree can be a long and grueling journey. I currently find myself at the halfway point on the quest to graduate, being invited to give advice on how to survive your first few semesters at Northeastern. In hindsight, though, survival was never my goal. If doing just enough to get by is the main focus of your college experience, then you are not going to learn anything and your degree will be useless. Although I am not perfect as a student, I intend on earning a useful degree. To help you get one of these too, I have reflected on my freshman and sophomore years with clarity and insight. In retrospect, my initial goal was not to survive but rather to learn who I was as a student. Then I had to decide who I want to be when I leave Northeastern. Finally, I needed to learn what I would have to do to make myself into that person, and I needed to start doing it.

Luckily for me, I quickly figured out what kind of student I am (a mild procrastinator who hates doing math problems, but loves in-class discussions and making gigantic study guides). In addition, I have a good idea of what I want to do when I graduate (something along the lines of veterinary medicine or zoology). Unfortunately for you, though, I cannot tell you who you are as a student and I definitely cannot tell you what you want to do. I can, however, give you some guidance on how to get there, once you have figured the other stuff out for yourself.

The first step toward undergraduate success is making perfect course schedules. I understand that being a “science” student

at Northeastern means that you are one of a variety of majors, but every student in every major will have a problem with picking courses at some point. Since my summer orientation before freshman year, my ability to sign up for a class schedule that works for me has improved considerably. My first lesson was there are very few courses that are “easy A’s,” and those courses that are, probably are not worth taking. I do not recommend rushing into advanced courses, either. Instead, I recommend a balanced approach to freshman and sophomore year. The key to doing well later on will be the strong foundation you build in your early semesters. These semesters are an excellent time to take introductory courses in areas outside of your major. Despite being a biology student, I took Peoples and Cultures, Foundations of Psychology, and Introduction to Shakespeare, filling three requirements along the way. I learned a lot of things that ended up being useful in my other courses and was influenced to declare a minor. In summary, take classes in fields that interest you! Do not be deterred from taking an interesting course because the lecture is on Friday morning or because you could take an easier (but less useful) course instead.

Another important aspect of course selection is knowing what you need to take to graduate as planned. “Students need to make sure that they are clear on what they need to take from day one. Our breakdown can be confusing at times,” counseled Efen Sandi (Psychology

2013). He warned that in the Psychology Department, for example, “classes are popular with students from all majors, so do not hesitate to register for classes that you need.”

Missing registration for a class could set you back a semester or two, especially if it is a prerequisite for another requirement. In my case, I wish I had taken Genetics & Molecular Biology sooner, as it is a prerequisite for many intermediate and advanced biology courses.

College is an expensive venture, so taking an unnecessary course can also be costly. To this effect, certain classes can fill multiple requirements if you play your cards right. Checking your degree audit on myNEU is always a wise thing to do before choosing classes for the upcoming semester, as it will correct any misconceptions and provide a solution to almost all dilemmas.

Despite their convenience, online resources cannot be your only sources of guidance when it comes to picking courses and solving other academic problems. The key to success in college (and beyond) is making connections. Connections do not have to be people in high places. My most useful associates are my friends and classmates who are just as motivated as I am. For example, two strangers named Dan and Tyler were in line with me at orientation two years ago because we all had the same scheduling conflict. We soon realized that we shared many of the same classes (Dan and I actually shared every class, including labs), so we made it a point to study

together. Scores of valuable study sessions have followed. Whether you happen to stumble upon great friends at orientation or not, simple actions like talking to people before class and asking to share notes can lead to a beneficial network of friends and acquaintances.

Of course, your classmates are still just as inexperienced as you are. This fact of life is faculty connections are another key to success. Every professor has office hours, and you should not be afraid to stay after class, either. Professors are not just vending machines that spit out grades; each one is a philosopher, a researcher, and a professional. Their knowledge, experience, and networks can be the tools that you use to get ahead (and get knowledge, experience, and networks of your own). I make a point to talk to my professors and advisors whenever I get the chance. Faculty members are more likely to assist a student that they know and can count on, regardless of their specialty. In addition to the professors that teach my classes, I have gotten to know Dr. Rebeca Rosengaus by working in her sociobiology research laboratory, the administrative staff in the Biology Department by volunteering to help with events and several advisors just by going to them in desperate need of guidance. It can be difficult to keep all of your advisors straight, as Northeastern assigns several to each incoming freshman. Whether they are your academic, experiential education, student activities or faculty advisor, I cannot stress enough the importance of get-

ting them to know and like you. Many students such as Jill Newman (Biology, 2013) know the importance of connecting with advisors but caution that it is not always easy. “If you need to meet with your academic or co-op advisor,” Jill warned “make appointments as early as possible because they can get very busy.”

Another way to become well-known besides dropping in on faculty is to participate in student activities. Undergraduate student Michael Tackenberg (Behavioral Neuroscience, 2012) suggested that freshman and sophomore students “take advantage of the communities already in place for your major, including faculty and student organizations.”

In his case, the organizations include the NEU Researchers of Neuroscience and the College of Science Student Activities Association, both of which he is a prominent member of. Clubs exist for almost every major in the College of Science and can even help you meet students in other majors through collaboration. Through my experiences, I have learned that the executive boards of most student clubs are easy to become a part of and are always looking for more input from interested students. I found my way into officer positions in the Biology Club and Pre-Veterinary Club just by expressing an interest, and I participate in several other student organizations too. The web of clubs and associations can help you to build a strong foundation early on in your college experience and is a tool that should not go unused.

Finally, the best thing that you can do to ensure that you finish your freshman year and are ready to be an upperclassman student (or co-op employee), is to study hard. It may seem obvious, but many students do not study enough or do not figure out how to make the most of their studying. Every major has several classes that make most students cringe when their course titles are uttered, and these need to be studied for ardently. Classes like organic chemistry, for example, require students to be the best students that they can be, so I highly advise against skipping lectures for that class unless it is absolutely necessary. You should take advantage of every review session, set of practice problems, and recitation, even if the next exam is weeks away. Above all else, do not be afraid to give up a weekend of partying in exchange for a weekend of sleep and studying. The weekend before an exam in your hardest class is not the time to go on a road trip, play the new Call of Duty, or take part in a pub crawl across the city. Learning scientific theory and process is difficult enough without distractions, so cut them out whenever your academic life is at risk.

Still, freshman and sophomore year should be enjoyable and should be a learning period during which you discover who you are – and who you are not.

—Anthony Denice, Biology, 2014



An Introduction to General Biology with Dr. MarySusan Potts-Santone



Dr. Potts-Santone

For many, the academic year begins with the imposing specter of General Biology, with over 100 students together in the classroom. Many students find college courses to be strikingly different from their high school studies, and when it comes to the sciences, there is no reason to proceed without a fully informed expectation of the course. In order to gain a better understanding of the General Biology 1 and General Biology 2 courses, I interviewed a professor in a science discipline who frequently oversees freshman and introductory courses. Dr. Potts-Santone, an Associate Academic Specialist in the Northeastern Biology Department, generously gave some of her time to answer a few questions pertaining to these courses.

NU SCI: What course(s) do you teach?

DR. POTTS-SANTONE: In the fall, there are two large sections of more than 150 students each in General Biology 1, accompanied by laboratory (BIOL1111 and 1112). In the spring, there is one large section of over 200 students for General Biology 2 and accompanying laboratory (BIOL1113 and 1114). I also teach Invertebrate Zoology and laboratory.

NU SCI: What skills are students expected to have going into your course?

DR. POTTS-SANTONE: Walking into the class with an open mind allows for the best learning after being exposed to the material in high school. If students assume they already know or have a strong grasp of the information presented, they can face an interference with the learning process of both new and old information. With such large class sizes, it is difficult to accommodate all the different learning styles the students have, so knowing your own learning style, whether it be acoustic, visual, experimental, etc, is an important criteria for doing well in the course.

When in the classroom, students should be able to take notes while still paying attention to the lecturer; good notes help process the information and keep you from passively listening without engaging your brain. Even when outside of the classroom, the minimum time put into studying out of class should be two hours for every one hour of lecture. Studying on a regular schedule spread over a period of time instead of cramming the night before is the key to success in this class [*I'd agree with that for any science course! –ND*]. Be proactive in seeking additional help as soon as you feel like you're beginning to fall behind or having difficulty.

NU SCI: What doesn't the short summary in the course catalog capture about this course?

DR. POTTS-SANTONE: An important aspect of this course is that it is a lecture/lab course enrolled by an almost uniquely large student body. Students from many different majors, including Pharmacy, Health Science, and Premeds, have this as a requirement, and many more take General Biology to fulfill a core science requirement.

NU SCI: How is the book utilized by the course? Is it the primary instructional material, or more of an additional learning resource?

DR. POTTS-SANTONE: The primary instructional material is indeed the textbook, and it is essential for properly learning in General Biology 1 and 2. It is important to be exposed to the topics in lecture before class, and review them after lecture.

NU SCI: Are the topics cumulative/sequential? Or is it more of a survey course? Is there a particular section more arduous or vexing than the others to watch out for?

DR. POTTS-SANTONE: General Biology 1 and 2 both examine a wide variety of different sub-disciplines within biology and are meant to be survey courses across the entire discipline. General Biology 1 focuses on no particular domain of life, whereas General Biology 2 contains an emphasis on animals.

For General Biology 1, the biggest hurdle for many students seems to be the section on energy acquisition/usage, such as photosynthesis and metabolism. These biochemical pathways take both a basic understanding of chemistry and the ability to remember large loops. For General Biology 2, the emphasis on scientific terminology and details can present a challenge to some students.

NU SCI: When you took this course in your undergraduate career, what surprised you? What did you find the most exciting?

DR. POTTS-SANTONE: For me the most exciting parts of Biology, then and now, are about exploring all sorts of adaptations, on multiple levels, that suit a living organism for its particular way of life and trying to understand the interconnectedness between living organisms and the environment. I want students to feel both connected to, and protective of, the astounding beauty and diversity of life surrounding them.

NU SCI: What comes next after this course if one decides to continue pursuing the discipline of Biology?

DR. POTTS-SANTONE: Genetics and Molecular Biology would be the next expected course after General Biology 1 and 2 for students majoring in Biology or planning a Pre-med track. Those on the Pharmacy or Health Science track typically take the Human Anatomy and Physiology course next.

—Nicholas A. DeLateur, Chemistry, 2013

Do's and Don'ts for Working with Your Academic Advisor

Do

Ask for their advice on courses you might take, life directions, co-op input.

Don't

Expect them to map everything out for you or to have all the answers.

Do

Schedule an appointment with them well in advance.

Don't

Walk into their office and expect to meet. All of the advisors have a lot of students and meetings need to be booked in advance.

Do

Make sure you're taking the right courses, especially for the first few semesters.

Don't

Wait until the week of course registration to contact your advisor. They're swamped during registration week so your best bet is to think about it a few weeks earlier and shoot them an email or schedule an appointment.

Do

Introduce yourself and make sure they are familiar with your goals. NU is a big school and it's easy to get lost in the mix if you're not proactive.

Don't

Expect them to remember every detail about you. It's not that they don't want to, but there are a lot of students to keep track of. They're there to help though, so be sure to take advantage of their knowledge!

Q&A with Erin Askounis: The Freshman Year Experience

When Erin, 19, got the urge to move across the country from her native California to the East Coast, the bustling urban campus of Northeastern University caught her eye. Now treasurer of the Biochemistry Club and an involved student, she reflects upon her first year so far away from home.

NU SCI: So, I understand you are a sophomore in the College of Science this coming semester. What is your field of study?

ASKOUNIS: I am currently a biochemistry major and loving it!

NU SCI: What is it about that subject that inspired you to pursue it further?

ASKOUNIS: I have always had a passion for science and I had a hard time choosing between biology and chemistry as majors, so I decided that biochemistry was a good medium that would allow me to dabble in both subjects. It's a very versatile degree; that's definitely a plus because I am still figuring out which career path would be best for me. You get a very well-rounded education in the sciences.

NU SCI: What was your experience with introductory classes in your freshman year?

ASKOUNIS: For the most part, the introductory courses freshman year were exactly as I expected: challenging, but doable. Transitioning from taking high school classes to college classes was a bit difficult in the beginning, but once I understood what I had to do to succeed in a class, it was smooth sailing.

NU SCI: Do you have any tips for establishing relationships with professors in large classes?

ASKOUNIS: Definitely go to office hours. I typically would have class or lab during a professor's office hours, but I would talk to them after class or email them. If it was super important, then I would schedule an appointment and ask my questions then. Never underestimate the benefits of one-on-one time with faculty.

NU SCI: Which class was your favorite this semester and why?

ASKOUNIS: I would have to say either Introduction to biochemistry or chemistry. My intro class was really exciting because we got to learn about what we would be doing in the future and what kind of co-ops we could get. I enjoyed chemistry because it has always been a favorite subject of mine and my professor made it even more interesting. He has amazing energy and really made an effort to involve the class, not to mention how available he was to the students outside of lecture!

NU SCI: What do you do outside of the classroom to expand on what you've learned?

ASKOUNIS: Second semester, I found a job working in a lab on campus and I have learned so much more than I had expected. You get so much more hands-on experience than you typically do in class.

NU SCI: How did you originally get involved in lab research?

ASKOUNIS: I looked on the Northeastern research website to see what kind of research was being done on campus and when I found a lab that interested me, I emailed the professor and asked if there were any openings! My advice is to dive right in and start contacting people. It's never too early.

NU SCI: What do you enjoy most about your research?

ASKOUNIS: During laboratory time in class, we learn a wide variety of techniques and procedures tailored to give us an overview of the work done in our general subject area. When participating in research, however; I find that you get to delve more into a specific area of interest and learn extensively about that area. You become more specialized and gain a much greater skill set. Plus, it can be very rewarding to work with other students on a project and feel that you have accomplished something.

NU SCI: What do you plan on doing post-graduation?

ASKOUNIS: As of now, I'm either going to take some time off to join the Peace Corps and then apply to medical school, or just apply to medical school right out of the gate.

NU SCI: What would be your ideal career?

ASKOUNIS: My ideal career would be to work as a pediatrician or a virologist. I'm still undecided and I hope that once I do a few co-ops I'll be able to decide. I'm really looking forward to the chance to try out these careers and test out how I respond to the different work environments.

NU SCI: On a lighter note, what's your favorite thing about living in Boston?

ASKOUNIS: There's always something to do here! You never get bored, between shopping on Newbury Street or going to a game at Fenway with a few friends. Plus, I love how there are so many colleges and universities in the area. Boston is such a young city and it's fun to have tons of people my own age around.

—Jennifer Endress

Rebecca Miller BEHAVIORAL NEUROSCIENCE and PHILOSOPHY DOUBLE MAJOR

NU Science had the opportunity to sit down with third year student Rebecca Miller, who has recently completed her first co-op with the VA New Jersey Health Care System. As a Behavioral Neuroscience and Philosophy Double Major, Miller brought a wide spectrum of knowledge to her position as a Research Assistant with the Veterans Biomedical Research Institute.

NU SCI: Tell us a little about where you worked on co-op.

MILLER: I completed my first co-op as a Research Assistant sponsored by the Veterans Biomedical Research Institute for the VA New Jersey Health Care System. This is to say that I worked for the Department of Veterans Affairs in East Orange, NJ at their War Related Illness and Injury Study Center.

NU SCI: What first interested you in selecting this co-op?

MILLER: Research is one of those things that most science and pre-med students are trying to get under their belt. When it came time to look for a co-op, the idea of pursuing the research field was on my mind. During my search, I came across an opportunity to research with the Department of Veteran Affairs and was immediately intrigued. This position interested me so much because not only was it a paid research position (which isn't terribly common) but I also considered it a way to give thanks and show my appreciation to our nation's brave troops.

NU SCI: What types of responsibilities did you have in your position?

MILLER: Unfortunately, when I began working with my Principal Investigator (PI), he was not as far along in the process as he had hoped to be by the time of my arrival. In the beginning, I did a lot of paperwork to help our PI finish grant applications, subject consent forms, protocols and IRB packets. The truth is, in public research, the paperwork never ends. Eventually, we moved past the bulk of the forms and were able to get more hands-on. I was in charge of purchasing and settings up a lot of physiological research equipment as well as making sure that all three of our lab rooms were getting ready for subjects. In addition to

working in the actual lab, I also had the opportunity to present a paper at one of the center's biweekly "Journal Club" meetings.

NU SCI: How has this co-op affected your future academic and career plans?

MILLER: I think it is true when they say you can always take something away from even the worst of experiences. And let me be clear here, this co-op was NOT something I would consider a "worst experience." However, I did learn that I did not like the field of study I was working in. The center itself was great and I met with some absolutely fantastic, brilliant people, but I learned that research just isn't the career for me. I love the idea of learning and I find new results exciting, but I do not think I have the patience needed for all of the red tape and paperwork. Either way, I left WRIISC with new knowledge and a new appreciation for the research process and all of the effort that goes into it.

NU SCI: What was your favorite aspect of your co-op?

MILLER: This is easy. Hands down, my favorite part of co-op was being able to join my lab (Integrative Human Physiology Laboratory, or IHPL) team on a weeklong business trip to the Houston, Texas National Aeronautics and Space Administration (NASA) campus. At NASA, we saw several subjects and we were able to collect some data. I was able to be a test subject for the Off-Axis Vertical Rotator (OVAR) chair, see a few areas of the campus, and to learn even more about the area of physiological research.

NU SCI: What did you find most challenging about your co-op?

MILLER: My PI/supervisor wasn't around very often. He was constantly traveling around the country and also internationally. Sometimes, we went weeks without seeing him. Having a boss who is always in and out can make certain things difficult to achieve since he isn't there to give his opinion or the go-ahead. It was also difficult to stay driven at times since the IHPL wasn't yet at the stage where we could see subjects at our NJ campus. But I was able to use the down time to speak with other PIs at the center and learn more about other areas/research being conducted right next door or down the hall.

NU SCI: Where do you hope to co-op in the future?

MILLER: I would like to gain some more clinical experience with cohorts that I do not have much exposure to. One of my greatest co-op interests in the Boston area is with the psychiatric department at Arbour Hospital. I am also looking into international co-ops.

NU SCI: What advice would you give students interested in completing a co-op similar to yours?

MILLER: I think one of my biggest faults was not taking on more responsibility. Instead of only editing and reviewing someone's paper draft, ask one of the researchers if they need any help with the writing. Volunteer, volunteer, volunteer! They might not know you are interested in helping with a certain project unless you (politely) offer your assistance. At the same time, know that a lot of PIs are very particular, so don't be offended if they are not receptive to your first offer. Also, learning computer programs for data analysis would have been an enormous help, so if you have the means to learn these programs, go for it!

—Elizabeth Gilbert, International Affairs and Health Science, 2013



Northeastern University is home to over 300 student organizations covering a vast array of interests from ballroom dancing to Greek Life. For an incoming student, finding the right club can seem like a daunting task. Even new applications like OrgSync and old-fashioned events like activities fairs, though informative, may be overwhelming. Here we try to highlight some of the 40 science clubs on campus so that new and seasoned students alike can find the right place to grow and flourish as a scientist.

Some majors have their own clubs, like the Biology, Biochemistry and Linguistics Clubs. The main mission of these groups is to introduce you to others in your major while doing fun activities, to expose you to lectures and events related to your field, and to help you prepare for graduate school. Though these clubs are titled after the majors they represent, they are in no way limited to just biology or biochemistry students. Anyone who has an interest in these fields is welcome to join. One thing to remember when looking at clubs on campus is to not rule one out just because you aren't taking classes in the field. Since Pre-med and Pre-dental are not majors offered at NU, their respective clubs, the Northeastern University American Medical Student Association and NEU Pre-Dental Association, are a great way to meet others on the same track and to prepare you for applying to medical or dental school. For example, the NEU Pre-Dental Association exposes members to the dental industry through relevant conferences and presentations by successful doctors to offer advice and guidance.

Not all science clubs are academic; many are routed in community service. Engineers without Borders focuses on bringing clean water to villages in Honduras and Uganda, while the NU Science Club for Girls promotes an interest in science with girls in grades K-12 through after school programs and mentorship. GlobeMed partners with grassroots organizations to fight global health inequality, improving the healthcare of impoverished people around the world. The American Red Cross and American Cancer Society are national nonprofits represented on campus through the NU American Red Cross and Colleges against Cancer Club (CAC) which serve to further their respective nonprofits goals. CAC hosts one of the largest fundraising events on campus, Relay for Life, which brings students together for an overnight lock-in at Matthews Arena with games, food and ceremonies celebrating and

remembering victims of cancer. These clubs may contain a larger variety of majors, but science does make an appearance. Sarah Jensen, vice president of CAC incorporates science via educational presentations, stating, "During education discussions, the science behind the topic cancer is explained. If a drug or treatment is presented, this science is explained as well." These clubs, though not directly utilizing scientific principles, foster those wishing to use their scientific degree for the greater good.

Though meeting content and frequency varies from group to group, a typical meeting follows the format president Christine Dunne describes for the Northeastern University Student Affiliates of the American Chemical Society (NUSAACS). An hour-long, weekly meeting starts with relevant announcements followed by an activity. NUSAACS meetings usually consist of a speaker talking about what they do within a chemical field, such as green chemistry, cosmetic chemistry or food chemistry. Other nights there may be a student-run workshop to improve resumes or writing skills.

Many groups also have social nights like a potluck or movie viewing to help build relationships and offer a relief from the stress of classes or co-op. Service centered clubs like CAC and GlobalMed center meetings around fundraising for their respective charities and educating the community about their cause.

Often the most important activities for any student group are events and field trips. In the past year NUSAACS visited the Samuel Adams Brewery, MIT Nuclear Reactor Lab, and to the Amgen Laboratories in Rhode Island.

College Against Cancer visits the nearby Hope Lodge to socialize and sometimes cook for the cancer patients staying there during treatment. The Biochemistry club holds three major events throughout the year to help students navigate through the College of Science and beyond – Freshman Info Panel, Undergraduate Research Night, and Graduate Info Night. Megan Troy, the president elect describes the Freshman info panel as an invitation to "our first-year members to ask questions of the upper-classmen about anything they may have encountered so far, such as certain classes, how to start working in research, or when to go on co-ops."

If you are interested in any of these student groups or wish to discover the ones we could not fit in here, visit Orgsync via myNEU. Log-in to your myNEU account, go to the community tab and click on the involveNU link.

Of course, I cannot finish without mentioning *NU Science* magazine, the first publication of its kind on campus. If you like what you're reading and have an interest in writing, science, or graphic design, pop by one of our meetings, held every Monday at 7:30 pm in 245 Ryder Hall.

—Tara Dhingra, Biochemistry 2012

A special thanks to Megan Troy, Sarah Jensen, Christine Dunne and GlobeMed for their contributions to this article.

Northeastern University Student Affiliates of the American Chemical Society (NUSAACS)

PRESIDENT: Christine Dunne

NU SCI: What is the purpose of your club?

DUNNE: The purpose of the Northeastern University Student Affiliates of the American Chemical Society (NUSAACS) is to advance the knowledge of chemistry within the Northeastern student body as well as the Boston area as a whole. Since 2011 is the International Year of Chemistry, a lot of focus will be on the chemistry in the world around each and every one of us. NUSAACS also wants to increase the understanding of how a background in chemistry can be extremely helpful within the real world.

NU SCI: What is a typical meeting like?

DUNNE: A typical meeting would be one hour long on a weeknight (normally Thursday) and the meeting would occur once a week. At the start of the meeting, all important announcements about upcoming events will be presented and then the activity of the meeting will begin. Oftentimes the meeting will consist of a speaker coming in to talk about what they do within the chemical field. On weeks that there are no speakers, students may design workshops to help with resume building or abstract writing skills, for a few examples. Finally, there are meetings where the students will organize a potluck or just play science Scattagories to get to know each other better and have a fun meeting.

NU SCI: Do you take trips throughout the year?

DUNNE: There are a few trips that can be taken throughout the year, all optional, of course. Many times these trips involve going on site to a laboratory and seeing what really happens out in the real world. Last year we took trips to the Samuel Adams Brewery, MIT Nuclear Reactor Lab, and to the Amgen Laboratories in Rhode Island.

NU SCI: Does your club require semester/yearly dues or fees?

DUNNE: There are no semester or yearly fees due to the NUSAACS club. We do encourage all students interested in chemistry to consider joining the national American Chemical Society which does have a yearly fee; however, to be a student member within our club, that is not required.



NUSAACS goes pumpkin picking!

NU SCI: How do you incorporate science into your club? (Do you discuss current research, visit labs on campus or have professors present their research in meetings, etc.?)

DUNNE: NUSAACS works hard to incorporate science in any aspect possible. In the beginning of the meeting, any important news within the chemistry world will be announced and shared with the group. Many times professors will volunteer to come speak with the students about their personal research and share how the students can join a lab to start their very own research. NUSAACS has outside speakers from various aspects of the chemistry world come speak about their work and history. Northeastern alumni come and discuss how their degree helped them to accomplish what they set out to in college. There are lab visits within the Boston and greater Boston area that the students can partake in. Every year for National Chemistry Week the students will perform demos out in the Krentzman quad for any student to join in on. There are many more ways in which NUSAACS incorporates science into the weekly meetings – come join us to find out more!

The Biochemistry Club

PRESIDENT: Megan Troy

The Biochemistry Club is all about sharing our passion for science with anyone who is interested in sharing and hearing new ideas. Our interest is mostly research-based. Throughout the year we schedule many events for our club members, with our most popular events being Freshman Info Panel, Undergraduate Research Night, and Graduate Info Night.

- Freshman Info Panel: First-year members ask questions of the upper-classmen about anything they may have encountered so far, such as certain classes, how to start working in research, or when to go on co-ops.
- Undergraduate Research Night: Faculty and current students present on research being done on campus and give students tips on how to begin a career in research or get funding for a lab.
- Graduate Info Night: Presenters speak about their experience post-undergrad and which paths are available, such as Masters, PhD, medical school, or going directly into the workforce.

We are open to students of any major who are interested in learning more about Biochemistry!

NU Science Club for Girls

NU SCI: What is the purpose of your club?

We are a service organization dedicated to encouraging young girls to explore their interest in the traditionally male-dominated fields of science, math, and engineering. The members of our club are mentors who run weekly science clubs for girls in preschool to 6th grade and volunteers who dedicate their time to various Science Club for Girls (SCfG) events. The Northeastern Chapter of SCfG holds programming on Saturday mornings at Northeastern. Off-campus sites and weekday times are available through the SCfG central office.

NU SCI: What is a typical meeting like?

A typical science club has a preset lesson plan with the supplies provided. The mentors guide the girls through the experiments, prompting them to make observations and asking them questions that will help the girls learn about the topic. Mentors typically meet after clubs to discuss how clubs went and prepare for next week.

NU SCI: Do you take trips throughout the year?

Although we have not yet taken any trips, we are open to suggestions.

NU SCI: Does your club require semesterly/yearly dues or fees?

There are no fees for our club. We do ask for the time commitment to come to science clubs regularly.

NU SCI: How do you incorporate science into your club? (Do you discuss current research, visit labs on campus or have professors present their research in meetings, etc.)

The lessons plans for the science clubs are all science experiments, and the concepts we teach the girls draw on what we learn in classes at Northeastern. We have not yet had the opportunity to have any speakers come talk to the mentors, but we are looking forward to inviting speakers this year.

NU SCI: Anything else you want incoming freshman to know about your club?

It's very rewarding being a mentor and seeing the girls get excited about science. Plus, you get to do cool science experiments with the girls! Last semester, one of the groups made ice cream, another group dissected a fish, and we made tie-dye t-shirts with the girls as an end-of-the-year project. NU SCfG is a lot of fun and a really great experience. If you are interested in joining or learning more, email northeastern@scienceclubforgirls.org.



Relay for Life 2011

Colleges Against Cancer

VICE PRESIDENT: Sarah Jensen

NU SCI: What is the purpose of your club?

JENSEN: To educate the Northeastern community about cancer risks, prevention and other vital information. We fundraise for the American Cancer society and advocate for cancer related policies.

NU SCI: What is a typical meeting like?

JENSEN: We will discuss a certain cancer in terms of education or advocacy, and usually will end doing a task that will help Relay for Life. New this year, we will be breaking up into smaller committees that will play a large role in planning Relay. We're always looking for help in both Colleges Against Cancer and Relay for Life!

GlobeMed

NU SCI: What is the purpose of your club?

GlobeMed is a student led non-profit organization on campus which partners with grassroots organizations around the world to improve the health of the impoverished. We are students with an interest in leading the fight in global health inequity and social justice. We are part of a vast network called GlobeMed, which has 33 chapters nationwide. On campus we fund effective projects to help our partner achieve their mission, organize on-campus events to educate students and host health campaigns. We are currently partnering with Kitovu Mobile, a mobile AIDS clinic in Uganda where we've implemented a Sanitation and Hygiene project. We have finished funding the first phase of our \$5,000 Hygiene and Sanitation Project.

NU SCI: What is a typical meeting like?

A typically meeting consists of breaking into groups to discuss our fundraising projects and having a global health education session. The "globalhealthU" portion of our meetings is where we educate our members on issues that vary each month such as infectious disease. We also col-

laborate with other groups to host panels of professionals on campus to discuss career paths and research.

Most importantly is we accept and welcome people from ANY major. We are always looking for people from outside the medical majors. Many of our leadership are not pre-med. We have theater majors, psychology majors, and more. Everyone can participate in the fight against global health inequity!



GlobeMed posing in Curry Student Center

An Introduction to Co-op Advisors

—Kristina Deak, Biochemistry 2012

Embarking on co-op is a huge part of your Northeastern education and something you should take full advantage of. But as any first time user of myNEUCOOL can tell you, finding the perfect co-op can be a daunting task. Luckily, your co-op advisor is there to help you along the way. They will help give you tips on how to perfect your resume, assist you with your interviewing skills, and, of course, help you find the internship that's right for you. *NU Science* was able to talk with a few advisors from the College of Science to get their input on the process.

KARYN ROSEN, M.ED., CPCC
CO-OP FACULTY COORDINATOR, MATH/PHYSICS



NU SCI: How did you get involved with the co-op program at NU?

KR: After several years of working at IBM in a variety of corporate marketing positions, I found myself at a crossroads. As a former educator, I wanted to use my training as a professional coach with college students to see if I would enjoy working with that population. After volunteering for a few months in Northeastern's Career Services Center, an opportunity to interview for the Math/Physics co-op advisor position became available. The rest, as they say, is history. I have now been working with this segment of the College of Science student population for two years.

NU SCI: What do you think the benefits are of partaking in a co-op experience how many would you suggest pursuing as an undergraduate?

KR: The benefits of co-op cannot be over emphasized. Here are a few:

- Strengthen communication skills – both written and oral
- Increase self confidence
- Acquire professional experience
- Test out different work environments
- Resolve problems
- Receive feedback from co-workers and supervisors
- Build professional networks

Although most students experience two co-ops, and many complete three, there are many opportunities for valuable experiential learning that enhance opportunities for future employment or graduate school. The number of co-ops recommended should depend on the interests of the students.

NU SCI: What sort of experience can a student expect for their first co-op?

KR: Math students have experienced a wide variety of first time co-ops. These can range from teaching assistantships in public schools to research assistants and actuarial positions.

Physics and Biomedical Physics typically find opportunities in technical support or conducting research on campus.

NU SCI: How does this experience change as you enter your second or third co-ops?

KR: The students typically find more sophisticated opportunities for their second and/or third co-op. For example, one of the math students who worked on curriculum for the Boston Public Schools last year is now working in a Finance position at IBM, India. Actuarial positions are more accessible as are higher level marketing and finance jobs.

Physics students frequently leverage their first co-op experience to land opportunities in engineering firms or at national department of energy labs. Many physics students wish to fulfill a co-op goal to work at Woods Hole Oceanographic Institution. This semester two applied Physics majors and one biomedical Physics major are completing their second co-op there. Their geophysical research took them to Botswana and Zambia.

NU SCI: Would you be able to share a few interview tips?

KR:

- Practice answers to the typical interview questions (Tell me about yourself; What are your strengths? What are your weaknesses?)
- Keep responses to <60 secs.
- Research the company and the industry.
- Prepare C.A.R. (Challenge, Action, Result) stories in advance. When the interviewer says "Tell me about a time when....." you'll be able to use one of your C.A.R. stories.
- Prepare three great questions to ask the interviewer(s) at the end of the interview.
- Get their business cards.
- Email a thank you note – Jobs have been won/lost by those who sent (or didn't send) a thank you note.

NU SCI: What has been your favorite experience as a co-op advisor at NU?

KR: It's always a thrill and a reason to celebrate, when a student says, "I got the job!"

JORDAN KEEFE
DIRECTOR OF STUDENT SERVICES



NU SCI: How did you get involved with the co-op program at NU?

JK: I had been an academic advisor previously and I liked the benefit co-op added to a student's studies.

NU SCI: What do you think the benefits are of partaking in a co-op experience? How many would you suggest pursuing as an undergraduate?

JK: The benefits are learning what you do and do not like with regards to a career. You may really love one area of your major and reinforce that on co-op, but you may also find that a certain area or field isn't for you, and that can be just as valuable. I recommend at least one, but depending on the areas you want to try out, two or three may be best!

NU SCI: What sort of experience can a student expect for their first co-op?

JK: It really depends on their previous experiences. If you have done internships or worked with a professor you may have a different experience than if this was your first professional experience.

NU SCI: How does this experience change as you enter your second or third co-op?

JK: Usually, students have more responsibility with each co-op and are also given more in-depth tasks at each position.

NU SCI: Would you be able to share a few interview tips?

JK: There are tons of interview tips! Make sure that you are professional and I definitely recommend doing a mock interview with your coordinator or career services if you are nervous about an interview.

NU SCI: What has been your favorite experience as a co-op advisor at NU?

JK: Getting to know my students and helping them to find the right path for their future.

Matthew Cottle

BEHAVIORAL NEUROSCIENCE MAJOR

Fourth year Behavioral Neuroscience major Matthew Cottle is currently working on co-op at the Arbour Hospital in Jamaica Plain. *NU Science* was able to interview Cottle about his position on co-op and learn more about how the experience has impacted his future.

NU SCI: Where did you work for your co-op?

COTTLE: This is actually my first co-op. I work at Arbour Hospital in Jamaica Plain. It is a psychiatric hospital for adolescents and adults that offers both inpatient and outpatient help to individuals who suffer from psychological disabilities and/or substance abuse.

NU SCI: What caused you to pursue this co-op?

COTTLE: I am hoping to get experience in both the biological and psychological sides of my field from working in different co-ops throughout my undergrad studies. This opportunity seemed unique because it allows students to work closely with patients and be part of a team to assist in their treatment. This job allows co-op students to not only see all of the psych disorders that we study, but also to observe the progress patients can make with the treatments most effective for the disorder and individual.

NU SCI: During your co-op, what were your day-to-day duties/experiences?

COTTLE: Each day, I am assigned the responsibility of ensuring the safety and compliance of a team of patients. Patient's vital signs need to be measured regularly, and depending on the severity of psychosis, a patient may need more assistance or encouragement in keeping up with the normal everyday activities you or I may take for granted. One-on-one meeting notes need to be taken for each patient on my daily team so that their nurses and doctors are able to keep up with their activity on the unit when they are not able to meet with or observe them.

NU SCI: How has this co-op affected your future goals?

COTTLE: This co-op has made me realize that, while I am fascinated by laboratory research in the neuroscience and biological fields, I enjoy working with

continued on p. 15

The Co-op Connection: How to Land the Perfect Co-op

When it comes to getting an education at Northeastern University, one of the most exciting and rewarding experiences available is the co-op program. It is a reason that many students choose to attend the school, and gives its participants a chance to see what is in store for them in their future careers. The process of applying for co-ops and interviewing for positions takes a lot of hard work, but here are some tips to help you navigate from applications to acceptance:

- The first step to landing a great co-op is the resume. Your resume is the very first part of your application that a company will see, and first impressions are crucial. While your Intro to Co-op class will be very helpful in designing and editing the first draft of your resume, it is important to continuously update your resume before sending it out to potential employers. Besides content, a resume should also create a nice visual. Co-op advisors are more than happy to help work on the aesthetics of your resume.
- Keep your options open. The more jobs you apply for, the more likely you are to get one. This means that you may have to apply for positions that you hadn't considered before. No matter where you co-op or what kind of job you find, you will still gain great experience and maybe even discover that the job you hadn't thought of could be perfect for you!
- Compile a list of a couple of people to serve as professional references and create a sheet with their contact information. Ask your advisor or a faculty member who knows you well enough to be able to recommend you to a position.
- After applications, the next important step is the interview. Depending on the company and the location, the interviews can either be done over the phone or in person. Regardless of how the interview is conducted, the most important step to take after scheduling an interview is to do some research on the company. Find out the name of the person who is supervising the position and read up on their most current research publications. The more you know about the position and the company, the more you will be able to discuss with the interviewer. Having done research prior to the interview shows the company that you are very interested in the job and willing to do work on your own to learn about your potential new employer. It also can help you develop questions to ask an interviewer about.
- For interviews that are done in person, dressing appropriately is key. Suits or shirts and ties for men, and skirt suits or slacks for women are appropriate. Oftentimes the interview is the first time that you will get to meet your potential supervisor for co-op, and dressing correctly can help make the best first impression possible. When in doubt, it is always better to be overdressed!

- Keep a clean folder set aside to take to any interview that includes extra printed copies of your resume, professional references, note-paper and a pen. The interviewer may bring a copy of your resume with them, but it never hurts to have an extra one just in case. Take notes on each position during interviews and gather contact information from interviewers, in case you come up with more questions after an interview has ended.
- Be patient throughout the application process. Every company does selections on a different timeline, and it can be altered by number of applicants, number of positions, or unexpected goings-on at the company. Don't get discouraged by other classmates discussing where they have interviewed or who has been offered positions. It will only lead to unnecessary stress.

While all of these points are important in preparing for co-op applications and in navigating the interview and selection process, the most important piece of advice, as cliché as it sounds, is to be yourself. Sticking to what you believe in and the topics you are interested in learning about will ultimately lead you to the co-op that will provide the best possible experience. The process might seem daunting at first, but the knowledge gained is well worth the effort.

—Megan Troy, Biochemistry, 2014

people more than test tubes and am now more interested in pursuing a clinical career.

NU SCI: What was the best thing about your position?

COTTLE: The best thing about working at Arbour Hospital is the great exposure it gives to the illnesses in the DSM (Diagnostic and Statistical Manual of Mental Disorders), seeing the different ways they manifest in an individual, and experiencing the ways that different treatments most effectively aid in the healing process. Co-op is such an important aspect of our education because it brings our textbooks to life.

NU SCI: What was one of the more difficult aspects of your co-op?

COTTLE: Quite frankly, when working on an acute unit in a psychotic hospital, you take a lot of verbal abuse from patients who aren't in complete control. Also, there are times when the job can get physical when there is no other option for maintaining a patient's safety.

NU SCI: How were you able to apply your experiences in the classroom to your co-op experience?

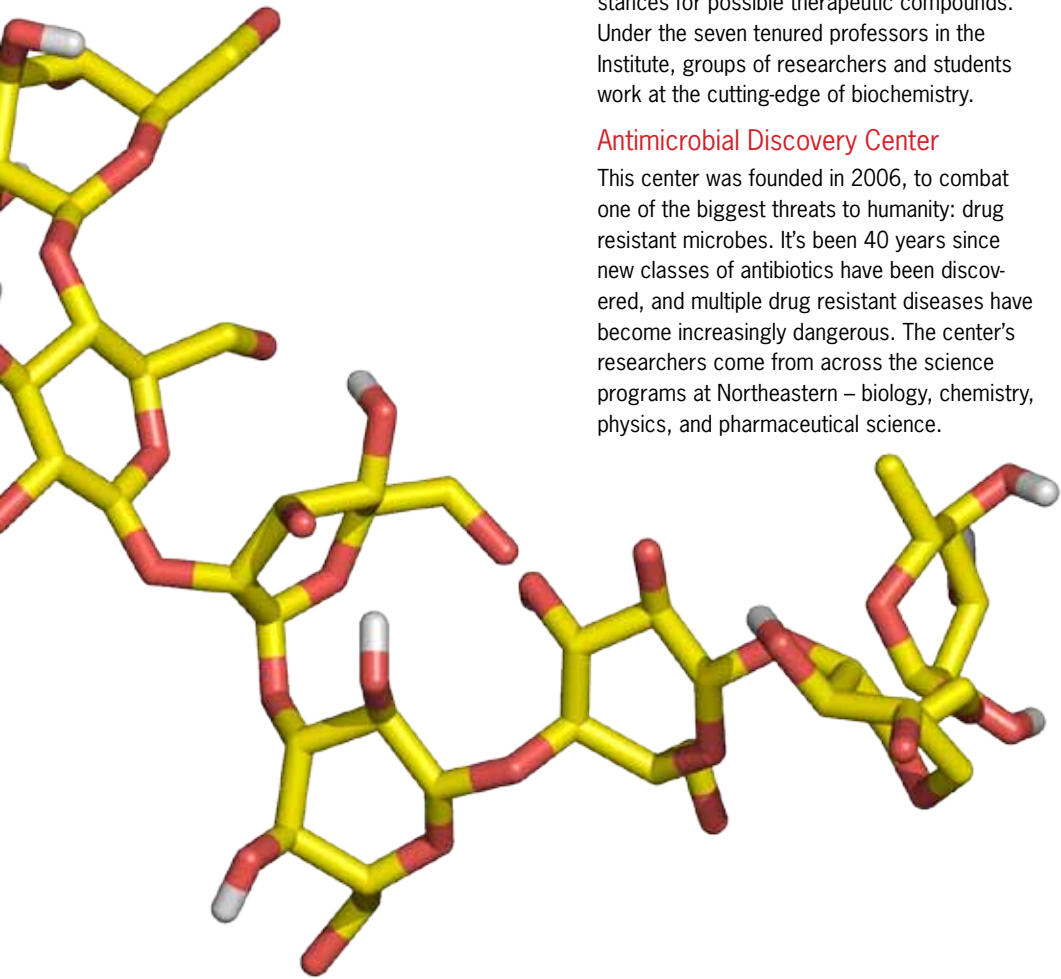
COTTLE: It is important to know about the different mental illnesses going into the job. Psychology classes help you to understand a patient's diagnosis and how to deal with that individual.

NU SCI: What advice would you give students interested in completing a co-op similar to yours?

COTTLE: My best advice would be to go into any co-op with an open mind, and be prepared for anything. In settings such as a psychiatric hospital, it is extremely important to be able to work as a close team with the rest of your staff. Be confident in yourself, your abilities, and what you can bring to your job. Don't hold any of it back. It is also important to go to work everyday like it is a new day and not hold onto the things that happened yesterday. With patients who are getting treatment and improving, it is more beneficial for them to not have you focused on the bad things they did in the past, but on the good things they are doing now.

—Elizabeth Gilbert, International Affairs and Health Science, 2013

Centers of Research on Campus



Barnett Institute of Chemical and Biological Analysis

This interdisciplinary center of research brings together analytical chemistry and systems biology to develop and apply new technologies in research and medicine. Since being established in 1973, students and researchers have published more than 975 papers and now hold more than 70 patents, which together bring about \$1 million a year to the university. Located in the Department of Chemistry and Chemical Biology, the Barnett Institute has pioneered such advancements as discovering biomarkers for breast, cervical, and lung cancers; multiple lectin affinity chromatography (MLAC), a revolutionary way to isolate an important class of proteins; and the use of capillary electrophoresis to screen natural substances for possible therapeutic compounds. Under the seven tenured professors in the Institute, groups of researchers and students work at the cutting-edge of biochemistry.

Antimicrobial Discovery Center

This center was founded in 2006, to combat one of the biggest threats to humanity: drug resistant microbes. It's been 40 years since new classes of antibiotics have been discovered, and multiple drug resistant diseases have become increasingly dangerous. The center's researchers come from across the science programs at Northeastern – biology, chemistry, physics, and pharmaceutical science.

Center for Drug Discovery

Working with the biotechnology and pharmaceutical industries, this center researches the methods of action of drugs in order to develop better therapeutic techniques. Areas of study include the blood-brain barrier, drug receptor interactions, and the role of membranes in drug activity. Classes of drugs being studied include cannabinoids, steroids, and antineoplastic ether lipids.

Center for Interdisciplinary Research on Complex Systems (CIRCS)

CIRCS was founded in 1995 as part of an effort to bring researchers of various backgrounds together to work on both biological and material science problems. Examples of the center's work include computer models to study HIV replication and cardiac dynamics; research on the formation of the mitotic spindle; and computational neural models. Twelve faculty members from physics, chemistry, mathematics, and electrical and computer engineering, as well as undergraduate and graduate students provide the backbone for this center, which has partnerships with Cornell, UCLA, and MIT.

Center for Complex Network Research

Research in this center has included studying the Internet (websites are, on average, 19 clicks from each other), complex cellular systems, and sociological connections, such as adding science to the game "Six Degrees of Kevin Bacon". Advances in network research promise to change our understanding of neuroscience, cell biology, and all other types of complex systems.

Marine Science Center

Located on a peninsula a few miles outside of Boston, the center is home to year-round research, teaching and diving. Research includes genetically engineered seaweed to clean wastewater from agricultural facilities, new antibiotics, and underwater robots. It is also the base for the Three Seas Program, in which 20 students spend a year studying in Friday Harbor Laboratories at the University of Washington, Panama and the Marine Science Center in Nahant.

New England Inflammation and Tissue Protection Institute

Founded in 2003, this center's work focuses on the mechanisms of tissue inflammation, and its role in fighting disease. The research builds the body of knowledge necessary to combat cancer and develop new approaches to vaccines.

—Cat Ferguson, Behavioral Neuroscience, 2013

“Alumni” :(

Let me start out by saying, 5 years is definitely not enough.

It's been 3 months since graduation day and somehow I still have to convince myself that I'm not in college. It feels like the end of an era. Looking back, I can absolutely say I made the most out of my time at Northeastern and I wouldn't change a thing. So, here are a few words about my journey through NU and a few pieces of advice to you lucky undergrads...

I entered Northeastern with the intention to graduate with a Biology degree and a pre-med concentration. Five years later, I did just that. I recently applied to medical school with the help of the Northeastern pre-health advising department. I must say, it wasn't an easy road, as I'm sure most of you can relate to. Now, I find that I am finally at a sense of ease and I am confident in my competitiveness as an applicant. This is directly attributed to my strong academic foundation as well as all of the undergraduate opportunities that I was able to take part in.

Academics are easily the most important asset in post-grad endeavors. I remember studying for the MCAT and being thankful for everything that I remembered from my NU courses. Regulatory Cell Biology was fundamental in my MCAT preparation thanks to Professor Wendy Smith's MCAT style testing questions. Equally as challenging and beneficial was the infamous Organic Chemistry. Yet, my favorite class by far was Biochemistry with Professor Manning. I can vividly remember light bulbs going off in my mind when I was able to truly understand how Chemistry and Physics all related to the processes within the human body. Although at times the tests, endless nights of reading and 8AM labs seem impossible, it was all worth it. Take the time to understand your coursework, otherwise you will find yourself having to re-learn things that you already know years later. It wasn't the random facts that I had learned along the way, but ultimately it was the accumulation of all this material that made my undergraduate education truly valuable.

As much as academics are the most important, it is not the only determining factor. Now remember, you didn't choose an ordinary school. You chose a five year school. You chose a school in the heart of

Boston with the best hospitals and biotech companies in the world! Northeastern is unique to say the least. Post-grad jobs are hard to come by, but rest assured that having co-op experiences on your resume already puts you ahead of the game. In my experience, employers were impressed by the fact that I took advantage of so many undergraduate opportunities. They were especially interested in the fact that I had a variety of research experience both through internships at biotech companies and within the Northeastern academic community. These experiences truly made me stand out amongst other applicants.

Currently I am working as a Research Associate within the Division of Cardiovascular Medicine at Brigham and Women's Hospital. To top it all off, my resume was given to the department by a recruiter who I met through the Northeastern career services office! Thanks to NU, I find myself well versed in the field of science; not as an unsure student, but as a young professional within the healthcare field, confident in my future career.

I wish that someone had told me 5 years ago that your early 20's would be one of the most challenging times in your life. So, here I am warning you! Graduating is really an eye opening experience to say the least. The real world is full of decisions and soul searching. Luckily, you still have time left to prepare! So as a student, focus on yourself, what you are capable of, and what you want to make out of your five years. Make decisions that will positively impact your future. In the end, a diploma is only a piece of paper. It is really what you've done along the way that makes your education worthwhile. Take advantage of everything while you can: study abroad, research, on campus organizations and clubs, community service, and internships! Do it all! Northeastern will give you the tools to do well, but it is ultimately your responsibility to use them to the fullest. Once you graduate, your privileges dwindle quickly. No more gym membership, cafeteria, or even student discounts! Luckily there is one thing that no one can ever take away from you: your lifetime connection to this University; your forever reputation as a Northeastern "Husky"!

—Andrea DeDonato, Biology, 2011

“Alumni” :(

James Peerless, Chemical Engineering, 2011

1. Why did you decide to go to NU?

Interestingly enough, Northeastern was the only northern school I applied to. I nearly ended up at Clemson in South Carolina. Two things happened when I visited Northeastern for an open house. First, the ride was only two hours to campus. Second, the professors were legitimately excited about what they do. Whatever it was they were talking about, I wanted in, and I wanted them to show me the way.



2. Did you enter NU knowing what you wanted to do and what you wanted to study?

I did want to be a chemical engineer before I entered school, but I had a different path in mind. I originally wanted to focus on pharmaceutical engineering. After a bad co-op experience and some influential classes, I switched to a materials focus.

3. What were your favorite courses?

My favorite courses were the ChemE transport courses (one and two). These are math-first classes that study fluid dynamics, heat and mass transfer. I've always appreciated the ability of mathematics to describe and predict natural phenomena. A few awesome professors didn't hurt either (Prof. Ziemer/Prof. Satvat).

4. Which courses most helped you to prepare for the future?

Each course added a little something. The thing you learn most in college is how to set up problems, what it means to be successful, how to work your butt off, and why working your butt off leads to being successful. The above two classes were exemplary in this respect, so they're de facto winners.

5. What were your co-op experiences like and how did they help you prepare for life after graduation?

I could be one of NU's many poster children for co-op. My first co-op switched my career paths from pharmaceuticals. My second two were at the company I now work for. My last two were great, thus leading to my job. And yes, these co-ops prepared me for my current job.

6. Do you have any advice for students applying to chemE co-ops?

For students applying, I guess all I could say is don't worry about not getting calls early, and just weigh your options based on clearly defined factors (commute, pay, future implications, etc.) For interviewing, if you're over 15 minutes early, take a walk around the block. This is a pet peeve of many interviewers. Other than that, just relax and try to come off as a person people would enjoy working with. Interviewers for co-op jobs don't expect you to know everything, just be reliable and fun to work with.

7. What are your plans now that you've graduated?

Right now, I'm focusing on work. That may not be the statement of the century, but it takes a little while to get acclimated. From there, I'll find where to go with my career; if grad school's right for me, a change of industry, or a complete change of career path. It all can change in the next couple years.

8. How did NU help you prepare for the future and what were your favorite parts of your NU education?

Northeastern's biggest gift to me was its general environment of career-oriented and forward-thinking students. The students here know how to have fun, but there's a subtle difference in the conversations you have at NU and those you'll have at UCONN. People have an idea of where they're going here. At other schools they mostly just care about where their next beer is coming from (not that it's not important) and what they saw on spring break (not that I'm not fascinated). The sense of focus was the best part of NU.



Heading to Vet School! An Interview with recent graduate, Aria Castori

Many have an affinity for animals and would love to spend their days working with them, but few realize the stamina, intellect, and determination it takes to become a veterinarian. NU Science magazine had the opportunity to talk with Aria Castori, a recent graduate, about her admittance to veterinary school and her experiences at Northeastern. While an undergraduate, Aria was an impeccable student, actively involved in a number of clubs on campus. Since graduating with a BS in Biology in December 2010, she has been working full-time at a local veterinary clinic, where she had completed two rounds of co-op. She was admitted to the prestigious veterinary medicine program at Cornell University, and will be graduating with a DVM (Doctor of Veterinary Medicine) in 2015.

NU SCI: Has your desire to work with animals and train in veterinary medicine been life-long or has it developed recently?

ARIA: My desire to work with animals began in high school. I thought I wanted to work in the human medical field but chose an internship at the Humane Society of New York almost on a whim. I absolutely fell in love with the environment and changed my career path to veterinary medicine.

NU SCI: Did you decide to attend NU with this career path in mind?

ARIA: Yes, I chose NU with this career path in mind. I was attracted to the co-op program and saw it as a way to gain meaningful experience in my field without having to rely on part-time or summer jobs as my only opening into the veterinary community. I also wanted to attend college in a city, and Boston fits the bill.

NU SCI: Did you partake in any co-ops and were they beneficial?

ARIA: I completed two rounds of co-op at the South Bay Veterinary Group as a veterinary assistant, working with dogs and cats. This is where I received the bulk of my veterinary experience and I would not trade this opportunity for anything. I highly recommend working here. I also interned (alternative co-op) at the New England Aquarium as a diver in the Giant Ocean Tank. This was an amazing experience that opened my eyes to the world of aquatic animal medicine. Both of these experiences allowed me to explore different aspects of the veterinary field, acquire skills necessary to enter the workforce after college, and made me a competitive applicant for veterinary school.

NU SCI: Which elective classes would you recommend to undergrads interested in veterinary science?

ARIA: I enjoyed Marine Birds & Mammals, Beginning Scuba, Environment & Society, and all zoology courses (such as Vertebrate Zoology). Although my elective choices did

not stray far from my chosen field, if I had more time I would have taken electives that explored my interests outside of the veterinary field, as this is the only time you will ever be able to take such classes again.

NU SCI: Which courses do you think were most beneficial to your education and for your preparation for vet school?

ARIA: Almost every biology class I've taken has proved to be beneficial to my prep for veterinary school. The classes that stand out the most in my mind are Genetics and Molecular Biology, Microbiology, Marine Birds and Mammals, and Vertebrate Zoology. The former two courses and especially their corresponding labs helped me acquire laboratory skills that I know will come in handy during veterinary school and the latter two courses proved useful during my co-ops.

NU SCI: Admissions to graduate school are difficult, and even more so for veterinary programs. How did you deal with the pressure and do you have any advice for conducting a successful search?

ARIA: I planned my schedule such that I was on co-op and then interning during the application process. This way, the only studying I had to worry about was for the GRE and the only essays I needed to write were for applications. If possible, I highly recommend this strategy to lower stress during applications. If I could do it again, I would have started studying for the GREs far earlier than the spring of application year so that I would be done with the GREs before applications began in June. Also, I cannot recommend NU's writing center highly enough. The tutors there were invaluable to me. I also recommend researching schools to apply to as if you already got in everywhere and have to decide between them. It is a waste of time and money to apply to schools you aren't excited about going to, and it can show on your application to those schools as well.

NU SCI: What are your plans for the next few years and how has your time at NU helped to shape your future?

ARIA: I will be attending Cornell's College of Veterinary Medicine this fall. It will be quite the journey and I have NU to thank for helping me get to this point. Right now my interests are in aquatic and wildlife medicine, but I am remaining open to the many different paths I can take in this field.

IT'S ALL ABOUT THE JOURNEY



Maybe the most important thing I've learned at NU is that you should take time to explore during your undergrad years. It's a unique period when you aren't really expected to know everything and you can take the time to really figure out what is right for you.

Some people enter college knowing exactly what they want to do with their life. It's as if they've sprung from the womb ingrained with a desire to become a doctor, or a rocket scientist, or to study some eccentric form of bacteria living on the bottom of their shoes. They had their courses for all five years mapped out before orientation, started looking for grad schools as a freshman, and have never wavered in their path toward their chosen professions.

Then there are those who enter with a vague idea of what they want to do, try out a bunch of different majors, and finally figure it out, long after their family and friends have given up asking about their interests. If you're one of the latter, don't panic. I was too and so far it's worked out beyond my wildest dreams.

I was the first person in my family to go to college and this carried with it both a fair amount of responsibility and obstacles. The first task was to convince my very blue-collar, grounded family that higher education was the best thing for my future. The next, to find a major that sounded immensely lucrative, to help convince my parents that the investment in a five year education would pay off in the long-run. In high school, my interests were in music, English, and history, but I knew none of these fields would be an easy sell. Instead, I entered Northeastern in the fall of 2007 as an International Business major with concentrations in Finance and Spanish.

The first semester was alright. I was getting acclimated to college life, exploring the city, and meeting new people. I wasn't challenged academically, but I figured that would come with time, and I filled my afternoons with a wide variety of clubs and activities like Model UN and Tastemakers. By the second semester though, I was pretty sure I needed a change. A few weeks into my internship at a financial firm the decision was solidified: I needed out! After some soul-searching and re-evaluating, I landed upon a new major, Biochemistry.

The jump from business to biochem may seem a bit drastic and it was. Science had been a calling much earlier in life, when I was fascinated by sharks and the natural world and would stay in at recess to dissect a fish one of my teachers had caught. Biochemistry seemed like an intriguing, rigorous, and rewarding field, both in life experience and job opportunities, and I was sold.

The switch to biochemistry was perhaps the most wonderful and defining decision in my life. I was once again immersed in a field where you could study all day and night and still have more material to pour over, a place where new developments occurred by the minute, and a place where you were (almost) never required to wear suits. The first few weeks were admittedly difficult. I hadn't taken a science course in two years, and here I was in a class with some of those, "from the womb" biology addicts. But it soon clicked and the passion to learn and discover was overwhelming. When I entered middler year and was able to start co-op, it just got better.

My first co-op experience was at the Cambridge Water Department, where I learned the basics of water chemistry, field sampling, and microbiology. It was my first real lab job and a tremendous learning experience, as the

co-ops are expected to run the majority of the day-to-day experimental activities in the lab. It was also a lot of fun, as once a week I was entitled to explore Cambridge in an orange truck while sampling for water quality around the city.

A wonderful asset of Northeastern is the way course scheduling works. After this six-month co-op I had a two-month gap before my classes began in the fall. During this time I worked at Boehringer-Ingelheim, one of the largest private pharmaceutical companies in the world. My project for this period was to look at changes in microRNA expression upon stimulation by a variety of pro-inflammatory cytokines. Not only was the work fascinating, but also I received an excellent primer in genetics and molecular biology, which would make future course work much easier. Entering fall semester 2010 I was a much more confident student both academically and in my scientific techniques.

I am just now finishing my second 8-month co-op/job period away from school. From January to May I worked at Mote Marine Laboratory in Sarasota, Florida in their Aquatic Toxicology lab. I assisted in a variety of projects, including work with the effects of contaminants on DNA in organisms from Baltimore Harbor, tissue analysis of dolphins, fish, and other organisms for the presence of PCBs and other toxicants, and of course, work on projects regarding the BP oil spill. My colleagues at Mote were absolutely fantastic and let me help out in a variety of other tasks, including water sampling around Sarasota Bay and participating in the shark training sessions every week. By far, the most exciting part of this internship was

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participation in a shark research cruise. We went out in the Gulf of Mexico to sample sharks and test their tissues, blood, and DNA for PAH contamination and plausible effects from the spill. The trip was enlightening, liberating, and critical in my development as a scientist.

From June through August, I was a Summer Student Fellow at Woods Hole Oceanographic Institution, the world's largest privately funded ocean research center. For people interested in marine systems, working at WHOI is generally a life-goal, and its name peppers the resumes of the many of the most accomplished marine scientists in the world. I completed a research project in the Aquatic Toxicology lab of Dr. Mark Hahn, looking at the effect of teratogen behavior on microRNA expression in zebrafish (*Danio rerio*). It would be impossible to quantify the utility of this project or internship as a whole, as it was essential in shaping my view of academic science and all the possibilities therein. At the end of the summer, the fellows were required to give a talk before their department, as well as prepare a final paper. While this was a stressful time (think finals week on steroids), it was a remarkable experience and one that I am incredibly thankful to have been chosen to participate in.

So why did I just feel the need to recount my resume for you? Not to tell you every detail of my life, but rather, to show you that you don't need to know what you want to do from birth to accomplish great things. I never would have believed three years ago that I would have

spent the past eight months working in marine science and aquatic toxicology, participated in a research cruise, spent quality time working with sharks, or given a talk at WHOI with a publication on the way. There's still a lot to accomplish before this final year at Northeastern is complete and to be honest, I still haven't figured out exactly what I want to do and what the next steps are. But each of these experiences has helped a little more, has introduced me to new ideas, and has added another line to that all-important resume.

The bottom line here is that someday or another, hard work will always be rewarded, regardless of whether it's applied consistently in one direction or is dispersed among a variety of interests. Maybe the most important thing I've learned at NU is that you should take time to explore during your undergrad years. It's a unique period when you aren't really expected to know everything and you can take the time to really figure out what is right for you. Everyone has a different way to get to their career goals, and if you've made it this far, you'll probably end up somewhere great in the end. It's really all about the *journey* to that end point and the paths you explore in the mean time.

—Kristina Deak, Biochemistry, 2012



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