Fostering a Community of Neuroscientists

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The **Interdisciplinary Program in Neuroscience (IPN)** at Georgetown may have a unique view on how future brain scientists should be trained, but one thing sets the program far apart – a softball team, a flag, and a color guard to carry it.

During IPN's annual September retreat for faculty and students, **G. William Rebeck, PhD**, who directs the program, will unveil the flag that looks like a skull and crossbones but which is actually a slice of brain with intertwining neurons. A contingent of faculty and students will carry it to the traditional softball game.

The camaraderie is not manufactured, Rebeck says.

"Students really associate with the program and like being part of it, and their instructors are the custodians: we all learn together," he says. "It is a remarkably collaborative environment that works particularly well with neuroscience."

That's because neuroscience is all about the brain, and "understanding the brain requires many different types of approaches," Rebeck says. "Neuroscience covers everything from a neuron all the way up to how a person recognizes faces. More than a lot of disciplines, neuroscience is so broad that if you were limiting yourself to just one topic you would miss out on too much."

The IPN began matriculating students in 1994 with a goal of training doctoral students for independent research and teaching in neuroscience. Candidates for the PhD degree are required to obtain a background covering cellular, molecular, and systems approaches in neurosciences. They take mandated courses, advanced electives and at least three laboratory rotations, and end with an original independent research project. The whole process takes about five years.

Fourteen different departments have faculty involved in IPN, which is the only interdisciplinary program of its kind at GUMC. They enroll about 10 students per year.

As novel as the program was 16 years ago, it is even more exciting today, Rebeck says.

"We are at a nice moment in history when we are figuring things out about the brain – such as depression and dementia - but we haven't progressed so far that people think we have answered the important questions," he says. "Interesting and incredibly vital clinical questions still remain, such as the roots of autism and schizophrenia.

"And then there is the complex structure of the brain itself – a single neuron has thousands of connections, and there are billions of neurons," Rebeck says. "It is better than the best supercomputer. It can change and learn. It can repair itself. There is so much still to uncover."

IPN students share Rebeck's enthusiasm. Many say they were drawn to the program for two reasons – the chance to be exposed to the many disciplines within neurosciences, and the welcoming atmosphere.

Jeremy Purcell, who came in 2005, said he had always had a deep-seated fascination with the brain/mind and how it works but wasn't sure about which aspect of neuroscience he wanted to explore. "The IPN program seemed an ideal fit because not only did it not mind the fact that I didn't know what to study, but actually encouraged such open-mindedness.

"This is in contrast to programs which foster a more focused approach to neuroscience and encourage students to find their niche early and dig deep into it quickly such that the breadth of neuroscience is given barely a passing glance," Purcell says. "By encompassing multiple disciplines whose singular focus is how the brain/mind work, the IPN has opened the doors to new avenues of neuroscience research that encourages understanding and collaborations across multiple areas of study."

Purcell now works with **Guinevere Eden, PhD**, in the **Center for the Study of Learning**. He is fascinated with how the brain works within the context of written language, which is a cultural, not a biological, invention. "How does this happen? Exploring this question provides me with a window into how the brain/mind works," he says.

IPN graduate **Danielle Evers, PhD**, who is preparing to work as a AAAS fellow in the White House Office of Science and Technology Policy, was also drawn to the IPN because of the diversity of research as well as the "proximity to policy opportunities," she says.

"I felt I was not yet convinced of the area in which I wanted to gain mastery and I thought it an incredible advantage to gain hands-on experience in several areas and with different mentors before committing to a thesis topic," she says. "This and the openness of the program for their students to explore interests outside the laboratory, particularly in science policy excited me most."

Melissa Herman, PhD, an IPN graduate who is doing her postdoctoral training at the Scripps Research Institute, said her experience at Georgetown has resulted in "long-term bonds across disciplines, which I feel is professionally advantageous as people progress and secure permanent positions in scientific careers."

She initially applied to the IPN program because of "the program was clearly very student-driven. All the students I interacted with felt invested in the program and wanted to see the program improve, which impressed me and was lacking in other programs I interviewed with.

"The camaraderie amongst students - even students working in diverse research areas - is an incredible support system during thesis work," Herman says. "When things get frustrating there are times when students feel very isolated and even good students actually question their ability to pursue research.

"During these times, I think it is invaluable to have a supportive student group made up of students from diverse research areas. For example, when I had difficulties with a lack of consistency in a particular *in vivo* result, I could find empathy from a student conducting MRI studies in humans where the degree of variability is even greater," she says. "The ability of students to commiserate across disciplines is a strength of the IPN and is a direct result of the interdisciplinary approach."

Sonya Dumanis, a current IPN student, echoed the thoughts of her fellow students. "Unlike some other programs that I have visited, the IPN is surprisingly cohesive. The students knew each other and many have collaborated on projects," she says. "Also, because of the interdisciplinary emphasis, the students had also established good relations with numerous faculty members from various departments. To succeed in science, one needs to be able to work in a team. The collaborative nature of the program fits with this belief."

Dumanis, who is working in Rebeck's lab, says she chose to study neurodegenerative diseases for personal reasons. "There are many people who I know who have been affected by stroke, Parkinson's or Alzheimer's disease," she says. "Trying to understand what causes these various conditions and what may potentially alleviate these diseases is what motivates me to come to the lab every day."

Rebeck credits IPN students for fostering a lot of collaborative research between disparate neuroscience laboratories. "The graduate students are the ones produce lot of interesting research. They read new papers, are excited, work long hours, have different interests than perhaps a faculty member does. That takes research in direction that it might not have gone without such input.

He adds, "Our little secret is that this PhD program helps keep the quality of neuroscience research at Georgetown high, and our students have only themselves to thank for that."

By Renee Twombly, GUMC Communications

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