
FEATURES

TECHNOLOGY

Opening doors to undergraduate research

By MARIN TAKIKAWA *Contributing Writer*

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Think professors don't know how intimidating the process for finding research can be? Think again.

The formation of BCS 206, "Undergraduate Research in Cognitive Sciences," last fall was initiated by a department faculty meeting in which professors discussed how to ease the stresses of an undergraduate research experience at UR.

"The idea was to offer hands-on research experience to undergraduate students because we know people want research," Assistant Professor Chigusa Kurumada said "It's intimidating to email a professor to find out about a lab."

Geared toward sophomores and juniors, BCS 206 is the first of a two-semester sequence (BCS 207 being the second in the spring semester) that allows students to get research experience and learn about the methods needed for behind-the-scenes research work.

During the first semester of the class, students are broken up into small groups, each headed by a BCS faculty mentor, and assigned to replicate a published study. These replications involve every aspect of the research process: creating an experimental setup, collecting data, and presenting findings.

During the second semester in BCS 207, the groups add a new aspect to their research that the original researchers had not tested.

An example of a study being replicated this year analyzes the understanding of foreign-accented speech.

"If someone has a strong accent, at the beginning it's difficult to understand them but it gets easier," Kurumada said. "We run an experiment of someone speaking with a strong accent. Subjects type up what they're saying, and we see how accurate they perceive [the speech] and how that comprehension changes over time."

Each week, one class meeting focuses on giving reports about the progress the students made on their studies, while the other day focuses on ensuring that students are well-versed in the techniques that go into research, such as statistics, programming, and scientific writing.

On top of meeting twice a week for class, the students meet with their mentors weekly and also put in a few hours at the lab they're working at. When students are at their busiest, they could be putting in five to ten hours of work a week.

To ensure that the broad areas of interests the class might have can be properly covered, BCS 206/207 is headed by two professors with different specializations: Kurumada's expertise is in higher-level cognition, Assistant Professor Ralf Haefner's in low-level perception.

"It's not research in class, but we try to make it as hands-on as possible," Haefner said. He intends to focus on computing statistics next week, but aims to have students follow along with his exercises by trying it out themselves on their laptops.

For juniors Anaclare Sullivan and Bethany Gardner, who took the BCS research course, the class seemed like a good opportunity to do something they had genuine interest in and to start research early. The two had in fact traveled to Bilbao, Spain, at the beginning of the fall semester to present their findings they had done in BCS 206 and 207 in the 2016 Architectures and Mechanisms for Language Processing Conference.

"Writing a scientific paper is a pretty high bar to cross, but [...] all the groups presented their posters at the undergraduate research fair last year," Haefner said "One group presented at the national undergraduate research fair and some groups pursued other opportunities and venues."

In their case, Gardner and Sullivan had pursued "other opportunities" with their research after the suggestion of their faculty mentor. They submitted an abstract of their research for review and were accepted to present a poster version of their work.

The study Gardner and Sullivan replicated with their group focused on the effects of speaker-specific information on pragmatic inferences. They tested how an individual's perception of the speaker—if they perceive them in a reliable or an unreliable manner—affects their real time processing of the spoken language.

"If the listener has reason to believe the speaker is somehow abnormal, their anticipatory eye movements to objects referred to in conversation will be delayed completely subconsciously," Sullivan said.

To successfully replicate this study, Sullivan and Gardner learned eye-tracking methods and data analysis to help with the actual collection of data. Class presentations and feedback from both the professors and their classmates helped refine their methods against problems they encountered while running the study.

For both of them, going to the conference was an “eye-opening experience.”

“[It’s] not a conference usually attended by undergrads, but once we got there we were treated as fellow researchers,” Sullivan said. “Getting feedback on your own research from someone who’s done far more work, and far more influential work, was an amazing opportunity.”

Both Sullivan and Gardner echoed their enjoyment of the class.

“This class was a phenomenal experience. In the span of a semester, I learned to literally run a study, from planning to data collection, to post processing and final presentation,” Sullivan said.

She recommends it to fellow BCS majors, and said she felt “more like a peer than someone being lectured at.”

The application process opens during the spring semester, and can be found on the Brain & Cognitive Sciences Department website. Students applying should have taken two BCS courses out of the following options: BCS 110, 111, 151, 152, 153. Students should have also taken a statistics course or will need to take one concurrently with BCS 206. A semester’s worth of computer programming is also required.

Marin Takikawa is a member of the Class of 2018.

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