ACADEMIC PROGRAMS

Thesis retreats give grad students a writing community

In 2015, Leslie Bruce, a Cal State Fullerton lecturer in English and faculty fellow for Writing Across the Curriculum, noticed that there weren’t enough programs to assist students in writing for general education and undergraduate classes. So she began to learn more about the best programs for graduate students.

“I saw a need to step in as we collaborated with librarians to host faculty and professors to survey graduate students,” Bruce said. “We discovered that graduate students needed support in managing their time for long-term projects, overcoming writer’s block and working with sources. Facility indicated similar student needs.”

So Bruce and Tian launched the Writing Across the Curriculum’s “Thesis Writing Retreats at Polk Library.” When the pandemic hit, in-person retreats turned into 30-minute Zoom consultations and workshops, led by experts in their fields. Eventually students from seven of eight colleges started attending the retreats.

“The virtual retreats drew more students than in-person ones for two reasons,” Bruce said. “First, the flexibility students could join us for an hour or two from home between their other obligations. The second was because students missed being in a community with faculty, librarians, and most importantly, other students working on these long-term projects. They could get a taste of academic community at the virtual retreats.”

All students writing long-term projects (theses, dissertations, capstone projects) are invited to join the free retreats for as long as they like. They can hop in for an hour or three hours.

Once students register for the retreat, they may also reserve 30-minute appointments with a librarian or writing consultant from the Department of English, Comparative Literature and Languages. There are also “writing cafes” they can join from and where they talk to other students.

“Our librarian frequently help students find more robust resources for their research, and our writing consultants often help students talk through their ideas so they can narrow their focus, beat writer’s block or find an organizing pattern,” said Bruce.

Last year, 64 students participated in the retreats with almost half returning for multiple retreats. In surveys, 88% rated the retreats as “valuable” or “very valuable” and 94% indicated that they had made progress.

“Sometimes, when students work with a librarian, the librarian helps them find things they wouldn’t have known to look for and want to find and what direction they hope to follow,” Bruce said. “They talk about their interests and motivations, and librarians point them to resources that can help. We often hear from students about how helpful these sessions are... and the librarians like them, too, because they want to help students succeed.”

Writing consultants help participants break down the objectives of students’ projects and teach them to focus on key elements. Among the student comments were:

• “Great idea! I wish I could have attended more.”
• “The professors were very helpful!”
• “I’ve acquired the ability to talk to real people about how to do research. Librarian (Adrienne Prints) was extremely helpful, and I was amazed that right after our session, I was able to find the needed material I’ve been searching for!”

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In 2017, Leslie Bruce, a Cal State Fullerton assistant professor of computer engineering, is also a team member.

ARTIFICIAL INTELLIGENCE

Fighting infernos before they start

After ash rained on her car while driving by a wildfires last year, Akshana Mohapatra had an idea, a big idea.

As destructive wildfires raged across California and the region, the Cal State Fullerton assistant professor of computer engineering wanted to develop an early detection system to identify areas vulnerable to wildfires using “smart” technology.

Mohapatra and faculty researchers in the “Engineering Wildfires Mitigation” project are designing a wireless solar-powered sensor hub that relays information to a central processing station for data analysis and generation of fire alerts.

The sensors will be used to machine learning and artificial intelligence to identify and prevent hot spots.

“Our goal is to save lives, minimize human displacement and loss of resources, support firefighting efforts and reduce carbon emissions,” said Mohapatra.

Nearly one-third of California’s population lives in areas vulnerable to wildfires, with September and October historically being the worst months for fighting fires. In 2021, the state is facing a record-breaking year of fires due to extreme heat, dry vegetation and climate change.

More than 430 fires have ignited across the state, accounting millions of acres. The fires have released hazardous pollutants that lead to better management and extinguishing flame front sensors, Akshana Mohapatra. This can result in saving lives, reducing threats to property, and curtailing health effects caused by smoke and toxins, such as carbon emissions.

The wildfire project is one of three College of Engineering and Computer Sciences’ “Flames of Transformation: Big Ideas” initiatives to offer collaborative solutions to society’s most pressing issues.

Mohapatra, assistant professor of computer engineering, is also a team member.

Fighting fires

Researchers are developing rechargeable solar panels to power tiny sensor nodes that monitor changes in the physical environment, such as temperature, humidity and fire air particle and gases, including carbon monoxide from smoke. The sensors would detect ignition fires or the probability of a flare-up.

“A smart sensor node could be defined as a mini-computer that detects the environment around it and can determine the likelihood of a fire event,” explains Mohapatra, adding that a prototype is in development with input from local fire departments.

Students are developing machine learning algorithms to determine the optimal locations for sensors in remote forest areas, local foothills and canyons — places where wildfires can start from lightning strikes.

The sensors would read atmospheric pressure and temperature data when the values cross into thresholds that are characterized by fire,” says Mohapatra. “The sensors will provide vital data that can be assimilated with existing fire spread models to forecast the likelihood of a path to be taken by a fire.”

The sensors will be powered by solar panels that can adapt to different environments, such as shade from trees, to provide uninterrupted power to the sensor day and night, points out Akshana Mohapatra, assistant professor of computer engineering.

Aaron Nguyen, a senior computer engineering major, is learning about machine learning-based modeling to design solar panels that adapt to their locations.

“I hope that my work will make a significant contribution to the project and will be effective in combating wildfires,” says Nguyen, who is working under the mentorship of Mahato.

The researchers are using a novel transistor switch embedded in the solar panel to keep it powered. Mahato studied this technology as a doctoral student to power macrosystems autonomously.

“These transistors enhance the capability of solar panels to recharge in real-time and are ideal for operating in remote areas,” Mahato says. “Changing light can boost the performance of solar panels, which in turn degrades the operability of sensors.”

Nguyen, the opportunity to learn about solar panels and give me real-world experience to help produce results that will benefit our communities.

The opportunity to learn about emerging technologies is equipping him for the workforce.”

“Through this project, undergraduate students are gaining significant research and fellowship experiences,” says Nguyen, “and the opportunity to learn about emerging technologies is equipping him for the workforce.”

Song Huang, professor of electrical engineering, is also a team member.

Communications app

Kenneth John Faller II, associate professor of computer engineering, is leading the design of a mobile app to support firefighters. The communications app will train people about fires, help fire agencies, the military, fire stations, and more.

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