ACADEMIC PROGRAMS

Thesis retreats give grad students a writing community

CSUF News Media Services

In 2017, Leslie Bruce, a Cal State Fullerton lecturer in English and faculty fellow for Writing Across the Curriculum, noticed that there were programs to assist students in writing for general education and undergraduate classes. But what about programs for graduate students?

"I saw a gap in the support so we collaborated with librarian Jie Tian, to host faculty focus groups and 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. Faculty indicated similar student needs."

So Bruce and Tian launched the Writing Across the Curriculum's "Thesis Writing Retreats at Pollak 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.

"I think our virtual retreats drew more students than in-person ones for two reasons," Bruce said. "The first is accessibility: 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 half 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 Linguistics. There are also "writing cafés" they can learn from and where they talk to other students.

"Our librarians 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.

"Oftentimes, when students work with a librarian, the librarian helps them focus their subject topics, asks what they 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 those 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 enjoyed being able to talk to real people about how to do research. Librarian (Adolfo Prieto) was extremely helpful, and I was amazed that right after our session, I was able to find the archived materials I'd been searching for."

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Leslie Bruce, lecturer in English and faculty fellow for Writing Across the Curriculum, saw a need for collaboration among grad students.

ARTIFICIAL INTELLIGENCE

Fighting infernos before they start

CSUF News Media Services

After ash rained on her car while driving by a wildfire last year, Ankita 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 facing high wildfire risks using "smart" technology.

Student and faculty researchers in the "Engineering Wildfire 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 idea is to use 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 fires. In 2021, the state is facing a record-breaking year of fires due to extreme heat, dry vegetation and climate change. More than 8,000 fires have ignited across the state, scorching millions of acres.

Ankita Mohapatra, assistant professor of computer engineering.

Research shows that early detection leads to better management and extinguishing flames faster, notes 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 Science's "Titans of Transformation: Big Ideas" initiatives to offer real-life solutions to society's most pressing issues.

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 fine air particles and gases, including carbon monoxide from smoke. The sensors would detect young 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 forests, local foothills and canyons — places where drought, dry conditions and vegetation add fuel for fires. The algorithm will best determine sensor locations using GPS coordinates.

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

Rakesh Mahto, assistant professor of computer engineering.

"The sensors would read atmospheric quality and generate alarms 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 highest 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 sensors day and night, points out Rakesh Mahto, 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 location.

"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 Mahto.

The researchers are using a novel transistor switch embedded in the solar panel to keep it powered. Mahto studied this technology as a doctoral student to power micro-autonomous drones.

"These transistors enhance the capability of solar panels to reconfigure in real-time and are ideal for operating in conditions with varying lighting conditions," Mahto says. "Changing light can lower the performance of solar panels, which in turn degrades the operability of sensors."

Communications app

Kenneth John Faller II, associate professor of computer engineering, is leading the design of a mobile app to support the project. The communication app will warn people about fires, help fire agencies and volunteers identify wildfire-prone areas, and coordinate evacuation efforts.

Kenneth John Faller II, associate professor of computer engineering.

The goal is to create a "smarter" system that will help in preemptive minimization of wildfire impact and improve public safety awareness through technology.

"There is an urgency for supplemental technology to assist the current firefighting efforts and decrease the impact of wildfires, specifically in Southern California, where much of the state is highly susceptible," Faller says.

"Studies indicate that in communities impacted by wildfires, people of color and low-income residents are more vulnerable and find it disproportionately more difficult to recover from the effects of fire events."

Meanwhile, Daniel B. Curtis, associate professor of chemistry and biochemistry, is working with the sensor board development team to add air particle sensors to the prototype to measure air quality, including the presence of soot or smoke particles

Daniel B. Curtis, associate professor of chemistry and biochemistry.

Next generation

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

For Nguyen, the opportunity to learn about emerging technologies through this research project is equipping him for the workforce.

"Dr. Mahto is teaching me about solar cells and giving me real-world experience to help produce results that will benefit the world," Nguyen says. "My career goal is to be a part of an industry that is on the frontier of new technologies to help improve the quality of life for people."