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Cal Poly Awarded $200,000 NSF Grant to Help Transform Undergraduate Science Education

SAN LUIS OBISPO — The National Science Foundation's (NSF) Transforming Undergraduate Education in Science division recently awarded a $200,000 grant to a Cal Poly team to integrate research into the curriculum.

The grant funds development of a theme-based, interdisciplinary approach to science education that allows students to work on real-life science from day one. "This gets lower division folks doing stuff in a lab that is meaningful," said Chris Kitts, Biological Sciences Department chair and team lead. "Their research is being used to improve real-life situations."

Kitts believes student participation in ongoing research will increase engagement in entry-level courses, which will in turn lead to higher student retention rates. "Science is about coming up with cool and interesting questions," said Kitts. "If you can get that across to an undergrad when they first start, then you've sparked a life-long appreciation for science."

The NSF grant allows Kitts and his colleagues to build on their current work to develop a general structure for this type of curriculum that other programs and universities can use.

Kitts and his colleagues have already begun implementing this approach with a previous grant from the Keck Foundation. The theme that runs through their current set of courses is the construction of an *E. coli* database that will help identify the source of fecal contamination in water and soil.

Freshmen biological sciences majors collect *E. coli* samples and produce fingerprints of different strains. Sophomores and juniors in biology and computer science work together to analyze the data that freshmen produced and add it to the database. At the senior and graduate levels, students can build on the earlier work to ask and answer real-life questions using the database.

Answering today's scientific questions requires the type of interdisciplinary approach students experience working on the database. "I think that a really important piece of education that we've been neglecting is how to put it all together," Kitts said.

Kitts also hopes these types of ongoing research projects can contribute to local communities. The construction of the *E. coli* database has already benefited San Luis Obispo County by helping to identify fecal contamination in the ocean at Pismo Beach and in San Luis Obispo Creek.

"We can help the community around us deal with some of their environmental issues. That's also bringing the students into relationship with the community and letting them know how what they're learning is ultimately useful and important," Kitts said.

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