

DIMENSIONS

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College of Science and Engineering

Dean: Research at smaller universities like SCSU may better prepare students for career realities

Imagine cancer treatment genetically customized to each individual patient to optimize effectiveness and minimize side effects. Imagine replacement joints, such as hips and knees, engineered through nanotechnology to ensure the material's tissue compatibility for maximum integration with an individual's muscles and tendons.

Imagine cleaning up environmental contamination with the help of bacteria that eat the pollution and enrich the environment.

These "imaginings" are actually concrete, present-day goals of bioscience, a word that implies finding the solutions to today's and tomorrow's medical and environmental challenges through "convergent technology."

Convergent technology combines previously independent areas of study such as biology, electrical and computer engineering and materials sciences/manufacturing.

Today's reality is that convergent technology in medicine, genetics and nanotechnology quickly moves discovery to practical applications rivaling science fiction.

Other bioscience goals, such as the economical production of renewable energy, are also being addressed at numerous sites around the world by convergent technology in engineering, genetics and agriculture.

In the College of Science and Engineering, steps are being taken to prepare students for careers that require an understanding of multiple disciplines — the foundation of developing convergent technology.

Since the college is to provide an "up-to-date, stimulating and effective learning environment for all students," according to its mission statement, Professor David DeGroot, dean, said faculty scholarly activities (research) "should be in the context of our teaching and learning responsibilities to our students."

Thus, DeGroot said, he is encouraging faculty to begin "operating in a more realistic — a more real world" approach that will acclimate students to the idea of meshing their efforts with those of individuals from other

disciplines on and off campus.

"Students need to have that experience, and we can do something about it at the undergraduate level that big research universities cannot, since they are constrained by their mission to find outside funding for discovery research. This is their role and not a criticism," DeGroot said.

At large research institutions, faculty have the wherewithal to conduct research strictly within their own disciplines through projects that have a clearly defined beginning and end.

But DeGroot said he believes such institutions cannot give students the interdisciplinary experience — particularly at the undergraduate level — needed to begin work in the real world, where projects require convergent technology and may not have a clearly defined beginning and end.

"In the real world, it's a continuum," DeGroot said, adding that students at a smaller institution where faculty are involved in interdisciplinary research have models they can observe and opportunities in which to gain real-world experience in what he refers to as "plug-and-play" projects.

"We can begin to embed (in students) an understanding of how to work in a managed project. We can say, 'You are part of a team.' "

DeGroot's vision includes large interdisciplinary projects among multiple departments, colleges and universities, and much discussion is underway to engage the college's new Center for Advancement of Bioscience in these kinds of endeavors.

Yet, this approach is not new to the College of Science and Engineering. Some interdisciplinary efforts have been underway here for years. Recent examples include the development of an aortic heart valve fatigue test system in Manufacturing and Mechanical Engineering and the development of an ultrasonic multidimensional heart imaging system in Electrical and Computer Engineering.

"This is the direction — these are the trends of the future. Students must gain an understanding of going to work in the world, and it is our responsibility to provide these opportunities" DeGroot said. 🐾