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New Spaces at the University of Detroit Mercy That Inspire Undergraduate Research and Innovation

Elizabeth S. Roberts-Kirchhoff, Shuvra Das, and Gary A. Kuleck

University of Detroit Mercy

The College of Engineering & Science at the University of Detroit Mercy is committed to authentic research experiences as part of the education of its students. The college has supported this effort with the recent design of two unique spaces for evidence-based teaching practices and measures designed to increase the number of STEM graduates. Both spaces have common themes that emphasize the college's approach to the experiential learning that embodies its mission to prepare students for professional STEM careers. First, both spaces introduce first-year students to critical thinking, problem solving, collaborative projects, and experimental design in an environment that encourages scientific exploration. Second, the spaces bring faculty and students together to discuss, conceive, and implement creative research projects that bond mentee and mentor as well as promote an academic learning community.

The Innovative Space for Research and Exploration (iNSPIRE) laboratory is funded by donors and a grant from the National Institutes of Health's Building Infrastructure Leading to Diversity (BUILD) program. As ReBUILDetroit Scholars prepare for graduate school in biomedical disciplines, they experience the excitement of scientific discovery through direct participation in research. The laboratory is a state-of-the-art facility where authentic research in first-year laboratories and interdisciplinary, collaborative research can take place. It is flexibly designed with lab furniture that can be rearranged, supporting classroom and laboratory activities by individuals and teams as well as providing connectivity to external sites for collaboration. First-year students can participate in two new, course-based research experiences in biology and chemistry—examples of pedagogical transformations made possible by this space's development.

The Center for Automotive Systems Engineering Education (CASEE) prepares engineering undergraduates for careers in the automotive industry by providing a space to develop design projects and vehicles for extramural competitions, conduct research projects with faculty mentors, and work collaboratively in an interdisciplinary setting. Students are exposed to technology and practices of the automotive field. Faculty can implement curriculum that incorporates custom-designed equipment and infuses system engineering principles throughout. Funded primarily by donations from alumni and industrial partners, CASEE includes a collaborative space with writeable vertical surfaces, flat-panel monitors, and a project design area. CASEE's unique structure emulates the subsystems found in the complex modern automobile with Control, Systems, and Engine rooms. Further, the design of the space allows for substantive student experimentation and research activities within the engineering curriculum and beyond.