

Leveraging Industry Partnership to Impact Engineering First-Generation and Financial Need Students

Dr. Sarah Furtney, University of Florida

Sarah Furtney received the B.S. degree in biomedical engineering from the University of Miami, Coral Gables, FL, USA in 2012, and the Ph.D. degree in bioengineering from Clemson University, Clemson, SC, USA in 2017.

She is the Director of Experiential Learning for the Herbert Wertheim College of Engineering and an Instructional Associate Professor in the J. Crayton Pruitt Family Department of Biomedical Engineering at the University of Florida.

Dr. Pamela L Dickrell, University of Florida

Dr. Pamela Dickrell is the Associate Dean of Student Affairs in the UF Herbert Wertheim College of Engineering.

Dr. Pingchien Neo, University of Florida

Pingchien Neo, the Director of International Engineering Programs at the University of Florida's Herbert Wertheim College of Engineering, brings a global perspective to her role. With a background in Nuclear Engineering, including studies in the US and Switzerland, she is passionate about inspiring engineering students to explore international opportunities. Under her leadership, UF's International Engineering Programs have seen significant growth in students pursuing global experiences, including study, research, internships, and service learning.

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Abstract

In the University of Florida (UF) Herbert Wertheim College of Engineering, 20% of our students are first-generation in college and 22% have documented family financial need. Overall combined, 28% of students are either first-generation or in financial need, totaling approximately 2,240 UF engineering undergraduate students.

Experiential learning during college, those co-curricular educational experiences outside the classroom, are important in the transformation of students into practicing engineers. Co-curricular experiences include participating in student organizations, design teams, hackathons, competitions, internships, co-ops, study abroad, undergraduate research, professional development seminars, and company tours. These experiences beyond the classroom are critical in student development, identity formation as engineers, retention, and in building the practical skills needed to be leaders in the engineering workforce.

Experiential learning opportunities often have financial barriers that prevent students with financial need from participating, putting them at a disadvantage compared to their peers. Costs like travel for national design teams, attending professional meetings, visiting corporate sites, funding study abroad courses, or presenting at conferences can be prohibitive. Further, students with financial need may choose to be employed in a non-STEM paid position instead of accepting a volunteer STEM-relevant opportunity. First-generation college students face challenges due to a lack of family experience with the college system, making it harder for them to understand the importance of engaging in these essential professional development activities.

Through a partnership with ExxonMobil Foundation and the College's Center for Experiential Learning, we are building co-curricular programs that take into thoughtful consideration the barriers to access that first-generation and financial need students commonly face. As a college-level office, our offerings are well positioned to serve all engineering majors and years. This paper will discuss how one industry partnership was used to create a multi-faceted means of engaging first-generation and financial needs students by one 1) establishing an undergraduate research scholarship program, 2) establishing an undergraduate abroad scholarship program, 3) creating free hands-on workshops in our prototyping facility, 4) equipping peer mentors who unknowingly interact with these populations with knowledge and language via training, and 5) providing additional support and materials for our students organizations who create hands-on activities for K-12 events.

Introduction

Experiential learning during college, those co-curricular educational experiences outside the classroom, are important in the transformation of students into practicing engineers. Recently, there has been interest in the state of Florida to formalize experiential learning opportunities and increase expectations for opportunities created in the state university system [1]. From that state-level interest, universities are creating dedicated positions and offices to facilitate campus efforts. The UF Herbert Wertheim College Engineering College's Center for Experiential Learning (CEL) office was established in January 2025 with the mission of serving as a centralized

resource to support current and to create new experiential learning opportunities for undergraduate engineering students. The CEL and its Director report directly to the College's Associate Dean for Student Affairs and interact with other student affairs personnel including first year advising, international engineering programs, and student retention programs. The CEL also coordinates with all department-level advising staff and leadership across the College to create offerings that serve all engineering majors and years and industrial advisory boards to create offerings relevant to employers. We are able to build co-curricular programs with the use of both state funds and industry sponsorship. This paper provides details on how one industry partnership was used to establish a wide portfolio of offerings including scholarship programs, workshops, training sessions, and student works – all with the sponsor's desire of providing experiential learning support for first-generation and financial need students. In the UF Herbert Wertheim College of Engineering, 20% of our students are first-generation in college and 22% have documented family financial need. Overall combined, 28% of students are either first-generation or in financial need, totaling approximately 2,240 UF engineering undergraduate students.

Implementation Strategies

Establishing an undergraduate research scholarship program

Participating in academic research is an effective and common method for students to gain technical experience that can then be leveraged for graduate programs and other professional degree programs or for full-time engineering employment following graduation. At UF, undergraduate students have access to expert researchers and their facilities, and the potential to contribute to these research teams year-round. The majority of our undergraduate engineering students are enrolled full-time during fall and spring semesters and take courses in person on the main campus. Therefore, students are interested in joining a research team as a part-time commitment during the fall and spring semesters. Students are responsible for balancing their engineering coursework and their other commitments such as involvement in organizations, social life, and personal well-being along with participation in a research team. Students with financial need have the additional responsibility of employment to support their studies, and in some cases may choose to be employed in a non-STEM paid position instead of accepting a volunteer STEM-relevant opportunity. In these cases, when asking: "if money wasn't a problem, which thing would you rather do?", university professionals know that students would select the STEM-relevant opportunity over the non-STEM job if they could.

Industry Partner funds from the ExxonMobil Foundation were used to convert the volunteer STEM-relevant experience of working in a research team to a paid STEM-relevant experience by providing a scholarship stipend directly to selected students. An application was created in Scholarship Universe and the scholarship program application was broadly marketed in various College of Engineering communications including the bi-weekly newsletter from the Engineering Associate Dean for Student Affairs and announcements from each department's advisors. All engineering majors and all undergraduate years were encouraged to apply. The only significant restriction was for students to already be in a research team or about to join one. Or put another way, this scholarship program was not responsible for matching participants with a research team. The authors understand this restriction reduces the eligibility pool, and acknowledge expanding this scholarship program to include matching as an opportunity for growth. Each application, containing demographic and quantitative information and applicant

short responses, was reviewed and scored. A total of six students were selected for the 2025-2026 program. All six students were designated a level 6 HIGH financial need (scale 1-6, with 1 being lowest) by the university financial aid office, and two of the six students were identified as a first-generation college student. Upon selection, students immediately received a lump sum stipend for the fall semester so they could make adjustments to their personal financial strategy and overall fall semester commitments. In order to receive the spring semester stipend, awardees are required to provide a report of what they accomplished in the fall and their research team supervisor must complete an evaluation. If the student fails to provide the report or their evaluation is unsatisfactory, they are dismissed from the scholarship program.

The program also encourages each scholarship recipient to present their year's work at the university's end of spring on-campus undergraduate research symposium. This venue is a low-cost opportunity for these students to gain experience presenting their work in a scholarly environment and can serve as preparation for if they chose to later present their work at a society's national annual conference. Further, since these national conferences also have additional costs we have pledged additional industry funds to support these students' travel.

Establishing an undergraduate abroad scholarship program

As the world becomes increasingly interconnected, the demand for engineers extends beyond technical expertise to include essential professional skills such as global awareness, cross-cultural communication, and adaptability. This trend is reflected in the rising number of engineering students who choose to participate in education abroad experiences during their academic careers [2].

Established in 2014, the International Engineering Programs office at UF is dedicated to expanding global opportunities for students through study, internship, research, and community engagement programs abroad. In 2024–2025, UF engineering students represented 14% of all participants in education abroad programs, ranking third among 16 colleges on campus.

While many students are eager to complete international learning experiences, participation often comes at a significant cost. As a result, financial barriers prevent students with demonstrated need from taking part. Moreover, many high-achieving engineering students with financial need self-select out of these opportunities, choosing not to apply at all due to concerns about affordability.

To mitigate the financial barrier, industry partner funds from the ExxonMobil Foundation were allocated to establish scholarships to reduce the costs of participating in an education abroad program. During the 2024–2025 application cycle, six students were selected for support (see Table 1). The recipients represent a diverse range of majors and academic levels and participated in a variety of program types and international locations.

Name	Major	Program	Program Type	Year
Student 1	Civil Engineering	[x] in Italy - Automotive Industries to Urban Planning	Study	1st year
Student 2	Aerospace Engineering	ICAI-SAPIENS at University Pontificia Comillas	Research	2nd year
Student 3	Computer Science	[x] in Singapore: Internship & Global Culture	Industry Internship	2nd year
Student 4	Mechanical Engineering	[x] in Lille - Engineering and Arts in France	Study	2nd year
Student 5	Mechanical Engineering	[x] in Ireland - Internship & Global Culture	Industry Internship	3rd year
Student 6	Mechanical Engineering	[x] in Italy- Automotive Industries to Urban Planning	Study	2nd year

Table 1. Overview table of participants in 2025-2026 Industry-Sponsored abroad participation

Creating free hands-on workshops in engineering on-campus prototyping facility

The CEL manages the College's prototyping facility that is used for engineering capstone and student organization design competition projects. We identified that first-generation college students and students with financial need may not know or may not be able to participate in student organization design competitions, and that exposure to prototyping facility equipment would facilitate success in the later capstone projects that students will encounter in their curriculum. .

Industry Partner funds from the ExxonMobil Foundation were used to purchase raw materials to be used in a series of technical workshops hosted in the prototyping facility. By using industry partner funds for workshop costs, we were able to reduce the student workshop registration cost to \$0. A limited number of seats were available for each workshop session, so an application was created and broadly shared to all engineering students. A variety of students were selected with an emphasis placed on underclassmen, knowing younger students could leverage these workshop experiences for future experiential learning opportunities. Three pilot workshops were offered: basic woodworking (8 participants), basic metalworking (6 participants), and wood joinery (6 participants). These workshops also serve as pilot sessions to help build a 1-credit prototyping course to be offered for the first time in Spring 2026. It is anticipated that by creating a low-stakes environment that can be incorporated into the student's course schedule and therefore financial aid package, we will be able to again create another experiential learning opportunity for first-generation and financial need students.

Equipping peer mentors who unknowingly interact with these populations with knowledge and language via training

Peer mentors provide student support that complement what students receive from faculty and advising staff. After surveying the various peer mentor groups in the College, we identified a variety of types including: peer mentor groups vetted and maintained by first year advising, peer mentor groups vetted and maintained by department leadership, and peer mentor groups initiated by engineering student organizations. Instead of creating our own peer mentor group to support specifically first-generation and financial need students, we identified an existing peer mentor group that had an established presence on campus. We selected the peer mentor group "Engineering Peer Advisors (EPA's) managed by first year advising, since they provide support to all years and all majors. The EPA's host one-on-one meetings, office hours and professional development events for freshman and are therefore the first peer mentors that many of our incoming freshmen interact with. The CEL provided sessions to train the mentors in how to effectively communicate with first-generation and financial needs students. The training sessions included information such as defining what first-generation and students with financial need are, and providing advising and professional development case studies to discuss. One overarching theme in these sessions was highlighting how the academic and professional development decisions a first-generation or financial need student makes may be impacted by this particular identity. By understanding this population's perspective we can better provide guidance on how they can proceed in their studies and careers. For the 2025-2026 academic year, we were able to train 42 of the 53 EPA's.

Industry Partner funds from the ExxonMobil Foundation were used to create a stipend that was provided upon completion of the training. A long-term goal is to expand training sessions to the other peer mentor groups in engineering.

Providing additional support and materials for student organizations who create hands-on activities for K-12 events

Engineering student organizations have limited budgets to create opportunities for their members and broader engineering community. Outreach events, especially activities that are hands-on with a supplies budget, can be difficult to fit into an already restricted budget. We identified that many engineers are interested in providing outreach experiences to K-12 audiences, and those who are first-generation or have financial need status are particularly eager in being involved in K-12 activities as a way to “give back” or “lift up” those who may come from similar backgrounds as themselves.

Industry Partner funds from the ExxonMobil Foundation were allocated to student organizations and teams of students to create and provide K-12 activities. The CEL in coordination with other College leadership hosted an outreach “hackathon” event where student teams were challenged to create new outreach activities and kits. These activities and kits will then be used for future outreach events that will also be supported by these industry partner funds.

Conclusions

This paper provides specific examples with implementation details on how industry sponsorship funds can be used to provide engineering-relevant experiential learning opportunities for first-generation and financial need undergraduate students. The portfolio of opportunities includes both short-term (peer mentor training and technical workshops) and long-term (research and engineering abroad scholarships) commitments. For each opportunity, the amount of funds allocated depended on the local cost of living and other campus-specific considerations. We encourage those interested in replicating our examples to identify amounts relevant to their communities. With this portfolio of examples, we were also able to demonstrate that a college-level office was able to effectively use industry funds to support a variety of majors and years while meeting the goals of impacting the experiential learning interests of first-generation and financial need students.

Acknowledgements

This material is based upon work supported by the ExxonMobil Foundation. Any opinions, findings, or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the ExxonMobil Foundation.

References

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