



U.A. Whitaker College of Engineering

Grand Challenges Scholars Program Proposal

A handwritten signature in blue ink that reads 'Richard Behr'.

Richard Behr, Dean, U.A. Whitaker College of Engineering

A handwritten signature in blue ink that reads 'Lisa Zidek'.

Lisa Zidek, Associate Dean, U.A. Whitaker College of Engineering
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Grand Challenges Scholars Program Director Contact Information

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A Grand Scholars Program at Florida Gulf Coast University U.A. Whitaker College of Engineering

Florida Gulf Coast University (FGCU) was founded on the principles of environmental sustainability, public service and civic responsibility. The U.A. Whitaker College of Engineering (WCE) embraced these founding principles in the development of its engineering programs and supporting curricula. The fourteen Grand Challenges published by the National Academy of Engineers align with the vision and mission of the WCE as well as that of the institution. Addition of the Grand Challenges Scholars Program will further enhance WCE's vision of developing engineers recognized for excellence in interdisciplinary engineering education and research accomplished in an entrepreneurial and innovative environment that values service, leadership and collaborations.

FGCU and the WCE currently have in place many aspects of a successful Grand Challenges Scholars Program including:

- A University requirement that all FGCU students complete 80 hours of service learning (40 hours for transfer students)
- A University requirement of all students to complete an interdisciplinary colloquium course considering the "environmental, social, ethical, historical, scientific, economic, and political influences" of various ecological decisions relevant to the region
- A college requirement of all engineering students to take a course in engineering entrepreneurship
- A strong working relationship between the WCE and Lutgert College of Business, in particular with respect to entrepreneurship
- A Backe Chair for Renewable Energy with a joint appointment in both the WCE and the College of Arts and Sciences and a current focus on solar energy.

Scholar Selection

Admission to the FGCU Eagles Grand Challenges Scholars Program (EGCSP) will be open to all engineering students in good standing. Students may apply to EGCSP during their first, second or third year of study. Students beyond their third year of study will not be accepted into the program, with the exception of the first year that EGCSP is offered.

Applicants must submit a letter of intent explaining their desire to become an Eagle Grand Challenges Scholar, a plan for completing the program, a letter of support from a University faculty member addressing the students ability to

successfully complete the research component of the program, and a second letter of support addressing the students ability to complete at least one other aspect of the program (interdisciplinary work, entrepreneurship, the global experience or the service learning experience). There is no limit to the number of students accepted into the program. It is anticipated that approximately 5 students from each program (20 students in total) will be accepted in the first few years, with growth expected in subsequent years.

The Backe Chair sponsors a solar competition for high school students that runs throughout the academic year and culminates in a solar go-kart race. Participants in the solar competition program will be eligible for the EGCSF upon admission to FGCU as aspiring engineering majors. The only requirement for these students will be a letter of intent and plan for EGCSF completion.

All applications will be reviewed by the Grand Challenges Scholars Program Director and a full-time faculty member from each discipline (currently FGCU offers Bio, Civil, Environmental and Software engineering). The faculty members will be elected at the fall engineering faculty retreat, typically held prior to the start of fall semester. This faculty team will also review progress of current EGCSF students as well as assist in certifying that program requirements have been met.

Curricular Components

In developing their plan for completing the program, students must explicitly demonstrate active participation in each of the 5 components outlined by the Grand Challenges Scholar Program: research, interdisciplinary curriculum, entrepreneurship, global dimensions and service learning. Plans must specifically address one or two specific Grand Challenges topics and identify how each of the five components will advance the scholar's understanding and growth of the chosen topic(s). It is possible, and desirable, for these components to overlap.

Each fall, during the week before classes begin, the EGCSF will host a Grand Challenges Forum. All EGCSF scholars are required to attend this annual event. The Grand Challenges Forum will include peer mentoring, a key note speaker specific to one of the 14 grand challenges, and EGCSF scholar presentations. Students approaching their final year of study will present either their research project or plans for their research project if this aspect has not been completed. All other scholars will present their completion plan and their progress to date. This forum will be open to the public.

In addition to developing a plan of completion and participating in the Grand Challenges Forum, EGCSF scholars must complete the following:

Research

EGCSP participants are expected to perform research, as outlined in their plan for completion, specifically related to the grand challenges. Research must be conducted under the supervision of a faculty member or industry sponsor. The most common approach for satisfying this requirement will be through the Capstone Design course required by every engineering program; however, other forms of research such as assisting on a faculty research grant or faculty supervised independent research projects are also acceptable. EGCSP scholars are expected to document their research activity. A minimum of 80 hours of research, verified by the course instructor, supervising faculty or industry sponsor is required. All EGCSP scholars must present their research at the University sponsored Research Day or other approved poster or presentation venue. Emphasis will be placed on both written and oral communication skill development.

Interdisciplinary Curriculum

Many options are available for EGCSP scholars to develop an interdisciplinary curriculum and are above and beyond the requirements of the engineering curriculum. The interdisciplinary curriculum may be satisfied through collaboration across colleges on research projects or other aspects of the EGCSP such as an entrepreneurship project that includes students outside the College of Engineering.

Additional avenues to fulfill the interdisciplinary aspects of the curriculum include attending a minimum of ten seminars or presentations hosted by programs such as the math department, the Everglades Wetland Research Park, Center for Environmental and Sustainability Education, the Sanibel Writers Conference or other events as approved by the program directed. SAGE (Students for a Greener Environment) Scholars participation will also satisfy this dimension of the EGCSP. Honors students may develop the interdisciplinary curriculum through the honors program requirement to complete an "honors experience."

The interdisciplinary experience is intended to broaden the breadth and depth of the scholar's exploration of the specific Grand Challenge topic(s) identified in the completion plan. The student portfolio will be required to include a reflection on the benefits and challenges of interdisciplinary collaborations. The portfolio should focus on the impact and value of the interdisciplinary experience as related to the scholar's Grand Challenge focus.

Entrepreneurship

All FGCU engineering students are required to take Engineering Entrepreneurship. This course is an open-ended project based course requiring students to develop a working prototype and a business model to solve a client-

based need. EGCSF scholars will develop their entrepreneurship project around one of the grand challenges. Ideally, this project would be tied to the scholar's research plan, however due to the nature of the projects this may not always be possible. In the event the project is not directly tied to the research plan, the student will be required to reflect on the impact of their entrepreneurship project with respect to their specific research plan.

Global Dimension

EGCSF scholars may satisfy the global dimension through active participation in Engineers Without Borders, Mano a Mano, participation in a study abroad program with a specific tie to the scholar's Grand Challenge focus, by completing the Global Healthcare Engineering course offered periodically in the college of engineering (course description in appendix A) or through other, approved global experiences. Honors students may participate in the Honors Study Abroad and Away program. Approval of study abroad programs will require submission of a list of goals and objectives tied to the scholar's Grand Challenge focus that will be accomplished during the study abroad experience.

Service Learning

All FGCU engineering students are required to complete 80 hours (40 hours for transfer students) of service learning. EGCSF scholars are required to focus a minimum of 15 hours of service learning toward one of the grand challenges. Participants will be required to not only document their service learning, but also reflect on the experience in their portfolio.

Assessment, Tracking and Recruiting

The FGCU learning management system, Canvas, will be used to assess and track EGCSF participant progress. Upon admission to the EGCSF, each participant will be added to a Canvas course designed specifically for the program. Students will submit all material electronically through Canvas and the program director and committee members will have access to all material for evaluation and assessment purposes. The use of Canvas will also provide a centralized location for posting calendar of events and developing discussion forums for relevant topics.

The faculty oversight committee will work together, either in person or through electronic communication, to review new applicants, complete an annual review of student progress and, prior to graduation, certify potential EGCSF graduates. The program director will complete the necessary documentation and provide the names of graduating seniors to the national office.

Students in various stages of the EGCSF will be invited to the Introduction to the Engineering Profession (EGN 1006L) course. Including a panel of current EGCSF scholars in this first engineering course would provide exposure to students not currently involved in the program but in the early stages of their engineering degree.

The EGCSF will have a presence on the WCE website as well as a landing page of its own. The landing page will include the program requirements, application process and examples of student success. In addition, flyers will be posted in Holmes Hall, the home to the WCE and displayed on the FGCU television announcement system.

Appendix A – Global Healthcare Engineering Course Description

Description:

This course, offered by U. A. Whitaker College of Engineering, is designed to introduce students to the engineering challenges of people and cultures in the developing world, with a focus on design and healthcare delivery. Some of the topics covered in this course include world health and global health challenges, medical technologies utilized across the world, healthcare systems, and design challenges in developing countries to name a few. Upon completion of this course students will be able to demonstrate understanding of and abilities to apply their engineering skills to identify, analyze and formulate solutions to health care problems for people and cultures in the developing world.