



Rollins College Proposal and Operational Plan
National Academy of Engineering Grand Challenges Scholars Program

Submitted by:

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Rollins Grand Challenges Scholars Program Vision, Mission, and Goals

Rollins is entrepreneurial. When Florida had no colleges, we founded one. More than 130 years later, we're still hard at work, blazing new trails and preparing the next generation of global citizens and responsible leaders to meet the challenges of the 21st century. Our mission:

Rollins College educates students for global citizenship and responsible leadership, empowering graduates to pursue meaningful lives and productive careers. We are committed to the liberal arts ethos and guided by its values and ideals. Our guiding principles are excellence, innovation, and community.

Rollins is a comprehensive liberal arts college. Rollins is nationally recognized for its distinctive undergraduate and selected graduate programs. We provide opportunities to explore diverse intellectual, spiritual, and aesthetic traditions. We are dedicated to scholarship, academic achievement, creative accomplishment, cultural enrichment, social responsibility, and environmental stewardship. We value excellence in teaching and rigorous, transformative education in a healthy, responsive, and inclusive environment

Developing students who are change makers is a priority at Rollins and aligns with the goals of the Grand Challenges Scholars Program (GCSP). We're powered by relationships, especially the partnerships between inventive, inspiring faculty and motivated, industrious students. Through this intimate and personalized learning environment, students are mentored and challenged by expert faculty every day, helping them unlock their unique potential to make the world brighter, smarter, and more enterprising. Support our students in changemaking both locally and globally. From semester- and summer-long programs to faculty-led field studies throughout the year, Rollins students are empowered to explore the world and test their ability to make it better. More than 70% of our students study abroad. Our learning environment supports entrepreneurship:

- In 2014, the College launched Rollins Foundations in the Liberal Arts, an innovative general-education curriculum designed to prepare students to develop solutions to tomorrow's most pressing problems.
- *Forbes* ranked Rollins the No. 11 most entrepreneurial college in America in 2015.
- Rollins is home to Rally, an accelerator program that propels qualified social entrepreneurs to build their ideas into self-sustainable ventures within the Central Florida community.
- Rollins' social entrepreneurship program was the first in the world to earn accreditation from AACSB International, the world's leading association of business schools.
- Adam Schwartz '11 '12MBA, the founder and CEO of multimillion-dollar startup FRESHHeTECH, was recently named to *Entrepreneur* magazine's Entrepreneur360 list and *Forbes*' 30 Under 30 list.
- In 2018, a team of Rollins students advanced to the finals of the Hult Prize, the world's most prestigious collegiate competition for social innovation startups.

All of our students have the opportunity to address grand challenges for social good:

- SPARC Day—the College’s annual day of service—is meant to ignite interest and passion in first-year students, encouraging them to ask tough questions about themselves, others, and the issues facing communities in the 21st century.
- In the 12 years since SPARC Day was established, more than 8,000 Rollins students have contributed more than 32,000 hours of service to an average of 24 community organizations each year.
- Rollins was ranked No. 1 in the nation for the highest percentage of students who participate in alternative spring breaks for the 2017–18 academic year. It was the sixth consecutive year that Rollins has ranked in the top 5 and the fourth time the College has held the top spot.
- Rollins is one of just 37 colleges and universities in the world to earn Ashoka U’s Changemaker Campus designation and, in 2018, one of 30 United Nations Millennium Fellows sites internationally, supporting students in implementing the United Nations Sustainable Development Goals.
- In 2018, Skylar Knight ’19 became the fifth Rollins student to earn Campus Compact’s Newman Civic Fellowship, which recognizes and supports students committed to achieving social change.

The National Academy of Engineering GCSP allows us to build on our theme/challenge based general education program, integrated support through our Social Innovation Hub, history of student/faculty collaborative research, and Community Engagement programming to create a GCSP program for our 3/2 engineering students, computer science, and science students to integrate the multiple dimensions of their learning experiences at Rollins to be prepared to address the most pressing challenges of our time, as articulated in the NAE Grand Challenges.

Our 3/2 engineering programs are similar those at other liberal arts colleges and have been in place for decades with the two longest standing partners being Washington University and Columbia. Students complete their pre-engineering work in the first three years at Rollins and then pursue an additional two years at the engineering school. They receive a BA in pre-engineering from Rollins and a B.S. in engineering from the partner school. These programs complement the innovative development of a four year *Bachelor of Arts in Liberal Studies in Engineering* degree program let by Louis Bucciarelli at MIT and supported by the NAE, Teagle, and the National Science Foundation

(https://dspace.mit.edu/bitstream/handle/1721.1/96672/Workshop_Report_final.pdf?sequence=57 and

https://dspace.mit.edu/bitstream/handle/1721.1/114609/LiberalStudiesEngineering_Boundaries.pdf?sequence=1). Both approaches recognize the value of liberal studies in

preparing students to address grand challenges. In many ways, these degree programs and the NAE GCSP build on the Sloan Foundation incented work at 33 liberal arts colleges in the 1980s to develop the New Liberal Arts that embraced technology and mathematical reasoning (Brockaway, J.P., 1986, Technology and the Liberal Arts,

<https://doi.org/10.1177/027046768600600216>). Rollins' views the NAE GCSP as an opportunity to learn and contribute to the collective understanding of liberal learning and engineering in preparing individuals to address the pressing challenges of today.

We have created a flexible program that covers a student's four-year experience at Rollins and can also be completed in three years by our 3/2 engineering students. Through the NAE GCSP consortium, we will seek to create additional opportunities for our 3/2 students once they transfer to complete their engineering degree. The exchange of ideas between our liberal arts college and an engineering program has the potential to enrich the experiences of students at both institutions. We would value the opportunity to create additional 3/2 programs with GCSP institutions.

Essential Elements of the Rollins Grand Challenges Scholars Program

(a) Recruitment and selection of a diverse cohort of engineering and non-engineering students who hail from all parts of the world.

All students with an intent to major in one of the sciences at Rollins, including 3/2 engineering students, are eligible to apply and participate, as long as they can complete the program requirements for an on-time graduation. The annual application deadline is February 1st. Students are encouraged to apply their first year at Rollins. Students must have a cumulative GPA of 3.0 at the time of application and maintain a cumulative 3.0 GPA throughout the program. Students will submit their application to Professor Chris Fuse, coordinator of the Rollins GCSP to be approved by the GCSP Advisory Board (details below). Successful applications will:

- Clearly identify one of the Grand Challenges or themes that the student is committed to addressing in their academic and professional endeavors;
- Address the importance of social and global issues that the selected Grand Challenge or theme raise;
- Provide a semester by semester plan for how the different competencies of the program will be met (a sample semester plan is provided in Appendix A); and
- Describe in 100 to 150 words how participation in the program, including the specific approaches to meeting the competencies and completing their specific major, will prepare the student to contribute to addressing the selected Grand Challenge or theme.

Applications will be evaluated based on completeness of the responses, clarity in articulating the chosen Grand Challenge or theme and its link to social and global issues, and demonstration of connections between selected approaches to achieving competencies and major with preparation to address a Grand Challenge or theme.

To reach all students, our Admissions Office will also include information about the GCSP in their informational materials. We are committed to reaching students from all demographic groups, across the globe. We are launching a new scholarship program. The Dr. Fritz K. Mueller '59H Memorial Endowed Scholarship for Science will be used to provide scholarship assistance for students who are declared majors in the natural or physical sciences, with a preference given to physics majors (our 3/2 engineering students receive a B.A. in Physics from Rollins). Inclusive excellence is a strategic priority of the College with an entering class where 36% of the students are students of color, 28% are Pell eligible, 85% of all students receive financial aid, and 40% are internationally influenced (students who are not US students or have been living abroad). One hundred percent of our new tenure-track faculty cohort in the fall of 2018 are members of underrepresented groups. Our physics faculty include two men and four women, one of whom is a woman of color. Our Dean of Faculty and our Director of the Endeavor Foundation Center for Faculty Development are engaging faculty in professional development focused on inclusive pedagogy to ensure the success of all students at Rollins. Our GCSP students will be recruited with a focus on diversity and with a program aimed at inclusive excellence. We plan to begin with a cohort of 10 students to ensure we provide the full support needed to be truly inclusive and excellent. We anticipate that the initial cohort will be about half 3/2 pre-engineering students, with the other half composed of students interested in one of the sciences or computer science. The program affords an opportunity for science and computer science majors to consider postgraduate study in engineering, a pathway that our advisor and NAE member, Rod Adkins pursued so successfully. The program is designed to be scalable so that all eligible students can be accepted into the program. We will increase the diversity of the group by building a robust pool of diverse applicants.

(b) Innovative and institutionally-tailored program that includes a suite of diverse curricular, co- and extra-curricular experiences, as well as multiple paths for completing GCSP requirements

The Rollins GCSP is built around our innovative general education program called Rollins Foundations in the Liberal Arts (rFLA, <https://www.rollins.edu/rollins-foundations-liberal-arts/>). This program is developmental, theme based, and culminates with a capstone course and research project. Our GCSP brings the major and rFLA together in connected and meaningful ways. The program is designed with our 3/2 engineers at the center, ensuring completion in three years. Specific details include:

1. Talent Competency: mentored research/creative experience on a Grand Challenge-like topic

The minimum requirement for this competency is participation in the capstone rFLA course which entails undertaking a theme-based research project and making a public presentation at the rFLA symposium. Our 5-themes — Cultural Collision, Environments, Innovation, Enduring Questions, and Identities — all provide the opportunity for the GCSP students to work on an NAE grand challenge within this framework. Students prepare for this research/creative experience as they progress through their rFLA course work, either by focusing on a single theme that supports the grand challenge they have embraced or by moving amongst themes to build the expertise needed for their specific challenge. In addition, rFLA is designed to deliver on our mission of educating all students to be responsible leaders and global citizens, prepared for meaningful lives and productive careers. We believe these goals and the GCSP goals are well aligned.

Each semester, students will discuss their rFLA course alignment with their academic advisor and will select their capstone experience in consultation with GCSP advisor. Participating students will be flagged in both our Education Advisory Board (EAB) Student Success Collaborative platform and DegreeWorks, with mapped program requirements so that students and advisors can check progress towards aligned course completion at least once each semester,

GCSP students will be encouraged to participate in our Student/Faculty Collaborative Research Program. Given our desire to ensure that all students have equivalent access to our GCSP program and recognizing that family or work obligations create challenges to participation in a 10-week, intensive, summer research experience, we will use the rFLA, course-based capstone research project as the requirement. All first time, full time students are required to complete a capstone rFLA course. For transfer students, an academic year or summer research experience may be substituted for this requirement. We encourage our 3/2 students to continue with research after they transfer to an engineering school.

2. Multidisciplinary Competency: understanding multidisciplinary of engineering systems solutions developed through personal engagement

Our rFLA program is intentionally multidisciplinary with a focus on integrated learning and requires that students take five Foundations seminars (<https://www.rollins.edu/rollins-foundations-liberal-arts/neighborhoods/index.html>). The first four seminars in the program introduce students to the arts, humanities, social sciences, and sciences, culminating in an

interdisciplinary capstone. But the seminars are also integrative, explicitly asking students to look back to prior coursework and to consider the role of disciplines in posing questions and offering methods for solutions. As they focus on their specific challenge while progressing through the five Foundations courses, they will gain a multidisciplinary toolkit for problem solving. To achieve this specific competency, The GCSP student will select one of the first four foundations courses that has a multidisciplinary focus that aligns with the student's overall preparation to address a specific challenge or theme. This course may not be used to fulfill any other GCSP competency but will count towards the Rollins rFLA requirements.

3. Viable Business/Entrepreneurship Competency: understanding, preferably developed through experience, of the necessity of a viable business model for solution implementation

Rollins offers both a Social Entrepreneurship and a Social Innovation major, in addition to majors in Economics, Business Management and International Business. Students may choose amongst the course offerings in these four majors to identify one course that aligns with their professional development to address their grand challenge. The course selection must be approved by the GCSP Coordinator and include sufficient business/entrepreneurship education to meet the goals of the program. Recommended courses:

- SE 100. Social Entrepreneurship: Leading Change
- SI 200. Introduction to Social Innovation
- MGT 101. Introduction to Responsible Business Management
- INB 200 Introduction to International Business

4. Multicultural Competency: understanding different cultures, preferably through multicultural experiences, to ensure cultural acceptance of proposed engineering solutions

GCSP students can complete this competency by:

- Successfully completing one rFLA course in the Cultures Collide theme group to meet this competency. The course selection must be approved by the GCSP coordinator (which will count as one of the five required Foundations courses) or
- A Rollins semester abroad program (<https://www.rollins.edu/international-programs/semester-programs/index.html>) or
- A Rollins field study (<https://www.rollins.edu/international-programs/field-studies/index.html>) or

- A Rollins international summer program (<https://www.rollins.edu/international-programs/summer-programs/index.html>) or
- A non-Rollins program approved by both the Director of Global Initiatives and the GCSP Coordinator.

5. Social Consciousness Competency: understanding that the engineering solutions should primarily serve people and society reflecting social consciousness

Students begin their study with the Rollins College Conference course (RCC). This course serves multiple roles, including helping students understand why we emphasize an integrated, multidisciplinary approach to learning at Rollins. Before their first class, they will participate in a full day of community engagement and service with their RCC class and one of our 236 community partners. We are the alma mater of Mr. Rogers and “life is for service at Rollins College. We launch all entering students with a structured experience, including built in reflections, with exposure to true community partnerships and contributing to social good. Transfer students who do not have AA degrees participate in an RCC for transfers. We will offer a GCSP specific RCC for entering students, recognizing that all RCCs fulfill this competency and not all students will be ready to join the program as they first arrive on campus.

In addition, GCSP students will be required to engage in an experience that serves people and society, reflecting social consciousness by:

- Completing one course, preferably within their major, with a community engagement designation (<https://www.rollins.edu/leadership-community-engagement/programs-initiatives/community-engagement-courses.html>). [These courses are offered by faculty who have gone through community engagement training and the students work within the community, supported by our Office of Campus Leadership and Community Engagement. All CE courses have a significant service component. Our partnerships are focused in three areas – Environment, Health and Well-being, and Education. Within these thematic areas, GCSP students will be able to find pathways to focus on their specific challenge.] or
- Successfully complete an immersion program (<https://www.rollins.edu/leadership-community-engagement/programs-initiatives/immersion.html>). Rollins Immersion exposes students to critical cultural, social, political and structural issues in the community.

(c) Thematic continuity and connectivity in each student’s GCSP trajectory

Assisting all our students in connecting the multiple dimensions of the learning at Rollins, in and out of the classroom, is a strategic priority. In the late fall of 2019, we plan to re-open our iconic Mills building in the center of campus. Mills will be our “mission center,” housing groups that are already working together programmatically – our Social Innovation Hub (co-lead by a staff director and faculty director), our Center for Global Initiatives (co-lead by a staff director and faculty director), our Center for Campus Leadership and Community Engagement, our Center for Career and Life Planning, our Fellowships Office, our Pre-Health Advising Office, our Department of Social Entrepreneurship, and our newly formed Social Innovation major. Our coordinator for student/faculty collaborative research and our GCSP advisor will also take advantage of the space. The programmatic intent of the co-location is to support students in reflecting upon and articulating their individual stories of their Rollins experience that integrates all dimensions of their learning. With this mindset, we will be focused on supporting our GCSP students in connecting their GCSP experiences. To that end, they will:

- Submit an annual reflection of one page to the GCSP coordinator by May 1 of each year.
- Submit their capstone or other research/creative project with a reflection of how their coursework and other experiences prepared them, how their work prepares them to address their specific grand challenge, how this work aligns with the four pillars of our mission, and how this work complements the work within their own major.

(d) Programmatic and individual student assessment

Individual student assessment. We have assessment built into our rFLA sequence so that each student is assessed twice for critical thinking, information literacy, and writing. There is also an ethical reasoning competency, a writing competency course, and a quantitative literacy course, all with built in assessments. We use the AAC&U VALUE rubrics and are calibrating our assessments with national assessments via the VALUE Institute at Indiana University.

Students are also assessed through a verbal interview during the capstone research presentations, coordinated by the Associate Dean for Academics. We will cluster the GCSP students and develop an additional interview rubric that addresses the five GCSP competencies. We believe that it is important for students to be able to verbally articulate the integration of their experiences and that this is excellent practice for job interviews.

We will also work with our Assistant Provost for Institutional Effectiveness to develop a rubric based assessment of the capstone project and written reflection. This will align

with our campus proof project to analyze written work for ability to deliver on the four elements of our mission, which align with the GCSP goals.

Overall assessment of whether and individual student has successfully completed the program is the responsibility of the GCSP Coordinator in collaboration with the GCSP committee if there are concerns about whether or not the student has successfully completed the Rollins GCSP.

Programmatic assessment. A successful GCSP program will engage 10-20 new students annually. We will use the individual student assessments to assess the quality of the learning experience, including learning gains for the students. We will also work with our Center for Career and Life Planning to follow the post-graduate success of our GCSP students. Additional metrics include tracking the percentage of students who complete the program and using a tool under development by our Director of Institutional Analytics to track the multiple pathways through the program. It is important that students have multiple options for completing this program and that we understand the pathways to ensure that the essential learning opportunities are offered when our GCSP scholars need them.

(e) Institutional GCSP governance and sustainability

Rollins has a long and successful history of managing our 3/2 engineering program and that program coordinator will also coordinate the GCSP program. The GCSP coordinator's efforts will be recognized with an annual stipend. The coordinator will lead an advisory board composed of the GCSP Coordinator, Director of the Social Innovation and Entrepreneurship Hub, Faculty Director of Director of the Social Innovation and Entrepreneurship Hub, Assistant Vice President for Campus Leadership and Community Engagement, Program Director for Computer Science, Chair of the Department of Social Entrepreneurship, Program Director of the Social Innovation Major, Chair of the Department of Business, Dean of Faculty, Associate Dean for Advising, Associate Dean for Academics, Director of the Center for Global Initiatives, a student representative, and the Provost. This GCSP is charged with approving recruitment materials, vetting the applicants, making decisions regarding requests from students to substitute experiences or courses needed to fulfill one or more competencies, approve recommendations from the GCSP Coordinator to award students a GCSP certificate, and ensure the overall quality of the program.

To ensure the sustainability of the program, the coursework is embedded within our existing curriculum and courses will be offered on a regular basis. The numerous offices supporting the program are ongoing and fully staffed. The work aligns with our

strategic priorities and our mission. We have a long history of successfully developing liberally educated engineers through our 3/2 programs as evidenced by the career long success of Dr. Rodney Adkins who has agreed to serve as an advisor to our GCSP students.

Nationally, the integration of general education and a student's experience within their major is aspirational, but not regularly achieved. As detailed earlier, we aim to guide our students in making these connections and being able to articulate the value of their overall preparation at Rollins. The GCSP is a first step in explicitly making this a priority. Longer term, we intend to learn from and scale successful elements to all of our students.

Rollins GCSP program will be supported through existing budget lines, ensuring its sustainability. The College of Liberal Arts has a budget line for the rFLA program including support for the capstone summit, development of new courses, and program related faculty travel. Assessment costs are included in a budget line for the Assistant Provost who has responsibilities for Institutional Effectiveness. Students and faculty participating in the Student-Faculty Collaborative Research program will be supported by endowed funds. Student travel to NAE GCSP meetings can be supported through the Student High Impact Program (SHIP) travel grants. The stipend for the coordinator and additional travel and expenses not covered in the aforementioned budgets will be covered by the Office of the Provost.

(f) Mentorship plan for GCSP faculty and students

Professor Chris Fuse will serve as the GCSP coordinator and mentor to the GCSP scholars. Chris will provide feedback on the connecting reflections pieces the students write and support their progress towards completing the requirements of our program. He will work with the faculty and staff directors of our Social Innovation and Entrepreneurship Hub to support cohort meetings each semester, ensuring that students have access to academic program advice, in addition to opportunities to enhance their entrepreneurial skills, including participation in Hult Prize competitions, applying to the UN Millennial Fellows opportunities, participating in our Ashoka Changemakers activities, and pitch competitions. Tiffany Griffin, our Director of Undergraduate Academic Advising Support Services, will work with our academic advisors to be sure they are aware of the program goals and suite of program elements so they can also support advisees that are or become interested in the GCSP program.

Dr. Rodney Adkins (<https://www.nae.edu/108874.aspx>) will serve as a mentor to the GCSP scholars. Dr. Adkins is a Rollins alum and member of our Board of Trustees. He

participated in our 3/2 engineering program with Georgia Tech. His advanced degrees are in engineering and he is a member of the National Academy of Engineering, as well as a former IBM vice president. Dr. Adkins fully understands the values of an engineer with a solid liberal education, which aligns with the goals and competencies of the NAE GCSP. His experience as a Black engineer and years of mentoring will help our students make the connections between their learning at Rollins and their postgraduate life and career. A bit of Dr. Adkins sage advice is encapsulated in his 2018 graduate speech:

Each generation that has come before us had to deal with significant challenges, but at the same time, each generation was given a set of resources that enabled them to create new opportunities. Graduates, your generation is seeing some of the most exciting opportunities that actually *surpass* those of all the generations that have come before you. Because of the pace of disruptive innovation, my advice to you is three things:

First, commit to lifelong learning so that you can remain competitive. Continuous education is required from ages zero to eighty as the new norm. We should invest several hours every year on something that is new and relevant.

Second, we must maintain our human connection skills. In a world of smart phones, social media and non-human interfaces, technology is making it easy for us to erode our verbal and written communications and our interpersonal relationship skills.

Third, we should surround ourselves with some people who have different experiences and don't think like us because innovation and learning are at their best when there is diversity of thought.

Dr. Adkins will meet with the GCSP cohort in October, February, and May of each year. Mentoring has long been one of Dr. Adkins' passions and we are grateful that our GCSP students will benefit from his expertise and generosity with his time.

Faculty mentoring will be provided by the Endeavor Foundation Center for Faculty Development and the Faculty Director for the Social Innovation and Entrepreneurship Hub. They will convene an annual design thinking workshop for faculty that intend to offer RCC and capstone rFLA courses for our GCSP students.

(g) Student recognition

The GCSP participants will present their capstone research in a special section of the Capstone Symposium. We will hold a reception for all successful participants at the end of their last year at Rollins. Each student will be recognized at our College-wide student recognition event in May. Students will receive a certificate from Rollins and letters from Dr. Rodney Adkins and the President of the National Academy of Engineering.

Appendix A: Sample Student Plan of Study for a Rollins NAE Grand Challenges Scholar

Specific Challenge: Provide Access to Clean Water

Semester	Course	Experience	Relevance to GC or Theme	Specific Competency
1	RCC	First exposure to community engagement and service learning through SPARC day	Opportunity to learn about Rollins GCSP through RCC instructor/advisor and peer mentor	
2		Submit GCSP application		
3		Immersion: The Local is Global: Immigration and Farmworker Justice <u>Location</u> : Apopka, FL <u>Impact Area</u> : Farmworkers and Immigrant Rights	Agriculture presents significant challenges for maintaining clean water. This immersion provides insight into the experience of immigrant farm workers	Social Consciousness Competency
4	SE 100. Social Entrepreneurship: Leading Change		Develop understanding of entrepreneurship for social good	Viable Business/Entrepreneurship Competency
5	rFLA 200C Collaborative Problem Solving	Course Description: "What? I can get academic credit for complaining about Rollins?" Yes you can! In this course you will learn collaborative problem-solving skills through the process of Human-Centered Design, which allows people to imagine, create, and implement solutions to their community's greatest problems. By applying this process to the challenges that face your own community at Rollins, you will learn theories of group dynamics and innovative social change in an interactive, experiential, and realistic environment. You will then apply these problem-solving techniques to a current problem that plagues our world.	Bringing together individuals with different disciplinary expertise to work together on solving a current problem.	Multidisciplinary Competency
6	rFLA 300 Capstone for the Environments theme*	Mentored research experience and presentation at the capstone colloquium	Opportunity to integrate previous four rFLA courses and other work in the program to specifically address the challenge	Talent Competency: mentored research/creative experience on a Grand Challenge-like topic
Summer Field Study	CHM102F: Water, Sanitation and Health (WASH) in the Dominican Republic**	https://360.rollins.edu/academics-and-research/water-works	Applying chemistry and engineering to providing potable water to communities in the Dominican Republic - specifically addressing the selected Grand Challenge	Multicultural Competency

*rFLA courses will be selected from the Environments theme, with specific attention to clean water. The Environment them "The earth is one interconnected system and humans play an integral role. Discover how to have a positive impact on social, cultural, and global environments. Gain the skills needed to identify, analyze, understand, and make significant changes to the environments we share and the relationships we have with science, environment, and personal responsibility."

**This field study program is funded by a generous endowment from an alum so that all students with an interest can participate, regardless of their economic situation.