

A Proposal to Establish the
Grand Challenges Scholars Program
at

George Mason University

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Submitted by

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I. Introduction

The following proposal to establish the Grand Challenges Scholars Program (GCSP) in the Volgenau School of Engineering (VSE) at George Mason University (Mason) in collaboration with the College of Science (COS) and College of Humanities and Social Sciences (CHSS), presents the vision of the GCSP at Mason including the elements that meet the five student competencies. The proposal defines the strategy for selection of its cohort of students, the plan to mentor students through program completion, the rubric for assessment of successful completion of the program, plans for continuous assessment and improvement of the program, and goals for expansion and sustainability. While based in the VSE, the program will be open to any Mason student both engineering and non-engineering, regardless of major discipline of study. The Mason GCSP will expand exposure of non-engineering students to engineering, systems design and inventive thinking, and engineering students to broader coursework in the natural sciences, humanities and social sciences to support implementation of design solutions in the context of a global society. The result will be a cohort of students with knowledge of their field of expertise underpinned by multidisciplinary studies of engineering, design, social and global studies, and ethics who are well prepared to be thought leaders and to lead people with innovative solutions to real-world challenges.

George Mason University – A university for the world

George Mason University is a public, comprehensive research university established by the Commonwealth of Virginia in the National Capital Region. We are an innovative and inclusive academic community committed to creating a more just, free, and prosperous world. Mason recently completed a major revision of its Strategic Plan (<https://strategicplan.gmu.edu/wp-content/uploads/2017/12/Strategic-Plan-Update-BOV-Final.pdf>) reaffirming our commitment to service to the community, the Commonwealth and the broader global community as a world-class research university committed to access and inclusion. Twin pillars of teaching and scholarship and our underlying commitment of service to the community and the Commonwealth remain our predominant strengths and form the basis of everything we do. By investing in and strengthening our research, scholarship, and creative activities, by pursuing initiatives that produce academic, societal, and economic impact, and by expanding our global ties, we will meet our objective to create and disseminate new knowledge for the betterment of society at home and around the world. These strategic objectives are entirely consistent and well aligned with the goals of the NAE Grand Challenges Scholars Program.

As part of our plan to meet our goals, Mason is focusing our curricular design on high-impact learning experiences. By broadening access through new programs and delivery formats, and constantly improving the entire teaching and learning ecosystem to provide a transformative learning experience to all students, we will meet our objective of preparing graduates for lives of meaning and impact. Through novel academic offerings and extracurricular opportunities, we are placing particular emphasis on our role as a source of innovation and entrepreneurship, and a critical engine of

regional economic development. To complement technical offerings, we are expanding, deepening and improving our programs, events, and services that enrich the cultural, intellectual, and social life of our community. The Mason Grand Challenges Scholars Program builds on our institutional strengths and embodies the tenets of our strategy to develop human talent as a source of creative energy, and social vibrancy for our region, the Commonwealth and the world.

Volgenau School of Engineering

The Volgenau School of Engineering (VSE) delivers a transformative learning experience to its students by integrating engineering and technology with other areas of scholarship. We produce visionary stewards of society who are prepared to discover solutions to complex global challenges and make the world safer, cleaner, and more prosperous. A faculty of engaged educators lead high-impact research in critical areas, including sustainability, big data, cybersecurity, robotics and artificial intelligence, signals and communications, and healthcare technology. These existing and emerging areas of expertise span departmental and disciplinary boundaries and reflect the breadth of the scholarly activities of our faculty and students.

The Volgenau School of Engineering prepares students to solve complex, multidisciplinary, global challenges by leveraging innovative learning tools, the inventive capacity of our region, and Mason's global presence. The faculty and administration support the needs of the 21st century learner by providing multiple paths to success, a diverse and inclusive academic community, and real-time integration of new data and technology in the classroom.

College of Science

The College of Science (COS) at George Mason University blends traditional science education with sought-after programs in molecular medicine, climate dynamics, planetary science, forensic science, environmental studies, and geoinformation science to prepare students for exciting careers at the cutting edge of interdisciplinary scientific domains. While serving as a vital community and regional resource for teaching and learning through hands-on programming for kindergarten through 12th grade (K–12) students, teacher training, and outreach programs, the college also undertakes pioneering research endeavors that offer insight and solutions to the complex issues that challenge today's world.

College of Humanities and Social Sciences

Students and faculty in the College of Humanities and Social Sciences (CHSS) confront essential questions about our lives and our world. CHSS brings the human perspective to the mission of George Mason University, by grounding discovery in the subtle fabric of individual and cultural life that shapes our values, experiences and sources of well-being.

Whether by exploring the teachings of history and culture, the political and social challenges of our nation and world, the processing power of the human brain, or the best ways to communicate advances of all kinds, they strive to see and understand how

people see and understand themselves and their world. The ancient Greek advice to “know thyself” remains true today: successful solutions to contemporary challenges require, along with scientific and technological advances, this human perspective.

As part of the college’s vision it helps Mason serve its stakeholders by

- Applying age-old wisdom and the latest social science to the problems of our day
- Preparing students to achieve fulfillment and success in their working, civic and personal lives
- Informing and enriching the lives of others through preservation of the past and preparation for the future
- Serving as a global resource and crossroads for an ever-more interconnected world

COS and CHSS are excited to partner with VSE in this endeavor that will help cast a wider net to identify more non-engineering students to potentially pursue the Mason GCSP.

II. Mason’s Grand Challenges Scholar Program Framework

Mason’s 2017 Strategic Plan (<https://strategicplan.gmu.edu/wp-content/uploads/2017/12/Strategic-Plan-Update-BOV-Final.pdf>) and its goal to ensure “100% of Mason undergraduate students will graduate with transformative IMPACT experiences incorporating at least one of the following: undergraduate research or creative project, civic engagement project, entrepreneurial experience, global education experience, clinical experience, student teaching, internship and/or capstone course” serve as the basis for the Mason GCSP framework. Mason Grand Challenges Scholars are expected to leverage their IMPACT experiences to advance solutions to the National Academy of Engineering (NAE) “Grand Challenges for Engineering” that must be addressed to “achieve a sustainable, economically robust, and politically stable future for our children and our children’s children” (<http://www.engineeringchallenges.org/>). Grouped into four larger themes, these challenges are:

Energy and Environment Grand Challenge Theme:

- (1) Make solar energy economical
- (2) Provide energy from fusion
- (3) Develop methods for carbon sequestration
- (4) Manage the nitrogen cycle
- (5) Provide access to clean water

Health Grand Challenge Theme:

- (6) Advance health informatics
- (7) Engineer better medicines

Security Grand Challenge Theme:

- (8) Prevent nuclear terror
- (9) Secure cyberspace
- (10) Restore urban infrastructure

Joy of Living Grand Challenge Theme:

- (11) Reverse engineer the brain
- (12) Enhance virtual reality
- (13) Advance personalized learning
- (14) Engineer the tools of scientific discovery

The Mason Grand Challenges Scholar will work to advance solutions of problems under one of the themes through a Personalized Educational Program (PEP) consisting of coursework, projects and experiential learning opportunities.

III. Mason's GCSP Required Components

The Mason Grand Challenges Scholar must advance solution to one of the Grand Challenges themes through a PEP consisting of one required core course and five different engagement competencies. These five competencies are as follows:

1. Talent Competency: mentored research/creative experience on a Grand Challenge-like topic
2. Multidisciplinary Competency: understanding multidisciplinary nature of engineering systems solutions developed through personal engagement
3. Viable Business/Entrepreneurship Competency: understanding, preferably developed through experience, of the necessity of a viable business model for solution implementation
4. Multicultural Competency: understanding different cultures, preferably through multicultural experiences, to ensure cultural acceptance of proposed engineering solutions
5. Social Consciousness Competency: understanding that the engineering solutions should primarily serve people and society reflecting social consciousness

Each Scholar must complete one core course. This course, undertaken early in their studies, is the Mason GCSP section of ENGR 107 Introduction to Engineering. There are no prerequisites to this introductory course, which introduces engineering profession fundamentals and problem solving. ME 151 Practicum in Engineering (<https://volgenau.gmu.edu/course/section/view/365341>) was designed to prepare mechanical engineering students for work on the NAE Grand Challenges and may substitute for the GCSP section of ENGR 107. These courses will introduce the NAE Grand Challenges and expose all Scholars to professional decision making in engineering, an overview of the fundamental concepts in engineering, basic problem-solving skills as applied to various engineering disciplines, critical and design thinking, engineering ethics, and a semester-long design project. Scholars will think creatively while working as a member of a team, and design and build something to meet the

specifications of the given problem related to the Grand Challenges. Students will present their findings through written and oral communications.

All Engineering students are required to take ENGR 107 or equivalent. Non-engineers will not have been exposed to the concepts presented in ENGR 107 and so it will be perfectly appropriate for these students to undertake the course at anytime during the course of their studies at Mason. Engineering students who transfer to Mason after completing some credits of engineering elsewhere may have already completed the equivalent to ENGR 107 elsewhere. Those transfer students who have already completed equivalent to ENGR 107 elsewhere, and who wish to participate in the Mason GCSP, will take the ME 151 Practicum in Engineering which is focused on the NAE Grand challenges. Therefore all students who wish to participate in the Mason GCSP will take either ENGR 107, or ME 151 as appropriate.

In addition to completion of the Special GCSP Section of ENGR 107 (or ME 151), the Mason Grand Challenges Scholar will develop a Personalized Educational Plan (PEP) to outline the educational experiences under each competency and how these experiences support their understanding and design and implementation of context-sensitive solutions of one of the Grand Challenges themes. The PEP is the roadmap to describe how the experiences across competencies are coordinated to support the development of the Mason Grand Challenges Scholar's expertise and competency in the single Grand Challenge theme selected. The following table summarizes acceptable activities under each of the five competencies. Students must complete one of the Immersive or Experiential Learning opportunities identified in each of the five competencies. Immersive experiences include for example, completion of minors that require in-depth study in a single area that supports expertise required to make a contribution to the solution of a grand challenge. Experiential opportunities include programs that incorporate learning through doing such as conducting research, participation in the Summer Entrepreneurship Accelerator Program or Engineers for International Development.

	Immersive or Experiential Learning
Talent Competency (Research/Creative Experience)	<p>Acceptance and participation in the Office of Student Scholarship Creative Activities and Research (OSCAR) research program in support of Scholar's chosen Grand Challenges theme (oscar.gmu.edu).</p> <p>Conduct minimum of one semester, or one summer, of research with a faculty mentor in support of Scholar's chosen Grand Challenges theme.</p> <p>Complete an approved three credit Independent Study in support of Scholar's chosen Grand Challenges theme.</p> <p>The research project or independent study must be approved by the Scholar's faculty mentor.</p> <p><i>* Note all Scholars must present at least one poster at the</i></p>

	<p><i>Celebration of Student Scholarship over the course of their program (https://oscar.gmu.edu/students/celebrations-of-student-scholarship/)</i></p>
Multidisciplinary Competency	<p>Complete six credits of coursework outside the Scholar's major discipline in support of Scholar's chosen Grand Challenges theme. The selection of the acceptable 6 credits of coursework will be determined in consultation with, and is subject to, approval by the Scholar's faculty mentor. For example, engineering students who have chosen to study the Management of the Nitrogen Cycle may elect to take courses in Environmental Microbiology and Atmospheric Chemistry or a course in Sustainable Agriculture. COS 400 Multidisciplinary Problem Solving in STEAM may fulfill three of the six credits.</p> <p>Complete a minor in a unit outside of the Scholar's major in support of Scholar's chosen Grand Challenges theme. The selection of an acceptable minor will be determined in consultation with, and is subject to approval by, the Scholar's faculty mentor. An example of an appropriate minor for an engineering student who has chosen to study the Advancement of Health Informatics might be a Minor in Bioinformatics in the College of Science. Another possible option is to pursue a minor in Scientific Leadership and Practice that allows students to enhance their 21st century skills including communication, collaboration, critical thinking, creativity, interdisciplinary problem solving, ethics and leadership.</p> <p>Note that the minor selected to fulfill the Multidisciplinary Competency may not be the same minor used to fulfill the Viable Business/Entrepreneurship Competency or the Multicultural Competency.</p>
Viable Business/Entrepreneurship Competency	<p>Participate in the Dean's Business Competition: http://business.gmu.edu/innovation/deans-business-competition/</p> <p>Complete the Entrepreneurship Minor: http://business.gmu.edu/innovation/entrepreneurship-minor/</p> <p>Complete the Sustainable Enterprise Minor: https://advising.gmu.edu/wp-content/uploads/sustainable-enterprise-minor18-19.pdf</p> <p>Note that the minor selected to fulfill the Viable Business/Entrepreneurship Competency may not be the same minor used to fulfill the Multidisciplinary Competency or the Multicultural Competency.</p> <p>Acceptance and minimum of one year participation in the Mason</p>

	<p>Innovation Lab: http://business.gmu.edu/innovation/mason-innovation-lab/</p> <p>Participate in the Summer Entrepreneurship Accelerator: https://startup.gmu.edu/entrepreneurial-programs/students/mason-summer-entrepreneurship-accelerator</p> <p>Participation in Venture Well's University Innovation Fellows Program: https://universityinnovationfellows.org/</p>
<p>Multicultural Competency (Global Engagement)</p>	<p>Certified participation in Study Abroad: https://masonabroad.gmu.edu/index.cfm?FuseAction=Programs.ListAll</p> <p>Complete a documented internship experience with a corporation engaged on a <i>global</i> project.</p> <p>Serve as officer, or complete 45 hours of project work, for Engineers for International Development (EfID) as certified by the faculty advisor for EfID: http://www.gmu-efid.org/</p> <p>Complete the six credit experience Conservation and Sustainability of the Amazon Rainforest: https://sail.gmu.edu/field-studies/all-courses/summer-2018/conservation-of-the-amazon-rainforest</p> <p>Complete one of the following minors:</p> <p>Asia-Pacific and Northeast Asian Studies: https://advising.gmu.edu/wp-content/uploads/asia-pacific-and-northeast-asian-studies-minor18-19.pdf</p> <p>Global Affairs: https://advising.gmu.edu/wp-content/uploads/global-affairs-minor18-19.pdf</p> <p>Global Health: https://advising.gmu.edu/wp-content/uploads/global-health-minor18-19.pdf</p> <p>Global Systems: https://advising.gmu.edu/wp-content/uploads/global-systems-minor18-19.pdf</p> <p>International Business: https://advising.gmu.edu/wp-content/uploads/global-systems-minor18-19.pdf</p> <p>International/Comparative Studies:</p>

<https://advising.gmu.edu/wp-content/uploads/international-comparative-studies-minor18-19.pdf>

International Security:

<https://advising.gmu.edu/wp-content/uploads/international-security-minor18-19.pdf>

Islamic Studies:

<https://advising.gmu.edu/wp-content/uploads/islamic-studies-minor18-19.pdf>

Italian Studies:

<https://advising.gmu.edu/wp-content/uploads/italian-studies-minor18-19.pdf>

Japanese Studies:

<https://advising.gmu.edu/wp-content/uploads/japanese-studies-minor18-19.pdf>

Korean Studies:

<https://advising.gmu.edu/wp-content/uploads/korean-studies18-19.pdf>

Latin American Studies:

<https://advising.gmu.edu/wp-content/uploads/latin-american-studies-minor18-19.pdf>

Middle East Studies:

<https://advising.gmu.edu/wp-content/uploads/middle-east-studies-minor.pdf18-19.pdf>

Complete Minor in one of the following language studies:

Arabic Language:

<https://mcl.gmu.edu/programs/LA-MINOR-MCL-ARAB/requirements>

Chinese Language:

<https://mcl.gmu.edu/programs/LA-MINOR-MCL-CHIN/requirement>

French Language:

<https://mcl.gmu.edu/programs/LA-MINOR-MCL-FRN/requirements>

Russian Language:

<https://catalog.gmu.edu/colleges-schools/humanities-social-sciences/modern-classical-languages/russian-minor/>

Spanish Language:

<https://catalog.gmu.edu/colleges-schools/humanities-social-sciences/modern-classical-languages/spanish-minor/>

	<p><i>Note that the minor selected to fulfill the Multicultural Competency may not be the same minor used to fulfill the Viable Business/Entrepreneurship Competency or the Multidisciplinary Competency.</i></p>
<p>Social Consciousness Competency (Service Learning)</p>	<p>Complete 45 hours of service learning by participating as mentors for high school students in the Global STEM Challenges program at Edison High School in Fairfax County Public School district (https://www.fcps.edu/Global%20STEM%20Challenges) or other equivalent Global STEM Challenges high school program.</p> <p>Participate in Mason Social Action and Integrative Learning (SAIL), which fosters integrative, innovative, and experiential learning opportunities on campus, regionally, and globally that educate and activate towards a more equitable, just, nonviolent, and sustainable world: https://sail.gmu.edu/</p> <p>Participate in Mason Service Corps: https://sail.gmu.edu/program/mason-service-corps</p> <p>Complete 45 hours of approved STEM related community service activity with focus on Scholar’s chosen Grand Challenges theme with evaluation: https://sail.gmu.edu/for-community/evaluation-of-service-learner</p> <p>Participate in Alternative breaks: https://sail.gmu.edu/alternative-break/alternative-break</p> <p>Participate in <u>Civic Learning and Community Engagement- Patriot Experience Pathway</u>, https://patriotexperience.gmu.edu/civic-learning-and-community-engagement/</p> <p>Complete six credit experience in Conservation and Sustainability of the Amazon Rainforest: https://sail.gmu.edu/field-studies/all-courses/summer-2018/conservation-of-the-amazon-rainforest</p> <p>Complete Social Innovation Minor: https://advising.gmu.edu/wp-content/uploads/social-innovation-minor18-19.pdf</p> <p>Complete Social Justice Minor: https://advising.gmu.edu/wp-content/uploads/social-justice-minor18-19.pdf</p> <p>Complete Social Work Minor: https://advising.gmu.edu/wp-content/uploads/social-work-minor18-19.pdf</p> <p>Complete Arlington Fellows Program (Global Health, Global Politics, Nonprofit, Peacebuilding, Social Innovation): https://fellows.gmu.edu/</p>

	<p>Serve as an elected officer, or complete 45 hours of project work, for Engineers for International Development (EfID) as certified by the faculty advisor for EfID: http://www.gmu-efid.org/</p> <p>Serve as officer for two or more years in STEM related Professional Society/Club or Competition Organization as certified by organization's faculty advisor.</p>
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IV. Mason Grand Challenges Scholar Selection, Support, Assessment and Tracking

During the first year after approval and launch of the Mason GCSP, we anticipate 20 students will be invited to join the program. Because the activities described in Table 1 which support the five competencies are already fully funded by various units and/or the Provost's office, we anticipate rapid scale of the program to as many as 100 Mason Grand Challenges Scholars by 2025. As new activities which serve the five competencies are developed or identified, new funding needs will be addressed on an ad hoc basis.

Mason will support all participants in the Grand Challenges Scholars Program with the opportunity to apply for resources to support travel and participation in National Grand Challenges Scholars' Annual Meetings and conferences. Associate Deans in both the College of Science and the College of Humanities and Social Sciences are committed to providing advising support to their students and to be fully engaged in the Mason Grand Challenges Scholars Program. The Co-Directors of the Program have been designated at the Associate Dean level to emphasis the commitment of the institution to the program.

To apply to the Mason Grand Challenges Scholars Program, a student must demonstrate the desire and passion to become part of the program. Minimally, the candidate must meet the following criteria:

1. Be a student in good standing and have completed 12 credits towards their declared major
2. Be committed to the Grand Challenges, and
3. Be aware of the importance of social and/or global issues.

Criteria 1 will be assessed by review of the transcript, and Criteria 2 and 3 will be assessed by evaluation of an application, including an essay of approximately 500 words framing the Grand Challenge theme the student wishes to study in the context of social and global issues. Applications will be reviewed by the Co-directors of the Mason GCSP and finalists for the program will be invited for an interview by January. Once selected each scholar must complete the process by:

1. Identifying a faculty mentor who will supervise the student's work
2. Completing a detailed Program Execution Plan (PEP) which must then be approved by the faculty mentor.

Scholars can begin their experiences as early as their first year of study, but must begin by no later than the fall semester of their junior year. Satisfactory progress towards completion of the Grand Challenges Scholars Program will be monitored through an Annual Reflection of Progress (ARP) Towards Completion of the Mason Grand Challenges Scholars Program. The ARP will be reviewed, and if acceptable, approved by the faculty mentor, and submitted to the GCSP Co-directors before the end of the each academic year. If the faculty mentor determines that there are deficiencies in the ARP, then the faculty mentor will work with the student to revise as appropriate to ensure student success as they navigate their plan. Continued participation in the program will be contingent upon annual approval of the ARP by the faculty mentor. As part of those progress reports, the student will describe their plan to meet competencies in the coming year and any appropriate adjustments from the PEP. The following table summarizes the annual timeline and expectations of a Mason Grand Challenges Scholar:

Mason GCSP Student Scholar Expectation Checklist

- ✓ Complete application (Due November 1)
- ✓ Complete Interview with GCSP Co-Directors (January)
- ✓ Student notified of acceptance to GCSP Program (February)
- ✓ Select faculty mentor (February)
- ✓ Complete Program Execution Plan (PEP) (February)
- ✓ Obtain approval of Program Execution Plan by faculty mentor (February)
- ✓ Begin activities to address competencies (Following acceptance into the Mason GCSP)
- ✓ Complete Annual Reflection of Progress (ARP) Towards Completion of the Mason GCSP Program (Annually in April)
- ✓ Present poster at Annual Undergraduate Research Celebration (May, At least once before graduation)

Faculty mentors will be identified and selected jointly by the Mason Grand Challenges Co-Director and the Mason Grand Challenges Scholar. The Mason GCSP Co-directors will develop a pool of engaged and supportive faculty through annual information sessions about the Mason GCSP for faculty, regular email communications to faculty about the program, and an annual workshop. The workshop will include discussion of best mentoring practices, review of successful Scholars' portfolios of activities and competencies, identification of new activities to support competencies, and sharing about program challenges and barriers as well as solutions to ensure successful

ongoing and expansion of the Mason GCSP. The community of past and present Mason GCSP Faculty Mentors will be surveyed annually for feedback on the program and recommendations for improvement in the Mason GCSP scope and execution. Faculty mentors who successfully guide a student to completion of the GCSP will receive a stipend. The following table summarizes general expectations for GCSP faculty mentors:

Mason GCSP Faculty Mentors' Annual Expectations Checklist

- ✓ Meet student and agree to mentor through to student's completion of the Mason GCSP (February)
- ✓ Advise, review and approve student mentee Program Execution Plan (PEP) (February)
- ✓ Submit Student's Program Execution Plan (PEP) to GCSP Co-Directors for final approval (February)
- ✓ Meet annually with student mentee to review and discuss student's Annual Reflection of Progress (ARP) Towards Completion of Mason GCSP (April)
- ✓ Participate in annual meeting of Mason GCSP faculty mentors (January)
- ✓ Recruit additional faculty members to serve as GCSP Scholar mentors (ongoing)
- ✓ Provide feedback to Mason GCSP Co-directors on scope and execution of the Mason GCSP (via annual survey)

As preparation for the annual evaluation of progress, the faculty mentor will review the ARP and follow up with the faculty director/advisor of the organization/program where the student plans to participate and discuss and agree upon expectations for satisfactory participation. At the end of the experience, the faculty director/advisor of the activity will provide recommendation of satisfactory or unsatisfactory participation in the activity identified in the ARP. Although each experience that may serve to fulfill a competency is different (e.g. minors, coursework, independent study, research project with faculty, study abroad, Engineers for International Development, participation in Business Competition, Summer Entrepreneurship accelerators etc.) there are some basic criteria that faculty advisors/directors may use as a baseline to certify satisfactory participation. The appropriate application of these criteria depends on the nature of the experience:

- Student completed all the requirements specified by the program to receive a passing or satisfactory grade as established by the program and approved by the University. For example, in the case of a minor, satisfactory completion of all coursework undertaken to support completion of the minor will be evaluated by the faculty mentors by review of transcript.
- Student participated in at least 80% of the meetings/events/classes associated with the organization or program.
- Student made substantial contributions to the organization/program as evidenced by deliverables such as project plans, or by leadership, such as holding an elected office.

The ARP becomes an annual contract between the student and the Mason GCSP which establishes the expectations for successful completion of the chosen experiences leading to competency.

V. Promotion of Mason Grand Challenges Scholars

The Mason GCSP Proposal was developed with guidance from the Mason GCSP Steering Committee which consists of the three Mason GCSP Co-Directors representing the Volgenau School of Engineering, the College of Science and the College of Humanities and Social Sciences as well as additional faculty from the Volgenau School of Engineering. By this broad participation from senior leadership from across three different academic units, we ensure the possibility of broad participation in the Mason GCSP and dissemination of its mission and advances.

Students will be informed about the Mason GCSP through information sessions, lunch and learn sessions offered by the Volgenau School of Engineering and in ENGR 107 and other introductory Mason courses offered each semester. Academic advisors will be educated about the Mason GCSP so that they may include it in the portfolio of immersive learning opportunities they present to students during their regular major advising. Also, we will leverage the NOVA Mason ADVANCE Program, a national model providing support to community college students to ensure that they can earn a bachelor's degree within four years. The program:

- Provides admissions guidance to both institutions. When a student meets program requirements, they will be automatically accepted into Mason.
- Connects students to dedicated advisors and success coaches from their first day at NOVA through graduation from Mason.
- Coordinates curricula to ensure students retain all credits when they transfer.
- Offers a financial aid and incentive plan to help students in need stay in school through graduation.
- Collaborates with area employers to spotlight majors that produce graduates with high-demand skills.
- Helps students earn two degrees: an associate's from NOVA and a bachelor's from Mason.
- Gives students access to clubs, sporting events, and recreational facilities at NOVA and Mason.

Through Mason's ADVANCE program, we will reach out to the community college students at NOVA who plan to matriculate to Mason so that they can learn about the Mason GCSP opportunity. NOVA ADVANCE students will be able to apply to the Mason GCSP while they are at NOVA and if accepted, begin work toward meeting the goals of their PEP under the direction of a Mason Engineering faculty mentor. Students who successfully complete the Mason GCSP will be recognized by their departments, and the Volgenau School of Engineering, at their degree celebrations and also with a cord to be worn at graduation during the cap and gown ceremony. Mason is also actively working to develop a transcript notation for high impact experiential

learning. Once Mason has the ability to denote experiences on the transcript, the completion of the Mason GCSP will be included on students' transcripts.

Graduates of the Mason GCSP will be invited back annually to attend the Volgenau School of Engineering Research Celebration to meet and interact with current GCSP Scholars, share their post Mason graduation experiences, and connect with the next generation of Mason Grand Challenges Scholars. Mason Grand Challenges Scholars will benefit from the engagement with Mason GCSP alumni who will serve as role models of professional life beyond Mason. We anticipate that the ecosystem of Mason Grand Challenges Scholars will enhance the quality of education and life associated with Mason, and Mason's impact on the solution of the NAE Grand Challenges