Project 1: Martian Soil Simulants  
**Sponsored by Civil Engineering**  
ENGR 1900-123  
Dr. Q. Chen  
This project aims to explore various potentially Mars-compatible processes that synchronize novel composite materials from simulated in-situ Martian materials for the creation of functional building blocks. Examples of the processes the team has been or will be exploring include bio-cementation and thermoset polymeric materials. The created composites will be tested and characterized for their mechanical and physical properties. **TBA.**  
May enroll directly in course.

Project 2: Robotics with Lego Mindstorms NXT  
**Sponsored by Electrical & Computer Engineering**  
ENGR 1900-010  
Mr. Michael Wooten  
This project teaches students some fundamentals of robotics, along with some programming. Each student will learn how to use and program the robotic pieces of a LEGO MINDSTORMS NXT kit, and will have to work as a group to complete a creative project for the end of the semester. All student backgrounds welcome, no experience is required. **TBA.**  
B-009 Holtzendorff.  
May enroll directly in course.

Project 3: Engineering Innovation Studio  
**Sponsored by General Engineering**  
ENGR 1900-006  
Dr. J. Maier  
Freshmen students will research ideas for innovative products and conduct conceptual design, prototype development and testing, hopefully leading to patent applications. **TBA.**  
Instructor consent required.

Project 4: Developing a Microfluidic Biochip  
**Sponsored by Mechanical Engineering**  
ENGR 1900-031  
Dr. X. Xuan  
The goals of this project are: 1) to learn how to fabricate micro-channels using soft lithography technique; 2) to study how fluids and particles (beads, cells, and molecules) move through micro-channels in response to electric and/or magnetic fields; and 3) to apply the developed electric and/or magnetic approaches to manipulate samples for useful biomedical and chemical applications. **TBA.**  
May enroll directly in course.

Project 5: ASME Student Design Competition  
ENGR 1900-078  
Dr. H. Zhao & C. Peruffo  
Students will design and engineer a small affordable prototype to address a real-world inspired problem. Previous project themes include “Robots for Relief” which focuses on building a robot that can maneuver challenging terrain while transporting objects to a destination and “Lighter than Air” building a reliable device that can carry and drop a payload onto a target. Students will design build, and test their prototypes before going to the competition in spring semester. **TBA.**  
May enroll directly in course.

Project 6: Developing & Assessing Maker Space Standard Operating Procedures  
ENGR 1900-219  
Dr. Schweisinger  
The Clemson Makerspace provides students and staff with the ability to collaborate and innovate using current technologies such as 3D-Printing, laser cutting, textiles processing equipment, and electronics. The Makerspace educates and trains students of all majors on machines and processes. Students in this CI will learn to operate key equipment in the Makerspace such as CNC machines, 3D scanners, 3D printers, laser cutters, electronics, embroidery and sewing machines, t-shirt printers.  
The objective is to develop a safe set of Standard Operating Procedures (SOPs) for training students on makerspace equipment within the culture and requirements of the university. Students will research, implement and evaluate the effectiveness of training methods that will likely include manuals, videos, and presentations. This CI has a strong hands-on component, and a team leadership aspect. **TBA.**  
May enroll directly in course.
General Engineering Creative Inquiry Choices – Fall 2018

Sponsored by Mechanical Engineering

Project 7: Incentivizing Litter Collection & Storage in Developing Areas  ENGR 1900-819 Dr. T. Schweisinger
Widespread litter, mostly comprised of plastic bags, plastic beverage containers, paper, and assorted refuse, vexes large parts of the world, particularly under-developed regions with no centralized trash and garbage collection. One practical solution involves locals collecting and transporting accumulated litter to central collection points and establishing incentives for participation.

An important component is developing a practical process allowing individuals to compact litter into small, manageable units, for which they could be compensated piece by piece, somewhat like collecting deposits on discarded beverage containers in some communities. Students will develop a way to compact litter into dense units that can be transported easily to central collection facilities by personal conveyances such as bicycles, motorcycles, push carts, bicycle rickshaws, and bullock carts. Apparatus used should be able to be made locally from readily available materials, including recycled automobile and bicycle parts, scrap metal, and the like using modest welding, blacksmithing, and fabrication methods commonly found in undeveloped regions. Any method or materials used to bind compacted litter into stable units should be derived from litter components. TBA. May enroll directly in course.

Projects 8-15 Restricted to RiSE Students

Project 8: Kinetic Art for Greenville’s Artisphere  ENGR 1900-012 Dr. C. Norfolk
Participants will design, prototype, produce, and present art pieces which incorporate movement at Greenville’s Artisphere art show. Thursday 11:00 am – 12:00 pm. Instructor consent required.

Project 9: Prosthetics Technology  ENGR 1900-013 Dr. C. Norfolk
Team will divide up to test and develop two systems with promise to improve the quality of life for amputees. One is a system which tests the degree of fit for the prosthetic system, the other is a system which tests the efficacy of cooling technologies which can be added to the prosthetic socket. Tuesday 11:00 am – 12:00 pm. Instructor consent required.

Project 10: Design for All Abilities  ENGR 1900-020 Mr. M. Miller
This project will guide students through research on principles of universal design and identification of a project to improve the accessibility and utility of the Clemson campus. By gaining an ability to design for people of all physical and cognitive abilities—including an understanding of the cultural implications on accessible and diverse design—students will be able to empathize with users of varying levels and forms of ability and truly think outside the box when developing solutions to meet stakeholder needs. The experience and perspective gained will enable students to be more innovative and entrepreneurial in their engineering mindsets. TBA. May enroll directly in course.

Project 11: Using an Arduino for Tech Development  ENGR 1900-023 Dr. W. Martin
Arduino microcontrollers are very versatile tools. We will first work through some basic projects to become familiar with how to program and build projects with Arduinos. Then the team will use an Arduino to build a water quality monitoring station for use on campus. TBA. Instructor consent required.

Project 12: Coupling Green Roofs, Rainwater Cisterns, & Urban Agriculture  ENGR 1900-024 Dr. W. Martin
Independently green roofs and rainwater cisterns benefit for urban storm water systems, but they also have drawbacks. This project investigates how these two green infrastructure technologies may possibly be used together in ways to mitigate their weaknesses and to create a more effective and resilient system. As a bonus, coupling these systems may allow for their use in urban agriculture. We will implement a pilot study system complete with monitoring systems to see how the system actually behaves. Then we will modify the design based on performance. TBA. Instructor consent required.
Project 13: MakerSpace Design & Exploration ENGR 1900-026 Dr. J. Maier
Continued development of a new RISE MakerSpace for Lever Hall and a vision of a new RISE college. TBA. Instructor consent required.

Project 14: Survey of Clemson Infrastructure ENGR 1900-025 Dr. W. Martin
"Restore and Improve Urban Infrastructure" is one of the 14 Engineering Grand Challenges and this CI will explore what infrastructure is and its role in our lives. Initial semesters will focus on storm water infrastructure and use Clemson’s campus as a case study. Participants will map the system with GPS equipment, analyze it using GIS software, and eventually build a model of the system. Students will identify infrastructure issues and propose and design new solutions. TBA. Instructor consent required.

Project 15: Sustainable Spools ENGR 1900-028 Dr. S. Grigg
This project will focus on reducing the impact of 3D printing on the environment by developing sustainable methods of producing printing filament by utilizing waste plastic to generate 3D printing filament for use in prototyping. Wednesday 3:40 – 5:30 pm. May enroll directly in course.