



# GENERAL ENGINEERING SPRING 2025 CREATIVE INQUIRY PROJECT LIST

Creative Inquiry (CI) is the imaginative combination of engaged learning, cross-disciplinary interactions and undergraduate research that is unique to Clemson University. Team-based investigations are led by faculty mentors and typically span a year or more. Students take on problems that spring from their own curiosity, from a professor’s challenge or from the pressing needs of the world around them. These invaluable experiences produce exceptional graduates.

The following list of CI projects in the College of Engineering, Computing, and Applied Sciences (CECAS) has been compiled for Spring 2025 General Engineering (GE) students. All projects on this list are appropriate for freshmen and new transfers. This list is comprised of several projects that are two or more semesters, meaning it can be continued once you have transitioned to your engineering major. Other projects may only last one or two semesters. Many of these CI projects are interdisciplinary and provide exposure to multiple fields of engineering (e.g., civil engineering, environmental engineering, electrical engineering, etc.).

All projects are open to any GE student. Projects with a “TBA” time, mean the faculty will work with students to decide on a meeting time. Information for each of the CI projects is presented as follows:

Project #   Title		Project Course Information
Primary Faculty ( <i>Faculty Dept./Program</i> )	Duration of Project-Credits	Project Meeting Day and Time
Description of CI Project		

During registration for Spring 2025 classes, students may directly add themselves to open sections of CI courses. There is no holding section. If consent of instructor is required, students must contact the instructor directly for permission to enroll. Students are added to the course when permission is granted. This information is located at the end of the project description.

Questions, please contact Monica Sint at [msint@clemson.edu](mailto:msint@clemson.edu).

# CI Projects for General Engineering Students

## Project #1 | Green Energy and Biodiesel Project

BE 4990 -005

Dr. Tom Dodd ( <i>Biosystems Engineering</i> )	Each semester is independent- 1 credit hour	TBA
<p>From Fields to Fuel, team members will be researching all aspects of sustainable biofuels production and engineering while facilitating biodiesel and ethanol production to be utilized by University Facilities. Projects will focus on facility optimization through relief of production bottlenecks, and research increasing biodiesel feedstock acquisition through cultivation of energy crops and harvest of waste lipid streams. Led by Biosystems Engineering faculty. Students enroll directly.</p>		

## Project #2 | Engineers Without Borders (EWB): Rwanda Water

EES 4900-040

Mark A. Schlautman, Professor ( <i>Environmental Engineering and Earth Sciences</i> )	Up to 8 semesters- 1 credit hour	Mondays 7-8 PM
<p>Students participating in this Creative Inquiry will help to lead the design and development of sustainable systems to provide drinking water and associated water treatment for communities in developing countries as part of an official project with the Clemson University Student Chapter of Engineers Without Borders. Students enroll directly.</p>		

## Project 3 | Microfluidics and Lab-on-a-chip for Point of Care Technology

ENGR 1900-031

Dr. Xiangchun Xuan ( <i>Mechanical Engineering</i> )	1 or more semesters- 1 credit hour	TBA
<p>In this Creative Inquiry project, we explore the use of electric, magnetic or flow field for the transport and control of biological and synthetic particles in engineered microchannels with lab-on-a-chip applications to chemistry and biomedicine for point of care technology. Instructor consent required. Please email Dr. Xuan at <a href="mailto:xcxuan@clemson.edu">xcxuan@clemson.edu</a>.</p>		

## Project 4 | Makerspace SOP

ENGR 1900-219

Dr. Todd Schweisinger ( <i>Mechanical Engineering</i> )	4 semesters- 1 credit hour	TBA
<p>The Clemson Makerspace provides students 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 3D printers, laser cutters, electronics, embroidery and sewing machines, direct to Garment Printers, etc. 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. Students enroll directly.</p>		

# CI Projects for General Engineering Students

## Project 5 | Engineering Biology of Arthropods

MSE 3900-002

Dr. Konstantin Kornev ( <i>Mechanical Engineering</i> )	Multiple semesters- 1-3 credit hours	TBA
<p>Making bioinspired fibers for ballistic applications: Insect fibers such as antennae demonstrate superior energy dissipation and robustness, outranking all known manmade materials. The AIMS lab <a href="https://cecas.clemson.edu/kornevlab/">https://cecas.clemson.edu/kornevlab/</a> is working on studying these materials and developing new technologies to reproduce the most attractive properties of insect materials in engineering applications.</p> <p>The project is aimed at the development of biologically inspired fibers for application to ballistic protection and noise superabsorbent materials. Students will learn how to make antenna-inspired liquid-filled microfibers using wet spinning. Students will work in groups with graduate students and will be trained in high-speed spinning and characterization of complex fibrous materials. Students interested in modeling will be engaged in modeling and validating the models using AI image processing and X-ray imaging of complex microstructures.</p> <p>Instructor consent required. Please email Dr. Kornev at <a href="mailto:kkornev@clemson.edu">kkornev@clemson.edu</a>.</p>		

## Project #6 | Building at the Nanoscale: Biomaterials

MSE 3910-007

Dr. Kimberly Weirich ( <i>Materials Science &amp; Engineering</i> )	Multiple semesters- 1 credit hour	TBA- Rhodes 511
<p>The remarkable ability of cells to build nanoscale materials that self-organize, control shape, regulate motion through adaptive mechanics, and replicate are some of the key features that set living systems apart from most synthetic systems. In this creative inquiry project, we will investigate nanoscale materials designed from biological and bioinspired building blocks, such as purified proteins or synthetic DNA "origami". Research will investigate regulating the intriguing properties and mechanics of these nanoscale materials through nanoscale architecture. We welcome a variety of backgrounds and majors to join our project. Students will gain experience in quantitative analysis, experimental techniques, and learn to be collaborative researchers as part of an interdisciplinary team. Curiosity required!</p> <p>Instructor consent required. Please email Dr. Weirich at <a href="mailto:weirich@clemson.edu">weirich@clemson.edu</a>.</p>		

## Project 7 | Advanced Manufacturing by Ultrafast Lasers

ME 2900-037

Dr. Xin Zhao ( <i>Mechanical Engineering</i> )	2 or more semesters- 1 credit hour	TBA
<p>This project includes hands-on participation to learn the state-of-the-art ultrafast laser and use it for micro-manufacturing, material strengthening, and multi-functional surface processing.</p> <p>Instructor consent required. Please email Dr. Zhao at <a href="mailto:xzhao5@clemson.edu">xzhao5@clemson.edu</a>.</p>		