clemson.edu/ci

CLEMSON UNIVERSITY:

CREATIVE INQUIRY + UNDERGRADUATE RESEARCH

QUICK FACTS

Year founded: **2005**
Project source: **Faculty, students, industry**
Duration: **Year-long**
Students per year: **4,500**
Interdisciplinary: **Yes**
Vertical integration: **Yes**

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PROGRAM SUMMARY

Creative Inquiry + Undergraduate Research (CI) is Clemson University's university-wide program that supports disciplinary and interdisciplinary team-based research for all undergraduate students, in all departments and at all academic levels.

Creative Inquiry is celebrating a 20-year anniversary in the 2024-2025 academic year. The program began in the 2005-2006 academic year, with the vision that undergraduate students would have graduate-level research experiences during their time at Clemson. A Creative Inquiry Task Force was established, with faculty drawn from all colleges, to develop opportunities for undergraduate research and scholarship known collectively as Creative Inquiry. Unique CI courses were established in all academic departments and faculty were invited to submit proposals for projects that would begin in spring 2006. The first Focus on Creative Inquiry Poster Forum was held at the end of spring semester, 2006.

Creative Inquiry offers early and extended research opportunities to large numbers of undergraduates, including in disciplines that typically offer fewer undergraduate research opportunities. Using this model, undergraduate students

1. work in mentor-guided small teams;
2. can start as early as freshman year;
3. are encouraged to continue in CI for at least two semesters (average is two to three semesters but may extend to eight semesters); and
4. can participate in projects within or outside of their majors and in multidisciplinary projects.

All CI projects are mentored by Clemson employees, mainly faculty but also post-docs, graduate students and, in some circumstances, staff members. Students receive one to three academic credits for each semester-long CI course. As a complement to the academic year model, exceptional students may continue their projects through the Summer CI + UR program, which provides stipends for 40–70 students to engage in 10 weeks of research. In the 2021-2022 academic term, CI enrolled 4,802 undergraduate students in 393 projects, with 480 mentors.

BY THE NUMBERS:

2021-2022 academic term

4,802 students

393 projects

480 mentors

Faculty mentors provide the ideas for most CI projects, but students may develop their own projects and teams with guidance from a mentor. For example, the Watt Family Innovation Center Makerspace grew out of a CI team. Creative Inquiry projects may incorporate: service-learning; international study, travel or virtual exchange; entrepreneurship; and other activities, with the requirement that research is a major component of the project. Creative Inquiry encourages and tracks citable accomplishments, in part by offering funds to present at academic or professional conferences. Research and accomplishments are defined by what is appropriate for each project. For example, among various disciplines, accomplishments might include publications, presentations, grants and proposals, architectural models, competitions, patent filings and/or community presentations.

In 2012, CI established an annual magazine, *Decipher*, to present a selected group of 20–40 CI projects to a wide audience. The magazine is deliberately written in a journalistic, rather than academic, style — we prefer that CI students publish their results in academic or professional publications rather than an on-campus research journal. Decipher is produced by undergraduate students, with mentoring by the CI associate director. The Decipher students interview the students and mentors in CI projects, write articles describing the work, take photos and create the graphic design. The CI staff then proofreads, adjusts text and graphics and sends the final version to a printer. All *Decipher* magazines, in PDF and as interactive blogs, are available on the CI website.

Over the years, CI has introduced special programs to meet specific needs and align with Clemson priorities and initiatives. For example, in the summers of 2014 and 2015, Adobe sponsored summer programs to teach small groups of CI students to use Adobe Creative Cloud programs for print Decipher articles and videos. During the COVID-19 pandemic, when many students were unable to engage in on-site research, CI launched the COVID Challenge, which placed students into teams for six-week remote research projects addressing pandemic-related topics. More than 400 undergraduates participated in 82 projects under the guidance of 126 faculty, graduate student, clinician and other mentors. Participants came from Clemson University and 15 other institutions.

RESOURCES AND ADMINISTRATIVE MODEL

Creative Inquiry is housed within the Watt Family Innovation Center, which reports to the provost's office and is associated with the university libraries. The program is managed by four full-time employees: a director, associate director, administrative coordinator and web developer. Additional institutional assistance includes access to financial, marketing, communications and graphic design staff members.

Financial support is provided primarily by the provost's office, with additional funds afforded through private and corporate donations. The base budget of $1.5 million per year covers staff salaries, office expenses and support for projects. Projects receive approximately $4,000 per year for supplies and travel needed to accomplish the project. Additional funds can be requested to support travel for presentations at academic and professional conferences, to offset publication costs or for extraordinary research needs. An endowment provides supplemental support for projects focusing on rural economic development and agriculture. The Corporate Creative Inquiry program enables industries to support projects doing industry-related research; the sponsoring company suggests the topic and contributes to the cost of the project.

A private endowment supports the Phil and Mary Bradley Faculty Award for Mentoring in Creative Inquiry. Donated funds also support a similar award that recognizes excellent graduate student mentors.

Administration of CI funds is entirely the responsibility of the director and associate director, with assistance from a department-level accountant. Each CI project has a unique budget number, allowing spending on each project to be effectively managed and monitored by the mentors and the CI staff.

BEST PRACTICES AND LESSONS LEARNED

SUPPORT FOR INSTITUTIONAL PRIORITIES: Creative Inquiry has consistently aligned with and supported Clemson's institutional priorities, as described in sequential university strategic plans, and departmental priorities. The current Clemson Elevate strategic plan has three main pillars: 1) to deliver the #1 student experience; 2) to double research by 2035; and 3) to transform lives statewide and beyond. Creative Inquiry contributes to each of these pillars. As a key feature of the Clemson student experience, Creative Inquiry is an exemplary experiential learning program and recognized as a recruiting draw for the university overall and for specific departments that emphasize CI to increase enrollment. Research productivity is encouraged and supported. In addition to involving student teams in data collection, analysis and outreach, faculty state that inclusion of CI is often an asset in grant proposals. Addressing the third institutional pillar, numerous CI projects focus on issues in South Carolina, the nation and the world.

Flexibility is a key feature for which faculty consistently praise CI. Projects may be directly aligned with their research, offer opportunities for interdisciplinary collaborations, or allow expansion into new areas, including topics derived from personal or student interests.

DATA AND BUDGET MANAGEMENT: A custom-designed online system linked to institutional databases is used to manage and report on CI projects. This system provides real-time data on student enrollment in CI projects and catalogues every student and mentor, dating back to the start of the online system in 2013. Mentors submit applications to initiate projects and request financial support. Proposals must include descriptions of planned project activities over multiple semesters and intended student learning outcomes. Applications are vetted by CI office staff. Each project receives a unique budget accounting number, allowing mentors and the CI office to monitor spending through direct links to the university financial system.

RECRUITING STUDENTS: Mentors may advertise for students through the *Find a Project* recruiting portal, which is particularly useful for multidisciplinary projects. Students search for projects by topic area and/or majors and then contact mentors directly to join the teams. Mentors determine team composition; some teams have open enrollment while others require specific expertise or applications.

ASSESSMENT: CI puts a strong emphasis on assessment, including annual project reports, mentor and student evaluations, and citations for accomplishments such as publications, presentations, grants/proposals, patents, awards, competitions and more. A searchable database allows visitors to view descriptions and accomplishments for all current CI projects.

Mentor and student program evaluations include quantitative and narrative responses. In a recent student survey, when asked "How beneficial is Creative Inquiry as a learning experience?" 94.9% of students identified CI as extremely beneficial (69%) or very beneficial (25.9%). When asked to describe their views on the impact of CI, students stated they gained high levels of confidence in identifying a research problem, formulating hypotheses, collecting and analyzing data/information, developing a sense of belonging within an academic discipline, communicating thoughts in written papers or reports, understanding ethical issues and explaining research to people outside the discipline. All surveys include open-ended questions and ask for general comments. A qualitative analysis of student comments in more than 4,000 surveys categorized 23 major points that students identified as important in their CI experiences, with these key themes: real-world experiences not available in the classroom, hands-on research, career preparation, networking and opportunities to work closely with faculty mentors. Mentors frequently report that mentoring students through CI allows them to experiment with new areas of research they would otherwise be unable to explore. Mentors also describe the benefits of CI, including increased ability to present and publish with undergraduate co-authors, financial support for the projects, support for conference travel and opportunities for their graduate students to develop mentoring skills.

VERTICAL INTEGRATION: The long-term structure of CI projects, with many projects continuing for years or decades, lends itself to developing leadership skills among the more experienced undergraduates and the graduate students who may serve as team co-mentors or mentors, with permission of their departments and advisers. Some of the strongest and longest-duration teams intentionally employ vertical integration to alleviate faculty workload and develop students to become peer-mentors, beginning with first-years and sophomores.

In partnership with the Graduate School, CI offers a Mentoring Up training program for graduate student CI mentors. Through this program graduate students complete a series of mentoring modules during each fall semester, implement best practices in the spring and subsequent semesters, and submit reflections on the interventions. Graduate students in the pilot program reported significant gains in confidence and the ability to communicate effectively with their research mentors as well as the CI students they mentor.

CHALLENGES AND PRIORITIES FOR THE FUTURE

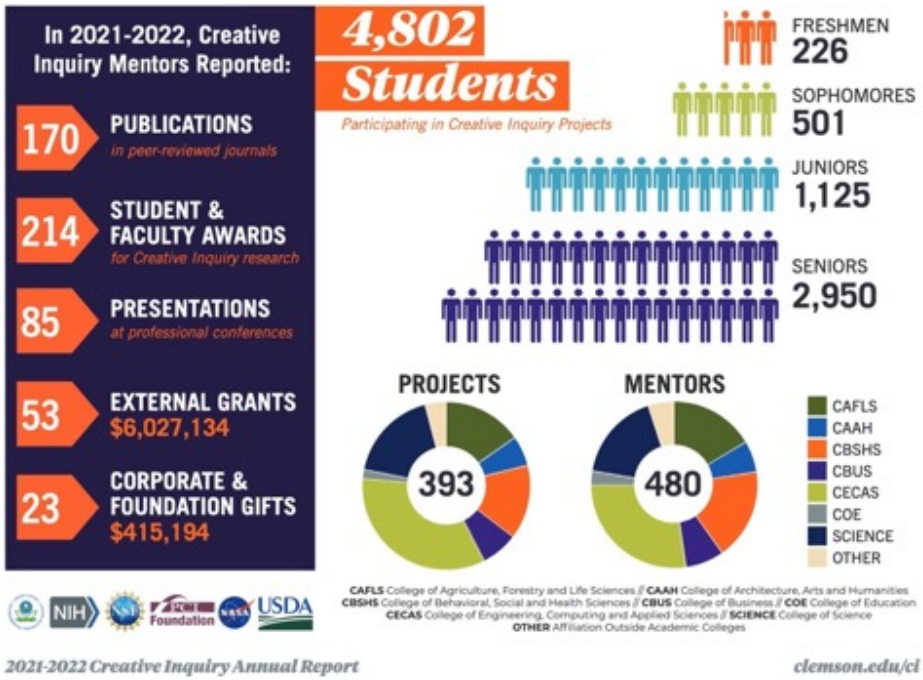
CHALLENGES

A continuing challenge is recruiting faculty to mentor the CI teams. This challenge is exacerbated as faculty workloads increase in part due to increasing enrollments and the research expectations of an R1 institution. The CI program does not pay faculty for their work. Teaching a CI course may not be a formal part of faculty workload, though various departments offer partial workload credit and some do include it in workload. The courses that house CI research projects are, for the most part, not required components of the curriculum, though some departments integrate CI into the curriculum as electives or required courses. CI classes are typically small (<20 students); as institutional enrollments grow it may become increasingly difficult to allocate faculty to these relatively low-enrollment sections. We encourage faculty to mentor CI projects by emphasizing benefits in addition to the intrinsic value of the research to themselves and their students. These benefits include the opportunity to involve their graduate students and post-doctoral fellows as mentors; gaining funds for supplies and travel; summer support for students; competitively awarded funds to support publishing costs; awards for faculty and graduate student mentors; and our efforts to publicize their projects, including in the Decipher magazine, news releases and social media. We also emphasize that Creative Inquiry can serve as a vehicle for exploring multidisciplinary research for which external funding is difficult to obtain or as preparation for submitting proposals. To that end, we work with Clemson's Division of Research to advertise to faculty the benefits of including CI in their grant proposals, for example in NSF Broader Impacts or in the education component of CAREER proposals.

PRIORITIES

Creative Inquiry's goals and priorities going forward build on our history and existing strengths. As mentioned above, Clemson has initiated a new strategic plan that is well aligned with CI's current and historical emphases. Clemson also recently initiated a new Quality Enhanced Plan that focuses on experiential learning and cites CI as a model program. A major goal is to increase the overall number of CI projects, including encouraging more from disciplines, such as the liberal arts and business, that currently offer relatively fewer undergraduate research opportunities. As a means for facilitating growth, we are communicating with individual departments and colleges to determine how CI can best benefit their students, faculty and curricula. We are exploring options for faculty to receive credit for their work with CI students and have partnered with the Graduate School in a Mentoring Up program to train graduate students to be effective CI mentors. We are seeking to increase our partnerships with industry both through university-mediated interactions and by developing more externally funded Corporate Creative Inquiry projects.

A Creative Inquiry Annual Graphic Report



Clemson University is located in Clemson, South Carolina. Founded in 1889, Clemson is a public land-grant R1 doctoral institution with 22,875 undergraduate students and 5,872 graduate students in more than 80 academic majors and 130 graduate degree programs.