COLLABORATIVE, PROJECT-BASED LEARNING IN HIGHER EDUCATION:

CASE STUDIES

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CONTENTS

BY PROGRAM REACH:

750+ students per year

100-749 students per year

<100 students per year

These cases were compiled as a complement to **The Future of Higher Education: A Symposium on Collaborative, Project-Based Learning**, hosted by Bass Connections at Duke University on June 26–27, 2023.

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EXECUTIVE SUMMARY

INTRODUCTION

"Give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking; learning naturally results."

– John Dewey, Democracy and Education, 1916

For the past several decades, collaborative projects have received attention as a "high-impact educational practice" — defined by the American Association of Colleges and Universities (AAC&U) as teaching and learning approaches that provide "significant educational benefits for students who participate in them" (Kuh, 2008).

More recently, the Boyer 2030 Commission Report characterized equitable access to high-impact practices as an essential component of "education that broadens horizons, stimulates curiosity and involves discovery of fields of knowledge, ways of knowing, and perspectives" (The Boyer 2030 Commission, 2022). As yet, however, the use of collaborative projects (and other high-impact practices) often remains at the periphery of university-level curricula.

In this compilation, we offer 17 case studies that illustrate how a diverse array of higher education institutions are delivering collaborative, project-based learning. Taken as a whole, these case studies provide practical information and insights on program design, best practices, common challenges and lessons learned. We hope that this set of programmatic overviews will spark innovation at other colleges and universities, aiding the spread and scaling of collaborative projects across higher education.

By showcasing how institutions of higher education can introduce collaborative projects through a variety of delivery models — including courses, capstones, interdisciplinary majors, co-curricular programs, labs and community-driven programs — we offer a range of avenues for experimentation. To aid universities at various stages of program development, these cases feature both small-scale pilots as well as large-scale established programs that have been running for years, and in some cases, decades.

We begin by offering some reflections on why colleges and universities should care about collaborative projects, what constrains more rapid adoption of the model, and how higher education institutions can foster best practices and sidestep common challenges.

ORIGINS

In June 2023 the Bass Connections program at Duke University convened a symposium on collaborative, project-based learning in higher education. Over two days, 120 faculty members, deans, vice provosts, administrators and postdocs from 45 institutions gathered to learn from one another about this dynamic approach to learning. They came from large research universities, liberal arts colleges, urban and regional universities, and community colleges.

During this action-oriented symposium, participants explored how different kinds of higher education institutions are embedding collaborative, project-based work into student experiences. We grounded these discussions in practical examples, seeded by the case studies presented here. On the second day of the symposium, participants worked in small groups to develop plans for piloting, adapting, scaling and/or assessing project-based learning programs at their institutions.

A NOTE ON TERMINOLOGY

These cases center around what we have termed "collaborative, project-based learning." As you will find in exploring the cases below, educators deploy this pedagogical approach in many contexts and through various strategies. As a result, we have no interest in being dogmatic about definitions. Indeed, readers of these cases will observe that case study authors describe these innovative educational programs in diverse ways, reflecting their multifaceted nature. However, because the scholarly literature on education often refers to "Project-Based Learning" in a more narrowly defined way, we want to clarify that our use of this term refers to the general use of projects to aid student learning.

We think of collaborative, project-based learning as a practice structured around team-based inquiry, analysis and communication that extends across a significant period. Such experiences often bridge the classroom, library and lab, on the one hand, and the world beyond the university, on the other, giving students a chance to bring their academic knowledge and skills to bear on complex problems under the mentorship of faculty, graduate students and, in some cases, community members.

WHY COLLABORATIVE PROJECTS?

A comprehensive literature review by Guo et al (2020) concluded that project-based learning improves students' motivation, grasp of content knowledge and capacity to deploy learning strategies, while fostering a range of important skills and leading to higher quality outputs. Similarly, the Buck Institute for Education has found that project-based experiences deepen student learning, cultivate important skills and promote a sense of purpose (Buck Institute for Education, n.d.). Other meta-analyses focused on project-based learning in STEM fields have

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found positive impacts on academic performance, retention of content knowledge, team skills and employability (Balemen & Keskin, 2018; Hart, 2019; Ralph, 2016).

When appropriately scaffolded, collaborative projects help students grasp the relevance of their education and encourage students to take greater ownership of the learning process, boosting their self-confidence and sense of efficacy. This approach motivates and inspires learners, leading to heightened engagement and deeper comprehension of the issues at hand.

Participation on a project team also builds transferable skills highly sought by employers, making collaborative projects a valuable pathway into careers. As students work together to identify problems, shape research questions, develop plans and craft potential approaches to address complex issues, they deepen their capacity for critical and creating thinking. By working alongside peers and contributing to a shared goal, students gain valuable experience in teamwork, communication and time management. In addition, projects designed around community-engaged work can foster a strong sense of belonging, increasing students' comfort level in sharing their perspectives and bringing their whole selves to the learning process.

Finally, collaborative projects can be hugely beneficial to participating faculty, who often feel energized by the opportunity to engage with students in new and authentic ways. Such projects allow faculty to integrate students into their own work by having them tackle research questions over a sustained period, and often entail an extension of scholarly inquiry to applied contexts beyond campus. Projects centered around interdisciplinary challenges can also enhance a faculty member's networks and introduce them to new research directions, methods and partnerships.

Given the benefits to both students and faculty, we see a strong case for deploying collaborative projects more broadly across higher education. Although collaborative projects are just one of several high-impact practices, and there are many contexts in which collaborative projects make less sense as an educational approach, we contend that they should be strongly represented in any higher education curriculum, for undergraduates and graduate and professional students alike.

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OBSTACLES

Although collaborative, project-based learning has long been recognized as a valuable pedagogical tool, its adoption in higher education remains limited. On many campuses, the emergence of this approach often reflects the initiative of an individual faculty member rather than a curricular strategy. Where this approach occurs more systematically, it is typically connected to a professional degree program, such as business administration or engineering management. So, what is holding us back from widespread deployment of collaborative projects?

Several factors contribute to this reluctance:

- First, the collaborative nature of such projects requires a significant shift in mindset by educators. Faculty members must embrace a less didactic and more facilitative role and devote careful attention to the scaffolding of effective teamwork. This transition can be challenging, as it involves relinquishing some control over the learning process and trusting students to take greater ownership of their education. Faculty also must reduce formal content coverage to make room for project work. As the scope of knowledge in every field continues to expand, many college instructors feel a pull to cover as much ground as they can.

- Second, collaborative projects often involve coordination with external partners or clients, which can add logistical complexity and administrative demands. This extra workload can include negotiating partnerships, managing travel arrangements and addressing potential risks. Collaborative projects can also be costly, requiring resources for travel, technology and sometimes student stipends (either for TAs or, in the case of summer non-credit programs, compensation for participating students).

Taken together, these challenges can deter individual faculty members who might be interested in experimenting with collaborative projects or give pause to administrators who are contemplating a pilot or the possibility of scaling programs. Our case studies offer practical guidance for overcoming these common challenges.

CASE STUDY COMMONALITIES AND DIFFERENCES

The 17 cases presented here illuminate a set of consistent practices, while highlighting variability in approaches that will allow other universities to consider adaptations that fit their circumstances. We have distilled salient trends here and, in the next section, provide a table that offers key features of each program at a glance.

COMMONALITIES

Collaboration around an intensive project takes center stage. Regardless of whether the program includes didactic or other pedagogical styles, the project serves as the primary vehicle of student exploration, inquiry and learning.

Most programs are **multi/inter/trans-disciplinary**, although a few programs are centered within just one field or division of knowledge. A number of case study authors reflect on the value of integrating different disciplines when tackling complex research questions and of pushing students to learn how to work across intellectual, methodological and practical boundaries.

All programs offer some form of **academic credit** for participation during the academic year, with some programs offering paid roles for graduate student mentors, as well as for students participating during the summer.

Almost all of these cases highlight **challenges related to faculty effort**. Although most programs operate as embedded courses for which faculty receive at least fractional teaching credit, these courses tend to include comparatively small numbers of students and often reside outside of participating faculty members' departments. As a result, faculty frequently hear concerns from unit leaders about their capacity to step away from departmental obligations. Numerous programs also report that faculty express apprehensions about the level of time that collaborative, project-based learning takes compared to the preparatory and instructional effort required for a typical course.

Almost every program includes **external partners**. Case study authors stress that projects with community partners provide an authentic and motivating opportunity for students to grapple with the application of knowledge and produce meaningful work. They also highlight the crucial importance of equitable partnership, and the need for a significant investment of time to establish the trust that makes equitable partnership possible.

Many programs emphasize the importance of **high-quality training** for faculty and graduate students to provide grounding in how to scaffold and manage project-based, community-engaged inquiry. Similarly, some programs have developed **mechanisms to foster effective teamwork**, including preparatory coursework, program-wide guidance around best practices and resources for troubleshooting common team challenges.

A number of programs support structured **opportunities for students to communicate their research findings** to an array of audiences, ranging from works-in-progress presentations and end-of-year showcases or expos to digital archives, exhibits and publications.

NOTABLE DIFFERENCES

These case studies showcase a **wide range of models**, including standalone courses, university-wide co-curricular programs, required elements of a specific major or degree program (e.g., capstone) and embedded dimensions of an overall university curriculum.

The **scope** of these programs ranges from 10 students a year to more than 4,000 students. In the case of boutique programs, a passionate faculty member or an individual academic unit has championed innovation. Larger programs tend to be managed by a university-wide administrative office.

The majority of programs source **project ideas from faculty, although often in consultation with community partners**. A few programs source ideas directly from external partners or allow students to shape project ideas more directly.

Project duration can vary greatly across (and even within) programs, ranging from six weeks in some instances to multiple years in others. Case study authors consistently note the challenges of supporting robust projects within the confines of a single semester, and many semester-long programs have developed "extension" opportunities through which students can continue their project engagement.

Programs incorporate **varying levels of didactic learning and foundation setting**, with some projects being coupled with full courses, others splitting time between course content and project work, and still others emphasizing project work alone.

Fewer than half of the programs represented here are **vertically integrated** (i.e., involving undergraduate and graduate students, and sometimes staff and/or postdocs, to foster layered mentoring by near peers) and these programs tend to be found in larger research universities.

A small number of programs provide **project funding** to support research and travel expenses, but most do not.

Academic credit takes a number of forms. In some cases, participation in a program leads to elective credit. In others, credit goes toward general education requirements or to a major or degree program.

Participation ranges across every **student level**, from first-year undergraduates through master's and professional students to Ph.D. students.

THEMES AND INSIGHTS

After reading these cases, talking with attendees at the symposium and tracking the landscape for collaborative projects in higher education over the last decade, we reflect on several important themes for the successful implementation of such efforts.

SCAFFOLDING AND SUPPORTING EFFECTIVE COLLABORATION

Most people have experienced the challenges of group work in an academic setting. Personality conflicts, an uneven division of labor and a lack of team structure can stand in the way of student learning. Successful collaborative projects require intentional effort to set teams up for success. The programs profiled use a variety of mechanisms to support students, but key elements include:

- **Effective team structure** that ensures team members have clear goals and roles, often including a requirement that teams create a team charter and project plan, with the latter subject to periodic updating as circumstances evolve
- **Open-ended, but well-supported, inquiry** that provides students with structured grounding and intellectual parameters, while eventually extending greater ownership to participating students so that they can grapple with the inevitable ambiguity in an inquiry-based approach
- **Mentorship** from faculty, graduate/professional students and often near peers to help students navigate complex issues constructively

FOSTERING AND MANAGING COMMUNITY-ENGAGED RESEARCH PROJECTS

As noted, collaborative projects often incorporate applied work with community organizations. This approach can provide numerous benefits for both students and community partners: students develop valuable research skills and cultivate important qualities like humility, empathy, communication and teamwork while producing useful research outputs.

The featured colleges and universities draw on a variety of approaches to source community-engaged research projects, with a common emphasis on conducting research “with” or “for” community partners rather than treating them as subjects. Some programs solicit community projects through applications, while others rely on existing faculty relationships or outreach from community partners. Regardless of the sourcing method, program leaders emphasize that building and maintaining strong, longer-term relationships with community partners is crucial, even as faculty and staff may change.

The need to balance student learning with community expectations presents important challenges, especially given the semester-based structure of many university programs. Some programs address this trade-off by holding pre-project meetings to establish expectations and then provide regular updates throughout the semester. Others rely on faculty to manage relationships while offering support and guidance.

To ensure ethical engagement, programs often incorporate research methods courses, provide faculty training and furnish participating students with training in community engagement.

Programs typically face the question of whether, and if so, how, to compensate community partners for their time and engagement. Some programs pay small honoraria to community partners. Larger-scale research initiatives might include partner funding in grant proposals. All programs emphasize the need to reduce time burdens on community partners.

SCALING AND EMBEDDING PROJECT-BASED LEARNING IN THE CURRICULUM

One can now find examples of collaborative, project-based learning on just about every college and university campus. Despite the rising number of efforts at project-based learning cropping up across higher education, it remains challenging to bring curricular structures to scale. This is particularly true for interdisciplinary programs and co-curricular initiatives, as universities largely remain structured around disciplinary departments and faculty teaching expectations rarely allow for effort outside of one's department.

As it stands now, the most sustainable and affordable way to increase collaborative, project-based learning is to embed such offerings into the curriculum as regular courses, particularly as required introductory courses or signature capstone experiences. This practice also aids in the recruitment of students. However, curricular integration, particularly for interdisciplinary programs, can require significant effort and persistence. Universities and departments must be willing to adapt their structures and processes to accommodate interdisciplinary projects. Adjustments may involve changes to funding models, teaching credit, assessment and course credit policies.

Even when a college or university builds such experiences into curricular requirements, it can be difficult to encourage faculty to participate, given the time commitments to develop projects, mentor students and see projects through to their conclusion. Universities can support faculty by fostering a culture of collaboration to facilitate best practice sharing, reducing administrative roadblocks around issues such as transportation and engaging with community partners, and providing teaching assistants to support the mentoring of student teams.

Extending project-based learning to graduate education can further enhance the impact of these programs. By involving graduate students in projects, universities can create a more integrated learning experience and deepen the capacity of those more advanced students

to work on teams, with positive impacts on their ability to succeed in a variety of careers. A growing number of programs combine students of different levels on teams, with associated graduation of responsibilities.

Ultimately, efforts to scale and embed collaborative projects hinge on the ability of champions to communicate the value of these programs. Higher education could benefit from a more consistent methodology to assess quality across programs and track longer-term outcomes for students. The development and refinement of shared approaches to assessment has the potential to better illuminate best practices in the field and make the case for a greater investment of resources (financial or otherwise) in these practices.

The variety of approaches to collaborative, project-based learning represented in these case studies reflects remarkable creativity on campuses across North America, as well as careful adaptation to local circumstances, opportunities and constraints. We hope that these cases provide readers with inspiration and practical insights into how to adapt this mode of education into their university's undergraduate and graduate programs.

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Key Program Information and Features

Program + Institutional information	Courses or projects/ year	Source of project idea	Mode of project selection	Project duration	Number, level and selection of students	Faculty incentives
PROGRAM REACH: **750+ STUDENTS/YEAR**						
BALL STATE UNIVERSITY: **Immersive Learning** Students enroll in project-based undergraduate courses to address a community issue with a faculty mentor and community partner. Program launch: 2000 Institution type: Public R2	130-150 courses	Faculty; sometimes a community partner sparks the collaboration	Any faculty member can offer a course; grant-funded projects are selected through faculty peer review	Many are semester-long, others extend for years; offer 1-year pilot grants and 3-year sustaining grants are offered	1,500-2,000 undergraduate students; open enrollment	Teaching credit or course release possible through grants; paid professional development
CLEMSON UNIVERSITY: **Creative Inquiry + Undergraduate Research** Teams of undergraduate students work over multiple semesters on complex research problems in partnership with faculty mentors. Program launch: 2005 Institution type: Public R1	Approx. 400 academic-year projects; 40-70 summer projects	Faculty and staff, students, community or industry partners	All project proposals are reviewed by the CI office	Multi-semester projects preferred; average student participates for 2.5 semesters; projects may extend for years; summer project awards require participation during the academic year	4,500 students, primarily undergraduates; graduate students only as mentors; selection of students varies by project — some are open to all; others require applications with selection by project leaders	Teaching credit at discretion of depts. but generally not provided; faculty can request project funds of approximately $4,000 per year plus supplemental funds for conference travel and summer student stipends
DUKE UNIVERSITY: **Bass Connections** Faculty, staff, undergraduate and graduate/professional students work on interdisciplinary research teams to address applied societal questions, often alongside community partners. Program launch: 2013 Institution type: Private R1	60-70 year-long project teams; 40-50 summer projects; 40-50 semester-long courses	Faculty, sometimes in partnership with graduate students or community partners	Faculty peer review	1-year projects, eligible for renewal, with many continuing for multiple years; summer projects also offered through affiliated programs	550-700 undergraduates; 150-200 graduate and professional students (doesn't include courses); students apply with selection by project leaders; emphasis on diverse teams	Teaching credit at discretion of depts. but generally not provided; faculty can request project funds up to $40,000

Program + Institutional information	Courses or projects/ year	Source of project idea	Mode of project selection	Project duration	Number, level and selection of students	Faculty incentives
GEORGIA TECH: **Vertically Integrated Projects (VIP) Program** Vertically integrated, long-term, large-scale, multidisciplinary teams of undergraduates are embedded in the creative activities of faculty members and their graduate students, often with external partners and funding via faculty grants. Program launch: 2001 Institution type: Public R1 (other VIP sites include R1, R2, MSI, HBCU and int'l institutions)	105 multi-year project teams	Faculty (academic faculty, research faculty and researchers at Georgia Tech Research Institute)	Each project is vetted for scale and duration through discussions between faculty proposing projects and the VIP director. Minimum 4-year duration expected	Minimum of 4 years; total lifetime of a project is unlimited — the longer the better. Longest-lived team is now 23 years old	Teams average 25 undergraduates, 0-4 graduate students and 1-3 faculty; 2,600 undergraduates in fall 2024; ~5,000 enrollments per year. Students apply to teams, with selection by VIP director and staff; low barriers to entry — no screening of students by GPA, CV or interview; selection based on enthusiasm	Teaching credit at discretion of depts. (recommendation: credit for 1 course over the year and credit available when students on a VIP team are using their work for capstone requirements)
WORCESTER POLYTECHNIC INSTITUTE: **Project-Based Education** Project-based learning is woven throughout WPI's undergraduate curriculum. All students complete multiple project experiences, including the *Great Problems Seminars*; an optional 1st-year project course; the *Interactive Qualifying Project*, a 7-week intensive project with partners (often in the field); and the *Major Qualifying Project* (team-based capstone). Program launch: 1971 Institution type: Private R2	1,000+ projects across all courses	Varies by course — includes faculty, students and community partners	Faculty vet and approve projects identified by community or students	Varies by course from 7 weeks to 9 months	5,000+ undergraduate students; generally open enrollment (Interactive Qualifying Projects by application)	Teaching credit
PROGRAM REACH: **100-749 STUDENTS/YEAR**						
ARIZONA STATE UNIVERSITY: **Humanities Lab** Interdisciplinary instructional teams (faculty, librarians and often community partners) work with undergraduate and graduate/professional student teams to pursue collaborative, public-facing research that addresses pressing social issues. Program launch: 2017 Institution type: Public R1	12 courses ("Labs") with multiple projects in each course; 1-2 Beyond the Lab courses	Humanities Lab staff and faculty across the university suggest overarching Lab challenges, sometimes with an external partner	Project ideas are student-generated, often in partnership with community leaders	7.5-week session or 15-week semester with option to continue through Beyond the Lab program	643 undergraduate and graduate students, including on-campus, online and hybrid; open enrollment	Teaching credit

Program + Institutional information	Courses or projects/ year	Source of project idea	Mode of project selection	Project duration	Number, level and selection of students	Faculty incentives
BOSTON UNIVERSITY: **BU HUB Cross-College Challenge (XCC)** Through semester-long courses led by 2 faculty from different disciplines, undergraduate student research teams work with campus and community partners on substantial real-world problems. Program launch: 2018 Institution type: Private R1	16 courses, 80-100 project teams	Faculty and community partners	Faculty and program leaders	1 semester	370-400 undergraduate juniors and seniors; open enrollment	Teaching credit or stipend for overload
DUKE UNIVERSITY FUQUA SCHOOL OF BUSINESS: **Fuqua Client Consulting Practicum (FCCP)** FCCP is an experiential learning course where a small team of Fuqua students collaborates with an external client to address a business challenge. Program launch: 2012 Institution type: Private R1	60-70 projects	External clients through referrals from staff, faculty, alumni and students	Staff, faculty and men-tors review client submissions; MBA students rank projects of interest while MMS students are assigned to projects	Ranges from 6 to 16 weeks based on student program (MMS vs. MBA vs. exec. MBA)	170-200 MBA students take FCCP as an elective with pro-ject placement based on se-lection; 230-250 MMS students take FCCP as a required course	Teaching credit
DUKE UNIVERSITY PRATT SCHOOL OF ENGINEERING: **First-Year Design (FYD)** Teams of undergraduate students engage in the engineering design process and build low- and medium-fidelity prototypes to solve a community-based need or problem. Program launch: 2017 Institution type: Private R1	8 course sections in the fall semester, 1 section in the spring; 50+ distinct client projects in the fall offered to 70-80 teams; ~5 distinct client projects in the spring offered to 5-6 teams	Projects in the community are identified by faculty and staff; in recent years, community members also contact the FYD ad-ministrative team with ideas	Project ideas are vetted and ultimately selected by the FYD administrative team	At least 1 semester; some projects continue for 2 or more semesters	Approximately 350 first-year students in the fall sections; 20-30 students in the spring section	Instructors indicate interest and are chosen by FYD director in agreement with home department
LEHIGH UNIVERSITY: **Office of Creative Inquiry** The Office of Creative Inquiry supports a wide range of interdisciplinary initiatives that help students and faculty pursue new intellectual, creative and artistic pathways leading to transformative new innovations, expressions and questions. Program launch: 2017 Institution type: Private R1	50 multiyear projects across five "Impact Fellowship programs; 45-50 summer projects continue through the academic year	Faculty and program leadership, typically in conjunction with external partners	Discussions between faculty and program leadership	Strong preference for 3-5-year time horizons; sometimes end early due to lack of viability/proof of concept or faculty bandwidth; re-evaluated annually	~300 undergraduates, 25-30 graduate students; students apply, ranking their top choices for projects; faculty mentors conduct interviews and make final selections with support from program management	No teaching credit or stipends; nominal project expenses are covered; for summer projects, faculty are offered research discretionary funding and project expenses

Program + Institutional information	Courses or projects/ year	Source of project idea	Mode of project selection	Project duration	Number, level and selection of students	Faculty incentives
PROGRAM REACH: **UNDER 100 STUDENTS/YEAR**						
APPALACHIAN STATE UNIVERSITY: **Research-to-Action Multidisciplinary Projects** Research faculty and staff lead student groups in conducting applied research on a wicked problem through a transdisciplinary framework. Program launch: 2021 Institution type: Regional university	1 course with 5 project groups	Program leadership chooses overarching problem/ issue; faculty develop related, locally relevant projects	Faculty develop a set of cohesive projects in consultation with an instructor of record who leads course planning	1 semester	10 undergraduate sophomores and juniors; open enrollment (half of seats reserved for honors students)	Faculty receive stipends based on level of engagement but not teaching credit; projects receive minor funding
CALIFORNIA STATE UNIVERSITY, CHICO: **Interdisciplinary Course on Housing and Homelessness** Students work in interdisciplinary teams during a semester-long course to conduct community-based participatory research focused on housing and homelessness. Program launch: 2017 Institution type: Regional university	1 offering that includes 2 classes that meet concurrently	Faculty and community partners; students select from a variety of projects	Faculty, in consultation with community partners or consultant	1 semester to 1 year	80-100 students, primarily undergraduates, with graduate student teaching assistants; open enrollment	Teaching credit
LOYOLA UNIVERSITY CHICAGO: **Center for Urban Research & Learning (CURL)** CURL brings together community and university partners to do collaborative, action-oriented, interdisciplinary research on topics that are of greatest concern to local, national and international partners. Program launch: 1996 Institution type: Private R1	4-6 courses; 15-20 research projects at any given time (no set schedule)	Collaboration among community, faculty and funding partners	CURL staff/ faculty consensus	1-year projects, eligible for renewal; some semester-long courses and summer projects also offered	25 undergraduates and 10 graduate/ professional students; student fellows apply for paid positions; classes are open enrollment	Faculty fellows receive supplemental salary or course buyouts; funding comes from research grants and/or CURL endowment

Program + Institutional information	Courses or projects/year	Source of project idea	Mode of project selection	Project duration	Number, level and selection of students	Faculty incentives
TRINITY COLLEGE AND CT STATE COMMUNITY COLLEGE CAPITAL: **Liberal Arts Action Lab** Community partners in Hartford propose semester-long research projects to pursue in collaboration with student and faculty teams from Trinity College and CT State Capital. Program launch: 2018 Institution type: Liberal arts college and community college	6-10 projects (Trinity's Center for Hartford Engagement & Research (CHER) also runs 20 community learning courses per semester)	Hartford-area community partners	Community review; selection by Hartford Resident Advisory Board	1 semester with opportunities for project extension through CHER's other community-engaged learning programs	40 undergraduate students; open enrollment	Project and methods instructors receive teaching credit; faculty fellows associated with each project receive a $1,000 stipend
UNIVERSITY OF MARYLAND, BALTIMORE COUNTY: **UMBC Interdisciplinary CoLab** Interdisciplinary teams of undergraduate students work with a project leader to utilize diverse humanities research methods, modes of analysis and technical tools to produce public-facing final projects for community partners. Program launch: 2018 Institution type: Public R1	4-7 summer projects	Faculty, community partners, campus organizations	All project proposals are reviewed by CoLab selection committee	6-week summer session	3-4 students per team; students can apply to multiple projects	Stipend provided for project leaders
UNIVERSITY OF MICHIGAN: **U-M History Labs** Faculty, undergraduates and graduate students collaborate on curricular and extracurricular projects with a mission of public engagement, digital humanities, community partnerships and real-world impact. Program launch: 2018 Institution type: Public R1	3-5 undergraduate lab courses and 1-2 grad lab courses	Faculty propose lab courses, often in consultation with community partners, and receive development funding	Faculty peer review	1 semester with option to continue through paid internships in select labs; many labs run for 1 semester, but 2 backbone labs have been running an annual course for 5+ years	75 undergraduates; 20 graduate or professional students; open enrollment	Teaching credit; project development funding for new versions
UNIVERSITY OF WATERLOO: **Knowledge Integration** This undergraduate honors degree program teaches transferable skills in interdisciplinary, collaborative problem solving by providing an array of "breadth courses" across disciplines and flexibility for students to develop customizable specializations. Program launch: 2008 Institution type: Public research university	Students must complete 3 core project-based courses and range of "breadth" and elective courses	Varies by course — includes campus partners, students and/or community partners	Varies by course	Varies by course from 4 weeks in the gateway course to 8 months in more advanced courses	15-20 undergraduate students per cohort; 70-80 students participate in open enrollment courses, with some courses limited to the major	Teaching credit

CASE STUDIES

BY PROGRAM REACH:

750+ students per year

BALL STATE UNIVERSITY

bsu.edu/immersive

BALL STATE UNIVERSITY:

IMMERSIVE LEARNING

QUICK FACTS

Year founded: **2000**
Project source: **Faculty**
Duration: **Semester-long**
Students per year: **1,500-2,000**
Interdisciplinary: **Yes**
Vertical integration: **No**

By: Jackie Grutsch McKinney, Professor of English and Director of Immersive Learning and High Impact Practices

PROGRAM SUMMARY

Immersive Learning is Ball State University's signature program. The name describes a high-impact practice that provides authentic, deep and transformative learning experiences for undergraduate students and faculty. Immersive learning courses are credit-bearing courses offered in departments throughout the university with a blend of collaborative, community-based and project-based learning. These courses have the following characteristics:

Immersive Learning

- At least 10 undergraduate students enrolled in a credit-bearing course
- Intensive work with a community partner (local or national nonprofit, small business, government agency, school, campus organization, etc.)
- Collaborative approach
- Creation of an outcome or deliverable that addresses a community-identified issue or need
- Faculty focus on serving as mentor, liaison and guide

The origins of immersive learning at Ball State University can be traced to the Virginia Ball Center for Creative Inquiry in 2000, an endowed program sponsored by the Ball family that originally enrolled up to 60 students a year. Building on the success of that model, the university embarked on a concerted effort to expand immersive learning opportunities to all students in three- or six-credit courses that would fit more easily into degree plans. Now, in a typical year, 1,500 to 2,000 students participate in an immersive learning course. All told, there have been approximately 3,500 immersive learning courses offered, reaching 48,000 students.

BY THE NUMBERS:
Immersive learning:
Fall 2022 + Spring 2023

145 classes

2,193 students

30+ departments

Faculty are incentivized to create and offer immersive learning courses with one-year and three-year grants, though most courses offered are not grant funded. Grant funding can be used for course buyouts, supplies, travel, consultants and student wages. Students in immersive learning courses are assessed yearly on two program-wide student learning outcomes: 1) students will create a constructive collaborative climate and 2) students will apply previous knowledge or skills to demonstrate comprehension and performance in novel situations.

RESOURCES AND ADMINISTRATIVE MODEL

The Office of Immersive Learning serves as the academic and administrative support unit for immersive learning activities across campus. We support faculty in planning and implementing immersive learning projects. Focal points include project development; identification of internal and external funding; introductions to community partners and internal collaborators; recruitment of students; management of projects and budgets; assessment of learning outcomes; and identification of scholarly research and presentation opportunities.

Immersive Learning is a unit within Academic Affairs under the purview of the Vice Provost of Academic Affairs. The team consists of a full-time director, two project managers, a project coordinator and a videographer. The director's title is "Director of Immersive Learning and High Impact Practices," and she has a split, though overlapping, appointment, as immersive learning is seen as a high-impact practice. The director holds faculty rank (professor of English) and reports to the Associate Provost for Faculty Affairs and Professional Development.

In addition to personnel, the unit has resources to fund immersive learning projects, incentivize professional development and scholarship, and recognize outstanding immersive learning projects. Funding comes primarily from the general university operating budget as determined by the provost. Additionally, immersive learning has donor-funded, endowed foundation accounts. Funding for immersive learning has been a priority for several administrations now and the budget has remained steady, even in recent years when enrollments have dipped.

BY THE NUMBERS:
Support for faculty teaching immersive learning classes

$270K
course grants

$20K
conference travel

$6K
faculty awards

$20K
summer scholarship grants

$15K
professional development

BEST PRACTICES AND LESSONS LEARNED

The widescale adoption of immersive learning by faculty, programs and departments reflects its prominence in the last three strategic plans and university marketing initiatives. The 2007–2012 Strategic Plan called for immersive learning opportunities for all undergraduates and wrote immersive learning into the mission of the university. Specifically, the strategic plan named immersive learning in Goal #1, stating the aspiration to "place immersive learning at the center of a Ball State education." The current strategic plan keeps immersive learning prominent in Goal #1, naming immersive learning as one of four high-impact practices (HIPs) that students should have the opportunity to participate in before graduating.

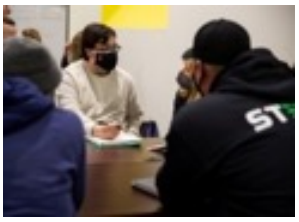
Similarly, university marketing efforts over this same timespan have focused on immersive learning as a mark of distinction for the university. At one point, Ball State billboards across the state simply said "IMMERSIVE." Because of the strategic plan initiatives, and because immersive learning is seen as part of the brand of the university, immersive learning has become well known across campus by faculty, staff and administrators — particularly those who have been at the university for some time. As a result, we do not have put a lot of effort into selling immersive learning or proving its worth to stakeholders at every turn.

Of course, the program would not have had buy-in without resources, particularly funding and staff. The call for immersive learning courses for all undergraduates in 2007, for example, was accompanied by an ask in a major capital campaign to make immersive learning viable long into the future. Likewise, the program has been able to draw on a well-staffed office to oversee and maintain the initiative.

The 2007-2012 Strategic Plan named immersive learning in Goal #1, stating the aspiration to "place immersive learning at the center of a Ball State education."

CONSERVATION TALES (VIDEO)

Combined art and biology course creating children's books to bring attention to endangered and invasive species



REPURPOSING ABANDONED PROPERTIES (VIDEO)

Urban design course making recommendations to city on which properties to acquire and how to repurpose them

WORK-RELATED STRESSORS AND POSITIVE WORK-RELATED EXPERIENCES OF NOBLESVILLE FIREFIGHTERS (VIDEO)

Psychology course using research to determine appropriate mental health interventions for firefighters

CHALLENGES AND PRIORITIES FOR THE FUTURE

Data, data, and data. Over the years, getting an accurate count of immersive learning courses has been challenging, as faculty in any department can offer a course. Additionally, until recently, there has not been a good way to get participation data on students who take immersive learning courses. We now have courses designated as immersive learning through our course registration system (we use Banner attributes for this) which, if used by all units, will finally give us reliable records of courses and student participation data.

We are particularly interested in disaggregating data to see who opts into immersive learning classes. Research shows that students in the "new majority" (first generation, lower income, Black and/or Latinx) are less likely to engage with HIPs, and yet, HIPs are typically associated with compensatory effects for this very student population — closing equity gaps in retention and graduation rates. Initial data analysis of the academic year 2021-2022 shows that we do have a participation gap in immersive learning of 2% for Black and Latinx students, and we suspect an even wider gap for first-generation students. We intend to undertake additional research to understand the sources of these disparities and identify what it might take to remedy them.

Simultaneously, we are pushing academic programs on campus to map immersive learning courses (and other high-impact practices) right into majors and minors, so students don't have to swerve off their degree plans to participate. If we can do this, students will not have to opt-in; all students will participate. In summer 2023, we piloted an inaugural cohort of eight departmental teams participating in a HIPs Curriculum Mapping Team program.

Ball State University is located in Muncie, Indiana. It is a public, regional comprehensive university with about 18,000 students (14,000 undergraduates) and 110 majors. About 40% of students are first-generation and over 75% receive financial aid.

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**

By: Barbara Speziale, Professor of Biological Sciences, Associate Director of the Watt Family Innovation Center and Director of Creative Inquiry + Undergraduate Research; Cora Allard-Keese, Associate Director of Creative Inquiry + Undergraduate Research

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.

BY THE NUMBERS:

2021-2022 academic term

4,802 students

393 projects

480 mentors

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.

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

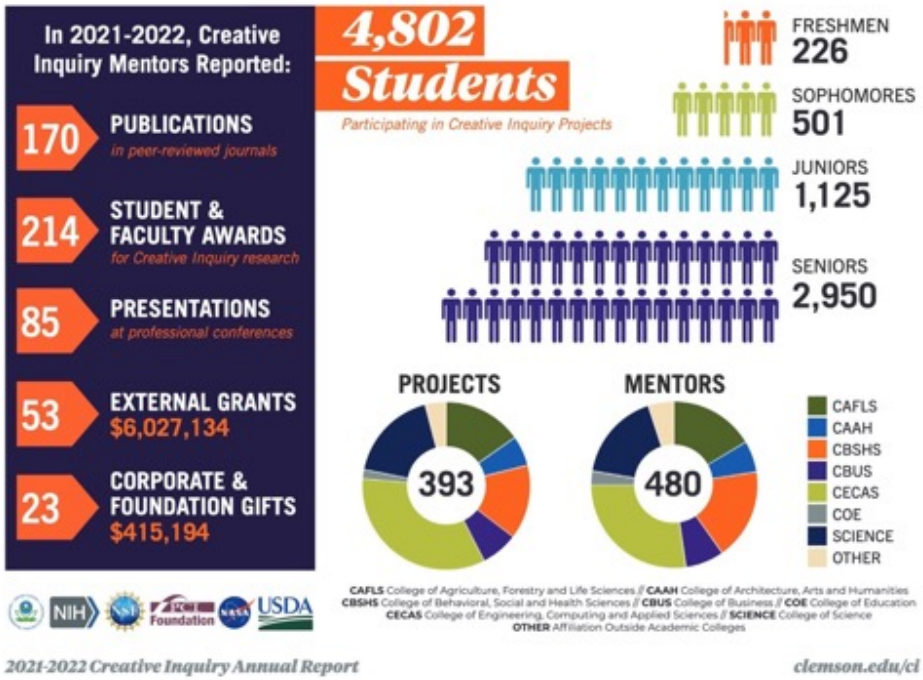
CHALLENGES

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.

Duke BASS CONNECTIONS

bassconnections.duke.edu

DUKE UNIVERSITY:

BASS CONNECTIONS

QUICK FACTS

Year founded: **2013**
Project source: **Faculty**
Duration: **Year-long**
Students per year: **800-1,000**
Interdisciplinary: **Yes**
Vertical integration: **Yes**

By: Edward J. Balleisen, Professor of History and Vice Provost for Interdisciplinary Studies; Laura Howes, Assistant Vice Provost for Interdisciplinary Studies and Bass Connections; Meghan O'Neil, Associate Director of Bass Connections

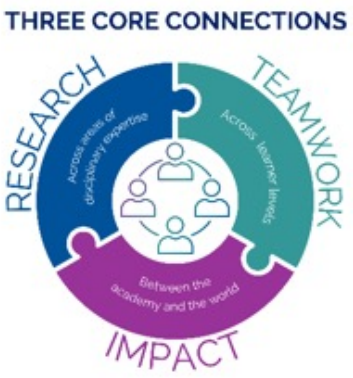
PROGRAM SUMMARY

Bass Connections is a university-wide program that supports interdisciplinary, applied research teams involving more than 1,200 individuals each year (a mix of faculty, staff, postdocs, graduate/professional students and undergraduate students). At the core of the program are approximately 70 year-long project teams that run each year, but the program also supports collaborative, applied summer research experiences and a growing number of semester-long courses designed around team-based research.

Bass Connections seeks to create a distinctive educational model that is predicated on collaborative, interdisciplinary inquiry and that actively engages students in the exploration of big, unanswered questions about major societal challenges.

Bass Connections teams establish three core connections:

1. Across areas of disciplinary expertise
2. Across learner levels (undergraduate students, graduate/professional students, faculty)
3. Between the academy and the broader world



Our year-long project teams address applied research questions proposed by faculty leaders (typically two to four scholars from different disciplines). Proposals are vetted and selected through a faculty peer review process, and once project teams are awarded funding, we work with faculty leaders to recruit graduate and undergraduate students. Teams typically include one to four graduate students and two to ten undergraduate students, resulting in an average team size of 10 students. In many cases, teams also include external partners, such as cultural institutions, government agencies, community organizations, nonprofits or businesses. Students typically receive academic credit for participating in the program, with

some advanced students and/or students in leadership roles receiving compensation. While faculty receive project funding and research support, they generally do not receive teaching credit.

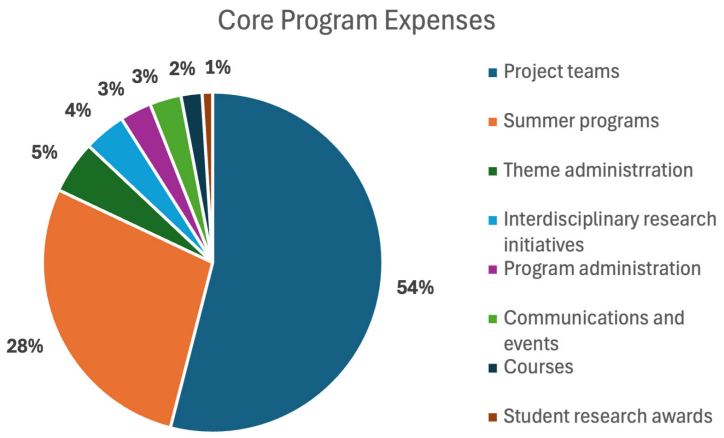
Project teams tackle a diverse set of issues, anchored by six interdisciplinary themes focused on societal problems. Teams use a wide range of research methods and approaches, and generate an array of outputs, including both traditional academic products (e.g., grant proposals, data sets, peer-reviewed scholarship) and creative public-facing work (e.g., new service delivery models and processes, policy briefs, op-eds, prototypes, algorithms and software, exhibits, websites, oral history archives, works of art). The research undertaken by project teams has also underpinned successful grant proposals leading to an estimated $125 million in external funding.

To offer just a few examples:

Team name	Team description and outputs	Disciplines involved	Activities and methods
Help Desk: Scaling Volunteer Models That Address Patients' Social Needs	This team partnered with a local, federally qualified community health center to pilot a new, student-driven volunteer model to connect patients to social services. The model has now been expanded to three clinics. The team also produced a comprehensive training curriculum and numerous research papers and presentations.	• Biology • Business • Global health • Medicine • Nursing • Policy • Sociology	• Feasibility assessment • Program design of a new service delivery model • Program evaluation
Gerrymandering and the Extent of Democracy in America	This team built, evaluated and refined diagnostic tools to quantify the effect of gerrymandering on congressional elections across a handful of states. Their district modeling algorithms have informed several federal and state judicial opinions related to gerrymandering, including the first federal court ruling to strike down electoral districting on the grounds that it unconstitutionally favored one political party over another.	• Computer science • Political science • Law • Math • Public policy	• Data collection and cleaning • Algorithm development and modeling • Policy and legal briefs
Arts and the Anthropocene	To educate the public and inspire action on climate change, this team developed two StoryMaps on the Science of Sea Level Rise and Local Impacts of Sea Level Rise in NC and created "Spectral Seas," a tapestry woven out of 400 plastic bags collected from the community, depicting the scale of future sea level rise.	• Arts, including sonic and visual media • Environmental science • Public policy	• Data collection and analysis • Literature reviews • Digital mapping • Exhibition design (including tapestry design and weaving) • Arts outreach

RESOURCES AND ADMINISTRATIVE MODEL

The program is overseen by Duke's Vice Provost for Interdisciplinary Studies and managed by three to four full-time staff members. Themes are administered by associated interdisciplinary units and supported part-time by one or two faculty "theme leaders" and a staff "theme administrator."



Given the distributed model of the program, it is difficult to assess exact program expenses, but core funding totaled approximately $2.5 million in 2024-2025. The program is funded primarily by endowed gifts, complemented by a smaller number of expendable funds. Thus, no tuition dollars or other internal strategic funds currently support the program.

As shown, funding for year-long project teams comprises more than 60% of the budget. Teams receive an average budget of $25,000 to support research expenses such as graduate student funding, travel for fieldwork and conference presentations, supplies and materials, and payments to study participants. Maximum project funding is $40,000. Funding for summer programs only represents contributions through Bass Connections, which provides partial support for those programs.

BEST PRACTICES AND LESSONS LEARNED

Since the program's founding, we have invested in a regular process of evaluation, with a continual eye towards identifying best practices and challenges confronting teams. We have drawn on these lessons to develop tools, resources, requirements and guidance to reinforce the following elements, which we have found to be critical to the impact of the program and the success of our teams:

TEAM ORGANIZATION, LOGISTICS AND CULTURE: Fostering productive collaborative, interdisciplinary research requires an intentional focus on team development. The success of our teams is highly reliant on the degree to which leaders foster strong team culture and clear structure for engagement. Our end-of-year evaluation surveys consistently underscore the importance of clear project goals, defined (albeit adaptable) timelines and specified roles. To support teams in these endeavors we have developed a team resource center that includes suggestions for team-building activities, guidance on setting team ground rules, and a team charter template. We also encourage faculty leads to appoint a graduate/professional student to partner with them as a project manager, and share trainings and resources directly with this group.

OPEN-ENDED, BUT WELL-SUPPORTED, INQUIRY: Students benefit greatly from engaging in applied research experiences that lack predetermined answers and provide them with a significant voice in shaping research objectives and design. This combination compels students to navigate ambiguity, take an inquiry-based approach, participate in collective

decision-making and engage in teamwork. These interrelated elements represent a shift from more didactic learning environments and thus require distinctive supports. We often counsel our teams on how to scaffold the experience for students, starting with a more structured approach that provides grounding in intellectual context and research methods, and then gradually empowering students to take greater ownership and initiative.

VERTICAL INTEGRATION: We expect teams to grapple with research questions collectively, drawing on the expertise of all team members. Because of the interdisciplinary nature of teams, students of all levels can bring significant expertise and valuable perspectives to their teams. It is not uncommon for faculty to remark on skills and insights they have gained from undergraduate team members.

Graduate/professional students frequently serve as critical interlocutors on teams, mentoring undergraduate students and providing project management support. These opportunities allow advanced students to practice leadership and communication across disciplines and levels, while also providing undergraduate students with an accessible near-peer mentor, thereby reducing the load on faculty leaders.

APPLIED ENGAGEMENT: All projects are applied in nature and about two-thirds of teams have an external client or partner. These external relationships enable our teams to learn from community organizations, professionals, public officials and/or entrepreneurs, and provide authentic audiences for their research and analysis. Our program evaluations consistently show that such interactions help students connect their academic experiences to broader social issues, provide practical skill development — including the capacity to grapple with ambiguity, work within teams and communicate with non-academic audiences — and help students develop new networks.

CHALLENGES AND PRIORITIES FOR THE FUTURE

The program has faced several persistent challenges:

FACULTY EFFORT AND ENGAGEMENT: While faculty who lead projects benefit from research funding and the capacity to engage teams of talented students in new research areas, they usually do not receive teaching credit and have consistently noted that their participation requires a great deal of time and energy, especially if it is their first time leading a team. Despite these concerns, the program has had strong engagement — with faculty participation over the first 10 years including more than 700 unique individuals representing all of the university's schools and cross-school interdisciplinary units. At the same time, there have been pockets of minimal engagement, including some humanities and natural science departments and the business school. On the basis of faculty focus groups, we have the sense that in some cases non-participation reflects misaligned incentives, while in others it is related to the nature of research and scholarship in those units.

STUDENT PREPARATION: One cause of the time burdens that faculty confront is that many undergraduate students are new to research, and while they are eager and bright, they may not always have the requisite intellectual or methodological grounding. Given the diverse nature of research taking place across our teams, we struggle to provide a centralized mode of preparation that will work for a significant portion of teams. Several years ago we ran a Foundational Research Modules Series — while these recordings remain available to teams, we have not repeated the live sessions due to relatively low turnout despite large numbers of students who registered. We have since broadened our efforts to connect teams to existing campus resources, but matching teams to these resources at the right time in their research trajectory remains a challenge.

UNEVEN TEAM EXPERIENCES: Although a large majority of the students on our year-long teams report good or excellent experiences, many faculty members lack experience in organizing collaborative, interdisciplinary projects. The learning curve for these team leaders sometimes results in poorly organized teams that flounder and cause frustration for students and faculty alike.

Looking ahead, we aspire to partner with Duke's schools to integrate the program further into curricular structures and provide a mechanism for participating faculty to receive fractional teaching credit. One promising avenue is to partner with more units that deliver a major, minor or certificate to embed team experiences in program requirements (e.g., to count as a capstone experience). We also hope to expand to meet student demand, with a focus on developing more semester-long courses built around collaborative, applied projects and more summer research experiences. Finally, to ensure more equitable community partnerships, we hope to create more avenues for community partners to bring project ideas to us. This last possibility depends on our ability to match faculty leaders to community interests, something that would be more feasible if coupled with the provision of teaching credit.

Duke University is a private research university located in Durham, North Carolina with 6,500 undergraduate students and 10,600 graduate and professional students across 10 schools.

vip.gatech.edu

GEORGIA TECH:

VERTICALLY INTEGRATED PROJECTS (VIP) PROGRAM

QUICK FACTS

Year founded: **2001**
Project source: **Faculty**
Duration: **Minimum 4 years**
Students per year: **3,900**
Interdisciplinary: **Yes**
Vertical integration: **Yes**

By: Edward J. Coyle, J.B. Peatman Distinguished Professor of Electrical and Computer Engineering, Director of VIP@GT and Board Chair of the VIP Consortium, LLC.; Julia Sonnenberg-Klein, Executive Director of VIP@GT

PROGRAM SUMMARY

A VIP team in the VIP Program at Georgia Tech is a large-scale, long-term, vertically integrated multidisciplinary team of undergraduates who are embedded in the scholarly and creative projects of the team's faculty adviser(s) and graduate students. The size, continuity, disciplinary depth and multidisciplinary breadth of VIP teams enable them to make significant contributions to the adviser's project.

All VIP students enroll in VIP courses that exist at the sophomore through graduate levels. Each semester, sophomores earn one credit; juniors and seniors earn one or two credits; and, in many departments, participation in VIP can satisfy capstone requirements. Master's students in some departments can earn one, two or three VIP credits per semester. All registered students are graded (A through F) each semester, with grades based on:

1. **Documentation**: This includes a student's personal log and to-do list of their activities on the team, their contributions to the team's wiki, their contributions to GitHub for software projects and other documentation required by the team's adviser(s).
2. **Peer evaluations**: A team's adviser(s) have access to students' evaluations of each other in areas that include leadership, teamwork, progress on tasks, initiative, reliability, etc.
3. **Contributions**: A team's adviser(s) and graduate students evaluate each student's contributions to the team's effort, as appropriate for the student's level, time on team, discipline and number of credits.

Undergraduates who have accumulated all credits that could count toward their degrees are sometimes paid by the team's adviser(s) on an hourly basis to continue on the project.

To share best practices and spread this model, Georgia Tech launched the VIP Consortium — a nonprofit that supports universities that have VIP Programs. A key element of that support is an annual meeting at which member institutions share best practices and research results for VIP. Members of the Consortium vote on the essential elements of VIP to ensure the quality of all VIP Programs, while enabling adaptation to local conditions. The meeting also includes workshops for prospective VIP sites and mentoring for new VIP sites.

Figure 1: Map showing the locations of the 40+ VIP sites in 2022 (see the full site list)

RESOURCES AND ADMINISTRATIVE MODEL

AT GEORGIA TECH: The VIP Program was the first program at Georgia Tech to have courses with a university-wide subject code: "VIP." The full set of undergraduate and graduate level VIP courses, each with the subject code of VIP, is shown in Table 1. These courses are officially housed in the university registrar's office instead of a college or department. Each department determines how the VIP credits that their students earn count towards their degrees, which leads to many different credit-use policies across campus. In general, departments first allow VIP credits to count for free-elective or research credits. Their policies then evolve to a threshold type of policy in which some fraction of, or all, VIP credits count as in-discipline electives once a minimum number of credits has been completed. In some departments, VIP credits taken after a specified minimum number can be used for capstone credit, such as senior-design in the College of Engineering or junior-design in the College of Computing.

The VIP Program staff consists of a director, executive director, assistant director for outreach and communication, assistant director for departmental and university policies, academic program manager, academic program coordinator and web application developer. The funding for the program comes through the Colleges of Engineering and Computing from the provost's office. Staff salaries are the primary costs at ~$450,000 per year, or ~$115 per VIP student.

	Sophomore		Junior			Senior				Graduate			
Course #	2601	2600	3601	3602	2600	4601	4602	Cap-stone	4600	6601	6602	6603	6600
Credits	1	Pay	1	2	Pay	1	2	Varies	Pay	1	2	3	Pay
Section, team 1	VP1	VP1	VP1	VP1	VP1	VP1	VP1	VP1	VP1	VP1	VP1	VP1	VP1
Section, team 2	VP2	VP2	VP2	VP2	VP2	VP2	VP2	VP2	VP2	VP2	VP2	VP2	VP2

Table 1: Courses that make up the VIP Program at Georgia Tech. Each course number is preceded by the VIP subject code: e.g., VIP-4602. Each VIP team consists of students in the same section of each VIP course: e.g., the Smart Stadium VIP team is section VP3 of each course. The campus course management system, Canvas, allows these sections to be combined into one Canvas site, making it easy for advisers to manage their VIP teams.

Faculty in some departments at Georgia Tech receive teaching credit for their work with their VIP team if they are the primary adviser (instructor of record) for the team. They typically receive credit for one course for the year, i.e., half of a course per semester. If some students on a VIP team are completing senior design requirements within their VIP project, additional teaching credit may sometimes be given.

The average number of undergraduates on a VIP team at Georgia Tech is ~25. Research staff at Georgia Tech and at the Georgia Tech Research Institute (GTRI) can also advise VIP teams — 13 of the 99 current VIP teams are advised by research staff members of GTRI, a contract-research organization of 2,400+ people associated with Georgia Tech. Clearly, VIP has the potential to scale to the point where every faculty member who wants to have a VIP team can start one and every undergraduate who wants to be on a VIP team can find one.

VIP has the potential to scale to the point where every faculty member who wants to have a VIP team can start one.

BEST PRACTICES AND LESSONS LEARNED

ONGOING PROGRAM EVALUATION: A high priority of the VIP Program at Georgia Tech is the long-term evaluation of its impact on students, faculty and institutions. Research articles from Georgia Tech about the VIP program are publicly available; as are those from, and with, other institutions in the VIP Consortium. The effort at Georgia Tech, which is led by Executive Director Julie Sonnenberg-Klein, provides compelling evidence of the effectiveness of the program. The two graphs in Figure 2 show students' development of skills in expertise-based and organizational leadership during their time on their VIP teams. It is not their academic rank when they join their team that matters; it is how many semesters they stay on their team.

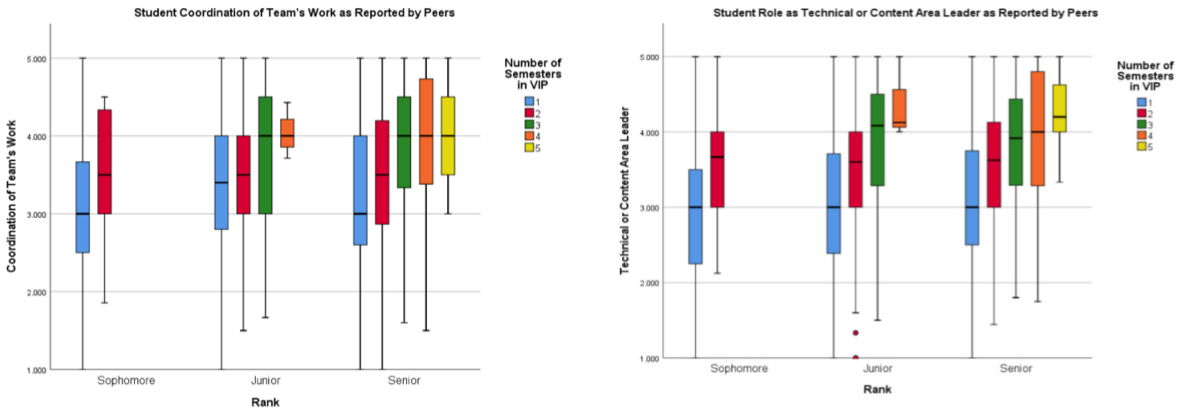


Figure 2: Students' development of expertise-based and organizational leadership skills as reported by peers. It's not the year (sophomore, junior, senior) that matters, but how many semesters they spend on their team. These results were published in the proceedings of the 2022 Frontiers in Education Conference and in the IEEE Transactions on Education in 2024.

IMPORTANCE OF POLICIES ON HOW CREDITS COUNT: Whether students participate in VIP and for how many semesters they choose to participate are closely tied to whether VIP credits can be counted in meaningful ways toward their degree programs (Figure 3). The benefits of multiple semesters of participation, both in leadership development and in job placement, justify consideration of policies that incentivize multiple semesters of participation.

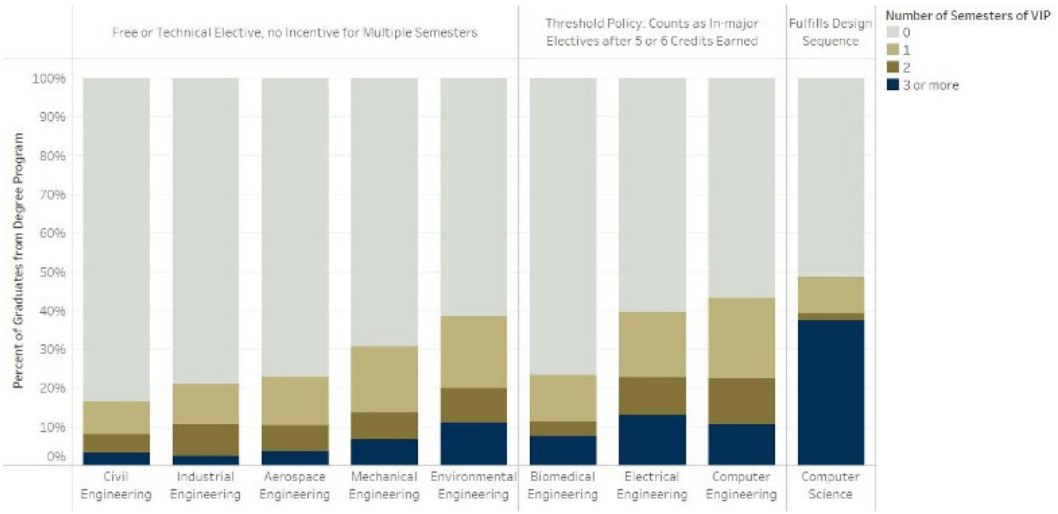


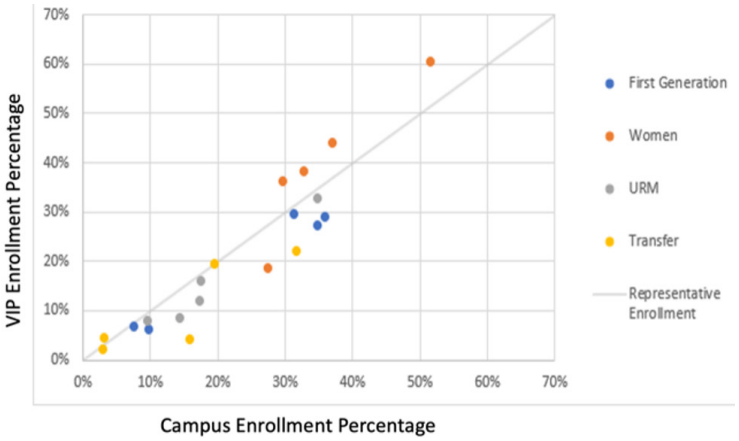
Figure 3: Student participation in VIP by major and curricular models for how VIP credits count

ENSURING EQUITABLE PARTICIPATION: VIP is a high-impact practice that increases graduation rates and achieves equitable results in employment upon graduation. Ensuring VIP is available to all students has thus been a goal of the program from its inception. This has been achieved primarily by lowering the barriers to participation:

- Teams are advertised on the VIP website so students do not have to seek out faculty to ask them if they have any projects available and if they can join.
- A student logs on to the VIP Application System after deciding which team is of most interest to them. The information students must provide is the name of the team they want to join,

their year and major, the number of credits they want to take and an explanation of why they want to join that team.

- The applications for teams are in a database that VIP staff and the adviser for each team review on a rolling first-come-first-serve basis. Permits to register for the VIP courses are issued for students that are accepted onto a team. Students returning to a team must apply again but are, almost without exception, accepted back to their team.
- Applicants for teams are ***not*** screened by GPAs, resumes, prerequisites or interviews, but program leaders do take account of applicants' year and major to balance the composition of the team. Prior work has shown a students' enthusiasm for the team to be the best predictor of their success.



These admissions procedures, combined with advertising and outreach to student groups and during campus orientations, have resulted in equitable participation. In recent work shown in Figure 4, enrollment data from Boise State, Georgia Tech, NYU, Purdue and Virginia Commonwealth demonstrate representational participation in VIP.

Figure 4: VIP participation rates for several groups of students at five different U.S. VIP sites demonstrate that equitable participation — normalized by enrollment percentages by discipline — can be achieved. Detailed explanations of these results have been published in the 2023 IEEE Frontiers in Education Conference.

ASSOCIATED WITH HIGHER JOB PLACEMENT: In an analysis of undergraduates' job placement prior to graduation, participation in three semesters of VIP was associated with approximately triple the odds of having found a job (Figure 5). These adjusted odds ratios were comparable to gains associated with having done an internship.

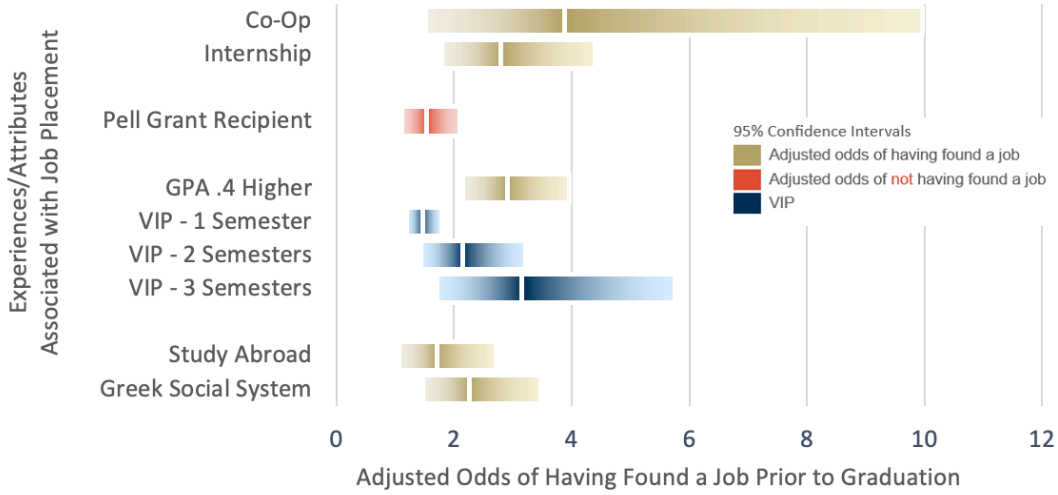


Figure 5: Programs associated with higher (or lower) job placement prior to graduation among students seeking employment. Figure based on data in https://doi.org/10.57709/36962302.

Supporting the findings of equity discussed above, the study also found that marginalized students participated at VIP at higher rates than in other programs associated with higher job placement (Figure 6).

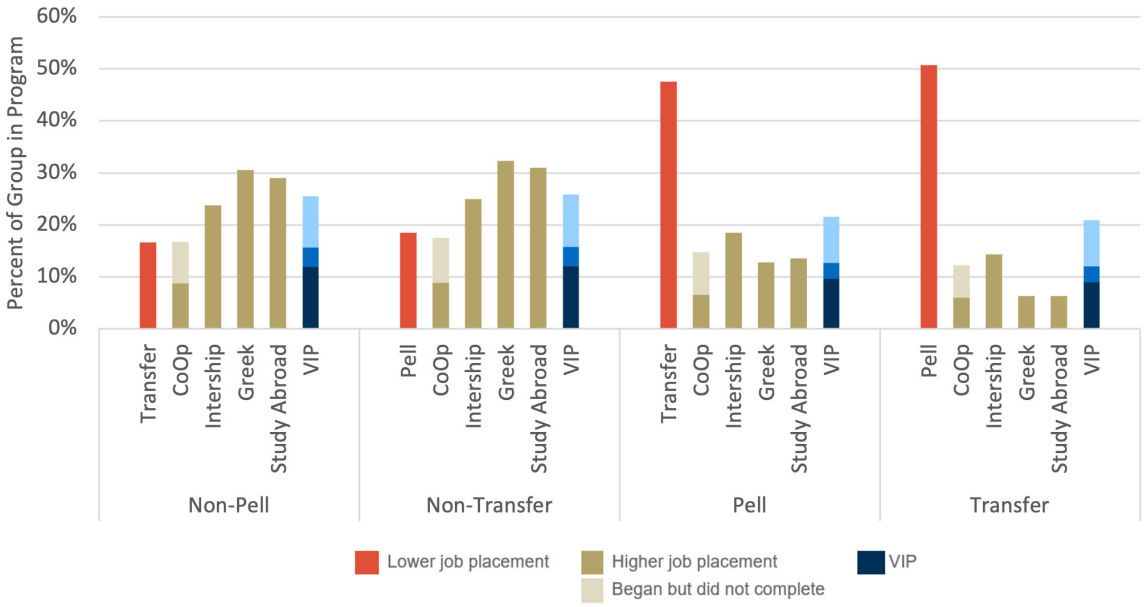


Figure 6: Student participation in programs associated with job placement by indicators of socioeconomic class. Figure based on data in https://doi.org/10.57709/36962302.

MULTIDISCIPLINARITY: Every VIP team at Georgia Tech is multidisciplinary and there are faculty from every college on campus that have teams. This has led us to measure the level of multidisciplinarity of teams and to see if/how that is a function of team size. The Rao-Sterling Diversity Index was used, with a measure of the similarity between disciplines based on the number of cross-listed courses between each pair of disciplines. These results are discussed in a paper that has been submitted to the journal *Studies in Higher Education*.

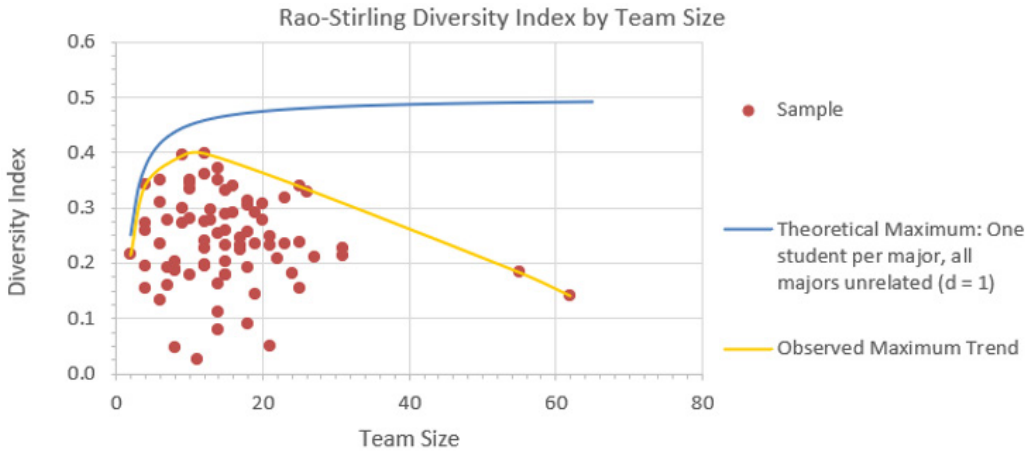


Figure 7: An entropy-like measure — the Rao-Sterling Diversity Index — of multidisciplinarity of teams, as a function of teams' sizes in the VIP Program at GT in 2020

THE BENEFITS OF THE VIP CONSORTIUM: The VIP Consortium was launched with a grant from Helmsley Trust in 2014-2015. It enabled the set of VIP sites to grow from five to 18 over three years. This grant enabled Georgia Tech to launch the Annual VIP Consortium Meeting, which is typically attended by the director and one or more faculty and/or students from each VIP site — there were 100 attendees this year. These meetings enable VIP sites to learn from each other, identify problems and opportunities affecting all VIP sites, plan research efforts focused on VIP, foster the development of VIP teams that span multiple VIP sites, identify funding opportunities, etc. They also provide workshops for institutions interested in VIP or in the process of launching VIP.

The collaborations fostered by these meetings resulted very quickly in the expansion of VIP beyond its traditional home in engineering disciplines to all other disciplines on campus. The examples of projects in new disciplines at one site helped ease the way for the launch of teams in those disciplines at other sites — primarily by easing the concerns of department chairs and college deans about whether the new VIP teams would be successful. There are now new VIP sites that have started up in the sciences and liberal arts as well as in engineering and computing.

To continue the benefits of the collaborations between VIP sites beyond the end of the Helmsley grant, the nonprofit VIP Consortium was launched on March 25, 2019. It supports all member VIP sites by providing documents/templates and other resources for new VIP sites, matching new VIP institutions with mentors at nearby VIP sites and continuing the annual Consortium meeting. Recently, the Consortium has seen the formation of regional hubs of VIP sites and the creation of special interest groups across VIP sites. The latter include VIP sites that have teams that share an interest, such as the UN Sustainable Development Goals, VIP in the Arts, Service-Learning, etc.

THE ROLE OF FACULTY: The fundamental reason for the success and scalability of the VIP Program at each institution is that faculty members benefit from their teams' activities. They thus have incentives to both request teams that will work with them and support those teams for the long term with good mentoring and financial support. For the latter, faculty include their VIP teams in research proposals to demonstrate the education and workforce development aspects of their proposed efforts and to secure funding for the activities of their teams.

The VIP Program at Georgia Tech does not provide any financial support to any VIP team. It has launched the VIP Industrial Affiliates program that enables industry, national labs and other organizations to support the student activities of VIP teams at the level of $20 million a year. These funds come in without overhead and are free of deliverables and intellectual property issues. This enables organizations to work with teams over a number of years, often resulting in standard research contracts that support the graduate students that are members of the teams.

In summary, VIP is successful because both faculty and students *want* to work together on interesting projects. The VIP Program enables them to do that.

CHALLENGES AND PRIORITIES FOR THE FUTURE

The goal of each VIP Program is to scale to serve everyone on campus that would like to have, or join, a VIP team. Most VIP Programs start at the faculty, departmental or college level and take time to spread across campus. We would like to shorten this time as much as possible by providing models for campus-wide VIP programs that exist at the university level.

At the departmental level, credit use polices evolve to the point where VIP credits count as disciplinary credits. This can come with a desire by curriculum managers to vet the activities of teams, sub-teams or even students. Effective management of this effort is still being developed. Solutions might include counting some VIP credits as university core classes if a student is contributing to a project but not in a way associated with their major.

The long-term vision is VIP counting as a mix of free, core and disciplinary electives. Figure 8 depicts the overall vision for the future curriculum.

The standard curriculum is shown as a space-filling curve on the left, with first-year students entering at the bottom left and completing standard course requirement and then exiting at the top left. On the right is the long-term VIP enrollment as a thread that runs through a student's time on campus. The VIP thread provides students with the chance to learn and master skills such as teamwork, leadership, innovation, etc. that are difficult to learn in standard course settings. It also enables them to participate in challenging projects in which they apply what they are learning in courses. Each VIP team is a community of individuals from all levels at the institution that share a common goal. The team is thus an excellent setting for effective advising and support of students.

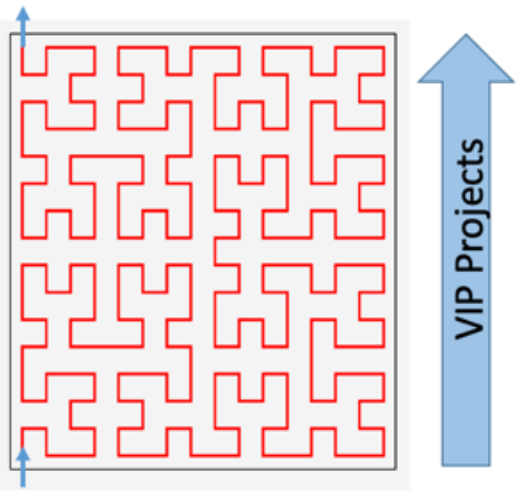


Figure 8: A depiction of the future curriculum

The final challenge is to ensure the long-term success of the VIP Consortium, its annual Consortium meeting and its recruiting and support of new VIP sites around the world. The overall goal is worldwide systemic reform of higher education.

Georgia Tech is an AAU/R1 public university located in Atlanta, Georgia. It has an enrollment of 45,000 students (18,000 undergraduates, 27,000 graduates) and is ranked in the nation's top 10 public universities by US News and World Report.

wpi.edu/project-based-learning/project-based-education

WORCESTER POLYTECHNIC INSTITUTE:

PROJECT-BASED EDUCATION

QUICK FACTS

Year founded: **1971**

Project source: **Community, students**

Duration: **7 weeks - 9 months**

Students per year: **5,000**

Interdisciplinary: **Varies by course**

Vertical integration: **Sometimes**

By: Kris Wobbe, Professor of Biochemistry and Director of the Center for Project-Based Learning; Kimberly LeChasseur, Senior Research and Evaluation Associate at the Center for Project-Based Learning; Chrysanthe Demetry, Professor of Materials Science and Director of the Morgan Teaching and Learning Center; Arthur Heinricher, Professor of Mathematical Sciences; Richard Vaz, Professor of Electrical and Computer Engineering Emeritus

PROGRAM SUMMARY

At Worcester Polytechnic Institute (WPI), 100% of students complete multiple project experiences, and 100% of faculty are involved in project-based learning.

For over 50 years, WPI has used a project-based curriculum that leads students through four years of increasingly complex challenges in the form of substantial open-ended projects. Students complete first-year projects on “Great Problems” such as energy and sustainability, second-year capstones in the humanities and arts, junior-year interdisciplinary projects relating technology to society, and senior research or design projects, the latter two often for external sponsors. The curriculum is decidedly global, with students tackling problems that are locally situated but of global importance and 90% of students completing at least one project off campus. In addition to projects required for graduation, 70% of our courses include projects. This curriculum was recently recognized with the prestigious Council on Undergraduate Research 2023 Award for Undergraduate Research Accomplishments.

The strength of the curriculum is that it places projects at the center and coursework in a supporting role. The primary graduation requirements for all majors are two significant (9-credit) projects, one in the student’s major — Major Qualifying Project (MQP) — and one at the intersection between technology and societal need — Interactive Qualifying Project (IQP), but the entire four-year curriculum is influenced by the clear importance assigned to the qualifying projects. WPI adopted a seven-week term to allow for in-depth dedicated terms devoted to projects without sacrificing rigor within disciplinary majors. A policy of no failing grades encourages intellectual risks and mediates the discomfort of ambiguity during open-ended, authentic projects. Faculty can ask students to take more responsibility for their learning in every course with the rationale that this prepares students for the required projects.

At WPI, 100% of students complete multiple project experiences, and 100% of faculty are involved in project-based learning.

WPI's project-based education starts with the elective Great Problems Seminar (GPS) during the first year. Here, students dive into global grand challenges such as climate change, food scarcity, energy independence, health equity and sustainability. Each topic area has both social and technical implications and can be mapped onto the United Nations Sustainable Development Goals. Students choose a challenge and work in small teams under the supervision of faculty with interdisciplinary expertise to propose solutions. Courses are team-taught, with the intent that the faculty are bringing diverse perspectives and expertise to the classroom. The GPS courses culminate in written project reports and a joint poster presentation attended by faculty, students, administrators and external judges. The GPS experience has proven effective in igniting student passion and commitment to tackling the world's most pressing problems, while at the same time introducing the value of interdisciplinary learning.

In the first and second years, students complete a self-designed minor in the Humanities & Arts (HUA), which culminates in either a seminar or practicum that involves individual creative work. Students interested in the history of technology, for example, may write an in-depth paper, while students who have pursued studies in music may compose and perform an original piece. There are also opportunities for students to travel to an international off-campus site to fulfill this requirement.

The Interactive Qualifying Project (IQP) is the centerpiece and perhaps most unique feature of the WPI experience. The IQP builds on previous project experiences, including the GPS and projects embedded in courses. Students typically complete the IQP during the junior year by conducting an interdisciplinary project in small teams coached and facilitated by faculty. Nearly 90% of students complete the IQP off campus at one of WPI's global project centers in Africa, the Americas, Asia-Pacific or Europe, where WPI students and faculty spend seven weeks away from courses tackling a problem of local importance that lies at the intersection of society and technology. These problems are sourced from local organizations, which then serve as project sponsors. The IQP concludes with a written report (publicly accessible) and presentation of results and recommendations, both to local project sponsors and to the WPI community. Completing the IQP off campus has a significant positive impact on students' understanding of context, teamwork skills, communication skills and ethics. Alumni also report that these global experiences enriched their personal lives in ways that continue after graduation.

The Major Qualifying Project (MQP) is carried out in the senior year. Students work in small teams supported by faculty on a design or research project of significant scope in their major field. Projects may focus on a problem chosen by the students, posed by external sponsors or derived from faculty research. All projects involve developing innovative solutions at a professional level. As with the IQP, students can elect to conduct their MQP off campus. For example, WPI chemical engineering students can work with French students in France, resulting

in a truly international collaborative experience. Some projects are sponsored by global firms, adding real-life excitement and underscoring the need to integrate theory with practice to develop locally appropriate solutions. Student project work is publicly shared during our annual Undergraduate Research Projects Showcase, a day free of classes. When appropriate, students receive support for filing patents. All student project reports are archived and publicly available through Digital WPI. These student products (GPS posters, IQP and MQP reports) in aggregate were viewed more than 125,000 times in 2022.

RESOURCES AND ADMINISTRATIVE MODEL

The Great Problems Seminars are led by a faculty director who is responsible for 1) recruiting faculty from across campus to teach in the program; 2) organizing the faculty development necessary to teach in this very different program; and 3) overseeing the production of the culminating poster session across courses. There is a small cadre of faculty hired expressly to teach in this program, as well as in their disciplinary field, alongside faculty from across campus. Faculty teach these courses in pairs, and any new pair is given a summer stipend to co-create course materials and activities and otherwise prepare to teach together. Participation in the annual faculty development program (five half-days) is also stipended, as it is scheduled out of contract. The program has an operating budget to support these expenses.

The Humanities & Arts capstone requirement is organized by the HUA department. Each faculty member in the department is responsible for offering one to two Inquiry Seminars or Practica (enrollment of 12) per year. This teaching is in-load for faculty.

Each degree program is responsible for providing MQPs to their majors. Generally, there is matching of student interests with faculty projects; we have an electronic platform, e-Projects, that organizes information to aid in securing matches. Students are often working in vertically integrated teams, with graduate students and post-docs also supporting the learning of the undergraduates. Project advising is considered teaching during tenure and promotion processes and all faculty are expected to advise MQPs and/or IQPs as part of their in-load work. There is funding available from departments to support purchasing materials for these projects; some faculty subsidize student projects with their research funding.

Each year, WPI's Global School matches approximately 1,200 students to project centers around the world.

The IQP program requires considerably more infrastructure and funding. The Global School is charged with administering the IQP with substantial collaboration across campus. There is a mandatory prep course prior to off-campus projects in which students learn research methods, conduct initial background research, identify a scope of work and learn about their project site. Faculty within The Global School generally teach these courses. The projects themselves are solicited by project center

directors — faculty with connections to the location who cultivate partnerships with community organizations. The Global School matches approximately 1,200 students to their desired sites each year using a home-grown algorithm. For the fraction of students who choose not to fulfill the requirement through attending a project center, e-Projects is used to post and find project ideas, as well as handle registration and grade assignment. The Global School is also responsible for recruiting, training and supporting the 70–80 faculty who advise at project centers each year. Faculty from across campus are encouraged to advise at project centers with the approval of their department head. Typically, two faculty accompany 24 students (six project teams) to the project site where they spend seven weeks supporting the students in their full-time project work. This is considered the equivalent of teaching two classes.

Locations of WPI Global Project Centers

To support students who are traveling to residential, often international sites, we have a Global Experience Office with a staff of seven. They provide risk management, travel education and preparation, and administrative support to students, faculty and staff participating in all WPI-sponsored off-campus travel. To ensure that all students, regardless of means, can participate in off-campus projects, all students are awarded a Global Scholarship of up to $5,000 for the costs of participation (travel, housing, food). These funds largely come from reallocated financial aid and an endowed fund.

BEST PRACTICES AND LESSONS LEARNED

Over the 50+ years WPI has had our project-based curriculum, we have accrued a wealth of lessons learned and developed key best practices. Several are summarized here; for more, see our Center for Project-Based Learning FAQs.

ADVANTAGES OF A FACULTY CORE: For two of our programs, the GPS and IQP, hiring a core group of faculty specifically to contribute to these programs has been key to the rapid advancement of the program in terms of developing and disseminating best practices. These faculty are committed to their programs and work together to try different approaches and

share assignments, assessments and strategies — all with an eye to deepening student learning and optimizing the experience for all. Both GPS and IQP also require faculty from across campus to participate; however, their participation is eased by the development of resources and the deep knowledge and camaraderie of the core groups. Since the GPS courses are co-taught and IQPs are most often co-advised, the core faculty can also serve as models in apprenticeship relationships with faculty new to participation in either program.

FACULTY TRAINING: Training in project-based learning is critical and is provided for all WPI faculty. For faculty contributing to the GPS (~14–19 per year) there is a week-long summer institute that functions as a learning community to support faculty by sharing best practices, airing concerns, identifying challenges and sharing potential solutions. These sessions also are used to brainstorm potential publications, conference presentations, research ideas and grant proposals. The result of these sessions is a group with a sense of shared mission and agency. The Morgan Teaching and Learning Center, together with several collaborators across campus, provides a set of sessions for faculty new to advising MQP or IQP projects that covers learning outcomes, sample syllabi, setting student expectations, grading criteria, scaffolding ideas, giving feedback on writing and other best practices. For off-campus IQP advising there is additional training more focused on the issues involved in taking students on residential programs in a new, often foreign, location (e.g., crisis management, available supports).

PROJECT AND PROGRAM ASSESSMENT: Key elements of our faculty training for guiding projects revolve around structuring projects and how to assess them. Not only do we provide sample syllabi and rubrics, but we also seek to instill the philosophy that projects should provide spaces for students to do self-directed work, but with guidance. Students should know that not only are the products of their work going to be assessed, but also their processes. We help faculty identify feasible mechanisms to evaluate process and promote its importance. We encourage faculty to consider individual grades even when projects are done in teams and provide guidance on how to differentiate grades within student teams. Student products are routinely used to assess the extent to which each program is achieving its program outcomes, both internally and by accrediting bodies (NECHE, ABET, etc.).

During the 50+ years that WPI has maintained a project-based curriculum, its leaders have discovered the importance of a faculty core, consistent self-assessment and intentional support for student teamwork.

SUPPORTING STUDENT TEAMWORK: While having students work in teams provides many advantages, it is essential to provide them with support in learning how to be effective and equitable teammates to reduce the damage that can also occur in student teams. Students need direct instruction on what productive teaming is and tools to develop good communication and feedback. Assessment of teaming is also important and faculty use a variety of strategies, including team-generated contracts and formative and summative self- and peer-evaluation. More recently, we have adopted a suite of tools that promote an asset-based approach to proactively help students divide work based on assets and areas of growth. This has seen

real benefits. For teams that need more than a simple assist, WPI has created the SWEET Center (Supporting WPI through Effective and Equitable Teamwork) which brings together experts on teamwork from across campus and beyond, creating space for partnerships with students, faculty and staff that support high-quality teamwork experiences for all. Individual students, student teams and faculty and staff can bring questions and problems related to their teamwork to the SWEET Center and receive support and guidance from staff, faculty and peer facilitators. Faculty can refer student teams for a consultation or teams and individuals can seek assistance on their own.

DEMONSTRATED BENEFITS OF PBL: WPI has conducted two alumni studies to document the benefits of PBL experiences post-college. Alumni indicated that projects had extensive, positive impacts on the academic skills most relevant to current and future work demands — fostering both timely and timeless knowledge, skills and attitudes. According to these data, the majority of our students reported that their formal project work at WPI much or very much enhanced their ability to effectively function on a team (78%); identify, analyze and solve problems creatively through sustained critical investigation (76%); integrate information from multiple sources (78%); write clearly and effectively (69%) and take responsibility for their own learning (83%). These benefits directly align with the skills employers seek. Personal character and self-efficacy were also deeply impacted. Notably, our women scientists and engineers attribute significantly greater benefits to PBL, further strengthening our contributions to more equitable STEM education ecosystems. These analyses advance the field's understanding of PBL as a high-impact practice by demonstrating that repeated project experiences provide greater impact on nearly all student outcomes, both immediate and long-term. Small doses of PBL in isolated courses are insufficient for reaping the full benefits of PBL. Furthermore, even students who have a negative project experience report positive impacts, particularly when followed by a more positive project experience.

WPI has conducted two alumni studies to document the benefits of PBL experiences post-college. Alumni indicated that projects had extensive, positive impact on the academic skills most relevant to current and future work demands — fostering both timely and timeless knowledge, skills and attitudes.

These results were so compelling that WPI initiated two key things: the Global Scholarship to allow all students to participate in off-campus projects (recently recognized by IEE and NAFSA) and the creation of the Center for Project-Based Learning. The Center's role is to share our decades of experience with other institutions that are interested in advancing PBL on their own campuses. Since 2017, the CPBL has worked with over 180 institutions in the U.S. (nearly 200 worldwide) and more than 2,000 faculty and staff to create and curate a wealth of resources that are shared broadly.

CHALLENGES AND PRIORITIES FOR THE FUTURE

FACULTY PARTICIPATION: As our undergraduate population has grown, departmental needs for instruction have decreased the ability of faculty in traditional departments to contribute to our GPS and IQP programs, both of which use faculty from across campus. Faculty enjoy the opportunities these programs provide to try new pedagogies, learn outside their discipline and travel. They also don't want to leave their departments short-handed. This has led to faculty feeling conflicted about volunteering, as well as tensions between faculty who do want to participate and their department heads who need to make sure that all their courses are fully staffed and between department heads and administration regarding the availability of faculty resources. We are committed to offering these very distinctive and transformative programs; therefore, identifying creative ways to solve the person-power dilemma is of primary importance.

ADVANCING OUR WORK IN EQUITABLE TEAMWORK: While the tools and strategies we have been using to help students work equitably in teams have resulted in better teaming behavior, we know students who hold marginalized identities still suffer microaggressions and tensions from largely well-meaning teammates with privileged identities. Additional work to support faculty and students to minimize these traumatic experiences for our students holding marginalized identities is needed.

GREENING OUR CARBON FOOTPRINT: In our Global Projects Program, we put over 1,000 students and faculty each year on airplanes to our off-campus project centers. Evidence shows that these immersive project experiences are transformative for the students, and that being away from campus is a key ingredient in that transformation. How can we create equally transformative experiences that do not have the same environmental costs?

Worcester Polytechnic Institute is private research university located in Worcester, Massachusetts. It enrolls 5,000 undergraduates and 2,000 graduate students.

CASE STUDIES

BY PROGRAM REACH:

100-749 students per year

Arizona State University

humanities.lab.asu.edu/co-directors-welcome

QUICK FACTS

Year founded: **2017**
Project source: **Faculty**
Duration: **7-15 weeks**
Students per year: **643**
Interdisciplinary: **Yes**
Vertical integration: **Yes**

ARIZONA STATE UNIVERSITY:

HUMANITIES LAB

By: Heather Switzer, Associate Professor of Women and Gender Studies and Co-Director of the Humanities Lab; Juliann Vitullo, Associate Professor of Italian Studies and Co-Director of the Humanities Lab

PROGRAM SUMMARY

The Humanities Lab creates inquiry-based, transdisciplinary, inclusive and multigenerational courses for both undergraduate and graduate students that we call "Labs." All Labs focus on a pressing social challenge with the common goal of encouraging students to reimagine their present and future worlds through collaborations with their peers, faculty, librarians and community members. Humanities Lab teams immerse themselves in a compelling array of questions, for example: How can we better support youth development in schools to prevent gun violence? How do we indigenize our food systems? What does it mean to decolonize "madness" and "wellness" and support Black, Indigenous and people of color (BIPOC) communities? Humanities Lab teams imagine and realize ethical and equitable interventions — which we call "student impact outcomes" — and then artfully share these results with the public.

KEY FEATURES OF EACH LAB:

Transdisciplinary: Each Lab is taught by an instructional team consisting of: two faculty members from different disciplines (one humanist + one non-humanist); embedded librarians who bring interdisciplinary training and perspective to the research process; and collaborators from different professions, on and off campus. Undergraduate and graduate students enrolled in Labs come from humanities, arts, sciences and professional programs throughout Arizona State University (ASU).

Translational: Each Lab integrates local to global community partners as key architects in the formation of research questions and the translation of research into action. From within this lively laboratory, diverse student teams create "impact outcomes" such as public art, social media campaigns, white papers, op-eds and mobile apps.

Transformational: The Humanities Lab takes a radically inclusive approach to learning by selecting instructional teams for their passion and expertise and by recruiting multigenerational students from diverse backgrounds, many of whom are first-generation college students. Each Lab therefore forms a collective of individuals who, through the experience of taking informed action together, are often transformed in the process.

Below, we have provided illustrative examples of transformational learning in two different Humanities Labs.

INDIGENIZING FOOD SYSTEMS — SPRING '22 AND '23

Co-taught by: Melissa Nelson (College of Global Futures/School of Sustainability) and Myla Vicenti Carpio (The College of Liberal Arts and Sciences/American Indian Studies)

Through an interdisciplinary and community-engaged approach, this Lab investigates what it means to indigenize our food systems and grapples with issues and questions regarding food sovereignty and Indigenous health. Through multiple fields and mediums (historical, cultural, scientific and creative), students engage in different ways of thinking about food and experiment with embodying the concept of "food is medicine." This Lab focuses on learning about the complex and sophisticated Indigenous food systems of North America with a focus on native nations in the Southwest, California and Midwest, including histories of dispossession and contemporary efforts at revitalization and food justice.

Student impact outcome examples (links below and collectively, here)

- Actualizing ASU's Land Acknowledgement and Uplifting Settler Consciousness: Indigenous Garden Plot Initiative (four undergraduate students and two community experts)
- Chi' Chil Countermap Storymap Project (three undergraduate students, one master's student and one doctoral student)
- *Econexiones*: Indigenizing Food Systems Podcast (two undergraduate students and one graduate student)

Spring ’22 community partners

- Amy Juan (Tohono O’odham), Manager, International Indian Treaty Council
- Jacob Butler (Onk Akimel O’odham), Community Garden Coordinator, Salt River Pima — Maricopa Indian Community
- Jacquelyn Ross (Pomo/Coast Miwok), Davis, CA
- Thosh Collins (Akimel O’Odham), Native Wellness Institute
- Dr. Lois Ellen Frank (Kiowa), Red Mesa Cuisine
- Joseph Gazing Wolf (Lakota), ASU Ph.D. Student

Events

- Seize the Moment and Humanities Lab Impact Outcomes Showcase at Walton Center for Planetary Health, Earth Week
- Indigenous Chef Cooking Demonstration and Tasting Event at the Engrained patio in the Memorial Union (see image box below)

DIPLOMACY LAB: LATIN AMERICA — SPRING ’24

Co-taught by: Mary Jane Parmentier (College of Global Futures/School of the Future of Innovation in Society) and Glen Goodman (The College of Liberal Arts & Sciences/School of International Letters and Cultures)

The Diplomacy Lab: Brazil Humanities Lab course focuses on a project from the Department of State that tasks students with collaboratively investigating how vulnerable urban communities in Brazil adapt to and mitigate climate risks. Students in this Lab learn the necessary background and consult with State Department representatives of the U.S. Embassy in Brasilia to ensure the local utility of the analysis and their recommendations for improved interventions and work collaboratively to produce deliverables for the Deputy Advisor for Environment, Science, Technology and Health. Students had the opportunity to participate in a global learning experience in Brazil over spring break to gain a greater understanding of what these communities face and what they are doing to address their situations. For their outcome, students presented their findings to the U.S. Embassy in Brasilia and at the U.S. Department of State’s DipLab Fair in Washington, D.C. Students who attended the DipLab Fair were also invited to visit the Brazilian Embassy.

The outcome goals are to:

1. identify the unique impact(s) of climate crisis in low-income communities, as well as the intersection of climate crisis with water, food, energy, jobs and migration;
2. demonstrate how marginalized Brazilian communities offer valuable examples of innovation, creativity and hope to address climate crises, and how their ideas may be adapted for other communities within and outside the Brazilian context; and
3. underscore the critical role of multi-sectoral, multi-scalar partnerships for simultaneously addressing climate crises and racial inequality.

Community partners:

- United States, Department of State
- U.S. Embassy Brasilia
- ASU Interplanetary Initiative
- U.S. Consulates in Recife, São Paulo, Rio De Janeiro and Porto Alegre
- Professor Chris Boone, School of Sustainability at ASU

RESOURCES AND ADMINISTRATIVE MODEL

The program has been historically overseen by Arizona State University's executive vice president and university provost with direct oversight from the dean of humanities in the College of Liberal Arts and Sciences. It is managed by two part-time faculty co-directors (one from humanities and one from social science) and two full-time staff members, with administrative support for finance, scheduling and personnel matters from the School of International Letters and Cultures, the administrative home of the Humanities Lab. Additionally, staff members supervise two to three student workers per semester.

Core funding totaled approximately $200,000 in 2022-2023. The program has been funded since its founding primarily by the provost's office and augmented by strategic initiative funding (2021–2023) from the president's office. As of spring 2024, the College of Liberal Arts and Sciences will support the Humanities Lab for $250k annually. Core funding covers the staff salaries as well as research funds for Lab instructors along with operating expenses. The Humanities Lab also has a small gift fund that is used to support student teams. We intermittently receive ad hoc internal grants from the humanities dean's office to contribute to unique student outcome opportunities (e.g., covering travel to D.C. for Diplomacy Lab students to present impact outcomes to the State Department).

BEST PRACTICES AND LESSONS LEARNED

Features of the Humanities Lab that we see as crucial to its success and important for other higher education leaders to understand include:

Emphasis on the importance of the humanities to tackle social challenges: Humanities Labs are premised on the belief that technology alone will not resolve contemporary public health, civil rights and environmental crises. Questions posed in the humanities disciplines about history, culture, ethics, storytelling and power are essential for developing healthier, more sustainable and more just futures. All Labs offer humanities general education credit, and all Labs are taught by one faculty from a humanities department.

Emphasis on the importance of the humanities for building professional skills: Each Humanities Lab has its own webpage that describes the student teams' projects. Students can use these descriptions to demonstrate the professional skills that they cultivated in their Lab, such as collaborative research, communication skills with and among diverse groups and various publics, and project design and management. Examples of past team webpages include Food, Health & Climate Change and Deconstructing Race.

Emphasis on transdisciplinary, inclusive and collaborative design at all levels (teaching teams and student teams): Humanities Labs bring diverse (and often historically excluded) stakeholders together to formulate inquiry-driven action. Humanities Labs attract a diverse group of faculty and students because the challenges posed often foreground the perspectives of marginalized and racialized communities. In addition, we have worked to make sure that all students can apply our courses to their degree programs (see below). Two Labs that illustrate this best practice are Indigenizing Food Systems and Disrupting Dis/Ability.

Emphasis on integrating Humanities Lab courses into different programs of study/majors: Labs as omnibus/special topics courses allows us to 1) attract students using general education requirements; and 2) use multiple cross-lists that reflect each faculty member's home unit as well as reflect other majors that might attract student enrollment. See for example Designing the Future University, which carries cross-listings for Humanities Lab (HUL), English (ENG), Future of Innovation and Society (FSIS), Human and Social Dimensions of Science and Technology (HSD) and Sustainability (SOS). Note these cross-listings are for undergraduate (400-level) and graduate (500-level) courses. Whereas historically we have used multiple general education designations to reflect the interdisciplinarity of our courses (e.g., Humanities and Social Science designations), the Arizona Board of Regents revised the general education requirements in 2023 limiting all courses to a single general studies designation.

Emphasis on community-embedded student research: All Labs to varying degrees work with community consultants (on and off campus). In some cases, community partners pose specific social challenges to student teams. Two Labs that illustrate community-embedded research and action are Language Emergency and Avanzando Education Pathways.

CHALLENGES AND PRIORITIES FOR THE FUTURE

UNEVEN STUDENT EXPERIENCES WITHIN AND ACROSS LABS: Factors that contribute to this include:

- **Multigenerational classrooms:** A strength of our model is the multigenerational composition of most Labs — students can range from first-semester undergraduates to doctoral candidates and every category between. While students often report positive experiences collaborating across these differences (particularly undergraduates expressing excitement to work with graduate students), this dynamic also creates challenges for faculty and students alike. Faculty are typically not used to accounting for a range of student backgrounds, uneven preparation (academically and sociologically) and dynamic student needs. Students often need time to adjust as well. One semester (on campus, 15 weeks) provides a very short runway for working out these intricacies, and our fully online, asynchronous Labs are even shorter (7.5 weeks).

- **Process and product:** Every Lab course will have several student teams and therefore several impact outcomes. There is strength in this diversity, and an overarching goal is to emphasize the process of collaboration and collective effort towards research-informed positive social change (even small bites). Still, faculty, students and community members alike remain invested in a fully realized "product" for any given project. The challenge for Humanities Labs staff is how best to support faculty and students as they navigate the dance between meaningful process and fully realized product.
- **Faculty support:** Over the years we have created and experimented with several ways of supporting faculty with pedagogical tools and strategies to help them comport with the Humanities Labs model (e.g., converting "topics to cover" to "inquiries to guide exploration"; interactive workshop-style activities instead of lectures; co-teaching over serial teaching). Nonetheless, each teaching team, each Lab focus and each set of students is different and often has different needs. The challenge is finding the sweet spot that combines typically meaningful tools and specifically catered tools and supports. Additionally, sometimes we don't learn that faculty are straying from the Humanities Labs approach until it's too late in the semester to steer them back on track.
- **Student enrollment:** Lab courses have historically received multiple general education designations (e.g., Humanities and Arts, Social and Behavioral Sciences, Global Awareness and/or Cultural Diversity in the U.S.) due to their interdisciplinary focus, which has tended to attract students from various majors seeking to fulfill their graduation requirements with courses that relate to their passions. The Arizona Board of Regents' recent changes to general education requirements require that courses carry only one designation, which means the Humanities Lab must change its strategy in order to make its courses accessible to the greatest number of students. In response to this challenge, we will continue to expand our ASU partnerships where Humanities Lab courses earn other credits like capstones, thesis and applied projects, and so on.

BUILDING RELATIONSHIPS WITH COMMUNITY PARTNERS: Working with communities is key to the Humanities Lab model. However, challenges include misalignment between community priorities/timelines and the academic calendars, and public outcomes created by students for community partners that may toe a delicate line between students' proprietary ownership and that of the community partner. Moreover, building trust takes time, and we have encountered specific concerns regarding partnerships with Indigenous communities that require acknowledgment of enduring legacies of violence (structural and direct) and creative, proactive approaches to building reciprocity.

INSTITUTIONAL CHALLENGES: As state funding has decreased, ASU has responded with alternate funding models that create pressure for academic units ("schools" at ASU) to generate revenue to operate, primarily through online instruction. Academic units can be reluctant to release faculty (even senior faculty) to teach a relatively low-enrollment Humanities Lab over courses for their home unit. Our relatively lean budget precludes offering units funds to pay

adjunct faculty to cover courses. Despite interest in and commitment to interdisciplinarity, school directors are not always willing to release faculty to teach Labs. We counter this challenge by focusing on the advantages of teaching an interdisciplinary Lab, which includes attracting new students to the academic program and encouraging new models of transdisciplinary project-based pedagogy.

CAPACITY: The core Humanities Lab staff is very small (two full-time staff, two 10-hour/week faculty directors and one to three student workers), and we work with a very lean (and not likely to grow from inside the university) budget. At current capacity we are able to offer no more than 12 Labs per academic year (five to seven per semester). In order to grow, we will need to pursue external funding but are limited in our capacity to do that. These constraints on capacity curtail what is possible for the Humanities Lab as an institutional structure and therefore our mission, particularly in terms of scalability.

GOALS AND PRIORITIES:

- Curate several Lab series focused on thematic social challenges such as health and wellbeing, citizenship and belonging, and imagining just futures.
- Apply for external funding to support thematic Lab series.
- Develop more multi-generational Labs focused on local high schools.
- Offer at least one Diplomacy Lab each year.
- Continue to expand online Humanities Lab offerings to make them as accessible as possible to all ASU students.

The historic campus of Arizona State University is located in Tempe, Arizona, with three additional campuses in the Phoenix metro-area and five Innovation Zones — 33.5% of students are first-generation and 34% receive Pell Grants. ASU identifies as a new prototype for the American public research university, with additional hubs in Los Angeles, Washington, D.C., and Hawaii. Arizona State University acknowledges that our Arizona campuses are positioned on the historic homelands of Indigenous communities including the Akimel O'odham (Pima) and Pee Posh (Maricopa).

BOSTON UNIVERSITY

bu.edu/hub/cross-college-challenge-xcc

QUICK FACTS

Year founded: **2018**
Project source: **Faculty**
Duration: **Semester-long**
Students per year: **370-400**
Interdisciplinary: **Yes**
Vertical integration: **No**

BOSTON UNIVERSITY:

BU HUB CROSS-COLLEGE CHALLENGE (XCC)

By: Sandra Deacon Carr, Master Lecturer of Management and Organizations and Faculty Director of BU Hub Curricular Initiatives; Phillip Jacob, Manager of BU Cross-College Challenge

PROGRAM SUMMARY

The Boston University Cross-College Challenge (XCC) is the signature experience of the BU Hub, the university-wide undergraduate general education program that emphasizes working across disciplines to prepare students for a complex and diverse world.

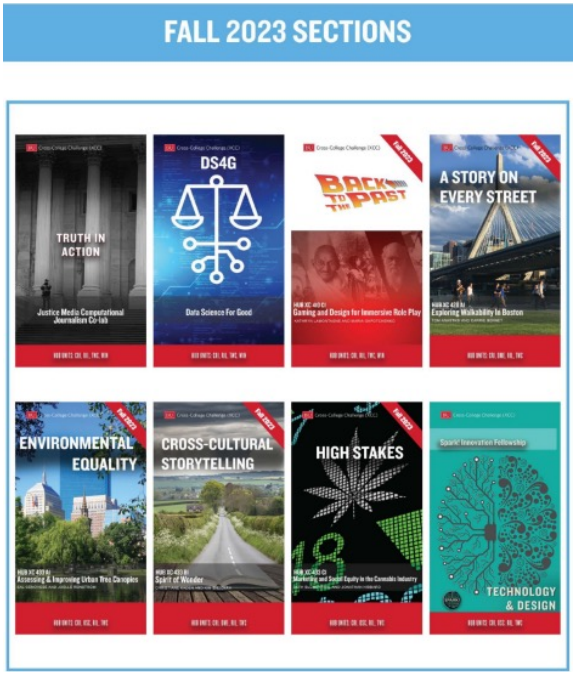
The XCC program typically offers eight to 10 interdisciplinary, project-based courses per semester, each focused on a different topic and set of challenges. These four-credit elective courses are co-led by two faculty members from different disciplines and are open to juniors and seniors from all of BU's undergraduate schools and colleges. Class size is limited to 25–30 students.

XCC courses engage students in team projects that address a real-world problem or an enduring human question. Student teams work with their faculty as well as a variety of campus and community partners on a substantial, research-based challenge, building their knowledge and skills to fulfill four Hub requirements: creativity/innovation, research/information literacy, teamwork/collaboration and communication.

The program kicks off with an XCC Launch event at the start of each fall and spring semester. The purpose of XCC Launch is to introduce the cohort of XCC students to the full complement of XCC courses being offered, allow them to meet the faculty, and build community within courses and across the program. The semester concludes with the XCC Showcase — a public event in which all XCC student teams present their projects as part of the undergraduate Experiential Learning Expo. The Spring 2023 Experiential Learning Expo is pictured below.

As previously mentioned, XCC offers eight to 10 different courses per semester that are focused on different project areas and community partners. Strategic priority areas for course selection include:

- Environmental Sustainability
- Public Health
- Racial Equity and Social Justice
- Data Sciences
- Boston Community

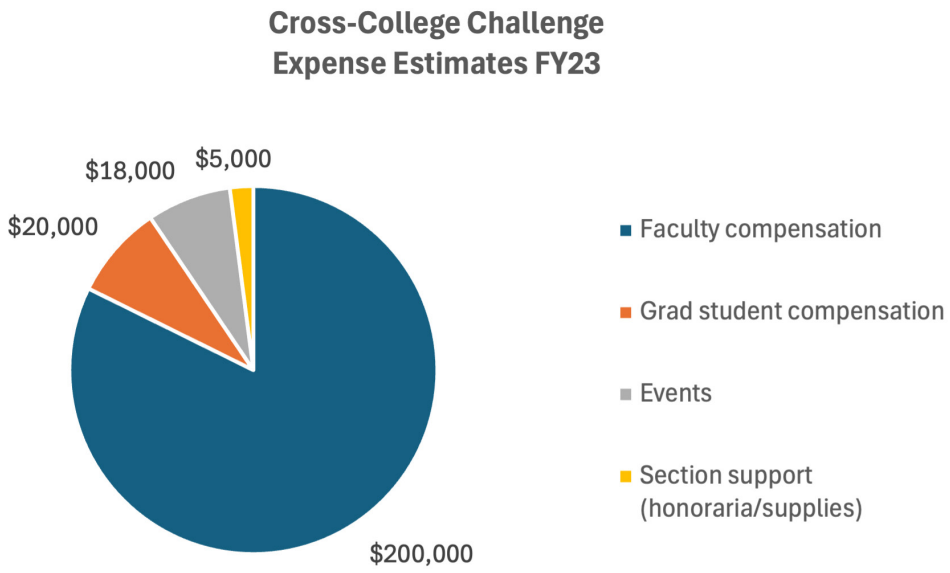


Student project work culminates in a project deliverable at the end of the semester. These deliverables can include a written report, video, podcast, performance, presentation, etc. Samples of student work are provided in the table below. Also included is a link to an article in *The Brink*, "Communicating Science and Research — Through Puppets," which describes the work done in the Thinking Through Puppets and Performing Objects course.

Course title	Examples of student project work
Unheard Voices: Deconstructing the Dominant Narratives by Inclusion	*Unheard Voices Podcasts*
Thinking Through Puppets and Performing Objects: Using Theatrical Tools to Communicate the Complex, the Abstract, and the Technical	*The Root of the Problem* *The Dehumanization of Puppets* *Spring '21 Virtual Showcase*
City Stories: Boston + One	*Palace for the People* *Public Gardens* *Via Metropolitana*

RESOURCE AND ADMINISTRATIVE MODEL

As XCC is the signature experience of the BU Hub general education program, its funding and reporting structure is through the Office of the Associate Provost for Undergraduate Affairs. Administration of the program includes an XCC manager, faculty director and administrative coordinator.



Beyond the administration expenses, faculty compensation represents the most significant portion of the budget. There are two faculty members per course, and each receives compensation for a full course, either as part of their normal teaching load or via an over-base stipend.

In addition, XCC provides program-wide Teaming Support by hiring three to four graduate Teaming Fellows each semester who are supervised by a faculty member with expertise in teamwork and collaboration. These Teaming Fellows collaborate with course faculty to design and deliver the course content on teamwork as well as provide coaching and support to student teams during the semester. Resources include one faculty supervisor stipend and three to four graduate student stipends per semester.

Finally, there is a $500 budget for each course to support course needs, including guest speakers/honoraria, supplies, student travel, tickets to events, etc.

BEST PRACTICES AND LESSONS LEARNED

Having just completed the sixth year of this innovative program at BU, we have learned several key lessons along the way:

- Faculty creativity and commitment are essential to the success of XCC: Faculty members envision projects, develop courses and engage with students in an impactful, hands-on learning experience. Bringing together faculty with different disciplinary expertise to co-teach a project-based course enables those faculty to model the skills of teamwork, collaboration and communication in real time. Faculty also engage the community partners to create and support the student projects.

- Engagement of community partners is critical to establishing the relevance and significance of the projects: As stakeholders interested in the students' work, these partners provide motivation, guidance and validation for the "real-world impact" of the project outcomes.
- Adaptability and resilience are essential: Over the past five years the needs of the program have continually changed as we not only launched a brand-new program but had to navigate a project-based learning experience as COVID-19 disrupted students, faculty and community partners in unique and challenging ways.
- Since XCC courses fulfill four different Hub requirements and faculty are not necessarily experts in all four areas, it is essential to provide training and support in key areas such as teamwork/collaboration and creativity/innovation.
- Curricular integration via course and Hub "credits" drives student enrollment, but not necessarily student interest or motivation. Therefore, it can be challenging for faculty to get students to fully engage in the pursuit of project-based learning in these courses. Some students find it particularly challenging to adapt to a less-structured, problem-focused approach to learning.

BEST PRACTICES INCLUDE:

- Engaging experts in collaboration to develop curricula and best practices for teamwork that can be used in all of the XCC courses.
- Hiring and training graduate students from the business school as Teaming Fellows to support the student teams directly through classroom engagement, content delivery and consultation as needed.
- Initiating program-wide events to build community and to showcase and celebrate student work.
- Creating a Steering Committee composed of XCC faculty to help oversee the program and provide guidance both to XCC faculty and to the program.
- Providing periodic training sessions for faculty on topics such as co-teaching and best practices in creativity/innovation, teamwork/collaboration, project-based learning and using relevant technology tools.
- Holding regular faculty meetings (at the start, midpoint and end of) each semester where faculty can learn best practices from one another across the program.
- Working with departments across the university to have relevant XCC courses count toward specific majors (e.g., computer science, journalism, business, fine arts, etc.) and minors (e.g., innovation and entrepreneurship, interdisciplinary studies, etc.) in addition to fulfilling general education requirements.

CHALLENGES AND PRIORITIES FOR THE FUTURE

As is typical with innovative programs, the legacy systems at the university can create barriers to implementation. One of the goals moving forward is to continue to grow this interdisciplinary program by offering more courses each semester. However, the issue of faculty compensation — how departments allocate faculty to teach courses — remains a challenge because "out of unit" teaching is not something that traditional BU systems and structures readily value or recognize. While the goal is to attract more faculty to teach in XCC as part of their normal "teaching load," it is very difficult to engage departments in this effort. Departments have their own courses to staff and the compensation provided to their faculty does not typically extend to courses outside of the department. The alternative is to pay over-base faculty compensation, and this obviously limits our growth.

Since XCC courses are electives that fulfill general education requirements, it can be a challenge to ensure that students are motivated to take the course because of the project or content, rather than because it will meet the requirements. Many of our students discover XCC courses when they are looking to fulfill certain general education requirements, so our challenge is to raise the visibility of these course offerings as exciting, topical, project-based courses that require commitment to the teams and projects.

Additionally, the interdisciplinary, team, project-based, co-teaching model for XCC has raised some challenges in terms of grading student work. Faculty from different schools/colleges and students from different majors have different grading paradigms and expectations. The team-based nature of the student projects also contributes to the challenges in grading, as faculty find it challenging to grade teamwork and individual contributions to the team's work product and process.

Faculty development focused on co-teaching and project-based pedagogy are both challenges and opportunities/priorities for us.

Our goal is to build the Cross-College Challenge into a destination program for students and faculty from across Boston University that serves our community partners by tackling real-world challenges and enduring questions. The priorities include recruiting faculty interested in an interdisciplinary, project-based, co-teaching model; engaging community partners; and developing compelling student projects — all of which should help drive student enrollment based on interest and skillset. When students collaborate on real-world projects that make an impact, they invariably build skills in high demand from employers.

Boston University is a private research university with three campuses in Boston, Massachusetts and 17 schools and colleges. There are more than 18,000 undergraduate students and 18,000 graduate and professional students at BU.

DUKE FUQUA SCHOOL OF BUSINESS

sites.fuqua.duke.edu/fccp

DUKE UNIVERSITY FUQUA SCHOOL OF BUSINESS:

FUQUA CLIENT CONSULTING PRACTICUM (FCCP)

QUICK FACTS

Year founded: **2012**
Project source: **External clients**
Duration: **6-16 weeks**
Students per year: **400**
Interdisciplinary: **Yes**
Vertical integration: **No**

By: Fiona Behm, Director of Experiential Learning; James Emery, Professor of the Practice of Management and Organization and Faculty Co-Director of FCCP; Pranab Majumder, Professor of the Practice of Operations Management and Faculty Co-Director of FCCP

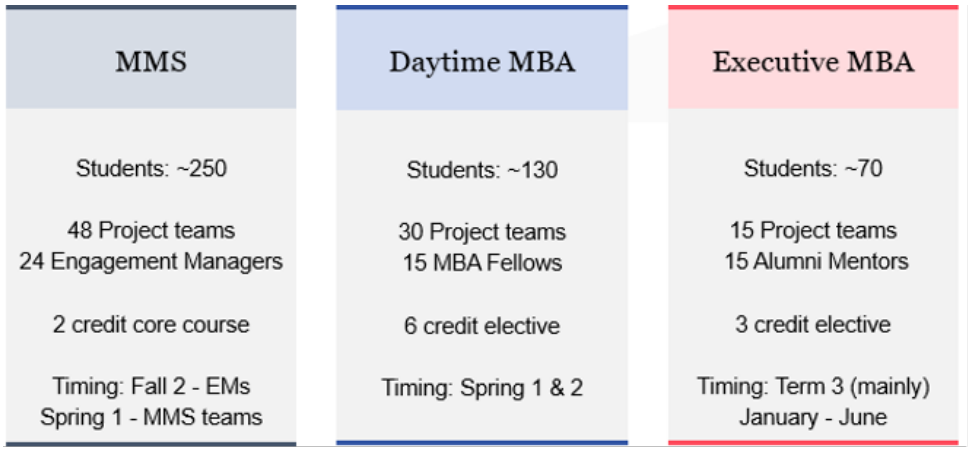
PROGRAM SUMMARY

The Fuqua School of Business has offered consulting practicum courses to students in the MBA program for more than 30 years. The Fuqua Client Consulting Practicum (FCCP) is the latest iteration of this legacy and represents an integration of several consulting courses into one program, allowing students to access a broad set of project opportunities and learning content through one course.

FCCP is a for-credit experiential learning course designed to assist Fuqua students in developing business consulting skills by applying content learned in their graduate coursework to real challenges facing businesses and other community-based organizations. Students work in small teams alongside classmates in the same program and use the consulting process to structure the business problem, define the work scope, conduct research or analysis and present their findings to the client. With faculty guidance and the support of a former FCCP student serving as a mentor, the project culminates in a final presentation to the client that captures the team's analysis, insights and actionable recommendations. Through this work, students deepen their industry-specific, function-specific and country-specific business content knowledge.

The course emphasizes developing the following skills:

- Identifying and understanding the needs of an organization (the client)
- Engaging with the client to develop a project plan to address the client's needs
- Working with the client to complete the project activities
- Influencing client decision-makers with written documents and oral discussions
- Adapting to feedback and challenges over the length of the course



FCCP is offered in three of Fuqua's degree-conferring programs — Master of Management Studies (MMS), Daytime MBA and Executive MBA — and iterations differ in terms of student experience, start/completion times and academic credit (pictured above).

During the summer project-sourcing months, FCCP program staff solicit applications from diverse client organizations that align with Fuqua's Centers, reflecting student interest areas. All project proposals undergo thorough vetting by the FCCP program office. In the Daytime MBA FCCP program, an additional layer of vetting occurs by a team of second-year MBA students (Fellows) that conduct diligence calls with one to two clients each to determine the final selection of projects presented to the first-year MBA students.

For the mandatory MMS FCCP program, 12 projects are pre-selected and assigned to student teams. The process varies slightly for the MBA programs, where FCCP is an elective. For those programs, in the fall, qualified projects are presented to MBA students, who then apply to FCCP by indicating their project preferences, providing a brief statement of interest and listing any relevant skills or expertise. The FCCP program office conducts a team formation process, matching students to projects and announcing the results. Students have 24 hours to accept or decline their place on the project team.

Once the projects are staffed and students are enrolled, teams schedule a team-building dinner and conduct a kickoff call with their clients before launching into formal coursework and project activities.

Faculty Advisors play a crucial role in the FCCP program and oversee several project teams in their section. They teach a series of classes and are actively engaged in student teams' progress throughout the project. They meet regularly with their project teams to provide guidance and collaborate with Fellows to identify issues and concerns.

See a selection of student blogs on the breadth and depth of project opportunities.

RESOURCES AND ADMINISTRATIVE MODEL

FCCP is one of the largest experiential learning programs at Fuqua, enrolling over 400 Fuqua students each year. A limited number of graduate students from professional schools such as the Nicholas School of the Environment and Sanford School of Public Policy are also eligible to enroll in FCCP; however, they must obtain permission from the registrar at their home school. FCCP is operated by a small team of staff and faculty in the Experiential Learning Office and is overseen by faculty co-directors Jim Emery and Pranab Majumder. While not an academic department or a Fuqua Center, FCCP is a program office that reports up to the senior associate dean.

The FCCP program is supported primarily through tuition, although it does generate some revenue from client fees which help offset certain costs such as team-building events, Fellow/Engagement Manager stipends and Experiential Learning software. FCCP also operates with the help of several third-party resources to ensure a valuable student learning experience.

- Faculty Advisors teach a series of classes and support the project teams in their section through regular meetings and problem-solving sessions.
- Fellows and Engagement Managers are second-year MBA students in paid teaching assistant positions that assist their project teams by sharing insights from their experience in the program, navigating early client conversations, facilitating team development discussions and being another resource for project-related questions.
- Fuqua's technology support staff creates the academic program pages for the FCCP courses in Canvas and administers course evaluations through the platform.
- EduSourced is a project-based experiential learning platform that integrates with Canvas and allows the FCCP faculty and program staff to support projects through the full lifecycle, from client proposal to facilitating secure file sharing, 360 peer surveys and assignment submissions.
- Key individuals within Fuqua's Center departments (CASE, EDGE, HSM, I&E) help to source projects from within their network and bolster the quality of project submissions across student interest areas.

BEST PRACTICES AND LESSONS LEARNED

Students report an overall high level of satisfaction with the course. Survey data support the stated goal that FCCP helps develop and refine skills that business school students find helpful in their summer internships and careers. Yet, program improvement and innovation remain crucial for FCCP to stay relevant as students navigate an ever-changing business landscape.

The features of the program that are important to its success are also the areas the FCCP program office monitors closely for improvement:

Through the FCCP program, students learn to identify challenges, develop project plans, collaborate with clients and apply feedback.

PROJECT SOURCING: The FCCP program office receives over 100 client applications annually, of which approximately 60 will be matched with a student team. To source this amount of quality projects, FCCP partners with Fuqua's Centers and the Alumni Relations team. These partnerships act as a force multiplier to increase the visibility of FCCP to greater networks, highlight the value of the Fuqua MBA program and provide a meaningful way for alumni to engage with students. Program staff actively participate in outreach, assessing initial client fit before Fellows and Engagement Managers (EMs) complete the next step of conducting due diligence calls and finalizing the projects. This process is intended to ensure the selected projects are suitable for Fuqua students in FCCP and achievable within the timeframe, not just external research projects.

TEAM FORMATION AND STRUCTURE: Effective teamwork is essential for successful and efficient consulting engagement, so considerable effort goes into team formation, support and development. At the team formation stage, the program office uses an algorithm and input from faculty/fellows to form diverse teams of five students. Project teams also benefit from having at least one student with consulting experience and relevant sector knowledge, which is factored into team formation where possible. Once finalized, teams participate in a formal team-building activity (Team Charter), get an opportunity to give and receive feedback from their peers (360 Evaluation), and then meet as a team to discuss project performance and include any course corrections in their revised team charter. Teams also receive support from a Fellow or Engagement Manager, as outlined previously, and students also provide feedback about their Fellow or Engagement Manager and faculty.

FELLOW/ENGAGEMENT MANAGER TRAINING: These second-year MBA students learn valuable consulting leadership skills and gain experience advising a team in a "Junior Partner" capacity. A Faculty Advisor conducts required training sessions to assist these students in developing the skills to coach and mentor teams well. Training sessions are usually scheduled during mealtime (lunch or dinner) to facilitate organic networking and impromptu problem-solving opportunities with faculty.

PROGRAM DESIGN WORKSHOPS: After projects are complete, there are several opportunities to debrief on the course, reflect on learnings and provide input for program improvement. The last FCCP class of the program is dedicated time for students to debrief and reflect with the faculty. Fellows and Engagement Managers also participate in a program design workshop where feedback is incorporated into the Fellows/EM program in the coming year. Clients also get an opportunity to provide feedback on their experience with a project team through a formal survey. Finally, the FCCP staff and faculty engage in a debriefing session synthesizing

relevant topics from other sessions. One outcome of this meeting is the creation of working groups of faculty and staff who undertake identified program improvement initiatives over the summer to implement in the upcoming academic year.

EXPERIENTIAL LEARNING AS A CORE PHILOSOPHY: The FCCP program is grounded in the core principles of project-based, experiential learning, which are integral to its design. While real clients are invested in the outcomes of the student projects, the FCCP program emphasizes the educational experience over the consulting engagement. In this course, students are counseled to expect to apply their skills to real-world projects, encounter ambiguity, struggle with defining a work scope, experience uncomfortable emotions, develop leadership skills and have an opportunity to learn through reflection.

CHALLENGES AND PRIORITIES FOR THE FUTURE

The FCCP program has faced several challenges over the years including:

NAVIGATING THE CHALLENGES AND OPPORTUNITIES OF GENERATIVE AI: As generative AI rapidly advances, FCCP, like most experiential learning programs, must adapt its curriculum to support student learning in an AI-driven world. The program office is undertaking an initiative to develop a comprehensive framework and guidelines for the appropriate use of generative AI in FCCP projects. This will include strategies for incorporating AI into classroom sessions and guidelines for integrating AI into student deliverable development.

MAINTAINING INSTITUTIONAL SUPPORT WHILE SITTING OUTSIDE OF THE DEPARTMENT STRUCTURE: FCCP, and experiential learning more generally, have enjoyed decades of support from Fuqua's leadership. As the FCCP program continues to evolve and expand, staying aligned with that vision is essential as we remain committed to generating value for our students, the School, and the larger Fuqua community (see Goals/Priorities below).

QUALITY CONTROL IN PROJECT SOURCING: Although the FCCP program office receives more client applications than can be matched with student teams, these submissions have a significant degree of variability. Even with program office expertise in sourcing and framing projects, plus the additional layer of diligence that Fellows and Engagement Managers undertake, quality control remains a challenge. Each year some projects suffer from poor client engagement, lack of understanding of the educational goals, misaligned expectations and scope creep, to name the more common client-related challenges.

CONFIDENTIALITY AGREEMENTS: The FCCP program has a standard Confidentiality Agreement that each team member on a project, along with their Faculty Advisor and Fellow, must sign before sending it to their client for signature. This document gets uploaded as a required submission. While some issues have to do with compliance, such as teams submitting forms with missing signatures, the more significant challenge has been client adjustments or requests

to use their own NDA, usually not drafted with the students' educational experience in mind. The complexity of these adjustments, the time investment in multiple rounds of markups, and discussions with legal departments strain a small program team during the busy project execution period. They also risk delaying the start of a project and potentially preventing the project from coming to fruition at all.

RECRUITING FELLOWS AND ENGAGEMENT MANAGERS: Promoting the Fellow/EM role to students, reviewing applications, coordinating interview schedules and scheduling meetings to assess candidates through final selection and orientation is time intensive and requires collaboration with several student leaders. An additional challenge is the fact that the EM role is a lesser-known opportunity and requires a more considerable student time investment, so applications tend to be fewer. Alumni Mentors are equivalent to the Fellow role, but the Executive MBA program relies entirely on working professional volunteers. As such, the difficulty maintaining engagement while juggling busy schedules can present problems, especially towards the tail end of a project.

Student and alumni feedback demonstrate that FCCP adds value by helping students secure job offers as well as preparing them to do well in the jobs they secure.

GOALS AND PRIORITIES:

The goal of FCCP is to enhance students' business education by developing collaborative consulting engagements with businesses and nonprofit organizations in which our students assist their client organizations in addressing existing and emerging challenges. To fulfill this educational goal while also addressing the challenges we face, FCCP must focus on generating value across the spectrum of institutional stakeholders, including students, alumni, organizations that have or may hire our graduates, and the School itself.

Student and alumni feedback demonstrate that these courses add value by 1) helping students secure internships and ultimately full-time job offers; and 2) preparing students to do well in the jobs they secure. FCCP supports students in their job searches by affording direct experience working with the types of organizations and in the industry sectors that students are targeting for employment. At the same time, FCCP offers students the ability to shape the scope of and then carry out project work, which allows them to practice the skills they are learning in the classroom. By enabling students to engage in the same (or similar) kinds of activities that they will be responsible for performing in their internships and full-time jobs, FCCP provides exceptional, real-world experiences that build confidence and prepare students for success on the job.

Beyond playing an important part in fulfilling Fuqua's educational mission, FCCP adds value to Fuqua in several important ways. First, the program assists the School in attracting students. Every year, inquiries about FCCP from students considering Fuqua grow, and our information sessions for prospective students during Blue Devil Weekend are well attended.

Second, FCCP offers a valuable way to enhance alumni ties with Fuqua. Increasingly, Fuqua alumni are bringing project opportunities for FCCP from their respective employers. It is particularly rewarding to see alumni who took these courses during their time at Fuqua now supporting our programs in these ways. Our contribution to supporting alumni relations has already resulted in financial contribution from a professional consulting firm, and we believe these efforts will continue to pay dividends to the School over the long term.

Third, and building on the second point, FCCP serves as another valuable, business-facing arm for the School. Beyond building ties with our alumni base, FCCP has a direct and positive impact on employer perceptions of the Fuqua School of Business. Employer feedback has demonstrated that they are very satisfied with the work our students are doing. Favorable employer reactions increase the perceived value of Fuqua MBAs, supporting both hiring and greater starting salaries for our graduates. This process of creating value for students, alumni, employers and the School itself has generated a virtuous cycle for all stakeholders. Our central priority is continuing to enhance this virtuous cycle of value creation.

Duke University's Fuqua School of Business is a top-ranked graduate business school within an extensive multi-discipline university dedicated to advancing the understanding of management through research and providing the highest quality education. Fuqua enrolls more than 1,900 students a year across our 10 degree programs, which offer a wide range of program formats and flexibility for working professionals and full-time students.

Duke
PRATT SCHOOL of ENGINEERING

fyd.duke.edu

DUKE UNIVERSITY PRATT SCHOOL OF ENGINEERING:

FIRST-YEAR DESIGN (FYD)

QUICK FACTS

Year founded: **2017**
Project source: **External clients**
Duration: **Semester-long**
Students per year: **400**
Interdisciplinary: **Yes**
Vertical integration: **No**

By: Dr. Ann Saterbak, Program Director

PROGRAM SUMMARY

Engineering Design and Technical Communication (EGR 101L) provides first-year students with the knowledge and experience needed to become successful engineers. Students work in a team to learn and apply the engineering design process to solve an open-ended, client-based problem drawn from a community partner. All first-year students entering the Pratt School of Engineering are required to enroll in the course.

Course Outcomes

Students completing the course should be able to:

1. Successfully solve a client-based design challenge by following steps in the engineering design process:
   a. Define a client's need.
   b. Complete a design context review.
   c. Establish design criteria.
   d. Generate solution ideas.
   e. Select an appropriate solution using a decision matrix.
   f. Iteratively prototype and build a physical, electronic or code solution.
   g. Evaluate a solution against established design criteria.
2. Develop proficiency to safely deploy two or more prototyping strategies or engineering tools.
3. Work collaboratively on an engineering team to complete an engineering design project.
4. Write technical memos, present oral reports with supporting visuals and present a poster that captures critical decisions and steps during the engineering design process.
5. Apply project management skills.
6. Upon reflection, recognize the engineering process and technical content knowledge gained during the course.

An important, defining feature of the course is that student teams solve problems that are sourced from community partners. Those partners include other university-affiliated groups, local non-profits and local companies. Popular project themes include: medical, environmental, design for individuals with disabilities, animals, infrastructure and educational. Example projects are shown on the below table, together with client, project goal and general theme. Clients are sourced from the community through a range of methods. First-Year Design team members reach out to possible partners to discuss projects and needs; community members hear about the program and reach out to a team member; or community members (especially alumni) reach out to the Pratt School and get connected to a team member.

Client	Project	Project goal	Project theme
Duke Physical Therapy	Colonic Massage	Develop a hand-held device to assist patients with arthritis in performing colonic massage	Medical
NC Zoo	Moss Dispensing System for Puffins	Dispense moss at varied distances and intervals for the horned puffins at the North Carolina Zoo	Animals
B3 Library	Coffee Lid Applicator	Create a device to help individuals with low hand strength to apply a lid to a coffee cup	Design for Individuals With Disabilities
Ellerbe Creek Water Association	Creek Trash Collector	Design a device that helps volunteers float trash down the creek for disposal	Environmental
Bell and Howell	Motorized Door Spool	Create a device to remotely close the door of a grocery pickup system	Infrastructure
Chapel Hill Public Library	Sensory Walk	Create and install an interactive display for trail visitors of all abilities	Educational

EGR 101L uses the flipped classroom model by delivering lectures outside of the class (topic-based videos, online quizzes) so that class time can be spent working in teams to solve engineering design challenges. Course sections meet in one of two maker-space classrooms. Each space is outfitted with myriad tools and resources. Spaces include worktables and benches; power tools and rapid prototyping machines (laser cutters and 3D printers); a pegboard with an array of hand tools; and fully stocked shelves and cabinets loaded with low- to medium-fidelity supplies that teams use to construct projects from paper to prototype. Additionally, soldering and sewing stations, a woodshop and a media room for private meetings are all nearby. The first half of the semester is devoted to defining the design problem; researching the problem and solution space by developing a design context review; establishing design criteria or specifications; brainstorming solutions; using a rigorous decision matrix to select a solution; and then describing the selected solution in more detail. During the second half of the semester, student teams focus on physical prototype development, iteration and testing with the goal of meeting the established design criteria. This “build” aspect of the course is critical to address the clients’ problem; it also allows students to develop important skills through an iterative process of learning.

As students engage with the engineering design process, they simultaneously learn how to communicate their ideas in a variety of formats: technical memos, oral presentations and posters. Technical memos require precise technical language supported with numerical values and justified by clear technical reasoning. Presentations are held at various times throughout the semester to update peers, clients and mentors on the status of a project. Sharing a stage, teams learn how to project professionalism and energy, maintain stance and posture, convey their ideas through a narrative arc and use effective gesturing.

RESOURCES AND ADMINISTRATIVE MODEL

EGR 101 is a required course for all incoming Pratt students. The vast majority enroll during the fall semester (approximately 350 students) in one of eight sections. As a result of scheduling challenges, approximately 20–30 students enroll in one section in the spring semester. The director of the program reports to the dean of the Pratt School of Engineering.

Student team installs an otter playground at the NC Zoo.

Funds for the program are supported from a budget provided by the School of Engineering. Costs are personnel- and non-personnel–related. Two faculty and three staff members comprise the administrative leadership team. Approximately 50 student staff (typical teaching assistants and technical teaching assistants) are an integral part of our team. Undergraduate students hold this role. They apply and are selected after an in-person interview. Student staff focus on supporting teams through the prototype process with an emphasis placed on safety. Lab supplies and materials are purchased to stock the two maker-space classrooms. In addition, each team receives a budget, and on average each team spends $150 to cover prototyping materials. A small stipend is paid to consultants, or "technical mentors," who work with each team. Instructors volunteer and are selected to teach a section of EGR 101 in exchange for a department-specific course. Each section is co-taught. Finally, students are provided with a "workbook" that serves as the required text for the course.

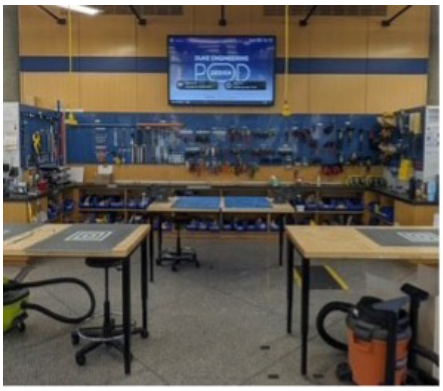
BEST PRACTICES AND LESSONS LEARNED

The success of the program is driven by a few components: 1) finding high-quality, student-centered instructors; 2) identifying the appropriate number of client-based projects that involve a reasonable scope for first-year students; and 3) providing sufficient administrative support. Team leaders are passionate about engineering education; organized; solutions-oriented; and driven to impact and improve the student experience. During the fall semester the instructor team meets with the First-Year Design leadership team on a bi-weekly basis, allowing instructors to learn from one other by discussing key components of the course and sharing teaching strategies.

This course requires a significant amount of preparation and oversight with a course management system (CMS). The course itself has many moving parts, assignments and points of online interaction for students. Course sections are set up within a CMS (at Duke, Canvas) and must be monitored daily. Client communication is another area of importance. The leadership team must collaborate and communicate with different constituents, some of whom are familiar with the University, and some of whom who are not, requiring nuanced and audience-centered communication to cultivate and maintain community partnerships.

At the conclusion of each fall semester, 10–15 student teams (of ~75 teams) continue to EGR 102: Design to Deliver. This elective independent study course is the right fit for student teams that want to continue testing and refining their prototype. These continuing team members are passionate about engineering design and meeting the clients' needs. Often, teams enrolled in this course attend research conferences to share their prototype with the appropriate audience.

CHALLENGES AND PRIORITIES FOR THE FUTURE



One of the EGR 101 lab classrooms

This program aims to continue delivering a high-quality experience for first-year students by focusing on the implementation of course learning outcomes. Recruitment of appropriate new projects and clients, while also strengthening existing relationships, requires significant effort. Looking ahead, we would like to involve more Duke alumni as clients, even if those individuals are not located in Durham. We also strive to deliver as many prototypes as possible to clients. Student teams have varied levels of success finishing fully workable prototypes. Even when prototypes do not meet client specifications, we would like to ensure each client receives plans, a poster presentation or a high-fidelity prototype. Finally, we also strive to leverage the course as a springboard for a continued interest in design work, and as a result, professional development for students.

Duke University's Pratt School of Engineering is a highly ranked educational and research institution focused on providing engineering in service to society. To its more than 3,200 students, it offers six undergraduate majors (including a customizable interdisciplinary option), 18 specialized master's degree programs and four doctoral programs.

creativeinquiry.lehigh.edu

LEHIGH UNIVERSITY:

OFFICE OF CREATIVE INQUIRY

QUICK FACTS

Year founded: **2017**
Project source: **Faculty**
Duration: **3-5 years**
Students per year: **375**
Interdisciplinary: **Yes**
Vertical integration: **Yes**

By: Bill Whitney, Assistant Vice Provost for Experiential Learning Programs; Khanjan Mehta, Vice Provost for Creative Inquiry

PROGRAM SUMMARY

The Office of Creative Inquiry supports a wide range of interdisciplinary initiatives that help students and faculty pursue new intellectual, creative and artistic pathways that lead to transformative new innovations, expressions and questions. Creative Inquiry is an integrated learning, research and engagement program that supports real, authentic and meaningful projects on their winding journeys toward tangible and sustainable impact. Creative Inquiry at Lehigh supports multiple university-wide programs, but our core initiatives — the Impact Fellowship programs and the Mountaintop Summer Experience — are vehicles for supporting and incubating faculty-guided, student-driven, authentic multi-year projects with large-scale ambitions focused on innovation and real-world impact.

The Impact Fellowships (IFs) are integrated learning, research and entrepreneurial engagement programs for interdisciplinary teams of faculty and students to work collaboratively with each other and external partners. The primary (but not exclusive) focus of these programs is on the UN's Sustainable Development Goals, with particular emphases on the environment, health, economic growth and the food-water-energy nexus. The five current programs are the Global Social Impact Fellowship (GSIF, founded in 2018), the Lehigh Valley Social Impact Fellowship (LVSIF, founded in 2019), the Campus Social Impact Fellowship (CSIF, founded in 2020) the Silicon Valley Social Impact Fellowship (SVSIF, founded in 2023) and the NextGen Pathways to Transformative Impact Fellowship (NextGen, founded in 2025). The IF academic structure consists of two components:

1. a project-based course in which faculty–student teams work on multi-year projects with the goal of creating new knowledge and translating it to innovative, practical and sustainable solutions; and
2. a weekly one-credit workshop course in which students learn essential concepts, frameworks, methods and tools that are foundational to project success.

Faculty make a multi-year commitment to one of these ambitious projects that aligns with

their research/impact agendas, while students make a one-year commitment through credit-bearing courses with the option of staying engaged for multiple years and walking away with publications, professional networks, a deeper sense of purpose and tangible impact.

The Mountaintop Summer Experience, which began in 2013 prior to the founding of the Office of Creative Inquiry, was Lehigh University's initial effort at creating a space to support open-ended, team-based project work. The program was inspired by the university's 2012 acquisition of two former Bethlehem Steel research and development facilities (still named "Building C" and "Building B") that contained large high-bay space and could function as sandboxes for doing more physical and intellectual explorations than prior university spaces allowed. Mountaintop was initiated as a 10-week summer program with no infrastructure for projects to continue beyond the experimental phase of the summer. The Office of Creative Inquiry was founded in part to create that infrastructure, and also to serve as the hub for university-wide, interdisciplinary research leading to tangible impact in the world.

Here are some project examples from the Impact Fellowships:

Team name	Team description and outputs	Disciplines involved	Activities and outcomes
Save Tuba (GSIF, Kazakhstan)	Almaty, the commercial capital of Kazakhstan and a major hub in Central Asia, is facing enormous challenges with sustainable urban development. Uncontrolled migration burdens the housing infrastructure, outdoor air quality, access to clean water and waste-water management systems at the constantly growing periphery of the city, leading to negative environmental consequences that compromise economic growth. The tuba is a critically endangered saiga antelope native to the Kazakh Steppes. Save Tuba is a sustainability education platform for Almaty's youngest citizens that connects knowledge, inquiry and action to help students build a healthy future for their communities and the planet. Save Tuba enables K–12 students and their teachers to embark on a series of real, relevant and meaningful sustainability actions with the goal of long-term behavioral change. The Lehigh team is collaborating with diverse partners to develop and validate the app and pilot-test it with schools in Almaty.	• Computer science • Marketing • Environmental science • Sustainability education • Education policy • Global health	• Focus groups of teachers and students in Kazakhstan • IRB approvals at Lehigh and at Almaty Management University • Graphic design • App design and development • Working with the Kazakh Ministry of Education to implement app into the national middle-school curriculum
Beyond Bars (LVSIF)	The issue of mass incarceration is one that touches lives locally, regionally and globally. The Beyond Bars project aims to examine all of the individual and community-wide consequences that stem from mass incarceration, focused on consequences here in the Lehigh Valley, and use innovative forms of theatre and storytelling to educate, inspire and move citizens to action on behalf of the cause of prison abolition. In the project's first three years, student teams wrote and performed live and virtual pieces of theatre based on stories and interviews conducted in the Northampton County Prison system and around the Lehigh Valley. Currently, Beyond Bars is focused on the school-to-prison pipeline and developing a set of innovative storytelling workshops that will be implemented with schools, youth programs and community organizations to give youth the ability to process and articulate their experiences.	• Political science • Theatre • Psychology • Sociology • Public policy • Adolescent psychology • Education	• Toolkit of storytelling workshops for schools and youth organizations • Interviews with formerly incarcerated persons • Focus groups with adolescent psychologists, teachers and youth group organizers • Several workshops piloted in schools

Team name	Team description and outputs	Disciplines involved	Activities and outcomes
EcoRealm Environments (CSIF)	Extensive research has proven that being immersed in nature can reduce stress and increase focus, productivity and creativity. It would be wonderful if we could all reap the benefits of the natural world when studying for the next exam, or writing that research essay — but who has time to go into the forest? EcoRealm aims to bring the forest to students with its modular, low-maintenance, immersive plant partitions. Early studies suggest a profound reduction in student stress by simply studying in "the realm." Heading into year three as a CSIF project, this project team is poised to further develop the autonomous plant health monitoring system, the aesthetic design and the manufacturing plan and further refine the business plan.	• Mechanical engineering • Computer Science • Electrical Engineering • Psychology • Marketing • Supply Chain Management • Environmental Science • Botany	• Industry interviews • Focus groups for students • Prototyping and refining hydroponic technology • Piloting first prototype in Lehigh University libraries • Data collection and analysis • Cultivating future business partners

RESOURCES AND ADMINISTRATIVE MODEL

The Office of Creative Inquiry is overseen by Lehigh's Vice Provost for Creative Inquiry. Primary program management is done by the Assistant Vice Provost for Experiential Learning Programs, and there are three other full-time staff members as of January 2023 for management of marketing and communications, "Lehigh 360" (a new initiative connecting Lehigh students to high-impact opportunities across campus, including Creative Inquiry programs) and administrative tasks. In January 2024, we jointly hired our first faculty member with the Department of Computer Science and Engineering in the P.C. Rossin College of Engineering and Applied Science. This faculty member has a 50% appointment in the college, teaching first-year curricula, and 50% appointment in Creative Inquiry, mentoring multiple project teams. We hope to scale this faculty model with Lehigh's other four colleges in the coming years. Faculty project mentors are drawn from across the university and are not directly compensated, although nominal project budgets (typically $500 per semester and another $500 for summer projects) are provided, with more project budgets granted if needed and if budget allows. The vast majority of funding for the office's entire suite of programs comes from the provost's office in the form of operating budgets, and currently our annual budget is approximately $800,000, which does not include salaries and benefits for the two highest-ranking employees but does include salaries and benefits for the other two full-time staff members and the faculty member's 50% appointment.

Our ideal operating budget as our programs are currently constructed would be north of $1.2 million annually, but that does not factor in the continued growth and popularity of our programs which, year over year, see large growth in applications and more students turned away. If we were to fully fund fieldwork for Global Social

Undergraduate students in Creative Inquiry programs have presented their work at national and global conferences, published in peer-reviewed journals, written successful grant proposals and obtained governmental approvals for new technologies.

Impact Fellowship students (currently with ~100 travelers per year), it would cost roughly $4,000 per student, for a total of $280,000. Needed in-country expenses and faculty mentor travel, which we already fund, totals an additional $70,000. As it is, we cover all in-country/on-the-ground expenses for GSIF and SVSIF student fieldwork, but do not cover flights, passports, visas or vaccinations, although we do solicit funds from other Lehigh offices, departments and programs to help support an increasing number of high-need students.

The Mountaintop summer program is the largest single expenditure item in our annual budget, since students receive stipends of $5,000 for undergraduates and $6,000 for graduate students — currently we are funding 60 undergraduates and 8 graduate students in 2024, totaling ~$350K for stipends alone, plus operating costs of staffing and running the program that total approximately $100K more. That is as far as our budget stretches, but we would ideally like to fund more students.

We have received a few gifts, including several endowments to support student stipends, and a five-year expendable gift which has provided support of $15,000 per year for global student fieldwork. Other small gifts have materialized as well, totaling near $5,000 to $10,000. We have ongoing conversations with interested alumni about larger endowed gifts, however, we do not have a dedicated development professional who works on soliciting gifts for Creative Inquiry, so any fundraising is done on an ad hoc basis. Finally, individual projects are strongly encouraged and supported to write extramural funding proposals for their own purposes, and we have had several successful grants and awards given to our projects, including VentureWell E-Team grants, Davis Projects for Peace awards, Grand Challenges Canada grants and others.

BEST PRACTICES AND LESSONS LEARNED

As the Creative Inquiry office has been focused solely on developing core programs and scaling to the highest possible level given budgetary limitations, we have not yet engaged in a structured external evaluation, although that is on our docket for some time in the next two to three years. Internal evaluations, however, are ongoing and consistent, and we are constantly refining our administrative policies and procedures, protocols for data tracking, communications efforts (including social media presence), internal marketing and external thought leadership, and perhaps most importantly, individual project evaluation. We have a Faculty Advisory Committee consisting of at least one senior tenured faculty member from each of Lehigh's five colleges, and engage in regular dialogue with the provost, who serves as a sounding board for new ideas and initiatives. Through this, and upon reflection of where we are now, we have a few lessons that can be noted as key to our success.

FOCUS ON IMPACT AND OUTCOMES: We frequently tell our students and faculty that everything we do is structured around three goals: impact, impact and impact. We take this extremely seriously and avoid any perception of indulging in short-term academic exercises that do not stay focused on project outcomes and pathways to implement new innovations. We allow faculty

and students to define impact in a myriad of ways, and encourage projects that are focused on new policies, procedures or creative works as much as ones yielding engineering technologies or scientific discoveries. In fact, all of our teams are built to be interdisciplinary, so although each project certainly has a disciplinary field of focus, beyond the initial stages of research all projects take a holistic systems approach to building partnerships and implementation pathways. Project teams build and continually refine business models, financial models, value propositions, matrices of partnerships, funding proposals, and opportunities to share and amplify research and praxis innovations on national and international stages.

BUILDING STUDENT PORTFOLIOS: Undergraduate students in Creative Inquiry programs have been responsible for presenting their work at national and global conferences, publishing their work in peer-reviewed professional journals, writing successful grant proposals — some for awards as large as $100,000 — and obtaining governmental regulatory approvals for new technologies. Some of the students responsible for undertaking this work have been first-year students. This is proof that when student passion and ambition are applied with the intellectual capital and resources of a university, it is never too soon for them to begin participating in the world of professional research and praxis. A core part of the ethos of Creative Inquiry is that what gets done is what matters, not who does it or what particular hoops they have cleared prior to doing the work. This has represented a significant cultural shift at Lehigh University (cf. challenges below), but by focusing on success stories and highlighting student achievements, including successful career paths and outcomes after graduation, and utilizing student testimonials, we have been relatively successful at silencing some of the doubters.

EXTERNAL CALIBRATION: Alongside outcomes, we have placed a very strong emphasis on external validation and calibration of any project. To reinforce this, we do several things as a matter of practice. For one, we provide multiple opportunities within a semester or a summer for student teams to deliver presentations/pitches to referees who, much of the time, are drawn from outside Lehigh, and sometimes are faculty at the university who have no direct relationship to our programs. These presentations always include a large degree of open Q&A. Through these undertakings, students are compelled to answer tough, pointed questions and justify their goals, methods and progress in ways that do not allow them to indulge in the usual performativity and approval-seeking that come with many in-class assignments. Second, we invite many guest speakers (we typically call them Innovators in Residence) to visit and talk with students about projects that overlap with their areas of expertise, particularly in the summer program when it is somewhat easier to invite outside guests. Finally, by encouraging students to write proposals, publications and conference submissions, we introduce them to the process of high-level peer review and feedback.

STRONG PARTNERSHIPS AND COLLABORATIONS, OPEN INTELLECTUAL PROPERTY SHARING: Unlike many traditional capstone projects, our projects do not have industry sponsorship — at the end of the day, students, with the guidance of their faculty mentors and the advice of

external partners, determine the trajectory and deliverables of their project. That said, we have built and relied upon global and local networks of organizations and individuals who collaborate with our project teams — whether operationally, intellectually, methodologically, financially or, many times, a combination of these. Our students are taught how to cultivate and scale these relationships, how to identify "win–win" scenarios, what different kinds of organizational models might make the most effective partners, and how to communicate with and to partnering organizations and individuals. As a corollary to this, we have a single intellectual property (IP) policy: "Please infringe." We work in an open-innovation environment where there is no protected IP, and when and if such potentially protectable IP is developed, the project moves to a different stage of its lifecycle where it is no longer directly part of our ecosystem. This allows for much freer exchange of ideas with partners and eliminates many of the barriers to collaboration that come up when protectable IP is at the center of the work.

CHALLENGES AND PRIORITIES FOR THE FUTURE

Our office was founded and initiated without an overarching mandate, clarity of direction, funding allocation or sufficient staffing. From that inauspicious beginning, in seven years we have grown to a university-wide operation with visibility across all of Lehigh's colleges and a strong presence within Lehigh's Admissions programs. We have strong support from Lehigh's current leadership as well. That said, we are not without our challenges and obstacles.

FACULTY ENGAGEMENT: Most significantly, faculty are not directly compensated for mentoring Creative Inquiry projects, either through salary or discretionary funding. Early in the Mountaintop Summer Experience program, the program had gift funds to provide faculty with additional discretionary research funding based on how many students they mentored. This practice was discontinued because of budget limitations driven by changes in the university's development structure and the desire to prioritize funding more student participation. When this change was made, many participating faculty became upset and quit participating in the program. This was not an entirely negative development, as it allowed us to rebuild the program with a new core philosophy of project continuation rather than the prior model of summer-only projects, and to create new courses and curricula that integrated these projects into credit-bearing activities. Still, it has been a long road to cultivate a new set of faculty who are willing and able to mentor projects that align with their research or impact agendas, without course releases or other direct incentives, and often without full support of these activities in their promotion and tenure portfolios.

Many faculty see the value in these projects and the potential for publications and grant funding that come with them, but many times these outcomes only occur after two or more years of arduous mentorship and cultivation of students. As one method of overcoming this challenge, we are in the process of working with each of Lehigh's five colleges on a joint faculty hire, who would teach courses for their home college as 50% of their effort, and mentor multiple

Creative Inquiry projects as the other 50%. As mentioned above, we have already in fact hired such a position with Lehigh's P.C. Rossin College of Engineering and Applied Science, and thus far it has proven to be a successful model on which to build future such hires.

HIGH-NEED STUDENT FUNDING: Lehigh University in general has an ever-increasing number of students who are first-generation college students, BIPOC and/or come from lower socioeconomic backgrounds. This is undoubtedly a positive development for the university. As we have found, these students are increasingly gravitating toward Creative Inquiry project work at even higher proportional numbers than they are adding to the Lehigh student population — again, a circumstance which comes with myriad benefits and positive outcomes, but also the particularly acute challenge of funding these students for summer programs, international/national fieldwork experiences and presenting at conferences. Many of these students are not able to bear more than a very minimum amount of out-of-pocket costs, and some of them cannot even consider these high-impact experiences because of cultural/family pressures to stay focused on their degree pathways, or because of lost time needed for work-based income.

INTER-COLLEGE/UNIVERSITY PROCEDURAL CONFLICTS: This is the most succinct way to describe an ongoing challenge that we face, as a university entity unaffiliated with any of Lehigh's five colleges but compelled to work with all of them equally. Lehigh University is extremely college-centric in its structures, to the degree that a student who matriculates at Lehigh's College of Arts and Sciences has a vastly different collegiate experience than one who matriculates at, for example, the College of Health or the College of Business. These differences manifest themselves in one way through students' different abilities to take credits and undertake experiences that do not translate directly to a degree program, and, in a less direct way, how much encouragement students are given to do so. For example, early on, one of Lehigh's largest undergraduate colleges would not acknowledge our courses nor their associated credits. While this did not mean that their students and faculty could not participate, it certainly limited the benefits to participation. That stance has since been modified to allow for Creative Inquiry credits to count toward student graduation total credit numbers (with a maximum of six), but there continues to be some resistance to our programs as a whole, making it more difficult for us to recruit new faculty and open up college-based sources of student funding.

Moving forward, Creative Inquiry leadership aims to increase program reach and continue supporting projects with tangible, sustainable impacts on society.

All these challenges aside, our primary goal and target for the future continues to be two-fold: first, continue to scale the numbers of projects, student participants, and faculty mentors to be approximately double where they are now; and second, to create a system that leads to robust project outcomes and societal impacts that are tangible, sustainable and extremely noteworthy. The latter is probably more important to us than the former, since it is still an open question how far we should, could or will intend to scale, but what remains the core of our programs is the focus on impact, and teaching students how to create impact while cultivating

new mindsets, skillsets and portfolios of accomplishment. We wish to be a fully transformative educational entity and continue to push a culture shift and mindset shift at Lehigh University which, to the credit of its leadership, has truly embraced impact as a critical piece of its ethos and incorporated that principle into its new strategic planning process. Creative Inquiry will continue to expand its staff and number of programs offered while keeping project-based learning at the core of its operations.

Lehigh University is located in Bethlehem, Pennsylvania. It is a private research university with 5,600 undergraduate students and 1,800 graduate students across five colleges (one of which is graduate-only). Around 40% of Lehigh students have a global experience during their undergraduate years.

CASE STUDIES

BY PROGRAM REACH:

<100 students per year

Appalachian STATE UNIVERSITY

APPALACHIAN STATE UNIVERSITY:

RESEARCH-TO-ACTION MULTIDISCIPLINARY PROJECTS (RAMP)

QUICK FACTS

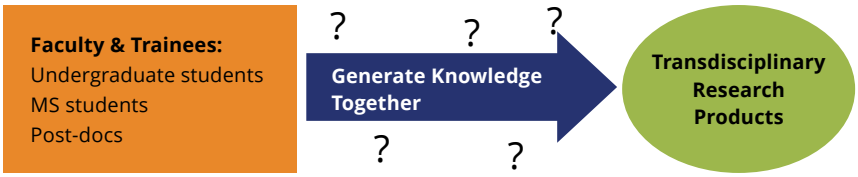
Year founded: **2021**
Project source: **Faculty**
Duration: **Semester-long**
Students per year: **10**
Interdisciplinary: **Yes**
Vertical integration: **No**

By: Kimberly Bourne, Postdoctoral Associate at the Research Institute for Environment, Energy and Economics (RIEEE) and Lead Co-Instructor of RAMP (Fall 2023); Christine Ogilvie Hendren, Vice Provost for Research and Innovation and Professor of Geological and Environmental Sciences; Grace Marasco-Plummer, Associate Director of RIEEE; Jay Rickabaugh, Associate Professor of Government and Justice Studies and Lead Co-Instructor of RAMP (Fall 2022 and 2023)

Appalachian State University RESEARCH INSTITUTE for environment, energy & economics

PROGRAM SUMMARY

As a society, we face many complex, large-scale problems such as climate change and food insecurity, and addressing them requires transdisciplinary research approaches. The Research-to-Action Multidisciplinary Projects (RAMP) model was co-created by the Research Institute for Environment, Energy and Economics and the Honors College at Appalachian State University (App State) as a course-based mechanism for blending the expertise and approaches of multidisciplinary faculty and students in semester-long experiences focused on convergence research. This model is envisioned as a platform for course-based research projects on a variety of problem-centered topics, and thus far has been piloted around two projects: 1) operationalizing the App State campus Climate Action Plan in conjunction with the Office of Sustainability, and 2) developing solutions to phosphorus sustainability.



RAMP experiences seek to address complex and specifically wicked problems at an applied scale using convergence approaches in the setting of the Appalachian High Country, where App State is located. Wicked problems are those that are difficult or seemingly impossible to solve because of the unknowable, contradictory and ever-shifting requirements of any potential solution, and the lack of any stopping rule that would signify a solution had been reached. Convergence research is applied to address these challenges by integrating knowledge, expertise and methods from various disciplines, with the goal of creating new approaches informed by this mixture of perspectives. Projects are developed by course faculty (four to six faculty from different disciplines) to explore locally relevant research questions related to the chosen wicked problem. Students are placed in interdisciplinary groups to complete these research projects under the mentorship of a participating faculty member. Local stakeholder engagement is highly encouraged for each project group.

This research-to-action course-based experience develops students' abilities to investigate physical and social-scientific events and circumstances with a focus on practical application. As a result, these courses emphasize out-of-classroom research but still utilize weekly meetings to build a base of knowledge and experiences and encourage cross-project convergence. The main focus is on developing practical research-to-action skills and convergence science literacy.

As one example, in the second iteration of this course, students explored phosphorus sustainability in connection with the National Science Foundation's Science and Technologies for Phosphorus Sustainability Center, in which Appalachian State serves as a core institutional partner. The element phosphorus (P) has been instrumental in both the most significant revolution to the conventional agricultural food system and one of the biggest environmental disasters of our lifetime. We are simultaneously facing a supply shortage and P-related water pollution, harming essential ecosystems.

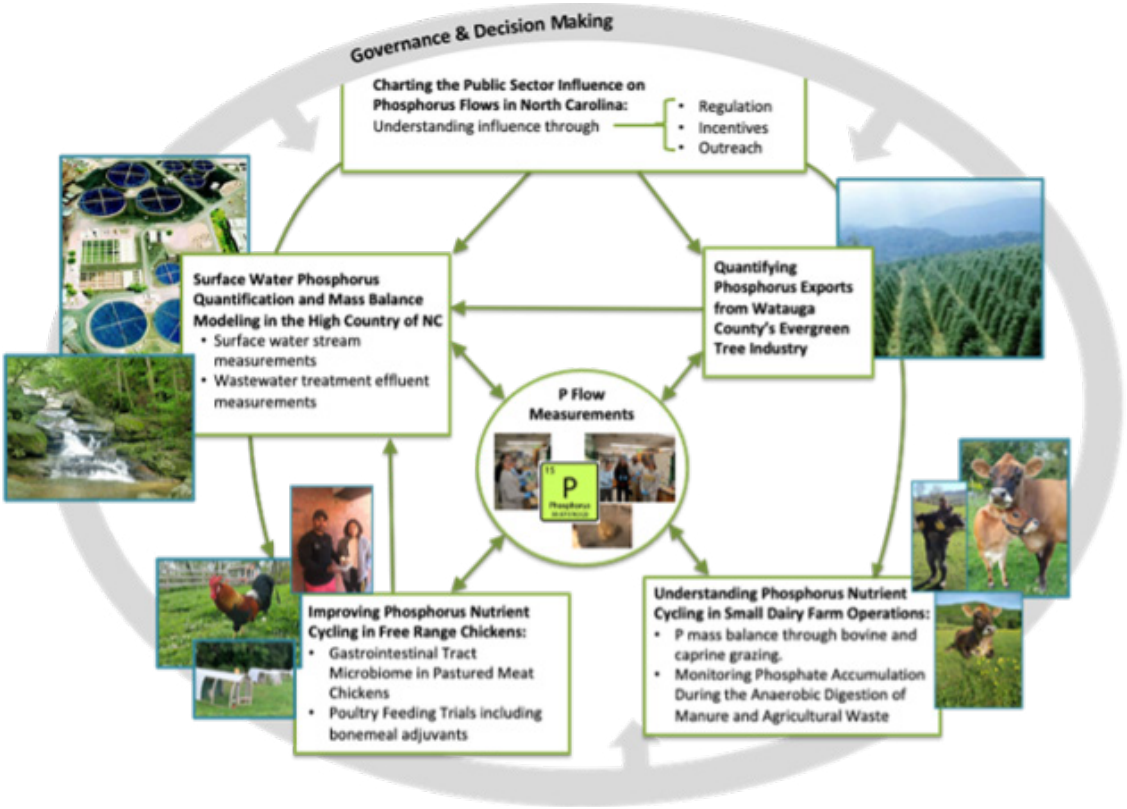


Diagram of an interlinked set of research projects designed to build an understanding of phosphorus flows in the Appalachian highlands along with the decisions and practices that govern them

Faculty from government and justice studies, chemistry and fermentation sciences, and sustainable development and biology departments led projects exploring local P cycling in agriculture and wastewater treatment as well as the government structures present to regulate this cycling. Students engaged in hands-on research activities such as:

- Developing a P supplement made from bovine femurs sourced from a local butcher for livestock chickens and evaluating its sustainability and effectiveness.
- Tracking orthophosphate flows from wastewater treatment plants, livestock production and non-point sources to determine the impact of local industries on P cycling using public databases.
- Evaluating the frequency and type of relevant North Carolina government agency press releases to assess whether P is a subject of outreach to media, and thus, the public at large.

RESOURCES AND ADMINISTRATIVE MODEL

This course is supported by the App State Honors College and the Research Institute for Environment, Energy and Economics (RIEEE). While it is listed as an Honors College course, half of the available seats are open to non-Honors students. The Honors College provides funding to compensate faculty, as this course does not count toward faculty teaching requirements. We have developed tiered faculty roles in which instructors of record take on the course planning, syllabus creation and organizational tasks; core faculty help develop lecture content and closely mentor project teams; and guest lecturers occasionally develop lecture content based on their expertise and provide some guidance to project groups.

The Honors College also provides instructional funding support for two adjunct stipends per course, supplementing research funding for faculty and student projects. Additional administrative support is provided by RIEEE, as Institute leadership helps to determine the chosen wicked problem and appoint instructors of record.

BEST PRACTICES AND LESSONS LEARNED

Based on feedback elicited from course instructors, we have defined three learning outcomes central to any RAMP course: 1) outline a research question and the project methods to answer the question in a rigorous manner, including study design, data collection and data analysis; 2) develop an understanding of wicked problems and establish a framework to assess the viability of different solutions; and 3) carry out convergent research practices to create holistic solutions to wicked problems that cross disciplinary boundaries. Each iteration should also have a learning outcome goal specific to the subject matter to ensure understanding of the complexities of the specific wicked problem and why it is defined as such.

To achieve these learning outcomes, students must first establish foundational knowledge tailored to the wicked problem at hand through engaged, interdisciplinary lectures and background literature review. This foundation helps students formulate research questions related to the larger project. As they carry out the research necessary to answer these questions, students must have the opportunity to reflect on their progress and methods

together throughout the semester. During classroom time, students should be encouraged to continually reflect upon the group's larger body of work and connection to societal impacts. By working across disciplines and projects, students will be able to successfully engage in convergent research in a meaningful way.

Strong administrative and organizational support from the instructor of record and RIEEE have been pivotal elements to course implementation. Instructors who have led these classes have also noted the value of the multidisciplinary approach, underscoring that it has enabled each instructor to share their disciplinary expertise with students in a meaningful way. The students in turn were motivated and engaged with the team and their individual research projects, further contributing to the success of the course.

CHALLENGES AND PRIORITIES FOR THE FUTURE

Faculty have identified several important course improvements, including 1) more effective use of classroom time through providing narrower prompts for guest lectures and more time for students to engage across projects; 2) more frequent course assignments to create a structure for concurrent research progress and evaluation; and 3) the provision of a predefined set of potential research areas as part of a larger project.

Currently, only one section of the course is offered. The long-term goal is to develop a cohesive program and structure to allow for multiple sections based on different issues. Each section will share course objectives around developing the skills to lead and engage with convergent research as well as follow a similar group research project structure with weekly seminars.

The number of sections available will be restricted by the number of faculty willing to take on an additional course and the availability of research funding. The current iteration of the course is bolstered by the research funding provided to App State by the Science and Technologies for Phosphorus Sustainability Center. In future iterations, the instructor of record will have to carefully manage the balance between allowing faculty enough flexibility in defining projects to further their own funded research, while also creating a cohesive set of projects that allows for impactful convergence. An alternative is to find additional funding sources to provide research grants to faculty who agree to lead projects. With each consecutive year the RAMP course has been offered, the course has filled up more quickly with less recruitment effort; however, an increase in program visibility and intentional recruitment across the university is essential to its sustainability in terms of both faculty and student engagement.

Appalachian State University is located in Boone, North Carolina, in the southern Appalachian High Country. It is a public, regional comprehensive university and a Primarily Undergraduate Institution with about 20,000 students, over 150 majors and more than 80 graduate programs (largely master's degrees and certificates). About 35% of students are first-generation.

California State University Chico

housingresearchgroup.csuchico.edu

CALIFORNIA STATE UNIVERSITY, CHICO:

INTERDISCIPLINARY COURSE ON HOUSING AND HOMELESSNESS

QUICK FACTS

Year founded: **2017**
Project source: **Faculty**
Duration: **Semester-long**
Students per year: **80-100**
Interdisciplinary: **Yes**
Vertical integration: **No**

By: Jennifer Wilking, Professor of Political Science and Co-Founder of the Housing Research Group; Susan Roll, Professor of Social Work, Associate Dean of Graduate Studies and Co-Founder of the Housing Research Group

HRG
HOUSING RESEARCH GROUP

PROGRAM SUMMARY

This course brings together students across the disciplines of social work, political science, criminal justice and occasionally psychology to conduct community-based participatory research (CBPR) on issues relating to housing and homelessness in our community. Students enroll in a selected course in their major department (e.g., SWRK 485: Social Welfare, Policy, Programs and Services, or POLS 331: Introduction to Research Methods). These courses meet twice a week during the same time slots. Students meet in their disciplinary course once a week and then all gather for an interdisciplinary class on the other day, in a shared space with peers from the other discipline and all of the co-teaching professors. Most of the joint meeting times are dedicated to working in interdisciplinary groups on a selected CBPR project relating to housing and homelessness. Interdisciplinary teams focus on the broad question of how research informs policy and social change. At the end of the semester, students present their work in a public-facing presentation.

Year 1:

Community Survey Regarding Homelessness (Fall 2017): In the inaugural and pilot course, Professors Jennifer Wilking, Susan Roll and Mariah Kornbluh joined their three classes — POLS 331: Introduction to Research Methods; SWRK 485: Social Welfare, Policy, Programs and Services; and PSYC 401: Capstone in Community Psychology — totaling over 100 students. Joined sessions comprised approximately one-third of the class meetings and were held in the only available space at that time, a 400-seat auditorium with fixed seats. The research projects were selected by students and involved surveys of both housed and unhoused community members, regarding the greatest needs and challenges in the community around housing and homelessness. Over the course of the semester, students — working in interdisciplinary teams of 10–12 — designed the surveys, collected data and conducted preliminary analyses. Community agencies presented guest lectures in joint class meetings for the purpose

of informing the surveys, and students volunteered at a local shelter on National Make a Difference Day. Students presented their research at a campus research forum at the end of the semester. Systematic assessment of the first class demonstrated student growth in interdisciplinary collaboration, transference of course knowledge to real-world problems, critical consciousness, civic development and self-awareness.

Year 2:

Interviews with Unhoused Individuals Regarding Eight Policy Areas (Fall 2018): In the second iteration of the class, the same classes and professors participated, with over 100 students enrolled in the course. Joint sessions took up more of the class meetings — close to half the semester — and were held in a classroom intentionally designed for group work. The classroom includes 12 stations, each with a computer and monitor that could be independently controlled. The professors hired a community consultant from a local housing organization to assist in identifying eight areas of pressing community need around housing and homelessness, which included public health (bathrooms and handwashing stations, needle exchange and medical respite care for unhoused patients), public safety (housing for individuals with criminal records) and housing services (homelessness prevention, street outreach, tiny homes and permanent, supportive housing). Interdisciplinary teams of eight to 10 students designed interview questions relating to their specific topic, conducted interviews with individuals experiencing homelessness and analyzed the qualitative data. The community was involved in the course and in the research through the consultants who identified issue areas and held community consultation days, during which issue area experts from local agencies and nonprofits met with groups to provide feedback on the interview instrument and project direction. Students also volunteered at a local shelter on the same day they conducted interviews. Students voted on the best projects and representatives from the top three teams presented at a meeting of the Local City Council. All projects were on public display at the City Council chambers on that same evening.

Year 3:

Housing Insecurity and Homelessness Post–Camp Fire (Fall 2019): In the third iteration of the course, two classes were joined — POLS 331: Introduction to Research Methods and SWRK 485: Social Welfare, Policy, Programs and Services — for a total of 80 students. Students were tasked with developing and proposing a university/community collaboration focusing on one of three populations: students experiencing homelessness, survivors of the 2018 wildfire in the county (the Camp Fire) or chronically homeless individuals. Multiple groups, each consisting of eight to 10 students, focused on each population. Students worked with data from a previously designed and implemented mixed methods study (see publications here and here) conducted by Professors Wilking, Roll and Kornbluh, and funded by the California State University Chancellor's Office. Each group created a website to present their proposed university/community collaboration. Community involvement included two consultation days, a volunteer day, and presentation of the group websites to campus and community members at a campus open house.

Year 4:

Understanding Barriers to Basic Needs Resources (Spring 2022): This interdisciplinary course joined SWRK 305: Community and Organizational Change with POLS 331: Introduction to Research Methods. Professors Roll and Wilking selected the project topic, Barriers to Accessing Basic Needs Services, and the community partner, the Basic Needs Project at Chico State. In this way, the course integrated with the professors' multi-year evaluation of the Basic Needs Project and the College-Focused Rapid Re-Housing programs. Students worked in 12 groups of six to eight students and focused on developing campaigns to reduce barriers to Basic Needs Services, based on the findings of their semester-long research. Research involved the collaborative design and implementation of a survey, as well as engagement with low-income students on campus, to understand potential reasons students were not accessing available resources around food and housing. Community involvement included presentations and consultation days with Basic Needs Project staff. Students presented their ideas, informed by the research, at a campus open house during finals week.

The table below summarizes specific attributes of the course, such as levels of student involvement in the research and reciprocity with community partners, over the different iterations of the course.

Class strengths and weaknesses	2017: Student-designed community survey regarding homelessness	2018: Student-designed interview of homeless individuals around 8 issue areas	2019: Mixed methods study of housing insecurity and homelessness, post–Camp Fire	2022: Understanding barriers to Basic Needs resources
Student involvement in research	High	High	Moderate	High
Quality of research	Low	Low	High	High
Community involvement and reciprocity	Low	High	Moderate	Moderate
Impact of the projects	Low	High	High	Low

RESOURCES AND ADMINISTRATIVE MODEL

The courses are "unofficially" joined, in part to reduce the need for resources. Each department funds the individual course involved, and enrolled students count toward that department's full-time equivalent students. The primary resources required are space and instructor time and commitment.

With respect to space, the class requires a classroom for each individual class on Tuesdays, and then a shared, larger space on Thursdays. Ideally, the shared space facilitates effective

group work. The class involves extensive planning, collaboration with community partners and development of research projects prior to the start of each semester. While co-teaching can reduce some of the required preparation for the involved instructors, the complexity involved in an interdisciplinary/CBPR course has required more time than a traditional class.

BEST PRACTICES AND LESSONS LEARNED

The major strength of the course is the combination of teaching, interdisciplinarity and community-based participatory research, which becomes more impactful than its individual components, for both students and faculty. This integration could impact broader goals beyond student outcomes and faculty professional development, such as increasing enrollment and enhancing the relevance and legitimacy of institutions of higher education.

Extensive research supports the impact of interdisciplinarity and CBPR as independent pedagogies on student outcomes such as ability to work in a team, empowerment, understanding of the research process and civic engagement (e.g., Bach & Weinzimmer, 2011; Lichtenstein et al., 2011; Mahoney & Brown, 2013; Stocking & Cutforth, 2006). These pedagogies are complementary — CBPR involves collaboration to address real-world problems that inherently involve more than one discipline (Sternberg, 2008). In this way, CBPR naturally encourages the breaking down of disciplinary boundaries and fosters collaboration with the local community (Dutton et al., 2015; Jung, 2017). Given this complementarity, more limited research, including our own, suggests that the combination of interdisciplinarity with CBPR is especially impactful for student empowerment, civic engagement and the ability to apply course concepts to real-world problems (Dunbar et al., 2013; Dutton et al., 2015; Jung, 2017; Kornbluh et al., 2020).

In addition to the positive impacts for students, integrating CBPR with instruction is also beneficial for faculty, especially at large, regional public institutions where teaching loads can be onerous. For example, across the California State University (CSU) system, the nation's largest system of higher education, many instructors teach four courses per semester and have research and service responsibilities. The integration of community-based participatory research with instruction is a way to efficiently satisfy service and research requirements via instruction. Additionally, team teaching not only brings in interdisciplinarity (in cross-discipline teams), but is essential given the complexity of the course, and helps to facilitate meaningful engagement with community partners. Moreover, and in our experience, co-teaching this CBPR course has been one of the most rewarding experiences of our careers.

Beyond benefits for students and faculty, systematically integrating CBPR and interdisciplinarity into the curriculum has potential for broader impacts. For example, providing greater access to CBPR may help strengthen university and community bonds, empower students to

facilitate change in their communities and increase the likelihood of students returning to rural communities. In the current context of a demographic shift resulting in fewer traditional college-age students, rethinking curricula to promote interdisciplinarity and project-based learning focused on community challenges may be a way forward in increasing enrollment.

CHALLENGES AND PRIORITIES FOR THE FUTURE

The primary challenge for the model is scaling beyond the one class a year taught by Professors Wilking and Roll. In fall 2019, three lecturers attempted to replicate the model around the issue of sustainability, informally joining classes in political science, sociology and biology. Ultimately, the additional workload around planning and coordination made the approach untenable for non–tenure track faculty. Additionally, while Professors Roll and Wilking regularly discuss developing a joint class over two semesters in order to address larger and longer-term research projects, the time commitment required of the co-taught CBPR course has thus far been prohibitive. In a similar vein, Professors Roll and Wilking established the Housing Research Group (HRG) to better facilitate community-based research (and potentially teaching) around issues of housing and homelessness at Chico State. While the HRG has expanded beyond Professors Roll and Wilking to include two additional researchers with active, ongoing projects, interest among full-time faculty is impeded by limited time and resources.

The primary goal is to overcome this challenge and increase the number of students able to participate in interdisciplinary, CBPR courses. Given the current lack of external grant resources to fund course buyouts for participating faculty, we are exploring curricular innovations that would enable faculty and students to receive credit for the extra work that this type of course entails. For example, creating a one-unit course associated with each discipline would provide students with an additional unit of credit for participation in the extra research activities associated with the course. If the additional one-unit course were coded at .1 weighted teaching unit per student, and enrolled 30 students, this would effectively count the interdisciplinary course as two classes for faculty workload. Banking systems for participation in this type of high-intensity course could also incentivize faculty member participation.

Chico State is part of the California State University (CSU) system and is located in northern California. As part of the nation's largest public university system, Chico State is committed to increasing access to higher education and is a Hispanic-Serving Institution. A majority of Chico's 14,000 students are first-generation and 77% receive financial aid.

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LOYOLA UNIVERSITY CHICAGO

luc.edu/curl

QUICK FACTS

Year founded: **1996**
Project source: **Community**
Duration: **Year-long**
Students per year: **35**
Interdisciplinary: **Yes**
Vertical integration: **Yes**

LOYOLA UNIVERSITY CHICAGO:

CENTER FOR URBAN RESEARCH AND LEARNING (CURL)

By: David Van Zytveld, Director of CURL

PROGRAM SUMMARY

The Center for Urban Research and Learning (CURL) is a research center that works across the whole of Loyola University Chicago — including its 13 schools and colleges — to do interdisciplinary, collaborative, community-based action research. CURL forms teams of community and university partners to produce research with the community, with an aim to promote social justice. In doing so, the Center is able to provide research and hands-on educational opportunities for faculty, staff and students.

Founded in 1996 (CURL was built on the work of the former Policy Research Action Group (PRAG), a community-based, collaborative research effort of Loyola Chicago, DePaul, Chicago State and the University of Illinois-Chicago), the Center recognizes that universities are not alone in creating knowledge that can contribute to the common good. If we are going to address society's most urgent issues, we must put multiple knowledge sources together in partnership with each other. Local communities and other such actors play a key role in that work, especially regarding issues they face every day.

CURL engages with community groups as equal partners in collaborative research projects.

The exact form and scope that a research project might take varies from project to project based on the resources available and the work that needs to be done. In general, however, CURL forms teams that include community partners and Loyola faculty, staff, undergraduate, graduate and professional students. While community partners are not expected to be equally involved in the day-to-day work of the research team, *they are equal partners* in shaping and guiding the project throughout the life of the research — from deciding what the research questions should be, all the way through dissemination of the research results.

CURL graduate and professional students are awarded competitive fellowships with the expectation that they will work 15–20 hours per week during the academic year. Undergraduate students join CURL via paid fellowships (10–20 hours per week) or through credit-bearing courses such as the capstone course of the interdisciplinary urban studies minor created

by CURL or other departmental crediting mechanisms (e.g., internships, independent studies linked to majors).

CURL does not specialize in any one topic — rather, topics develop organically in collaboration with our community and university partners. However, given that relationship development and maintenance are key to the model, it is not unusual for community partners to return to CURL multiple times for the same subject area.

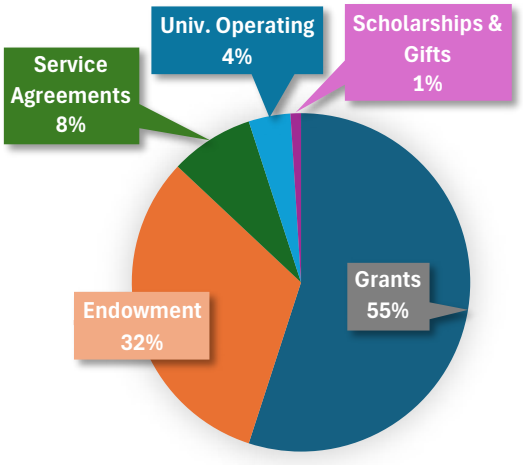
A more complete listing of our research projects can be found here; our current lineup of projects includes:

- Evaluation of a Flexible Housing Pool, a private/public partnership to provide housing and services to those facing chronic homelessness.
- Creation of a university-based Supervised Visitation Center for families involved in Domestic Violence Court.
- Evaluation of We Rise Together, an effort to promote racially equitable economic recovery from COVID-19 in Chicago.
- Assessment of the multi-generational impact of Housing Choice Vouchers (Section 8) for affordable housing.

RESOURCES AND ADMINISTRATIVE MODEL

CURL has always been located within the provost's office at Loyola, by intentional design. While the program has had various reporting structures within Academic Affairs in its 29 years, we believe that our interdisciplinary research needs to remain distinct from any particular school or discipline in order to more easily connect the disparate university resources to each other and, in turn, to the community. The liminal space between schools and disciplinary boundaries is where we thrive.

CURL staffing size and structure have varied over the years depending on the number of projects and overall funding. In general, however, we have been led by a director who partners to manage the larger work of the center with full-time, CURL-based staff and research faculty.



Fellowships for undergraduates, graduate/professional students, faculty and community members provide part-time funding to round out the typical CURL research team.

For the fiscal year 2022, CURL had approximately $1.2 million in expenditures with the vast majority of those costs coming from salary and benefits (including

student workers). As the above figure highlights, CURL is almost exclusively funded by outside grants/contracts (63%) in combination with support from the CURL endowment (32%) that was created when we began the center.

BEST PRACTICES AND LESSONS LEARNED

"COLLABORATION, STUPID": It may seem self-evident for us to point to collaboration (with a paraphrased wink and a nod to James Carville), but we also recognize that it is easy to glide over the critical importance of this part of our model. Too often, the collaborative effort gets enthusiastic nods or firm pats on the back and not much more. The reality is that the collaborative, participatory nature of our model is not simply window dressing. It is the lifeblood of our model. The aforementioned budget breakdown (63% from grants/contracts) shows the critical nature of our collaborative partnerships with community groups. Without that collaboration, the economic model of CURL breaks down.

THE TEAM IS EVERYTHING: We are fiercely committed to our team approach and believe that it is the best way to combine the collaborative nature of our work between university and community while also fulfilling our educational mission. Having students (graduate and undergraduate) at the table with faculty and community partners allows for multi-directional, multi-leveled education for all.

THE CURL "SCRAPPY MODEL": One of our partners noted some years ago that we are willing to take on the projects that many other university-based researchers might pass up. They applauded our "scrappiness" and willingness to meet partners where they were and to do the research that needed to be done instead of being slavishly devoted to a particular vision of what important research might look like.

ENDOWMENT: Talking about our endowment isn't the most inspiring part of the CURL model, but time and again it has proven to be critical to our success. It gives us a basic operating core while also allowing us freedom to bring on underfunded (or even unfunded) projects without having wild swings in staffing levels.

CHALLENGES AND PRIORITIES FOR THE FUTURE

With a 29-year history, we have seen a lot of challenges and obstacles. Here are a few current and ongoing issues:

ALWAYS "HUSTLING": Given that the CURL model is so heavily driven by grants and contracts, full-time staff and faculty at CURL are always having to "hustle" for the next round of funding. While the endowment softens this a bit, burnout is always a common threat.

RARELY "CRUISING": Beyond the burnout, the other most significant impact of the "hustle" is

that we are rarely able to cruise, by which we mean spending the necessary time reflecting on our work, how it might be done better, exploring ways to mentor our students more fully, etc.

ONGOING UNCERTAINTY IN HIGHER EDUCATION: Like many in higher education, Loyola is keenly aware of the drop in college-aged young people and its impact on higher education. While we believe the CURL model is an excellent way to attract students to hands-on education experiences, we also have to prepare to be buffeted by these demographic forces and their budgetary implications.

Having said all of that (and likely missing some other critical challenges), CURL is still optimistic about the future. We know that there is a great deal more work we could be doing, and we continue to seek new partners within and without the university. A key component of solidifying the next 25 years of work will be deepening and expanding our partnerships with young faculty and students and expanding our endowment funding to better support our work.

Loyola University Chicago is a Jesuit Catholic University with over 17,000 students enrolled (11,819 undergraduate) in 13 Schools and Colleges with four campuses (two in Chicago, one in Maywood, Illinois and one in Rome, Italy).

Trinity College | CT STATE COMMUNITY COLLEGE CAPITAL

trincoll.edu/cher/action-lab

TRINITY COLLEGE AND CONNECTICUT STATE COMMUNITY COLLEGE CAPITAL:

LIBERAL ARTS ACTION LAB

QUICK FACTS

Year founded: **2018**
Project source: **Community**
Duration: **Semester-long**
Students per year: **40**
Interdisciplinary: **Yes**
Vertical integration: **No**

By: Derin O. Atalay, Trinity Lecturer and Liberal Arts Action Lab Coordinator; Laura Minor, Trinity Lecturer and Director of Academic Programs; Jeff Partridge, CT State Capital Professor of English and Faculty Director of the Liberal Arts Action Lab; Abigail Fisher Williamson, Trinity Associate Professor of Political Science and Public Policy and Faculty Lead, Center for Hartford Engagement and Research

PROGRAM SUMMARY

The Liberal Arts Action Lab (LAAL) engages research teams of students and faculty from CT State Community College Capital and Trinity College to investigate questions posed by Hartford community partners. Founded in 2018 and located at Trinity's downtown Hartford campus, LAAL aims to produce community-driven, participatory action research by allowing Hartford partners — neighborhood groups, nonprofit organizations, government agencies and social entrepreneurs — to propose research projects. Semester-long projects are then selected in collaboration with a Hartford Resident Advisory Board.

The Action Lab is a partnership between a liberal arts college and a community college, with students from each institution bringing valuable skills and learning to partner on diverse teams.

Each semester, Trinity and Capital students apply to join Action Lab project teams and enroll in two courses. In Action Research Methods, they learn research skills and digital tools. In a Hartford Research Project course, they collaborate with faculty and a community partner to pursue a research question important to the community. Each project team is led by one member of the LAAL faculty who guides the research and is supported by an additional faculty fellow with project-related expertise. At the end of the semester, each of the project teams presents findings at a public digital poster session.

Since 2018, LAAL has hosted 214 students across 48 interdisciplinary projects that incorporate elements from the arts, humanities and social and health sciences. In a typical semester, 14 students from Trinity and five students from Capital work across three to four project teams. All projects culminate in a website that preserves findings for the community partner and broader public. Projects can be perused here and include the following examples:

The Black Heritage Project: In spring 2020, CT State Capital's Hartford Heritage Project and the Hartford History Center (HHC) at the Hartford Public Library asked students to research the history of Hartford's first Black church, create an online exhibit and make recommendations on how to bring its history out of the shadows and into the lived experience of the city. The LAAL project team conducted archival research and spoke with members of the extant congregation. The findings inspired a $150,000 National Endowment for the Humanities grant that has put three LAAL recommendations into action: 1) creating a K–12 local history curriculum; 2) producing a long-standing exhibit; and 3) establishing an annual public lecture on race in America, named after the historic church's renowned pastor Reverend James Pennington. A Capital student reflected on her participation in this blog.

The Frog Hollow Oral History Project: In fall 2021, the Southside Institutions Neighborhood Alliance (SINA) asked the Action Lab to document the history of Hartford's Latinx-dominant Frog Hollow neighborhood through the firsthand knowledge of its residents, with the long-term goal of constructing a bilingual walking tour. Through oral history interviews and archival research, student researchers assembled a bilingual multimedia archive documenting the neighborhood's history and present. The research team identified four paths for the walking tour: Community Spaces, Public Art, Frog Hollow Heroes and Voices of Frog Hollow. Stops along each path were paired with relevant photos, interviews or data. While the LAAL project lasted only a semester, the partnership was carried forward through Trinity's Center for Hartford Engagement and Research, with students in the Community Action Gateway and Public Humanities Collaborative bringing the tour to fruition. Trinity highlighted the project's culmination here and a Trinity student from the original LAAL team reflected on her participation in this blog.

The Immigrant Welcoming Project: In spring 2023, two Hartford city councilors from Connecticut's Working Families Party asked the Action Lab to investigate the feasibility of establishing a city-supported immigrant welcoming center. The research team investigated best practices for welcoming immigrants across U.S. cities, examined cities demographically and politically similar to Hartford with effective models, and interviewed community leaders from Hartford-based immigrant-serving organizations to gauge their views on a city-sponsored center. Based on these findings, the team presented a policy brief recommending that Hartford first invest in an infrastructure to sustain a relationship of trust with the immigrant community. Specifically, they recommended hiring a liaison for immigrant affairs, creating an immigrant council with broad representation and working with Welcoming America to become a certified "Welcoming City." In fall 2023, Hartford's newly elected mayor formed an Immigration Task Force and is drawing on the findings of the project to develop next steps.

The Action Lab's Black Heritage Project inspired a $150,000 National Endowment for the Humanities grant that has enacted three LAAL recommendations: developing a K–12 local history curriculum, creating a long-standing exhibit and establishing an annual public lecture.

More recently, a spring 2024 project examining the need for a state child tax credit (in partnership with the United Way of CT) presented testimony at the state capitol, held a press conference and garnered attention in city and state news coverage. As the Action Lab's reputation grows, recent project presentations have attracted a range of community nonprofit leaders, two city council members, two city hall employees and the superintendent of schools, along with students, faculty and administrators from local higher education institutions.

RESOURCES AND ADMINISTRATIVE MODEL

As an educational partnership between Trinity College and CT State Community College Capital, the Action Lab is situated within two distinct higher education institutions. At Trinity, the Action Lab resides within the Center for Hartford Engagement and Research (CHER). CHER synergizes the efforts of five academic and co-curricular community engagement programs across Trinity, with the goal of strengthening mutually beneficial partnerships between the College and Hartford. CHER's director of academic programs (reporting to the dean of faculty's office) oversees LAAL in collaboration with the LAAL coordinator and a shared program manager. Both the director and the coordinator also serve as the LAAL's main instructors. The Trinity-funded LAAL team coordinates with Capital's LAAL faculty director, who manages Capital's participation. In addition, faculty fellows from Hartford higher education institutions receive a $1,000 stipend for partnering with a project for a semester, resulting in a $6,000–$10,000 expense per year.

Beyond personnel expenses, the Action Lab has an annual operating budget from Trinity of $22,400, which is used for project costs, technology and equipment, faculty development, student worker wages, publicity and events. Within this budget, each project is allotted $500 for research expenses, including compensating participants, purchasing data or software and supporting team field trips. Well-justified expenses can exceed the $500 limit. In addition, Capital supports the following costs: a course release for its faculty director, parking spaces and a $12,000 annual contribution toward personnel expenses.

BEST PRACTICES AND LESSONS LEARNED

The Action Lab "flips the script" of typical higher education community engagement by empowering community partners and residents to propose and prioritize research projects (Brown, Dougherty & Partridge, 2022). Projects thus reflect community needs and interests rather than elite research agendas. The Action Lab then trains undergraduates in participatory action research while simultaneously allowing them to apply those skills in project-based learning. Lastly, the Action Lab is a partnership between a liberal arts college and a community college, with students from each institution bringing valuable skills and learning to partner on diverse teams.

Community-driven and community-engaged research projects: To ensure that projects address the priorities of Hartford residents, the Action Lab implemented a unique model through which community partners propose research projects, which are then evaluated by a Hartford Resident Advisory Board (HRAB). Using a mailing list and networking, the Action Lab recruits an average of 12–15 proposals annually. The HRAB then reviews the proposals and prioritizes a small number to be announced to students and faculty. During registration period for the following semester, students and faculty apply to join project teams that match their interests and expertise. Prior to the semester, the LAAL instructional team meets with the partner and faculty fellow to scope the project and prepare a syllabus. Thereafter, the partner and faculty fellow meet with the research team monthly to guide and evaluate progress.

The Action Lab has implemented 48 projects that address a wide range of interdisciplinary subjects, from creative placemaking to Puerto Rican migrant needs following Hurricane Maria.

In total, the Action Lab has received 143 proposals from organizations in every Hartford neighborhood and implemented 48 projects that address a wide range of interdisciplinary subjects such as home ownership, creative placemaking, career growth for food service workers and Puerto Rican migrant needs following Hurricane Maria. Through digital poster fair presentations and project websites, research teams share their projects with their partners and the broader Hartford community.

Participatory research methods and interdisciplinary project-based learning: For students, the Action Lab is a unique and intensive two-course learning experience coupling research methods instruction with interdisciplinary project-based learning. Each semester, all LAAL students take LAAL 200: Action Research Methods in Hartford, in which they learn about the city, the ethics of community-based engagement, and participatory research methods including collecting and analyzing qualitative and quantitative data. Each student also participates in a second course, applying these methods through a community-engaged research project (LAAL 201/202: Hartford Research Project). Project teams are typically between five and nine students. The courses are held at Trinity's downtown Hartford campus and typically involve local field work, requiring students from both institutions to regularly leave their main campus and engage in the community.

Higher education institutional partnership: The innovative partnership between Trinity and CT State Capital has been a major benefit for student learning and project outcomes. Capital students are more likely to have long-term roots in Hartford and often have prior work experience, bringing local expertise that few Trinity students possess. Community partners appreciate this local knowledge and students from both institutions learn by bridging the divide between their different college experiences. The partnership also contributes to the interdisciplinarity of projects, with Capital's programs in business and health supplementing both institutions' liberal arts disciplines.

CHALLENGES AND PRIORITIES FOR THE FUTURE

A credit-bearing program that prioritizes community needs, develops actionable public-facing outcomes and provides a valuable learning experience for students from two vastly different higher education institutions does not come without its challenges, in terms of resources and managing community and institutional partnerships. The Action Lab has evolved over its first five years of operation and will continue to do so in response to these challenges.

RESOURCE INTENSIVENESS: The Liberal Arts Action Lab requires a significant institutional commitment for a program that serves roughly 20 students and two to four community partners per semester. Because the 20 students take one class together (research methods), and then two to four project classes separately, each semester LAAL hosts three to five classes running simultaneously. From 2018 to 2020, the Action Lab operated with a single director who not only managed student, faculty and partner recruiting, but also taught all of the courses (with the support of a half-time program assistant). The teaching load of five courses per semester was twice Trinity's typical course load and, unsurprisingly, proved unsustainable. Even with a small number of students, instructing project courses is challenging since each new project requires distinct preparation, often including literature outside the faculty member's area of expertise. Moreover, project classes have higher stakes than a typical course since they facilitate a community partnership and produce public-facing products. In addition to this steep course load, LAAL faculty face a perpetual recruiting cycle of community proposals, students and faculty fellows.

In response to these challenges, since fall 2021, the Action Lab has divided teaching responsibility between two faculty members who each teach one to two courses a semester, while also managing recruiting and administration, for a total of 2.5 FTE, including a shared program manager. While this solution is more sustainable for the faculty members, it is also more resource-intensive for the institution, which can make the program vulnerable during moments of college leadership transition. Going forward, the Action Lab aims to identify ways to recruit more Trinity and Capital faculty members to teach courses in the LAAL through their annual teaching unit allotment. This will connect existing teaching resources to the Action Lab and diversify the disciplinary expertise of LAAL faculty. However, achieving this goal will require creative thinking since many faculty members must focus on in-demand, required courses in their departments. Moreover, to ensure that projects remain driven by the community and not faculty, we will need to align the timing of project selection with faculty course planning. Alongside this goal and to reduce administrative burden, LAAL has moved to recruiting proposals once a year for the entire subsequent academic year, rather than administering two recruitment periods.

COMMUNITY PARTNERSHIP CHALLENGES: While the Action Lab remains firmly committed to its community-driven model, differing schedules and incentives between community partners and higher education constituents can present challenges. While community partners propose

projects they care about and agree to a schedule of participation in advance, LAAL projects are understandably not always the community partner's highest priority. This presents particular challenges given the semester-long project timeframe. In the course of the semester, LAAL faculty are leading students in both learning and implementing research methods — building the plane and flying it in only three months. During this short period, students must understand community partner needs and related literature; obtain approval for an IRB application to protect human subject ethics; implement the proposed research; identify findings; and distill them in a public project website and presentation.

Over time, the Action Lab has learned to scope project expectations and work effectively with Trinity's relatively nimble IRB. An ongoing challenge, however, is periodic delays in communication with community partners that can set back an already ambitious schedule. Most critically, if a community partner is not able to follow through on promised outreach to constituents, students may lack research participants within the needed timeframe. To address these challenges, the Action Lab has developed a signed partner memorandum of understanding in addition to existing written and in-person communications. We are also considering a stipend for the community partner charged with directly interacting with the project team. Sometimes organizational leaders propose projects but then delegate them to staff members with differing priorities, leading to delays. Lastly, we are considering a model in which at least some projects will continue across multiple semesters as they are brought to fruition by different student teams. Project products will improve with longer timeframes; however, the Action Lab will serve fewer community partners, a critical tradeoff that requires further consideration.

INSTITUTIONAL PARTNERSHIP CHALLENGES: As outlined in the previous section, creating a partnership between a private liberal arts college and a public community college offers important benefits. However, this partnership also presents challenges. Some of these challenges are misalignments that require careful planning and communication, like differences in semester schedules, course credits and major requirements. Registration and major requirements are a significant barrier to recruitment at Capital. LAAL courses need to be transferred into Capital majors as substitutions for existing requirements. This requires individualized advising with each potential applicant and customized registration. During the early phases of the pandemic, many Capital students faced significant challenges that temporarily slowed recruiting. The partnership also requires proactive attention to team dynamics. Differences between students at the two institutions are an opportunity for group members to learn from each other and for teams to produce more nuanced work, but they can also lead to friction as assumptions and biases emerge. Thus, it is essential to build rapport and ensure communication about group dynamics. Lastly, the partnership is facilitated by its location at Trinity's downtown campus, in proximity to Capital, but this remote location also presents challenges for student transportation and securing IT and technical assistance that is more readily available on the main campus.

The preceding challenges call for creative solutions around attracting additional faculty to teach through the Action Lab, greater consideration of project timeframes and community partner capacity, and continued attention to institutional partnership dynamics on the micro and macro levels. In addition to these goals, the LAAL team sees several opportunities for promising future development that build on LAAL's unique community-driven model.

The Action Lab as an intermediary between Metro Hartford's resources and Hartford's priorities: Metro Hartford is among the nation's wealthiest metro areas, while Hartford is among the poorest cities. Many metro area residents commute into the city for daytime work or evening entertainment, but take their resources home with them to suburban communities. As businesses and individual donors become more interested in philanthropic work that advances social justice, Hartford businesses or donors may welcome the opportunity to fund and participate in projects identified by local organizations. Hartford-based professionals could complete pro bono hours as "community fellows" on LAAL projects, bolstering the networks and learning of students and partners.

The Action Lab as a pipeline for engaged learning and scholarship: The projects and partnerships identified through the community-driven LAAL process can serve as a pipeline for engaged learning and scholarship locally and beyond. Undergraduate projects initially contribute to partners' needs, but once these partnerships are formed, they could be taken further by scholarly teams with compatible research interests. Researchers often want to work with community organizations but face challenges in developing those connections. The Action Lab generates a regular stream of readily available partners with clearly articulated needs.

The Action Lab as a center for Hartford higher education collaboration: The existing Trinity–Capital partnership offers a model for an expanded institutional collaboration that would bring additional skills to the Action Lab, including graduate students and other researchers.

Trinity is an independent, nonsectarian liberal arts institution located in the capital city of Hartford, Connecticut. With more than 2,100 full-time undergraduate students and 91 graduate students, Trinity's student body is diverse, representing 41 states and 70 countries, with 21% of U.S. students of color and 50% who identify as women.

CT State Community College Capital is an open-admission, two-year educational institution in downtown Hartford, Connecticut. A federally designated Hispanic Serving Institution, Capital serves 2,500 students who are: 37% Black, 33% Hispanic, an average age of 29, and 75% residing in Hartford or neighboring towns.

UMBC Interdisciplinary CoLab

iaac.umbc.edu/co-lab

UNIVERSITY OF MARYLAND, BALTIMORE COUNTY:

UMBC INTERDISCIPLINARY COLAB

QUICK FACTS

Year founded: **2018**
Project source: **Faculty**
Duration: **6 weeks**
Students per year: **15-21**
Interdisciplinary: **Yes**
Vertical integration: **No**

By: Carole McCann, Co-Director; Donald Snyder, Co-Director; Rachel Carter, Faculty Lead

PROGRAM SUMMARY

UMBC Interdisciplinary CoLab brings together interdisciplinary teams of undergraduate students to conduct humanities-based research, work professionally on "real-world" projects, tell compelling stories and amplify community voices. A hallmark of CoLab is its focus on public-facing final projects that support on- and off-campus community partners. Since the program launched in 2018, CoLab students have engaged with archived texts and images to develop websites, built podcasts based on oral history interviews and worked with communities on documentary films.

CoLab's innovative project-based curriculum combines instruction in interdisciplinary humanities research methods and effective collaboration practices with tools for metacognitive reflection in an immersive 6-week paid summer internship. The CoLab experience is structured differently from other course-based group projects in which students work together to master the same materials and skills within a shared disciplinary framework across a semester. In CoLab, students from different disciplines apply to specific projects and spend 30 hours a week together conducting primary research and creating public-facing research artifacts.

A hallmark of CoLab is its focus on public-facing final projects that support on- and off-campus community partners.

STUDENT LEARNING GOALS: 1) To work in interdisciplinary teams to create narrative-based research "products" in multiple modalities, engaging multiple audiences and addressing multiple social challenges; 2) to work effectively in interdisciplinary teams by integrating inclusive excellence best practices with narrative-based research strategies and effective collaboration, including articulating roles, integrating diverse viewpoints, motivating and supporting team members, synthesizing contributions, sharing constructive feedback, fulfilling roles and responsibilities, and negotiating, managing and resolving conflicts; and 3) to demonstrate increasing confidence in working across disciplinary boundaries to

conduct original research, work effectively with peers and leaders to create research artifacts, and communicate with multiple audiences.

To achieve these goals, project teams are intentionally composed so that the three student members draw on complementary disciplinary backgrounds and skillsets. Aided by CoLab's purposeful practices of collaboration and self-reflection, students develop effective collaboration methods and come to realize the wealth of what they can bring to a project and to value the contributions made by others. They also gain confidence in and appreciation of group work. The five-year assessment conducted in 2022 demonstrated that CoLab's unique collaborative interdisciplinary format is a high-impact practice for student learning in the areas of humanities research, interdisciplinary collaboration and structured self-reflection. Humanities students learn that their unique habits of mind have tremendous "real-world" relevance, while non-humanities majors come to appreciate the value of humanistic approaches for ethical engagement with colleagues and communities. Students report that CoLab significantly boosts their confidence in themselves and in teamwork. For instance, students report:

> ***"Taking an idea all the way from conception to final product was rewarding in ways I hadn't anticipated."***
>
> ***"I feel like I can take on more ambitious projects and be able to trust more in my fellow collaborators, even if they come from different backgrounds than myself."***
>
> ***"I feel more confident that I can excel in whatever endeavor I take on, and I thank the CoLab team for creating an environment in which I was able to grow in this manner."***

In sum, it is a group project that students find meaningful and fulfilling, making it a highly sought-after learning experience. CoLab faculty who serve as project leaders consistently say it "is what teaching should be." Community partners praise the students' professionalism and say the program has a valuable impact for their organizations. CoLab students also earn a University System of Maryland (USM) Digital Badge in Interdisciplinary Collaboration, which validates the acquisition of the skills necessary to be a successful contributor to professional teams. CoLab has been cited as an innovative model for humanities education by the National Humanities Alliance and the American Council of Learned Societies.

RESOURCES AND ADMINISTRATIVE MODEL

COLLABORATION AT ALL LEVELS

CoLab is a collaboration of the provost's office, the Dresher Center for the Humanities and the Division of Professional Studies. The provost's office provides core funding of $142,000 and the Dresher Center provides administrative support for faculty salaries, student stipends and project expenditures. The Division of Professional Studies manages marketing and student

applications and provides full tuition scholarships to CoLab students. This collaboration has evolved over time and was formalized in an MOU in 2021.

The day-to-day operations are managed by a three-member faculty leadership team that recruits and selects projects and project leaders and coordinates the student selection process. These leaders' work with the program is carried out in addition to their primary faculty roles. CoLab project ideas are solicited among faculty and staff throughout the academic year with a formal application and selection process conducted during the fall semester. Project leaders are identified and recruited as part of the project proposal development and review process. Often faculty and staff members already working on a research project or with community partners opt to lead the projects. In other cases, the CoLab leadership team identifies and recruits individuals with the requisite skills to lead projects. Students apply to specific projects after seeing descriptions of project activities and goals, as well as necessary skills. In their applications, students write a short essay outlining the interests and skills they would bring to the projects. Students are encouraged to apply for all projects of interest to them. Student teams are jointly selected by project leaders and the leadership team, ensuring that they reflect diversity with respect to majors and demographic backgrounds.

CoLab has been cited as an innovative model for humanities education by the National Humanities Alliance and the American Council of Learned Societies.

The leadership team also prepares and delivers the core curriculum and conducts annual program assessments. Interdisciplinary, collaborative and metacognitive skills are at the core of the CoLab curriculum. In the week before CoLab begins, students are asked to write a short essay outlining their goals for the summer experience. This assignment prepares them to learn from the first week of workshops on interdisciplinary collaboration, professionalism, working with community partners, narrative and narrative-based research, and research ethics. This essay also serves as the "pre-test" component of the CoLab program assessment. Each week, Friday afternoon sessions engage students in structured self-reflection, giving them opportunities to observe their learning in real time. The collaboration between the core instructional faculty, leadership team and project leaders in these sessions also models effective collaboration practices for students. At the program's conclusion, a second essay gives students an opportunity to reflect on the full CoLab experience, and is the post-test component of the program assessment.

With limited staffing, budget and year-to-year funding, CoLab's success depends on the collaborative relationships the leadership team has built across campus, especially with the committed faculty who serve as project leaders. Through these faculty members, we have also developed significant relationships with community partners both on and off campus. One community partner, UMBC Special Collections, has offered a project for a student team every

summer since 2018. With faculty and staff support, the program has slowly increased the number of projects offered each summer from three in 2018 serving nine students to seven in 2024 serving 21 students.

BEST PRACTICES AND LESSONS LEARNED

PROJECT LEADER TRAINING: One important takeaway is that the 6-week CoLab summer session goes by quickly, so projects and project leaders need to be ready to go from the first day. Given this reality, the leadership team has developed a series of two workshops for project leaders that take place during the spring semester. The workshops acquaint them with the program's project-based learning philosophy, student learning goals and core curriculum and guide them in creating a pedagogy and supervision plan tailored to their specific projects. Together, the workshops facilitate development of project-specific curricula, task lists and timelines. They also facilitate coordination of necessary project-specific workshops and resources. Project-specific workshops are generally very practice oriented, covering skills-related topics such as digital storytelling, project-specific software, marketing and promotion, scriptwriting and prop-making, or thematic overviews of issues such as climate change. We also use the spring to plan any field trips necessary to engage students in the practices and commitments of on- and off-campus partners. In this way, all necessary project activities are scheduled in advance.

A STRONG CORE CURRICULUM AND PROJECT LEADERS: The program's curriculum is also vital to CoLab's success. First-week workshops on best practices for interdisciplinary collaboration, professionalism in the 21st century, working with community partners and narrative-based research provide an invaluable common foundation for developing students' skills and confidence. When these workshops are coupled with intentional instruction in the metacognitive skill of structured self-reflection, students achieve a high level of durable learning. In the annual and five-year assessments, based on direct measures by project leaders and the leadership team, students achieved an advanced level of proficiency on each of the learning goals. Indirect measures of student learning likewise provided strong evidence of CoLab's impact. In particular, students' self-assessments indicated significant learning of soft skills that are critical to success in any field. They reported substantial growth in their collaborative abilities, greater confidence in those abilities and greater appreciation of the value of working in interdisciplinary teams. Students often described CoLab as the best group project of their college careers. They noted that the concrete emphasis on collaborative skills helped them learn to effectively present their point of view, listen carefully to others, negotiate their differences and synthesize their individual contributions into a final product of which they were proud.

Students further reported that the unique experience of working closely with an expert project leader within a student-driven project was vital to their success, and that CoLab taught them to trust in teamwork and boosted confidence in their ability to thrive in collaborative settings. One student described the unique character of CoLab by saying, "the essence

behind CoLab: three people divided by backgrounds, skills, and majors, but working towards a common mission." The boost in collaboration skills and confidence was especially notable for women and minoritized student participants, two groups whose voices are often sidelined in group projects. These data validate that the careful composition of interdisciplinary teams and instruction in concrete tools for effective collaboration and structured self-reflection are fundamental to CoLab's success. The results of the alumni survey also demonstrate that this learning is durable. Former CoLab participants reported that they continue to use the skills they developed through the CoLab experience. Moreover, the collaborative skills they developed transferred easily into their professional experiences. Likewise, the confidence they gained in their abilities, along with their greater trust in teamwork, has made them more effective team members in subsequent academic and professional work.

ROBUST ASSESSMENT: The strong results for student learning provided by CoLab have been apparent from the beginning. Nonetheless, CoLab has benefited from a robust assessment process. Annual assessments of student learning include 1) project leader scores of student proficiency in the learning outcomes; 2) the leadership team analysis of the pre- and post-essays; and 3) a student focus group at the session conclusion. Additionally, at the end of each session, the leadership team sends anonymous online surveys to both project leaders and community partner members for a 360-degree robust assessment process. These tools identify areas for improvement, which the leadership team uses to inform program refinements, which are then assessed, thus both "closing" and "doubling" the "assessment loop." We have supplemented annual assessments with a five-year assessment that evaluates the achievement of program goals and the effectiveness of the administrative model over time. One key finding of the assessment process is the value of the self-reflection practices built into the initial curriculum. These practices were intended primarily as accountability measures, but both formal and informal student feedback make clear that they are an indispensable tool for enhancing student learning and appreciation of their skills, the skills of others and collaborative work. Furthermore, self-reflection is a valuable life skill that students can take advantage of throughout their education and career.

CHALLENGES AND PRIORITIES FOR THE FUTURE

The CoLab program faces two main challenges for the future: 1) sustainability and 2) scaling the program's reach and impact.

SUSTAINABILITY: The program is currently funded year-to-year on soft money from the provost. We have submitted a proposal to the budget office for base funding. However, a transition between provosts has delayed review and approval of that proposal. Additionally, we have been hampered by the limitations of faculty time and resources. As mentioned above, managing CoLab is an add-on to the core responsibilities of the leadership team members. For these reasons, our efforts have been focused on stabilizing the program and modestly

expanding the number of projects offered. Given the limited staff and soft budget, CoLab's success has depended on the collaborative relationships built across campus, especially with the dedicated faculty project leaders and community partners both on and off campus. CoLab's future depends, then, on the leadership team's continuing work to sustain and expand this vital network. CoLab's future also depends on the leadership team's ongoing efforts to address institutional barriers to the program's effective integration into the university curriculum as well as to demonstrate the program's high impact on student learning to upper administrators. These relationship-building and networking efforts represent a significant portion of the time the leadership team invests in the program, which is a key reason that additional program staff are needed.

GROWTH AND EXPANSION: Once permanent funding is secured to support the CoLab core activities, the leadership team will pursue a strategy for expansion that will include increasing the program's visibility on campus, increasing faculty and student engagement, and building more strategic community partnerships. We will pursue external sources of funding to support this expansion.

Currently, CoLab is a niche, summer-only program that exists outside the usual structures of the university curriculum, presenting challenges for both its sustainability and growth. While student applications have grown quickly because it is a paid internship for which students also receive course credit, faculty and staff engagement in the program has taken more time to generate. Here again, the level of faculty interest grows as previous faculty project leaders and community partners share their overwhelmingly positive experiences with CoLab. In addition, the practice of annually hosting the university president's visit with CoLab teams has also raised the program's profile on campus as upper administrators learn about the amazing things CoLab students are doing. The growth in faculty/staff engagement is largely responsible for the expansion from the three projects in 2018 to the seven projects this year.

"I feel like I can take on more ambitious projects and be able to trust more in my fellow collaborators, even if they come from different backgrounds than myself."

—CoLab student on the impact of the program

PRIORITIES FOR THE FUTURE: Some possible routes for growth include: securing a place for CoLab among official university internship opportunities; integrating CoLab into the applied experiences being considered as part of general education revisions; and/or affiliating CoLab with other campus community-engaged activities. Students in the public humanities minor and the media and communication studies major can use CoLab to fulfill their internship requirements. The program has also been an attractive option for students and faculty in small units that do not have formal internship programs, such as gender, women's and sexuality studies. More fully attaching CoLab to departmental and the general education curricula might garner additional institutional resources for the program. This strategy would also further

raise the visibility of the program on campus and potentially increase both faculty and student engagement. The program could also be expanded by creating multi-year projects that work with a community partner or faculty member in successive summers. Another option for expansion we are eager to pursue is to increase the number of projects that support the research of humanities and interdisciplinary faculty. Also, working more strategically with the campus research centers to sponsor projects could help us with another challenge: the need to increase the number of STEM projects offered. Increasing STEM projects could also aid in building cross-college faculty participation and in developing additional community partnerships. Finally, developing more robust assessment data collection from alumni and community partners could better allow program leadership to tell CoLab stories while also making data-driven arguments for CoLab's value to the university.

University of Maryland, Baltimore County (UMBC) is a public research university with approximately 15,000 undergraduate and graduate students. UMBC offers 61 undergraduate majors and over 92 graduate programs.

lsa.umich.edu/history/history-at-work/u-m-historylabs.html

UNIVERSITY OF MICHIGAN:

U-M HISTORYLABS

QUICK FACTS

Year founded: **2018**
Project source: **Faculty**
Duration: **Semester-long**
Students per year: **95**
Interdisciplinary: **Yes**
Vertical integration: **Generally, no**

By: Matthew Lassiter, Louis Evans Professor of History, Urban and Regional Planning

PROGRAM SUMMARY

The U-M HistoryLabs model emerged in part from the Michigan in the World program that the history department began in 2015 to provide team-based, active-learning opportunities for undergraduate researchers. The program called for students to create digital history exhibits through courses and a summer internship program, using the resources of the Bentley Historical Library and other campus archives. Another important precedent, the Environmental Justice HistoryLab (2017–2021) operated as a partnership between the history department and the Ecology Center (a community partner) and created two multimedia historical websites, two documentary films and an archive of 40 oral interviews through two project courses and embedded Ecology Center interns (13 undergraduate and three graduate students). Around this time, the history department also made a significantly expanded commitment to publicly engaged scholarship and active learning collaborations to revolve around community partnerships, digital humanities, career diversity, public impact and especially the empowerment of undergraduate as well as graduate students to be full collaborators on team-based projects.

U-M HistoryLabs provide team-based, active-learning opportunities for undergraduate researchers.

U-M HistoryLabs formally launched in fall 2018 with two pilot undergraduate-centered projects: the Policing and Social Justice HistoryLab and the Immigrant Justice Lab. Both projects received substantial seed funding from an internal grant (see below), with an agreement to offer each lab course at least once annually; work with community partners; recruit diverse, underrepresented and directly impacted students; and hire around half of the student researchers to continue through paid extracurricular internships and research associate positions.

The Policing and Social Justice HistoryLab has involved 65 undergraduate students and five graduate student supervisors/consultants across four lab courses and a broad array of extracurricular research projects. These groups have created a multimedia website exhibit, *Detroit Under Fire* (2021); three additional website exhibits that are forthcoming; a curriculum

utilized by the Detroit Public Schools; and 16 other digital publications. Undergraduate students have authored or co-authored all of these exhibits and reports, receiving more than 250,000 total webpage views to date.

The Immigrant Justice Lab has worked closely with the Michigan Immigrant Rights Center, its community partner, to involve more than 100 undergraduates, five graduate students, and around 30 law school students in seven project courses so far and many follow-up internships. Collectively, they have produced dozens of asylum briefs for individual clients, "country conditions" templates for attorneys of asylum seekers elsewhere, and a series of "self-defense" immigration guides authorized for distribution in Michigan's ICE facilities and federal immigration court. The Department of Justice has approved a nationwide rollout of these guides.

The Policing and Social Justice HistoryLab has involved 65 undergraduate students and five graduate students and resulted in a multimedia website exhibit; three additional online exhibits that are forthcoming; a curriculum utilized by the Detroit Public Schools; and 16 other digital publications.

In addition to the annual Policing and Immigration lab courses, the department offers several topic-specific undergraduate team-based HistoryLabs each year that majors can take instead of the traditional capstone course with a written research paper (large numbers of non-majors, often a majority, also take the HistoryLab courses). Most labs have been offered only one time and include project courses on Asian Americans in Michigan; the politics of academic freedom; medieval London; environmental justice and the Great Lakes; the history of the Detroit River; a traveling exhibition at the University of Michigan Museum of Art; and the history of the book. The most successful of these additional HistoryLabs are offered more than once and are part of a sustained digital humanities research project led by the faculty instructor and funded by additional resources — specifically the Philippines and the University of Michigan project and another that investigates communities to add to the Sundown Towns website.

In 2019, a graduate student version of U-M HistoryLabs was launched with a co-taught seminar that conducted research in partnership with the United States Holocaust Memorial Museum to create curated digital resources and educational programming for its website. (Read co-instructor Rita Chin's reflection on the Holocaust Museum collaboration here). The history department has averaged one or two graduate HistoryLabs per year with other projects partnering with the Detroit Institute for the Arts, the University of Michigan Museum of Art, the U-M Center for Social Solutions (for its historical reparations project) and the American Historical Association. In 2024, the history department began offering a new series of graduate HistoryLabs linked to the University of Michigan's recently launched Inclusive History Project to critically investigate its own past.

RESOURCES AND ADMINISTRATIVE MODEL

The most ambitious undergraduate HistoryLabs, involving the largest number of students and the most visible impact and sustained community partnerships, have operated with larger budgets and multi-year commitments that do not apply to the one-semester courses. Matt Lassiter and Jesse Hoffnung-Garskof, the respective faculty directors of the Policing and Social Justice HistoryLab and Immigrant Justice Lab, collaborated closely in designing the pilot version of each course and received a $53,570 grant from the College of Literature, Science, and the Arts' New Initiatives/New Instruction program in exchange for committing to the projects for a minimum of five years. About half of this initial grant went to two individual graduate student lab supervisors who provided indispensable support as full collaborators and made the public engagement project part of their own research portfolio and professional development (U-M makes it very difficult to employ graduate research assistants in departments without federal grants, and HistoryLabs are too small to qualify for graduate student instructors/teaching assistants). The other half went to paying undergraduate students enrolled in these lab courses to continue work during the summer or next academic semester/year, which was very valuable for their own career development and enabled the projects to take on research initiatives beyond the confines of a single semester.

This model was so successful that Lassiter and Hoffnung-Garskof expended the initial grant in less than three years and received a $93,000 supplemental grant from the same funding source in 2021. Both of the pilot projects also became key components of the Carceral State Project's broader *Documenting Criminalization, Confinement, and Resistance* initiative, which since 2019 has received two additional major grants from U-M's Humanities Collaboratory and the Meet the Moment public engagement initiative. These have contributed around $100,000 to the Policing and Social Justice HistoryLab and Immigrant Justice Lab for paid student researchers, faculty summer compensation, honoraria for community partners, curricular development, public events, distribution of publications and the "self-defense" guides, and a series of workshops and mini-conferences designed to spread the HistoryLab model.

In 2024, the history department began offering a new series of graduate HistoryLabs linked to the University of Michigan's recently launched Inclusive History Project to critically investigate its own past.

The other undergraduate HistoryLabs have not received anywhere near the same level of funding or administrative support, with the important exception of the Philippines and the University of Michigan course, which is connected to a larger Humanities Collaboratory–funded project, ReConnect/ReCollect: Reparative Connections to Philippine Collections at the University of Michigan. The history department provides $5,000 in HistoryLab course development funds for instructors the first time that they propose a course that is approved by the review committee. The funds are designated to hire a graduate student to collaborate on the development of the HistoryLab course over the summer and provide some consulting assistance during the semester. Most

faculty report that the HistoryLab course involves a significant workload and that undergraduate team projects rarely are publishable at the end of the semester, leaving the instructor to either work uncompensated to bring the work product online or hire student collaborators from personal research funds. Faculty have expressed frustration that U-M does not authorize graduate student instructors or research assistants to work on non-lecture sectioned courses and that funding for a graduate student consultant is not available if they teach the HistoryLab more than once.

Several of the graduate HistoryLab courses have enjoyed supplemental funding from an institutional partner (i.e., the Holocaust Museum, the American Historical Association) or well-resourced internal partners (Center for Social Solutions, Inclusive History Project). They often have been co-taught (lessening the workload on faculty leads) or integrated into preexisting faculty research agendas (such as an art museum exhibit). Graduate courses also seem to face fewer hurdles in bringing a project to completion during one semester, in part because the process of editing and enhancing student-produced work before public release is not as time-consuming. It also seems that community partners with existing digital platforms have defined more manageable work products than faculty who conceptualize an undergraduate HistoryLab with a website built from scratch and then find that a semester with 15 undergraduates is a very short time period to accomplish their vision.

BEST PRACTICES AND LESSONS LEARNED

This section focuses on the undergraduate HistoryLabs, as the graduate HistoryLabs have a distinct trajectory and deserve a fuller analysis than is possible here (for more about the graduate HistoryLabs see Cook & Chin, 2024; Balleisen & Chin, 2022). The two pilot undergraduate projects, the Policing and Social Justice HistoryLab and the Immigrant Justice Lab, account for around half of the U-M HistoryLabs courses offered since 2018, but also operate with significant differences and advantages compared to the majority of the other projects. The goals of these two projects include:

- Providing valuable curricular and extracurricular experiences and career-enhancing opportunities to undergraduate students, especially underrepresented students.
- Providing leadership and career-enhancing opportunities to graduate students employed as supervisors, consultants and collaborators.
- Implementing a social justice agenda that employs historical research methods to address pressing areas of public policy and influence contemporary political and legal debates.
- Developing robust relationships with community partners, especially the Michigan Immigrant Rights Center, as well as other Detroit-based groups.
- Piloting and developing models for scaling the HistoryLab program in the Department of History and spreading the model to other programs and departments at U-M and beyond.

The most important features of these two pilot HistoryLabs are 1) the supplemental grant funding, to compensate graduate student collaborators and paid undergraduate researchers after the semester is over (as described above); and 2) the decision to integrate both HistoryLab seminars into larger lecture courses offered the semester before. Both project directors teach a 50–75 enrollment "flipped" lecture course that introduces students to the general historical content and the team-based, active-learning, document-centered approach (Crime and Drugs in Modern America for Lassiter; Immigration Law for Hoffnung-Garskof). Both instructors recruit most, and often all, of the undergraduate students who join the HistoryLab seminar directly from the preceding lecture course. This enables screening of students who receive overrides into the HistoryLab based on their previous coursework and level of commitment, along with the conscious effort to create a diverse project team that whenever possible includes students from directly impacted communities and/or with a track record of public service and engagement. The two-course scaffolding also means that the HistoryLab teams can hit the ground running on the research project, without spending as much time teaching content and methods as would be required with a typical new group of students, since the larger team-based course familiarizes them with collaborative work, research methods and general historical context. Eleven versions of these two HistoryLab courses confirm that this approach results in a highly motivated group of students, the majority of whom spend at least 12 months (two courses plus the summer internship), and in some cases two to three years, contributing to the projects and becoming very valued collaborators.

Community partnerships also beckon as an effective and compelling approach. The Immigrant Justice Lab launched with a robust partnership already developed with the Michigan Immigrant Rights Center. In contrast, the Policing and Social Justice HistoryLab started with a research agenda that was not formulated in collaboration with community partners, which has necessitated significant work in subsequent years to build the relationships that, in retrospect, would have been advantageous at the outset. On the other hand, the Immigrant Justice Lab has tended to defer to the community partner for its agenda each semester, and its essential work on behalf of clients has been less publicly visible and less likely than that of the Policing HistoryLab to take the form of digital publications and website exhibits with a different type of impact. The other more successful HistoryLabs have also often worked closely with community or campus partners, including most of the graduate versions and the undergraduate collaborations with the Sundown Towns and the Philippines and U-M projects.

CHALLENGES AND PRIORITIES FOR THE FUTURE

Faculty compensation, scholarly credit and workload are major challenges for the HistoryLab program. Lassiter and Hoffnung-Garskof, the directors of the pilot projects, were both full professors at the time of the 2018 launch and less worried than many colleagues about whether collaborative public engagement and digital humanities projects would "count" toward their research and scholarship. At the same time, both found the project work so meaningful

that they incorporated the HistoryLabs into their personal research programs and they each received full-year sabbatical fellowships specifically to work on the projects. That said, it has been fairly difficult to recruit assistant and even associate professors to lead HistoryLab projects because of their (not inaccurate) perception that this work is time-consuming and will not be adequately credited in the tenure and promotion process, compared to the traditional book and journal article model for history faculty. It is worth noting that both U-M and the Department of History have recently modified their tenure and promotion criteria to encourage faculty to "mark" this sort of labor and scholarship as research and not just as teaching and service. The U-M HistoryLabs program is disadvantaged by the reluctance of many faculty to participate until they have become full professors and/or finished their second book, and also by a (mis)perception among some that the initiative is primarily for historians of the modern United States.

HistoryLabs has successfully built community partnerships and reached public audiences that were barely on the history department's radar before it began, while also transforming students into publicly engaged historians.

The strategy of incorporating collaborative, public engagement scholarship into the curricular space turned out to be a brilliant move that made it possible for faculty in a humanities department to imagine having the time to engage in this sort of work. But most HistoryLab projects, or at least the undergraduate ones, cannot be completed during a single semester and require significant faculty time commitment after the formal course is over. We have discussed a two-semester sequence but worry this would deter many potential students.

The model of faculty supervising grant-funded graduate students and undergraduates to continue working on the projects is essential and has made possible many of the program's most substantive accomplishments. But most of this faculty labor outside of the semester is uncompensated by the university. The subset of faculty who have received summer stipends through the Carceral State Project or the Humanities Collaboratory do receive some renumeration but generally consider it to be much less than they deserve for the amount of time required. HistoryLab faculty leaders who do not have access to supplemental grants, or do not have funding for a graduate student consultant the second time around, generally express frustration that the workload was much more than they anticipated and that they do not have the capacity or resources to complete the unfinished work (a number of digital projects have come out several years later or not at all).

Another real challenge is dissemination of the work product. Faculty leaders generally lack the time and expertise to publicize their digital publications to diverse audiences, which lessens the public impact that is a central goal of the HistoryLabs initiative. The history department unsuccessfully requested a staff position from the University of Michigan to hire a public

engagement coordinator who would be fully dedicated to its various initiatives, including but not limited to HistoryLabs, and would be responsible for marketing projects, consulting on technology and working with faculty to develop curricula. Multiple faculty also wish they had the funding to hire a custom website designer rather than relying on more limited platforms supported by university technology services. HistoryLabs that have well-resourced institutional partners such as the Holocaust Museum, or access to larger grant funds such as the Carceral State Project, have been able to address this challenge more effectively than those that do not.

All that said, the HistoryLabs program has still been very successful in building community partnerships and reaching public audiences that were barely on the history department's radar before it began. It also has provided an alternative to the solo-authored book and article model through meaningful collaborations that have transformed graduate and especially undergraduate students into publicly engaged historians who have enhanced career-oriented skills and published digital scholarship.

References

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Balleisen, E. J., & Chin, R. (2022). The case for bringing experiential learning into the humanities. *Daedalus, 151*(3), 138–152.

The University of Michigan is a public research university in Ann Arbor, Michigan, with 48,000 students, including more than 31,000 undergraduates and more than 16,000 graduate students.

UNIVERSITY OF WATERLOO

ki.uwaterloo.ca

UNIVERSITY OF WATERLOO:

KNOWLEDGE INTEGRATION (KI)

QUICK FACTS

Year founded: **2008**
Project source: **Varies by course**
Duration: **Semester-long**
Students per year: **15-20**
Interdisciplinary: **Yes**
Vertical integration: **No**

By: Rob Gorbet, Associate Professor and former Department Chair of Knowledge Integration

knowledge integration
UNIVERSITY OF WATERLOO

PROGRAM SUMMARY

Knowledge Integration (KI) is a four-year honors program delivering a Bachelor of Knowledge Integration (BKI) degree. Unlike many project-based learning programs that are accessed by students from departments and schools across campus, KI is a complete undergraduate degree program designed to support students with a broad range of interests in developing the knowledge, skills and attitudes to engage in effective interdisciplinary, collaborative problem-solving. Project-based learning is integrated throughout the curriculum.

The degree program comprises:

- **Core courses:** Specific courses required for the BKI and mostly taught by KI faculty — designed to teach transferable skills and knowledge aimed at teaching and empowering students to collaborate effectively and appreciate and leverage diversity in the application of problem-solving skills.
- **Breadth courses:** Required topics (math, science, ethics and social justice, conflict management, statistics, computer science, English, cultural diversity) to develop understanding and base-level knowledge in different disciplines — not enough for fluency, but enough to be able to interact, understand the values and methods of different disciplines, and know what they don't know. These courses are typically not taught by KI faculty and are taken alongside disciplinary students. Within each topic area, students have freedom to select courses that are appropriate for their interests and level (e.g., one student might choose BIOL 130 and BIOL 230 for their sciences while another might choose PHYS 120 and CHEM 120).
- **Elective courses:** Courses that students use to build their own deeper specializations — these may align with existing degrees on campus (e.g., biology), but are also customizable (e.g., combining math and music, or anatomy and linguistics).

The program is divided into semesters, with terms offered in the fall and winter (Waterloo has a spring semester that runs May–August, but KI courses are only offered in fall/winter). The structure and core courses are listed in the table below. With a couple of exceptions, core courses are taught by Department of Knowledge Integration faculty.

Year 1	Year 2	Year 3	Year 4
The Art and Science of Learning Collaboration, Design Thinking and Problem Solving Public Speaking Critical Thinking 6 Electives (including remaining Breadth courses)	Nature of Scientific Knowledge The Social Nature of Knowledge The Museum Course: Field Trip 8 Electives (including remaining Breadth courses)	The Museum Course: Research and Design The Museum Course: Practicum and Presentation Research Design and Methods 7 Electives (including remaining Breadth courses)	Senior Honors Project: Part A Senior Honors Project: Part B 7 Electives (including remaining Breadth courses)

Various courses throughout the program include both individual and group research/problem-solving projects (specifics noted below). Project work is scaffolded throughout the degree and supported with explicit training in collaboration, allowing students to gain applied experience integrating knowledge. Each engages partners in different ways, including campus partners, community partners and student-selected projects that are community/campus-engaged. Projects range from a few weeks to eight+ months, and are done in groups ranging in size from one to eight, depending on the course.

INTEG 121: Collaboration, Design Thinking and Problem Solving

- Core course taken in the second semester of a student's first year.
- 50–60 students, of which about 20 are KI majors, with the remainder being from other programs across campus.
- Teaches collaboration and design thinking models and includes two to three small-group projects.
- Project example: design a public-service campaign for a campus partner such as the sustainability office or food services (groups of two to three working for three weeks).

INTEG 320/321: The Museum Course

- Core course taken in fall and winter terms of the third year.
- 20–30 students, all KI majors; studio-like course.
- End goal is to create a 225-square-foot museum exhibit on a topic related to the United Nations Sustainable Development Goals.
- Groups of five to six work from September to March to select, scope and research a topic; design learning outcomes; and design, research, build and exhibit an interactive, object-centric informal learning experience to encourage visitors to meet the learning outcomes.
- Museum design experts and subject matter experts from the community act as expert critics to provide feedback.

INTEG 420A/B: Senior Honors Project

- Core course taken in fall and winter of final year.
- 20–30 students, all KI majors.
- Students work typically individually, but sometimes in groups of two, on an in-depth senior honors project, supervised/advised by volunteer subject matter experts typically drawn from the University community but sometimes from beyond.
- End products range widely from a typical academic paper/poster to podcasts, game design, playwriting, poetry, children's books, etc.

INTEG 499A/B: Real-World Problem Solving

- Elective course taken in third or fourth year.
- Six to 12 students, typically all KI majors but open to others as well.
- Students work in groups of five to six in a client/consultant model with a partner.
- Partners typically drawn from outside the university (e.g., design an online portal for a local bookstore) but sometimes from within (e.g., develop a proposal for the integration of a new regional bike share program into campus systems for the university sustainability office).

RESOURCES AND ADMINISTRATIVE MODEL

The Department of Knowledge Integration (and hence the program) is housed in the Faculty of Environment, which also houses four other academic units that together deliver a total of nine undergraduate programs. It has a traditional department structure, with a chair reporting to the dean of the faculty and an associate chair managing the undergraduate program, both drawn from the five faculty (four tenured and one definite-term).

The program has a 1,600-square-foot teaching and studio space (the “KI studio”) and is supported by three part-time staff. The outreach and administrative manager (KI, 0.8 FTE) leads recruitment and supports the chair and other faculty in administering the department. The department has an undergraduate advisor (KI, 0.6 FTE) to support students with course selection and administrative hurdles. A workshop coordinator from the Faculty of Environment has part of their time allocated to KI for support of the Museum Course, which uses a shared workshop (maker space, woodworking, etc.).

As an undergraduate degree program, we rely on operating funds from the university, which come from per-student tuition and government grants. Because of our small size (~20 students per cohort), we are effectively dependent on “transfer payments” from other units which is a challenge. As of July 2025, the Department of Knowledge Integration will merge with the School of Environment, Resources and Sustainability (SERS) within the Faculty of Environment at Waterloo. This collaboration will reduce administrative burdens by eliminating the need for a chair and associate chair within a small group of professors. The program will also reduce staffing for outreach, administration and advising. These changes are a reflection of the budgetary difficulties experienced by universities and colleges across Canada, especially for smaller programs.

BEST PRACTICES AND LESSONS LEARNED

Central to the program learning outcomes are:

- Appreciation of diverse perspectives in problem-solving.
- Understanding how to leverage diverse perspectives for effective interdisciplinary collaboration.
- Collaborative problem-solving skills and experience.
- Depth in an area of specialization, whether it be traditional or custom.

It has been our experience that some of the program design aspects that facilitate these outcomes are:

Building a psychologically safe community of learners, which means explicitly teaching about psychological safety and then putting in place appropriate conditions to facilitate it. Among other things, these conditions include a small cohort size and higher faculty-student ratios than are typical.

Explicit training in collaboration, scaffolded throughout the KI courses and applied in groups of varying sizes from first to fourth year, but also supported by the Conflict Management breadth requirement. It is surprising to see the number of other programs across campus expecting significant group work (e.g., in capstone design courses) but not teaching students explicitly how to understand and manage conflict.

Ensuring a combination of "knowing" and "doing" that means students gain theoretical knowledge but also have the opportunity to apply it through experiential learning, most often in collaborative groups of varying sizes and lengths. This cycle of knowing and doing appears within each of the core courses, but also across the program including the breadth electives. For example, students will learn concepts from feminist and scientific epistemology (e.g., epistemic humility, values and proof in different disciplines) in second-year core courses and then apply them in their breadth courses. A great success of the program design from that perspective is that students gain their breadth by being embedded with honors students in other disciplinary contexts on campus as opposed to taking "Biology for KI Students," for example.

Significant grace from our campus partners, as we depend critically on access to resources and courses in other academic units across campus. This unique model is both an enormous benefit, and also a significant challenge. The program is bound by both the institutional structures and processes (e.g., course timetabling, registration, enrollment limits/restrictions, budget model) and the goodwill of faculty members and administrative staff across campus. KI students enjoy a strong reputation, and a very significant majority of faculty who get to know KI students say they look forward to working with more of them. However, this arrangement is very sensitive to institutional processes, workloads and budget models. Significant growth in the number of KI students could also challenge our ability to maintain this grace and generosity.

CHALLENGES AND PRIORITIES FOR THE FUTURE

Aside from the challenge of depending heavily on goodwill, grace and structures we have no control over, other key challenges include:

MARKETING AND RECRUITMENT: While alumni, employers, parents and current students all strongly express their appreciation for the program and its graduates, it remains a significant challenge to explain it to prospective students. It is not clear how to identify a specific target group, and graduating high school students are often looking for job training in known fields (e.g., engineer, teacher, doctor, lawyer). For those students who are interested in broader

knowledge, they are not, for the most part, aware of what an interdisciplinary program might bring them. General messaging about the world needing collaborative interdisciplinary problem-solvers to tackle the great challenges we face doesn't seem to stick. The practical outcome is that, while we believe a small cohort size is key (see above), we would like that to be closer to 40 than 20. We have enrolled up to 36 in fall first-year admission, but in recent years the number of incoming students has dropped below 20.

RESOURCE COMMITMENT: While the university and the Faculty of Environment are strongly supportive of KI, we face resource constraints. The INTEG 499A/B course, for example, is under threat because it enrolls only about six to 12 students per term. In Fall 2024, the course was co-offered with a two-term project course from another department to increase enrollment across the two courses. While it seems an important part of the KI students' experience, allowing them to experience "client-driven" problem solving, it is financially difficult to run regularly.

INSTITUTIONAL STRUCTURES: In some cases, KI has pioneered the introduction of new institutional structures to support interdisciplinarity (e.g., in the tenure and promotion processes for interdisciplinary faculty). In other cases, institutional structures that have been designed for disciplinary silos have been frustrating. Just one example is the complexity of trying to set up a senior capstone course that would integrate KI students with other units' students in taking on large, longer-term projects.

FITTING IN WITH THE BRAND: Waterloo is known for its students' successful entrepreneurial innovations (it has a large, well-oiled successful startup culture), and for its cooperative education program (it was the first university to introduce Co-ops at a large scale, in 1957). Finding ways to evolve KI to better align with these key aspects of the university's brand is critical from both the perspectives of external marketing and internal support. This is a significant challenge and a priority.

The University of Waterloo is a public, comprehensive and research-intensive university in Waterloo, Canada. It has 1,400 faculty and 42,000 students. It is known for its STEM-oriented programs, co-operative education model and start-up culture, having graduated 20% of Canadian tech founders. Because most students at Waterloo are in a co-operative education model, it places a high value on experiential education. Waterloo is consistently ranked as Canada's most innovative university.