Table of Contents

Georgia Tech
Office of the Provost

December 2, 2024

Board of Regents of the University System of Georgia
270 Washington Street, SW
Atlanta, GA 30334

Dear Awards Committee,

I am pleased to nominate Georgia Techs' Vertically Integrated Projects (VIP) Program for the Regents' Award for Excellence in High-Impact Practices (HIPs) and Experiential Learning. Beyond offering high impact experiences that are integrated into university systems and curricula, the VIP Program has shown a remarkable impact on students, has achieved unparalleled participation among first generation students and transfer students, and has cultivated faculty engagement across the institute.

The VIP Program combines the advantages of undergraduate research (HIP) and collaborative learning (HIP) by embedding large student teams in faculty research. With an average of 25 students per team, the model enables faculty to mentor many more students than otherwise possible, and it creates collaborative project-based learning experiences around real-world projects akin to internships. The program has grown from a grass-roots faculty-led initiative to a campus-wide program with over 100 faculty-led teams and approximately 3,000 students in Spring 2025, serving one-third of undergraduates by the time they graduate. The program is able to serve such a large portion of the student population because **faculty are eager to participate**. VIP teams make meaningful contributions to faculty research, which attracts instructors to the program and cultivates long-term engagement. VIP serves faculty from every college at the institution (engineering, computing, business, science, design, and liberal arts), researchers from the Georgia Tech Research Institute, as well as non-tenure track faculty. More join the program each semester, and students continue to fill their teams, so the program continues to expand.

The impact of the program on students is remarkable. Participation is associated with higher job placement and cumulative gains in professional skills for multiple semesters of participation. Three semesters of participation are associated with **triple the odds of having found a job** prior to graduation, comparable to the gains associated with internships. VIP is also associated with cumulative gains in **leadership development** as well as other professional skills detailed in the nomination package.

Beyond the sizeable impact in student outcomes, the VIP Program has achieved unparalleled participation among **first-generation college students** and **transfer students**. Nationally, both groups participate in undergraduate research at lower rates than their peers. In contrast, both groups participate in Georgia Tech's VIP Program at the same rate as their non-first-generation and non-transfer peers **without special incentives or focused recruiting**. The program is thus equally attractive and accessible to all students.

Steven W. McLaughlin
Provost and Executive Vice President for Academic Affairs
225 North Avenue, NW
Atlanta, Georgia 30332-0700 U.S.A.
Phone: 404.385-2700

As detailed in the nomination package, the VIP Program is well integrated into institutional processes and systems. VIP has a dedicated subject code in Banner, an indicator in the institution data warehouse, and a range of Tableau data dashboards. This enables the program, institutional assessment personnel, and campus stakeholders to report on engagement and study outcomes. The nomination package also details the extensive assessment and evaluation of the program using institution-wide data as well as program-level peer evaluations, using methods suited to each evaluation.

Beyond changing the HIP landscape at our own institution, Georgia Tech has actively disseminated the model and helped other institutions establish VIP Programs. Georgia Tech has provided guidance and support to VIP Programs and Directors at the University of Georgia, Georgia State University, Georgia Southern University, Georgia College and State University, and Morehouse College. With these efforts, Georgia Tech's VIP Program is working to benefit students throughout the state.

Georgia Tech launched the VIP Consortium in 2015 with a large grant from the Helmsley Trust. The consortium now consists of 50+ universities with VIP Programs in Georgia, throughout the US, and around the world. The annual VIP Consortium Meeting, held each year at Georgia Tech, is attended by VIP Directors and faculty from around the world, and focuses on accomplishments, challenges, and opportunities affecting all VIP sites. The VIP Program has thus spread around the world and is on its way to achieving systemic reform of higher education.

Because of its remarkable impact on students, high participation among first-generation and transfer students, high faculty engagement, integration into institutional systems, size/ongoing growth, support to institutions in Georgia and its dissemination around the world, Georgia Tech's VIP Program is an ideal recipient for the Regents' Award for Excellence in High-Impact Practices and Experiential Learning.

Sincerely,

Steven W. McLaughlin
Provost and Executive Vice President for Academic Affairs
Georgia Tech

Narrative Statement

Summary: Georgia Tech's VIP Program combines two high impact practices (HIPs): undergraduate research and collaborative projects, by embedding large student teams in faculty research/projects. Students earn academic credit, and faculty benefit from their teams' work. The program has been widely adopted and integrated, serving 1/3 of bachelor's degree recipients, and it continues to grow. It effectively engages first-generation and transfer students, and evaluations show numerous gains including higher job placement. Georgia Tech has also supported VIP program establishment at institutions in Georgia and around the world, with 6 programs in Georgia (5 USG institutions), 29 in the US, and 24 abroad.

Program Structure: VIP teams are established at faculty request, and each team is:

- **Large:** Consisting of at least 8 students, with an average of 25 per team in Fall 2024.
- **Interdisciplinary:** Drawing students from all majors needed for the project.
- **Vertically Integrated:** Composed of sophomores, juniors and seniors, as well as graduate students, post-docs, and the faculty instructor.
- **Long-term:** Lasting at least 3-5 years and often 10 or more years, with both new and returning students each semester. In their second and subsequent semesters, students take on leadership roles and mentor new students, ensuring the continuity of the team. This enables faculty to mentor such large teams and allows teams to last for many years, even decades.

The disciplinary depth, interdisciplinary breadth, and continuity of VIP teams enable them to make significant contributions to their advisers' research. Extensive research has verified the positive effect of VIP on students:

- Triple the odds of having a job prior to graduation associated with 3 semesters of VIP.
- Leadership growth through the third semester of participation.
- Active collaboration across disciplinary lines.
- Gains in multiple professional skills.
- First-generation and transfer students participate at the same rates as their peers.

Context, Philosophy & Mission: Undergraduate research is a high-impact practice (HIP). However, traditional undergraduate research in which a professor mentors a single or a small group of students is not scalable – it serves only a select few, leaving a highly beneficial experience inaccessible to most students. The VIP Program's philosophy is that **all students should have the opportunity** to work with faculty on ambitious projects embedded in faculty research. The VIP Program's mission is to 1) enable faculty, students and researchers across campus to work together on long-term, large-scale, multidisciplinary project teams; 2) research the impact of these experiences on faculty, students, project partners, and higher education; and 3) be thought leaders for multidisciplinary project-based learning at Georgia Tech, across Georgia, throughout the US, and around the world.

Innovative Pedagogical Approaches: The VIP Program has expanded the institution's capacity to provide **undergraduate research experiences (HIP)**. Undergraduate research cultivates intellectual curiosity [1], [2], strengthens communication skills [1], [3], [4], clarifies career goals [1], [5], and enhances preparation for graduate school [5], [6]. Kuh attributes the benefits of undergraduate research to student-faculty interaction [7]. Student faculty-interaction is prominent in multiple theories of college student development including Astin's Theory of

Student Involvement, Pascarella's General Model for Assessing Change in college students, Weidman's Model for Undergraduate Socialization, and Tinto's Theory of Student Departure.

However, in VIP, students benefit from more than faculty mentorship – the program leverages **collaborative projects (HIP)**. When students learn collaboratively, they develop deeper understanding by discussing, sharing, and using ideas in community. VIP's approach to collaborative learning leverages learning theories employed in project based learning: active construction, situated learning, and social interaction [8]. In *active construction*, learners construct knowledge instead of having instructors guide every step. VIP faculty establish teams to help advance their research because they do not already have formulaic answers. While faculty provide guidance, students draw on prior knowledge and acquire/build new knowledge and skills. In *situated learning*, student learning is situated in authentic, real-world contexts (faculty research). *Social interaction* is essential to collaborative learning, and it is central to the VIP experience. Social network analysis of student peer evaluations shows high levels of interaction between students within teams, higher interaction across disciplinary lines, and balance in interaction by race/ethnicity and gender. Beyond assuming the program provides the social interaction so important to collaborative learning, the program has confirmed it.

Faculty Development and Support: VIP supports instructors in a variety of ways. The first stage of support relates to onboarding, which consists of a new instructor workshop developed by the Center for Teaching and Learning (CTL), a video on setting the tone in the first team meeting, and a video on grading. The program also provides a grading framework for the course, with 1/3 of the grade based on contributions to the project; 1/3 on documentation, both individual documentation and team-level documentation; and 1/3 on teamwork, which is essential for effective collaboration. The VIP Program also collaborates with the Center for Teaching and Learning (CTL) to address emerging faculty needs. CTL developed the new instructor workshop, facilitated a faculty learning community to clarify/simplify student assessment, and hosted a workshop on the SCRUM project management method.

Beyond onboarding, the VIP Program offers centrally administered peer evaluations at the midpoint and at the end of each semester. The peer evaluation platform was developed in-house, and it uses color-coding to help instructors interpret results, with colors varying by the reviewer scores and the range of scores given. To help instructors incorporate peer evaluation timing into their semesters, the program provides semesterly syllabus templates that include dates and timelines, and the program distributes announcements and reminders to students and instructors during the semester.

Another key service to instructors is student recruiting. The program recruits students through online team listings, campus-wide email campaigns, poster information sessions, and VIP Ambassadors (volunteers) who give presentations on request (freshman experience courses, fairs, etc.). The program offers focused recruiting to low-enrollment teams, with emails to students who have taken courses associated with the project. The program also offers guidance on team names and descriptions to improve clarity and appeal to prospective students.

Integration into Campus Systems: The VIP Program is fully integrated into campus systems with a campus-wide **VIP subject code** (2018) and a **data warehouse indicator** (2017), enabling analysis of enrollment for the full life of the program, 2009-present. With the indicator, the VIP Program has developed data dashboards used to confirm individual students' participation,

track faculty and student engagement at the department/college level, and to monitor the health of teams (W rates, grade distributions, student persistence to second and third semesters of VIP, etc.). Additionally, the undergraduate research indicator being implemented in Banner will be applied to all VIP courses.

Assessment and Continuous Improvement: As the timeline below illustrates, the VIP Program uses assessment to drive improvement. Each assessment was designed to answer specific questions about the program, and each study led to improvements and/or a follow-up study.

2012: ***Assessment:*** Student surveys and social network analysis were used to study peer mentorship within teams. ***Findings:*** Peer-interaction supports greater learning gains [9]. ***Improvements:*** Questions on peer-interaction were added to peer evaluations, to enable instructors to assess/monitor interaction across the team.

2015: ***Assessment:*** Institution exit surveys were analyzed to assess the impact of VIP participation on student outcomes. ***Findings:*** Gains in ability to work in multidisciplinary teams; ability to work with individuals from diverse backgrounds; and understanding of technologies related to their fields [10]. ***Follow-up:*** 2016 investigation of mechanisms for observed gains.

2016: ***Assessment:*** Interaction within teams was analyzed through social network analysis of peer evaluations. ***Findings:*** Within teams, students interacted more often with students from other majors and from other races/ethnicities [11], supporting the gains seen in the 2015 study. ***Improvements:*** The analysis showed unusual patterns on one team, so CTL developed a workshop to support instructor development. Follow-up analysis confirmed that after the workshop, the unusual patterns no longer appeared.

2017: ***Assessment:*** The VIP Consortium conducted an evaluation of student and faculty experiences. ***Findings:*** Connection between student persistence and policies on how credits count toward degree requirements [12]. ***Follow-up:*** 2018 analysis of student persistence.

2017: ***Improvement:*** A VIP identifier was developed for campus data warehouse. This made evaluations easier for the program and the institute to conduct.

2018: ***Assessment:*** The program examined student persistence in VIP by degree program. ***Findings:*** Correlation between policies on how VIP credits fulfill degree requirements and student persistence in the program [13]. ***Improvements:*** Departments used the findings to inform policies on how VIP credits count toward degree requirements.

2019: ***Assessment:*** The VIP Program developed data dashboards to monitor enrollment, support academic advisors, and to support decision-making. ***Finding 1***: Identified major-specific dips in enrollment tied to policy changes. ***Improvement 1:*** Engaged departments to develop solutions. ***Finding 2:*** Identified teams with low student persistence. ***Improvement 2:*** Matched instructors with mentors to support effective mentoring and support.

2021: ***Assessment:*** Analyzed institution career and salary surveys to assess the impact of VIP participation on student job placement prior to graduation. ***Findings:*** Higher job placement for participants [14]. ***Follow-up:*** The program conducted a deeper analysis to control for self-selection and additional variables.

2023-2024: ***Assessment:*** Propensity score analysis was used to study job placement while controlling for self-selection and participation in other programs. ***Findings****:* VIP was associated with higher job placement prior to graduation [15]. ***Improvements:*** The findings were used to shape the institute's Quality Enhancement Plan for transformative learning.

Fact Profile

Students

Fall 2024: 96 Multidisciplinary Teams
2,289 students

Participation Among AY 2023-24 Graduates:

College	VIP Participants	Portion of College
Computing	638	53%
Engineering	507	25%
Ivan Allen (Arts)	51	24%
Sciences	89	18%
Design*	22*	14%*
Scheller (Business)*	19*	5%*
All Colleges	**1,326**	**30%**

* 6 teams from the Scheller College of Business and 4 teams from the College of Design have been established, and enrollments in both are increasing.

Incorporation into the Curriculum

VIP has been incorporated into policies for general electives, in-major electives, and pathways for required sequences in 18 undergraduate degree programs, a degree designator, and a minor (table below) as well as three graduate programs.

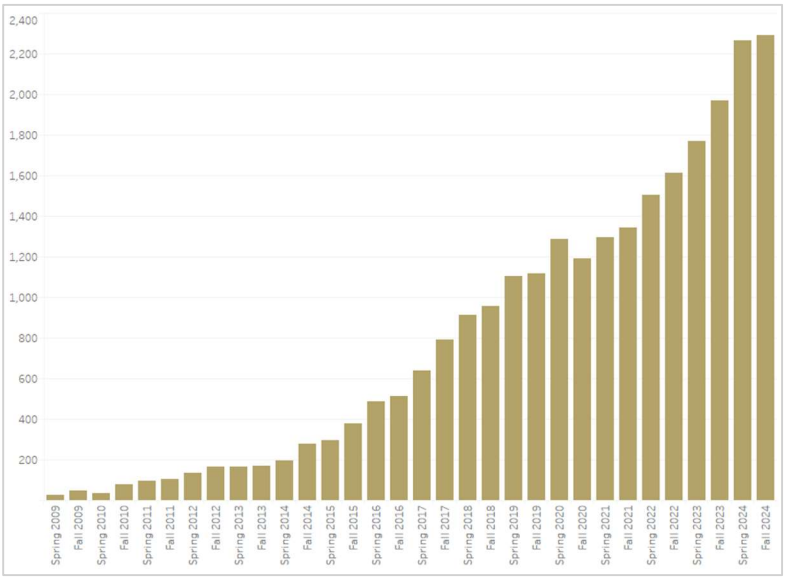
	College	Undergraduate Program	General Elective	In-Major Elective	Jr. Design, Sr. Design, Capstone	Incentivizes Multiple Semesters
1	Computing	Computer Science		✓	✓	✓
2	Design	Architecture		✓		
3		Industrial Design		✓		
4		Music Technology		✓	✓	✓
5	Engineering	Biomedical Eng.		✓		✓
6		Chemical and Biomolecular Eng.		✓		✓
7		Civil and Environmental Eng.		✓		✓
8		Computer Eng.	✓	✓	✓	✓
9		Electrical Eng.	✓	✓	✓	✓
10		Industrial Eng.		✓	✓	
11		Mechanical Eng.	✓	✓C		
12	Liberal Arts	International Affairs	✓			
13	Management	Business Administration		✓C		✓
14	Sciences	Biochemistry	✓			
15		Biology		✓		
16		Chemistry		✓		
17		Physics		✓		
18	Joint Program	Computational Media		✓	✓	
19	Other	Honors Program (Deg. Designator)		✓		
20		Sustainable Cities Minor		✓		✓

C: Policy applies to specific concentrations or tracks.

Faculty

Growth Driven by Faculty Engagement:
The VIP Program continues to grow because more faculty establish teams each semester, and because faculty incorporate their teams into their research portfolios, resulting in very low turn-over.

With 10 new teams scheduled for Spring 2025, enrollments of 2,600-3,000 are expected.



AY 2024-25 Instructors: VIP draws instructors from every college as well as research centers.

College	Department	Lead Instructor	Co-Instructor	Total
Computing	Computational Science & Engineering	3	4	7
	Computer Science	3		3
	Computing Instruction	1	3	4
	Interactive Computing	4	2	6
Design	Architecture	4	2	6
	Music	2	1	3
	School of City & Regional Planning	1	1	2
	Other	1	2	3
Engineering	Aerospace Engineering	2	2	4
	Civil & Environmental Engineering	7	3	10
	Electrical & Computer Engineering	19	6	25
	Industrial & Systems Engineering	2	4	6
	Mechanical Engineering	11	4	15
	Other	3	2	5
Ivan Allen	Economics	1	1	2
	International Affairs	1		1
	Literature, Media & Communication	3	1	4
	Modern Languages	5	1	6
	Public Policy	2		2
Scheller	Business	6	3	9
Sciences	Biology	3	3	6
	Chemistry	1	1	2
	Physics	1	2	3
	Psychology	3	2	5
	Other	1	1	2
Other	C21U	1	3	4
	Enterprise Innovation Institute	2	3	5
	Georgia Tech Research Institute	15	18	33
	OIT		2	2
	Other	3	4	7
Total	**All Colleges and Units**	**111**	**81**	**192**

Evidence

Dedication to Student Access: Nominal Screening

The philosophy of the VIP Program is that *all* students should have the opportunity to work with faculty on ambitious projects embedded in faculty research. This is not typically the case in traditional undergraduate research. The limited number of opportunities creates competition, and programs/faculty typically select juniors and seniors with high GPAs [6]. Further, when students are screened by resumes and letters of recommendations, students with prior experience are selected over students with no experience, and "the rich get richer" (experienced students get more experience). In contrast, the VIP Program **does not screen students by GPA, by resumes, or by letters of recommendation**. This is because years of experience have shown student motivation/interest in the project to be the strongest predictor of success on the team. A highly motivated student will learn the skills needed for the project, regardless of how well they perform in conventional courses.

How can a program with nominal screening succeed? When a faculty member mentors a single undergraduate research student, he/she takes a risk. The professor invests time and energy, and the student may or may not perform well. VIP mitigates this risk with its large-scale nature and by leveraging peer leadership/mentorship (i.e. collaborative learning, an HIP). When a VIP professor takes on eight (or thirty) students instead of one, he/she has higher odds of having high-performing students in the group. In turn, high-performing students and students returning for their second and subsequent semesters model effective behaviors for peers. This supports student development, enabling more students to become high-performers.

Faculty can be dubious of the program's approach to admissions. To ease their adjustment, the VIP Program handles student applications for the first year for each instructor. This enables instructors to see the lack of correlation between GPA and high productivity, and to see the way in which high performers help their teammates. This reduces the burden on faculty, enhances students' experiences, and cultivates faculty buy-in.

Dedication to Student Access: Low-Stress Application

The VIP Program's dedication to student access is reflected in the low-stress nature of the student application. The program does not request GPAs, resumes, letters of recommendation, or long essays. If these things were requested, it would signal to students with less competitive GPAs, little experience, and few/no sources for recommendations that they are not qualified. Instead, beyond basic information (name, major, etc.), the application has a single free-response question, "Please explain your motivation for applying to the team (350 characters max, including spaces)." This **centers student motivation** in the student selection process. Limiting the length of the response to 350 characters maintains the low-stress nature of the application, and it keeps responses from becoming narrative versions of applicants' resumes.

Students are selected on a rolling basis with the goal of admitting motivated students (i.e. students who express interest in the project), getting the majors needed for the team, and maintaining a balance of sophomores, juniors, and seniors (to maintain continuity when seniors graduate). In some cases, students from one major will be rejected because the team already has enough students from the major, while students from another major will be admitted. When students are rejected, they receive an automated email explaining that the team already

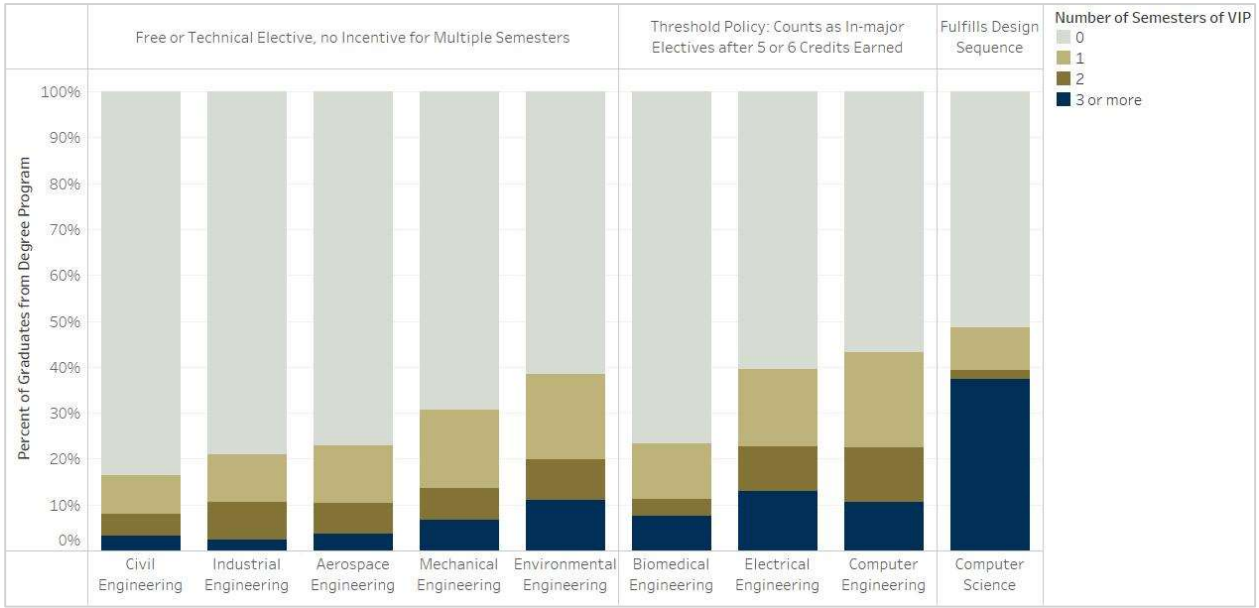
has enough students from their major and/or academic rank, but that they are welcome to apply to another team.

Dedication to Student Access: Online Team Listings & Proactive Recruiting

The VIP Program's dedication to student access is also apparent in its proactive student recruiting. The Program maintains an online listing of VIP Projects, enabling students to browse available opportunities, to filter projects by majors sought by instructors, and to filter projects by curricular policy (approved by a department to fulfill a specific requirement). This online clearinghouse enables students to find projects that fit their interests, as opposed to being limited to faculty they know from class and/or approaching faculty who are not looking for new students. Additionally, the program conducts proactive student recruiting campaigns twice a semester. At the beginning of student registration (Phase I registration), the program emails all sophomores, juniors, and seniors explaining the program and inviting them to a poster information session. The emails are distributed by major (Dear CS Students, Dear Public Policy Students, etc.) with links to listings of teams looking for their major. This shows students that the program is specifically interested in their major and increases engagement. It is not uncommon for students at the poster information sessions to say, "I got an email saying you were looking for ___ majors." During the first week of class, the program does another recruiting campaign and poster session, with a focus on teams with lower enrollment. Nearly half of students register during this time, making the follow-up campaign key to program success.

Dedication to Student Access: Integration into the Curriculum

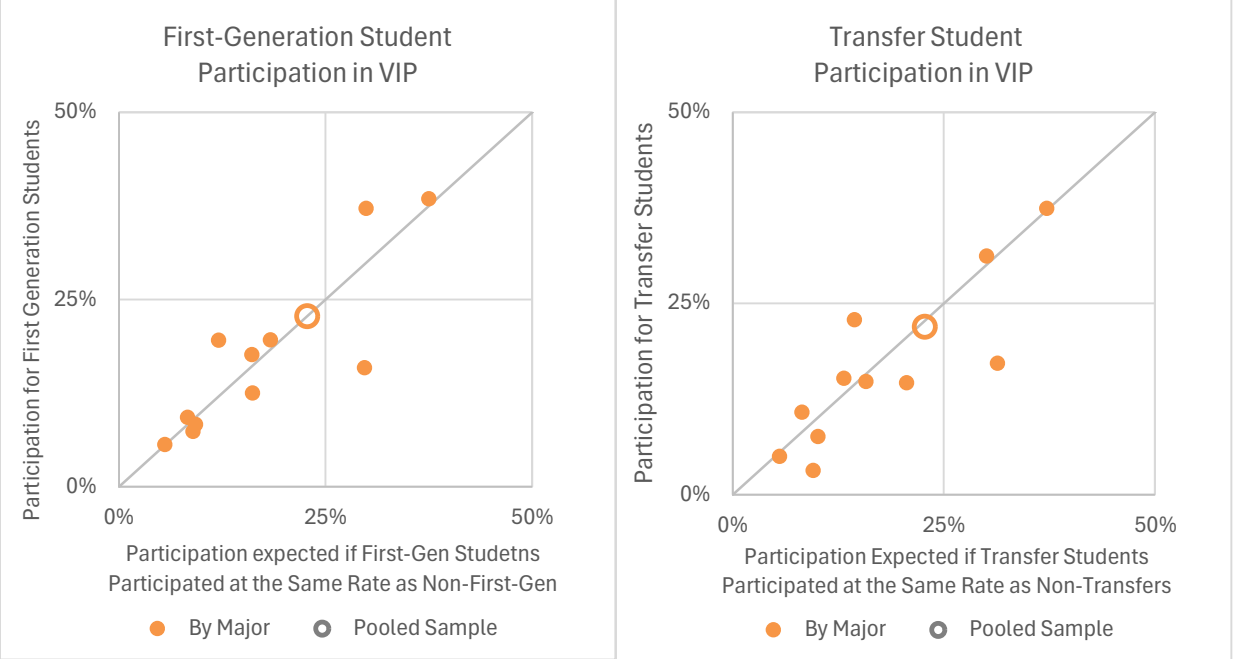
An analysis of enrollments showed correlations between policies on how VIP credits can be used to fulfill degree requirements and student persistence to second and subsequent semesters [13], as illustrated in the figure below. Allowing VIP credits to count toward degree requirements enables the program to attract students who may be less engaged in extracurriculars (particularly students who work or who have family-related responsibilities), because VIP provides engaging experiences *and* advances students toward their degrees.



Instructors have found that students make their greatest contributions in their second and subsequent semesters, both in leadership and technical contributions. Based on the importance of clear curricular policies and the value of multiple semesters, the VIP Program 1) works with departments across the institution to establish policies confirming which degree requirements VIP credits can be used to fulfill; and 2) encourages departments to adopt policies that incentivize multiple semesters of participation. Policies are now in place for 18 undergraduate programs, and incentives are in place in 9 programs. This is an ongoing process. In support of these efforts, the program generates discipline-specific annual reports for each department to keep administrators apprised of student and faculty engagement, and of the benefits of the program to students. The degree programs and policy models are detailed in the fact profile.

Evidence of Student Access: First-Generation and Transfer Status

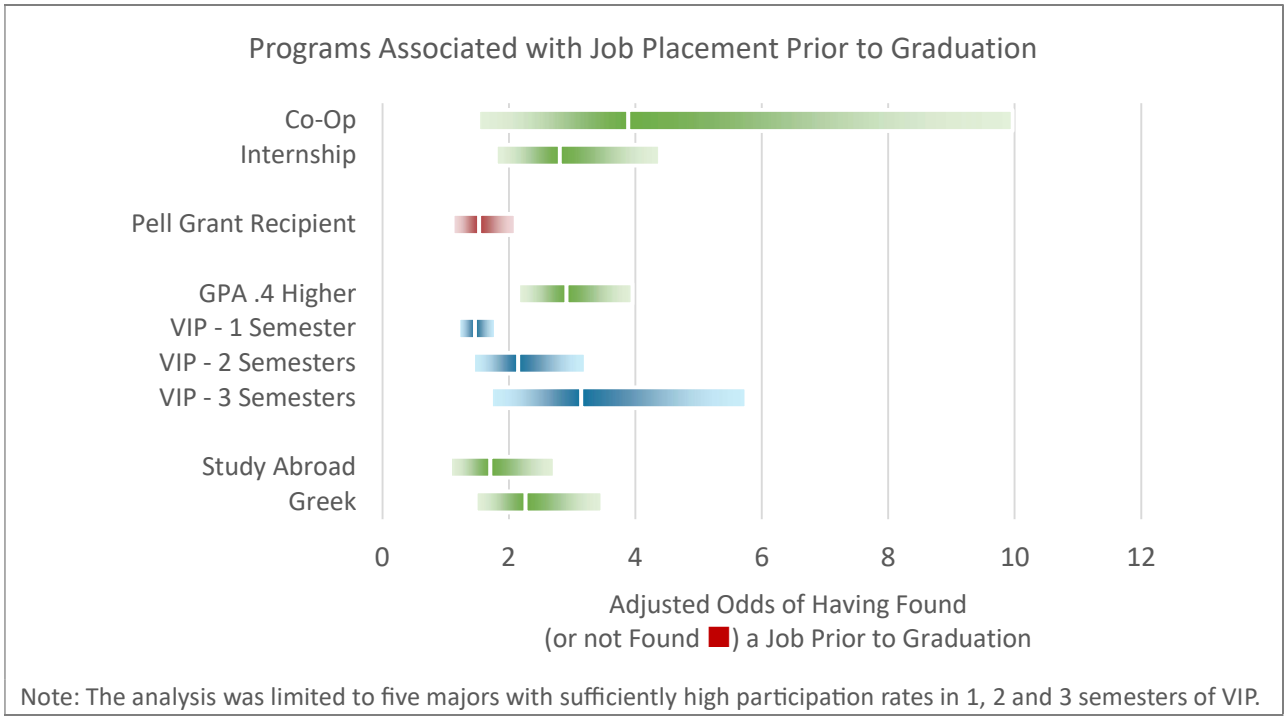
Nationally, first-generation college students and transfer students participate in undergraduate research at lower rates than students whose parents went to college and students who began at the institution as freshmen [16]. The VIP Program was not established as an "equity program" but its dedication to student access – demonstrated in nominal screening, low stress applications, and proactive recruiting – has yielded high engagement among both of these groups. Analysis of VIP enrollments showed **first-generation students and transfer students participate in VIP at the same rates** as students whose parents went to college and students who began at the institution as freshmen (figures below), which is a notable accomplishment for a program that is not specifically targeting these groups.



Note: The data visualizations are based on a study that involved Chi-square analysis. For this reason, only majors with at least 5 students in each category (first-generation, non-first-generation, transfer, and non-transfer) were included, yielding 11 majors. Adapted from [16].

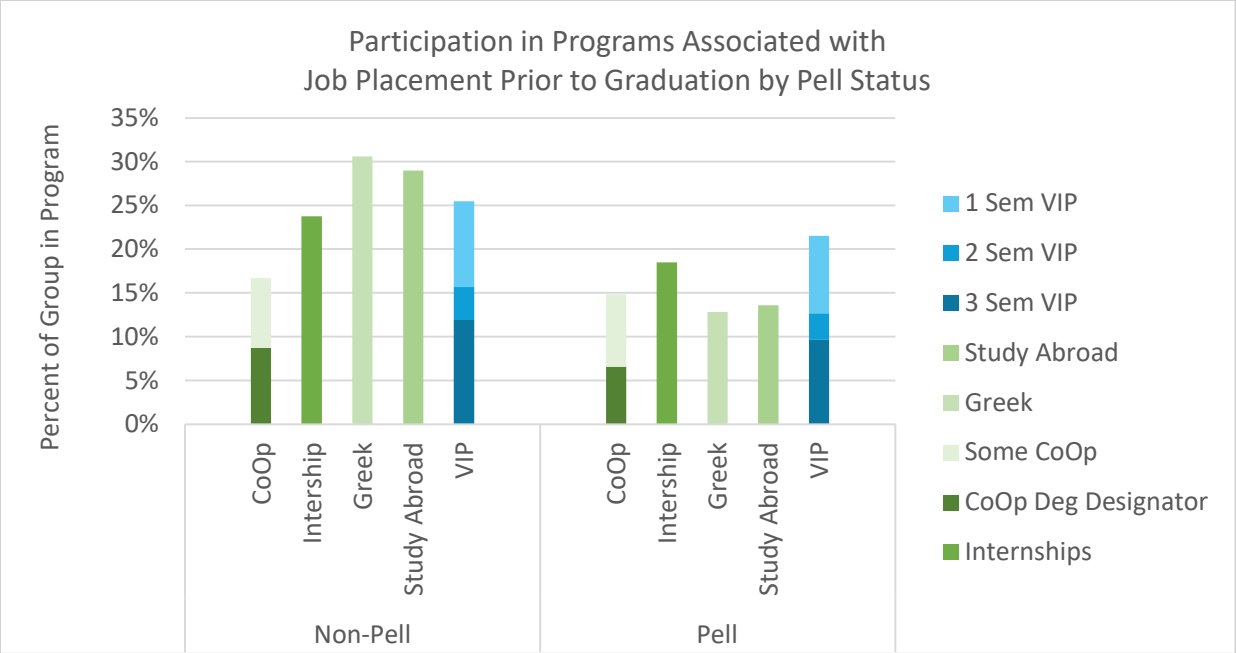
Effectiveness: VIP Associated with Higher Job Placement

A 2021 analysis of career and salary surveys administered prior to graduation showed higher job placement among VIP Participants. To control for self-selection and for the effects of other programs on job placement, a propensity score analysis employing inverse propensity score weighting and regression was conducted in 2023-24. The results confirmed that, among students who reported planning to enter the workforce, VIP participation was associated with higher job placement with a dosage effect. Three semesters of participation was associated with triple the odds of having found a job, comparable to gains associated with internships [15].



Note: The analysis was limited to five majors with sufficiently high participation rates in 1, 2 and 3 semesters of VIP.

Status as a Pell grant recipient was associated with higher odds of not having found a job (represented with red in the figure above), which may stem from a variety of sources. This disadvantage was roughly equal to the advantage associated with one semester of VIP. This implies VIP may counteract the disadvantages Pell students face in securing employment. Further analysis showed that Pell students participated in VIP at higher rates than any other program associated with higher job placement (figure below) [15]. The comparatively low participation rates among Pell students across all programs associated with higher job placement reflects larger challenges (commitments outside of school, sense of belonging, etc.), but the seeming appeal of VIP to Pell students is striking. It represents a key aspect of access, with disadvantaged students gaining important experience associated with job placement.



Effectiveness: Professional Skills

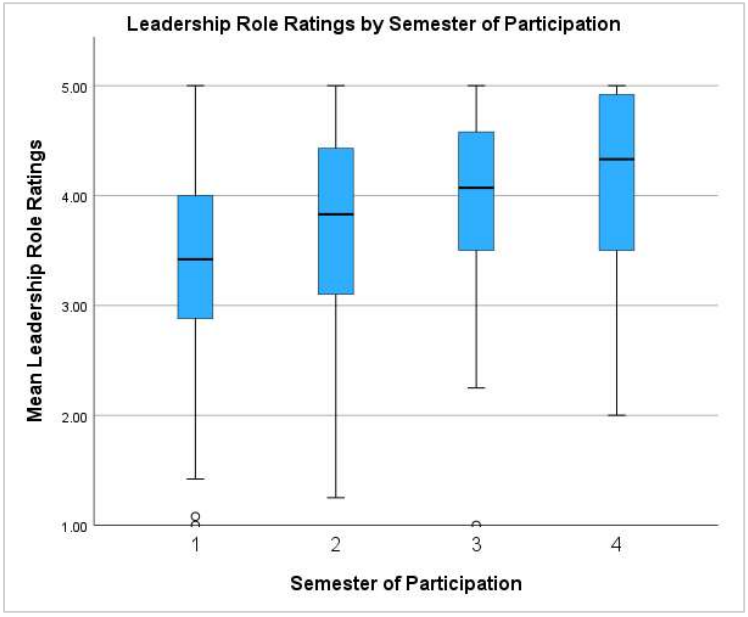
In an analysis of institutional exit surveys, VIP students agreed more strongly than non-VIP participants that their Georgia Tech educations contributed to the professional skills below, with meaningful effect sizes (Cohen's *d* of .2 or greater).

- Ability to work in a **multidisciplinary team** ($t(1982) = 4.437$, $p < 0.001$, $d = 0.313$);
- Ability to **work with individuals from diverse backgrounds** ($t(1987) = 3.271$, $p = 0.001$, $d = 0.231$);
- **Understanding of technology applications** relevant to their field of study ($t(2002) = 3.19$, $p = 0.001$, $d = 0.224$).

Based on these findings, the VIP Program sought to determine whether collaboration across disciplinary and racial/ethnic lines could be measured/confirmed. The program conducted a social network analysis of peer evaluations, which asked students to what degree they interact with each classmate. Results showed that within VIP, students interacted more often with students from other majors and more often with students from other races/ethnicities. This supported the findings of the exit survey study in which VIP students more strongly agreed that their Georgia Tech educations contributed to their ability to work in multidisciplinary teams and ability to work with people from diverse backgrounds.

Effectiveness: Leadership Growth

Leadership programs typically involve trainings and workshops, but students apply and develop skills in applied settings such as clubs and student government. Most assessments of leadership rely on self-reported measures, but with peer evaluations, the program was able to examine leadership roles as reported by peers. The peer evaluation asks students two leadership role related questions: the extent to which their teammates coordinate the team's work, and the extent to which they serve as technical/content area leaders. Longitudinal analysis confirmed that mean leadership role ratings grew through the third semester of participation ($t(685) = 13.22$, $\Delta M = 0.29$, $p < .001$) [17] (figure below).

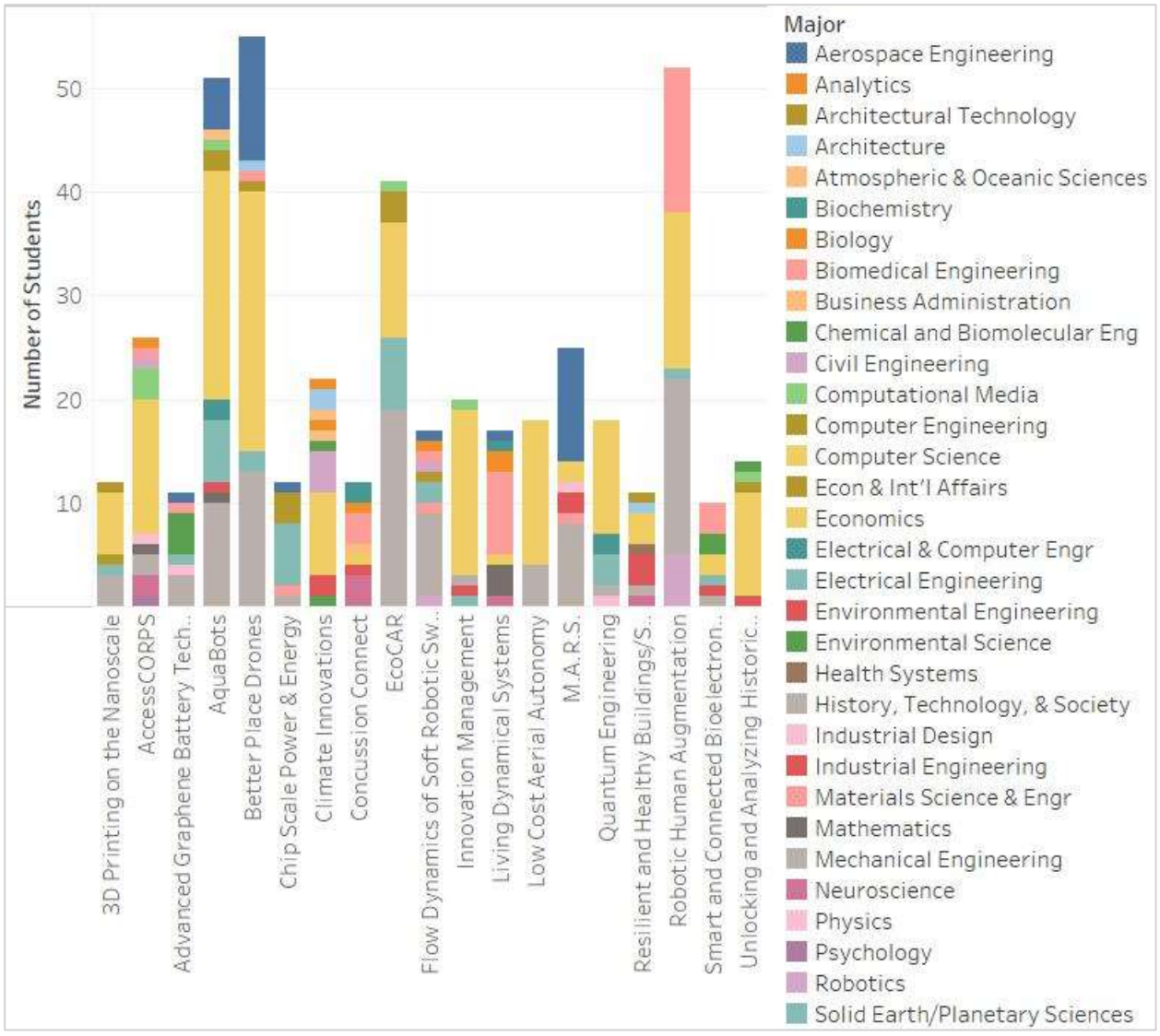


Data-Driven Improvement

The VIP Program's dedication to student access and learning are reflected in its extensive and ongoing assessments. The program has examined a wide range of research questions and utilized a similarly wide range of methods. Matching and t-tests were used to compare institutional exit survey responses related to professional skills. Social network analysis was then used to explore student interaction within VIP teams, to determine if interactions supported findings related to professional skills. Analysis of variance was used in a cross-sectional analysis of leadership. Longitudinal analysis was then used to confirm whether growth occurred over multiple semesters. Chi-square tests were used to compare job placement for participants and non-participants. Inverse propensity score weighting was then used to control for self-selection, with regression used to account for the effects of other programs on job placement. Most recently, Chi-square tests were used to examine participation among first-generation college students and transfer students. Instead of relying on program-level pre and post surveys, the VIP Program leverages the Banner identifier and institutional data to examine questions of access and outcomes, and it has examined peer evaluations to understand engagement and student growth. The VIP Program exemplifies agility in assessment and dedication to data-driven improvement.

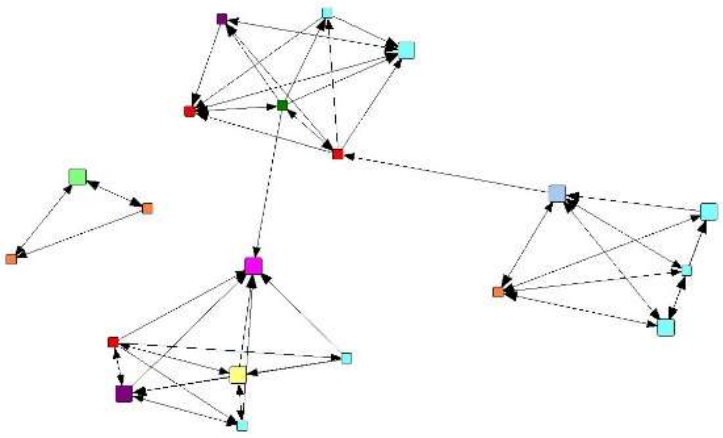
Evidence: Multidisciplinary Collaborative Projects

A key aspect of VIP is the multidisciplinarity of the program, as shown in the figure below. Each bar represents a team, and each color block represents students on the team by major. While colors do repeat (because there are so many majors), the visual conveys the nature of the program. Social network analysis of peer evaluations found that within teams, students interact more often with students from other majors, confirming that collaborations within VIP cross disciplinary lines.



Above: Enrollments for 19 of the VIP Program's 96 teams, Fall 2024

Collaboration Across Disciplinary Lines



Each node represents a student, node size represents number of semesters on the team (1-3), and color represents major. Lines represent frequent and very frequent interaction.

In addition to illustrating collaboration across disciplinary lines, the figure also shows the sub-team structure employed in large teams. Reused with permission [11].

Evidence: A Leader in Multidisciplinary Project-Based Learning - Georgia Tech's is the leader in research and dissemination of the model, and it actively supports other institutions in program establishment. Georgia Tech hosted the first annual meeting of the VIP Consortium in 2014, and it continues to lead the annual meeting, drawing representatives from colleges and universities from around the world. Georgia Tech's VIP Directors advise administrators and deans from current and prospective VIP institutions, developed a logic model for program establishment, and presents workshops to program directors and VIP instructors around the world (Europe, Middle East, Asia, Africa, and South America). Georgia Tech has facilitated program establishment at Morehouse College, Georgia College and State University (housed in the EPIC program), Georgia Southern University, Georgia State, Kennesaw State University, and the University of Georgia, with support including workshops, course descriptions, syllabus templates, and consultations with directors, administrators, and registrars (resource below).

Logic Model - VIP Program Establishment

Inputs	Activities	Short-Term Outputs	Long-Term Outputs	Outcomes
Core Inputs Director(s) Administrator(s) Faculty Students Curricula Space	**Negotiate/Secure** Release time for Director Meeting space for teams Curricular policies on how credits count toward degree requirements	Syllabus Template Grading framework	Program & courses in catalog	**Institutional** Increases institution capacity to provide undergraduate research experiences Policies enable students to participate for multiple semesters Program grows until capable of serving all students on campus Increases institution's appeal and reputation (prospective students, employers, industrial partners, and peer institutions) Increases funding to the institution through: - Research grants - Industry sponsorships for teams
Process Stakeholders Curriculum Committees Academic Advisors Registrar	**Develop or Select** Subject Code Course numbers, course descriptions Application process Registration/permit process to control size/composition of VIP Teams Webpage	Number of teams	Teams last 3 or more years	
Helpful Inputs Funding Staff Central Campus Program Development Support Communi-cations Support	**Recruit** Faculty Students	**Student Enrollment** Overall enrollment Students participate multiple semesters Variety of academic ranks Variety of majors		**Individual** Faculty benefit, stay engaged for many years. Students develop and apply skills and knowledge. Increases student job placement rates
	Plan, Manage Growth Track and analyze enrollments Communicate to stakeholders Hire academic program manager @ 8-10 teams	Meetings, reports, and presentations	VIP incorporated into accredit-ation processes	
		Connections with other VIP Programs	Presentations, publications, collaborations	

VIP Programs in the US: Arizona State University, Boise State University, Coastal Carolina University, Colorado State University, Drexel University, **Georgia College and State University**, **Georgia Institute of Technology**, **Georgia Southern University**, **Georgia State University**, Howard University, Iowa State University, **Kennesaw State University**, **Morehouse College**, NYU Tandon School of Engineering, Purdue University, Rice University, Rochester Institute of Technology, Stony Brook University, Texas A&M University, The Cooper Union, University of Arizona, University of California Davis, University of Delaware, **University of Georgia**, University of Hawaii, University of Memphis, University of Michigan, Virginia Commonwealth University, and Virginia Tech.

Summary

Georgia Tech's VIP Program combines two HIPs, undergraduate research and collaborative projects, which carry myriad benefits (deeper understanding [8], intellectual curiosity [1], [2], communication skills [1], [3], [4], and clarification of career goals [1], [5]). The Program's philosophy is that all students should have the opportunity to work with faculty on ambitious projects embedded in faculty research, and this has had wide ranging impacts on students, the institution, and other colleges and universities. At the student level, the Program is having a measurable and significant impact on student job placement, leadership growth, and professional skill development. The Programs' dedication to student access has yielded unparalleled results: First-generation and transfer students participate at the same rate as their peers, and Pell grant recipients participate in VIP at higher rates than any other program associated with job placement, and both have been achieved without special recruiting or accommodations.

At the institutional level, enrollments continue to grow because more faculty continue to establish teams, teams last many years or indefinitely, and departments are adopting policies that support student participation. Faculty from every college have established teams, showing that the model can work in all fields. The program supports faculty instructors with onboarding, instructional support, and by working with CTL to address emerging faculty needs. The Program is dedicated to continual assessment and improvement, leveraging program and institution-level data to answer large questions on access and student outcomes. It then actively engages departments to support data-driven decision making in curriculum development and revision. Beyond its own campus, Georgia Tech's VIP Program also disseminates findings and aids in program establishment at institutions in Georgia and around the world.

The VIP Program is not required of anyone. Its ongoing growth indicates that it fills a critical unmet need. Georgia Tech's VIP Program envisions a transformation of higher education in which the "new normal" includes faculty and student teams working together on projects of mutual interest. With a program that serves 1/3 of students, that actively engages departments, and that continues to grow, Georgia Tech is moving the needle toward this new normal.

References

[1] K. W. Bauer and J. S. Bennett, "Alumni Perceptions Used To Assess Undergraduate Research Experience," *J. High. Educ.*, vol. 74, no. 2, pp. 210–30, Mar. 2003.

[2] C. A. M. Kardash, "Evaluation of an Undergraduate Research Experience: Perceptions of Undergraduate Interns and...," *J. Educ. Psychol.*, vol. 92, no. 1, p. 191, Mar. 2000.

[3] D. Carter, H. Ro, B. Alcott, and L. Lattuca, "Co-Curricular Connections: The Role of Undergraduate Research Experiences in Promoting Engineering Students' Communication, Teamwork, and Leadership Skills," *Res. High. Educ.*, vol. 57, no. 3, pp. 363–393, 2016, doi: 10.1007/s11162-015-9386-7.
[4] D. Lopatto, *Science in Solution: The Impact of Undergraduate Research on Student Learning*. Research Corporation for Science Advancement, 2004.
[5] E. Seymour, A.-B. Hunter, S. L. Laursen, and T. DeAntoni, "Establishing the benefits of research experiences for undergraduates in the sciences: First findings from a three-year study," *Sci. Educ.*, vol. 88, no. 4, pp. 493–534, Jul. 2004, doi: 10.1002/sce.10131.
[6] S. H. Russell, M. P. Hancock, and J. McCullough, "Benefits of Undergraduate Research Experiences," *Science*, vol. 316, no. 5824, pp. 548–549, 2007.
[7] G. D. Kuh, "High-Impact Educational Practices: What They Are, Who Has Access to Them, and Why They Matter," Association of American Colleges and Universities, Sep. 2008.
[8] J. S. Krajcik and P. C. Blumenfeld, "Project-based Learning," in *The Cambridge Handbook of Learning Sciences*, R. K. Sawyer, Ed., Cambridge University Press, 2005, pp. 317–34.
[9] J. Melkers *et al.*, "The Social Web of Engineering Education: Knowledge Exchange in Integrated Project Teams," in *2012 ASEE Annual Conference and Exposition*, 2012. [Online]. Available: http://www.asee.org/public/conferences/8/papers/5300/view
[10] J. Ludlum, "Georgia Tech Exit Survey Research Brief: VIP Program Comparisons," Georgia Institute of Technology, Atlanta, GA, 2015.
[11] J. Sonnenberg-Klein, R. T. Abler, E. J. Coyle, and H. H. Ai, "Multidisciplinary Vertically Integrated Teams: Social Network Analysis of Peer Evaluations for Vertically Integrated Projects (VIP) Program Teams," presented at the 2017 ASEE Annual Conference & Exposition, Columbus, Ohio, Jun. 2017. doi: 10.18260/1-2--28697.
[12] E. J. Coyle, "VIP Consortium Final Report, submitted to The Helmsley Charitable Trust," Georgia Institute of Technology, Atlanta, GA, Jul. 2018.
[13] J. Sonnenberg-Klein, R. T. Abler, and E. J. Coyle, "Correlation between Academic Credit-use Policies and Student Persistence in Vertically Integrated Project (VIP) Courses," in *2018 ASEE Annual Conference & Exposition*, Salt Lake City, Utah, Jun. 2018. doi: 10.18260/1-2--30227.
[14] J. Ludlum, "Analysis of Post-Graduation Outcomes for Vertically Integrated Projects (VIP) Participants," Georgia Institute of Technology, Atlanta, GA, May 2021.
[15] J. Sonnenberg-Klein, "Relationship between College Graduate Job Placement and Faculty-Led, Team-based, Undergraduate Research Experiences: A Propensity Score Analysis," Georgia State University, 2024. [Online]. Available: https://doi.org/10.57709/36962302
[16] J. Sonnenberg-Klein, D. O'Bryant, and E. J. Coyle, "First-Generation Students, Transfer Students, and Vertically Integrated Projects," *Scholarsh. Pract. Undergrad. Res.*, no. Submitted for 2025 Special Issue on VIP, 2025.
[17] J. Sonnenberg-Klein and E. J. Coyle, "Leadership Growth over Multiple Semesters in Vertically Integrated Project (VIP) Courses," *IEEE Trans. Educ.*, vol. 67, no. 3, Jan. 2024, doi: 10.1109/TE.2023.3344314.