

Lessons learned from the first implementation year at the University of Memphis

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**Vertically
Integrated
Projects**



Student Teams. Faculty Projects. Innovating Together.

VIP Consortium Annual Meeting, 2023

NSF IUSE Award 2021-2024

*Chrysanthe Preza (PI)
Stephanie Ivey (co-PI)
Craig Stewart (co-PI)*

*Understanding the Role of
Undergraduate Research and
Mentoring in the Self-Efficacy,
Identity, and Success of
Engineering Undergraduate
Students*

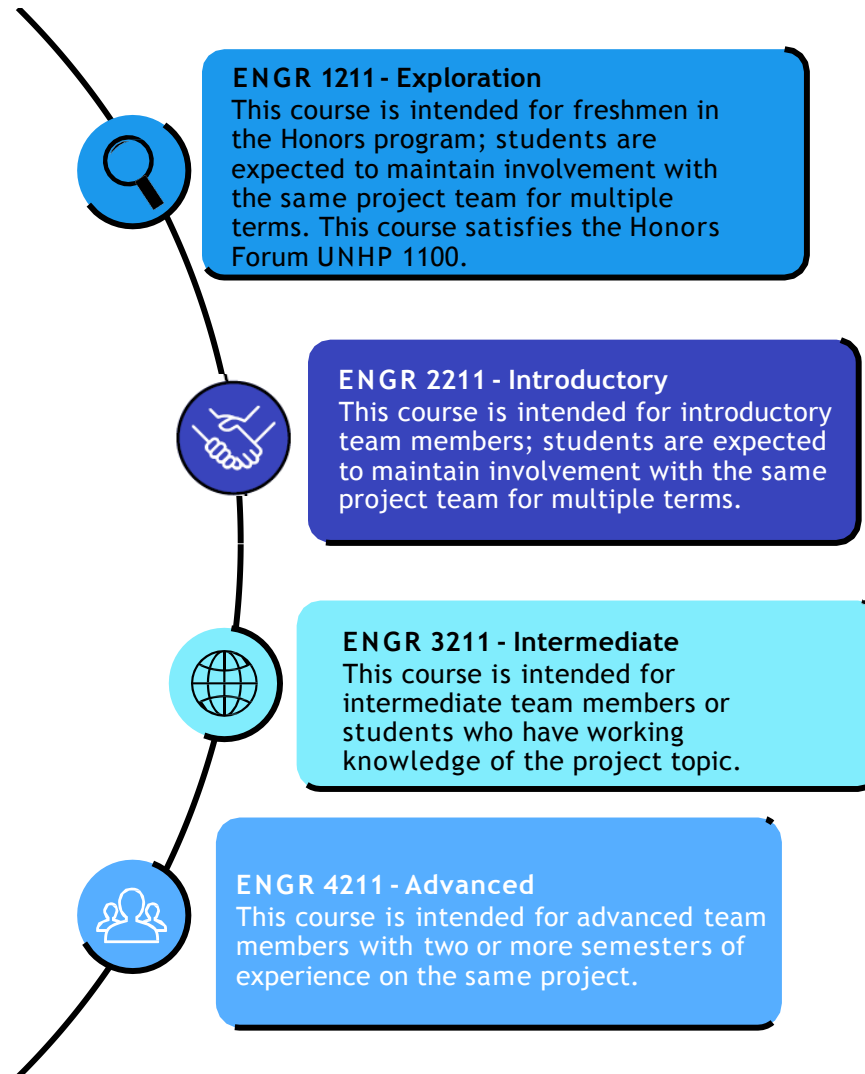


<https://www.memphis.edu/vip>



VIP Course Sequence

Students enroll in progressive VIP courses for **three consecutive semesters** and participate at the appropriate level of experience to earn 3.0 hours of credit.



Pilot: Two VIP teams in Fall 2022

- *Making the invisible visible: Engineering microscopes with deep learning*

Faculty: Dr. C. Preza, Elec. & Comp. Eng.

- *Integrating Social Media, Big Data, and other Innovations to Assess Community Livability*

Faculty: Dr. S. Ivey, Civil Eng.

- Our first cohort: N = 12; 7 women; 4 Black/African American; 2 Hispanic
- 5 graduate student mentors



VIP Team expansion to include faculty from all engineering departments

3rd team added in spring 2023

- *Making Sense of a Big World: Autonomous Sensing for Large Area Situational Awareness*

Faculty: Dr. Eddie Jacobs, **Elec. & Comp. Eng.**

Two New VIP teams available in Fall 2023!

- *Winning the War on Bugs: Design of Antimicrobial Materials for Biomedical Applications*

Faculty: Dr. Jessica Amber Jennings, **Biomedical Eng.**

- *Organizing chaos: Understanding turbulence in large-scale applications*

Faculty: Dr. Daniel Foti, **Mechanical Eng.**



First Year Outcomes & Observations

- Overall positive impact of the program for the students
 - building community with their peers
 - developing deeper understanding in the team's technical focus area
 - Improving technical writing and presentation skills
 - graduate students developed leadership and mentoring skills

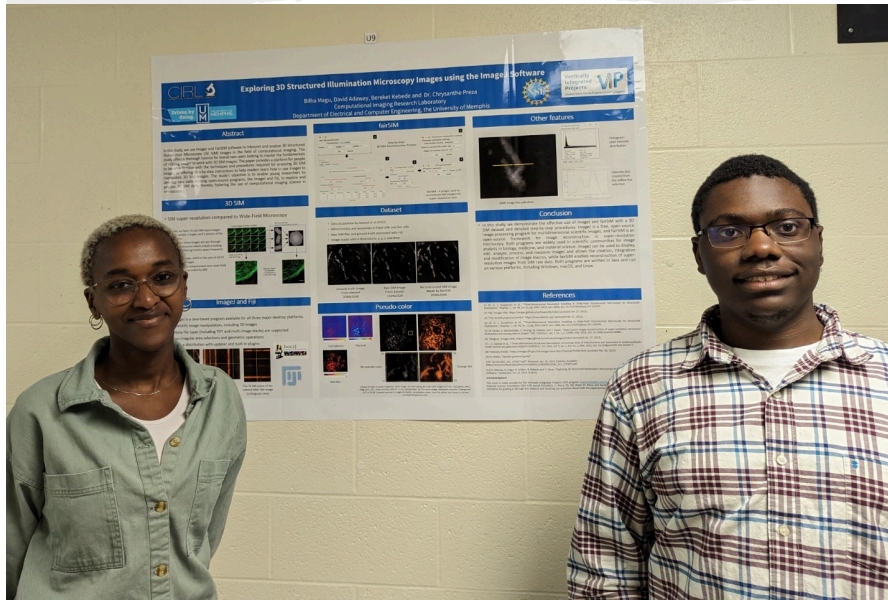
• Address Concerns/Challenges

- Student retention
 - 5 out of 12 did not continue to 2nd semester
- Clearer communication regarding how course activities scaffolded and supported the research project
- Clarify value of self-reflection in weekly journals
- Department buy in
- Approval of permanent VIP courses
- VIP course Meeting time
- Balance course work and VIP research

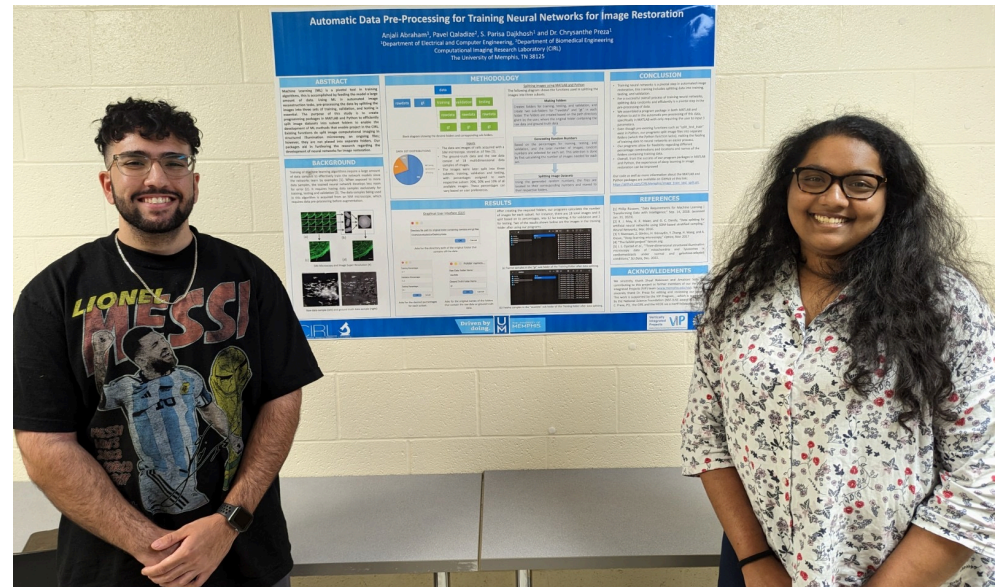
2nd Semester Deliverables

VIP Poster Presentations at

The UoM Student Research Forum, March 2023
The EECE Dept. Annual Competition, April 2023



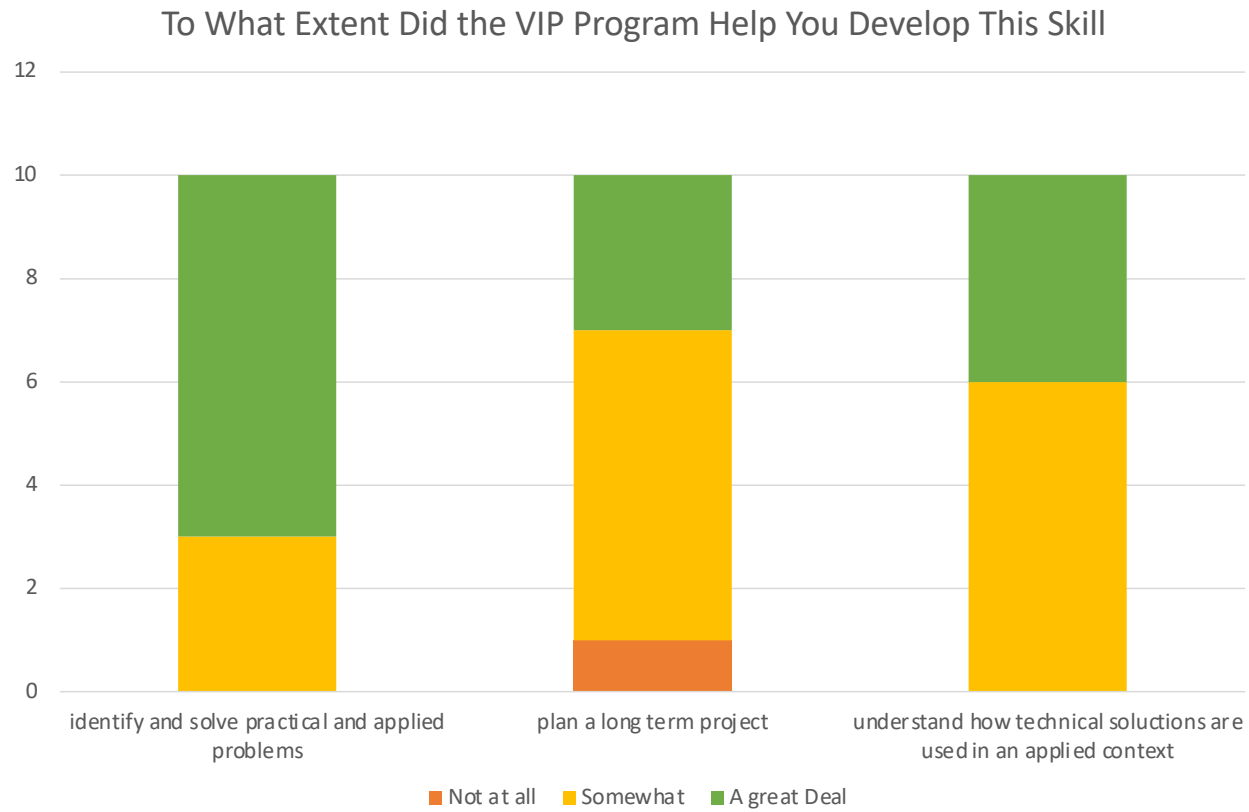
Published paper in
QuasesitUM - Undergraduate research journal
at the UoM



2nd place winners in EECE competition

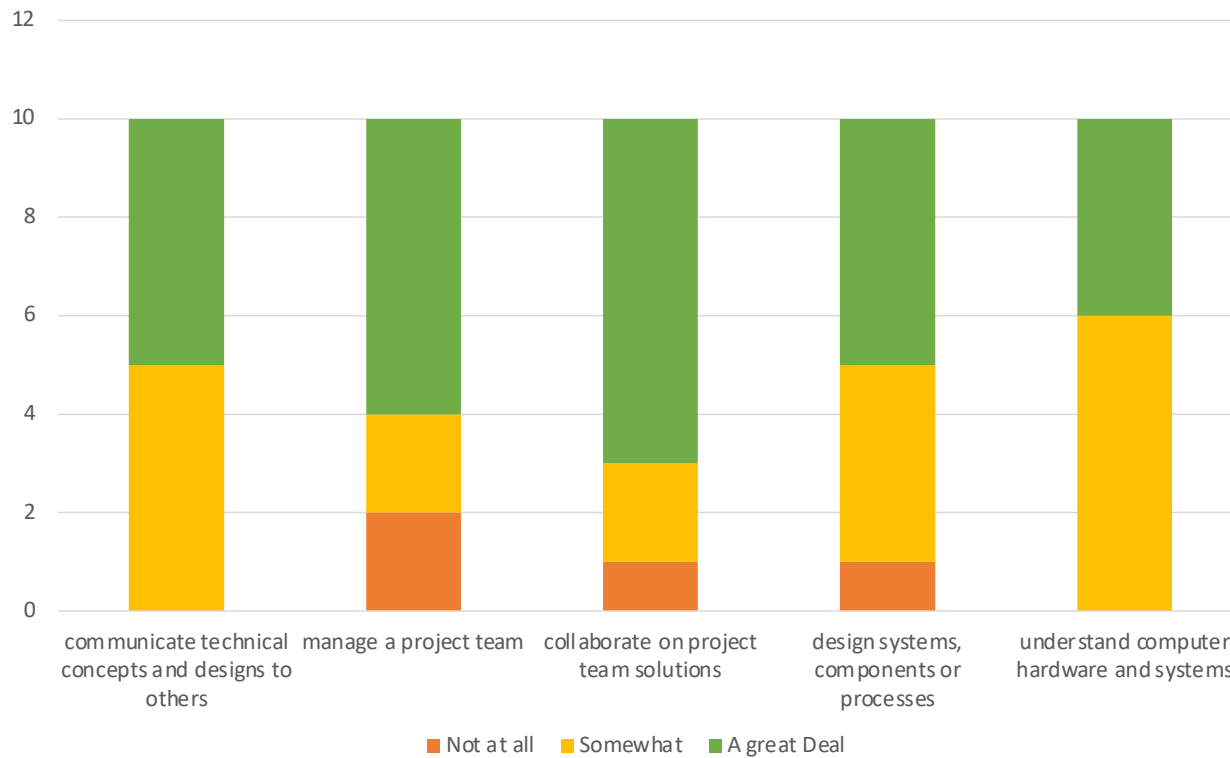
VIP Post-survey Results Spring 2023

(N=10, 4 women, 3 Black/African American; 1 Hispanic)

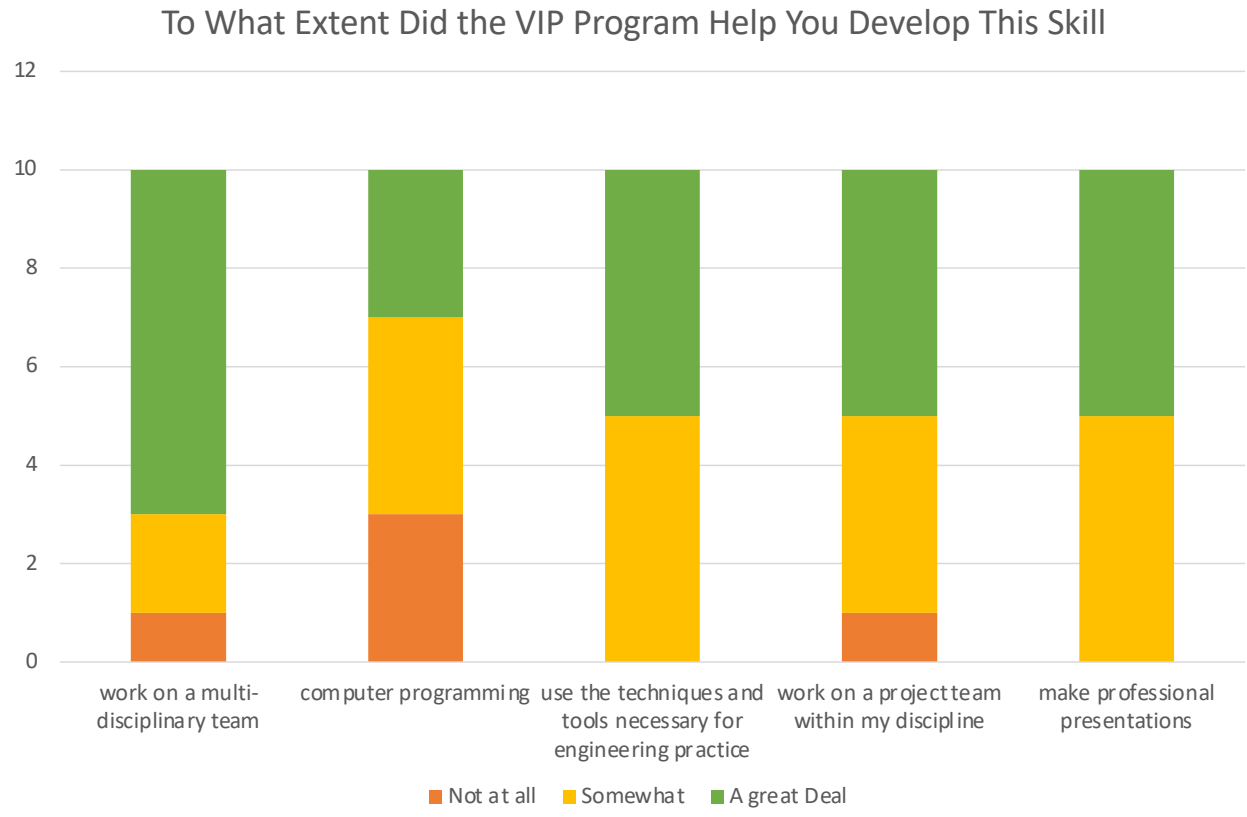


VIP Post-survey Results Spring 2023

To What Extent Did the VIP Program Help You Develop This Skill

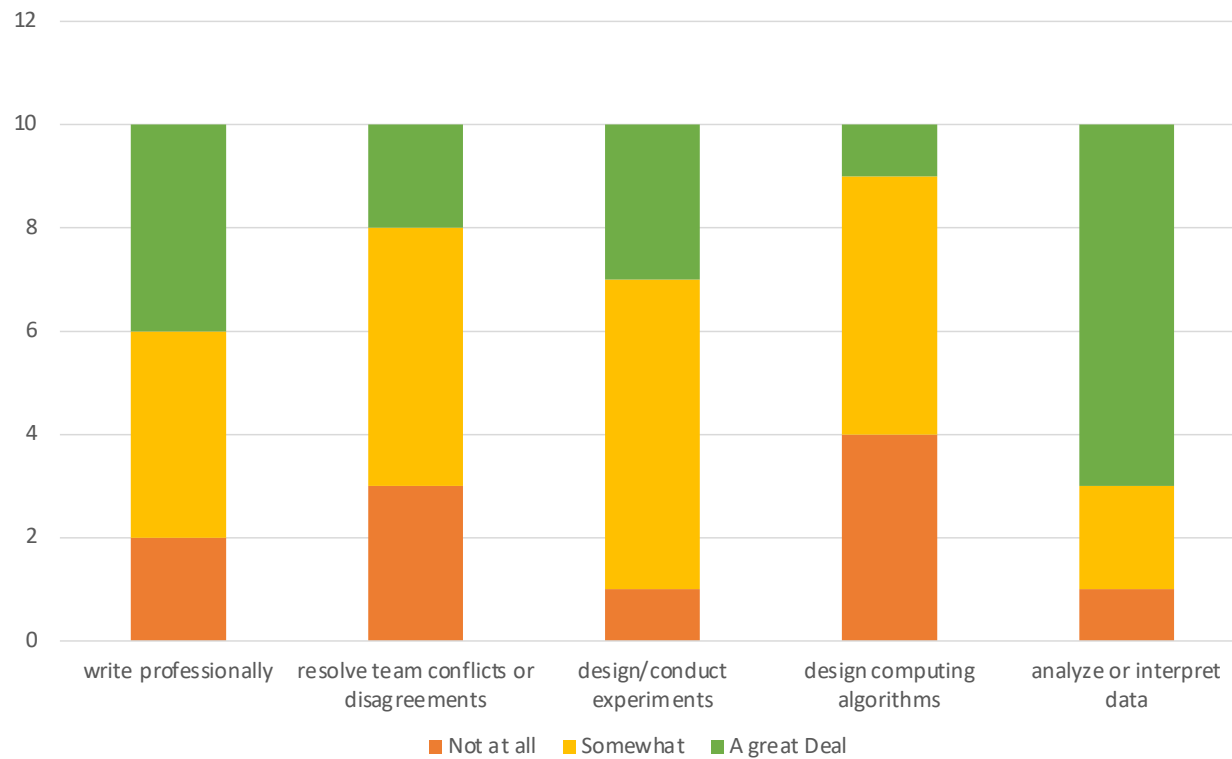


VIP Post-survey Results Spring 2023

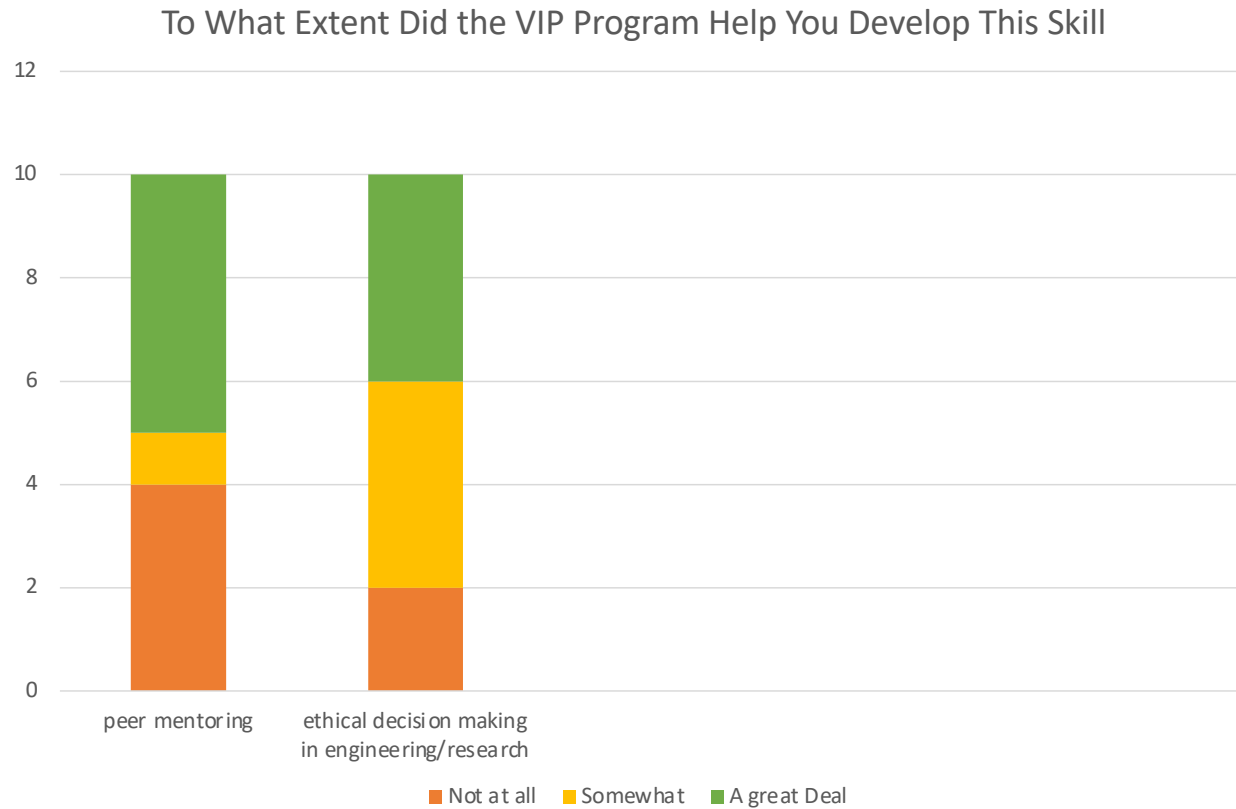


VIP Post-survey Results Spring 2023

To What Extent Did the VIP Program Help You Develop This Skill



VIP Post-survey Results Spring 2023





Questions?



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VIP impact on engineering identity, self-efficacy, growth mindset, persistence (student)



VIP impact on culture of inclusion (organization)



Determinants for scalable and sustainable model at UofM

VIP



Inputs and Investments

- University leaders
- Participating Faculty conducting interdisciplinary research
- Diverse student body
- Physical meeting space conducive to teamwork
- Industry partners

Activities

- Development of VIP curriculum
- Development of training units
- Student recruitment
- Development of team projects
- VIP team formation
- Diversity workshops
- Innovation Seminars
- Mentoring
- VIP Spotlights
- Development 1-day summer summit

Outputs

- Research project-based curriculum
- Undergraduate students earn credit doing research
- Improved undergraduate academic performance
- Undergraduate students acquire skillset for real-world problem solving
- Improved undergraduate experience through mentoring and networking

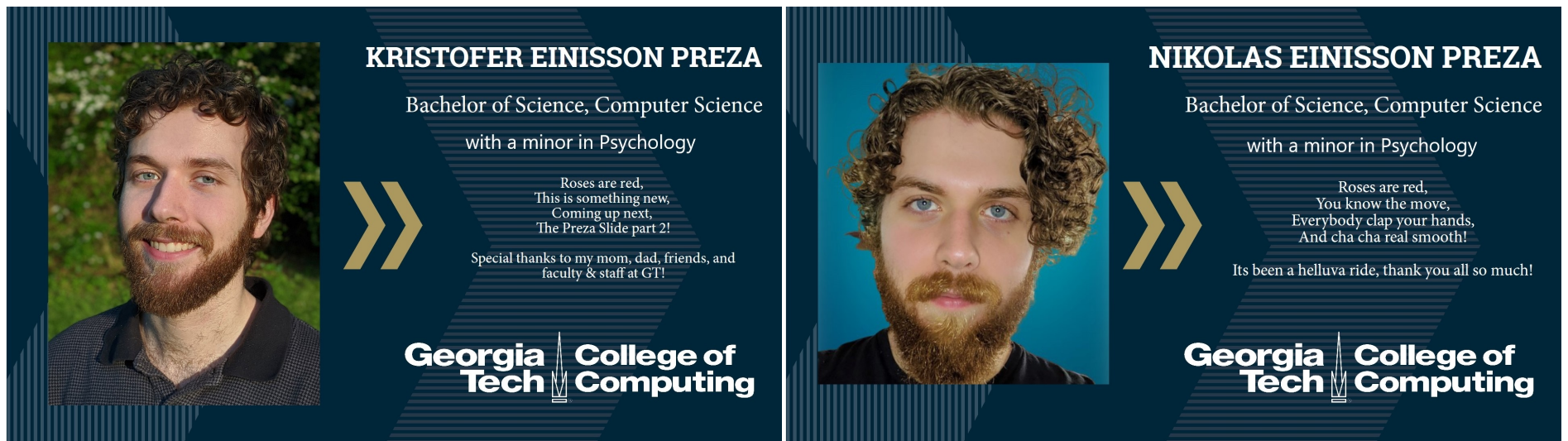
Outcomes - Short term

- Higher retention rate in STEM disciplines
- More diverse student body (gender, ethnicity, socioeconomic, academic preparation)
- Increased student engagement
- Enhanced STEM identity
- Increased understanding of importance of diversity and STEM identity

Outcomes - Long term

- Inclusive culture in Engineering
- Positive impact on post-graduate achievement
- Positive impact on career pathway
- Create STEM majors awareness in high school students
- Facilitate TLSAMP student transfer to the UofM

How I learned about the VIP program



The image shows two side-by-side graduation slides for Kristofer and Nikolas Einisson Preza. Each slide features a portrait of the graduate, their name, degree information, a poem, and the Georgia Tech College of Computing logo. The slides are set against a dark blue background with a light blue geometric pattern.

KRISTOFER EINISSON PREZA
Bachelor of Science, Computer Science
with a minor in Psychology

»»

Roses are red,
This is something new,
Coming up next,
The Preza Slide part 2!

Special thanks to my mom, dad, friends, and
faculty & staff at GT!

Georgia Tech College of Computing

NIKOLAS EINISSON PREZA
Bachelor of Science, Computer Science
with a minor in Psychology

»»

Roses are red,
You know the move,
Everybody clap your hands,
And cha cha real smooth!

Its been a helluva ride, thank you all so much!

Georgia Tech College of Computing

From May 2020 virtual graduation

UofM Vertically Integrated Projects Program

VERTICALLY INTEGRATED PROJECTS

Join a VIP team and earn academic credits while getting the opportunity to engage in ambitious, long-term, large-scale, multidisciplinary project teams that are led by UofM faculty



www.memphis.edu/vip