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Motive for industry engagement

- Situation at Howard

- Students receiving financial aid: 98%
- Cost: \$23,233 /year (after financial aid) Percentage of students taking out loans: 72%
- Average loan amount: \$7,082/year (national average = \$6,768/yr)
- Students work off-campus

- Motive of engagement

- Provide on-campus working opportunities
- Stipend earning while doing projects
- Industry sponsorship is sought

Opportunity for industry engagement

- Previous engagement
 - Through senior-design project
 - Philanthropic gift to College of Engineering
- Opportunity
 - Local company's interest in hiring Howard students
 - Easy, convenient way of support
 - through company's philanthropic foundation
 - Simple and easy way of giving (gift)
 - Diversification of workforce

Protocol for industry engagement



VIP Program at Howard University

Howard University

Washington, DC 20059

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On-boarding Process for Industry Sponsors

***NOTE:** From Fall 2023 semester, **EE/CpE students** could earn 3 credits from VIP courses (EEE101 Faculty-Student Team Project (VIP) (1 cr); EECE201 (1 cr); and EECE 301 (1 cr)) and substitute them for 1 EE/CpE elective course.

Benefits: Through the VIP framework, companies can connect with VIP teams embedded in faculty R&D efforts. Through team and program sponsorships, companies can identify and reach: (a) Motivated students earlier in their academic careers: VIP attracts sophomores, juniors, and seniors actively seeking challenges beyond classroom. Students can participate for multiple semesters, with new students replacing graduates, and returning students taking on leadership roles with the teams; (b) Large number of students from many majors: Each team is multidisciplinary by design, and VIP attracts students from all majors from college of engineering and other colleges; (c) Students doing R&D in company's area of interest: VIP teams are embedded in faculty research efforts. Companies can sponsor teams of interest, and team-sponsor relations are tailored to meet the need of teams and sponsors; (d) Team-oriented students: VIP cultivates a culture of peer-mentorship, with returning students onboarding new students and taking on increasing level of responsibility each semester. VIP students report high marks in understanding of technology applications relevant to their field of study, ability to work with individuals from diverse background, and ability to work in a multidisciplinary team.

[VIP Sponsorship opportunity \(pdf\)](#).

[VIP on-boarding Process \(pdf\)](#)

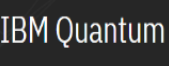


Project Description File (in [pptx](#) and [pdf](#))

- Benefit for Sponsoring Companies
 - Skill-Set development: embedded in the project description
 - Multidisciplinary team environment: team playing and leadership
 - (Optional) Summer internship opportunity: continuous engagement with students
- Sponsorship
 - Stipend for 4 – 6 students for at least 2 semesters
 - 20 – 30% may be paid for faculty research development activities
- On-boarding process
 - Initial Discussion
 - Project Description
 - Sponsorship and payment process
 - Faculty advisor selection
 - VIP team formed
 - Kick-off meeting
 - Bi-weekly/monthly meeting with industry's technical point of contact

Status

- Multiple Industry Sponsors
- Continuation and Extension is norm

<p>Metasurfaces and Resonators are physical structures that are patterned into crystals to create special quantum-like behavior when it interacts with light; think about how light reflects off a flat CD/DVD disc and creates a rainbow. In this research we study Metasurfaces and Resonators in transparent and reflective crystals to enable new effects which can be used for photonic circuits, waveguides, and sensors. This work doesn't require prior knowledge in optics but requires a desire to learn new concepts. The research tasks will include:</p> <ul style="list-style-type: none"> ○ Simulations using Software ○ Data analysis and Statistics ○ Collecting microscopy and optical spectroscopy data ○ Scientific Reading and Writing 	 <p>Team Members</p>
<p>Algorithmic and Visualization Capabilities for Machine Learning: The objective of the project is to evaluate various algorithmic and visualization tools and insights which would generate various types of visualization to support machine learning-driven analysis of large/complex data sets. The project utilizes open source tools and publicly available data in the evaluation study.</p>	 <p>Team Members</p>
<p>This research aims to develop advanced machine learning and econometric models to tackle current days freight optimization problems. More specifically, this project focuses on the cold chain implementation in the Amazon Freight Inbound (AFI) network. Students from both Civil and Environmental Engineering and Computer Engineering are part of this research team. The project team will help Amazon to create a web-based service for cold chain shippers. The service allows shippers to send their freight pickup requests and then builds optimized execution plans for the Amazon Freight inbound process, including freight pickup, DC cross-dock, and delivery to the destination facilities. The optimization engine generates the most cost-efficient route solutions that meet the time, temperature, capacity, and operational constraints.</p>	 <p>Team Members</p>
<p>This project aims to complete a trade study against attack methods which have become increasingly sophisticated, for the tools that provide physical memory coverage against those attacks, by conducting extensive analysis which leads to determination of the best memory forensics tools that provide the best threat intelligence coverage used in identifying and investigating cyber-attacks.</p>	 <p>Team Members</p>

<p>Quantum Applications: This project explores quantum computing applications. One of them includes development of quantum games for experimental test beds for hybrid classical-quantum machine learning algorithms via the IBM-HBCU Quantum Coalition.</p>	 <p>Team Members</p>
<p>Solar arrays use sunlight as a source of energy to generate DC electricity. Due to the relatively low efficiency of modern day solar cells (~20% maximum) solar powered electronics must be energy efficient for practical use. In the field of embedded systems, some modern day microcontrollers have peripherals and functionalities designed to minimize the amount of energy that is needed to interface with and control systems, making them perfect for solar powered projects. The goal of this project is to design and build a solar powered vehicle that can efficiently maximize solar array energy to charge batteries, as well as minimizing the energy lost through microcontroller control power consumption.</p>	 <p>Team Members</p>
<p>Businesses need help sifting through mountains of documents (unstructured data), finding insights and using these to take action. Manual review is often not practical or viable. Organizations are using NLP models to review large volumes and data and patterns and anomalies. These findings can then lead to greater insights and actions. However, many current NLP models are trained on generalized data sets and are not domain specific, making them less effective. This project will focus on proposing a method to find a way to adapt generic language models for a domain specific use case such as: healthcare, legal, financial data. This project is carried out in conjunction with Excella as an industry sponsor.</p>	 <p>Team Members</p>

Lessons Learned

- Develop a convenient process/mechanism for industry sponsor
 - Emphasis with gift (rather than grant/contract)
- Emphasize the benefit the company may receive
- Emphasize the possibility of advancement toward faculty research project
- Keep them in the loop
- Presentation event

Conclusions

- Engagement of industry in the VIP at Howard projects
- Stipend payment for students
 - Earning while learning
 - Grade improvement
 - Retention improvement
 - Graduation improvement
 - Employment improvement
- Easy and convenient process/mechanism
- On-boarding process

Questions and Answers

- Contact:

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