Department of Electrical Engineering and Computer Science

5th Electrical Engineering and Computer Science Day
Friday, April 14, 2023

At
Howard University
INNOVATION CENTER
Mackey Building, 2336 Sixth Street, Northwest
Washington, DC 20059

Keynote Speaker
Tom Clancy
Chief Technology Officer
Aurora Flight Sciences, a Boeing Company

Tom Clancy joined Aurora as one of its original staff members. He has a broad background and experience across all aspects of UAV engineering and technology.

Early in his career, Tom was the group leader for avionics, heading the team responsible for flight control systems and original sizing of an electrical propulsion system for the Perseus high-altitude UAV, later becoming the group leader for propulsion, managing the development of the Arion I closed-cycle engine, and overseeing the maturation of the Arion IIB multi-stage turbocharged engine. As the Perseus aircraft progressed into integration, he served as Project Manager and Chief Engineer for the entire Perseus development program. He has also served as Chief Engineer and Flight Director on multiple UAV programs and operations. In 1997 he took responsibility for Aurora's NASA ERAST programs as the VP for NASA ERAST. In 2000 he became the VP of Engineering, then the VP of Unmanned Aircraft System and now serves as the Chief Technology Officer.

On the Orion Program, he served as the Program Manager during integration, test and the first flight test series. He is also a member of the Flight Readiness Review Board and the Test Director for all the test flights.

Tom earned his bachelor's degree in Electrical Engineering from the Massachusetts Institute of Technology.

Schedule of Activities

8:30 am – 9:00 am   **Registration and Breakfast**

9:00 am – 9:15 am   **Welcome and Overview**
Dr. John Anderson, Dean
College of Engineering and Architecture

9:15 am – 11:45 am   **Senior Design Presentations**

Session 1: Innovation Center – Computer Science Projects

9:15 am – 9:30 am   **Team 1:** Pushin Black
Project Title: Bulletin
Faculty Advisor:
Team Member(s):   Morenike Onifade
Zoe Carter
Khalil Scott-Shepherd
Ahmed Anthony
Akosua Wordie

Problem Statement: Businesses owned by minorities can be hard to discover. This can make it harder for minority owned businesses to succeed, which can lead to various detrimental effects for their respective communities. Minority communities struggle with wealth, and making their businesses more successful will go a long way in bridging the gap between minority and white wealth. It will also make consumers happier as they may want to receive certain services from people who they can share life experiences with.

Project Goal: The purpose of Bulletin is to provide minority business owners with ways to reach new customers and build relationships with them. Users will be able to create an account when they first use the application. When they create an account, they will be able to decide whether they want to register as a consumer or a business owner. Once they make the decision they will be able to choose either what type of business they are for the owners, or what types of businesses they are interested in seeing for the consumers. Consumers will be able to search business by tags to specify what types of business they want to see. On business pages users will be able to see reviews other users left. They will also be able to follow business they are interested in and see updates on the bulletin board in a timeline style. Business owners will be able to post updates and promotions for users following them to see and take advantage of.

9:30 am – 9:45 am   **Team 2:** Fantastic Five
Project Title: MVMNT
Faculty Advisor:
Team Member(s):   Dion Simmons
Malaya Moon
Iyinoluwa Tugbobo
Aster Smith
James Fisher

Problem Statement: For small minority-owned businesses in urban areas, it can be challenging to expand their customer base. While locals in their relative area likely know and frequent their services, for customers not-so-familiar with the area it can be hard to learn about them.

Project Goal: The solution will need to address two types of users: members of the public seeking businesses and business owners looking to be found. Our solution, MVMNT, is a business locator and review site. MVMNT serves to connect urban minority-owned businesses to new customers while also providing a review platform to cultivate business-customer relationships. We have created a full-stack web application. It is a web/mobile app that provides information about local small businesses while offering business facilitation and expansion through promotion and support. This solution addressed two types of users: members of the public seeking services from a new provider and business owners looking for customer base expansion. The app/site can be used primarily by small minority-owned businesses located in major metropolitan cities with a focus on businesses located in lower income neighborhoods.

9:45 am – 10:00 am	**Team 3:** Remedy
	Project Title: Fairer Prescription Adherence Model (FPAM)
	Faculty Advisor:
	Team Member(s): Janelle Wallace
	Kuira Edwards
	Leandra McPhie
	Kevin Claiborne Jr
	Manish Basnet

Problem Statement: Black Americans have historically been the victims of racial bias in the US. This racial bias is prevalent in many institutions, including healthcare. Research has shown that healthcare providers have beliefs that Black Americans do not experience the same amount of pain as white Americans. This may lead to discrepancies in how pain medication is administered to both races. Studies have shown that black patients consistently experience poorer communication quality, information-giving, patient participation, and participatory decision-making than white patients. This inequity and lack of empathy from providers can be attributed to the lack of shared racial identity in patient-physician relationships.

Project Goal: We have created an inclusive sentiment analysis model using natural language processing to incorporate African American Vernacular English (AAVE) in order to help providers empathize with Black patients who speak using AAVE. We have trained this model by using an AAVE dataset. The model takes an input string of text that the patient conveys to the provider and returns an output that classifies the text as positive, neutral, or negative. This product is a provider service. We hope that this product will help to overcome the language barrier between Black patients and non-Black providers, especially as it pertains to telehealth.

10:00 am – 10:15 am	**Team 4:** Power Rangers
	Project Title: Hospital Triage App
	Faculty Advisor:
	Team Member(s): Marquise Byrd
	Xavier Vaugh

Kameron Nelson
Abdoul Bah
Julian Forbes

Problem Statement: The wait for emergency rooms can be deadly to the patient and costly/logistically inefficient to the hospital. Seconds can be the difference between life and death and filling out a form or describing your symptoms to the receptionist then waiting is a real problem for a lot of people.

Project Goal: Our product allows people to plan ahead when going to the emergency room, as well as be in a virtual queue. They do this by filling out a form on the app, that can either be general or tailor made to the hospital. These forms can then be updated either statically or dynamically. Static downloading would be if you don't have a consistent connection to wifi, and will be downloaded as a batch, and dynamically will be able to download them on cellular or wifi at the moment for a more recent form if there is any.

10:15 am – 10:30 am	**Team 5:** JJAKK
	Project Title: Huemans
	Faculty Advisor:
	Team Member(s): Josh Kennedy
	Jailynn Primus
	Ahmaz Athias
	Kyndall Jones
	Keerthana Pullela

Problem Statement: In the United States, the average Black and Hispanic or Latino households earn about half as much as the average White household and own only about 15 to 20 percent as much net wealth. To combat the racial wealth gap, support is needed for minority businesses. Currently there is no tool/app/software that exclusively supports searching up and reviewing minority-owned businesses. Due to this, excess time is spent searching and vetting for services by people of color.

Project Goal: Our solution is a curated avenue that provides a platform to both discover and discuss minority-owned alternatives to necessary services. Users can not only search for the services they require, they can also see reviews, photos, and FAQs surrounding the business. This will help provide a spotlight, and build a sense of community to support local businesses. There will also be room for listing deals, at the business owners discretion, in order to incentivize users to continue their patronage and refer more people to do the same.

10:30 am – 10:45 am	**Team 6:** Fitness Group
	Project Title: _Health and Fitness App + Forum
	Faculty Advisor:
	Team Member(s): Keianna Nagle
	Chandler Bursey-Reece
	Siroun Petersen
	Izaac Ballard
	Shail Pokharel

Problem Statement: Currently there are ways to monitor a user's fitness activities, but there are very few ways for these users to communicate, share progress, provide advice, and seek help in relation to these activities. Exercisers need to be able to communicate with each other and share their progress and thoughts about the activities they have done related to fitness.

Project Goal: Our product is an android fitness application that assists users in improving their overall health & being. Users answer questions at sign up and get personalized notifications throughout the day on their daily steps (Too Little, Too Much). Our application is connected to a forum which is also accessible via the web. Here users are able to discuss and participate in health discussions. It is a forum for users to be able to share discuss and comment with each other about their goals and progress. People with similar health questions will be able to discuss about common interests.

10:45 am – 11:15 am	**Team 7:** MiSark
	Project Title: MiSark
	Mentor/Advisor:
	Team Member(s): Onyinyechukwu Ogbuanya
	Tolulope Akinlabi
	Teanna Barrett
	Adewale Folorunsho
	Nicholas Wayoe

Problem Statement: According to the Boston Federal Reserve, many Americans turned to the informal sector to offset the effects of the 2008 Recession. As financial prospects continue to be more unstable for young people from racial minority populations, the freelance sector has grown as well. According to a 2019 report by Statistica, 75% of freelancers are in the art and design sector. Some of these businesses include photography, caterers, videography, planners/hosts, etc. These businesses encounter difficulties such as a lack of funds for advertising, racial bias within the US against minority creatives, and existing bias in advertising for minority groups when trying to reach prospective customers. This project aims to provide visibility for these businesses and connect them to prospective customers from similar backgrounds to give our users a sense of belonging and a supportive environment as they navigate the US.

Project Goal: Our product is a web app that will match prospective customers to existing minority-owned businesses. This product will address two types of users: members of the public seeking businesses and business owners looking to be found. Users will be able to find a business via multiple methods, including proximity to the user's current location, text keywords e.g. colleges, product image, voice search, and recommendations based on search history or behavior. Additional features such as the ability to register a business on behalf of an owner and the owner's ability to claim a business registered on their behalf are included. This product includes the implementation of specific workflows, including user account creation, business registration, claiming business ownership, and flagging issues with business pages.

Session 2: Innovation Center – Electrical and Computer Engineering Projects

9:15 am – 9:30 am   **Team 1:** AeroSpace
                                          Project Title:
                                          Mentor/Advisor: Casey Jones (Aerospace)
                                          Team Member(s):   Nora Fischer
                                                                   Desvaun Drummond
                                                                    Autumn Edwards
                                                                    Sukti Tiwari

- **Project Goal:** Creation of an autonomous robot that will identify an object.
- **Problem Statement:** The need of the Aerospace Corporation's complaint of reducing the amount of space junk and the expense of building new things that are sent into space is to provide a means of collecting space junk to be reused in the future while being environmentally friendly.

9:30 am – 9:45 am   **Team 2:** Deliveroid
                                          Project Title: Delivery Robot
                                          Mentor/Advisor: Charles Kim
                                          Team Member(s):   Noah Drakes
                                                                    Ileana Bocage
                                                                    Aaron Gibbs
                                                                    Chrisserge Pierre-Louis

- **Project Goal:** Utilization of an H-Bridge to validate motor controls, Arduino to control the vehicle, and setting up the vehicle to operate autonomously.
- **Problem Statement:** The need of Howard University given the contact delivery health risks posed by the Covid-19 pandemic as well as overcrowded cafeterias, too many food/package orders and too few people to fulfilling these requests, is to efficiently provide convenient contactless delivery to students on campus so that the cafeteria can maximize its profits and mitigate overcrowding.

9:45 am – 10:00 am   **Team 3:** EMVP
                                          Project Title: EM Virtual Playground
                                          Mentor/Advisor: Su Yan
                                          Team Member(s):   Chism Atulomah
                                                                    Andrew Awoniyi
                                                                    Marvin Atwell
                                                                    Kyle Simon

- **Project Goal:** Design and implementation of an Electromagnetic Virtual Playground which visualizes the generation, propagation, and interaction of EM waves with environments.
- **Problem Statement:** The need of this experiment project is the generation of randomized ellipsoids within a set two-dimensional surface whilst avoiding overlapping within the given area to allow users to conduct virtual experiments with different experimental setups, such as different sources, materials, and geometries,

and perform simulations to monitor and visualize the process of EM phenomena such as antenna radiation, wave scattering and diffraction.

10:00 am – 10:15 am **Team 4: G**enAqua
Project Title: Water Battery
Mentor/Advisor:
Team Member(s): Abeeku Paulos
Adinah Gray
Barry Curtis
Nii Kojo Mante

- **Project Goal:** Production of a self-contained power generating system that catches excess solar energy and stores it as gravitational potential energy of water.
- **Problem Statement:** The need around current battery production with heavy metals is to devise a means to utilize a solar powered system in tandem with micro-hydro system so that a self-contained power generating system with an environmentally friendly energy storage.

10:15 am – 10:30 am **Team 5: Photon**
Project Title: Photonic Biosensor
Mentor/Advisor: Eric Seabron
Team Member(s): David Masale
Samuel Dowling
Jerome Halsell
Rachel Hurst

- **Project Goal:** Production of a photonic resonator with improved light coupling, better sensitivity, higher E-field enhancement, and better practicality.
- **Problem Statement:** After the COVID-19 pandemic, the need for more efficient means to detect diseases and pollutants is becoming more important. Thus, the need to develop a resonator design and meta material to use within a noninvasive biosensor that will increase chemical sensitivity and provide quick and accurate results via finite element analysis.

10:30 am – 10:45 am **Team 6: Terminator**
Project Title: Tic-Tac-Toe Machine
Mentor/Advisor: Charles Kim
Team Member(s): Bella Kuete
Omaretsoguwa Atsagbede
Oshione Adams
Amiya Bronw

- **Project Goal:** Creation of a robotic arm that can play tic-tac-toe against a human.
- **Problem Statement:** The need of today's children who are always on their phone and don't have someone to play with leads us to create a robot that plays tic-tac-toe so that they are not on their phones the whole day.

Time	Event
12:00 pm – 1:00 pm	**Lunch**
1:00 pm – 1:45 pm	**Remarks and Introduction of the Keynote Speaker**
1:45 pm – 2:15 pm	**DEMO/POSTER PRESENATION**
2:15 pm – 3:00 pm	**Awards**
3:00 pm	**Adjourn**