

# SUSTAIN CITY PROJECT

The Sustain City project is a sustainable plastic waste recovery project with a focus on recovering and documenting plastic waste generated at Academic City University College. The project will also seek to engage community members through a waste buy-back programme, research on plastic waste recycling programmes, advocacy on plastic pollution and partnerships with recycling companies.

Plastic waste is recovered and documented on campus through a weighing and recording programme. The project has also signed up onto global plastic waste marketplace programmes that connects the project team to plastic waste buyers. It is expected that the project will create jobs for the people of Cosway and its environs.

## Tackling Sustainable Development Goals :

6 CLEAN WATER AND SANITATION



8 DECENT WORK AND ECONOMIC GROWTH



11 SUSTAINABLE CITIES AND COMMUNITIES



# EGG INCUBATOR

PROJECTS BY : Wisdom Mahami



A 1,000 capacity Egg Incubator Innovation with 90% hatching rate to boost poultry production while minimizing the importation of poultry products. The project will significantly contribute to food security and job creation in the agricultural sector. Currently, this innovation is already piloted and commercialized installations completed for eight farms in the Northern parts of Ghana.

**Tackling Sustainable Development Goals :**



# HYDROPONICS FODDER SYSTEM

Livestock is critical to the survival of people all around the world and is worth \$1.4 trillion. The sector employs over 1.3 billion people each year. Livestock is a valuable asset for the rural poor in developing countries, but it faces a serious problem in the form of limited seasonal feed supply. Hydroponics fodder system is the game changer for livestock production around the world which is the cultivation of plants without using soil. This hydroponics grow machine will be used to cultivate crops such as microgreens and green fodder to feed livestock all year round.

**Tackling Sustainable Development Goals :**



# LOCOVENT 4 AFRICA

The COVID19- pandemic brought dire consequences to the global economy. During the peak of the pandemic, ventilators became the most crucial medical device in treating patients. Lack of adequate ventilators in developing countries such as Ghana, hampered medical care for many affected people. Ventilators provide mechanical ventilation by moving breathable air into and out of the lungs, to deliver oxygen to a patient who is physically unable to breathe, or breathing insufficiently.

In this regard, Academic City initiated LOCOVENT4AFRICA to build a low-cost movable mechanical ventilators that can be used in remote areas to save lives. With a 16-hour battery life the Locovent4 Africa ventilator can be easily charged in a vehicle with the regular 12 Volts vehicle adaptor and has solar charging technology. The innovation is at the stage where it is being tested by Korle Bu Teaching Hospital and Ghana Standards Authority.

**Tackling Sustainable Development Goals :** 3 GOOD HEALTH AND WELL-BEING 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

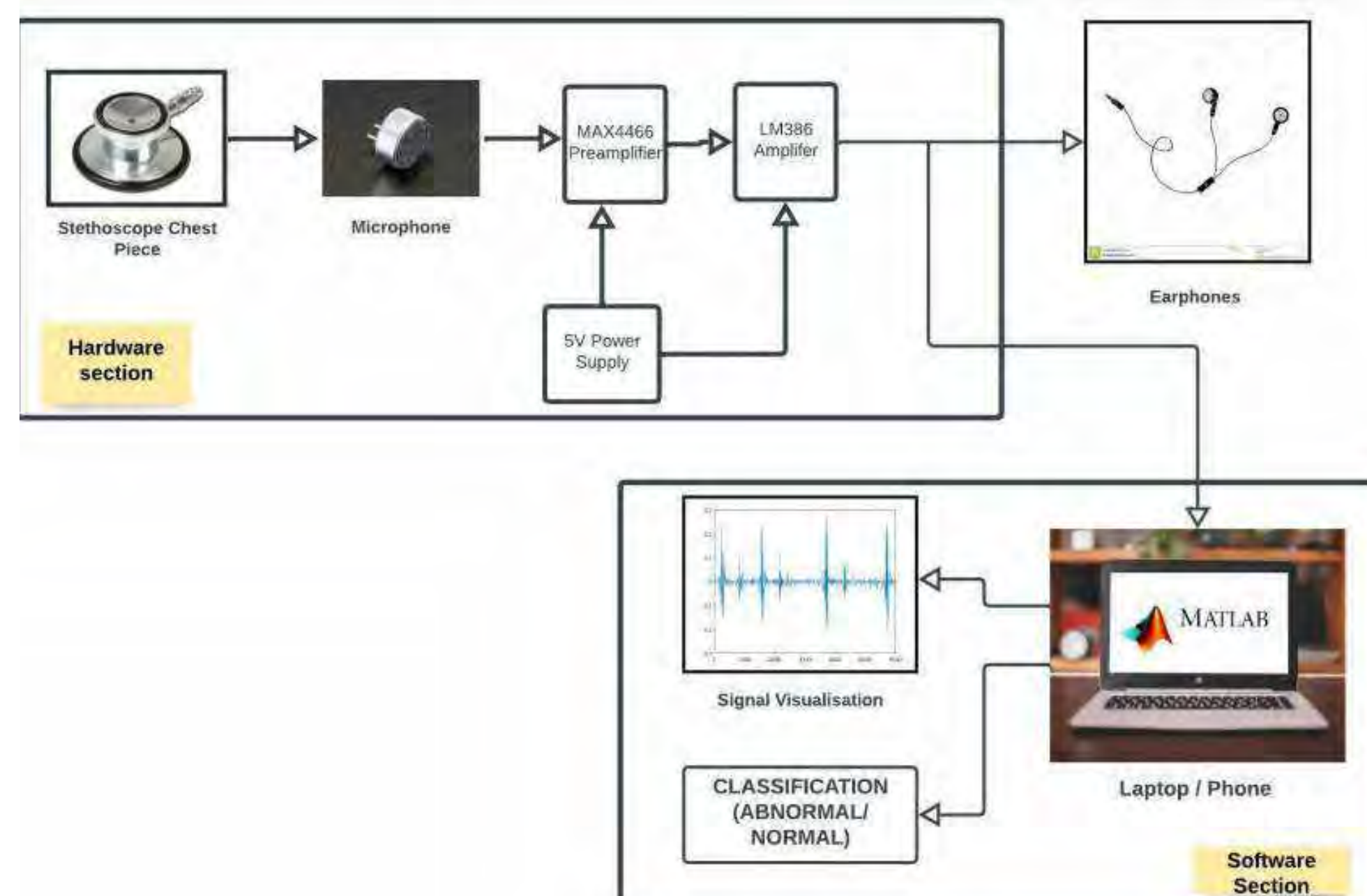
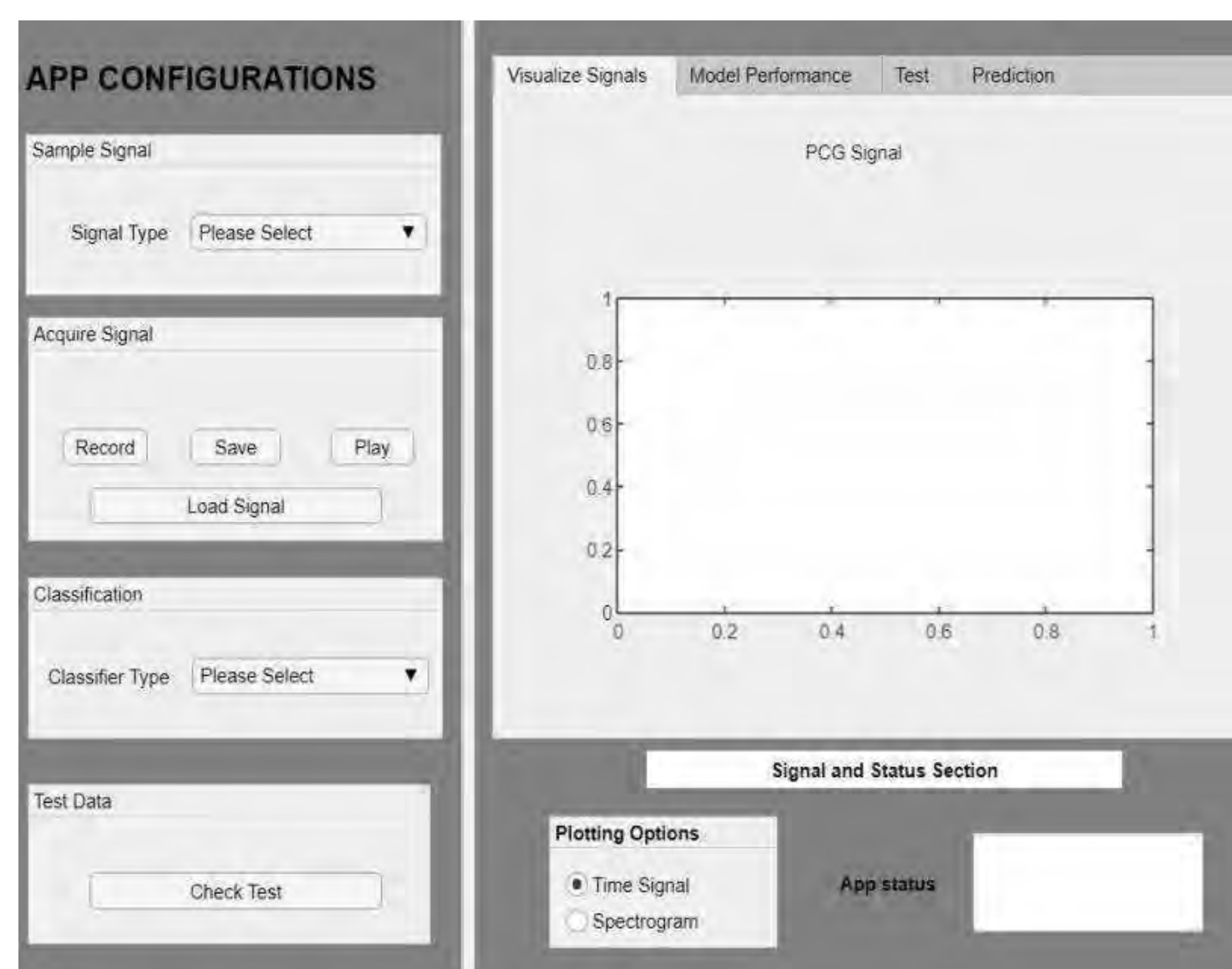


# HEARTBEAT MONITOR

PROJECT BY : Nathaniel Asiak

The goal of this project is to create a low-cost digital stethoscope that can process audio signals from the heart using cutting-edge filtering techniques, introduce machine learning algorithms that categorize heart sounds, and finally include a supervised learning algorithm that continuously tracks a user's heart health. By allowing them to be monitored remotely, this study aims to increase the number of individuals who have access to healthcare. This technology enables common people to monitor and have doctors validate their diagnosis because the doctor-patient ratio in underdeveloped nations is high.

Tackling Sustainable Development Goals : **3** GOOD HEALTH AND WELL-BEING **9** INDUSTRY, INNOVATION AND INFRASTRUCTURE

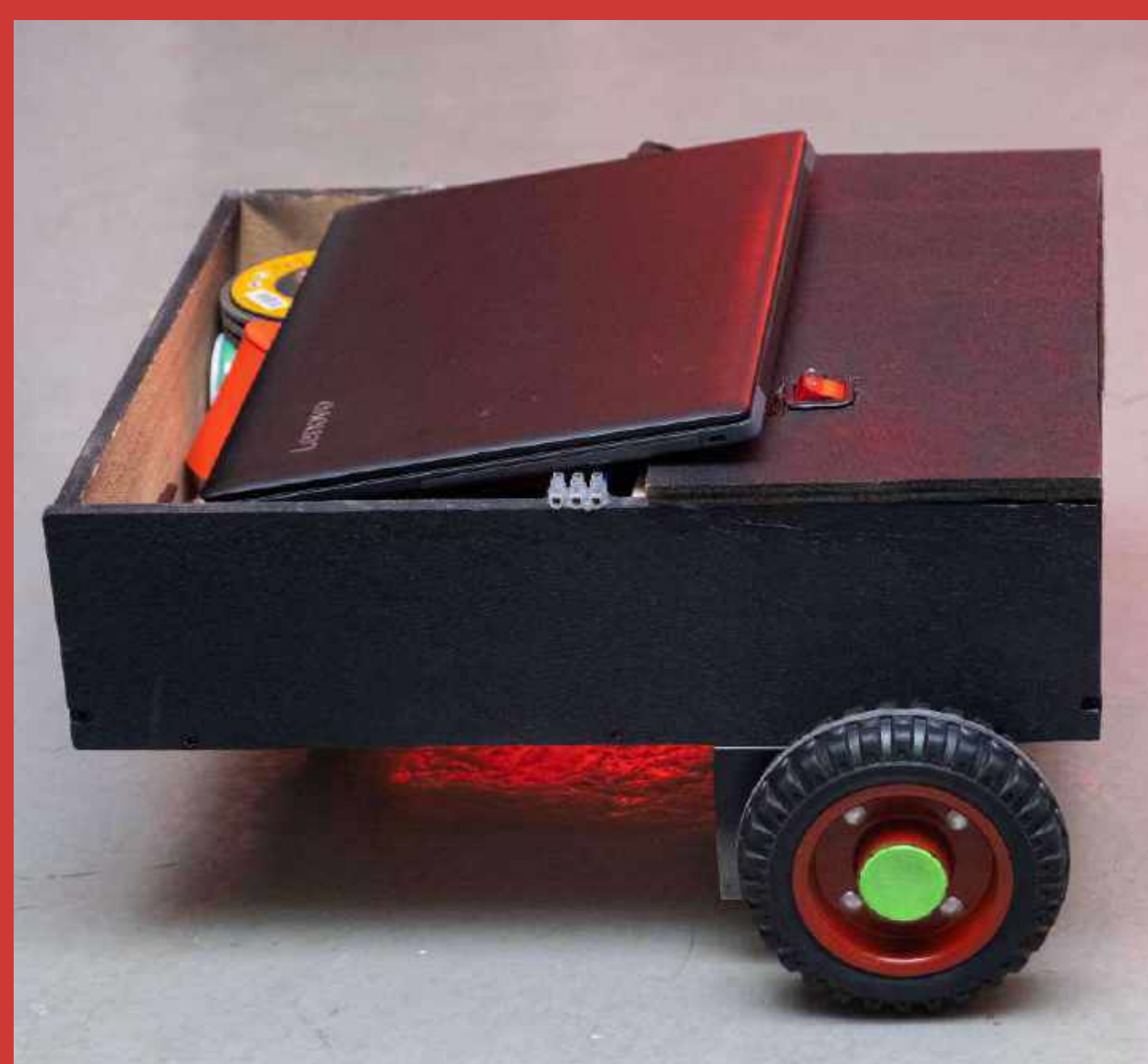


# AUTOMATED TOOL BOX

**TEAM MEMBERS:** Levi Soudi, Mawuena Komla Ackotia, Edem Fiifi Dawson, Baldo Giorgio Otu - Quayson.

This project aims at improving the efficiency of work by reducing the burden of having to transport tools and equipment from one point to another manually. The main reason behind the creation of this bot is to aid in the carrying or transportation of tools and materials across a workshop but this is only based on the limitations we have given it. The project is currently in the development phase. This bot has Bluetooth functionality, such that it can be paired with a Mobile phone. In the long term, we plan to have a complete model with Bluetooth Functionality, line-following technology, and a GPS-co-ordinate system.

**Tackling Sustainable Development Goals :** 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

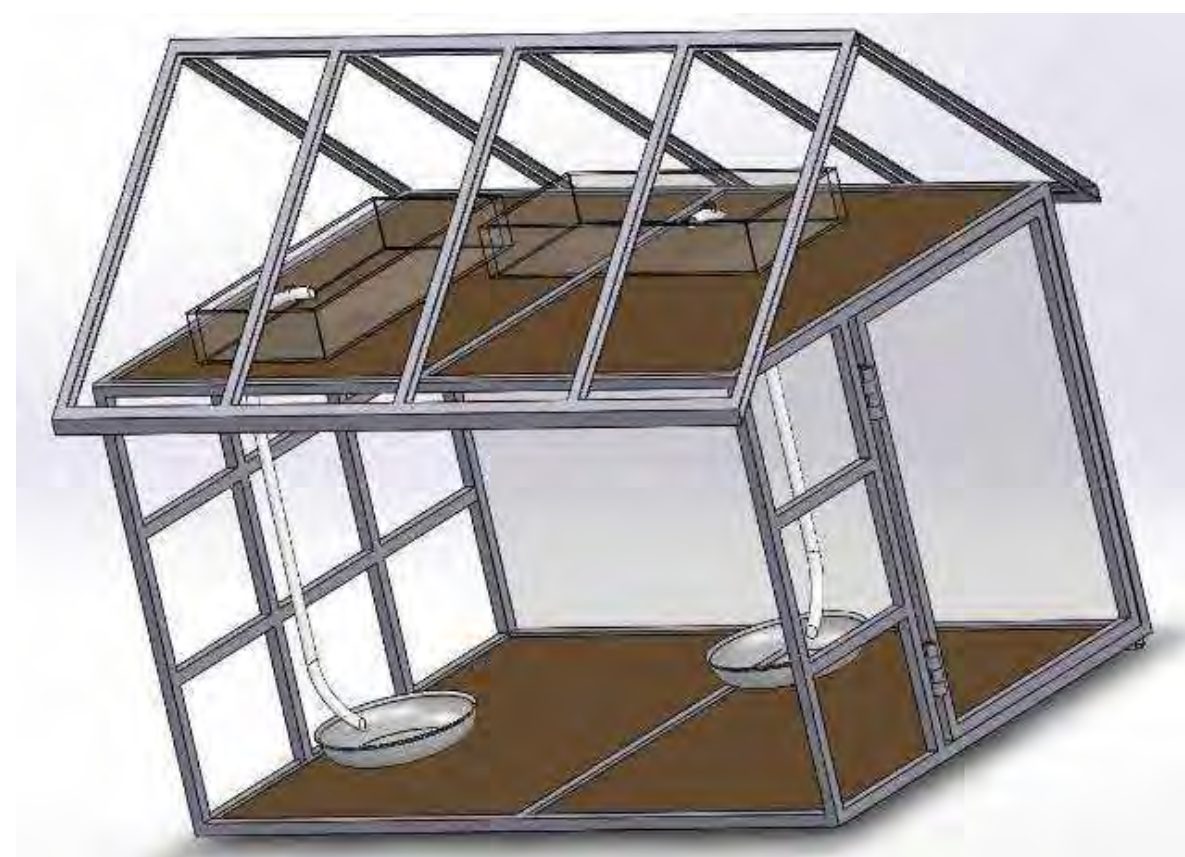
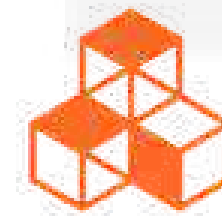


# SMART DOG KERNEL

**TEAM MEMBERS:** Jefferson Geraldo, Joseph Apiriala-Atedoghu, Fiiifi Addae, Kelvin Atograh

This project automates components of a dog kennel: the door would be able to open and close automatically; the dog's water bowl will be refilled when almost empty; the dog's food bowl will be topped up when almost empty. The dog's owner can now open the kennel from anywhere he/she is and would not need to frequently refill the dog's food and water bowl. Our project is in line with fulfilling the sustainable development goal of innovation and infrastructure. As it stands, we are currently phasing into the kennel's commercialization.

**Tackling Sustainable Development Goals :**  **9 INDUSTRY, INNOVATION AND INFRASTRUCTURE**

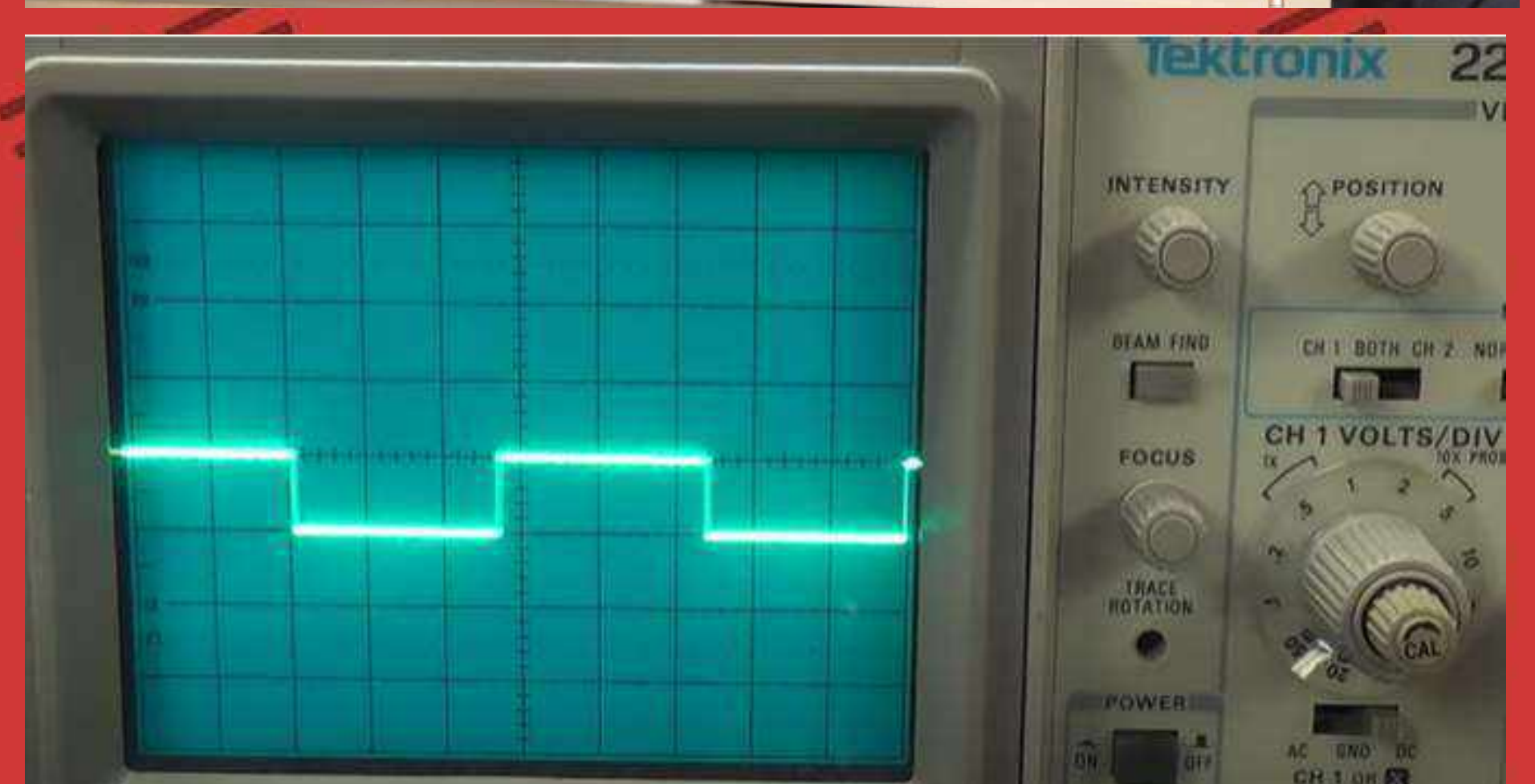
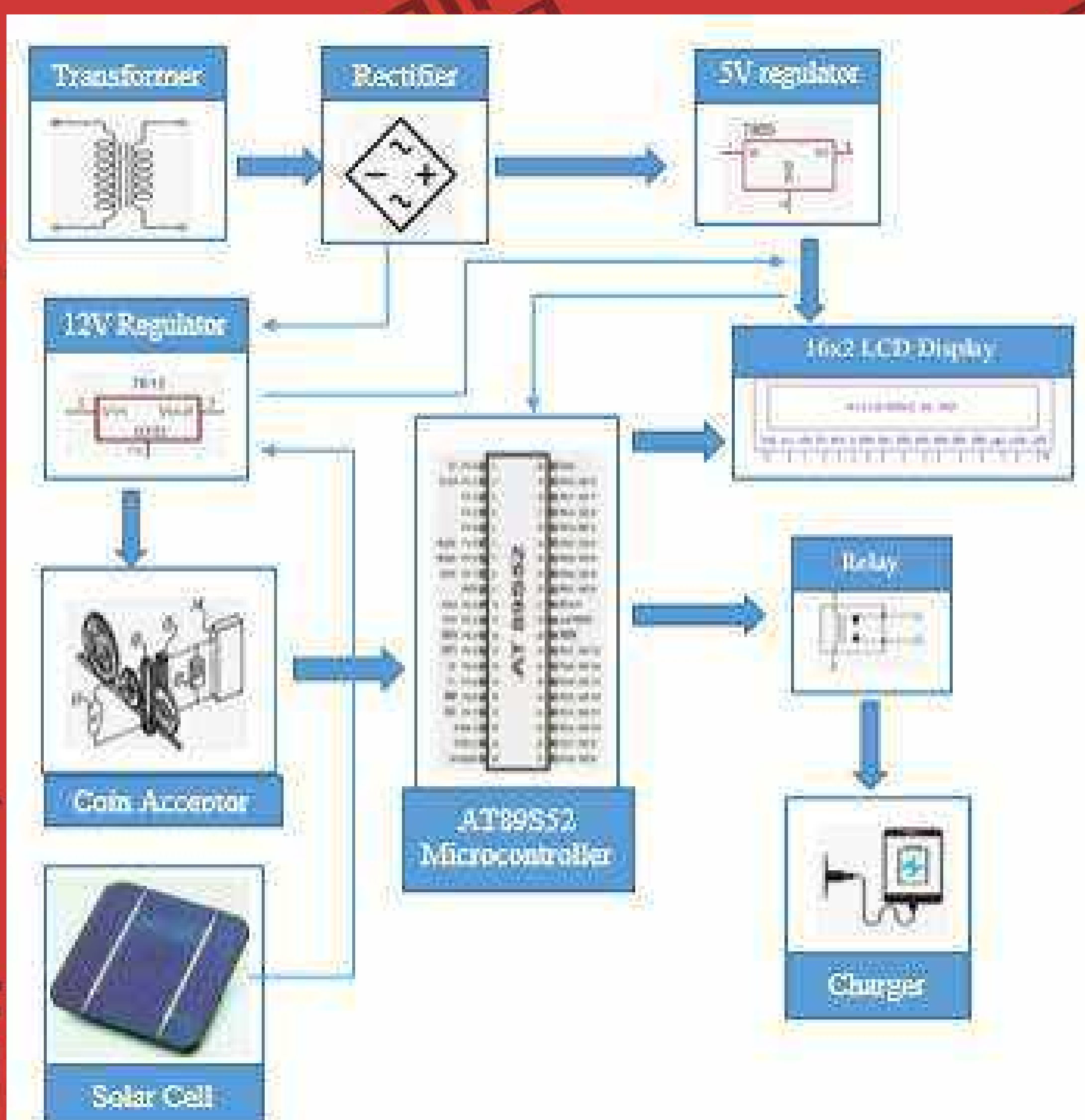
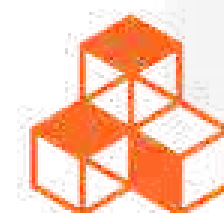


# MOBILE CHARGING STATION BASED ON COIN INSERTION

**PROJECT BY :** Anthony Agyemang

This project demonstrates the creation of a dual power source coin-based mobile charger. A coin-operated mobile charger must be created so that those without access to power can charge their phones for emergencies or for regular use in public areas. Rural, urban, and public places are all served by this coin-operated mobile charger. We use coin-operated phone chargers when the grid power is intermittent. Outside of a business, a coin-operated phone charger can be installed. Additionally, it exhibits the capacity to simultaneously charge three distinct types of phones.

**Tackling Sustainable Development Goals :** 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 11 SUSTAINABLE CITIES AND COMMUNITIES



# ELECTRIC WHEELCHAIR

**PROJECTS BY :** GOLIATH ROBOTICS

The Electric Wheelchair project seeks to provide increased independence to people with mobility challenges due to its ease-of-use and ability to travel without experiencing fatigue. Socialisation is vital to one's emotional and physical wellbeing disability to be productive in society. The project is at prototyping stage with motor controllers, mechanical parts and battery management systems being designed.

**Tackling Sustainable Development Goals :** 3 GOOD HEALTH AND WELL-BEING 7 AFFORDABLE AND CLEAN ENERGY 10 REDUCED INEQUALITIES



# E-BIKE



The E-bike seeks to provide students of Academic City University College an ease with commuting around spaces on campus and around campus. Such a solution could have the potential to transform not only the commute experience on campus, but also be adapted and integrated into several places like large public university campuses.

**Tackling Sustainable Development Goals :**

3 GOOD HEALTH AND WELL-BEING

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

13 CLIMATE ACTION





# WIND POWERED ELECTRIC CHARGING STATION

**PROJECT BY :** Jeremiah Fiagbedzi

Considering the power challenges in Ghana, it is vital that we explore other sources of power generation to complement our electricity use. A typical power source, wind energy, which is very environmentally friendly, is always available for use as it is renewable. But to produce energy with this means has quite an expensive initial cost. Therefore, there is a need to search for less expensive alternatives. In this project scrap metal, repurposed PVC pipes and an electric motor harvested from an old hover board was used to build a 150 Watt horizontal axis wind turbine. The erratic AC power generated from the generator was rectified and boosted to 15 Volts to charge a 12V 20Ah battery with a final output of 42V. A good use case for this is to charge electric powered devices like e-bikes, e-scooters, and e-wheelchairs.

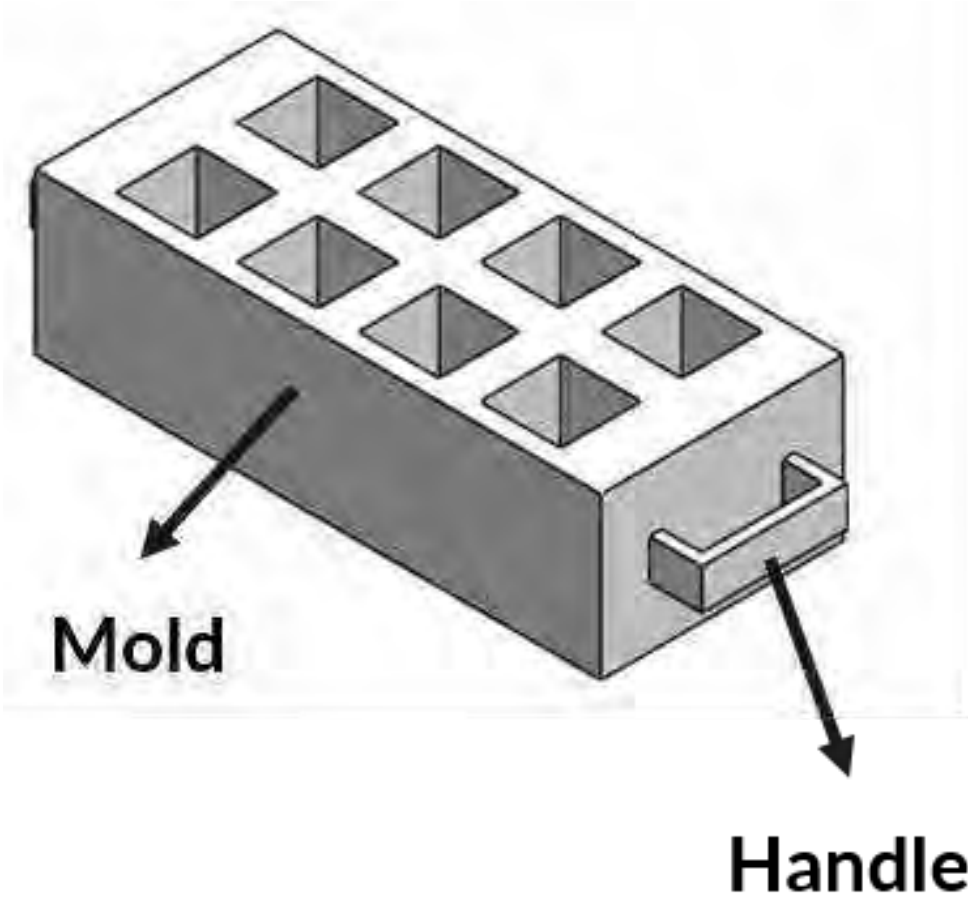
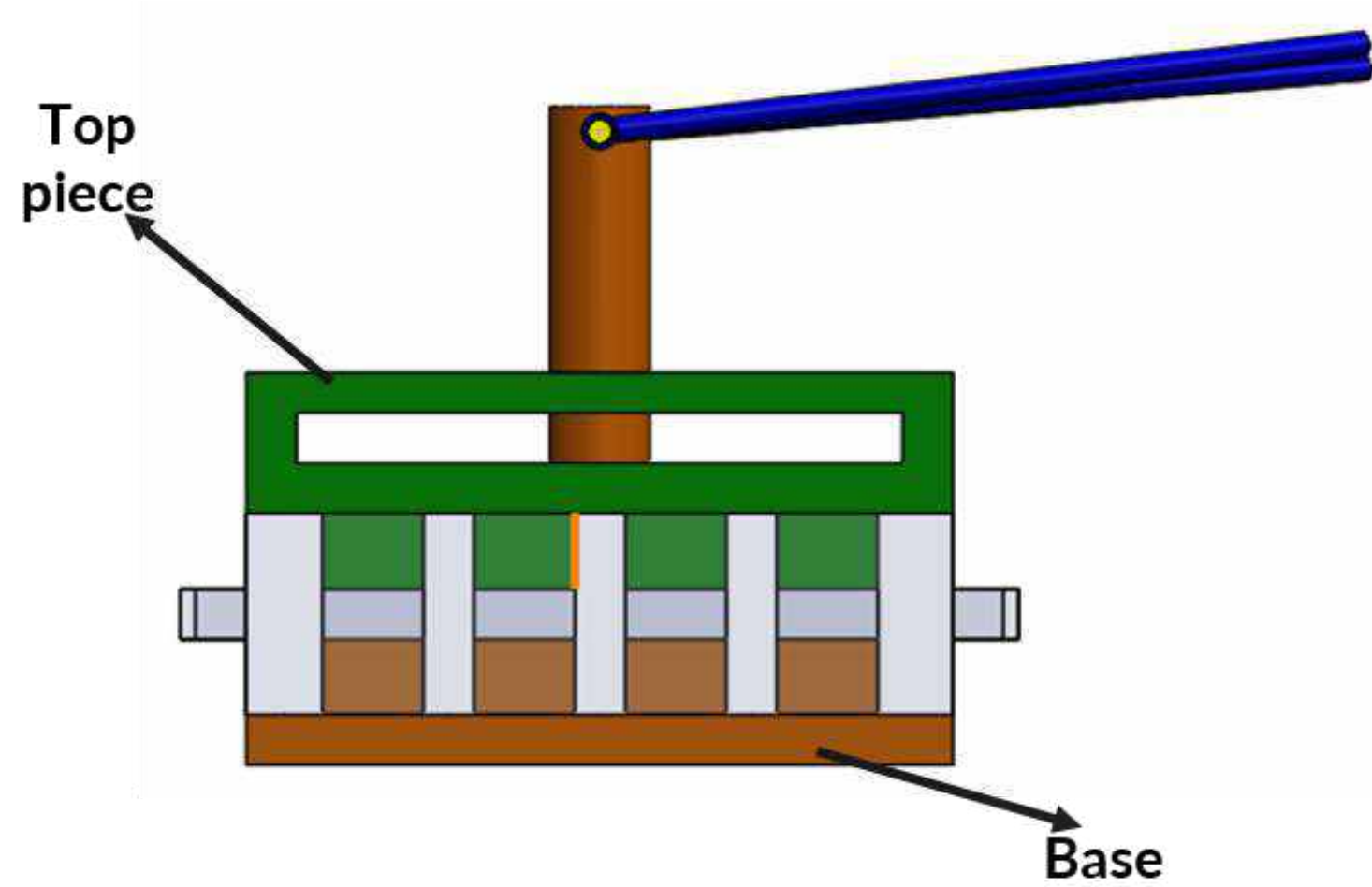
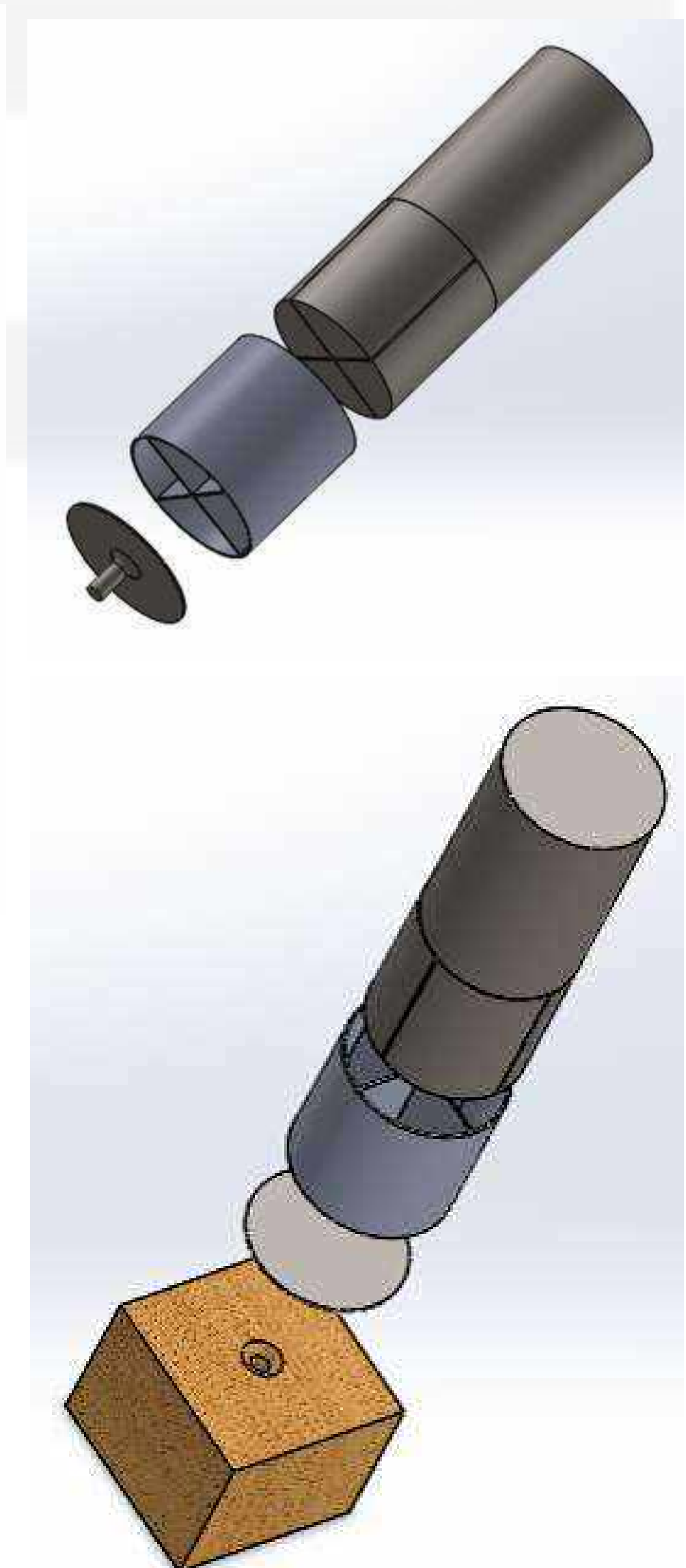
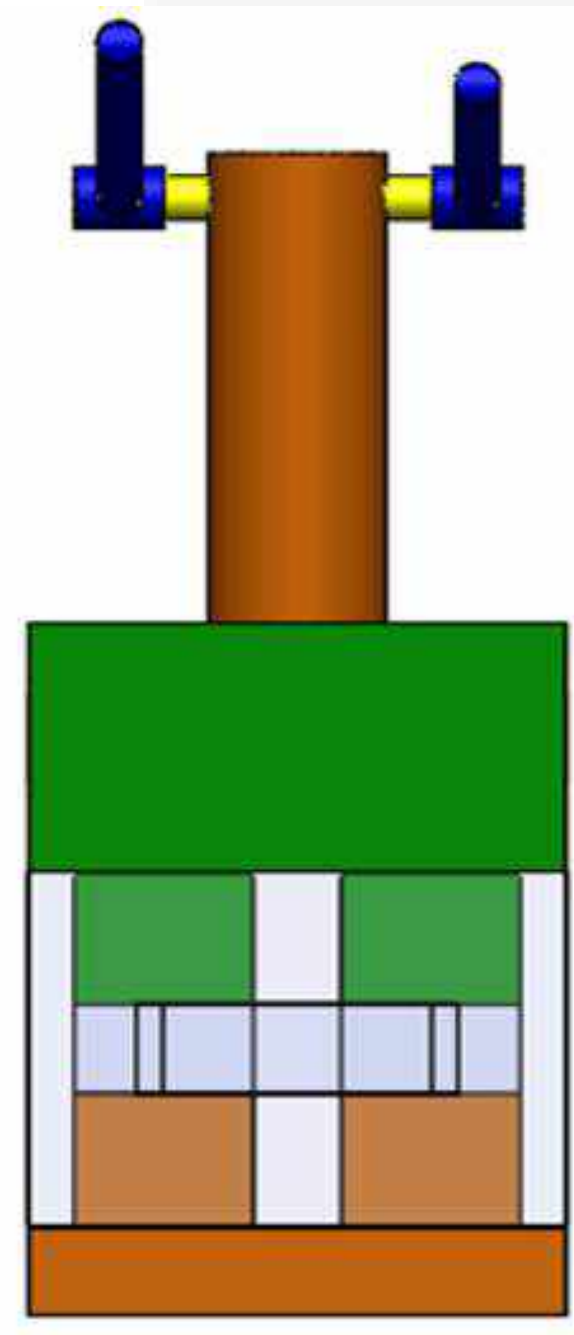
**Tackling Sustainable Development Goals :** 7 AFFORDABLE AND CLEAN ENERGY



# COMPACTOR FOR CHARCOAL BRIQUETTE

Eight Virginia Tech students visited Ghana this summer to collaborate with our students to look into how they could make a mechanical device for crushing hard shells into powder and a device to compact powder into briquettes so they could eventually carbonize them into charcoal. The primary objective of this project was to look into how they could make charcoal briquettes cheaply from waste materials like coconut husk, peanut shells and banana peels. These charcoal briquettes are denser, 'stainless' (leave less black mess) and burn longer than traditional charcoal. Three concepts were modelled by three different Teams of the collaborating students.

**Tackling Sustainable Development Goals :**

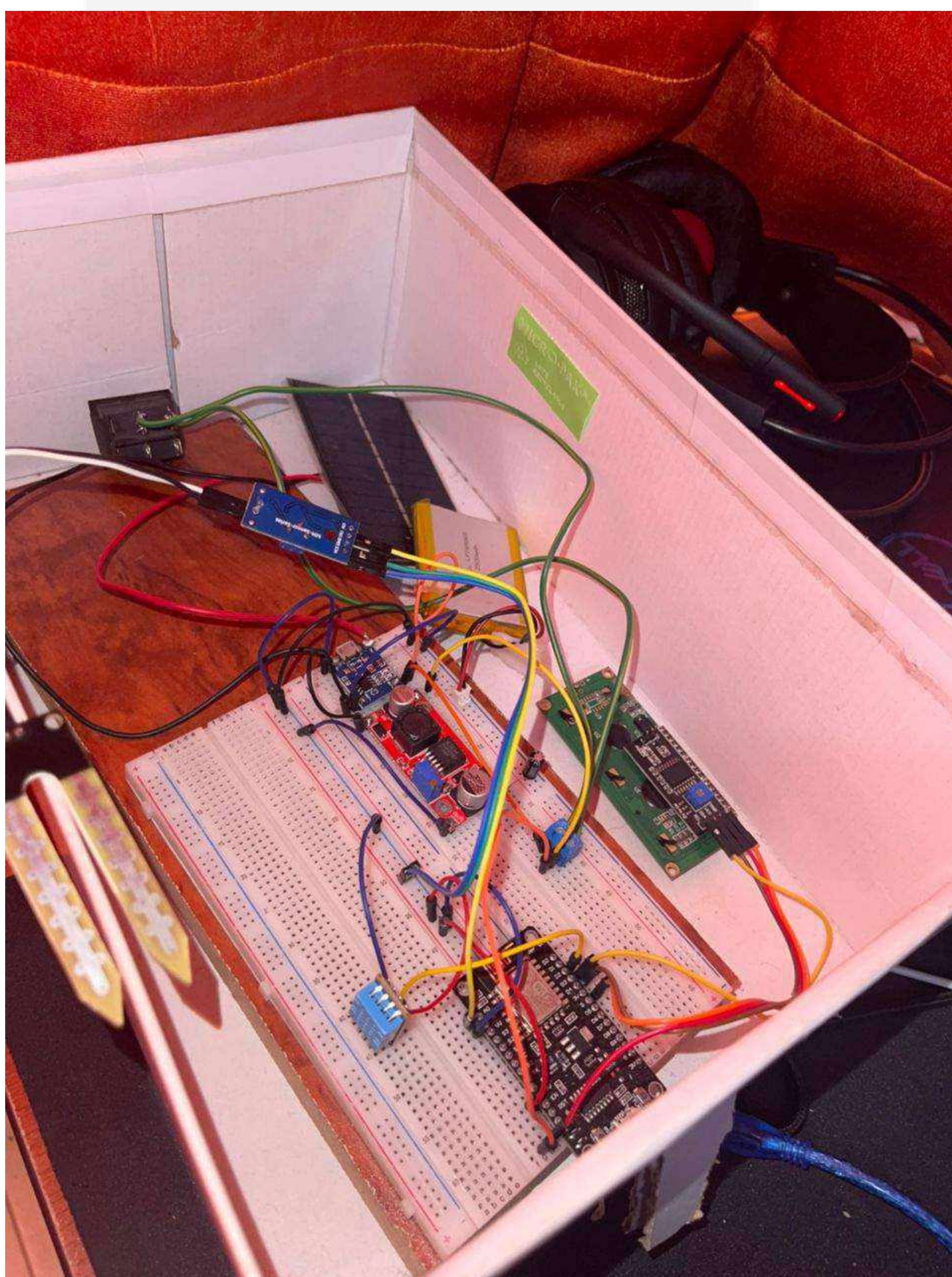


# AUTOMATIC GARDEN IRRIGATION SYSTEM

**PROJECT BY :** Likem Senaya

Research has demonstrated the significance of agriculture's contribution to the general public's enhancement of quality of life. The addition of automation to such a cycle would be an improvement given the multiple difficulties associated with the water system structures in actual practice. This was the creative force behind my final year project. This project is an application-accessible automatic irrigation system. The anticipated outcome is a system that will guarantee efficient water use to promote year-round farming utilizing an Android interface and offer advantages over the traditional methods of irrigation, particularly in agriculture.

**Tackling Sustainable Development Goals :**



# MG GAMING

**TEAM MEMBERS:** Akwasi Anto, Delasie Bansah, Kwabena Afari Boateng, Caleb Abayatey, Kwabena Asare Boateng, Yineteili Tioyem Abii, Nikoi- kotey Abrahams, Sigrid Bruce Catherine.

The purpose of the project is to capitalize on the rapidly growing gaming market in Ghana and Africa to provide platforms for Gaming, Software and Hardware development. There is a lot of market that is not being capitalized on and we would want to take up that market share and provide jobs in Software and Hardware Manufacturing for Gaming. Another goal is to use gaming to promote the equality of gender across all sectors including gaming. The project is the stages of organizing tournaments and partnering with tournament organizers. Some such upcoming tournaments includes Iron Sight Challenge, Turbo and Squad Wipeout. We are also in the Software development stage with KWERH, which is an interactive Augmented Reality social deduction game of teamwork and betrayal.

**Tackling Sustainable Development Goals :** 5 GENDER EQUALITY 8 DECENT WORK AND ECONOMIC GROWTH



# SOLAR AGRICULTURAL PRODUCE DRYER

**PROJECT BY :** Elizabeth Fio

The Solar Powered Agricultural Food Dryer provides a controlled atmosphere for drying produce while removing the dangers of contamination, rain damage, produce loss due to decomposition, insect exposure, and chemical exposure. In Sub-Saharan Africa, more than 35% of food production is lost each year, which worsens the region's food security issue and hinders our capacity to achieve Zero Hunger, a crucial Sustainable Development Goal. The ability to decrease post-harvest losses and boost sales will greatly aid farmers' economic empowerment. Additionally, it will lengthen the produce's shelf life and aid in packing while lowering the amount of methane, a greenhouse gas, released into the environment as a result of food decomposition. This innovation will also reduce the incidence of cholera from house flies that transfer disease to households.

**Tackling Sustainable Development Goals :**

1 NO POVERTY



2 ZERO HUNGER



8 DECENT WORK AND ECONOMIC GROWTH



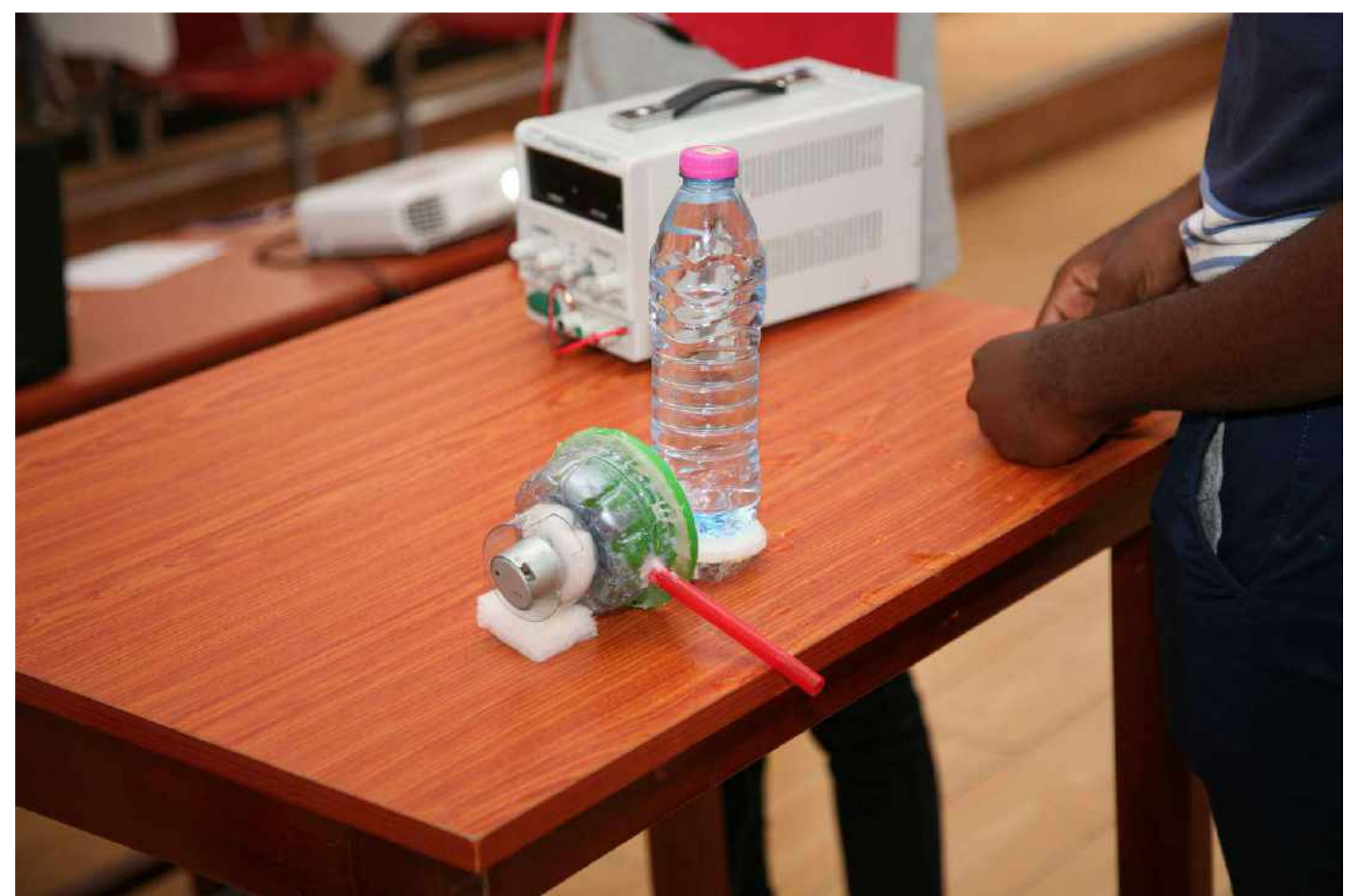
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



# THE BNARI FARMS PROJECT

The project saw students get closer to our neighbors, Bnari Farms, a vegetable farming community, build a formidable relationship with the farming community, and with the innovative use of technology, among others, assist the local farmers to add value to their processes and produce.

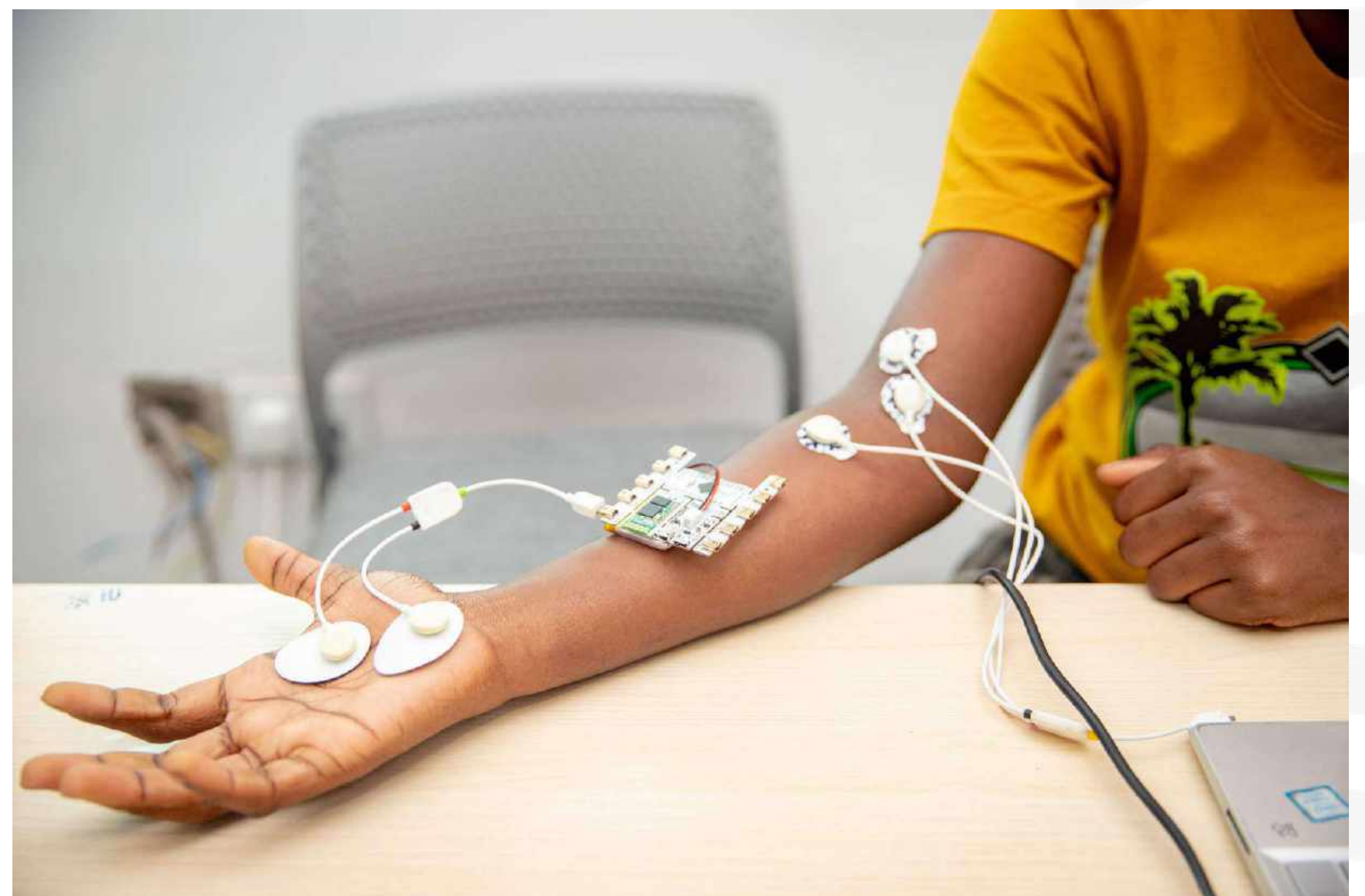
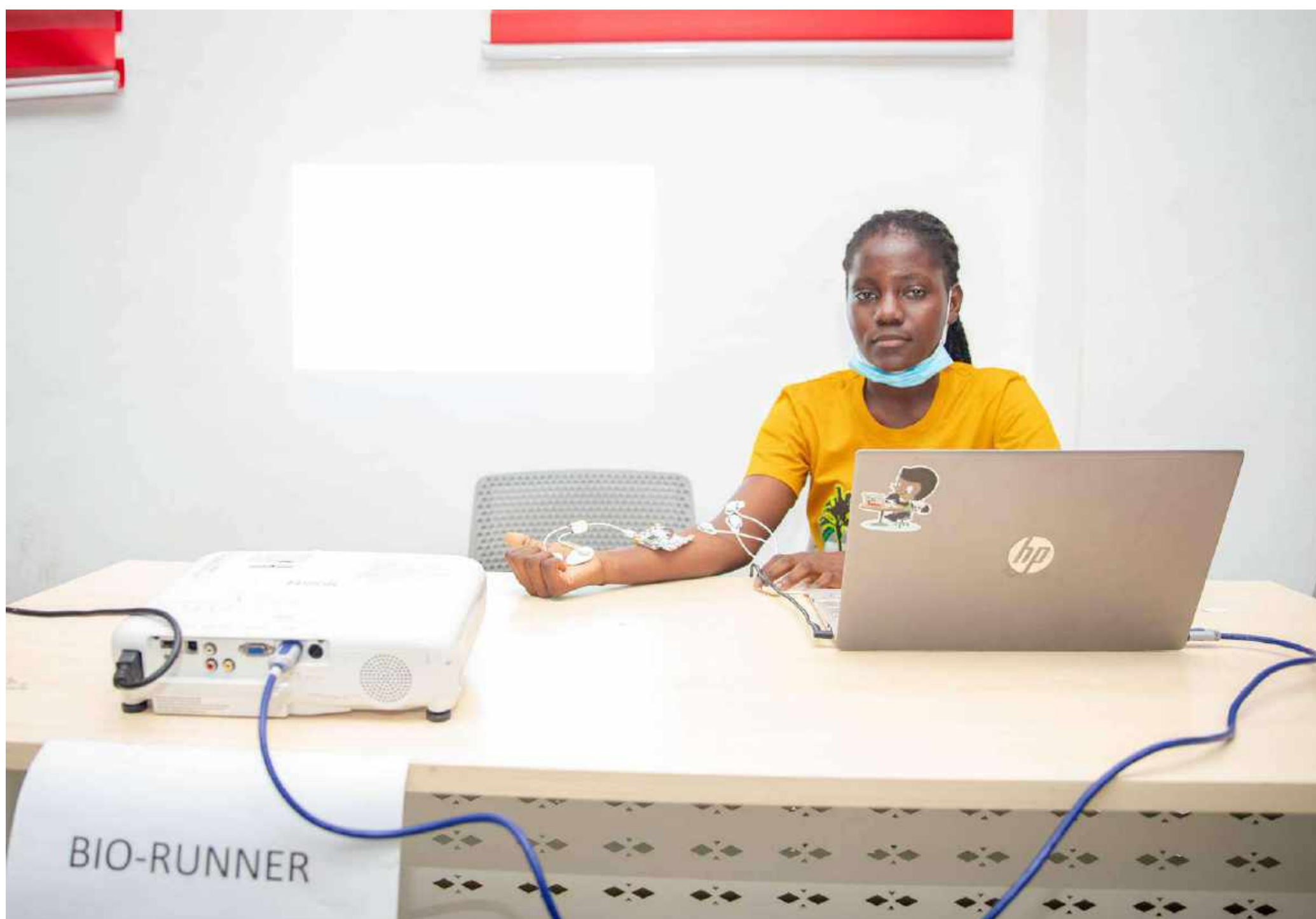
Tackling Sustainable Development Goals : 2 ZERO HUNGER 8 DECENT WORK AND ECONOMIC GROWTH



# BIO RUNNER PROJECT

A lot could be done to monitor muscle fatigue rate and potential for oxygen debt during varying activity cadence checking electro dermal activity respiration rates finding sore/strained spots heart rate. Hence, the conception of Bio Runner. The goal is "To continuously stream the vitals of any user while they are engaged in any activity to figure out What the body is trying to tell them." A proof-of-concept project that comprises of computers or phones connected to fitness devices to collect various data on the body which can be analyzed and interpreted to help people exercise at an optimum rate to reduce stress and excessive fatigue on the body.

Tackling Sustainable Development Goals : 3 GOOD HEALTH AND WELL-BEING



# THE BUS SHELTER

The general aim of the bus shelter project is to explore the use of plastic beams innovation as a viable alternative for wood and other materials for construction. The objective is to design, fabricate and install a sustainable public space structure that people can experience. Also promote further research and investigations into plastic waste innovations in Ghana and promote Public-Private partnership in pursuing sustainable plastic waste recycling innovation Programs. Furthermore, the bus shelter project seeks to discover how these materials will respond to adverse weather conditions and their durability. Showcase recycling innovations as we change the narrative for Ghana and Africa. Explore sustainable ways of keeping plastic waste out of the environment. Use these installations as a powerful advocacy tool in pushing plastic pollution and the climate crisis agenda.

Tackling Sustainable Development Goals :

6 CLEAN WATER AND SANITATION



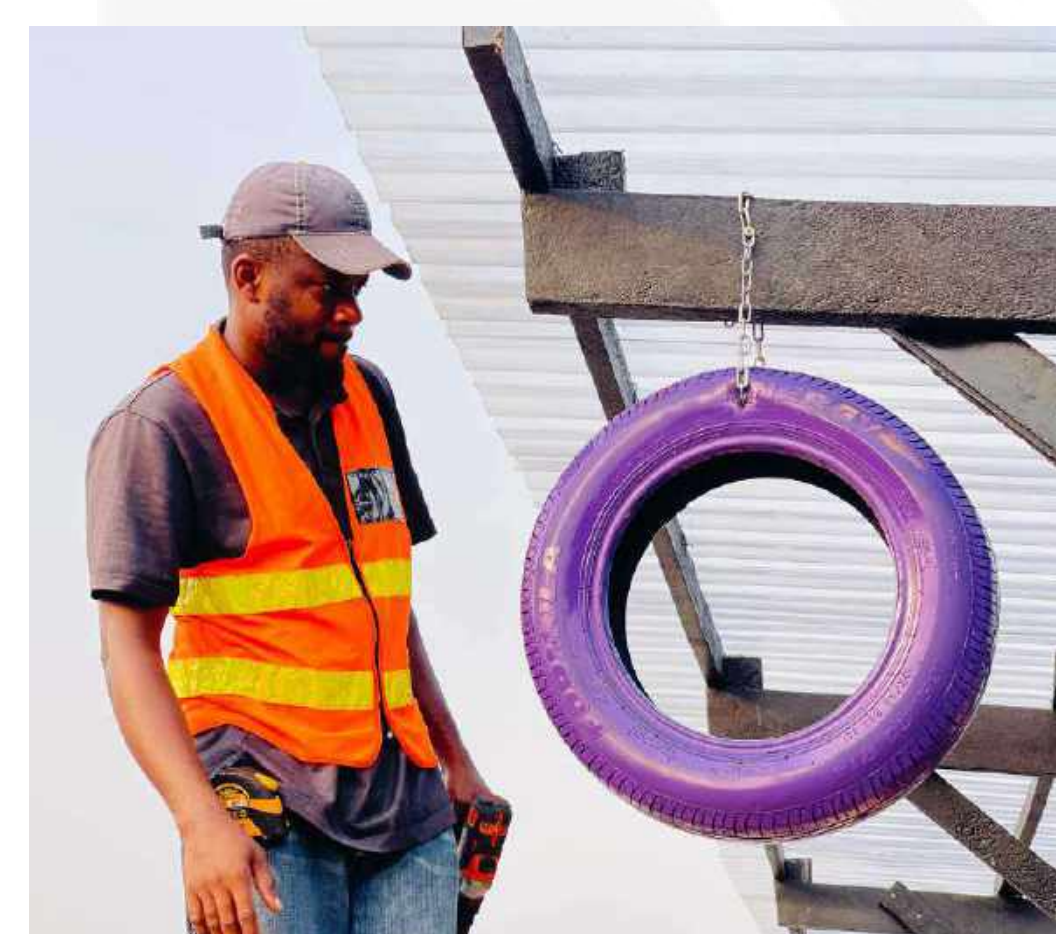
8 DECENT WORK AND ECONOMIC GROWTH



11 SUSTAINABLE CITIES AND COMMUNITIES



13 CLIMATE ACTION





# WEATHER BALLOON POWER SUPPLY PROJECT

An AcensionWX and Academic City University partnered to develop a weather balloon product that can collect weather data capable of predicting thunderstorms and other weather conditions across West Africa. It is developed using open-source hardware and software. The objective is to use weather data in a cost-effective manner and to share this data so that students and young adults in West Africa are empowered to fight climate change. The team at the University of Dayton has been tasked with creating a redesigned power source for the electronics of the weather balloon. West Africa lacks real-time weather data collection and distribution to the general public. So it doesn't give the population adequate time to prepare for the adverse condition.

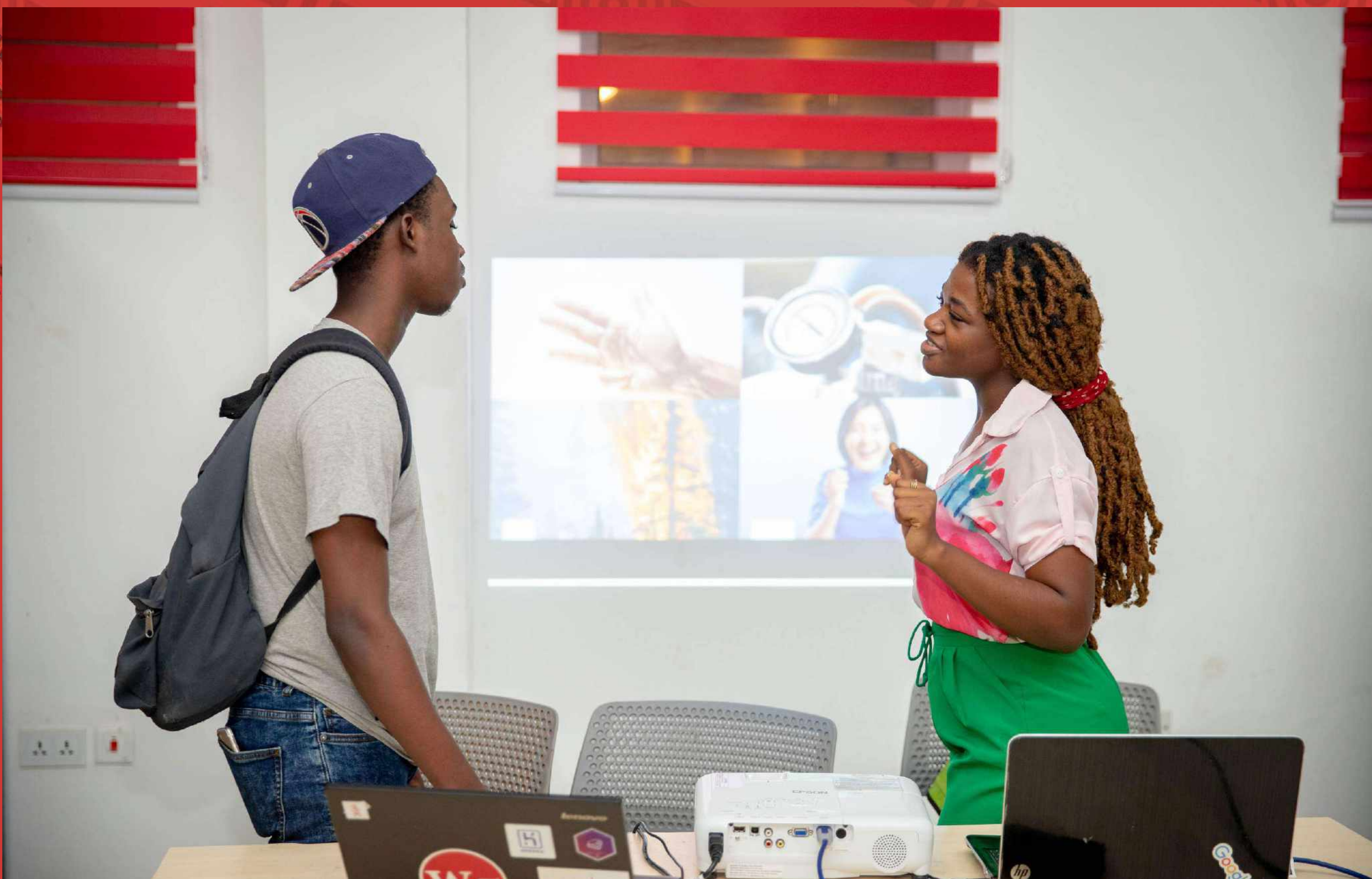
**Tackling Sustainable Development Goals :**  **2 ZERO HUNGER**  **11 SUSTAINABLE CITIES AND COMMUNITIES**  **13 CLIMATE ACTION**



# MACHINE LEARNING IMAGE SEGMENTATION PROJECT

Image segmentation results in more granular information about the shape of an image and thus an extension of the concept of Object detection. We segment i.e. divide the images into regions of different colors which helps in distinguishing an object from the other in a finer level. Our students have been performing image segmentation using the Mask R-CNN architecture. The technology is crucial for self-driving cars, facial recognition devices, for detecting circuit board defects and also in medical imaging. Students developed algorithms that would feed into a computer to detect and distinguish between the items.

**Tackling Sustainable Development Goals :** 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



# ADDITIVE MANUFACTURING

At Academic City, our staff and students use 3D printers that use Fused Deposition Modeling (FDM), which combines the ideation, modeling, and printing phases of design. The strategy is chosen, and ideas are modeled using solid works, prototyping, testing, and 3D printing evaluation. To aid in the study of mechatronics, several students are currently printing a manipulator or robotic arm. Students have designed and completed printings for the Sustain City Project and Environment 360's Waste Hub through partnerships between academia and industry. Prototype bicycle handles were printed for women who were supported by the hub as a reference for subsequent printings with a recycling printer. At the heart of additive manufacturing at Academic City are the creative and innovative female students who have been modeling concepts and printing them.

**Tackling Sustainable Development Goals :** 3 GOOD HEALTH AND WELL-BEING 4 QUALITY EDUCATION 8 DECENT WORK AND ECONOMIC GROWTH 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

