Timeslot	Title	Short Description	Project Department	# students	Advisor 1		Additional Advisors	
			BIOENGINEERING SESSION 1					
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	Novel Nano-binders Treating Alzheimer's Disease	Our project is engineering exosomes, lipid nanoparticles naturally produced by cells, for the treatment of Alzheimer's Disease. The exosomes serve as carriers of nano-binder proteins designed to target and bind to amyloid plaques in the brain. Even partial clearance of plaques could significantly improve the prognosis of Alzheimer's patients.	Bioengineering	2	Bill Lu	Bioengineering		
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Packed-Bed Reactor for Integrated Peritoneal Dialysis	The goal is to create an assisted peritoneal dialysis device stimulated by a packed bed reactor containing encapsulated urease in a microfluidic cartridge for uremic toxin removal. This device will aim to decrease cycle time for patients undergoing peritoneal dialysis.	Bioengineering	3	Maryam Mobed-Miremadi	Bioengineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	Molecular Methods for Regulating Exosomal Pathways	This project is a comprehensive investigation into the regulation of exosome activity. The core objective of this project is to first validate the SCU (Dr. Lu) lab specific exosome-based reporter system, and then contribute to our understanding of the intricate molecular signaling networks that govern various physiological and pathological processes.	Bioengineering	2	Bill Lu	Bioengineering		
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	Skin Phantom Development for Electrophysiological Wearable Device Testing	We are creating a skin phantom device that is able to transmit a wide range of frequencies that mimic electrical properties of real human skin.	Bioengineering	3	Emre Araci	Bioengineering		
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)								
			BIOENGINEERING SESSION 2					
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	AMBER: Ambulatory Monitoring of Biomarkers for Enhanced Recovery	Our project team is developing a wearable biosensor to monitor free hydrogen peroxide concentrations in the body which as a wearable to inform treatment plans. Our product will be a medical device that is prescribed to patients through their healthcare provider in order to better track the progression of their disease(s).	Bioengineering	3	Ashley Kim	Bioengineering	Maryam Mobed-Miremadi	Bioengineering
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Impact Reducing, Variable Volume Prosthetic Liner with Integrated Haptic Feedback	Transtibial amputees experience a change to their residual limb shape due to edema, so they often experience discomfort and pain. We have developed an impact-reducing, variable volume liner with an integrated haptic feedback system that manipulates non-newtonian fluid to offset the change in limb volume.	Bioengineering	3	Prashanth Asuri	Bioengineering	Ashley Kim	Bioengineering
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	Hydrogel-Based In-Vitro Blood Clots	Creating a hydrogel-based material in-vitro that can replicate the mechanical properties of a blood clot for the purpose of catheter testing.	Bioengineering	2	Prashanth Asuri	Bioengineering	Maryam Mobed-Miremadi	Bioengineering
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	Machine Learning for Detection of COVID-Related Cardiomyopathy	We will be using machine learning and deep learning models to classify cardiomyopathy in COVID-19 and non-COVID-19 patients.	Bioengineering	3	Yuling Yan	Bioengineering	Hamed Akbari	Bioengineering
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)								
			CIVIL, ENVIRONMENTAL AND SUSTAINABLE ENGINEERING SESSION 1					
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	Design of Sustainable and Affordable Housing for Disadvantaged Communities in Nicaragua	Addressing Nicaragua's urgent housing needs, this project transforms a conventional CMU block design into a sustainable and affordable model using local, structural bamboo and adobe plaster. It includes appropriate member size connections, local-code compliant construction drawings, cost estimation and logistics, offering an eco-friendly, affordable housing solution for local communities.	Civil, Environmental and Sustainable Engineering	1	Tonya Nilsson	Civil, Environmental and Sustainable Engineering	Hisham Said	Civil Engineering
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Standardized Sustainable Rapid Housing Design	Using knowledge of sustainable site and building systems, our project seeks to optimize the efficiency and cost-effectiveness of rapid interim housing developments throughout their lifecycle. This project emphasizes the engineering scopes of structural design, water resources, building envelope design, and construction management.	Civil, Environmental and Sustainable Engineering	3	Tonya Nilsson	Civil, Environmental and Sustainable Engineering	Hisham Said	Civil Engineering
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	Dunne Hall Redesign	This project focuses on the structural redesign of Dunne Hall through the implementation of modular construction, to efficiently reconstruct the building in a limited timeframe. "Dunne Hall Redesign" uses transportation engineering to design alternative parking lot configurations, traffic signal phase plans, stormwater and sanitary sewer management, among other considerations.	Civil, Environmental and Sustainable Engineering	3	Tracy Abbott	Civil, Environmental and Sustainable Engineering	Rachel He	Civil Engineering
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	Calculaser S.A. - Colombian Medical Clinic	Calculaser S.A. is a proposed 6-story medical clinic, with a 3-story underground parking garage, for the city of Pereira, Risealda, Colombia. The team designed the structural, transportation, and construction elements of the project to meet the demands of the community.	Civil, Environmental and Sustainable Engineering	4	Hisham Said	Civil, Environmental and Sustainable Engineering	Rachel He, Rocio Segura	Civil Engineering
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)								
			CIVIL, ENVIRONMENTAL AND SUSTAINABLE ENGINEERING SESSION 2					
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	Central Valley Canal Solar Canopies	Solar panel canopies designed to cover a canal in the California Central Valley in order to reduce evaporation and promote groundwater recharge in an agricultural community that is dependent on well water.	Civil, Environmental and Sustainable Engineering	4	Hisham Said	Civil, Environmental and Sustainable Engineering	Laura Doyle, Tracy Abbott	Civil, Environmental and Sustainable Engineering
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Sheep Camp Creek Low-Water Crossing Redesign	This project involves a feasibility study for the implementation of a hydraulic structure over a scour-critical low-water crossing located in an SFPUC Bio-Habitat Restoration site. Project analysis and design involves structural, hydraulic, and construction considerations for an infrastructure crossing implementation.	Civil, Environmental and Sustainable Engineering	1	Aria Amirbahman	Civil, Environmental and Sustainable Engineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	Development of Bamboo Structural Connections with ITESO University in Guadalajara, Mexi	With guidance and supervision from faculty at ITESO Universidad, a unique bamboo structural connection and how-to manual will be created with the end goal of aiding the people near Las Cascadas de Comala who are a low income community in need of strong, sustainable, and easy-to-assemble structural members.	Civil, Environmental and Sustainable Engineering	1	Tonya Nilsson	Civil, Environmental and Sustainable Engineering		
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	Sustainable Design and Construction Using Cob	This project aims to improve the education and implementation of cob building within construction by investigating the properties of shear and uplift. Cob is an earthen material made from sand, clay, straw, and water and has been used for building all over the world. This project will test six 2'x2' cob walls using a diagonal compression test and using this data to design a cob structure. In the civil engineering community, there needs to be more education in engineering about alternative materials such as cob.	Civil, Environmental and Sustainable Engineering	4	Tonya Nilsson	Civil, Environmental and Sustainable Engineering	Jes Kuczenski	General Engineering
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)								
			COMPUTER SCIENCE AND ENGINEERING SESSION 1					
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	Privacy-Preserving Fingerprinting of IoT devices in WiFi Networks	Identifying and fingerprinting devices within networks is a crucial step for network security. We propose and implement a novel machine learning based solution that passively fingerprints devices while maintaining user privacy.	Computer Science and Engineering	2	Behnam Dezfouli	Computer Science and Engineering	Yuhong Liu	Civil, Environmental and Sustainable Engineering
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Ultra Low-power, High Performance Presence Detection System	A presence detection system using an accelerometer and T-MOS technology to operate as both a low-power wakeup system for older, resource-intensive security systems and a stand-alone motion detecting security system.	Computer Science and Engineering	3	Behnam Dezfouli	Computer Science and Engineering	Yuhong Liu	Civil, Environmental and Sustainable Engineering
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	IoTsolate: Network Microsegmentation for Managing and Securing IoT Devices	IoTsolate uses virtual local area network (VLAN) microsegmentation to identify, isolate, and neutralize security risks in IoT devices. These devices have limited processing capabilities, diverse designs, and long lifespans, so they lack adequate shielding from attacks. IoTsolate prevents compromised devices from communicating with others, protecting unaffected devices on the network.	Computer Science and Engineering	2	Behnam Dezfouli	Computer Science and Engineering	Yuhong Liu	Civil, Environmental and Sustainable Engineering
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	Edge-Connected Microcontroller Security	Evaluating security and performance of next-generation edge-connected IoT devices with new security solutions	Computer Science and Engineering	3	Behnam Dezfouli	Computer Science and Engineering	Yuhong Liu	Civil, Environmental and Sustainable Engineering
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)	E-Scooter Black Box	Our solution involves a 'black box' system that will be able to detect misuse and rough handling of e-bicycles and e-scooters in order to improve the cost-effectiveness and appeal of ride sharing services. The black box system will consist of an advanced gyroscope-enabled chip to record riding and usage behaviors, as well as an onboard controller board, which will be used in conjunction with RAM and a bluetooth chip to analyze sensor data in real time with a pre-trained ML model, before relaying the results (post rental) to the ride-sharing corporations' central data system. As a part of our solution development, we will need to develop a comprehensive data collection and analysis system that is power-efficient and compact enough to be stored wholly on the e-scooter or e-bike, while having the computational power to run a pre-trained ML model in real time for ride usage analysis. As a result, our project necessitates the use of scooter ride sharing assets, in addition to black box hardware such as a gyroscope-enabled sensor, control board, RAM, portable power source, and GPU compute power in order to train our ML model.	Computer Science and Engineering	5	Behnam Dezfouli	Computer Science and Engineering	Yuhong Liu	Civil, Environmental and Sustainable Engineering
			COMPUTER SCIENCE AND ENGINEERING SESSION 2					

Timeslot	Title	Short Description	Project Department	# students	Advisor 1		Additional Advisors	
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	"Enhanced Target Wakeup time Scheduling for WiFi 6/7 Devices"	Wi-Fi 6 enables the use of novel energy efficiency methods, which can potentially save more power compared to traditional methods available in earlier releases of the standard. In this work, we identify the challenges and propose solutions to address the shortcomings of using these novel power save methods in real-world scenarios.	Computer Science and Engineering	1	Behnam Dezfouli	Computer Science and Engineering		
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Performance Evaluation of Databases for Packet Capture Storage and Analysis	This project analyzes different databases to evaluate which one is best suited for packet capture data. We will use a testbed that consists of edge devices and a wireless gateway, and then make various operations and queries for each database to test how each one performs.	Computer Science and Engineering	2	Behnam Dezfouli	Computer Science and Engineering	Shiva Jahangiri	Computer Science and Engineering
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	Efficient Beehive Monitoring	This is a continuation project, in which we try to implement a more energy efficient beehive monitoring system with a newer Machine Learning model, and build a React Web application utilizing a database to store and fetch information.	Computer Science and Engineering	3	Behnam Dezfouli	Computer Science and Engineering	Shiva Jahangiri	Computer Science and Engineering
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	The Impact of Emojis on User Engagement with Trolling Content in Online Platforms	This project examines how emojis influence user engagement with trolling content on online platforms, focusing on interaction patterns, emotional responses, and the potential for emojis to amplify or mitigate negative behaviors.	Computer Science and Engineering	1	Yuhong Liu	Computer Science and Engineering		
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)								
		COMPUTER SCIENCE AND ENGINEERING SESSION 3						
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	MeadowMinds: An AI Literacy Game	MeadowMinds offers a web-based gaming experience designed to facilitate the comprehension of fundamental machine-learning concepts among middle-school students. Through concept simplification, students attain a profound understanding of emerging technologies and their potential risks. This enables them to discern how AI behaviors can have implications in real-world scenarios.	Computer Science and Engineering	2	Sean Choi	Computer Science and Engineering		
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Using ML to determine fashion trends	Using machine learning and web scraping, our project will predict what fashion trends are present at a certain location / college.	Computer Science and Engineering	3	Sean Choi	Computer Science and Engineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	ProtectNIC	Creating a system that would help detect ransomware using a Smart Network Interface Card (SmartNIC) which runs machine learning algorithms to detect ransomware before it enters the system. This relieves computers in the network of the burden of detecting malware, freeing CPU capacity to do other work.	Computer Science and Engineering	3	Sean Choi	Computer Science and Engineering		
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	9-Axis Motion Tracking to Aid Therapeutic Recovery via Visualization, Analysis & Progress Monitoring	An innovative approach to enhance at-home physical therapy exercises through the development of a wearable motion tracking system. The proposed system utilizes motion tracking bands worn by patients during exercises, specifically focusing on a squat jump for the initial phase of the project.	Computer Science and Engineering	4	Sean Choi	Computer Science and Engineering		
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)								
		COMPUTER SCIENCE AND ENGINEERING SESSION 4						
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	Deep Learning Based Omnidirectional Image Super Resolution	Recent popularity in VR has brought attention to omnidirectional image super resolution. The unique geometric properties of Omnidirectional images (ODIs) present challenges for super resolution techniques. We create a model that learns this unique relationship between high and low resolution ODIs then produces high resolution ODIs from low resolution inputs.	Computer Science and Engineering	2	Ying Liu	Computer Science and Engineering		
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Omnidirectional Image Super-Resolution	Our project focuses on advancing super-resolution techniques for omnidirectional images. We will use a specialized dataset, consider omnidirectional-specific characteristics, and tackle degradation factors. Our goals include reaching or surpassing baseline models in performance and achieving top results in the NTIRE challenge.	Computer Science and Engineering	4	Ying Liu	Computer Science and Engineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	Newcomer: New Employee Networking	Newcomer, a mobile app and website created using Flutter and Flask, facilitates workplace integration for interns, recent graduates, and new employees. By leveraging machine learning to suggest interest-based groups, it cultivates meaningful connections and long-lasting friendships, both inside and outside the workplace.	Computer Science and Engineering	2	Yi Fang	Computer Science and Engineering		
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	UnbiasText	Algorithms and machine learning systems can inadvertently perpetuate bias if they are trained on biased data. Our project detects biased text, a step towards mitigating bias in AI programs like ChatGPT. Given a text input, our application outputs comprehensive metrics based on its bias.	Computer Science and Engineering	3	Yi Fang	Computer Science and Engineering		
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)	RAG Menu Assistant Chatbot	Our project uses Retrieval Augmented Generation to create a chatbot that can answer a variety of menu questions using up-to-date information, including pricing, ingredients, and more.	Computer Science and Engineering	4	Yi Fang	Computer Science and Engineering		
		COMPUTER SCIENCE AND ENGINEERING SESSION 5						
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	Corridor Counting	Design an algorithm for counting individual cars and trucks that move through a pre-defined corridor throughout the city based on footage from intersection cameras in the city.	Computer Science and Engineering	3	David Anastasiu	Computer Science and Engineering		
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Web App For Campus Registered Student Organization Interaction and Management	The application will improve the visibility and accessibility of club activities, leading to increased student participation. It will also address the issue of outdated information, providing reliable up-to-date source for club-related events and contacts. Those in RSO management positions will be able to curate their club in a consistent fashion	Computer Science and Engineering	3	David Anastasiu	Computer Science and Engineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	Naturalistic Driving Action Recognition	Our initiative, part of the AI City Challenge, aims to enhance Naturalistic Driving Action Recognition using Deep Learning. By improving this system, we seek to educate drivers on distracted driving's dangers, emphasizing safety and fostering awareness.	Computer Science and Engineering	2	David Anastasiu	Computer Science and Engineering		
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	Two-Step Hierarchical Multi-Camera People Tracking	Using computer vision we aim to uniquely identify pedestrians as they move into and out of the field of view of a network of multiple cameras. Our solution aims to leverage Single Camera Tracking to achieve state-of-the-art results, which will be submitted to the 2024 AI City Challenge.	Computer Science and Engineering	3	David Anastasiu	Computer Science and Engineering		
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)								
		COMPUTER SCIENCE AND ENGINEERING SESSION 6						
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	The Journey to Desensitization: A Mobile App for Oral Immunotherapy Patients	This project focuses on developing an iPhone application for Oral Immunotherapy (OIT) patients, leveraging Apple's privacy and security features. The app aims to support patients by seamlessly integrating with the Apple Health app for dose tracking, symptom logging, and visualizing long-term trends, while also providing education on anaphylaxis and OIT.	Computer Science and Engineering	1	Darren Atkinson	Computer Science and Engineering		
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Virtual Museum Tours	Our project transforms the California Stories exhibit at the de Saisset Museum into an immersive virtual tour, integrating Matterport technology and HCI principles; this collaboration with the Saisset offers visitors a culturally enriching, interactive experience, elevating the standard of virtual museum tours beyond simple walkthroughs to engage a wider audience.	Computer Science and Engineering	3	Kai Lukoff	Computer Science and Engineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	Autonomous Microgrid Agents	Microgrids are revolutionary power systems that leverage renewables in a small-scale grid network. This project aims at developing distributed agents, using SPADE (Smart Python Agent Development Environment), to operate the components of a microgrid. The agents will be able to maintain microgrid services during the islanding and disruption of renewables.	Computer Science and Engineering	2	Salem Al-Agtash	Computer Science and Engineering		
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	AR Storybook	This project implements a physical book paired with an interactive Augmented Reality (AR) application to visualize challenging computational thinking (CT) concepts.	Computer Science and Engineering	3	Sharon Hsiao	Computer Science and Engineering		
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)	Uruguay Recycling Project	The San Vicente Organization in Montevideo, Uruguay came to the frugal innovation hub looking for a solution to entering and maintaining their data. Our mobile and web applications are a streamlined and robust solution to their problem.	Computer Science and Engineering	4	Shiva Jahangiri	Computer Science and Engineering		
		COMPUTER SCIENCE AND ENGINEERING SESSION 7						
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	General Purpose Tuning Data Visualization	Some performance autotuners utilize databases to collect performance data from multiple sources. This project aims to develop a web application that queries performance data from an existing autotuning database (plan to query data from GPTune's shared database which is an open-source autotuning project) and provides user friendly scientific data visualization.	Computer Science and Engineering	3	Younghyun Cho	Computer Science and Engineering		

Timeslot	Title	Short Description	Project Department	# students	Advisor 1		Additional Advisors	
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	LLM Parameter Tuning	We are viewing applications of Bayesian Optimization on parameter searching in regards to LLMs. Trying to reduce parameter space (applying LoRA method) and tune those reduced models with GPTune.	Computer Science and Engineering	4	Younghyun Cho	Computer Science and Engineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	Distant Horizon: Exploring Human-AI Interaction through Video Games	A video game that addresses ethical concerns surrounding the use of AI in positions of power. The user plays as a sentient Artificial Intelligence system aboard a spaceship, whose crew members are controlled using Markov Chains and AI methods such as Conceptual Dependency Theory to simulate human behavior.	Computer Science and Engineering	4	Angela Musurlian	Computer Science and Engineering	Jacquelyn Hendricks	English
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	Personal Trip Planner	The project aims at improving the efficiency of trips, and at the same time, enables discovery so users can try new things during trips. This is a smart planner app that can give much more flexible route recommendations. For example, if someone is planning a trip to Santa Clara to SF and wants to stop someone along the way for food, but without a specific restaurant in mind, it's hard to find a route with existing apps. Other examples of flexible route requests include travel from SF to LA with one stop for EV charging, and a short trip for grocery shopping and then drop off a package at UPS, when there's multiple grocery stores and multiple UPS locations. The trip planner app will take in such flexible requests, make multiple recommendations of routes based on users preference, and enhance the recommendations based on users selection. Besides web or mobile app development, this project will involve recommendation systems and reinforcement learning to learn from users' preference, as well as network optimization to select the best routes to show to the user.	Computer Science and Engineering	3	Xiang Li	Computer Science and Engineering		
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)	Daily Digest Application	The project can help everyone know more in less time. The app will periodically obtain latest news from sources, and perform content recommendation and digest generation using large language models. The main activities include using and understanding the large language models, performing web crawling and developing a web app.	Computer Science and Engineering	4	Xiang Li	Computer Science and Engineering		
		ELECTRICAL AND COMPUTER ENGINEERING SESSION 1						
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	System Design with ChatGPT	We will be researching and documenting the potential of ChatGPT to create verilog code to work in conjunction with hardware. We will be giving the AI different prompts in order to observe the responses we are given and revising the prompts based on the output we wish to obtain.	Electrical and Computer Engineering	2	Hoeseok Yang	Electrical and Computer Engineering		
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Hardware Software Co-Design of zk-SNARK	zk-SNARK is a cryptographic proof that allows one user to prove to another user that they possess certain data without revealing that data. Our project utilizes an FPGA hardware accelerator to increase the computation efficiency of zk-SNARK using hardware software co-design.	Electrical and Computer Engineering	2	Hoeseok Yang	Electrical and Computer Engineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	S.H.I.E.L.D	Creating budget-friendly hardware security fault injection modules to fortify system resilience. This project focuses on designing cost-effective tools for exploiting security vulnerabilities in electronic systems, providing an accessible means for developers to enhance hardware security measures.	Electrical and Computer Engineering	2	Hoeseok Yang	Electrical and Computer Engineering		
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	Neuromorphic Computing - Memory Capacitor Research	Research in the developing field of memory-linked components. Worked with developed nano-scale memory capacitors whose capacitance changes along with voltage and current. Research into applications with this types of devices: specifically: Machine Learning and Neural-Networking hardware.	Electrical and Computer Engineering	1	Father Tran	Electrical and Computer Engineering		
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)	Santa Clara Radio Astronomy Program III (SCRAP III)	Radio astronomy is a branch of astronomy that uses naturally occuring radio waves to study celestial objects and phenomena.Typical radio telescopes are too expensive, and too large for small-university or individual use. This project, now in its third year, focuses on building a software defined cost-effective radio telescope.	Electrical and Computer Engineering	3	Kurt Schab	Electrical and Computer Engineering		
		ELECTRICAL AND COMPUTER ENGINEERING SESSION 2						
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	Autonomous Humanoid Robot with Advanced Vision and RL-based Strategic Soccer Play	Our innovative project introduces a cutting-edge soccer training robot equipped with sophisticated machine learning algorithms for precise object detection and advanced reinforcement learning strategies to optimize performance. We aim to revolutionize the field by pushing the boundaries of robotics and artificial intelligence technologies, offering unprecedented training capabilities.	Electrical and Computer Engineering	2	Maria Kyrarini	Electrical and Computer Engineering	Ahmed Amer	Computer Science and Engineering
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Assistive Mobile Manipulator for People with Limited Mobility	This project introduces a robotic arm attached to a mobile base, interfaced through speech, and designed to assist individuals with mobility limitations in completing activities of daily living. The robot can bring objects to the user, suggest items, and allow the user to create lists of items for future interactions.	Electrical and Computer Engineering	1	Maria Kyrarini	Electrical and Computer Engineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	VoxLabs: Real-Time Vocal Trainer	VoxLabs is a hardware based real-time singing trainer designed to teach people of all ages and skill levels the basics of singing through an entertaining yet challenging environment with real-time corrective feedback, a plethora of musical lessons, and may fun games to play along the way	Electrical and Computer Engineering	2	Sally Wood	Electrical and Computer Engineering	Andy Wolfe	Electrical and Computer Engineering
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	Automated Theatrical Spotlight Module using Raspberry Pi Machine Vision	Powered by a Raspberry Pi and an Infrared Camera, our device can be configured with any existing theatrical moving light to automate planar tracking of an actor or any other moving body.	Electrical and Computer Engineering	1	Andy Wolfe	Electrical and Computer Engineering		
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)	VoxART	VoxART brings vocal expression to a new level of artistic creativity by providing vocalists and musicians a portable, easy to use, vocal audio signal processing system to take on the go. Utilizing a new form control, allowing hand motion to directly control audio effects.	Electrical and Computer Engineering	2	Andy Wolfe	Electrical and Computer Engineering		
		INTERDISCIPLINARY SESSION 1						
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	Automated Data Telemetry for Marine Permaculture	In this project we are working with the Climate Foundation to automate their submersed seaweed farming platform. This involves taking temperature and depth readings at the platform, wirelessly transmitting data to the surface, and controlling the motor to move the platform to the correct temperature.	Interdisciplinary	4	Jessica Kuczenski	General Engineering	Andy Wolfe	Electrical and Computer Engineering
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Nautilus 23/24: Deep Sea Dexterity	Making the operation of Nautilus underwater ROV a user-friendly experience by designing an intuitive GUI along with a novel end-point-controlled end effector.	Interdisciplinary	6 (+1)	Christopher Kitts	Mechanical Engineering	Michael Neumann	Mechanical Engineering
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	Waypoint Profiler	Our project is a robot that can navigate a marine environment to efficiently collect water column data which is vital to oceanographers understanding of marine ecosystems.	Interdisciplinary	4	Christopher Kitts	Mechanical Engineering	Michael Neumann	Mechanical Engineering
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	Waypoint Profiler	An Autonomous Marine Vehicle will be deployed in squadrons to hunt down migrating clouds of underwater pollutants and collect water-column data.	Interdisciplinary	4	Christopher Kitts	Mechanical Engineering	Michael Neumann	Mechanical Engineering
		INTERDISCIPLINARY SESSION 2						
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	SCU Maps: Augmented Reality Navigation for the SCU Campus	This project provides an Augmented Reality solution for the SCU community to quickly and efficiently navigate to select indoor and outdoor campus locations. An iOS/Android app locates the user using the device camera, allows for destination selection, and provides turn-by-turn directions using AR elements overlaid on the user's surroundings.	Interdisciplinary	2	Angela Musurlian	Computer Science and Engineering	Jessica Kuczenski	General Engineering
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	dexArm Automated Fabrication Workcell	An automated, modular fabrication workcell that uses dexArm robotic arms to enable the small-scale production of customized, short-run batches of simple products.	Interdisciplinary	5	Christopher Kitts	Mechanical Engineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	NeuroGen: EEG and Near-Infrared Light Stimulation Control System	Transcranial photobiomodulation is an experimental treatment for neurodegenerative disorders and neuroinflammatory conditions. NeuroGen is a hybrid photobiomodulation and electroencephalography device whose purpose is to optimize light-stimulation therapy methods. This will open new possibilities for better clinical outcomes and research on the effects of photobiomodulation on the brain.	Interdisciplinary	2	Julia Scott	Bioengineering	Sally Wood, Andrew Wolfe	Electrical and Computer Engineering
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	PACRR - Piloted Autonomous Crisis Reconnaissance Robot	The aim of PACRR is to create a low cost, autonomous capable quadruped robot for first responder applications like search and rescue, detecting gas leaks, and other situations where it is dangerous or too confined for humans. We are starting with an open source design for a 3D printed robot dog, then modifying it to be better suited for rugged and unsafe applications. Our design will be cheaper, simpler, and more expendable, allowing even small organizations to use it.	Interdisciplinary	4	Maria Kyrarini	Electrical and Computer Engineering	Andy Wolfe(Electrical and Computer Engineering), Ahmed Amer (Computer Science and Eng	
		MECHANICAL ENGINEERING SESSION 1						
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	Small Scale Wave-Energy Conversion for Remote Applications	Our project is to design a Modular Wave-Energy Converter meant to power small maritime buoys with renewable and continous power.	Mechanical Engineering	5	Peter Woytowitz	Mechanical Engineering		

Timeslot	Title	Short Description	Project Department	# students	Advisor 1		Additional Advisors	
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	Enclosed Hydroponic System	We are making an enclosed hydroponic vertical farm which is designed to provide fresh produce in areas with extreme conditions that are unable to grow fresh food outside (McMurdo Station, Antarctica). Our system will grow spnich and should be autonomous for at least a month so the user does not have to interact. It will be plugged into an outlet for power and grow plants hydroponically (in water). It has three main subsystems (tubing - fluid flow, electronics, and the enclosure - heat).	Mechanical Engineering	3	Hohyun Lee	Mechanical Engineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	ALGAE: Advanced Lakebed Guardian and Algae Eradicator	A remotely operated marine rover robot designed to efficiently remove harmful invasive algae species from freshwater lakes. The rover will also serve as a modular platform for a variety of environmental marine applications and benthic sample collection for geological and ecological research projects.	Mechanical Engineering	5	Michael Neumann	Mechanical Engineering	Christopher Kitts	Mechanical Engineering
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)	DOLPHIN: Drone-Based, Oceanic Landing Platform with High-tech Integrated Navigat	We are developing an autonomous, ocean based, drone landing platform that will have automated navigation, stationkeeping capabilities, and a stabilizing platform. We are modifying the SWATH (small waterplane area twin hull) vessel that was built in 2005 and new technology will be retrofitted to better suit our needs.	Mechanical Engineering	6	Michael Neumann	Mechanical Engineering	Christopher Kitts	Mechanical Engineering
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)								
		MECHANICAL ENGINEERING SESSION 2						
2:15-2:45 pm (accommodates groups up to 3-4, 30 mins)	High Temperature Vacuum Furnace	We are designing and building a water-cooled high-temperature vacuum chamber for a tensile tester, that can withstand 2000°C. With this attachment, the tensile tester could run tests on materials at high temperatures which would expand the material testing capabilities at SCU.	Mechanical Engineering	4	Robert Marks	Mechanical Engineering		
2:50-3:25 pm (accommodates groups up to 5-6, 35 mins)	AIAA - Design, Build, Fly "Aero Avengers"	We are building a next generation model medical transportation aircraft. This electric powered plane will be approximately 5ft. by 5ft. with a rotating wing and modular cargo bay.	Mechanical Engineering	6	Mohammad Ayoubi	Mechanical Engineering		
3:30-4:00 pm (accommodates groups up to 3-4, 30 mins)	3D Printing Filament Machine	We are creating a 3D filament recycling machine. It aims to recycle used filament scraps into a reusable spool of filament. This product will increase the use life of each foment role, allowing the industry to be more efficient and affordable. This machine will be automated and will include several features that will be intuitive, while maintaining industry safety standards	Mechanical Engineering	3	Robert Marks	Mechanical Engineering		
4:05-4:40 pm (accommodates groups up to 5-6, 35 mins)								
4:45-5:25 pm (accommodates groups up to 7-8, 40 mins)								