



COLLEGE OF ENGINEERING
AND COMPUTER SCIENCE
FLORIDA ATLANTIC UNIVERSITY



SENIOR DESIGN SHOWCASE SPRING 2018

05.02.18 | ENGINEERING EAST | BOCA RATON CAMPUS

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SENIOR DESIGN SHOWCASE
SPRING 2018

Designers: Cheryl Halle, Maria Valdes

MESSAGE FROM THE DEAN

Welcome to the Spring 2018 Senior Design Showcase. We are so pleased you are joining us and participating in one of our most exciting and innovative signature events of the year.

During their senior year, students are assigned to teams and are tasked with addressing real-world problems through advanced and complex computer science and engineering projects. This spring, the Showcase features 39 projects in the areas of civil engineering, computer engineering, computer science, electrical engineering, mechanical engineering, and ocean engineering.

As you walk through the Showcase, you will find a wide variety of exceptionally creative and sophisticated projects that address daily challenges with truly clever and ingenious solutions. I encourage you to personally speak with our students to learn more about their projects, their problem solving strategies and their teamwork experiences.

Let us know if you have a senior design project idea that could provide our students with a unique opportunity to work on a current industry issue. Working with a highly motivated student design team could provide you with a fresh perspective and creative ideas for your project. We always welcome these types of partnership opportunities.

Thank you for joining us tonight as we highlight and celebrate our students and their impressive accomplishments.



Stella Batalama

Stella N. Batalama, Ph.D.
Dean
Florida Atlantic University
College of Engineering and Computer Science

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ACKNOWLEDGMENTS

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Javad Hashemi, Ph.D., Assoc. Dean for Research, and Interim Chair, Department of Ocean and Mechanical Engineering

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Trudy Jeffries, Project Specialist

Maria Valdes, Student Assistant

Student Volunteers



DEPARTMENT OF OCEAN AND MECHANICAL ENGINEERING

PROJECTS

COURSE: OCEAN ENGINEERING SYSTEMS CONTROL AND DESIGN (EOC 4804L)

The course Ocean Engineering Systems Control and Design (EOC 4804) deals with ocean engineering design, creativity and professionalism, ocean systems design, simulation and control, dynamic modeling, system trade-offs and system evaluation. Projects are developed in the lab portion of the course (EOC 4804L).



PROJECTS 01 TO 04

Pierre-Philippe Beaujean, Ph.D., Professor

Prof. Pierre-Philippe J. Beaujean received a doctoral degree in ocean engineering from Florida Atlantic University in 2001. He is a professor in the Department of Ocean and Mechanical Engineering at FAU. He specializes in the field of underwater acoustics, signal processing, sonar design, data analysis, machine health monitoring, and vibrations control. Dr. Beaujean is an active member of the Acoustical Society of America (ASA), the Institute of Electrical and Electronic Engineers (IEEE) and the Marine Technology Society (MTS).

COURSE: DESIGN PROJECT (EML 4551)

The course Engineering Design (EML 4521C) goes over the design process, including decision theory, creativity concepts, human factors, optimization techniques, reliability, statistics, professional ethics, engineering economy, material selection and testing and fatigue and fracture design. Projects are continued and completed in Design Project (EML 4551).



PROJECTS 05 TO 15

Oren Masory, Ph.D., Professor

Prof. Masory received his B.Sc., M.Sc. and Ph.D in Mechanical Engineering from the Technion, Israel Institute of Technology, Haifa, Israel, in 1974, 1977 and 1980 respectively. His interests are: real-time computer control of manufacturing systems; robotics; machine tools kinematic calibration; automation, drivers' performance; accident reconstruction; product liability; assistive technology and rehabilitation engineering. He is teaching Programming, Electro-mechanical Systems, Senior Design and other courses. He joined FAU in 1988 and is currently a full professor in the Department of Ocean and Mechanical Engineering.

OCEAN ENGINEERING SYSTEMS CONTROL AND DESIGN (EOC 4804L)

01: AUTONOMOUS SURFACE VESSEL FOR MICROPLASTIC SAMPLING



Adam
Dubin



Zachary
Fisher



Alex
Garnett



Alexander
Gonzalez



Robert
Kipp



Ryan
Reifenberg



Will
Wiard

Description: Micro-plastics pose a huge threat to the ocean environment, marine life, and subsequently to our health. They are classified by the National Oceanic and Atmospheric Administration (NOAA) as plastic particles less than 5 mm in diameter. The current method of detecting the severity of micro-plastic pollution in water samples involve using a large research vessel towing a net at points of interest which are then put through a refinement process. This research method makes the cost of conducting micro-plastic research very expensive. The objective is to create a payload system deployable on an Autonomous Surface Vehicle (ASV) that would be able to sample the water for micro-plastics autonomously. By using an ASV, the cost of collecting this data is reduced significantly, and a larger picture of micro-plastic pollution could be seen across the oceans.

02: AUTONOMOUS SELF-DOCKING SURFACE VESSEL (ASDSV) T-REX



John
Bryan



Richard
Dowling



Andrew
Matyk



Luke
Ridley



Joshua
Simmons



Matthew
Warren

Description: Autonomous Surface Vessels (ASVs) can run missions with minimal human interaction. These missions can include tasks such as collection of oceanographic data, deploying and recovering targets, and marine surveillance. Typically, these boats require a significant effort to launch and recover safely. This vessel uses a catamaran design with differential thrust to carry a target to a desired location. The vessel uses a GPS and compass to determine its desired location and autonomously deploys the target within 2 meters of a specified location. The innovation in its design is that the vessel begins its missions by releasing itself from a docking bar and completes its missions by re-attaching itself to the same docking bar using a simple latch.

03: BUTHIZÓ



Chris
Cardella



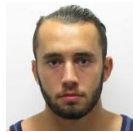
Marc
Carlo



Tripp
Dawson



Amanda
Fosbrook



James
McGinley



Nicole
Perry

Description: Buthizó is a hull inspection and cleaning remotely operated underwater vehicle (ROV). The ROV electronics are completely self-contained within an onboard pressure vessel connected through a communications cable to a controller. Electrical system health is monitored through LabView at the control station. The controller contains full functionality of the ROV's inspection, cleaning and operation systems. The ROV is driven by manipulating four independent BlueRobotics thrusters and is capable of maneuvering in the surge, yaw, heave and sway directions through various user inputs. The inspection system uses a GoPro camera with a continuous live feed display for the user on a full screen monitor. The cleaning system implements two separate attachments for removal of specified growth. Each cleaning attachment is placed on a motor assembly that is engaged by two switches on the controller to set the direction of rotation and cleaning motor speed.

04: WAVE POWERED AIR COMPRESSOR



Broc
Dunlap



Joseph
Cauley



Allison
Miranda



Ian
O'Keefe



Corey
Page



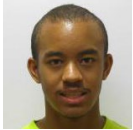
Amanda
Small

Description: The objective of this project is to provide preliminary documentation and careful engineering consideration into the analysis, design and feasibility of a wave energy converting device as well as a system to monitor the wave environment. The design is the product of trade studies, operational risk management and high-level review. The system was narrowed down to a point absorbing device named the Compressed-air Buoyancy Operated Buoy or C-BOB. The chosen point absorbing configuration operates primarily with an oscillating surface buoy attached to a pneumatic piston capable of achieving a pressure of 2500 psi. The piston is attached to a shell that counteracts the motion of the surface buoy effectively absorbing the ocean wave energy. A tank mounted to the buoy will be used to store the energy in the form of high-pressure air. The design, analysis and testing procedures will be presented in a concise manner to demonstrate the applicability of this alternative method to capturing renewable energy.

DESIGN PROJECT

(EML 4551)

05: ENGINE DYNAMOMETER



Myles
Grey



O'Brien
Lavin

Description: The goal of this project is to create a small-scale engine dynamometer, in which the torque is measured and horsepower is calculated versus RPM of the engine. An engine will be mounted to a test bench and a drive shaft will be coupled to the engine with a rotor mounted to it. To measure the torque output of the engine a brake caliper will be used to input a resistance force on the rotor until the engine stalls. The system will use a linear actuator to input the force through a master cylinder connected to the pressure line. The force will be modulated by a spring placed between the actuator and the master cylinder. The pressure change in the line will be monitored by a pressure sensor and used to calculate the force output. Which is then used to generate a graph of the recorded readings.

06: UNDERWATER GLIDER



Kevin
Dusang



Andrew
Mitchell



Engelbert
Ocampo

Description: The underwater glider is a type of autonomous vehicle used to collect ocean data. Utilizing variations in buoyancy to propel itself through a water column, gliders have low power consumption and do not require human interaction while traveling. This has allowed extended sampling missions lasting up to weeks at a time in remote locations, both safely and at a relatively low cost. The group has designed its own glider capable of moving through a water column using a buoyancy engine and a translating mass that allows manipulation of the glider's pitch. An Arduino microcontroller is implemented to control the glider, and a micro SD for data storage.

07: BRASS COLLECTING ROVER AND SORTER MACHINE



Peter
Hughes



Joshua
Selgren



Andrew
Singh

Description: The purpose of this project is to design an autonomous system that collects and sorts brass shell casings. An estimated ninety percent of gun range customers do not collect empty shell casings after shooting. This is a total of \$15,215 per year at a single range. This is where the autonomous rover and sorting machine comes in handy. The rover will navigate a predetermined path in order to collect the casings, and then return to the sorting machine where the brass shells will be sorted by caliber. The rover will autonomously find the sorter and dump the collected casings into a hopper. The hopper is an open cylindrical tray that can rotate and allow for the shells to feed one by one. The casings are fed to two spinning rollers allowing the shell casings to move horizontally and drop in the trays according to the shell size.

08: RACING SIMULATOR



Ross
McAllister



Shaun
Swannick



Nathan
Witztum

Description: This project is a racing simulator intended to be used as a driver training tool for the Florida Society of Automotive Engineers (FSAE) team, Owls Racing. This will allow new drivers for different racing events to get used to the handling of the car and the layout of the controls throughout the year as a new car is constructed. It consists of a cockpit, provided by Owls Racing, which will tilt in order to simulate the accelerations felt by the driver of the car. This will be limited to two degrees of freedom representing the longitudinal and lateral accelerations of the car. This project will involve the integration with existing simulation software which will handle the simulated motion of the car and will provide the forces that will then be simulated. This is done by inputting the actual car's specifications, provided by the Owls Racing team, into the program.

09: VARIABLE RESISTANCE BALANCE TRAINER



Joshua
Bowyer



Victor
Coto



Austin
Peseux

Description: This project aims to aid in the rehabilitation of individuals whose circumstances led them to have decreased balance and coordination, such as hip and knee replacement patients and those who have suffered a stroke. The device will have a platform on which the patient stands, and will tilt over a central pivot. A pattern of springs will be placed underneath the platform to provide resistance against the leaning of the patient. This resistance can be varied according to user input in order to change how difficult it is for the patient to tilt the board. The tilt and direction of tilt will be tracked using sensors and output as a moving tracker on a display. The exercises to help re-train the patients balance and coordination involve tilting the platform as to navigate the tracker through different shapes and patterns.

10: TACTICAL RC ROBOT



Hamad
Alfarhan



Peter
Crocco



Carlos
Galdamez

Description: The purpose of this project is to design and build a Tactical RC robot that has the ability to take on tasks that would normally put human beings in harm's way. The robot will be designed to work in extreme terrains and the key features include: rugged and reliable mobile platform for indoor and outdoor applications requiring robust maneuverability. Two articulated arms that could convert the robot into various navigation configurations to overcome different terrain challenges will be included. Also sensitive features that are rarely seen in other designs will be considered in this tactical robot, such as: indoor and outdoor operation for extreme terrains, climbing up slope or stairs ($> 55^\circ$), lightweight (< 20 lb), managing 1 ft (max) vertical step or obstacles, and maximum speed of 3 mph. Plus, for what this robot can offer, the price would be also very competitive and cost effective. This smart robot would make tasks dangerous to humans safer to manage.

11: BRAKE DYNAMOMETER



Marco
Cheraso



Minh
Nguyen



Kamal
Tina

Description: In the automotive racing and development industry, testing and validation of design concepts is essential. Validation of brake system performance is of critical significance, and many testing devices called brake dynamometers have been created for this purpose. This project presents a brake dynamometer design that is capable of quantifying the coefficient of friction at different operating temperature of rotor pads, while underscoring cost-effective and portability features. Such a system could not only provide meaningful data for automobile testing, but also facilitate accessibility and affordability for a broad range of clientele. This design incorporates sensing devices for temperature and coefficient of friction characterization, on-system data collection, and programmable actuation for control of braking force, the independent variable. The final design and prototype was made possible with sponsorship and guidance of the faculty from the Department of Ocean and Mechanical Engineering.

12: AUTOMATED HAIR DYE MIXER



Michael
Bornstein



Matthew
Conard



Harrison
Heysek



Lyndsey
Mandelare

Description: This system enables a hairdresser to increase the precision and accuracy of any hair coloring process by automating the processes of dye selection and mixing. Hair dye is wasted everyday by stylists overestimating the volume of hair dye required to cover a given client's hair, amounting to \$7,400 of annual waste. This machine automates volume selection, and creates any color that the client desires. The amount of hair dye required is determined through an equation that uses information gathered about the hair. With each use of the machine, the calculation will become more accurate through an iterative process. The volume of dye is then applied to a ratio of CMYK colors required to create the desired color. This is accomplished by creating an assembly that features a carousel of tubes of known diameter that are actuated with a motor encoded lead screw attached to a piston.

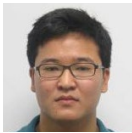
13: SHOCK ABSORBER DYNAMOMETER



Patrick
Costa



Daniel
Morishita-Horner



Napatarong
Wannaphaschaiyong

Description: Shock absorbers are a vital part of vehicular performance. They dampen the effects of road irregularities and the motion of the vehicle in order to improve ride quality and vehicle handling. Shock absorbers use valving of oil to absorb kinetic energy as a function of shaft velocity. A shock absorber dynamometer measures the force vs. velocity which determines the damping level of the shock. Shock dynos can be used to monitor the wear of shocks as they can wear over time, or the fluid can become degraded which will influence the damping characteristics. Additionally, for performance applications such as motorsports where the dampers are adjustable, it is important to determine the damping constants for each setting and different valving as this information can be used in both the design and tuning of the vehicle. There currently does not exist an affordable shock dynamometer for the weekend racer. Commercial units do not use constant speed mechanisms which require expensive velocity and LVDT sensors along with additional features which increase the cost. Our design represents a cost-effective solution that utilizes a lead screw mechanism to actuate the shock which will be powered by a small AC motor for FAU's FSAE racing team. We keep the velocity of the actuator constant by analyzing the feedback signal provided by an optical encoder. The resulting data is stored in an SD card and displayed in a plot of force vs. velocity.

14: HOVER TRAIN



David
Carlson



Lloyd
Chambers



Guillermo
Rosero

Description: In 1804, the first steam locomotive was built, stimulating the industrial revolution in the centuries to come. The engines in trains used to transport people and goods are becoming increasingly efficient. Improvements to train tracks have not followed the same pattern. A majority of money spent on train projects is on maintenance of the railway. The Hover Train significantly reduces the cost of maintenance by utilizing an air cushion on a precast track. A precast concrete track will significantly decrease the number of parts on a track which will need maintenance over an 80-year period. The lift for the train is provided by a set of fans. The horizontal propulsion is given by engines on the top and rear of the craft. The Hover Train was inspired by a French project during 1970's called Aerotrain using similar methods of operation.

15: WATERLESS URINAL MAINTENANCE DEVICE



Gaston
Garcia



Tommy
Torres

Description: A Waterless Urinal that receives proper maintenance saves on average of 20,000 to 45,000 potable gallons of water a year that would otherwise be flushed down the drain. To keep Waterless Urinals in proper working condition requires bi-weekly maintenance that is a time consuming manual process. Waterless urinals that are not properly maintained will clog and will be unavailable for use until they have been manually serviced. The objective of our project is to design and fabricate a device that can be installed on a standard Waterless Urinal that automatically performs maintenance and sanitation on a regular basis.



Engineering East, FAU Boca Raton Campus

DEPARTMENT OF COMPUTER AND ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

PROJECTS

COURSE: ENGINEERING DESIGN 2 (EGN 4952C)

In the course Engineering Design 1 (EGN 4950C) students develop and present proposals for capstone design projects to be completed in EGN 4952C. Students are required to work in interdisciplinary teams to develop their projects.



PROJECTS 16 TO 31

Hanqi Zhuang, Ph.D., Associate Chair and Professor

Prof. Hanqi Zhuang's research interests are in the areas of robotics, signal processing, and assistive technology. He has published more than 120 refereed journal and conference papers and co-authored two books. He has guided 12 Ph.D. and 17 M.S. students to completion. He received an NSF grant that supports engineering students in the development of devices for assisting the elderly and persons with disabilities. He was appointed for two terms as an Associate Editor of IEEE Transactions on Robotics and Automation. He is now an Associate Editor of the International Journal of Computer Applications and is on the editorial board of the International Journal of Biometrics. He received an Excellence in Under-graduate Teaching award from Florida Atlantic University in 2003 and was a finalist for the University Teaching of the Year Award in 2010.

ENGINEERING DESIGN 2

(EGN 4952C)

16: SMART GARDEN



Yousuf
Mubarak



Juan
Andonaire



Justin
Dunn

Description: The smart garden system will be developed to help users that are too busy to maintain a complex garden. A garden requires a lot of maintenance ranging from watering, temperature control, sunlight control, and soil conditions. With Smart Garden, we will take care of all of the above. With advanced sensors and programming, the system will proceed to maintain these tasks all without user interaction. In a smart garden, data is key. When the user logs into our web application they see what our system is seeing. The user learns if plants receive sufficient sunlight, water and other nutrients. All of the data is obtained by sensors and saved in an SQL database, which can be accessed by a web application. The system also does intervention if the plants need certain nutrients. We hope Smart Garden will improve the quality of life for people that live in cities.

17: NeRDS: NEARBY ROBOT DELIVERY SERVICE



Michael
Padron



Rachel
Phelps



Alexander
Roscoe



Roberto
Sanchez-
Giron



Marquita
Scott

Description: Our robotic platform is designed to assist with last mile deliveries, which describes the movement of goods from a central transportation hub to its destination. To replace a whole postal fleet with one robotic platform is impossible; thus, our system is designed to supplement existing solutions. Our current application is geared towards college campuses to aid in the delivery of both mail and food across campus, in this case, the Boca Raton campus of FAU. Our project consists of an autonomous delivery robot platform as well as a full ordering system. The ordering system allows customers to place orders either on our website or using a mobile app. We have also created routing algorithms and a way of securing the compartments during transportation.

18: ALCOHOL SENSING CAR SYSTEM



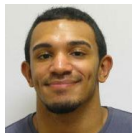
Quyen
Cao

Description: Accidents caused by drunk drivers occur all over the world. According to current statistics, the United States has a high rate of alcohol related road fatalities. Installing an Alcohol Sensing Car System into vehicles would help reduce drunk driving accidents and save lives. If a driver is under the influence of alcohol the system will detect it via their breathe and send a signal to the engine so that it will not start. The system utilizes a microcontroller that takes an alcohol signal from an alcohol sensor and displays an alcohol detection alert on an LCD screen. If the microcontroller sends a signal then the engine will not start.

19: MEMORY KEEPER



Daniel
Cruz



Jean-Pierre
Estevez



Jessica
Carmona
Matos

Description: The main objective of the project is to create a wearable device for patients with Alzheimer's disease, called the Memory Keeper, in order to help them continue to live a normal life despite their illness. The Memory Keeper assists patients by reminding them of their daily tasks such as, taking medication, and exercising, among many other things. It is also able to determine whether a patient has fallen and automatically alert their caretakers via text messages. It includes a button that when pressed will contact their caretakers in order to let them know the patient is in some kind of trouble. The device works with a phone application that allows caretakers to input events their patient needs to be reminded of. The Memory Keeper is a device that is aimed at benefitting all patients suffering from a mild form of Alzheimer's, thus relieving the stress and worry from the caretakers and most importantly, the patients.

20: INFANT HERO (CHILD-IN-CAR ALERT SYSTEM)



Jorge
Burgos



Cameron
Hernandez



Jacob
Pack

Description: On average, 37 children die in hot cars yearly. The primary objective of our project is to prevent these deaths. Our system alerts the child's guardian via SMS text and audible tone that a child has been left in the car. If the child is left and the temperature is too hot, our system starts the car, secures the vehicle, turns on the AC and initiates an alarm, which will alert bystanders. Once authorities are contacted, they can scan a QR code printed on the vehicle via an Android application, access the vehicle and safely remove the child. Ultimately, we envision our safety system installed in every vehicle, serving to protect and save young lives.

21: SHADOW CAST



Cliford
Guillaume



Christopher
Jones



Joshua
Marker

Description: Shadow Cast is a projector and programmed camera to detect an object's outline in real time. When run, the system will take a video of an object's outline, process it into the motor commands for the laser, transmit wirelessly through an online connection over a mobile phone to a Raspberry Pi, which runs the motors of the laser projector, to display the image outline. The purpose of this project is to simulate a simplified holographic projection. This project simplifies 3-D holographic to a 2-D environment, where body motions and images are captured then transmitted to a holographic projector in a distant location.

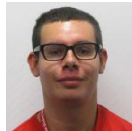


Christopher
Wongsam

22: SMART CUBE



Arturo
Carcamo



Eduardo
Ortiz



Spencer
Pope



Kim
Smelt

Description: The smart cube is a device that controls the power to a wall outlet by sending a wireless signal to a proprietary wall outlet controller. The signal being sent is based on accelerometer and gyrometer data generated by moving the cube. There is a 2.4 GHz antenna receiving and transmitting commands. This project has leveraged the knowledge of writing code, CAD modeling, PCB modeling, PCB Assembly, Antenna design, and Teamwork. The Smart Cube's foundational ideas can be translated into other products where movement of an object controls the electricity around you. This project will help to push further into the realm where devices are controlled by gestures by bringing all of the "dumb" devices in your home into the world of the internet of things.

23: SMART PARKING SYSTEM



Nair
Alam



Ihsan Kutay
Tumay

Description: Smart Parking System is to reduce cars waiting time in a parking area which will help to prevent traffic jams/incidents and environmental pollutions. The basic idea involves sensing the arrival of a new vehicle and accordingly opens the entry boom to allow the car to be parked in the available space. When a parked car needs to leave its parking lot, the controller accordingly opens the entry boom to allow the car to leave the lot and closes the boom afterward until a new car arrives. The parking gate closes completely once the number of cars parked reaches the given limit. The system also tracks the number of cars parked and the number of spaces available, and displays the information for the drivers.

24: HANDY ALERT



Andrew
Boukzam



David
Dorneau



Damoy
Hyman



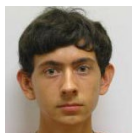
Justin
Roopnarine

Description: The objective of Handy Alert is to create a device that allows for disabled and elderly individuals to live as freely and independent as possible knowing that their safety is being watched over and ensured. Additionally, Handy Alert allows for those families and friends of disabled or elderly to have peace of mind knowing that their loved ones are being monitored for their well-being. Some of the tools used in our project are AutoCAD circuit design, SolidWorks 3D printing, and Arduino IDE. The software development technique used models that of Agile Methodology, Scrum in particular. We hope that Handy Alert will eventually be used in nursing homes, hospitals, and other facilities that service the elderly or disabled.

25: SMART ADAPTER



Mustafa
Camtepeoglu



Cory
Jorgensen



Wesley
Watkins

Description: Our project involves designing and building a Smart Adapter that can control voltage and current for any home appliance, for instance, laptops, phones, lights, and televisions. The Smart Adapter will be controlled via a phone application and will have customer data that can be accessed through a web application. The phone application controls the device with such actions as voltage and current flow, power on and off with motion control for power saving. The web application will be able to monitor the energy usage for each appliance so one can get some idea about power consumption of each device.

26: MOBILE WEATHER STATION



Jesse
Farber



Joe
Grier



Donny
Hale

Description: The Mobile Weather Station is a response to a call by the US Air Force. It is comprised of two main parts: an Aerial Unit and a Ground Unit. The Aerial Unit is mounted on a drone and collects weather data (including air pressure, wind speed, wind direction, temperature, GPS location, and altitude) at different height intervals. The Aerial Unit then wirelessly transmits the data to the Ground Unit via LoRa RF. The Ground Unit then processes, stores, and displays the data for further analysis. The Ground Unit possesses the ability to export the data collected and upload it to the Cloud where it can be downloaded and used with a weather forecasting software.

27: POOL CONTROL SYSTEM



Michael
Borombozin



Andrew
Freudenberg



Lucas
Miranda



Brian
Yaciuk

Description: Owning a pool has two main challenges: maintaining proper water composition, and securing the pool from kids or unwanted guests. Our autonomous pool system addresses this by monitoring the water via pH and temperature sensors, storing the data for later viewing, and automatically engaging heaters or dosing pumps when a deficiency is detected. The system also controls the main pool pump operation, through an online interface that can be configured by the owner. Lastly, the system can also detect the presence of a human in the water through its algorithms and gyrosopic sensor. Once triggered, a local alarm is off and a message is sent to the owner through email or text. The system allows for a more hands-off approach with pool maintenance, while helping better protect pets and young children from drowning.

28: SMART GREENHOUSE



Dmitri
Barbe



Sarah
Crimi



Brandon
Dosil



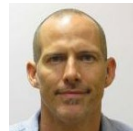
Justin
Evans

Description: Our smart greenhouse creates an environment for plants to thrive in conditions that may otherwise be impossible. We design a greenhouse that can be used for a variety of different plants that need different environments to grow. To accomplish this task, we build a water management system to keep the moisture level in optimal conditions. Also, we build a system where when no external source of UV radiation, artificial lights provide the radiation while keeping proper temperature for plants. The system also maintains a pH level in the water, among other things.

29: EMERGENCY BEACON SYSTEM



Kyle
Bowman



Sam
Shakespeare



Ed
Whitaker

Description: The Emergency Beacon System (EBS) is a modular beacon network which is deployed as a combination of stationary and portable beacons linked to a central gateway. The nodes can send location data to the gateway, which will store the information in the cloud to be used by our website. The system uses LoRaWAN technology to communicate between beacons and gateways while using a solar charging to provide power to each beacon. The EBS has a wide variety of uses such as emergency road side beacons and a safety location net in a national park. The EBS provides low cost communication in areas lacking communication capabilities and allows a user to be located in the case where assistance is required.

30: BUILDING MANAGEMENT SYSTEM



Grant
Lanham



Darlon
Lawrence



Robert
Smith

Description: The Building Management System (BMS) aims to aid in monitoring occupants entering and leaving a building. In addition, it does smoke detection for residents in their rooms. This technology will transform buildings such as nursing homes, schools and clubs into smart buildings by utilizing various sensors coupled with a PC desktop application and additionally an interactive webpage. Ideally, whenever a change in state is detected by a sensor, the data is sent to a microcontroller, an Arduino Mega, which acts as a router and send the data to another microcontroller, an Arduino Nano, which in turn sends the data to the PC to be saved and displayed. The Arduino Mega also sends the data to a third microcontroller, a Raspberry Pi, which posts data to the website. This system will play a vital role in rapid evacuations in case of a fire, in prevention against possible mass shootings and in other emergency situations.

31: iLOCK - YOUR SMART DOOR LOCK



Brenton
Farr



Carl Henley
Jules

Description: In this project, we are developing iLock, an innovative technology that will change the way we interface with our door lock. iLock is an electronic system fitted with a camera. The technology instantly recognizes its home occupants and opens the door. In addition, iLock will have a smartphone application that can be used to unlocked the door from anywhere in the world. We utilize the Eigenface algorithm in OpenCV for face recognition. In addition, we employ the Raspberry Pi integrated WiFi and web server capability to add remote communication with the system. The smartphone app is built in Android Studio and iLock is developed with Python programming language. These improvements will make a significant difference to the security of the home.



Engineering West, FAU Boca Raton Campus

DEPARTMENT OF CIVIL, ENVIRONMENTAL AND GEOMATICS ENGINEERING

PROJECTS

CIVIL ENGINEERING DESIGN 2 (CGN 4804C)

This course is a continuation of Civil Engineering Design 1 (CGN 4803C). Multidisciplinary team design projects with multiple realistic constraints culminate with written and oral reports. Design and professional practice issues are also presented and discussed.



PROJECTS 32 TO 39

Fred Bloetscher, Ph.D., Associate Professor

Prof. Frederick Bloetscher's areas of expertise include water resource management issues and utility management. Major areas of research in the past five years have included adaptation strategies for sea level rise for water, the sustainability of water supplies through innovative opportunities using membranes, wastewater, storm water and transportation infrastructure, water supply challenges for water limited areas, water quality solutions for water supply challenges, and public health impacts of emerging water contaminants. He is a co-PI on the 2009 Southeast Florida report on the effects of sea level rise on water infrastructure, and on the FDOT study on roadway vulnerability. He has written over 200 papers, 22 peer reviewed in the past 3 years, and authored 5 books concerning utility management and practice. He is the recipient of the 2012 FAU faculty Talon Leadership Award; the TIAA-CREF Leadership award, and; the recipient of the 2012 NCEES Award for the collaboration with students and professionals in the building of the Dania Beach, Fla. nanofiltration plant. The plant, is the first LEED® - Gold certified water plant in the world, and has received four national awards, two state awards and one local design award.

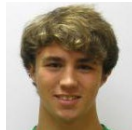
CIVIL ENGINEERING DESIGN 2 (CGN 4804C)

32: LINCOLN PARK INCINERATOR - FT. LAUDERDALE, FL

Team: 4 Site Engineering



Mohammed Alotaibi



Jonathan Danforth



Jermaine Hamm



Cia Jordonne



Christopher Makransky

Description: The scope work was to create a mix used facility including artist live/work space, commercial units as a stop, for the Destination Sistrunk tour. This is Fort Lauderdale's up-and-coming tourist excursion that highlights the city's culturally rich locations, and a parking garage. The request for proposal was made for the 1.61 acre site located at 2511 NW 6th Street, Fort Lauderdale, Florida, 33311, also known as Sistrunk Boulevard). The site is just outside of Fort Lauderdale city limits. The design priorities will be to satisfy the stockholder's needs and create a building that is self-sustaining. 4SITE will Also achieve a Leadership in Energy and Environmental Design (LEED) Gold certification. Landscaping and exterior lighting will be incorporated into the design for function, aesthetics, security and safety. Lighting and security shall be furnished to connect the proposed building with the nearby parking areas of the site and any additional parking required because of the new building. Separation of vehicular and pedestrian traffic will emphasize the safety of pedestrian circulation as well as the development of parking areas with access from the perimeter and access for service vehicles, necessary to maintain the building and the grounds. The site and building will be designed to allow flexibility for future program growth and change.

33: LINCOLN PARK INCINERATOR - FT. LAUDERDALE, FL

Team: Apogee Engineering



Jordan Clayton



Carlos Cruz



Lisandre Meyer



Landon Scheer



Leonardo Trejo

Description: The property known as the "Old Lincoln Park Incinerator" has a very lengthy historical background dating back to the 1920s. Many uses of the site have contaminated the area over the years, from operating as a municipal incinerator and landfill from 1920's to 1950s, to a wastewater treatment plant recently. A management plan was also developed demonstrating the different technical design elements that each member is tasked to execute. An extensive Remediation Action Plan (RAP) was prepared to document the evaluation of the remedial options as well as the specifications of the plan set forth. Before commencing any future development on site, an excavation plan will need to be executed to remove any contaminants from the soil. These are some of the challenges Apogee has had to face in order to make this site a feasible destination with commercial use for residents and visitors. Apogee understood the importance of having a parking garage to accommodate and bring in visitors to the area. One of the ideas of the solar farm is to change the perception of the site's past history and make a statement of commitment by placing a commercial building, as well as a meandering walkway to make the community feel included in this new transformation. All of these features are beneficial to the development of the site because they showcase its potential for growth, future use and innovation, while satisfying the current needs of the community and the city.

34: INNOVATION DISTRICT - POMPANO BEACH, FL

Team: Ascension Engineering



Mustafa
Jafar



Ernst
Saint-Ange



Johnson
Saint-Hilaire



Michael
Technow

Description: The City of Pompano Beach is located in the Northern portion of Broward County, lining the East coast of the Atlantic Ocean about 8 miles North of Fort Lauderdale. Pompano Beach serves a population of just over 100,000 people, comprising a total area of 25.4 square miles. Continuing in the vein Pompano's long-standing traditions as a standout community and destination, The City has begun development of a pedestrian friendly downtown area given the name of the Innovation District. Upon completion of analysis of available sites and selection of the 6.24-acre plot located on the Northeast corner of MLK Boulevard and Dixie Highway, the team at AEG began a preliminary evaluation of current site conditions for development. The Plan: a 40,000 square foot facility designed to accommodate a dual commercial and office use. Provide patio-seating areas in the front and back.

35: INNOVATION DISTRICT - POMPANO BEACH, FL

Team: Collaborative Engineering & Design



Tyler
Hoorn



Mark
Landsman



Caique
Martins



Aaron
Spence



Teresa
Villalon-Comacho

Description: Collaborative Engineering & Design (CED) proposes a mixed use facility at 790/800 MLK Road located in Pompano Beach, Florida. The site plan is located on a 3.96-acre lot that is located on the Northeast corner of I-95 and Atlantic and it is bounded by NW 9 Avenue and NW 8th Avenue. This building has commercial shops and eateries on the first floor and will include a hotel on the 4th through 6th floor with a communal parking garage on the 2nd and 3rd floor. The proposal includes an innovative idea that emphasizes on improving the existing water drainage system and creating a downtown waterfront through a series of canals. There will be considerations made for Leadership and Environmental Design (LEED) accreditation to reduce long term operational costs. The ultimate goal is to achieve a Leadership and Environmental Design Gold Certification at the completion of this project.

36: INNOVATION DISTRICT - POMPANO BEACH, FL

Team: Strategic Design & Engineering



Jephthe Anosier



Oscar Billini



Ricardo Dornelus



Justin Napolitano



Tyrell Skipping

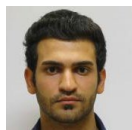
Description: Strategic Design and Engineering has created a site plan for the designed innovation district area within the City of Pompano Beach. The proposed structure provided by Strategic Design and Engineering was designed to create commerce, a habitable living space, and provide a “downtown” feel to this currently semi-barren area. The main issue with the area is that currently there are no structures that benefit what the City of Pompano Beach wants in a downtown area or what they refer to as the “Innovation District”. The current conditions of the property are a vacant land with an approximate area of 2.81 acres. The proposed building would create commercial business along MLK Boulevard and along the new minor street that is being designed per the municipalities’ street regulating plan. An approximate 20,000 SF structure with a parking garage attached to is being proposed. The design of the building will be sustainable which includes replanting trees when appropriate and design a site that can be easily or minimally have the option to be expanded in the future. There are other factors such as designing efficient drainage, example would be the on-site canal, adding addition pedestrian access such as a new minor street that promotes pedestrian use, also placing vehicular access routes that will make the structure easily accessible.

37: WEST GROVE NEIGHBORHOOD - MIAMI, FL

Team: Premier Innovation Engineering



Silvana Alvarez



Sepehr Amiri



Greg Jett



Lens Lubin



Abimbola Olajoyegbe

Description: The neighborhood of West Coconut Grove is suffering culturally and economically as a result of gentrification, and this is what is being addressed in our design. Many long-time residents are being forced to relocate because of the increase in property value that has taken place, and its once thriving sense of community has been on a decline ever since new investors have been buying and developing in the neighborhood. Premier Innovative Engineering will counteract these negative effects to the community with the design of a 3-story mixed-used building located on the lot of 3320 SW 37th Ave. In order to combat the cultural impact of gentrification, we designed a mixed-use building with commercial space and residential affordable housing units. The affordable housing units will allow the long-time residents of West Grove to remain living in the neighborhood by providing affordable places to live even with the rise in property values, while the commercial space will give local businesses a place to operate and help restore the sense of community.

38: WEST GROVE NEIGHBORHOOD - MIAMI, FL

Team: Ascending Engineering Solutions



Cristina
Caceres



Harout
Gurneian



Rudy
Mall



Kyle
Rosenberg

Description: Ascending Engineering Solutions is aware of the problems that face the residents of the West Coconut Grove community including the burden of the Neighborhood Conservation District 2 (NCD-2). The elimination of slum and blight is important to AES but we realize that slum and blight are simply signs of broader economic and societal impacts facing the community. The scope of this re-development effort is to build an affordable housing community while increasing density and having comfortable living conditions. All areas on the south side of the property shall remain two-story single-family or townhome residential units. Areas on the north side will contain 3 story apartments.

39: WEST GROVE NEIGHBORHOOD - MIAMI, FL

Team: True Horizons Engineering



Nibras
Aneed



Alvaro G.
Castaneda



Pharez
Darville



Jason
Driskel



Rodrigo
Torres

Description: The lot at 3850 S Dixie Highway in Coconut Grove West Village is under consideration for development. True Horizon relishes the opportunity to aptly serve in this capacity. The 1.21-acre site has been conceptualized to include a building with 2500 sf of restaurant space, 6 residential units totaling 11,800 sf, and 6,000 sf of commercial/retail space. These spaces were designed with the Coconut Grove West Village's needs as expressed in person and at community meetings attended by True Horizon Engineering. The proposed site plan also allocates the green, open, and parking spaces as required by code. The parcels of land under consideration for development are subject to the Miami 21 Zoning Code. The main site at 3850 S. Dixie Hwy is divided between T6-80 and T5 zoning. The additional four lots directly southwest to the main site along Day Avenue are zoned T3. Our preliminary site plan calls for the building footprint sitting within the boundaries of the T6-80 zoning, allowing for a mixed-use, commercial and residential edifice. This zoning allows for buildings between two and eight stories, with a floor-to-lot ratio of 5, allowing up to 91,210 square feet of building space. At present, True Horizon is developing a mixed use, restaurant and apartment building footprint roughly 6,000 square feet per story.



SeaTech - The Institute for Ocean and Systems Engineering, FAU Dania Beach Site

COLLEGE CONTACT



Florida Atlantic University strives to meet industry needs through high-quality education, groundbreaking research and personalized service. Companies that partner with FAU and the College of Engineering and Computer Science receive many benefits, including but not limited to:

- Connecting with talented, diverse students to hire as interns or part/full-time employees.
- Accessing professional development opportunities to support corporate goals.
- Utilizing research and development expertise for company needs.
- Increasing brand awareness and recognition among students, faculty, staff and alumni.

If you would like to partner with the FAU College of Engineering and Computer Science, please contact Michael O. Miller, Director Development at 561.297.2083 or via email at millermichael@fau.edu.



ABOUT FLORIDA ATLANTIC UNIVERSITY

Florida Atlantic University, founded in 1961, is currently serving more than 30,000 undergraduate and graduate students at sites throughout its six-county service region in southeast Florida. FAU has an annual economic impact of \$6.3 billion. The University's student body, which ranks as the most ethnically and culturally diverse in Florida's State University System, includes many men and women of non-traditional age. Long known as an outstanding teaching institution, FAU is undergoing rapid development as a center of cutting-edge research, particularly in the biomedical arena. This process has been accelerated by the University's partnerships with three internationally known biomedical research organizations, the Torrey Pines Institute for Molecular Studies and the Max Planck Florida Institute for Neuroscience. Additionally, FAU's Charles E. Schmidt College of Medicine welcomed its inaugural class in 2011. For more information on Florida Atlantic University, visit fau.edu.

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FAU's College of Engineering and Computer Science is committed to providing accessible and responsive programs of education and research recognized nationally for their high quality. Course offerings are presented on-campus, off-campus and through distance learning in bioengineering, civil engineering, computer engineering, computer science, electrical engineering, environmental engineering, geomatics engineering, mechanical engineering and ocean engineering. For more information about the college, visit eng.fau.edu.

2018 REMEMBERING ENGINEERING TECHNOLOGY

eng.fau.edu/set



Summer Engineering Technology Program

Summer camps for high-achieving students entering grades 7 to 9 in Fall 2018.

Camps held Mon. to Fri., 8:30 a.m. to 4:30 p.m. on the FAU Boca Raton campus. Aftercare Option available from 4:30 to 5:30 p.m. See the program details on the website for more information.

Week One: June 11 - 15

Week Two: June 18 - 22

Week Three: June 25 - 29

Camps offered:

- Fundamentals of Engineering - Wks. 1 & 2
- Video Game Design - Wks. 1 to 3
- Girls Exploring Engineering - Wk. 1
- Building Smart Cities - Wk. 2
- Exploring Electrical Engineering - Wk. 3
- Transportation Systems Eng. - Wk. 3

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