



FERRIS STATE UNIVERSITY

College of Engineering Technology

COMPUTER NETWORKS AND SYSTEMS

&

ELECTRICAL/ELECTRONICS ENGINEERING TECHNOLOGY

SENIOR DESIGN PROJECTS PRESENTATIONS

APRIL 20, 2018



FERRIS STATE UNIVERSITY

IMAGINE MORE

Welcome to the 27th annual Senior Projects Presentations of the Computer Networks & Systems and Electrical/Electronics Engineering Technology programs. These presentations represent the culmination of many hours of design, development, construction, troubleshooting, and even frustration as every group and student has had to overcome major challenges. Parallel to this construction challenge, students have had to incorporate project management skills into their project. These skills include all the paperwork of developing a schedule, creating a budget, assigning tasks, monitoring the progress, and discovering that success is a team sport. Please enjoy the presentations today as the students share their struggles and triumphs.

“In the middle of difficulty lies opportunity.” – Albert Einstein

Thank you all for coming today,
Steve Johnson, Professor



PRESENTATIONS

- 1. PORTABLE POWER**
- 2. SKATE GUARDZ**
- 3. MOW-BOT**
- 4. KRZ ENGINEERING**
- 5. VETS WITH PETS**
- 6. KNOCKOUT PROTECTION**

PORTABLE POWER

Advisor - Murry Stocking

The purpose of the Portable Power project is to develop and prototype a solar charged system that has adequate power for common electric tools such as a circular saw, hand drill or an air compressor requiring high current start up and used intermittently. This system could be used for light off grid construction and also be able to run other applications with lighter current draw for a longer period of time such as a small refrigerator overnight or high efficiency lighting. This could also be used in unimproved areas such as third world countries or areas that have been devastated by natural disasters to help provide needed power while also being quite portable.



Jeffrey Pedelty – is a resident of Mecosta County and is also employed at Ferris State University. Jeffrey has worked in industry and has served in the US Military. Presently he is pursuing a BS in EEET. When not working on his alternative energy project (and his ongoing responsibilities with Ferris), he enjoys time with grandkids and motorsports.

SKATE GUARDZ

Advisor - Robert Most

Skate Guardz is a device that uses RFID tags for a "check-out/check-in" system as well as a security system. Skate Guardz system grew out of the fact that rental skates at an ice arena could be easily stolen by the customers. To solve this issue, RFID tags can simply be put onto each skate and then "checked-out" or "checked-in" by scanning the tags. Along with the "checking-out" and "check-in" scanner, there are more RFID sensors by the exit to the building that will set off an alarm if any attempt to steal skates occur. As an added feature, the entire system is connected through the web so that potential renters can see the availability of their desired skates before even coming to the rink.



Kaylie Bohn – is from Unionville, Mi and graduated from Unionville-Sebewaing High School in 2014. She is a senior at Ferris State University, who will graduate in May 2018 from the Honor's program and with a Bachelor's degree in Electrical/Electronics Engineering Technology (EEET). In 2016 she gained her Associate in Industrial Engineering Technology from Ferris. Kaylie is currently a member and the President for Ferris' Student Chapter of Habitat for Humanity. After graduation, she plans on returning home to work for Nexteer Automotive in Saginaw, Mi.



Michael Hyde – Michael Hyde is from Edmore, MI and graduated from Montabella High school. Michael is a senior in the EEET program. He enjoys golfing, hunting, playing video games, and competing on the Ferris State Ultimate Frisbee team.



Nathan Reeder – was born in Grand Rapids, Michigan. He graduated from Grand Rapids Catholic Central High School in 2014 and is currently a Senior in Electrical/Electronics Engineering Technology (EEET). He earned his Associates in Industrial Electronics Technology in 2016 and is planning on graduating in the Spring of 2018 with his Bachelors Degree. He currently works as a Zamboni Driver and Student Manager at the Ewigleben Sports Complex and will work at Gentex Corporation upon graduation. He thoroughly enjoys listening to music and collecting vinyl records in his free time.

MOW-BOT

Advisor - Robert Most

The purpose of this project was to create a self-propelled lawn-mower that can be remotely controlled by the user or run autonomously. For the remote operation of the mower, a 2.4Ghz radio transmitter and receiver were used. The automation portion of the project utilized the PIC18F4520 microprocessor in combination with ultrasonic distance sensors, digital encoders, and a magnetometer/accelerometer combo. This combination of sensors was used to implement basic collision detection, and aid in navigation.



H. Rael Cortes – was born in Midland, Michigan, and graduated from Midland High School. He is a senior in the Computer Networks and Systems program at Ferris State University and is scheduled to graduate spring of 2018. Rael is currently a software development intern at KPMG in Grand Rapids and will continue to work full time there after graduation. His interests include video games, snowboarding, and martial arts.



Tim Klementowski – is a senior in the Electrical/Electronic Engineering Technology program at Ferris State University and plans on graduating in spring 2018. He is currently employed at GE Aviation where he is a technician that troubleshoots avionics electronic equipment. He is interested in developing his knowledge in embedded systems to continue his career. He is native to the Grand Rapids area and likes living there. In his spare time, he enjoys backpacking and kayaking. His most recent backpacking trip was in the Pictured Rocks National Lakeshore area.



Caleb Reyers – was born in Grand Rapids, Michigan and graduated from Spring Lake High School. Before enrolling at Ferris State University, Caleb worked for two years as a mechanic and electrical troubleshooter at a marine repair shop. He is currently a senior in the Electrical/Electronics Engineering Technology (EEET) program and plans to graduate fall of 2018. Caleb's interests include working with computers, programming, electronics, and rebuilding/restoring his classic automobile.



Vincent Williams – is from the small town of Brethren, MI and he graduated from Brethren High School. He is currently a senior working towards a Bachelor of Science degree in the Electrical/Electronics Engineering Technology program and is expected to graduate in May 2018. In 2017, he earned his AAS in Industrial Electronics Technology from Ferris State University. Upon completion of his recent internship at Dematic in Grand Rapids, he was offered a full-time Controls Engineer position. Vincent plans to accept the position and move to the Grand Rapids area after graduation.

KRZ ENGINEERING

Advisor - Warren Klope

The purpose of this project is to build and create an Augmented Reality Sandbox (ARS) to place in the science building lobby that will encourage students to learn in an exciting and fun way. The first part of the ARS will be a real-time topographical map on top of the sand that will update due to the way you mold the sand. Also, the first part of the ARS will have a water simulation where you can generate VR water that will flow due to the elevation of the sand. The second part of the ARS will allow you to create real life terrain by displaying the topographical map and then displaying the satellite image equivalent. The ARS will be used by the science department to teach topography and can be used by students passing through the science commons.



Kyle Barnes – was born in Novi, Michigan, and graduated from Howell Highschool in 2014. He is a senior at Ferris State University and is working towards a Bachelor of Science degree in Electrical/Electronics Engineering Technology, with a focus on industrial automation. He plans on graduating from Ferris State after his internship is completed this summer. In his free time, Kyle enjoys videogames, building computers and playing/watching sports. After graduation Kyle is interested in a control engineer position, to begin his career in the engineering field.



Ronak Trivedi – was born in India and came to United States of America on Jan 2016. I'm a senior graduating in Dec 2018 from the Electrical/Electronic Engineering Technology at Ferris State University. I have also completed my associates in Electrical Engineering. I started getting interest in this field after I was going to my father's work place. In there I was watching and learning from my father about how to repair devices and the installation. After graduation, I'm planning to do a designing course and then I can work with a company who does electrical designing. From beginning I enjoy learning new things and researching about the new things. Some hobbies include sports, hiking, biking and car racing.



Zikun Xie – was born in Shijiazhuang, Hebei Province in China. He is a senior in Electrical / Electronics Engineering Technology program at Ferris State University and plans on graduating in spring of 2018. He graduated from Hebei Technology University in Tianjin in 2012. He decided to continue studying to get his Bachelor's Degree of Electrical Engineering from United States in Spring of 2014. He excels in Mathematics and physics. In his free time, he enjoys playing soccer, travelling to different cities, cooking food and hang out with friends.

VETS WITH PETS

Advisor - Warren Klope

During the events of last year's Hurricane Harvey and shortly after Hurricane Irma, thousands of dogs were separated from their families. Many were collected in shelters but the overwhelming amounts of animals led to shelter's considering euthanization due to crowded kennels and little supplies. With that in mind we came together and created a concept to help stop this from happening to your dog. The Harvey Harness should be a go-to for safely transporting your dog during natural disasters. The chance of your K9 family member being separated is a large possibility, and the Harvey Harness's purpose is to decrease the possibilities of permanent separation from your loved K9 family member, as well as assisting the dog's abilities to survive the natural disaster. The use of a GPS tracker as well a remote triggering of safety measures and components to assist with spotting the K9 increases the survivability as well as improves the possibility of locating of your dog. With a change of communication systems, the system could be easily adapted to military and police use. While working dogs are rarely abandoned or even left alone, this tracking system could be used in maintain tactical awareness.



Mathew Dawson – is 24 years old and graduated from Waverly High School in 2012. He also joined Michigan Army National Guard in 2011, his junior year of high school. After graduation Mathew decided to work full time until he started college here at Ferris State in the Fall of 2014. Before starting college, he had decided with the Electronics Engineering Technology degree because of his familiarity with small electronic training he received from the Army. Mathew spends his time working at the Markers Space or in the Veterans Resource center on campus. In his free he watches as many movies as he can.



Brian J Manley – is a Michigan local who after graduating from Morley-Stanwood High School in 2001, enlisted in with the U.S. Army and spent 12.5 years going back and forth from Kuwait and Iraq while fulfilling multiple job roles. Brian has always been interested in computers, dating back to monochrome monitors. He lives in Big Rapids Township with his wife of over a decade and their wiener dog Chilly. In his free time Brian hunts, rustic camps, plays video games, and reads fantasy and some sci-fi novels. He is currently looking for an internship.



Michael J Stevens – is a EEET student from Cadillac, MI. During his time at Cadillac Senior High School, he attended the Wexford-Missaukee Career Tech Center for Computers, Networking, Electronics, and Technology which sparked his love for the field. During his Junior Year at CHS, he enlisted in the Michigan National Guard. In the National Guard he repairs night vision, and radio equipment. He will be interning at Logic Plus in Reed City this summer, and greatly looks forward to the experience. He expects to be graduating this December. During his free time, he is often found playing board games with friends.



Matthew B. Wood – is a Michigan local who after graduating from Chippewa Hills High School in 2007, enlisted with the U.S. Navy and spent his 6 years of Active Duty service traveling the Pacific Ocean and fulfilling multiple job roles. After his time served in the military he moved back to Michigan with his wife and attended Grand Rapids Community College and completed the Electrical and Electronic Technologies Associates Degree. After which he transferred to Ferris State University in pursue of the Computer Networks and Systems Bachelor's Degree. Matthew's ambitions are to stay local in Michigan and pursue a career in Computer Systems, gathering more knowledge, and more experience in the IT field. Matthew spends his free time with his wife Jessica, and his K9 companion Benelli exploring nature trails and lakeshores.

KNOCKOUT PROTECTION

Advisor - Debbie Dawson

Knockout Protection is an acceleration device designed to detect high impact collisions. The data from the collision can be used to identify head trauma, for which other tests could be administered to determine a return to continued activity. Installing an ADXL377 accelerometer with X, Y and Z directions, the device will be able to monitor all directions of motion. This measurement will be sent from the accelerometer to an NRF51 DK board (Nordic Bluetooth Microcontroller) that will translate the data and broadcast it to an android Bluetooth device. This immediate transmission of data will help trainers and emergency medical crews respond more efficiently to a head injury. Users of the Knockout Protection will receive immediate care that may prevent the risk of further head trauma.



Omar Aldhafeeri - was born in Kuwait, and then because he is a Saudi Arabian national, he moved to Saudi Arabia to complete his studies. He graduated from Jubail Industrial College with an associate degree in Instrumentation and Control Engineering Technology in 2011. Omar did his internship in Chevron petrochemical company in Saudi Arabia. After that, he worked for two years in Schlumberger company as a field specialist in gas and oil services. In 2014, he came to the USA to study electrical engineering at Ferris State University and received his associate degree in 2016. Omar now speaks fluent English and is graduating in May 2018 with a bachelor's degree in Electrical and Electronic Engineering Technology.



Kevin Bassham - Kevin Bassham was born in Burton, Michigan to Shirley and Jimmy Bassham. Soon after, he and his family moved to Mayville, MI where he attended Mayville Public School. While in high school, Kevin attended the Tuscola Technology Center for Computer Technology Management. This is where Kevin found his passion for computer technology and programming. Upon graduating high school, he decided to pursue a degree at Ferris State University. Kevin will be graduating the fall semester of 2018, with a bachelor's in Electrical/Electronics Engineering Technology.



Matt Gurd - is a EEET student from Grand Rapids Michigan. He is interested in embedded system programming and has a great programming background. He has worked as an electrician and mechanic prior to going back to school. He hopes to use his degree and knowledge gained at Ferris University to obtain a job in the electronics field.



Corbin Miller - is an Electrical/Electronics Engineering Technology (EEET) student and holds an Associate's degree in Industrial Engineering Technology from Ferris State University. He grew up in Battle Creek, MI where he first grew an interest in electronics by building over over-clocking computers at a young age. He will be graduating spring of 2017. Corbin recently accepted a position at Electro-Matic in Farmington Hills, MI.



**EET/CNS
FACULTY AND STAFF**



**Gareth Todd, Professor
Program Coordinator**



**Jannifer Anderson
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**Jeff Pedelty
Equipment Technician**



**Deborah Dawson
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**Steven Johnson
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**Warren Klope
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**Bob Most
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**Murry Stocking
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