



# FERRIS STATE UNIVERSITY

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College of Engineering Technology

**ELECTRICAL/ELECTRONICS ENGINEERING TECHNOLOGY**

**AND**

**COMPUTER NETWORKS AND SYSTEMS**

**SENIOR DESIGN PROJECTS PRESENTATIONS**

**APRIL 26, 2013**

# Welcome!

Welcome to the 22<sup>nd</sup> annual Senior Projects Presentations of the Electrical/Electronics Engineering Technology and Computer Networks & Systems Department! We are pleased to welcome parents, prospective employers and students, alumni, faculty and staff, and our industrial advisors. Without all of you, today and future presentations would not be possible.

*“There is a great difference between knowing and understanding: you can know a lot about something and not really understand it” Charles Kettering – Inventor of the electric starter*

Beginning in the fall of 2012, our seniors began to plan their projects. They had ideas about things of which they knew, but may not have fully understood. After a year of planning and building, they now understand. They understand not only the engineering aspect, but also managing a project and setting timelines and budgets. Working in teams they were required to allocate resources, and rely on each other’s skills and knowledge to overcome their obstacles. These two courses represent real-life more than any other we offer. Please enjoy the presentations today and see the results of our students’ efforts.

Enjoy!

Gary Todd  
Associate Professor

## **Presentation Schedule**

9:00 Keynote Speaker

9:30 Raspberry Pi Entry System

10:00 Ball and Beam System

10:30 Currency Recognition with OpenCV

11:00 SCAMP

11:30 Awards Presentations

12:00 Lunch

# RASPBERRY Pi ENTRY SYSTEM

Advisor: Keith Jewett

The Raspberry Pi Entry System involves creating a keyless entry system, specifically with campus labs in mind using the Raspberry Pi development board. The entry system will interface with a door strike and will allow entry with the use of Near Field Communication (NFC). In addition to the entry system will be a web interface that will provide further functionality of the system including monitoring of the restricted area, logging of personnel entering and exiting to the room, and house a database coupled with the security system. The web portal will also allow configuration of the system via administrative privileges. These privileges will allow one to add and deny privileges to users and allow an admin to change the configuration of the device. The possibilities for this project are seemingly endless and it offers great expandability. When completed this system will provide security to restricted locations and can be remotely administered by the web interface.



Zachary Will is a student currently enrolled in the Computer Networks and Systems degree at Ferris State University. Zachary knew from an early age that he wanted to make a career in the technology industry. After graduating from Lowell High School in 2008, he started his secondary education at Grand Rapids Community College and eventually transferred to Ferris to pursue his degree in networking. He classifies himself as a “hardware” guy and likes tearing things apart and seeing how they work. He also enjoys hanging with friends, disc golf and is fond of working with his hands. Zachary is currently searching for internship and job opportunities in the IT or networking field.



Alex Breu was born on the warm spring morning of April 9, 1989, to Doug and Cindy Breu. He later graduated from Rockford High School in 2007. After that, he attended Grand Rapids Community College for two years before finally transferring to Ferris State University for Computer Networks and Systems in the fall of 2009. In his free time, Alex enjoys going out with his friends, riding his bike, and working on whatever project is in front of him. He is not sure where he is going after he graduates, but he is definitely excited and looking forward to the next chapter of his life.



Brian Sweet is a full-time student in the Computer Networks and Systems program at Ferris State University. He has been working in the IT field since 2005 and completed his internship at Quicken Loans. During his time at Ferris State University, Brian has been employed as a Student Computer Technician. When not in school or at work, Brian enjoys spending his free time with his fiancé, friends, and family. Currently Brian is searching for a full-time position in the IT field that will be able to support his him and his soon to be family.



Nathan Duley was born in Grand Rapids, MI on March 9, 1990. He grew up on Canonsburg Road and lived there all throughout grade school, middle school, and high school. He attended St. Patrick's Parish in Parnell for grade and middle school, and Lowell High School for high school. Nathan was accepted to Ferris State University and started attending in the Pre-Pharmacy program in 2008. He switched to Computer Networks and Systems halfway through his first year, and is set to graduate in May 2013. His hobbies include guitar, computers, cooking, acting, and camping.

## BALL AND BEAM SYSTEM

Advisor: Ron Mehringer

The Ball and Beam system is one of the most popular and important laboratory models for teaching control systems engineering. It is widely used because of the simplicity to understand as a system, and yet the control techniques that can be studied from it. The system can be used to demonstrate many important classical and modern design methods. The Ball and Beam system consists of a metal ball which can roll freely on a horizontal beam. One end of the beam is fixed; the other end is coupled on the output shaft of an electric motor. The position of the ball can be controlled by tilting the beam's angle through the motor shaft. The objective of this project is to construct the physical system and accurately control the position of the ball at the desired set point.



Darius Ganzie- At the age of 13, Darius was introduced to troubleshooting electronics when he fixed his mother's radio. During high school, he attended Golightly Career and Technical Center (vocational school) in Detroit, MI, where he studied electronics engineering/information technology. In his free time, he enjoys playing bass guitar, troubleshooting electronic projects, spending time with friends and exercising. Darius Ganzie is a senior in the Electrical/Electronics Engineering Technology Program and will be graduating in May 2013. He is currently seeking employment in the automation or electronic field.



Robert Tran is a senior in the Electrical/Electronic Engineering Technology Program and a junior in the Mechanical Engineering Technology Program. He will be graduating in May 2013. He has been an electronics tutor and a lab attendant for the past four years. Robert believes in hard work and honesty. His special interests include: mathematics, programming PLC, industrial motion controls, 3-phase power generation and distribution. In his free time, Robert enjoys reading physics books and conducting electronic experiments. He is currently seeking a position in the automation and control field.

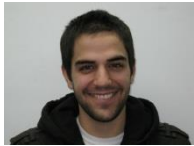
# CURRENCY RECOGNITION WITH OPENCV

Advisor: Bob Most

The purpose of this project is to make use of OpenCV to create a software program which, initially, will be able to recognize any of the six US paper dollar bills using a basic webcam attached to a computer. The program will subsequently vocalize the dollar amount back to the user and read the amount on screen. The separate bills will be distinguishable to the program using unique characteristics pertaining to each type of bill. The potential for the program lies in the possible expansion to other denominations as well as coins and a conversion feature to easily recognize and convert currency into a preferred type. Ultimately, the program would also be utilized for use in rudimentary educational programs in the form of a mobile android and iOS application.



Jacob Schwind - Jacob is a Computer Networks and Systems major with a minor in Computer Science who enjoys spending his free-time programming, listening to music, and having fun. Near the end of high school he started a business, PlzGeek, building websites, writing applications, and providing IT support for local businesses. This work, along with an exceptional academic record, landed Jacob an internship with IBM last summer. He will be joining IBM in Massachusetts full time in May. [[jacobx1.com/resume](http://jacobx1.com/resume)]



David Kalaf was born in Port Huron, Michigan, where he was raised by his parents, David and Kristine Kalaf. He graduated from Port Huron Northern High School in 2007 and spent two years at Baker College of Port Huron. After acquiring his Associates Degree from Baker College, he transferred to Ferris State University where he decided to pursue a degree in the CNS program.



Ryan Tabor is a senior in the Computer Networks and Systems program and will be graduating in May 2013. Ryan is obtaining a minor in Computer Information Systems and hopes to acquire a job in the IT/Networking Administration field after graduation. Ryan's strengths include Windows, Linux, Mac, Networking, and Active Directory. Currently, Ryan is employed by Big Rapids Public Schools as a technician assistant, gaining valuable knowledge that can be applied to his field. In his free time, Ryan enjoys sports, riding his motorcycle, technology, and spending time with friends and family.



Richard Bichler - Richard was born on April 27<sup>th</sup>, 1990 to Catherine and Richard James Bichler in Grand Rapids, Michigan. He attended the Lowell and Saranac school systems while growing up and graduated with a 3.5 cumulative GPA. He is currently enrolled at Ferris State University in the Computers, Networks and Systems program and is set to graduate in May of 2013, and is competent in most fields related to computer and network technology. In his free time Rich enjoys playing an array of musical instruments, browsing the internet aimlessly, spending time with nerdy acquaintances and being overly-opinionated.

## SCAMP

Advisor: Murry Stocking

The Self-Guided Changeable Academic Mobile Platform, or S.C.A.M.P., is a mobile robotic platform designed to serve academic groups. The goal of SCAMP is to create a platform that is to be used as a base unit for subsequent academic groups to use and expand its capabilities. This project is a continuation from last year, in an on-going process to have all features programed and wired for external modules to be easily adapted to the interface of SCAMP. The overall design of SCAMP will not change in this phase of its build, however, some rewiring and redesigning of the drive system will be.



Mike Landis is a veteran of the United States Navy; he served his nation honorably for four years as an Aviation Electronics Technician. From his Navy experience is where he developed his passion for electronics. Mike is now in his senior year in the EEET program, focusing in industrial automation with a graduation date of May 10, 2013. He is a family man; much of his free time is enjoyed spending quality moments with his wife and four kids. He is currently unemployed, seeking a Controls Engineering position located in the West Michigan area.



Tim Parks is currently a senior in the E.E.E.T. program. He has spent the last two years as a member of the F.S.U. Formula Hybrid racing team tackling the electrical system. He has also been interning with All-Tech Engineering in Wyoming as a Controls Engineer/Machine Electrician since May 2012. Tim has also been a volunteer fire fighter back home in Saranac, MI. for five years. In his spare time, Tim likes to go backpacking and camping, play guitar and paintball, and also enjoys building computers. Once Tim graduates, he will begin working as a Controls Engineer with Eagle Technologies in Bridgeman, Michigan.



Brad Patzer is studying in the Electrical/Electronics Engineering Technology field. I own and operate Eagle Lake Pier Service. During the summer, I like to spend lots of time on the lake swimming and tubing; when I'm not on the lake, I'm riding dirt bikes. When the snow starts to fly, I enjoy going snowmobiling. I go by the motto "Life is too short - live it to the fullest." I'm looking forward to starting my career as an engineer.

## EET AND CNS FACULTY



**Keith Jewett**



**Steve Johnson**



**Warren Klope**



**Ron Mehringer**



**Bob Most**



**Jeff Pedelty**



**Murry Stocking**



**Gary Todd**

*Thank you for Coming!*