

ELECOMP CAPSTONE DESIGN PROGRAM
FALL 2019 ENROLLMENT: ELE480

Name:

ID Number:

University Email Address:

Overall GPA:

Engineering GPA:

Major/s:

Minor/s:

Grade in 212:

Semester Taken:

Grade in 313:

Semester Taken:

Grade in 338:

Semester Taken:

Cumulative numerical average of above 3 courses:

Will you have car for 2019-2020 academic year? (y/n)

Will you have a laptop for the 2019-2020 academic year? (y/n)

Confirm no classes taken on Fridays after 5pm for BOTH semesters. (y/n)

Will you have any class from 1.00pm to 1.50pm on Fridays? (y/n)

If you are an ELE Major, do you have any key skills in CPE/CS areas? If you are a CPE Major, do you have any key skills in the ELE area?

Previous Internships & Work Experience: time periods, location, skills gained:

Do you have an internship in the present Spring 2019 semester? If so, give details:

Will you have an internship during the summer this year? If so, give details:

Will you have an internship during 2019-2020 academic year? If so, give details:

Summary of KEY Skills in your Major.

Passion areas in your major and minor concentrations? Justify:

Key projects in or outside of your coursework (course assignments, hobby projects, etc.). Give detail and justify your selection.

Which projects would be your top 3 choices; justify in detail and correlate with your Passion Areas, and Key Skills above. Select from the projects being executed this current year. Go to this link for the project descriptions of all 22 projects.

Links: [2018-2019 Current Proposals](#) | [Symposium Program](#)

A hard copy is also being distributed to all students, for easy reference. The video presentation of each team is also available at the website.

Project One:

Project Two:

Project Three:

Will you be interested to take the PCB Design Course:

Insert your Resume, starting on the next page, together with a photo of yourself, so that I can put a face to a name! You are welcome to provide further explanations on any of the above topics in your resume.

(save the full doc as a pdf, and label it as: ELECOMP-F19-"your name")

**Submit only as ONE attachment to: sunak@ele.uri.edu,
john_murphy0910@my.uri.edu**

Save the Date: Tuesday September 3rd, 2019: Advising Day. Capstone Interviews for ALL Capstone Designers. Registration slots in late August.

See details of the PCB Design Course, which can be used as a 4th Professional Elective by Petition. It will be offered in the Fall 2019 semester, on Thursdays, from 5.15pm to 9pm. Will you be interested to take this course? Last Fall semester, the enrollment in this course was 17! Seniors who take this course will be given preference in capstone projects that require PCB Design.)

Timothy Boyd

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Education

2015 - Present **University of Rhode Island - Kingston, RI**
Majors: Electrical Engineering, Computer Engineering, German IEP
GPA: 3.76
Awards: Dean's List: Fall 15, Spring 16, F16, S17, F17, S18

Experience and Research

02.19 - Present **Fraunhofer Institute for Manufacturing Engineering and Automation - Stuttgart, Germany**
→ Creation of ROS Software for control of UR10 Industrial Robotic Arm for application to automated Electrical Switching Cabinet Assembly

08.18 - 03.19 **TU Braunschweig Institute for Control Systems - Braunschweig, Germany**
→ MATLAB Modelling of a Current Controlled Voltage Source Inverter using both inline and Simulink Modelling techniques

10.17 - 08.18 **SubChem Sensor Systems - Narragansett, RI**
→ Revitalization of the Autonomous Profiling Nutrient Analyzer controlling electronics, and management of various other devices.

May - July 2017 **General Dynamics - Electric Boat - Groton, CT**
→ Development of a database back end with a visual front end with MS Office VBA.
→ Development of tactical systems test scenarios and improvement of project management tools.
→ Department of Defense Personnel Security Clearance: Secret Level

2014 - Present **Wilmington Research and Development Corp. - Newburyport, MA**
→ Hardware Design for Motion Control Applications
→ Layout of Printed Circuit Boards for manufacturing
→ Design of code for use in production level control systems

Other Information

Affiliations **Boy Scouts of America - Eagle Scout 05/21/15, Senior Patrol Leader**
URI Hydrobotics MATE ROV Team - Former Control Systems Leader
Tau Beta Pi - Rhode Island Beta Chapter
Phi Beta Kappa - University of Rhode Island Chapter

Software Eagle 8.X, LaTeX, MATLAB, Microsoft Office Suite, MPLAB X, ROS, Simulink,

Programming Languages C++, C, Java, Python, Visual Basic, VHDL

Hardware Platforms Microchip PIC, Atmel Attiny, Arduino, Teensyduino

Languages English - Native Speaker
German - C1

Timothy Boyd – List of Important Projects carried out between 2015-2019

Professional Projects:

Development of a six-channel millivolt level analog signal transducer for use in an underwater profiling device (Solo Project 2018)

- Built with PIC16F19156 Microprocessor which utilizes multiple 12-bit ADC's, as well as a TTL UART, and an Internal Fixed Voltage Reference module
- Built surrounding hardware for noise resistant current control of external transducer LED's, TTL to RS-232 conversion, and noise resistant DC signal amplification using specialized zero drift rail to rail Op-Amps
- Programmed using the MPLAB X coding environment
- Design of PCB using EAGLE

During this project I practiced good PCB layout techniques for reduction of noise sensitivity, specialized component selection and implementation, and production of a professional level component for harsh environment implementation.

Development of a CAN Enabled Dual Bipolar Stepper Motor Driver for control of an Underwater ROV Manipulator (Solo Project 2017)

- Built using Teensy 3.2 Microcontroller and Pololu Stepper Motor Driver Carriers.
- Programmed using the Arduino IDE
- Result was a small, two wire interfaceable controller able to be encased in potting compound and directly submerged while maintaining operating condition
- Design of PCB using EAGLE

This project was one of my first professional standalone projects and allowed me to learn PCB Layout of compact designs, as well as learn how to use the Arduino IDE as an object-oriented C++ programming environment.

Development of an ROV Control System (Partner Project 2017)

- Control of four 120W BLDC ESC's
- Control of servo motors for camera angle manipulation
- Control of the above-mentioned Stepper Motor Driver
- General Data Processing
- Control of a Network of four main Microprocessors using a CAN Bus network
- Design of multiple PCB's using EAGLE

This Project was extremely important for the development of my engineering knowledge of embedded system design. Important topics within were I2C, SPI, TTL RS232, and CAN Communication methods, creation of a network of microprocessors, control of multiple high-power BLDC Motors, and heat management in an environment without airflow.

I began this project with little to no knowledge of any of the above things, but through the work of myself and another student, we both learned alongside one another in order to adapt to the challenge.

Another important aspect of this project was adapting the solutions for use in an underwater environment.

Perhaps the most important aspect of this project was learning to work in a multi-team group, in which my designs must be coordinated with many other aspects of the Robot's design, such as Manipulator and overall Structure.

Hobby Projects:

Development of an RC Car (Partner Project 2016, Solo Electrical Design)

- Use of Arduino UNO as well as multiple adapter shields to allow control using an Xbox remote, and interface with a Brushed DC Motor

This project was originally important, as it was my introduction into the world of systems design through a simple Arduino coding interface, and readily available hardware adaptation boards.

It is important to mention here, as the other student and I that worked on this as Freshmen are currently working on a new version, utilizing new techniques we have both acquired through the University. The other student is a Mechanical Engineer.

The new RC car will utilize:

- PIC18F4431 Microprocessor with Quadrature Encoder Interface for measurement of the motor speed, allowing a simple PID internal control structure.
- Radio Control through Dfrobot LoRa radio modules (434 MHz, TTL Serial Communication)
- Embedded H Bridge motor control hardware with programmable overcurrent detection through custom external comparator structure.
 - Custom comparator will be a microprocessor-based SPI enabled comparator with programmable internal negative bias and hysteresis
- All embedded onto a single PCB with requisite voltage conversions and protections

The status of this project is stalled while I and the other student are abroad. I have finished most of the PCB layout in EAGLE, and plan on continuing with the first phase of prototyping once I have returned to the United States. The project is nonetheless promising, and I am excited to use the skills I have learned at the University to improve upon one of my first designs in the world of embedded hardware.

