Autonomous Systems Lab (ASL) Undergraduate Project Openings for Fall 2015

The Autonomous Systems Lab seeks a small group of students across different departments to work with our PhD students on robotics applications and research. Details on the project descriptions, application process, and additional notes are given below.

Segway RMP50/50XL outdoor robot fleet, equipped with Septentrio GPS, 180 deg FOV SICK and 270 deg FOV Hokuyo Lidar, Mimo touchscreen interfaces, Firefly Cameras, onboard IMU, mobile WiFi, custom electronics and mounting hardware.

Notes:
-Undergraduate students are expected to sign up for 3-4 credits of (…ECE/MAE/CS Independent study courses) during the semester, and thus commit at least 9-12 hours per week in the ASL. A commitment of two semesters or a summer and a semester is desired. We are also willing to consider employment, especially for those who have work study credit.

How to apply:
1. Go to cornell-asl.org and download an application form from the front page
2. Scan and e-mail your **completed application and your resume/CV** with the subject line :
   "[Fall 2015 ASL application] <Your Name>, Project <Project Number> ,"
   where <Your Name> is your name and <Project Number> is the number of the project listed below. Please send your application and resume/CV to one of the following people:
       Professor Mark Campbell, mc288@cornell.edu
       Jennifer Padgett, jpp263@cornell.edu

Specific Projects:

1. **Robotic Manufacturing and Testing: 2-3 MAE/ECE students:** Machine shop certification and wiring experience highly desired

    Description: This project encompasses updating our robotic platforms to be more rugged and able to operate outdoors in adverse environments such as rain sleet or snow.

    Who should apply: Freshman and sophomore students are encouraged to apply. This project is meant as an introduction to our robotic systems to instill a deep understanding of our primary research platform. This will give students an overview of the capabilities of our systems as well as their limitation. In addition, students will be expected to re-build a robotic platform from scratch and perform robustness and reliability testing. In other words, you will build your own robot!

2. **Segway Sensor Network and Emergency stop PCB design: 1 MAE/ECE Masters Student:** Prior experience with PCB design is required. Knowledge of power electronics and switching power supplies is highly desired.

    Description: This project seeks to design an all-in-one axilliary PCB cape for a Beaglebone Black. This cape should include circuits for current and voltage limiters, as well as a backup battery to facilitate safe-shutdown of the Beaglebone Black upon power loss. In addition, this design should allow for a hard-wired emergency stop for a CAN interface.

    Who should apply: ECE students with experience in circuit design especially power electronics and PCB design should apply. Robustness and reliability of the design is paramount, as well as ease of access.

3. **Segway Real-time OS Timestamping and Hardware triggering: 1 ECE/CS Masters Student:** Prior experience with Linux OS required.

    Description: This project seeks implement a real-time kernel onto a Beaglebone Black micro-computer. This kernel should be able to timestamp large amounts of data in near real time as well as provide accurate hardware triggering of cameras. Reliability and robustness are a core component of this project.

    Who should apply: ECE/CS students with experience in operating systems. Experience with GPIO and sensor networks is preferred.