

# Cornell Cup Create an Innovative Modular Robotics Platform

## M.Eng. and Undergrad Project Announcement

**Project title: Create an Innovative Modular Robotics Platform, an R2-D2, and a Novel Robotics / Video Game Hybrid System in the Cornell Cup**

### Brief description of project:

The Cornell Cup competition creation team was once again recognized last year by the White House and the international Making Community last year not only for their own robotics work but for their efforts in aiding students of many of the nation's top colleges throughout the years including Berkeley, MIT, UPenn, Georgia Tech, Columbia and many more to create their own embedded systems and Internet of Things inventions.

This year the team aims to expand and refine the existing ModBot (Modular Robotics Platform) to transform it into a state of the art telepresence robotic system, and our own R2-D2 lab assistant to not only navigate our busy lab but be able to interact with key features. But adding to all of this we'll be creating the Mini-Bot system that pulls together years of work into a low cost educational platform – and possibly showcase it as a miniature robotic and video game hybrid version of Mario Kart! This Mini-Bot system is already being planned to be showcased at national venues throughout the year.

Here are just some of the areas being targeted for development:

- Oculus Rift Virtual Reality and Microsoft Hololens Augmented Reality Control
- "R2-D2" Droid Lab Assistant
- Omni-Directional and Dune Buggy-like Robotic Rovers Enhancements
- Indoor SLAM (simultaneous
- Vision Systems (Onboard and External)
- PC and Embedded System Communications
- On-line GUI Applications
- Video Game-like A.I. and virtual environments
- Microcontroller / Arduino with MATLAB interface code
- Development on ARM and Intel boards with a built-in Altera FPGA
- Autonomous and Semi-Autonomous Control Schemes
- Model Predictive Control
- Obstacle Avoidance and Path Planning
- Mechanical Device Design
- 3D Printable Mechanical Designs
- Mobile Device Applications
- Adaptive GUI Design
- Simulation & Performance Prediction
- Power Systems

Many companies are now specifically targeting students who have had experience in college robotics projects as these students have been recognized as having the skills necessary to apply their knowledge and gain new knowledge more quickly in multi-disciplinary teams. This is your opportunity to become one of the members of a robotics effort that is quickly gaining national and even international attention from industry, government, academic, and media groups while earning you invaluable experience in particularly Electrical, Mechanical, & Systems Engineering and Computer Science. More so, the team will be strongly engaged this year in utilizing professional design techniques and means for helping the team to learn them that have been recognized internationally, including by the White House, as highly valued skills commonly lacking from even the nation's top students.

This project will also enable you to make a significant difference in engineering education systems where you will inspire future students to make a difference through engineering as we once again showcase our work at various events throughout the year and country. Sponsored by ARM, NASA, Tektronix, Mathworks, and Intel.

### M-Eng Project Credit and/or Course Credit Positions Available

*All of the Cornell Cup info sessions will be held in **Upson B17 at 5:30 PM** at the dates below:*

**Thursday, August 25th**

**Tuesday, August 30th**

**Wednesday, August 31st**

Contact: head faculty advisor, Dr. David R. Schneider at [drs44@cornell.edu](mailto:drs44@cornell.edu) or at (607)-254-5403.

**Faculty sponsor: David R. Schneider (drs44)**

**also with Bruce Land**

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**Project Web Site: [www.systemseng.cornell.edu/intel](http://www.systemseng.cornell.edu/intel)**

**Time Frame: 2016-2017**