

### **FACULTY MENTOR**

Atanasov, Nikolay

### **PROJECT TITLE**

Gazebo Simulation of a Ground-Aerial Robot Team

### **PROJECT DESCRIPTION**

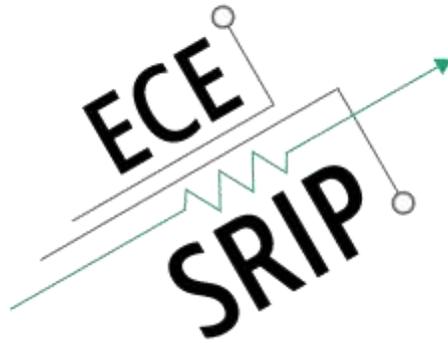
This project will focus on simulating photorealistic terrain as well as robot kinematics and dynamics in Gazebo and the Robot Operating System (ROS). The objective is to simultaneously simulate multiple robots, equipped with various sensors. If time permits, accessing the robot simulator from a remote server will be investigated.

### **INTERNS NEEDED**

1 BS/MS Student

### **PREREQUISITES**

Candidates are expected to have a very strong programming background in algorithms and data structures, as well as C++. Prior experience with Gazebo/ROS is preferred but not required.



### **FACULTY MENTOR**

Atanasov, Nikolay

### **PROJECT TITLE**

Lidar Odometry and Trajectory Tracking for an Autonomous Racecar

### **PROJECT DESCRIPTION**

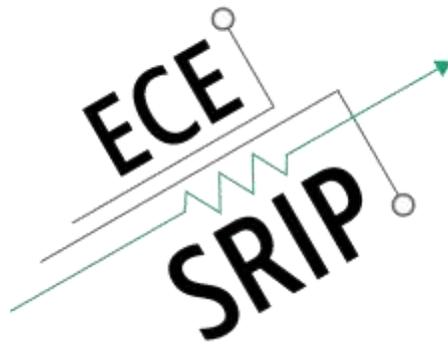
This project will focus on modeling the kinematics and dynamics of an ackermann drive car robot in Gazebo and the Robot Operating System (ROS). You will also learn to estimate the position and orientation of the robot using lidar data. Finally, a trajectory tracking controller will be developed and tested in simulation and on the physical robot.

### **INTERNS NEEDED**

1 BS/MS Student

### **PREREQUISITES**

Candidates are expected to have programming experience at the level of ECE141 and knowledge of linear systems and control theory at the level of ECE101 and ECE171.



### **FACULTY MENTOR**

Atanasov, Nikolay

### **PROJECT TITLE**

Modeling, Simulation and Control of an Autonomous Quadrotor

### **PROJECT DESCRIPTION**

This project will focus on modeling the kinematics and dynamics of a quadrotor system and simulating in Gazebo and the Robot Operating System (ROS). Next, we will focus on position and attitude control based on linearization in order to achieve hovering and 3-D trajectory tracking. If time allows, the developed controller will be tested on a physical platform and will be improved using nonlinear geometric control techniques.

### **INTERNS NEEDED**

1 MS/ BS Student

### **PREREQUISITES**

Candidates are expected to have programming experience at the level of ECE141 and knowledge of linear systems and control theory at the level of ECE101 and ECE171.