

**ECE Capstone program
Spring 2018
Project Abstract & Info**

Please provide the following information to be shared with on capstone information exchange platform:

1. Project number: S18-20

2. Project title (as will appear on the poster):

Hand-Eye Coordination

3. Team members:

1. Will Lewental
2. Brendan Bruce
3. Dominic DiPuma
4. Shakaed Subin
5. Joseph Newmark

4. Adviser(s) name(s):

1. Dr. Laleh Najafizadeh
2. Dr. Foroogh Shamsi

5. Up to 5 keywords that will help to classify the project scope:

1. "Hand-Eye Coordination"
2. "Object Recognition"
3. "Pupil-Tracking"
4. "Human-Robot Interaction"
5. "Assistive Care Technology"

6. Project abstract (up to 250 words) to be shared with judges:

Many challenges arise for those assisting quadriplegic patients, patients who are paralyzed from the neck down, but for many aids, feeding the patient is one of the most complicated tasks. The process may be extremely tedious at times because quadriplegics lack the autonomy to eat and drink on their own. Therefore, the goal of "Hand-Eye Coordination" is to accommodate these difficulties by pairing pupil-tracking devices and image processing techniques with robotics, to enable patients to pick up a target object (i.e. a mug or a cup) using only their eyes. The first step of our procedure includes collecting data from a pupil-scanner to track user eye movements. Then, we will process the pupil data in combination with data collected from webcams placed overhead, which will locate the position of a target object in 3D space. Once this is achieved, we aim to enable the user to have the ability to grasp an object, with the help of this robotic arm, using the processed data as input signals. "Hand-Eye Coordination" will be the

foundation of a long process, aimed at building a non-invasive assistance workstation that will allow an aid to position quadriplegic patients in front of their meals, so the patients can feed themselves using solely eye movement. This will help ease the difficulties that come with medical assistance for quadriplegic patients by providing patient independence, and ensure an enhanced quality of life for those with this unfortunate disability.