Project Descriptions for ME463 Fall 2015

1. **Team Name:** Boiler Bunch  
**Project Name:** Truck Radiator Louver System  
**Brief Project description:**  
Truck diesel engines are most efficient at an optimal temperature, which is difficult to achieve in winter driving conditions because the engine cooling capacity is designed to work well in hot summer weather. In winter this engine temperature is best achieved by reducing the air flow through the radiator of the truck, which also reduces drag and improves overall vehicle fuel economy. Many operators achieve this effect by manually adjusting a cloth cover over the front of the truck. We have developed a system that automatically senses engine water-jacket temperature and actuates a louver system in front of the radiator to minimize air flow. The system is very simple using no electronics.

2. **Team Name:** Dynamic Cooling Solutions  
**Project Name:** Ceiling-Mounted Evaporative Cooler  
**Brief Project description:**  
Evaporative coolers are effective cooling devices for hot dry climates. Outdoor spot cooling is desirable in these climates for patios and outdoor serving areas of restaurants. Current evaporative spot coolers are portable (taking up valuable floor space) or bulky and aesthetically unappealing. Our solution is a ceiling-mounted evaporative cooler that encorporates a fan and water evaporation system in a package that resembles a ceiling fan and cools a 25 square foot floor space.

3. **Team Name:** V-12  
**Project Name:** Caterpillar Engine Test Cell Monitoring System  
**Brief Project description:**  
Caterpillar test-runs every engine they build at the Lafayette plant in test cells. They monitor the engines for performance as well as leaks and temperatures. Some of the monitoring requires the test-cell operators to enter the test cell while the engine is running under full-power, which can be dangerous. Our team is designing a test cell monitoring system that can inspect all of the critical areas of the engine in the visible, ultraviolet, and infrared light spectrums. This allows for leak detection and temperature measurements as well as visual inspection of the engine for quality assurance.

4. **Team Name:** Comfort Achievers  
**Project Name:** Adjustable Door-Side Arm Rest for Dodge Ram Trucks  
**Brief Project description:**  
Seat, steering wheel, and even pedal assemblies are adjustable on many vehicles to accommodate variations in driver sizes and preferences. These adjustments not only aid comfort, but safety as well, allowing the operator to optimize access to vehicle controls and view out of the windows. Door-side arm rests are not adjustable however, because of challenges due to space constraints, and other functional needs of the door panel area, such as handles for opening and closing the door. We have designed a drivers-door arm-rest that is vertically and horizontally adjustable to accommodate 95th percentile users while still satisfying these challenging constraints.
5. Team Name: **Court Guard**  
Project Name: **Tennis Ball Collecting Robot**  
Brief Project description:  
Any tennis player knows that a good practice session ends with a court littered by stray tennis balls. After a hard workout, the last thing any athlete wants to do is stoop down and pick up 50 some tennis balls. Current consumer spending indicates people are willing to pay for convenience and cool new tech. Court Guard has designed and built a fully autonomous tennis ball collecting robot. The robot navigates half the court at a time using the net as a diving line, and is capable of detecting the fence and navigating into corners.

6. Team Name: **Bumper Bicep**  
Project Name: **Electrically Assisted Hitch Mounted Hoist**  
Brief Project description:  
In our ever-growing world, the solo-salesman, contractor or soccer mom is always moving from point A to point B. Typically, these individuals are carrying many objects, ranging from a briefcase to a 60 pound bag of dog food. While some of these items may be easy to throw in the back seat of any minivan, others are a struggle to lift into and out of the trunk of a vehicle. This is where the Bumper Bicep comes in to lend a helping hand, or bicep for that matter! Bumper Bicep is small electrically powered hoist capable of lifting up to 300 pounds. It is designed to collapse into the footprint of a vehicle’s bumper, and interfaces with any vehicle having a hatch style trunk and a class I hitch.

7. Team Name: **Boiler Up… Stairs**  
Project Name: **Stair Traversing Dolly**  
Brief Project description:  
With the ubiquitous existence of heavy packages and suitcases it has become an imperative to use dollies and luggage carts; however, with a freedom of moving on flat ground, the carts do not have the capability to move up and down without external assistance. Since elevators will not omnipresent and most people will not be able to move heavy parcels without assistance, Boiler Up…Stairs has created a cart capable of traversing flat ground and stairs alike. In addition the cart folds into a compact package for travel or storage.

8. Team Name: **Dock N’ Deliver**  
Project Name: **Package Delivery Drone**  
Brief Project description:  
With the advent of many new partial and fully autonomous devices today, people are met with new conveniences and options for how they work, travel, and play. Amazon has discussed the possibilities of implementing a package delivery service for customers with aerial drones; however, there are many obstacles in the way of that vision becoming reality due to its scope and high level of complexity. As a starting place and possible segue into fully autonomous parcel delivery, Dock N’ Deliver seeks to create a semi-autonomous aerial drone that delivers a package from delivery vehicle to customer
residence. The delivery personnel would provide input to designate the residence and desired package drop off point, and then the drone would fly to the destination, deliver the package, and return to the vehicle for restocking.

9. Team Name: HYPERGROUP
   Project Name: Hyperloop Tube and Pod Model
   Brief Project description:
   Hyperloop is a vacuum tube transit system originally proposed by Elon Musk. His concept was a passenger vehicle traveling between Los Angeles and San Francisco, and is a combination of a high speed train and the tubes used at a drive through bank teller window. In an effort to further the technological development of the concept Elon Musk is hosting a scaled prototype design competition geared toward college university participants. HYPERGROUP has designed and built a model to help bring tangency to the concept, while teaching and inspiring the general public about the idea.

10. Team Name: Team Fly On
    Project Name: Vertical Takeoff Drone
    Brief Project description:
    With the ever advancing design and increase in demand of fully autonomous products, the interest and use of drone technology is expanding. The application of autonomous products can be seen in both Military and Hobbyist industries. In regards to the demand, Team Fly On will innovatively design and build a semi-autonomous air vehicle with the ability to do a one-button transition from vertical take-off to horizontal flight. This high performance drone will have the ability to fly a 25 mile distance during a 30 minute flight time. Our air vehicle will also be able to carry on-board sensory applications such as infrared imaging and live camera feed.

11. Team Name: Boiler Brothers
    Project Name: SAE Aero Regular Class Airplane
    Brief Project description:
    Remote controlled aircraft designed to the 2016 SEA Aero Competition rules. The competition limits power supply, runway length, and total aircraft dimensionality with the overall objective of maximizing the flyable payload weight. In addition to the physical craft, the team has developed chart models for maximizing design parameters with competition specifications.

12. Team Name: Car Cart
    Project Name: Collapsible Shopping Cart
    Brief Project description:
    Grocery shopping can be an enjoyable yet time consuming process. In order help streamline the shopping experience Car Cart has developed a collapsible shopping cart that rolls right into the trunk of your car or into your home. This reduces the amount of time spent loading and unloading groceries. The cart is lightweight and can be collapsed into just the basket for transportation or fully collapsed for
storage when not in use.

13. Team Name: **International Market**

    Project Name: **Smart Cart**

**Brief Project description:**
Consumers are constantly seeking the next level of automation for their lives. That is why the Smart Cart is going to change your shopping experience, with an autonomous shopping cart. It follows the user at a distance of 3 to 4 feet using ultrasonic sensors, and is capable of obstacle avoidance on all sides of the cart through infrared sensors. Capable of holding up to 200 pounds Smart Cart is the step in shopping cart evolution.