



Unique, Real-World Learning Environment

Because of the interdisciplinary team interaction, hands-on approach to building and testing prototypes, and intimate involvement of a faculty advisor, the U-Capstone experience provides students with a truly unique learning experience. All material taught in Capstone classes is geared toward teaching students a structured design and product development process and is directly relevant to and necessary for their projects. Class assignments relate directly to project deliverables, enabling early and consistent feedback from project sponsors. Student teams work closely with their liaison at the sponsoring company to ensure that work is progressing according to the sponsor's needs.

Design Capabilities

Student project teams have access to:

3D CAD: SolidWorks, Autodesk Inventor, Autodesk, Alias, Cadence
Engineering Analysis: Abaqus, ANSYS, FLUENT, Matlab, Maple, Comsol

Engineering Fabrication: machining, CNC, rapid prototyping, plastics, composites, water jet, metal forming, and laser cutting

Engineering Laboratories: Mechatronics, Robotics, MEMS, experimental and computational fluid dynamics, wind tunnels, biomechanics, microscopy, composites, materials testing

Super Computer

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CAPSTONE PROGRAM

Industry Sponsored



THE UNIVERSITY OF UTAH

DEPARTMENT OF
MECHANICAL ENGINEERING

WHAT IS U CAPSTONE?

U Capstone is an eight-month design course for senior engineering students. Students work in teams of four to six students throughout two semesters to complete projects provided by industrial and faculty sponsors. Through coursework and interaction with their faculty advisor, teams learn to follow a structured design approach in completing their projects. They interact with and receive feedback from the industrial sponsor to make sure the work meets the sponsor's needs. Students allocate approximately 10 hours each week for Capstone and are expected to provide working prototypes and project documentation at the end of the two semester sequence.

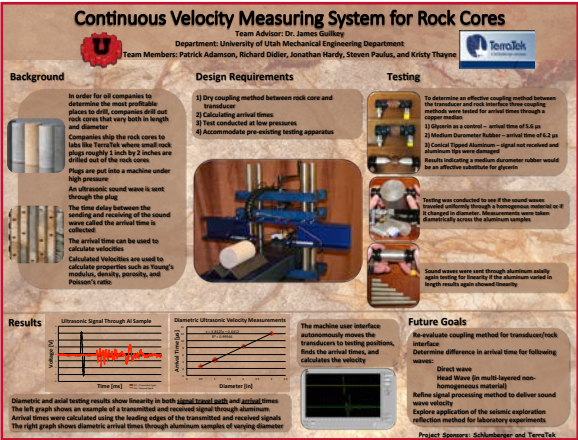
How to Sponsor

1. Generate possible project ideas.
2. Visit <http://mech.utah.edu/capstone>, click on the "How to Sponsor" link and fill out the project proposal form. The U Department of Mechanical Engineering will contact you to determine a good match.
3. Timeline: For students starting the year-long sequence in the Fall semester, submit projects by July 1. For students starting in the Spring semester, submit projects by December 1.
4. Make arrangements to pay the educational grant of \$15,000.
5. A Capstone team and faculty advisor are assigned to your project by the first week of September for the Fall-Spring cycle or the first week of January for the Spring-Fall cycle.

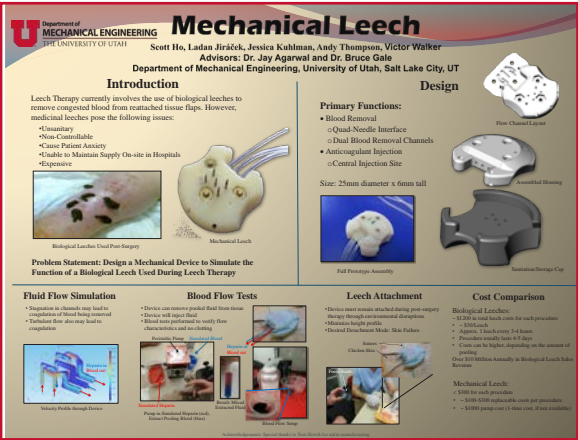


Benefits to Sponsors

- Sponsors benefit from real work on real projects from student teams
- Progress is made on mid- to back-burner projects
- Sponsors evaluate students and students evaluate sponsors - a valuable process for potential employment



CONTINUOUS VELOCITY MEASURING SYSTEM FOR ROCK CORE: TerraTek, a division of Schlumberger, provides rock mechanics and core analysis services for oil and gas well development companies. One of the tests provided is an ultrasound wave velocity test. While there are currently velocity measuring systems available on the market today they do not have the ability to collect data along the length of rock cores, which are typically over three feet long, and require a liquid material to be applied to the surface of the sample. It is desired by TerraTek that a test set up be developed that can attach onto a pre-existing fixture and collect the sound wave velocity along the length of an entire rock core without the use of a liquid coupling material.



MECHANICAL LEECH: The Mechanical Leech will be a drop-in replacement for biological leeches, providing the necessary fluid removal that is needed during post-surgical skin graft treatment. Live leeches are currently used during post-surgical skin graft procedures to remove pooling blood at the surgical sites. This gives the body time to form new veins to handle the return blood flow. These biological leeches have drawbacks such as sanitation and patient appeal, which will be resolved using the Mechanical Leech that is an aesthetically pleasing, sterilizable replacement.



SELF-RELEASE PARKING BOOT: This project is to improve upon the design of the current Paylock SmartBoot. Paylock's Smart-Boot is designed so that the recipient of the parking boot can pay their fine over the phone and receive an unlock code to take the boot off themselves by punching the code into a keypad on the boot. This eliminates the need for officers to go back to the location and remove the boot themselves. However Paylock's current boot has a very high theft rate (20% in Oakland) and costs \$450 to manufacture. Our task is to make the SmartBoot more secure and also cheaper to make.



SNOW SPORTS WINCH: Capstone students designed and built a lightweight economical gas-powered winch system that accelerates skiers and snowboarders up to a target velocity.

Ideal Projects

Ideal projects should focus on design and build elements that require 600-800 project engineering hours. Sponsors often provide mid- to back-burner project types-for example, new or improved product prototypes, process machines, tooling and gauging, test machines, semi automation, or process optimization.

Current and Past Projects

- Adaptive Motocross
- Alpine Tetra Ski Team
- Atomospheric boundary Layer research Rocket
- Automated Dip Coating Deposition
- Automated Snow Measurement System
- Autonomous Collision Avoidance Aerial Robot
- Beginning Braille Training Device
- Bio-sensing Chip
- Budget Atomic Force Microscope
- Cancer Therapy Skin Cooling
- Compact Urban Transportation Board
- Composite Motorcycle Frame
- Continuous Velocity Measuring System for Rock Core
- Electricity Harvesting from Low-temperature Waste Heat
- FASEA Aerodynamics Package
- Formula FSAE
- Gliding Wheelchair Transfer System
- Grip Force and Wrist Position Measurement System
- Helical Residential Wind Turbine
- Home Firefighting Robot
- Human Powered Vehicle
- Improved Rehabilitation Walker
- Low-infrasturture Hydroelectric Generator
- Needleless IV Port Redesign
- Pediatric Prosthetic
- Reliable Controls Rock Crusher Drive System
- Semi-automated Pyrotechnic Loading Mchine
- Solar-powered Commuter Vehicle
- Surface Extractable Marine Current Turbine
- Universal Time Lapse Photography
- Variable Angle Luminescence Mapping
- Wave Energy