Summer 2019 Projects

All are located in Cambridge, MA.

Project A (Hand-held MRI): Magnetic resonance imaging is a form of medical imaging that utilizes strong magnetic fields, magnetic field gradients, and radio waves to produce images of the anatomy and physiological processes in the body. For this project, a team of students will have the opportunity to design, test, and optimize constraints of materials to be utilized in the development of a handheld MRI device. A general understanding of high school physics (magnetic fields) is preferred, and algebra and trigonometry are required. Some experience with modeling software (ANSYS, COMSOL, or SolidWorks) is desired but not necessary.

Project B (Sunflyer): Unmanned aerial systems (UAS) can be used for a number of applications, from dispatching medical supplies in areas where travel is difficult due to lack of roads and infrastructure to delivering internet connections to remote locations. For this project, a team of students would be working together to modify a UAS to fly for long durations without need for repair or refueling. A general understanding of algebra and trigonometry are required, while an interest in building objects (prototyping) and aviation technologies are desired but not necessary.

Project C (Raspberry Pi Water Test Kit): Drinking contaminated water can lead to waterborne diseases and in turn cause serious health issues for the consumer. Developing a field test for public water sources could be beneficial in informing users of water quality for consumption. For this project, a team of students will use a Raspberry Pi to develop a sensor to determine the safety of drinking water in public places. A general understanding of basic algebra is required. Some experience with programming (MATLAB, Python, or C/C++) and measuring/recording data is desired but not necessary.

Project D (Low cost EEG): An electroencephalography (EEG) is a method to monitor and record the electrical activity of the brain, and can be used in diagnostic tests in the medical field. For this project, a team of students will work together to optimize the design of a low cost EEG system. A general understanding of algebra and physics is preferred. Some programming experience with MATLAB, or CADing software (SolidWorks, Autodesk), is desired but not necessary. An interest in electronics and/or biology/neuroscience is preferred.