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.