Microfluidic devices have been gaining popularity in the diagnostics industry as delivery mechanisms for small amounts of sample to be delivered to a sensing device. Traditionally, the development and manufacturing of microfluidic devices requires the use of a clean room, expensive equipment, and the time of a skilled laboratory technician; these requirements impart a high cost to the final product. While hospitals and the health care industry might be willing to spend the money for individual detection devices, the food production industry cannot. In order to make microfluidic diagnostic instruments more accessible to the food industry their size and production cost must be drastically lowered. Professor Christopher Salthouse of the Umass ECE department and undergraduate Stephen McKinley of the UMass ME department will work this summer to the realization of rapidly prototyped microfabricated detection devices using relatively low-tech and inexpensive equipment.

Professor Salthouse’s research group has already shown marked progress in the implementation of low-cost commercial webcams in the imaging and detection of individual pathogenic cells or spores. The goal of this summer research experience is to design and implement a method to deliver cell culture to the surface of the imaging sensor of a webcam. This will require the production of microfluidic channels and their union with the sensing surface of the webcam as well as microfabricated fluid circulation devices. Design and manufacturing of these devices on the size scale required presents challenges that must be overcome by the research group this summer.