

ECC WEILL HALL TOUR AND DEMONSTRATION

Date: October 30, 2008

Time: 1:15-2:15 p.m.

Estimated # of ECC Members: 24-30

Meeting Location at Start of Tour: Weill Hall first floor atrium

Groups: The ECC will be split into two groups

Tour Leaders: Michael Shuler, Chair of BME, and Larry Bonassar, Associate Chair of BME, will each lead a group

Demonstration of 3D Printing of Living Aortic Heart Valves (Jonathan Butcher)

Live Tissue Printing: Fabrication of an Aortic Valve. Many technologies have been applied to construct living tissue replacements, but few have been able to replicate the complex three dimensional anatomy and material properties of real tissues. Cornell researchers have developed a novel device that deposits living cell slurries (aka inks) in three dimensions to create a realistic tissue structure. We have further advanced this technology by incorporating a printable temporary mold and an ultraviolet light based curing system to selectively stiffen selected tissue regions. Our eventual goal is to create living tissue replacements with patient specific geometries and material properties. We will show two demonstrations of this technology. One printing system will create a mitral valve directly from an MRI generated dataset. A second system will print a rectangular model tissue using two different materials to create a tissue with regionally changing material stiffness. Both projects can occur simultaneously so that people can see both at work.

Demonstration of Student designed Micromixers (Shivaun Archer)

Enzymatic assays performed on a microchip platform are highly attractive as biomedical analytical microsystems because of their versatility, negligible sample/reagent consumption, and high selectivity. Students are given a problem to design a microfluidic mixer that can be used on a microchip for enzymatic assays. The students use computer aided design (AutoCAD) software to design a microscale mixer. They then fabricate their device in the clean room using polydimethyl siloxane (PDMS). Their devices are tested to assess the success of their mixing device in terms of the resulting colorimetric change. In this demonstration we will demonstrate various student designs.