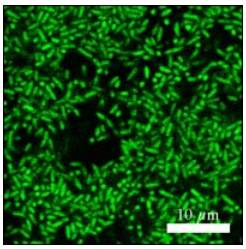
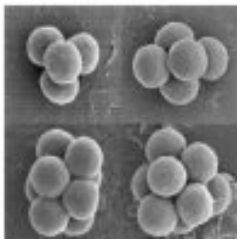
BACTERIA (maximum 8 students)



Tommy Angelini, PhD
Bacteria are everywhere in the world. They live in soil and they coat rocks in streams, but they also cover our teeth and infect our wounds. Most bacteria in the world exist as biofilms: large complex colonies that function as a whole organism. Students joining our lab will get to explore the multicellular nature of a biofilm as we search through different parts of the biofilm that perform different functions.

Jim Wilking, PhD
Bacteria can be genetically engineered so that they "glow" when exposed to certain wavelengths of light. This technique is extremely useful when imaging individual bacteria using a microscope. I am interested in looking at bacteria communities that exist on a variety of surfaces, including your teeth (dental plaque). By engineering the bacteria so that they glow green, we are able to visualize the bacteria to see how they behave in their microenvironment.

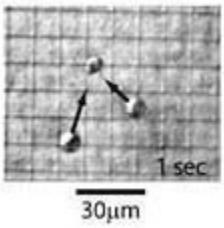
COLLOIDAL PARTICLES (maximum 8 students)



Emily Gardel, PhD Cand.
The colors we see are closely related to the material's properties. What happens when we change these properties? We'll learn how we can make a gold ring or coin look red just by altering its size and how salt partly explains why lakes and ponds are more murky than oceans.

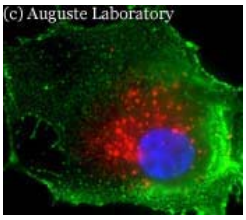
David Kaz, PhD Cand.
We will be using optical tweezers to manipulate tiny (2 micron) particles near an oil-water interface. Sometimes they stick to the interface, and sometimes they don't. I'm trying to find out why. This sort of thing is important in mineral recovery and defoaming root-beer floats.

NANOTECHNOLOGY (maximum 4 students)



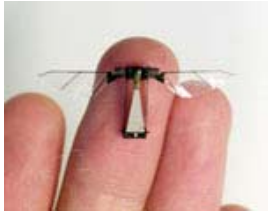
Keith Brown, PhD Cand.
We'll show you how we move single cells on an integrated circuit and our project to control it with a custom touch screen. We might even be able to let you move and arrange a fleet of cells and vesicles.

HUMAN EMBRYONIC STEM CELLS (maximum 4 students)



Marjan Rafat, PhD Cand.
We will be demonstrating human embryonic stem cell culture. We will also show other human cell culture techniques. Finally, we will discuss drug delivery and tissue engineering principles.

ROBOTICS (maximum 4 students)



Ben Finio, PhD Cand.
The Harvard Microrobotics Lab specializes in the design and construction of miniature robots that can rest easily on your fingertip. Many of our designs are biologically inspired and are based on methods of locomotion seen in nature such as flapping-wing flight or six-legged crawling, as opposed to the more "traditional" motors-and-gears approach to robotics. We have a wide array of equipment (including laser cutters, high-speed video and motion tracking systems, and micro-assembly tools) to custom fabricate and test all of our robots in-house.