Measuring Mechanical Force exerted by Cells

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Research

Title: Measuring Mechanical Force exerted by Cells

This effort focused on creating a fabrication process for polydimethylsiloxane stamp (PDMS) and a prototype for the microfabricated post-array detectors (MPADS) using a microfabrication technique. The PDMS can be used as a single cell capture device and the MPADS as cellular force measurement sensors. The teacher constructed the PDM molds to visualize the cells and to be later used as MPADS. After photographing the cells, she used a MATLAB software package to analyze the traction forces exerted by the cells. She also investigated how each post can be readjusted in the center of the new grid, correcting distortions caused by cells. She formulated this research based on the hypothesis that the force can be measured indirectly by equating it to the deflection of the micro-posts using the beam bending theory. In collaboration with her partner graduate student, she calculated force from displacement of the tip of the posts on the MPAD using spring theory concept and force proportionality relationship.

Figure: MPADS force measurement

Lesson Plan

Title: Filtering Frequencies of light in MATLAB

In this activity, students construct a simple conductivity probe and then integrate the probe into two different circuits to test the behavior of the probe in solutions of varying conductivity. The focus is to introduce students to the construction of a conductivity probe and expose them to several different ways of integrating the probe to obtain qualitative and quantitative measurements.

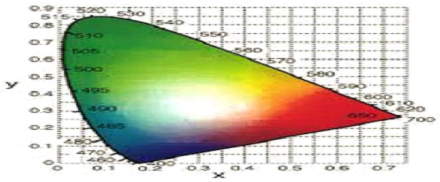

Figure: Filtering frequencies of light