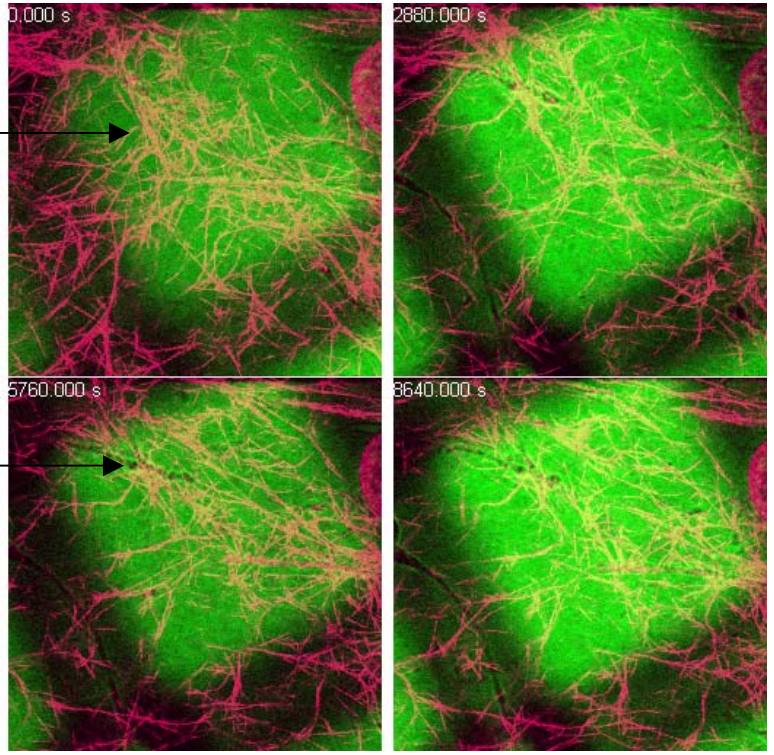
Invasive Brain Tumor Cells

We have used simple microscopies to study the invasion of glioblastoma brain tumor cells in a collagen matrix, which has properties similar to brain tissue.

Confocal reflectance image of collagen fibers (pink)

Bright field image of cell projection (shadow on green background).



144 μm

The collagen matrix changes quite drastically as the cells send their invasive tips microns further into the matrix.

Images collected over many hours have directly shown that the brain tumor remodels the collagen matrix. The collagen fibers are reorganized (both pulled and pushed) by the brain tumor cells. CARS microscopy will be employed in the future for more detailed brain tumor cell imaging.

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Confocal Microscope Facility and REU

This summer the confocal microscope facility played host to a number of undergraduate students and their advisors participating in the Research Experience for Undergraduates (REU) program. A number of students became proficient in the technique of fluorescence microscopy, a technique being widely used in many scientific disciplines today.

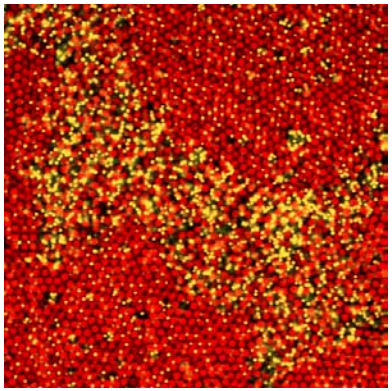
Among the projects that utilized the confocal microscope facility were:

"Using Kinesin to Probe the Mechanical Properties of Biopolymer,"
Emily Kendall, Clifford Brangwynne, Margaret Gardel, David A. Weitz
confocal fluorescence microscopy

"Emulsion Synthesis of Large Porous Particles for Drug Delivery by Inhalation,"
Katherine Kirkwood, Nicolas Tsapis, Eric Dufresne, David A. Weitz
CARS microscopy

"Crack Dynamics in a Drying Silica Suspension,"
Daniel Stark, Eric Dufresne, David A. Weitz
confocal fluorescence microscopy

"Binary Crystalization from a Ternary Colloidal System,"
Cynthia Chi, Rebecca Christianson, David A. Weitz
confocal fluorescence microscopy



Binary crystals unexpectedly formed in regions of the ternary system. Two of the three colloids were dyed with a fluorescent dye (they show up as red and yellow in the image above) and the third component was not dyed (it shows up black in the image above). In this image both disordered regions and FCC binary crystals are visible.