

Dear Faculty, IGERT Fellows, IGERT Associates and Students,

You are cordially invited to attend a Seminar presented by Benjamin Guan.
Please plan to attend.

Benjamin Guan

IGERT Fellow

Date: Friday, May 16, 2014

Location: Bourns A265

Time: 11:00am

Cell Segmentation: 50 Years Down the Road

Abstract:

Ever since the establishment of cell theory in the early 19th century, which recognized the cell as the fundamental building unit of life, biologists have sought to explain the underlying principles. Momentous discoveries were made in the course of many decades of research, but the quest to attain full understanding of cellular mechanisms and how to manipulate them to improve health, continues to the present day, with bigger budgets, more minds, and more sophisticated tools than ever before. One of the tools to which a great deal of the progress in cell biology can be attributed is light microscopy. The field has come a long way since Antoni van Leeuwenhoek's first steps in the 1670s toward improving and exploiting microscopic imaging for studying life at the cellular level. Not only do biologists nowadays have a plethora of different, complementary microscopic imaging techniques at their disposal, enabling them to visualize phenomena even way below the classical diffraction limit of light, advanced microscope systems also allow them to easily acquire very large numbers of images within just a matter of hours. The abundance, heterogeneity, dimensionality, and complexity of the data generated in modern imaging experiments rule out manual image management, processing, and analysis. Consequently, computerized techniques for performing these tasks have become of key importance for further progress in cell biology. A central problem in many studies, and often regarded as the cornerstone of image analysis, is image segmentation. Specifically, since cellular morphology is an important phenotypic feature, indicative of the physiological state of a cell, and since the cell contour is often required for subsequent analysis of intracellular processes (zooming in to nanoscale), or of cell sociology (zooming out to millimeter scale), the problem of cell segmentation has received increasing attention in past years. Here we reflect on how the field has evolved over the years and how past developments can be expected to extrapolate into the future.

Reference:

Meijering, E. (2012). Cell Segmentation: 50 Years Down the Road. *IEEE Signal Process* 29(5), pp. 140-145.

