



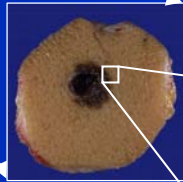
# Optical Coherence Tomography (OCT) for Surgical Diagnosis, Guidance, and Interventions

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University of Illinois at Urbana-Champaign

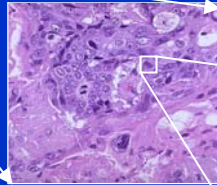


Whole-Body  
Imaging  
(meters)

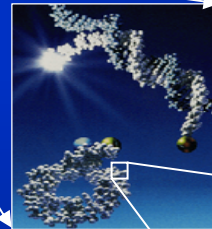


Tissue  
Imaging  
(centimeters)

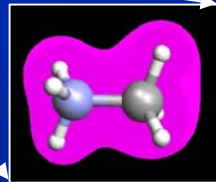
Cellular  
Imaging  
(microns)



Molecular  
Imaging  
(nanometers)



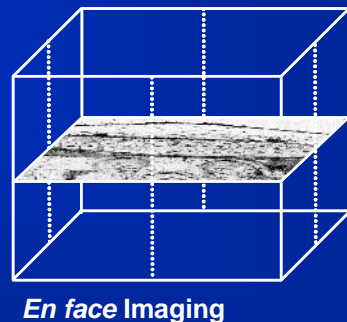
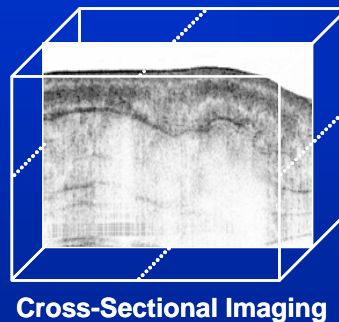
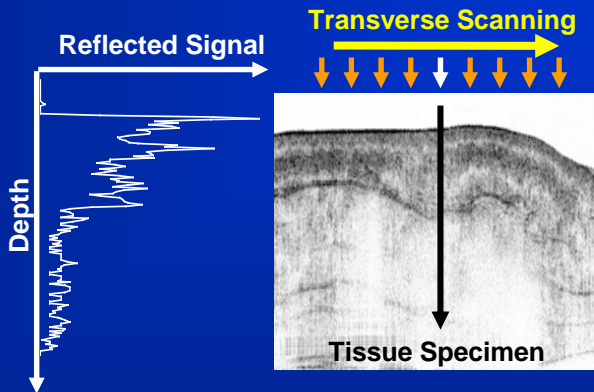
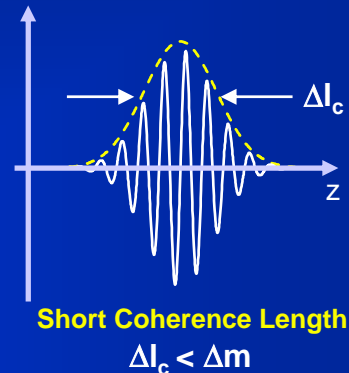
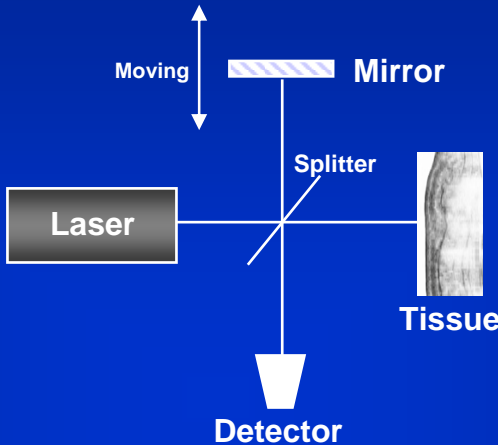
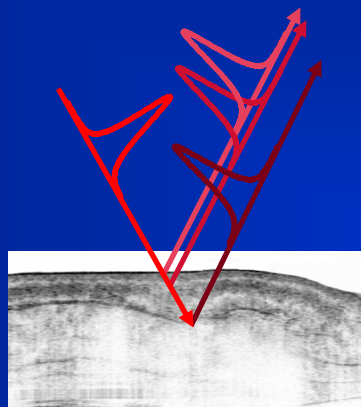
Molecular  
Vibrational  
Imaging  
(Angstroms)



**Interventions must be  
guided at the level of  
the disease process.**



# Optical Coherence Tomography (OCT)

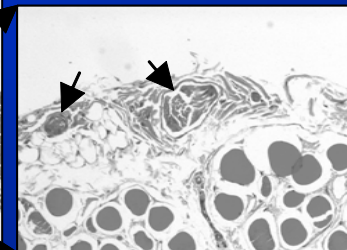
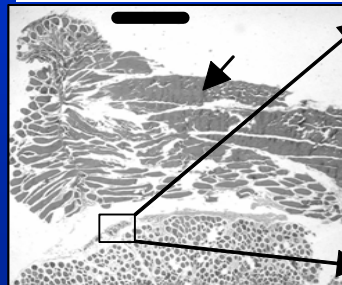
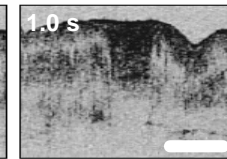
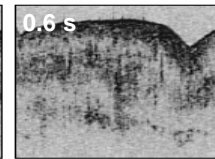
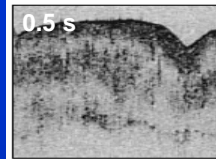
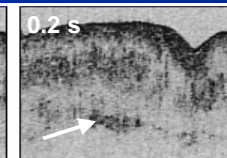
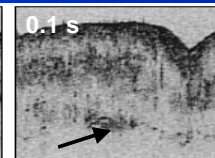
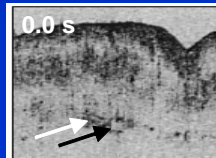
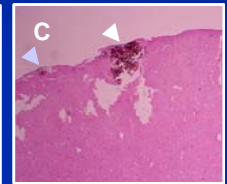
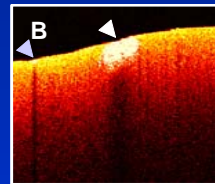
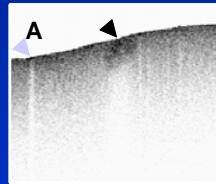
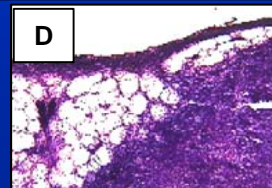
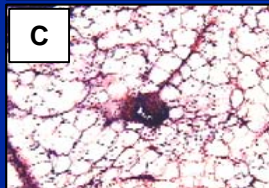
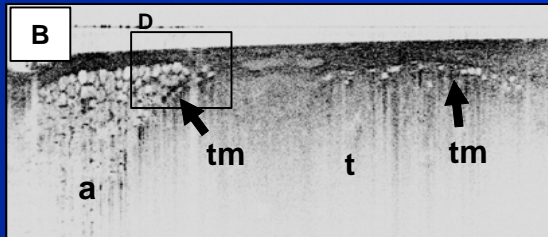
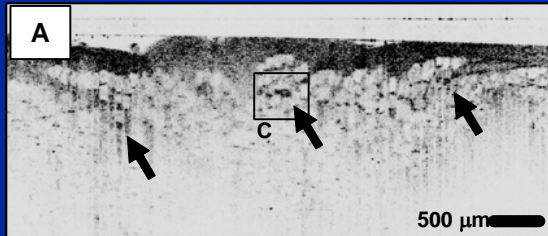




# Morphological OCT Imaging

- High-Resolution, Real-Time Imaging
- Tumor Morphology and Margins
- Integration with Optical Instruments
- Image-Guided Procedures
- Open Surgical Field

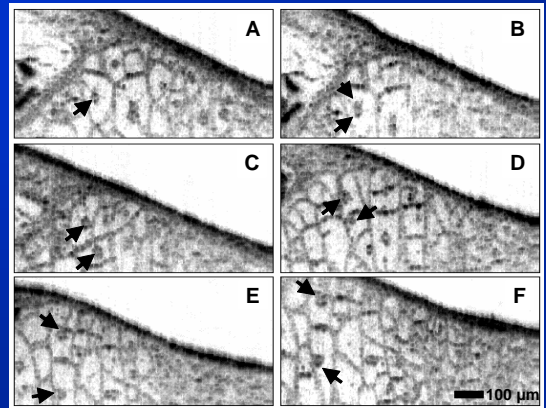
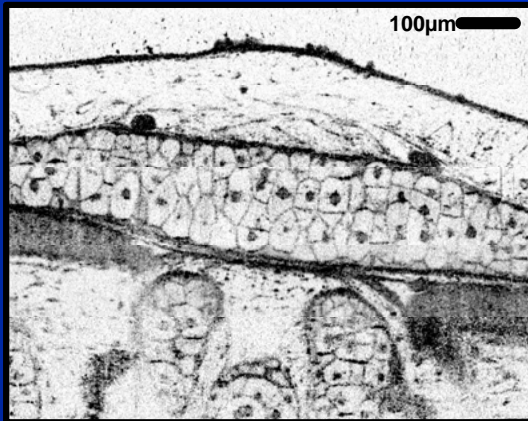
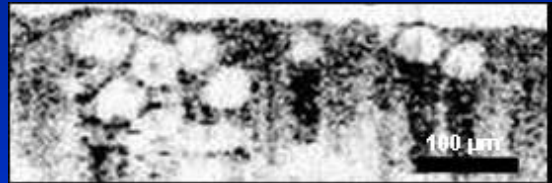
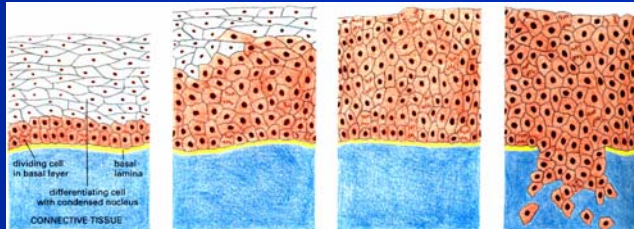
Move the Surgical Path Lab into the OR!





# Cellular OCT Imaging

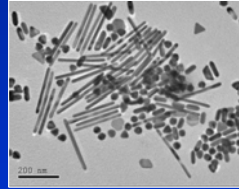
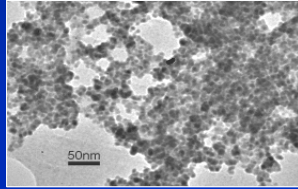
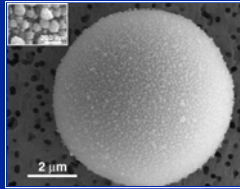
- Real-Time Optical Biopsies
- Replace the Surgical Pathology Lab
- Identify Cellular Processes
- Locate Micrometastases or Tumor Cell Nests



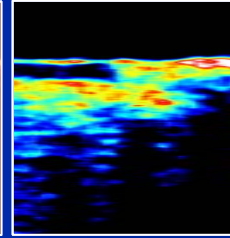
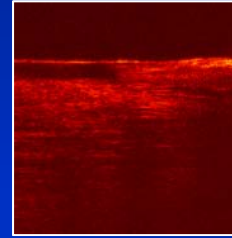


# Molecular OCT Imaging

## • OCT Contrast Agents:

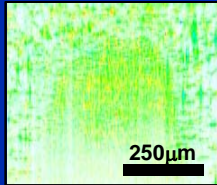


Topical magnetite  
Structure Magnetic

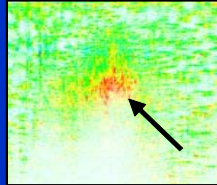


## • Spectroscopic OCT:

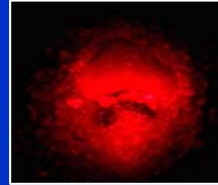
SOCT (-) Dye



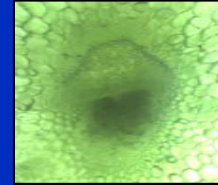
SOCT (+) Dye



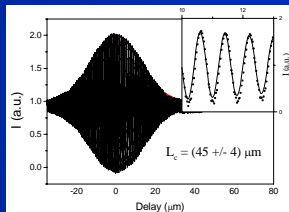
Fluorescence  
Microscopy



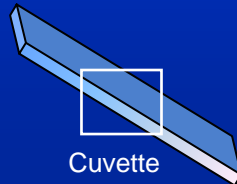
Brightfield  
Microscopy



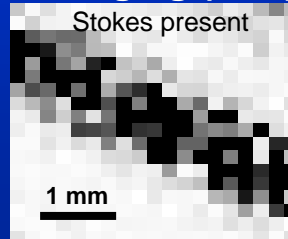
## • Nonlinear Interferometric Vibrational Imaging (NIVI):



En face images of benzene-filled cuvette



Stokes present



Stokes blocked

