SUMMER RESEARCH

SUMMARY

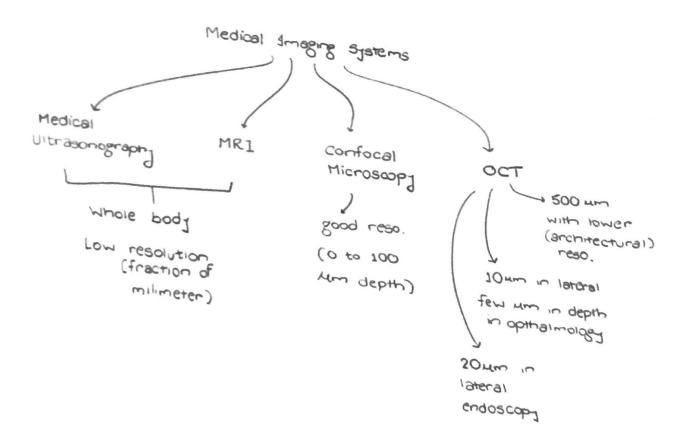
Biophotonics Imaging Lab

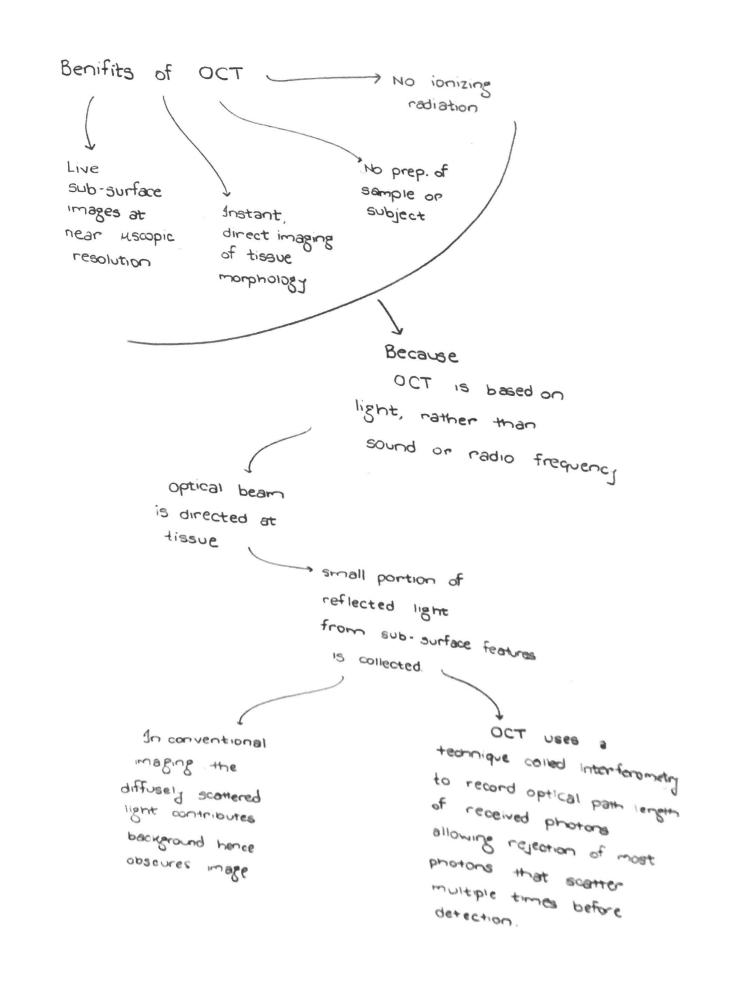
prof. Stephen Boppart

Optical
Coherence
Tomography

SPIE.

Medical technique
that uses light
to capture um resolution,
3º images from optical
Scattering media

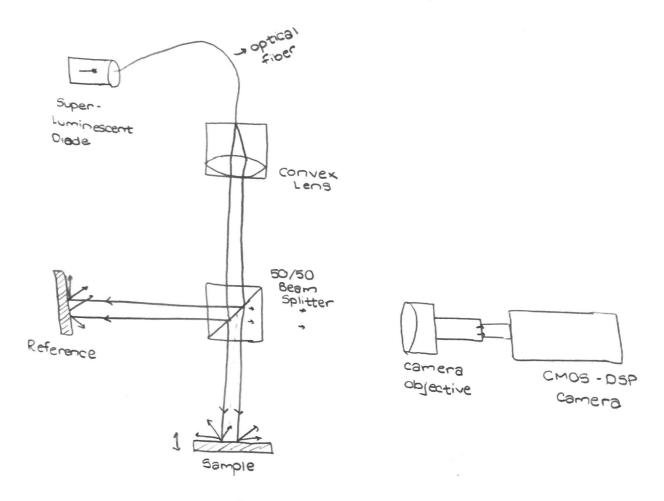




From the Biophotonics Imaging Lab website Research - OCT smaging technology Desirable to construct a versatile fiber based optical source Needs to accommodate maximum number Start with, modalities high powered, near IR (1050±50 pm) Ytterbium ultrafast fiber oscillator then employ Photonic crystal fiber non linear freq. conversion to generate A outside laser emission Spectrum » High quality super antinuum optical optical freq. freq. up down

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Optical Elastography
    OCE
          Magnetomotive OCE
       Introduce
 magnetic nanoparticles A steel microbead
in the medium to be
    probed
                Apply a small,
                  controlled, external
                   magnetic Field
      thus, gain access
     to nano- to
     micro level interactions when excited by a step
    bet" MNPs and
                                waveform from the electromagnet
    surrounding environmental
                                natural freq of oacillation of
    Matrix
                                each sample was obtained
                                  Result
                            A linear relationship
                           between natural freq.
                           of oscillation of a moterial
                           and a square root of its
                           elastic modulus.
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Principle of OCT



Juli - Field OCT set up

Magnetomotive dynamics of magnetic particles for Optical Imaging Contrast and Elastography Dissertation

> (2) Background and Processing

Optical Coherence Tomography light from a broadband light

source is aplit by a beam splitter

And the reference arm are spectrally decomposed by a diffraction grating and focused onto a line scan camera for detection

Sample Reference arm arm Interference potterns formed from the backscattered light from the internal tissue

> Then directed to

two arms

microstructures