# Optical Coherence Elastography

**Background** – Optical Coherence Tomography acquires micrometer scale 3D images of tissue. The OCT image, and parameters derived from the data, are used to distinguish different tissue types or disease states. Optical Coherence Elastography combines OCT with measurements of mechanical properties such as stiffness and Young's modulus for additional tissue characterization. A typical OCT measurement consists of measuring strain stress (applied force per cross sectional area) and strain (deformation due to applied stress). Whereas strain can be measured directly from the 3D OCT data, stress measurements usually require an intermediate medium with known mechanical properties.

**Goal** – Setup OCE measurements in our laboratory. Conventional OCT systems are available and can be customized to enable OCE measurements. These measurements will be validated by repeating experiments described in the literature. Dynamic measurements of Young's modulus will be initiated.

**Requirements** – This assignment has a strong experimental component. Some experience with Matlab or LabVIEW for instrumentation and data analysis is beneficial.

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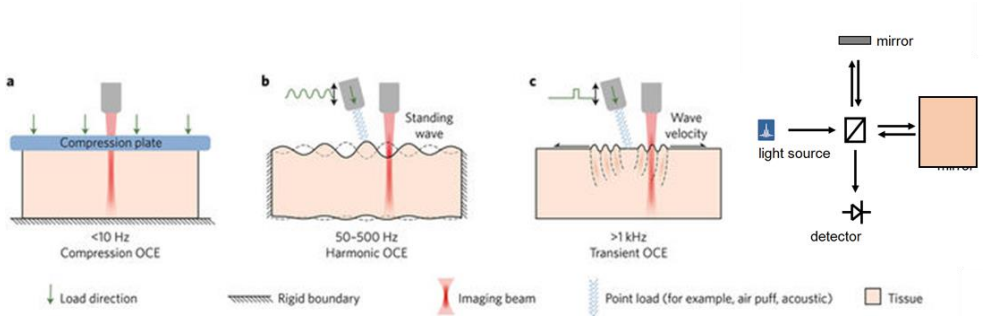


*Illustration of OCE concepts: (a) application of static force; (b) application of oscillatory force (piezo transducer or acoustic); (c) pulsed excitation and 'downstream' measurement of shear wave.*