



## DBS COLLOQUIUM SEMINAR

Friday, 12 August 2022 | 4.00 pm | Lecture Theatre 32

Hosted by Associate Professor Liou Yih-Cherng

# *The art and science of good imaging: Sample clearing and choice of mounting medium for optical microscopy*

**By Ping-Chin Cheng, PhD**

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### **About the Speaker**

Professor Ping-Chin Cheng is with the Department of Electrical Engineering, State University of New York at Buffalo. His research involves the instrumentation of confocal and multiphoton microscopy, as well as X-ray microtomography work on the sequencing of *ndh* gene and its role in maize (corn) anther dehiscence.

Professor Cheng obtained his PhD in Anatomy from the University of Illinois, USA, an MSc in Plant Sciences and BSc Honors in Biology from the University of Western Ontario, Canada.

As water is the most abundant material in living systems, light absorption of water determines the usable spectral range of optical microscopy of living material. Water is transparent at the shorter wavelengths (<200nm), with two minor absorption peaks at approximately 1000 and 1200 nm, but becomes opaque at wavelengths longer than 1300 nm. This transparent spectral window determines the operational range of live cell imaging. Besides water, tissue consists of organic molecules, inorganic deposits, and other light absorbing pigments that contribute significant light attenuation. Any optical heterogeneity within the specimen or deviation in the refractive index from the design specification of the objective can produce spherical aberration. Structures having different refractive indexes can also affect the flatness of an optical section. Historically, this heterogeneity is overcome by dehydration and by clearing and mounting the tissue sections between a slide and coverslip in proper mounting medium. This procedure matches the optical properties of the specimen to the design conditions of objective lens, and should not be overlooked in modern widefield, confocal, and multi-photon microscopy. A number of methods to minimize refraction mismatch and minimize scattering will be discussed.

**All are welcome to attend**