Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **585** Type: **Invited Speaker / Conférencier(ère) invité(e)**

(I) In-vivo, non-contact, cellular resolution imaging of the srtucture and function of the human eye

Thursday 10 June 2021 12:45 (25 minutes)

Over the past 25 years, optical coherence tomography (OCT) technology has been used for clinical diagnostics of potentially blinding ocular (retinal and corneal) diseases because it offers a non-invasive approach, fast image acquisition rates and multi-functionality. However, clinical OCT systems lack the necessary resolution and imaging speed for in-vivo imaging of the cellular and sub-cellular structure of ocular tissues, as well as probing fast, light-induced functional changes in the retina.

This presentation will discuss a relatively novel line-scan OCT (LS-OCT) technology that combines ultra-broadband lasers with ultrahigh speed cameras to allow for in-vivo, non-contact imaging of individual cells in the human cornea and limbus. The same technology is able to map blood vasculature, measure ocular flow and potentially measure light-induced physiological changes in the retina. The LS-OCT technology has numerous clinical applications from early diagnostics of potentially blinding corneal and retinal diseases, including neurodegenerative conditions such as Alzheimer's, Diabetes, etc, to aiding and monitoring the effectiveness of different therapeutic approaches (drug therapies, nano-caged drugs, ocular surgeries, stem cell transplantation, etc.)

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Session Classification: R2-3 Biophotonics II (DAMOPC/DPMB) / Biophotonique II (DPAMPC/DPMB)

Track Classification: Atomic, Molecular and Optical Physics, Canada / Physique atomique, moléculaire et photonique, Canada (DAMOPC-DPAMPC)