Ilias Tachtsidis (University College London)

November 04, 2025 to November 07, 2025
ICFO Auditorium

"Brain?Haemodynamic?and?Metabolic in-vivo optical sensing with NIRS:?MetaboLight"

Abstract:

My work is?interdisciplinary?and?distinctive?as it crosses from technology development in optical neuroimaging (devices, algorithms) to applications (clinical, neuroscience) to data analytics towards generating information and knowledge (computational models, machine learning).?During my?talk?I will talk?about my?work?that?starts from the development of optical broadband-NIRS?or?bNIRS?instrumentation and algorithms for?monitoring?non-invasively brain tissue changes in oxygenation and?mitochondrial?metabolism (the oxidation state of cytochrome-c-oxidase or?oxCCO). I will then introduce how we have applied the?bNIRS?technology in neuroscience and clinical

applications.??I will introduce our neuroimaging work with?bNIRS?in understanding the role of mitochondrial in driving\supporting the functional?haemodynamic?response and brain activity.?Demonstrating how optical metabolic imaging can?inform on?brain function in infants and adults beyond the?haemodynamics. Finally?demonstrating?via clinical studies and computational analytics that?bNIRS?measurement of brain tissue?mitochondrial metabolic function, measured as early as the first day of life in newborns with hypoxic-ischaemic?encephalopathy (HIE) can prognosticate neurodevelopment.?Hence?demonstrating?beyond the proof-of-principle stage how?optical technologies have a direct impact on?identifying?within hours after birth neonatal brain injury?and support clinical decisions.??

Biography:

Professor Tachtsidis has an educational background in physical sciences and engineering. He is a multidisciplinary scientist with a research portfolio that encompasses engineering, physics, computing, neuroscience and clinical medicine. He has an internationally leading reputation within the field of optical near-infrared spectroscopy (NIRS) through his novel optical brain sensing\imaging technology called broadband near-infrared spectroscopy (bNIRS), which can quantify non-invasively brain tissue mitochondrial metabolism. Prof Tachtsidis projects include studies of acute brain injury, multiple sclerosis, newborn birth asphyxia, prematurity, neurodevelopmental disorder such as autism and mental health disorders. Evidence of his research excellence are his extensive publication output 170 journal articles and his research funding portfolio that tops 10 million sterling. In recognition of his research activities and public\school engagement activities, he is featured in the London Science Museum Engineering Gallery that open in June 2023.?

Link:?https://profiles.ucl.ac.uk/2168-ilias-tachtsidis??