



# High-density Diffuse Optical Tomography for Imaging Human Brain Function

ADAM EGGBRECHT

June 06, 2018

12:00

Blue Lecture Room

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Imaging spatially and temporally distributed brain activity has revolutionized our understanding of the brain. The complex of interacting brain systems supporting our thoughts and actions—from sensing the visual world, to communicating, to maintaining attention and control, to daydreaming or sleeping—are accessible to quantitative investigation because of functional imaging techniques. Optimizing neuroimaging technologies as tools for understanding these disorders and tracking their progression presents significant challenges. Optical neuroimaging techniques such as diffuse optical tomography (DOT) offer

unique advantages over more traditional technologies like PET or functional MRI to provide safe, wearable, quiet, and portable methods for measuring brain function in naturalistic settings. The image quality of DOT is fundamentally dependent upon utilizing multiple source-detector measurements that are sensitive to hemodynamics within overlapping regions of tissue. Focusing on continuous wave DOT design strategies, source-detector measurement pairs of various source-detector distances provide information about various depths, and, additionally, the overlapping distances at a given support improved lateral resolution. This leads directly to significant challenges in managing crosstalk between detection channels, dynamic range of the detectors, and stable coupling between the optical elements and the scalp over the footprint of the imaging cap. This talk will discuss recent advancements in high-density DOT methods that have led to improved image quality, anatomical specificity, and reliability in non-invasive optical mapping of human brain function.

**Wednesday, June 6, 2018, 12:00. ICFO's Blue Lecture Room**

**Hosted by Prof. Turgut Durduran**

