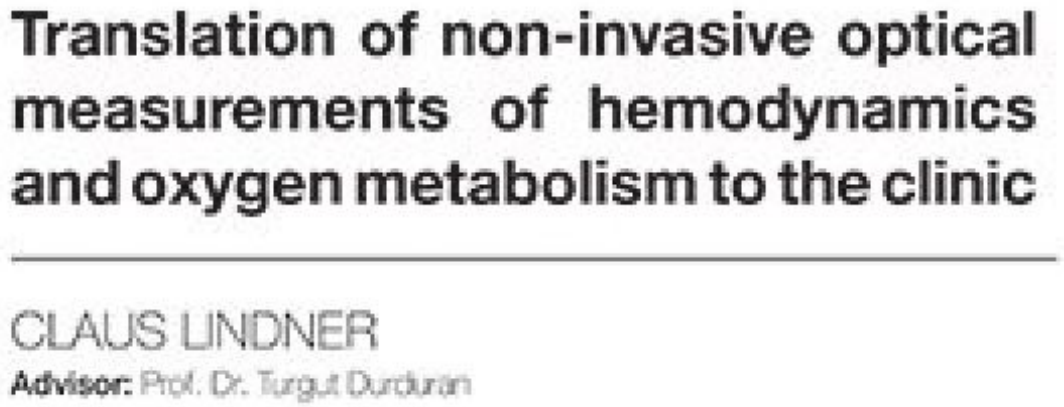


# PhD Thesis Defense CLAUS LINDNER 'Translation of Non--Invasive Optical Measurements of Hemodynamics and Oxygen Metabolism to the Clinic'

CLAUS LINDNER

March 24, 2017

Friday, March 24, 11:00. ICFO Auditorium

**CLAUS LINDNER**

Medical Optics

ICFO-The Institute of Photonic Sciences

Several clinical studies for non-invasive estimation of tissue hemodynamics by the combination of two diffuse optical techniques, time-resolved and diffuse correlation spectroscopy, were carried out in collaboration with local hospitals.

These led to the 1rst application of hybrid diffuse optics in the characterization of healthy and

pathological human thyroid tissue and the initiation of a European Horizon 2020 research project aiming at signi1cantly improving the current
thyroid cancer screening process.

The advantages of the hybrid diffuse optical device allowed to gain information on cerebral oxygen metabolism and improved estimation of cerebral blood flow. Data was collected from patients without brain diseases as well as healthy volunteers
in clinical and surgical environments. The diffuse
optical measurements were shown to correlate with the bispectral index, a widely used anesthesia monitor in the clinic.

The optically derived parameters demonstrated the conservation of physiological coupling between cerebral blood flow and oxygen metabolism in patients under propofol-induced anesthesia.

Additional studies focused on the investigation of microvascular cerebral physiology in response to common challenges in surgical procedures. These were simulated on healthy subjects and studied in depth.

Overall, this work pushes the limits of the clinical translation of hybrid diffuse optics paving the way for new applications.

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**Thesis Director: Prof . Dr. Turgut Durduran**