**ICT Ph.D.**

**Research Project for a Ph.D. Curriculum in ICT – Electronics and Telecommunications**

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**Co-tutor:**

**Proposed Title of the Research:** Advanced Optical Systems and Vision Science for Enhanced Ophthalmic Diagnostics

**Keywords: (5)** Optical engineering, vision science, light sources, laser applications, image processing

**Research Objectives: (max 10 rows)** The aim of this research is to develop innovative optical systems for ophthalmic diagnostics, incorporating cutting-edge technologies in light sources, lasers, and detectors. This project seeks to refine the precision of eye examinations and expand the capabilities of vision science by creating tools that provide deeper insights into ocular health and diseases. A key focus will be the integration of novel light sources technologies for non-invasive scanning and imaging, enhancing the ability to detect and monitor conditions such as cataracts, glaucoma, and retinal diseases. The research will also explore advanced algorithms for image analysis, improving the accuracy and efficiency of diagnostics. Ultimately, this project aims to bridge the gap between technical optical solutions and clinical applications in ophthalmology.

**Proposed Research Activity: (max 10 rows)** The proposed research activity includes:

1. Development of a versatile optical system integrating innovative non-invasive light sources and stimulation techniques for enhanced investigation of physical and physiological visual system diseases.
2. Investigation and design of advanced sensors for flow measurement, utilizing cost-effective and high-sensitivity low-coherence interferometry with optical feedback to improve diagnostic capabilities.
3. Application of cutting-edge image acquisition and processing techniques to accurately analyze and interpret detailed ophthalmic images.
4. Clinical validation of the developed optical systems by assessing their diagnostic accuracy, reliability, and performance in early disease detection, compared to traditional diagnostic methods.