SEMS: RESEARCH PROJECT DESCRIPTION

1. Project Background and Description

Smart optoelectronic sensors for in-vivo diagnostics

The rising of artificial intelligence (AI) and deep learning has been transforming human's ability to execute complex inference tasks using computers. In the field of photonics, deep learning has found exciting applications in areas such as sensing, imaging, communication, and optical system designs.

This PhD project aims to design and develop deep-learning enabled novel sensors and imaging probes for performing early diagnosis in vivo. In particular, the PhD student will implement AI enabled intelligent optical fibre devices and systems, not only because of the host group's strong expertise on optical fibre sensing and imaging, but also because of the information-rich nature of MMF and the attractiveness offered by fibre-optic devices such as low cost, light weight, miniature size, resistance to electromagnetic interference, and minimally invasiveness, etc.

2. Project Scope

1) Design and develop ultrathin catheter based endoscopic sensors for in vivo diagnosis;

2) Analyse the sensing data using deep learning;

3) Implement the sensing system as a bench-top prototype in potential animal and human studies.

3. Desired Skills from the Student

One or more of the following

First degree in Optical Engineering, Fibre Optics, Optoelectronics, Electrical and Electronic Engineering, Physics, or Computer Science.

4. Supervisory Team

Primary: Dr Lei Su

Secondary: Dr Ketao Zhang