**Summer Undergraduate Bursary Programme 2020**

**Application Form**

Full Name:

Email:

University of Study:

Degree programme:

Year of Study:

Please return pages 1 and 2 of this form and attach a copy of your CV and cover letter to Dr Caitríona Tyndall (caitriona.tyndall@tyndall.ie).

Please indicate **one** preferred choice of IPIC research theme (more details included below):

[ ]  Biomedical [ ]  Monolithic & Heterogeneous Integrations

[ ]  Optical Communications [ ]  Packaging & Hybrid Integrations

Please indicate **one** preferred choice of Tyndall research theme (more details included below):

[ ]  Sensor Devices and Systems [ ]  Wearable Technologies

[ ]  Nano Bio/Chemical Sensors and Systems [ ]  Powering the Internet of Things

[ ]  Beyond CMOS

Please indicate preferred location (more details included below):

[ ]  Cork [ ]  Dublin (IPIC ONLY)

Please include a personal statement including reasons for applying for this programme with IPIC (300 max words):

**IPIC Research Themes:**

Biomedical

The objective of the Biomedical theme is to work towards developing the World’s smallest integrated imaging system for guided surgery. In the future, surgeons will require the ability to generate high quality, diagnostic images deep within the body using micro-scale instrumentation such as arterial guidewires. This Theme will develop major novel innovations in micro-scale cameras and surgical platform integration technologies, multi-spectral diagnostic imaging and in-body optical powering and data transmission.

Optical Communications

The Communications theme will focus on real-time internet that will require a converged wireless/optical edge cloud with unprecedented ability to dynamically reconfigure in the wavelength and time domain in response to rapid and massive bandwidth fluctuations and latency-critical service demands. Coherent communications systems offer the potential to deliver this vision, but are currently orders of magnitude too expensive. This Theme will address the question: can we build a coherent transceiver at the tens of Euro cost point required for the network edge and, if so, how will this transform metro-scale access network design?

Monolithic and Heterogeneous Integration

The Monolithic and Heterogeneous Integration theme will develop a range of essential semiconductor material, device and integration technologies, with a key objective being to find new ways to combine photonics and electronics together on multiple substrates (silicon, ceramic, polymer etc.) with unprecedented simplicity and cost-effectiveness, using transfer printing. We refer to this colloquially as ‘printed photonics on anything’.

Packaging and Hybrid Integration

The Packaging and Hybrid Integration theme will focus on the high cost of photonic packaging, which can amount to as much as 80% of total product cost in some applications, which has restricted the deployment of photonics to a relatively small number of mass and niche markets to date (albeit markets of enormous value). This Theme will develop optical and electrical wafer-scale assembly and packaging processes and low cost cooling technologies that aim to ‘break this cost barrier’.

**IPIC Locations:**

Cork

Tyndall National Institute (<https://www.tyndall.ie/>)

University College Cork (UCC) (<https://www.ucc.ie/en/>)

Cork Institute of Technology (CIT) (<https://www.cit.ie/>)

Dublin

Dublin City University (DCU) (<https://www.dcu.ie/>)

Trinity College Dublin (TCD) (<https://www.tcd.ie/>)

More information: <https://www.ipic.ie/research/>

**Tyndall Research Themes:**

The Micro & Nano Systems (MNS) Centre at Tyndall focuses on modelling and development of materials, devices and systems for integrated information and communications technology (ICT) applications.

Sensor Devices and Systems for Smart MedTech and BioPharma

Wearable Technologies for Health, Wellness and Industry 4.0

Nano Bio/Chemical Sensors and Systems for AgriTech and the Environment

Powering the Internet of Things - Energy Harvesting, Storage and Power Management

Beyond CMOS - theory, materials and devices for Neuromorphic Computing

More information: <https://www.tyndall.ie/micro-nano-systems>