


## PHD STUDENTSHIP

 Photonic integrated devices for the generation of high purity mmW/THz signals for next generation high-capacity telecommunication systems

Applications are invited for a fully funded four year PhD position, to work in the above mentioned research topic. The research project is funded by Science Foundation Ireland through the CONNECT centre and involves collaboration with academic and industrial partners.

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### Background and Project Description

The demand for higher data rates in wireless communications has been increasing over the years; fuelled by the proliferation of the connected smart devices, high-definition multi-media and cloud-based services. To cater for the continuous growth and support future services, a new paradigm with high capacity, high data rate and low latency is required. Thus, wireless networks are progressing towards 5G and beyond, which will provide the necessary infrastructure for next-generation bandwidth-hungry services such as autonomous vehicles, augmented-virtual reality, telesurgery, smart cities, industry 4.0, etc. Due to spectral congestion in the microwave band (300 MHz to 3 GHz), the transmission of ultra-broad bandwidth data will utilize new millimetre-wave (mmW) and terahertz (THz) frequencies, where large bands of un-allocated spectrum are available and have been recommended by ITU-R for future 5G+ implementations.

The overarching goal of this project is to develop a technology and concepts that would enable the realization of an ultra-high data rate photonics-based mmW/THz system. The system should be capable of supporting future network applications and services in an efficient, flexible and reliable manner. To achieve this goal, the project will develop photonically integrated circuits (PICs) capable of generating ultra-pure mmW/THz waves, investigate optimum filtering techniques for the flexible selection of required optical tones, verify pre-distortion algorithms for power amplifiers and characterise the generated mmW/THz signals using the RadioSpace testbed.

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### Requirements

Candidates must have completed a university degree (Diploma, Masters or equivalent) in Electrical/Electronic Engineering or Physics with a minimum grade of 2.1 (mark  $\geq$  60%).

The postgraduate scholarship is open to Irish, EU and international students who should have some experience in the following areas:

- Photonics, electronics, and signal processing.
  - Programming (Matlab, Python, etc).
  - Proficiency in English (<https://www.dcu.ie/registry/english.shtml>).
  - Strong motivation to tackle challenging research problems.
  - Willingness to collaborate with the broader research group and with colleagues in other disciplines is vital.
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## Funding Information

The four year full-time studentship provides full support for tuition fees, and an annual tax-free stipend at IUA rates (for 2022/23 - €19,000 p.a.).

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## Photonics Systems and Sensing Laboratory (PSSL)

The successful candidate will join the SFI CONNECT Centre, and carry out their research at the Photonics Systems and Sensing Laboratory (PSSL), Dublin City University (DCU) and the Photonic Networks and Technology Group (Photon), Trinity College Dublin (TCD). CONNECT brings together world-class expertise from ten Irish academic institutions and over 40 companies including large multinationals, SMEs and start-ups, while the PSSL and Photon host a multidisciplinary team of leading scientists and engineers who focus on the simulation and demonstration of novel technologies for future broadband photonic communication and sensing systems.

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Applicants should submit a CV and a brief letter of interest to the main contact below. The closing date for applications: Open until filled.

- Dr. Prince Anandarajah,  
Director of the Photonics Systems and Sensing Lab. (PSSL),  
School of Electronic Engineering,  
Dublin City University, Glasnevin, Dublin 9, Ireland.  
Email: [prince.anandarajah@dcu.ie](mailto:prince.anandarajah@dcu.ie) Tel: +353 1 700 7537
  
- Dr. Aleksandra Kaszubowska  
Senior Research Fellow and Co-director of the Photonics Systems and Sensing Lab. (PSSL),  
Connect Research Centre,  
Dunlop Oriel House, Trinity College Dublin, Ireland.  
Email: [anandara@tcd.ie](mailto:anandara@tcd.ie)

Please use the title (PICs for high purity mmW/THz signals) in your email subject line for your application or for any queries related to the position.

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Dublin City University (DCU) was the top-ranked young Irish university in the latest Times Higher Education (THE) 100 under 50 index, having risen 17 places from 92nd to 75th. The ranking lists the world's leading universities that were established since 1965. Universities are scored on academic reputation, employer reputation, faculty-student ratio, research publications per academic staff, citations per paper, and the international nature of the university (measured in terms of staff and students). DCU is also the 2022 'The Education Awards' winner for Best Student Experience, and for Best Education Outreach Award.

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