

Irish Photonic Integration Centre (IPIC)

IPIC brings together more than 100 researchers from four institutes to develop new light-enabled technologies. Photonics is the generation, manipulation and use of light. It is a key enabling technology that underpins the internet and affects diverse industries such as medical devices, renewable energy, manufacturing and environmental monitoring.



With €30 million in funding, IPIC's integrated research team has competencies in the theory of novel light-emitting materials through to the design of devices and systems. IPIC can accelerate transfer from laboratory to market by using its advanced fabrication and packaging capabilities to develop concepts and deliver low-volume manufacturing of prototypes.

Research Areas

- › Enabling continued growth of the internet through faster, more energy-efficient devices for information transport, storage and display
- › Delivering smart medical devices for improved treatment of disease
- › Developing highly compact instrumentation for point-of-care diagnostics
- › Developing systems for food, beverage and environment monitoring



Research programmes

IPIC's grand challenge is to advance and miniaturise photonic integration science and technology to produce micro- and nanoscale optoelectronic systems, which will increase device functionality, performance and energy efficiency. The centre will achieve this through programmes that will develop:

- › Highly energy efficient >400Gb/s transceivers for short-reach optical interconnects in data centres to address a critical bottleneck in these warehouses
- › Terabit/s communication systems for wide area networks, based on integrated photonic circuits, that allow information channels to be packed tightly in order to approach theoretical maximum capacities
- › Miniaturised, and potentially wearable, diagnostics systems by using the emerging science of silicon photonics, and hybrid and monolithic integration technologies
- › Surgical instruments with integrated miniaturised photonics-based sensors, including the development of flexible microLEDs for optogenetics

Academic partners

- › Tyndall National Institute
- › Cork Institute of Technology
- › Dublin City University
- › University College Cork

Industry and commercialisation

Targeting the ICT, medical devices and diagnostics sectors, IPIC is working with 20 industry partners to develop solutions tailored to their needs. Some 80 percent of IPIC's activity is focused on technology readiness levels 2 to 5, that is concept formulation to validation of prototypes in the relevant environment.

Industry partners include:

- › British Telecom
- › Compact Imaging Ltd
- › Eblana
- › Epi-light Ltd
- › FazTech
- › Firecomms
- › InfiniLED
- › Intel
- › Lake Region Medical
- › Luxcel Biosciences
- › M/A-COM
- › Pilot Photonics
- › Radisens Diagnostics
- › Seagate
- › Somex
- › Stryker
- › X-Celeprint
- › Xilinx

Facilities

- › Modelling and design
- › Materials growth
- › Device fabrication
- › Packaging
- › Device characterisation
- › Systems testing



Key Contacts

Prof Paul Townsend

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Paul Townsend is Research Professor in the Department of Physics at University College Cork. He is also an Honorary Professor in the School of Engineering and Physical Sciences at Heriot-Watt University in Edinburgh and a Fellow of the Institute of Physics. Prof Townsend is widely recognised as one of the founders of the field of experimental quantum key distribution (QKD). The main focus of his current research is next-generation fibre to home networks. He has written more than 170 peer-reviewed publications, including 40 invited papers, and holds numerous granted and pending patents.

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