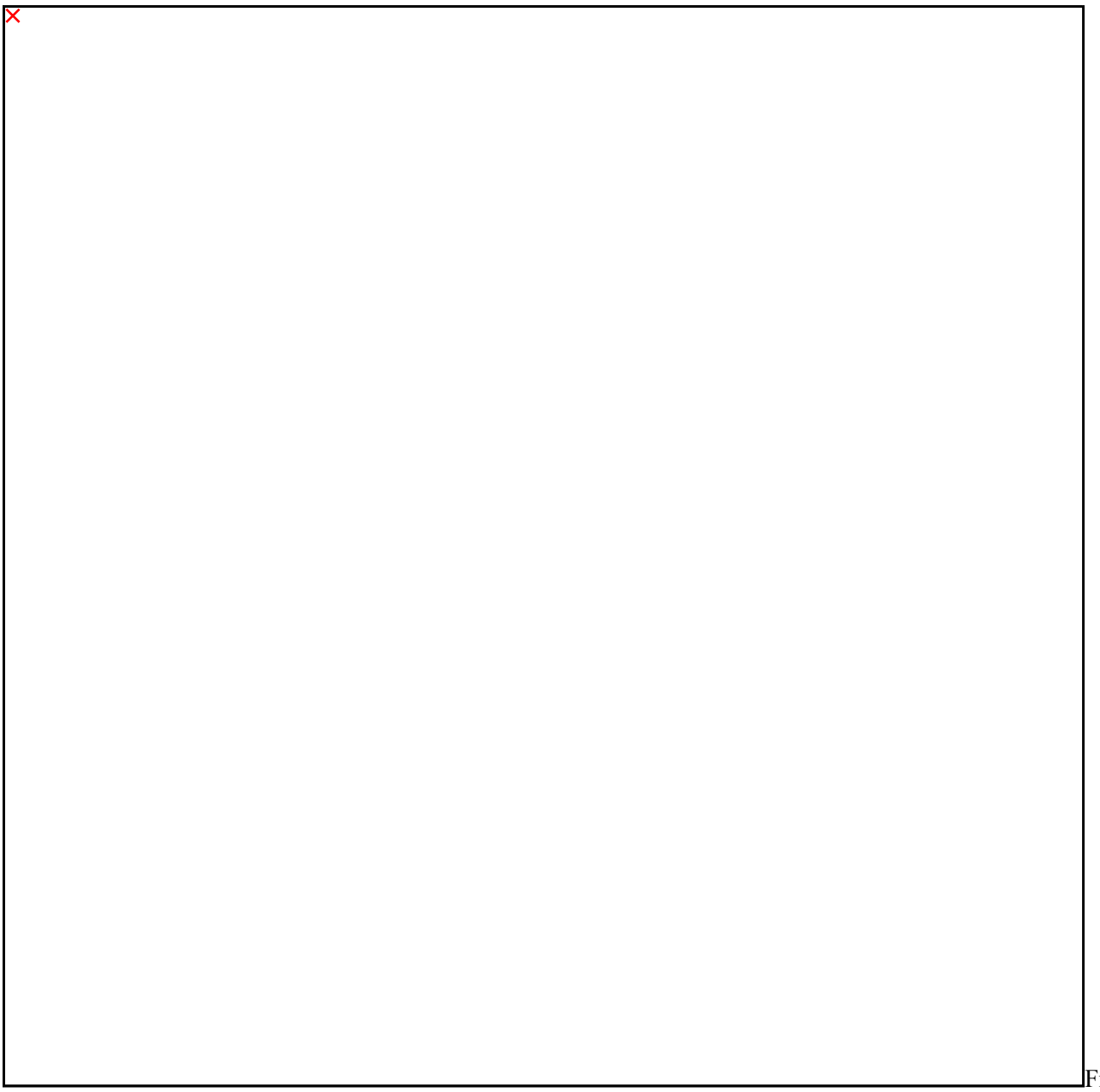
Electronics

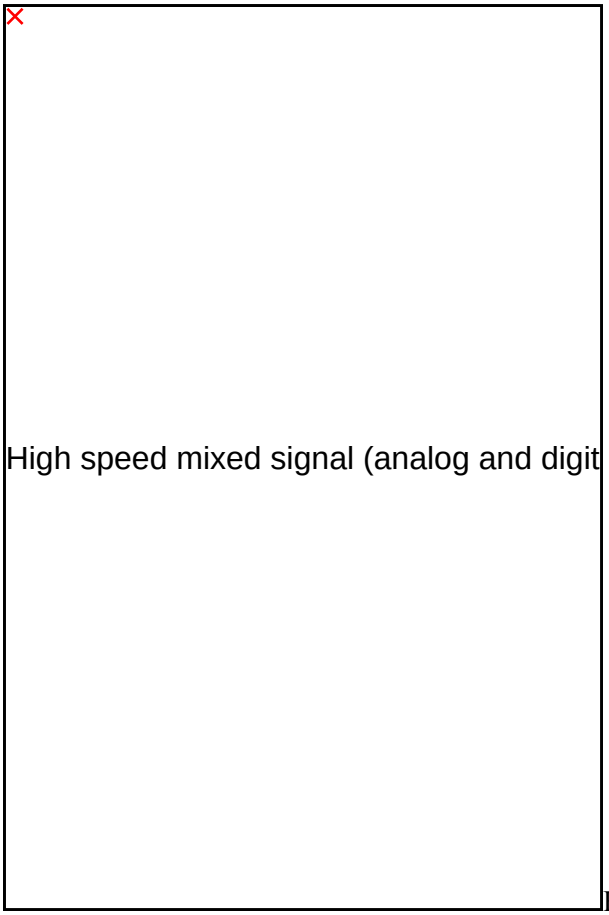


Fibre-optic transmission system test and demonstration (state-of-the-art photonic systems lab includes access to 1000km of field-deployed fibre supplied by BT-Ireland)

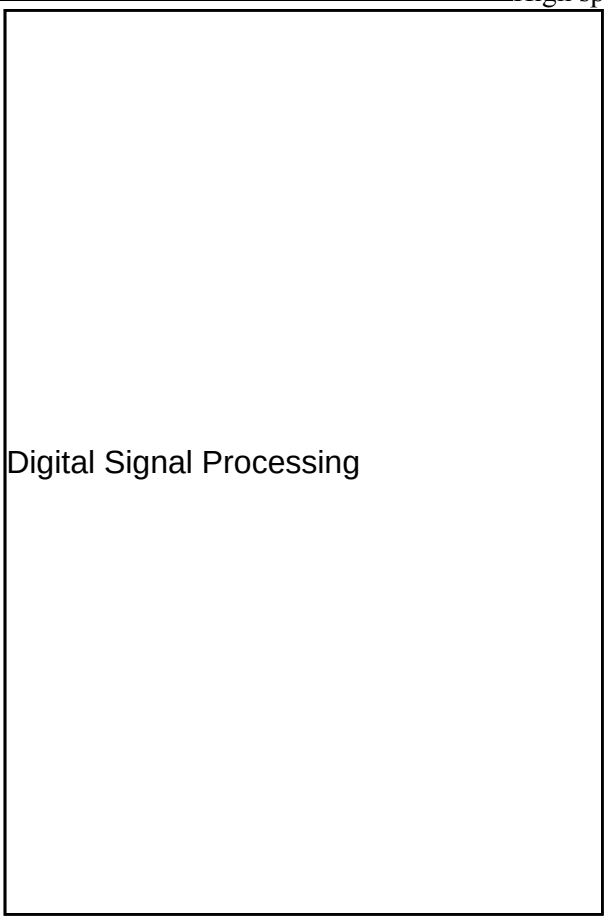
The Photonic Systems Group is part of the Photonics Research Centre at Tyndall National Institute, and is affiliated with the Department of Physics at University College Cork. The group was created in 2003 with Science Foundation Ireland support to investigate advanced photonic systems in collaboration with other research groups and industry. The Group, led by Professor Paul Townsend, had its origins in industry at the former Corning Research Centre and British Telecom Research Labs in the UK.

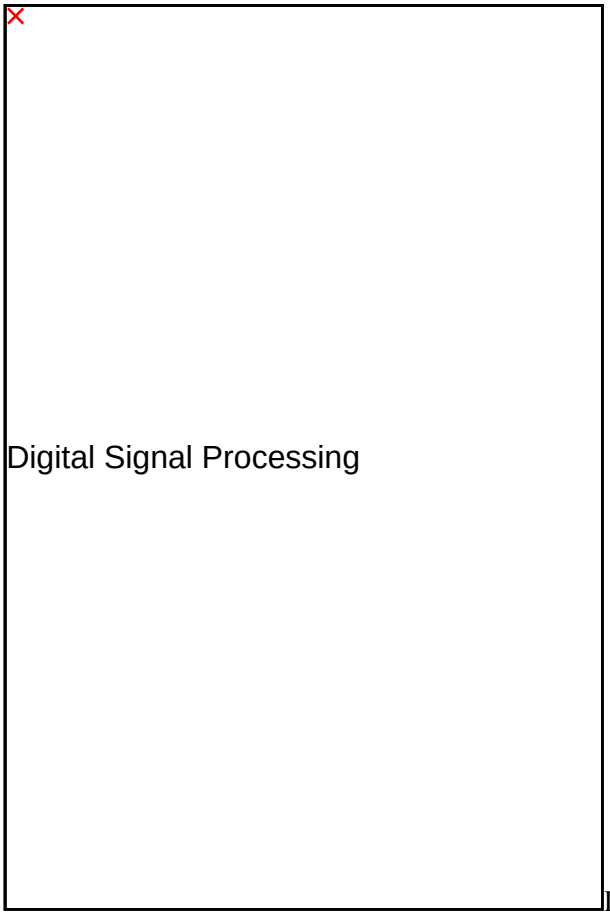
The major theme of the Photonics Systems research programme is to find new ways to integrate different photonic and electronic technologies to demonstrate greatly enhanced capabilities (e.g. higher speed, capacity, or scalability) of optical communications and other applications, with the primary aim of reducing the overall cost and energy consumption of future full-scale systems. The group typically comprises up to 30 members including senior researchers, postdocs, PhD and Masters students and undergraduate interns with backgrounds in electronic and

electrical engineering and physics. Research disciplines include photonic system design, modeling, integration and demonstration; high speed digital signal processing and high speed mixed signal (analog and digital) microelectronic circuit design and test.



High speed mixed signal (analog and digital) microelectronic



circuits 

Digital Signal Processing

Some recent examples of the group's work include:

- Advanced fibre-to-the-home networks
- High speed burst mode receivers and equalisers for fibre-to-the-home applications
- High capacity coherent communication systems including advanced modulation formats and non-linear impairment compensation
- New technologies for beyond standard fibre capacity limits (e.g. communications at 2 microns)
- High speed electronic solutions for extended reach transmission
- Energy-efficient microelectronic circuits and silicon photonic transceivers for datacenters
- Colourless metro switching nodes
- Secure quantum key distribution networks

Contact

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Related Publications

- DISCUS: an end-to-end solution for ubiquitous broadband optical access
  IEEE Communications Magazine volume **52** issue **2** pages **S24 to S32** (2014)
  Authors: Marco Ruffini, Lena Wosinska, Mohand Achouche, Jiajia Chen, Nick Doran, Farsheed Farjady, Julio Montalvo, Peter Ossieur, Barry O'Sullivan, Nick Parsons, Thomas Pfeiffer, Xing-Zhi Qiu, Christian Raack,

Harald Rohde, Marco Schiano, Paul Townsend, Roland Wessaly, Xin Yin, David Payne

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- Demonstration of 10 Gbit/s Burst-Mode Transmission Using a Linear Burst-Mode Receiver and Burst-Mode Electronic Equalization [Invited]
  Journal of Optical Communications and Networking volume **7** issue **1** page **A118** (2014)
  Authors: Stefano Porto, Cleitus Antony, Anil Jain, Denis Kelly, Daniel Carey, Giuseppe Talli, Peter Ossieur, Paul D. Townsend

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- Dense WDM transmission at 2 μm enabled by an arrayed waveguide grating
  Optics Letters volume **40** issue **14** page **3308** (2015)
  Authors: H. Zhang, M. Gleeson, N. Ye, N. Pavarelli, X. Ouyang, J. Zhao, N. Kavanagh, C. Robert, H. Yang, P. E. Morrissey, K. Thomas, A. Gocalinska, Y. Chen, T. Bradley, J. P. Wooler, J. R. Hayes, E. Numkam Fokoua, Z. Li, S. U. Alam, F. Poletti, M. N. Petrovich, D. J. Richardson, B. Kelly, J. O'Carroll, R. Phelan, E. Pelucchi, P. O'Brien, F. Peters, B. Corbett, F. Gunning

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- A 10 Gb/s Linear Burst-Mode Receiver in 0.25 μm SiGe:C BiCMOS
  IEEE Journal of Solid-State Circuits volume **48** issue **2** pages **381 to 390** (2013)
  Authors: Peter Ossieur, Nasir A. Quadir, Stefano Porto, Cleitus Antony, Wei Han, Marc Rensing, Peter O'Brien, Paul D. Townsend

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- Modified phase-conjugate twin wave schemes for fiber nonlinearity mitigation
  Optics Express volume **23** issue **23** page **30399** (2015)
  Authors: Yukui Yu, Jian Zhao