

UK & Ireland Chapter 16 March 2023 13:30 – 14:30 BST (*in person*)

Venue: Lecture Theatre 4 (CTLTT4), Teaching and Learning Building, Nottingham Trent University, Clifton Lane, Nottingham NG11 8NS (see bottom of the flyer)

Lecturer: Dr Vidur Raj, University of Glasgow

Lecture title: Breaking the barriers of photodetection and photovoltaics using nanowire devices

Abstract:

Nanowires have emerged as an efficient alternative to their planar counterparts, especially for optoelectronics applications. In this talk, I will present my recent work on semiconducting and superconducting nanowire devices. In the first half of the talk, I will discuss radial junction III-V semiconductor devices and show how our study conclusively showed the absolute superiority of radial junction nanowire devices over their thin film or axial junction counterparts, especially when the absorber lifetime is extremely low. The proposed device holds enormous promise for III-V based photovoltaics and photodetectors, as control of absorber quality at the nanoscale remains one of the biggest technical challenges in the realization of nanoscale optoelectronics.



In the second half of the talk, I will discuss single photon detectors based on superconducting nanowires for relatively challenging mid-IR single photon detection. I will be showing our recent results on the fabrication of a 6x6 individually addressable superconducting nanowire array for mid-IR applications, and will discuss some new optical designs we are using for enhanced optical absorption in the mid-infrared regime. I also show recent developments in our lab in designing cryogenic circuits for SNSPD signal readouts. Finally, I will conclude the talks with future research problems that we are working on.

About Lecturer:

Vidur completed his Ph.D., followed by a 2-year postdoc at the Australian National University in the group of Prof. Chennupati Jagadish. His Ph.D. work is the first detailed investigation of the fabrication of high efficiency solar cells using low-lifetime III-V absorber layers. During his postdoc at ANU, he reported the world's first self-powered single photon detector, and the world's highest filling ratio nanowire array for the growth of a highly interconnected neural network. He is currently a postdoctoral research associate working on "Superconducting single photon detectors" at the University of Glasgow. Vidur has published more than 20 research articles in top journals, 17 of which are the lead author. He has also published several co-author publications and presented at conferences and seminars worldwide. Additionally, he has served as an invited reviewer for about 20 journals and has given invited talks at reputed universities and conferences. Vidur's research interests range from nanoscale III-V optoelectronics to neuroscience and superconducting devices for quantum computing and communications.

Registration is required

<https://www.eventbrite.co.uk/e/ieee-nanotechnology-uk-ireland-chapter-seminar-by-dr-vidur-raj-tickets-571410944517>

Venue: CTLTT4 is Lecture Theatre 4 in the Clifton Teaching and Learning Building.

Free pre-booked parking: Please contact claudia.gathercole@ntu.ac.uk to request a car parking space in the visitor parking. It is accessed using the Main Gate. After parking, please make your way through the open plaza: you will find the Teaching and Learning Building ahead of you.