

Department Seminar

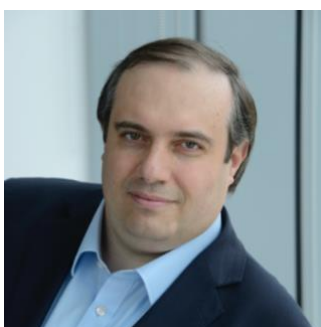
Dear Colleagues & Students,
You are cordially invited to a special seminar on

Date: 28th August 2026, Friday

Time: 10:30am

Venue: S9 Building (Level 9 Seminar Room), 4 Science Drive 2, Singapore 117544 ([Map](#))

Layered Materials for Photonics and Quantum: From Energy Efficient AI to Chemometric Raman Imaging and Single Photon Emitters



By Prof. Andrea C. Ferrari

(Cambridge Graphene Centre, University of Cambridge, CB3 0FA, UK)

Abstract:

Graphene and layered materials have great potential in photonics and optoelectronics, where the combination of their optical and electronic properties can be fully exploited, and the absence of a bandgap in graphene can be beneficial. Artificial intelligence (AI) and machine learning (ML) applications are generating an unprecedented demand for computational capacity and energy. Graphene- based integrated photonics can enable ultrahigh spatial bandwidth density, low power consumption for board connectivity and connectivity between data centres, access networks and metropolitan, core, regional and long- haul optical communications and for energy efficient AI hardware. Layered materials are also taking centre stage in the ever-increasing research effort to develop material platforms for quantum technologies. They have already shown potential as scalable components, including quantum light sources, photon detectors and nanoscale sensors, and have enabled research of new phases of matter within the broader field of quantum simulations. I will discuss opportunities and challenges faced by layered materials within the landscape of material platforms for quantum technologies, with focus on applications that rely on light-matter interfaces. I will discuss the case of Coherent Phonons used for Stimulated Raman Scattering, reaching sub-cellular spatial resolution and molecular-specific contrast. This enables label-free chemically-specific imaging by detecting the vibrational properties of tissues.

Biography:

Andrea Ferrari is Professor of nanotechnology at the University of Cambridge and a Fellow of Pembroke College. He founded and directs the Cambridge Graphene Centre and the EPSRC Layered Materials Research Foundry. He co-Chairs the EPSRC Centre for Doctoral Training in 2D Materials for Tomorrow, and the University of Cambridge Strategic Research Initiative in Quantum and Advanced Materials for a Sustainable Society (QAMSS). He is a Fellow of the Royal Academy of Engineering, the American Physical Society, the Materials Research Society, the Institute of Physics, the Optical Society, the Royal Society of Chemistry, The European Academy of Sciences, the Academia Europaea. He received numerous awards, such as the Royal Society Brian Mercer Award for Innovation, the Royal Society Wolfson Research Merit Award, the Marie Curie Excellence Award, the Philip Leverhulme Prize, The EU-40 Materials Prize, the Blaise Pascal Medal of the European Academy of Sciences, the Lee Hsun Lecture Award of the Chinese Academy of Sciences, the Nanosmat Award, the Charles E. Pettinio Award of the American Carbon Society.