



**JOINT SPECIAL COLLOQUIUM**  
College of Science, College of Engineering &  
Quantum Materials and Sensing Institute (QMSI)

## *An interdisciplinary approach to building up quantum science and technology*

*Dr. Kin Chung Fong*

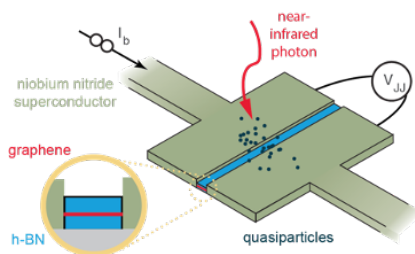
*Raytheon BBN Technologies*



**Friday, 2<sup>nd</sup> Feb, 2024; 11:00 a.m. to 12:00 p.m.**  
**Hosts: Arun Bansil and Matteo Rinaldi**

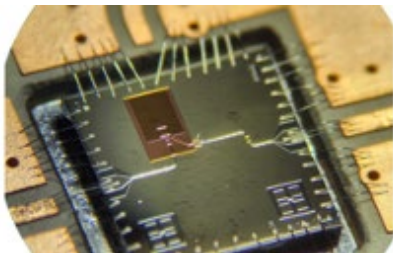
**Zoom meeting link:**

<https://northeastern.zoom.us/j/91765771043>



Quantum science and technology hold the promise to deepen our understanding of the universe and deliver groundbreaking technical innovations. The opportunity also poses a grand challenge to today's scientists and engineers because initializing, controlling, manipulating, and measuring the quantum information while maintaining the coherence and entanglement can be very difficult. Therefore, successfully achieving breakthroughs would require an interdisciplinary approach that leverages resources from various disciplines to forge new pathways which cannot be defined by a singular field of study.

In this talk, I will share my interdisciplinary adventure through quantum material and quantum device landscapes. We will start from the study of fundamental characteristics of Dirac and topological materials, and then focus on the material physics that we can exploit to invent single-photon detectors. We will further explore how to utilize the novel properties of the two-dimensional van der Waals materials to miniaturize qubits and develop quantum-noise-limited amplifiers. And finally, we will turn around to apply what we learn from quantum sensing to study the pairing symmetry of novel superconductivities, including the topological Weyl superconductors. We will end by elucidating how to harness the kinetic inductance of these novel superconductors for future flight-missions to explore planetary science and the origins of life.



Dr. Kin Chung Fong is a Senior Scientist at RTX BBN (Cambridge, MA) and a Research Associate at Physics Department, Harvard University. His interdisciplinary research focuses on quantum materials and their applications. KC also studies how to exploit these quantum sensors to investigate the hydrodynamic physics in the nearly perfect fluid, reveal the pairing symmetry of novel superconductors, search for the dark matter axion, and explore the origins of life from the early universe. In addition to his substantial publications in high-impact peer-reviewed journals, he is also a prolific inventor with >10 granted patents. His innovation has been recognized with the Raytheon Intelligence & Space Innovators Award in 2020 and 2022. KC received his PhD from Ohio State University and served his postdocs at Max Planck Institute for Quantum Optics and Caltech.