

**Speaker:** [Professor Baohua Jia](#)

*Founding Director*

*Centre for Translational Atomaterials*

*School of Science*

*Swinburne University of Technology*

**Date:** Wednesday 7 April 2021

**Time:** 10.00 am Brisbane time

**Venue:** MS Teams – [Click here to join the meeting](#)



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**Title:** **Graphene metamaterials and functional devices**

### Abstract

Metamaterials comprising alternating graphene and dielectric layers are artificially structured materials designed to attain extremely high optical responses. Graphene-based metamaterials with layered artificial structure can enhance optical modulation; thus, theoretical studies have suggested that these materials can be useful in diverse applications. However, the fabrication of graphene-based metamaterials remains significantly challenging due to the inaccurate control and sophisticated transfer process of conventional mechanical exfoliation and deposition methods, restricting experimental demonstrations to only a few examples.<sup>[1]</sup> In this talk, I will present a low-cost solution-phase method that generates a multilayered metamaterial consisting of alternating monolayer graphene oxide (GO)/graphene and dielectric layers without a transfer step. The single-step method produces metamaterial on diverse substrates with arbitrary surfaces, shapes, and sizes. Such graphene metamaterials pave the way to multifunctional integrated devices due to their exceptional mechanical, thermal, optical, and electrical properties not available in conventional materials. This talk explores the optoelectronic applications of graphene metamaterials by using the direct laser printing (DLP) method.<sup>[2]</sup> Our results demonstrate the great potentials of graphene metamaterial films as an emerging integratable platform for ultrathin, light-weight and flexible photonic devices towards all-optical communications, microscopic imaging and energy storage applications.<sup>[3-6]</sup>

### Biography

Professor Baohua Jia is the Founding Director of Centre for Translational Atomaterials at Swinburne University of Technology. She received her BSc and MSc degrees from Nankai University, China. She was awarded a PhD (2007) from Swinburne University of Technology, Australia. Dr Jia's research focuses on the fundamental light and nano-and atomaterial interaction. In particular her work on laser manipulation of two-dimensional materials has led to the design and fabrication of functional nanostructures and nanomaterials for effective harnessing and storage of clean energy from sunlight, purifying water and air for clean environment and imaging and spectroscopy and nanofabrication using ultrafast laser towards fast-speed all-optical communications and intelligent manufacturing.

### Reference

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**ALL WELCOME**