

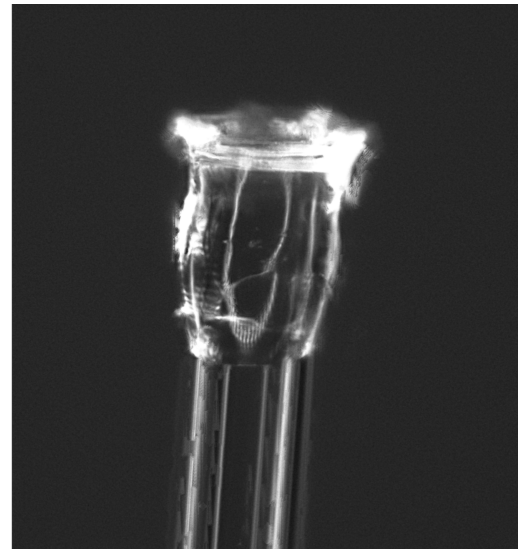
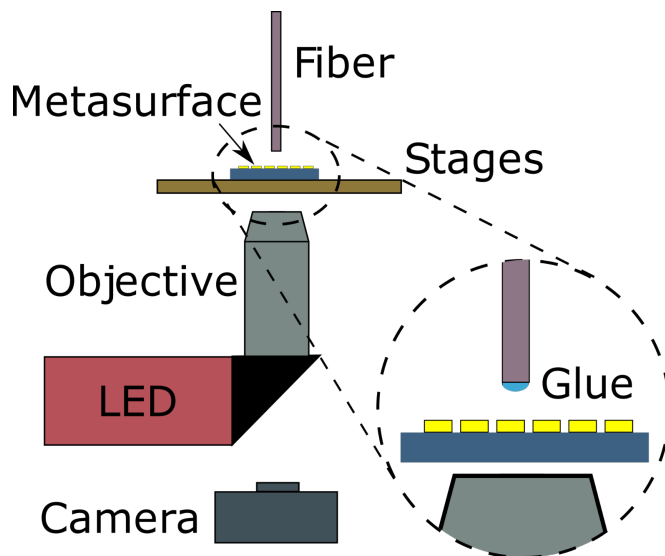


Optics and Photonics Group Lunchtime Seminar

“Transferring ultrathin metasurfaces
onto fiber endoscope probes for
advanced imaging techniques”

Dr Fei He

Optics and Photonics Group



13:30 Wednesday 14 December 2022
C24 Coates Building
All Welcome

http://optics.eee.nottingham.ac.uk/wiki/Seminars_2022-2023

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MS Teams link

Optical endoscope has been widely used to the detection of early-stage cancers in accessible areas of human body such as gastrointestinal tract. However, conventional endoscope with buck optics has difficult access into inaccessible organs (i.e. pancreas), which hair-thin endoscope using optical fiber can gain easier access to such area via needle to inspect in detail with minimal invasiveness. Another challenge to the next-generation endoscope is the image contrast to identify subtle tissue changes indicative of early-stage cancers. Many advanced imaging technologies (i.e. phase and polarisation imaging) have been developed to unlock such subtle-tissue limitation. For the integration of these imaging technologies onto hair-thin fiber tips, micro- and nano-sized optical functional surface (i.e. metasurface) is one of the best candidates to manipulate light as analogue to endoscope.

In this talk, I will introduce a novel way to flexibly transfer metasurfaces onto optical fiber tips, which also has the advantage to reliably fabricate multi-layer metasurface stacks as potential requirement by these imaging technologies. I will show the performance of nanowire polariser on a fiber tip (foundation for polarisation imaging) and compare the light foci between a Fresnel zone plate and an axicon mask (longer depth-of-focus as required by optical coherence tomography). I will also discuss the design principle of multilayer metalens towards multiphoton imaging through optical fibers