

Spring
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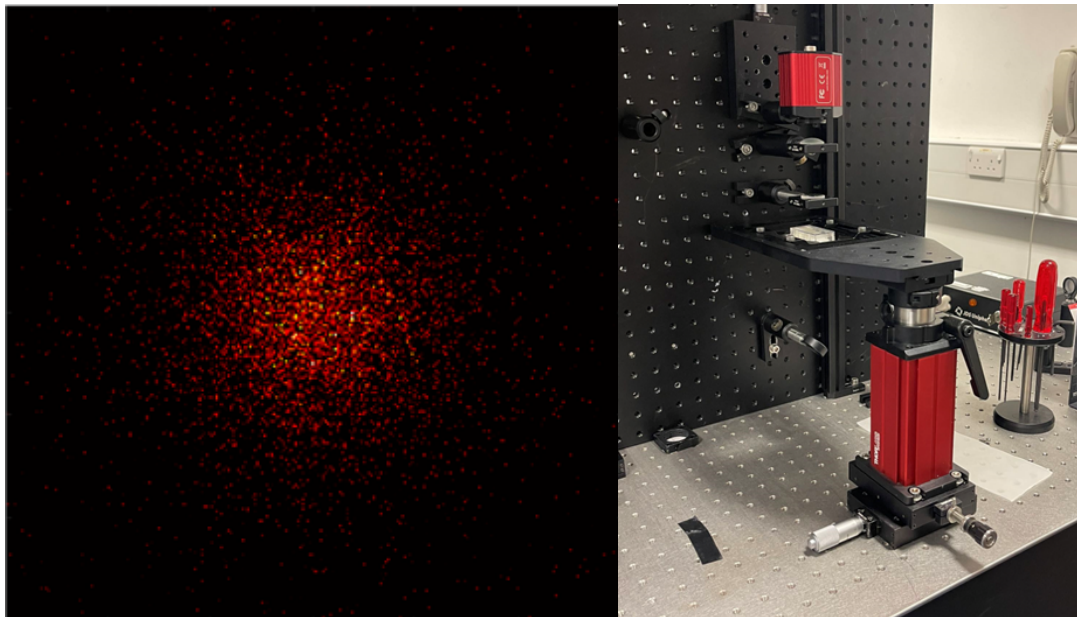
Optics & Photonics Group Lunchtime Seminar Series

University of Nottingham

Machine learning to estimate the optical properties of tissue

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13:30 Wednesday 6 March 2024

Pope Building - C16



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Machine learning to estimate the optical properties of tissue

Measuring the optical properties of biological tissues is of great importance in the biomedical field. There are three well-accepted methods: Integrating Sphere Spectrophotometry, Diffuse Reflectance Spectroscopy and Spatial Frequency Domain Imaging. Integrating Sphere Spectrophotometry is an ex-vivo measurement method and cannot avoid the interference of sample dehydration on the optical properties. Diffuse Reflectance Spectroscopy and spatial Frequency Domain Imaging both are in-vivo measure method. But both method require specialist equipment and careful calibrations with the measurement results being highly affected by the accuracy of the optical model and sensitivity to ambient light. Recently a method combining Monte Carlo and deep learning for measuring optical properties of biological tissues has been proposed. We have improved this approach by using the powerful resnet-50 to analyse photon distributions generated by Monte Carlo simulations for the prediction of optical properties of biological tissues and expect to be able to separate μ_s and g from μ_s' . Currently, our network is able to predict μ_s' with RMSE less than 0.4 and μ_a with RMSE less than 0.5.

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All are welcome



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