## **MQ Photonics Research Centre Seminars**



OUR SPEAKER: DR. ADAM BENNET from Macquarie University.

## Title: Towards a quantum optical randomness beacon

**Abstract:** Any device whose operation relies upon classical physics cannot guarantee a truly unpredictable output. This poses a risk for the operational security of cyber systems whose components often rely upon classical randomness. To address this vulnerability, a certification of true randomness is required. Bell tests performed upon pairs of entangled quantum particles generate a form of certifiable randomness which has no analogue in classical physics, ensuring that outputs cannot be pre-determined. This strong form of certified randomness provides a randomness standard, however the experimental complexity associated with strong randomness certification limits the resultant randomness generation rate. As a trade-off, practical quantum random number generators are deployed which improve randomness generation rates, however they require comprehensive characterization of the source and measurement apparatus. Many trusted quantum randomness beacons which broadcast quantum randomness to multiple users are of this form. This talk explores randomness certification via Bell tests and the hierarchy of quantum randomness certification, and presents experimental results towards a polarization-encoded quantum optical randomness beacon based upon spontaneously initiated stimulated Raman scattering in Diamond.



**Time:** Wednesday 16 September at 2 PM

Location: MPR and via Zoom

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