

## **Self-Assembled Quantum Dots: Past, Present and Future**

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This talk will describe the many and varied advantageous prospects of self assembled quantum dots, including favourable coherence, strong interaction with photons, very high radiative efficiency and well-developed fabrication technology.

The talk will have in part a historical nature, but will focus mainly on recent steps towards chip-based quantum optical circuits based on quantum dots in the In(Ga)As system. Some of the notable results include resonance fluorescence to enhance coherence, electrically-switched single photon routing on chip and spin to path conversion in nanobeam waveguides, a potential route to a scalable spin-network architecture. The spin to path chiral behaviour will be shown to be a nanophotonic effect, arising from the existence of longitudinal as well as transverse electromagnetic fields, together with symmetry breaking by quantum dot position in otherwise non-chiral structures. Control of the chiral phenomenon by deliberate quantum dot positioning will be shown using registration techniques. Future prospects for the science and technology will be discussed.