

### **Microwave Photonic Signal Processing (Invited Paper)**

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**Abstract** – Photonic signal processing can realize multi-GHz sampling frequencies, overcoming inherent electronic limitations, for processing high bandwidth signals. In-fibre signal processors are compatible with fibre-optic microwave systems and can provide RF pre-processing with EMI immunity. Structures are presented, which address the challenge of realising photonic signal processors that simultaneously exhibit high-resolution and low-noise. These comprise photonic processor topologies for infinite impulse response (IIR) filters, and also a range of structures for multiple-tap finite impulse response (FIR) filters that enable general responses to be obtained. Finally, a new structure that can realise a hardware-compressed, high-resolution FIR microwave photonic filter is presented, which not only has the ability to generate multiple taps, but also has significant noise suppression, and enables the achievement of high-resolution and general response characteristics.