**Keynote for SSIP 2022 - Robert Minasian**

**Title:** Integrated microwave photonics for photonic signal processing and sensing

**Abstract:**

Integrated microwave photonic signal processing offers a new powerful paradigm due to its inherent advantages including wide bandwidth and immunity to electromagnetic interference. Microwave photonics, which merges the worlds of RF and photonics, shows strong potential as a key enabling technology to provide new signal processing systems and sensors that can overcome inherent electronic limitations. As an example, optical sensors for monitoring the environment for IoT provide advantages of immunity to electromagnetic interference, inertness in chemical and biological applications, compactness, lightweight, and the ability to operate in harsh environments. Recently, there has been a significant global drive to achieve integration of photonic signal processors on silicon platforms, especially since this leverages the CMOS fabrication technology to enable boosting the performance of future systems performing signal processing and sensing with the potential for implementing high bandwidth, fast and complex functionalities. Advances in integrated signal processing and sensing are presented. These include dense optical integration techniques for LIDAR on-a-chip systems, widely tunable microwave photonic filters, multi-function and programmable photonic signal processors, and high-resolution integrated sensors for IoT. These photonic processors herald new capabilities for achieving high-performance signal processing and sensing.