

Title:

**The Best Reciprocal Resonators Make the Best Nonreciprocal Systems**

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**Abstract:**

Circulators are a key building block in next generation microwave systems for Simultaneous Transmit and Receive Radios (STAR) and Quantum Computing. State-of-the-art circulators have a ferro-magnet that breaks reciprocity but is hard to scale down to chip-scale dimensions for integrating with on-chip electronic components. The demand is even more urgent in photonic systems where it is essential to Isolate the laser from reflections of downstream components.

Over the last few years there has been outstanding theoretical and experimental progress in RF optical non-reciprocal technologies. In this talk I will convince you that in order to build superb non-reciprocal systems, all you need is a design library, a foundry technology and generous industry collaborators. I will demonstrate an RF circulator built using Broadcom's film bulk acoustic resonators (FBARs) and highlight the advantages of mechanical coupling towards improving power handling and bandwidth of the FBAR circulator. In the second half of my talk I will provide a glimpse of how we attempt to leverage HBARs (the FBAR's cousin) to modulate LiGenTec's optical ring resonators and demonstrate high bandwidth optical isolation.

**Biography:**

Sunil received the B.S. and Ph.D. degrees from Cal in EECS in 1998 and 2004 respectively. In April 2015, he joined the School of Electrical and Computer Engineering at Purdue University as an Associate Professor. Sunil received the NSF CAREER Award in 2007, the DARPA Young Faculty Award in 2008 and the IEEE Ultrasonics Society's Young Investigator Award in 2014. His students have received Best Paper Awards at IEEE Photonics 2012, Ultrasonics 2009 and IEDM 2007.

Sunil was a co-founder of Silicon Clocks, which was acquired by Silicon Labs in April 2010. Before joining Purdue, Sunil was an associate professor at Cornell and a sensor architect at Analog Devices.

