A Passive wireless surface acoustic wave sensor of a delay-line type is composed of an antenna, a transducer that converts the EM signal into a surface acoustic wave, and a set of acoustic reflectors that reflect the incoming signal back out through the antenna. A cavity forms between the transducer and the reflectors, trapping energy and causing multiple unwanted echoes. The work in this dissertation aims to reduce the unwanted echoes so that only the main transit signal is left—the signal of interest with sensor information.

The contributions of this dissertation include:

- Echo suppression description in the form of IIR filter
- Optimized single phase unidirectional transducer (SPUDT) for 3rd harmonic operation
- Walsh Haddamard-like reflectors for pulse shaping, coding, and orthogonality
- Synthesized with high reflectivity reflectors
- Two types, equal length and varied length chips
- Fabricated wireless SAW device with optimized echo suppression for passive sensor applications
- Tunable antenna enables tuning of device

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The public is welcome to attend.