1154-68-1800 **Camila Alexandra Ramirez***, cramirez@exptechinc.com. *On Complex-Valued Equivariant Neural Networks for Radio Frequency Fingerprinting.*

Identifying Internet of Things (IoT) devices by their Radio Frequency (RF) fingerprint has important security implications. As the number of devices grows, current authentication mechanisms become susceptible to spoofing attacks. To combat this problem, we exploit hardware imperfections in the RF transmit chain and extract device-specific features uniquely identifying an emitter. RF propagation channels degrade signals, when measured at a receiver, following a convolutional model. Assuming that test data reflects the diversity of channels in a train set, a device fingerprint should be repeatable and accuracy comparable. However, when this assumption is broken, the classifier performs poorly. That is, the learned classifier is not invariant to the RF channel degradation. In this talk, we use an algebraic representation of signal processing, where channels are defined as an algebra and signals as a module over the channel-algebra. Modeling channel degradation as convolution, and given that raw RF signals are complex-valued, we define an N-dimensional invariant distance metric with which we construct equivariant convolutional layers. We then build a complex-valued neural network invariant to channel degradation and test the efficacy of our method on synthetic and real WiFi datasets. (Received September 16, 2019)