Hello,

My name is Josiah Smith. I am a PhD student at The University of Texas at Dallas pushing the limits of hybrid algorithms by fusing high-resolution imaging algorithms and machine learning techniques.

Today, I am going to show you the strides we have been making to increase the accessibility of terahertz imaging platforms and enable exciting machine learning algorithms that can exceed the theoretical limitations of spatial resolution.

As wideband terahertz imaging systems becoming increasingly viable, the demand for high-fidelity imaging simulation platforms is steadily increasing. We have developed the first framework capable of complete system simulation from waveform design to image reconstruction.

Our all-in-one software toolbox enables rapid prototyping of terahertz array imaging systems by allowing easy access to complex simulation tools and image reconstruction algorithms. The user can quickly set up the waveform, antenna gain pattern, MIMO array, and scanning pattern in the graphical user interface. 3-D targets can be imported from STL files to allow efficient simulation any conceivable target scene and the image can be easily reconstructed using the included algorithms.

Additionally, for researchers developing state-of-the-art imaging algorithms, our framework offers a flexible, robust environment for algorithm development by allowing easy access to data from a host of antenna types, array configurations, scanning patterns, and target scenes.

While access to large quantities of meaningful training data is an obstacle for many machine learning applications on RF imaging systems, our API allows for efficient generation of large datasets highly representative of real terahertz images.

To get an inside look at this work and see real results from a machine learning model trained using our platform, I invite you to stop my poster.

Thank you.