Title: *Seeing is believing – how x-ray probes can help us image solid state batteries*

Abstract: Transportation accounts for 23% of energy-related carbon dioxide emissions and electrification is a pathway toward ameliorating these growing challenges. All solid state batteries could potentially address the safety and driving range requirements necessary for widespread adoption of electric vehicles. However, the power densities of all-solid state batteries are limited because of ineffective ion transport at solid|solid interfaces. New insight into the governing physics that occur at intrinsic and extrinsic interfaces are critical for developing engineering strategies for the next generation of energy dense batteries. However, buried solid|solid interfaces are notoriously difficult to observe with traditional bench-top and lab-scale experiments. In this talk I discuss opportunities for tracking phenomena and mechanisms in all solid state batteries *in-situ* using advanced synchrotron techniques. Synchrotron techniques that combine reciprocal and real space techniques are capable of tracking multi-scale structural phenomena from the nano- to meso-scale. This talk will discuss the role microstructure plays on transport and interfacial properties that govern adhesion. Quantification of salient descriptors of structure in solid state batteries is critical for understanding the mechanochemical nature of all solid state batteries.