

UNIVERSITY OF RHODE ISLAND
Department of Chemistry
VIRTUAL SEMINAR

3:00 PM, Monday, Oct. 19, 2020
Please email blucht@uri.edu for link

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***“Bioelectrochemical Measurements
with Nanoscale Pipettes”***

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Bioelectrochemical Measurements with Nanoscale Pipettes
Lane Baker, Indiana University – Bloomington

Traditional transepithelial electrical resistance (TER) measurements in conjunction with molecular biology techniques are widely used to inform the present understanding of transport at tissue interfaces. These techniques, which include well-known Ussing chamber experiments, provide an excellent opportunity to study active ion transport and ion permeability. However, most of these measurements represent the aggregate response of thousands of transport pathways in cell membrane, which can obfuscate measurement of individual components. We have recently explored new instrumentation to perform conductance measurements at tight junctions at high spatial resolution. Conductance scanning is a powerful method in discrimination of trans- and para- cellular conductance and can provide local conductance information. By performing conductance measurements on P-SICM, several other advantages can be realized. With a topographic image obtained with SICM, detailed surface structures and relative position of different cellular pathways can be obtained. Positioning of pipet can be more precise and easier with the feedback system in SICM, and cell damage can be avoided as the pipet doesn't touch the cell membrane. Smaller pipets provide more localized measurements of conductance in a much smaller area. Also due to the feedback mechanism and nanometer scale pipet, a smaller probe surface distance (~ 100 nm than ~ 3 μm) can be obtained with ease. Our most recent results in conductance scanning and complementary methods for increasing the chemical information present in such studies will be discussed.



