UNIVERSITY OF LOUISVILLE

COLLEGE OF ARTS & SCIENCES

Department of Chemistry

Brown and Williamson Series

Friday, November 12, 2021
@4:00 pm
CB LL16

Lane Baker, Ph.D.

Professor
James F. Jackson Chair
Indiana University

Resolving Nanoscale Ion Transport through Biological Interfaces

ABSTRACT:
For the last decade, we have developed Potentiometric-Scanning Ion Conductance Microscopy as a tool for measurement of ion transport. We will show recent progress in measuring relevant biological processes, including effects of hyperosmolar conditions, on Madin-Darby Canine Kidney strain II (MDCKII) cells, which allows differentiation of two types of TJs, bicellular tight junctions (bTJs) and tricellular tight junctions (tTJs). We discovered that hyperosmolality leads to increased conductance at tTJs without significant alteration in conductance at bTJs. We will also describe a new hybrid 2D-3D blood brain barrier model based on paper substrates which aims to address challenges in future measurements.

BIO:
Lane Baker obtained his PhD from Texas A&M University (2001). After completing postdoctoral appointments at the Naval Research Laboratory (2001), and the University of Florida (2004), he started as an Assistant Professor in the Department of Chemistry at Indiana University in 2006, rising to a James F. Jackson Chaired Professorship in 2021. Baker's research group focuses on nanoscale electrochemistry, especially scanning ion conductance microscopy. Baker is a Fellow of the American Chemical Society and the Royal Society of Chemistry. His previous awards include a CAREER Award from the National Science Foundation, a Cottrell Scholar's Award from the Research Corporation for Scientific Advancement, the Young Investigator Award from the Society for Electroanalytical Chemistry, the American Chemical Society Division of Analytical Chemistry Award in Electrochemistry, and a special creativity award from the National Science Foundation. Baker served as Chair for the Division of Analytical Chemistry of the American Chemical Society in 2019.