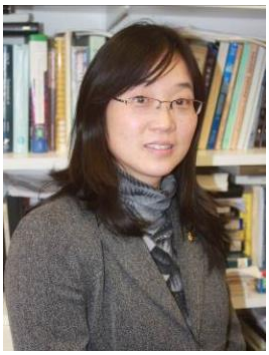
Advances in the Design of Real-time Chemical/biochemical Sensors: Meeting Needs for the 21st Century

In recent years, sensor research has experienced a revolution, promising to have a significant impact on a broad range of applications relating to national security, health care and medicine, the environment, energy, food safety, and manufacturing etc. This presentation will discuss some of the key technological developments of chemical and biosensors, particularly, the real-time electrochemical sensor technology that has taken place in the past decades in our laboratory for health, environmental and energy applications. It will include a few topics: (1) general theory of sensors; (2) basic characteristics and applications of sensors; (3) unique sensing elements and interface reactions such as peptides, conductive polymers, ionic liquids and nanocrystals in our sensing strategy to achieve in situ and real time detection of important chemical and bioanalytes with high temporal and/or spatial resolution. Our fundamental and applied research at solid/liquid/gas interfaces allows us to address many sensors challenges, especially miniaturized, real-time and continuous sensing that are essential for their integration with engineering advancements such as portable electronics, networked sensing and next-generation monolithic implementation of autonomous sensors with the performance, cost, power, and operational lifetime characteristics to suit a broad range of applications in health, environment and energy applications.

Short Bio



Dr. Xiangqun Zeng is currently a Professor of Chemistry with joint appointment as a Professor of Chemical and Biomedical Engineering at University of Missouri Columbia (https://chemistry.missouri.edu/people/zeng). She is also Emeritus Distinguished Professor at Oakland University (www.oakland.edu/~zeng). Her research interests lie at materials and interface science. Currently, her lab studies fundamental interfacial phenomena at electrode interfaces for the development of next generation detection technologies, i.e., in vitro, ex vivo, in vivo, in situ detection and quantification of molecules and species of chemical and biological significance with high sensitivity and specificity at high temporal and/or spatial resolution for a broad range of applications including health, environment and energy applications. She has mentored over 80 students/postdocs/visiting scholars including a Fulbright scholar. She was selected and featured on a book " Women who changed the world The journey and joy“ in 2015.