DETECTION OF *ESCHERICHIA COLI* AND ANTIBIOTIC-RESISTANT BACTERIA BY MONITORING BIOMOLECULES USING ELECTROCHEMISTRY; **Rebecca X. Y. Chen**, Zhe She, R. Stephen Brown; Queen's University Chemistry Department, 90 Bader Lane, Kingston, ON K7L 3N6, Canada. (rebecca.chen@queensu.ca)

A contaminant of emerging concern with significant impact on the environment and in clinical settings is antibiotic-resistant bacteria (ARB). In 2019, the CDC reported more than 2.8 million infections and 35,000 deaths caused by antibiotic-resistant bacteria and fungi in the USA alone. Current methods for detecting bacteria and ARB rely on culturing in lab facilities, use analytical instrumentation with trained personnel, and can take up to 48 hours or more to obtain results. These methods cannot be used for rapid, routine testing of ARB nor for on-site real-time monitoring, especially in remote areas. The ability to detect and monitor ARB contributes to understanding and characterizing antimicrobial resistance and can inform policy.

The recent SARS-CoV-2 pandemic demonstrated the efficiency and accessibility of point-of-care and self testing. This research addresses the demand for rapid, low-cost, portable, sensitive, and specific detection of ARB. Electrochemical (bio)sensors can detect bacteria and ARB directly, such as by antibody binding, or indirectly as demonstrated effectively in this work with the successful detection of *Escherichia coli* by monitoring 4-methylumbelliferyl-β-D-glucuronide hydrolysis by β-glucuronidase. The versatility of (bio)sensor designs presents an opportunity to develop a multiplexed electrochemical (bio)sensor device for multiple bacterial and ARB analytes.