Yue Cui, PhD | Associate Professor | Departments of Electrical Engineering and Computing Systems and Mechanical and Materials Engineering

Cui’s research group focuses on bioelectronics sensors.

The bioelectronics sensors are miniaturized electronic devices functionalized with biological molecules. The sensing devices can be used for a variety of applications, such as medical diagnosis, drug discovery, explosive detection, and environmental monitoring.

Her research group focuses on development of new types of bioelectronics devices that involve a combination of biological recognition, microfabrication, materials integration, and electrical measurement in research. The devices can offer the advantages of being miniaturized, sensitive, selective, and rapid for the detection of target analytes.

As an example, as shown in the figures, Dr. Cui’s group developed new types of biosensors on a plastic film and a regular office paper. Compared with traditional sensors which are normally on hard substrates, the sensor on a plastic film provides the flexibility, and the multiplexed sensors integrated with microfluidic channels on regular office paper provide several advantages, such as a low cost due to the use of paper substrate, a low volume consumption of the analyte solution due to microfluidic channels, and a simultaneous detection of multiple analytes.

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As part of a National Science Foundation funded EAGER Award, the Wendell Lab visited the remote island of Lord Howe. Located hundreds of miles from the Australian coast, the island is a unique and pristine ecosystem limited to 400 visitors at any time and even fewer permanent residents. The island’s surrounding reefs are classified as a UNESCO World Heritage Site because they are home to many unique aquatic animals found nowhere else in the world. Dr. Wendell’s research is examining the transport of wastewater from island septic tanks into these protected waters, with the goal of assisting local residents with wastewater treatment renovations. Dr. Wendell and his doctoral student, Elizabeth Wurtzler, are helping Lord Howe residents “Engineer Better” wastewater treatment options for the preservation of a globally important tropical barrier reef.

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