

DEPARTMENT OF MECHANICAL ENGINEERING

WILLIAM MAXWELL REED SEMINAR SERIES

“Fighting COVID with Engineering: A Symbiotic Partnership with the Public Health Community.”

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Associate Professor, University of Kentucky

Presentation Abstract

Over the course of the COVID-19 pandemic, wastewater surveillance has emerged as a methodology to determine SARS-CoV-2 prevalence among populations ranging in scale from individual facilities (e.g., university residence halls, nursing homes, prisons) to communities. Typically, the screening of wastewater for SARS-CoV-2 biomarkers requires specialized equipment, expensive consumables, and/or expert staff, which limits its feasibility and scalability. Additionally, the extremely fragile nature of the biomarker of interest, viral RNA, limits the ability to transport samples. These logistical limitations presented an opportunity to enhance the state-of-the-art of wastewater surveillance via engineering innovation. Specifically, we utilized principles of surface chemistry and small-scale fluid mechanics to significantly streamline the analysis workflow required to extract, stabilize, and quantitate SARS-CoV-2 viral RNA from wastewater. While data collection was immediately successful, we realized that a broader network of stakeholders was required to fully integrate this new metric into existing healthcare infrastructure. In response, we constructed a consortium of collaborators from UK and beyond to supplement our engineering knowledge, including academic experts in communication, medicine, graphic design, STEM education, biostatistics, data science, and public health as well as partnerships with facility managers, law enforcement, local health departments, utility operators, and citizen scientist volunteers. In summary, engineering innovation must often be buttressed with a strong network of multidisciplinary collaborators in order to maximize the impact of new technologies.

Speaker Bio

Dr. Scott Berry is an Associate Professor of Mechanical Engineering at the University of Kentucky. He completed his PhD in Mechanical Engineering at the University of Louisville in 2009. For the past 12 years, he has worked to apply the “physics of the microscale” toward the development of new molecular assays targeting a myriad of diseases including cancer, HIV, TB, hepatitis, flu, and most recently COVID-19. In 2013, Dr. Berry co-founded Salus Discovery, where he currently serves as Chief Scientific Officer, driving the commercialization of technologies derived from his academic research. He holds 16 issued patents describing new molecular analysis devices and techniques and has published over 40 peer-reviewed journal papers. He currently directs the Advanced Diagnostics Lab at UK, which has played a key role in Kentucky’s fight against the COVID-10 pandemic.

Date: Friday, November 19, 2021

Place: Whitehall Classroom Building 114

Time: 3:00 PM EST

Contact: Dr. Alexandre Martin 257-4462

Attendance open to all interested persons