# MINIATURIZED PLATFORM FOR *IN SITU* DETECTION OF *E. COLI* IN WATER SAMPLES

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We have been developing an innovative platform to detect *E. coli* outbreaks that threaten many coastal regions around the world. *E. coli* are a large and diverse group of bacteria. Most strains are harmless, but others can cause abdominal cramps, vomiting, and diarrhea. In addition, the presence of *E. coli* is the water quality indicator recommended by the United States Environmental Protection Agency since E. coli are present in faecal material, and faecal matter is the main source for disease-causing agents in water.

Our device is capable of lysis bacteria, enriching and purifying DNA, which is enabled by a paper-based unit and ball-based valves for the storage and sequential delivery of reagents. To speed up filtration for a relatively large volume of the sample, we have integrated a vacuum at the bottom of the platform to accelerate the process. The collected DNA is then amplified by using a smart coffee mug (Ember Travel Mug) that provides constant temperature for reverse transcription loop-mediated isothermal amplification (RT-LAMP), followed by colorimetric detection. The colorimetric detection is carried out by adding SYBR Green dye after DNA amplification.

Our platform is capable of detecting *E. coli* much faster than traditional culture approaches, lowering the analysis time from 2-3 days (Method 1603 by Environmental Protection Agency) to less than 90 min. We demonstrated the detection of several E. coli strains using this device including One Shot™ TOP10 Chemically Competent E. coli, K12 MG1655, and DH5-α. Integration and adaption of the overall platform for in situ detection in the field have been planned.

**PRESENTER BIO:** Carlos Manzanas is a PhD student in the Department of Mechanical and Aerospace Engineering at the University of Florida. He is also part of the Interdisciplinary Microsystems Group and part of the Microfluidics and BioMEMS Laboratory. He received his BS in Mechanical Engineering from Northern Illinois University.