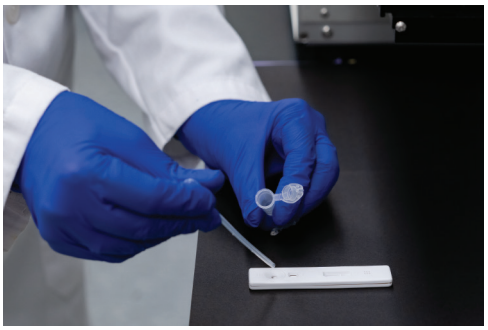
BIOENGINEERING, BIOMEDICAL & MATERIALS FRONTIERS

Katerina Kourentzi

Ph.D. – University of Houston

Research Associate Professor, William A. Brookshire Department of Chemical & Biomolecular Engineering

Dr. Kourentzi conducts research in the Willson Laboratory in the William A. Brookshire Department of Chemical and Biomolecular engineering. Her research interests lie at the interface of engineering, nanotechnology and biology. She possesses technical background in chemical engineering and biotechnology and has a broad understanding of the practices in diagnostics coupled with extensive research and scientific writing experience. Dr. Kourentzi has been working to develop novel diagnostic technologies for the early detection of disease with a special focus on point-of care, lateral flow tests. She currently leads the efforts for the development of phage-based rapid diagnostics. She was recently awarded a President's Grants to Enhance Research on COVID-19 and the Pandemic titled: *Immunophage lateral-flow diagnostics for COVID-19 for the development and clinical translation of a rapid, affordable and deployable SARS-CoV-2 nucleoprotein lateral-flow test.*



PHAGE-BASED DIAGNOSTICS

Dr. Kourentzi and Dr. Willson have developed a replacement for the standard gold lateral flow assay (LFA) reporter particles based on innocuous M13 bacteriophage virus particles. These serve as a scaffold on which multiple antibodies and read-out enzymes can be attached and improve analytical sensitivity by 100-1,000-times. Her team has demonstrated the ultrasensitive detection of the MS2 virus, Norwalk-like particles and IgE antibodies (below 0.016-0.1 ng/mL, up to 1,000 times as sensitive as gold with the same antibodies). Immunophage LFAs are compatible with standard roll-to-roll LFA manufacturing processes and are applicable to the problem of rapid diagnosis even in low-tech environments. In parallel, Dr. Kourentzi has an ongoing collaboration with Dr. Jacinta Conrad from the William A. Brookshire Department of Chemical and Biomolecular engineering to investigate the fundamental mechanisms of the ultra-sensitivity of bacteriophage LFA reporters, with an eye to improving them further.

Publications

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3. Chavan D, Chen H, Crum M, Vu B, Safari M, Smith M, Vekilov P, Conrad JC, Kourentzi K, Willson RC. Neutral DNA-avidin nanoparticles as ultrasensitive reporters in immuno- PCR. Analyst. 2020. 145:4942-4949

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5. Khodadadi M, Chang L, Trabuco JRC, Vu BV, Kourentzi K, Willson RC, Litvinov D. PCB Based Magnetometer as a Platform for Quantification of Lateral-Flow Assays. Sensors (Basel). 2019.19(24):5433.

6. Chen H, Crum M, Chavan D, Vu B, Kourentzi K, Willson RC. Nanoparticle-Based Proximity Ligation Assay for Ultrasensitive, Quantitative Detection of Protein Biomarkers. ACS Appl Mater Interfaces. 2018. 10(38):31845-9.

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