

Pharmaceutical Sciences is pleased to announce the  
**24th John G. Wagner Lecture**

Wednesday, October 9, 2019

2548 North University Building

4:00-5:00 pm

“New hybrid materials for ultrasensitive biosensing and regenerative medicine”



Presented by:

Professor Molly Stevens

Professor of Biomedical Materials and Regenerative Medicine

And the Research Director for Biomedical Material Sciences in the Department of Materials

Department of Bioengineering and the Institute of Biomedical Engineering

at Imperial College London.

This talk will provide an overview of our recent developments in bio-responsive hybrid materials which are of growing importance in the field of disease diagnostics and regenerative medicine [1]. We engineer simple conceptually novel approaches to detect disease biomarkers, such as abnormally regulated enzymes, to extend the detection window for early disease diagnostics and develop high throughput drug screening platforms. This talk will describe our research on the design of polymeric and inorganic nanomaterials for developing sensitive detection assays that are simple, cost-effective and easy deploy to the point-of-care. We are exploiting the sensing capabilities of nanoparticles to engineer paper-based lateral flow immunoassays (LFIAs) and nanosensors for in vivo disease diagnostics that produce a colorimetric response ideal naked eye read-out. We integrate our nanomaterial based assays into smartphone enabled diagnostic tests for patient self-monitoring, geographical tagging and epidemic surveillance [2]. We have also developed different platforms of nanoneedles capable of interfacing with cells to inform multiplexed intracellular biosensing at sub-cellular resolution and modulate biological processes [3]. Recent developments in this context will be discussed.

[1] P. D. Howes, R. Chandrawati, M. M. Stevens. “Colloidal nanoparticles as advanced biological sensors.” Science. 2014. 346: 53-63.

[2] C. S. Wood, M. R. Thomas, J. Budd, T. P. Mashamba-Thompson, K. Herbst, D. Pillay, R. W. Peeling, A. M. Johnson, R. A. McKendry, M. M. Stevens. “Taking connected mobile-health diagnostics of infectious diseases to the field.” Nature. 2019. 566: 467-474.

[3] S. Gopal, C. Chiappini, J. Penders, V. Leonardo, H. Seong, S. Rothery, Y. Korchev, A. Shevchuk, M. M. Stevens. "Porous silicon nanoneedles modulate endocytosis to deliver biological payloads." Advanced Materials. 2019. 31(12):1806788.

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