



Department of Chemical Engineering presents

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Institute of Biomaterials and Biomedical Engineering
University of Toronto
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Gavett 202 @ 3:25pm

"Tracking rare cells and biomolecules using nanostructured materials "

Nanostructured materials possess a variety of properties that can enhance the speed and sensitivity of biomolecular and cellular detection. The length scale of many nanomaterials enhances their ability to contact individual molecules, and their surface-to-volume ratios can produce enhanced levels of signal. The magnetic, electrochemical and optical properties of nanomaterials are also highly sensitive to small changes in local environment, which also enhances the performance of nanostructured detectors. We have developed a variety of new solutions for biomolecular and cellular analysis powered by inorganic nanomaterials. Three-dimensional, nanostructured sensors for electrochemical analysis of biomolecular targets have been engineered using electrodeposited metals and shown to exhibit clinically-relevant levels of sensitivity and specificity.¹⁻⁵ As well, a nanoparticle-mediated approach to the analysis and phenotypic profiling of circulating tumor cells allows these rare cells to be analyzed in patient samples for cancer monitoring.⁶⁻⁸ These new tools enhance the level of information that can be collected from clinical specimens, and provide new possibilities for molecular analysis in medicine.

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