Abstract

The microsystems field has been notably advanced in the last decade by the remarkable progress in materials and fabrication methodologies at micro- and nanoscales. Recent developments on integrated microsystems technology containing structures at both length scales and their role in key applications in biology and biomedical diagnostics will be discussed. The first part of the talk will describe the use of micrometer-sized structures and their integration with electrical and optical components into on-chip platforms for the study of individual living organisms. Examples of application will include the measurement of forces exerted by individual cells and extraction of intracellular contents. In a second part, I will talk about metallic nanostructures, their integration with microfluidics and their use as label-free biosensors. During this part of the talk, I will discuss the inherent advantages of using the nanostructures as nanofluidic elements and their potential to actively concentrate bioanalytes in applications demanding ultralow limits of detection.

Bio:
Carlos Escobedo started as assistant professor at the Department of Chemical Engineering at Queen’s University in May 2013. He received a B.Sc. from the National University of Mexico, M.A.Sc. from University of Toronto and Ph.D. from University of Victoria (2011). Between his master’s and Ph.D. studies, he worked 4 years in the medical R&D industry for Innovamedica as manager of the Mechanical Engineering Division, developing an artificial heart and other medical equipment. Most recently, he was an NSERC postdoctoral fellow at the Bioengineering Laboratory at ETH Zürich in Switzerland. He has published papers in different scientific journals related to micro- and nanotechnology, including Lab-on-a-Chip, Analytical Chemistry and Nano Letters, and some of them have been featured Optics and Photonics News, Nanowerk and Nature Photonics. He currently serves as Chair for MEMS, Nanotech and Microfluidics in the Canadian Society of Mechanical Engineering and his research involves the development of microfluidic systems, and micro- and nanostructures for analytical applications in biology and chemistry.