Stevens Institute of Technology

Nanotechnology Graduate Program

Integrated Nanofluidic Systems for Systems Biotechnology

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There have been many driving forces exploring the potential benefits of utilizing micro/nano-sized fluidic systems over those of conventional size, including reduced consumption of samples and reagents, shorter analysis times, greater sensitivity, and portability; for real-time analysis. A unified consensus of researchers in the field embrace the notion that, in the same way that integrated circuits used miniaturized transistors to automate computation, nano/microfluidic chips could accomplish large-scale automation of biological processing using nanoliter or picoliter volumes. Here, microfluidic chips for automating molecular biology processes and reaction kinetics of biocatalytic reactions in nanolitre/picoliter sample volumes with parallel architecture will be presented. The microfluidic devices could be applied to systems biology with limited number of target biomolecules opening a new window of handling inaccessible problems.

Dr. JW Hong is currently an Associate Professor of Materials Engineering in the Department of Mechanical Engineering at Auburn University. Hong has published in prestigious journals including Science and Nature Biotechnology. Hong's research interests include BioMEMS/NEMS; biomaterials; automated high-throughput systems for systems biology; biomolecular engineering; and nanoparticles synthesis. He received his Ph.D. in Chemical Engineering from The University of Tokyo, Japan. Before joining Auburn in December 2004 as an assistant professor, he was a postdoctoral scholar at the T.J. Watson, Sr. Laboratories of Applied Physics of the California Institute of Technology (Caltech), Pasadena, CA, U.S.A..

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