



Society for Analytical Chemists OF PITTSBURGH



OCTOBER MEETING

Monday, October 5, 2009
8:00 p.m.

Duquesne University
Laura Falk Hall

Dinner: City View Café (6th Floor)



JAMES P. LANDERS, PH.D.

PROFESSOR OF CHEMISTRY AND MECHANICAL ENGINEERING AT THE UNIVERSITY OF VIRGINIA
ASSOCIATE PROFESSOR OF PATHOLOGY AT THE UNIVERSITY OF VIRGINIA HEALTH SYSTEM

***"A Generic Microfluidic Platform for Ultrafast Genotyping:
Sample-In/Answer-Out Capabilities That Revolutionize
Clinical/Forensic Diagnostic Analysis"***



5:30 PM	Social Hour	Student Union – City View Café (6 th Floor)
6:30 PM	Dinner	Student Union – City View Café (6 th Floor)
7:30 PM	Student Affiliate Meeting	Mellon Hall – Room 410
7:40 PM	Business Meeting	Mellon Science Building – Laura Falk Hall
8:00 PM	Technical Meeting	Mellon Science Building – Laura Falk Hall

ABSTRACT:

A Microfluidic Genetic Analysis (MGA) system capable of genetic analysis with sample-in/answer-out capabilities must be able to accept real-world samples, execute multiple, sequential sample preparation steps, and then provide an interpretable read-out following separation and detection. These processes involve chromatographic separation of sample components for isolation of DNA, the enzyme-mediated amplification of target DNA sequences in a temperature-dependent manner, the electrophoretic separation of the products of amplification, and detection by fluorescence. In order to accomplish the tasks within the nanospace of the microfluidic architecture, there has to be exquisite nanoliter volume fluidic control. This is accomplished using nothing more than a single nanoliter-flow syringe pump, a series of elastomeric valves, and restrictive flow built into the microchannel architecture which, collectively, allow for precise control of fluid flow through the sample preparation domains and into the separation domain. The effectiveness of the MGA system for the detection of select infectious disease agents (B. Pertussis; B. Anthracis) from multiple sample types (nasal swab, blood, nasal aspirate) in microliter (and sub-microliter) volume samples has been shown. In addition, the potential for interrogation of human genomic DNA for mutations associated with the diagnosis of T-cell lymphoma will be discussed. Together these represent a microchip capable of sample-in/answer-out analysis - a bona fide micro-total analysis system – and a technology ripe for translation in the clinical medicine sector. However, much work remains to be done with respect to simple valving solutions for accurate fluidic control, minimizing the external hardware for packaging into a portable system and improved detection.

BIOGRAPHY:

James Landers is Professor of Chemistry, Professor of Mechanical Engineering at the University of Virginia, and an Associate Professor of Pathology at the University of Virginia Health System. James received his Bachelor of Science degree in Biochemistry with a minor in Biomedicine at the University of Guelph (pronounced Gwelf) in Ontario (Canada) in 1984. He earned his Ph.D. in Biochemistry from the same department in 1988. After a one-year post-doctoral fellowship at the Banting Institute at the University of Toronto's School of Medicine, he was awarded a Canadian Medical Research Council (MRC) Fellowship to study cancer biology and diagnostics under Dr. Thomas Spelsberg, a breast cancer biochemist at the Mayo Clinic. He launched and directed the Clinical Capillary Electrophoresis Facility in the Department of Lab Medicine and Pathology at Mayo developing clinical assays using capillary electrophoretic technology. Beginning as an Assistant Professor of Analytical Chemistry at the University of Pittsburgh in 1997, he forayed into analytical microfluidic systems with the goal of developing the next generation molecular diagnostics platform. These efforts were bolstered when his program moved to the University of Virginia where access to a dedicated class-100 cleanroom for microchip fabrication allowed for rapid prototyping of microdevices for separations, DNA purification and DNA amplification.

DINNER RESERVATIONS:

Please email William Straub, Arrangements Co-Chair at straub@pittcon.org, by Thursday, October 1, 2009 to make dinner reservations. Should you not have email, please call Bill at 412-372-8312. If you want to be placed on the permanent dinner list, let Bill know when you RSVP. The entrée for October is Sauerbraton. Dinner will cost \$8 (\$4 for students) and checks can be made out to the SACP. If you have any dietary restrictions, let Bill know when you leave a message.

PARKING:

Duquesne University Parking Garage entrance is on Forbes Avenue. Upon entering the garage, you will need to get a parking ticket and drive to upper floors. Bring your parking ticket to the dinner or meeting for a validation sticker. Contact Dr. Mitch Johnson at Duquesne University if any difficulties arise.