

2008 Annual Meeting of the American Electrophoresis Society

Topical Conference at the 2008 AIChE Annual Meeting

**Philadelphia, Pennsylvania
16 - 21 November 2008**

ISBN: 978-1-61567-216-5

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2008) by AIChE
All rights reserved.

Printed by Curran Associates, Inc. (2009)

For permission requests, please contact AIChE
at the address below.

AIChE
3 Park Avenue
New York, NY 10016-5991

Phone: (203) 702-7660
Fax: (203) 775-5177

www.aiche.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

A Mixed Boundary Element Method/brownian Dynamics Approach for Simulating DNA Electrophoresis In Electrically Insulating Microfluidic and Nanofluidic Geometries.....	1
<i>Jaeseol Cho, Kevin D. Dorfman</i>	
Effects of Gel Morphology on Predicting Optimal Times of Separation In Nanocomposite Gels	2
<i>Jennifer Anne Pascal, Holly A. Stretz, Mario Oyanader, Pedro E. Arce</i>	
Electrical Conductance of Aqueous Solutions of Surfactants with Added Electrolytes.....	3
<i>Ezinwa O. Elele, Boris Khusid</i>	
Structure and Conformation of Protein-Surfactant Complexes In Gel Electrophoresis.....	4
<i>Danilo C. Pozzo, Monica Ospinal</i>	
Optimal Separation Times In An Electrical Field Flow Fractionation (EFFF) Separator: Effect of Electroosmotic Flow	5
<i>Jennifer Anne Pascal, Mario Oyanader, Pedro E. Arce</i>	
Molecular Dynamics Simulations of the Effect of Dc and AC Electric Field on Polyelectrolyte	6
<i>Boris Khusid, Tak S. Lo, Joel Koplik</i>	
Insulator-Based Dielectrophoresis of Protein Particles Using Direct Current Electric Fields.....	7
<i>Sandra Ozuna-Chacón, Blanca H. Lapizco-Encinas, Marco Rito-Palomares</i>	
Dielectrophoretic Characterization of Red Blood Cells.....	14
<i>Kaela M. Leonard, J. Eric Rutan, Sheena Reeves, Megan Walton, Ashley Pate, Sarah Thompson, Adrienne R. Minerick</i>	
Dielectrophoretically Induced Electrothermal Cell Separation.....	22
<i>Zachary R. Gagnon, Satyajyoti Senapati, H.-C. Chang</i>	
Capillary Electrophoresis of Pegylated Proteins	23
<i>Jessica R. Molek, Andrew L. Zydney</i>	
Effect of Serum Contaminants on the Detection of DNA and RNA Using Surfactant Probes in Capillary Electrophoresis.....	31
<i>Oxana Selivanova, James W. Schneider</i>	
Capillary Channels with Electroosmotic Flows: Role of Fundamental Forces In Promoting Flow Reversal	32
<i>Karina Merino, Mario Oyanader, Pedro E. Arce</i>	
Electrofocusing of Trace Contaminants.....	33
<i>Jeffrey M. Burke, Cornelius F. Ivory</i>	
DNA Electrophoresis in Sparse PDMS Micropillar Arrays.....	34
<i>Jia Ou, Daniel Olson, Michael Meloche, Kevin D. Dorfman</i>	
Influence of Pore Morphology on DNA Separation Performance In Microchip Gel Electrophoresis	35
<i>Nan Shi, Roger C. Lo, Jian Wang, Victor M. Ugaz</i>	
Using Optical Tweezers for Electroporation Process Analysis	36
<i>Brian E. Henslee, Shengnian Wang, Xin Hu, Andrew Morss, L. James Lee, Gregory Lafyatis</i>	
Effect of the Electric Field on a Multi-Cell System in Complex Geometry.....	37
<i>Xin Hu, Andrew Morss, Brian E. Henslee, Wei-Ching Liao, Shengnian Wang, Gregory Lafyatis, Ly James Lee</i>	

Characterization of Microfluidic Devices for Cell Separation Via Adhesion to Peptide-Functionalized Surfaces	38
<i>Melissa A. Brown, Shashi K. Murthy, Milica Radisic</i>	
A Microfluidic Cell Array with Individually Addressable Culture Chambers	42
<i>Hsiang-Yu Wang, Ning Bao, Chang Lu</i>	
Modelling Cell Migration In Tapered Micro-Channels	43
<i>Fong Yew Leong, Keng Hwee Chiam</i>	
Control and Separation of Proteins In a Nanofluidic Fet Device, Using pH Gradient and Valence Charge	44
<i>Youn-Jin Oh, Danny Bottenus, Cornelius F. Ivory, Sang M. Han</i>	
Selection of Non-Equilibrium Over-Limiting Currents: Universal Depletion Layer Formation Dynamics and Vortex Instability	45
<i>Gilad Yossifon, Hsueh-Chia Chang</i>	
Transport of Ions and Molecules In Nanofluidic Devices	49
<i>Rohit Karnik, Chuanhua Duan, Kenneth Castelino, Rong Fan, Peidong Yang, Arun Majumdar</i>	
Analytes Preconcentration and Separation in Nanofluidic Channels	50
<i>Thomas C. Gamble, Yi Zhang, Zhen Yuan, Alexander Neumann, Gabriel P. Lopez, Steven R. J. Brueck, Dimiter N. Petsev</i>	
Diffusivity Effects In Charged Particle Transport In Nanochannels	51
<i>David A. Boy, Maria Napoli, Frederic Gibou, Igor Mezic, Sumita Pennathur</i>	
Electromigration Current Rectification In a Single Cylindrical Nanopore	52
<i>Jung Yeul Jung, Trevor J. Thornton, Jonathan D. Posner</i>	
Nanofluidic Systems for Concentration and Detection of Biomolecules	53
<i>Jongyoon Han</i>	
Nanoscale Physics of Induced-Charge Electrokinetic Phenomena	54
<i>Martin Z. Bazant, Mustafa Sabri Kilic, Brian D. Storey, Armand Ajdari</i>	
Discrimination of DNA Structure Using Single Protein Channels Supported on Glass Nanopore Membranes	56
<i>Ryuji Kawano, Hao Sun, Anna Schibel, Chris Cauley, Henry White</i>	
Experimentally and Theoretically Observed Native pH Shifts In a Nanochannel Array	57
<i>Danny Bottenus, Youn-Jin Oh, Sang M. Han, Cornelius F. Ivory</i>	
Stretching Genes	58
<i>Winston Timp, Utkur Mirsaidov, Gregory Timp</i>	
Modification of Cells Using a High-Throughput Microelectroporator	60
<i>Daniel Stark, Yoonsu Choi, Sourindra Maiti, Dean Lee, Robert Raphael, Thomas Killian, Laurence Cooper, Sibani Lisa Biswal</i>	
Rapid Fabrication and Characterization of 3-D Branched Microvascular Flow Networks	62
<i>Jen-Huang Huang, Jeongyun Kim, Arul Jayaraman, Victor M. Ugaz</i>	
Negative Selection Separation of Cells In Microfluidic Devices	63
<i>James V. Green, Brian D. Plouffe, Milica Radisic, Shashi K. Murthy</i>	
Microfluidic Cell Electroporation Using a Mechanical Valve	64
<i>Jun Wang, M. Jane Stine, Chang Lu</i>	
Microfluidic Control of Spatial Nutrient Gradients for Plant Culture on a Chip	71
<i>Satya Gowthami Achanta, David Henthorn, Chang-Soo Kim</i>	
Complex 3D Scaffolds for Cell Culture	72
<i>Noy Bassik, George Stern, Mustapha Jamal, David H. Gracias</i>	

Microfluidic Neuromuscular Control of Insect Micro-Air-Vehicles	73
<i>Aram J. Chung, David Erickson</i>	
Quantitative Proteomic Analysis of Membrane Proteins Based on Gel and Shotgun Techniques	74
<i>Trong Khoa Pham, Phillip C. Wright</i>	
High-Throughput Metalloproteomics: X-Ray Fluorescence Imaging Paired with Electrophoresis	75
<i>Lydia A. Finney, Yasmin Chishti, Tripti Khare, Carol Giometti, Stefan Vogt</i>	
2D Gel Western Blotting Using Antibodies against Acetyl, Sumo and Ubiquitin Groups on Proteins Is a Useful Tool for Studying Disease Processes	76
<i>Nancy Kendrick, Matthew Hoelter, Jon Johansen</i>	
Fluorescence Visualization of Newly Synthesized Proteins In Mammalian Cells	77
<i>Julie C. Liu, Kimberly E. Beatty, Fang Xie, Daniela C. Dieterich, Erin M. Schuman, Qian Wang, David A. Tirrell</i>	
Nuclear Proteomics	78
<i>Miguel Barthelery, Ugur Salli, Kent Vrana</i>	
Proteomics-Level Identification of Kinetically Stable Proteins by Diagonal 2D SDS-Page.....	79
<i>Ke Xia, Songjie Zhang, Wilfredo Colón</i>	
A Novel Mixed-Integer Linear Optimization Framework for the Identification of Post-Translationally Modified Proteins Using Etd/ecd Tandem Mass Spectrometry	82
<i>Peter A. DiMaggio Jr., Richard Baliban, Benjamin A. Garcia, Christodoulos A. Floudas</i>	
Multiplexed Proteomic Technologies for the Study of Host-Pathogen Interactions	85
<i>Brett A. Chromy</i>	
A Microfluidic Device for Physical Extraction of Intracellular Proteins from Bacterial Cells	86
<i>Ning Bao, Chang Lu</i>	
Eliminating Electrokinetic Cross-Talk in Nano-Channel Arrays for Biomolecular Detection	96
<i>Gilad Yossifon, Satyajyoti Senapati, Diana S. Hou, Hsueh-Chia Chang</i>	
The Use of a Bead-Based Combinatorial Peptide Library to Enrich Low-Abundance Proteins from Various Sample Types	97
<i>Tom Berkelman, Steve Freeby</i>	
2D Electrophoresis: Isotachopheresis Followed by Isoelectric Focusing	98
<i>Bingwen Liu, Cornelius F. Ivory</i>	
A Generic Platform for Label-Free Detection of Proteins, DNA, and Other Charged Analytes.....	99
<i>Yu-Wen Huang, Faisal Shaikh, Victor M. Ugaz</i>	
Cys Shotgun Labeling to Probe Protein Unfolding and Assembly In Solution and In Cells	100
<i>Christine Carag, David Pajeroski, Karthik Rajagopal, Dennis E. Discher</i>	
Electrokinetic Velocity Characterization of Microparticles in Glass Microchannels	101
<i>José I. Martínez-López, Blanca H. Lapizco-Encinas, Héctor Moncada-Hernández, Marco Rito-Palomares, Sergio O. Martínez-Chapa</i>	
Thermoresponsive Microparticle Gels for Electrophoresis: PNIPAm Templated Page	109
<i>Jeffery W. Thompson, Holly A Stretz, Pedro E. Arce</i>	

Investigation of Changes in the Surface Chemistry and Morphology of Platinum Microelectrodes Subjected to a Dielectrophoretic Field	110
<i>Aytug Gencoglu, Emily F. Cotten, S. Anell Pullen, Sarah Thompson, B. Selin Tosun, Adrienne R. Minerick</i>	
An Electrokinetic-Hydrodynamics-Ekhd Based Approach to Determine Effective Transport Parameters: Illustrative Results and Comparison.....	117
<i>Jennifer Anne Pascal, Mario Oyanader, Pedro E. Arce</i>	
Electrokinetic-Hydrodynamics (EKHD): An Efficient Framework for Systematic Research	119
<i>Jennifer Anne Pascal, Mario Oyanader, Pedro E. Arce</i>	
Polyacrylamide Gel Modified with Poly-N-Isopropylacrylamide Coated Gold Nanoparticles for Electrophoresis	120
<i>Jyothirmai J. Simhadri, Holly A. Stretz, Pedro E. Arce</i>	
Characterizing the Abundance and Activity of Soil Microbes by Capillary Electrophoresis Using Single-Strand Conformational Polymorphism	121
<i>Alice C. Jernigan, Greg Thoma, Duane C. Wolf, Christa N. Hestekin</i>	
High Resolution In Situ Temperature Measurement In Microfluidic Systems Using Brownian Motion of Nanoparticles.....	122
<i>Kwanghun Chung, Jae Kyu Cho, Victor Breedveld, Hang Lu</i>	
Micro-Device to Detect Bacterial Proliferation Using Reactance Measurements at Multiple Frequencies	123
<i>Sachidevi Puttaswamy, Shramik Sengupta</i>	
Optimization of Micro-Fluidic Network Geometries for Micromosaic Immunoassays.....	124
<i>Nicholas S. Lynn, Brian Murphy, Charles S. Henry, David S. Dandy</i>	
Automated Monocyte Depletion for CD4 Counting at Resource Limited Settings	125
<i>Xuanhong Cheng, Mehmet Toner, William Rodriguez</i>	
“Detectorless” Electrophoresis for Multiplexed Enzyme Activity Assays	126
<i>David Ross, Jason G. Kralj</i>	
Self-Loading Lithographically Structured Microcontainers: 3D Patterned, Mobile Microwells.....	127
<i>Timothy Leong, Bryan Benson, Christina Randall, Aasiyeh Zarafshar, David H. Gracias</i>	
Electrochemical Detection of Signaling Biomolecules In Nanofluidic Devices	128
<i>Edgar D. Goluch, Bernhard Wolfrum, Marcel A.G. Zevenbergen, Serge G. Lemay</i>	
Detection of Kinase Translocation Using Microfluidic Electroporative Flow Cytometry	129
<i>Jun Wang, Ning Bao, Leela Paris, Hsiang-Yu Wang, Robert Geahlen, Chang Lu</i>	
Droplet-Based PCR In a Valveless Microfluidic Device	136
<i>Fang Wang, Mark A. Burns</i>	
Parallel Multi-Time Point Cell Stimulus and Lysis In a Microfluidic Device Using Chaotic Mixing and Pressure Resistance	137
<i>Alison Hirsch, Catherine Rivet, Boyang Zhang, Melissa Kemp, Hang Lu</i>	
Enhancement of Acoustic Streaming Induced Flow on a Focused SAW Device: Implications for Biosensing and Microfluidics	138
<i>Reetu Singh, Subramanian K.R.S. Sankaranarayanan, Venkat Bhethanabotla</i>	
Design and Evaluation of Polymeric Microfluidic Biochips for Enzyme-Linked Immunosorbent Assay	146
<i>Hongyan He, Yuan Yuan, Nan-rong Chiou, L. James Lee</i>	

On-Chip Analysis of Neutrophil Isolation and Migration In Complex ChEmotactic Environments147
Nitin Agrawal, Daniel Irimia, Mehmet Toner

Insulator-Based Dielectrophoretic Lab-on-a-Chip System for Erythrocytes148
Soumya S. Keshavamurthy, S. Anell Pullen, Adrienne Robyn Minerick

Author Index