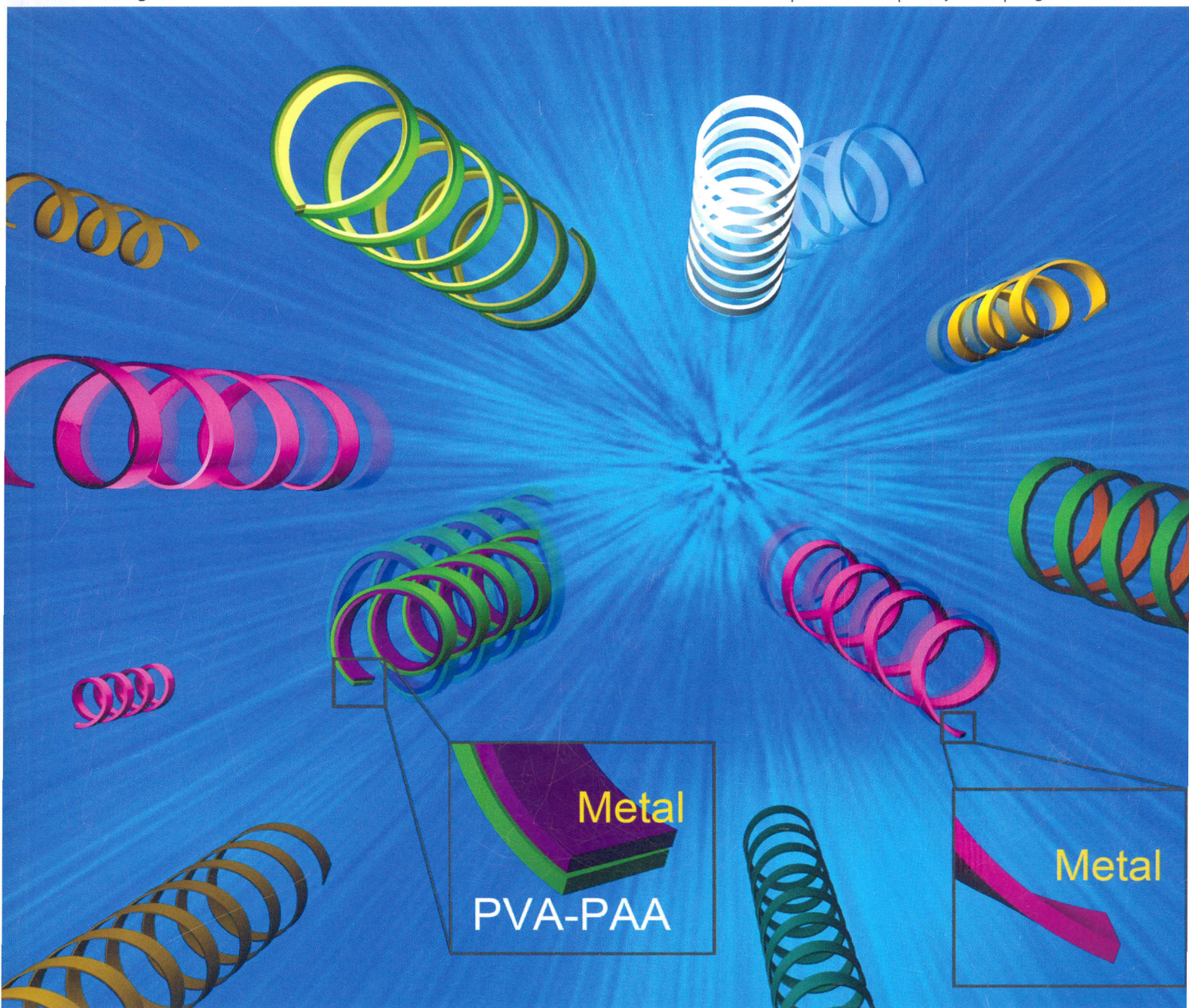


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PAPER

Weiming Li *et al.*

Superelastic metal microsprings as fluidic sensors and actuators



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Cover

See Weiming Li *et al.*, pp. 2322–2328. Image reproduced by permission of Yongfeng Mei from *Lab Chip*, 2012, 12, 2322.

HIGHLIGHT

2289

Research highlights

Šeila Selimović, Cole A. DeForest, Mehmet R. Dokmeci and Ali Khademhosseini*

Engineering a human “gut-on-a-chip” – Origami for microfluidics – Predictive microfluidic modeling of vaso-occlusive processes.



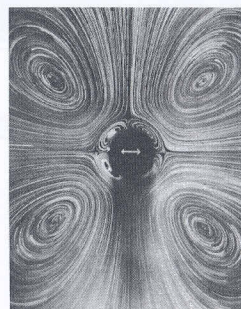
FOCUS

2292

Acoustofluidics 13: Analysis of acoustic streaming by perturbation methods

S. S. Sadhal

In this Part 13 of the tutorial series “Acoustofluidics—exploiting ultrasonic standing waves forces and acoustic streaming in microfluidic systems for cell and particle manipulation,” the streaming phenomenon is presented from an analytical standpoint, and perturbation methods are developed for analyzing such flows.

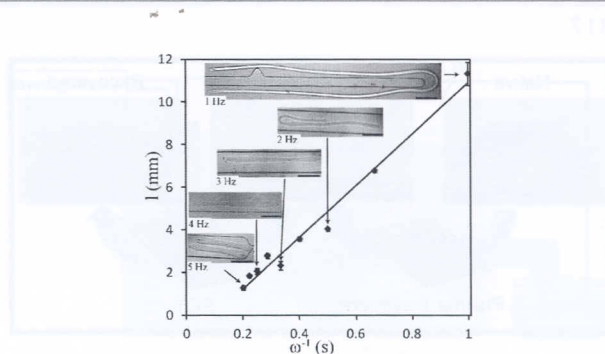


2301

Control of the length of microfibers

Janine K. Nunes, Krzysztof Sadlej, Jee Ian Tam and Howard A. Stone*

We developed a simple microfluidic method for synthesizing polymeric microfibers, where the fiber length can be systematically varied as a function of valve frequency.

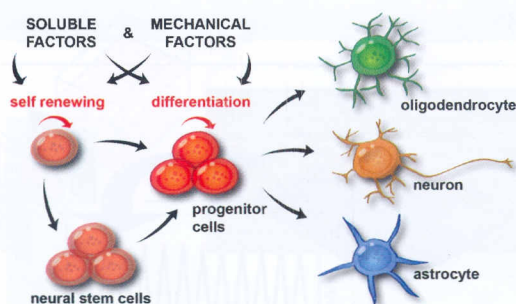


2305

Three-dimensional extracellular matrix-mediated neural stem cell differentiation in a microfluidic device

Sewoon Han, Kisuk Yang, Yoojin Shin, Jung Seung Lee, Roger D. Kamm, Seok Chung* and Seung-Woo Cho*

Here, we report a unique method to quantify the effects of *in vivo*-like extracellular matrix (ECM) for guiding differentiation of neural stem cells (NSCs) in three-dimensional (3D) microenvironments using quantitative real-time polymerase chain reaction (qRT-PCR).



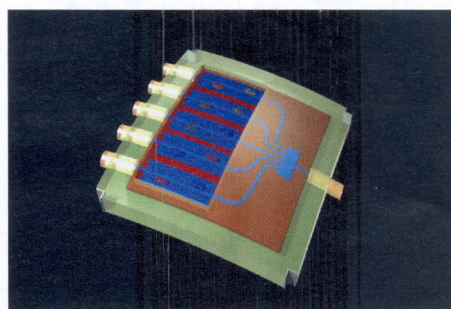
TECHNICAL INNOVATIONS

2309

Methods to array photonic crystal microcavities for high throughput high sensitivity biosensing on a silicon-chip based platform

Yi Zou,* Swapnajt Chakravarty,* Wei-Cheng Lai, Che-Yun Lin and Ray T. Chen

The paper describes serial and parallel arraying methods of photonic crystal microcavity sensors for highly-sensitive, high-throughput biosensing microarrays.

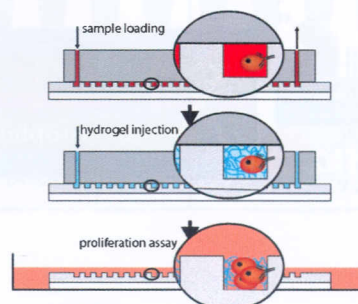


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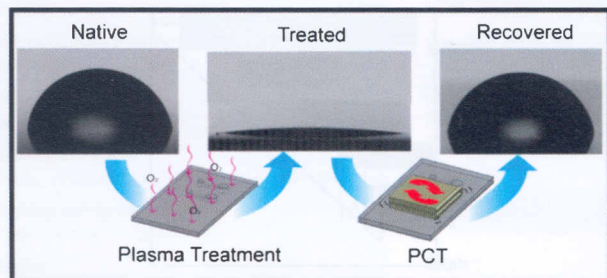
Diagnostic microchip to assay 3D colony-growth potential of captured circulating tumor cells

Colette A. Bichsel, Samy Gobaa, Stefan Kobel, Chiara Secondini, George N. Thalmann, Marco G. Cecchini and Matthias P. Lutolf*

Microfluidic immunocapture of circulating tumor cells was merged with three-dimensional (3D) cell culture on the same chip to assess clonal 3D spheroid growth potential.



2317

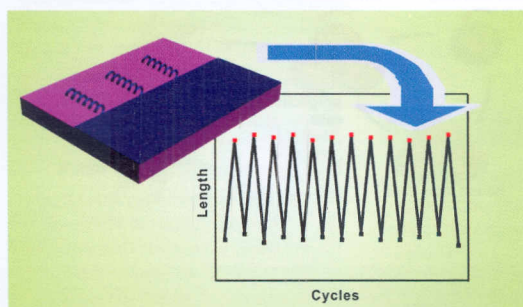


Induced hydrophobic recovery of oxygen plasma-treated surfaces

David J. Guckenberger, Erwin Berthier, Edmond W. K. Young and David J. Beebe*

We describe a practical and cheap technique to induce hydrophobic recovery of plasma-treated surfaces that can be easily adopted by any lab with access to common lab supplies such as tapes and wipers.

2322

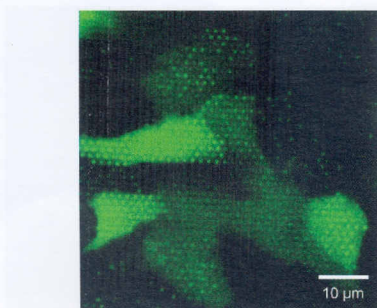


Superelastic metal microsprings as fluidic sensors and actuators

Weiming Li, Gaoshan Huang,* Jiao Wang, Ying Yu, Xiaojing Wu,* Xugao Cui and Yongfeng Mei*

Superelastic microsprings fabricated by rolling up nanomembranes with anisotropic-strain present advantageous applications as flow rate sensors and chemical-stimulated actuators.

2329

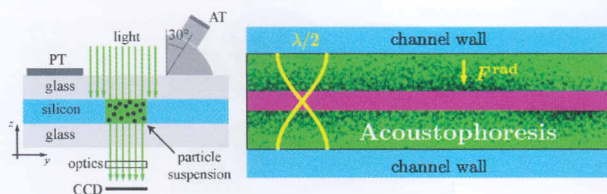


Macroporous silicon chips for laterally resolved, multi-parametric analysis of epithelial barrier function

Stefanie Michaelis, Christina E. Rommel, Jan Endell, Petra Göring, Ralf Wehrspohn, Claudia Steinem, Andreas Janshoff, Hans-Joachim Galla and Joachim Wegener*

Macroporous silicon chips are used to probe the permeability characteristics of 2D tissues *in vitro*. When cells are grown on these chips, the pores in the substrate are used as a highly ordered array of femtolitre-sized cuvettes in which the permeating probe can accumulate at the site of permeation.

2337



Measuring acoustic energy density in microchannel acoustophoresis using a simple and rapid light-intensity method

Rune Barnkob,* Ida Iranmanesh, Martin Wiklund and Henrik Bruus

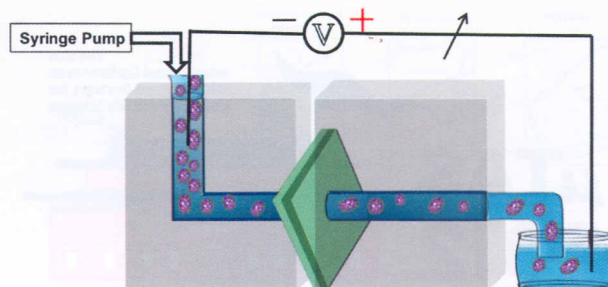
A simple and rapid method for *in situ* determination of the acoustic energy density in microchannel acoustophoresis using light-intensity measurements.

2345

Electrical fingerprinting, 3D profiling and detection of tumor cells with solid-state micropores

Waseem Asghar, Yuan Wan, Azhar Ilyas, Robert Bachoo, Young-tae Kim and Samir M. Iqbal*

We present a solid-state micropore based device that can differentiate cancer cells from whole blood with more than 85% detection efficiency.

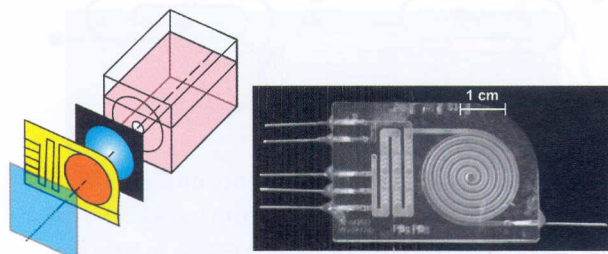


2353

Rapid determination of vitamin B₁₂ concentration with a chemiluminescence lab on a chip

Khoi Seng Lok, Siti Zubaidah binte Abdul Muttalib, Peter Peng Foo Lee, Yien Chian Kwok and Nam-Trung Nguyen*

This paper reports the fabrication and characterization of a lab on a chip system for rapid determination of vitamin B₁₂ using chemiluminescence. The device is able to detect small amounts of vitamin B₁₂ concentration at picogram level. The amount of vitamin B₁₂ in supplementary tablets and hen egg yolk was quantitatively measured with this system.

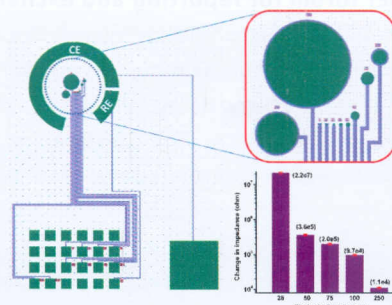


2362

Breast tumor cell detection at single cell resolution using an electrochemical impedance technique

Sunil K. Arya,* Kok Chuan Lee, Dhiya'uddin Bin Dah'alan, Daniel and Abdur Rub Abdur Rahman*

Impedance studies for MCF-7 cell capture on micro-electrodes of various sizes reveal the best sensitivity for a 25 μm diameter electrode.

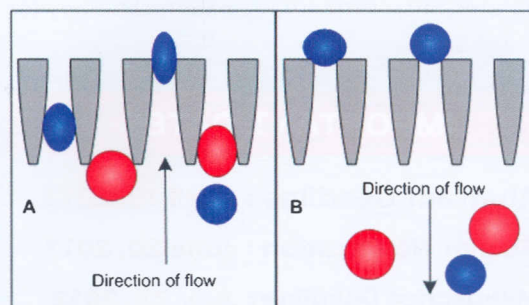


2369

Cell separation based on size and deformability using microfluidic funnel ratchets

Sarah M. McFaul, Bill K. Lin and Hongshen Ma*

Physical cell separation device utilizing a microfluidic structural ratchet mechanism where individual cells are transported unidirectionally when subjected to an oscillatory flow. Processing cells through a 2D array of such ratchets enables cell separation based on size and deformability.

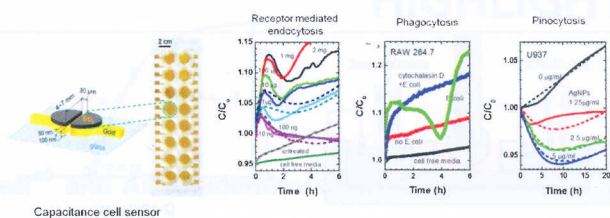


2377

Capacitance-based assay for real-time monitoring of endocytosis and cell viability

Rimi Lee, Jihun Kim, Sook Young Kim, Seon Mi Jang, Sun-Mi Lee, In-Hong Choi, Seung Woo Park, Jeon-Soo Shin* and Kyung-Hwa Yoo*

Three types of endocytosis can be distinguished in real-time using our novel capacitance-based assay.

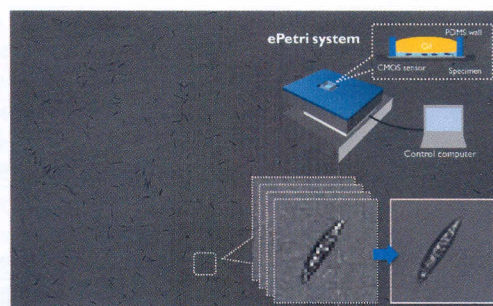


2385

On-chip continuous monitoring of motile microorganisms on an ePetri platform

Seung Ah Lee,* Guoan Zheng, Nandini Mukherjee and Changhui Yang

We present ePetri, an on-chip cell imaging platform, for continuous monitoring and high-resolution imaging of motile microorganisms by using their inherent ability to perform pixel-super resolution image reconstruction.

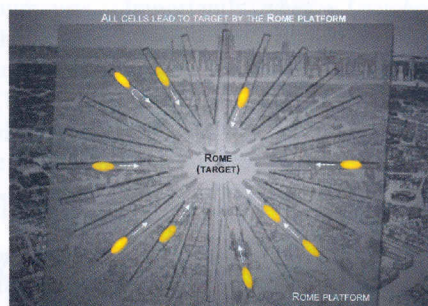


2391

Passive control of cell locomotion using micropatterns: the effect of micropattern geometry on the migratory behavior of adherent cells

Sang-Hee Yoon, Young Kyun Kim, Eui Don Han, Young-Ho Seo, Byeong Hee Kim and Mohammad R. K. Mofrad*

The changes in the migratory behavior of adherent cells exposed to physical spatial cues are explored using a microfabricated biological platform, nicknamed the "Rome platform".

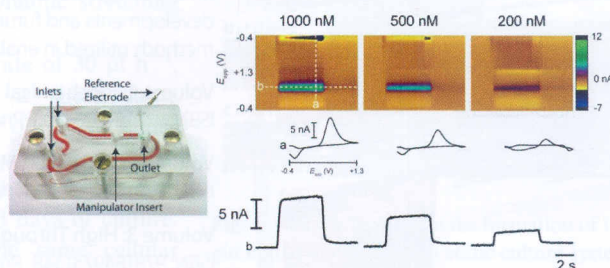


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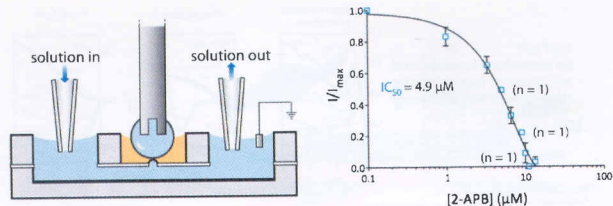
Electrode calibration with a microfluidic flow cell for fast-scan cyclic voltammetry

Elly Sinkala, James E. McCutcheon, Matthew J. Schuck, Eric Schmidt, Mitchell F. Roitman and David T. Eddington*

The microfluidic flow cell creates "step-like" current responses that provide reliable electrode calibrations for concentration measurements with fast-scan cyclic voltammetry.



2409

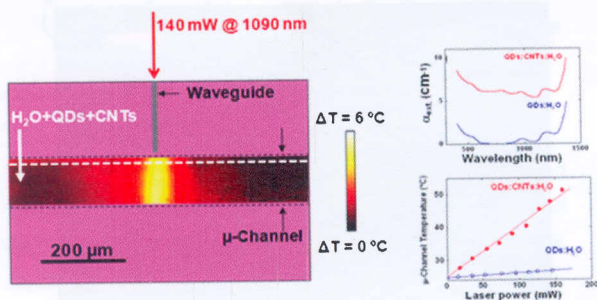


Ion channel drug potency assay with an artificial bilayer chip

Ahmad M. El-Arabi, Carl S. Salazar and Jacob J. Schmidt*

We present an automation and array compatible artificial bilayer chip and its use for measurements of drug potency on the TRPM8 ion channel.

2414



Quantum dot enabled thermal imaging of optofluidic devices

Debaditya Choudhury,* Daniel Jaque, Airan Rodenas, William T. Ramsay, Lynn Paterson and Ajoy K. Kar

We present quantum dot enabled nanothermometry in an ultrafast laser inscribed optofluidic device.

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