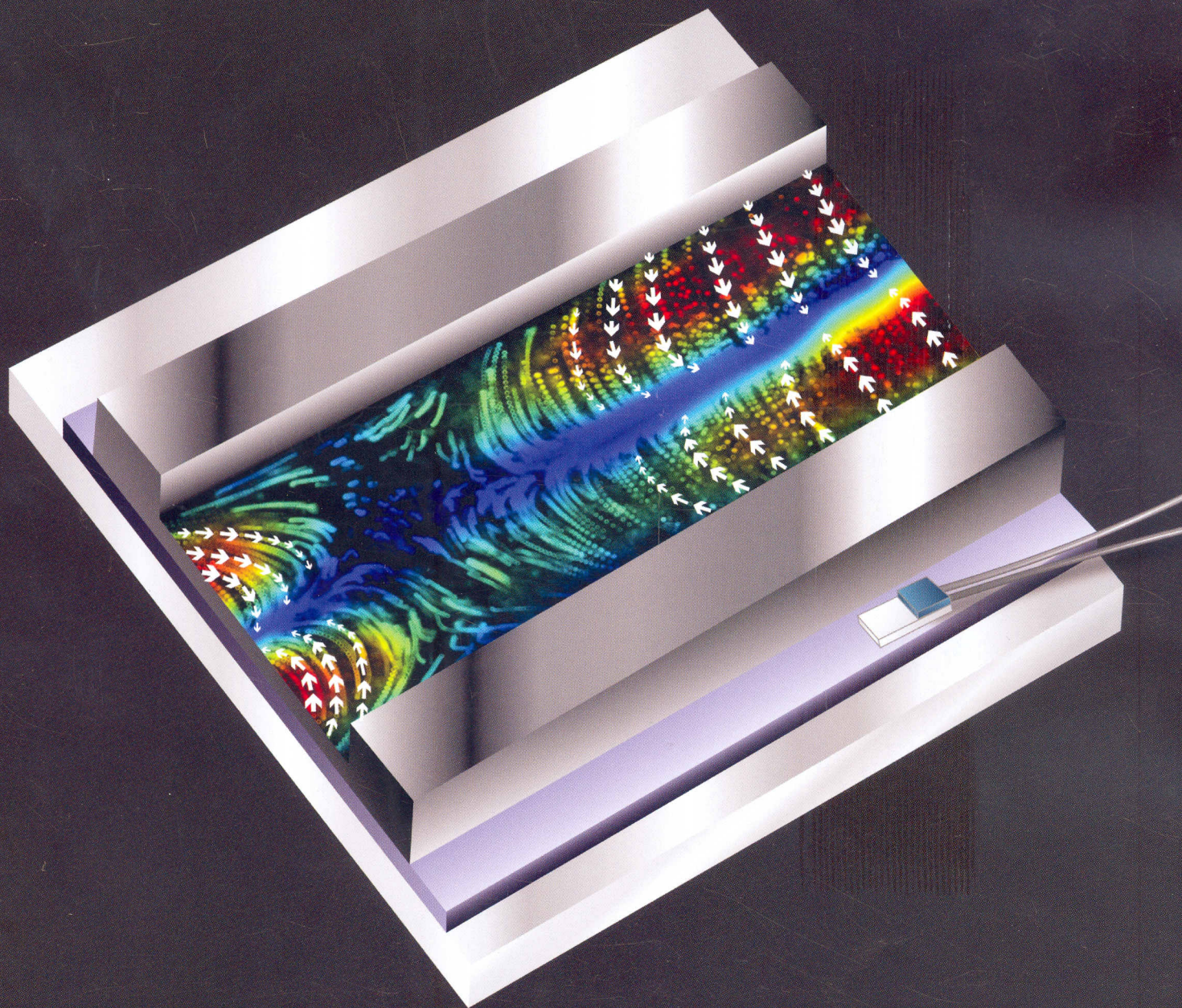


Lab on a Chip

Miniaturisation for chemistry, physics, biology, materials science and bioengineering

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PAPER

Laurell *et al.*

Automated and temperature-controlled micro-PIV measurements enabling long-term-stable microchannel acoustophoresis characterization



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Lab on a Chip

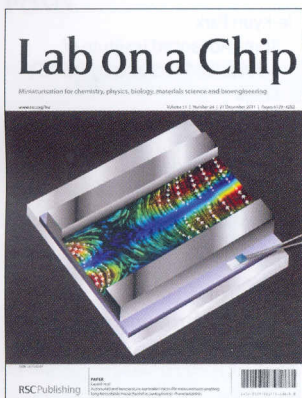
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Cover

See Laurell *et al.*, pp. 4152–4164.
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Lab Chip, 2011, **11**, 4152.



Inside cover

See Parker *et al.*, pp. 4165–4173.
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Lab Chip, 2011, **11**, 4165.

HIGHLIGHT

4141

Research highlights

Šeila Selimović, Omar Z. Fisher and Ali Khademhosseini*

Deconstructing dendritic chemotaxis - Complex shape-controlled particles - Click-ing proteins in place - Bio-breadboard.



FOCUS

4144

Droplet microfluidics—a tool for protein engineering and analysis

Haakan N. Joensson and Helene Andersson-Svahn*

Helene Andersson Svahn and Haakan Joensson discuss droplet microfluidics as a tool for protein engineering and analysis – Part of a series of Focus articles elucidating bio-related issues that impact on lab on a chip and microfluidic research.

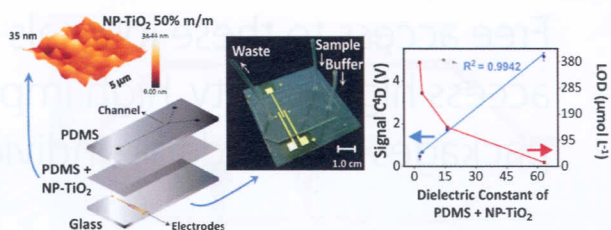


4148

Doping of a dielectric layer as a new alternative for increasing sensitivity of the contactless conductivity detection in microchips

Renato Sousa Lima, Thiago Pinotti Segato, Angelo Luiz Gobbi, Wendell Karlos Tomazelli Coltro and Emanuel Carrilho*

Images of the C^4D microchip and improvement in sensitivity by adding TiO_2 nanoparticles (NP- TiO_2) to the dielectric layer of PDMS.



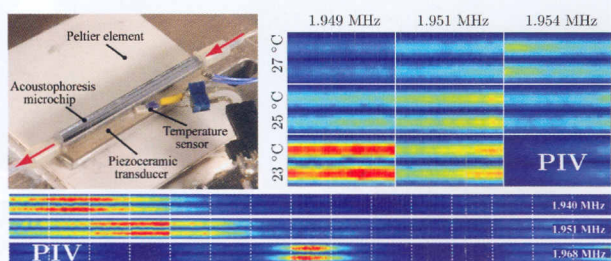
PAPERS

4152

Automated and temperature-controlled micro-PIV measurements enabling long-term-stable microchannel acoustophoresis characterization

Per Augustsson, Rune Barnkob, Steven T. Wereley, Henrik Bruus and Thomas Laurell

A novel, optimized, and automated method for high-precision measurement of the acoustophoretic velocity field in microchannels, using particle image velocimetry.

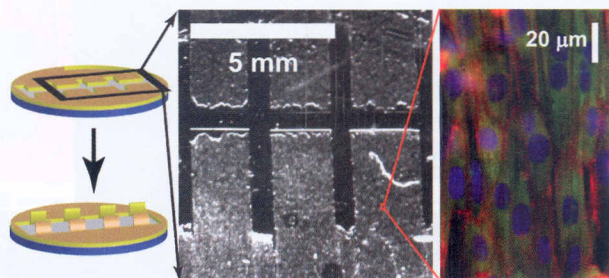


4165

Ensembles of engineered cardiac tissues for physiological and pharmacological study: Heart on a chip

Anna Grosberg, Patrick W. Alford, Megan L. McCain and Kevin Kit Parker*

We present a new *in vitro*, tissue scale “heart on a chip” technology that incorporates a multiplex contractility assay combined with immunostaining or electrophysiological experiments.

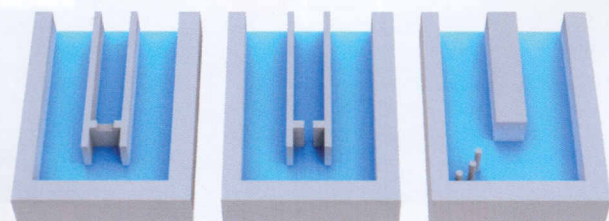


4174

Mass sensors with mechanical traps for weighing single cells in different fluids

Yaochung Weng, Francisco Feijó Delgado, Sungmin Son, Thomas P. Burg, Steven C. Wasserman and Scott R. Manalis*

Suspended microchannel resonator mass sensors with mechanical traps have been developed to enable cell capture and fluid exchange allowing an individual cell to be weighed in different fluids.

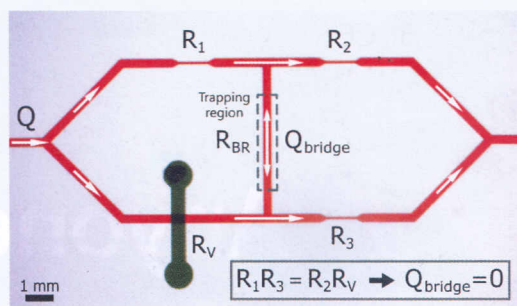


4181

Microfluidic Wheatstone bridge for rapid sample analysis

Melikhan Tanyeri, Mihnil Ranka, Natawan Sittipolkul and Charles M. Schroeder*

We developed a microfluidic analogue of the Wheatstone bridge circuit for automated, real-time sampling of solutions, particles or cells in a flow-through format.

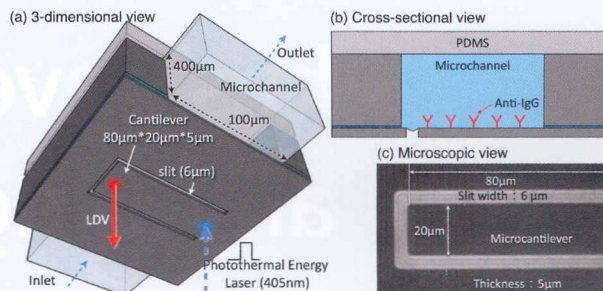


4187

High-resolution cantilever biosensor resonating at air-liquid in a microchannel

Jungwook Park,* Shuhei Nishida, Pierre Lambert, Hideki Kawakatsu and Hiroyuki Fujita

One surface of a dynamic-cantilever is functionalized for label-free detection, while the opposite side is exposed to air to improve the resonance-characteristics.

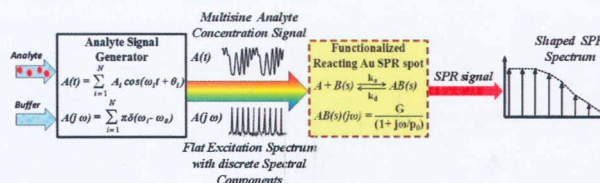


4194

Label-free detection of protein binding with multisine SPR microchips

Tridib Ghosh,* Layne Williams and Carlos H. Mastrangelo

A new frequency-domain method using multisine chemical excitation in a PDMS microfluidic chip is used to characterize real-time bio-interactions. The new method has improved SNR over that achieved with conventional step response analysis.

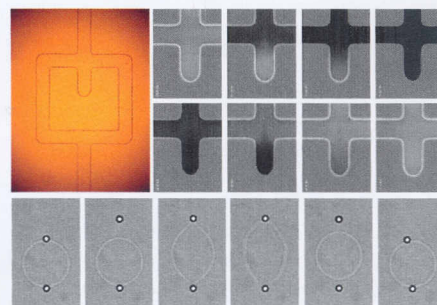


4200

A microfluidic diffusion chamber for reversible environmental changes around flaccid lipid vesicles

Saša Vrhovec, Mojca Mally, Blaž Kavčič and Jure Derganc*

The diffusion chamber, designed as a dead-end channel extending from a T-junction, provides an effectively flow-free environment with even diffusion from the main microchannels.

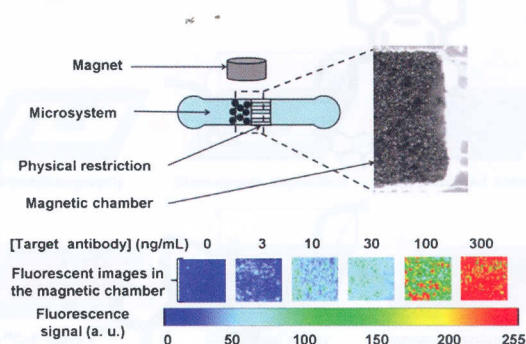


4207

Microchip integrating magnetic nanoparticles for allergy diagnosis

Bruno Teste, Florent Malloggi, Jean-Michel Siaugue, Anne Varenne, Frederic Kanoufi and Stéphanie Descroix*

We developed a microdevice integrating magnetic nanoparticles and a magnetic chamber thus combining the advantages of homogeneous and heterogeneous immunoassays.

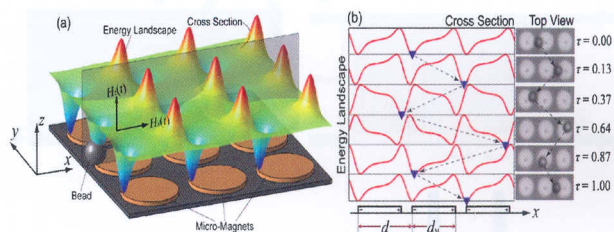


4214

Multiplexing superparamagnetic beads driven by multi-frequency ratchets

Lu Gao, Mukarram A. Tahir, Lawrence N. Virgin and Benjamin B. Yellen

These results open up a new platform for multiplexing the motion of colloidal beads on a miniaturized chip-based platform.

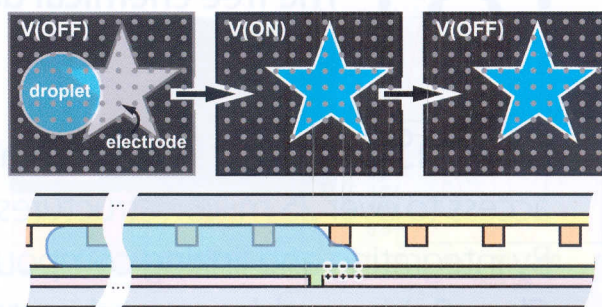


4221

Partial-post laplace barriers for virtual confinement, stable displacement, and $>5 \text{ cm s}^{-1}$ electrowetting transport

E. Kreit, B. M. Moggetti, J. M. Yeomans and J. Heikenfeld*

Novel partial-post Laplace barriers allow for virtual confinement, stable displacement, and $>5 \text{ cm s}^{-1}$ electrowetting transport.

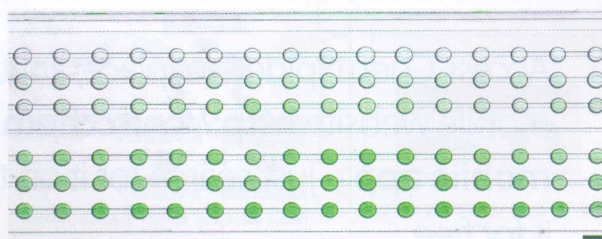


4228

Combining rails and anchors with laser forcing for selective manipulation within 2D droplet arrays

Etienne Fradet, Craig McDougall, Paul Abbyad, Rémi Dangla, David McGloin and Charles N. Baroud*

We demonstrate a device for selectively patterning a 2D array with microfluidic droplets. This is performed either through filling or emptying the array, or by triggering a chemical reaction on demand.

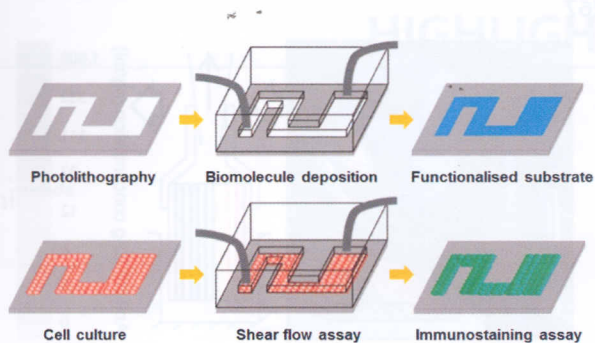


4235

Patterning cells and shear flow conditions: Convenient observation of endothelial cell remoulding, enhanced production of angiogenesis factors and drug response

Li Wang, Zhi-Ling Zhang, Joanna Wdzieczak-Bakala, Dai-Wen Pang, Jianmiao Liu* and Yong Chen*

We propose a microfluidics based multi-shear stress assay with a patterned substrate for conventional cell culture and characterization.

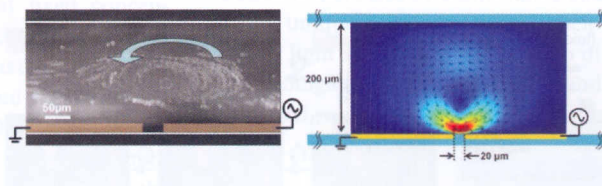


4241

DC-biased AC-electrokinetics: a conductivity gradient driven fluid flow

Wee Yang Ng, Antonio Ramos, Yee Cheong Lam, I. Putu Mahendra Wijaya and Isabel Rodriguez*

We report the electrohydrodynamic mechanism responsible for flow generation in DC-biased AC-electrokinetics based on conductivity gradients.

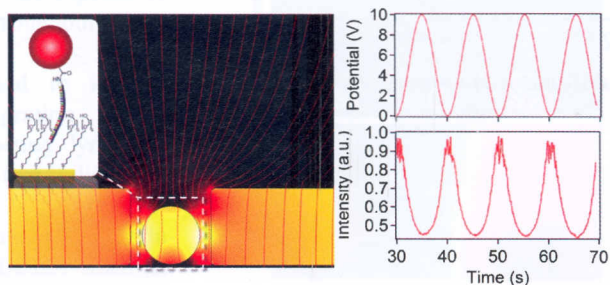


4248

Dielectrophoretic tweezers as a platform for molecular force spectroscopy in a highly parallel format

Peng Cheng, Michael J. Barrett, Piercen M. Oliver, Deniz Cetin and Dmitri Vezenov*

Dielectrophoresis applied to arrays of colloidal probes serves as a form of molecular force spectroscopy in a highly parallel format.

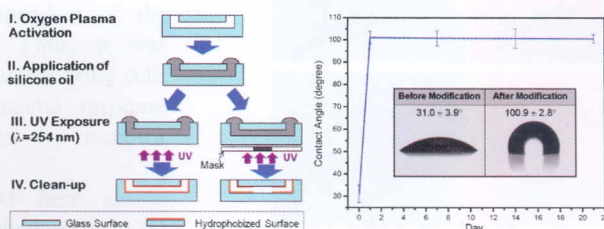


4260

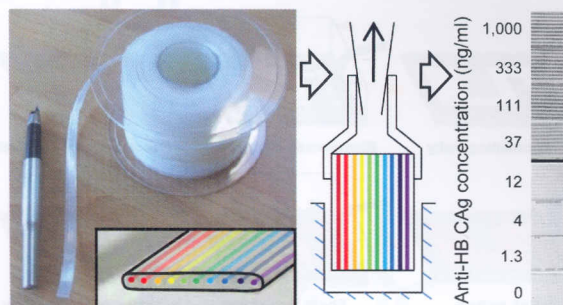
A new method of UV-patternable hydrophobization of micro- and nanofluidic networks

Rerngchai Arayanarakool, Lingling Shui, Albert van den Berg and Jan C. T. Eijkel*

A new particle-free hydrophobization method for glass-based micro- and nanofluidic networks is proposed by employing oxygen plasma, silicone oil and ultraviolet light.



4267

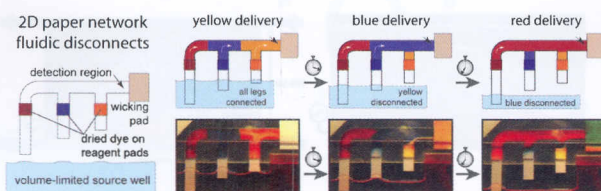


A simple device for multiplex ELISA made from melt-extruded plastic microcapillary film

Alexander D. Edwards,* Nuno M. Reis, Nigel K. H. Slater and Malcolm R. Mackley

A simple device made from melt-extruded microcapillary film allowing rapid quantitative multiplex immunoassay analysis using a flatbed scanner.

4274



Two-dimensional paper networks: programmable fluidic disconnects for multi-step processes in shaped paper

Barry R. Lutz,* Philip Trinh, Cameron Ball, Elaine Fu and Paul Yager

Multi-step assays require controlled reagent timing. A paper network dipped in a well creates “off switches” needed for multi-step automation.

ADDITIONS AND CORRECTIONS

4279

Additions and corrections published in 2011.



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