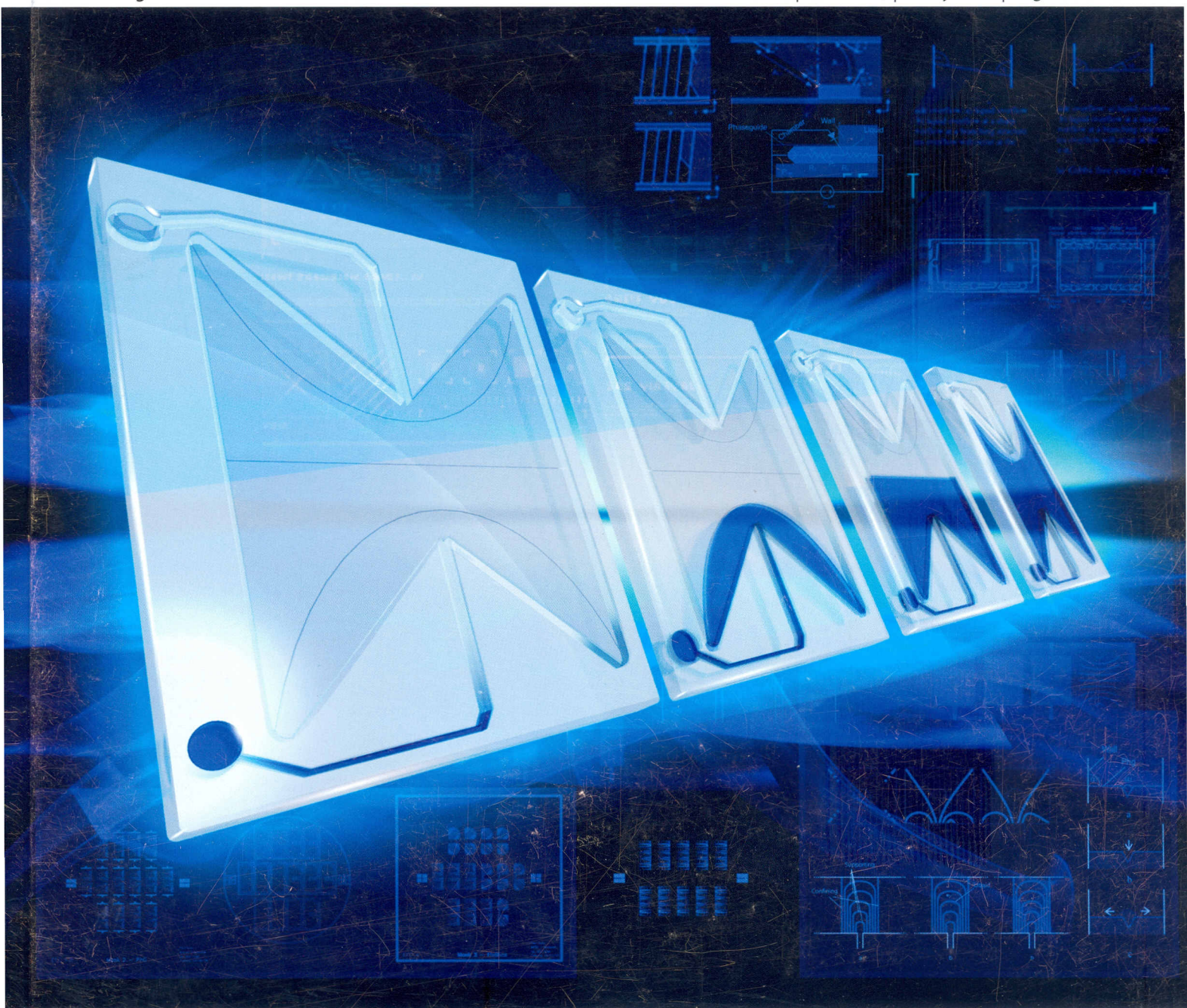


Lab on a Chip

Micro- & nano- fluidic research for chemistry, physics, biology, & bioengineering

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PAPER

Vulto *et al.*

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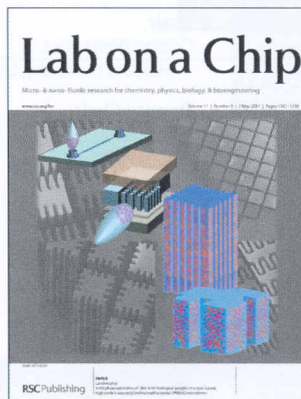
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Cover

See Vulto *et al.*, pp. 1596–1602.
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Inside cover

See Landers *et al.*,
pp. 1603–1611.
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FOCUS

1571

All I want for Christmas...

Holger Becker*

Holger Becker constructs a wish-list of unsolved technological issues—part of a series of Focus articles on the commercialization of microfluidics.



CRITICAL REVIEW

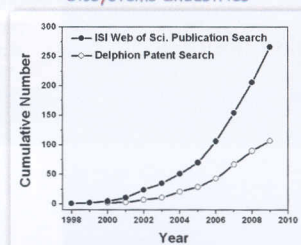
1574

Microfluidics for food, agriculture and biosystems industries

Suresh Neethirajan,* Isao Kobayashi, Mitsutoshi Nakajima,
Dan Wu, Saravanan Nandagopal and Francis Lin*

We critically review the current applications, emerging opportunities, and the future perspectives of microfluidic technology in the food, agricultural and biosystems industries.

Microfluidics for Agri-Food and Biosystems Industries

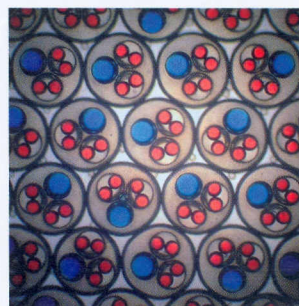


1587

Controllable microfluidic production of multicomponent multiple emulsions

Wei Wang, Rui Xie,* Xiao-Jie Ju, Tao Luo, Li Liu,
David A. Weitz and Liang-Yin Chu*

A highly scalable microfluidic device is developed for controlled generating multicomponent multiple emulsions with droplets containing different contents co-encapsulated in the same level.

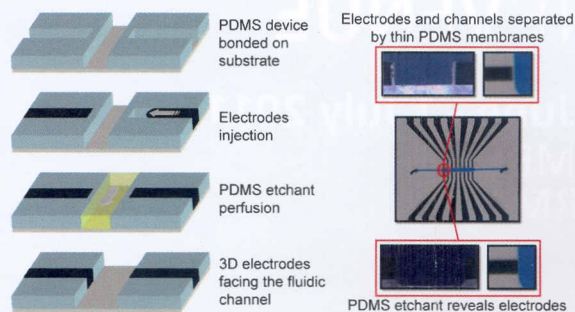


1593

How to embed three-dimensional flexible electrodes in microfluidic devices for cell culture applications

Andrea Pavesi, Francesco Piraino, Gianfranco B. Fiore,
Kevin M. Farino, Matteo Moretti and Marco Rasponi*

A simple, rapid and cost effective method of embedding a conductive and flexible material within microfluidic devices as a means to realize uniform electric fields within cellular microenvironments. Fluidic channels and electrodes are fabricated by traditional soft-lithography in conjunction with chemical etching of PDMS.



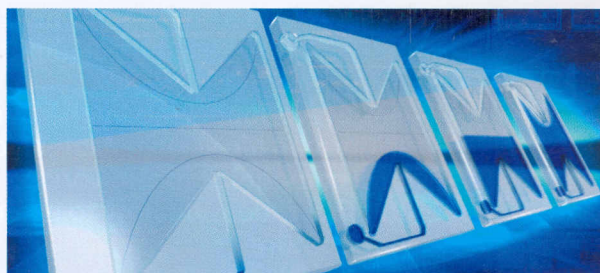
PAPERS

1596

Phaseguides: a paradigm shift in microfluidic priming and emptying

Paul Vulto,* Susann Podszun, Philipp Meyer,
Carsten Hermann, Andreas Manz and Gerald A. Urban

Phaseguide technology gives complete control over filling and emptying of microfluidic structures, independent of the chamber and channel geometry.

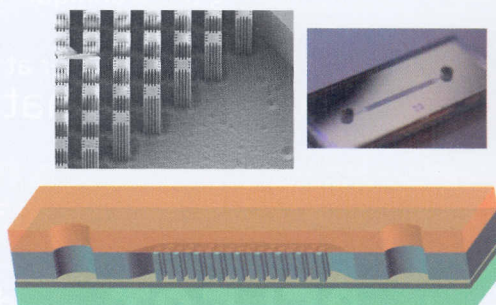


1603

Solid phase extraction of DNA from biological samples in a post-based, high surface area poly(methyl methacrylate) (PMMA) microdevice

Carmen R. Reedy, Carol W. Price, Jeff Sniegowski,
Jerome P. Ferrance, Matthew Begley and James P. Landers*

This work describes a PMMA microfluidic DNA purification device with embedded microfabricated posts, functionalized to allow for pH-induced DNA binding.

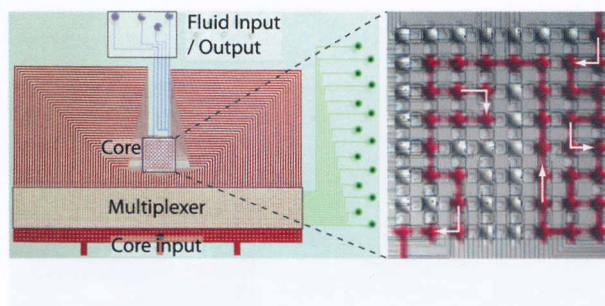


1612

A software-programmable microfluidic device for automated biology

Luis M. Fidalgo and Sebastian J. Maerkl*

Here we present a general-purpose software-programmable microfluidic device which is capable of performing a multitude of low- and high-level functions without requiring any hardware modifications.

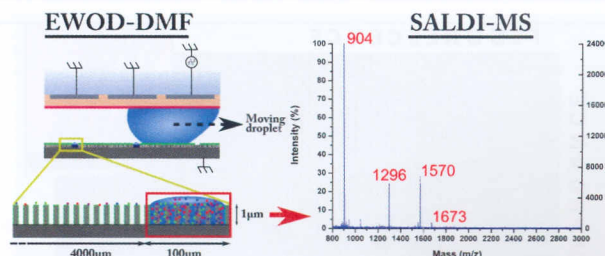


1620

High sensitive matrix-free mass spectrometry analysis of peptides using silicon nanowires-based digital microfluidic device

Florian Lapierre, Gaëlle Piret, Hervé Drobecq, Oleg Melnyk, Yannick Coffinier, Vincent Thomy* and Rabah Boukherroub*

An electrowetting on dielectric (EWOD) microfluidic system coupled to a surface-assisted laser desorption-ionization (SALDI) silicon nanowire-based interface for mass spectrometry (MS) analysis of small biomolecules.

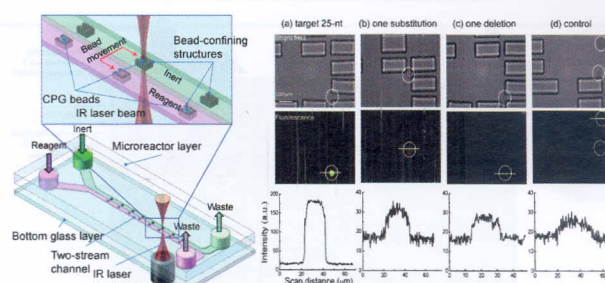


1629

Optical tweezers directed one-bead one-sequence synthesis of oligonucleotides

Tao Wang,* Stefan Oehrlein, Mark M. Somoza, Jose R. Sanchez Perez, Ryan Kershner and Franco Cerrina

An optical tweezers directed parallel DNA oligonucleotide synthesis on controlled pore glass beads in a two-stream microfluidic reactor was developed.

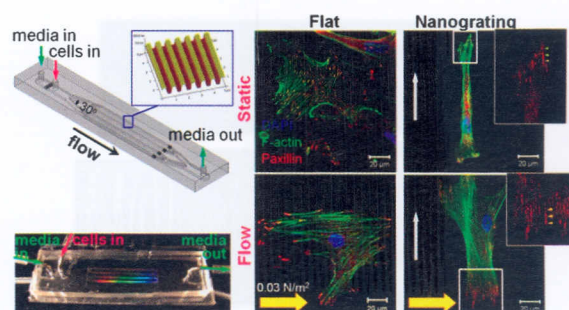


1638

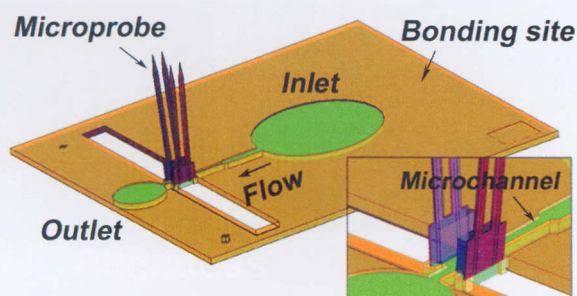
Engineering of a microfluidic cell culture platform embedded with nanoscale features

Yong Yang, Karina Kulangara, Jaren Sia, Lu Wang and Kam W. Leong*

Novel nanoengineering techniques have been developed to embed nanoscale features in a microfluidic platform for cell studies.



1647

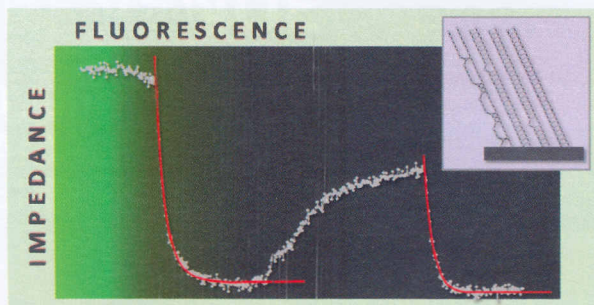


A three-dimensional flexible microprobe array for neural recording assembled through electrostatic actuation

Chang-Hsiao Chen, Shih-Chang Chuang, Huan-Chieh Su, Wei-Lun Hsu, Tri-Rung Yew, Yen-Chung Chang, Shih-Rung Yeh and Da-Jeng Yao*

We presented a novel three-dimensional flexible microprobe to record neural signals through an electrostatic actuation and capillarity. An assembly based on static electricity simplified the fabrication and was non-toxic.

1656

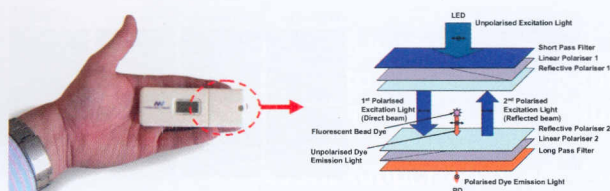


Rapid assessment of the stability of DNA duplexes by impedimetric real-time monitoring of chemically induced denaturation

B. van Grinsven,* N. Vanden Bon, L. Grieten, M. Murib, S. D. Janssens, K. Haenen, E. Schneider, S. Ingebrandt, M. J. Schöning, V. Vermeeren, M. Ameloot, L. Michiels, R. Thoelen, W. De Ceuninck and P. Wagner

Development of a novel label-free method for the detection of single nucleotide polymorphisms based on impedance spectroscopy.

1664

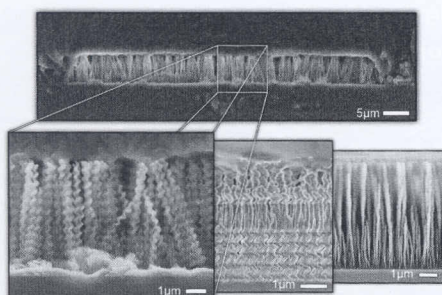


Highly sensitive fluorescence detection system for microfluidic lab-on-a-chip

Gihan Ryu, Jingsong Huang, Oliver Hofmann, Claire A. Walshe, Jasmine Y. Y. Sze, Gareth D. McClean, Alan Mosley, Simon J. Rattle,* John C. deMello, Andrew J. deMello and Donal D. C. Bradley*

This work demonstrates a compact, low cost and practical fluorescence detection system for lab-on-a-chip applications.

1671



Microchannels filled with diverse micro- and nanostructures fabricated by glancing angle deposition

Louis W. Bezuidenhout, Neda Nazemifard, Abebaw B. Jemere, D. Jed Harrison and Michael J. Brett*

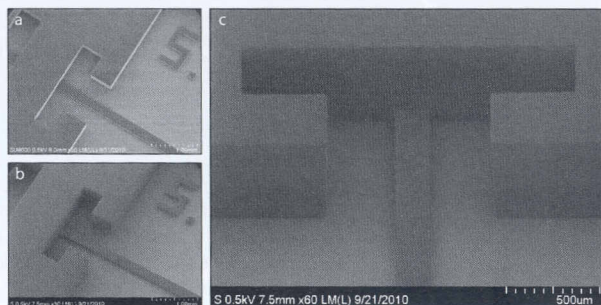
Nanostructures with controllable architecture and porosity, incorporated in microchannels using a sacrificial etch microfabrication technique, were used for separating DNA.

1679

Flexible casting of modular self-aligning microfluidic assembly blocks

Sean M. Langelier, Eric Livak-Dahl, Anthony J. Manzo, Brian N. Johnson, Nils G. Walter and Mark A. Burns*

An advanced modular assembly block platform aimed at bringing do-it-yourself microfluidics to researchers not skilled in fabrication.



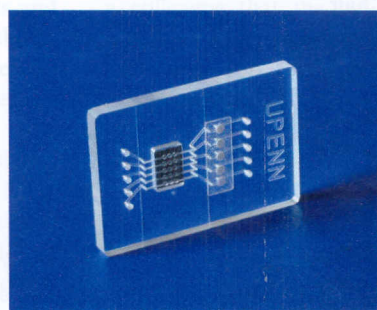
TECHNICAL NOTES

1688

A membrane-based, high-efficiency, microfluidic debubbler

Changchun Liu, Jason A. Thompson and Haim H. Bau*

A novel, efficient, reliable debubbler for microfluidic systems is described.



1694

Lithographic patterning on polydimethylsiloxane surfaces using polydimethylglutarimide

Roger M. Diebold* and David R. Clarke

A new processing technique is presented which permits high fidelity lithography directly on untreated polydimethylsiloxane surfaces using polydimethylglutarimide.

