

# Lab on a Chip

## Devices and applications at the micro- and nanoscale rsc.li/loc

The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

### IN THIS ISSUE

ISSN 1473-0197 CODEN LCAHAM 24(1) 1-152 (2024)



#### Cover

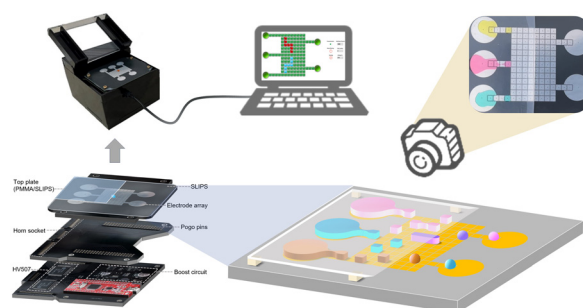
See Xiaodong He et al.,  
pp. 8–19.  
Image reproduced by  
permission of Xiaodong He  
from *Lab Chip*, 2024, **24**, 8.

### PAPERS

8

#### Droplet manipulation on an adjustable closed-open digital microfluidic system utilizing asymmetric EWOD

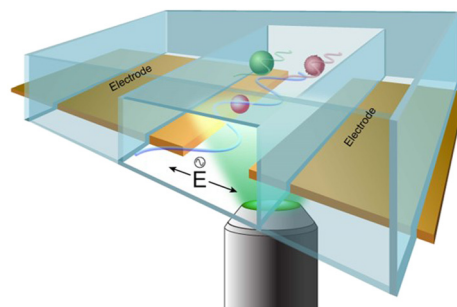
Jingsong Xu, Xingcheng Wang, Qingyuan Huang and Xiaodong He\*



20

#### Measuring the electrophoretic mobility and size of single particles using microfluidic transverse AC electrophoresis (TrACE)

M. Hannah Choi,\* Liu Hong, Leonardo P. Chamorro, Boyd Edwards and Aaron T. Timperman\*



# Advance your career in science

with professional recognition that showcases your **experience, expertise and dedication**

## Stand out from the crowd

Prove your commitment to attaining excellence in your field

## Gain the recognition you deserve

Achieve a professional qualification that inspires confidence and trust

## Unlock your career potential

Apply for our professional registers (RSci, RSciTech) or chartered status (CChem, CSci, CEnv)

## Apply now

[rsc.li/professional-development](https://rsc.li/professional-development)

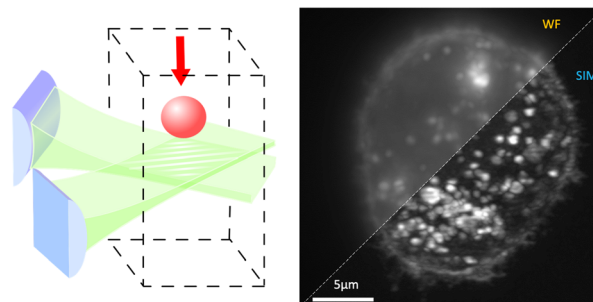


Registered charity number: 207890

34

### Structured-light-sheet imaging in an integrated optofluidic platform

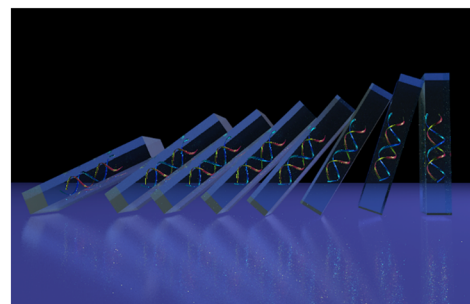
Petra Paiè,\* Gianmaria Calisesi, Alessia Candeo, Andrea Comi, Federico Sala, Francesco Ceccarelli, Ada De Luigi, Pietro Vegliane, Korbinian Muhlberger, Michael Fokine, Gianluca Valentini, Roberto Osellame, Mark Neil, Andrea Bassi and Francesca Bragheri\*



47

### Micropillar enhanced FRET-CRISPR biosensor for nucleic acid detection

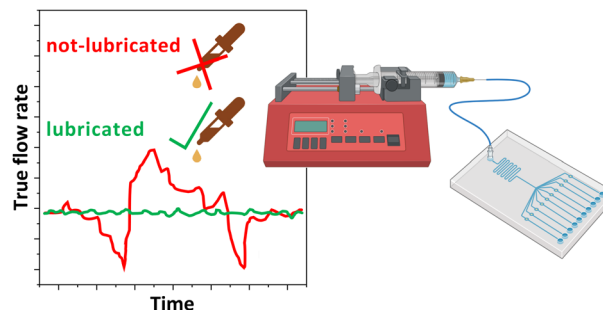
Mengdi Bao, Stephen J. Dollery, FNU Yuqing, Gregory J. Tobin and Ke Du\*



56

### Grease the gears: how lubrication of syringe pumps impacts microfluidic flow precision

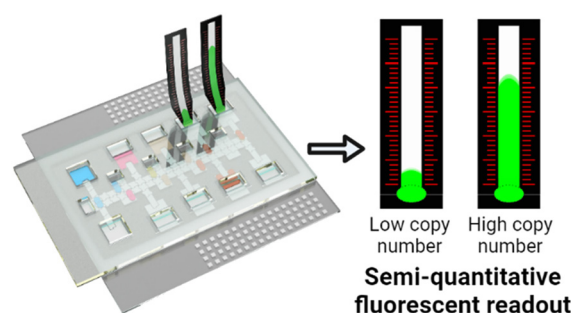
Moritz Leuthner\* and Oliver Hayden\*



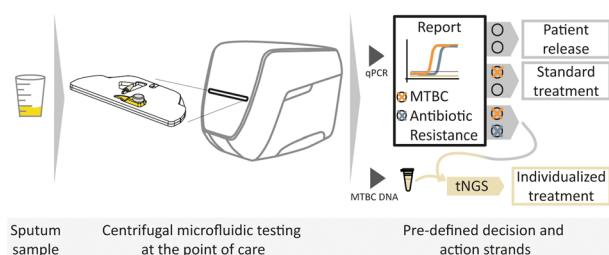
63

### Digital microfluidics with distance-based detection – a new approach for nucleic acid diagnostics

Man Ho, N. Sathishkumar, Alexandros A. Sklavounos, Jianxian Sun, Ivy Yang, Kevin P. Nichols and Aaron R. Wheeler\*



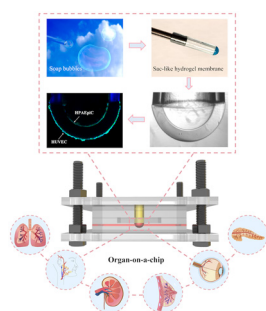
74



## Two-stage tuberculosis diagnostics: combining centrifugal microfluidics to detect TB infection and *Inh* and *Rif* resistance at the point of care with subsequent antibiotic resistance profiling by targeted NGS

J. Schlenderer, H. Hoffmann, J. Lüddecke, A. Golubov, W. Grasse, E. V. Kindler, T. A. Kohl, M. Merker, C. Metzger, V. Mohr, S. Niemann, C. Pilloni, S. Plesnik, B. Raya, B. Shresta, C. Utpatel, R. Zengerle, M. Beutler and N. Paust\*

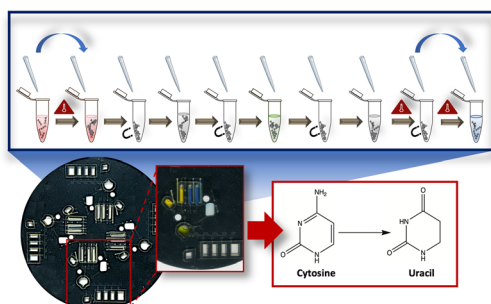
85



## Fabrication of sac-like hydrogel membranes for replicating curved tissue barriers on chips

Wenqi She, Chong Shen, Yinghua Ying and Qin Meng\*

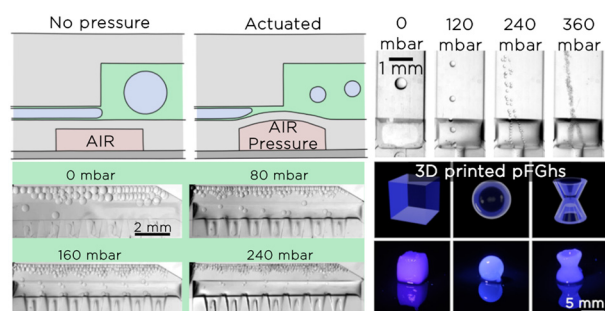
97



## A rotationally-driven dynamic solid phase sodium bisulfite conversion disc for forensic epigenetic sample preparation

R. Turiello,\* R. L. Nouwairi, J. Keller, L. L. Cunha, L. M. Dignan and J. P. Landers

113



## Tuna-step: tunable parallelized step emulsification for the generation of droplets with dynamic volume control to 3D print functionally graded porous materials

Francesco Nalin, Maria Celeste Tirelli, Piotr Garstecki, Witold Postek\* and Marco Costantini\*

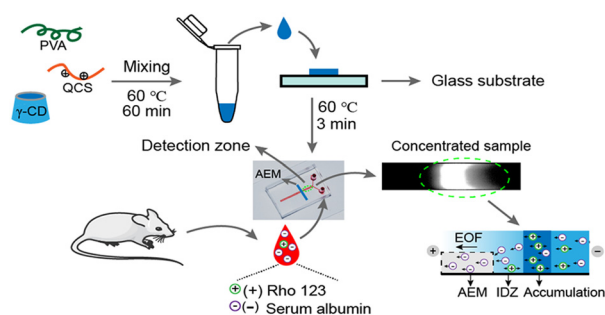


## PAPERS

127

# High-performance cation electrokinetic concentrator based on a $\gamma$ -CD/QCS/PVA composite and microchip for evaluating the activity of P-glycoprotein without any interference from serum albumin

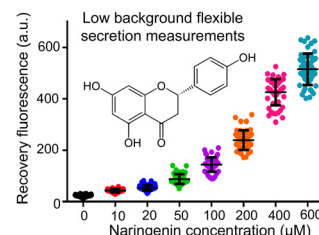
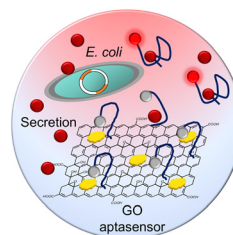
Runhui Zhang, Jun Xu, Jieqi Deng, Wei Ouyang, Hanren Chen, Qing Tang, Shiquan Zheng and Lihong Liu\*



137

# Graphene oxide aptasensor droplet assay for detection of metabolites secreted by single cells applied to synthetic biology

Dan Zheng, Jingyun Zhang, Wenxin Jiang, Ying Xu, Haixu Meng, Chueh Loo Poh\* and Chia-Hung Chen\*



## CORRECTIONS

148

# Correction: Measuring the electrophoretic mobility and size of single particles using microfluidic transverse AC electrophoresis (TrACE)

M. Hannah Choi,\* Liu Hong, Leonardo P. Chamorro, Boyd Edwards and Aaron T. Timperman\*

149

# Correction: Enhanced cardiomyocyte structural and functional anisotropy through synergetic combination of topographical, conductive, and mechanical stimulation

Jongyun Kim, Arunkumar Shanmugasundaram, Cheong Bin Lee, Jae Rim Kim, Jeong Jae Park, Eung-Sam Kim, Bong-Kee Lee and Dong-Weon Lee\*

