

# 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(7) 1823-2136 (2024)



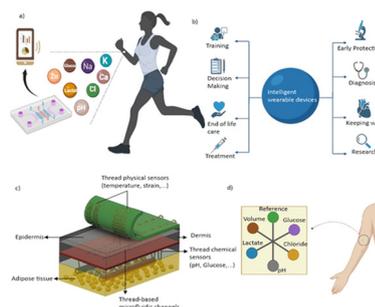
**Cover**  
See Houjin Zhang,  
Huan Liu *et al.*,  
pp. 1875-1886.  
Image reproduced by  
permission of Huan Liu from  
*Lab Chip*, 2024, 24, 1875.

### CRITICAL REVIEW

1833

#### Recent developments and future perspectives of microfluidics and smart technologies in wearable devices

Sasikala Apoorva, Nam-Trung Nguyen and Kamalalayam Rajan Sreejith\*

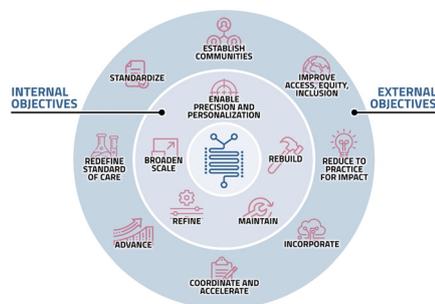


### PERSPECTIVE

1867

#### Next generation microfluidics: fulfilling the promise of lab-on-a-chip technologies

Umut A. Gurkan,\* David K. Wood,\* Dorn Carranza, Luke H. Herbertson, Scott L. Diamond, E. Du, Suvajyoti Guha, Jorge Di Paola, Patrick C. Hines, Ian Papautsky, Sergey S. Shevkoplyas, Nathan J. Sniadecki, Vamsee K. Pamula, Prithu Sundd, Asif Rizwan, Pankaj Qasba and Wilbur A. Lam\*





# 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)

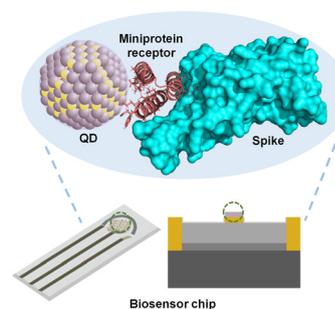


## PAPERS

1875

### A miniprotein receptor electrochemical biosensor chip based on quantum dots

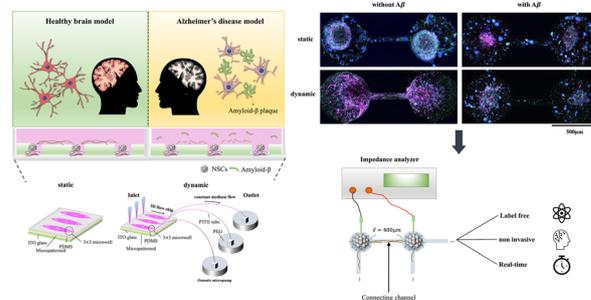
Yunong Zhao, Juan Han, Jing Huang, Qing Huang, Yanbing Tao, Ruiqin Gu, Hua-Yao Li, Yang Zhang, Houjin Zhang\* and Huan Liu\*



1887

### Comparison between dynamic *versus* static models and real-time monitoring of neuronal dysfunction in an amyloid- $\beta$ induced neuronal toxic model on a chip platform

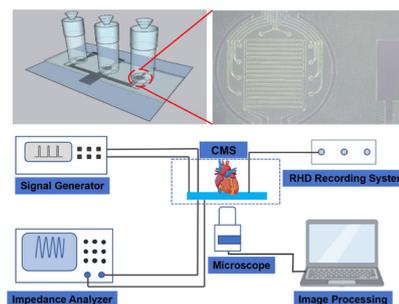
Chu-Chun Liang, Po-Yen Chen, Nien-Che Liu and I-Chi Lee\*



1903

### Multifunctional cardiac microphysiological system based on transparent ITO electrodes for simultaneous optical measurement and electrical signal monitoring

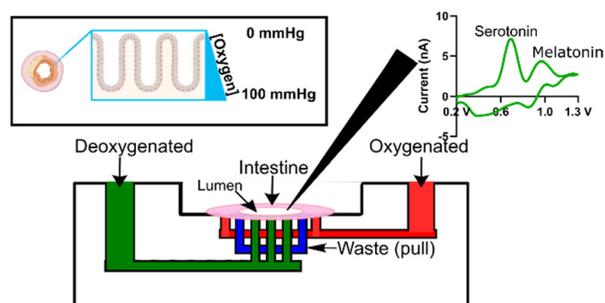
Zhangjie Li, Kai Niu, Chenyang Zhou, Feifan Wang, Kangyi Lu, Yijun Liu, Lian Xuan and Xiaolin Wang\*



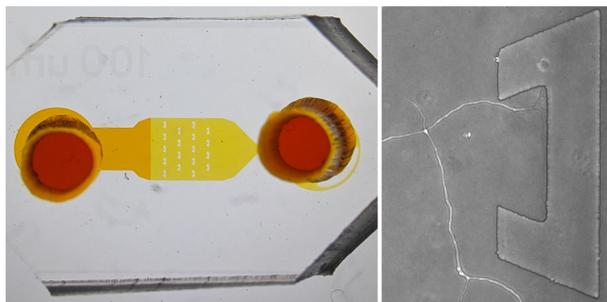
1918

### A microfluidic chip for sustained oxygen gradient formation in the intestine *ex vivo*

Lauren M. DeLong, Colby E. Witt, Madison Pennell and Ashley E. Ross\*



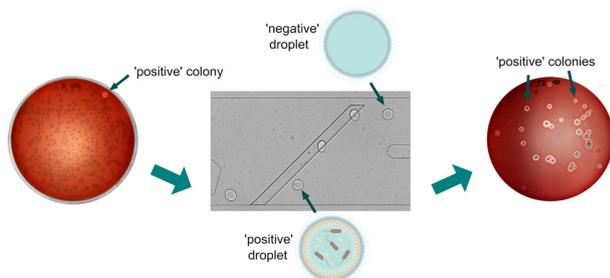
1930



### AMF-SporeChip provides new insights into arbuscular mycorrhizal fungal symbiotic hyphal growth dynamics at the cellular level

Felix Richter, Maryline Calonne-Salmon, Marcel G. A. van der Heijden, Stéphane Declerck and Claire E. Stanley\*

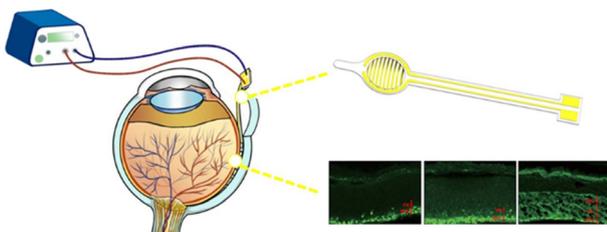
1947



### Droplet microfluidic system for high throughput and passive selection of bacteria producing biosurfactants

Kludia Staskiewicz, Maria Dabrowska-Zawada, Lukasz Kozon, Zofia Olszewska, Lukasz Drewniak and Tomasz S. Kaminski\*

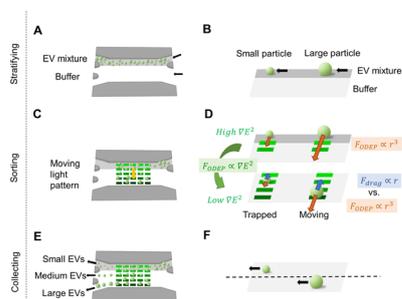
1957



### A flexible electrode Array for genetic transfection of different layers of the retina by electroporation

Yu Zhang, Tao Peng, Yu Ge, Mengda Li, Chendi Li, Jiyu Xi, Zixi Li, Zewen Wei\* and Yuntao Hu\*

1965



### Nanoscale sorting of extracellular vesicles via optically-induced dielectrophoresis on an integrated microfluidic system

Wei-Jen Soong, Chih-Hung Wang, Chihchen Chen and Gwo-Bin Lee\*

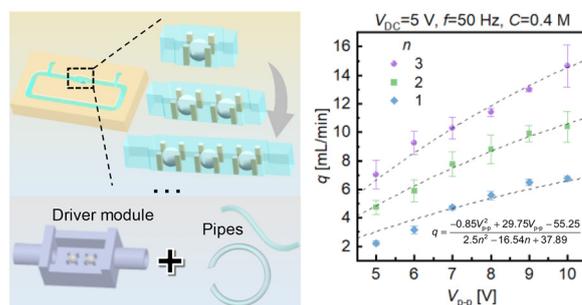


## PAPERS

1977

**A system for fluid pumping by liquid metal multi-droplets**

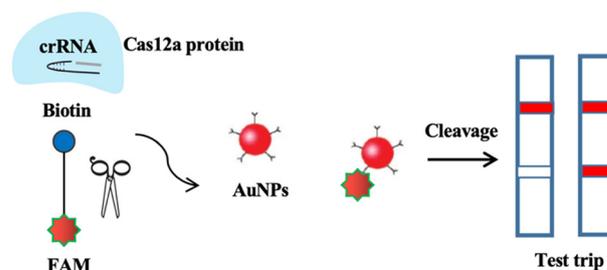
Liyu Dai, Xiaomin Wu,\* Huimin Hou, Zhifeng Hu, Yukai Lin and Zhiping Yuan\*



1987

**Test strip coupled Cas12a-assisted signal amplification strategy for sensitive detection of uracil-DNA glycosylase**

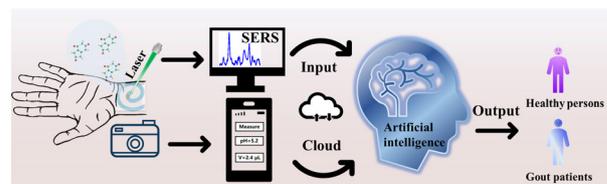
Bin Guo, Chong Hu, Zeping Yang, Chu Tang, Chuanxian Zhang and Fu Wang\*



1996

**Wearable intelligent sweat platform for SERS-AI diagnosis of gout**

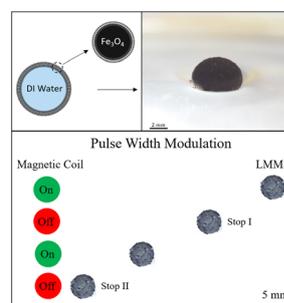
Zhaoxian Chen, Wei Wang, Hao Tian, Wenrou Yu, Yu Niu, Xueli Zheng,\* Shihong Liu, Li Wang and Yingzhou Huang\*



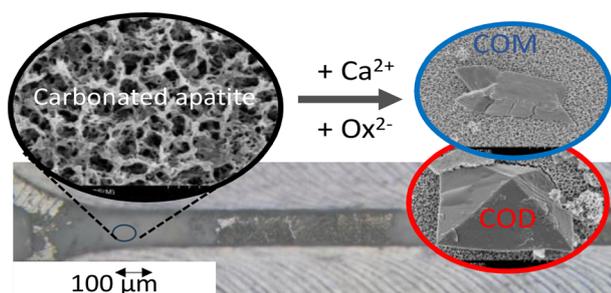
2005

**Dynamic behavior of floating magnetic liquid marbles under steady and pulse-width-modulated magnetic fields**

Hossein Dayyani, Alireza Mohseni and Mohamad Ali Bijarchi\*



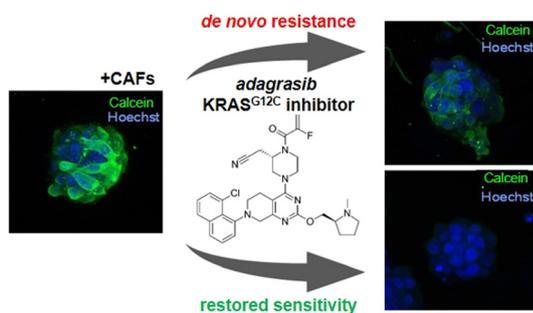
2017



### Confining calcium oxalate crystal growth in a carbonated apatite-coated microfluidic channel to better understand the role of Randall's plaque in kidney stone formation

Samantha Bourg, Karol Rakotozandriny, Ivan T. Lucas, Emmanuel Letavernier, Christian Bonhomme, Florence Babonneau and Ali Abou-Hassan\*

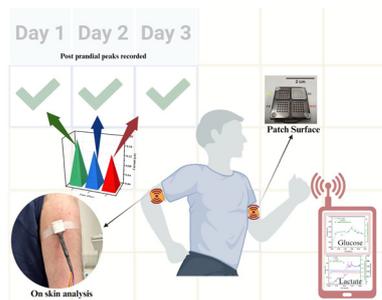
2025



### Deciphering fibroblast-induced drug resistance in non-small cell lung carcinoma through patient-derived organoids in agarose microwells

Qiyue Luan, Ines Pulido, Angeliqye Isagirre, Julian Carretero, Jian Zhou, Takeshi Shimamura and Ian Papautsky\*

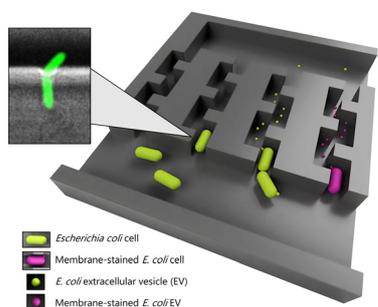
2039



### Lab on skin: real-time metabolite monitoring with polyphenol film based subdermal wearable patches

Georgeta Vulpe, Guoyi Liu, Sam Oakley, Guanghao Yang, Arjun Ajith Mohan,\* Mark Waldron and Sanjiv Sharma\*

2049



### Capturing of extracellular vesicles derived from single cells of *Escherichia coli*

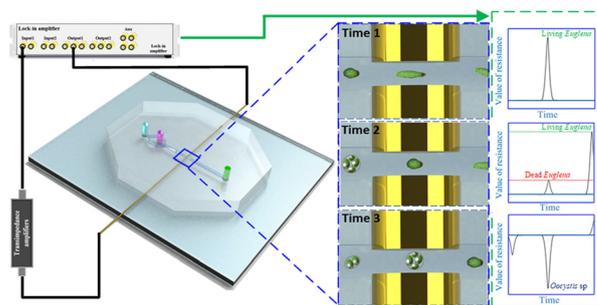
Fumiaki Yokoyama, André Kling and Petra S. Dittrich\*



2058

### Microfluidic impedance cytometry with flat-end cylindrical electrodes for accurate and fast analysis of marine microalgae

Xiaoming Chen,\* Mo Shen, Shun Liu, Chungang Wu, Liangliang Sun, Zhipeng Song, Jishun Shi, Yulong Yuan and Yong Zhao\*



2069

### Tonicity-induced cargo loading into extracellular vesicles

Chaeun Lee, Sumit Kumar, Juhee Park, Yongjun Choi, Elizabeth Maria Clarissa and Yoon-Kyoung Cho\*

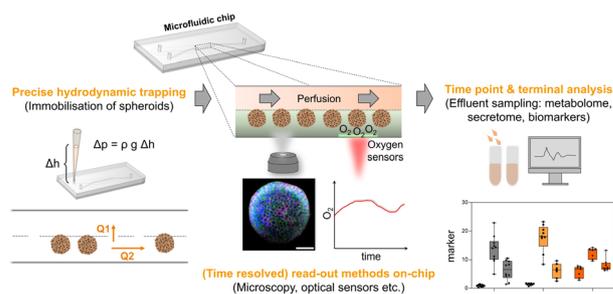
### Tonicity-induced cargo loading into EVs



2080

### Microphysiological pancreas-on-chip platform with integrated sensors to model endocrine function and metabolism

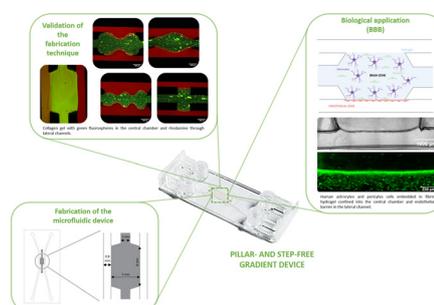
Katharina Schlünder, Madalena Cipriano, Aline Zbinden, Stefanie Fuchs, Torsten Mayr, Katja Schenke-Layland and Peter Loskill\*



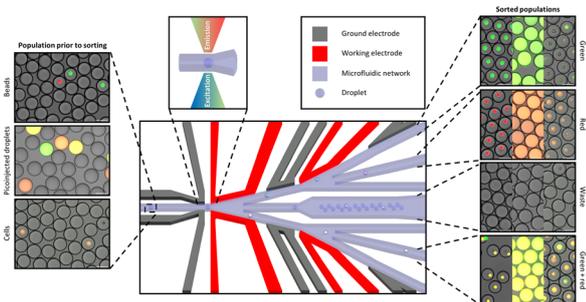
2094

### Tuneable hydrogel patterns in pillarless microfluidic devices

Claudia Olaizola-Rodrigo, Sujey Palma-Florez, Teodora Randelović, Clara Bayona, Mehran Ashrafi, Josep Samitier, Anna Lagunas, Mònica Mir, Manuel Doblare, Ignacio Ochoa,\* Rosa Monge\* and Sara Oliván\*



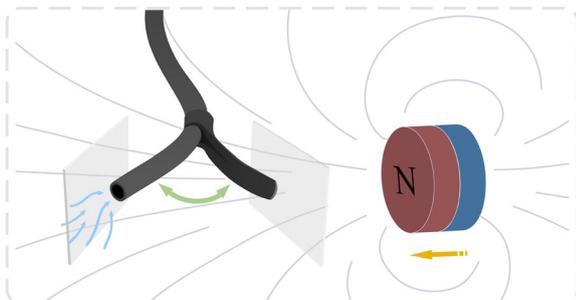
2107



### SeParate: multiway fluorescence-activated droplet sorting based on integration of serial and parallel triaging concepts

Wannes Verbist, Jolien Breukers, Sapna Sharma, Iene Rutten, Hans Gerstmans, Lotte Coelmont, Francesco Dal Dosso, Kai Dallmeier and Jeroen Lammertyn\*

2122



### Multifunctional flexible magnetic drive gripper for target manipulation in complex constrained environments

Meiying Zhao, Ye Tao,\* Wenshang Guo, Zhenyou Ge, Hanqing Hu, Ying Yan, Chaoxia Zou, Guiyu Wang\* and Yukun Ren\*

