

# Lab on a Chip

Devices and applications at the micro- and nanoscale  
[rsc.li/loc](https://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(14) 3317–3570 (2024)



### Cover

See Yan-qing Lu, Lumbiao Cui, Guanghui Wang *et al.*, pp. 3367–3376.  
Image reproduced by permission of Guanghui Wang from *Lab Chip*, 2024, 24, 3367.



### Inside cover

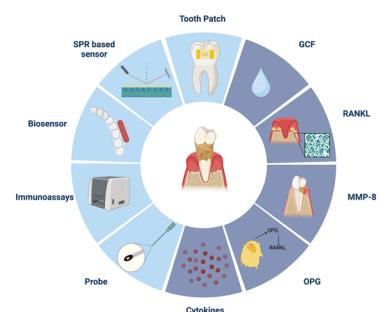
See Shoji Takeuchi *et al.*, pp. 3377–3387.  
Image reproduced by permission of Tomohiro Morita from *Lab Chip*, 2024, 24, 3377. Image designed using Adobe Firefly.

## CRITICAL REVIEWS

3326

### Periodontal disease and emerging point-of-care technologies for its diagnosis

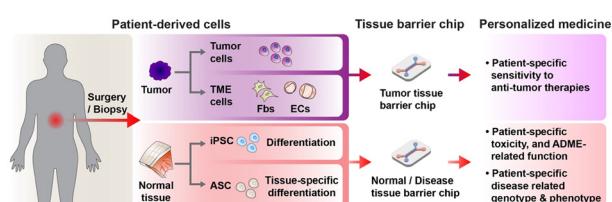
Jayesh Korgaonkar, Azra Yaprak Tarman, Hatice Ceylan Koydemir\* and Sasanka S. Chukkapalli\*



3347

### Reconstitution of human tissue barrier function for precision and personalized medicine

Jaehoon Kim, Taehee Yoon, Sungryeong Lee, Paul J. Kim and YongTae Kim\*





# Royal Society of Chemistry approved training courses

Explore your options.  
Develop your skills.  
Discover learning  
that suits you.

**Courses in the classroom,  
the lab, or online**

Find something for every  
stage of your professional  
development. Search our  
database by:

- subject area
- location
- event type
- skill level

Members get at least 10% off

Visit [rsc.li/cpd-training](https://rsc.li/cpd-training)

**SAVE  
10%**

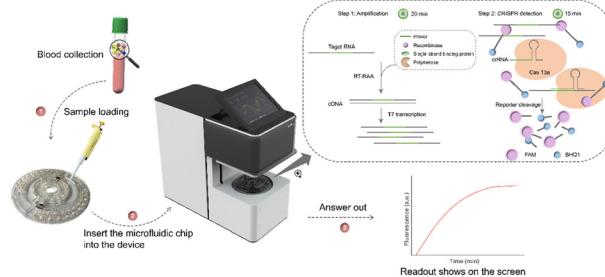


## PAPERS

3367

## Portable all-in-one microfluidic system for CRISPR-Cas13a-based fully integrated multiplexed nucleic acid detection

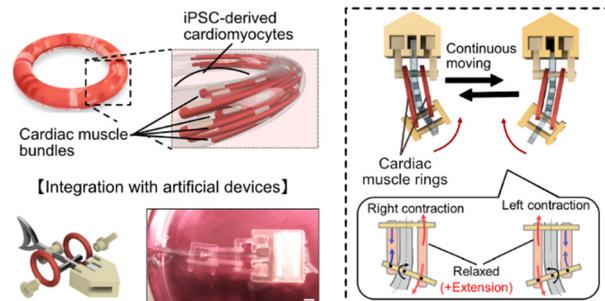
Ya Zhang, Yue Guo, Guozhen Liu, Shiqi Zhou, Rouyu Su, Qian Ma, Yiyue Ge, Yan-qing Lu,\* Lunbiao Cui\* and Guanghui Wang\*



3377

## Human induced pluripotent stem cell-derived cardiac muscle rings for biohybrid self-beating actuator

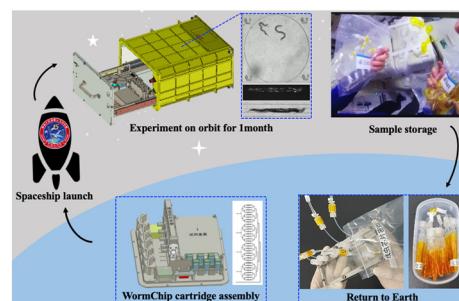
Tomohiro Morita, Minghao Nie and Shoji Takeuchi\*



3388

## WormSpace $\mu$ -TAS enabling automated on-chip multi-strain culturing and multi-function imaging of *Caenorhabditis elegans* at the single-worm level on the China Space Station

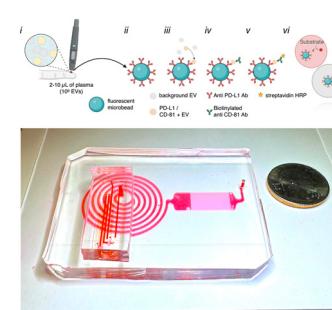
Qianqian Yang, Runtao Zhong,\* Wenbo Chang, Kexin Chen, Mengyu Wang, Shuqi Yuan, Zheng Liang, Wei Wang, Chao Wang, Guanghui Tong, Tao Zhang and Yeqing Sun\*



3403

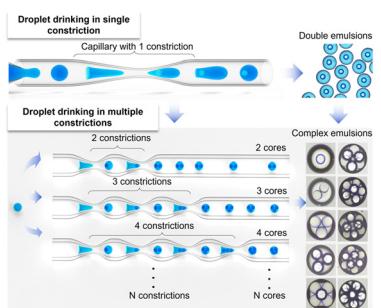
## Ultrasensitive quantification of PD-L1+ extracellular vesicles in melanoma patient plasma using a parallelized high throughput droplet digital assay

Hanfei Shen, Yasemin Atiyas, Zijian Yang, Andrew A. Lin, Jingbo Yang, Diao Liu, Juhwan Park, Wei Guo and David A. Issadore\*



## PAPERS

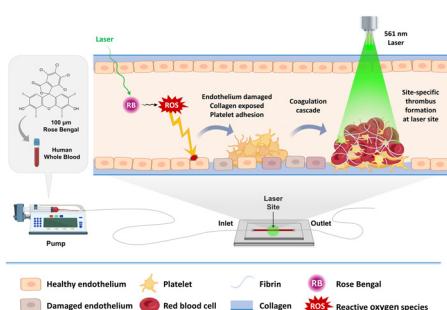
3412



## Droplet drinking in constrictions

Shi Feng, Chundong Xue, Cunliang Pan and Shengyang Tao\*

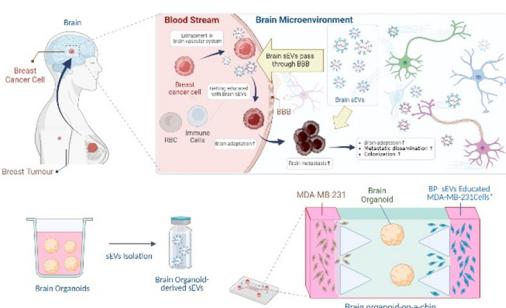
3422



## Site-specific thrombus formation: advancements in photothrombosis-on-a-chip technology

Kuan-Ting Liu, Pai-Wen Wang, Han-Yun Hsieh, Han-Chi Pan, Hsian-Jean Chin, Che-Wei Lin, Yu-Jen Huang, Yung-Chieh Liao, Ya-Chun Tsai, Shang-Ru Liu, I.-Chang Su, Yen-Fang Song, Gung-Chian Yin, Kuang-Chong Wu, Er-Yuan Chuang, Yu-Jui (Ray) Fan\* and Jiashing Yu\*

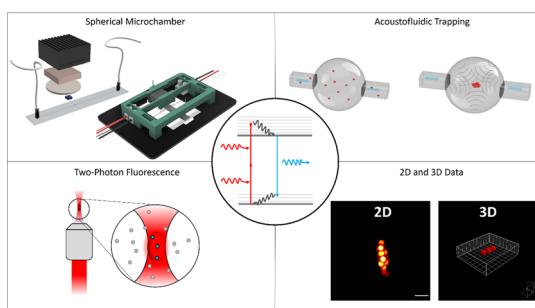
3434



## Impact of brain organoid-derived sEVs on metastatic adaptation and invasion of breast carcinoma cells through a microphysiological system

Hojjatollah Nazari, Ann-Na Cho, Dale Goss, Jean Paul Thiery and Majid Ebrahimi Warkiani\*

3456



## Two-photon microscopy of acoustofluidic trapping for highly sensitive cell analysis

Thomas Kellerer, Bettina Sailer, Patrick Byers, Rune Barnkob, Oliver Hayden and Thomas Hellerer\*

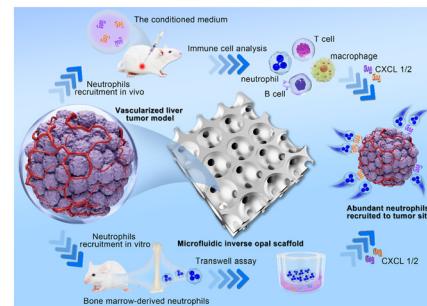


## PAPERS

3470

***In vitro* vascularized liver tumor model based on a microfluidic inverse opal scaffold for immune cell recruitment investigation**

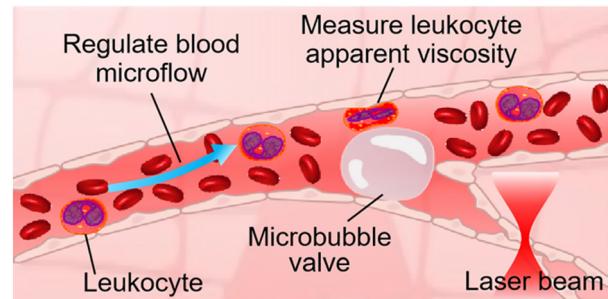
Pingwei Xu, Junjie Chi,\* Xiaochen Wang, Meng Zhu, Kai Chen, Qihui Fan,\* Fangfu Ye\* and Changmin Shao\*



3480

**Laser-induced microbubble as an *in vivo* valve for optofluidic manipulation in living Mice's microvessels**

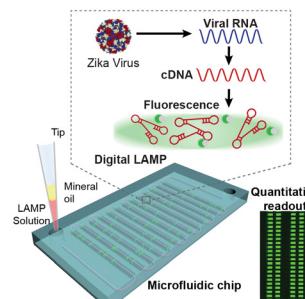
Meng Shao, Changxu Li, Chun Meng, Rui Liu, Panpan Yu, Fengya Lu, Zhensheng Zhong, Xunbin Wei,\* Jinhua Zhou\* and Min-Cheng Zhong\*



3490

**Development of a self-powered digital LAMP microfluidic chip (SP-dChip) for the detection of emerging viruses**

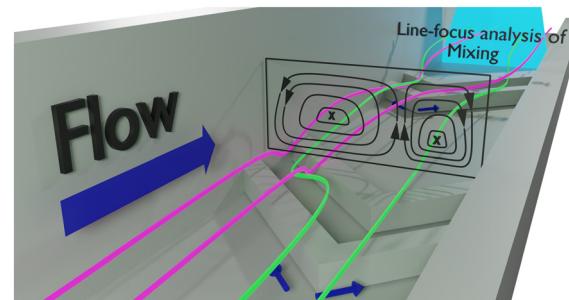
Tom Kaspuris, Po-Chen Yeh, Li Liu, Jeffrey Marano, James Weger-Lucarelli, Ke Du, Liwei Lin\* and Juhong Chen\*



3498

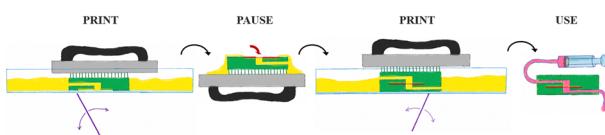
**In-line Raman imaging of mixing by herringbone grooves in microfluidic channels**

W. J. Niels Klement, Elia Savino, Wesley R. Browne\* and Elisabeth Verpoorte\*



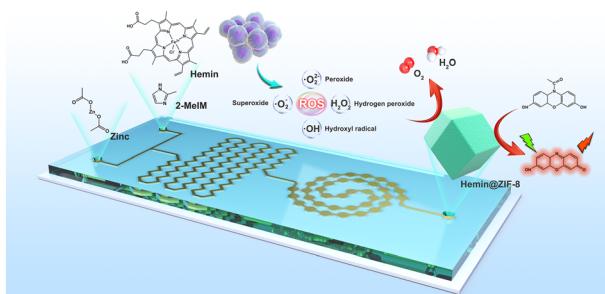
## PAPERS

3508


**Functionality integration in stereolithography 3D printed microfluidics using a “print-pause-print” strategy**

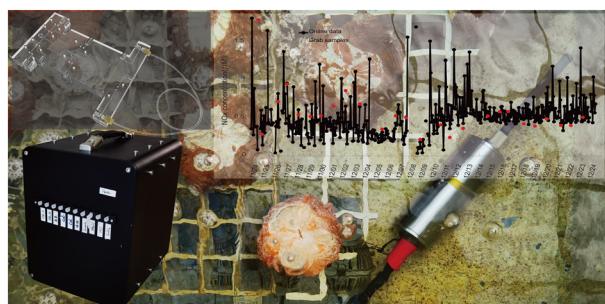
Matthieu Sagot, Timothée Derkenne, Perrine Giunchi, Yohan Davit, Jean-Philippe Nougayrède, Corentin Tregouet, Vincent Rimbault, Laurent Malaquin and Bastien Venzac\*

3521


**Microfluidic synthesis of hemin@ZIF-8 nanozyme with applications in cellular reactive oxygen species detection and anticancer drug screening**

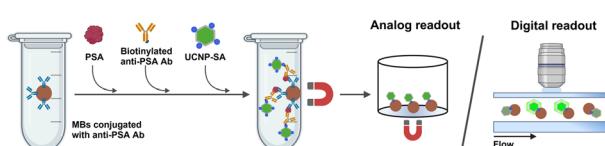
Yanping Wang, Shujun Feng, Xuyuan Wang, Chungui Tao, Yuta Liu, Yanyi Wang, Yanfeng Gao, Jinsong Zhao\* and Yujun Song\*

3528


**A high-sensitivity lab-on-a-chip analyzer for online monitoring of nitrite and nitrate in seawater based on liquid waveguide capillary cells**

Zeming Yang, Junxiao Zhang, Jincheng Zhao, Wen Zhou, Yuanyue Cheng, Zhan Tang Xu, Panpan Wei, Zihui Wang, Haorui Liang and Cai Li\*

3536


**Single-molecule microfluidic assay for prostate-specific antigen based on magnetic beads and upconversion nanoparticles**

Dorota Sklenářová, Antonín Hlaváček,\* Jana Křivánková, Julian C. Brandmeier, Julie Weisová, Michal Řiháček, Hans H. Gorris, Petr Skládal and Zdeněk Farka\*

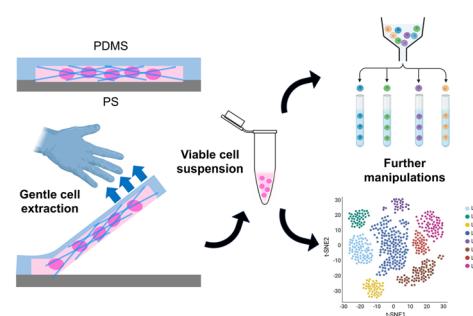


## PAPERS

3546

**Reversibly-bonded microfluidic devices for stable cell culture and rapid, gentle cell extraction**

Xiaohan Feng, Zehaoyu Wu, Lily Kwan Wai Cheng,  
 Yang Xiang, Ryohichi Sugimura, Xuyan Lin\*  
 and Angela Ruohao Wu\*



3556

**Microfluidic fabrication of monodisperse microcapsules with gas cores**

Shi-Hao Yang, Wan-Lu Song, Lin-Ling Fan,  
 Chuan-Fu Deng, Rui Xie, Wei Wang, Zhuang Liu,  
 Da-Wei Pan, Xiao-Jie Ju\* and Liang-Yin Chu\*

