

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(4) 631–986 (2024)



Cover

See Si-Hyung Lim *et al.*, pp. 658–667.
Image reproduced by permission of Si-Hyung Lim from *Lab Chip*, 2024, 24, 658.



Inside cover

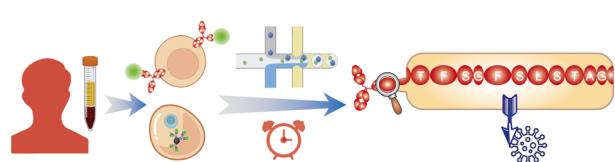
See Matthias Geissler, Daniel Brassard *et al.*, pp. 668–679.
Image reproduced by permission of Matthias Geissler (National Research Council) from *Lab Chip*, 2024, 24, 668.

PERSPECTIVE

642

Microfluidic-assisted single-cell RNA sequencing facilitates the development of neutralizing monoclonal antibodies against SARS-CoV-2

Ziwei Wang, Amelia Siqi Huang, Lingfang Tang, Jianbin Wang and Guanbo Wang*

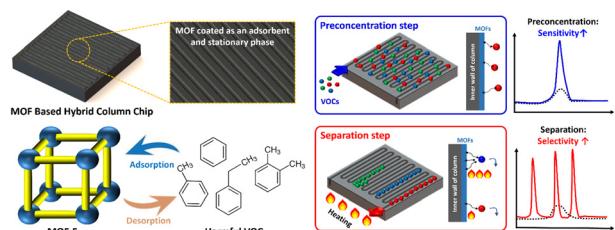


PAPERS

658

Metal–organic framework-based high-performance column chip for micro gas chromatography: hybrid function for simultaneous preconcentration and separation of volatile organic compounds

Yeongseok Lee, Yuntaek Choi, Jaehyun Sim, Jeonghun Kim and Si-Hyung Lim*



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

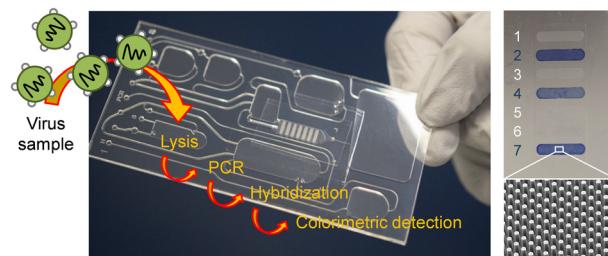


PAPERS

668

Centrifugal microfluidic system for colorimetric sample-to-answer detection of viral pathogens

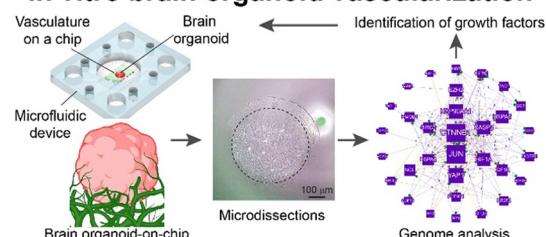
Matthias Geissler, Daniel Brassard, Nadine Adam, Neda Nasheri, Ana Victoria C. Pilar, Kyle Tapp, Liviu Clime, Caroline Miville-Godin, Maxence Mounier, Christina Nassif, Ljuboje Lukic, Lidija Malic, Nathalie Corneau* and Teodor Veres*



680

Deciphering potential vascularization factors of on-chip co-cultured hiPSC-derived cerebral organoids

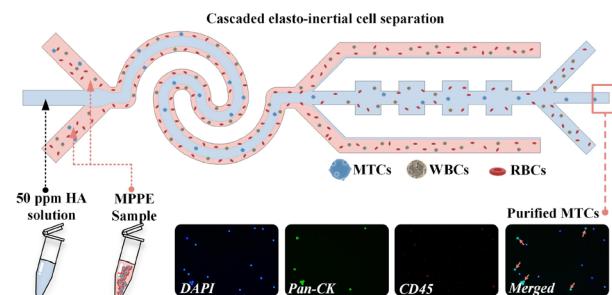
Maneesha Shaji, Atsushi Tamada, Kazuya Fujimoto, Keiko Muguruma,* Stanislav L. Karsten* and Ryuji Yokokawa*

In vitro brain organoid vascularization

697

Cascaded elasto-inertial separation of malignant tumor cells from untreated malignant pleural and peritoneal effusions

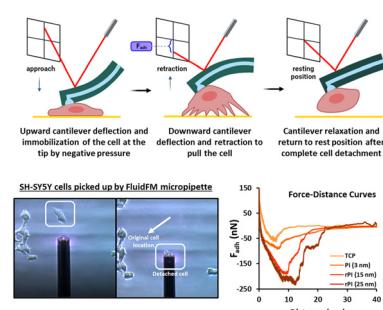
Chen Ni, Dan Wu, Yao Chen, Silin Wang and Nan Xiang*



707

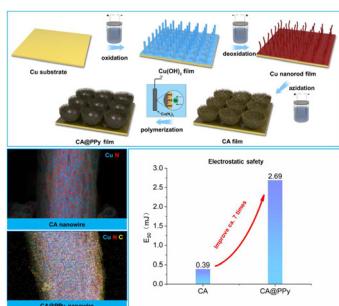
Single-cell fluid-based force spectroscopy reveals near lipid size nano-topography effects on neural cell adhesion

Zeina Habli, Rima Lahoud, Ahmad Zantout, Wassim Abou-Kheir and Massoud L. Khrache*



PAPERS

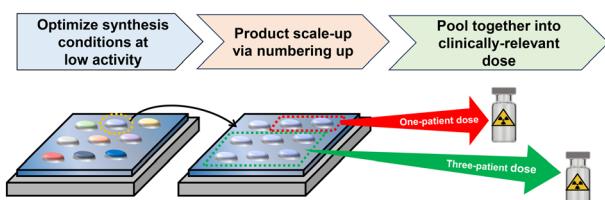
719



Synthesis and protection: a controllable electrochemical approach to polypyrrole-coated copper azide with superior safety for MEMS

Minghao Bao, Chunpei Yu,* Gexing Yang, Junhong Chen, He Cheng, Jianyong Xu, Wei Shi, Changkun Song, Xiaoting Lei, Zhongbo Han and Wenchao Zhang*

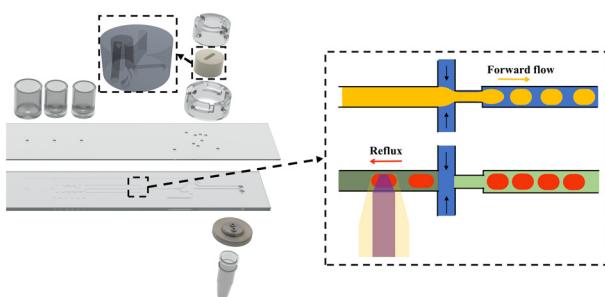
728



Scalable droplet-based radiosynthesis of $[^{18}\text{F}]$ fluorobenzyltriphenylphosphonium cation ($[^{18}\text{F}]$ FBnTP) via a “numbering up” approach

Yingqing Lu, Jeffrey Collins, Kuo-Shyan Lin and R. Michael van Dam*

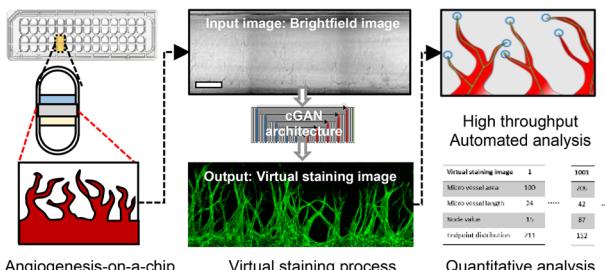
738



A ddPCR platform based on a microfluidic chip with a dual-function flow-focusing structure for sample-to-result DNA quantification analysis

Xiaoliang Zhang, Shun Wang, Jinxian Wang, Xiaojie Sun, Jinbing Xue, Zhenya Wang, Tianhang Yang, Liangfei Weng, Bidou Wang* and Gangjin Luo*

751

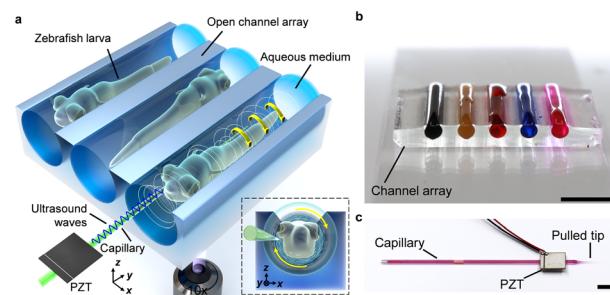


PAPERS

764

A vibrating capillary for ultrasound rotation manipulation of zebrafish larvae

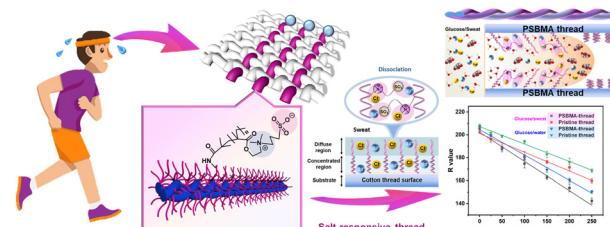
Zhiyuan Zhang, Yilin Cao, Sara Caviglia, Prajwal Agrawal, Stephan C. F. Neuhauss and Daniel Ahmed*



776

Smart salt-responsive thread for highly sensitive microfluidic glucose detection in sweat

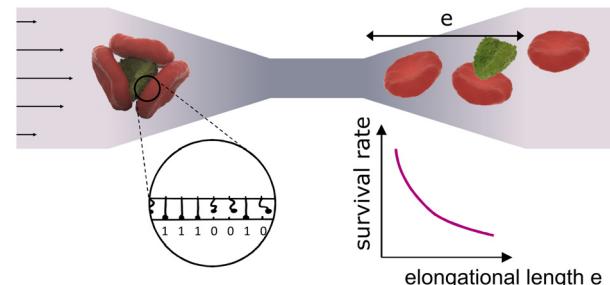
Liang Wu, Jing Xiong, Gang Xiao, Jun Ju, Wei Sun, Wei Wang, Yan Ma, Rulong Ran, Yan Qiao, Changming Li, Ling Yu* and Zhisong Lu*



787

Survival of *P. falciparum* infected red blood cell aggregates in elongational shear flow

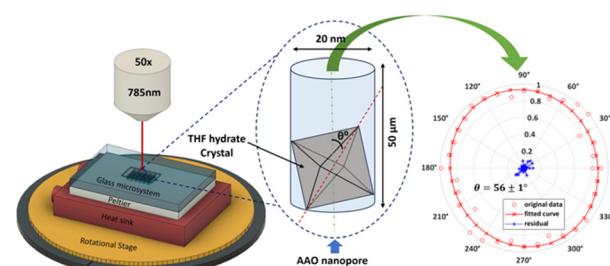
Anna M. Jötten, Anabelle Schepp, Adam Machon, Kirsten Moll, Mats Wahlgren, Timm Krüger and Christoph Westerhausen*



798

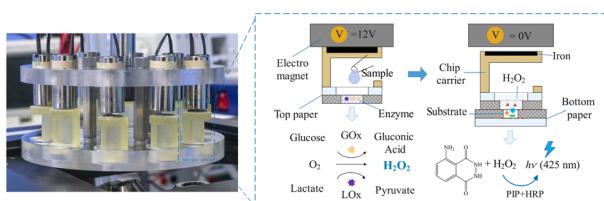
The crystal orientation of THF clathrates in nano-confinement by *in situ* polarized Raman spectroscopy

Mrityunjay K. Sharma, Xin Ning Leong, Carolyn A. Koh and Ryan L. Hartman*



PAPERS

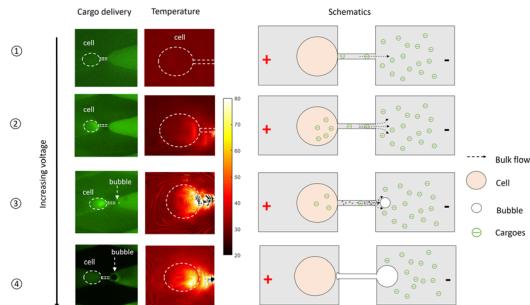
810



High sensitivity and automatic chemiluminescence detection of glucose and lactate using a spin-disc paper-based device

Wenqiang Tong, Jiaming Shi, Zhihang Yu, Bin Ran, Huaying Chen* and Yonggang Zhu*

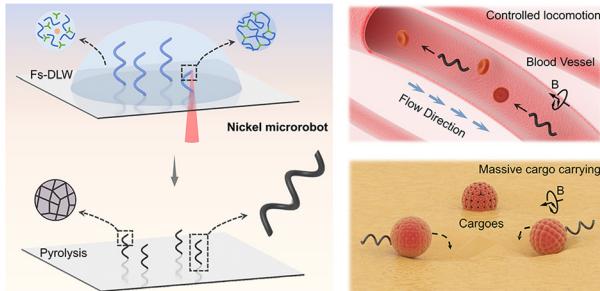
819



Joule heating and electroosmotic flow in cellular micro/nano electroporation

Junjie Pan, Xinyu Wang, Chi-ling Chiang, Yifan Ma, Junao Cheng, Paul Bertani, Wu Lu* and L. James Lee*

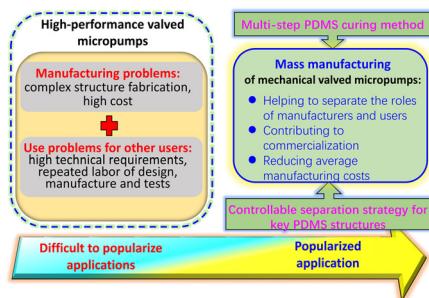
832



High-performance magnetic metal microrobot prepared by a two-photon polymerization and sintering method

Rui Li, Modong Jiang, Bingrui Liu, Shaojun Jiang, Chao Chen, Mengxue Liang, Lijie Qu, Chaowei Wang, Gang Zhao, Yanlei Hu, Dong Wu, Jiaru Chu and Jiawen Li*

843



Multi-step PDMS curing and a controlled separation method for mass manufacturing of high-performance and user-friendly micro-devices: valved micropumps

Zhichang Du, Wei Sun* and Shengli Mi*

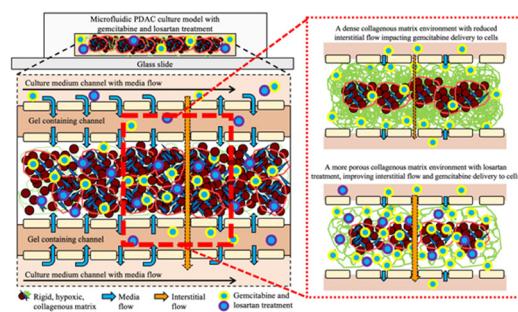


PAPERS

854

Modelling and breaking down the biophysical barriers to drug delivery in pancreatic cancer

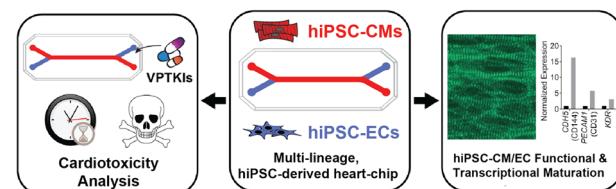
Delanyo Kpeglo, Malcolm Haddrick,
Margaret A. Knowles, Stephen D. Evans
and Sally A. Peyman*



869

Multi-lineage heart-chip models drug cardiotoxicity and enhances maturation of human stem cell-derived cardiovascular cells

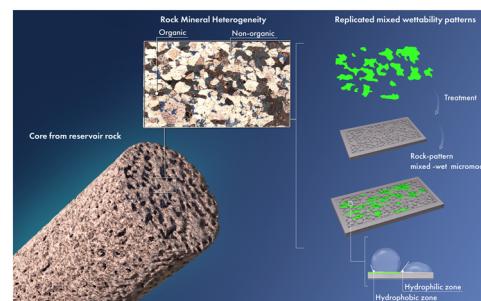
Maedeh Mozneb, Amelia Jenkins, Samuel Sances,
Stephany Pohlman, Michael J. Workman, Dylan West,
Briana Ondatje, Kareem El-Ghazawi, Amanda Woodbury,
Veronica J. Garcia, Shachi Patel, Madelyn Arzt,
Felipe Dezem, Alex H. Laperle, V. Alexandra Moser,
Ritchie Ho, Nur Yucer, Jasmine Plummer,
Robert J. Barrett, Clive N. Svendsen and Arun Sharma*



882

Novel fabrication of mixed wettability micromodels for pore-scale studies of fluid–rock interactions

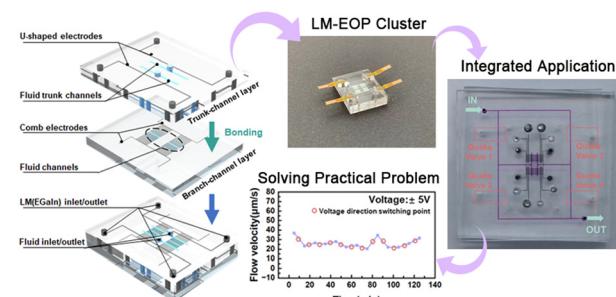
Abdullah AlOmier, Dongkyu Cha, Subhash Ayirala,
Ali Al-Yousef and Hussein Hoteit*



896

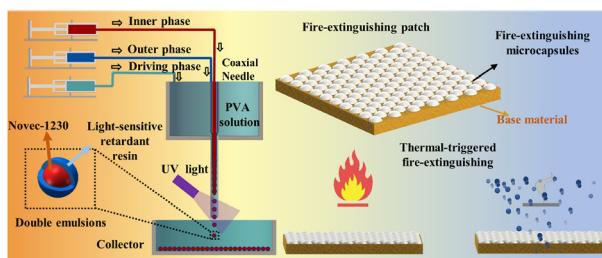
A liquid metal based, integrated parallel electroosmotic micropump cluster drive system

Qian Li, Pan Zhang, Zi Ye, Huimin Zhang, Xiao Sun
and Lin Gui*



PAPERS

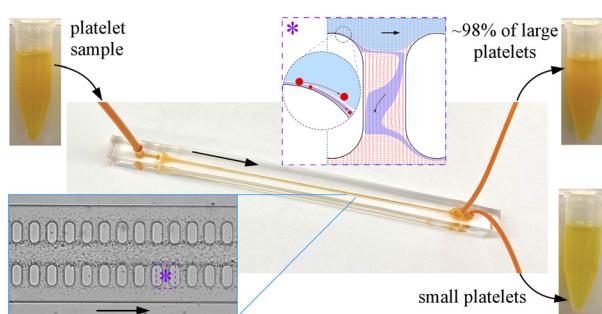
904



Enhancing safety in small confined spaces with thermally triggered fire-extinguishing microcapsules from microfluidics

Chen Li, Hairui Bian, Dang Ding, Fangsheng Huang* and Zhiqiang Zhu*

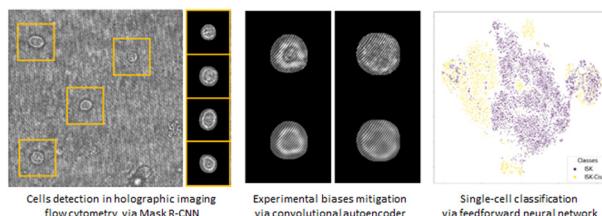
913



Separation of platelets by size in a microfluidic device based on controlled incremental filtration

Mai T. P. Dinh, Anton Mukhamedshin, Kumar Abhishek, Fong W. Lam, Sean C. Gifford and Sergey S. Shevkoplyas*

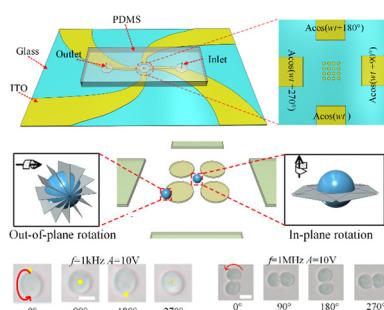
924



Label-free cell classification in holographic flow cytometry through an unbiased learning strategy

Gioele Ciaparrone, Daniele Pirone, Pierpaolo Fiore, Lu Xin, Wen Xiao, Xiaoping Li, Francesco Bardozzo, Vittorio Bianco, Lisa Miccio, Feng Pan,* Pasquale Memmolo,* Roberto Tagliaferri* and Pietro Ferraro

933



Three-dimensional rotation of deformable cells at a bipolar electrode array using a rotating electric field

Yupan Wu,* Yuanbo Yue, Haohao Zhang, Xun Ma, Zhexin Zhang, Kemu Li, Yingqi Meng, Shaoxi Wang, Xuewen Wang* and Wei Huang*

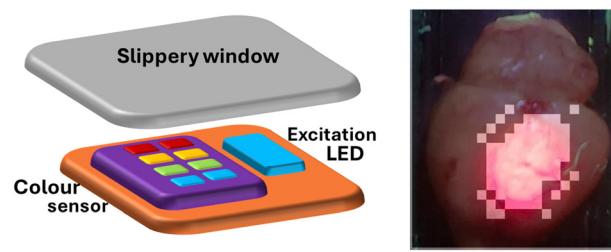


PAPERS

946

Miniature fluorescence sensor for quantitative detection of brain tumour

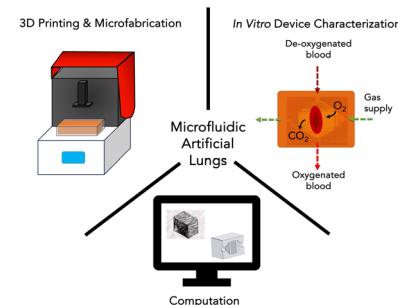
Jean Pierre Ndabakuranye, James Belcourt, Deepak Sharma, Cathal D. O'Connell, Victor Mondal, Sanjay K. Srivastava, Alastair Stacey, Sam Long, Bobbi Fleiss and Arman Ahnood*



955

Toward 3D printed microfluidic artificial lungs for respiratory support

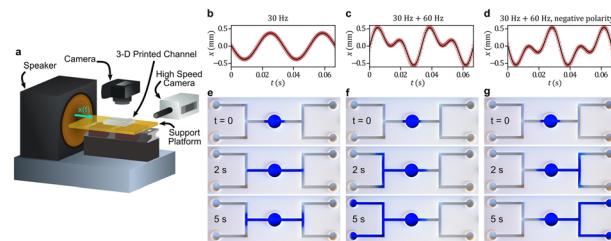
Elyse Fleck,* Charlise Keck, Karolina Ryszka, Andrew Zhang, Michael Atie, Sydney Maddox and Joseph Potkay



966

Vibrational manipulation of dry granular materials in lab-on-a-chip devices

Timothy C. Hui, Xiaolin Zhang, Dhruva Adiga, Gregory H. Miller and William D. Ristenpart*



975

Fast and on-site animal species identification in processed meat via centrifugal microfluidics and isothermal amplification

Laura Niebling,* Ramona Nitzsche, Thorben Sieksmeyer, Vera Haskamp, Jonas Kissenkötter, Ahmed Abd El Wahed, Thomas Teufel, Herbert Hermann, Nils Paust and Ana R. Homann*

