# 26th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2022)

Hangzhou, China 23-27 October 2022

Volume 1 of 2

ISBN: 978-1-7138-7792-9

#### Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2022) by Chemical and Biological Microsystems Society All rights reserved.

Printed with permission by Curran Associates, Inc. (2024)

For permission requests, please contact Chemical and Biological Microsystems Society at the address below.

Chemical and Biological Microsystems Society c/o Preferred Meeting Management, Inc. 307 Laurel Street San Diego, California 92101-1630 USA

Phone: (619) 232-9499 Fax: (619) 232-0799

info@cbmsociety.org

#### Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400

Fax: 845-758-2633

Email: curran@proceedings.com Web: www.proceedings.com

#### **TABLE OF CONTENTS**

# Day 1 - Monday, 24 October

Plenary	Presentation 1
---------	----------------

1PL-1 SINGLE-CELL GENOMCIS: ITS COMING OF AGE IN BIOLOGY AND MEDICINE Xiaoliang Sunney Xie

Peking University, CHINA

#### **Session 1A1 - Single Cell Analysis and Sequencing**

Kevnote	Presentation
1A1-1	LIQUID METAL/POLYMER-BASED MICROFLUIDICS AS
	FLEXIBLE BIOMEDICAL DEVICES 1
	Xingyu Jiang
	Southern University of Science and Technology (SUSTech), CHINA
1A1-2	RAPID-SEQ: SINGLE-CELL GENOME SEQUENCING BY
	DIRECTED Tn5 TAGMENTATION
	Huimin Zhang, Xiyuan Yu, Wei Lin, and Chaoyong Yang
	Xiamen University, CHINA
1A1-3	FAST AND LARGE-FIELD SPATIALLY-RESOLVED RNA PROFILING
	THROUGH AUTOMATED IN-SITU SEQUENCING4
	Tianyi Chang, Wuji Han, Mengcheng Jiang, and Yanyi Huang
	Peking University, CHINA
	Session 1B1 - Extracellular Vesicles
	Session IDI Latracentian vesicies
Kevnote	Presentation
1B1-1	INTEGRATED TECHNOLOGIES FOR MOLECULAR
	ANALYSES OF CIRCULATING BIOMARKERS6
	Huilin Shao
	National University of Singapore, SINGAPORE
1B1-2	CST-II-ASSISTED EXOSOME LABELING STRATEGY ON A MICROFLUIDIC PLATFORM 7
101-2	Xin Zhou <sup>1</sup> , Mohit Jaiswal <sup>1</sup> , Sayan Kundu <sup>1</sup> , Jingzhu Shi <sup>1</sup> , Zhongwu Guo <sup>1</sup> , and Yong Zeng <sup>1,2</sup>
	<sup>1</sup> University of Florida, USA and <sup>2</sup> University of Florida Health Cancer Center, USA
1B1-3	INTERFERENCE IMAGING AND HIGHLY MULTIPLEXED AFFINITY
	PROTEOMICS OF SINGLE EXTRACELLULAR VESICLES
	Andreas Wallucks, Philippe DeCorwin-Martin, Lucile Alexandre,
	Johan Renault, Andy Ng, and David Juncker
	McGill University, CANADA

# Session 1C1 - Organ-on-a-Chip I

Keynote	Presentation	
1C1-1	ORGANS-ON-CHIP FOR ASSISTED REPRODUCTIVE TECHNOLOGIES	11
1C1-2	A THREE-DIMENSIONAL ARTIFICIAL INTESTINAL TUBE WITH A CRYPT-LIKE INNER SURFACE FORMED BY ELECTROLYTIC MICROBUBBLES	13
1C1-3	BIO-ENGINEERED HUMAN STOMACH MICRO-PHYSIOLOGICAL SYSTEM FOR MODELLING HELICOBACTER PYLORI PATHOGENESIS	15
	Session 1A2 - Cell Imaging	
1A2-1	TWO-STEP & CONSTRAIN-FREE 3D RECONSTRUCTION OF ZEBRAFISH EMBRYOS THROUGH CONTROLLABLE BUBBLE-BASED MICROMA-NIPULATION Dunqing Hong, Yidi Zhou, and Jixiao Liu Hebei University of Technology, CHINA	17
1A2-2	ON-CHIP AND LONG-TERM OBSERVATION OF CELL FATE ENABLED BY LABEL-FREE 3D REFRACTIVE-INDEX IMAGING Fei Liang, Peng Zhao, Yongxiang Feng, Huichao Chai, Weihua He, Junwen Zhu, and Wenhui Wang Tsinghua University, CHINA	19
1A2-3	HIGHLY SENSITIVE MONITORING OF TELOMERASE ACTIVITY IN LIVING CELLS BASED ON RAPIDLY TRIGGERED CASCADE AMPLIFICATION USING A MICROFLUIDIC CHIP Jie Wang, Xiao-Peng Liu, Wan-Yi Xue, Yun-Yun Wei, and Zhang-Run Xu Northeastern University, CHINA	21
	Session 1B2 - Imaging	
1B2-1	SIMULTANEOUS RECORDING OF NEURAL ACTIVITY AND BEHAVIOR IN C. ELEGANS ENABLED BY ON-DEMAND HYDROGEL LOCALIZATION Hyun Jee Lee, Julia Vallier, and Hang Lu Georgia Institute of Technology, USA	23
1B2-2	HIGH-THROUGHPUT PARALLEL OPTOFLUIDIC 3D-IMAGING OF ADHERENT CELLS IN ADHERENT STATE Minato Yamashita, Kazuki Hattori, Hiromi Kirisako, Xiaoyao Chen, Masashi Ugawa, and Sadao Ota University of Tokyo, JAPAN	25
1B2-3	LABEL-FREE DROPLET SCREENING THROUGH MASS SPECTROMETRY IMAGING  Linfeng Xu and Adam R. Abate  University of California, San Francisco, USA	27

	Session 1C2 - Organ-on-a-Chip II
1C2-1	AC ELECTRIC FIELD-ASSISTED GENERATION OF 3D FREESTANDING LIPID BILAYER ARRAY WITH CONTROLLED MEMBRANE FUSION IN PHYSIOLOGICAL CONDITIONS 29 Bong Kyu Kim <sup>1,2</sup> , Dong-Hyun Kang <sup>1</sup> , Seok Chung <sup>2</sup> , and Tae Song Kim <sup>1</sup> Korea Institute of Science and Technology (KIST), KOREA and <sup>2</sup> Korea University, KOREA
1C2-2	A 3D-PRINTED ORGAN-ON-CHIP PLATFORM AND IMPELLER PUMP TO MODEL INTER-ORGAN COMMUNICATION WITH THE LYMPH NODE
1C2-3	A BIOMIMETIC JOINT MODEL WITH HETEROGENOUS OXYGEN ENVIRONMENTS
	Plenary Presentation II
1PL-2	ACTIVE FEMTO REACTOR TECHNOLOGY
	In-Person Poster Session 1
	Session 1A3 - Organ-on-a-Chip III
Keynote 1 1A3-1	Presentation THE FABRICATION AND MEASUREMENT OF ORGANS-ON-A-CHIP AS ALTERNATIVES TO ANIMAL TESTS
1A3-2	DROPLET-BASED MICROFLUIDIC SYNTHESIS OF FUNCTIONAL VASCULARIZED HYDROGEL MICROSPHERES
1A3-3	VASCULOGENESIS OF ENDOTHELIAL CELLS WITHIN COMPLEX CONSTRUCTS BIOPRINTED ON A MICROSTRUCTURED SUBSTRATE

# Session 1B3 - Cell Assay and Co-Culture

Keynote P	Presentation	
1B3-1	NEW OPPORTUNITIES TO PROBE MICROBIAL POPULATION GENETICS BY LAB-ON-A-CHIP DEVICES Anzhelika Koldaeva, Paul Hsieh-Fu Tsai, Simone Pigolotti, and Amy Q. Shen Okinawa Institute of Science and Technology Graduate University, JAPAN	45
1B3-2	MEMBRANE TRAP ARRAYS FOR T CELL/TUMOR CO-CULTURE	48
1B3-3	ASTROCYTES TRANSFER KA-INDUCED EXCITOTOXICITY PATHOLOGY BETWEEN SYNAPTICALLY SEPARATED NEURON POPULATIONS IN A NOVEL MICROFLUIDIC MAZE DEVICE  Yiing C. Yap¹, Ruth E. Musgrove¹, Tracey C. Dickson¹, Anna E. King¹, Rosanne M. Guijt², Graeme Wertheimer³, and Michael C. Breadmore¹  ¹University of Tasmania (UTAS), AUSTRALIA, ²Deakin University, AUSTRALIA, and ³University of Newcastle, AUSTRALIA	50
	Session 1C3 - Microfluidics I	
Keynote P 1C3-1	Presentation IMAGING FLOW CYTOMETRY-BASED BLOOD DIAGNOSTICS Andrew de Mello ETH Zürich, SWITZERLAND	52
1C3-2	MULTIPHASE FLOW CONTROL IN CAPILLARIC CIRCUITS AND MICROFLUIDIC CHAIN REACTIONS Geunyong Kim, Andy Ng, and David Juncker McGill University, CANADA	53
1C3-3	ELECTROOSMOTIC PUMPING VALVE FOR AUTOMATION OF MULTI-STEP PAPER-BASED ASSAYS  Baruch Rofman <sup>1</sup> , Rawi Naddaf <sup>1</sup> , Maya Bar-Dolev <sup>1</sup> , Tal Gefen <sup>1</sup> , Nadav Ben-Assa <sup>1</sup> , Naama Geva-Zatorsky <sup>1,2</sup> , and Moran Bercovici <sup>1</sup> <sup>1</sup> Technion - Israel Institute of Technology, ISRAEL and <sup>2</sup> Canadian Institute for Advanced Research (CIFAR), CANADA	55
	Session 1A4 - Organ-on-a-Chip IV	
1A4-1	THREE-DIMENSIONAL MICROCAGE FOR MATURATION OF HPSC-DERIVED CARDIAC-SPHEROIDS BY ELECTRICAL STIMULATION Zetian Wang, Feixiang Ge, Meixuan Zhang, Jianzhong Xi, Wei Wang, and Mengdi Han Peking University, CHINA	57
1A4-2	A MICROFLUIDIC-BASED PLATFORM FOR BACTERIAL TARGETED PHOTOSENSITIZERS WITH AGGREGATION-INDUCED EMISSION TO PROMOTE CHEMOTHERAPY FOR THE TREATMENT OF CANCER INFLAMMATORY	59

1A4-3	FAST AND ROBUST TRANSPORT OF MAGNETIC MICROPARTICLES ON ARTIFICIAL MICROTUBULES Hongri Gu <sup>1</sup> , Emre Hanedan <sup>1</sup> , Quentin Boehler <sup>1</sup> , Tian-Yun Huang <sup>1</sup> , Arnold J.T.M. Mathijssen <sup>2</sup> , and Bradley J. Nelson <sup>1</sup> <sup>1</sup> ETH Zürich, SWITZERLAND and <sup>2</sup> University of Pennsylvania, USA	61
	Session 1B4 - Wearable Devices	
1B4-1	3D CO-PRINTING OF IONIC HYDROGEL AND ELASTOMER FOR FABRICATION OF WEARABLE SENSORS Shaojia Wang, Pengfei Xu, and Xinyu Liu University of Toronto, CANADA	63
1B4-2	BATTERY-LESS SMART MASK FOR LUNG HEALTH MONITORING	65
1B4-3	MAGNETICALLY ACTUATED GLAUCOMA DRAINAGE DEVICE FOR REGULATING INTRAOCULAR PRESSURE AFTER IMPLANTATION	67
	<sup>2</sup> Maastricht University Medical Centre+ (MUMC+), NETHERLANDS	
1C4-1	<sup>2</sup> Maastricht University Medical Centre+ (MUMC+), NETHERLANDS	69
1C4-1 1C4-2	<sup>2</sup> Maastricht University Medical Centre+ (MUMC+), NETHERLANDS  Session 1C4 - 3D Printing  DEVELOPMENT OF MIST-BASED PRINTHEAD TECHNOLOGY FOR EXTRUSION-BASED, DROPLET-BASED AND CO-AXIAL BIOPRINTING	

# **Virtual Poster Session 1**

#### Day 2 - Tuesday, 25 October

#### Virtual Poster Session 2

#### **Young Innovator Award Presentation**

Sponsored by Analytical Chemistry

#### Plenary Presentation III

2PL-3 DROP-BASED MICROFLUIDICS FOR PATHOGEN DETECTION AND ANALYSIS
David A. Weitz
Harvard University, USA

09:50 - 10:05 Transition

#### Session 2A1 - Micromanipulation **Keynote Presentation** 2A1-1 Bi-Feng Liu Huazhong University of Science and Technology, CHINA 2A1-2 Gong Li<sup>1,2</sup>, Bingrui Xu<sup>1,2</sup>, Xiaopu Wang<sup>3,4</sup>, Aaron R. Wheeler<sup>5</sup>, and Shuailong Zhang<sup>1,2</sup> <sup>1</sup>Beijing Institute of Technology, CHINA, <sup>2</sup>Beijing Advanced Innovation Center for Intelligent Robots and Systems, CHINA, <sup>3</sup>Shenzhen Institute of Artificial Intelligence and Robotics for Society (AIRS), CHINA, <sup>4</sup>Chinese University of Hong Kong, HONG KONG, and <sup>5</sup>University of Toronto, CANADA 2A1-3 Yang Bai<sup>1</sup>, Zhiwen Zheng<sup>2</sup>, Yang Yang<sup>1</sup>, Wei Wei<sup>1</sup>, Xianjie Shi<sup>1</sup>, Zhihong Zhang<sup>2</sup>, and Xuexin Duan<sup>1</sup> <sup>1</sup>Tianjin University, CHINA and <sup>2</sup>Tianjin Medical University, CHINA **Session 2B1 - Cell Analysis I Keynote Presentation** 2B1-1 SPATIAL MULTI-OMICS SEQUENCING ENABLED BY MICROFLUIDICS DETERMINISTIC BARCODING .......81 Rong Fan Yale University, USA 2B1-2 SELF-ORGANIZED CANCER SPHEROID-VASCULAR BARRIER Gihyun Lee, Soo Jee Kim, and Je-Kyun Park Korea Advanced Institute of Science and Technology (KAIST), KOREA

2B1-3	A MICROFLUIDIC PLATFORM TO PRESERVE MICRO-DISSECTED TUMOR MICROVASCULATURE Brandon Nguyen <sup>1</sup> , Tran N.H. Nguyen <sup>1</sup> , Lisa Horowitz <sup>1</sup> , Adán Rodriguez <sup>1</sup> , Cb Lim <sup>2</sup> , Mehdi Mehrabi <sup>3</sup> , Taranjit S. Gujral <sup>2</sup> , and Albert Folch <sup>1</sup> <sup>1</sup> University of Washington, USA, <sup>2</sup> Fred Hutchinson Cancer Research Center, USA, and <sup>3</sup> University of Pretoria, SOUTH AFRICA	84
	Session 2C1 - Nuclear Acid Analysis	
Keynote 2C1-1	Presentation  MICROFLUIDIC TOOLS FOR MULTI-MODAL PRECISION  MEASUREMENT OF SINGLE CELLS  Aaron Streets <sup>1,2</sup> <sup>1</sup> University of California, Berkeley, USA and <sup>2</sup> Chan Zuckerberg Biohub, USA	86
2C1-2	A SMARTPHONE-BASED DIGITAL CRISPR PLATFORM FOR HIV VIRAL LOAD QUANTIFICATION	89
2C1-3	ONE-POT ENDONUCLEOLYTICALLY EXPONENTIATED ROLLING CIRCLE AMPLIFICATION BY CRISPR-Cas12a AFFORDS SENSITIVE, EXPEDITED ISOTHERMAL DETECTION OF MicroRNAs	91
	Session 2A2 - Biosensing I	
2A2-1	A RESPIRATORY SENSOR FABRICATED BY PERFORATED FLEXIBLE PRINTED CIRCUIT BOARD WITH SPUTTERED PLATINUM	93
2A2-2	CONSTRUCTION OF LIQUID METAL-BASED SOFT MICROFLUIDIC SENSORS VIA SOFT LITHOGRAPHY Yang Zhang¹ and Sheng Yan² ¹Macquarie University, AUSTRALIA and ²Shenzhen University, CHINA	95
2A2-3	A SHRINK POLYMER ELECTROCHEMICAL SENSOR FOR POINT-OF-CARE DETECTION OF PROSTATE CANCER  Wenzheng He <sup>1</sup> , Qifu Zhang <sup>2</sup> , Changdong Zhou <sup>2</sup> , Yang Lin <sup>2</sup> , Xiongying Ye <sup>1</sup> , and Tianhong Cui <sup>3</sup> <sup>1</sup> Tsinghua University, CHINA, <sup>2</sup> Jilin Cancer Hospital, CHINA, and <sup>3</sup> University of Minnesota, USA	97
	Session 2B2 - Microfluidics II	
2B2-1	SINGLE-CELL PROTEIN ISOFORMS ANALYSIS USING A HYBRID DROPLET-ELECTROPHORESIS PLATFORM Yang Liu and Amy E. Herr University of California, Berkeley, USA	99

2B2-2	A LOW-COST PAPER-BASED SAMPLE PREPARATION MODULE TO LYSE BACTERIAL CELLS AND EXTRACT GENOMIC DNA USING ISOTACHOPHORESIS Shruti Soni and Bhushan J. Toley Indian Institute of Science, Bangalore, INDIA	101
2B2-3	INTEGRATED AND MODULAR SYSTEM FOR MICROFLUIDIC AFFINITY ISOLATION AND LABEL-LESS ENUMERATION OF SARS-COV-2 FROM SALIVA SAMPLES	103
	Session 2C2 - Flow Cytometry	
2C2-1	LABEL-FREE ISOLATION AND ELECTRO-MECHANO-PHENOTYPING OF SINGLE LEUKOCYTES FOR POINT-OF-CARE IMMUNOPROFILING USING A DROP OF BLOOD Linwei He, Chayakorn Petchakup, Hui Min Tay, King Ho Holden Li, and Han Wei Hou Nanyang Technological University, SINGAPORE	105
2C2-2	HIGH-SPEED 3D IMAGING FLOW CYTOMETRY  Masashi Ugawa and Sadao Ota  University of Tokyo, JAPAN	107
2C2-3	MULTICHANNEL IMPEDANCE CYTOMETRY DOWNSTREAM OF CELL SEPARATION FOR QUANTIFYING ENRICHMENT OF ACTIVATED MACROPHAGE SUBPOPULATIONS	109
	Plenary Presentation IV	
2PL-4	NANOFLUIDICS COMING OF AGE  Lydéric Bocquet  Ecole Normale Supérieure, FRANCE	111
	In-Person Poster Session 2	
	Session 2A3 - Droplet-Based Microfluidics I	
Keynote 1 2A3-1	Presentation  DROPLET CONFINEMENT INDUCED ASSEMBLY AND APPLICATION  Lingling Shui <sup>1</sup> , Juan Wang <sup>1,2</sup> , Liping Mei <sup>1</sup> , Shuting Xie <sup>1</sup> , Zhibing Yan <sup>1</sup> , and Mingliang Jin <sup>1</sup> South China Advanced Normal University, CHINA and <sup>2</sup> University of Twente, NETHERLANDS	113
2A3-2	A SHAPE-RECONFIGURABLE, LIGHT AND MAGNETIC DUAL-RESPONSIVE SHAPE-MEMORY MICROPILLAR ARRAY CHIP FOR WATER-IN-OIL DROPLET MANIPULATION	116

2A3-3	CHANNEL-INTEGRATED DIGITAL MICROFLUIDIC CHIP FOR NUCLEIC ACID EXTRACTION AND DIGITAL PCR DETECTION	118
	Session 2B3 - Cell Analysis II	
Keynote 2B3-1	Presentation ON BIOCHEMICAL CONSTRUCTORS AND SYNTHETIC CELLS	120
2B3-2	OVERCOMING DOUBLE-POISSON LIMITATION FOR CO-ENCAPSULATION IN DROPLETS THROUGH HYDRODYNAMIC CLOSE PACKING OF CELLS Xuhao Luo and Abraham Lee University of California, Irvine, USA	121
2B3-3	PASSIVE AND DETERMINISTIC SINGLE CELL ENCAPSULATION WITH DROPLET BASED MICROFLUIDICS Jiande Zhou, Arnaud Bertsch, and Philippe Renaud Swiss Federal Institute of Technology Lausanne (EPFL), SWITZERLAND	123
	Session 2C3 - Biomolecular Assay I	
Keynote 2C3-1	Presentation MICROFLUIDIC LABYRINTH FOR LABEL FREE ISOLATION AND SINGLE CELL ANALYSIS OF CIRCULATING TUMOR CELLS Brittany Rupp, Sarah Owen, Harrison Ball, Kaylee Judith Smith, Valerie Gunchick, Evan T. Keller, Vaibhav Sahai, and Sunitha Nagrath University of Michigan, USA	125
2C3-2	A MICROFLUIDIC PLATFORM FOR QUANTITATIVE MULTIPLEX PROFILING OF DNA METHYLATION BIOMARKERS  Yang Zhao <sup>1</sup> , Christine M. O'Keefe <sup>1</sup> , James G. Herman <sup>2</sup> , Thomas Pisanic <sup>1</sup> , and Tza-Huei Wang <sup>1</sup> <sup>1</sup> Johns Hopkins University, USA and <sup>2</sup> University of Pittsburgh, USA	128
2C3-3	A DIGITAL MICROFLUIDIC-BASED ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY FOR CELL-BASED IMMUNOASSAY IN A DYNAMIC MODE	130
	Session 2A4 - Droplet-Based Microfluidics II	
2A4-1	HIGH RESOLUTION, MULTIPLEX ANTIBODY PATTERNING USING PIEZOELECTRIC DROPLET PRINTING AND MICROCONTACT PRINTING Meichi Jin, Kai Wu, and Zida Li Shenzhen University, CHINA	132

2A4-2	BARCODED COMBINATORIAL SCREENING FOR HIGHLY EFFICIENT OPTIMIZATION OF CELL-FREE PROTEIN SYNTHESIS SYSTEMS IN DROPLETS Jiawei Zhu, Yaru Meng, Conghui Ma, Jian Li, and Yifan Liu ShanghaiTech University, CHINA	134
2A4-3	SESSILE DROPLET DIFFERENTIAL SCANNING CALORIMETRY CHIP FOR LIQUID CRYSTAL SAMPLES  Sheng Ni <sup>1</sup> , Yang Bu <sup>1</sup> , Hanliang Zhu <sup>2</sup> , Pavel Neuzil <sup>2,3</sup> , and Levent Yobas <sup>1</sup> Hong Kong University of Science and Technology, HONG KONG,  Northwestern Polytechnical University, CHINA, and Brno University of Technology, CZECH REPUBLIC	
	Session 2B4 - Particle Manipulation	
2B4-1	ELASTO-INERTIAL FOCUSING MECHANISMS OF PARTICLES IN SHEAR-THINNING VISCOELASTIC FLUID IN RECTANGULAR MICROCHANNELS	138
2B4-2	ROBOTIC ARM CONTROLLED ACOUSTOFLUIDIC END-EFFECTOR FOR PARTICLE MANIPULATION Jan Durrer, Prajwal Agrawal, and Daniel Ahmed ETH Zürich, SWITZERLAND	140
2B4-3	EXPLOITING AXIAL PRIMARY RADIATION FORCE FOR ACOUSTOFLUIDIC PARTICLE TRAPPING  Lokesh Malik <sup>1</sup> , Amal Nath <sup>1</sup> , Subhas Nandy <sup>1</sup> , Thomas Laurell <sup>2</sup> , and Ashis Kum Sen <sup>1</sup> <sup>1</sup> Indian Institute of Technology, Madras, INDIA and <sup>2</sup> Lund University, SWEDEN	142
	Session 2C4 - Flow Chemistry	
2C4-1	HIGHLY PARALLELIZED SILICON AND GLASS MICROFLUIDIC PLATFORM FOR ROBUST MANUFACTURING OF MRNA LIPID NANOPARTICLES FOR VACCINE APPLICATIONS Sarah J. Shepherd, Michael J. Mitchell, and David Issadore University of Pennsylvania, USA	. 144
2C4-2	CONTINUOUS BIODIESEL PRODUCTION USING SERIES MICROREACTORS	146
2C4-3	A MICROFLUIDIC PLATFORM FOR CONTINUOUS PRODUCTION OF <sup>13</sup> C – HYPERPOLARIZED METABOLITES  Sylwia J. Barker <sup>1</sup> , Laurynas Dagys <sup>1</sup> , Manvendra Sharma <sup>1</sup> , James Eills <sup>2</sup> , Malcolm H. Levitt <sup>1</sup> , and Marcel Utz <sup>1</sup> <sup>1</sup> University of Southampton, UK and <sup>2</sup> Barcelona Institute of Science and Technology, SPAIN	148

# Day 3 - Wednesday, 26 October

# **Virtual Poster Session 3**

### Pioneers in Miniaturization Lectureship Prize and Presentation

Sponsored by Lab on a Chip and Dolomite

	Plenary Presentation V	
3PL-5	UNLOCKING THE NATURE OF DISEASE WITH SINGLE-CELL PROTEFORM PROFILING Amy E. Herr <sup>1,2</sup> <sup>1</sup> University of California, Berkeley, USA and <sup>2</sup> Chan Zuckerberg Biohub, USA	150
	Session 3A1 - Cell Analysis III	
Keynote Pr 3A1-1	OPEN MICROFLUIDICS FOR SINGLE CELL ANALYSIS  Jin-Ming Lin, Qiang Zhang, and Shou Feng  Tsinghua University, CHINA	154
3A1-2	NEUROMORPHIC-ENABLED EVENT-BASED DEEP IMAGING FLOW CYTOMETRY	157
3A1-3	<b>DEVELOPMENT OF A MICROFLUIDIC PLATFORM CAPABLE OF CHARACTERIZING SINGLE-CELL INTRINSIC STRUCTURAL AND ELECTRICAL PROPERTIES IN A HIGH-THROUGHPUT MANNER</b> Hongyan Liang <sup>1,2</sup> , Xiao Chen <sup>1,2</sup> , Deyong Chen <sup>1,2</sup> , Junbo Wang <sup>1,2</sup> , and Jian Chen <sup>1,2</sup> <sup>1</sup> Chinese Academy of Sciences, CHINA and <sup>2</sup> University of Chinese Academy of Sciences, CHINA	159
3A1-4	AUTOMATIC MORPHOLOGICAL ANALYSIS AND REPLICATIVE LIFESPAN DETERMINATION OF DIPLOID BUDDING YEAST IN A HIGH-THROUGHPUT MICROFLUIDIC DEVICE	161
	Session 3B1 - Organ-on-a-Chip V	
Keynote Pr 3B1-1	EMERGING MICROFLUIDIC TECHNOLOGIES FOR BIOHYBRID DEVICES	163

3B1-2	MULTILAYER ORGAN-ON-A-CHIP WITH REVERSIBLY BONDED LAYERS FOR PROBING GEL STIFFNESS IN A PANCREATIC CANCER MODEL Michael D. Mohan, Neda Latifi, Craig A. Simmons, and Edmond W. K. Young University of Toronto, CANADA	164
3B1-3	HIGH THROUGHPUT 3D PRINTING OF TUBULAR MICROSTRUCTURES FROM ELASTOMERIC POLYMERS FOR ORGAN-ON-A-CHIP APPLICATIONS	166
3B1-4	PRECISE AND FAST CONTROL OF THE DISSOLVED  OXYGEN LEVEL IN A TUMOR-ON-CHIP MODEL  Charlotte Bouquerel <sup>1</sup> , William César <sup>2</sup> , Giacomo Gropplero <sup>1</sup> , Fatima Mechta-Grigoriou <sup>3</sup> , Gérard Zalcman <sup>3</sup> , Maria-Carla Parrini <sup>3</sup> , Marine Verhulsel <sup>2</sup> , and Stéphanie Descroix <sup>1</sup> Institut Curie, FRANCE, <sup>2</sup> Fluigent R&D, FRANCE, and <sup>3</sup> Institut Curie, FRANCE	168
	Session 3C1 - Cell Analysis IV	
Keynote I 3C1-1	Presentation  LONGITUDINAL STUDY OF CIRCULATING TUMOR CELLS  AND DNA IN PANCREATIC CANCER PATIENTS  Z. Hugh Fan <sup>1</sup> , Pablo J. Dopico <sup>1</sup> , Zhijie Yang <sup>2</sup> , Kangfu Chen <sup>1</sup> , Youxiang Wang <sup>2</sup> , Thomas J. George <sup>1</sup>	170
	<sup>1</sup> University of Florida, USA and <sup>2</sup> Atila Biosystems, USA	
3C1-2	THE RELEASE OF NEUTROPHIL EXTRACELLULAR TRAPS:  A SELF-AMPLIFIED PROCESS	172
3C1-3	AVATAR CELLS: LIVING-CELLS GIFTED NANOFUNCTIONERS	174
3C1-4	LIVE INTACT TUMOR "CUBOIDS" ANALYZED ON A VALVED 96-WELL MICROFLUIDIC PLATFORM  Ethan J. Lockhart <sup>1</sup> , Lisa F. Horowitz <sup>1</sup> , Cb Lim <sup>2</sup> , Tran Nguyen <sup>1</sup> , Mehdi Mehrabi <sup>3</sup> , Taranjit S. Gujral <sup>2</sup> , and Albert Folch <sup>1</sup> <sup>1</sup> University of Washington, USA, <sup>2</sup> Fred Hutchinson Cancer Research Center, USA, and <sup>3</sup> University of Pretoria, SOUTH AFRICA	176
	In-Person Poster Session 3	
	Session 3A2 - MEMS I	
Keynote I 3A2-1	Presentation ADVANCED MATERIAL THERMAL ANALYSIS WITH TEMPERATURE-PROGRAMMED RESONANT MICRO-CANTILEVER Xinyu Li <sup>1</sup> , Pengcheng Xu <sup>1</sup> , Haitao Yu <sup>1,2</sup> , and Xinxin Li <sup>1</sup> Chinese Academy of Sciences, CHINA and Xinamen High-end MEMS Technology Co., Ltd. CHINA	178

3A2-2	MANIPULATION OF MICROPARTICLES USING LIGHT PATTERNS WITH DIFFERENT THICKNESS IN AN OPTOELECTRONIC TWEEZERS SYSTEM	. 180
3A2-3	CONTINUOUS-FLOW DIELECTROPHORETIC SEPARATION OF SUBMICRON POLYSTYRENE PARTICLES WITH 200 NM RESOLUTION USING THREE-DIMENSIONAL MICROELECTRODES Yang Bu, Zili Tang, Sheng Ni, and Levent Yobas Hong Kong University of Science and Technology, HONG KONG	. 182
3A2-4	MICROPATTERN EMBOSSING: A FACILE PROCESS FOR MICROCHANNEL FABRICATION ON NANOCELLULOSE-PAPER-BASED MICROFLUIDICS	. 184
3A2-5	SUSPENDED MICROFLUIDIC RAILS FOR HYDROGEL PATTERNING	. 186
	Session 3B2 - Biochemical Analysis I	
Keynote P 3B2-1	Presentation MICROFLUIDIC FILTERS FOR HIGH-FREQUENCY OUT-OF-LAB MEASUREMENTS Michael Breadmore <sup>1</sup> , Maria Paniagua Cabarrus <sup>1</sup> , Aliaa Shallan <sup>2</sup> , Mostafa Atia <sup>1</sup> , Sepideh Keshan Balavandy Min Zhang <sup>1</sup> , Yakini Tavares <sup>2</sup> , Moein Navvab Kashani <sup>2</sup> , Rosanne Guijt <sup>3</sup> , and Craig Priest <sup>2</sup> <sup>1</sup> University of Tasmania, AUSTRALIA, <sup>2</sup> University of South Australia, AUSTRALIA, and <sup>3</sup> Deakin University, AUSTRALIA	
3B2-2	ULTRA-RAPID ANTIBIOTIC SUSCEPTIBILITY TESTING OF MYCOBACTERIA USING A MICROCHAMBER ARRAY SYSTEM WITH METABOLIC ACTIVITY DETECTION	. 189
3B2-3	A MICRO-ANALYTICAL PLATFORM COMBINING TUMOR TREATING FIELDS AND INTEGRATED CAPACITANCE SENSING Yann Gilpin and Marc Dandin Carnegie Mellon University, USA	. 191
3B2-4	PHYSIOLOGICAL GLUCOSE SENSING IN IN-VITRO 3D SPHEROIDS USING SERS BASED NANOSENSORS Koyel Dey <sup>1,2</sup> , Venkanagouda S. Goudar <sup>1</sup> , Fan-Gang Tseng <sup>1</sup> , and Tuhin Subhra Santra <sup>2</sup> <sup>1</sup> National Tsing Hua University, TAIWAN and <sup>2</sup> Indian Institute of Technology, Madras, INDIA	. 193
3B2-5	FLUIDOT: A CASE STUDY ON DRUG TOLERANCE SCREENING AND ANTIBODY MINING, ONE CELL AT A TIME  Karen Ven¹, Jolien Breukers¹, Caroline Struyfs¹, Louanne Ampofo¹, Iene Rutten¹, Maya Imbrechts¹, Winnie Kerstens¹, Sam Noppen¹, Dominique Schols¹, Paul De Munter¹,², Hendrik Jan Thibaut¹, Karen Vanhoorelbeke¹, Dragana Spasic¹, Paul Declerck¹, Bruno P.A. Cammue¹, Nick Geukens¹, Karin Thevissen¹, and Jeroen Lammertyn¹  ¹KU Leuven, BELGIUM and ²University Hospitals Leuven, BELGIUM	. 195

# Session 3C2 - Microfluidics III

Keynote	Presentation	
3C2-1	DROPLET DIGITAL IMMUNO-PCR FOR PROFILING PROTEIN-SPECIFIC EXTRACELLULAR VESICLES Chunchen Liu <sup>1</sup> , Huixian Lin <sup>1</sup> , and Shuhuai Yao <sup>2</sup> <sup>1</sup> Nanfang Hospital, Southern Medical Univeristy, CHINA and <sup>2</sup> Hong Kong University of Science and Technology, HONG KONG	197
3C2-2	INTEGRATED MICROFLUIDICS FOR IMPEDANCE-BASED CELLULAR MONITORING AND REAL-TIME ACTUATED SORTING OF SINGLE MICROCARRIERS Lingyan Gong, Chayakorn Petchakup, and Han Wei Hou Nanyang Technological University, SINGAPORE	199
3C2-3	MEASURING STRAIN-DEPENDENT CELL MECHANICS WITH SEQUENTIAL-SQUEEZE NODE-PORE SENSING Rachel Rex, Sharicka Zutshi, and Lydia Sohn University of California, Berkeley, USA	201
3C2-4	SHEATH FLOW GENARATOR IMPLEMENTING PDMS SPONGES FOR MICROFLUIDIC PARTICLE SORTING SYSTEMS  Ayumi Hayashi, Runa Hemmi, Masumi Yamada, and Minoru Seki  Chiba University, JAPAN	203
3C2-5	ORDERING OF LARGE PARTICLES TO REGULATE EVENT INTERVALS BY UTLIZING HIGH-SPEED FLOW CONTROL Makoto Saito <sup>1</sup> , Yoko Yamanishi <sup>1</sup> , Fumihito Arai <sup>2</sup> , and Shinya Sakuma <sup>1</sup> <sup>1</sup> Kyushu University, JAPAN and <sup>2</sup> University of Tokyo, JAPAN	205
	Session 3A3 - Biochemical Analysis II	
3A3-1	FLUID MULTIVALENT MAGNETIC INTERFACE FOR HIGH-PERFORMANCE ISOLATION AND PROTEOMIC PROFILITING OF TUMOR-DERIVED EXTRACELLULAR VESICLES	207
3A3-2	A MICROFLUIDIC DEVICE TO PROMOTE EXOSOME SECRETION	209
3A3-3	ADVANTAGE-COMPLEMENTARY-HETEROMULTIVALENCY ENGINEERING CAN FACILITATE TARGETED CELL CAPTURING ON MICROFLUIDIC AFFINITY CHIPS	211
3A3-4	A PORTABLE MICROFLUIDIC CHIP FOR RAPID AND SENSITIVE DRUG DETECTION USING COMPETITIVE IMMUNOASSAYS Fan Yang, Guangyang Li, Xiaozhi Wang, Shurong Dong, and Zhen Cao Zhejiang University, CHINA	213

	Session 3B3 - Sensing	
3B3-1	A TOUCH-BASED ALCOHOL INTAKE DETECTION SYSTEM FOR IN-VEHICLE BIO-AUTHENTICATION AND DUI PREVENTION	215
3B3-2	WIRELESS SOIL PH SENSING IN OUTDOOR ENVIRONMENT WITH PH-SELECTIVE FULLY-DEGRADABLE METAMATERIAL ANTENNA	217
3B3-3	MULTIPLEX ANTIBIOTIC SUSCEPTIBILITY TESTING USING AN ELECTROCHEMICAL MICROFLUIDIC DEVICE Benjamin Crane <sup>1</sup> , Alex Iles <sup>2</sup> , Craig E. Banks <sup>1</sup> , Mamun Rashid <sup>1</sup> , Patricia E. Linton <sup>1</sup> , and Kirsty J. Shaw <sup>1</sup> *IManchester Metropolitan University, UK and <sup>2</sup> University of Hull, UK	219
3B3-4	<b>ELECTRODEIONIZATION WITH A POROUS ION EXCHANGE STRUCTURE FOR ULTRAHIGH SALINITY LIQUID DESICCANT REGENERATION</b> Yeonuk Yu <sup>1</sup> , Sudong Park <sup>1</sup> , Jongyoon Han <sup>2</sup> , and Rhokyun Kwak <sup>1</sup> 'Hanyang University, KOREA and <sup>2</sup> Massachusetts Institute of Technology, USA	221
	Session 3C3 - Biochemical Analysis III	
3C3-1	REMOTELY CONTROLLABLE DNA MICROFLOW  Hirotake Udono <sup>1</sup> , Shin-ichiro M. Nomura <sup>2</sup> , and Masahiro Takinoue <sup>1</sup> <sup>1</sup> Tokyo Institute of Technology, JAPAN and <sup>2</sup> Tohoku University, JAPAN	223
3C3-2	LAB-ON-A-PARTICLE ASSAY AND PORTABLE READER FOR ACCESSIBLE MONITORING OF HEART FAILURE  Vishwesh Shah <sup>1</sup> , Xilin Yang <sup>1</sup> , Mengxing Ouyang <sup>1</sup> , Alyssa Arnheim <sup>1</sup> , Hatice Koydemir <sup>2</sup> , Derek Tseng <sup>1</sup> , Yi Luo <sup>1</sup> , Shreya Udani <sup>1</sup> , Ghulam Destgeer <sup>1</sup> , Aydogan Ozcan <sup>1</sup> , and Dino Di Carlo <sup>1</sup> *University of California, Los Angeles, USA and *Texas A&M University, USA*	225
3C3-3	INTEGRATED RNA EXTRACTION AND RT-LAMP FOR RAPID AND AUTOMATED DETECTION OF SARS-COV-2 USING CENTRIFUGAL MICROFLUIDIC SYSTEMLidija Malic, Daniel Brassard, Dillon Da Fonte, Christina Nassif, Maxence Mounier, André Ponton, Matthias Geissler, Matthew Shiu, Keith J. Morton, and Teodor Veres National Research Council, CANADA	227
3C3-4	AN INTEGRATED MICROFLUIDIC DEVICE FOR AUTOMATED DETECTION OF CANCER CELLS FROM BILE FOR CHOLANGIOCARCINOMA PROGNOSIS	229

# Day 4 - Thursday, 27 October

# **Test of Time Award**

Sponsored by Microsystems and Nanoengineering/Springer Nature

	Plenary Presentation VI	
4PL-6	INTEGRATED PHOTONICS FOR NEUROTECHNOLOGIES	231
	Session 4A1 - Biosensing II and MEMS II	
Keynote	Presentation	
4A1-1	MICROELECTRODE TECHNOLOGIES FOR BIOCOMPATIBLE AND MULTI-FUNCTIONAL NEURAL INTERFACING	232
4A1-2	BARBED MICRONEEDLES ELECTRODE FOR HIGH-QUALITY	
	SIGNAL DETECTION DURING HUMAN MOVEMENT Yingjie Ren, Junshi Li, Zhongyan Wang, Zhitong Zhang, and Zhihong Li Peking University, CHINA	233
4A1-3	MICROFLUIDIC VISCOMETER BASED ON SUSPENDED U-SHAPED	
	ELECTRODE MADE OF CONDUCTING ELASTOMER  Wei Guan, Tianyi Li, Duli Yu, and Xiaoxing Xing  Beijing University of Chemical Technology, CHINA	235
4A1-4	HYBRID MICROMOTOR POWERED BY TRIPLE ENERGY SOURCES	237
	Session 4B1 - Droplet-Based Microfluidics III	
Kevnote	Presentation	
4B1-1	NANOSTRUCTURED APPROACHES FOR ENCAPSULATION OF ENZYME	220
	AND DRUG ON NANOPARTICLE AND CELL-BASED CARRIERS <u>Dong-Pyo Kim</u> Pohang University of Science and Technology (POSTECH), KOREA	239
4B1-2	OPTIMIZATION OF THE CELL-FREE PROTEIN SYNTHESIS IN	
	MONODISPERSE LIPOSOMES PRODUCED BY MICROFLUIDICS	242
4B1-3	DROPLET DIGITAL MICROFLUIDIC SYSTEM FOR SCREENING	
	FILAMENTOUS FUNGI BASED ON ENZYMATIC ACTIVITY	244

4B1-4	COMPUTATIONAL DNA DROPLETS BASED ON LIQUID-LIQUID	
	PHASE SEPARATION FOR CANCER DIAGNOSIS	246
	Jing Gong <sup>1</sup> , Nozomi Tsumura <sup>1</sup> , Yusuke Sato <sup>2</sup> , and Masahiro Takinoue <sup>1</sup> <sup>1</sup> Tokyo Institute of Technology, JAPAN and <sup>2</sup> Kyushu Institute of Technology, JAPAN	
	Tokyo Institute of Technology, 3A1 AIV and Kyasha Institute of Technology, 3A1 AIV	
	Session 4C1 - MEMS III	
Keynote	Presentation	
4C1-1	ELECTRONICALLY INTEGRATED MICROSCOPIC ROBOTS	248
	<u>Itai Cohen</u>	
	Cornell University, USA	
4C1-2	ELECTROSTATIC MICROFILTRATION ENRICHES LOW-ABUNDANCE	
	BACTERIA AND IMPROVES DOWNSTREAM DETECTION	252
	Yaoping Liu <sup>1</sup> , Joshua Raymond <sup>1</sup> , Xiaolin Wu <sup>1</sup> , Stacy L. Springs <sup>1,2</sup> ,	
	Timothy K. Lu <sup>1,2</sup> , Hanry Yu <sup>1,3,4</sup> , and Jongyoon Han <sup>1,2</sup> <sup>1</sup> Singapore-MIT Alliance for Research and Technology (SMART), SINGAPORE, <sup>2</sup> Massachusetts Institute of	c
	Technology (MIT), USA, <sup>3</sup> Agency for Science, Technology and Research (A*STAR), SINGAPORE, and	
	<sup>4</sup> National University of Singapore, SINGAPORE	
4C1-3	SPIDER INSPIRED SILK FIBROIN FIBER ACTUATOR BY MICROFLUIDIC SPINNING	25/
401-3	Ronghui Wu, Juyeol Bae, and Taesung Kim	23-
	Ulsan National Institute of Science and Technology (UNIST), KOREA	
4C1-4	HIGH-THROUGHPUT MICROFLUIDIC DROPLET GENERATOR IMPLEMENTING	
401-4	INVERSE OPAL STRUCTURE AS PARALLEL MICRONOZZLES	256
	Shota Mashiyama, Runa Hemmi, Takeru Sato, Masumi Yamada, and Minoru Seki	
	Chiba University, JAPAN	
	Awards Ceremony	

CHEMINAS - Young Researcher Poster Awards
Royal Society of Chemistry/Lab on a Chip - Widmer Poster Award
Sensors (MDPI) - Outstanding Sensors and Actuators, Detection Technologies Poster Award
IMT Masken und Teilungen AG - Microfluidics on Glass Poster Award
Micromachines (MDPI) - Outstanding Tissue or Organ on Chip Microsystems Poster Award
NIST and Lab on a Chip - Art in Science Award
Biomicrofluidics (AIP) - Best Paper Award
Elsevier Sensors and Actuators B. Chemical - Best Paper Award
Microsystems & Nanoengineering/Springer Nature - Best Talk Award

#### **Poster Presentations Classification Chart**

(last character of poster number)

a	Cells, Organisms and Organs on a Chip
b	Diagnostics, Drug Testing and Personalized Medicine
c	Fundamentals in Microfluidics and Nanofluidics
d	Integrated Microfluidic Platforms
e	Micro- and Nanoengineering
f	Sensors and Detection Technologies
g	Other Applications of Microfluidics
h	Late News

a - Cells, Organisms and Organs on a Chip

	Bioinspired, Biomimetic and Biohybrid Devices	
M001.a	AN ARTIFICIAL BASEMENT MEMBRANE ENABLES TUMOR INTRAVASATION MICROENVIRONMENT REMODELING AND ANTI-METASTATIC DRUG SCREENING Xin-Xin Xu <sup>1</sup> , Ya-Jun Wang <sup>1</sup> , Qi-Yuan Bao <sup>2</sup> , Wei Liu <sup>1</sup> , Yang Du <sup>1</sup> , Yu-Lian Zeng <sup>2</sup> , Yu-Chen Chen <sup>1</sup> , Sai-Xi Yu <sup>1</sup> , Hong Liang <sup>1</sup> , Yu-Hui Shen <sup>2</sup> , Jian Shi <sup>3</sup> , and Yan-Jun Liu <sup>1</sup> Fudan University, CHINA, <sup>2</sup> Shanghai Jiaotong University School of Medicine, CHINA, and  MesoBioTech, FRANCE	258
M002.a	CB-PDMS BASED CELLULAR SENSOR ARRAY FOR HIGH LIGHT-SHIELDING SENSING APPLICATIONS  Yujia Lian, Haruka Oda, Minghao Nie, and Shoji Takeuchi University of Tokyo, JAPAN	260
M003.a	ESCAPING BEHAVIOR OF SPERM IN OVIDUCT CHIP  Sai-Xi Yu <sup>1</sup> , Yi Wu <sup>1</sup> , Hao Luo <sup>2</sup> , Yanan Liu <sup>2</sup> , Yu-Chen Chen <sup>1</sup> , Ya-Jun Wang <sup>1</sup> , Wei Liu <sup>1</sup> ,  Jianan Tang <sup>1</sup> , Huijuan Shi <sup>1</sup> , Hai Gao <sup>1</sup> , Guangyin Jing <sup>2</sup> , and Yan-Jun Liu <sup>1</sup> <sup>1</sup> Fudan University, CHINA and <sup>2</sup> Northwest University, CHINA	262
M004.a	TARGETED SYNTHESIS OF BIOMIMETIC CELL WALL FOR CIRCULATING TUMOR CELL IDENTIFICATION AND PROTECTION	264
M005.a	TENSEGRITY ROBOT ACTUATED BY CULTURED SKELETAL MUSCLE TISSUE	266

Kazuma Morita, Yuya Morimoto, and Shoji Takeuchi

University of Tokyo, JAPAN

T001.a	<b>BIOENGINEERING HUMAN AIRWAY MIMETIC INTEGRATING AIRFLOW</b>	268
	Keith Morton <sup>3</sup> , Teodor Veres <sup>3</sup> , Axel Guenther <sup>2</sup> , and Amy P. Wong <sup>1,2</sup>	
	<sup>1</sup> Hospital for Sick Children, CANADA, <sup>2</sup> University of Toronto, CANADA, and	
	<sup>3</sup> National Research Council Canada, CANADA	
T002.a	BIOHYBRID DEVICE WITH YEAST AS A SENSOR ELEMENT	
	EXPRESSING DRYING RESISTANCE	270
	Kazuki Nishimoto, Haruka Oda, Yuya Morimoto, and Shoji Takeuchi	
	University of Tokyo, JAPAN	
T003.a	FORMATION OF LIPID BILAYER AT AN INTERFACE BETWEEN	
	PARALLEL MICROCHANNELS BY OPERATION OF	
	AQUEOUS/ORGANIC PARALLEL TWO-PHASE FLOW	272
	Naoyuki Takezoe and Yutaka Kazoe  Keio University, JAPAN	
T004.a	MAGNETIC BLOOD VESSEL DEVICES AS VASCULARIZATION MODELS	274
100 r.a	Ana C. Manjua <sup>1,2</sup> , Joaquim M. S. Cabral <sup>2</sup> , Frederico Castelo Ferreira <sup>2</sup> ,	,, <i>a</i> / T
	Han Gardeniers <sup>3</sup> , Carla A.M. Portugal <sup>1</sup> , and Burcu Gumuscu <sup>3,4</sup>	
	<sup>1</sup> NOVA School of Science and Technology, PORTUGAL, <sup>2</sup> Universidade de Lisboa, PORTUGAL,	
	<sup>3</sup> University of Twente, NETHERLANDS, and <sup>4</sup> Eindhoven University of Technology, NETHERLANDS	
W001.a	BIOINSPIRED ORGAN-ON-A-CHIP COMPATIBLE FLOW	
	SENSORS BASED ON MAGNETIC ARTIFICIAL CILIA	276
	Bhavana B. Venkataramanachar, Max Verhoef, Tanveer ul Islam, and Jaap M.J. den Toonder	
	Eindhoven University of Technology, NETHERLANDS	
W002.a	BIOINSPIRED ROSE PETAL DERIVED ZnO MICRODEVICE FOR ENHANCED	
	CAPTURE AND RELEASE OF CIRCULATING TUMOR CELLS	278
	Le Wang, Song Huang, Qin-Ying Li, Ming Jiang, Xu Yu, and Li Xu	
	Huazhong University of Science and Technology, CHINA	
W003.a	EXPLORING THE MECHANISM OF COLORECTAL CANCER METASIATSIS AND ITS	
	MICROENVIRONMENT USING HYDROGEL INCORPORTATED BIOMMIMETIC CHIP	280
	Yi-Hsuan Lin <sup>1</sup> , Long-Sheng Lu <sup>2</sup> , and Fan-Gang Tseng <sup>1,3</sup>	
	<sup>1</sup> National Tsing Hua University, TAIWAN, <sup>2</sup> Taipei Medical University Hospital, TAIWAN, and <sup>3</sup> Academia Sinica, TAIWAN	
W004.a	PILLAR ARRAY ELECTRODE FOR THE ELECTRICAL	
w 004.a	STIMULATION OF SKELETAL MUSCLE TISSUE	282
	Tingyu Li <sup>1</sup> , Minghao Nie <sup>1</sup> , Yuya Morimoto <sup>1</sup> , Junshi Li <sup>2</sup> , Yingjie Ren <sup>2</sup> ,	=5=
	Dong Huang <sup>2</sup> , Zhihong Li <sup>2</sup> , and Shoji Takeuchi <sup>1</sup>	
	<sup>1</sup> University of Tokyo, JAPAN and <sup>2</sup> Peking University, CHINA	
	a Calle Organisms and Organs on a Chin	
	a - Cells, Organisms and Organs on a Chip Cell Capture, Counting, and Sorting	
	Cen Capture, Counting, and Sorting	
M006.a	COMBINED MOLECULAR AND MORPHOLOGICAL IMAGING	
	OF CTCs FOR HER2-TARGETED CHEMOTHERAPY GUIDANCE	284
	Haimeng Pei, Zhaojun Han, Chang Xu, Lu Li, and Bo Tang	
	Shandong Normal University, CHINA	

M007.a	COMPUTATIONAL STUDY OF INERTIAL MIGRATION OF PROLATE PARTICLES IN A STRAIGHT RECTANGULAR CHANNEL	286
M008.a	DONUT-STEP COMBINED MICROCHANNELS FOR HIGH-EFFICIENT INERTIAL PARTICLE FOCUSING Yang Wang, Yang Lou, Shirong Chen, Gaobin Xu, and Jianguo Feng Hefei University of Technology, CHINA	288
M009.a	ENHANCED AND TUNABLE CELL ADHESION ON 3D-PATTERNED HIERARCHICAL NANOINTERFACE TO TRACK THE PHENOTYPIC DYNAMICS OF CIRCULATING TUMOR CELLS Lianyu Lu <sup>1</sup> , Peng Zhang <sup>2</sup> , and Chaoyong Yang <sup>1,2</sup> 1 Xiamen University, CHINA and 2 Shanghai Jiao Tong University, CHINA	290
M010.a	HIGH-THROUGHPUT MICROFLUIDIC DEVICE FOR SPERM SORTING	292
M011.a	LABEL-FREE SORTING OF ADIPOCYTES AT DIFFERENT STAGES OF DIFFERENTIATION BY PASSIVE MICROFLUIDICS Gloria Porro <sup>1</sup> , Rita Sarkis <sup>2</sup> , Clara Orbegozo <sup>2</sup> , Lucie M.D. Godot <sup>1</sup> , Olaia Naveiras <sup>2</sup> , and Carlotta Guiducci <sup>1</sup> <sup>1</sup> École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND and <sup>2</sup> Université de Lausanne (UNIL), SWITZERLAND	294
M012.a	MACHINE LEARNING BASED CLASSIFICATION OF CELLS BY MECHANICAL PROPERTIES IN MICROFLUIDIC DEVICE Ratul Paul, Shen Wang, Daniel Karkhut, Linxi Yang, Zach Laswick, Daolong Liu, Muyuan He, Joshua C. Agar, and Yaling Liu Lehigh University, USA	296
M013.a	MICROFLUIDIC PLATFORM FOR THE IDENTIFICATION OF MICROORGANISMS THAT PRODUCE METABOLITES WITH BIOLOGICAL ACTIVITY  Abraham Ochoa-Guerrero <sup>1</sup> , Gabriela Gastélum <sup>2</sup> , Jorge Rocha <sup>2</sup> , and Luis F. Olguin <sup>1</sup> <sup>1</sup> Universidad Nacional Autónoma de México (UNAM), MEXICO and <sup>2</sup> Centro de Investigación en Alimentación y Desarrollo A.C., MEXICO	298
M014.a	NUMERICAL OPTIMIZATION OF MICROFLUIDIC TRAPS FOR CAPTURE OF CIRCULATING TUMOR CELLS	300
M015.a	ON-CHIP SINGLE CELL CHARACTERIZATION AND MANIPULATION FOR MASS SPECTROMETRY Junwen Zhu, Yongxiang Feng, Peng Zhao, Huichao Chai, Fei Liang, and Wenhui Wang Tsinghua University, CHINA	302
M016.a	OPTICALLY-CONTROLLED MICROMANIPULATION USING VARIABLE STIFFNESS MICROGRIPPER COMPRISED OF PHOTOCHROMIC MATERIAL	304
M017.a	SEPARATION OF SINGLETS AND CLUSTERS OF GROUP A STREPTOCOCCI USING DETERMINISTIC LATERAL DISPLACEMENT AND FILTER SONICATION	306

T005.a	A SINGLE-CELL pDEP CAPTURE ARRAY FOR NANOINJECTION APPLICATIONS	308
T006.a	ADVANCED SPERMATOZOA TRACKING IN MICROFLUIDICS AS PRECISE TOOL FOR LABEL-FREE SEMEN CLASSIFICATION	310
T007.a	CONTINUOUS RAMAN ACTIVATED CELL SORTING WITH MACHINE LEARNING	312
T008.a	THE DEVELOPMENT OF A 3-DIMENSIONAL HYDRODYNAMIC FOCUSING IMPEDANCE CYTOMETER  Yang Zhou <sup>1,2</sup> , Man Wu <sup>1</sup> , Yaru Huang <sup>3</sup> , Tong Qi <sup>1</sup> , Weihan Fang <sup>4</sup> , Chunping Jia <sup>1</sup> , and Jianlong Zhao <sup>1,2</sup> <sup>1</sup> Shanghai Institute of Microsystem and Information Technology, CHINA, <sup>2</sup> University of Chinese Academy Sciences, CHINA, <sup>3</sup> Shanghai Normal University, CHINA, and <sup>4</sup> Shanghai Pinghe School, CHINA	
W005.a	<b>3D-STACKED MULTI-STAGE INERTIAL MICROFLUIDIC CHIP FOR HIGH-THROUGHPUT ENRICHMENT OF CIRCULATING TUMOR CELLS</b> Jingjing Sun <sup>1</sup> , Xiwei Huang <sup>1</sup> , Xuefeng Xu <sup>1</sup> , Jin Chen <sup>1</sup> , Guohua Wu <sup>2</sup> , Shuqi Wang <sup>2</sup> , Jinhong Guo <sup>3</sup> , and Lingling Sun <sup>1</sup> <sup>1</sup> Hangzhou Dianzi University, CHINA, <sup>2</sup> Zhejiang University, CHINA, and <sup>3</sup> Shanghai Jiao Tong University, CHINA	316
W006.a	ISOLATION OF MITOCHONDRIAL SUBPOPULATIONS BY INERTIAL MICROFLUIDICS Shirui Zhao, Thomas Ting Hei Chan, Fuyang Qu, Kathrine Nygaard Borg, and Yi-Ping Ho Chinese University of Hong Kong, HONG KONG	318
W007.a	MICROFLUIDIC CHIP-BASED NONINVASIVE REMISSION STATUS MONITORING AND PROGNOSIS PREDICTION OF ACUTE MYELOID LEUKEMIA	320
W008.a	SORTING OF BREAST CANCER CELL INTO DIFFERENT SUBPOPULATIONS TOWARDS LONG-TERM OBSERVATION Esra Yilmaz, Jason P. Beech, and Jonas O. Tegenfeldt Lund University, SWEDEN	322
	a - Cells, Organisms and Organs on a Chip	
	Cell-Culturing and Perfusion (2D & 3D)	
M018.a	FRAGMENTED COLLAGEN MICROFIBER-ASSISTED FORMATION OF SKIN TISSUE MODELS WITH TUNALBE CELL/MATRIX DENSITIES Yuri Shimoda, Keigo Yamanaka, Masumi Yamada, Rie Utoh, and Minoru Seki Chiba University, JAPAN	324
M019.a	HIGH-THROUGHPUT GENERATION OF GRADIENT SPHEROID ARRAY USING HANGING DROP MICROARRAY AND SHAPE-GUIDING BLOCK Hwisoo Kim and Je-Kyun Park Korea Advanced Institute of Science and Technology (KAIST), KOREA	326

M020.a	MICROFLUIDIC DEVICE FOR LOCAL DIFFERENTIATION INDUCTION OF IPS CELLS-DERIVED EMBRYOID BODIES	328
	Naoto Kusunoki <sup>1</sup> , Shuhei Konagaya <sup>2</sup> , Mitsunori Nishida <sup>3</sup> , Shigehiro Sato <sup>3</sup> ,	020
	Hidekuni Takao <sup>1</sup> , Fusao Shimokawa <sup>1</sup> , and Kyohei Terao <sup>1</sup>	
	<sup>1</sup> Kagawa University, JAPAN, <sup>2</sup> Kyoto University, JAPAN, and <sup>3</sup> TAZMO Co., Ltd., JAPAN	
M021.a	MICROFLUIDIC NMR FOR IN SITU CULTURE AND METABOLOMIC	
	ANALYSIS OF HEPATOCELLULAR CARCINOMA CELL LINES	330
	Evie Rogers, Sylwia Barker, Manvendra Sharma, Bishnubrata Patra, Salim Khakoo, and Marcel Utz University of Southampton, UK	
T009.a	A NEW BODY-ON-A-CHIP MICROSYSTEM FOR THE STUDY OF	
	EARLY-STAGE OF OVARIAN CANCER METASTASIS	332
	Magdalena Flont, Dominik Kołodziejek, Artur Dybko, and Elżbieta Jastrzębska Warsaw University of Technology, POLAND	
T010.a	BIOPRINTING SOFT COLLAGEN TISSUES EMBEDDED	
	WITH PERFUSABLE BRANCHING CHANNELS	334
	Tomohiro Morita, Minghao Nie, Shigenori Miura, and Shoji Takeuchi <i>University of Tokyo, JAPAN</i>	
T011.a	FORMATION OF INTESTINAL EPITHELIAL MONOLAYER ON	
	VARIOUS FOLLICLE GEOMETRIES TO MIMIC THE PEYER'S PATCH	336
	Jongho Park, Gihyun Lee, and Je-kyun Park	
	Korea Advanced Institute of Science and Technology (KAIST), KOREA	
T012.a	LIQUID MARBLE - A NOVEL HIGH YIELD PHOTO-MICROREACTOR PLATFORM	338
	Nhat-Khuong Nguyen, Pradip Singha, Ann Chuang, Gregor Kijanka,	
	Michele Burford, Nam-Trung Nguyen, and Chin Hong Ooi	
	Griffith University, AUSTRALIA	
T013.a	PATIENT-SPECIFIC HIGH-THRUGHPUT DRUG SCREENING IN MICROWELLS	340
	Qiyue Luan <sup>1,2</sup> , Ines Pulido <sup>1,2</sup> , Jian Zhou <sup>1,2</sup> , Takeshi Shimamura <sup>1,2</sup> , and Ian Papautsky <sup>1,2</sup>	
	<sup>1</sup> University of Illinois, Chicago, USA and <sup>2</sup> University of Illinois Cancer Center, USA	
T014.a	REVERSIBLE BONDING OF THERMOPLASTIC ELASTOMERS	
	FOR CELL AND TISSUE HARVESTING APPLICATIONS	342
	Byeong-Ui Moon <sup>1</sup> , Kebin Li <sup>1</sup> , Caroline Miville-Godin <sup>1</sup> , Lidija Malic <sup>1</sup> , Edmond Young <sup>2</sup> , Sowmya Viswanathan <sup>2,3</sup> , and Teodor Veres <sup>1</sup>	
	<sup>1</sup> National Research Council, CANADA, <sup>2</sup> University of Toronto, CANADA, and	
	<sup>3</sup> University Health Network, CANADA	
T015.a	ROD-SHAPED OSTEOBLASTIC TISSUES FABRICATED USING	
	TISSUE MOLDING METHOD WITH MICRO-ANCHOR DEVICES	344
	Kohei Fukushima, Minghao Nie, Shigenori Miura, Yuya Morimoto, and Shoji Takeuchi University of Tokyo, JAPAN	
W009.a	A TUMOR-ON-A-CHIP MICROFLUIDIC PLATFORM FOR	
	IMMUNE CELL INFILTRATION STUDY	346
	Yu-Chen Chen <sup>1</sup> , Kang-Yun Lee <sup>2</sup> , Wei-Lun Sun <sup>2</sup> , Wan-Chen Huang <sup>3</sup> ,	
	Wei-Chiao Chang <sup>4</sup> , and Cheng-Hsien Liu <sup>1</sup>	1
	<sup>1</sup> National Tsing Hua University, TAIWAN, <sup>2</sup> Shuang Ho Hospital, TAIWAN, <sup>3</sup> Academia Sinic, TAIWAN, a. <sup>4</sup> Taipei Medical University, TAIWAN	па

W010.a	DROPLET INCUBATOR: A NEW DROPLET-BASED MODEL TO INVESTIGATE LIVING CELL-SYNTHETIC CELL INTERACTIONS Pantelitsa Dimitriou, Jin Li, Giusy Tornillo, Matthew J. Smalley, and David A. Barrow Cardiff University, UK	348
W011.a	DYNAMIC VANISHING CHARACTERISTICS OF CONFINED  MICROBUBBLES DURING PROTEIN PATTERNING	350
W012.a	HYPOXIA SIMULATION IN PC-PDMS-PC MICROSYSTEM INTEGRATED WITH NANOFIBROUS MATS Dominik Kołodziejek, Urszula Sierańska, Michal Wojasiński, Iwona Łopianiak, Zbigniew Brzozka, and Elzbieta Jastrzebska Warsaw University of Technology, POLAND	352
W013.a	OPEN MICROFLUIDIC SYSTEM FOR PATTERNING CHEMOTACTIC GRADIENTS IN CELL-LADEN HYDROGELS TO DIRECT MIGRATION	354
	a - Cells, Organisms and Organs on a Chip	
	Inter-and Intracellular Signaling, Cell Migration	
M022.a	CELLS DECIPHER THE INTEGRATED CHEMICAL AND FLUIDIC CUES AS TERNARY LOGIC PROCESSOR FOR DIRECTED MIGRATION	356
M023.a	IN SITU MONITIORING OF PTK7 DURING CELL MIGRATION BASED ON A SERS-MICROFLUIDIC PLATFORM Xiao-Peng Liu, Jie Wang, Wen-Shu Zhang, Yue Wang, and Zhang-Run Xu Northeastern University, CHINA	358
T016.a	AN OPEN MICROFLUIDIC COCULTURE MODEL OF EOSINOPHILS AND FIBROBLASTS TO INVESTIGATE MECHANISMS OF AIRWAY INFLAMMATION	360
T017.a	UNIDIRECTIONAL ANALYSIS OF CARDIAC PROPAGATION VELOCITY BY HUMAN IPSC-DERIVED CARDIAC CORE-SHELL MICROFIBER Akari Masuda <sup>1</sup> , Shun Itai <sup>1</sup> , Yuta Kurashina <sup>2</sup> , Shugo Tohyama <sup>1</sup> , and Hiroaki Onoe <sup>1</sup> **Ikeio University, JAPAN and **Tokyo University of Agriculture and Technology, JAPAN	362
W014.a	ISOLATION AND CONTROL OF IMMUNE CELLS IN RESPONSE TO CHEMOKINE GRADIENT  Parvaneh Sardarabadi <sup>1</sup> , Kang-Yun Lee <sup>2</sup> , Wei-lun Sun <sup>2</sup> , and Cheng-Hsien Liu <sup>1</sup> *INAtional Tsing Hua university, TAIWAN and *Inational Hospital, TAIWAN	364

# a - Cells, Organisms and Organs on a Chip Liposomes/Membranes

M024.a	DESIGN AND CHARACTERIZATION OF ENZYME-RESPONSIVE SYNTHETIC ION CHANNELS  Liro Kiiski <sup>1</sup> , Nanami Takeuchi <sup>1</sup> , Alexandre Legrand <sup>2</sup> , Reiko Sakaguchi <sup>3</sup> ,  Kenji Usui <sup>4</sup> , Shuhei Furukawa <sup>2</sup> , and Ryuji Kawano <sup>1</sup> <sup>1</sup> Tokyo University of Agriculture and Technology, JAPAN, <sup>2</sup> Kyoto University, JAPAN, <sup>3</sup> University of Occupational and Environmental Health, JAPAN, and <sup>4</sup> Konan University, JAPAN	366
M025.a	EVALUATING THE ACCURACY OF IMPEDANCE FLOW CYTOMETRY WITH CELL-SIZED LIPOSOMES	368
M026.a	HETEROGENEOUS EXTRACELLULAR MATRIX DETERMINES NANOVESICLE-CELL ADSORPTIONS Hua Sun and Qionglin Liang Tsinghua University, CHINA	370
T018.a	INVESTIGATION OF CELL PENETRATING PEPTIDE MEDIATED THE PROTEIN TRANSLOCATION INTO CELL-SIZED ASYMMETRIC LIPID VESICLES	372
T019.a	REAL-TIME ESTIMATION OF PHYSIOLOGICAL STIMULI FROM GATING CURRENTS OF ION CHANNELS  Kazuto Ogishi <sup>1</sup> , Toshihisa Osaki <sup>2</sup> , Hisatoshi Mimura <sup>2</sup> , Yuya Morimoto <sup>1</sup> , and Shoji Takeuchi <sup>1,2</sup> <sup>1</sup> University of Tokyo, JAPAN and <sup>2</sup> Kanagawa Institute of Industrial Science and Technology, JAPAN	374
W015.a	CAPTURING THE NANO-SIZED SINGLE LIPOSOME  VESICLES IN NANOFLUIDIC DEVICE  Yuki Arai <sup>1</sup> , Hiroto Kawagishi <sup>1</sup> , Yusufu Aishan <sup>2</sup> , and Yan Xu <sup>1,2,3</sup> <sup>1</sup> Osaka Prefecture University, JAPAN, <sup>2</sup> Osaka Metropolitan University, JAPAN, and <sup>3</sup> Japan Science and Technology Agency (JST), JAPAN	376
W016.a	VERTICAL LIPID BILAYERS FORMATION IN NANOFLUIDIC CHANNELS BY REVERSE MICELLES CONTACT	
	a - Cells, Organisms and Organs on a Chip	
	Organisms on Chip (C. elegans, Zebrafish, Arabidopsis, etc.)	
M027.a	INVESTIGATION ON PARTICLE DEPOSITION IN MULTILAYER LUNG CHIP WITH MULTI-GENERATIONAL ALVEOLAR DUCTS  Yan Qiu <sup>1</sup> , Chao Lu <sup>2</sup> , and Guoqing Hu <sup>1</sup> <sup>1</sup> Zhejiang University, CHINA and <sup>2</sup> China Jiliang University, CHINA	380

M028.a	SCANNING THE MORPHOLOGY OF SINGLE IMMOBILIZED C. ELEGANS IN AN IMPEDANCE-BASED MULTI-ELECTRODE MICROFLUIDIC DEVICE	382
T020.a	A 3D BIOPRINTED LIVER-ON-A-CHIP FOR HIGH THROUGHPUT TOXICITY SCREENING  Qihong Huang, Tianhao Yang, Hongbo Zhang, Ruixue Yin, Lei Ma, and Honglin Li East China University of Science and Technology, CHINA	384
T021.a	MICROFLUIDIC DEVICE TO SCREEN THE FIN AND HEART ACTIVITIES OF MULTIPLE ZEBRAFISH LARVAE Arezoo Khalili, Ellen Van Wijngaarden, Georg R. Zoidl, and Pouya Rezai York University, CANADA	386
T022.a	SAMPLING MICROBIAL VOLATILE COMMUNICATION IN A NOVEL SEGREGATED COCULTURE DEVICE  Jodie C. Tokihiro, Ulri N. Lee, Lina Mikaliunaite, Sarah Prebihalo, Erwin Berthier, Robert E. Synovec, and Ashleigh B. Theberge University of Washington, USA	388
W017.a	RAPID SORTING, TRAPPING, AND LONG-TERM IMAGING OF CAENORHABDITIS ELEGANS EMBRYOS IN A SPIRAL MICROCHANNEL	390
W018.a	IN VIVO ACOUSTIC PATTERNING IN ZEBRAFISH EMBRYOS	392
W019.a	MONITORING THE LOCOMOTION OF <i>C. ELEGANS</i> BY AN ELECTRICAL-IMPEDANCE-TOMOGRAPHY-INTEGRATED MICROFLUIDIC DEVICE. Haoxi Wang <sup>1</sup> , Song Yu <sup>1</sup> , Jiankun Yang <sup>1</sup> , Xinxin Lu <sup>1</sup> , Zi Wang <sup>2</sup> , Di Chen <sup>2</sup> , and Zhen Zhu <sup>1</sup> Southeast University, CHINA and <sup>2</sup> Nanjing University, CHINA	394
	a - Cells, Organisms and Organs on a Chip	
	Organs on Chip	
M029.a	BaSIC: A MODULAR SYSTEM FOR LONG-TERM BRAIN SLICE CULTURE AND CIRCADIAN RHYTHM STUDY Kui Han <sup>1</sup> , Meimei Liao <sup>2</sup> , Eric Erquan Zhang <sup>2</sup> , and Yanyi Huang <sup>1</sup> Peking University, CHINA and <sup>2</sup> National Institute of Biological Sciences, CHINA	396
M030.a	BIOENGINEERING OF HOMOGENOUS hiPSC-DERIVED ORGANOIDS ON A CHIP	398
M031.a	CELL MANIPULATINO SYTEM FOR GENERATION OF CELL PATTERNS FROM MICROMETER TO MILLIMETER SCALE Kohei Morita and Takeshi Hayakawa Chuo University, JAPAN	400

M032.a	FABRICATION OF JOINT-ON-A-CHIP DEVICE FOR COMPRESSION OF CARTILAGE EXPLANTS  Ka Kit Cheung <sup>1</sup> , Lauren Banh <sup>1,2</sup> , Mable W.Y. Chan <sup>1,2</sup> , Byeong-Ui Moon <sup>3</sup> , Sowmya Viswanathan <sup>1,2</sup> , and Edmond W.K. Young <sup>1</sup>	402
	<sup>1</sup> University of Toronto, CANADA, <sup>2</sup> University Health Network, CANADA, and <sup>3</sup> National Research Council, CANADA	
M033.a	IMPEDANCE MEASUREMENTS REVEAL CISPLATIN-INDUCED NEPHROTOXICITY IN RENAL PROXIMAL TUBULE EPITHELIAL CELLS Yuji Takata, Ramin Banan Sadeghian, Kazuya Fujimoto, and Ryuji Yokokawa Kyoto University, JAPAN	404
M034.a	IN VITRO VASCULARIZED MUSCLE ON CHIP FOR MYOSITIS INVESTIGATION	406
M035.a	MICROFLUIDIC DIGITAL-TO-ANALOG CONVERTER (µDAC) TO STUDY FATTY ACID UPTAKE RATES IN EX VIVO ADIPOSE TISSUE BY RAPID STIMULATION	408
M036.a	MICROSENSOR WELLS FOR OXYGEN MONITORING OF BIOPRINTED SINGLE BREAST CANCER SPHEROIDS  Johannes Dornhof <sup>1</sup> , Viktoria Zieger <sup>1</sup> , Jochen Kieninger <sup>1</sup> , Daniel Frejek <sup>2</sup> , Gerald A. Urban <sup>1</sup> , Sabrina Kartmann <sup>1,2</sup> , and Andreas Weltin <sup>1</sup> <sup>1</sup> University of Freiburg, GERMANY and <sup>2</sup> Hahn-Schickard, GERMANY	410
M037.a	OPEN MICROFLUIDIC DEVICE FOR 3D CO-CULTURED TUMOR SPHEROIDS AND FACILE RETRIEVAL Jooyoung Ro <sup>1,2</sup> , Junyoung Kim <sup>1,2</sup> , and Yoon-Kyoung Cho <sup>1,2</sup> <sup>1</sup> Ulsan National Institute of Science and Technology (UNIST), KOREA and <sup>2</sup> Institute for Basic Science (IBS), KOREA	412
M038.a	OPTIMIZING CO-CULTURE SYSTEM OF KIDNEY ORGANOIDS AND ON-CHIP VASCULAR BED Yoshikazu Kameda <sup>1</sup> , Kensuke Yabuuchi <sup>2,3</sup> , Junichi Taniguchi <sup>2</sup> , Toshikazu Araoka <sup>1</sup> , Minoru Takasato <sup>1,2,3</sup> , Kazuya Fujimoto <sup>1</sup> , and Ryuji Yokokawa <sup>1</sup> <sup>1</sup> Kyoto University, JAPAN, <sup>2</sup> Institute of Physical and Chemical Research (RIKEN), JAPAN, and <sup>3</sup> Osaka University, JAPAN	414
M039.a	PARALLEL FORMATION OF CELL SPHEROIDS BASED ON VIBRATION-INDUCED FLOW Takuya Iizawa and Takeshi Hayakawa Chuo University, JAPAN	416
M040.a	PERIODONTIUM-ON-A-CHIP	418
M041.a	SLIDING MICROFLUIDIC DEVICE FOR VASCULARIZED ORGAN-ON-A-CHIP APPLICATIONS Feifan Wang, Qinyu Li, and Xiaolin Wang Shanghai Jiao Tong University, CHINA	420

T023.a	ANTI-ANGIOGENIC EFFECTS OF SODIUM SELENITE	
	SUPPLEMENT ON MICROVASULAR NETWORK ON A CHIP	. 422
T024.a	EVALUATION OF ISLET HETEROGENEITY IN ANGIOGENIC CAPABILITY USING A MICROFLUIDIC DEVICE An Konno <sup>1</sup> , Yuji Nashimoto <sup>2</sup> , Hirofumi Shintaku <sup>3</sup> , Kosuke Ino <sup>1</sup> , Masafumi Goto <sup>1</sup> , and Hitoshi Shiku <sup>1</sup> <sup>1</sup> Tohoku University, JAPAN, <sup>2</sup> Tokyo Medical and Dental University, JAPAN, and <sup>3</sup> Institute of Physical and Chemical Research (RIKEN), JAPAN	. 424
Т025.а	MICROFLUIDIC DEVICE WITH POROUS ELECTRODE FOR ELECTROCHEMICAL ANALYSIS OF VASCULAR ENDOTHELIAL CELLS	. 426
T026.a	PERFUSION MODES AFFECT FIBROBLAST OVERGROWTH IN LONG-TERM MICROFLUIDIC VESSEL NETWORK CULTURE Han Shao and Edmond W. K. Young University of Toronto, CANADA	. 428
W020.a	AN ENGINEERED EPITHELIAL TISSUE OFFERS IMPROVED URINARY EXCRETION PERFORMANCE IN A PROXIMAL TUBULE MICROPHYSIOLOGICAL SYSTEM	. 430
W021.a	DEVELOPMENT OF ROBUST SACRIFICIAL SUPPORT CONSTRUCT WITH DECELLUARIZED LIVER EXTRACELLULAR MATRIX Vamakshi Khati <sup>1</sup> , Johannes A. Turkki <sup>2</sup> , Harisha Ramachandraiah <sup>3</sup> , Falguni Pati <sup>4</sup> , Giulia Gaudenzi <sup>5</sup> , and Aman Russom <sup>1</sup> IKTH Royal Institute of Technology, SWEDEN, <sup>2</sup> Tampere University, FINLAND, <sup>3</sup> Biopromic AB, SWEDEN  Indian Institute of Technology, Hyderabad, INDIA, and <sup>5</sup> Karolinska Institute, SWEDEN	
W022.a	IN VIVO VASCULAR FORMATION IN A MICROFLUIDIC DEVICE WITH LIVER SINUSOIDAL ENDOTHELIAL CELLS Satomi Matsumoto, Jennifer S. Fang, Yu-Hsi Chen, Abraham P. Lee, and Christopher C.W. Hughes University of California, Irvine, USA	, 434
W023.a	MESENCHYMAL STEM CELL-DERIVED EXTRACELLULAR VESICLES PROMOTE REPAIRING OF CORNEAL WOUND IN HUMAN CORNEA-ON-A-CHIP Zitong Yu, Rui Hao, Xi Chen, Yi Zhang, and Hui Yang Chinese Academy of Sciences, CHINA	. 436
W024.a	THE EFFECT OF CURVATURE ON CORNEAL KERATOCYTES USING A PNEUMATICALLY CONTROLLED ORGAN CHIP Minju Kim, Kanghoon Choi, Yeji Ann, and Jungkyu Kim University of Utah, USA	, 438

# a - Cells, Organisms and Organs on a Chip Single-Cell Analysis

M042.a	A MICROPORE MEMBRANE-BASED SINGLE-CELL HANDLING SYSTEM	440
M043.a	AN INTEGRATED AND INDIVIDUALLY ADDRESSABLE MICROFLUIDIC SINGLE-CELL ARRAY CHIP Qiaoyi Wang and Hongkai Wu Hong Kong University of Science and Technology, HONG KONG	442
M044.a	CELL-ANCHORED MATRIX TECHNOLOGY FOR HIGH THROUGHPUT SINGLE CELL MULTIDIMENSIONAL ANALYSIS Ying Xu and Chia-Hung Chen City University of Hong Kong, HONG KONG	444
M045.a	COMPARING SHEATH CONSTRICTION WITH MECHANICAL CONSTRICTION IN IMPEDANCE FLOW CYTOMETRY Junwen Zhu, Yongxiang Feng, Huichao Chai, Fei Liang, and Wenhui Wang Tsinghua University, CHINA	446
M046.a	DROPLET-BASED ULTRA-HIGH-THROUGHPUT MICROBIAL SINGLE-CELL WHOLE-GENOME AMPLIFICATION AND BARCODING Jie Li, Rong Zhang, and Yifan Liu ShanghaiTech University, CHINA	448
M047.a	HIGH THROUGHPUT DIELECTROPHORESIS ASSISTED ELECTROPORATION FOR LOCALIZED INTRACELLULAR DELIVERY Xiaochen Qin, Yuyuan Zhou, Ratul Paul, and Yaling Liu Lehigh University, USA	450
M048.a	MATS-DROP: A HIGHLY SENSITIVE HIGH-THROUGHPUT SINGLE-CELL WHOLE TRANSCRIPTOMIC SEQUENCING METHOD Wenjian Cao, Yating Pan, Ying Mu, and Qiangyuan Zhu Zhejiang University, CHINA	452
M049.a	MICROFLUIDIC PROBE FOR ELECTRO-PERMEABILIZATION-BASED SINGLE CELL ANALYSIS  Samuel Sofela <sup>1</sup> , Alla Saleh <sup>1</sup> , and Mohammad A. Qasaimeh <sup>1,2</sup> <sup>1</sup> New York University Abu Dhabi (NYUAD), UAE and <sup>2</sup> New York University, USA	454
M050.a	PREPARATION OF SINGLE NEURON SAMPLES USING A TWO-LAYERED MICROWELL-ARRAY DEVICE Ayaka Nakama and Takashi Yasuda Kyushu Institute of Technology, JAPAN	456
T027.a	ACHIEVING SUPER-POISSONIAN MICROBEAD LOADING IN DROPLETS VIA HYDROGEL LUBRIFICATION Long Chen <sup>1,2</sup> , Xianqiang Mi <sup>2</sup> , and Yifan Liu <sup>1</sup> ShanghaiTech University, CHINA and <sup>2</sup> Chinese Academy of Sciences, CHINA	458
T028.a	AUTOMATED BIOPHYSICAL DISTINCTION OF DRUG-TREATED CANCER VERSUS ASSOCIATED FIBROBLAST CELLS FROM PANCREATIC TUMORS	460

T029.a	<b>DEVELOPMENT OF A REAL-TIME MICROFLUIDIC IMPEDANCE FLOW CYTOMETRY</b> Xiaofeng Luan <sup>1,2</sup> , Yuang Li <sup>1,2</sup> , Pengbin Liu <sup>1</sup> , Sheng Sun <sup>1,2</sup> , Wenchang Zhang <sup>1</sup> , Lingqian Zhang <sup>1</sup> , Mingxiao Li <sup>1</sup> , Haiping Zhao <sup>3</sup> , Yang Zhao <sup>1</sup> , and Chengjun Huang <sup>1,2</sup> <sup>1</sup> Chinese Academy of Sciences, CHINA, <sup>2</sup> University of Chinese Academy of Sciences, CHINA, and <sup>3</sup> Xuanwu Hospital of Capital Medical University, CHINA	. 462
Т030.а	<b>DEVELOPMENT OF MICROFLUIDIC DEVICES FOR SINGLE-CELL OXYGEN TENSION ANALYSIS</b> Santhosh Kannan <sup>1,2</sup> , Ping-Liang Ko <sup>1,3</sup> , Hsiao-Mei Wu <sup>1,3</sup> , and Yi-Chung Tung <sup>1</sup> <sup>1</sup> Academia Sinica, TAIWAN, <sup>2</sup> National Tsing Hua University, TAIWAN, and <sup>3</sup> National Taiwan University, TAIWAN	. 464
T031.a	OIL-SEALED HYDROGEL MICROWELL ARRAY FOR ANALYSIS ON SECRETORY COMPONENTS FROM CONFINED SINGLE CELLS	. 466
W025.a	CLASSIFICATION OF NEUTROPHILS, EOSINOPHILS AND BASOPHILS BASED ON 58 SINGLE-CELL BIOELECTRICAL PARAMETERS DERIVED FROM IMPEDANCE FLOW MICROCYTOMETRY	. 468
W026.a	APPLYING SUCCESSIVE MECHANICAL STRESSES ON CIRCULATING CELLS USING MICROFLUIDIC VASCULAR NETWORK TO ASSESS SICKLED RED BLOOD CELLS RIGIDITY	
W027.a	CONTINUOUS MONITORING OF LIVE SINGLE-CELL METABOLISM FOR DRUG THERAPY Shengsen Zhang, Shengjie Chen, and Rong Zhu Tsinghua University, CHINA	. 472
W028.a	DROPLET ARRAY-BASED PLATFORM FOR TIME-LAPSE QUANTIFICATION OF EXTRACELLULAR VESICLE RELEASE FROM SINGLE CELLS Kazuki Hattori <sup>1</sup> , Yuki Goda <sup>1</sup> , Minato Yamashita <sup>1</sup> , Yusuke Yoshioka <sup>2</sup> , Ryosuke Kojima <sup>1</sup> , and Sadao Ota <sup>1</sup> **Iniversity of Tokyo, JAPAN and **Tokyo Medical University, JAPAN	. 474
W029.a	EASYFLOW: TOOL FOR QUICK DROPLET DATA ANALYSIS	. 476
W030.a	GLIOMA SINGLE CELLS ANALYSIS BY CYCLIC GRADUAL CONSTRICTION MICROCHANNELS  Xin Geng <sup>1</sup> , Chunhong Wang <sup>2</sup> , Meng Wang <sup>1</sup> , Hongming Ji <sup>2</sup> , and Xiang Ren <sup>2,3</sup> <sup>1</sup> Fifth Clinical Medical College of Shanxi Medical University, CHINA, <sup>2</sup> Fifth Hospital of Shanxi Medical University, CHINA, and <sup>3</sup> Tianjin University, CHINA	. 478
W031.a	MICROFLUIDIC CELL ASSEMBLY DEVICE FOR CELL-CELL INTERACTIONS AT THE SINGLE-CELL LEVEL Weizhi Liu, Shanqing Huang, Zhi Zhu, and Chaoyong Yang Xiamen University, CHINA	. 480

W032.a	MICROFLUIDIC SINGLE-CELLS SAMPLING COMBINED WITH 2D CYTOMETRY SPECTRUM/MASS SPECTROMETRY ENABLES SIMULTANEOUS ONLINE PROFILING OF BIOMARKER AND AGENT UPTAKE Xuan Zhang, Cheng-Xin Wu, Xing Wei, Jiao Wang, Xue Men, Ming-Li Chen, and Jian-Hua Wang Northeastern University, CHINA	482
W033.a	MICROPROBE ELECTROSPRAY IONIZATION MASS SPECTROMETRY REVEALS METABOLIC REGULATION OF SINGLE BACTERIAL CELL DURING ANTIBIOTICS INDUCED FILAMENTATION Dongxue Zhang and Liang Qiao Fudan University, CHINA	484
W034.a	SINGLE-CELL IMPEDANCE CYTOMETRY TO EXPLORE THE ACTION OF ANTIMICROBIAL PEPTIDES  Cassandra Troiano <sup>1</sup> , Adele De Ninno <sup>2</sup> , Bruno Casciaro <sup>3</sup> , Francesco Riccitelli <sup>1</sup> , Sara Bobone <sup>1</sup> , Renato Massoud <sup>1</sup> , Maria L. Mangoni <sup>4</sup> , Paolo Bisegna <sup>1</sup> , Lorenzo Stella <sup>1</sup> , and Federica Caselli <sup>1</sup> <sup>1</sup> University of Rome Tor Vergata, ITALY, <sup>2</sup> Italian National Research Council, ITALY, <sup>3</sup> Italian Institute of Technology, ITALY, and <sup>4</sup> Sapienza University of Rome, ITALY	486
W035.a	SINGLE-CELL METABOLITE AND LIPID PROFILING REVEALS MACROPHAGE HETEROGENEITY DURING FOAM CELL FORMATION Yiwen Wang, Ling Lin, and Liang Qiao Fudan University, CHINA	488
W036.a	WELL-PAIRED-SEQ: A SIZE-EXCLUSION AND LOCALLY QUASI-STATIC HYDRODYNAMIC MICROWELL CHIP FOR SINGLE-CELL RNA-SEQ  Kun Yin <sup>1</sup> , Meijuan Zhao <sup>1</sup> , Li Lin <sup>1</sup> , Yingwen Chen <sup>1</sup> , He Dong <sup>1</sup> , Dianyi Liang <sup>1</sup> , Jia Song <sup>2</sup> , and Chaoyong Yang <sup>1,2</sup> <sup>1</sup> Xiamen University, CHINA and <sup>2</sup> Shanghai Jiao Tong University, CHINA	490
	a - Cells, Organisms and Organs on a Chip	
	Synthetic Biology	
M051.a	CONCENTRATION-CONTROLLED GENERATION OF DNA CONDENSATES WITHIN MONODISPERSE GIANT UNILAMELLAR VESICLES Ryotaro Yoneyama <sup>1</sup> , Ryota Ushiyama <sup>1</sup> , Tomoya Maruyama <sup>2</sup> , Masahiro Takinoue <sup>2</sup> , and Hiroaki Suzuki <sup>1</sup> Chuo University, JAPAN and <sup>2</sup> Tokyo Institute of Technology, JAPAN	492
W037.a	DETECTION OF Y-SHAPED DNA USING MUTANT NANOPORE PROTEIN BY A PATCH CLAMP METHOD OF THE ARTIFICIAL LIPID BILAYER Toshiyuki Tosaka and Koki Kamiya Gunma University, JAPAN	494
	a - Cells, Organisms and Organs on a Chip	
	Other Applications in Biology	
M052.a	A LABEL-FREE PLATFORM COMBINING QUANTITATE PHASE IMAGING AND MICROFLUIDICS FOR THE MEASUREMENT OF CELLULAR BIOPHYSICAL PROPERTIES Qinru Xiao, Yanping He, Md Habibur Rahman, Renjie Zhou, and Yi-Ping Ho Chinese University of Hong Kong, HONG KONG	496

M053.a	CRYOPRESERVATION OF NATURAL KILLER CELLS IN DROPLETS	
M054.a	PRODUCTION AND VIABILITY OF ENCAPSULATED BACTERIAL-FUNGAL CONSORTIA FOR DELIVERY IN SOIL  Alexandra Homsy <sup>1</sup> , Edith Laux <sup>1</sup> , Laure Jeandupeux <sup>1</sup> , Tatiana Nogueira-Matos <sup>1</sup> , Ajith Manimala <sup>1</sup> , Nina Châtelain <sup>1</sup> , Claudio Prieur <sup>1</sup> , Cristina Martin-Olmos <sup>2,3</sup> , Isha Hashmi <sup>4</sup> , Camille Hyde <sup>4</sup> , Celia Ruiz <sup>4</sup> , Pilar Junier <sup>4</sup> , and Saskia Bindschedler <sup>4</sup> <sup>1</sup> University of Applied Sciences Western Switzerland, SWITZERLAND, <sup>2</sup> University of Lausanne, SWITZERLAND, <sup>3</sup> Ecole Polytechnique Fédérale de Lausanne, SWITZERLAND <sup>4</sup> University of Neuchâtel, SWITZERLAND	
Т032.а	MICROFLUIDIC DEVICES FOR PLATELET ACTIVATION	502
	b - Diagnostics, Drug Testing and Personalized Medicine	
	Cancer Research, Capture and Analysis of Circulating Tumor Cells	
M055.b	A FLEXIBLE INDWELLING SYSTEM FOR IN VIVO ENRICHMENT OF CIRCULATING TUMOR CELLS Yixing Gou <sup>1</sup> , Zheng You <sup>2</sup> , and Dahai Ren <sup>2</sup> <sup>1</sup> Hebei University of Technology, CHINA and <sup>2</sup> Tsinghua University, CHINA	504
M056.b	A GEL-FREE MICROFLUIDIC CELL CULTURE ARRAY FOR SELECTIVE EXPANDING CIRCULATING TUMOR STEM CELLS Yanzhang Luo, Yang Liu, Zihe Chen, Jueming Chen, Dongguo Lin, and Dayu Liu South China University of Technology, CHINA	506
M057.b	A NOVEL ELECTROROTATION PLATFORM "vROT" WITH EASY CELL HANDLING FOR CANCER ANALYSIS Kazuma Yoda, Yoshiyasu Ichikawa, and Masahiro Motosuke Tokyo University of Science, JAPAN	508
Т033.b	MICROFLUIDIC ISOLATION AND CAPTURE OF CIRCULATING TUMOR CELLS AND CLUSTERS FROM MOUSE BLOOD Celine Macaraniag, Jian Zhou, Jing Li, William Putzbach, Nissim Hay, and Ian Papautsky University of Illinois, Chicago, USA	510
T034.b	THE UNDERLYING CORRELATION BETWEEN THE PRIMARY SINGLE CELLS' ADHERENT MORPHOLOGY AND SUSPENDED ELECTRICAL PROPERTIES DISCOVERED WITH A MICROFLUIDIC IMPEDANCE FLOW CYTOMETRY  Xiaofeng Luan <sup>1,2</sup> , Yuang Li <sup>1,2</sup> , Sheng Sun <sup>1,2</sup> , Wenchang Zhang <sup>1</sup> , Lingqian Zhang <sup>1</sup> , Mingxiao Li <sup>1</sup> , Jinghui Wang <sup>3</sup> , Lina Zhang <sup>3</sup> , Yang Zhao <sup>1</sup> , and Chengjun Huang <sup>1,2</sup> <sup>1</sup> Chinese Academy of Sciences, CHINA, <sup>2</sup> University of Chinese Academy of Sciences, CHINA, and <sup>3</sup> Beijing Chest Hospital, Capital Medical University, CHINA	512
W038.b	<b>3D-OXYGEN GRADIENT CHIP FOR CANCER CELL MIGRATION RESEARCH</b> Pan Zuo, Jelle J.F. Sleeboom, and Jaap M.J. den Toonder Eindhoven University of Technology, NETHERLANDS	514

W039.b	BIOPRINTING MICRODISSECTED TUMOR "CUBOIDS"  Anjul M. Bansal <sup>1</sup> , Lisa F. Horowitz <sup>1</sup> , Taranjit S. Gujral <sup>2</sup> , and Albert Folch <sup>1</sup> <sup>1</sup> University of Washington, USA and <sup>2</sup> Fred Hutchinson Cancer Research Center, USA	516
W040.b	ESTABLISHMENT OF A CASCADED MICROFLUIDIC SINGLE CELL ANALYSIS SYSTEM FOR MOLECULAR AND FUNCTIONAL HETEROGENEITY ANALYSIS OF CIRCULATING TUMOR CELL Yingying Lu, Shuai Yue, and Jin Fang China Medical University, CHINA	518
W041.b	IN-VIVO PERFECT FILTER-BASED CIRCULATING FILTRATION SYSTEM FOR DEPLETION OF CIRCULATING TUMOR CELLS	520
	b - Diagnostics, Drug Testing and Personalized Medicine	
	Drug Delivery	
M058.b	REAL TIME IMAGING OF ACOUSTIC MICROROBOTS INSIDE MICROFLUIDIC AND EX-VIVO VESSELS Alexia D.C. Fonseca, Anna Heinle, Tirza Heinle, and Daniel Ahmed ETH Zürich, SWITZERLAND	522
M059.b	TONICITY CHANGE USING EXODISC FOR DRUG LOADING INTO EXTRACELLULAR VESICLES  Chaeeun Lee <sup>1,2</sup> , Sumit Kumar <sup>2</sup> , Juhee Park <sup>2</sup> , and Yoon-Kyoung Cho <sup>1,2</sup> <sup>1</sup> Ulsan National Institute of Science and Technology (UNIST), KOREA and <sup>2</sup> Institute for Basic Science (IBS), KOREA	524
T035.b	<b>DEVELOPMENT OF DELIVERY METHOD USING LIPID NANOPARTICLES OF LONG-CHAIN DNAS ENCODING CRISPR/CAS SYSTEM COMPONENTS</b> Shuya Uno <sup>1</sup> , Masatoshi Maeki <sup>1,2,3</sup> , Yusuke Sato <sup>1</sup> , Akihiko Ishida <sup>1</sup> , Hideyoshi Hrashima <sup>1</sup> , and Manabu Tokeshi <sup>1</sup> <sup>1</sup> Hokkaido University, JAPAN, <sup>2</sup> Japan Science and Technology Agency (JST), JAPAN, and <sup>3</sup> High Energy Accelerator Research Organization, JAPAN	526
T036.b	MEGAHELTZ-BAND ULTRASOUND-TRIGGERED ON-DEMAND DRUG RELEASE FROM HYDROGEL MICROSPHERES WITH ACOUSTIC-RESPONSIVE MICROBUBBLES	
Т037.ь	PULSE LASER ACTIVATED HIGH THROUGHPUT INTRACELLULAR DELIVERY ON HANGING DROP SPHEROIDS USING NANO-SPIKES GOLD NANOPARTICLES	530
W042.b	PERMEATION CHARACTERISTIC OF  EXOSOME-ENCAPSULATING MICRO-HYDROGEL  Daisuke Takeuchi <sup>1</sup> , Shuhei Takatsuka <sup>1</sup> , Yuto Hamazaki <sup>2</sup> , Yuta Kurashina <sup>3</sup> ,  Makoto Asai <sup>4</sup> , Ayuko Hoshino <sup>2</sup> , and Hiroaki Onoe <sup>1</sup> <sup>1</sup> Keio University, JAPAN, <sup>2</sup> Tokyo Institute of Technology, JAPAN, <sup>3</sup> Tokyo University of Agriculture and Technology, JAPAN, and <sup>4</sup> Keio University Global Research Institute, JAPAN	

W043.b	PROTOTYPING OF SHEAR-MEDIATED MEMBRANE DEFORMATION FOR SCALE-UP PAYLOAD LOADING INTO ERYTHROCYTES	534
W044.b	TUMOR-DERIVED EXOSOMES PURIFIED BY MICROFLUIDIC DEVICE FOR DRUG DELIVERY AGAINST THEIR HOMOLOGOUS TUMOR	536
	b - Diagnostics, Drug Testing and Personalized Medicine	
	Drug Screening and Development	
M060.b	COCKTAIL DRUGS DELIVERY CHIP WITH SELECTIVELY CROSSLINKING HYDROGEL FOR COLON CANCER DRUG SCREENING Hsin-Yu Yang <sup>1</sup> , Ouyang Chih-Hsuan <sup>1</sup> , and Fan-Gang Tseng <sup>1,2</sup> <sup>1</sup> National Tsing Hua University, TAIWAN and <sup>2</sup> Academia Sinica, TAIWAN	538
T038.b	HETEROGENEITY ANALYSIS OF MICRO-DISSECTED CANCER "CUBOIDS" USING A MICROFLUIDIC DEVICE Lisa F. Horowitz <sup>1</sup> , Tran N.H. Nguyen <sup>1</sup> , Ethan Lockhart <sup>1</sup> , Cb Lim <sup>2</sup> , Taranjit S. Gujral <sup>2</sup> , and Albert Folch <sup>1</sup> **Iniversity of Washington, USA and **2Fred Hutchinson Cancer Research Center, USA**	540
W045.b	HIGH-THROUGHPUT DRUG DELIVERY BASED ON A DRIED DRUG PROBE ARRAY FOR DRUG SCREENING Yi-Xue Chen, Meng-Ting Zhang, Jian-Zhang Pan, and Qun Fang Zhejiang University, CHINA	542
	b - Diagnostics, Drug Testing and Personalized Medicine	
	Liquid Biopsy and Sample Preparation	
M061.b	AUTOMATIC BACTERIAL DNA PURIFICATION DEVICE UTILIZING PRESSURE-DRIVEN AND SELF-CONTAINED CARTRIDGE Le Tran Huy Thang, Han Won, and Joong Ho Shin Pukyong National University, KOREA	544
M062.b	DYNAMIC MAGNETIC NANOMIXERS ENABLING RAPID ISOLATION AND MOLECULAR PROFILING OF TUMOR-DERIVED EXTRACELLULAR VESICLES	546
M063.b	LABEL-FREE AND RAPID DETECTION OF URINARY TRACT INFECTION USING IMPEDANCE CYTOMETRY Chayakorn Petchakup <sup>1</sup> , Hui Min Tay <sup>1</sup> , Yuan Yi Constance Chen <sup>2</sup> , Pei Yun Hon <sup>2</sup> , Partha Pratim De <sup>2</sup> , Tsin Wen Yeo <sup>1</sup> , King Ho Holden Li <sup>1</sup> , Shawn Vasoo <sup>2</sup> , and Han Wei Hou <sup>1</sup> Inanyang Technological University, SINGAPORE and <sup>2</sup> Tan Tock Seng Hospital, SINGAPORE	548
M064.b	MICROARC: AN AUTOMATED MICROFLUIDIC SYSTEM FOR ULTRA HIGH THROUGHPUT ISOLATION OF LOW ABUNDANCE BACTERIA FROM BLOOD TOWARDS RAPID SEPSIS DIAGNOSTICS  Sheng Yuan Leong <sup>1</sup> , Hui Min Tay <sup>1</sup> , Wan Wei Lok <sup>1</sup> , Xing Yang <sup>2</sup> , and Han Wei Hou <sup>1</sup> Nanyang Technological University, SINGAPORE and <sup>2</sup> Jiaxing Accunome Biotechnology, CHINA	550

M065.b	MICRORNA EXPRESSION PROFILING OF SINGLE TUMOR-ASSOCIATED EXOSOME BY PROGRAMMABLE LIPSOME VECTOR	. 552
M066.b	PUSHBUTTON-ACTIVATED MICROFLUIDIC DEVICE FOR DNA EXTRACTION AND DROPLET GENERATION FOR DDPCR  Dong Hyun Han, Juhwan Park, and Je-Kyun Park Korea Advanced Institute of Science and Technology (KAIST), KOREA	. 554
M067.b	SINGLE EV QUANTIFICATION USING PLASMONIC RESONANCE INSIDE DROPLET REACTOR  Nakyung Jung <sup>1</sup> , Sumit Kumar <sup>1,2</sup> , and Yoon-Kyoung Cho <sup>1,2</sup> <sup>1</sup> Ulsan National Institute of Science and Technology (UNIST), KOREA and <sup>2</sup> Institute for Basic Science (IBS), KOREA	. 556
M068.b	TOPOGRAPHIC MODULATION OF ENZYMATIC REACTION AFFORDS ULTRASENSITIVE DIGITAL DETECTION OF TUMOR EXOSOMES Yunjie Wen <sup>1</sup> , Yutao Li <sup>1</sup> , Andrew K. Godwin <sup>2</sup> , and Yong Zeng <sup>1,3</sup> <sup>1</sup> University of Florida, USA, <sup>2</sup> University of Kansas Medical Center, USA, and <sup>3</sup> University of Florida Health Cancer Center, USA	. 558
Т039.Ь	DIRECT SAMPLE EXTRACTION AND ADVANCED PRE-PROCESSING ON A SELF-POWERED MICROFLUIDIC CHIP FOR LATERAL FLOW IMMUNOASSAY AUTOMATION Dries Vloemans, Lorenz Van Hileghem, Francesco Dal Dosso, and Jeroen Lammertyn KU Leuven, BELGIUM	. 560
T040.b	METABOLIC GLYCAN LABELING-BASED ISOLATION OF NEWLY SYNTHESIZED EXOSOMES IN IMMUNOTHERAPY Qiuyue Wu, Yanling Song, and Chaoyong Yang Xiamen University, CHINA	. 562
Т041.ь	NEAR-PATIENT EXTRACTION AND DETECTION OF MIR-122 MICRORNA BIOMARKER FOR DRUG-INDUCED LIVER INJURY DIAGNOSTICS  Maïwenn Kersaudy-Kerhoas <sup>1,2</sup> , Antonio Liga <sup>1,2</sup> , Appan Roychoudhury <sup>2</sup> , Marilena Stamouli <sup>2</sup> , Rhiannon Grant <sup>2</sup> , Damaso Sanchez Carrera <sup>1</sup> , Holger Schulze <sup>2</sup> , Witold Mielczarek <sup>1,2</sup> , Wilna Oosthuyzen <sup>2</sup> , Juan Quintana-Alcala <sup>2</sup> , Paul Dickinson <sup>2</sup> , Amy H. Buck <sup>2</sup> , Nicholas R. Leslie <sup>1</sup> , Jurgen Haas <sup>2</sup> , Till T. Bachmann <sup>2</sup> , and James W. Dear <sup>2</sup> <sup>1</sup> Heriot-Watt University, SCOTLAND and <sup>2</sup> University of Edinburgh, SCOTLAND	. 564
W046.b	3D-PRINTED SLIPCHIP FOR COLLECTION OF AQUEOUS SAMPLES WITH A SPECIFIC VOLUME Zhiqing Xiao, Zejingqiu Chen, Zitao Feng, and Weijin Guo Shantou University, CHINA	. 566
W047.b	CO-ISOLATION OF EXTRACELLULAR VESICLES AND CELL-FREE DNA IN THE SAME ALIQOUT OF BLOOD PLASMA USING CENTRIFUGAL MICROFLUIDICS	. 568
W048.b	OPTIMIZATION OF CELL CAPTURE AND RELEASE FROM UNDILUTED WHOLE BLOOD BY POLYVINYL ALCOHOL (PVA) - FUNCTIONALIZED FILTRATION SYSTEM	. 570

W049.b	SERS-BASED MICROFLUIDIC BIOCHIP FOR TUMOR-RELATED EXOSOME ANALYSIS Weiming Lin <sup>1,2</sup> , Xianjie Xiu <sup>3</sup> , Zehang Gao <sup>1</sup> , Gaozhe Cai <sup>1</sup> , Zizhen Ming <sup>4</sup> , Zufang Huang <sup>2</sup> , Jing Wang <sup>2</sup> , Jianlong Zhao <sup>1</sup> , and Shilun Feng <sup>1</sup> <sup>1</sup> Chinese Academy of Sciences, CHINA, <sup>2</sup> Fujian Normal University, CHINA, <sup>3</sup> Shanghai Jiao Tong University, CHINA, and <sup>4</sup> Shanghai Jiao Tong University School of Medicine, CHINA	
W050.b	SIZE-DEPENDENT MICROFLUIDIC FILTRATION COUPLED ON-CHIP SURFACE-ENHANCED RAMAN SCATTERING FOR EXOSOME ANALYSISLiang Qiao and Zhenzhen Han Fudan University, CHINA	574
	b - Diagnostics, Drug Testing and Personalized Medicine	
	Neurobiology/Neuroscience	
M069.b	ASTROCYTE POTENTIAL MEASUREMENT USING A MICROELECTRODE ARRAY WITH BACK-TO-BACK LAYERED CO-CULTURE Satoshi Yoshida and Takashi Yasuda Kyushu Institute of Technology, JAPAN	576
М070.Ь	DEVELOPMENT OF SHAPE-COMFORTABLE HYDROGEL-BASED CUFF ELECTRODE FOR VAGUS NERVE STIMULATION Hayato Yoroizuka <sup>1</sup> , Daigo Terutsuki <sup>1</sup> , Shin-ichiro Osawa <sup>1</sup> , Yuka Ogihara <sup>1</sup> , Hiroya Abe <sup>1</sup> , Atsuhiro Nakagawa <sup>1</sup> , Masaki Iwasaki <sup>2</sup> , and Matsuhiko Nishizawa <sup>1</sup> <sup>1</sup> Tohoku University, JAPAN and <sup>2</sup> National Center of Neurology and Psychiatry (NCNP), JAPAN	578
	b - Diagnostics, Drug Testing and Personalized Medicine	
	Nucleic-Acid Analysis	
M071.b	DETECTION OF MICRORNA-21 BASED ON ROLLING CIRCLE AMPLIFICATION IN MICROFLUIDIC DROPLET Ze-Lin Du, Wen-Qi Ye, Dan Wang, Qing-Shuo Li, Chun-Guang Yang, and Zhang-Run Xu Northeastern University, CHINA	580
M072.b	LABEL-FREE AND NAKED-EYE BASED DIGITAL LAMP IN MULTIFUNCTIONAL HYDROGEL Mei Fang and Xingyu Lin Zhejiang University, CHINA	582
T042.b	HIGH-THROUGHPUT NUCLEIC ACID QUANTIFICATION  USING LabChip® GX Touch™ NUCLEIC ACID ANALYZER  Brendan Curran, Gayatri P. Gautam, Jason Charbonneau, Guangnan Meng, Thomas Perroud, and James White  PerkinElmer Inc., USA	584
T043.b	INTEGRATING CRISPR-Cas12a AND MULTIPLEX RPA INTO A MICROFLUIDIC DUAL-DROPLET DEVICE ENABLES SIMULTANEOUS DETECTION OF HPV16 AND HPV18	586

T044.b	MICROFLUIDIC SPACE CODING FOR MULTIPLEXED NUCLEIC  ACID DETECTION VIA CRISPR-Cas12a: A NOVEL APPROACH  Zhichen Xu <sup>1,2</sup> , Tao Li <sup>1,2</sup> , Ying Li <sup>1,2</sup> , and Yunhuang Yang <sup>1,2</sup> <sup>1</sup> Innovation Academy for Precision Measurement Science and Technology, CHINA and <sup>2</sup> University of Chinese Academy of Sciences, CHINA	588
W051.b	A FINGER-DRIVEN DISPOSABLE MICRO-PLATFORM BASED ON ISOTHERMAL AMPLIFICATION FOR THE APPLICATION OF MULTIPLEXED AND POINT-OF-CARE DIAGNOSIS OF TUBERCULOSIS Zhiying Wang, Yang Wang, and Lingqian Chang Beihang University, CHINA	590
W052.b	A MICROFLUIDIC-BASED QUANTITATIVE LAMP DETECTION  SYSTEM FOR MULTIPLE FOOD ALLERGENS  Daigo Natsuhara <sup>1</sup> , Yuka Kiba <sup>2</sup> , Koki Shirai <sup>1</sup> , Tomoya Bussho <sup>1</sup> , Ryogo Saito <sup>1</sup> ,  Shunya Okamoto <sup>1</sup> , Moeto Nagai <sup>1</sup> , Masashi Kitamura <sup>2</sup> , and Takayuki Shibata <sup>1</sup> <sup>1</sup> Toyohashi University of Technology, JAPAN and <sup>2</sup> Josai University, JAPAN	592
W053.b	CARBON BLACK-PDMS EMBEDDED PAPER-BASED DEVICE FOR PATHOGEN DETECTION USING PHOTOTHERMAL EFFECT Ye Lin Kim and Joong Ho Shin Pukyong National University, KOREA	594
W054.b	OVERCOMING FALSE POSITIVES CAUSED DUE TO PRIMER-DIMERS IN A NUCLEIC ACID LATERAL FLOW ASSAY USING LATE-PCR Priyanka Agarwal and Bhushan J. Toley Indian Institute of Science, Bangalore, INDIA	596
W055.b	PARTITIONED PRESTORAGE AND CONTROLLED RECONSTITUTION OF PRIMER/PROBE REAGENTS FOR ROBUST MULTIPLEX DIGITAL PCR Tengbao Xie <sup>1</sup> , Ping Wang <sup>2</sup> , Qiang Zhao <sup>1</sup> , and Gang Li <sup>1</sup> <sup>1</sup> Chongqing University, CHINA and <sup>2</sup> Henan University of Science and Technology, CHINA	598
	b - Diagnostics, Drug Testing and Personalized Medicine	
	Pathogen Detection and Antibiotics	
M073.b	A DIGITAL CULTURE PLATFORM FOR STUDYING VIRUS DISTRIBUTION IN RESPIRATORY AEROSOLS Siddharth Raghu Srimathi and Don L. DeVoe University of Maryland, USA	600
M074.b	LOGARITHMIC-DILUTION-BASED DROPLET DIGITAL PCR FOR HIGH-DYNAMIC-RANG QUANTIFICATION OF CLINICAL-RELEVANT VIRAL PATHOGENS	
T045.b	COMMENSAL BACTERIA DETECTION USING A LOLLIPOP-BASED MICROFLUIDIC DEVICE Wan-chen Tu <sup>1</sup> , Anika M. McManamen <sup>1</sup> , Xiaojing Su <sup>1</sup> , Damielle L. Hieber <sup>1</sup> , Meg G. Takezawa <sup>1</sup> , Grant W. Hassan <sup>1</sup> , Ulri N. Lee <sup>1</sup> , Eden V. Anana <sup>1</sup> , Molly W. Stephenson <sup>1</sup> , Ingrid Jeacopello <sup>1</sup> , Karen N. Adams <sup>1</sup> , Erwin Berthier <sup>1</sup> , Sanitta Thongpang <sup>1,2</sup> , and Ashleigh B. Theberge <sup>1</sup> **IUniversity of Washington, USA and **2Mahidol University, THAILAND**	604

M075.b	A SENSITIVE NATIVE PURIFICATION AND MASS SPECTROMETRIC CHARACTERIZATION STRATEGY FOR PROTEIN COMPLEX ANALYSIS	622
	Protein Analysis and Proteomics	
	b - Diagnostics, Drug Testing and Personalized Medicine	
W059.b	SPORE-BASED BIOSENSOR-ON-PILLAR PLATFORM FOR DETECTION OF B-LACTAM ANTIBIOTICS IN MILK  Sammer Ul Hassan <sup>1,3</sup> , Prashant Goel <sup>2</sup> , Naresh Kumar <sup>2</sup> , and Xunli Zhang <sup>1</sup> **IUniversity of Southampton, UK, **ICAR-National Dairy Research Institute, INDIA, and  **JUniversity of Hong Kong, HONG KONG**	620
W058.b	POINT-OF-CARE MULTIPLEX-GENES DETECTION OF MYCOBACTERIUM TUBERCULOSIS USING A LOW-COST PAPER THE PROPERTY OF FLUIDIC DEVICE	618
W057.b	POINT-OF-CARE DEVICES FOR DETECTING MOSQUITO-BORNE AND AIRBORNE VIRUSES George Adedokun, Carlos Manzanas, Morteza Alipanah, John A. Lednicky, Chang-Yu Wu, and Z. Hugh Fan University of Florida, USA	616
W056.b	GENERATION OF SERIES OF DILUTIONS ON SLIPCHIP FOR DRUG RESISTANCE STUDIES  Wong Wai Tan <sup>1</sup> , Xu Miao <sup>1</sup> , Ho Cheung Shum <sup>1,2</sup> , and Sammer Ul Hassan <sup>1,2</sup> <sup>1</sup> University of Hong Kong, HONG KONG and <sup>2</sup> Advanced Biomedical Instrumentation Centre, HONG KONG	
T049.b	ONE-STEP SIGNAL AMPLIFIED GOLD NANOPARTICLES FOR BACTERIAL INFECTION DIAGNOSIS ON LATERAL FLOW IMMUNOASSAY DEVICE	612
T048.b	MONOLITH-MODIFIED PAPER ANALYTICAL DEVICE FOR TUBERCULOSIS DETECTION Wei-Yi Chu, Chun-Hui Yang, and Chien-Fu Chen National Taiwan University, TAIWAN	610
T047.b	INTEGRATED PLATFORM FOR AUTOMATED SAMPLE PREPARATION AND MULTIPLEXED POINT-OF-CARE DIAGNOSTICS VIA SEQUENTIAL MAGNETOFLUIDIC ELUTION Asher Varon, David Lu, Fan-En Chen, Alexander Y. Trick, and Tza-Huei Wang Johns Hopkins University, USA	608
T046.b	A MICROBIAL CELL-FREE DNA METAGENOMIC APPROACH  Ana Martinez-Lopez <sup>1</sup> , Kazuhiro Horiba <sup>2</sup> , Linda Marriott <sup>1</sup> , Amanda Warr <sup>3</sup> , Jacob N. Phulusa <sup>4</sup> ,  Jamie Rylance <sup>4,5</sup> , Yoshinori Ito <sup>2</sup> , and Maïwenn Kersaudy-Kerhoas <sup>1,3</sup> <sup>1</sup> Heriot-Watt University, UK, <sup>2</sup> Nagoya University, JAPAN, <sup>3</sup> University of Edinburgh, UK, <sup>4</sup> Malawi-Liverpoo Wellcome Clinical Research Programme, MALAWI, and <sup>5</sup> Liverpool School of Tropical Medicine, UK	

M076.b	Peng Zhao, Yongxiang Feng, Fei Liang, and Wenhui Wang  Tsinghua University, CHINA	. 624
M077.b	SIMULTANEOUS TRANSCRIPTOME AND PROTEOME PROFILING OF SINGLE MOUSE OOCYTE USING DEEP SINGLE-CELL MULTI-OMICS TECHNIQUE  Yi-Rong Jiang <sup>1</sup> , Le Zhu <sup>2</sup> , Lan-Rui Cao <sup>2,3</sup> , Qiong Wu <sup>1</sup> , Jian-Bo Chen <sup>1</sup> , Yu Wang <sup>1</sup> , Zhi-Ying Guan <sup>1</sup> , Tian-Yu Zhang <sup>4</sup> , Zhao-Lun Wang <sup>4</sup> , Shao-Wen Shi <sup>5</sup> , Hui-Feng Wang <sup>5</sup> , Jian-Zhang Pan <sup>1,5</sup> , Xu-Dong Fu <sup>2,3</sup> , Yong-Cheng Wang <sup>2</sup> , and Qun Fang <sup>1,5</sup> <sup>1</sup> Zhejiang University, CHINA, <sup>2</sup> Zhejiang University Medical Center, CHINA, <sup>3</sup> Zhejiang University School of Medicine, CHINA, <sup>4</sup> M20 Genomics, CHINA, and <sup>5</sup> ZJU-Hangzhou Global Scientific and Technological Innovation Center, CHINA	. 626
T050.b	A MAGNETIC BEAD-BASED PROXIMITY EXTENSION ASSAY FOR HIGHLY-SENSITIVE PROTEIN DETECTION	. 628
T051.b	A NITROCELLULOSE PAPER-BASED MULTI-WELL PLATE FOR POINT-OF-CARE ELISA	. 630
W060.b	A HIGH-SENSITIVE DETECTION OF AGGREGATED α-SYNUCLEIN BY SALT ADDITION FOR LIPOSOME-IMMOBILIZED QCM MECHANICAL SENSOR	. 632
W061.b	BEAD-BASED SLIPCHIP FOR DIGITAL IMMUNOASSAY WITH MULTISTEP SAMPLE DELIVERY Weiyuan Lyu, Jingwei Yi, Hong Xu, Feng Shen, and Hongchen Gu Shanghai Jiao Tong University, CHINA	. 634
W062.b	DIFFUSIONAL MICROFLUIDICS FOR PROTEIN ANALYSIS	. 636
W063.b	GOLD NANOPARTICLE ENHANCED 3D FLUORESCENCE MICROARRAY FOR HIGHLY SENSITIVE MULTIPLEXED PROTEIN ANALYSIS IN EXTRACELLULAR VESICLES	. 638
W064.b	MILLISECONDS TIME RESOLVED CRYO-EM THROUGH DROPLET MICROFLUIDICS Stefania Torino <sup>1,2</sup> , Mugdha K. Dhurandhar <sup>1,2</sup> , and Rouslan G. Efremov <sup>1,2</sup> <sup>1</sup> Vlaams Instituut voor Biotechnologie (VIB), BELGIUM and <sup>2</sup> Vrije Universiteit Brussel (VUB), BELGIUM	

## b - Diagnostics, Drug Testing and Personalized Medicine Testing for COVID-19, Rapid Virus Testing, Pandemic Management

M078.b	LAB-ON-PCB DEVICE FOR HANDHELD, RAPID, MOLECULAR SARS-C <sub>0</sub> V-2 DIAGNOSTIC IN WASTEWATER	. 642
	Sotirios Papamatthaiou <sup>1</sup> , James Boxall-Clasby <sup>1</sup> , Varun K.S. Kumar <sup>1</sup> , Mirella Di Lorenzo <sup>1</sup> , Julien Reboud <sup>2</sup> , Jonathan M. Cooper <sup>2</sup> , Pedro Estrela <sup>1</sup> , Barbara Kasprzyk-Hordern <sup>1</sup> , and Despina Moschou <sup>1</sup> <i>University of Bath, UK and <sup>2</sup>University of Glasgow, UK</i>	
M079.b	AUTOMATED MICROFLUIDIC SYSTEM WITH GLUCOSE	<b>C A A</b>
	OUTPUT FOR POINT-OF-NEED DIAGNOSTICS	. 644
M080.b	CLINICAL APPLICATIONS OF POINT-OF-CARE REAL-TIME	
	PHOTOTHERMAL PCR FOR COVID-19 DIAGNOSTICS	. 646
	Byoung-Hoon Kang, Eun-Sil Yu, Hamin Na, and Ki-Hun Jeong Korea Advanced Institute of Science and Technology (KAIST), KOREA	
M081.b	DUAL-CLAMPED SERS BASED BIOSENSORS FOR RAPID AND	
	SENSITIVE DETECTION OF THE OMICRON VARIANT OF SARS-C <sub>0</sub> V-2 USING PORTABLE RAMAN SPECTROMETER	619
	Kiran Kaladharan <sup>1</sup> , Kuan-Hung Chen <sup>1</sup> , Ping-Han Chen <sup>1</sup> , and Fan-Gang Tseng <sup>1,2</sup> <sup>1</sup> National Tsing Hua University, TAIWAN and <sup>2</sup> Academia Sinica, TAIWAN	. 040
M082.b	MULTIPLEX RT-PCR ASSAYS FOR RAPID DIAGNOSIS OF SARS-C <sub>0</sub> V-2	
	AND INFLUENZA A/B BY USING AN ELECTROMAGNETICALLY-DRIVEN INTEGRATED MICROFLUIDIC PLATFORM	650
	Chien-Hsin Chiu, Chih-Hung Wang, Yi-Cheng Tsai, and Gwo-Bin Lee University of Tsing Hua, TAIWAN	. 050
M083.b	ULTRAFAST AND DIGITAL QUANTIFICATION OF SARS-COV-2	
	USING NANOCONFINED RT-LAMP WITHOUT PRE-LYSIS Tao Yang, Yuhua Yan, and Xingyu Lin Zhejiang University, CHINA	. 652
T052.b	A NOVEL DUAL-MODE CAPILLARY METHOD	
	FOR RAPID DETECTION OF SARS-CoV-2	. 654
	China University of Petroleum, CHINA	
T053.b	RAPID ELECTROCEHMICAL DETECTION OF	( <b>=</b> (
	SARS-COV-2 ANTIGENS IN HUMAN SALIVA Yueyue Pan and Xinyu Liu	. 656
	University of Toronto, CANADA	
W065.b	A MICROFLUIDIC CHIP FOR DETECTING MULTIPLE	650
	SARS-CoV-2 VARIANTS BASED ON CRISPR/CAS SYSTEM	. บวช
	Beijing Institute of Technology, CHINA	

W066.b	A ULTRAFAST qPCR SYSTEM FOR DETECTING 2019-nCoV UNDER 1000 COPIES/ ML WITHIN 15 MINUTES Yu Guo <sup>1</sup> and Wenming Wu <sup>2</sup> <sup>1</sup> Guangdong University of Technology, CHINA and <sup>2</sup> Guangdong Academy of Sciences, CHINA	660
W067.b	NEUTRALIZING APTAMER-LIPID NANOPARTICLES FOR SYNERGISTIC TREATMENT OF SARS-CoV-2 INFECTION Miao Sun, Yanling Song, and Chaoyong Yang Xiamen University, CHINA	663
W068.b	RAPID CONVECTIVE PCR-BASED BIODETECTION AT THE POINT OF CARE FOR RESOURCE LIMITED SETTINGS	665
	b - Diagnostics, Drug Testing and Personalized Medicine	
	Others	
W069.b	ENHANCED SIGNAL INTENSITY AND SENSITIVITY IN PRESSED  LATERAL FLOW ASSAY STRIP  Se Been Park and Joong Ho Shin  Pukyong National University, KOREA	667
W070.b	MACHINE LEARNING ENABLES QUANTIFYING CELL-JANUS PARTICLE CONJUGATES THROUGH MICROFLOWING IMPEDANCE SIGNALS	669
W071.b	NANOPARTICLE SYNTHESIS USING THREE-DIMENSIONAL HYDRODYNAMIC FLOW FOCUSED MICROFLUIDIC DEVICES WITH A HILLOCK STRUCTURE FOR AN INFLUENZA A VIRUS TREATMENT  Eric K. Marecki, Corrin Bowman, Diego Gutierrez, Morgan Ketcham, Rayhan, Bruce Davidson, Paul Knight, and Kwang W. Oh  State University of New York at Buffalo (SUNY-Buffalo), USA	671
W072.b	RAPID DETECTION OF DNASE I BY DIELECTROPHORESIS AND IMPEDANCE MEASUREMENT OF DNA-LABELED MICROBEADS	673
	c - Fundamentals in Microfluidics and Nanofluidics	
	Acousto- and Magnetofluidics	
M084.c	ACOUSTOFLUIDIC INTRA DROPLET CELL SEPARATION FOR SUBSEQUENT MALDI-MS ANALYSIS	675
M085.c	CONTROLLABLE PHASE ACOUSTIC FIELD IN THE OCTAGONAL CHAMBER FOR CELL PATTERNING AND MANIPULATION Liang Huang, Dong Tang, Jingui Qian, and Haojie Xia Hefei University of Technology, CHINA	677

M086.c	FERROFLUID DROPLET TO SPIKE REVERSIBLE TRANSITION DUE TO AN APPROACHING PERMANENT MAGNET	
M087.c	FOURIER-SYNTHESIZED HARMONIC BULK ACOUSTIC STANDING WAVE FOR CHANGEABLE FOCUSING OF MICRO/SUBMICRON PARTICLES  Yoshiyuki Tsuyama <sup>1</sup> , Yusuke Yoshioka <sup>1</sup> , SangWook Lee <sup>2</sup> , and Sadao Ota <sup>2</sup> <sup>1</sup> Tokyo Medical University, JAPAN and <sup>2</sup> University of Tokyo, JAPAN	681
M088.c	MICROPARTICLE ORIENTATION AND PATTERN IN A COMBINED ACOUSTIC AND MAGNETIC FIELD  Zhiyuan Zhang and Daniel Ahmed ETH Zürich, SWITZERLAND	683
Т054.с	3D PHONONIC BASED PH SENSING AND ITS EXPEDITED CLASSIFICATION VIA DEEP NEURAL NETWORKS Syed Muhammad Anas Ibrahim, Zhang Fang, Gyubin Park, Jaehyun Kim, and Jungyul Park Sognag University, KOREA	685
Т055.с	BEAD-BASED ELISA ACCELERATED VIA SURFACE ACOUSTIC WAVE-DRIVEN MIXING FLOW Shuai Zhang <sup>1</sup> , Lei Zhang <sup>1</sup> , Kha Nguyen <sup>1</sup> , Cécile Floer <sup>2</sup> , and James Friend <sup>1</sup> <sup>1</sup> University of California, San Diego, USA and <sup>2</sup> Université de Lorraine, FRANCE	687
Т056.с	MAGNETIC LEVITATION-BASED VISCOSITY  MEASUREMENT IN A MICROCAPPILARY CHANNEL  Oyku Doyran <sup>1</sup> and H. Cumhur Tekin <sup>1,2</sup> <sup>1</sup> Izmir Institute of Technology, TURKEY and <sup>2</sup> Middle East Technical University (METU), TURKEY	689
Т057.с	OPTIMISED ACOUSTOPHORESIS CONDITIONS ENABLE SEPARATION OF MICROPARTICLES AT A SAMPLE FLOW RATE ≈ 1 mL/min Thierry Baasch, Linda Péroux, Wei Qiu, Andreas Lenshof, and Thomas Laurell Lund University, SWEDEN	691
Т058.с	SURFACE ACOUSTIC WAVE-INDUCED REAGENT-FREE CELL LYSIS	693
Т059.с	MULTIPLE VORTICES-STRUCTURE STREAMING FLOW AT AUDIBLE FREQUENCY	695
W073.c	ANALYSIS OF ACOUSTIC RELOCATION OF IMMISCIBLE FLUIDS IN A MICROCHANNEL  Varun Kumar Rajendran and Karthick Subramani Indian Institute of Information Technology, Design and Manufacturing, INDIA	697
W074.c	COMBINING A 3D-LOCATION AND TEMPERATURE  MEASUREMENT WITH THE TRAPPING OF PARTICLES  Zhichao Deng¹, Vijay V. Kondalkar², Robert Weser², Hagen Schmidt², Christian Ciepka¹, and Jörg König¹  ¹Technische Universität Ilmenau, GERMANY and ²Leibniz Institute for Solid State and Materials Research Dresden, GERMANY	699

W075.c	CONTROLLABLE MICROBUBBLE: A VERSATILE TOOL FOR MULTI-DIMENSIONAL INFORMATION ACQUISITION Yidi Zhou, Dunqing Hong, Jixiao Liu, Shijie Guo, and Tiejun Li Hebei University of Technology, CHINA	
W076.c	FUSION OF VESICLES BY THE GHZ ACOUSTIC STREAMING Yao Lu <sup>1</sup> , Yang Yang <sup>2</sup> , Xiaotian Shen <sup>2</sup> , Huikai Xie <sup>1</sup> , and Xuexin Duan <sup>2</sup> Beijing Institute of Technology, CHINA and <sup>2</sup> Tianjin University, CHINA	703
	c - Fundamentals in Microfluidics and Nanofluidics	
	Capillary Microfluidics	
Т060.с	GROOVED MICRONEEDLES WITH ABSORBENT BEADS FOR CONTINUOUS SAMPLING OF INTERSTITIAL FLUID  Ruben Del-Rio-Ruiz, Atul Sharma, and Sameer Sonkusale  Tufts University, USA	705
T061.c	TOWARD OPERATION OF MOLECULAR ROBOT IN THE AIR: GLASS CAPILLARY-BASED GENERATION OF REPRODUCIBLE SOAP BUBBLES Rina Takagi, Sotaro Takiguchi, and Ryuji Kawano Tokyo University of Agriculture and Technology, JAPAN	707
W077.c	A WEARABLE MICROFLUDIC SENSING PATCH DRIVEN BY CAPILLARY PUMP FOR RAPID SWEAT COLLECTION AND MULTIPLEX ANALYSIS	709
W078.c	CAPILLARY FLOW IN CONVERGING OPEN-FLUIDIC CHANNELS	711
W079.c	DROP IMPACT ON A SUPERHYDROPHILIC SPOT SURROUNDED BY A SUPERHYDROPHOBIC SURFACE Niladri Sekhar Satpathi, Lokesh Malik, Alwar Samy Ramasamy, and Ashis Kumar Sen Indian Institute of Technology, Madras, INDIA	713
W080.c	EHANCING CAPILLARY PUMPING ON NITROCELLULOSE PAPER BY APPLYING PRESSURE USING AN ELECTROMAGNET Zitao Feng, Zejingqiu Chen, and Weijin Guo Shantou University, CHINA	715
W081.c	SINGLE-CELL MASS-DENSITY MEASUREMENTS USING MICROCHANNEL GRADIENT CENTRIFUGATION Richard Soller <sup>1</sup> and Rune Barnkob <sup>2</sup> <sup>1</sup> Lund University, SWEDEN and <sup>2</sup> Independent Researcher, ITALY	717
W082.c	SINGLE-CELL TRAPPING IN OPEN MICROFLUIDICS  Tomoki Murakami and Hiroaki Suzuki  Chuo University, JAPAN	719

### Centrifugal Microfluidics M089.c A PORTABLE SMARTPHONE-BASED CENTRIFUGAL MHEALTH PLATFORM WITH INTELLIGENT RESULT ANALYSIS .......721 Bangfeng Wang<sup>1</sup>, Zetai Liu<sup>1</sup>, Mingyu Zhang<sup>1</sup>, Hufei Duan<sup>2</sup>, Hongjia Kang<sup>3</sup>, Peng Chen<sup>1</sup>, Wei Du<sup>1</sup>, Yiwei Li<sup>1</sup>, Xiaojun Feng<sup>1</sup>, and Bi-Feng Liu<sup>1</sup> <sup>1</sup>Huazhong University of Science and Technology, CHINA. <sup>2</sup>Tsinghua Shenzhen International Graduate School, CHINA, and <sup>3</sup>Xi'an Jiaotong University, CHINA AN ADDRESSABLE ELECTROWETTING VALVE FOR CENTRIFUGAL MICROFLUIDICS ..... 723 M090.c Yanming Xia<sup>1,2</sup>, Chao Song<sup>2</sup>, Yingchao Meng<sup>2</sup>, Peng Xue<sup>2</sup>, Andrew J. deMello<sup>2</sup>, Quan Gao<sup>2</sup>, Stavros Stavrakis<sup>2</sup>, Shenglin Ma<sup>1</sup>, and Xiaobao Cao<sup>1,3</sup> <sup>1</sup>Xiamen University, CHINA, <sup>2</sup>ETH Zürich, SWITZERLAND, and <sup>3</sup>Guangzhou Laboratory, CHINA M091.c PARALLEL DROPLET GENERATION IN 8-TUBE STRIPS FOR HIGH-THROUGHPUT DIGITAL ASSAYS .......725 Yu-Kai Lai<sup>1</sup>, Yu-Ting Kao<sup>1</sup>, Jacob F. Hess<sup>2</sup>, Silvia Calabrese<sup>2</sup>, Felix von Stetten<sup>1,2</sup>, and Nils Paust<sup>1,2</sup> <sup>1</sup>University of Freiburg, GERMANY and <sup>2</sup>Hahn-Schickard, GERMANY T062.c MAGNETIC ISOLATION OF HUMAN PERIPHERAL MONONUCLEAR CELLS ON CENTRIFUGAL PLATFORMS WITH ACTIVE PNEUMATIC CONTROL AND Liviu Clime, Lidija Malic, Byeong-Ui Moon, Dillon Da Fonte, Moira Janta-Polczynski, and Teodor Veres National Research Council, CANADA A ROLLING BALL VISCOMETER ON A CENTRIFUGAL PLATFORM .......729 W083.c Chih-Hsin Shih, Chia-Lin Chang, and Yuan-Ting Cheng Feng Chia University, TAIWAN W084.c AQUEOUS TWO-PHASE SYSTEM APPLICATIONS Byeong-Ui Moon, Liviu Clime, Daniel Brassard, Christina Nassif, Lidija Malic, and Teodor Veres National Research Council, CANADA DEVELOPMENT OF FRACTION COLLECTORS FOR CONDUCTING W085.c Chih-Hsin Shih and Chih-Chien Hsiao Feng Chia University, TAIWAN ENRICHMENT OF VEGF<sub>165</sub> IN BLOOD BASED ON A NOVEL W086.c Xinyu He, Junyan Xu, Xiaoli Wang, and Yi Xu Chongging University, CHINA c - Fundamentals in Microfluidics and Nanofluidics **Digital Microfluidics** M092.c HIGHLY PARALLEL, RAPID, AND SENSITIVE SINGLE-CELL

Linfeng Cai, Xing Xu, Li Lin, Zhi Zhu, and Chaoyong Yang

Xiamen University, CHINA

c - Fundamentals in Microfluidics and Nanofluidics

M093.c	MAGNETO TWISTER: STABLE DROPLET MANIPULATION SYSTEM	739
	<sup>1</sup> University of the Basque Country, SPAIN, <sup>2</sup> IKERBASQUE, SPAIN, <sup>3</sup> Bioaraba Health Research Institute, SPAIN, and <sup>4</sup> BCMaterials, SPAIN	
M094.c	ON-CHIP ELECTROPORATION IN EWOD DIGITAL MICROFLUIDICS	741
M095.c	SUPERWETTABILITY BASED MICROARRAYS FOR HIGH-THROUGHPUT SINGLE-MICROSPHERE ISOLATION ON DIGITAL MICROFLUIDICS	743
Т063.с	3D-PRINTED MAGNETIC SOFT MILLIROBOTS FOR DROPLET MANIPULATION ON MAGNETIC DIGITAL MICROFLUIDIC PLATFORM Yi Zhang University of Electronic Science and Technology of China, CHINA	745
Т064.с	ONE-FACTOR-AT-A-TIME – A NEW ROUTE FOR HIGH-THROUGHPUT DIGITAL MICROFLUIDICS  Fatemeh Ahmadi <sup>1</sup> , Mohammad Simchi <sup>2</sup> , James M. Perry <sup>1</sup> , Stephane Frenette <sup>1</sup> , Habib Benali <sup>1</sup> , Jean Paul Soucy <sup>1,3</sup> , Gassan Massarweh <sup>3</sup> , and Steve C.C. Shih <sup>1</sup> <sup>1</sup> Concordia University, CANADA, <sup>2</sup> University of Toronto, CANADA, and <sup>3</sup> McGill University, CANADA	747
W176.c	WEARABLE SWEAT SENSING DEVICE FOR MONITORING SWEAT RATE FROM SINGLE GLANDS IN SEDENTARY STATE Emma J.M. Moonen <sup>1</sup> , Sander J.N. de Graaf <sup>1</sup> , Sebastiaan van Kemenade <sup>1</sup> , Eduard Pelssers <sup>1,2</sup> , and Jaap M.J. den Toonder <sup>1</sup> **IEIndhoven University of Technology, NETHERLANDS and **Philips Research, NETHERLANDS**	749
W087.c	HIGH FILLING DIGITAL PCR THROUGH-HOLE ARRAY FOR PATHOGENS DETECTION Yaru Huang <sup>1,3</sup> , Zehang Gao1, Yimeng Sun <sup>1</sup> , Cong Ma <sup>1,2</sup> , Gaozhe Cai <sup>1</sup> , Haoran Hu <sup>1</sup> , Lijuan Liang <sup>1</sup> , Chunping Jia <sup>1</sup> , Jianlong Zhao <sup>1</sup> , and Shilun Feng <sup>1</sup> <sup>1</sup> Chinese Academy of Sciences, CHINA, <sup>2</sup> ShanghaiTech University, CHINA, and <sup>3</sup> Shanghai Normal University, CHINA	751
W088.c	PARTICLE SORTING BY INTEGRATED DIELECTROPHORESIS-DIGITAL MICROFLUIDIC PLATFORM  Chenxuan Hu <sup>1,2</sup> , Siyi Hu <sup>1</sup> , Qi Huang <sup>1</sup> , and Hanbin Ma <sup>1,3</sup> <sup>1</sup> Chinese Academy of Sciences, CHINA, <sup>2</sup> University of Science and Technology, CHINA, and <sup>3</sup> Guangdong ACXEL Micro & Nano Tech Co., Ltd., CHINA	753
W089.c	WHOLE-GENOME PROFILING OF SINGLE BACTERIAL CELL BY DIGITAL MICROFLUIDICS-BASED ISOLATION AND SEQUENCING  Junnan Guo <sup>1</sup> , Di Sun <sup>2</sup> , Shichen Geng <sup>1</sup> , Mengwu Mo <sup>1</sup> , Wei Wang <sup>2</sup> ,  Jia Song <sup>2</sup> , Huimin Zhang <sup>1</sup> , and Chaoyong Yang <sup>1,2</sup> <sup>1</sup> Xiamen University, CHINA and <sup>2</sup> Shanghai Jiao Tong University, CHINA	755

### c - Fundamentals in Microfluidics and Nanofluidics Droplet Microfluidics

M096.c	ACTIVE CONTENT RELEASE FROM SYNTHETIC CELL INTERIOR TOWARDS A NOVEL DRUG DELIVERY METHOD Pantelitsa Dimitriou, Jin Li, William D. Jamieson, Oliver K. Castell, and David A. Barrow Cardiff University, UK	. 757
M097.c	COMPLEX FILTRATION-ENABLED SUBCULTURE-FREE PHENOTYPIC IDENTIFICATIONS OF CARBAPENEM-RESISTANT ORGANISMS WITH A DROPLET DIGITAL CHROMOGENIC ASSAY	. 759
M098.c	DROPLET ENCODING AND PAIRING-BASED MULTIPLEXED DROPLET DIGITAL LOOP-MEDIATED ISOTHERMAL AMPLIFICATION  Dongyang Cai, Jingjing Zou, and Dayu Liu  South China University of Technology, CHINA	. 761
M099.c	EFFICIENT MICRODROPLET INJECTION METHOD FOR SINGLE-CELL SELECTIVE LYSIS AND SORTING	. 763
M100.c	EFFICIENT PROTEIN CRYSTALLIZAITON AND DAMAGELESS EXTRACTION FLOW DEVICE USING MULTI-MICRODROPLET TRAPPING STRUCTURE Aya Miyazaki, Daiki Tanaka, Tetsushi Sekiguchi, Masahiro Furuya, and Shuichi Shoji Waseda University, JAPAN	. 765
M101.c	HIGH-THROUGHPUT PRODUCTION OF GIANT UNILAMELLAR VESICLES BY STEP EMULSIFICATION AND DROPLET TRANSFER TECHNIQUE Shota Nakagawa, Naotomo Tottori, Shinya Sakuma, and Yoko Yamanishi Kyushu University, JAPAN	. 767
M102.c	LIPOSOME TRAP USING A MICROFLUDICS CHANNEL WITH RAIL	. 769
M103.c	MULTIPLEX DIGITAL PCR USING A SELF-PARTITIONING SLIPCHIP WITH MELTING CURVE ANALYSIS  Yan Yu <sup>1</sup> , Ziqing Yu <sup>1</sup> , Xufeng Pan <sup>2</sup> , Lei Xu <sup>1</sup> , Rui Guo <sup>1</sup> , Xiaohua Qian <sup>1</sup> , and Feng Shen <sup>1</sup> <sup>1</sup> Shanghai Jiao Tong University, CHINA and <sup>2</sup> Shanghai Chest Hospital, CHINA	. 771
M104.c	PARALLEL SYNTHESIS OF CELL-LADEN CALCIUM-ALGINATE MICROSPHERES IN MICROFLUIDIC DROPLET GENERATORS ON SLITS Yingzhe Liu and Takasi Nisisako Tokyo Institute of Technology, JAPAN	. 773
M105.c	PUMP-FREE GENERATION OF HYDROGEL BEADS BY MICROFLUIDIC STEP EMULSIFICATION Jijo Easo George, Riddha Manna, Shomdutta Roy, and Debjani Paul Indian Institute of Technology, Bombay, INDIA	. 775

M106.c	SYNTHESIS OF FUNCTIONAL POLYMERIC MICROSPHERES VIA SETP EMULSIFICATION AND DETERMINISTIC LATERAL DISPLACEMENT Guangchong Ji, Yusuke Kanno, and Takasi Nisisako Tokyo Institute of Technology, JAPAN	777
M107.c	TIME-VARIANT DUAL PICOINJECTION FOR FAST REAGENT CONCENTRATION SCREENING IN DROPLETS  Jolien Breukers <sup>1</sup> , Hannah Op de Beeck <sup>1</sup> , Iene Rutten <sup>1</sup> , Montserrat López Fernández <sup>2,3</sup> , Sven Eyckerman <sup>2,3</sup> , and Jeroen Lammertyn <sup>1</sup> *IKU Leuven, BELGIUM, *2VIB-Ghent University, BELGIUM, and *3Ghent University, BELGIUM	779
Т066.с	ANTIBIOTIC COMBINATION SCREENING VIA ROBOTIC PRINTED COMBINATORIAL DROPLET (ROBODROP) PLATFORM Fangchi Shao, Hui Li, Kuangwen Hsieh, Pengfei Zhang, and Tza-Huei Wang Johns Hopkins University, USA	781
Т067.с	BUILDING LIPID-BASED ARTIFICIAL TISSUES USING A BESPOKE MICROFLUIDIC PLATFORM	783
Т068.с	EXPERIMENTAL INVESTIGATION OF THE DEFORMATION AND MIGRATION OF MICROCAPSULES IN CURVED VESSELS	785
Т069.с	IN SITU PREPARATION OF POROUS GELMA MICROGELS VIA DROPLET MICROFLUIDIC CHAOTIC ADVECTION EFFECTS	787
Т070.с	PERFORMANCE OPTIMIZATION OF THE STAGNANT CAP HYDRODYNAMIC RETARDATION EFFECT DETECTOR (SHRED) Afreen Fatima and Amar S. Basu Wayne State University, USA	789
W090.c	A DROPLET DIGITAL PCR CHIP WITH AUTOMATIC BUBBLES REMOVAL FOR ABSOLUTE NUCLEIC ACID QUANTIFICATION	791
W091.c	A POWER-FREE EMULSION PLATFORM FOR FACILE AND UNIVERSAL PREPARATION OF MONODISPERSE MICROSPHERES	793
W092.c	A PURIFICATION AND ddPCR INTEGRATED CHIP FOR COVID-19 DETECTION	795

W093.c	ACOUSTIC LEVITATION OF COMPLEX EMULSIONS  AND HIERARCHICAL SOFT MATTER CONSTRUCTS  Jin Li <sup>1</sup> , Pantelitsa Dimitriou <sup>1</sup> , Bruce Drinkwater <sup>2</sup> , and David Barrow <sup>1</sup> <sup>1</sup> Cardiff University, UK and <sup>2</sup> University of Bristol, UK	797
W094.c	CONTINUOUS GENERATION OF FUSED CELLS IN MICRODROPLETS UTILIZING A DROPLET MICROFLUIDIC SYSTEM  Naotomo Tottori <sup>1</sup> , Sora Sadamichi <sup>1</sup> , Shinya Sakuma <sup>1</sup> , Tomomi Tsubouchi <sup>2</sup> , and Yoko Yamanishi <sup>1</sup> *IKyushu University, JAPAN and *2National Institute for Basic Biology, JAPAN	799
W095.c	DEVELOPMENT OF MICROFLUDIC PLATFORM ENABLING QUANTITATIVE MEASUREMENTS OF SINGLE-CELL PROTEINS LEVERAGING DROPLET BASED CONSTRICTION MICROCHANNELS	801
W096.c	GRAVITY ENABLES FAST GENERATION OF SPHEROIDS IN GELMA DROPLETS	803
W097.c	IMAGE-ACTIVATED PICO-INJECTION FOR SINGLE CELL ANALYSIS	805
W098.c	IMPROVING SINGLE-TARGET ENCAPSULATION EFFICIENCY USING VISCOELASTIC MEDIUM	807
W099.c	NUMERICAL MODELING OF MICROFLUIDIC GENERATION AND SHOOTING OF PICOLITER LIQUID DROPLETS USING AIR FLOW  Po-yin Chen <sup>1</sup> , Chihchen Chen <sup>1</sup> , Yutaka Kazoe <sup>2</sup> , Kyojiro Morikawa <sup>1,3</sup> , and Takehiko Kitamori <sup>1,3</sup> <sup>1</sup> National Tsing Hua University, TAIWAN, <sup>2</sup> Keio University, JAPAN, and <sup>3</sup> University of Tokyo, JAPAN	809
W100.c	RAPID ACOUSTIC MIXER FOR HIGH THROUGHPUT DROPLET MICROFLUIDCS	811
	c - Fundamentals in Microfluidics and Nanofluidics	
	Electrokinetic Phenomena	
M108.c	ELECTRICAL GENERATION OF ION CONCENTRATION GRADIENT IN HYDROGEL MICROFLUIDIC DEVICE Chenwei Xiong, Jie Li, Yuewei Zhu, Long Chen, Rong Zhang, and Yifan Liu ShanghaiTech University, CHINA	813
M109.c	ENERGY-EFFICIENT ION CONCENTRATION POLARIZATION  DESALINATION WITH A POROUS ION EXCHANGER  Dongho Kim <sup>1</sup> , Yeonuk Yu <sup>1</sup> , Junghyo Yoon <sup>2</sup> , Hyukjin Kwon <sup>2</sup> , Jongyoon Han <sup>2</sup> , and Rhokyun Kwak <sup>1</sup> Hanyang University, KOREA and <sup>2</sup> Massachusetts Institute of Technology, USA	815

M110.c	ENHANCED ELECTRIC FIELD UNIFORMITY USING DC VOLTAGE SOURCES FOR SINGLE-CELL ELECTROROTATION Liang Huang, Qiang Fang, Zhihui Han, and Haojie Xia Hefei University of Technology, CHINA	. 817
M111.c	INTERPLAY OF ELECTROKINETIC EFFECTS IN NONPOLAR SOLVENTS FOR E-PAPER DISPLAYS  Mohammad Khorsand Ahmadi <sup>1</sup> , Wei Liu <sup>1,2</sup> , Alex Henzen <sup>2</sup> , and Hans M. Wyss <sup>1</sup> <sup>1</sup> Eindhoven University of Technology, NETHERLANDS and <sup>2</sup> South China Academy of Advanced Optoelectronics, Electronic Paper Display Institute, CHINA	. 819
M112.c	ULTRA-LONG NANOWIRE SYNTHESIS BASED ON ELECTRICALLY-DRIVEN IONIC DIODES	. 821
Т071.с	SCAFFOLD-FREE FORMATION OF 3D CELL CLUSTERS USING DIELECTROPHORESIS AND ELECTRO-OSMOSIS AT A BIPOLAR ELECTRODE ARRAY Yupan Wu, Haohao Zhang, and Xunma Northwestern Polytechnical University, CHINA	. 823
Т072.с	STREAMING CURRENT IN 50NM NANOFLUIDIC CHANNEL  Kyojiro Morikawa <sup>1,2</sup> , Chih-Chang Chang <sup>3</sup> , Yutaka Kazoe <sup>4</sup> , Kazuma Mawatari <sup>2</sup> , and Takehiko Kitamori <sup>1,2</sup> <sup>1</sup> National Tsing Hua University, TAIWAN, <sup>2</sup> University of Tokyo, JAPAN, <sup>3</sup> National Kaohsiung Normal University, TAIWAN, and <sup>4</sup> Keio University, JAPAN	. 825
W101.c	CREATING PAPER-BASED ELECTRIC FIELD GRADIENTS FOR HIGH-THROUGHPUT DIELECTROPHORETIC TRAPPING Md. Nazibul Islam and Zachary R. Gagnon Texas A&M University, USA	. 827
	c - Fundamentals in Microfluidics and Nanofluidics	
	Modeling/Numerical Simulation	
M113.c	NUMERICAL STUDY OF THE VIBRATION-INDUCED CHAOTIC MIXER BASED ON VIBRATION SWITCHING Kanji Kaneko <sup>1</sup> , Yosuke Hasegawa <sup>2</sup> , Takeshi Hayakawa <sup>1</sup> , and Hiroaki Suzuki <sup>1</sup> Chuo University, JAPAN and <sup>2</sup> University of Tokyo, JAPAN	829
Т073.с	<b>DEVELOPING A DIGITAL TWIN FOR SINGLE-CELL MECHANICAL PHENOTYPING MICROFLUIDIC DEVICES</b> Sayan Roychowdhury <sup>1</sup> , Samreen T. Mahmud <sup>1</sup> , Daniel F. Puleri <sup>1</sup> , Andre Lai <sup>2</sup> ,  Rachel Rex <sup>2</sup> , Brian Li <sup>2</sup> , Lydia Sohn <sup>2</sup> , and Amanda Randles <sup>1</sup> <sup>1</sup> Duke University, USA and <sup>2</sup> University of California, Berkeley, USA	. 831
W102.c	AUTOMATED DESIGN AND SIMULATION SOFTWARE FOR MICROFLUIDIC DEVICES Weidong Zhou, Wei Hua, Zhenfeng Wang, and Wei Wang Singapore Institute of Manufacturing Technology (SIMTech), SINGAPORE	. 833
W103.c	EXPERIMENT-SIMULATION COMPARISON IN LIQUID FILLING PROCESS	. 835

W104.c	ROLE OF DEFORMABILITY AND SUPER-HYDROPHOBICITY IN THE MICROHCHANNEL Kumar Amit, Ashwani Assam, and Abhishek Raj	837
	Indian Institute of Technology, Patna, INDIA	
W105.c	THE LIFETIME OF CONFINED MICROBUBBLES ON SUBMERGED SUPERHYDROPHOBIC SURFACES	839
	Yechang Guo <sup>1</sup> , Peiyue Li <sup>1</sup> , Shaofeng Wang <sup>3</sup> , Tingting Hun <sup>1</sup> , Pan Zhang <sup>1</sup> , and Wei Wang <sup>1,2</sup> <sup>1</sup> Peking University, CHINA, <sup>2</sup> National Key Laboratory of Science and Technology on Micro/Nano Face CHINA, and <sup>3</sup> China University of Geosciences (Beijing), CHINA	brication,
	c - Fundamentals in Microfluidics and Nanofluidics	
	Nanofluidics/Nanofluidic Phenomena	
M114.c	DECIPHERING ENZYMELESS CHEMICAL MODIFICATIONS OF NUCLEOBASES USING NANOPORE SEQUENCING Qingyuan Fan, Ronghui Liu, Qiang Ji, and Yi Li Southern University of Science and Technology (SUSTech), CHINA	841
M115.c	IONIC SYNAPTIC DEVICE BASED ON FUNNEL NANOCHANNEL EMULATE SYNAPSE PLASTICITY Peiyue Li <sup>1</sup> , Yechang Guo <sup>1</sup> , Pan Zhang <sup>1</sup> , Yufeng Jin <sup>1</sup> , and Wei Wang <sup>1,2</sup> <sup>1</sup> Peking University, CHINA and <sup>2</sup> National Key Laboratory of Science and Technology on Micro/Nano Fabrication, CHINA	843
Т074.с	ASYMMETRIC COFs/AAO NANOFLUIDIC DEVICE FOR ION RECTIFICATION AND BIOANALYSIS Mengyuan Chen and Chen Wang Nanjing Normal University, CHINA	845
Т075.с	DEVELOPMENT OF A METHOD OF SINGLE-PARTICLE TRANSPORT UTILIZING ULTRASMALL-DROPLETS IN NANOCHANNELS Ryosuke Ohho and Yutaka Kazoe Keio University, JAPAN	847
Т076.с	ELUCIDATION OF TRAPPING BEHAVIORS OF SINGLE  EXOSOMES IN A NANOFLUIDIC DEVICE  Daigo Tamaoki <sup>1</sup> , Nattapong Chantipmanee <sup>1,3</sup> , Ryosuke Kojima <sup>2</sup> , and Yan Xu <sup>1,3</sup> <sup>1</sup> Osaka Metropolitan University, JAPAN, <sup>2</sup> University of Tokyo, JAPAN, and <sup>3</sup> Japan Science and Technology Agency (JST), JAPAN	849
Т077.с	FABRICATION OF ATTOLITER DROPLETS BASED ON LIQUID/SOLID INTERFACES IN NANOFLUIDIC CHANNELS  Yuto Tanaka <sup>1</sup> , Hiroto Kawagishi <sup>2</sup> , Nattapong Chantipmanee <sup>1</sup> , and Yan Xu <sup>1,2,3</sup> <sup>1</sup> Osaka Metropolitan University, JAPAN, <sup>2</sup> Osaka Prefecture University, JAPAN, and <sup>3</sup> Japan Science and Technology Agency (JST), JAPAN	851
Т078.с	NANOFLUIDIC ENZYME REACTOR EXCEEDING BULK SOLUBILITY LIMIT	853

W106.c	CONTROLLABLE SIZE-INDEPENDENT SINGLE-LINE INERTIAL FOCUSING IN HIGH ASPECT RATIO SERPENTINE MICROCHANNELS Chen Ni, Shu Zhu, Yao Chen, Zheng Zhou, Kefan Guo, Weiqi Cheng, and Nan Xiang Southeast University, CHINA	855
W107.c	HIGHLY EFFICIENT OSMOTIC ENERGY HARVESTING IN  PDMS NANOCHANNEL-BASED DEVICE	
W108.c	MODELING OF DIFFUSIOOSMOTIC ION TRANSPORT THROUGH NANOPORES TOWARD UNDERSTANDING NEURAL SIGNAL RETARDATION BY LOW TEMPERATURE	859
W109.c	TRANSPORT OF FINE PARTICLES IN ALVEOLI  Huimin Lv, Jun Dong, Yue Yang, Wei Zhang, and Yonggang Zhu  Harbin Institute of Technology, CHINA	861
W110.c	ULTRAFAST SELECTIVE PROTON TRANSPORT UNDER SUBNANOMETER CONFINEMENT ENABLED BY ATOMICALLY THIN NANOPOROUS N-DOPED GRAPHENE Shengping Zhang, Zhiyang Zeng, Ningran Wu, Ruiyang Song, Xiao Han, Xiaobo Chen, Dandan Hou, and Luda Wang Peking University, CHINA	863
	c - Fundamentals in Microfluidics and Nanofluidics	
	Others	
Т079.с	MICROBREWIDICS: WHAT STABILIZES HOP OIL EMULSIONS IN BEER?  Alex McDonald <sup>1</sup> , Alexandra Schauman <sup>1</sup> , Kaitlyn E.E. Ramsay <sup>1</sup> , Euan L. Thomson <sup>2</sup> , and Katherine S. Elvira <sup>1</sup> <sup>1</sup> University of Victoria, CANADA and <sup>2</sup> Phillips Brewing and Malting Co., CANADA	865
Т079.с	Alex McDonald <sup>1</sup> , Alexandra Schauman <sup>1</sup> , Kaitlyn E.E. Ramsay <sup>1</sup> , Euan L. Thomson <sup>2</sup> , and Katherine S. Elvira <sup>1</sup> <sup>1</sup> University of Victoria, CANADA and <sup>2</sup> Phillips Brewing and Malting Co., CANADA	865
Т079.с	Alex McDonald <sup>1</sup> , Alexandra Schauman <sup>1</sup> , Kaitlyn E.E. Ramsay <sup>1</sup> , Euan L. Thomson <sup>2</sup> , and Katherine S. Elvira <sup>1</sup>	865
T079.c	Alex McDonald <sup>1</sup> , Alexandra Schauman <sup>1</sup> , Kaitlyn E.E. Ramsay <sup>1</sup> , Euan L. Thomson <sup>2</sup> , and Katherine S. Elvira <sup>1</sup> <sup>1</sup> University of Victoria, CANADA and <sup>2</sup> Phillips Brewing and Malting Co., CANADA  d - Integrated Microfluidic Platforms	
	Alex McDonald¹, Alexandra Schauman¹, Kaitlyn E.E. Ramsay¹, Euan L. Thomson², and Katherine S. Elvira¹ ¹University of Victoria, CANADA and ²Phillips Brewing and Malting Co., CANADA  d - Integrated Microfluidic Platforms  Chemical and Particle Synthesis  A LOW-COST PLATFORM WITH FINGER-OPERATED-PUMPING FOR MICROFLUIDIC PREPARATION OF NANOPARTICLES  Ahmed Azmeer, Ibraheem Kanan, Ghaleb Husseini, and Mohamed Abdelgawad	867

T080.d	MICROFLUIDIC GENERATION OF THERAPEUTICALLY RELEVANT POLYCAPROLACTONE (PCL) MICROPARTICLES: COMPUTATIONAL AND EXPERIMENTAL APPROACHES	873
	Alejandro Forigua, Arash Dalili, Rebecca Kirsch, Stephanie Willerth, and Katherine Elvira <i>University of Victoria, CANADA</i>	
	d - Integrated Microfluidic Platforms	
	Electrophoretic and Chromatographic Separation	
M119.d	AN INTEGRATED MICRO-PROBE FOR LOSSLESS LIQUID CHROMATOGRAPHIC INJECTION AND ITS APPLICATION IN SINGLE CELL PROTEOMIC ANALYSIS	875
M120.d	AUTOMATED MICROFLUIDIC SAMPLE PREPARATION FOR CRYOGENIC ELECTRON MICROSCOPY USING SUB-MICROGRAM AMOUNTS OF PROTEIN	877
W111.d	FEMTOLITER VOLUMETRY BY LAPLACE VALVE AND MECHANICAL VALVE FOR SAMPLE INJECTION IN FEMTOLITER CHROMATOGRAPHY	879
W112.d	OPTIMIZED LABCHIP® ASSAY FOR ANALYSIS OF cfDNA	881
W113.d	PARTICLE ASSEMBLY VIA WET PDMS RUBBING IN PRE-PATTERNED SILICON SUBSTRATES FOR THE FABRICATION OF ORDERED PARTICLE ARRAYS IN MICROFLUIDIC DEVICES	885
	d - Integrated Microfluidic Platforms	
	Micromixers and Microreactors	
M121.d	A MICROFLUIDIC REACTOR ENABLING PHOTOCATALYTIC COENZYME REGENERATION FOR ARTIFICIAL PHOTOSYNTHESIS OF GLUCOSE Fengjia Xie <sup>1</sup> , Yujiao Zhu <sup>1</sup> , Chi Chung Tsoi <sup>1</sup> , Huaping Jia <sup>1</sup> , Abdel El Abed <sup>2</sup> , and Xuming Zhang <sup>1</sup> <sup>1</sup> Hong Kong Polytechnic University, HONG KONG and <sup>2</sup> Université Paris-Saclay, FRANCE	887
M122.d	CONTINUOUS HIGH-VISCOSITY BIPHASIC FLOW SEPARATION	889
M123.d	GENERATION OF MULTIPLE CONCENTRATION GRADIENTS AIDED BY MACHINE LEARNING PREDICTION	891

M124.d	HIGH-YIELD AND WELL-CONTROLLED SYNTHESIS OF Ti <sub>3</sub> C <sub>2</sub> T <sub>x</sub> /Pt-Pd NANOCOMPOSITES USING TWO 3D MICROMIXERS Bo Liu, Bin Ran, Chaozhan Chen, and Yonggang Zhu Harbin Institute of Technology, CHINA	893
M125.d	INTEGRATED MICROFLUIDIC CHIP FOR AUTOMATED  AND CONTINUOUS PHAGE SELECTION	895
M126.d	L-2L LADDER MICROFLUIDICS FOR DYNAMIC GENERATION OF CHEMICAL CONCENTRATIONS  Suguru Shiraishi <sup>1</sup> , Tomohito Chatani <sup>1</sup> , Hiroki Miyazako <sup>2</sup> , Hiroaki Onoe <sup>1</sup> , and Yutaka Hori <sup>1</sup> <sup>1</sup> Keio University, JAPAN and <sup>2</sup> University of Tokyo, JAPAN	897
M127.d	MICROFLUIDIC PROBES INTEGRATED WITH MICROMIXERS	899
M128.d	PORTABLE IMMUNO-MICROFLUIDIC SYSTEM WITH ELECTROSPUN POLYSTYRENE MICROFIBROUS REACTOR FOR RAPID DETECTION	901
M129.d	PREDICTING BIPHASIC FLOW SEPARATION	903
W114.d	A NOVEL 3D TESLA VALVE MICROMIXER FOR EFFICIENT SYNTHESIS OF CHITOSAN NANOPARTICLES Kefan Guo, Shu Zhu, Yao Chen, Chen Ni, Zheng Zhou, and Zhonghua Ni University of Southeast, CHINA	905
W115.d	CONTROLLABLE HIGH-SPEED MIXING MICROFLUIDICS DEVICE BASED ON AN AZ-SU8 PHOTORESISTS COMBINATIONAL MOLD PROCESS	907
W116.d	SELECTIVE CHEMICAL PRODUCTS SEPARATION FROM ORGANIC MICRO DROPLETS USING SURDACTANT FREE SINGLE MICRON DROPLET GENERATION	909
W117.d	ULTRAFAST ACOUSTOFLUIDIC HANDLING OF HUMAN BLOOD	911

# d - Integrated Microfluidic Platforms Particle Separation

M130.d	A MICROFLUIDC SYSTEM FOR LABEL-FREE AND BIO-COMPATIBLE MAGNETIC SEPARATION OF SMALL EXTRACELLULAR VESICLES Lin Zeng <sup>1</sup> , Shi Hu <sup>1</sup> , Xi Chen <sup>1</sup> , Pengcheng Zhang <sup>1</sup> , Guoqiang Gu <sup>1</sup> , Yuye Wang <sup>1</sup> , Hongpeng Zhang <sup>2</sup> , and Hui Yang <sup>1</sup> <sup>1</sup> Chinese Academy of Sciences, CHINA and <sup>2</sup> Dalian Maritime University, CHINA	913
M131.d	HIGH VOLUME EXTRACELLULAR VESICLE SEPARATION IN MICROFLUIDICS: PROOF OF PRINCIPLE Arturs Abols <sup>1</sup> , Miks Priedols <sup>1</sup> , Felikss Rumnieks <sup>1</sup> , Gunita Paidere <sup>2</sup> , Gatis Mozolevskis <sup>2</sup> , and Roberts Rimsa <sup>2</sup> <sup>1</sup> Latvian Biomedical Research and Study Centre, LATVIA and <sup>2</sup> University of Latvia, LATVIA	<b>915</b>
M132.d	MICROFLUIDIC DEVICE FOR FLUORESCENCE SPECTROSCOPY-BASED SORTING OF MARINE MICROPLASTICS  Yuka Kurosaki <sup>1</sup> , Natsuo Hasegawa <sup>1</sup> , Yoshikazu Koike <sup>1</sup> , Hisayuki Arakawa <sup>2</sup> , and Nobuyuki Futai <sup>1</sup> <sup>1</sup> Shibaura Institute of Technology, JAPAN and <sup>2</sup> Tokyo University of Marine Science and Technology, JAPAN	
M133.d	OSTE DEVICE FOR MAGNETIC PARTICLE CAPTURE  Janis Cipa <sup>1,2</sup> , Edgars Endzelins <sup>3</sup> , Roberts Rimsa <sup>2</sup> , Artis Galvanovskis <sup>3</sup> ,  Arturs Abols <sup>2,3</sup> , Aija Line <sup>3</sup> , and Gatis Mozolevskis <sup>2</sup> <sup>1</sup> University of Latvia, LATVIA, <sup>2</sup> Cellboxlab Ltd, LATVIA, and <sup>3</sup> Latvian Biomedical Research and Study Centre, LATVIA	919
M134.d	RELATIVE QUANTIFICATION OF EXOSOMES DIRECTLY FROM ORIGINAL SAMPLES BY NANOFLUIDICS  Kosaku Murata <sup>1</sup> , Nattapong Chantipmanee <sup>2,5</sup> , Chitose Oneyama <sup>3</sup> , Ryosuke Kojima <sup>4</sup> , and Yan Xu <sup>1,5</sup> <sup>1</sup> Osaka Prefecture University, JAPAN, <sup>2</sup> Osaka Metropolitan University, JAPAN, <sup>3</sup> Aichi Cancer Center Research Institute, JAPAN, <sup>4</sup> University of Tokyo, JAPAN, and <sup>5</sup> Japan Science and Technology Agency (JST), JAPAN	921
T081.d	ESTABLISHMENT OF COMPONENT SEPARATION METHOD DEPENDING ON PARTICLE SIZE USING MICRO-CHAMBER ARRAY Mitsuhiro Horade <sup>1</sup> , Ryuusei Okumura <sup>1</sup> , Shuichi Murakami <sup>2</sup> , and Tsunemasa Saiki <sup>3</sup> <sup>1</sup> National Defense Academy of Japan, JAPAN, <sup>2</sup> Osaka Research Institute of Industrial Science and Technolog JAPAN, and <sup>3</sup> Hyogo Prefectural Institute of Technology, JAPAN	
T082.d	MICROPARTICLE SEPARATION WITH A ROUNDED FLEXIBLE MEANDERING CHANNELS Sho Yokoyama Osaka Institute of Technology, JAPAN	925
T083.d	PARTICLE TRAPPING WITH FOCUSED TRAVELING SURFACE ACOUSTIC WAVE ON A MICROFLUIDIC CHIP Yuang Li <sup>1,2</sup> , Xiaofeng Luan <sup>1,2</sup> , Yun Zhang <sup>1,2</sup> , Yijun Zhang <sup>1,2</sup> , Hang Gao <sup>1</sup> , Wenchang Zhang <sup>1</sup> , Yang Zhao <sup>1</sup> , and Chengjun Huang <sup>1,2</sup> <sup>1</sup> Chinese Academy of Sciences, CHINA and <sup>2</sup> University of Chinese Academy of Sciences, CHINA	927
T084.d	VISCOELASTIC SEPARATION OF DRUG-TREATED E. COLI BY SHAPE	929

W118.d	A TWO-PARAMETER INTEGRATED SYSTEM FOR EFFICIENCY ISOLATION OF BREAST CANCER CELLS  Yixing Gou <sup>1</sup> , Zheng You <sup>2</sup> , and Dahai Ren <sup>2</sup> <sup>1</sup> Hebei University of Technology, CHINA and <sup>2</sup> Tsinghua University, CHINA	931
W119.d	DISCONTINUOUS DEWETTING FOR DROPLET SPLITTING AS AN ASSET FOR PARTICLE TRAPPING AND SEPARATION Lilu Jia and Richard Oleschuk Queen's University, CANADA	933
W120.d	ISOLATION OF EpCAM EXPRESSING EXOSOMES USING RADIAL FLOW MICROFLUIDIC CHIP WITH IEDDA CHEMISTRY (Epcam-TCOONCOBEAN CHIP)	935
	d - Integrated Microfluidic Platforms	
	Other Applications in Chemistry	
M135.d	DEVELOPMENT OF LIQUID-LIQUID PHASE SEPARATOR FOR CONTINUOUS ASPIRIN PROCESS Guan-Yu Lu, Can-Hong Ni, and Ya-Yu Chiang National Chung Hsing University, TAIWAN	937
M136.d	MICROFLUIDIC PLATFORM INTEGRATED WITH ALGINATE/TiO <sub>2</sub> BEADS FOR GLUCOSE DETERMINATION IN ARTIFICIAL SWEAT  Sandra Garcia-Rey <sup>1</sup> , Eva Gil Hernandez <sup>1</sup> , Udara Bimendra Gunatilake <sup>1</sup> , Lourdes Basabe-Desmonts <sup>1,2,3,4</sup> , and Fernando Benito-Lopez <sup>1,3,4</sup> <sup>1</sup> University of the Basque Country, SPAIN, <sup>2</sup> IKERBASQUE, SPAIN, <sup>3</sup> Bioaraba Health Research Institute, SPAIN, and <sup>4</sup> BCMaterials, SPAIN	939
T085.d	REAL-TIME ENZYME KINETICS MONITORING OF TYROSINASE USING A PORTABLE 3D PRINTED SPECTROMETER Antony Jesuraj and Umer Hassan Rutgers University, USA	941
	e - Micro- and Nanoengineering	
	Bonding, Sealing and Interfacing Technologies	
M137.e	THE EFFECT OF Cae DISTRIBUTION ON THE REGIONAL CAPTURE EFFICIENCY IN MEF CHIPS WITH 2 DIFFERENT PACKAGING DESIGNS Jose Cabot <sup>1</sup> , Huahuang Luo <sup>1</sup> , Tianer Feng <sup>1</sup> , Izhar <sup>1</sup> , Mingzheng Duan <sup>1</sup> , Jung Eun Ahn <sup>1</sup> , Xioahuan Cao <sup>1</sup> , Nong Xu <sup>2</sup> , Yulong Zheng <sup>2</sup> , and Yi-Kuen Lee <sup>1</sup> Hong Kong University of Science and Technology, HONG KONG and <sup>2</sup> Zhejiang University, CHINA	943
T086.e	DIFFUSION BONDING TECHNOLOGY FOR THREE-LAYERED POLYMER MICROFLUIDIC DEVICES	945

W121.e	AN APPROACH TO CONVERT FRAGILE HYDROGEL MICROFLUIDIC CHIPS INTO CARTRIDGES EASY AND RELIABLE TO USE Sin-Yung Siu <sup>1</sup> , Chiu-Wing Chan <sup>1</sup> , Yisu Wang <sup>1</sup> , Langcheng Feng <sup>2</sup> , and Kangning Ren <sup>1,2</sup> <sup>1</sup> Hong Kong Bapstist University, HONG KONG and <sup>2</sup> Translational Research and Development Center for Biomimetic Microfluidic Systems, CHINA	947
W122.e	RAPID PROTOTYPING OF PARAFILM®-BASED ANALYTICAL MICROFLUIDIC DEVICES USING LASER ABLATION AND THERMAL FUSION BONDING	949
	e - Micro- and Nanoengineering	
	Micropumps, Valves, and Dispensers	
M138.e	HIGH-SPEED ON-CHIP FLOW CONTROL UTILIZING CYCLO-OLEFIN POLYMER MEMBRANE PUMP Nariaki Kiyama, Makoto Saito, Yoko Yamanishi, and Shinya Sakuma Kyushu University, JAPAN	951
M139.e	OPTIMIZATION OF A PHASED PERISTALTIC MICROPUMP FOR DROPLET MICROFLUIDIC BASED POINT OF CARE SENSORS	
M140.e	RIPPLE REDUCTION IN PIEZOELECTRIC MICROPUMPS BY PHASED ACTUATION IN PARALLEL AND DAMPING	955
T087.e	ELASTOMERIC CYCLIC OLEFIN COPOLYMER (ECOC) CHARACTERIZATION AND APPLICATION AS MICROFLUIDIC VALVES FOR INTEGRATED SYSTEMS	957
T088.e	METACHRONAL MOTION OF MINIATURIZED MAGNETIC ARTIFICIAL CILIA GENERATES MICROFLUIDIC FLOW Zhiwei Cui, Ye Wang, and Jaap den Toonder Eindhoven University of Technology, NETHERLANDS	959
T089.e	MICROFLUIDIC PEN FOR LONG-TERM LOCAL DELIVERY THROUGH TISSUE WITH MITIGATION OF LATERAL DIFFUSION Hannah Musgrove and Rebecca R. Pompano University of Virginia, USA	961
W123.e	DESIGN AND DEVELOPMENT OF PIEZOELECTRIC BASED 3-D PRINTED VALVELESS MICROPUMP FOR DRUG DELIVERY APPLICATION	963
W124.e	DEVELOPING AN EXTREMELY HIGH FLOW RATE MICRO PUMP FOR BLOOD PLASMA SEPARATION WITH INERTIAL PHENOMENON Tuan N.A. Vo and Pin-Chuan Chen National Taiwan University of Science and Technology, TAIWAN	965

# e - Micro- and Nanoengineering Microscale Fabrication, Patterning, and Integration

M141.e	A WEARABLE MICROFLUIDIC PATCH FOR REAL-TIME COLLECTING, STORAGE, AND COLORIMETRIC ANALYSIS OF SWEAT Juan Yu <sup>1</sup> , Zhizhen Wang <sup>1</sup> , Yanming Xia <sup>1</sup> , Xianglong Chu <sup>1</sup> , Caiming Zhao <sup>1</sup> , Nanxin Wang <sup>1,2</sup> , Yufeng Jin <sup>2</sup> , and Shenglin Ma <sup>1</sup> <sup>1</sup> Xiamen University, CHINA and <sup>2</sup> Peking University Shenzhen Graduate School, CHINA	. 967
M142.e	WETTABILITY ASSISTED DIRECT PATTERNING OF SILVER NANOWIRES ON VARIOUS SUBSTRATES AS TRANSPARENT, FLEXIBLE, OR STRETCHABLE ELECTRODE	. 969
M143.e	A NOVEL PAPER-BASED ELECTROWETTING DEVICE USING CELLULOSE PAPER AND PARAFFIN WAX He Li <sup>1,3</sup> , Zhibin Yan <sup>1,2</sup> , Mingliang Jin <sup>1</sup> , Guofu Zhou <sup>1</sup> , and Lingling Shui <sup>1</sup> <sup>1</sup> South China Normal University, CHINA, <sup>2</sup> Chongqing University, CHINA and, <sup>3</sup> Guangdong Shunde Innovative Design Institute, CHINA	. 971
M144.e	A SELF-ASSEMBLING SYSTEM USING AIR-WATER INTERFACIAL TENSION AS A BONDING FORCE Akira Ito and Hiroaki Suzuki Chuo University, JAPAN	. 973
M145.e	ACTIVE CONTROL OF THE VIBRATION-INDUCED FLOW BY PNEUMATICALLY ACTUATED MICROPILLARS Taku Sato, Kanji Kaneko, Takeshi Hayakawa, and Hiroaki Suzuki Chuo University, JAPAN	. 975
M146.e	DEEP-LEARNING DEFORMATION CYTOMETRY	. 977
M147.e	DEPOSITION OF MULTIPLE METAL SPECIES ON HYDROGELS USING MICRO-PLASMA-BUBBLES Haruna Takahashi, Yu Yamashita, Shinya Sakuma, and Yoko Yamanishi Kyushu University, JAPAN	. 979
M148.e	DEVELOPMENT OF A LOW-COST MICROCHANNEL MOLD FOR A SOFT LITHOGRAPHY PROCESS BY UV LASER CUTTING & ANODIC BONDING Neethish Kumar Unnam and Lung-Jieh Yang Tamkang University, TAIWAN	. 981
M149.e	HIGH-THROUGHPUT PATTERNING OF ALL INORGANIC PEROVSKITE MICRO-NANO STRUCTURES BY DROPLET EVAPORATIVE ASSEMBLY AND THEIR OPTOELECTRONIC APPLICATIONS Bori Shi <sup>1</sup> , Mengying Zhang <sup>1</sup> , Weijia Wen <sup>2</sup> , and Jinbo Wu <sup>1</sup> 1 Shanghai University, CHINA and 2 Hong Kong University of Science and Technology, HONG KONG	. 983
M150.e	PROCESS IMPROVEMENT OF THE THREE-WIRE ANEMOMETER	. 985

M151.e	SELF-ALIGNMENT OF MICROSTRUCTURES USING LATERAL FLUIDIC FORCE BASED ON LOCAL SPATIAL ASYMMETRY  Tao Yue <sup>1</sup> , Shenyu Gu <sup>1</sup> , Xinye Zhang <sup>1</sup> , Long Li <sup>1</sup> , Quan Zhang <sup>1</sup> , and Toshio Fukuda <sup>2,3</sup> <sup>1</sup> Shanghai University, CHINA, <sup>2</sup> Beijing Institute of Technology, CHINA, and <sup>3</sup> Nagoya University, JAPAN	. 987
M152.e	THREE-DIMENSIONAL CHANNEL FOR PREPARATION OF MICROPATTERNED HYDROGEL ARRAYS Haruka Oda and Shoji Takeuchi University of Tokyo, JAPAN	. 989
M153.e	WAX PATTERNED PAPER-BASED MICROWELLS FOR 3D CELL CULTURE AND CRYOPRESERVATION Ayoub Glia <sup>1</sup> , Pavithra Sukumar <sup>1</sup> , Muhammedin Deliorman <sup>1</sup> , and Mohammad A. Qasaimeh <sup>1,2</sup> <sup>1</sup> New York University Abu Dhabi (NYUAD), UAE and <sup>2</sup> New York University, USA	. 991
Т090.е	A MONOLITHICALLY INTEGRATED MICROCANTILEVER ARRAY FOR BIOMOLECULAR DETECTION Yi Liu, Cong Lin, Jiahao Miao, and Xiaomei Yu Peking University, CHINA	. 993
T091.e	A SLICE-LIKE MICROFLUIDIC IMPEDANCE CYTOMETRY FOR CELL ANALYSIS	. 995
T092.e	FACILE FABRICATION OF TWO-DIMENTIONAL MICRONOZZLE ARRAY USING SKEW-POSITIONED WIRES AS A MOLD Koki Takahashi and Kyohei Terao Kagawa University, JAPAN	. 997
Т093.е	MULTI-MATERIAL MICROFLUIDIC VALVES via STEREOLITHOGRAPHY 3D-PRINTING Alireza Ahmadianyazdi, Isaac J. Miller, and Albert Folch University of Washington, USA	. 999
Т094.е	PORTABLE 3D-PRINTED PNEUMATIC OSCILLATOR CIRCUITS CHARACTERIZED BY SMARTPHONE AUDIO AND VIDEO AND USED FOR PUMPING FLUIDS WITH MICROFLUIDIC VALVES Joanne Seow, Md Mohibullah, and Christopher J. Easley Auburn University, USA	1001
Т095.е	PORTABLE AND PUMPLESS MICROFLUIDIC DEVICE FOR VISCOELASTIC PARTICLE FOCUSING  Dan Yuan, Azadeh Nilghaz, and Rosanne M. Guijt  Deakin University, AUSTRALIA	1003
W125.e	A GLASS-ULTRA-THIN PDMS FILM-GLASS MICROFLUIDIC DEVICE FOR DIGITAL PCR APPLICATION BASED FLEXIBLE MOLD PEEL-OFF PROCESS	1005
W126.e	A MAGNETORHEOLOGICAL ELASTOMER BASED MICROFLUIDIC SYSTEM FOR BACTERIAL DETECTION Gaozhe Cai <sup>1</sup> , Haoran Hu <sup>1</sup> , Cong Ma <sup>1,2</sup> , Yaru Huang <sup>1,3</sup> , Jianlong Zhao <sup>1</sup> , and Shilun Feng <sup>1</sup> <sup>1</sup> Chinese Academy of Sciences, CHINA, <sup>2</sup> ShanghaiTech University, CHINA, and <sup>3</sup> Shanghai Normal University, CHINA	1007

W127.e	BIOMIMETIC THREE-DIMENSIONAL TUMOR MANIPULATION AND ANALYSIS USING MICROCONTACT PRINTING-BASED POLYDIMETHYLSILOXANE MICROPATTERNING Menlin Sun, Jinwei Zhang, and Wenming Liu Central South University, CHINA	. 1009
W128.e	HIGH-PERFORMANCE 3D PRINTABLE BIO-INK BASED ON GRANULAR HYDROGEL MICROBEADS Xinyang Shao, Zhizhao Liao, Yifan Wang, and Yanyi Huang Peking University, CHINA	. 1011
W129.e	HIGHER RESOLUTION MICROFLUIDIC PAPER-BASED ANALYTICAL DEVICESLishen Zhang, Daniel O. Reddy, Timothy T. Salomons, and Richard Oleschuk Queen's University, CANADA	. 1013
W130.e	MOLECULARLY IMPRINTED POLYMER (MIP) COATINGS ON MICROSCALE SPHERICAL AND CYLINDRICAL SUBSTRATES  Shiva Akhtarian <sup>1</sup> , Ali Doostmohammadi <sup>1</sup> , Khaled Youssef <sup>1</sup> , Satinder Kaur Brar <sup>1</sup> , Garrett Kraft <sup>2</sup> , and Pouya Rezai <sup>1</sup> <sup>1</sup> York University, CANADA and <sup>2</sup> Sixth Wave Innovations Inc., CANADA	. 1015
\W131.e	UTILIZING STEREOLITHOGRAPHY 3D PRINTING TO MANUFACTURE MONOLITHIC LAYER 3D-μPADS FOR MULTISTEP DOPAMINE ASSAY Muhammad Faizul Zaki¹, Pin-Chuan Chen¹, Yi-Chun Yeh², Ping-Heng Lin², and Ming-Yi Xu¹¹National Taiwan University of Science and Technology, TAIWAN and ²National Taiwan Normal University, TAIWAN	. 1017
	e - Micro- and Nanoengineering	
	e - Micro- and Nanoengineering Nanoscale Fabrication, Patterning, and Integration	
M154.e		. 1019
M154.e W132.e	Nanoscale Fabrication, Patterning, and Integration  DEVELOPMENT OF A NANOFLUIDIC ANALYTICAL SYSTEM INTEGRATED WITH NANOCHANNEL OPEN/CLOSE VALVES Hiroki Sano <sup>1</sup> , Yutaka Kazoe <sup>2</sup> , Ryoichi Ohta <sup>1</sup> , Hisashi Shimizu <sup>1</sup> , Kyojiro Morikawa <sup>1,3</sup> , and Takehiko Kitamori <sup>1,3</sup>	
	Nanoscale Fabrication, Patterning, and Integration  DEVELOPMENT OF A NANOFLUIDIC ANALYTICAL SYSTEM INTEGRATED WITH NANOCHANNEL OPEN/CLOSE VALVES Hiroki Sano¹, Yutaka Kazoe², Ryoichi Ohta¹, Hisashi Shimizu¹, Kyojiro Morikawa¹,³, and Takehiko Kitamori¹,³ ¹University of Tokyo, JAPAN, ²Keio University, JAPAN, and ³National Tsing Hua University, TAIWAN  A BOWL-LIKE TiO₂ NANOSPHERE INTEGRATED MICROFLUIDIC CHIP FOR LABEL-FREE ENRICHMENT OF SMALL EXTRACELLULAR VESICLES Le Wang, Song Huang, Ming Jiang, Li Xu, and Xu Yu	. 1021

	e - Micro- and Nanoengineering	
	New Materials and Surface Modification	
W135.e	INVESTIGATION OF MANUFACTURING APPROACHES FOR SUSTAINABLE BIOPOLYMER BASED MICROFLUIDIC SYSTEMS	1027
W136.e	NOVEL NANOFIBER MATERIAL WITH MAGNETIC PROPETIES FOR CARDIAC CELL CULTURES  Dominik Kołodziejek, Oliwia Tadko, Michal Wojasiński, Iwona Łopianiak, Marcin Drozd, and Elzbieta Jastrzebska Warsaw University of Technology, POLAND	1029
	e - Micro- and Nanoengineering	
	Others	
M155.e	IN-SITU INJECTION OF MOLECULES INTO CELLS	1031
M156.e	VACUUM-DRIVEN DRY ASSEMBLY OF ELECTROSTATICALLY LEVITATED MICROSPHERES ON PERFORATED DEVICES	1033
Т096.е	LOW-COST DROPLET LIBRARY GENERATOR FOR MODULAR LAB-IN-TUBING SYSTEMS	1035
W137.e	MICROCONTACT TRANSFER OF WAX PATTERNS FOR PAPER-BASED MICROFLUIDICS  Pavithra Sukumar and Mohammad A. Qasaimeh  New York University Abu Dhabi (NYUAD), UAE	1037
	f - Sensors and Detection Technologies	
	Chemical and Electrochemical Sensors	
M157.f	A CRISPR-POWERED ELECTROCHEMICAL SENSOR BASED ON GOLD NANOPARTICLES/MXENE NANOCOMPOSITES	1039
M158.f	A NUMERICAL STUDY ON THE ELECTROCHEMICAL SENSING PROPERTIES OF BIO-INSPIRED MICROPILLAR ARRAY ELECTRODE IN A MICROFLUIDIC CHIP Chaozhan Chen, Bin Ran, Bo Liu, Xiaoxuan Liu, Huaying Chen, and Yonggang Zhu Harbin Institute of Technology, CHINA	1041

M159.f	AN ELECTROCHEMICAL THREE-ELECTRODE BIOSENSOR ENHANCED BY HIGH-FREQUENCY SURFACE ACOUSTIC WAVES  Zhihua Pu, Liangya Han, and Dacaho Li  Tianjin University, CHINA	1043
M160.f	BIOLOGICAL NANOPORE PROBES FOR LOCAL MOLECULAR DETECTION AND TOPOGRAPHIC IMAGING Shuta Nomi, Ryo Yoshihara, and Kan Shoji Nagaoka University of Technology, JAPAN	1045
M161.f	INGESTIBLE BIOSENSING CAPSULE WITH INTEGRATED THREAD-BASED SENSORS Cihan Asci, Ruben Del-Rio-Ruiz, Atul Sharma, and Sameer Sonkusale <i>Tufts University, USA</i>	1047
M162.f	INTEGRATED MICROFLUIDIC CHIP FOR CHEMILUMINESCENCE DETECTION OF URINE OCCULT BLOOD	1049
M163.f	ISOTHERMAL EG-FET pH SENSOR FOR REAL-TIME LABEL-FREE LOOP-MEDIATED ISOTHERMAL AMPLIFICATIONS	1051
T097.f	A TOUCH-BASED, CRYPTOGRAPHIC, SMART MEDICATION DISPENSING SYSTEM	1055
T098.f	MULTIPLEXED, SELF-CALIBRATED POTENTIOMETRIC SENSOR SYSTEM FOR LONG-TERM, IN SITU MEASUREMENTS Zhehao Zhang, Elena Boselli, and Ian Papautsky University of Illinois, Chicago, USA	1057
T099.f	A MICROFLUIDIC DEVICE FOR DNA ELECTROCHEMICAL DETECTION ON PLATINUM ELECTRODES  Martina Freisa, Choayb Omar, Djamila Kechkeche, Thi Hong Nhung Dinh, David Bouville, Isabelle Le Potier, and Jean Gamby Université Paris-Saclay, FRANCE	1059
T100.f	A NOVEL METAL ION SENSOR USING RESISTIVE SWITCHING EFFECT	1061
T101.f	A SLOT ANTENNA TERAHERTZ SENSOR FOR URIC ACID DETECTION	1063
T102.f	AN IMPEDIMETRIC MICRO CHIP FOR NON-INVASIVE MEASUREMENT OF STRESS BIOMARKER TO TRACK THE ANIMAL HEALTH Brince Paul, Luiza A. Wasiewska, Fernando Garrido Diaz, Marcello Valente, Han Shao, and Alan O'Riordan Tyndall National Institute, IRELAND	1065

T103.f	AN INTEGRATED MICROFLUIDIC SYSTEM FOR DETECTING CARDIOVASCULAR DISEASE BIOMARKERS  Pei-Rong Li <sup>1</sup> , Yu-Jen Cheng <sup>1</sup> , Yi-Xian Chen <sup>2</sup> , Hsiao-Yu Huang <sup>3</sup> , Chih-Hung Wang <sup>1</sup> , Tsung-Heng Tsai <sup>2</sup> , Chien-Nan Kuo <sup>3</sup> , and Gwo-Bin Lee <sup>1</sup> **National Tsing Hua University, TAIWAN, **National Chung Cheng University, TAIWAN, and **National Yang Ming Chiao Tung University, TAIWAN	1067
T104.f	ENZYME-LIKE SYNTHETIC BIOSENSORS FOR STEROIDS DETECTION	1069
T105.f	MECHANICALLY-SENSITIVITY-TUNABLE STRUCTURAL-COLOR CHEMICAL SENSOR COMBINED WITH DNA-APTAMER HYDROGEL FOR VISIBLE SILVER ION DETECTION	1071
T106.f	MULTIPLEXED SENSING MICROPROBE FOR BIOPROCESS MONITORING	1073
T107.f	NITRATE SENSORS WITH ULTRA SENSITIVE AND SELECTIVE GRAPHENE FIELD EFFECT TRANSISTORS  Yingming Xu, Jungyoon Kim, Peng Zhou, and Tianhong Cui University of Minnesota, USA	1075
T108.f	SMARTPHONE-BASED ELECTROCHEMILUMINESCENCE DETECTION OF METABOLIC BIOMARKERS  Yueyue Pan, Tianyu Li, Peng Pan, and Xinyu Liu University of Toronto, CANADA	1077
T109.f	FABRICATION AND VALIDATION OF FULLY CUSTOMIZABLE ATR-FITR BASED SPECTROFLUIDIC DEVICES  Nan Jia, Arthur Bouchard, Tianyang Deng, André Bégin-Drolet, Jesse Greener  Université Laval, CANADA	1079
W138.f	ELECTROCHEMILUMINESCENCE HETEROGENEOUS IMMUNASSAY ON A MICROFLUIDIC CHIP Yun Hui, Weiliang Shu, Fenglin Liu, Tianzhun Wu, Wenhua Zhou, and Xuefeng Yu Chinese Academy of Sciences, CHINA	1081
W139.f	INTELLIGENT IMPEDANCE SYSTEM FOR RECOGNIZING SINGLE BACTERIA SUSCEPTIBLE TO ANTIBIOTIC TREATMENT  Tao Tang¹, Yo Tanaka², Yang Yang³, Ming Li⁴, Yoichiroh Hosokawa¹, and Yaxiaer Yalikun¹.²  ¹Nara Institute of Science and Technology, JAPAN, ²Institute of Physical and Chemical Research (RIKEN), JAPAN, ³Chinese Academy of Sciences, CHINA, and ⁴Macquarie University, AUSTRALIA	
W140.f	IONOTROPIC RECEPTOR-BASED SENSOR ARRAY UTILIZING SOLID-SUPPORTED MEMBRANE ELECTROPHYSIOLOGY Hisatoshi Mimura <sup>1</sup> , Toshihisa Osaki <sup>1</sup> , Sho Takamori <sup>1</sup> , and Shoji Takeuchi <sup>1,2</sup> <sup>1</sup> Kanagawa Institute of Industrial Science and Technology, JAPAN and <sup>2</sup> University of Tokyo, JAPAN	1085
W141.f	MICRODIALYSIS/ULTRAFILTRATION-INTEGRATED DROPLET MICROFLUIDIC SENSORS FOR DECODING NITRATE DYNAMICS IN SOIL	1087

W 142.1	ELEVATION MYOCARDIAL INFARCTION	1089
W143.f	MOLECULAR BASIS OF FEMTOMOLAR-NANOPORE-DETECTION OF DNAS WITH THE EXCESS COMPLEMENTARY PROBES Nanami Takeuchi and Ryuji Kawano Tokyo University of Agriculture and Technology, JAPAN	1091
W144.f	MOLECULARLY IMPRINTED POLYMER-COATED MICROWIRES FOR SENSOR APPLICATIONS AND BACTERIA DETECTION	1093
W145.f	SINGLE-CELL PROTEIN ANALYSIS ENABLED BY MICROFLUIDIC PLATFORM LEVERAGING CONSTRICTION MICROCHANNEL AND LIGHT MODULATION	1095
	f - Sensors and Detection Technologies	
	Optical Sensors and Imaging	
M165.f	A PAPER-BASED MICROFLUIDIC BIOSENSOR FOR LOW-COST, ON-SITE DIAGNOSIS OF URINARY TRACT INFECTIONS ON A SMARTPHONE	1097
M166.f	A SMARTPHONE-ASSISTED MICROARRAY IMMUNOSENSOR FOR HIGH-SENSITIVITY DETECTION OF OKADAIC ACID Xiaotong Li, Yongqiang Cheng, Ranran Xu, Ziwei Zhang, Xiaoxiao Qi, Longyu Chen, and Meijia Zhu Shandong University, CHINA	1099
M167.f	CELL ACTIVITY MEASUREMENT FOR EVALUATION OF PHYSICAL AND CHEMICAL REACTIONS BY UTILIZING 1D-SPR MEASUREMENT	1101
M168.f	MICROSPHERE ASSISTED LIGHT-SCATTERING IMAGING OF PLASMONIC NANOPARTICLES AT THE SINGLE PARTICLE LEVEL Pengcheng Zhang, Guoqiang Gu, Sha Xue, Xiaoqin Huo, Xi Chen, Lin Zeng, and Hui Yang Chinese Academy of Sciences, CHINA	1103
M169.f	SERUM CREATININE DETECTION IN A MICROFLUIDIC CHIP USING A SMARTPHONE CAMERA Betul Karakuzu <sup>1</sup> , Ergun Alperay Tarim <sup>1</sup> , and H. Cumhur Tekin <sup>1,2</sup> <sup>1</sup> Izmir Institute of Technology, TURKEY and <sup>2</sup> Middle East Technical University (METU), TURKEY	1105
M170.f	SIMPLE ANION DETECTION ON MICROFLUIDIC PAPER ANALYTICAL DEVICE	1107

M171.f	ULTRA HIGH-THROUGHPUT CELL IMAGING ENABLED BY OPTIMIZED MICROFLUIDIC DEVICE WITH HORIZONTAL CONNECTION	1109
T110,f	A NOVEL QUANTITATIVE METHOD BASED ON ON-CHIP FLOW RATE MEASUREMENT  Kuizhi Qu¹, Kazuhiro Morioka², Konoka Nakamura², Shoji Yamamoto¹, Akihide Hemmi³, Atsushi Shoji², and Hizuru Nakajima¹  ¹Tokyo Metropolitan University, JAPAN, ²Tokyo University of Pharmacy and Life Sciences, JAPAN, and ³Mebius Advanced Technology Ltd., JAPAN	1111
T111.f	REFLECTION-MODE PHOTOPLETHYSMOGRAPHY SENSOR PATCH FOR MENTAL HEALTH SCREENING TOOLS  Namyun Kim <sup>1</sup> , Yao Zhang <sup>1</sup> , and Yi Jae Lee <sup>1,2</sup> <sup>1</sup> Korea Institute of Science and Technology (KIST), KOREA and <sup>2</sup> University of Science & Technology (UST), KOREA	1113
T112.f	SENSITIVE AND SELECTIVE PREGNENOLONE DETECTION WITH NARROW EMISSION GREEN CARBON DOTS Xueqiao Zhang, Sanjida Yeasmin, Ahasan Ullah, and Li-Jing Cheng Oregon State University, USA	1115
T113.f	SENSITIVE INTERROGATION OF ENHANCER ACTIVITY IN LIVING CELLS ON NANOELECTROPORATION-PROBING PLATFORM Zaizai Dong and Lingqian Chang Beihang University, CHINA	1117
T114.f	SOLUTE DIFFUSION AND HYDROGEL SWELLING EVALUATION METHOD AIMING AT NON-LABEL SENSING IN MICROPHYSIOLOGICAL SYSTEMS	1119
T115.f	TOWARDS A LOW-COST AND HANDHELD THERMO-PHOTONIC DEVICE FOR RAPID DETECTION OF BACTERIA IN DRINKING WATER	1121
W146.f	FLOW-CONTROLLED PLASMONIC SENSORS  Raquel Catalan-Carrio <sup>1</sup> , Alba Calatayud-Sanchez <sup>1</sup> , Yara Alvarez-Braña <sup>1</sup> , Joel Villatoro <sup>1,2</sup> , Fernando Benito-Lopez <sup>1,3,4</sup> , and Lourdes Basabe-Desmonts <sup>1,2,3,4</sup> <sup>1</sup> University of the Basque Country, SPAIN, <sup>2</sup> IKERBASQUE, SPAIN, <sup>3</sup> Bioaraba Health Research Institute, SPAIN, and <sup>4</sup> BCMaterials, SPAIN	1123
	f - Sensors and Detection Technologies	
	Others	
T116.f	SIMPLIFIED PROCESS FOR PICOWATT CALORIMETER BASED ON FLEXIBLE PRINTED CIRCUIT TECHNIQUE Hanliang Zhu, Lan Wang, and Pavel Neuzil Northwestern Polytechnical University, CHINA	1125

W147.f	MALDI MASS SPECTROMETRY ON HIGH-DENSITY DROPLET ARRAYS: MATRIX DEPOSITION, SELECTIVE REMOVAL AND RECRYSTALLIZATION	1127
W148.f	A ZnO-MICROCHIP FOR EXTRACELLULAR VESICLES DETECTION WITH CASCADE SIGNAL AMPLIFICATION AND GLUCOSE METER READOUT	1129
W149.f	MULTI-ANALYTE SENSING MICROFLUIDIC STRUCTURE FOR ARRAY SENSORS AND ITS USAGE WITH A CANTILEVER BIO SENSOR	1131
W150.f	POROUS MICRONEEDLES INTEGRATED PAPER SENSOR FOR CHOLESTEROL MEASUREMENT	1133
	f - Sensors and Detection Technologies	
	Physical Sensors	
M172.f	A FLEXIBLE, WEARABLE AND WIRELESS ELECTROPHYSIOLOGICAL SIGNAL SENSING SYSTEM FOR ERG WAVE DETECTION	1135
M173.f	A HOT-FILM AIRFLOW SENSOR WITH HIGHLY THERMAL SENSITIVE THIN FILM	1137
M174.f	A LOW HYSTERESIS FORCE DISTRIBUTION TRANSDUCER FOR ARTIFICIAL JOINT 1 Yunfei Liu, Jie Wang, Zhenchuan Yang, Yilong Hao, and Chengchen Gao Peking University, CHINA	1139
M175.f	AN L-SHAPED TWO-DIMENSIONAL HOT-WIRE ANEMOMETER FOR LOW SPEED GAS FLOW DETECTION	1141
M176.f	APPLICATION OF A THERMAL SENSOR SYSTEM FOR THE MEASUREMENT OF BIOFILM FORMATION OVER 24 H AND INHIBITION BY AN ANTIMICROBIAL PEPTIDE IN REAL-TIME Tobias Wieland, Krishan Kotthaus, Leon Brenner, and Gerald A. Urban University of Freiburg, GERMANY	1143
M177.f	ENABLING HIGH SENSITIVITY AIRFLOW MEASUREMENT USING PHASE-CHANGE MATERIALS Yushan Zhou <sup>1</sup> , Yunqi Cao <sup>1</sup> , Nelson Sepúlveda <sup>2</sup> , and Hongjian Zhang <sup>1</sup> **IZhejiang University, CHINA and **2Michigan State University, USA**	1145

M178.f	NOVEL MEASUREMENT COMPENSATION TECHNIQUE FOR WEARABLE MICROFLUIDIC SWEAT SENSOR	1147
M179.f	PATCH-TYPE PRESSURE SENSOR WITH UNBALANCED MICRO-STRUCTURE	1149
T117.f	A CMOS-MEMS THERMAL CONVECTIVE ACCELEROMETER FOR PERFORMANCE ENHANCEMENT USING FILM THINNING METHOD  Xiaoyi Wang <sup>1</sup> , Zhongyi Liu <sup>1</sup> , Yi-Kuen Lee <sup>2</sup> , and Huikai Xie <sup>1</sup> Beijing Institute of Technology, CHINA and <sup>2</sup> Hong Kong University of Science and Technology, HONG K	
T118.f	FLOATING ELECTRODES CONFIGURATION ENABLING SPATIAL LOCATION OF SINGLE CELLS IN MICROCHANNEL Qiang Fang <sup>1</sup> , Yongxiang Feng <sup>2</sup> , Liang Huang <sup>1</sup> , and Wenhui Wang <sup>2</sup> <sup>1</sup> Hefei University of Technology, CHINA and <sup>2</sup> Tsinghua University, CHINA	1153
T119.f	LOW-COST AND LABEL-FREE RESISTIVE MICROFLUIDIC BIOSENSOR FOR BACTERIA DETECTION IN DRINKING WATER Mohammad Javad Farshchi Heydari, Daphne-Eleni Archonta, Vasily G. Panferov, Sergey N. Krylov, Nima Tabatabaei, and Pouya Rezai York University, CANADA	1155
W151.f	GENE EXPRESSION ANALYSIS FOLLOWING MECHANICAL CHARACTERIZATION OF A CELL BY MEMS TWEEZERS Kouhei Takamura and Momoko Kumemura Kyushu Institute of Technology, JAPAN	1157
W152.f	HIGHLY FLEXIBLE SENSOR INTEGRATED WITH ULTRA THIN GLASS CANTILEVER FOR STIFFNESS EVALUATION	1159
	g - Other Applications of Microfluidics	
	Artificial Intelligence and Microfluidics	
M180.g	MACHINE LEARNING-BASED QUANTITATIVE ANALYSIS METHOD USING IMMUNO-WALL DEVICE Jungchan Shin, Toshihiro Kasama, and Ryo Miyake University of Tokyo, JAPAN	1161
	g - Other Applications of Microfluidics	
	Fuel Cells and Energy	
T120.g	CANTILEVER STRUCTURE FOR PORTABLE SOLID OXIDE FUEL CELL WITH HIGH THERMAL INSULATION AND DURABILITY IN HARSH CONDITIONS  Ryutaro Torikai <sup>1</sup> , Daiki Takeda <sup>2</sup> , Tetsuya Yamada <sup>1</sup> , and Yasuko Yanagida <sup>1</sup> <sup>1</sup> Tokyo Insutitute of Technology, JAPAN and <sup>2</sup> Industrial Research Institute of Ishikawa, JAPAN	1163

<sup>1</sup> Technical University of Munich, GERMANY and <sup>2</sup> Soft	ware Competence Center Hagenberg SCCH, AUSTRIA
W153.g 3D PRINTED MICRO FUEL CELLS FOR POINT Lore Van Looy <sup>1</sup> , Frederic Becker <sup>1</sup> , Philippe Vereecker ** *IKU Leuven, BELGIUM and ** *Imec, BELGIUM**	<b>-OF-CARE DIAGNOSTICS</b>
W154.g  INTEGRATED MICROFLUIDIC DEVICE FOR M CULTIVATION AND CARBOHYDRATES EXTR Qianwei Jiang¹, Toshihiro Kasama¹, Tomomi Sato², Jin ¹University of Tokyo, JAPAN and ²KISTEC, JAPAN	ACTION 1169
W155.g LIQUID-LIQUID CONTACT ELECTRIFICATIO MICROFLUIDICS-BASED TRIBOELECTRIC NA Ruotong Zhang, Haisong Lin, and Anderson Ho Cheur University of Hong Kong, HONG KONG	ANOGENERATOR 1171
g - Other Applications	of Microfluidics
Others	<u> </u>
M181.g  NUMERICAL CHARACTERIZATION OF THE VIBRATION-INDUCED FLOW IN VARIOUS CO Zhitai Huang <sup>1</sup> , Kanji Kaneko <sup>1</sup> , Yuto Asada <sup>1</sup> , Yosuke F <sup>1</sup> Chuo University, JAPAN and <sup>2</sup> University of Tokyo, JA	
T122.g STUDENT ENGAGEMENT & ACHIEVEMENT I RESEARCH EXPERIENCE CREATING APPLIE Andrew Dean, James Redfern, and Kirsty J. Shaw Manchester Metropolitan University, UK	N A COURSE-BASED UNDERGRADUATE D MICROFLUIDIC DEVICES
T123.g THE FUNCTIONALITY OF PROGRAMMABLE Zachary Estlack <sup>1</sup> , Matin Golozar <sup>2</sup> , Anna Butterworth <sup>2</sup> , <sup>1</sup> University of Utah, USA and <sup>2</sup> University of California	
h - Late N	ews
Cells, Organisms and O	
M182.h A GLASS MICROFLUIDIC BIOELECTROCHEM FOR THE STUDY OF MICROBIAL EXTRACEL Andreea Stoica, Karthikeyan Rengasamy, Tahina O. R Washington University, St. Louis, USA	LULAR ELECTRON UPTAKE 1179
M183.h A NANOPIPETTE-BASED THERMOCOUPLE FO Li-Qiu Huang, Xin-Lei Ding, Xiao-Tong Pan, Kang W Nanjing University, CHINA	OR SINGLE-CELL ANALYSIS 1181 Yang, Zhong-Qiu Li, and Xing-Hua Xia
T124.h CHARACTERIZATION OF THE WHOLE NEUR READOUT PLATFORM FROM A 3D NEURONA THE CELL PATTERNING ON A MICROELECT Dongjo Yoon and Yoonkey Nam Korea Advanced Institute of Science and Technology (s.	L NETWORK USING RODE ARRAY 1183

T125.h	MICROCHANNEL WITH PATTERNED SURFACE COATING AS FLUID GUIDE FOR ON-CHIP CELL CULTURING Ming Pan, Xiaohua Qian, and Xin Xie Xellar Biosystems, USA	1185
T126.h	SPATIOTEMPORAL CONTROL OF APOPTOSIS BY MANIPULATING OPTOGENETIC-BAX Dain Lee and Seok Chung Korea University, KOREA	1187
W156.h	A MICROFLUIDIC SPHEROIDS-BASED DERMAL MODEL FOR SCREENING HYDROPHILIC AND HYDROPHOBIC ACTIVE INGREDIENTS FOR SKINCARE Zhengkun Chen¹, Sina Kheiri¹, Albert Gevorkian¹, Edmond Young¹, Oussama El Baraka², Valarie Andre², Ted Deisenroth³, and Eugenia Kumacheva¹  ¹University of Toronto, CANADA, ²BASF Beauty Care Solutions France S.A.S, FRANCE, and ³BASF Advanced Formulation Research North America, USA	1189
W157.h	PROGRAMMABLE MICRO-FLOW ASSAY OF APATMER AS A POTENTIAL THERAPEUTIC AGENT TOWARDS NEUTROPHILS RESPIRATORY BURST	1191
W158.h	RAPID DETERMINATION OF ANTIBIOTIC RESISTANCE IN KLEBSIELLA PNEUMONIAE VIA DIRECT SINGLE-CELL IMAGING BY DROPLET MICROFLUDICS Yue Wang <sup>1,2</sup> , Cancan Zhu <sup>1</sup> , Ke Yang <sup>1</sup> , Jun Zhao <sup>1</sup> , Zhenyu Wang <sup>1</sup> , Xueer Yin <sup>1</sup> , Yong Liu <sup>1</sup> , and Ling Zhu <sup>1</sup> Chinese Academy of Sciences, CHINA and <sup>2</sup> University of Science and Technology of China, CHINA	1193
	h - Late News	
	Diagnostics, Drug Testing and Personalized Medicine	
M184.h	A DIGITAL MICROFLUIDIC DEVICE INTEGRATED WITH COLORIMETRIC LOOP-MEDIATED ISOTHERMAL AMPLIFICATION FOR VISUAL DETECTION OF MULTIPLE PATHOGENS	
	Mei Xie <sup>1</sup> , Bo Lei <sup>1</sup> , Tianlan Chen <sup>2</sup> , and Cheng Dong <sup>2,3</sup> <sup>1</sup> HKBU-NBU United International College, CHINA, <sup>2</sup> Digifluidic Biotech Ltd, CHINA, and <sup>3</sup> Jinan University, CHINA	1195
M185.h	<sup>1</sup> HKBU-NBU United International College, CHINA, <sup>2</sup> Digifluidic Biotech Ltd, CHINA, and	
M185.h T127.h	<sup>1</sup> HKBU-NBU United International College, CHINA, <sup>2</sup> Digifluidic Biotech Ltd, CHINA, and <sup>3</sup> Jinan University, CHINA  SENSITIVITY-IMPROVED IMMUNOASSAY FOR SARS-CoV-2 SPIKE PROTEIN IN SALIVA WITHOUT PRETREATMENT BY USING IMMUNO-WALL MICROFLUIDIC DEVICE	1197

W159.h	MULTIPLE CONCENTRATION GRADIENT-TAILORED ARRAY FOR HIGH-THROUGHPUT SINGLE-CELL ANALYSIS	1203
W160.h	TTAGO-COUPLED-MULTIPLEX-DIGITAL-RPA-CRISPR/CAS12A FOR EGFR MUTATIONS DETECTION  Jianjian Zhuang <sup>1</sup> , Liping Xia <sup>3</sup> , Zheyu Zou <sup>3</sup> , Juxin Yin <sup>2</sup> , and Ying Mu <sup>3</sup> <sup>1</sup> Zhejiang University School of Medicine, CHINA, <sup>2</sup> Zhejiang University City College, CHINA, and <sup>3</sup> Zhejiang University, CHINA	1205
W161.h	A FULLY AUTOMATED, INTEGRATED DROPLET DIGITAL PCR ANALYZER	1207
W162.h	A DCD-CHIP DESIGNED FOR DIGITAL AND ULTRA-PRECISE QUANTIFICATION OF COPY NUMBER VARIATION Zheyu Zou, Liping Xia, Juxin Yin, and Ying Mu Zhejiang University, CHINA	1209
W163.h	DPCR DUPLEXING METHOD IN A SINGLE FLUORESCENCE CHANNEL  Haoqing Zhang <sup>1,2</sup> , Soňa Laššáková <sup>3</sup> , Zhiqiang Yan <sup>1</sup> , Xinlu Wang <sup>1</sup> , Pavel Šenkyřík <sup>3</sup> ,  Martina Gaňová <sup>4</sup> , Honglong Chang <sup>1</sup> , Marie Korabecna <sup>3,5</sup> , and Pavel Neuzil <sup>1</sup> <sup>1</sup> Northwestern Polytechnical University, CHINA, <sup>2</sup> Xi'an Jiaotong University, CHINA, <sup>3</sup> Charles University and General University Hospital in Prague, CZECH REPUBLIC, <sup>4</sup> Brno University of Technology, CZECH REPUBLIC, and <sup>5</sup> University of Trnava, SLOVAKIA	1211
W164.h	DIRECT DIGITAL CRISPR/CAS-ASSISTED ASSAY FOR ULTRASENSITIVE DETECTION OF PATHOGENS Liping Xia <sup>1</sup> , Juxin Yin <sup>2</sup> , Jianjian Zhuang <sup>3</sup> , Weihong Yin <sup>1</sup> , Zheyu Zou <sup>1</sup> , and Ying Mu <sup>1</sup> <sup>1</sup> Zhejiang University, CHINA, <sup>2</sup> Zhejiang University City College, CHINA, and <sup>3</sup> Affiliated Hangzhou First People's Hospital, Zhejiang University School of Medicine, CHINA	1213
	h - Late News	
	Fundamentals in Microfluidics and Nanofluidics	
M186.h	ACOUSTOFLUIDIC FOR FOULING MITIGATION IN CROSS-FLOW MICROFILTRATION Ting-Yu Wan, Yen-Wei Chang, Ta-Jen Yang, Tsui-Ting Lee, Hsiang-I Yin, Yu-Chin Ho, Hsiao-Lin Hwa, and Yen-Wen Lu National Taiwan University, TAIWAN	1215
T129.h	CONTROLLED DROPLET PRODUCTION IN SYMMETRIC FLOW-FOCUSING DEVICE FOR TUNABLE GOLD NANOPARTICLES SYNTHESIS  Kavitha Illath <sup>1</sup> , Moeto Nagai <sup>2</sup> , and Tuhin S. Santra <sup>1</sup> Indian Institute of Technology Madras, INDIA and <sup>2</sup> Toyohashi University of Technology, JAPAN	1217
T130.h	LAYERED BIOMIMETIC MICROGELS FOR GENE DELIVERY AND SCAFFOLD CONSTRUCT ASSEMBLY	1219

W165.h	TOWARDS CONCENTRIC TOPOLOGY IN ORGANOIDS: STRUCTURATION AND CULTURE OF BRAIN DERIVED SPHEROIDS IN A BULK ACOUSTIC WAVE RESONATOR Chloé Dupuis <sup>1,2</sup> , Xavier Mousset <sup>1,2</sup> , Guillaume Viraye <sup>2</sup> , Pierre-Ewen Lecoq <sup>1,2</sup> , Mauricio Hoyos <sup>1</sup> , Jean-Luc Aider <sup>1</sup> , and Jean-Michel Peyrin <sup>2</sup> <sup>1</sup> École Supérieure de Physique Et de Chimie Industrielles de La Ville de Paris, FRANCE and <sup>2</sup> Sorbonne Université, FRANCE	1221
W166.h	MEASUREMENT OF PRESSURE-DRIVEN FLOW IN A NANOCHANNEL BY DEFOCUSING NANO-PARTICLE IMAGE VELOCIMETRY  Yutaka Kazoe <sup>1</sup> , Minori Tanaka <sup>1</sup> , and Itsuo Hanasaki <sup>2</sup> <sup>1</sup> Keio University, JAPAN and <sup>2</sup> Tokyo University of Agriculture and Technology, JAPAN	1223
W167.h	NANOFLUIDIC DEVICE FOR SURFACE CHARGE MEASUREMENT OF NANOPARTICLES USING TUNABLE ELECTROSTATIC LANDSCAPE Imman I. Hosseini, Zezhu Liu, Walter Reisner, and Sara Mahshid McGill University, CANADA	1225
	h - Late News	
	Integrated Microfluidic Platforms	
M187.h	SEEDLESS SYNTHESIS OF GOLD NANOTRIANGLES USING MICROFLUIDICS WITH NON-THERMAL LIQUID PHASE REDUCTION Mao Hamamoto and Hiromasa Yagyu Kanto Gakuin University, JAPAN	1227
T131.h	MICROFLUIDIC FABRICATION OF MONODISPERSE DEGRADABLE CELL-SUPPORTIVE HYDROGEL MICROPARTICLES (MICROGELS) Afshin Abrishamkar, Cynthia Pham, Eva Mueller, and Todd Hoare McMaster University, CANADA	1229
	h - Late News	
	Micro- and Nanoengineering	
M188.h	DEVELOPMENT OF MICROWELL ARRAY FOR CELL TRAPPING AND SHRNA DELIVERY USING ELECTROPORATION Han-Yun Hsieh <sup>1</sup> , Che-Yi Li <sup>1</sup> , Jian-Chie Chao <sup>1</sup> , Yu-Jui Fan <sup>2</sup> , and Horn-Jiunn Sheen <sup>1</sup> National Taiwan University, TAIWAN and <sup>2</sup> Taipei Medical University, TAIWAN	1231
M189.h	MULTILAYER MICROFLUIDIC DEVICES: NEW FABRICATION METHOD USING A CUSTOM-BUILT WAFER-SCALE PDMS SLAB ALIGNER Trieu Nguyen <sup>1,2</sup> , Tanoy Sarkar <sup>1</sup> , and Fakhrul Ahsan <sup>1</sup> <sup>1</sup> California Northstate University, USA and <sup>2</sup> East Bay Institute for Research & Education (EBIRE), USA	1233
M190.h	STEREOLITHOGRAPHY 3D PRINTING FOR RAPID FABRICATION OF MICROFLUIDIC CHANNELS WITH INTEGRATED QUAKE VALVES Isteaque Ahmed and Aashish Priye University of Cincinnati, USA	1235

T132.h	LOW TEMPERATURE BONDING WITH ROUGH BONDING SURFACE FOR GLASS MICRO/NANOFLUIDIC DEVICE Ryoichi Ohta <sup>1</sup> , Kyojiro Morikawa <sup>1,2</sup> , and Takehiko Kitamori <sup>1,2</sup> <sup>1</sup> University of Tokyo, JAPAN and <sup>2</sup> National Tsing Hua University, TAIWAN	1237
T133.h	LOW COST LIFT-OFF TECHNIQUE TO FABRICATE MICRO-ELECTRODE ARRAY FOR NEURON CULTURE PLATFORM Xiangping Li, Steffen Fricke, Jochen Meier, and Andreas Dietzel Technical University Braunschweig, GERMANY	1239
W168.h	ULTRAFAST-RESPONSE MICROPUMP ACTUATED BY A GIGAHERTZ ACOUSTIC RESONATOR  Yangchao Zhou <sup>1,2</sup> , Moonkwang Jeong <sup>1</sup> , Wei Pang <sup>2</sup> , Xuexin Duan <sup>2</sup> , and Tian Qiu <sup>1</sup> **IUniversity of Stuttgart, GERMANY and <sup>2</sup> Tianjin University, CHINA**	1241
W169.h	3D MULTICELLULAR CO-CULTURE ON A CHIP: NEW DESIGN TOWARDS COMMERCIALIZATION Trieu Nguyen <sup>1,2</sup> , Linh Ho <sup>1</sup> , and Fakhrul Ahsan <sup>1</sup> <sup>1</sup> California Northstate University, USA and <sup>2</sup> East Bay Institute for Research & Education (EBIRE), USA	1243
W170.h	PRESSURE-INDUCED CHANNEL DEFORMATION ON A ULTRA-THIN GLASS MICROFLUIDICS  Doudou Ma <sup>1,2</sup> , Koki Yamamoto <sup>1</sup> , Nobutoshi Ota <sup>1</sup> , Yuri Ito <sup>1</sup> , Yalikun Yaxiaer <sup>1,3</sup> , and Yo Tanaka <sup>1,2</sup> <sup>1</sup> Institute of Physical and Chemical Research (RIKEN), JAPAN, <sup>2</sup> Osaka University, JAPAN, and <sup>3</sup> Graduate School of Nara Institute of Science and Technology, JAPAN	1245
	h - Late News	
	Sensors and Detection Technologies	
M191.h	RAPID DETECTION OF AIRBORNE CORONAVIRUSES USING CARBON NANOTUBES-COATED PAPER WORKING ELECTRODES  Daesoon Lee, Junbeom Jang, and Jaesung Jang Ulsan National Institute of Science and Technology (UNIST), KOREA	1247
T134.h	ELECTROCHEMICAL CHARACTERIZATION OF POLYANILINE-BASED NANOFILMS FOR USE AS ELECTRODES FOR A MICRONEEDLE-TYPE PH SENSOR	1249
W171.h	LOW-COST AND POINT-OF-CARE ELECTROCHEMICAL MICROFLUIDIC DEVICE WITH ON-PLATFORM SAMPLE COLLECTION, PRE-TREATMENT AND ANALYSIS OF WHOLE BIOFLUIDS Houda Shafique, Roozbeh Siavash Moakhar, Carolina del Real Mata, Tamer Abdel Fatah, Imman Isaac Hosseini, Sripadh Guptha Yedire, Justin de Vries, Julia Strauss, and Sara Mahshid McGill University, CANADA	1251
W172.h	CHIRAL RECOGNITION OF HOMOCHIRAL ZEOLITIC IMIDAZOLATE FRAMEWORK MEMBRANES WITH TUNABLE MICROENVIRONMENT Ming-Yang Wu, Ri-Jian Mo, Zhong-Qiu Li, and Xing-Hua Xia Nanjing University, CHINA	1253

W173.h W174.h	GOLD NANOPARTICLE-COATED MAGNETIC PARTICLES BASED  ELECTROCHEMICAL BIOSENSOR FOR DETECTION OF  PANCREATIC CANCER-DERIVED EXTRACELLULAR VESICLES
	h - Late News Other Applications of Microfluidics
W175.h	ELECTROKINETIC ENERGY CONVERSION IN NANOFLUIDIC CHANNEL: SQUARE NANOCHANNEL VS PLATE NANOCHANNEL