



# Preliminary Program

**Conference Chairs:**

Hyunjoo "Jenny" Lee, *Korea Advanced Institute of Science and Technology, KOREA*  
Sheng-Shian Li, *National Tsing Hua University, TAIWAN*

**Conference Location:**

Kaohsiung Exhibition Center  
Kaohsiung, TAIWAN

**Sponsored by:**



**IEEE**



The Executive Committee has the right to change dates and times if needed.

## Sunday, 21 January

All times are Chinese Standard Time (CST).

### Industry Sesion I – AI for MEMS

Room 304a

- 13:00 MEMS BEYOND SENSORS**  
Franz Lärmer  
*Robert Bosch GmbH, GERMANY*
- 13:25 MEMS SENSORS ENABLING SUSTAINABLE EDGE AI COMPUTING**  
Marco Ferrera  
*STMicroelectronics, ITALY*
- 13:50 EDGE INTELLIGENCE FOR MEMS: ENABLING ON-DEVICE SENSOR DATA INTERPRETATION WITH TINYML**  
Sang Won Lee  
TDK SensEI, USA
- 14:15 TBD**  
Jerry Chen  
*Upbeat Technology, TAIWAN*
- 14:40 SPECTROCHIP X AI - EXPAND THE HORIZON OF SPECTRAL SENSING**  
Kevin Ko  
*Spectrochip, TAIWAN*

15:05	Break
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### Industry Sesion II –MEMS for AI

Room 304a

- 15:30 BRIDGING THE GAP: MEMS AND AI, A PERFECT PARTNERSHIP**  
Jerwei Hsieh  
*Asia Pacific Microsystems, Inc., TAIWAN*
- 15:50 THE X FACTOR IN MEMS INNOVATION: BREAKTHROUGHS ACROSS THREE PRODUCT LINES WITH A SINGLE PLATFORM**  
Chiung-Cheng Lo  
*xMEMS, USA*
- 16:10 TBD**  
Mario Kiuchi  
*Sumitomo Precision Products Co., Ltd., JAPAN*
- 16:30 ACCELERATING MEMS PROTOTYPING WITH PIEZOELECTRIC THIN FILM PLATFORMS**  
Zhu Yao  
*Agency for Science, Technology and Research (A\*STAR), SINGAPORE*
- 16:50 ENHANCING AUTOMOTIVE HMI DESIGN WITH ADVANCED PIEZO-MEMS DEVICES**  
Hao-Yen Tang  
*UltraSense Systems, USA*
- 17:10 Adjournal

<b>Registration</b>

17:10 – 19:00

<b>Welcome Reception</b>
Room 305

17:10 – 19:00

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## Monday, 20 January

<b>Welcome Address</b>
Room 301

08:00 MEMS 2025 Conference Chairs

Hyunjoo "Jenny" Lee, *Korea Advanced Institute of Science and Technology, KOREA*  
Sheng-Shian Li, *National Tsing Hua University, TAIWAN*

<b>• IEEE Fellows Recognition in the Field of MEMS/NEMS</b>
<b>• IEEE EDS Robert Bosch Micro and Nano Electro Mechanical Systems Award</b>
Room 301

<b>Plenary Presentation I</b>
Room 301

08:45 **NAVIGATING THE NEW NORMAL**

Tien Wu  
*Advanced Semiconductor Engineering, Inc (ASE), TAIWAN*

## Session I - Medical MEMS

Room 301

- 09:30 THE FIRST TOOL-CHANEL TACTILE SENSOR FOR SIMULTANEOUS ACQUISITION OF TACTILE AND FORCE SENSATIONS IN MICRO AND NARROW SPACE UNDER ENDOSCOPIC SURGERY**  
Keisuke Yoshimoto, Takanori Matsui, Kyohei Terao, Hideki Kobara, Hidekuni Takao  
*Kagawa University, JAPAN*
- 09:45 A DUAL-DETECTION APPROACH FOR CARDIOTOXICITY SCREENING: UTILIZING NANO SILICON STRAIN SENSOR AND MEA TO MONITOR CONTRACTILITY AND FIELD POTENTIAL IN CARDIOMYOCYTES**  
Haolan Sun, Longlong Li, Dong-Weon Lee  
*Chonnam University, KOREA*
- 10:00 TRIBOELECTRIC MAT MULTIMODAL SYSTEM FOR SLEEP POSE ESTIMATION**  
Jinlong Xu<sup>1,2</sup>, Xinge Guo<sup>1,2</sup>, Chengkuo Lee<sup>1,2</sup>  
<sup>1</sup>National University of Singapore, SINGAPORE,  
<sup>2</sup>Center for Intelligent Sensors and MEMS (CISM)
- 10:15 ULTRA-SENSITIVE WIRELESS PRESSURE SENSOR FOR REAL-TIME CARDIOVASCULAR RESTENOSIS MONITORING IN SMART STENTS**  
Lei Wang<sup>1</sup>, Nomin-Erdene Oyunbaatar<sup>1</sup>, Dong-Su Kim<sup>2</sup>, Jinliang Wei<sup>1</sup>, Yun-Jin Jeong<sup>3</sup>, Heonzoo Lee<sup>1</sup>, Su-Hwan Kim<sup>4</sup>, Yonggwon Won<sup>1</sup>, Kyeongha Kwon<sup>4</sup>, In-Seok Jeong<sup>5</sup>, Dong-Weon Lee<sup>1</sup>  
<sup>1</sup>Chonnam National University, KOREA, <sup>2</sup>Korea Institute of Industrial Technology (KITECH), KOREA, <sup>3</sup>Chosun College of Science & Technology, KOREA, <sup>4</sup>Korea Advanced Institute of Science and Technology (KAIST), KOREA, <sup>5</sup>Chonnam National University Hospital, KOREA

10:30	Break and Exhibit Inspection
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## Session II - Electromagnetic MEMS

Room 301

- 11:00 DIAMAGNETICALLY LEVITATED AND TRAPPED GRAPHITE MECHANICAL RESONATORS**  
Yunong Wang<sup>1</sup>, Alexander Gage<sup>1</sup>, Jaesung Lee<sup>2</sup>, Philip X.-L. Feng<sup>1</sup>  
<sup>1</sup>University of Florida, USA, <sup>2</sup>University of Central Florida, USA
- 11:15 A FLEXIBLE AND ULTRASENSITIVE ARTIFICIAL COMPOUND EYE USING BIONIC MICRO-LENS ARRAY FOR DRONE VISION**  
Jiachuang Wang<sup>1,2</sup>, Fangyu Zhou<sup>1,2</sup>, Wenyuan Liu<sup>1,2</sup>, Nan Qin<sup>1,2</sup>, Tiger H. Tao<sup>1,2,3,4,5</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA
- 11:30 HARNESSING MAGNETIC INTERCONNECTS FOR GENERIC FEEDTHROUGH CANCELLATION IN MEMS RESONATORS**  
Zhong-Wei Lin, Anurag A. Zope, Sheng-Shian Li  
*National Tsing Hua University, TAIWAN*
- 11:45 INTEGRATED RESONANT MICRO-PLATE FOR SIMULTANEOUS DIFFERENTIAL THERMAL ANALYSIS AND THERMOGRAVIMETRIC ANALYSIS**  
Yuhang Yang<sup>1,2</sup>, Zechun Li<sup>1,2</sup>, Hao Jia<sup>1,2</sup>, Pengcheng Xu<sup>1,2</sup>, Xinxin Li<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA

## MEMS Community Announcement

Room 301

12:00 Clark T.-C. Nguyen, *University of California, Berkeley, USA*

12:05 Lunch and Exhibit Inspection

## Session IIIa - Inertial MEMS

Room 304a

- 13:05 MODELING ZERO TEMPERATURE DRIFTS IN GYROSCOPES WITH AND WITHOUT AUTOMATIC QUADRATURE COMPENSATION**  
Luca Pileri<sup>1</sup>, Marco De Pace<sup>1</sup>, Gabriele Gattere<sup>2</sup>, Luca Falorni<sup>2</sup>, Giacomo Langfelder<sup>1</sup>  
*<sup>1</sup>Politecnico di Milano, ITALY, <sup>2</sup>ST Microelectronics, ITALY*
- 13:20 A SELF-POWERED INERTIAL SWITCH WITH ASYMMETRY DOUBLE-WELL POTENTIAL MECHANISM FOR ANTI-FALSE TRIGGERING**  
Kai Wang<sup>1</sup>, Chao Ren<sup>2</sup>, Ran Zhang<sup>1</sup>, Yaling Luo<sup>3</sup>, Dengyin Zhang<sup>1</sup>  
*<sup>1</sup>Nanjing University of Posts and Telecommunications, CHINA, <sup>2</sup>Tsinghua University, CHINA, <sup>3</sup>Suzhou Zhenlun Spinning Co., Ltd, CHINA*
- 13:35 A NOVEL NEAR-ZERO STIFFNESS MEMS ACCELEROMETER BASED ON DUAL NONLINEAR CURVED BEAMS ANTI-SPRING MECHANISM**  
Ruihong Xiong<sup>1</sup>, Lihui Jin<sup>1</sup>, Xuankai Xu<sup>1</sup>, Wenzhen Li<sup>1</sup>, Shihao Du<sup>2,3</sup>, Yiwei Wang<sup>1</sup>, Fang Chen<sup>2,3</sup>, Tao Wu<sup>1,2,3,4</sup>  
*<sup>1</sup>ShanghaiTech University, CHINA, <sup>2</sup>Chinese Academy of Sciences, CHINA, <sup>3</sup>University of Chinese Academy of Sciences, CHINA, <sup>4</sup>Shanghai Engineering Research Center of Energy Efficient and Custom AI IC, CHINA*
- 13:50 ACHIEVING BELOW 200PPM SCALE FACTOR TEMPERATURE STABILITY IN AN AM GYROSCOPE WITH ON-CHIP STRESS SENSING**  
Mehran Hosseini-Pishrobat, Derin Erkan, Erdinc Tatar  
*Bilkent University, TURKEY*

## Session IIIb - Biomedical Sensing

Room 304b

### Invited

- 13:05 MICROMACHINED SILICA RESONATORS FOR BIOSENSING APPLICATIONS**  
Vedant Sumaria<sup>1</sup>, Hwall Min<sup>2</sup>, Soheil Farazi<sup>3</sup>, Srinivas Tadigadapa<sup>3</sup>  
*<sup>1</sup>Iota Bioscience, USA, <sup>2</sup>illumina, USA, <sup>3</sup>Northeastern University, USA*
- 13:35 MICRODEVICE FOR SYNTHESIS OF BIOGLASS AND ITS BIOACTIVITY STUDY**  
Lakshmi Krishnan<sup>1</sup>, Abinaya Rajendran<sup>1</sup>, Kavitha Govarthanam<sup>1</sup>, Moteo Nagai<sup>3</sup>, Srabani Kar<sup>3</sup>, Suresh Rao<sup>1</sup>, Tuhin Subhra Santra<sup>1</sup>  
*<sup>1</sup>Indian Institute of Technology, Madras, INDIA, <sup>2</sup>Toyohashi University of Technology, JAPAN, <sup>3</sup>Indian Institute of Technology, Hyderabad, INDIA*
- 13:50 A BIOCHEMICAL SENSOR WITH TUNABLE HIGH SENSITIVITY BASED ON A REFLECTIVE SECONDARY METAGRATING**  
Lijun Ma<sup>1</sup>, Bingrui Wang<sup>2</sup>, Liye Li<sup>1</sup>, Yunhao Cao<sup>1</sup>, Long Rong<sup>2</sup>, Wengang Wu<sup>1</sup>  
*<sup>1</sup>Peking University, CHINA, <sup>2</sup>Peking University First Hospital, CHINA*

14:05 Transition

## Session IVa - 3D MEMS

Room 304a

### Invited

#### 14:10 3D PRINTED MEMS

Po-Han Huang<sup>1</sup>, Lee-Lun Lai<sup>2</sup>, Theocharis Iordanidis<sup>2</sup>, Shiro Watanabe<sup>2</sup>, Göran Stemme<sup>2</sup>, Niclas Roxhed<sup>2</sup>, Kristinn B. Gylfason<sup>2</sup>, Frank Niklaus<sup>2</sup>

<sup>1</sup>National Tsing Hua University, Taiwan, <sup>2</sup>KTH Royal Institute of Technology, SWEDEN

#### 14:40 OPTICAL 3D $\mu$ -PRINTED PVDF PIEZOELECTRIC TRAPEZOIDAL-SHAPED MICROGRID FORCE SENSORS

Nannan Zhou<sup>1,2</sup>, Huimin Xie<sup>1</sup>, Yangxi Zhang<sup>1</sup>, Hongrui Ao<sup>2</sup>

<sup>1</sup>Hong Kong Polytechnic University, HONG KONG, <sup>2</sup>Harbin Institute of Technology, CHINA

#### 14:55 LOW POWER SWITCHING OF A METAL AIR BATTERY TOWARDS EXTENDED LIFETIME

Farhan Sadik Sium, Steven Tran, Khandaker Reaz Mahmud, Amirali Nikeghbal, Seungbeom Noh, Carlos Mastrangelo, Hanseup Kim

University of Utah, USA

## Session IVb - In Vitro Assays

Room 304b

#### 14:10 ON-CHIP DISASSEMBLING OF CELL-AGGREGATES FOR SEAMLESS SINGLE-CELL ANALYSIS AND HOMOGENEOUS TREATMENT

Niko Kimura<sup>1</sup>, Shigeo S. Sugano<sup>2</sup>, Shinya Sakuma<sup>3</sup>

<sup>1</sup>Tokyo University of Agriculture and Technology, JAPAN,

<sup>2</sup>National Institute of Advanced Industrial Science and Technology, JAPAN, <sup>3</sup>Kyushu University, JAPAN

#### 14:25 MICROMETER-SIZED CARBON MESH ELECTRODE-BASED IN-SITU ELECTROCHEMICAL FILTER FOR ENHANCING RELIABILITY OF ELECTROCHEMICAL BIOSENSORS

Woojae Jeong, Beomsang Kim, Akhsunkhar Khazhmurat, Heungjoo Shin

Ulsan National Institute of Science and Technology, KOREA

#### 14:40 ARRAYED ELECTRICAL STIMULATION PLATFORM FOR ACCURATE EVALUATION OF CONTRACTILE FORCE OF RING-SHAPED ENGINEERED HEART TISSUE

Daiki Miyata<sup>1</sup>, Akari Masuda<sup>1</sup>, Gakuto Kagawa<sup>1</sup>, Hidenori Tani<sup>2</sup>, Hidetoshi Takahashi<sup>1</sup>,

Shugo Tohyama<sup>2</sup>, Hiroaki Onoe<sup>1</sup>

<sup>1</sup>Keio University, JAPAN, <sup>2</sup>Fujita Health University, JAPAN

#### 14:55 A RETINA-ELECTRODE INTERFACE FOR LIGHT SENSING AND IMAGE RECOGNITION

Yunxiao Lu<sup>1</sup>, Peijie Chen<sup>2</sup>, Zhitao Zhou<sup>2</sup>, Xiaoling Wei<sup>2</sup>, Tiger H. Tao<sup>2</sup>, Lunming Qin<sup>1</sup>,

Yifei Ye<sup>2</sup>, Liuyang Sun<sup>2</sup>

<sup>1</sup>Shanghai University of Electric Power, CHINA, <sup>2</sup>Chinese Academy of Sciences, CHINA

<sup>3</sup>ShanghaiTech University, CHINA, <sup>4</sup>Neurxess Co.,Ltd, CHINA, <sup>5</sup>Guangdong Institute of Intelligence Science and Technology, CHINA, <sup>6</sup>Tianqiao and Chrissy Chen Institute for Translational Research, CHINA

## Poster Session I

Hall S2, First Floor

#### 15:10 Poster Session I

Poster presentations are listed by topic category with their assigned number starting on Page 17.

15:10	Break and Exhibit Inspection
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17:00	Adjourn for the Day
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## Tuesday, 21 January

All times are Chinese Standard Time (CST).

### Plenary Presentation II

Room 301

- 08:15**    **MY 50 YEARS IN MEMS**  
Kurt Petersen  
*Silicon Valley Band of Angels, USA*

### Session V - Acoustic MEMS

Room 301

- 09:00**    **MgHf CO-DOPED ALN THIN FILMS TOWARD LOW SIGNAL-TO-NOISE RATIO IN PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCERS**  
Hung H. Nguyen<sup>1,2</sup>, Yosuke Takayama<sup>1,2</sup>, Hiroki Kuwano<sup>1,2</sup>  
*<sup>1</sup>Tohoku University, JAPAN, <sup>2</sup>Sendai Smart Machines Co., Ltd., JAPAN*
- 09:15**    **SINGLE-BIAS DUAL-MODE CMUT ARRAY UTILIZING PRE-SNAPBACK REGION FOR ACOUSTIC HOLOGRAM**  
Seyoung Park, Geon Kook, Chaerin Oh, Sangho Bang, Hyunjoo J. Lee  
*Korea Advanced Institute of Science and Technology (KAIST), KOREA*
- 09:30**    **DEVELOPMENT OF PMUT LINEAR ARRAY INCLUDED WITH FRESNEL ZONE PLATE FOCUSING FUNCTION**  
Tatsuya Shimoyama, Akihiko Teshigahara, Shinya Yoshida  
*Shibaura Institute of Technology, JAPAN*
- 09:45**    **DUAL-ELECTRODE SC<sub>0.3</sub>AL<sub>0.7</sub>N PMUT WITH ULTRA-HIGH OUTPUT PRESSURE FOR LONG DISTANCE RANGING**  
Qing Xin Zhang<sup>1</sup>, Peter Hyun Kee Chang<sup>1</sup>, Merugu Srinivas<sup>1</sup>, Domenico Giusti<sup>3</sup>, Alberto Leotti<sup>2</sup>, Yul Koh<sup>1</sup>, Yao Zhu<sup>1</sup>  
*<sup>1</sup>Agency for Science, Technology and Research (A\*STAR), SINGAPORE, <sup>2</sup>STMicroelectronics, SINGAPORE, <sup>3</sup>STMicroelectronics, ITALY*

10:00	Break and Exhibit Inspection
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### Session VI - 3D Manufacturing

Room 301

- 10:30**    **SELF-ASSEMBLED HIERARCHICAL NANOPOROUS STRUCTURES FOR DURABLE LUBRICANT-INFUSED SURFACES**  
Joowon Lim, Geonho Lee, Beomsu Kim, Sueng Yoon Lee, Dohyun Lim, Junho Oh, Won Chul Lee  
*Hanyang University, KOREA*
- 10:45**    **SELECTIVE FORMATION OF LASER-INDUCED GRAPHENE (LIG) ADJACENT TO 3D METAL ELECTRODE FOR MINIATURIZED LIG-SENSOR APPLICATION**  
Yoo-Kyum Shin, Mijeong Kang, Min-Ho Seo  
*Pusan National University, KOREA*
- 11:00**    **DLP 3D-PRINTED NANOGENERATORS: RAPID AND ROBUST FABRICATION POLYMERIC MICROSTRUCTURE NANOGENERATOR FOR PORTABLE ENERGY HARVESTING AND SELF-POWERED SENSORS**  
Chen-Fang Sun, Muhammad Faizul Zaki, Pin-Chuan Chen  
*National Taiwan University of Science and Technology, TAIWAN*

- 11:15 SEQUENTIAL EXPOSURE DIGITAL LIGHT PROCESSING (SDLP) 3D PRINTING FOR HIERARCHICAL MICROSTRUCTURE TACTILE SENSORS ENABLING ULTRA HIGH-SENSITIVITY, MULTIAXIAL FORCES DETECTION AND LOW CROSS-TALK**  
 Muhammad Faizul Zaki, Pin-Chuan Chen, Adhimoorthy Saravanan, Bohr-Ran Huang  
*National Taiwan University of Science and Technology, TAIWAN*
- 11:30 MULTILAYERED ON-LENS INDUCTOR FOR EFFICIENT WIRELESS POWERING**  
 Khandaker Reaz Mahmud, Farhan Sadik Sium, Seungbeom Noh, Ashrafuzzaman Bulbul, Carlos H. Mastrangelo, Hanseup Kim  
 University of Utah, USA

<b>MEMS 2026 Announcement</b>
Room 301

11:45

12:05	Lunch and Exhibit Inspection
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<b>Poster Session II</b>
Hall S2, First Floor

- 15:10 Poster Session II**  
 Poster presentations are listed by topic category with their assigned number starting on Page 17.

14:20	Break and Exhibit Inspection
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<b>Student Led Conference Session I</b>
Hall S2, First Floor

- 14:20 TOWARDS TACTILE SENSING HUB VIA CMOS-MEMS PLATFORM: EFFECT OF CONTACT INTERFACE MATERIAL AND COIL TURNS ON THE PERFORMANCE OF INDUCTIVE TACTILE SENSORS**  
 Fuchi Shih, Mei-Feng Lai, Weileun Fang  
*National Tsing Hua University, TAIWAN*
- 14:35 CARBON NANOTUBE RESONATOR RESEARCH**  
 Morten Vollmann  
*ETH Zurich, SWITZERLAND*

<b>Session VIIa - MEMS for Computing</b>
Room 304a

- 15:00 CMOS-MEMS PHYSICAL UNCLONABLE FUNCTIONS BASED ON UNBALANCED BIMODAL FREQUENCY COMBS**  
 Ting-Yi Chen, Wei-Chang Li  
 National Taiwan University, TAIWAN
- 15:15 MICROELECTROMECHANICAL LOGIC DEVICE ENABLED BY TUNABLE TORSIONAL RESONATOR WITH LAYERED INDUCTOR**  
 Yohan Jung<sup>1</sup>, Eunhwan Jo<sup>2</sup>, Jongbaeg Kim<sup>1</sup>  
<sup>1</sup>Yonsei University, KOREA, <sup>2</sup>Kumoh National Institute of Technology, KOREA



- 15:30 PROGRAMMABLE CONNECTED 2D NETWORK OF BISTABLE ELEMENTS FOR MEMS ISING MACHINE**  
Shun Yasunaga, Motohiko Ezawa, Yoshio Mita  
*University of Tokyo, JAPAN*
- 15:45 NANOPHOTONIC EDGE COMPUTING SYSTEM FOR ULTRA-LOW LATENCY HUMAN-MACHINE INTERFACE**  
Zihao Ren<sup>1,2</sup>, Zixuan Zhang<sup>1</sup>, Yangyang Zhuge<sup>1</sup>, Zian Xiao<sup>1,2</sup>, Siyu Xu<sup>1</sup>, Jingkai Zhou<sup>1</sup>, Chengkuo Lee<sup>1,2</sup>  
<sup>1</sup>National University of Singapore, SINGAPORE,  
<sup>2</sup>National Centre for Advanced Integrated Photonics (NCAIP), SINGAPORE

## Session VIIb - Soft MEMS

Room 304b

### Invited

- 15:00 EMERGING TECHNOLOGY FOR THE BIOHYBRID ROBOTICS**  
Shoji Takeuchi<sup>1,2</sup>  
<sup>1</sup>University of Tokyo, JAPAN, <sup>2</sup>Kanagawa Institute of Industrial Science and Technology (KISTEC), JAPAN
- 15:30 A BIFUNCTIONAL ORGANOHYDROGEL-BASED TRIBOELECTRIC STRAIN SENSING GLOVE FOR SIGN LANGUAGE INTERPRETATION AND HUMAN-MACHINE INTERFACING**  
Shital Sharma, Gagan Bahadur Pradhan, Trilochan Bhatta, Jae Yeong Park  
*Kwangwoon University, KOREA*
- 15:45 A DIRECT CURRENT TRIBOVOLTAIC NANOGENERATOR-DRIVEN SELF-CHARGING SUPERCAPACITOR FOR PREVENTING STRAIN INJURY**  
Kumar Shrestha, Gagan Bahadur Pradhan, Jae Yeong Park  
*Kwangwoon University, KOREA*

16:00	Transition
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## Session VIIIa - Metrology Using MEMS

Room 304a

- 16:05 LIQUID MIXTURE ANALYSIS BY SIMULTANEOUS PROPERTIES MEASUREMENTS UNDER TEMPERATURE MODULATION AND DEEP LEARNING**  
Juhee Ko, Jungchul Lee  
*Korea Advanced Institute of Science and Technology (KAIST), KOREA*
- 16:20 INLINE MICROFLUIDIC THERMAL CONDUCTIVITY SENSOR USING A SUSPENDED SILICON HEATER**  
Maarten J.S. Bonnema<sup>1</sup>, Job Harbers<sup>1</sup>, Yaxiang Zeng<sup>1</sup>, Jarno Groenesteijn<sup>2</sup>, Remco J. Wiegerink<sup>1</sup>, Joost C. Lötters<sup>1</sup>  
<sup>1</sup>University of Twente, NETHERLANDS, <sup>2</sup>Bronkhorst High-Tech B.V., NETHERLANDS
- 16:35 DETERMINING ACTIVATION ENERGY OF AMMONIUM SALTS DECOMPOSITION USING MEMS THERMOPILE-BASED DIFFERENTIAL SCANNING CALORIMETRY (DSC)**  
Zechun Li<sup>1,2</sup>, Shaokui Tan<sup>1,3</sup>, Ming Li<sup>1,2</sup>, Yuhang Yang<sup>1,2</sup>, Haozhi Zhang<sup>1,2</sup>, Pengcheng Xu<sup>1,2</sup>, Xinxin Li<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA,  
<sup>3</sup>Shanghai Normal University, CHINA

## Session VIIIb - Physical Sensing

Room 304b

- 16:05**     **ENHANCED QUANTUM TEMPERATURE SENSING VIA MICROFLUIDIC-ASSISTED ASSEMBLY OF FLUORESCENT NANODIAMONDS FOR TEMPERATURE MAPPING APPLICATION**  
Keita Saikawa<sup>1</sup>, Zetsu Masaya<sup>1</sup>, Daiki Ueshima<sup>1</sup>, Taiichi Shikama<sup>1</sup>, Ken-ichiro Kamei<sup>1,2</sup>, Osamu Tabata<sup>3</sup>, Yoshikazu Hirai<sup>1</sup>  
<sup>1</sup>*Kyoto University, JAPAN*, <sup>2</sup>*New York University, Abu Dhabi, UAE*,  
<sup>3</sup>*Kyoto University of Advanced Science, JAPAN*
- 16:20**     **FRICITION JOINTING OF DISTRIBUTED RIGID CAPACITORS TO STRETCHABLE LIQUID METAL COIL FOR FULL-BODY WIRELESS CHARGING CLOTHING**  
Takashi Sato<sup>1</sup>, Shinto Watanabe<sup>2</sup>, Ryo Takahashi<sup>3</sup>, Wakako Yukita<sup>3</sup>, Tomoyuki Yokota<sup>3</sup>, Takao Someya<sup>3</sup>, Yoshihito Kawahara<sup>3</sup>, Eiji Iwase<sup>2</sup>, Junya Kurumida<sup>1</sup>  
<sup>1</sup>*National Institute of Advanced Industrial Science and Technology (AIST), JAPAN*,  
<sup>2</sup>*Waseda University, JAPAN*, <sup>3</sup>*The University of Tokyo, JAPAN*
- 16:35**     **AN ANNULAR SLOTS BACK ISLAND MEMS HYDROPHONE WITH ULTRA-HIGH SENSITIVITY AT LOW FREQUENCY**  
Lixuan Li, Zhiyong Hu, Tao Ruan, Zhiyue Yang, Hanshuo Liu, Fangtao Kuang, Bin Yang, Jingquan Liu  
*Shanghai Jiao Tong University, CHINA*

16:50	Adjurn for the Day
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## Conference Banquet

Marriott Hotel

**18:30 -**     Join us for a memorable evening of networking with colleagues.

**21:00**

This event is included in your registration. Guest tickets may be purchased.

## Wednesday, 22 January

All times are Chinese Standard Time (CST).

### Plenary Presentation III

Room 301

- 08:15 HIGH-RESOLUTION UNCOOLED INFRARED SENSORS: INNOVATIONS IN 3D MEMS TECHNOLOGY FOR MILITARY USE**  
Han Chung, Myungho Kwon, Sang-gu Kang  
*i3system, KOREA*

### Session IX - Resonators

Room 301

- 09:00 A QUICK-SETTLING ENHANCEMENT-MODE RESOSWITCH**  
Nilabh Basu, Chun-Pu Tsai, Ting-Yi Chen, Wei-Chang Li  
*National Taiwan University, TAIWAN*
- 09:15 A NOVEL ELECTROSTATIC FREQUENCY TUNING MECHANISM BASED ON A VERTICALLY COUPLED CMOS-MEMS RESONATOR**  
Wei-Hsiang Hsu<sup>1</sup>, Hung-Yu Chen<sup>2</sup>, Zhong-Wei Lin<sup>1</sup>, Sheng-Shian Li<sup>1</sup>  
<sup>1</sup>National Tsing Hua University, TAIWAN, <sup>2</sup>University of California, Berkeley, USA
- 09:30 APPROACHING ~0.1ppb FREQUENCY STABILITY IN ~11MHz AIN-ON-SI DUAL-RING BULK ACOUSTIC WAVE MEMS RESONATOR**  
Connor A. Watkins<sup>1</sup>, Tahmid Kaiser<sup>1</sup>, Mina Rais-Zadeh<sup>2</sup>, Philip X.-L. Feng<sup>1</sup>  
<sup>1</sup>University of Florida, USA, <sup>2</sup>California Institute of Technology, USA
- 09:45 ULTRA-STABLE MEMS CLOCK WITH 53 PARTS-PER-TRILLION FRACTIONAL FREQUENCY STABILITY AT 8 HOURS**  
Jintark Kim<sup>1</sup>, Jie Yan<sup>1</sup>, Rakibul Islam<sup>1</sup>, Jiheng Jing<sup>1</sup>, Jiawei Yang<sup>2</sup>, Gabrielle Vukasin<sup>2</sup>, Ryan Kwon<sup>2</sup>, Saurabh Saxena<sup>1,3</sup>, Thomas W. Kenny<sup>2</sup>, Pavan K. Hanumolu<sup>1</sup>, Gaurav Bahl<sup>1</sup>  
<sup>1</sup>University of Illinois, Urbana-Champaign, USA, <sup>2</sup>Stanford University, USA, <sup>3</sup>Indian Institute of Technology, INDIA

10:00	Break and Exhibit Inspection
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### Session X - Mechanical Cell Manipulation

Room 301

- 10:30 FIN THRUSTER ON ACOUSTIC RESONATOR (FTAR) FOR MICRO SWIMMING ROBOTS**  
Wenbo Li, Sung Kwon Cho  
*University of Pittsburgh, USA*
- 10:45 A CELL-SQUEEZING MECHANOPORATION DEVICE FOR INTRACELLULAR DELIVERY**  
Pulasta Chakrabarty<sup>1</sup>, Muhammad Ahtsham Iqbal<sup>2</sup>, Ammar Ghous<sup>2</sup>, Srikanth Vedantam<sup>1</sup>, Moeto Nagai<sup>2</sup>, Tuhin Subhra Santra<sup>1</sup>  
<sup>1</sup>Indian Institute of Technology, Madras, INDIA, <sup>2</sup>Toyohashi University of Technology, JAPAN
- 11:00 PARALLEL PRODUCTION OF UNIFORM ARTIFICIAL CELL AGGREGATES USING VIBRATION-INDUCED FLOW**  
Yui Katsumata, Zhitai Huang, Ryuhei Takata, Reiko Sato, Mamiko Tsugane, Hiroaki Suzuki  
*Chuo University, JAPAN*

**11:15 CONTINUOUSLY VARIABLE ON-CHIP FLOW SWITCHER UTILIZING VORTEX GENERATIONS**

Makoto Saito, Yoko Yamanishi, Shinya Sakuma  
Kyushu University, JAPAN

**11:30 3D-MICROPRINTED MICROFLUIDIC SCAFFOLDS AND THE RAPID SEEDING STRATEGY FOR ORGAN-ON-A-CHIP APPLICATIONS**

Chen-Yu Chen, Xin Xu, Ryan D. Sochol, William E. Bentley  
University of Maryland, USA

11:45	Lunch and Exhibit Inspection
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<b>Women in Engineering-MEMS Group Networking Event</b>
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11:45

<b>Session XIa - Neural Interface I</b>
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Room 304a
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**13:00 SELF-ASSEMBLED ULTRA-FLEXIBLE MESH PROBES FOR STABLE NEURAL RECORDINGS**

Kejun Tu, Longchun Wang, Bin Yang, Jingquan Liu  
Shanghai Jiao Tong University, CHINA

**13:15 A MEMS-BASED FLEXIBLE BIDIRECTIONAL MULTIREGION NEURAL INTERFACE FOR OLFACTORY AUGMENTATION**

Jizhi Liang<sup>1,2</sup>, Hailang He<sup>1,2</sup>, Yuxin Liu<sup>1</sup>, Xiaoling Wei<sup>1,2</sup>, Liuyang Sun<sup>1,2</sup>, Tiger H. Tao<sup>1,2,3,4,5,6</sup>, Zhitao Zhou<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA, <sup>3</sup>Neuroxess Co., Ltd., CHINA, <sup>4</sup>ShanghaiTech, CHINA, <sup>5</sup>Guangdong Institute of Intelligence Science and Technology, CHINA, <sup>6</sup>Tianqiao and Chrissy Chen Institute for Translational Research, CHINA

**13:30 A CEREBRAL COMPLIANCE ECOG MICROELECTRODE WITH ADAPTIVE 3D UNTETHERED STRUCTURES FOR ENHANCED NEURAL RECORDING**

Jingjing An, Longchun Wang, Kejun Tu, Mengfei Xu, Zixing Li, Haoyuan Chen, Ning Wei, Bin Yang, Jingquan Liu  
Shanghai Jiao Tong University, CHINA

**13:45 AN IMPLANTABLE NANO-ELECTRODE FOR SIMULTANEOUS IN-SITU SELF-REFERENCING, DRUG DELIVERY, AND RELIABLE FIXED-POINT RECORDING WITHIN A SINGLE NEURON**

Zhiyuan Du<sup>1</sup>, Qingda Xu<sup>1</sup>, Ye Xi<sup>1</sup>, Mengfei Xu<sup>1</sup>, Jiawei Cao<sup>1</sup>, Xiantao Zhu<sup>1</sup>, Quan Peng<sup>1</sup>, Xiuyan Li<sup>1</sup>, Xiaolin Wang<sup>1</sup>, Bin Yang<sup>1</sup>, Zhihong Li<sup>2</sup>, Jingquan Liu<sup>1</sup>  
<sup>1</sup>Shanghai Jiao Tong University, CHINA, <sup>2</sup>Peking University, CHINA

<b>Session XIb - Biomedical Ultrasound</b>
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Room 304b
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**13:00 BONE-SHAPE PMUTS WITH ENHANCED BANDWIDTH FOR DOPPLER BLOOD FLOW DETECTION**

Kai Yang, Lei Zhao, Yexing Fang, Jiao Xia, Bowen Sheng, Haixia Zhang, Yipeng Lu  
Peking University, CHINA

- 13:15 ALIGNMENT-FREE, NON-INVASIVE BLOOD VESSEL MONITORING BY PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCERS**  
Fan Xia, Yande Peng, Wei Ji, Gurnoor Saini, Yen-Chen Wang, Aalaya Wudaru, Xiaoyang Yu, Mingze Luo, Ariane De Guzman, Zihan Wang, Yuguang Yuan, Jun-Chau Chien, Liwei Lin  
*University of California, Berkeley, USA*
- 13:30 TWO-DIMENSIONAL ULTRASOUND IMAGING USING SINGLE TRANSDUCER PIXEL BASED ON SPATIAL-SPECTRUM CORRELATION METHOD**  
Jinghan Gan, Aocheng Bao, Chong Yang, Yexing Fang, Junhao Wang, Jiao Xia, Bowen Sheng, Yipeng Lu  
*Peking University, CHINA*
- 13:45 MULTIELEMENT SELF-FOCUSING PIEZOELECTRIC MICRO-MACHINED TRANSDUCER FOR CROSS-TISSUE ULTRASONIC STIMULATION**  
Xingyu Bai, Liyun Zhen, Lihan Yu, Meng Cui, Yiqing Shao, Jingquan Liu, Bin Yang  
*Shanghai Jiao Tong University, CHINA*

14:00	Transition
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## Session XIIa - Neural Interface II

Room 304a

- 14:10 SELF-ROLLING HIGH CONFORMAL FLEXIBLE ELECTRODE FOR PERIPHERAL NEUROMODULATION AND RECORDING**  
Jianbo Jiang<sup>1,2</sup>, Huiran Yang<sup>1</sup>, Ziyi Zhu<sup>1,2</sup>, Dujuan Zou<sup>1,2</sup>, Siyuan Ni<sup>1,2</sup>, Zhengyu Liang<sup>1,2</sup>, Lirui Yang<sup>1,2</sup>, Guopei Zhou<sup>1,4</sup>, Zhitao Zhou<sup>1,2</sup>, Liuyang Sun<sup>1,2</sup>, Tiger H. Tao<sup>1,2,3,5,6,7</sup>, Xiaoling Wei<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA, <sup>3</sup>Shanghai Tech University, CHINA, <sup>4</sup>Wuhan Research Institute of Posts and Telecommunications, CHINA, <sup>5</sup>Neuroxess Co., Ltd., CHINA, <sup>6</sup>Guangdong Institute of Intelligence Science and Technology, CHINA, <sup>7</sup>Tianqiao and Chrissy Chen Institute for Translational Research, CHINA
- 14:25 MULTI-STAGE SEGMENTED MEMS ELECTRODE FOR LAYER-BY-LAYER PULSED FIELD ABLATION IN CARDIAC SURGERY**  
Quan Peng, Mengfei Xu, Zilang Song, Zhiyuan Du, Jingjing An, Zixing Li, Yunhe Luo, Kaijie Yang, Bin Yang, Mu Qin, Jingquan Liu  
*Shanghai Jiao Tong University, CHINA*
- 14:40 SILK-BASED SELF-UNFOLDING ELECTRODE ARRAY FOR MINIMALLY-INVASIVE LARGE-SCALE DEEP BRAIN ACTIVITY MONITORING**  
Jizhi Liang<sup>1,2</sup>, Songtao Lai<sup>1,2</sup>, Xiner Wang<sup>1,2</sup>, Zhaohan Chen<sup>3</sup>, Xiaoling Wei<sup>1,2</sup>, Liuyang Sun<sup>1,2</sup>, Tiger H. Tao<sup>1,2,3,4,5,6</sup>, Zhitao Zhou<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA, <sup>3</sup>Neuroxess Co., Ltd., CHINA, <sup>4</sup>ShanghaiTech University, <sup>5</sup>Guangdong Institute of Intelligence Science and Technology, CHINA, <sup>6</sup>Tianqiao and Chrissy Chen Institute for Translational Research, CHINA
- 14:55 ONE-STEP LASER-INDUCED DISSOLVABLE PVA MASK FOR 3D SOFT CARBON ELECTRODE ARRAY**  
Xuanqi Wang<sup>1</sup>, Kai Xue<sup>1</sup>, Ruiyu Bai<sup>1</sup>, Ye Huang<sup>1</sup>, Zimo Zhang<sup>1</sup>, Xiaoli You<sup>1</sup>, Minghao Wang<sup>2</sup>, Honglong Chang<sup>1</sup>, Bowen Ji<sup>1</sup>  
<sup>1</sup>Northwestern Polytechnical University, CHINA, <sup>2</sup>Hangzhou Dianzi University, CHINA

## Session XIIb - Nano Material

Room 304b

### Invited

- 14:10 CARBON NANOTUBES AS CONTACT MATERIAL FOR MEMS: ENHANCING SENSITIVITY, DURABILITY, AND FLEXIBILITY**  
Kyubin Bae, Sangjun Sim, Jongbaeg Kim  
*Yonsei University, KOREA*
- 14:40 GEOMETRICALLY RECONFIGURABLE SILK-BASED ELECTRONIC IMPLANTS**  
Siyuan Ni<sup>1,2</sup>, Ziyi Zhu<sup>1,2</sup>, Zhiwen Yan<sup>3</sup>, Zhengyu Liang<sup>1,2</sup>, Jianbo Jiang<sup>1,2</sup>, Dujuan Zou<sup>1,2</sup>, Huiran Yang<sup>1</sup>, Zhitao Zhou<sup>1,2</sup>, Liuyang Sun<sup>1,2</sup>, Tiger H. Tao<sup>1,2,4,5,6,7</sup>, Yun Qian<sup>3</sup>, Xiaoling Wei<sup>1</sup>, Keyin Liu<sup>1</sup>  
<sup>1</sup>*Chinese Academy of Sciences (CAS), CHINA*, <sup>2</sup>*University of Chinese Academy of Sciences, CHINA*,  
<sup>3</sup>*Jiao Tong University School of Medicine, CHINA*, <sup>4</sup>*ShanghaiTech University, CHINA*,  
<sup>5</sup>*Neuroxess Co., Ltd., CHINA*, <sup>6</sup>*Guangdong Institute of Intelligence Science and Technology, CHINA*,  
<sup>7</sup>*Tianqiao and Chrissy Chen Institute for Translational Research*
- 14:55 THERMOGRAVIMETRIC ANALYSIS OF MOLYBDENUM DITELLURIDE NANOFLLAKE USING INTEGRATED RESONANT MICROCANTILEVERS**  
Jun Li<sup>1,2</sup>, Hao Jia<sup>1,3</sup>, Ruomeng Guo<sup>1,2</sup>, Qiaoyuan Yang<sup>1,3</sup>, Pengcheng Xu<sup>1,3</sup>, Xinxin Li<sup>1,3</sup>  
<sup>1</sup>*Chinese Academy of Sciences (CAS), CHINA*, <sup>2</sup>*ShanghaiTech University, CHINA*,  
<sup>3</sup>*University of Chinese Academy of Sciences, CHINA*

## Poster Session III

Hall S2, First Floor

- 15:10 Poster Session III**  
Poster presentations are listed by topic category with their assigned number starting on Page 17.

16:40	Break and Exhibit Inspection
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## Student Led Conference Session II

Hall S2, First Floor

- 16:40 ENABLING ON-CHIP 3D MAGNETIC FIELD DETECTION WITH HALL EFFECT SENSORS**  
Jacopo Ruggeri, Karen M. Dowling  
*Delft University of Technology, NETHERLANDS*
- 16:55 FROM MOTION TO MEDICINE: TRIBOELECTRIC NANOGENERATORS IN NEXT-GEN HEALTHCARE AND HUMAN-MACHINE INTERACTION**  
Kumar Shrestha  
*Kwangwoon University, KOREA*

17:10	Adjourn for the Day
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## Reunion and Networking Night

Sunset Beach

18:00 -  
20:30

# Thursday, 23 January

All times are Chinese Standard Time (CST).

## Plenary Presentation IV

Room 304a

**08:15 WILL ORGAN-ON-A-CHIP SURVIVE THE TEST OF TIME?**

Sabeth Verpoorte

University of Groningen, NETHERLANDS

## Session XIII - Innovative Sensor

Room 304a

**09:00 SIMPLE FABRICATION AND INTEGRATION OF 3D ELECTRODES FOR HIGH-SENSITIVITY DROPLET DETECTION**

Byeolnim Oh<sup>1</sup>, Moon Sung Son<sup>1</sup>, Jaewon Park<sup>3</sup>, Kang-Ho Lee<sup>2</sup>, Hyun Soo Kim<sup>1</sup>

<sup>1</sup>Kwangwoon University, KOREA, <sup>2</sup>Korea Institute of Machinery and Materials, KOREA,

<sup>3</sup>Korea University, KOREA

**09:15 DURABLE AG-COATED MICRO-CRACK VELCRO ELECTRODE FOR HI-FI BIOELECTRIC SIGNALS IN HAIRY AREAS**

Jun Guo<sup>1</sup>, Kang Fu<sup>1</sup>, Zimo Zhang<sup>1</sup>, Ruiyu Bai<sup>1</sup>, Xuanqi Wang<sup>1</sup>, Kai Xue<sup>1</sup>, Huazhen Chen<sup>1</sup>, Le Li<sup>1</sup>, Huijing Hu<sup>1</sup>, Minghao Wang<sup>2</sup>, Honglong Chang<sup>1</sup>, Bowen Ji<sup>1</sup>

<sup>1</sup>Northwestern Polytechnical University, CHINA, <sup>2</sup>Hangzhou Dianzi University, CHINA

**09:30 IMPACT OF SKIN SURFACE PH ON INTERSTITIAL FLUID EXTRACTION BY REVERSE IONTOPHORESIS**

Wangwang Zhu, Haixia Yu, Xi Li, Youhao Liu, Chenxi Jin, Xingguo Zhang, Hao Zheng, Dachao Li, Zhihua Pu

Tianjin University, CHINA

**09:45 VISUALLY INTELLIGENT DIGITAL MICROFLUIDICS FOR GENERALIZED COLORIMETRIC ASSAYS**

Zongliang Guo<sup>1</sup>, Rongxin Fu<sup>1</sup>, Hanzhi Zhang<sup>1</sup>, Fenggang Li<sup>1</sup>, Siyi Hu<sup>2</sup>, Hang Li<sup>1</sup>, Hanbin Ma<sup>2</sup>, Huikai Xie<sup>1</sup>, Shuailong Zhang<sup>1</sup>

<sup>1</sup>Beijing Institute of Technology, CHINA, <sup>2</sup>Guangdong ACXEL Micro & Nano Tech Co., Ltd, CHINA

10:00	Break and Exhibit Inspection
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## Session XIV - Environmental Sensing

Room 304a

**10:30 SIMULTANEOUSLY VOLUMETRIC TEMPERATURE, HUMIDITY AND PRESSURE MONITORING BASED ON ULTRASONIC SIGNALS**

Megan Teng, Peggy Tsao, Liwei Lin

University of California, Berkeley, USA

**10:45 BATTERY-LESS OUTDOOR FARMING IOT SENSING SYSTEM USING MULTIFUNCTIONAL HYDROGEL ENABLED DIRECT-CURRENT POWERING AND SELF-POWERED LEAF MONITORING CAPABILITY**

Xinge Guo, Luwei Wang, Chengkuo Lee

National University of Singapore, SINGAPORE

**11:00 INTEGRATED PRECONCENTRATOR-ENHANCED GAS SENSOR FOR LOW POWER DETECTION OF LOW CONCENTRATION TOLUENE**

Jeonghyeop Son<sup>1</sup>, Hee-Jin Ko<sup>1</sup>, Jaebum Jeong<sup>2</sup>, Jun Young Kim<sup>2</sup>, Jongbaeg Kim<sup>1</sup>  
<sup>1</sup>*Yonsei University, KOREA*, <sup>2</sup>*Gyeongsang National University, KOREA*

**11:15 IC-COMPATIBLE FABRICATION OF UNIFORM WO<sub>3</sub> NANOSHEETS FOR ULTRASENSITIVE ON-CHIP HYDROGEN SENSORS**

Jiyong Zhou<sup>1</sup>, Jianyou Dai<sup>1</sup>, Lei Shan<sup>1</sup>, Xiaohong Wang<sup>2</sup>, Sixing Xu<sup>1</sup>  
<sup>1</sup>*Hunan University, CHINA*, <sup>2</sup>*Tsinghua University, CHINA*

<b>Awards Ceremony and Final Remarks</b>
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Room 304a
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**11:50 Awards Ceremony**

**12:05 Final Remarks**

12:15	Conference Adjourns
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<b>Technical Tour (ASE)</b>
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**13:00 -  
15:00**



# POSTER PRESENTATIONS

All times are Chinese Standard Time (CST).

**M** - Monday, 20 January - 15:10 - 17:00

**T** - Tuesday, 21 January - 13:00 - 15:00

**W** - Wednesday, 22 January - 15:10 - 17:10

## Classification Chart

(last character of poster number)

<b>a - Bio and Medical MEMS</b>
<b>b - Emerging Technologies and New Opportunities for MEMS/NEMS</b>
<b>c - Industry MEMS and Advancing MEMS for Products and Sustainability</b>
<b>d - MEMS &amp; NEMS Materials, Fabrication and Packaging</b>
<b>e - MEMS Actuators and PowerMEMS</b>
<b>f - MEMS Physical &amp; Chemical Sensors</b>
<b>g - MEMS/NEMS for Optical, RF and Electromagnetics</b>
<b>h - Micro- &amp; Nanofluidics</b>
<b>i - Open Posters</b>

<b>a - Bio and Medical MEMS</b>
<b>Biosensors and Bioreactors</b>

- M01-a**    **A THIN FILM COIL WITH INTEGRATED ELECTROCHEMICAL SENSOR FOR WIRELESS AND PASSIVE BIOMARKER SENSING**  
Ruitong Chen, Alexander Baldwin, Emmanuel Ramirez, Ellis Meng  
University of Southern California, USA
- T01-a**    **CRITICAL SUITABILITY EVALUATION OF CACO-2 CELLS FOR GUT-ON-A-CHIP**  
Wenhong Zhang<sup>1</sup>, Xiatong Pan<sup>2</sup>, Zhipeng Xu<sup>3</sup>, Jun Chen<sup>2</sup>, Junlei Han<sup>2,4</sup>, Li Wang<sup>2</sup>, Jing Wang<sup>1</sup>  
<sup>1</sup>Donghua University, CHINA, <sup>2</sup>Qilu University of Technology, CHINA, <sup>3</sup>University of Sheffield, UK, <sup>4</sup>Tianjin University, China
- W01-a**    **MACHINE LEARNING-AIDED POLARONIC NANOANTENNAS FOR LABEL-FREE BIOIMAGING OF VIRUS MONOLAYERS**  
Hong Zhou, Dongxiao Li, Zhihao Ren, Cheng Xu, Chengkuo Lee  
National University of Singapore, SINGAPORE
- M02-a**    **MACHINE LEARNING-ENHANCED OVERCOUPLED PLASMONIC RESONATORS FOR BIOMOLECULAR DETECTION**  
Dongxiao Li, Hong Zhou, Zhihao Ren, Cheng Xu, Chengkuo Lee  
National University of Singapore, SINGAPORE
- T02-a**    **SENSITIVITY ENHANCEMENT WITH NOISE SUPPRESSION OF SURFACE FUNCTIONALIZATION FOR SILICON NANOWIRE BIOSENSORS**  
Dongqin Chen<sup>1,2</sup>, Jiushuai Xu<sup>1</sup>, Yanzhi Dou<sup>1</sup>, Tie Li<sup>1</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA

## a - Bio and Medical MEMS

### Devices & Systems for Cellular and Molecular Studies

- W02-a AN AUTOMATIC DIVERTER MICROFLUIDIC CHIP WITH DUAL-CHANNEL CONCENTRATION GRADIENT FOR DRUG SCREENING OF HEAD AND NECK TUMOR CELLS**  
Zhimi Zhang<sup>1,2</sup>, Jingru Liao<sup>1</sup>, Xiaolong Ru<sup>1</sup>, Guiquan Zhu<sup>1</sup>, Ling Li<sup>2</sup>, Yuanlin Xia<sup>1</sup>, Zhuqing Wang<sup>1</sup>  
<sup>1</sup>Sichuan University, CHINA, <sup>2</sup>University of Electronic Science and Technology of China, CHINA
- M03-a AN INTEGRATED MICROFLUIDIC SYSTEM FOR mRNA EXTRACTION FROM IN VITRO TRANSCRIBED REACTION MIXTURE BY USING PROBE-COATED MAGNETIC BEADS**  
Swati T. Gurme, Yu-Ting Su, Yi-Da Chung, Lily Hui-Ching Wang, Gwo-Bin Lee  
National Tsing Hua University, TAIWAN
- T03-a MICRO-FLOWER STRUCTURE ACTIVATED PHOTOPORATION FOR LARGE SIZED BIOMOLECULAR DELIVERY IN CANCER CELLS**  
Ashwini S. Shinde<sup>1</sup>, Pallavi Shinde<sup>1</sup>, Moeto Nagai<sup>2</sup>, Tuhin Subhra Santra<sup>1</sup>, Srabani Kar<sup>3</sup>  
<sup>1</sup>Indian Institute of Technology, Madras, INDIA, <sup>2</sup>Toyohashi University of Technology, JAPAN, <sup>3</sup>Indian Institute of Technology, Hyderabad, INDIA
- W03-a MICROENVIRONMENT COMPARTMENTALIZATION FOR OPTIMIZING DIFFERENTIATION OF IPS CELLS**  
Daiki Fukai<sup>1</sup>, Yuma Abe<sup>1</sup>, Taro Toyoda<sup>2</sup>, Hidekuni Takao<sup>1</sup>, Kyohei Terao<sup>1</sup>  
<sup>1</sup>Kagawa University, JAPAN, <sup>2</sup>Kyoto University, JAPAN
- M04-a SINGLE CELL EJECTION FROM PERIPHERAL BLOOD MONONUCLEAR CELLS (PBMC) INTO OIL-COATED 96-WELL PLATE**  
Kianoush Sadeghian Esfahani, Baptiste Neff, Akash Roy, Anik Sengupta, Eun S. Kim  
University of Southern California, USA

## a - Bio and Medical MEMS

### Flexible and Wearable Devices and Systems

- T04-a A FULLY INTEGRATED, FLEXIBLE AND TUNABLE CAPACITIVE STRAIN SENSOR BASED ON MAGNETO-DIELECTRIC FOR HUMAN MOTION MONITORING**  
Mujeeb Yousuf, Pushpapraj Singh  
Indian Institute of Technology, New Delhi, INDIA
- W04-a A HIGHLY MINIATURIZED, STABLE, BREATHABLE E-SKIN PATCH FOR SKIN-HYDRATION AND ECG MONITORING**  
Gagan Bahadur Pradhan, SeongHoon Jeong, Sudeep Sharma, Jae Yeong Park  
Kwangwoon University, KOREA
- M05-a A SELF-ASSEMBLED FLEXIBLE STRAIN AND TEMPERATURE SENSOR BASED ON THE MICROSTRUCTURE OF PYRAMIDS WITH HIGH ELASTICITY, TEMPERATURE SENSITIVITY AND WIDE RANGE**  
Yangtao Yu<sup>1</sup>, Bo Yan<sup>1</sup>, Wenbo Cui<sup>2</sup>, Mengqiu Li<sup>1</sup>, Chenyuan Li<sup>1</sup>, Faheng Zang<sup>1</sup>, Zhuoqing Yang<sup>1</sup>  
<sup>1</sup>Shanghai Jiao Tong University, CHINA, <sup>2</sup>Harbin Institute of Technology, CHINA
- T05-a A WEARABLE PAPER-BASED HYBRID ENERGY HARVESTER FROM HUMAN SWEAT AND AMBIENT MOISTURE**  
Yang Gao, Seokheun Choi  
State University of New York, Binghamton, USA
- W05-a A WEARABLE SYSTEM FOR WIRELESS AND MULTIPLEXED MOLECULAR SENSING VIA SOLID MICRONEEDLES**  
Emmanuel Ramirez<sup>1</sup>, Christopher Larson<sup>1</sup>, James J. Yoo<sup>1</sup>, Chelsea Brown<sup>2</sup>, Kevin W. Plaxco<sup>2</sup>, Tod Kippin<sup>2</sup>, Ellis Meng<sup>1</sup>  
<sup>1</sup>University of Southern California, USA, <sup>2</sup>University of California, Santa Barbara, USA

- M06-a ARTERIAL PULSE SIGNAL ACQUISITION USING FLEXIBLE SENSING DENSE ARRAY WITH HIGH SPATIAL RESOLUTION**  
Yue He<sup>1,2</sup>, Ke Sun<sup>2</sup>, Fang Wang<sup>2</sup>, Tiger H. Tao<sup>2</sup>, Heng Yang<sup>2</sup>, Yi Sun<sup>2</sup>, Quan Wang<sup>1</sup>, Xinxin Li<sup>2</sup>  
<sup>1</sup>Jiangsu University, CHINA, <sup>2</sup>Shanghai Institute of Microsystem and Information Technology, CHINA
- T06-a CONFORMAL ULTRASOUND PATCH FOR REAL-TIME BLOOD FLOW MONITORING**  
Taemin Lee<sup>1</sup>, Jongcheol Park<sup>2</sup>, Il-seop Kim<sup>3</sup>, Sangho Bang<sup>1</sup>, Joontaek Jung<sup>2</sup>, Hyunjoo J. Lee<sup>1</sup>  
<sup>1</sup>Korea Advanced Institute of Science and Technology (KAIST), KOREA,  
<sup>2</sup>National NanoFab Center (NNFC), KOREA, <sup>3</sup>Healcerion Co., Ltd., KOREA
- W06-a ECO-FRIENDLY FABRICATION PROCESS OF FLEXIBLE PIEZOELECTRIC PRESSURE SENSORS: A PATH TO SUSTAINABLE ELECTRONICS**  
Mujeeb Yousuf, Sazid Ali, Khanjan Joshi, Pushpapraj Singh  
*Indian Institute of Technology, Delhi, INDIA*
- M07-a STRETCHABLE AND SELF-HEALING GRAPHITE/POLYBOROSILOXANE CONDUCTIVE COMPOSITES FOR WEARABLE STRAIN SENSORS**  
Guan-Ze Song, Yi-Tsung Su, Kuan-Yu Tu, Lung-Hao Hu, Ching-Te Kuo  
*National Sun Yat-sen University, TAIWAN*
- T07-a STRUCTURAL AND CONSTITUENT ENGINEERING OF CONDUCTIVE POLYMER COMPOSITES TOWARDS SYNERGETIC MONITORING OF PHYSIOLOGICAL PRESSURE AND ELECTROPHYSIOLOGICAL SIGNALS**  
Wanxin Zhou, Xiaoyu Wang, Yuanlin Xia, Zhuqing Wang  
*Sichuan University, CHINA*
- W07-a TACTILE SENSING OF EXTENSOR TENDONS AND NEAR-SENSOR GESTURE RECOGNITION FOR CONTROL OF ROBOTIC HAND**  
Yushen Hu<sup>1</sup>, Zhejun Zhang<sup>1</sup>, Tengting Lei<sup>1</sup>, Man Wong<sup>1,2</sup>  
<sup>1</sup>Hong Kong University of Science and Technology, HONG KONG, <sup>2</sup>Guangzhou HKUST Fok Ying Tung Graduate School

## a - Bio and Medical MEMS

### Manufacturing for Bio- & Medical MEMS

- M08-a A SILK-BASED MULTIFUNCTIONAL AND BIDIRECTIONAL NEURAL INTERFACE**  
Xiner Wang<sup>1,2</sup>, Yan Wang<sup>3</sup>, Yuxin Liu<sup>1</sup>, Xiaoling Wei<sup>1,2</sup>, Liuyang Sun<sup>1,2</sup>, Tiger H. Tao<sup>1,2,4,5,6</sup>, Zhitao Zhou<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA
- T08-a BREAKING THE DIMENSION BARRIER: VARIDDEPTH NEUROELECTRODE ARRAY (VD-NEA) ENABLED BY A NOVEL STEREO MASK FOR ACHIEVING ARBITRARY ELECTRODE DEPTH IN NEURAL RECORDING**  
Zhitong Zhang, Zhe Huang, Lexuan Yang, Junshi Li, Yu-Qing Zheng, Zhihong Li  
*Peking University, CHINA*
- W08-a ELECTROWETTING-ON-DIELECTRIC-BASED MICROBUBBLE PATTERNING FOR SPATIAL ULTRASOUND MODULATION**  
Subeen Kim, Sangho Bang, Yehhyun Jo, Hyunjoo J. Lee  
*Korea Advanced Institute of Science and Technology (KAIST), KOREA*
- M09-a IN-SITU RING ASSEMBLED INNER TUBULAR FABRICATION BY OPTOFLUIDIC MASKLESS LITHOGRAPHY FOR SOFT ROBOTICS AND MEDICAL DEVICES INSPIRED FROM SEGMENT CONSTRUCTION OF SHIELD TUNNEL TECHNOLOGY**  
Yuki Kamiya, Yingzhe Wang, Keisuke Morishima  
*Osaka University, JAPAN*

**T09-a MICROFLUIDIC TISSUE BARRIER SENSOR CHIP WITH INTEGRATED MICROELECTRODES AND ULTRATHIN MICROPOROUS MEMBRANE**  
Pratik V. Tawade<sup>1</sup>, Hande Aydogmus<sup>1</sup>, Lovro Ivancevic<sup>1</sup>, Jia-Jun Yeh<sup>1,2</sup>, Vasiliki Gkouzioti<sup>3</sup>, Jean-Philippe Frimat<sup>3</sup>, Jaap den Toonder<sup>2</sup>, Massimo Mastrangeli<sup>1</sup>  
<sup>1</sup>Delft University of Technology, NETHERLANDS, <sup>2</sup>Eindhoven University of Technology, NETHERLANDS, <sup>3</sup>Leiden University Medical Center, NETHERLANDS

**W09-a SILICON-BASED WIRELESS PASSIVE LC MICROSYSTEMS WITH POTENTIAL FOR PULMONARY ARTERY PRESSURE MONITORING**  
Pichao Pan<sup>1,2</sup>, Li Wang<sup>1,2</sup>, Min Liu<sup>1,2</sup>, Xinxin Li<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences, CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA

## a - Bio and Medical MEMS

### Materials for Bio- and Medical MEMS

**M10-a A HIGHLY CATALYTIC ZWITTERIONIC HYDROGEL FOR ELECTROCHEMICAL ENZYMATIC BIOSENSORS**  
Chengcheng Li, Wenjun Li, Wangwang Zhu, Xingguo Zhang, Hao Zheng, Zhihua Pu, Dachao Li  
Tianjin University, CHINA

**T10-a DNA-APTAMER INCORPORATED MICROGEL BEADS BY CRYOGENIC PARTICLE FABRICATION**  
Momoka Minami, Satofumi Kato, Hiroaki Onoe  
Keio University, JAPAN

**W10-a PHOTOLUMINESCENT POLYMER FILMS FOR HIGH-SENSITIVITY OXYGEN SENSING IN BIOMEDICAL IMPLANTS**  
Julian A. Singer<sup>1</sup>, Anton Geläschus<sup>1</sup>, Patrick Kleinschnittger<sup>1</sup>, Ute Schmidt<sup>1</sup>, Matthias Kuhl<sup>2</sup>, Andreas Bahr<sup>3</sup>  
<sup>1</sup>Hamburg University of Technology, GERMANY, <sup>2</sup>University of Freiburg, GERMANY, <sup>3</sup>Technische Universität Dresden, GERMANY,

## a - Bio and Medical MEMS

### Medical Microsystems

**M11-a A MEMS-BASED MINIATURIZED WIRELESS FULLY-IMPLANTABLE BRAIN-COMPUTER INTERFACE SYSTEM**  
Zexi Su<sup>1,2</sup>, Jiaqi Yang<sup>1,2</sup>, Xiaoling Wei<sup>1,2</sup>, Liuyang Sun<sup>1,2</sup>, Tiger H. Tao<sup>1,2,3,4,5,6</sup>, Zhitao Zhou<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA, <sup>3</sup>ShanghaiTech University, CHINA, <sup>4</sup>Neuroxess Co., Ltd., CHINA, <sup>5</sup>Guangdong Institute of Intelligence Science and Technology, CHINA, <sup>6</sup>Tianqiao and Chrissy Chen Institute for Translational Research, CHINA

**T11-a A MODIFIED ULTRA-FLEXIBLE NEURAL ELECTRODE FOR LONG-TERM DUAL-MODALITY DETECTION ACROSS MULTIPLE BRAIN REGIONS**  
Guopei Zhou<sup>1,2</sup>, Xueying Wang<sup>2,3</sup>, Jianbo Jiang<sup>2,3</sup>, Dujuan Zou<sup>2,3</sup>, Zhengyu Liang<sup>2,3</sup>, Huiran Yang<sup>2</sup>, Ziyi Zhu<sup>2</sup>, Siyuan Ni<sup>2,3</sup>, Mingliang Xu<sup>3</sup>, Fei He<sup>2</sup>, Liuyang Sun<sup>2,3</sup>, Zhitao Zhou<sup>2,3</sup>, Tiger H. Tao<sup>2,3,4,5,6</sup>, Xiaoling Wei<sup>2,3</sup>,  
<sup>1</sup>Wuhan Research Institute of Posts and Telecommunications, CHINA, <sup>2</sup>Chinese Academy of Sciences, CHINA, <sup>3</sup>University of Chinese Academy of Sciences, CHINA, <sup>4</sup>Neuroxess Co., Ltd. (Jiangxi), CHINA, <sup>5</sup>Guangdong Institute of Intelligence Science and Technology, CHINA, <sup>6</sup>Tianqiao and Chrissy Chen Institute for Translational Research, CHINA

**W11-a A SILK-BASED MINIMALLY INVASIVE STENT-ELECTRODE SYSTEM FOR VASOSPASM MONITORING AND IN-SITU TREATMENT**  
Yihan Diao<sup>1,2</sup>, Hailang He<sup>1,2</sup>, Zuyong Fang<sup>1,2</sup>, Xiaoling Wei<sup>1,2</sup>, Liuyang Sun<sup>1,2</sup>, Tiger H. Tao<sup>1,2,3,4,5,6</sup>, Zhitao Zhou<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA, <sup>3</sup>ShanghaiTech University, CHINA, <sup>4</sup>Neuroxess Co., Ltd., CHINA, <sup>5</sup>Guangdong Institute of Intelligence Science and Technology, CHINA, <sup>6</sup>Tianqiao and Chrissy Chen Institute for Translational Research, CHINA

- M12-a BIPOLAR CONCENTRIC RING MICRONEEDLE ARRAY (BCRMA): AN ELECTRICAL STIMULATION ELECTRODE FOR PRECISE MOVEMENT CONTROL**  
Jiayan Zhang, Dongxu Ma, Zhitong Zhang, Zhongyan Wang, Yuxing Pang, Junshi Li, Zhihong Li  
*Peking University, CHINA*
- T12-a DISSOLVABLE SILK FIBROIN MICRONEEDLE (SF $\mu$ N) PATCH FOR LONG-ACTING THYROID HORMONE REPLACEMENT THERAPY**  
Diana V. Rodriguez De Francisco, Edwin Davidson Barahona, Omar S. Cepeda Torres,  
Swadeshmukul Santra, Swaminathan Rajaraman  
*University of Central Florida, USA*
- W12-a HIGHLY SENSITIVE DRIP-PROOF TACTILE ARRAY SENSOR FOR SLIP/GRASP DETECTION UNDER LAPAROSCOPIC SURGERY**  
Keisuke Yoshimoto<sup>1</sup>, Sho Yoshikawa<sup>1</sup>, Masao Fujiwara<sup>2</sup>, Kyohei Terao<sup>1</sup>, Hidekuni Takao<sup>1</sup>  
<sup>1</sup>*Kagawa University, JAPAN, <sup>2</sup>Takamatsu Red Cross Hospital, JAPAN*
- M13-a IN VITRO ELECTRICAL STIMULATION SYSTEM BASED ON STRETCHABLE MICROELECTRODE ARRAY**  
Yoojeong Kim<sup>1</sup>, Byumseok Koh<sup>2</sup>, Kiup Kim<sup>1</sup>, Sung Bum Park<sup>2</sup>, Ki Young Kim<sup>2</sup>, Jeong Hyeon Jo<sup>2,3</sup>,  
Hyunjoo J. Lee<sup>1</sup>  
<sup>1</sup>*Korea Advanced Institute of Science and Technology (KAIST), KOREA, <sup>2</sup>Korea Research Institute of Chemical Technology (KRICT), KOREA, <sup>3</sup>Chungnam National University, KOREA*
- T13-A INTRACORTICAL FLEXIBLE MICRONEEDLE NEURAL ELECTRODE (*f*- $\mu$ NEURODE) BASED ON PROJECTION-MICRO-STEREOLITHOGRAPHY (P $\mu$ SL) TECHNOLOGY FOR CHRONIC IN-VIVO ELECTROPHYSIOLOGICAL RECORDING**  
Zhe Huang<sup>1,4</sup>, Yanran Wang<sup>2</sup>, Junshi Li<sup>1,4</sup>, Xinyi Ma<sup>1,4</sup>, Zhitong Zhang<sup>1,4</sup>, Xiaowen Sun<sup>2</sup>, Jiayan Zhang<sup>1,4</sup>,  
Dong Huang<sup>3</sup>, Bin Yang<sup>5</sup>, Jingquan Liu<sup>5</sup>, Dajun Xing<sup>2</sup>, Zhihong Li<sup>1,4</sup>  
<sup>1</sup>*Peking University, CHINA, <sup>2</sup>Beijing Normal University, CHINA, <sup>3</sup>Acimicro Medical Technology Co., Ltd., CHINA, <sup>4</sup>Beijing Advanced Innovation Center for Integrated Circuits, CHINA, <sup>5</sup>Shanghai Jiao Tong University, CHINA*
- W13-a MEMS-BASED HIGH-DENSITY ULTRA-CONFORMAL  $\mu$ ECOG ELECTRODE ARRAY FOR REAL-TIME MOTOR DECODING**  
Erda Zhou<sup>1</sup>, Changjiang Liu<sup>1</sup>, Xiner Wang<sup>1</sup>, Xiaoling Wei<sup>1</sup>, Liuyang Sun<sup>1</sup>, Tiger H. Tao<sup>1,2,3,4,5</sup>, Zhitao Zhou<sup>1</sup>  
<sup>1</sup>*Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA, <sup>3</sup>Neuroxess Co., Ltd. CHINA, <sup>4</sup>Guangdong Institute of Intelligence Science and Technology, CHINA, <sup>5</sup>Tianqiao and Chrissy Chen Institute for Translational Research, CHINA*
- M14-a MINIATURE AND WIRELESS ULTRASONIC IMAGING SYSTEM FOR WEARABLE HUMAN CAROTID ARTERY HEALTH MONITORING**  
Lei Zhao, Aocheng Bao, Chong Yang, Junhao Wang, Xixin Cao, Yipeng Lu  
*Peking University, CHINA*
- T14-a MULTIMODAL MEMS MICROWRINKLE ELECTRONICS FOR CARDIAC PULSED FIELD ABLATION AND SENSING**  
Mengfei Xu<sup>1</sup>, Quan Peng<sup>1</sup>, Ziliang Song<sup>1</sup>, Mu Qin<sup>1</sup>, Yimeng Sun<sup>2</sup>, Zhiyuan Du<sup>1</sup>, Kunyu Zheng<sup>1</sup>, Xiaolin Wang<sup>1</sup>, Bin Yang<sup>1</sup>, Jingquan Liu<sup>1</sup>  
<sup>1</sup>*Shanghai Jiao Tong University, CHINA, <sup>2</sup>Shanghai University of Electric Power, CHINA,*
- W14-a SPRING-LIKE KIRIGAMI MICROELECTRODE ARRAY IN SHAPE MEMORY POLYMER FOR SPONTANEOUS ADAPTATION OF COMPLEX TOPOGRAPHY IN NEURAL IMPLANTS**  
Yuanhao Xu, Stella W. Pang  
*City University of Hong Kong, HONG KONG*
- M15-a ULTRA-FLEXIBLE HONEYCOMB DEEP BRAIN ELECTRODE FOR RESISTANCE TO BRAIN SHIFT AND EXTERNAL DISTURBANCES**  
Dongyang Wen<sup>1</sup>, Kejun Tu<sup>1</sup>, Liyun Zhen<sup>1</sup>, Bin Yang<sup>1</sup>, Zhihong Li<sup>2</sup>, Jingquan Liu<sup>1</sup>  
<sup>1</sup>*Shanghai Jiao Tong University, CHINA, <sup>2</sup>Peking University, CHINA*

## a - Bio and Medical MEMS

### MEMS & BioMEMS for Fighting COVID-19 & Future Pandemic

- T15-a BIOCHEMICAL DETECTION BASED ON NANOPARTICLE INDUCED ULTRASONIC RAYLEIGH SCATTERING**  
Wangyang Zhang, Jiaqian Yang, Haoliang Jia, Tao Liu, Yuchen Mao, Lei Ren, Ziwei Chen, Xiaojing Mu  
*Chongqing University, CHINA*

## a - Bio and Medical MEMS

### MEMS & BioMEMS for Healthcare and Public Health

- W15-a INTEGRATED MICROFLUIDIC RAPID RESPONSE AND HIGHLY SENSITIVE ELECTROCHEMICAL APTASENSOR FOR SIMULTANEOUS DETECTION OF AFLATOXIN B1 AND DEOXYNOVIVALENOL**  
Jinlei Wu, Qinghui Jin, Ping Yang, Wanlei Gao,  
*<sup>1</sup>Ningbo University, CHINA*
- M16-a A MEMS PRESSURE SENSOR ARRAY FOR SLEEP APNEA RECOGNITION AND MONITORING BASED ON THE PRINCIPLE OF TRADITIONAL CHINESE MEDICINE**  
Lin Qin, Long Cheng, Xianzhang Zeng, Yuanlin Xia, Zhuqing Wang  
*Sichuan University, CHINA*
- T16-a AN ARRAY OF SILICON DUAL MICRONEEDLE ELECTRODES INTEGRATED WITH MINI-LEDS FOR ELECTROPHYSIOLOGICAL RECORDING AND SIMULTANEOUS APPLICATION OF ELECTRICAL AND OPTICAL STIMULI TO THE RETINA FOR ARTIFICIAL VISION**  
Seung-Han Chung<sup>1</sup>, Chaesung Kim<sup>2,3</sup>, Yong-Kweon Kim<sup>1</sup>, Seung-Ki Lee<sup>4</sup>, Jae-Hyoung Park<sup>4</sup>, Mesoon Im<sup>2,5,6</sup>  
*<sup>1</sup>Seoul National University, KOREA, <sup>2</sup>Korea Institute of Science and Technology, KOREA, <sup>3</sup>Korea University, KOREA, <sup>4</sup>Dankook University, KOREA, <sup>5</sup>University of Science & Technology, KOREA, <sup>6</sup>Kyung Hee University, KOREA*
- W16-a HIGH-RESOLUTION HAIR TEXTURE SENSOR WITH MONOLITHICALLY INTEGRATED GUIDING STRUCTURE FOR REALIZATION OF PRECISE EVALUATION AND SIMPLE OPERATION**  
Gakuto Tanaka<sup>1</sup>, Masahito Komatsubara<sup>1</sup>, Ryusei Kawagoe<sup>1</sup>, Hirotooshi Oikaze<sup>2</sup>, Yoshiyasu Kitagawa<sup>2</sup>, Yasunori Matsui<sup>2</sup>, Hidekuni Takao<sup>1</sup>  
*<sup>1</sup>Kagawa University, JAPAN, <sup>2</sup>Panasonic Corporation, JAPAN*
- M17-a NONPLANAR WIRELESS DIFFERENTIAL MICROSENSOR FOR INTEGRATION ON INTRAVENOUS CATHETERS FOR THERAPEUTIC DRUG MONITORING AND OTHER APPLICATIONS**  
Jiaxin Jiang<sup>1</sup>, Vidya Chidambaran<sup>2</sup>, Tao Li<sup>1</sup>  
*<sup>1</sup>University of Cincinnati, USA, <sup>2</sup>Cincinnati Children's Hospital Medical Center, USA*
- T17-a SILICON SOLAR CELL-INTEGRATED FLEXIBLE RETINAL PROSTHESIS FOR ARTIFICIAL VISION**  
Chaesung Kim<sup>1,2</sup>, Seung-Han Chung<sup>3</sup>, Yong-Jin Kim<sup>4</sup>, Hyeonhee Roh<sup>1,2</sup>, Seung-Ki Lee<sup>5</sup>, Yong-Kweon Kim<sup>3</sup>, Hyung-Min Lee<sup>1</sup>, Jae-Hyoung Park<sup>5</sup>, Min-Gu Kang<sup>4</sup>, Maesoon Im<sup>2,6,7</sup>  
*<sup>1</sup>Korea University, KOREA, <sup>2</sup>Korea Institute of Science and Technology, KOREA, <sup>3</sup>Seoul National University, KOREA, <sup>4</sup>Korea Institute of Energy Research, KOREA, <sup>5</sup>Dankook University, KOREA, <sup>6</sup>University of Science and Technology, KOREA, <sup>7</sup>Kyung Hee University, KOREA*
- W17-a WEARABLE NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY SYSTEM TO DETECT STRESS AND VIRAL BIOMARKERS, AND ILLICIT DRUGS NON-INTRUSIVELY IN VIVO**  
Massood Tabib-Azar, Brian Baker  
*University of Utah, USA*

**W117-a A HIGH-DENSITY ELECTROMYOGRAPHY SENSOR BASED ON MEMS E-SKIN FOR DETECTING ACTIVITY OF MOTOR UNITS**

Yirong Wang, Shuihan Shao, Chunpeng Jiang, Bin Yang, Jingquan Liu  
*Shanghai JiaoTong University, CHINA*

**a - Bio and Medical MEMS**

**Tissue Engineering**

**M18-a INNOVATIVE STAMP-STRUCTURED ORGAN-ON-A-CHIP PLATFORM FOR VASCULARIZED TUMOR AND COLON MODELS**

Feifan Wang, Chenyang Zhou, Xiaolin Wang  
*Shanghai Jiao Tong University, CHINA*

**T18-a TONGUE-LIKE BIOACTUATOR WITH MULTIPLE SKELETAL MUSCLE TISSUES**

Xuankai Gao<sup>1</sup>, Kohei Okasaki<sup>2</sup>, Hirono Ohashi<sup>2</sup>, Takeshi Sakurai<sup>2</sup>, Yuya Morimoto<sup>1</sup>  
<sup>1</sup>Waseda University, JAPAN, <sup>2</sup>Tokyo University of Agriculture, JAPAN

**b - Emerging Technologies & New Opportunities for MEMS/NEMS**

**Computing Devices and Systems with MEMS/NEMS**

**M19-b EDGE-COMPUTING ENABLED SI PHOTONICS MULTIMODAL SENSOR WITH INTEGRATED PHOTONIC CONVOLUTIONAL PROCESSOR**

Zian Xiao<sup>1,2</sup>, Zhihao Ren<sup>1</sup>, Yangyang Zhuge<sup>1</sup>, Zixuan Zhang<sup>1</sup>, Jingkai Zhou<sup>1</sup>, Siyu Xu<sup>1</sup>, Cheng Xu<sup>1</sup>, Bowei Dong<sup>3</sup>, Chengkuo Lee<sup>1,2,4</sup>

<sup>1</sup>National University of Singapore, SINGAPORE, <sup>2</sup>NUS Suzhou Research Institute (NUSRI), SINGAPORE, <sup>3</sup>Institute of Microelectronics, SINGAPORE, <sup>4</sup>National Centre for Advanced Integrated Photonics, SINGAPORE

**T19-b HIGH-TEMPERATURE DUAL-RAIL CONTACTLESS MEMS LOGIC FOR INDUSTRIAL EDGE COMPUTING**

Aleksandra Markovic<sup>1</sup>, Adrian Laborde<sup>1</sup>, Nicolas Maurant<sup>1</sup>, Hervé Fanet<sup>1</sup>, Gaël Pillonnet<sup>2</sup>, Bernard Legrand<sup>1</sup>  
<sup>1</sup>LAAS-CNRS, FRANCE, <sup>2</sup>CEA-Leti, FRANCE

**W18-b IMPROVED LEARNING PERFORMANCE IN PHYSICAL RESERVOIR COMPUTING USING COUPLED TRIPLE MEMS NONLINEAR RESONATORS**

Kosuke Shima, Hiroki Takemura, Masaki Shimofuri, Amit Banerjee, Jun Hirotani, Toshiyuki Tsuchiya  
*Kyoto University, JAPAN*

**M20-b NEUROMORPHIC PIEZOMEMS SENSOR USING EPITAXIAL BIFEO<sub>3</sub> THIN FILM**

Sena Yamamoto<sup>1</sup>, Mario Kiuch<sup>1</sup>, Takeshi Yoshimura<sup>2</sup>

<sup>1</sup>Sumitomo Precision Products Co., LTD., JAPAN, <sup>2</sup>Osaka Metropolitan University, JAPAN

**T20-b REDUCING DYNAMIC MEMORY REFRESH OVERHEAD VIA READ-LESS REFRESH OPERATION USING MEMS-BASED MEMORY CELL**

Khanjan M. Joshi, Manu Garg, Mujeeb Yousuf, Pushpapraj Singh  
*Indian Institute of Technology, Delhi, INDIA*

**b - Emerging Technologies & New Opportunities for MEMS/NEMS**

**Internet of Things (IoT) with MEMS/NEMS**

**W19-b STRETCHABLE DEVICE WITH LOW-ENERGY CONSUMPTION USING POSITIVE PIEZOCONDUCTIVE ELECTRIC COMPONENT**

Yuji Isano, Shoki Kato, Tamami Takano, Purevdorj Munkhzaya, Nyamjargal Ochirkhuyag, Hiroki Ota  
*Yokohama National University, JAPAN*



## **b - Emerging Technologies & New Opportunities for MEMS/NEMS**

### **Machine Learning (ML) & Artificial Intelligence (AI)-Enhanced MEMS/NEMS Design, Manufacturing, and Applications**

- M21-b A MACHINE-LEARNING-ASSISTED SILENT SPEECH INTERFACE UTILIZING MICRO-NEEDLE-ARRAY EMG ELECTRODES AND HIGH-SENSITIVITY STRAIN SENSING ELEMENTS**  
Sheng-Kai Lin<sup>1</sup>, Yen-Chun Chen<sup>1</sup>, Jing-Han Lin<sup>2</sup>, Pin-Hao Lin<sup>1</sup>, Wen-Cheng Kuo<sup>2</sup>, Yao-Joe Yang<sup>1</sup>  
<sup>1</sup>National Taiwan University, TAIWAN, <sup>2</sup>National Kaohsiung University of Science and Technology, TAIWAN
- T21-b DEEP REINFORCEMENT LEARNING-BASED PARAMETERS OPTIMIZE PREDICTION MODEL FOR SMOOTH-VERTICAL SIDEWALL PROFILE IN DEEP REACTIVE ION ETCHING PROCESS**  
Fang Wang<sup>1,2</sup>, Hao Yu<sup>1,2</sup>, Yechen Miao<sup>1,2</sup>, Yue He<sup>1</sup>, Ke Sun<sup>1</sup>, Yi Sun<sup>1</sup>, Heng Yang<sup>1,2</sup>, Xinxin Li<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA
- W20-b ENHANCED REAL-TIME GAS DETECTION ACCURACY BY A SCALABLE MACHINE LEARNING SCHEME**  
Yuan Gao<sup>1</sup>, Wei Yue<sup>1</sup>, Qiuyang Xiao<sup>2</sup>, Peisheng He<sup>1</sup>, Liwei Lin<sup>1</sup>  
<sup>1</sup>University of California, Berkeley, USA, <sup>2</sup>Peking University, CHINA

## **b - Emerging Technologies & New Opportunities for MEMS/NEMS**

### **MEMS/NEMS for Advancing Scientific Instrumentation and Metrology**

- T122-b ULTRASONIC PARTICLE LEVITATION USING PIEZOELECTRIC MICROMACHINED ULTRASOUND TRANSDUCER ARRAY FOR NON-CONTACT PARTICLE MANIPULATION**  
Sagnik Ghosh<sup>1</sup>, David S. W. Choong<sup>1</sup>, Jihang Liu<sup>1</sup>, Daniel S.-H. Chen<sup>1</sup>, Yong Shun Teo<sup>1</sup>, Yan Hong<sup>1</sup>, Alberto Leotti<sup>2</sup>, Domenico Giusti<sup>3</sup>, Ivan Vezzoli<sup>3</sup>, Yao Zhu<sup>1</sup>, Yul Koh<sup>1</sup>  
<sup>1</sup>Agency for Science, Technology and Research (A\*STAR), SINGAPORE, <sup>2</sup>STMicroelectronics, SINGAPORE, <sup>3</sup>STMicroelectronics, ITALY

## **b - Emerging Technologies & New Opportunities for MEMS/NEMS**

### **Nonlinear Dynamics in MEMS/NEMS**

- T22-b ATOMICALLY THIN NEMS FREQUENCY COMB WITH BOTH FREQUENCY TUNABILITY AND RECONFIGURABILITY VIA MECHANICAL MIXING OF TWO EXCITATIONS**  
Bo Xu, Zenghui Wang  
University of Electronic Science and Technology of China, CHINA
- W21-b NON-HERMITIAN MEMS DISK RESONATOR BASED ON THERMAL-ELASTIC-DAMPING-REGULATION AND DYNAMICAL INTERACTION**  
Sen Zhang<sup>1</sup>, Lei Yu<sup>2</sup>, Kaixuan He<sup>2</sup>, Ning Zhou<sup>2</sup>, Xin Zhou<sup>1</sup>  
<sup>1</sup>National University of Defense Technology, CHINA, <sup>2</sup>East China Institute of Photo-Electronic IC, CHINA

## **b - Emerging Technologies & New Opportunities for MEMS/NEMS**

### **Quantum Devices and Systems with MEMS/NEMS**

- M23-b ALSCN LAMB WAVE RESONATOR BASED ON NBN SUPERCONDUCTING ELECTRODE AT CRYOGENIC TEMPERATURE**  
Wenzhen Li<sup>1</sup>, Xuankai Xu<sup>1</sup>, Jiawei Li<sup>1</sup>, Peng Dong<sup>1</sup>, Yiwei Wang<sup>1</sup>, Ruihong Xiong<sup>1</sup>, Jun Li<sup>1</sup>, Tao Wu<sup>1,2,3,4</sup>  
<sup>1</sup>ShanghaiTech University, CHINA, <sup>2</sup>Chinese Academy of Sciences, CHINA, <sup>3</sup>University of Chinese Academy of Sciences, CHINA, <sup>4</sup>Shanghai Engineering Research Center of Energy Efficient and Custom AI IC, CHINA



- T23-b MINIATURE QUANTUM GRADIOMETER USING 3D INTERCONNECTED ATOMIC VAPOR CELLS**  
Jianfeng Zhang, Jintang Shang  
*Southeast University, CHINA*

**c - Industry MEMS and Advancing MEMS for Products and Sustainability**  
**Measurement Methods for Product Specs**

- M24-c WAFER-LEVEL EXTRACTION OF MULTILAYER RESIDUAL STRESS IN PVD-PZT PMUTS THROUGH AN AUTOMATED COUPLED METHOD WITH FEM AND MEASUREMENT**  
Prakasha Chigahalli Ramegowda<sup>1</sup>, Shyam Trivedi<sup>1</sup>, Sagnik Ghosh<sup>1</sup>, David Sze Wai Choong<sup>1</sup>  
Duan Goh Jian<sup>1</sup>, Liu Jihang<sup>1</sup>, Qian You<sup>1</sup>, Domenico Giust<sup>2</sup>, Filippo D'Ercoli<sup>2</sup>, Alberto Leotti<sup>3</sup>, Yul Koh<sup>1</sup>  
<sup>1</sup>*Agency for Science, Technology and Research (A\*STAR), SINGAPORE*, <sup>2</sup>*STMicroelectronics, ITALY*,  
<sup>3</sup>*STMicroelectronics, SINGAPORE*

**c - Industry MEMS and Advancing MEMS for Products and Sustainability**  
**MEMS Packaging Techniques**

- T24-c A SANDWICH AU-POROUS TI-DENSE TI MEMS GETTER WITH ON-CHIP SELF-HEATING AND MONITORING FUNCTIONS**  
Haowen Hu<sup>3</sup>, Chenzhe Du<sup>1</sup>, Zhiyu Sun<sup>1</sup>, Yufeng Jin<sup>2,3</sup>, Qiancheng Zhao<sup>1,2</sup>, Jian Cui<sup>1,2</sup>  
<sup>1</sup>*Peking University, CHINA*, <sup>2</sup>*National Key Laboratory of Advanced Micro and Nano Manufacture Technology, CHINA*, <sup>3</sup>*Peking University Shenzhen Graduate School, CHINA*
- W22-c ELECTROSTATIC POLARITY SWITCHING PACKAGING FOR DEGRADATION MITIGATION IN SEAWATER USAGE**  
Steven Tran, Seunbeom Noh, Hanseup Kim  
*University of Utah, USA*

**c - Industry MEMS and Advancing MEMS for Products and Sustainability**  
**MEMS System Design and Integration Approaches**

- M25-c ALL PRINTED LITHIUM ION BATTERY WITH LIQUID METAL PACKAGE**  
Yuta Ozawa, Daisuke Kuse, Mizuki Funahashi, Kyohei Nagatake, Tamami Takano,  
Kazuhide Ueno, Hiroki Ota  
*Yokohama National University, JAPAN*
- T25-c DESIGN AND FABRICATION OF A 2-IN-1 MEMS AUDIO TRANSDUCER FOR IN-EAR APPLICATIONS**  
Yu-Chen Chen, Zih-Song Hu, Weileun Fang  
*National Tsing Hua University, TAIWAN*
- W23-c RECONFIGURABLE NON-VOLATILE 4-WAY ROUTING SWITCH WITH ZERO STANDBY POWER**  
Victor Marot, Mukesh K. Kulsreshath, Qi Tang, Manu B. Krishnan, Dinesh Pamunuwa  
*University of Bristol, UK*

**c - Industry MEMS and Advancing MEMS for Products and Sustainability**  
**MEMS/NEMS - CMOS Integration**

- M26-c A PURE CMOS STACK ELECTROSTATIC MICROMIRROR FEATURING SIMPLIFIED FABRICATION AND STRESS-ADJUSTED MODELING**  
Wenhao Chen<sup>1</sup>, Hadi Tavakkoli<sup>1</sup>, Bin Zhao<sup>2</sup>, Maojie Zhang<sup>2</sup>, Wibool Piyawattanametha<sup>3,4</sup>, Yi-Kuen Lee<sup>1</sup>  
<sup>1</sup>*Hong Kong University of Science and Technology, HONG KONG*, <sup>2</sup>*CanSemi Technology, Co., Ltd., CHINA*,  
<sup>3</sup>*King Mongkut's Institute of Technology Ladkrabang, THAILAND*, <sup>4</sup>*Michigan State University, USA*

**T26-c MONOLITHIC ANEMOMETER/THERMOMETER/PRESSURE SENSING CHIP FOR AIR STATIC/DYNAMIC PRESSURE DETECTION**

Ming-Hsuan Huang, Ting-Fang Wang, Yuanyuan Huang, Mei-Feng Lai, Weileun Fang  
*National Tsing Hua University, TAIWAN*

**W24-c MONOLITHIC INTEGRATED CMOS-MEMS PRESSURE SENSOR WITH PIEZORESISTORS FABRICATED BY COMBINATIONS OF P-TYPE ION IMPLANTATION IN THE STANDARD CMOS PROCESS**

Fengyang Li, Zhiheng Yu, Changyuan Mai, Jiawei Zhou, Shiyang Yuan, Xuanqing Hua, Dacheng Zhang  
*Peking University, CHINA*

**d - MEMS & NEMS Materials, Fabrication and Packaging**

**Advancement in Conventional Materials for MEMS & NEMS**

**T27-d HIGHLY SENSITIVE CRYOGENIC TEMPERATURE SENSORS UTILIZING CUSTOM-FABRICATED RUTHENIUM OXIDE SLURRY**

Yonghao Xie, Minmin You, Yanjie Li, Yongpeng Ran, Jingquan Liu, Zude Lin  
*Shanghai Jiao Tong University, CHINA*

**W25-d HYDROSTATIC STRENGTH AND RESONANT FREQUENCY OF LARGE AND THIN LPCVD SIN DIAPHRAGM WITH ADDED PARYLENE**

Hongxiang Gao, Junyi Wang, Kunfeng Wang, Anik Sengupta, Eun Sok Kim  
*University of Southern California, USA*

**M27-d WAFER-SCALE DEMONSTRATION OF A HIGHLY SENSITIVE STRAIN SENSOR BASED ON POLYCRYSTALLINE VO<sub>2</sub>**

Zahra Saadat Somaehsofla<sup>1</sup>, Cyrille Masserey<sup>1</sup>, Anna Varini<sup>1</sup>, Denis Flandre<sup>2</sup>, Adrian Mihai Ionescu<sup>1</sup>  
<sup>1</sup>*École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND,*  
<sup>2</sup>*Université Catholique de Louvain, BELGIUM*

**d - MEMS & NEMS Materials, Fabrication and Packaging**

**Digital Micromanufacturing**

**T28-d VIBRATION-BASED AIRFLOW SENSOR WITH THREE-DIMENSIONAL BLUFF BODY STRUCTURE FORMED USING LASER FOLDING TECHNIQUE ON COPPER-POLYIMIDE FILM**

Kei Ohara, Rihachiro Nakashima, Hidetoshi Takahashi  
*Keio University, JAPAN*

**W26-d 3D-PRINTED STAINLESS STEEL ELECTRODES FOR ADVANCING MEMS MICROBIAL FUEL CELLS TOWARD SUSTAINABLE ON-CHIP ENERGY**

Anwar Elhadad, Guangfa Li, Jiaqi Yang, Dehao Liu, Seokheun Choi  
*State University of New York, Binghamton, USA*

**d - MEMS & NEMS Materials, Fabrication and Packaging**

**Generic MEMS & NEMS Manufacturing Techniques**

**M28-d A METHOD FOR IN-SITU ON-WAFER FOUR-POINT BENDING TEST OF MICROBEAMS**  
Xufeng Wang, Jiakang Li, Yi Chen, Jiawei Zhou, Shiyang Yuan, Xuanqing Hua, Dacheng Zhang  
*Peking University, CHINA*

**T29-d ABNORMAL ORIENTED GRAINS(AOG) CONTROLLED OF AL<sub>x</sub>SC<sub>1-x</sub>N BIMORPH STACK AND PIEZOELECTRIC PROPERTIES CHARACTERIZATION AT 8-INCH WAFER**

Yucheng Ji<sup>1,2,3,4</sup>, Anyuan Liu<sup>1,4</sup>, Ruixiang Yan<sup>1,4</sup>, Songsong Zhang<sup>2,3,4</sup>, Alex Gu<sup>1</sup>  
<sup>1</sup>*Shanghai University, CHINA,* <sup>2</sup>*The Chengdu Chimesen Technology Co., Ltd., CHINA,* <sup>3</sup>*Shanghai Melon Technology Co. Ltd, CHINA,* <sup>4</sup>*The Shenghai Industrial  $\mu$ Technology Research Institute, CHINA*

- W27-d BANDWIDTH AND THERMAL STABILITY ENHANCEMENT OF POLYMER-INTEGRATED PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCER ARRAY FOR AIR-COUPLED APPLICATIONS**  
Alvaro Rosa, Wolfgang Muehleisen, Annalisa De pastina, Javad Abbaszadeh  
*Silicon Austria LAB, AUSTRIA*
- M29-d CREATING DOUBLY RE-ENTRANT STRUCTURES WITH ANY THERMOSETTING POLYMER**  
Qingyang Sun, Tingyi “Leo” Liu  
*University of Massachusetts, Amherst, USA*
- T30-d EXPERIMENTS ON ANISOTROPIC WET ETCH RATE DISTRIBUTION OF GA-FACE GAN CRYSTAL AND LEVEL SET SIMULATION**  
Ye Chen, Xi Chen, Yan Xing, Zaifa Zhou  
*Southeast University, CHINA*
- W28-d RAPID HETEROGENEOUS TRANSPORT USING MICRO/NANO HIERARCHICAL DENDRITIC MESH WICK**  
Xinmeng Zhai<sup>1,2</sup>, Yan Wang<sup>1</sup>, Dongdong Xie<sup>1,3</sup>, Yuna Sun<sup>1</sup>, Faheng Zang<sup>1</sup>, Zhuoqing Yang<sup>1</sup>, Congchun Zhang<sup>1</sup>, Guifu Ding<sup>1</sup>  
<sup>1</sup>*Shanghai Jiao Tong University, CHINA*, <sup>2</sup>*Harvard University, USA*

## d - MEMS & NEMS Materials, Fabrication and Packaging

### New & Emerging Materials for MEMS/NEMS

- M30-d BIODEGRADABLE AND SELF-HEALABLE PIEZOELECTRIC HYDROGEL FOR BIOCOMPATIBLE SOLID-STATE TRANSDUCERS**  
Sujoy Kumar Ghosh, Peisheng He, Fan Xia, Wei Yue, Megan Teng, Peggy Tsao, Liwei Lin  
*University of California, Berkeley, USA*
- T31-d FACILE IDENTIFICATION OF CARBON NANOTUBE’S CRYSTAL ORIENTATION USING EPITAXIAL GROWTH OF AUCN NANOWIRES**  
Sunbin Yoon, Joowon Lim, Byeongju Hong, Wonchul Lee  
*Hanyang University, KOREA*
- W29-d HIGHLY SENSITIVE LITHIUM NIOBATE-BASED SAW STRAIN SENSOR WITH ON-CHIP TEMPERATURE COMPENSATION**  
Chunlong Cheng, Jingwen Yang, Xiaoru Li, Tong Tong, Huahuang Luo, Zekai Meng, Qingqing Ke  
*Sun Yat-sen University, CHINA*
- M31-d IN-SITU SAW/BAW SENSORS BASED ON P(VDF-TrFE) FOR STRAIN AND TEMPERATURE MEASUREMENT**  
Xiaoru Li, Chunlong Cheng, Jingwen Yang, Guoxiang Zhang, Zihan Lu, Xuefei Yan, Huahuang Luo, Zekai Meng, Qingqing Ke  
*Sun Yat-sen University, CHINA*
- T32-d INTERACTIVE EFFECTS OF WATER MOLECULES ACROSS A SUSPENDED DOUBLE-LAYER GRAPHENE WITH ELECTRO-MODULATION**  
Yu-Xuan Lu, Wei-Yu Long, Cheng-Yu Lin, Chih-Ting Lin  
*National Taiwan University, TAIWAN*
- W30-d NANOSTRUCTURED BORON-DOPED DIAMOND ELECTRODES FOR ENHANCED HEAVY METAL SENSING**  
GM Hasan Ul Banna<sup>1</sup>, James R. Siegenthaler<sup>1,2</sup>, Ahmed Azwad Kabir<sup>1</sup>, Raul Murillo Martinez<sup>1</sup>, Wen Li<sup>1,2</sup>  
<sup>1</sup>*Michigan State University, USA*, <sup>2</sup>*Fraunhofer USA Center Midwest, USA*
- M32-d TWISTABLE POLYMER BASED ON RESIDUAL MAGNETIC FLUX VECTOR PROGRAMMING FOR MICRO MIRROR**  
Yangzhi Yu, Yinfeng Xia, Kai Du, Yuanlin Xia, Zhuqing Wang  
*Sichuan University, CHINA*

## d - MEMS & NEMS Materials, Fabrication and Packaging

### New Fabrication Processes for Making MEMS/NEMS

- T33-d A PIONEERING LAYER-BY-LAYER FABRICATION PROCESS FOR HIGH-DENSITY AND HIGH-RESOLUTION DOUBLE-SIDED FLEXIBLE NEURAL ELECTRODES**  
Zixing Li<sup>1</sup>, Haoyuan Chen<sup>1</sup>, Kejun Tu<sup>1</sup>, Jingjing An<sup>1</sup>, Kaijie Yang<sup>1</sup>, Longchun Wang<sup>1</sup>, Jiawei Cao<sup>1</sup>, Bin Yang<sup>1</sup>, Zhihong Li<sup>2</sup>, Jingquan Liu<sup>1</sup>  
<sup>1</sup>Shanghai Jiao Tong University, CHINA, <sup>2</sup>Peking University, CHINA
- W31-d FEMTOSECOND LASER INDUCED GRAPHENE BASED ON DOUBLE-LINE METHOD FOR ELECTROMYOGRAPHY ELECTRODE**  
Lingyu Yang, Minmin You, Shuihan Shao, Jingjing An, Bin Yang, Jingquan Liu  
Shanghai Jiao Tong University, CHINA
- M33-d WAFER-SCALE FERROMAGNETIC SHADOW MASK COMPATIBLE WITH CONTACT ALIGNER FOR DRY ETCHING AND DEPOSITION**  
Taeyeong Kim, Juhee Ko, Jungchul Lee  
Korea Advanced Institute of Science and Technology (KAIST), KOREA
- T34-d WATER-SOLUBLE AND ENVIRONMENTALLY FRIENDLY UV PHOTODETECTOR FABRICATED THROUGH SOLVENT-FREE MATERIAL PATTERNING**  
Zhiqing Xu, Qinhuo Guo, Lizhou Yang, Jiajun Zhang, Xiwen Liu, Qinghao He, Man Chan, Yunda Wang  
Hong Kong University of Science and Technology, CHINA

## d - MEMS & NEMS Materials, Fabrication and Packaging

### Packaging & Assembly

- W32-d DEVELOPMENT OF DOUBLE-LAYER-STACKED SILICON INTERPOSER FOR 32X32 MICROMIRROR ARRAY PACKAGING**  
Biyun Ling<sup>1</sup>, Minli Cai<sup>1,2</sup>, Dalong Chen<sup>1</sup>, Xiaoyue Wang<sup>1</sup>, Yuwei Han<sup>1,2</sup>, Yaming Wu<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA
- M34-d EVALUATION OF MEMS GETTER PERFORMANCE BASED ON THE SURFACE ROUGHNESS AND ATOMIC-LEVEL SIMULATION THEREOF**  
Haowen Hu<sup>3</sup>, Chenzhe Du<sup>1</sup>, Ziyu Sun<sup>2</sup>, Yufeng Jin<sup>2,3</sup>, Qiancheng Zhao<sup>1,2</sup>, Jian Cui<sup>1,2</sup>  
<sup>1</sup>Peking University, CHINA, <sup>2</sup>National Key Laboratory of Advanced Micro and Nano Manufacture Technology, <sup>3</sup>Peking University Shenzhen Graduate School, CHINA,
- T35-d MEMS-IC INTEGRATION STRATEGY BY EMBEDDED SILICON FAN-OUT PACKAGE**  
Bohan Zhang<sup>1</sup>, Lang Chen<sup>1</sup>, Chi Zhang<sup>1,2,3</sup>, Han Xu<sup>1</sup>, Wei Wang<sup>1,2,3</sup>  
<sup>1</sup>Peking University, CHINA, <sup>2</sup>National Key Laboratory of Advanced Micro and Nano Manufacture Technology, CHINA, <sup>3</sup>Beijing Advanced Innovation Center for Integrated Circuits, CHINA

## e - MEMS Actuators & Power MEMS

### Actuator Components & Systems

- T36-e A ROBUST ELECTROTHERMAL MICROMIRROR ARRAY BASED ON POLYIMIDE/AL BIMORPHS**  
Hengzhang Yang<sup>1,2</sup>, Qiangqiang Liu<sup>1,2</sup>, Jihui Ni<sup>1,2</sup>, Wenlong Jiao<sup>1</sup>, Xiaodan Mao<sup>1</sup>, Yingtao Ding<sup>1,2</sup>, Anrun Ren<sup>1,2</sup>, Hui Zhao<sup>1,2</sup>, Shuailong Zhang<sup>1,2,3</sup>, Huikai Xie<sup>1,2</sup>  
<sup>1</sup>Beijing Institute of Technology, CHINA, <sup>2</sup>Ministry of Education of China, CHINA, <sup>3</sup>BIT Zhengzhou Research Institute, CHINA

- W34-e DEVELOPMENT OF LARGE-RANGE ROTARY INTERFEROMETER USING A GENETIC ALGORITHM FOR MINIATURE FTIR SPECTROMETER**  
 Honglin Qian<sup>1</sup>, Huanyu Dai<sup>1</sup>, Minjie Zhu<sup>1</sup>, Yonggang Jiang<sup>2</sup>, Bing Li<sup>1</sup>, Gaopeng Xue<sup>1</sup>  
<sup>1</sup>Harbin Institute of Technology, CHINA, <sup>2</sup>Beihang University Technology and Economy Institute, CHINA
- M35-e ELECTROSTATIC MEMS SWITCH WITH ISOLATED SWITCHING PATH AND STATE-HOLDING MECHANICAL LATCH STRUCTURES**  
 Yuki Okamoto<sup>1</sup>, Ryo Oda<sup>1,2</sup>, Jun Usami<sup>1</sup>, Rihachiro Nakashima<sup>1,2</sup>, Kei Ohara<sup>1,2</sup>, Sucheta Gorwadkar<sup>1</sup>, Yusuke Takei<sup>1</sup>, Hironao Okada<sup>1</sup>  
<sup>1</sup>National Institute of Advanced Industrial Science and Technology (AIST), JAPAN, <sup>2</sup>Keio University, JAPAN
- T37-e HYBRID ACTUATORS WITH TRANSMISSION-SPRING FOR PIEZOELECTRIC MEMS SCANNING MIRROR**  
 Hao-Chien Cheng, Weileun Fang  
 National Tsing Hua University, TAIWAN
- W35-e SCAN-ANGLE ENHANCEMENT OF QUASI-STATIC PIEZOELECTRIC MEMS MIRROR BY MULTIPLE RING-SHAPED DESIGN AND CROSS-ELECTRODE ARRANGEMENT**  
 Hung-Yu Lin<sup>1,2</sup>, Hao-Chien Cheng<sup>1,2</sup>, Mingching Wu<sup>2</sup>, Jerwei Hsieh<sup>3</sup>, Mei-Feng Lai<sup>1</sup>, Weileun Fang<sup>1</sup>  
<sup>1</sup>National Tsing Hua University, TAIWAN, <sup>2</sup>Coretronic MEMS Corporation, TAIWAN, <sup>3</sup>Asia Pacific Microsystems, TAIWAN
- M36-e TEMPERATURE-DEPENDENCE OF STATIC AND DYNAMIC DEFLECTION OF BISTABLE PIEZOELECTRIC MEMS MEMBRANES**  
 Philipp Moll, Shareena Muringakodan, Ulrich Schmid, Michael Schneider  
 TU Wien, AUSTRIA

## e - MEMS Actuators & Power MEMS

### Energy Harvesting Materials, Structures, and Transducers

- T38-e A DOUBLE-WELL POTENTIAL EXPANSION MECHANISM FOR OMNI-DIRECTIONAL BROADBAND MEMS BI-STABLE ENERGY HARVESTER**  
 Kai Wang<sup>1</sup>, Yuan Zhu<sup>2</sup>, Ran Zhang<sup>1</sup>, Dengyin Zhang<sup>1</sup>  
<sup>1</sup>Nanjing University of Posts and Telecommunications, CHINA, <sup>2</sup>Shanghai Jiao Tong University, CHINA
- W36-e NANOPOROUS SILICON MATERIALS FORMED BY METAL-ASSISTED CHEMICAL ETCHING FOR THERMOELECTRIC GENERATOR**  
 Nguyen Van Toan<sup>1</sup>, Yijie Li<sup>1</sup>, Truong Thi Kim Tuoi<sup>1</sup>, Khairul Fadzli Samat<sup>2</sup>, Ngyuyen Van Hieu<sup>3</sup>, Ioana Voiculescu<sup>4</sup>, Takahito Ono<sup>1</sup>  
<sup>1</sup>Tohoku University, JAPAN, <sup>2</sup>Universiti Teknikal Malaysia Melaka, MALAYSIA, <sup>3</sup>Vietnam National University, VIET NAM, <sup>4</sup>Grove School of Engineering, USA
- T39-e SELF-POWERED MOTION AND TACTILE POSITIONING BASED ON A DUAL MODE TRIBOELECTRIC SENSOR WITH CHARGE ACCUMULATING ENCLOSURE FOR SPORTS MONITORING**  
 Trilochan Bhatta, Gagan Bahadur Pradhan, Shital Sharma, Jae Yeong Park  
 Kwangwoon University, KOREA
- W37-e THERMOELECTRIC GENERATOR WITH THERMAL CONTACT AND COOLING SURFACES USING KIRIGAMI STRUCTURE STOOD UP BY STRETCHING DEFORMATION**  
 Atsuki Oguchi, Shingo Terashima, Eiji Iwase  
 Waseda University, JAPAN

## e - MEMS Actuators & Power MEMS

### Manufacturing for Actuators & Power MEMS

- M38-e**    **PERFORMANCE ENHANCEMENT IN THERMOELECTRIC GENERATORS USING SELFCURLING METAL THIN FILMS**  
Milad Shojaeian, Nadezda Kuznetsova, Chen Wang, Francisco Molina Lopez, Michael Kraft  
KU Leuven, BELGIUM
- T40-e**    **SPRING DIAPHRAGM STRUCTURE WITH RING ACTUATOR TO ACHIEVE WIDE BANDWIDTH AND HIGH FIDELITY MICROSPEAKER**  
Chia-Hao Lin<sup>1</sup>, Ting-Chou Wei<sup>1</sup>, Chin Tseng<sup>1</sup>, Tsung-Wen Tsai<sup>1</sup>, Po-Shen Chen<sup>1</sup>, Sung-Cheng Lo<sup>2</sup>, Mei-Feng Lai<sup>1</sup>, Weileun Fang<sup>1,2</sup>  
<sup>1</sup>National Tsing Hua University, TAIWAN, <sup>2</sup>Upbeat Technology, TAIWAN

## e - MEMS Actuators & Power MEMS

### Materials for Actuators & Power MEMS

- W38-e**    **CELLULOSE NANOFIBER- BISMUTH TELLURIDE COMPOSITE FILM FOR MICRO THERMOELECTRIC GENERATOR**  
Jianghan Tian<sup>1</sup>, Nguyen Van Toan<sup>1</sup>, Keita Sakakibara<sup>2</sup>, Takahito Ono<sup>1</sup>  
<sup>1</sup>Tohoku University, JAPAN, <sup>2</sup>National Industry of Advanced Industrial Science and Technology (AIST), JAPAN
- M39-e**    **DESIGN OF PIEZOELECTRIC MEMS MICROSPEAKER WITH PARYLENE SPRING FOR PERFORMANCE IMPROVEMENT**  
Zih-Song Hu<sup>1</sup>, Chia-Hao Lin<sup>1</sup>, Sung-Cheng Lo<sup>2</sup>, Weileun Fang<sup>1,2</sup>  
<sup>1</sup>National Tsing Hua University, TAIWAN, <sup>2</sup>Upbeat Technology Co., Ltd., TAIWAN
- T41-e**    **HIGH-PERFORMANCE FLEXIBLE MICRO-SUPERCAPACITORS BASED ON NOVEL 2D MBENE AND 3D INTERDIGITATED ELECTRODES**  
Yiwen Ma<sup>1</sup>, Wenhe Xia<sup>1</sup>, Qingfubo Geng<sup>1</sup>, Xinyu Yao<sup>1</sup>, Xuan Liu<sup>1</sup>, Xiaohong Wang<sup>2</sup>, Bingmeng Hu<sup>1</sup>  
<sup>1</sup>Minzu University of China, CHINA, <sup>2</sup>Tsinghua University, CHINA

## e - MEMS Actuators & Power MEMS

### Power MEMS Components & Systems

- W39-e**    **AN ULTRASONIC WIRELESS POWER TRANSMISSION SYSTEM WITH HIGH CONVERSION EFFICIENCY BASED ON 30% ScAlN PIEZOELECTRIC MEMS TRANSDUCERS**  
Chenyuan Zhang, Zhiwei You, Jiao Xia, Yiwei Guo, Junhao Wang, Yipeng Lu  
Peking University, CHINA

## e - MEMS Actuators & Power MEMS

### Self-Powered Devices and Microsystems

- M40-e**    **A FLEXIBLE THERMOELECTRIC GENERATOR WITH OPTIMIZED DESIGN FOR LOW-THERMAL HEAT WASTE ENERGY HARVESTING**  
Hao Lv, Yuanlin Xia, Zhuqing Wang  
Sichuan University, CHINA
- T42-e**    **A TRIBOELECTRIC-POWERED CONTINUOUS WIRELESS COMMUNICATION MICROSYSTEM WITH SYNCHRONOUS ELECTRIC CHARGE EXTRACTION POWER MANAGEMENT**  
Xiangyu Zhao<sup>1</sup>, Zerui Xu<sup>1</sup>, Yuqi Kang<sup>1</sup>, Ziyang Ou<sup>1</sup>, Yisong Ling<sup>1</sup>, Sixing Xu<sup>2</sup>, Xiaohong Wang<sup>1</sup>  
<sup>1</sup>Tsinghua University, CHINA, <sup>2</sup>Hunan University, CHINA



**W40-e SELF-POWERED FLEXIBLE MICRO-SUPERCAPACITOR BASED ON OPTIMIZED LASER INDUCED GRAPHENE ELECTRODES FOR SUSTAINABLE ENERGY HARVESTING AND STORAGE**

Faizan T. Beigh<sup>1</sup>, Vishal Singh<sup>1</sup>, Bharti Singh<sup>2</sup>, Dhiman Mallick<sup>1</sup>

<sup>1</sup>Indian Institute of Technology, Delhi, INDIA, <sup>2</sup>Delhi Technological University, INDIA

**e - MEMS Actuators & Power MEMS**

**Other Actuators & Power MEMS**

**T43-e AN ULTRA-LOW TOTAL HARMONIC DISTORTION PIEZOELECTRIC MEMS LOUDSPEAKER WITH DOUBLE-S UNIMORPH ACTUATORS**

Qincheng Zheng<sup>1,2</sup>, Ke Cao<sup>1,2</sup>, Ning Deng<sup>1,2</sup>, Chenyu Bai<sup>1,2</sup>, Yao Lu<sup>1,2</sup>, Huikai Xie<sup>1,2</sup>

<sup>1</sup>Beijing Institute of Technology, CHINA, <sup>2</sup>Ministry of Education of China, CHINA

**f - MEMS Physical & Chemical Sensors**

**Fluidic Sensors**

**T44-f CONTACTLESS ULTRASONIC FLUID VISCOSITY AND DENSITY MONITORING**

Pei-Chi (Peggy) Tsao<sup>1</sup>, Samantha Averitt<sup>2</sup>, Megan Teng<sup>1</sup>, Haoyun (Jerry) Tang<sup>1</sup>, Ting Chen<sup>4</sup>, Yande Peng<sup>1</sup>, Wei Yue<sup>1</sup>, Liwei Lin<sup>1</sup>

<sup>1</sup>University of California, Berkeley, USA, <sup>2</sup>Stanford University, USA

**W42-f GAS FLOW SENSING WITH A PIEZORESISTIVE SILICON NANOWIRE-BASED MEMS FORCE SENSOR**

Levent Demirkazik<sup>1</sup>, Umut Kerimzade<sup>1</sup>, Masoud Jedari Ghourichaei<sup>1</sup>, Onur Aydin<sup>1</sup>, Bekir Aksoy<sup>1</sup>, Cemal Aydogan<sup>2</sup>, Gokhan Nadar<sup>1</sup>, Ivo W. Rangelow<sup>2,3</sup>, Arda Deniz Yalcinkaya<sup>4</sup>, Halil Bayraktar<sup>5</sup>, Burhanettin Erdem Alaca<sup>1</sup>

<sup>1</sup>Koç University, TURKEY, <sup>2</sup>Ilmenau University of Technology, GERMANY, <sup>3</sup>nano analytik GmbH, GERMANY, <sup>4</sup>Bogazici University, TURKEY, <sup>5</sup>Istanbul Technical University, TURKEY

**M42-f LIQUID VISCOSITY DETECTION BASED ON HARMONIC ENGINEERING AND DUAL-FREQUENCY ULTRASONIC TRANSDUCER ARRAYS**

Jiao Xia, Aocheng Bao, Junhao Wang, Jinghan Gan, Bowen Sheng, Yipeng Lu  
*Peking University, CHINA*

**T45-f PIEZOELECTRIC ACOUSTIC PRESSURE SENSORS WITH ENHANCED SENSITIVITY AND STIFFNESS BASED ON STRESS CONCENTRATION STRUCTURES AND WEDGE-SHAPE ELECTRODES**

Zhiwei You, Chong Yang, Lei Zhao, Aocheng Bao, Yipeng Lu  
*Peking University, CHINA*

**f - MEMS Physical & Chemical Sensors**

**Force & Displacement Sensors**

**W43-f 2-AXIS FORCE PLATE FOR DROPLET COLLISION MEASUREMENT USING LINE SCAN CAMERA AND SAMPLING MOIRÉ METHOD**

Yukitake Nakahara<sup>1</sup>, Satofumi Kato<sup>1</sup>, Hiroaki Onoe<sup>1</sup>, Choongyeop Lee<sup>2</sup>, YunJung Heo<sup>2</sup>, Hidetoshi Takahashi<sup>1</sup>

<sup>1</sup>Keio University, JAPAN, <sup>2</sup>Kyung Hee University, KOREA

**M43-f A NOVEL MULTIPLE MODES RESONANT SENSOR FEATURING BLUE SIDEBAND EXCITATION**

Jiao Xu<sup>1</sup>, Zhuoyue Zheng<sup>2</sup>, Jingqian Xi<sup>1</sup>, Ziqian Zhang<sup>1</sup>, Huafeng Liu<sup>1</sup>, Pan Zhang<sup>5</sup>, Jianlin Chen<sup>5</sup>, Chen Wang<sup>3</sup>, Michael Kraft<sup>3</sup>, Yuan Wang<sup>2</sup>, R.P. Martins<sup>2</sup>, Pui-In Mak<sup>2</sup>

<sup>1</sup>Huazhong University of Science and Technology, CHINA, <sup>2</sup>University of Macau, CHINA,

<sup>3</sup>University of Leuven, BELGIUM, <sup>4</sup>Peking University, CHINA, <sup>5</sup>Shanghai University, CHINA

- T46-f A NOVEL PRESSURE SENSOR WITH COMPOSITE SENSITIVE FILM FOR HIGH PRECISION MEASUREMENT AT BROAD RANGE**  
Xiaopeng Chen<sup>1</sup>, Sijia Ling<sup>1</sup>, Hanyang Tong<sup>1</sup>, Yujing Xiao<sup>1</sup>, Jin Zhang<sup>2</sup>, Zhengyin Yu<sup>1</sup>, Qinghui Jin<sup>1</sup>,  
<sup>1</sup>Ningbo University, CHINA, <sup>2</sup>Chinese Academy of Sciences, CHINA
- W44-f BIAXIAL GLASS FORCE PLATE USING INCLINED LASER INDUCED BACKSIDE WET ETCHING TROUGH A PRISM**  
Nozomi Ono, Rihachiro Nakashima, Toshihiro Shiratori, Hidetoshi Takahashi  
Keio University, JAPAN
- M44-f FLIP-CHIP BONDING OF TACTILE SENSORS WITH STAINLESS STEEL BUMP INTEGRATION FOR SENSING PERFORMANCE IMPROVEMENTS**  
Fuchi Shih, Yi-Ming Lai, Mei-Feng Lai, Weileun Fang  
National Tsing Hua University, TAIWAN
- T47-f FORCE-SENSOR INTEGRATED TOUCH-FEELING SENSOR CAPABLE OF ACQUIRING SUBTLE TEXTURE CHANGES CAUSED BY CONTACT FORCE**  
Ryo Akiyama, Nachi Mise, Kyohei Terao, Hidekuni Takao  
Kagawa University, JAPAN
- W45-f HIGH-FREQUENCY VISION-BASED TACTILE SENSOR WITH EMBEDDED TRANSPARENT PIEZOELECTRIC MODULE FOR HUMANOID ROBOTIC PERCEPTION**  
Zhengyi Xie<sup>1</sup>, Chunpeng Jiang<sup>1</sup>, Haoxiang Jiang<sup>1,2</sup>, Yimeng Sun<sup>3</sup>, Bin Yang<sup>1</sup>, Jingquan Liu<sup>1</sup>  
<sup>1</sup>Shanghai Jiao Tong University, CHINA, <sup>2</sup>Zhangjiang Laboratory, CHINA,  
<sup>3</sup>Shanghai University of Electric Power, CHINA
- M45-f HYBRID ORI/KIRIGAMI STRUCTURED PIEZOELECTRIC THIN-FILM SENSORS COVERED BY ELASTOMER WITH HIGHLY DIRECTIONAL STRETCH SENSING ABILITY FOR HEARTBEAT MOTION MONITORING**  
Chiranjit Das, Guo-Hua Feng  
National Tsing Hua University, TAIWAN
- T48-f MICRO FORCE PLATE ARRAY FOR MEASURING 3-AXIS GROUND REACTION FORCES IN ANTS USING SAMPLING MOIRÉ METHOD**  
Toshihiro Shiratori, Hidetoshi Takahashi  
Keio University, JAPAN
- W46-f NANOSTRUCTURE-BASED HIGHLY SENSITIVE AND RELIABLE PIEZO-TRANSMITTANCE STRAIN SENSOR AND INTEGRATED SYSTEM**  
Myung-Kun Chung<sup>1</sup>, Su-Min Jeon<sup>1</sup>, Jae-Soon Yang<sup>1</sup>, Jae-Young Yoo<sup>2</sup>, Min-Uk Kim<sup>1</sup>, Beom-Jun Kim<sup>1</sup>,  
Tae-Yeon Lee<sup>1</sup>, Min-Seung Jo<sup>3</sup>, Jun-Bo Yoon<sup>1</sup>  
<sup>1</sup>Korea Advanced Institute of Science and Technology (KAIST), KOREA, <sup>2</sup>Sungkyunkwan University, KOREA,  
<sup>3</sup>Northwestern University, USA
- M46-f PRESSURE SENSITIVE ALUMINUM NITRIDE DRUMHEAD RESONATORS**  
Seyyed Mojtaba Hassani Gangaraj<sup>1</sup>, Tanya Chauhan<sup>1</sup>, Mingyo Park<sup>2</sup>, Azadeh Ansari<sup>1</sup>  
<sup>1</sup>Georgia Institute of Technology, USA, <sup>2</sup>Pennsylvania State University, USA
- T49-f SINGLE CRYSTAL DIAMOND MEMS FOR REVEALING THE DESORPTION OF ADSORBATES ON O-TERMINATED DIAMOND**  
Keyun Gu<sup>1,2</sup>, Zilong Zhang<sup>3</sup>, Guo Chen<sup>1</sup>, Wen Zhao<sup>1</sup>, Guangchao Chen<sup>4</sup>, Jian Huang<sup>2</sup>, Yasuo Koide<sup>1</sup>,  
Satoshi Koizumi<sup>1</sup>, Meiyong Liao<sup>1</sup>  
<sup>1</sup>National Institute for Materials Science, JAPAN, <sup>2</sup>Shanghai University, CHINA, <sup>3</sup>Tohoku University, JAPAN,  
<sup>4</sup>University of Chinese Academy of Sciences, CHINA
- W47-f STACKED MULBERRY PAPER COATED WITH MXENE FOR HIGHLY SENSITIVE PRESSURE DETECTION WITH WIDE SENSING RANGE**  
Sangrim Lee<sup>1</sup>, Chaemin Won<sup>1</sup>, Jaebeen Ahn<sup>1</sup>, Bowoong Heo<sup>2</sup>, Kyubin Bae<sup>2</sup>, Jongbaeg Kim<sup>2</sup>, Taewook Kim<sup>1</sup>,  
Changyong Yim<sup>1</sup>, Yunsung Kang<sup>1</sup>  
<sup>1</sup>Kyungpook National University, KOREA, <sup>2</sup>Yonsei University, KOREA



**M47-f** **THREE-DIMENSIONAL HALBACH ARRAY COILS FOR SENSITIVITY ENHANCEMENT OF INDUCTIVE THREE-AXIS FORCE SENSOR**  
Yi-Ming Lai, Ruei-Cing Mai, Mei-Feng Lai, Weileun Fang  
National Tsing Hua University, TAIWAN

## **f - MEMS Physical & Chemical Sensors**

### **Gas & Chemical Sensors**

- T50-f** **A NOVEL MEMS RESONANT PRESSURE SENSOR OPERATING IN AIR WITH THERMAL ACTUATION PIEZORESISTIVE SENSING**  
Chen Wang<sup>1</sup>, Appo van der Wiel<sup>2</sup>, Ben Maes<sup>2</sup>, Michiel Gidts<sup>2</sup>, Michael Kraft<sup>1</sup>  
<sup>1</sup>*KU Leuven, BELGIUM*, <sup>2</sup>*Melexis Company, BELGIUM*
- W48-f** **ACOUSTIC GAS SENSING WITH WEAKLY COUPLED MEMS RESONATORS**  
Derin Erkan<sup>1</sup>, Ahmet Arif Aslan<sup>1</sup>, Erdinc Tatar<sup>1,2</sup>  
<sup>1</sup>*Bilkent University, TURKEY*, <sup>2</sup>*National Nanotechnology Research Center (UNAM), TURKEY*
- M48-f** **ECO-FRIENDLY FABRICATION OF SUSPENDED 1D NANOHEATERS FOR ULTRALOW POWER TCD-TYPE GAS SENSORS**  
Wootaeck Cho, Jihyeon Yoo, Jong-Hyun Kwak, Heungjoo Shin  
*Ulsan National Institute of Science and Technology, KOREA*
- T51-f** **RELIABILITY ENHANCEMENT EXPERIMENTAL STUDY FOR MEMS GAS SENSORS**  
Chaoyang Huo<sup>1</sup>, Jingxin Wu<sup>1</sup>, Minjie Zhu<sup>2</sup>, Yuanlin Xia<sup>1</sup>, Zhuqing Wang<sup>1</sup>  
<sup>1</sup>*Sichuan University, CHINA*, <sup>2</sup>*Instrumentation Technology and Economy Institute, CHINA*
- W49-f** **IONIC-LIQUID GATED ELECTROCHEMICAL CARBON NANOTUBE TRANSISTOR WITH HIGH ON-OFF RATIO FOR SELECTIVE GAS SENSING**  
Peisheng He<sup>1</sup>, Alex Abelson<sup>2</sup>, Wei Yue<sup>1</sup>, Jenny Zhou<sup>2</sup>, Liwei Lin<sup>1</sup>, Eric Meshot<sup>2</sup>, Steven F. Buchsbaum<sup>2</sup>  
<sup>1</sup>*University of California, Berkeley, USA*, <sup>2</sup>*Lawrence Livermore National Laboratory, USA*
- M49-f** **ONE-DIMENSIONAL MN-BASED STACKED COORDINATION POLYMER MEMS SENSOR FOR EFFICIENT AMMONIA SENSING**  
Jian Wu, Rui Yang, Xue Liu, Aochen Wang, Jingzhu Li, Yuyang Wang, Nantao Hu, Min Zeng, Jianhua Yang, Zhi Yang  
*Shanghai Jiao Tong University, CHINA*
- T52-f** **RESONANT CHEMICAL SENSOR PERFORMANCE ENHANCEMENT THROUGH 3D PRINTED SCAFFOLDS**  
Biya D. Haile<sup>1</sup>, Nikolas T. Roeske<sup>2</sup>, Hongyu Guo<sup>1</sup>, Omer T. Inan<sup>1</sup>, Luke A. Beardslee<sup>2</sup>  
<sup>1</sup>*Georgia Institute of Technology, USA*, <sup>2</sup>*Institute for Matter and Systems, USA*
- W50-f** **TRANSFER-FREE INTEGRATION OF GRAPHENE ON SUSPENDED MICRO-HOTPLATES FOR NO<sub>2</sub> SENSING**  
Leandro N. Sacco, Sten Vollebregt  
*Delft University of Technology, NETHERLANDS*
- M50-f** **ULTRA-HIGH-SENSITIVITY HYDROGEN NANOGAP MICROSENSOR FOR ENVIRONMENTAL APPLICATIONS BASED ON CHEMICALLY ACTUATED PALLADIUM CANTILEVER BEAMS**  
Amirali Nikeghbal, Rabiul Hasan, Farhan S. Sium, Fatemeh Momeni, Adwait Deshpande, Seungbeom Noh, Hanseup Kim, Carlos H. Mastrangelo  
*University of Utah, USA*

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### Inertial Sensors

- T53-f A LINEAR CAPACITIVE GRAVIMETER WITH PSEUDO-DIFFERENTIAL ELECTRODES CAPABLE OF MEASURING EARTH TIDES**  
Mikhail Kanygin<sup>1</sup>, Fatemeh Es.haghi<sup>1</sup>, Sarai Montanez Munoz<sup>1</sup>, Douglas Schouten<sup>2</sup>, Glyn Williams-Jones<sup>1</sup>, Behraad Bahreyni<sup>1</sup>  
*<sup>1</sup>Simon Fraser University, CANADA, <sup>2</sup>Ideon Technologies Inc., CANADA*
- W51-f A NEW SINGLE CHIP HIGH-OVERLOAD TRI-AXIAL MEMS GYROSCOPE WITH MULTI-WHEEL-RING FOR Z-AXIS INPUT RANGE ENHANCEMENT**  
Wenqiang Wei<sup>1</sup>, Fang Chen<sup>2</sup>, Huimin Tian<sup>1</sup>, Qi Cai<sup>1</sup>, Rang Cui<sup>1</sup>, Xinyu Wang<sup>1</sup>, Zhenghao Lu<sup>3</sup>, Huiliang Cao<sup>1</sup>  
*<sup>1</sup>North University of China, CHINA, <sup>2</sup>Chinese Academy of Sciences, CHINA, <sup>3</sup>Soochow University, CHINA*
- M51-f A SENSITIVE UNIT COMPENSATION METHOD FOR ENHANCING THE PERFORMANCE OF ELECTROCHEMICAL VIBRATION SENSORS**  
Nan Zhang, Xiaoyu Qi, Zhenchuan Yang, Chengchen Gao  
*Peking University, CHINA*
- T54-f A SINGLE-LOOP NARROW-BAND FORCE REBALANCE CONTROL METHOD WITH TEMPERATURE SELF-COMPENSATION FOR A MEMS GYROSCOPE**  
Chunhua He<sup>1</sup>, Yingyu Xu<sup>1,2</sup>, Heng Wu<sup>1</sup>, Qinwen Huang<sup>2</sup>, Qiancheng Zhao<sup>3,4</sup>, Guizhen Yan<sup>3,4</sup>  
*<sup>1</sup>Guangdong University of Technology, CHINA, <sup>2</sup>Science and Technology on Reliability Physics and Application Technology of Electronic Component Laboratory, CHINA, <sup>3</sup>Peking University, CHINA, <sup>4</sup>National Key Lab of Micro/Nano Fabrication Technology, CHINA*
- W52-f AN WAFER-LEVEL TEST APPROACH FOR ADHESION CHARACTERIZATION IN MEMS ACCELEROMETERS**  
Lukas Ackermann<sup>1</sup>, Matthew Lewis<sup>1</sup>, Gevorg Aleksanyan<sup>1</sup>, Marvin Freier<sup>1</sup>, Dominic Palm<sup>1</sup>, Jens Anders<sup>2</sup>  
*<sup>1</sup>Robert Bosch GmbH, GERMANY, <sup>2</sup>IIS University of Stuttgart, GERMANY*
- M52-f CRYSTALLOGRAPHIC ORIENTATION-DEPENDENT THERMAL STABILITY OF TORSION VIBRATION NATURAL FREQUENCY IN SILICON-BASED MEMS RESONATORS**  
Chenzhe Du<sup>1</sup>, Zhiyu Sun<sup>1</sup>, Chun Xu<sup>1</sup>, Zhenchuan Yang<sup>1,2</sup>, Qiancheng Zhao<sup>1,2,3</sup>, Jian Cui<sup>1,2,3</sup>  
*<sup>1</sup>Peking University, CHINA, <sup>2</sup>National Key Laboratory of Advanced Micro and Nano Manufacture Technology, CHINA, <sup>3</sup>Beijing Advanced Innovation Center for Integrated Circuits, CHINA*
- T55-f DEMONSTRATION OF ±100G SENSITIVITY BY DROP IMPACT OF HIGH ACCURACY DIFFERENTIAL RESONANT ACCELEROMETER**  
Kei Masunishi, Etsuji Ogawa, Daiki Ono, Fumito Miyazaki, Kengo Uchida, Jumpei Ogawa, Hideaki Murase, Fumitaka Ishibashi, Naoki Hiramatsu, Yasushi Tomizawa  
*Toshiba Corporation, JAPAN*
- W53-f EXPLOITING SHAPED COMBS WITHIN FM ACCELEROMETERS FOR LOW-NOISE AND WIDE DYNAMIC RANGE APPLICATIONS**  
Christian Padovani<sup>1</sup>, Luca Pileri<sup>1</sup>, Gabriele Gattere<sup>2</sup>, Giacomo Langfelder<sup>1</sup>  
*<sup>1</sup>Politecnico di Milano, ITALY, <sup>2</sup>STMicroelectronics, ITALY*
- M53-f IMPROVING THE PERFORMANCE OF MEMS RESONANT SENSORS WITH SYNCHRONIZED PIEZORESISTIVE/CAPACITIVE TRANSDUCTIONS USING SIGNAL FUSION**  
Chengxin Li<sup>1</sup>, Fan Wu<sup>1</sup>, Chun Zhao<sup>2</sup>, Hemin Zhang<sup>3</sup>, Mustafa M. Torunbalci<sup>4</sup>, Chen Wang<sup>1</sup>, Lieven De Stryker<sup>1</sup>, Michael Kraft<sup>1</sup>  
*<sup>1</sup>KU Leuven, BELGIUM, <sup>2</sup>University of York, UK, <sup>3</sup>Northwestern Polytechnical University, CHINA, <sup>4</sup>Google, USA*
- T56-f MICROWAVE FREQUENCY COMB INTERROGATION OF HIGH-OVERTONE BULK ACOUSTIC RESONATORS FOR HIGH-SPEED, MULTI-MODAL MASS SENSING**  
Liam G. Connolly<sup>1,2</sup>, Sean M. Bresler<sup>1,3</sup>, David A. Long<sup>1</sup>, Jason J. Gorman<sup>1</sup>  
*<sup>1</sup>National Institute of Standards and Technology (NIST), USA, <sup>2</sup>Johns Hopkins University, USA, <sup>3</sup>University of Maryland, USA*

**W54-f PHASE COMPENSATION METHOD FOR THE DRIVE LOOP OF MEMS GYROSCOPE BASED ON DUAL PHASE-LOCKED LOOP SYNCHRONOUS TRACKING**

Chun Xu<sup>1</sup>, Qiancheng Zhao<sup>1,2,3</sup>, Jian Cui<sup>1,2,3</sup>

<sup>1</sup>Peking University, CHINA, <sup>2</sup>National Key Laboratory of Advanced Micro and Nano Manufacture Technology, CHINA, <sup>3</sup>Beijing Advanced Innovation Center for Integrated Circuits, CHINA

**M54-f ULTRA-SENSITIVE, HIGH BANDWIDTH PHOTONIC-MEMS SEISMIC SENSOR**

Farnaz Ebrahimi Argi<sup>1,2</sup>, Ayman Manzoor<sup>1</sup>, Hamed Sattari<sup>1</sup>, Yves Petremand<sup>1</sup>, Dara Bayat<sup>1</sup>, Luigi Ferraioli<sup>2</sup>, Antoniou Anastasios<sup>2</sup>, Domenico Giardini<sup>2</sup>, Katrin Plenkers<sup>3</sup>, Arno Hoogerwerf<sup>1</sup>, Homa Zarebidaki<sup>1</sup>, Guido Spinola Durante<sup>1</sup>, Amir H. Ghadimi<sup>1</sup>, Linus Villiger<sup>2</sup>, Stefan Wiemer<sup>2</sup>, Michel Despont<sup>1</sup>

<sup>1</sup>CSEM, SWITZERLAND, <sup>2</sup>ETH Zürich, SWITZERLAND, <sup>3</sup>GMuG, GERMANY

**f - MEMS Physical & Chemical Sensors**

**Manufacturing Techniques for Physical Sensors**

**T57-f HIGHLY SENSITIVE PRESSURE SENSOR FABRICATED BY COATING MXene TO SURFACE-TREATED ECO-FLEX FOR RELIABLE NETWORK**

Dokyung Kim<sup>1,2</sup>, Jaesam Sim<sup>1</sup>, Dong-Weon Lee<sup>2</sup>,

<sup>1</sup>Korea Institute of Industrial Technology, KOREA, <sup>2</sup>Chonnam National University, KOREA

**W55-f INKJET-PRINTED MN-CO-NI-O CERAMIC MICROBEADS TOWARDS HIGH-SENSITIVITY AND HIGH-STABILITY TEMPERATURE SENSING AT ROOM TEMPERATURE**

Yongpeng Ran, Yanjie Li, Xiuyan Li, Zude Lin, Bin Yang, Jingquan Liu, Minmin You  
Shanghai Jiao Tong University, CHINA

**f - MEMS Physical & Chemical Sensors**

**Materials for Physical Sensors**

**M55-f DIAMOND MEMS MAGNETIC TORQUE SENSOR TOWARD FEMTONEWTON AT ROOM TEMPERATURE**

Zilong Zhang<sup>1</sup>, Zhijian Zhao<sup>1</sup>, Meiyong Liao<sup>2</sup>, Takahito Ono<sup>1</sup>, Masaya Toda<sup>1</sup>

<sup>1</sup>Tohoku University, JAPAN, <sup>2</sup>National Institute for Materials Science, JAPAN

**f - MEMS Physical & Chemical Sensors**

**Metrology and Measurement Techniques for MEMS/NEMS Sensors**

**T58-f IDENTIFICATION OF STRUCTURE IMBALANCE FOR MEMS TUNING-FORK RESONATORS BASED ON MULTI TRANSFER FUNCTIONS SYNTHESIS**

Jian Cui<sup>1,2,3</sup>, Chenzhe Du<sup>2</sup>, Yi Tang<sup>2</sup>, Qiancheng Zhao<sup>1,2,3</sup>

<sup>1</sup>National Key Laboratory of Advanced Micro and Nano Manufacture Technology, CHINA, <sup>2</sup>Peking University, CHINA, <sup>3</sup>Beijing Advanced Innovation Center for Integrated Circuits, CHINA

**W56-f OPTICAL CANTILEVER USING DIFFRACTION GRATING AND SAMPLING MOIRÉ METHOD**

Soya Sato<sup>1</sup>, Toshihiro Shiratori<sup>1</sup>, Tetsuo Kan<sup>2</sup>, Hidetoshi Takahashi<sup>1</sup>

<sup>1</sup>Keio University, JAPAN, <sup>2</sup>University of Electro-Communications, JAPAN

**M56-f SENSITIVITY-ENHANCED SURFACE ACOUSTIC WAVE HUMIDITY SENSOR BASED ON A NONLINEAR PARITY TIME SYMMETRIC SYSTEM BIASED AT THE EXCEPTIONAL POINT**

Zhenyu Wei, Jianqiu Huang, Qing-an Huang  
Southeast University, CHINA

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### Nanoscale Physical Sensors

- T59-f GHOST TOUCH FREE WIRELESS NANOGAP CAPACITIVE PRESSURE SENSOR**  
Jae-Soon Yang<sup>1</sup>, Myung-Kun Chung<sup>1</sup>, Jae-Young Yoo<sup>2</sup>, Beom-Jun Kim<sup>1</sup>, Sung-Ho Kim<sup>1</sup>, Se-Yoon Jung<sup>1</sup>,  
Tae-Yeon Lee<sup>1</sup>, Min-Uk Kim<sup>1</sup>, Jun-Bo Yoon<sup>1</sup>  
<sup>1</sup>Korea Advanced Institute of Science and Technology (KAIST), KOREA, <sup>2</sup>Sungkyunkwan University, KOREA

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### Sonic & Ultrasonic MEMS Transducers

- W57-f A CMOS-MEMS ULTRASONIC TRANSCEIVER WITH BIPOLAR-BIASED DIFFERENTIAL CMUT TRANSDUCERS**  
Yu-Cheng Lin, Tzu-Yun Huang, Ming-Huang Li  
National Tsing Hua University, TAIWAN
- M57-f ACOUSTICALLY DRIVEN SCANNING MIRROR ENHANCED BY HELMHOLTZ RESONATOR UNIT**  
Masahiro Fukuta<sup>1</sup>, Rihachiro Nakashima<sup>1</sup>, Tetsuo Kan<sup>2</sup>, Hidetoshi Takahashi<sup>1</sup>  
<sup>1</sup>Keio University, JAPAN, <sup>2</sup>University of Electro-Communications, JAPAN
- T60-f AN ELECTROCHEMICAL VELOCITY-TYPE VECTOR HYDROPHONE FOR DIRECT DETECTION OF UNDERWATER ACOUSTIC PARTICLE VELOCITY**  
Nan Zhang, Xiaoyu Qi, Zhenchuan Yang, Chengchen Gao  
Peking University, CHINA
- W58-f AN IN-DEPTH ACOUSTIC CHARACTERIZATION MAP AT THE WAFER LEVEL UTILIZING ADVANCED OPTICAL MICROPHONE**  
Luigi Barretta<sup>1</sup>, Rossana Scaldasferri<sup>1</sup>, Alessandro S. Savoia<sup>2</sup>, Carlo L. Prelini<sup>1</sup>, Carla M. Lazzari<sup>1</sup>, Yul Koh<sup>3</sup>,  
Sagnik Ghosh<sup>3</sup>, Daniel S-H. Chen<sup>3</sup>, Andrea Di Matteo<sup>1</sup>, Marco Ferrera<sup>1</sup>, Domenico Giusti<sup>1</sup>  
<sup>1</sup>STMicroelectronics, ITALY, <sup>2</sup>Roma Tre University, ITALY,  
<sup>3</sup>Agency for Science, Technology and Research (A\*STAR), SINGAPORE
- M58-f BIOLOGICAL BONE AGE ASSESSMENT VIA PMUTS**  
Nikita G. Lukhanin, Fan Xia, Sean R. Isomatsu, Megan Teng, Liwei Lin  
University of California, Berkeley, USA
- T61-f DYNAMIC PMUTS PACKAGING USING SHAPE MEMORY ALLOY**  
Megan Teng, Peggy Tsao, Wei Yue, Fan Xia, Peisheng He, Yande Peng, Liwei Lin  
University of California, Berkeley, USA
- W59-f FABRICATION OF WAFER-BONDED 2D CMUT ARRAY WITH GLASS-FILLED TRENCHES**  
Chaerin Oh<sup>1</sup>, Seyoung Park<sup>1</sup>, Jongcheol Park<sup>2</sup>, Joontaek Jung<sup>2</sup>, Hyunjoo J. Lee<sup>1</sup>,  
<sup>1</sup>Korea Advanced Institute of Science and Technology (KAIST), KOREA and  
<sup>2</sup>National NanoFab Center, KOREA
- M59-f MONOLITHIC INTEGRATION OF ACOUSTIC ENRICHMENT AND RESONANT SENSING FOR TRACE DETECTION OF MICRO-PLASTICS**  
Yue Wang<sup>1</sup>, Wenqi Fan<sup>1</sup>, Liang Huang<sup>1</sup>, Jingui Qian<sup>1,2</sup>  
<sup>1</sup>Hefei University of Technology, CHINA, <sup>2</sup>Southeast University, CHINA
- T62-f NONINVASIVE ARTERIAL MOTION MONITORING WITH ALUMINUM NITRIDE-BASED PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCER**  
Yunhao Wang<sup>1,2,3</sup>, Junxiang Cai<sup>1,2,3</sup>, Tao Wu<sup>1,2,3</sup>, Xinxin Li<sup>1,2,3</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>ShanghaiTech University, CHINA,  
<sup>3</sup>University of Chinese Academy of Sciences, CHINA

- W60-f PLANETARY GEAR FAULT DETECTION USING PMUT BASED ACOUSTIC EMISSION SENSOR**  
Hanjie Dou, Tao Liu, Xiao Yang, Zhihao Li, Jixuan Zhang, Jiaqian Yang, Yuchen Mao, Xiaojing Mu  
*Chongqing University, CHINA*
- M60-f REAL-TIME DIFFERENTIAL ULTRASONIC FLOW SENSING ENABLED BY PMUT PHASED ARRAY WITH A NOVEL V-SHAPED BEAM PATTERN**  
Yufeng Gao, Xili Wang, Lei Zhao, Yipeng Lu  
*Peking University, CHINA*
- T63-f STRAIN-INSENSITIVE, STRETCHABLE THERMOACOUSTIC LOUDSPEAKER WITH ENTANGLED CARBON NANOTUBES**  
Sangjun Sim<sup>1</sup>, Eunhwan Jo<sup>2</sup>, Hyungyu Im<sup>1</sup>, Kyubin Bae<sup>1</sup>, Yunsung Kang<sup>3</sup>, Jongbaeg Kim<sup>1</sup>  
<sup>1</sup>Yonsei University, KOREA, <sup>2</sup>Kumoh National Institute of Technology, KOREA, <sup>3</sup>Kyungpook National University, KOREA

## f - MEMS Physical & Chemical Sensors

### Other Physical Sensors

- W61-f A HIGH EFFICIENCY MINIATURE MULTI-TIP CORONA CHARGER FOR NANOPARTICLE SENSORS**  
Chandrashekhar Choudhary, Tao Li  
*University of Cincinnati, USA*
- M61-f A HIGH SENSITIVITY SANDWICH-TYPE TERAHERTZ METASURFACE MICROFLUIDIC SENSOR FOR DIRECTLY DETECTION OF AQUEOUS SOLUTIONS**  
Yunhao Cao<sup>1</sup>, Hongshun Sun<sup>1</sup>, Yusa Chen<sup>1</sup>, Lijun Ma<sup>1</sup>, Liye Li<sup>1</sup>, Shixiong Liang<sup>2</sup>, Shengxiao Jin<sup>3</sup>, Wengang Wu<sup>1</sup>  
<sup>1</sup>Peking University, CHINA, <sup>2</sup>Tianjin University, CHINA, <sup>3</sup>National Key Laboratory of Science and Technology on Space Microwave, CHINA
- T64-f SELF-ADAPTIVE 2-DOF HYBRID WEAKLY COUPLED SYSTEM WITH MEMS BAW RESONATORS**  
Bernardo P. Madeira<sup>1</sup>, Ruopeng Chen<sup>1</sup>, Linlin Wang<sup>1</sup>, Chen Wang<sup>1</sup>, Fadwa El Jaouhari<sup>2</sup>, Yuan Wang<sup>3</sup>, Javier Collado<sup>1</sup>, Chun Zhao<sup>4</sup>, Georges Gielen<sup>1</sup>, Michael Kraft<sup>1</sup>  
<sup>1</sup>KU Leuven, BELGIUM, <sup>2</sup>University of Montpellier, FRANCE, <sup>3</sup>University of Macau, CHINA, <sup>4</sup>University of York, UK
- W62-f HIGH-PERFORMANCE MEMS MAGNETIC SENSOR BASED ON A SMART TUNABLE RESONATOR**  
Hanin Amara, Nadeem Tariq Beigh, Nouha Alcheikh  
*Khalifa University, UAE*
- M62-f MICROELECTROMECHANICAL 2-BIT LOGIC DEVICE VIA FREQUENCY COMB GENERATION**  
Hongyu Chen<sup>1,2</sup>, Dongyang Chen<sup>1</sup>, Chen Wang<sup>2</sup>, Ronghua Huan<sup>1</sup>, Michael Kraft<sup>2</sup>, Jin Xie<sup>1</sup>  
<sup>1</sup>Zhejiang University, CHINA, <sup>2</sup>KU Leuven, BELGIUM
- T65-f MULTI-DEGREE OF FREEDOM AND LARGE SCAN RANGE ELECTROTHERMAL MICROMIRROR INTEGRATED WITH THERMAL CONVECTION-BASED MIRROR PLATE POSITION SENSORS**  
Anrun Ren<sup>1,2</sup>, Yingtao Ding<sup>1,2</sup>, Hengzhang Yang<sup>1,2</sup>, Ziyue Zhang<sup>1,2</sup>, Hui Zhao<sup>1,2</sup>, Huikai Xie<sup>1,2</sup>  
<sup>1</sup>Beijing Institute of Technology, CHINA, <sup>2</sup>Ministry of Education of China, CHINA
- W63-f SURFACE INSPECTION OF LIQUID AND ICE LAYERS USING A WIDE-BANDWIDTH AND HIGHLY DIRECTIONAL ULTRASONIC TRANSDUCER**  
Junhao Wang, Jiao Xia, Aocheng Bao, Chong Yang, Ting Xie, Jinghan Gan, Lei Zhao, Wei Wang, Yipeng Lu  
*Peking University, CHINA*

**g - MEMS/NEMS for Optical, RF and Electromagnetics**  
**Electrical Field and Magnetic Field Sensors and Transducers**

- T66-g A CONTACTLESS DC CURRENT SENSOR BASED ON THIN-FILM LITHIUM NIOBATE S0-MODE LAMB WAVE RESONATOR**  
Wenwei Gao<sup>1</sup>, Hanlun Guan<sup>1</sup>, Chenyao Zhu<sup>2</sup>, Huikai Xie<sup>1,3</sup>, Feng Gao<sup>4</sup>, Xiaoyi Wang<sup>1,3</sup>  
<sup>1</sup>Beijing Institute of Technology, CHINA, <sup>2</sup>Baotou INST Magnetic New Materials Co., Ltd., CHINA,  
<sup>3</sup>BIT Chongqing Institution of Microelectronic and Micrsystem, CHINA, <sup>4</sup>ZJU-Hangzhou Global Scietific and Technological Innovation Center, CHINA

**g - MEMS/NEMS for Optical, RF and Electromagnetics**  
**Free Space Optical Components & Systems**

- W64-g MERGING MEMS VAPOR CELLS WITH METASURFACES FOR NEXT-GEN CHIP-SCALE ATOMIC CLOCKS**  
Ponrapee Pruthongs<sup>1</sup>, Yuto Kataoka<sup>1</sup>, Motoaki Hara<sup>2</sup>, Kentaro Iwami<sup>1</sup>  
<sup>1</sup>Tokyo University of Agriculture and Technology, JAPAN,  
<sup>2</sup>National Institute of Information and Communications Technology, JAPAN
- M63-g MICROFABRICATED ROBOT HAND SYSTEM INTEGRATED WITH TRANSPARENT SUCTIONING HEAD AND DUAL-METALENS CAMERA**  
Atsushi Hasegawa<sup>1</sup>, Keisuke Ozawa<sup>2</sup>, Yuki Abe<sup>2</sup>, Koichiro Matsumoto<sup>2</sup>, Mineki Taoka<sup>2</sup>, Takeshi Yamagishi<sup>2</sup>, Kentaro Iwami<sup>1</sup>  
<sup>1</sup>Tokyo University of Agriculture and Technology, JAPAN, <sup>2</sup>Samsung R&D Institute Japan, JAPAN
- T67-g POLARIZATION-INDEPENDENT WAVELENGTH-MULTIPLEXED FULL-COLOR METASURFACE HOLOGRAM BASED ON HIGH-ASPECT-RATIO SILICON NITRIDE NANOPILLARS**  
Masakazu Yamaguchi, Tetsuhito Omori, Mitsutoshi Hada, Junpei Beppu, Kentaro Iwami  
Tokyo University of Agriculture and Technology, JAPAN
- W65-g SIGNIFICANTLY ENHANCED BANDWIDTH OF A DUAL-AXIS PIEZOELECTRIC QUASI-STATIC MEMS MIRROR FOR MINIATURIZED LASER TRACKING**  
Anna Li<sup>1,2</sup>, Hao Huang<sup>1,2</sup>, Yongquan Su<sup>1,3</sup>, Cheng Zhang<sup>1,2</sup>, Jiachang Zhang<sup>1,2</sup>, Yonggui Zhang<sup>1</sup>, Lihao Wang<sup>1,4</sup>, Yichen Liu<sup>1,3</sup>, Yang Wang<sup>1,2</sup>, Zhenyu Wu<sup>1,2,3,4,5</sup>  
<sup>1</sup>Shanghai Institute of Microsystem and Information Technology, CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA, <sup>3</sup>Shanghai Industrial  $\mu$ Technology Research Institute, CHINA,  
<sup>4</sup>Shanghai MExpert Technologies Co., Ltd, CHINA, <sup>5</sup>Shanghai University, CHINA

**g - MEMS/NEMS for Optical, RF and Electromagnetics**  
**Infrared (IR) Sensors and Imaging Systems**

- M64-g CMOS MICROMACHINED CAPACITIVE SENSORS FOR UNCOOLED INFRARED DETECTION**  
Yan-Cheng Liu, Michael S.-C. Lu  
National Tsing Hua University, TAIWAN
- T68-g FABRICATION OF FLEXIBLE NEAR-INFRARED-TO-VISIBLE LIGHT UPCONVERSION DEVICE ENHANCED BY 3D PRINTED MICROLENS ARRAY FOR LOW-COST NEAR-INFRARED IMAGING SENSORS**  
Nankun Zhang<sup>1</sup>, Po-Han Huang<sup>1,2</sup>, Jerker Widengren<sup>1</sup>, Haichun Liu<sup>1</sup>, Frank Niklaus<sup>1</sup>  
<sup>1</sup>KTH Royal Institute of Technology, SWEDEN, <sup>2</sup>NTHU National Tsing Hua University, TAIWAN
- W66-g NARROW ELECTRODE SPACING FOR ENHANCED SENSITIVITY OF PTSI/P-SI NANO HOLE-ARRAY MID-INFRARED PHOTODETECTOR**  
Elyas A. Ashenafi<sup>1</sup>, Daiji Noda<sup>2</sup>, Ryo Ohta<sup>2</sup>, Tetsuo Kan<sup>1</sup>  
<sup>1</sup>University of Electro-Communications, JAPAN, <sup>2</sup>Micromachine Center, JAPAN



- M65-g PLASMONICALLY ENHANCED ALSCN NANOPlates AS UNCOOLED AND ULTRA-FAST SINGLE-PIXEL DETECTORS FOR IR IMAGING**  
Aurelio Venditti, Enise F. Altin, Walter Gubinelli, Farah Ben Ayed, Luca Colombo, Pietro Simeoni, Ben Davaji, Matteo Rinaldi  
*Northeastern University, USA*

**g - MEMS/NEMS for Optical, RF and Electromagnetics**

**Manufacturing for Electromagnetic Transducers**

- T69-g MINIATURIZED ELECTROMAGNETIC ACTUATOR FOR TACTILE DISPLAY DEVICES WITH HIGH SPATIAL RESOLUTION**  
Hussein S. Musa, Shamin Sadrafshari, Uriel Martinez- Hernandez, Ali Mohammadi  
*University of Bath, UK*

**g - MEMS/NEMS for Optical, RF and Electromagnetics**

**MEMS for Timing & Frequency Control**

- W67-g GEOMETRICALLY MODIFIED SILICON RESONATORS WITH SUB-PPM LINEAR TEMPERATURE COEFFICIENT OF FREQUENCY**  
Ashudeep<sup>1</sup>, Azadeh Jafari<sup>1</sup>, Abid Ali<sup>1</sup>, Amirmohammad Zare<sup>1</sup>, Siddharth Kumanduri<sup>2</sup>, Anosh Daruwalla<sup>2</sup>, Behraad Bahreyni<sup>1</sup>  
*<sup>1</sup>Simon Fraser University, CANADA, <sup>2</sup>Stathera, Inc., CANADA*

- M66-g HIGH-PERFORMANCE PIEZOELECTRIC MEMS RESONATORS AND OSCILLATORS LEVERAGING ADVANCED HIGH-ORDER SUPPORT TRANSDUCER TOPOLOGIES**  
You-Ting Lin, Chin-Yu Chang, Sheng-Shian Li  
*National Tsing Hua University, TAIWAN*

- T70-g INNOVATING ST-CUT QUARTZ WITH MEMS: HIGH Q SMALL RESONATORS WITH HIGH OVEN GAIN AND LOW POWER OVENIZATION**  
Bokyung Suh, Xinyi Fang, Gianluca Piazza  
*Carnegie Mellon University, USA*

**g - MEMS/NEMS for Optical, RF and Electromagnetics**

**Photonic Components & Systems**

- W68-g A TIP-TILT-PISTON PIEZOELECTRIC MICROMIRROR WITH A DOUBLE-S SHAPED UNIMORPH SPUTTERED PZT STRUCTURE**  
Ke Cao<sup>1,2</sup>, Qincheng Zheng<sup>1,2</sup>, Bo Xie<sup>1,2</sup>, Ning Deng<sup>1,2</sup>, Hui Shang<sup>1,2</sup>, Hui Zhao<sup>1,2</sup>, Yao Lu<sup>1,2</sup>, Huikai Xie<sup>1,2</sup>  
*<sup>1</sup>Beijing Institute of Technology, CHINA, <sup>2</sup>Ministry of Education of China, CHINA*

- M67-g ASYMMETRICAL MEMS MIRROR FOR COMPACT-SIZE AND WIDE FIELD-OF-VIEW AR DISPLAY EQUIPMENT**  
Yusuke Sakata, Masaya Nakazumi, Kensuke Mihara  
*Panasonic Industry Co., Ltd, JAPAN*

- T71-g CHARACTERIZATION OF ULTRA-SENSITIVE NEMS PHOTONIC MODULATORS – OVERCOMING PRECISION MEASUREMENT CHALLENGES**  
Andrew Cochran, Harshvardhan Gupta, Maysamreza Chamanzar, Gianluca Piazza  
*Carnegie Mellon University, USA*

- W69-g DEVELOPMENT OF THE MULTIPOINT FOCUSING METASURFACE FOR LASER-INDUCED BREAKDOWN SPECTROSCOPY**  
Satoshi Ikezawa<sup>1</sup>, Kentaro Iwami<sup>2</sup>, Eiji Iwase<sup>1</sup>  
*<sup>1</sup>Waseda University, JAPAN, <sup>2</sup>Tokyo University of Agriculture and Technology, JAPAN*

- M68-g**    **EFFICIENT MID-INFRARED ACOUSTO-OPTIC MODULATION IN SILICON PHOTONIC DEVICES USING LITHIUM NIOBATE**  
 Siyu Xu<sup>1</sup>, Weixin Liu<sup>1</sup>, Chengkuo Lee<sup>1,2</sup>  
<sup>1</sup>National University of Singapore, SINGAPORE, <sup>2</sup>National Centre for Advanced Integrated Photonics, SINGAPORE
- T72-g**    **PLASMON-ENHANCED GRAPHENE PHOTOTHERMOELECTRIC DETECTOR FOR MID-INFRARED SENSING APPLICATIONS**  
 Pen-Sheng Lin<sup>1</sup>, Shayan Parhizkar<sup>2,3</sup>, Arne Quellmalz<sup>1</sup>, Nour Negm<sup>2,3</sup>, Stephan Suckow<sup>3</sup>, Aron Cummings<sup>4</sup>, Alba Centeno<sup>5</sup>, Amaia Zurutuza<sup>5</sup>, Max Lemme<sup>2,3</sup>, Frank Niklaus<sup>1</sup>, Kristinn Gylfason<sup>1</sup>  
<sup>1</sup>KTH Royal Institute of Technology, SWEDEN, <sup>2</sup>RWTH Aachen University, GERMANY, <sup>3</sup>AMO GmbH, GERMANY, <sup>4</sup>Catalan Institute of Nanoscience and Nanotechnology, SPAIN, <sup>5</sup>Graphenea S.A., SPAIN
- W70-g**    **SUB-MICRON-THICK SI MEMBRANE SURFACE PLASMON COUPLING STRUCTURE FOR REDUCING UNWANTED PROPAGATION MODES INSIDE SI**  
 Tetsuya Ozawa, Abubakr Eslam, Tetsuo Kan  
 University of Electro-Communications, JAPAN

## g - MEMS/NEMS for Optical, RF and Electromagnetics

### RF MEMS Components & Systems

- M69-g**    **3.5 GHZ THERMO-ACOUSTIC PHASE MODULATOR BASED ON Z-CUT LINBO<sub>3</sub> THIN FILM**  
 Xuankai Xu<sup>1</sup>, Yushuai Liu<sup>1</sup>, Ruihong Xiong<sup>1</sup>, Tao Wu<sup>1,2</sup>  
<sup>1</sup>ShanghaiTech University, CHINA, <sup>2</sup>Chinese Academy of Sciences, CHINA, <sup>3</sup>Shanghai Engineering Research Center of Energy Efficient and Custom AI IC, CHINA
- T73-g**    **6 GHZ LITHIUM NIOBATE ON INSULATOR LOW-LOSS SAW DELAY LINE ADAPTING NON-LEAKY COMPOSITE WAVEGUIDE MODE**  
 Zhi-Qiang Lee<sup>1</sup>, Sung-Yuan Huang<sup>1</sup>, Tzu-Hsuan Hsu<sup>1,2</sup>, Joshua Campbell<sup>2</sup>, Jack Kramer<sup>2</sup>, Ruo Chen Lu<sup>2</sup>, Ming-Huang Li<sup>1</sup>  
<sup>1</sup>National Tsing Hua University, TAIWAN, <sup>2</sup>University of Texas, Austin, USA
- W71-g**    **A 4.3 GHZ LITHIUM NIOBATE ON INSULATOR WIDEBAND SURFACE ACOUSTIC WAVE DELAY LINE WITH MULTI-MODE COMPOSITION**  
 Sung-Yuan Huang<sup>1</sup>, Zhi-Qiang Lee<sup>1</sup>, Tzu-Hsuan Hsu<sup>1,2</sup>, Joshua Campbell<sup>2</sup>, Jack Kramer<sup>2</sup>, Ruo Chen Lu<sup>2</sup>, Ming-Huang Li<sup>1</sup>  
<sup>1</sup>National Tsing Hua University, TAIWAN, <sup>2</sup>University of Texas, Austin, USA
- M70-g**    **A KU-BAND ACOUSTIC FILTER WITH IL OF 2.0 DB AND FBW OF 13.1% BASED ON Z-CUT LITHIUM NIOBATE THIN FILM**  
 Fuhong Lin<sup>1</sup>, Yiming Wang<sup>1</sup>, Kai Yang<sup>1</sup>, Jiming Fang<sup>1</sup>, Jie Chen<sup>1</sup>, Meijuan Li<sup>1</sup>, Chengjie Zuo<sup>1,2,3</sup>  
<sup>1</sup>University of Science and Technology of China, CHINA, <sup>2</sup>YUNTA Technologies, CHINA, <sup>3</sup>ANUKI Technologies, CHINA
- T74-g**    **DESIGN AND IMPLEMENTATION OF A GUIDED SURFACE ACOUSTIC WAVE DIRECTIONAL COUPLER FOR PHONONIC INTEGRATED CIRCUITS**  
 Jack Guida, Siddhartha Ghosh  
 Northeastern University, USA
- W72-g**    **DOUBLE-SIDED HEAT DISSIPATION FOR ACOUSTIC RESONATORS BASED ON LITHIUM NIOBATE ON SAPPHIRE**  
 Fangsheng Qian, Zijun Ren, Wei Wei, Jiashuai Xu, Junyan Zheng, Xingyu Liu, Yansong Yang  
 Hong Kong University of Science and Technology, HONG KONG
- M71-g**    **EXPERIMENTAL STUDY OF Q-BOOSTING IN TPOS RESONATORS USING CONVENTIONAL AND COUPLED RESONATOR ARCHITECTURE**  
 Raeann Jesma R<sup>1</sup>, Ken-Wei Tang<sup>2</sup>, Sheng-Shian Li<sup>2</sup>, Gayathri Pillai<sup>1</sup>  
<sup>1</sup>Indian Institute of Science, INDIA, <sup>2</sup>National Tsing Hua University, TAIWAN



- T75-g SOLIDLY MOUNTED LONGITUDINALLY EXCITED A1 MODE RESONATOR BASED ON THE LINBO<sub>3</sub>/Metal/SIO<sub>2</sub>/SIC**  
Xiaoli Fang<sup>1,2</sup>, Jinbo Wu<sup>3</sup>, Shibin Zhang<sup>1,2</sup>, Pengcheng Zheng<sup>1</sup>, Xinjian Ke<sup>1,2</sup>, Juxing He<sup>1,2</sup>, Mijing Sun<sup>1</sup>, Xin Ou<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA, <sup>3</sup>Shanghai Xin Ou Integration Technology Company Ltd, CHINA

- W73-g SEALED CAVITY BULK ACOUSTIC WAVE RESONATOR WITH COUPLING AND TCF ENHANCEMENT**  
Jiashuai Xu, Zijun Ren, Yansong Yang  
Hong Kong University of Science and Technology, HONG KONG

## g - MEMS/NEMS for Optical, RF and Electromagnetics

### THz MEMS Components & Systems

- M72-g ANGLE-MULTIPLEXED TERAHERTZ FREQUENCY-SELECTIVE FINGERPRINT SENSOR: BROADBAND IDENTIFICATION OF CHIRAL ENANTIOMERS**  
Hongshun Sun<sup>1</sup>, Yunhao Cao<sup>1</sup>, Yusa Chen<sup>1</sup>, Liye Li<sup>1</sup>, Lijun Ma<sup>1</sup>, Shengxiao Jin<sup>2</sup>, Guodong Gu<sup>3</sup>, Zhihong Feng<sup>3</sup>, Wengang Wu<sup>1</sup>  
<sup>1</sup>Peking University, CHINA, <sup>2</sup>National Key Laboratory of Science and Technology on Space Microwave, CHINA, <sup>3</sup>National Key Laboratory of Solid-State Microwave Devices and Circuits, CHINA

## g - MEMS/NEMS for Optical, RF and Electromagnetics

### Other Electromagnetic MEMS/NEMS

- T76-g MULTI-DOF DYNAMIC MODELING OF FREQUENCY DRIFT AND PACKAGE OPTIMIZATION GUIDELINE FOR 2D MICROMIRRORS**  
Ze-Yu Zhou, Kai-Ming Hu, Er-Qi Tu, Xiao-Yong Fang  
Shanghai Jiao Tong University, CHINA

## h - Micro- & Nanofluidics

### Biological and Medical Microfluidics and Nanofluidics

- M73-h DRILLING BACTERIAL MOTILITY IN CONFINED SPACES INVESTIGATED USING SUB-MICRON WIDTH FLUIDIC CHANNELS**  
Yoshiki Shimada, Aoba Yoshioka, Naoki Uemura, Daisuke Nakane, Tetsuo Kan  
University of Electro-Communications, JAPAN
- T77-h IN VITRO STUDY OF LUNG CONNECTIVE TISSUE STIFFNESS AT VARIOUS OXYGEN TENSIONS AND GRADIENTS**  
Heng-Hua Hsu<sup>1</sup>, Ping-Liang Ko<sup>1,2</sup>, Dao-Ming Chang<sup>1</sup>, Yi-Chung Tung<sup>1</sup>  
<sup>1</sup>Academia Sinica, TAIWAN, <sup>2</sup>National Taiwan University, TAIWAN
- W74-h LOW-COST, HIGH-PERFORMANCE DIGITAL MICROFLUIDIC CHIPS FOR REAL-TIME PCR USING REWORKABLE SUBSTRATES**  
Zhaoduo Tong<sup>1,2</sup>, Chuanjie Shen<sup>1,2</sup>, Xin Xu<sup>1</sup>, Weidong Yang<sup>1,2</sup>, Yan Li<sup>3</sup>, Fangliang Xu<sup>1,2</sup>, Zhenhua Wu<sup>1,2</sup>, Lin Zhou<sup>1,2</sup>, Hongju Mao<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA, <sup>3</sup>Fudan University, CHINA
- M74-h MICROFLUIDIC PLATFORM FOR HIGH-RESOLUTION IMAGING OF OOMYCETE SPORES EXPOSED TO OSMOTIC STRESS**  
Yiling Sun, Ayelen Tayagui, Ashley Garrill, Volker Nock  
University of Canterbury, NEW ZEALAND

- T78-h** **SIMULTANEOUS ANALYSIS OF ALZHEIMER'S DISEASE BIOMARKERS USING CASCADED MICROFLUIDIC CAPTURE ARRAYS**  
Pengcheng Zhao<sup>1,2</sup>, Jieyu Wang<sup>1,2</sup>, Jiangyu Ji<sup>1,2</sup>, Huiying Liu<sup>2</sup>, Guowu Ma<sup>2</sup>, Hongju Mao<sup>1,3</sup>, Jianan Hui<sup>1,3</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>Dalian Medical University, CHINA, <sup>3</sup>University of Chinese Academy of Sciences, CHINA

### **h - Micro- & Nanofluidics**

#### **Generic Microfluidics & Nanofluidics**

- W75-h** **HIGH-THROUGHPUT ACOUSTIC SORTING OF CELLULAR-SIZED MICROPARTICLES IN 3D MICROFLUIDIC CHANNELS**  
Akash Roy, Baptiste Neff, Kianoush Sadeghian Esfahani, Anik Sengupta, Eun S. Kim  
*University of Southern California, USA*

### **h - Micro- & Nanofluidics**

#### **Integrated/Embedded Microfluidics and Nanofluidic Systems & Platforms**

- M75-h** **GUT-ON-A-CHIP REVEALS REDUCED NANOPLASTIC-INDUCED INFLAMMATION THROUGH ENHANCED PERISTALSIS**  
Junlei Han<sup>1,2</sup>, Huimin Li<sup>1,2</sup>, Zhipeng Xu<sup>3</sup>, Jun Chen<sup>1</sup>, Chaoyang Shi<sup>2</sup>, Li Wang<sup>1</sup>  
<sup>1</sup>Qilu University of Technology, CHINA, <sup>2</sup>Tianjin University, CHINA, <sup>3</sup>University of Sheffield, UK
- T79-h** **DESIGN AND STUDY OF A PUMP-FREE MICROFLUIDIC DEVICE FOR SINGLE-CELL ELECTRO-ROTATION DRIVEN BY ELECTRO-OSMOTIC FLOW**  
Jianming Shu, Xijiang Wang, Yue Wang, Jingui Qian, Liang Huang  
Hefei University of Technology, CHINA
- W76-h** **RAPID AMPLIFICATION OF SINGLE-STRANDED DNA BY ON-BEAD PLASMONIC PCR IN AN AUTOMATED MICROFLUIDIC SYSTEM**  
Anni Hu, Yang Bu, Yuze Liu, Yung Ching Lee, Levent Yobas  
Hong Kong University of Science and Technology, HONG KONG

### **h - Micro- & Nanofluidics**

#### **Manufacturing for Micro- and Nanofluidics**

- M76-h** **EFFICIENT FABRICATION OF SINGLE-UNIT HYBRID PAPER/PDMS MICROFLUIDICS WITH CONTROLLABLE BONDING STRENGTH FOR OIL/WATER SEPARATION AND GRADIENT GENERATOR**  
Phong Vi Lam, Pin-Chuan Chen  
National Taiwan University of Science and Technology, TAIWAN
- T80-h** **INTEGRATED NANOPORE DEVICE FOR ELECTRONIC SINGLE MOLECULE TRAPPING IN FEMTOLITRE CAVITIES FABRICATED BY SELF-ALIGNED ETCHING**  
Xinxin Liu<sup>1</sup>, Valentin Dubois<sup>1</sup>, Shyamprasad N. Raja<sup>1</sup>, Shaufei Cheng<sup>2</sup>, Yuming Yeh<sup>2</sup>, Yingzong Juang<sup>2</sup>, Hanting Hsueh<sup>2</sup>, Weileun Fang<sup>3</sup>, Göran Stemme<sup>1</sup>, Frank Niklaus<sup>1</sup>  
<sup>1</sup>KTH Royal Institute of Technology, SWEDEN, <sup>2</sup>Taiwan Semiconductor Research Institute, TAIWAN, <sup>3</sup>National Tsing Hua University, TAIWAN

### **h - Micro- & Nanofluidics**

#### **Materials for Micro & Microfluidics**

- W77-h** **FABRICATING STRETCHABLE LIQUID METAL CIRCUITS WITH A PHYSICAL SACRIFICIAL LAYER**  
Kaushal J. Sumaria, Tingyi Liu  
*University of Massachusetts, Amherst, USA*

## h - Micro- & Nanofluidics

### Other Micro- and Nanofluidics

- M77-h A HIGH-ACCURACY PAIR MATCHING METHOD FOR DROPLET MICROFLUIDICS WITH TWO-STATE MEASUREMENT POINTS**  
Akihiro Isozaki<sup>1</sup>, Yusuke Nasu<sup>2,3</sup>, Naohiro Terasaka<sup>4</sup>  
<sup>1</sup>Ritsumeikan University, JAPAN, <sup>2</sup>University of Tokyo, JAPAN, <sup>3</sup>Academia Sinica, TAIWAN, <sup>4</sup>Institute of Science Tokyo, JAPAN
- T81-h A NANOFORREST-INTEGRATED MICROFLUIDIC COOLING DEVICE FOR HIGH-POWER CHIPS**  
Qirui Zhang<sup>1,2</sup>, Zizhen Wang<sup>1,2</sup>, Qiming Guo<sup>1,2,3</sup>, Huabin Yang<sup>1,2,3</sup>, Yizhi Shi<sup>1,2,3</sup>, Na Zhou<sup>1,2</sup>, Xiaoli Tian<sup>1,2</sup>, Haiyang Mao<sup>1,2</sup>  
<sup>1</sup>Chinese Academy of Sciences (CAS), CHINA, <sup>2</sup>University of Chinese Academy of Sciences, CHINA, <sup>3</sup>Shandong Key Laboratory of Intelligent Sensing Chip and System, CHINA
- W78-h AN ELECTRO-DEWETTING BASED MICROFLUIDIC PIXEL DEVICE**  
Qining Leo Wang, Chang-Jin "CJ" Kim  
University of California, Los Angeles, USA

## i - Open Poster

- T82-i IMPEDANCE SENSING OF MIGRATING CELLS IN MICROCHANNEL WITH TOPOGRAPHY GUIDANCE**  
Xiao Hong, Stella W. Pang  
City University of Hong Kong, HONG KONG
- W79-i MICROFABRICATION OF BIORESORBABLE ZNO TFTS FOR UV-RESPONSIVE AND SUSTAINABLE ELECTRONICS**  
Deniz Aktas, Levent Beker  
Koç University, TURKEY
- M78-i SILICON ELECTRON EMITTER INTEGRATED WITH LED FOR X-RAY GENERATOR WITH HIGH EMISSION CURRENT AND LONG LIFETIME**  
Hyo-jin Nam, Eunju Hong, Giwon Lee, Jinah Kim, Youngsik Kim, Byungkee Lee  
LG Electronics, KOREA
- T83-i MACHINE LEARNING TO ENABLE GAS CLASSIFICATION FOR MEMS GAS SENSING PLATFORM**  
Changting Xu<sup>1</sup>, Jiezhi Yang<sup>1,2</sup>, Philip Papageorgiou<sup>1</sup>, Kostadin Djordjev<sup>1</sup>, Jim Cheng<sup>1</sup>  
<sup>1</sup>Qualcomm Technologies Inc, USA, <sup>2</sup>Harvard University, USA
- W80-i SILENT SPEECH INTERFACE ON THE HAND USING LIQUID METAL AND SOFT MATERIALS**  
Yuta Kurotaki<sup>1,2</sup>, Reitaro Yoshida<sup>2</sup>, Shusuke Yamakoshi<sup>1</sup>, Yutaka Isoda<sup>1</sup>, Tamami Takano<sup>1</sup>, Yuji Isano<sup>1</sup>, Yusuke Miyake<sup>2</sup>, Kentaro Kuribayashi<sup>2</sup>, Hiroki Ota<sup>1</sup>  
<sup>1</sup>Yokohama National University, JAPAN, <sup>2</sup>GMO Pepabo, Inc., JAPAN
- M79-i PACKAGE STRUCTURE FOR GAS SENSOR BASED ON THERMAL INFRARED DETECTION**  
Luca Maggi, Marco Del Sarto, Marco Ferrera, Michele Dellutri, Giuseppe Bruno, Silvia Nicoli, Matteo Birondi, Anita Previdi  
STMicroelectronics, ITALY
- T84-i SELF-ASSEMBLED MICRO-NANO STRUCTURES MANUFACTURING STRATEGY BASED ON CMOS-COMPATIBLE SU8 PHOTORESIST**  
Zhi-Qi Dong, Kai-Ming Hu, Rui-Jia Xiang, Tian-Yu Zhao, Jun-Feng Zhou, Guang Meng, Wen-Ming Zhang  
Shanghai Jiao Tong University, CHINA

- W81-i A ROBUST PIEZORESISTIVE PRESSURE SENSOR**  
Hung-Lin Yin, Yen-Liang Lin, Wu-Hsing Yi  
*Asia Pacific Microsystems, Inc, TAIWAN*
- M80-i GAP VARIATION ESTIMATION IN MEMS GYROSCOPE SUBJECTED TO MECHANICAL STRESS**  
Davide Bernabucci, Patrick Fedeli, Gianfranco Javier Yallico Sanchez, Luca Guerinoni, Luca Falorni  
*STMicroelectronics, ITALY*
- T85-i LASER DOPPLER VELOCIMETER USING ON-CHIP MICRO FRINGE PATTERN PROJECTOR FOR MICROFLUIDICS**  
Hiroki Kumon, Masatoshi Takahashi, Kazuyoshi Hirose, Shu Honma, Hiroki Kamei, Tomohiko Hirano, Masakazu Katsumata, Hidenao Yamada  
*Hamamatsu Photonics K.K., JAPAN*
- W82-i LEAD-FREE PIEZOELECTRIC MEMS ACOUSTIC EMISSION SENSOR COMPATIBLE WITH COMMERCIAL BULK AE SENSORS**  
Yongfang Li, Yuki Ueda, Takashi Usui, Kazuo Watabe  
*Toshiba Corporation, JAPAN*
- M81-i WORLD'S SMALLEST COMMERCIALIZED PARTICULATE MATTER SENSOR ENABLED BY AN INNOVATIVE SEMICONDUCTOR PACKAGE DESIGN**  
Tobias Henn<sup>1</sup>, Steve Lin<sup>1</sup>, Nico Chou<sup>1</sup>, Wallace Chuang<sup>1</sup>, Chin Yi Cho<sup>1</sup>, Anna Kamolawat<sup>2</sup>, Martin Edel<sup>2</sup>, Joachim Friedl<sup>2</sup>, Florian Grabmaier<sup>3</sup>, Robert Weiss<sup>3</sup>  
<sup>1</sup>Robert Bosch Ltd., TAIWAN, <sup>2</sup>Robert Bosch GmbH, GERMANY, <sup>3</sup>Bosch Sensortec GmbH, GERMANY
- T86-i SINGLE-TRANSDUCER ULTRASONIC AIRFLOW-METER**  
Stefano Sanvito<sup>1</sup>, Marco Passoni<sup>2</sup>, Marco Ferrera<sup>2</sup>  
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- W83-i OPTIMIZATION OF THIN-FILM MAGNETOELECTRIC CANTILEVER THROUGH DUAL MODULATION OF MAGNETIC AND ELECTRIC BIAS FIELDS**  
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- M82-i NUMERICAL FLUID-STRUCTURE INTERACTION WORKFLOW FOR PATTERN COLLAPSE PREDICTION DURING SEMICONDUCTOR FABRICATION**  
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