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MEMS 2021 PROGRAM SCHEDULE

Day 1 - Monday, 25 January

Welcome Address

- 07:45 MEMS 2021 Conference Chairs**
Philip Feng, *University of Florida, USA*
Niclas Roxhed, *KTH Royal Institute of Technology, SWEDEN*
Haixia "Alice" Zhang, *Peking University, CHINA*

IEEE Electron Devices Society Robert Bosch Micro and Nano Electro Mechanical Systems Award

- 08:00 Award Recipient**
Chang-Jin "CJ" Kim
University of California, Los Angeles, USA

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Massachusetts Institute of Technology, USA

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⁵Shanghai Research Center for Brain Science and Brain-Inspired Intelligence, CHINA

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¹National Institute of Advanced Industrial Science and Technology (AIST), JAPAN and
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¹University of Central Florida, USA, ²AxoSim Inc., USA, and ³Tulane University, USA

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¹Chinese Academy of Sciences (CAS), CHINA and ²Jiangsu Hinoaic Technologies Co., Ltd, CHINA
- 12:55 A NEW SCHEME TO ENHANCE/DECREASE SENSITIVITY OF A MEMS RESONATOR USING PARAMETRIC MODULATION 286**
Chengxin Li¹, Jingqian Xi¹, Yuan Wang¹, Fangzheng Li¹, Lu Gao¹, Huafeng Liu¹, Chun Zhao¹, and Liangcheng Tu^{1,2}
¹Huazhong University of Science and Technology, CHINA and ²Sun Yat-sen University, CHINA

Session VIc - Optical MEMS

- 12:10 DESIGN AND FABRICATION OF A FORWARD VIEW SCANNER ON SIOB WITH LATCH STRUCTURE FOR IMPROVED VERTICAL ORIENTATION 290**
Dingkang Wang¹, Dong Zheng¹, Sanjeev Koppal¹, Boqian Sun², and Huikai Xie²
¹University of Florida, USA and ²Beijing Institute of Technology, CHINA

12:25	A HIGH-FREQUENCY TUNABLE PIEZOELECTRIC MEMS SCANNER FOR FAST ADDRESSING APPLICATIONS	294
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	Hamed Sattari ¹ , Alain Y. Takabayashi ¹ , Pierre Edinger ² , Peter Verheyen ³ , Kristinn B. Gylfason ² , Wim Bogaerts ^{3,4} , and Niels Quack ¹ ¹ École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND, ² KTH Royal Institute of Technology, SWEDEN, ³ IMEC, BELGIUM, and ⁴ Ghent University, BELGIUM	
12:55	SUBWAVELENGTH-ENGINEERED SUSPENDED SILICON WAVEGUIDE FOR LONG-WAVE INFRARED SENSING APPLICATIONS	302
	Weixin Liu, Yiming Ma, Yuhua Chang, Bowei Dong, Jingxuan Wei, and Chengkuo Lee <i>National University of Singapore, SINGAPORE</i>	
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Day 4 - Thursday, 28 January

Plenary Speaker Presentation IV

- 08:00** **EXPLORING SYNERGY BETWEEN DRUG DELIVERY AND MEMS** N/A
Anja Boisen
Technical University of Denmark, DENMARK

MEMS 2022 Announcement

09:00 - 09:05 Transition Break

Session VIIa - Biomarker Detection

- 09:05** **DETECTION OF METHYLATED CELL-FREE DNA FOR DIAGNOSIS AND PROGNOSIS OF OVARIAN CANCER ON AN INTEGRATED MICROFLUIDIC SYSTEM** 310
Yu-Jen Cheng, Chih-Hung Wang, and Gwo-Bin Lee
National Tsing Hua University, TAIWAN
- 09:20** **HIGH-ENTROPY ALLOY NANOPARTICLES AS CATALYST FOR NANOMOLAR-LEVEL DETECTION OF NEUROTRANSMITTER SEROTONIN IN SERUM** 314
Ming Li^{1,2}, Xuefeng Wang^{1,2}, Yarong Cheng^{1,3}, Li Su^{1,3}, Pengcheng Xu^{1,2}, and Xinxin Li^{1,2}
¹*Chinese Academy of Sciences (CAS), CHINA*, ²*University of Chinese Academy of Sciences, CHINA*, and ³*Shanghai Normal University, CHINA*
- 09:35** **AN INTEGRATED MICROFLUIDIC SYSTEM FOR EARLY DIASNOSIS OF BREAST CANCER IN LIQUID BIOPSY BY USING MICRORNA AND FET BIOSENSORS** 318
Chi-Chien Huang, Yu-Husan Kuo, Yi-Sin Chen, and Gwo-Bin Lee
National Tsing Hua University, TAIWAN

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Hanyong Dong, Dongsheng Li, Jintao Pang, Qian Zhang, and Jin Xie
Zhejiang University, CHINA
- 09:20** **MICROMACHINED SILICON CANTILEVER RESONATOR-BASED HUMIDITY SENSORS FOR MULTIFUNCTIONAL APPLICATIONS** 326
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Technische Universität Braunschweig, GERMANY
- 09:35** **A HIGHLY SENSITIVE HUMIDITY SENSOR BASED ON NANOFORESTS** 330
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¹*Chinese Academy of Sciences (CAS), CHINA*, ²*University of Chinese Academy of Sciences, CHINA* and ³*Jiangsu Hinoaic Technologies Co., Ltd, CHINA*

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- 09:05** **AN ANTI-ALIASING AND SELF-CLOCKING $\Sigma\Delta$ COBWEB-LIKE DISK RESONANT GYROSCOPE WITH EXTENDED INPUT RANGE** 334
Fang Chen¹, Zuxiang Wen², Dacheng Xu², Wei Zhou¹, and Xinxin Li¹
¹*Chinese Academy of Sciences (CAS), CHINA* and ²*Soochow University, CHINA*

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MODE-MATCHED GYROSCOPES BASED ON SUPPORT TRANSDUCER 338**
Ngoc Minh Nguyen, Chin-Yu Chang, Gayathri Pillai, and Sheng-Shian Li
National Tsing Hua University, TAIWAN

**09:35 A STUDY OF MODE-MATCHING AND ALIGNMENT IN PIEZOELECTRIC
DISK RESONATOR GYROS VIA FEMTOSECOND LASER ABLATION 342**
Zhenming Liu, Anosh Daruwalla, Benoit Hamelin, and Farrokh Ayazi
Georgia Institute of Technology, USA

09:50 – 09:55 Transition Break

Flash Poster Presentation I

09:55 - 10:30

Poster Session IV

10:30 – 11:30 Presentations are listed by topic category with their assigned number starting on page 19.

11:35 – 11:35 Transition Break

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Si-Yang Zheng
Carnegie Mellon University, USA

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AND INFORMATION SYSTEMS FOR THE INTERNET OF THINGS FOR
PRECISION AGRICULTURE 350**
Cherie R. Kagan¹, David P. Arnold², Mark G. Allen¹, and Roy H. Olsson¹
¹*University of Pennsylvania, USA* and ²*University of Florida, USA*

12:05 - 12:10 Transition Break

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Pengkun Xia, Jiawei Zuo, Shinhyuk Choi, Xiahui Chen, Jing Bai, and Chao Wang
Arizona State University, USA

**12:25 HIGHLY SENSITIVE AND HIGHLY MULTIPLEXED CELL-FREE DNA GENOTYPING
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Tatsuo Nakagawa, Junko Tanaka, Kazuma Matsui, Kunio Harada, Akiko Shiratori, and Chihiro Uematsu
Hitachi, Ltd., JAPAN

**12:40 A HIGH-THROUGHPUT NANOFUIDIC DEVICE FOR SMALL
EXTRACELLULAR VESICLE NANOPORATION 362**
Rui Hao¹, Zitong Yu¹, Jing Du¹, Hang Guo², Yi Zhang¹, and Hui Yang¹
¹*Chinese Academy of Sciences (CAS), CHINA* and ²*Xiamen University, CHINA*

12:55	EXTRACTION AND QUANTIFICATION OF MICRORNA BIOMARKERS FOR DIAGNOSIS OF OVARIAN CANCER ON AN INTEGRATED MICROFLUIDIC PLATFORM	366
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	Eldwin J. Ng ¹ , Jaibir Sharma ¹ , Eva Wai Leong Ching ¹ , Guoqiang Wu ¹ , Didier Pohl ² , and Olivier Vancauwenberghe ² ¹ Agency for Science, Technology and Research (A*STAR), SINGAPORE and ² Safran Tech, FRANCE	
12:25	MEMS MAGNETOMETER USING MAGNETIC FLUX CONCENTRATORS AND PERMANENT MAGNETS	374
	Federico Maspero ¹ , Gabriele Gatani ³ , Simone Cuccurullo ² , and Riccardo Bertacco ^{1,2} ¹ CNR-Istituto di Fotonica e Nanotecnologie, ITALY, ² Politecnico di Milano, ITALY, and ³ Politecnico di Torino, ITALY	
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	Chao Xu ^{1,2} , Junbo Wang ¹ , Deyong Chen ¹ , Jian Chen ¹ , Wenjie Qi ^{1,2} , Bowen Liu ^{1,2} , Xu She ^{1,2} , and Tian Liang ^{1,2} ¹ Chinese Academy of Sciences (CAS), CHINA and ² University of Chinese Academy of Sciences, CHINA	
12:55	OPTICAL FIBER-TIP PRESSURE SENSOR FEATURING A SPRING BODY AND MULTIPOSITIONAL FABRY-PÉROT CAVITY RESONATOR	382
	Jeremiah C. Williams ¹ , Joseph S. Suelzer ² , Nicholas G. Usechak ² , and Hengky Chandrahilim ¹ ¹ U.S. Air Force Institute of Technology, USA and ² Air Force Research Laboratory, USA	

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	Zhichun Shao, Yande Peng, Sedat Pala, Yue Liang, and Liwei Lin <i>University of California, Berkeley, USA</i>	
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	Sedat Pala, Zhichun Shao, Yande Peng, and Liwei Lin <i>University of California, Berkeley, USA</i>	
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12:55	HYDROGEN SELECTIVE GAS SENSOR BASED ON ATTENUATION MEASUREMENT OF ACOUSTIC WAVE USING UNCOATED CMUT	398
	Luis Iglesias Hernandez ¹ , Priyadarshini Shanmugam ² , Jean-François Michaud ² , Daniel Alquier ² , Dominique Certon ² , and Isabelle Dufour ¹ ¹ Université de Bordeaux, FRANCE and ² Université de Tours, FRANCE	
13:10	Adjourn for the day	

Day 5 - Friday, 29 January

Plenary Speaker Presentation V

- 08:00** **BERKELEY LIGHTS: MEMS TECHNOLOGY TO ENABLE
A SCALABLE AND SUSTAINABLE CELL-BASED FUTURE** N/A
Eric D. Hobbs
Berkeley Lights, Inc., USA

08:45 – 08:50 Transition Break

Session IXa - Organ on Chip

- 08:50** **THREE-DIMENSIONAL MICROFLUIDIC DRUG SCREENING PLATFORM TO STUDY
VASCULARIZED HEPATOCELLULAR CARCINOMA IN HYPOXIC CONDITION** 403
Jungeun Lim, Hyeri Choi, and Noo Li Jeon
Seoul National University, KOREA
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Frédéric De Miollis^{1,2}, Zied Souguir³, Charles Poiraud², Joseph de Saxcé², Lucie Dercourt¹,
Elodie Vandenhoute³, Audrey Vincent², Nathalie Maubon³, Isabelle Van Seuningen², and Vincent Senez¹
¹CNRS, FRANCE, ²University of Lille, FRANCE, and ³HCS Pharma, FRANCE
- 09:20** **HIGHLY ACCURATE MEASUREMENT OF TRANS-EPITHELIAL
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Takashi Miyazaki¹, Jiandong Yang¹, Satoshi Imamura¹, Yoshikazu Hirai¹,
Ken-ichiro Kamei¹, Toshiyuki Tsuchiya¹, and Osamu Tabata^{1,2}
¹Kyoto University, JAPAN and ²Kyoto University of Advanced Science, JAPAN
- 09:35** **EVALUATION OF TRANS-EPITHELIAL ELECTRICAL RESISTANCE
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Yuji Takata¹, Ryohei Ueno¹, Ramin Banan Sadeghian¹, Kaori Naganuma²,
Kiyotaka Tsuji², and Ryuji Yokokawa¹
¹Kyoto University, JAPAN and ²Panasonic Corporation, JAPAN

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- 08:50** **A PMUT-BASED ULTRASONIC PROBE USED FOR CONTACT FORCE SENSING** 419
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Xi'an Jiaotong University, CHINA
- 09:05** **PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCERS
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Xiaoyue (Joy) Jiang¹, Vincent Perrot^{2,3}, François Varray², Mei-Lin Chan¹,
Bala Govind¹, Stephen Bart¹, and Peter Hartwell¹
¹TDK InvenSense, USA, ²University Lyon, FRANCE, and ³Polytechnique Montréal, CANADA
- 09:20** **AIN BASED PIEZOELECTRIC MICROMACHINED ULTRASONIC
TRANSDUCERS FOR CONTINUOUS MONITORING OF THE
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Licheng Jia, Lei Shi, Chengliang Sun, Sheng Liu, and Guoqiang Wu
Wuhan University, CHINA

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Dongcheng Xie, Ruichen Liu, George Adedokun, Lei Xu, and Feng Wu
University of Science and Technology of China, CHINA
- 09:05 PLANAR LAB-ON-A-CHIP MICRO MASS SPECTROMETER WITH TIME-OF-FLIGHT SEPARATION** 434
Stephan Westerdick, Bent Walther, Patrick Hermanns, Florian Fricke, and Thomas Musch
Ruhr University Bochum, GERMANY
- 09:20 RAPID GAS SENSING BASED ON PULSE HEATING AND DEEP LEARNING** 438
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Qiming Tian³, Juntao Qi³, Yutao Ba³, and Tao Deng¹
¹*Beijing Jiaotong University, CHINA*, ²*Tsinghua University, CHINA*, and
³*Insights Value Technology, CHINA*

09:50 – 09:55 Transition Break

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09:55 - 10:30

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- 11:35 WHAT DOES A CELL SECRETE? ON-CHIP ANALYSIS OF COMPOUNDS AND VESICLES RELEASED FROM SINGLE CELLS** 446
Petra S. Dittrich
ETH Zurich, Basel, SWITZERLAND

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- 11:35 THIN FILM DEVICES FOR 5G COMMUNICATIONS** 450
Soumya Yandrapalli, Marco Liffredo, Muhammad Faizan,
Seniz Küçük, Damien Maillard, and **Luis Guillermo Villanueva**
École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND

12:05 – 12:10 Transition Break

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- 12:10 REAL-TIME THREE-DIMENSIONAL SINGLE-CELL-RESOLUTION MONITORING SYSTEM FOR OBSERVATION OF DYNAMIC CELL BEHAVIOR UNDER MECHANICAL STIMULI 454**
Keitaro Kasahara¹, Yuta Kurashina², Shigenori Miura³, Shogo Miyata¹, and Hiroaki Onoe¹
¹Keio University, JAPAN, ²Tokyo Institute of Technology, JAPAN, and ³University of Tokyo, JAPAN
- 12:25 OXYGEN-TRANSPORTING PARYLENE-HT MESH FOR CELL TRANSPLANTATION TO REDUCE HYPOXIA 458**
Kuang-Ming Shang¹, Hirotake Komatsu², and Yu-Chong Tai¹
¹California Institute of Technology, USA and ²Beckman Research Institute of City of Hope, USA
- 12:40 FEMTOSECOND LASER-INDUCED RESPONSE WAVE MEASURING METHOD FOR SINGLE CELL CHARACTERIZATION 462**
Tang Tao¹, Yansheng Hao¹, Yo Tanaka², Yoichiro Hosokawa¹, and Yalikun Yaxiaer¹
¹Nara Institute of Science and Technology, JAPAN and
²Institute of Physical and Chemical Research (RIKEN), JAPAN

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Yi Zhang¹, Liang Wang², Yang Zou¹, Qinwen Xu¹, Jieyu Liu¹, Qing Wang², Alexander Tovstopyat¹, Wenjuan Liu¹, Chengliang Sun¹, and Hongyu Yu^{2,3,4}
¹Wuhan University, CHINA, ²Southern University of Science and Technology, CHINA,
³Shenzhen Institute of Wide-bandgap Semiconductors, CHINA, and ⁴Ministry of Education, CHINA
- 12:25 A THIN-FILM PIEZO-SILICON ACOUSTOELECTRIC ISOLATOR WITH MORE THAN 30 DB NON-RECIPROCAL TRANSMISSION 470**
Hakhamanesh Mansoorzare and Reza Abdolvand
University of Central Florida, USA
- 12:40 LOW LOSS AND WIDEBAND SURFACE ACOUSTIC WAVE DEVICES IN THIN FILM LITHIUM NIOBATE ON INSULATOR (LNOI) PLATFORM 474**
Tzu-Hsuan Hsu, Feng-Chieh Su, Kuan-Ju Tseng, and Ming-Huang Li
National Tsing Hua University, TAIWAN
- 12:55 TEMPERATURE DEPENDENCE OF MULTIMODE GALLIUM NITRIDE/ALUMINUM NITRIDE (GaN/AlN) HETEROSTRUCTURE STRING RESONATOR 478**
Wen Sui¹, Xu-Qian Zheng¹, Ji-Tzuoh Lin², Bruce W. Alphenaar², and Philip X.-L. Feng¹
¹University of Florida, USA and ²University of Louisville, USA
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POSTER PRESENTATIONS

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T – Tuesday, 26 January 10:30 - 11:30 **F** – Friday, 29 January 10:30 - 11:30
W – Wednesday, 27 January 10:30 - 11:30

Classification Chart
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a	Bio & Medical MEMS
b	Emerging Technologies & New Opportunities for MEMS/NEMS
c	Materials, Fabrication and Packaging for Generic MEMS & NEMS
d	MEMS Actuators & Power MEMS
e	MEMS Physical & Chemical Sensors
f	MEMS/NEMS for Optical, RF and Electromagnetics
g	Micro- & Nanofluidics
h	Industry MEMS and Advancing MEMS for Products and Sustainability

a - Bio & Medical MEMS
Biosensors and Bioreactors

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Zhejiang University, CHINA
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¹University of Tokyo, JAPAN, ²National Institute of Advanced Industrial Science and Technology (AIST), JAPAN, ³ESIEE Paris Université Paris-Est, FRANCE, and ⁴ENS Paris-Saclay, FRANCE

a - Bio & Medical MEMS
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a - Bio & Medical MEMS
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a - Bio & Medical MEMS

Manufacturing for Bio- & Medical MEMS & Microfluidics

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¹University of Cincinnati, USA and ²Cincinnati Children's Hospital Medical Center, USA
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¹Kyoto University, JAPAN and ²Institute of Physical and Chemical Research (RIKEN), JAPAN and ³Osaka University, JAPAN
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¹Shanghai Jiao Tong University, CHINA and ²Northwestern Polytechnical University, CHINA
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Technical University, Wien, AUSTRIA

a - Bio & Medical MEMS

Medical Microsystems

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¹KTH Royal Institute of Technology, SWEDEN, ²MedTechLabs, SWEDEN, and ³Karolinska Institutet, SWEDEN
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¹University of California, Irvine, USA and ²VA Portland Health Care System, USA
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