



Technical Program

**All indicated times in the program are
Japan Standard Time (JST)**

The Executive Committee reserves the right to amend the program if necessary.

Sunday, 25 June

All times are Japan Standard Time (JST)

International Contest of Application in Nano-Micro Technology (iCAN)

Monday, 26 June

All times are Japan Standard Time (JST)

Welcome Address and Technical Program Information

08:30 - 09:00

TRANSDUCERS 2023 CONFERENCE CHAIRS

Satoshi Konishi, *Ritsumeikan University, JAPAN*

Plenary Presentation 1

09:00 - 09:45

M1A.P1 RETINAL REGENERATION USING IPS CELLS

Masayo Takahashi

Vision Care Inc., JAPAN

AWARDS

09:45 - 10:15

10:15 - 11:00 Break and Exhibit Inspection

Session M3A - Medical Devices I

11:00 - 11:15

M3A.01 SELF-POWERED WEARABLE BITE FORCE SENSOR FOR CONTINUOUS BRUXISM MONITORING

Kenta Ichikawa and Wataru Hijikata

Tokyo Institute of Technology, JAPAN

11:15 - 11:30

M3A.02 A SEMI-PASSIVE SMART CONTACT LENS WITH ON-LENS STORAGE ELEMENT

Shun-Hsi Hsu, Cheng-Wei Tsai, Jin-Chern Chiou, Yu-Chieh Huang, Guan-Ting Yeh, Cheng-Yu Hsu, Chun-Yu Wu, Jhu-Jyun Yang, Xuan-Wei Zhang, and Yu-Hsuan Huang

National Yang Ming Chiao Tung University, TAIWAN

11:30 - 11:45

M3A.03 TISSUE-ADHESIVE PIEZOELECTRIC SOFT SENSOR FOR IN VIVO BLOOD PRESSURE MONITORING DURING THE SURGICAL OPERATION

Chan Wang¹, Zhuo Liu³, Ying Liu², Yizhu Shan², Xuecheng Qu², Jiangtao Xue², Hong Zhou¹, Weixin Liu¹, Zihao Guo², Zhou Li², and Chengkuo Lee¹

¹National University of Singapore, SINGAPORE, ²Beijing Institute of Nano Energy and System, CHINA, and ³Beihang University, CHINA

11:45 - 12:00

M3A.04 BALLOON CATHETER WITHIN SITU PRESSURE SENSING FUNCTION FOR EVALUATING HEMODYNAMICS

Xing Chen¹, Yizhou Wang², Chengxu Wang², Jianrong Wang¹, Xiangyu Cao³, and Lei Geng²

¹Beihang University, CHINA, ²Tiangong University, CHINA, and

³First Medical Center of Chinese PLA General Hospital, CHINA

12:00 - 12:15

M3A.05 DEVELOPMENT OF HOLLOW TYPED MICRONEEDLES PATCH WITH CONTINUOUS GLUCOSE MONITORING SENSOR BASED ON POLYLACTIC ACID

Shicheng Zhou¹, Yutaro Chino², Toshihiro Kasama¹, Ryo Miyake¹, Takehiro Sato¹, Shigenobu Mitsuzawa³, and Madoka Takai¹

¹University of Tokyo, JAPAN, ²Sanyo Chemical Industries, Ltd., JAPAN, and ³Honda Motor Co., Ltd., JAPAN

12:15 - 12:30

M3A.06 HYDROGEL MICRONEEDLE ARRAY WITH ARRANGED COLORIMETRIC GLUCOSE-SENSING MICROBEADS FOR TRANSDERMAL PATCH TESTING

Mayu Omote, Tomomi Murayama, Shuhei Takatsuka, and Hiroaki Onoe

Keio University, JAPAN

Session M3B - Polymer Fabrication Process

11:00 - 11:30

M3B.01 INVITED PRESENTATION

11:30 - 11:45

M3B.03 MULTILEVEL MICROCHANNEL-BASED, 3D PRINTED AND LIQUID-METAL FILLED MICROELECTRODE ARRAY WITHIN A MULTIPHASE CONTROLLED MICROCHAMBER FOR ELECTROPHYSIOLOGICAL STUDIES

Jorge Manrique Castro, Isaac Johnson, and Swaminathan Rajaraman

University of Central Florida, USA

11:45 - 12:00

M3B.04 STRETCHABLE HEATER WITH ENTANGLED VERTICALLY ALIGNED CARBON NANOTUBES

Kyubin Bae, Sangjun Sim, and Jongbaeg Kim

Yonsei University, KOREA

12:00 - 12:15

M3B.05 BILAYER SELF-FOLDING METHOD WITH HIGH FOLDING FORCE AND ANGLE BY SUPPRESSING DELAMINATION OF SHRINK LAYER

Yusuke Sato, Takashi Sato, and Eiji Iwase

Waseda University, JAPAN

12:15 - 12:30

M3B.06 PAVING SMART ROADS: ROLL-TO-ROLL LASER MANUFACTURING OF TAR-BASED STRAIN SENSOR NETWORKS

Man Zhang, Jincui Huang, and Xining Zang

Tsinghua University, CHINA

Session M3C - Energy Harvesters I

11:00 - 11:30

M3C.01 **INVITED PRESENTATION**

11:30 - 11:45

M3C.03 **MONOLITHIC INTEGRATION OF THICK NDFEB MICRO-MAGNETS INTO MEMS: APPLICATION TO ELECTROMAGNETIC ENERGY HARVESTING**

José Elías Angulo-Cervera¹, Frederico Orlandini-Keller², Ilona Lecerf^{1,3}, Pierre Moritz^{1,3}, Fabrice Mathieu¹, David Bourrier¹, Richard Haettel², Thibaut Devillers², Liviu Nicu¹, Thomas Blon³, Lise-Marie Lacroix³, Nora Dempsey², and Thierry Leichle^{1,4}

¹LAAS-CNRS, FRANCE, ²Institut Néel, FRANCE,

³Laboratoire de Physique et Chimie des Nano-Objets, FRANCE, and ⁴Georgia Tech, USA

11:45 - 12:00

M3C.04 **OUTPUT CHARACTERISTICS ON KIRIGAMI THERMOELECTRIC GENERATOR BY THREE-DIMENSIONAL DEFORMATION AND GEOMETRIC SHAPES**

Shingo Terashima and Eiji Iwase

Waseda University, JAPAN

12:00 - 12:15

M3C.05 **FULLY SELF-POWERED WEARABLE LIMB MOTION MONITORING SYSTEM USING FLEXIBLE THERMOELECTRIC POWER GENERATOR**

Jinfeng Yuan, Yuzhong Zhang, Caise Wei, and Rong Zhu

Tsinghua University, CHINA

12:15 - 12:30

M3C.06 **TRIBOELECTRIC PRESSURE SENSOR WITH SURFACE CHARGE DENSITY CALIBRATION**

Chankyu Han, Jungrok Choi, and Inkyu Park

Korea Advanced Institute of Science and Technology (KAIST), KOREA

Session M3D - Inertial Sensors

11:00 - 11:15

M3D.01 **ELECTROCHEMICAL SEISMOMETER BASED ON ONE SINGLE SILICON CHIP WITH FOUR ELECTRODES**

Zhenyu Sun^{1,2}, Tian Liang^{1,2}, Lintao Hu^{1,2}, Maoqi Zhu^{1,2}, Mingbo Zhang^{1,2}, Junbo Wang^{1,2}, Deyong Chen^{1,2}, and Jian Chen^{1,2}

¹Chinese Academy of Sciences (CAS), CHINA and ²University of Chinese Academy of Sciences, CHINA

11:15 - 11:30

M3D.02 **ULTRA-HIGH SENSITIVITY PULL-IN TIME MEMS ACCELEROMETER FOR SATELLITE GRAVIMETRY**

Inês S. Garcia¹, Dimitri E. Santos¹, José B. Queiroz¹, João T. da Encarnação^{2,3}, Tiago Hormigo⁴, Jorge Cabral⁵, Filipe S. Alves¹, and Rosana A. Dias¹

¹INL - International Iberian Nanotechnology Laboratory, PORTUGAL, ²Delft University of Technology, NETHERLANDS, ³University of Texas, Austin, USA, ⁴Spin.Works S.A., PORTUGAL, and

⁵University of Minho, PORTUGAL

11:30 - 11:45

M3D.03 **FREQUENCY-MODULATED MEMS ACCELEROMETER WITH DUAL-LAYER PROCESS FOR MINIMUM AREA OCCUPATION OF ANCHOR POINTS**

Christian Padovani¹, Riccardo Nastri¹, Leonardo Gaffuri Pagani¹, Gabriele Gattere², Francesco Rizzini², and Giacomo Langfelder¹

¹Politecnico di Milano, ITALY and ²STMicroelectronics, ITALY

11:45 - 12:00

M3D.04 ELECTROTHERMALLY TUNABLE ACCELEROMETER WITH SMALL TUNING VOLTAGE AND VERY LARGE SENSITIVITY TUNING RANGE

Yu-Chi Chuang, Yuan-Chieh Lee, and Yi Chiu
National Yang Ming Chiao Tung University, TAIWAN

12:00 - 12:15

M3D.05 DEMONSTRATION OF WIDE DYNAMIC RANGE MEASUREMENT OF A MICROCONTROLLER-BASED MEMS GYRO MODULE BY FUSING THE OUTPUTS OF TWO DIFFERENT OPERATION MODES

Yasushi Tomizawa, Fumito Miyazaki, Daiki Ono, Hideaki Murase, Jumpei Ogawa, Tazuko Tomioka, Kei Masunishi, Etsuji Ogawa, Fumitaka Ishibashi, and Kengo Uchida
Toshiba Corporation, JAPAN

12:15 - 12:30

M3D.06 HIGH-SENSITIVITY ELECTROCHEMICAL ANGULAR ACCELEROMETER RELYING ON SOI-BASED MICROELECTRODES

Tian Liang^{1,2}, Mingbo Zhang^{1,2}, Lintao Hu^{1,2}, Zhenyu Sun^{1,2}, Maoqi Zhu^{1,2}, Deyong Chen^{1,2}, Jian Chen^{1,2}, and Junbo Wang^{1,2}
¹*Chinese Academy of Sciences (CAS), CHINA* and ²*University of Chinese Academy of Sciences, CHINA*

12:30 - 14:00 **Lunch and Exhibit Inspection**

Industrial Session 1

12:40 - 13:40

Poster Session M4P and Exhibit Inspection

14:00 - 16:00

Session M5A - Microfluidics I

16:00 - 16:30

M5A.01 INVITED PRESENTATION

16:30 - 16:45

M5A.03 SYNTHESIS AND DIRECT INSERTION OF MEMBRANE PROTEIN INTO MONODISPERSE GUVS FABRICATED BY A MICROFLUIDIC DEVICE

Satoshi Nanjo¹, Mamiko Tsugane¹, Ryotaro Yoneyama¹, Ryota Ushiyama¹, Tomoaki Matsuura², and Hiroaki Suzuki¹
¹*Chuo University, JAPAN* and ²*Tokyo Institute of Technology, JAPAN*

16:45 - 17:00

M5A.04 HIGH EFFICIENCY CELL-BEAD PAIRING VIA DIELECTROPHORESIS-CONTROLLED QUEUING PROCESS FOR SINGLE-CELL ANALYSIS

Yao Cai¹, Zhuzhu Liu¹, Fei Su², Duli Yu¹, Yuan Luo³, and Xiaoxing Xing¹
¹*Beijing University of Chemical Technology, CHINA*, ²*China-Japan Friendship Hospital, CHINA*, and ³*Chinese Academy of Sciences (CAS), CHINA*

17:00 - 17:15

M5A.05 CONTINUOUS PRODUCTION OF CELL-ENCAPSULATED DROPLETS FOR MEMBRANE FUSION OF CELLS UTILIZING A MICROFLUIDIC DEVICE

Hiroki Fukunaga¹, Naotomo Tottori¹, Shinya Sakuma¹, Tomomi Tsubouchi², and Yoko Yamanishi¹
¹*Kyushu University, JAPAN* and ²*National Institute for Basic Biology, JAPAN*

17:15 - 17:30

M5A.06 OPTIMIZING SCREENING PROCESS OF APTAMERS ON AN MICROFLUIDIC SYSTEM BY SHEARE FORCE CONTROL FOR APTAMERS SPECIFIC TO FOLATE RECEPTOR ALPHA

Yi-Cheng Tsai, Yang Sheng Shao, Hung Bin Wu, and Gwo Bin Lee
National Tsing Hua University, TAIWAN

Session M5B - Pressure Sensors

16:00 - 16:30

M5B.01 INVITED PRESENTATION

16:30 - 16:45

M5B.03 A RESONANT MICROSENSOR FOR MULTI-PARAMETER MEASUREMENT OF DIFFERENTIAL PRESSURE, TEMPERATURE AND STATIC PRESSURE

Chao Cheng^{1,2}, Jiahui Yao^{1,2}, Han Xue^{1,2}, Yulan Lu¹, Junbo Wang^{1,2}, Deyong Chen^{1,2}, and Jian Chen^{1,2}
¹*Chinese Academy of Sciences (CAS), CHINA* and ²*University of Chinese Academy of Sciences, CHINA*

16:45 - 17:00

M5B.04 A RESONANT HIGH-PRESSURE SENSOR WITH AN H-CAVITY

Jie Yu^{1,2}, Zongze Yu^{1,2}, Pan Qian^{1,2}, Yulan Lu¹, Jian Chen^{1,2}, Junbo Wang^{1,2}, and Deyong Chen^{1,2}
¹*Chinese Academy of Sciences (CAS), CHINA* and ²*University of Chinese Academy of Sciences, CHINA*

17:00 - 17:15

M5B.05 NOVEL THERMAL MEMS DYNAMIC PRESSURE SENSOR

Akash Gupta¹, Achim Bittner¹, and Alfons Dehe^{1,2}
¹*Hahn-Schickard-Gesellschaft für Angewandte Forschung e.V., GERMANY* and ²*University of Freiburg, GERMANY*

17:15 - 17:30

M5B.06 NONLINEARITY COMPENSATION FOR MEMS PRESSURE SENSORS WITH PIEZORESISTORS AT THE NEUTRAL POSITION

Grim Keulemans¹, Appo Van der Wie², Ben Maes², Maliheh Ramezani², Michael Kraft¹, and Chen Wang¹
¹*KU Leuven, BELGIUM* and ²*Melexis Company, BELGIUM*

Session M5C - pMUT

16:00 - 16:15

M5C.01 CHARACTERIZATION OF PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCERS FOR BIOMEDICAL APPLICATIONS

Bruno Fain, François Blard, Jean-Rémi Chatroux, Fabrice Casset, Romain Liechti, Antoine Hamelin, Jean-Claude Bastien, and Helene Lhermet
University Grenoble Alpes, FRANCE

16:15 - 16:30

M5C.02 FLEXIBLE ULTRASONIC TRANSDUCER FOR RF-DATA AND ENERGY TRANSMISSION THROUGH THE METAL PIPE

Javad Abbaszadeh, Vladimir Pashchenko, Lukas Rauter, and Mohssen Moridi
Silicon Austria Labs GmbH (SAL), AUSTRIA

16:30 - 16:45

M5C.03 HIGH-SPL PMUT ARRAY FOR MID-AIR HAPTIC INTERFACE

Fan Xia¹, Yande Peng¹, Wei Yue¹, Chun-Ming Chen¹, Sedat Pala¹, Ryuichi Arakawa², and Liwei Lin¹
¹University of California, Berkeley, USA and ²NGK Spark Plug Co., JAPAN

16:45 - 17:00

M5C.04 IN-AIR LONG-RANGE ENVIRONMENTAL TEMPERATURE SENSING WITH A SINGLE SCANDIUM-DOPED ALUMINUM NITRIDE PMUT ARRAY

Mantalena Sarafianou¹, Daniel Chen¹, David Choong¹, Duan Jian Goh¹, Jihang Liu¹, Srinivas Merugu¹, Qing X. Zhang¹, Huamao Lin¹, Steven L.H. Jang¹, Peter Chang¹, Yee Lung Lee³, Carlo L. Prelini², Filippo D'ercoli², Dao H. Sim³, Alberto Leotti³, Fabio Quaglia², Domenico Giusti², and Joshua E.-Y. Lee¹
¹Agency of Science Technology and Research (A*STAR), SINGAPORE, ²ST Microelectronics, ITALY and ³STMicroelectronics, SINGAPORE

17:00 - 17:15

M5C.05 TILTABLE CANTILEVER-PLATE BASED PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCERS (PMUT) WITH LARGE LINEAR VIBRATION RANGE AND HIGH OUTPUT POWER

Tingzhong Xu and Claire Bourquard
Silicon Austria Labs GmbH (SAL), AUSTRIA

17:15 - 17:30

M5C.06 A SINGLE-CHIP CMOS-MEMS CMUT ARRAY TRANSCEIVER WITH LOW BIAS

Hung-Yu Chen, Yung-Shun Chan, Tzu-Hsuan Hsu, Ming-Huang Li, and Sheng-Shian Li
National Tsing Hua University, TAIWAN

Session M5D - Bio Sensors

16:00 - 16:15

M5D.01 NANOPLASMONIC BIOSENSOR FOR CYTOKINE PROFILING IN PATIENT PLASMA

Lip Ket Chin¹, Hyungsoon Im², Sung-Gyu Park³, and Benjamin Chousterman⁴
¹City University of Hong Kong, HONG KONG, ²Massachusetts General Hospital, USA, ³Korea Institute of Materials Science, KOREA, and ⁴Hôpital Lariboisière, FRANCE

16:15 - 16:30

M5D.02 LAB-ON-CMOS RESONANT MICRO-CALORIMETER

Rafel Perello-Roig^{1,2}, Jaume Verd^{1,2}, Sebastia Bota^{1,2}, Toshikazu Nishida³, and Jaume Segura^{1,2}
¹University of the Balearic Islands, SPAIN, ²Health Research Institute of the Balearic Islands, SPAIN, and ³University of Florida, USA

16:30 - 16:45

M5D.03 A NOVEL RADIAL CHIP FOR COLLECTION OF EXHALED BREATH TO DETECT

James D. Morris, Zhenzhen Xie, Jiapeng Huang, Michael H. Nantz, and Xiao-An Fu
University of Louisville, USA

16:45 - 17:00

M5D.04 IN-VITRO REAL-TIME IDENTIFICATION OF CORONAVIRUS SPIKE PROTEINS VIA ULTRASENSITIVE MID-INFRARED HOOK NANOANTENNAS ARRAY

Zhihao Ren, Hong Zhou, Zixuan Zhang, Cheng Xu, and Chengkuo Lee
National University of Singapore, SINGAPORE

17:00 - 17:15

M5D.05 A FLEXIBLE GLUCOSE SENSOR WITH ANTI-SWELLING AND CONDUCTIVITY ZWITTERIONIC HYDROGEL ENZYME MEMBRANE

Chengcheng Li, Zhihua Pu, Hao Zheng, Zijing Guo, Wangwang Zhu, and Dachao Li
Tianjin University, CHINA

17:15 - 17:30

M5D.06 DUAL METHYLATED BRCA1/BRCA2 DETECTION ON AN APTAMER-BASED INTEGRATED MICROFLUIDIC SYSTEM

Chih-Hung Wang¹, Keng-Fu Fu², and Gwo-Bin Lee¹

¹National Tsing Hua University, TAIWAN and ²National Cheng Kung University, TAIWAN

17:30 - 17:45 Transition

Special Session 1 - Student Leadership Project

17:45 - 19:00

M6A.01 TBD

Casual Reception in Exhibition Area

19:00 - 20:00

20:00 End of Day

Tuesday, 27 June

Plenary Presentation 2

08:30 - 09:15

T1A.P2 QUANTUM SENSORS: PRINCIPLES AND APPLICATIONS

Jörg Wrachtrup
University of Stuttgart, GERMANY

Transducers 2025 Announcement

09:15 - 09:30

09:30 - 09:45 Transition

Session T2A - Cell

09:45 - 10:00

T2A.01 CYTOTRANSDUCERS VISUALIZE FUNCTIONS OF LIVING CELLS

Niko Kimura and Shinya Sakuma
Kyushu University, JAPAN

10:00 - 10:15

T2A.02 DIRECT MONITORING OF NEUROTRANSMITTER EXOCYTOSIS IN LIVING CELLS USING ELECTROCHEMICAL SENSORS FABRICATED WITH MIXED-DIMENSIONAL BIOSENSING NANOSTRUCTURES

Pengcheng Xu^{1,2}, Xuefeng Wang^{1,2}, Hao Jia^{1,2}, Yuan Zhang³, and Xinxin Li^{1,2}
¹*Chinese Academy of Sciences (CAS), CHINA*, ²*University of Chinese Academy of Sciences, CHINA*, and ³*Shanghai University, CHINA*

10:15 - 10:30

T2A.03 THE SEARCH FOR THE MAXIMUM 2D-PARTICLE SIZE THAT CAN BE INTERNALIZED BY LIVING CELLS

Marta Duch¹, Ana Fernández-Escribano², Maria Isabel Arjona¹, Patricia Vázquez², Juan Pablo Aguil¹, Mariano Redondo-Horcajo², Ana Sánchez¹, Héctor Zamora², Sergi Sánchez¹, Teresa Suárez², and Jose Antonio Plaza¹
¹*Institute of Microelectronics of Barcelona, SPAIN* and ²*Centre for Biological Research Margarita Salas (CSIC), SPAIN*

10:30 - 10:45

T2A.04 A MICROFLUIDIC FLOW CYTOMETRY ENABLING HIGH-THROUGHPUT CHARACTERIZATION OF SINGLE-CELL IMPEDANCE AND IMAGING BASED ON CONSTRICTIONAL MICROCHANNELS COUPLED WITH DEEP NEURAL NETWORKS

Xiao Chen^{1,2}, Xukun Huang^{1,2}, Huiwen Tan^{1,2}, Minruihong Wang^{1,2}, Yimin Li^{1,2}, Yuanchen Wei^{1,2}, Jie Zhang^{2,3}, Deyong Chen^{1,2}, Junbo Wang^{1,2}, Yueying Li^{1,2}, and Jian Chen^{1,2}
¹*Chinese Academy of Sciences (CAS), CHINA* and ²*University of Chinese Academy of Sciences, CHINA*

Session T2B - Actuators I

09:45 - 10:00

T2B.01 DESIGN AND EXPERIMENTAL VALIDATION OF A NEW MEMS LONG-STROKE ACTUATOR BASED ON TUNNEL-COMB FINGERS

Valentina Zega¹, Andrea Opreni¹, Yassine Banani¹, Andrea Buffoli¹, Flavia D. Mauri¹, Gabriele Gattere², Manuel Riani², Giacomo Langfelder¹, and Attilio Frangi¹

¹Politecnico di Milano, ITALY and ²STMicroelectronics, ITALY

10:00 - 10:15

T2B.02 DOWNSCALING AND TEMPERATURE HOMOGENIZATION OF TINIHF/SI SHAPE MEMORY MICROACTUATORS

Gowtham Arivanandhan¹, Zixiong Li¹, Sabrina M. Curtis^{2,3}, Eckhard Quandt², and Manfred Kohl¹

¹Karlsruhe Institute of Technology (KIT), GERMANY, ²Kiel University (CAU), GERMANY, and

³University of Maryland, USA

10:15 - 10:30

T2B.03 3D ELECTRON-BEAM WRITING OF NANOACTUATORS IN GENETICALLY ENGINEERED SPIDER SILK PROTEINS

Nan Qin and Tiger H. Tao

Chinese Academy of Sciences (CAS), CHINA

10:30 - 10:45

T2B.04 SELF-ASSEMBLED NANOSCALE CILIARY ACTUATORS

Minsu Kang¹, Moon Kyu Kwak², Hosup Jung³, and Hoon Eui Jeong¹

¹Ulsan National Institute of Science & Technology (UNIST), KOREA,

²Kyungpook National University, KOREA, and ³Seoul National University, KOREA

Session T2C - Environmental Sensors

09:45 - 10:00

T2C.01 HIGH-PERFORMANCE SILICON CARBIDE-ON-INSULATOR THERMORESISTIVE HIGH-TEMPERATURE SENSOR UP TO 750 °C

Baoyun Sun, Jiarui Mo, Willem D. van Driel, and Guoqi Zhang

Delft University of Technology, NETHERLANDS

10:00 - 10:15

T2C.02 MOSFET-BASED AND P-N DIODE BASED TEMPERATURE SENSORS IN A 4H-SIC CMOS TECHNOLOGY

Jiarui Mo¹, Jinglin Li¹, Yaqian Zhang¹, Alexander May², Tobias Erlbacher², Guoqi Zhang¹, and Sten Vollebregt¹

¹Delft University of Technology, NETHERLANDS and

²Fraunhofer Institute for Integrated System and Devices Technology IISB, GERMANY

10:15 - 10:30

T2C.03 DEVELOPMENT OF A HIGH SENSITIVITY PELTIER TYPE SOIL WATER CONTENT SENSOR FOR MONITORING AGRICULTURAL MEDIA

Masato Futagawa, Haruki Sato, Kisho Sakamoto, and Satoshi Ota

Shizuoka University, JAPAN

10:30 - 10:45

T2C.04 ALGAN/GAN SPLIT-ELECTRODE SECTORIAL SENSOR ARRAY FOR ULTRA-LOW MAGNETIC FIELD DETECTION AT 8 μ T

Lingxi Xia^{1,2} and Yung C. Liang^{1,2}

¹National University of Singapore, SINGAPORE and ²National University of Singapore, Suzhou, CHINA

Session T2D - Functional Materials & Fabrication I

09:45 - 10:00

T2D.01 HYBRID MICROFABRICATION, AND ELECTROCHEMICAL ANALYSIS OF NONAGONAL 2D/3D MICROELECTRODE ARRAYS, WITH MULTI-METALLIC INTERFACES

Charles M. Didier¹, Maria Corina Garcia Chaulbad^{1,2}, Julia F. Orrico¹, Jorge Manrique Castro¹, and Swaminathan Rajaraman¹

¹University of Central Florida, USA and ²Polytechnic University of Puerto Rico, PUERTO RICO

10:00 - 10:15

T2D.02 MANUFACTURING OF FLEXIBLE METALLIC AEROGEL BY ICE-TEMPLATED ASSEMBLY OF NANOWIRES AND ITS APPLICATIONS

Donghyun Lee and Jungwook Choi

Chung-Ang University, KOREA

10:15 - 10:30

T2D.03 SIMPLE FABRICATION OF PARYLENE-BASED SLIPPERY LIQUID-INFUSED POROUS SURFACES FOR HEALTHCARE APPLICATIONS

Kuang-Ming Shang¹, Haixu Shen¹, Hiroyuki Kato², Suhash Aravindan¹, Hirotake Komatsu², and Yu-Chong Tai¹

¹California Institute of Technology, USA and

²Arthur Riggs Diabetes & Metabolism Research Institute at City of Hope, USA

10:30 - 10:45

T2D.04 APPLYING GRAYSCALE DIGITAL MASKS AND DEFOCUSING METHOD TO DIGITAL LIGHT PROCESSING STEREOLITHOGRAPHY FOR RAPID MANUFACTURE OF MICROLENS ARRAYS

Chih-Yu Hsieh¹, Pin-Chuan Chen¹, Pai-Shan Chen², and Yi-Hsin Liu³

¹National Taiwan University of Science and Technology, TAIWAN, ²National Taiwan University, TAIWAN, and ³National Taiwan Normal University, TAIWAN

Session T3A - Tissue Engineering I

11:15 - 11:45

T3A.01 INVITED PRESENTATION

11:45 - 12:00

T3A.03 TARGETING NANOCARRIERS COMBINED WITH PHOTOTHERMAL THROMBOLYTIC THERAPY TESTED FROM IN VITRO, AND THROMBOSIS VESSEL-ON-A-CHIP, TO IN VIVO

Kuan-Ting Liu¹, Er-Yuan Chuang², Yu-Jui Fan², and Jiashing Yu¹

¹National Taiwan University, TAIWAN and ²Taipei Medical University, TAIWAN

12:00 - 12:15

T3A.04 A HIGHLY SENSITIVE CAPACITIVE DISPLACEMENT SENSOR FOR FORCE MEASUREMENT INTEGRATED IN AN ENGINEERED HEART TISSUE PLATFORM

Milica Dostanic^{1,2}, Filippo Pfaffner¹, Mahdieh Shojaei Baghini¹, Laura M. Windt², Maury Wiendels², Berend J. van Meer², Christine L. Mummery^{2,3}, Pasqualina M. Sarro¹, and Massimo Mastrangeli¹

¹Delft University of Technology, NETHERLANDS, ²Leiden University Medical Center, NETHERLANDS, and ³University of Twente, NETHERLANDS

12:15 - 12:30

T3A.05 HIGH THROUGHPUT, MULTIMODAL, MICROCHAMBER BIOSENSORS FOR IN VITRO SELECTIVE LOCALIZATION OF KILLIFISH CARDIAC MODELS

Andre Childs¹, Isaac Johnson¹, Benjamin Dubansky², and Swaminathan Rajaraman¹

¹University of Central Florida, USA and ²Louisiana State University, USA

12:30 - 12:45

T3A.06 REAL-TIME ASSESSMENT OF MATURITY BY MICROFIBER-SHAPED IPSCS-DERIVED CARDIAC TISSUE WITH GCAMP-EXPRESSION

Akari Masuda¹, Shun Itai¹, Yuta Kurashina², Shugo Tohyama¹, and Hiroaki Onoe¹
¹Keio University, JAPAN and ²Tokyo University of Agriculture and Technology, JAPAN

Session T3B - Nanoscale Materials & Fabrication

11:15 - 11:30

T3B.01 SILICON-NANODOT-INDUCED STRENGTH CONTROL FOR SILICON MEMS

Abhiraj Singh, Shingo Kammachi, and Takahiro Namazu
Kyoto University of Advanced Science, JAPAN

11:30 - 11:45

T3B.02 DISSIPATION AND LOSS ANGLE IN TWO-DIMENSIONAL MOLYBDENUM DITELLURIDE NANO-ELECTROMECHANICAL RESONATORS

Pengcheng Zhang, Yueyang Jia, Zuheng Liu, and Rui Yang
Shanghai Jiao Tong University (SJTU), CHINA

11:45 - 12:00

T3B.03 LONG-WAVE INFRARED GRAPHENE PHOTODETECTORS FOR POLARIZATION DETECTION AND GAS SENSING

Junsheng Xie, Zhihao Ren, Jingxuan Wei, Weixin Liu, Jingkai Zhou, and Chengkuo Lee
National University of Singapore, SINGAPORE

12:00 - 12:15

T3B.04 DEMONSTRATION OF A NON-VOLATILE ANTIFERROELECTRIC PYROELECTRIC SWITCH

Patrick D. Lomenzo¹, Songrui Li¹, Thomas Mikolajick^{1,2}, and Uwe Schroeder¹
¹NaMLab gGmbH, GERMANY and ²TU Dresden, GERMANY

12:15 - 12:30

T3B.05 HIGH-SA/V-RATIO TiO₂-NANOPARTICLE-ENCAPSULATING HYDROGEL UNIT PROMOTES EFFICIENT LIGHT-DRIVEN SELF-ASSEMBLY

Natsumi Watanabe and Hiroaki Onoe
Keio University, JAPAN

12:30 - 12:45

T3B.06 TITANIUM/SILICA BIOCOMPATIBLE NANOPARTICLES WITH TUNABLE EXOTHERMIC CHARACTERISTICS FOR FUTURE HYPERTHERMIA TECHNOLOGY

Kingkarn Khotchasing, Michiko Shindo, and Takahiro Namazu
Kyoto University of Advanced Science, JAPAN

Session T3C - Energy Harvesters II

11:15 - 11:30

T3C.01 MEMS ELECTROSTATIC ENERGY HARVESTER WITH RECHARGEABLE ELECTRET BY BUILT-IN CORONA TIPS

Anxin Luo, Mingjie Li, Xiaojiang Liu, Wenxin Luo, and Fei Wang
Southern University of Science and Technology, CHINA

11:30 - 11:45

T3C.02 DUAL-PHASE ROPE-SPUN ELECTRET ROTARY GENERATOR FOR MORPHING WING ENERGY HARVESTING AND DEFORMATION MONITORING

Huipeng Zhou and Xinhui Mao
Northwestern Polytechnical University, CHINA

11:45 - 12:00

T3C.03 ORIGAMI-INSPIRED TRANSFORMABLE ELECTRET GENERATOR FOR FLAPPING-LEAF WIND ENERGY HARVESTING

Boming Lyu, Yangyang Gao, Zhaoshu Yang, Jin Wu, Honglong Chang, Weizheng Yuan, and Kai Tao
Northwestern Polytechnical University, CHINA

12:00 - 12:15

T3C.04 SELF-POWERED DUST REMOVAL SYSTEM FOR SOLAR PANELS DRIVEN BY A ROTARY FREESTANDING-ELECTRET GENERATOR

Rong Ding, Junchi Teng, Zeyuan Cao, Zibo Wu, Kang Deng, Xiangzhu Yuan, Yujia Cao, and Xiongying Ye
Tsinghua University, CHINA

12:15 - 12:30

T3C.05 FREQUENCY TRACKING OF VIBRATIONAL ENERGY HARVESTER USING PHASE-LOCKED LOOP (PLL)

Yuto Akai, Hiroaki Honma, and Hiroshi Toshiyoshi
University of Tokyo, JAPAN

12:30 - 12:45

T3C.06 SUPPRESSING THE AIR-BREAKDOWN PHENOMENON OF ELECTROSTATIC GENERATOR FOR EFFICIENT ENERGY HARVESTING

Zeyuan Cao, Rong Ding, Junchi Teng, Zibo Wu, and Xiongying Ye
Tsinghua University, CHINA

Session T3D - Force Sensors

11:15 - 11:45

T3D.01 INVITED PRESENTATION

11:45 - 12:00

T3D.03 AN ACTIVE-MATRIX PIEZOELECTRIC TACTILE SENSOR ARRAY WITH IN-PIXEL AMPLIFIER AND NON-UNIFORMITY COMPENSATION

Tengteng Lei, Yushen Hu, Xinying Xie, and Man Wong
Hong Kong University of Science and Technology, HONG KONG

12:00 - 12:15

T3D.04 MONOLITHICALLY VERTICAL INTEGRATION WITH CAPACITIVE PROXIMITY AND INDUCTIVE FORCE SENSOR WITH SENSING RANGE ENHANCEMENT

Ruei-Cing Mai¹, Fuchi Shih¹, Yuanyuan Huang¹, Yu-Hsuan Li¹, I-Yu Huang², Yu-Cheng Lin³, and Weileun Fang¹

¹National Hsing Hua University, TAIWAN, ²National Sun Yat-sen University, TAIWAN, and ³National Cheng Kung University, TAIWAN

12:15 - 12:30

T3D.05 LOW POWER AND ULTRATHIN SHEAR STRESS SENSOR WITH HIGH SENSITIVITY SUSPENDED ON A FLEXIBLE SUBSTRATE

Xiangyu Song, Ke Xiao, and Wei Xu
Shenzhen University, CHINA

12:30 - 12:45

T3D.06 A STRAIN-INSENSITIVE STRETCHABLE PATCH SENSOR FOR SIMULTANEOUS MONITORING OF BODY TEMPERATURE AND ECG

Sudeep Sharma, Ashok Chhetry, Seonghoon Jeong, and Jae Y. Park
Kwangwoon University, KOREA

12:45 - 14:15 **Lunch and Exhibit Inspection**

Industrial Session 2

12:55 - 13:55

Poster Session T4P and Exhibit Inspection

14:15 - 16:15

Session T5A - Medical Devices II

16:15 - 16:30

T5A.01 HYBRID BIODEGRADABLE POLYMER STENT FABRICATION USING 3D PRINTERS AND INTEGRATION WITH WIRELESS SENSORS FOR REAL-TIME PRESSURE SENSOR MONITORING IN BLOOD VESSELS

Jinliang Wei, Nomin-Eredne Oyunbaatar, Dong-Su Kim, and Dong-Weon Lee
Chonnam National University, KOREA

16:30 - 16:45

T5A.02 A SENSOR-INTEGRATED "SMART" URETERAL STENT AND WIRELESS IN-VITRO TEST FOR REAL-TIME OBSTRUCTION DETECTION

MohammadReza YousefiDarestani, Dirk Lange, Ben H. Chew, and Kenichi Takahata
University of British Columbia, CANADA

16:45 - 17:00

T5A.03 ULTRA-SOFT NEURAL PROBE WITH A TEMPORARY HIGH-STRENGTH U-SECTION COATING BY PICOSECOND LASER MICROMACHINING

Fanqi Sun¹, Xiaoli You¹, Yuhao Zhou¹, Minghao Wang², Mengfei Xu³, Kai Tao¹, Honglong Chang¹, Jingquan Liu³, and Bowen Ji¹

¹Northwestern Polytechnical University, CHINA, ²Hangzhou Dianzi University, CHINA, and ³Shanghai Jiao Tong University, CHINA

17:00 - 17:15

T5A.04 SELF-STRETCHABLE CHRISTMAS-TREE-SHAPED ULTRAFLEXIBLE NEURAL PROBES

Ye Tian^{1,3}, Cunkai Zhou^{1,2}, Kuikui Zhang⁸, Huiran Yang¹, Zhaohan Chen¹, Zhitao Zhou^{1,3}, Xiaoling Wei^{1,3}, Tiger H. Tao^{1,3,4,5,6,7,8}, and Liuyang Sun^{1,3}

¹Chinese Academy of Sciences (CAS), CHINA, ²Shanghai DianJi University, CHINA,

³University of Chinese Academy of Sciences, CHINA, ⁴ShanghaiTech University, CHINA,

⁵Neuroxess Co., Ltd. (Jiangxi), CHINA, ⁶Guangdong Institute of Intelligence Science and Technology, CHINA, ⁷Tianqiao and Chrissy Chen Institute for Translational Research, CHINA, and

⁸Nanjing Tech University, CHINA

17:15 - 17:30

T5A.05 BIOMIMETIC FLEXIBLE NEURO-PROBE SYSTEM FOR EARLY WARNING WITH FORCE FEEDBACK TO AVOID VASCULAR DAMAGE

Yu Zhou

Chinese Academy of Sciences (CAS), CHINA

Session T5B - Micromirrors

16:15 - 16:30

T5B.01 INTEGRATED THERMAL CONVECTION-BASED POSITION SENSING FOR ELECTROTHERMAL MICROMIRRORS

Anrun Ren, Yingtao Ding, Hengzhang Yang, Teng Pan, and Huikai Xie
Beijing Institute of Technology, CHINA

16:30 - 16:45

T5B.02 MEMS SCANNING GRATING BASED COMPACT DIFFUSE REFLECTANCE SPECTROSCOPIC MODULE FOR SKIN ANALYSIS

Jaehun Jeon, Jung-Woo Park, Gi Beom Kim, and Ki-Hun Jeong
Korea Advanced Institute of Science and Technology (KAIST), KOREA

16:45 - 17:00

T5B.03 NOVEL BOW-SHAPE TRANSMISSION SPRINGS FOR PIEZOELECTRIC MEMS MIRROR WITH 180-DEGREES OPTICAL SCANNING ANGLE

Si-Han Chen¹, Shih-Chi Liu¹, Hung-Yu Lin¹, Jerwei Hsieh², and Weileun Fang¹
¹National Tsing Hua University, TAIWAN and ²Asia Pacific Microsystems, Inc., TAIWAN

17:00 - 17:15

T5B.04 DESIGN OF A BI-AXIAL PIEZOELECTRIC MEMS SCANNER WITH TRI-GIMBAL STRUCTURE FOR SCANNING PATTERN ENHANCEMENT

Chih-Chen Hsu¹, Hao-Chien Cheng^{1,2}, Shi-Chi Liu¹, Hung-Yu Lin¹, Mingching Wu², Kai-Chih Liang², and Weileun Fang¹
¹National Tsing Hua University, TAIWAN and ²Coretronic MEMS Corporation, TAIWAN

17:15 - 17:30

T5B.05 FABRICATION OF A NOVEL PIEZOELECTRIC MEMS MIRROR WITH HIGH FILL FACTOR AND HIGH SPEED

Yang Wang¹, LiHao Wang¹, Hao Zhang⁵, YiChen Liu¹, YuYao Zhang³, WeiHong Zhu³, YongGui Zhang¹, and Zhenyu Wu^{1,2,3}
¹Chinese Academy of Sciences (CAS), CHINA, ²Shanghai Industrial Technology Research Institute, CHINA, ³Shanghai University, CHINA, and ⁵University of Chinese Academy of Sciences, CHINA

Session T5C - Acoustic Devices

16:15 - 16:30

T5C.01 LOW DIELECTRIC LOSS TANGENT, HIGHLY SCANDIUM DOPED ALUMINUM NITRIDE THIN FILM FOR ACOUSTIC DEVICES

Takahiro Higuchi¹, Akihiko Teshigahara¹, Kenji Kijima¹, Takashi Kakefuda², Takahide Usui², Yusuke Kawai¹, Takashi Omichi², and Hiroyuki Wado¹
¹MIRISE Technologies Corporation, JAPAN and ²Nissinbo Micro Devices Inc., JAPAN

16:30 - 16:45

T5C.02 HOW TO TURN A MEMS MICROPHONE INTO A PHOTOACOUSTIC SENSOR: AN EXPERIMENTAL STUDY

Thomas Strahl^{1,2}, Jonas Steinebrunner², Christian Weber^{1,2}, Jürgen Wöllenstein^{1,2}, and Katrin Schmitt^{1,2}
¹University of Freiburg, GERMANY and ²Fraunhofer Institute for Physical Measurement Techniques IPM, GERMANY

16:45 - 17:00

T5C.03 WAFER-SCALE TRANSFER-FREE GRAPHENE MEMS CONDENSER MICROPHONES

Roberto Pezone, Gabriele Baglioni, Leonardo Di Paola, Pasqualina M. Sarro, Peter G. Steeneken, and Sten Vollebregt
Delft University of Technology, NETHERLANDS

17:00 - 17:15

T5C.04 A NOVEL HIGH-SNR FULL BANDWIDTH PIEZOELECTRIC MEMS MICROPHONE BASED ON A FULLY CLAMPED ALUMINUM NITRIDE CORRUGATED MEMBRANE

Gabriele Bosetti¹, Christian Bretthauer², Andreas Bogner², Michael Krenzer², Karolina Gierl², Hans-Joerg Timme², Heinrich Heiss², and Gabriele Schrag¹

¹Technical University of Munich, GERMANY and ²Infineon Technologies AG, GERMANY

17:15 - 17:30

T5C.05 DUAL-FREQUENCY ALUMINUM SCANDIUM NITRIDE PIEZOELECTRIC MICROPHONES WITH WIDE BANDWIDTH, LARGE DYNAMIC RANGE, AND HIGH SENSITIVITY FOR WIND TUNNEL TESTING

Yanfen Zhai¹, Thai Anh Tuan Nguyen², Lokesh Kumar Reddy Onteru¹, Claire Bourquard¹,

Annalisa De-Pastina¹, Alexander Shatalov¹, Nikolai Andrianov¹, Xuyuan Chen², and Lixiang Wu¹

¹Silicon Austria Labs GmbH (SAL), ALGERIA and ²University of South-Eastern Norway, NORWAY

Session T5D - Microfluidics II

16:15 - 16:30

T5D.01 OPENABLE DOUBLE MICROTUBES STRUCTURE DRIVEN BY PNEUMATIC BALLOON ACTUATOR ARRAYS FOR TUBULAR ORGAN-ON-A-CHIP

Shiho Shimizu, Keiichiro Nishizaki, and Satoshi Konishi

Ritsumeikan University, JAPAN

16:30 - 16:45

T5D.02 ACOUSTOFLUIDIC MICROMANIPULATION SYSTEM WITH AN OPEN MICROFLUIDIC CHIP

Natsumi Hirata and Takeshi Hayakawa

Chuo University, JAPAN

16:45 - 17:00

T5D.03 SPERM ENRICHMENT AND FOULING MITIGATION IN BUBBLE-BASED ACOUSTOFLUIDIC FILTRATION MICRODEVICE

Ting-Yu Wan, Tsui-Ting Lee, Hsiao-Lin Hwa, and Yen-Wen Lu

National Taiwan University, TAIWAN

17:00 - 17:15

T5D.04 ACOUSTIC TWEEZERS USING BISYMMETRIC COHERENT SURFACE ACOUSTIC WAVES FOR RECONFIGURABLE MODULATION OF PARTICLE MULTIMERS

Hemin Pan, Yancheng Wang, and Deqing Mei

Zhejiang University, CHINA

17:15 - 17:30

T5D.05 LASER-WRITTEN CONDUCTIVE TRACKS FOR THE INTEGRATION OF SURFACE-MOUNT DEVICES ONTO PMMA

Tina Mitteramskogler, Andreas Fuchsluger, Rafael Ecker, Andreas Tröls, and Bernhard Jakoby

Johannes Kepler University Linz, AUSTRIA

17:30 - 17:40 Transition

Special Session 2 - Industry

17:40 - 19:10

T6A.02 TBD

19:10 End of Day

Wednesday, 28 June

Plenary Presentation 3

08:30 - 09:15

W1A.P3 MIMICKING THE CELLULAR MICROENVIRONMENT WITH 3D HYDROGELS ENABLES TARGET DISCOVERY AND DRUG SCREENING

Molly S. Shoichet
University of Toronto, CANADA

09:15 - 09:30 Transition

Session W2A - Fluidic Control

09:30 - 09:45

W2A.01 MICRODROPLET REACTIONS BY HYPERBRANCHED, SPACE-FILLING OPEN MICROFLUIDIC CHANNELS

Hiroyuki Kai
Tokyo University of Science, JAPAN

09:45 - 10:00

W2A.02 CHIRALITY SENSING MECHANISM USING VERTICAL CONTACT CONTROL OF LIQUID CRYSTAL MICRO-DROPLETS

Shinji Bono^{1,2,3} and Satoshi Konishi^{1,2,3}
¹*Ritsumeikan University, JAPAN*, ²*Ritsumeikan Advanced Research Academy, JAPAN*, and
³*Ritsumeikan Global Innovation Research Organization, JAPAN*

10:00 - 10:15

W2A.03 LOCALIZED ELECTROCHEMICAL DEPOSITION OF MULTI-METAL STRUCTURES BY HYDRODYNAMIC FLOW CONFINEMENT

Daniel Widerker¹, Govind Kaigala², and Moran Bercovici¹
¹*Technion, Israel Institute of Technology, ISRAEL* and ²*University of British Columbia, CANADA*

10:15 - 10:30

W2A.04 LENS-LESS ACOUSTIC TWEEZERS BASED ON SPIRAL-ARM VORTEX-BEAM TRANSDUCERS CAPABLE OF LEVITATING, TRAPPING, AND MANIPULATING LARGE AND HEAVY PARTICLES

Jaehoon Lee, Kianoush Sadeghian Esfahani, Matin Barekattain, and Eun S. Kim
University of Southern California, USA

10:30 - 10:45

W2A.05 FLUORESCENCE-ACTIVATED MULTI-SORTING OF SINGLE CELLS UTILIZING HIGH-SPEED ON-CHIP FLOW CONTROL

Makoto Saito¹, Niko Kimura¹, Shigeo S. Sugano², Yoko Yamanishi¹, Fumihito Arai³, and Shinya Sakuma¹
¹*Kyushu University, JAPAN*, ²*National Institute of Advanced Industrial Science and Technology, JAPAN*, and
³*University of Tokyo, JAPAN*

Session W2B - Optical Devices

09:30 - 09:45

W2B.01 METAMATERIAL-ENHANCED VIBRATIONAL CIRCULAR DICHROISM FOR MID-INFRARED SPECTROSCOPIC NANOSENSORS

Cheng Xu^{1,2}, Zhihao Ren^{1,2}, Hong Zhou^{1,2}, Jingkai Zhou¹, Chong Pei Ho², Nan Wang², and Chengkuo Lee¹
¹*National University of Singapore, SINGAPORE* and ²*Agency for Science, Technology and Research (A*STAR), SINGAPORE*

09:45 - 10:00

W2B.02 MULTIFUNCTIONAL METASURFACE FOR A MINIATURIZED REFLECTION-TYPE ATOMIC VAPOR CELL

Ponrapee Prutphongs¹, Katsuma Aoki¹, Ikezawa Satoshi¹, Motoaki Hara², and Kentaro Iwami¹

¹*Tokyo University of Agriculture and Technology, JAPAN and*

²*National Institute of Information and Communication Technology, JAPAN*

10:00 - 10:15

W2B.03 AN ALL-METAL METASURFACE FOR HIGH-EFFICIENCY REFRACTIVE INDEX SENSING BASED ON REFLECTION-TYPE SURFACE LATTICE RESONANCE

Liye Li¹, Lijun Ma¹, Yifan Ouyang¹, Hongshun Sun¹, Shengxiao Jin¹, Senyong Hu¹, Meizhang Wu², Zhimei Qi³, and Wengang Wu¹

¹*Peking University, CHINA, ²University of Science and Technology Beijing, CHINA, and*

³*University of Chinese Academy of Sciences, CHINA*

10:15 - 10:30

W2B.04 AN INTEGRATED PLATFORM FOR CAVITY OPTOMECHANICS WITH VACUUM-SEALED SILICON PHOTONIC MEMS

Pierre Edinger¹, Gaehun Jo¹, Simon Bleiker¹, Alain Y. Takabayashi⁴, Niels Quack⁴, Umar S. Khan^{2,3}, Wim Bogaerts^{2,3}, Peter Verheyen³, Cleitus Antony⁵, Frank Niklaus¹, and Kristinn B. Gylfason¹

¹*KTH Royal Institute of Technology, SWEDEN, ²Ghent University, BELGIUM, ³IMEC, BELGIUM,*

⁴*École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND, and ⁵Tyndall Institute, IRELAND*

10:30 - 10:45

W2B.05 FIRST DEMONSTRATION OF SELF-POWERED ALGAN/GAN UV PHOTODETECTOR ENABLED BY NON-PLANAR SCHOTTKY DEPLETION

Yuhan Pu^{1,2} and Yung C. Liang^{1,2}

¹*National University of Singapore, SINGAPORE and*

²*National University of Singapore (Suzhou) Research Institute, CHINA*

Session W2C - Packaging & Fabrication

09:30 - 09:45

W2C.01 3D PRINTING OF SILICA-HSQ COMPOSITES WITH SUB-MICROMETER RESOLUTION AND SELECTIVELY GENERATED SILICON NANOCRYSTALS

Po-Han Huang¹, Miku Laakso¹, Oliver Hartwig², Georg S. Duesberg², Göran Stemme¹, Kristinn B. Gylfason¹, and Frank Niklaus¹

¹*KTH Royal Institute of Technology, SWEDEN and ²Universität der Bundeswehr Munich, GERMANY*

09:45 - 10:00

W2C.02 A TIME-MATCHED SiO₂-LAYER ETCH FOR ADVANCED MEMS FOUNDRY PROCESSES MULTI-PROJECT CHIP (MPC)

Sushil Kumar, Khanjan Joshi, and Pushpapraj Singh

Indian Institute of Technology Delhi, INDIA

10:00 - 10:15

W2C.03 LIQUID-IN-A-MEMS: ENCAPSULATION OF LIQUID IN A MICROCAPSULE BY INKJET PRINTING

Jongeon Park, Arnaud Bertsch, and Juergen Brugger

École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND

10:15 - 10:30

W2C.04 DOUBLE-LEVEL TEMPORARY PROTECTIVE PACKAGING OF TSV-BASED MICRO-MIRROR ARRAY FOR OPTICAL-WINDOW-FREE VERTICAL INTEGRATION

Yuhu Xia^{1,2}, Biyun Ling¹, Xiaoyue Wang¹, Minli Cai^{1,2}, and Yaming Wu^{1,2}

¹*Chinese Academy of Sciences (CAS), CHINA and ²University of Chinese Academy of Sciences, CHINA*

10:30 - 10:45

W2C.05 THE HETEROGENEOUS PACKAGING OF A 3X3 MINI-LED ARRAY FOR SMART CONTACT LENS APPLICATIONS

Cheng-Wei Tsai, Guan-Ting Yeh, Shun-Hsi Hsu, Shin-Ho Wu,
Yu-Hsuan Huang, Her-Ming Chiueh, and Jin-Chern Chiou
National Yang Ming Chiao-Tung University, TAIWAN

Session W2D - Non-Linear Resonators

09:30 - 09:45

W2D.01 OPERATION OF ARRAYED LOGIC ELEMENTS FOR MEMS ISING MACHINE

Shun Yasunaga, Masahiko Ezawa, Keigo Tsuji, Kei Misumi, Tomoki Sawamura, Shinji Tsuboi,
Ayako Mizushima, Yukinori Ochiai, Akio Higo, and Yoshio Mita
University of Tokyo, JAPAN

09:45 - 10:00

W2D.02 EFFICIENT RESERVOIR COMPUTING BY NONLINEARLY COUPLED PIEZOELECTRIC MEMS RESONATORS

Takeshi Yoshimura¹, Taiki Haga¹, Norifumi Fujimura¹, Kensuke Kanda², and Isaku Kanno³
¹Osaka Metropolitan University, JAPAN, ²University of Hyogo, JAPAN, and ³Kobe University, JAPAN

10:00 - 10:15

W2D.03 CONSTRUCTING MICROMECHANICAL FREQUENCY COMBS IN BIFURCATING ATTRACTOR BRANCHES FOR EVENT TRIGGERED SENSORS

Ting-Yi Chen, Chun-Pu Tsai, and Wei-Chang Li
National Taiwan University, TAIWAN

10:15 - 10:30

W2D.04 VIBRO-IMPACT PERTURBATION BASED ATTRACTOR EXCHANGER FOR OPEN-LOOP NONLINEAR RESONATORS

Chun-Pu Tsai and Wei-Chang Li
National Taiwan University, TAIWAN

10:30 - 10:45

W2D.05 IMPROVING THE DYNAMIC RANGE AND RESOLUTION OF MEMS RESONANT SENSORS UTILIZING PARAMETRIC NONLINEAR CANCELLATION

Chengxin Li¹, Aojie Quan¹, Hemin Zhang², Chen Wang¹, Mustafa M. Torunbalci³,
Linlin Wang¹, Chenxi Wang¹, Yangyang Guan¹, Yuan Wang⁴, Michael Kraft¹
¹KU Leuven, BELGIUM, ²Northwestern Polytechnical University, CHINA, ³Broadcom, USA, and ⁴University of Macau, CHINA

10:45 - 11:15 Break and Exhibit Inspection

Session W3A - Microfluidics III

11:15 - 11:45

W3A.01 INVITED PRESENTATION

11:45 - 12:00

W3A.03 A HIGH-THROUGHPUT UNIFORM-SIZED DROPLET GENERATOR WITH A TRIANGULAR CROSS-SECTION CHANNEL FABRICATED BY SIMPLE MEMS PROCESS AND SELF-ALIGNMENT

Oh Byeolnim¹, Cho Youngseo², Park Jaewon³, Cho Younghak², and Kim Hyun Soo¹

¹Kwangwoon University, KOREA, ²Seoul National University of Science and Technology, KOREA, and

³Korea University, KOREA

12:00 - 12:15

W3A.04 IONIC SIGNAL-AMPLIFICATION ACTUATED BY GAS DISSOLUTION

Sangjin Seo and Taesung Kim

Ulsan National Institute of Science and Technology (UNIST), KOREA

12:15 - 12:30

W3A.05 ALGINATE HYDROGEL MICROBEADS WITH DIFFERENT MESH STRUCTURES ENABLE CONTROLLED RELEASE OF ADENO-ASSOCIATED VIRUS FOR GENE THERAPY

Aiki Hioki¹, Shuhei Takatsuka¹, Yuta Kurashina², and Hiroaki Onoe¹

¹Keio University, JAPAN and ²Tokyo University of Agriculture and Technology, JAPAN

12:30 - 12:45

W3A.06 MECHANISM OF DRUG RELEASING UNIT VIA OSCILLATING BUBBLES AND INTEGRATION WITH 3-D MICROSWIMMER

Wenbo Li, Fang-Wei Liu, and Sung Kwon Cho

University of Pittsburgh, USA

Session W3B - Chemical Sensors I

11:15 - 11:30

W3B.01 HYDROGEN-SENSING PROPERTIES AND REDUCTION-INDUCED SENSING MECHANISM OF NICKEL OXIDE NANOPATES

Tao Zhang^{1,2}, Ying Chen¹, Ming Li¹, Pengcheng Xu¹, Xinxin Li¹, and Dan Zheng²

¹Chinese Academy of Sciences (CAS), CHINA and ²Shanghai Institute of Technology, CHINA

11:30 - 11:45

W3B.02 QUANTITATIVE MEASUREMENTS OF ADSORBED OXYGEN SPECIES ON MATERIAL SURFACE FOR HIGH-PERFORMANCE GAS SENSOR DESIGN

Ruomeng Guo^{1,2}, Xinyu Li², Ming Li², Ying Chen², Pengcheng Xu², and Xinxin Li²

¹ShanghaiTech University, CHINA and ²Chinese Academy of Sciences (CAS), CHINA

11:45 - 12:00

W3B.03 FAST AND SIMULTANEOUS GAS SENSING METHOD IN MIXED GASES USING MULTIPLE MICROMACHINED THERMAL CONDUCTIVITY DETECTORS FOR FUTURE CARBON-NEUTRAL SOCIETY

Hiroaki Yamazaki, Ping Wang, Naoya Fujiwara, Yoshihiko Kurui, Naoki Hiramatsu, Fumitaka Ishibashi, Ryota Kitagawa, and Akihiro Kojima

Toshiba Corporation, JAPAN

12:00 - 12:15

- W3B.04 A CHAMELEON-INSPIRED FLEXIBLE HUMIDITY SENSOR BASED ON PEDOT: PSS-MEDIATED THERMOCHROMIC LIQUID CRYSTAL COMPOSITE MATERIALS**
Chong-Ren Sun, Yu-Hsuan Cheng, and Ching-Te Kuo
National Sun Yat-sen University, TAIWAN

12:15 - 12:30

- W3B.05 MONOLITHIC INTEGRATION OF GAS/HUMIDITY/TEMPERATURE SENSORS WITH THERMAL COUPLING EFFECT REDUCTION**
Chi-Te Fang¹, Tung-Lin Chien¹, Yung-Chen Li¹, Yuanyuan Huang¹, Yu-Cheng Lin², I-Yu Huang³, and Weileun Fang¹
¹*National Tsing Hua University, TAIWAN*, ²*National Cheng Kung University, TAIWAN*, and ³*National Sun Yat-sen University, TAIWAN*

12:30 - 12:45

- W3B.06 FABRICATION OF HIGH-RESOLUTION MULTI-ION IMAGE SENSOR USING RUBBER-BASED NEGATIVE RESIST AND EXTRACELLULAR ION IMAGING IN THE HIPPOCAMPAL SLICE**
Moe Kato¹, Jumpei Otsuka¹, Hideo Doi¹, Bijay Parajuli², Tomoko Horio¹, Eiji Shigetomi², Youichi Shinozaki², Yong-Joon Choi¹, Kazuhiro Takahashi¹, Toshiaki Hattori¹, Toshihiko Noda¹, Schuichi Koizumi², and Sawada Kazuaki¹
¹*Toyohashi University of Technology, JAPAN* and ²*University of Yamanashi, JAPAN*

Session W3C - Resonating Devices

11:15 - 11:30

- W3C.01 TEMPERATURE COMPENSATION IN CMOS-MEMS OSCILLATORS VIA FOLDED-ANCHOR RESONATOR GEOMETRICAL TUNING**
Rafel Perello-Roig^{1,2}, Salvador Barcelo^{1,2}, Jaume Verd^{1,2}, Sebastia Bota^{1,2}, and Jaume Segura^{1,2}
¹*University of the Balearic Islands, SPAIN* and ²*Health Research Institute of the Balearic Islands, SPAIN*

11:30 - 11:45

- W3C.02 COMPACT MEMS TEMPERATURE SENSOR EXPLOITING A DUAL-MODE POLYSILICON RESONATOR AND PHASE-LOCKED-LOOP MULTIPLICATION**
Paolo Frigerio¹, Andrea Fagnani¹, Valentina Zega¹, Gabriele Gattere², Attilio Frangi¹, and Giacomo Langfelder¹
¹*Politecnico di Milano, ITALY* and ²*STMicroelectronics, ITALY*

11:45 - 12:00

- W3C.03 LISSAJOUS-FM RESONANT MAGNETOMETER**
Linxin Zhang, Takashiro Tsukamoto, and Shuji Tanaka
Tohoku University, JAPAN

12:00 - 12:15

- W3C.04 EXPLOITING BLUE SIDEBAND EXCITATION TO ENHANCE MODE LOCALIZATION IN A RESONANT DOUBLE-ENDED TUNING FORK MAGNETOMETER**
Yuan Wang¹, Chun Zhao², Huafeng Liu⁴, Chen Wang³, Linlin Wang³, Fangjing Hu⁴, Shaolin Zhang⁴, and Michael Kraft³
¹*University of Macau, CHINA*, ²*University of York, UK*, ³*KU Leuven, BELGIUM*, and ⁴*Huazhong University of Science and Technology, CHINA*

12:15 - 12:30

- W3C.05 A FREQUENCY COMB WITH HIGH RESOLUTION AND LOW THRESHOLD POWER BASED ON A SINGLE MODE CIRCULAR RESONATOR**
Hongyu Chen, Dongyang Chen, Ronghua Huan, and Jin Xie
Zhejiang University, CHINA

12:30 - 12:45

W3C.06 A MASS SENSOR BASED ON 3-DOF MODE LOCALIZED BAW RESONATORS WITH ENHANCED QUALITY FACTOR AND RESOLUTION

Linlin Wang¹, Chen Wang¹, Aojie Quan¹, Yuan Wang², Chenxi Wang¹,
Bernardo P. Madeira¹, Chengxin Li¹, and Michael Kraft¹

¹*KU Leuven, BELGIUM* and ²*University of Macau, CHINA*

Session W3D - Logic Devices & Switches

11:15 - 11:45

W3D.01 INVITED PRESENTATION

11:45 - 12:00

W3D.03 CORRECTION OF TRANSMITTERS' PIXEL VALUES IN AN ULTRASONIC FOURIER TRANSFORM ANALOG COMPUTING APPARATUS

Xing Haw Marvin Tan¹, Daniel Ssu-Han Chen¹, Zaifeng Yang¹, Viet Phuong Bui¹,
Kevin Tshun Chuan Chai¹, Ching Eng Png¹, and Amit Lal²

¹*Agency of Science Technology and Research (A*STAR), SINGAPORE* and ²*Cornell University, USA*

12:00 - 12:15

W3D.04 ADIABATIC LOGIC GATES FOR ULTRA-LOW-POWER OPERATION USING CONTACTLESS CAPACITIVE MEMS

Aleksandra Markovic¹, Laurent Mazonq¹, Adrian Laborde¹, Hervé Fanet², Gaël Pillonnet²,
and Bernard Legrand¹

¹*LAAS-CNRS, FRANCE* and ²*CEA, FRANCE*

12:15 - 12:30

W3D.05 FULLY 3D-PRINTED, SEMICONDUCTOR-FREE, TRANSISTOR-LIKE LOGIC DEVICES

Jorge Cañada and Luis F. Velásquez-García
Massachusetts Institute of Technology, USA

12:30 - 12:45

W3D.06 ROBUST MEMS WAVEGUIDE SWITCH FOR THZ SPECTROSCOPY IN SPACE

Sofia Rahiminejad, Sven van Berkel, Robert H. Lin, Cecile Jung-Kubiak, Goutam Chattopadhyay,
and Mina Rais-Zadeh

Jet Propulsion Laboratory, USA

12:45 - 14:15 **Lunch and Exhibit Inspection**

Industrial Session 3

12:55 - 13:55

Poster Session W4P and Exhibit Inspection

14:15 - 16:15

Session W5B - Chemical Sensors II

16:15 - 16:45

W5B.01 **INVITED PRESENTATION**

16:45 - 17:00

W5B.03 **HIGH-RESPONSIVITY SINGLE-CRYSTAL SILICON MEMS THERMOPILES FOR DIFFERENTIAL THERMAL ANALYSIS (DTA)**

Haozhi Zhang, Hao Jia, Weiwen Feng, Pengcheng Xu, and Xinxin Li
Chinese Academy of Sciences (CAS), CHINA

17:00 - 17:15

W5B.04 **A NON-ENZYMATIC ELECTROCHEMICAL SENSOR BASED ON CERIUM OXIDE NANOCUBES FOR THE RAPID DETECTION OF HYDROGEN PEROXIDE RESIDUES IN FOOD SAMPLES**

Xuefeng Wang^{1,2}, Jiacy Shi^{1,3}, Wei Shen^{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*

17:15 - 17:30

W5B.05 **LONG-LIFE SENSING FILM STRUCTURE AND RELIABILITY EVALUATION OF PD-CU-SI-METALLIC GLASS FOR HYDROGEN SENSOR**

Yumi Hayashi, Naoki Hiramatsu, Hiroaki Yamazaki, and Akihiro Kojima
Toshiba Corporation, JAPAN

17:30 - 17:45

W5B.06 **CMOS GAS-SENSING ARRAY BY NOVEL SENSING APPROACH USING MIXED-PIXEL-ARCHITECTURE FOR DETECTION OF VARIOUS RESPONSE OF GAS-SENSITIVE MEMBRANES**

Takeru Wada, Tomoki Kamijo, Yoshiko Noda, Daisuke Akai, Takeshi Hizawa, Yasuyuki Kimura, Yong-joon Choi, Kazuhiro Takahashi, Kazuaki Sawada, and Toshihiko Noda
Toyohashi University of Technology, JAPAN

Session W5C - RF Resonators

16:15 - 16:30

W5C.01 **AN INTRINSICALLY TEMPERATURE-COMPENSATED FULLY DIFFERENTIAL CMOS-MEMS RESONATOR WITH DUAL-RESISTOR PIEZORESISTIVE DETECTION**

Zhi-Qiang Lee, Jie-Sheng Jiang, Hung-Yu Chen, Sheng-Shian Li, and Ming-Huang Li
National Tsing Hua University, TAIWAN

16:30 - 16:45

W5C.02 **VERY HIGH FREQUENCY STABILITY OF SINGLE-CRYSTAL SILICON THERMAL-PIEZORESISTIVE RESONATORS WITH PHASE-LOCKED LOOP**

Connor A. Watkins¹, Jaesung Lee¹, Harris J. Hall², Jon P. McCandless³, and Philip X.-L. Feng¹
¹*University of Florida, USA*, ²*Air Force Research Labs, USA*, and ³*Case Western Reserve University, USA*

16:45 - 17:00

W5C.03 **REDUCED ORDER MODELING OF PIEZOELECTRIC RESONATORS WITH MULTI-FREQUENCY IMPEDANCE ESTIMATION**

Kuan-Ting Chen, Tzu-Hsuan Hsu, Guan-Lin Wu, and Ming-Huang Li
National Tsing Hua University, TAIWAN

17:00 - 17:15

W5C.04 EXPERIMENTAL STUDY OF THE ORIGIN OF NONLINEAR DAMPING IN VERY HIGH FREQUENCY CONTOUR MODE RESONATORS

Yi Chan¹, Xuetian Wang¹, Juan Sebastian Gomez-Diaz², and Jeronimo Segovia-Fernandez³
¹Beijing Institute of Technology, CHINA, ²University of California, Davis, USA, and ³Texas Instruments, USA

17:15 - 17:30

W5C.05 MICRO-TO-NANOACOUSTIC SCALN LAMB WAVE RESONATORS: FREQUENCY SCALING TOWARDS THE MM-WAVE SPECTRUM

Gabriel Giribaldi, Luca Colombo, Pietro Simeoni, and Matteo Rinaldi
Northeastern University, USA

17:30 - 17:45

W5C.06 NONLINEAR PERFORMANCE OF MONOLITHICALLY INTEGRATED SCALN-BASED GHZ ACOUSTIC FILTERS WITH RFSOI SWITCHES

Chen Liu, Ying Zhang, Xinghua Wang, Wenjia Yang, and Yao Zhu
Agency of Science Technology and Research (A*STAR), SINGAPORE

Session W5D - Intelligent Bio-Chemical Sensors

16:15 - 16:30

W5D.01 A MICROSYSTEM FOR NON-INVASIVE IMAGING AND SIMULTANEOUS MULTI-BIOMARKER 3D IMAGING

Erick J. Vargas-Ordaz¹, Terrance Lam¹, Bonan Liu¹, Fabrizio Horta^{1,2}, Michelle L. Halls¹, Adrian Neild¹, and Victor J. Cadarso¹
¹Monash University, AUSTRALIA and ²Monash Data Future Institute, AUSTRALIA

16:30 - 16:45

W5D.02 FABRICATION AND DEMONSTRATION OF FILTER-FREE WAVELENGTH IMAGE SENSOR FOR VISUALIZATION OF WAVELENGTH INFORMATION

Tomoya Ide, Yong-Joon Choi, Kakeru Nakano, Tsugumi Sakae, Ryoya Matsubara, Yasuyuki Kimura, Kensuke Murakami, Yoshiko Noda, Daisuke Akai, Takashi Hizawa, Hiromu Ishii, Kazuhiro Takahashi, Toshihiko Noda¹, and Kazuaki Sawada¹
Toyohashi University of Technology, JAPAN

16:45 - 17:00

W5D.03 WIRELESS SOIL PH SENSING USING ISOTROPIC DEGRADABLE ARRAY SENSOR

Ken Sakabe¹, Tetsuo Kan², and Hiroaki Onoe¹
¹Keio University, JAPAN and ²University of Electro-Communications, JAPAN

17:00 - 17:15

W5D.04 MOF-INTEGRATED ULTRA-BROADBAND NANOANTENNAS FOR MACHINE-LEARNING-ENABLED VOC GAS IDENTIFICATION

Hong Zhou, Dongxiao Li, Zhihao Ren, Cheng Xu, and Chengkuo Lee
National University of Singapore, SINGAPORE

17:15 - 17:30

W5D.05 TACTILE-OLFACTORY FUSION HUMANOID HAND FOR ENVIRONMENTAL SENSING WITH FAST NONLINEAR DECISION-MAKING

Jiachuang Wang^{1,2}, Tiger H. Tao^{1,2,3}, and Nan Qin^{1,2}
¹Chinese Academy of Sciences (CAS), CHINA, ²University of Chinese Academy of Sciences, CHINA, and ³Neuroxess Co., Ltd. (Jiangxi), CHINA

17:30 - 17:45

W5D.06 A GAS SENSOR ARRAY PACKAGED WITH A HIERARCHICAL NEURAL NETWORK FOR GAS SPECIES IDENTIFICATION AND CONCENTRATION ESTIMATION

Zong Liu^{1,2}, Gabriel E. Carranza¹, Yushen Hu¹, Fei Wang², and Man Wong¹

¹*Hong Kong University of Science and Technology, HONG KONG and*

²*Southern University of Science and Technology, CHINA*

Session W5E - Functional Materials & Fabrication II

16:15 - 16:45

W5E.01 INVITED PRESENTATION

16:45 - 17:00

W5E.03 DRIVING FORCE FOR PIEZOELECTRIC ORIENTATION IN PLASMA DEPOSITION PROCESSES

Jan-Willem Burssens¹, Chen Wang¹, Xinyu Wu¹, Appo Van der Wiel², and Michael Kraft¹

¹*KULeuven, BELGIUM and* ²*Melexis, BELGIUM*

17:00 - 17:15

W5E.04 MEASURING LIGHT PENETRATION FOR SPECTRAL ANALYSIS WITH INTERCALATED GRAPHENE/QUANTUM DOT PHOTODETECTORS

Seungbae Ahn, Ju Ying Shang, and Oscar Vazquez Mena

University of California, San Diego, USA

17:15 - 17:30

W5E.05 ISOTROPIC DEGRADABLE METAMATERIAL FOR ENVIRONMENTAL SENSING

Tatsuya Yano, Gaku Furusawa, and Tetsuo Kan

University of Electro-Communications, JAPAN

17:30 - 17:45

W5E.06 LIGHT-DRIVEN FLAGELLATED MICRO-GEL ROBOT MADE OF TEMPERATURE-RESPONSIVE HYDROGEL ACTUATOR

Hinako Sato¹, Yoshiyuki Yokoyama², and Takeshi Hayakawa¹

¹*Chuo University, JAPAN and* ²*Toyama Industrial Technology Research and Development Center, JAPAN*

Banquet

18:00 - 21:00

Thursday, 29 June

Plenary Presentation 4

08:30 - 09:15

Th1A.P4 NUCLEIC ACIDS-BASED INFORMATION MATERIALS

Chunhai Fan

Shanghai Jiao Tong University (SJTU), CHINA

09:15 - 09:30 Transition

Session Th2C - Tissue Engineering

09:30 - 09:45

Th2C.01 ON-CHIP DIFFERENTIATION OF RADIALY VASCULARIZED HEPATIC CORDS MIMICKING THE LIVER LOBULE

Alan Raj Jeffrey Rajendran^{1,2}, Sakina Chantoiseau-Bensalem¹, Antonietta Messina², Nassima Benzoubir^{2,3}, Rasta Ghasemi⁴, Jean-Charles Duclos-Vallée^{2,3}, and Bruno Le Pioufle^{1,4}

¹CNRS LUMIN, FRANCE, ²INSERM - UMR_S 1193, FRANCE, ³AP-HP, FRANCE, and

⁴CNRS - Institut d'Alembert, FRANCE

09:45 - 10:00

Th2C.02 EXPLORING AUTONOMOUS OPTIMAL EXPERIMENTAL CONDITIONS FOR IN VITRO TISSUE MATURATION WITH BATCH BAYESIAN OPTIMIZATION

Daiki Miyata¹, Keitaro Kasahara¹, Takahiro Yamada¹, Yuta Tokuoka¹, Yujin Taguchi¹, Yuta Kurashina², Akira Funahashi¹, and Hiroaki Onoe¹

¹Keio University, JAPAN and ²Tokyo University of Agriculture and Technology, JAPAN

10:00 - 10:15

Th2C.03 AUTOMATED LARGE-SCALE SPHEROID GENERATION VIA HANGING-DROP AND EFFICIENT TRANSFER INTO PHYSIOLOGICAL MIMICKING MICROENVIRONMENT

Viktoria Zieger¹, Ellen Woehr², Stefan Zimmermann¹, Daniel Frejek³, Peter Koltay¹, Roland Zengerle^{1,3}, and Sabrina Kartmann³

¹University of Freiburg, GERMANY, ²University of Furtwangen, GERMANY, and

³Hahn-Schickard, GERMANY

10:15 - 10:30

Th2C.04 MICROFLUIDIC CO-CULTURES OF CANCER SPHEROIDS AND NK CELLS FOR TESTING IMMUNOTHERAPY

Alan M. Gonzalez-Suarez, Michael Medlyn, Daheui Choi, Gulnaz Stybayeva, Daniel D. Billadeau, and Alexander Revzin

Mayo Clinic, USA

10:30 - 10:45

Th2C.05 APICAL MICROVILLI OF A HYBRID HIPSC-DERIVED PROXIMAL TUBULE MICROTISSUE REACT TO FLOW-INDUCED SHEAR STRESS IN A MICROPHYSIOLOGICAL SYSTEM

Ramin Banan Sadeghian¹, Cheng Ma¹, Akihiko Kawakami¹, Minoru Takasato^{1,2,3}, and Ryuji Yokokawa¹

¹Kyoto University, JAPAN, ²Institute of Physical and Chemical Research (RIKEN), JAPAN, and

³Osaka University, JAPAN

Session Th2D - Soft Actuators

09:30 - 09:45

Th2D.01 HIGH EFFICIENCY ACTUATION CONVERSION MECHANISM FOR HIGH-OUTPUT BENDING MOTION OF A SOFT INFLATABLE MICROACTUATOR

Yuto Hori, Seiji Suzuki, Tatsumi Katsura, and Satoshi Konishi
Ritsumeikan University, JAPAN

09:45 - 10:00

Th2D.02 SELF-SENSING SOFT PNEUMATIC MICRO ACTUATORS FOR HAPTIC FEEDBACK AND HUMAN-MACHINE INTERFACES

Xiayu Wang, Fade Hu, Chuan Luo, and Zheng You
Tsinghua University, CHINA

10:00 - 10:15

Th2D.03 DEPLOYABLE SOFT MICROACTUATOR WITH WATER CIRCULATION CHANNEL AND SHAPE MEMORY POLYMER

Toshiro Yamanaka, Taosong Yu, Yuta Taniguchi, Satoshi Amaya, and Fumihito Arai
University of Tokyo, JAPAN

10:15 - 10:30

Th2D.04 MAGNETIC CONTROLLED MULTIFUNCTIONAL THREE-DIMENSIONAL SOFT ROBOT WITH SELF-PERCEPTIVE CAPABILITY

Chen Xu, Ji Wan, Haobin Wang, Zehua Xiang, Pengcheng Zhao, Mengdi Han, and Haixia Zhang
Peking University, CHINA

10:30 - 10:45

Th2D.05 UNTETHERED SWARM ROBOTS WITH INDEPENDENT CRAWLING AND ROLLING MOTIONS

Wei Yue¹, Xinyu Zhou², Fanping Sui¹, Mingzheng Duan¹, and Liwei Lin¹
¹University of California, Berkeley, USA and ²Peking University, CHINA

Session Th2E - Fluidic Sensors

09:30 - 09:45

Th2E.01 A UNIVERSAL GAS SENSING CONCEPT THROUGH ACOUSTIC COUPLING IN A CAVITY

Derin Erkan, Ahmet A. Derin, and Erdinc Tatar
Bilkent University, TURKEY

09:45 - 10:00

Th2E.02 HIGH QUALITY FACTOR SUSPENDED NANOCHANNEL RESONATOR DEVICES, WITH SELF-OSCILLATION CAPACITY

Katell Aldrin¹, Thomas Furcette¹, Georgios Katsikis², Guillaume Jourdan¹, Selim Olcum³, Aurélien Lepoetre¹, Jean-François Beche¹, François Boizot¹, Marc Sansa¹, Fabrice Navarro¹, Scott Manalis², and Vincent Agache¹
¹CEA/LETI, FRANCE, ²Massachusetts Institute of Technology, USA, and ³TRAVERA, USA

10:00 - 10:15

Th2E.03 DROPLET AS A MECHANICAL COUPLING FOR A VIBRATIONAL SYSTEM AND ITS APPLICATION IN FLUID PROPERTY SENSING

Saravanakumar Dharmaraj and Prosenjit Sen
Indian Institute of Science, INDIA

10:15 - 10:30

Th2E.04 AN ULTRALOW-POWER FLEXIBLE THERMAL FLOW SENSOR BASED ON ELECTROCHEMICAL IMPEDANCE

Ke Xiao, Xiangyu Song, and Wei Xu
Shenzhen University, CHINA

10:30 - 10:45

Th2E.05 PITOT-TYPE WATERFLOW SENSOR LOGGER FOR RELATIVE WATERFLOW VELOCITY MEASUREMENT OF A SEA TURTLE

Takuto Kishimoto¹, Ryosuke Saito², Hiroto Tanaka², Yu Naruoka³, Kenta Kuroda⁴, Katsufumi Sato⁴, and Hidetoshi Takahashi¹

¹Keio University, JAPAN, ²Tokyo Institute of Technology, JAPAN, ³JAXA, JAPAN, and

⁴University of Tokyo, JAPAN

Session Th2F - Wearable Devices

09:30 - 09:45

Th2F.01 A BRAIN-TO-BRAIN INTERFACE WITH A FLEXIBLE NEURAL PROBE FOR MOUSE TURNING CONTROL BY HUMAN MIND

Yifei Ye¹, Zhenyu Wang¹, Ye Tian¹, Han Wang¹, Cunkai Zhou¹, Honglin Hu¹, Ting Zhou², Zhitao Zhou¹, Xiaoling Wei¹, Jianlong Zhao¹, Tiger H. Tao¹, and Liuyang Sun¹

¹Chinese Academy of Sciences (CAS), CHINA and ²Shanghai University, CHINA

09:45 - 10:00

Th2F.02 ULTRA-CONFORMAL TONGUE ELECTRODE ARRAY FOR TASTE PERCEPTION DECODING

Xiner Wang^{1,2}, Guo Bai³, Zhaohan Chen¹, Jizhi Liang^{1,2}, Qianyang Xie³, Zhitao Zhou^{1,2}, and Tiger H. Tao^{1,2}

¹Chinese Academy of Sciences (CAS), CHINA, ²University of Chinese Academy of Sciences, CHINA, and

³Shanghai Ninth People's Hospital, Shanghai JiaoTong University School of Medicine, CHINA

10:00 - 10:15

Th2F.03 A WEARABLE MULTISENSORY PULSE SENSOR BASED ON PIEZO-THERMIC TRANSDUCTION

Shuo Tian, Liangqi Wang, and Rong Zhu

Tsinghua University, CHINA

10:15 - 10:30

Th2F.04 GAIT EVENT DETECTION USING PIEZOELECTRIC FIBER EMBEDDED SMART-SOCK

Jarred W. Fastier-Wooller^{1,2}, Nathan Lyons¹, Trung Hieu Vu¹, Claudio Pizzolato¹, Toshihiro Itoh², Dzung Viet Dao¹, Jayishni Maharaj¹, and Van Thanh Dau¹

¹Griffith University, AUSTRALIA and ²University of Tokyo, JAPAN

10:30 - 10:45

Th2F.05 CONTINUOUS CUFFLESS MONITORING OF ARTERIAL BLOOD PRESSURE BASED ON HIGH-DENSITY FLEXIBLE SENSOR ARRAY

Fang Wang^{1,2}, Heng Yang^{1,2}, Ke Sun¹, Yi Sun¹, and Xinxin Li^{1,2}

¹Chinese Academy of Sciences (CAS), CHINA and ²University of Chinese Academy of Sciences, CHINA

10:45 - 11:15 Break and Exhibit Inspection

Session Th3C - Agricultural Applications

11:15 - 11:45

Th3C.01 INVITED PRESENTATION

11:45 - 12:00

Th3C.03 DEVELOPMENT OF PLANT GROWTH MONITORING SENSOR TO VISUALIZE ION DYNAMICS IN PLANTS AND ITS FUNCTIONAL VALIDATION IN LONG-TERM MEASUREMENTS

Taichi Yoshida, Yusuke Matsushita, Naoki Sakaguchi, Yong-Joon Choi, Kazuhiro Takahashi, Kotaro Takayama, Kazuaki Sawada, and Toshihiko Noda

Toyohashi University of Technology, JAPAN

12:00 - 12:15

Th3C.04 COMPACT CHLOROPHYLL MEASUREMENT SYSTEM FOR QUANTITATIVE ANALYSIS OF LEAF PHOTOSYNTHESIS IN AGRICULTURE

Ryoma Mibu, Ryosuke Ichikawa, Yong-Joon Choi, Seitaro Toda, Kazuhiro Takahashi, Kotaro Takayama, Toshihiko Noda, and Kazuaki Sawada
Toyohashi University of Technology, JAPAN

12:15 - 12:30

Th3C.05 A PASSIVE, WIRELESS GAS SENSOR BASED ON LASER INDUCED GRAPHENE FOR SOIL AMMONIA LEVEL MONITORING

Chao Liang¹, Xiaoguang Zhao², Wenqiang Zhang¹, Wei Zhou¹, and Ziqi Mei²
¹*China Agricultural University, CHINA* and ²*Tsinghua University, CHINA*

12:30 - 12:45

Th3C.06 HIGH-SPEED ON-CHIP IN-LIQUID DISPENSING BY UTILIZING ON-DEMAND VORTX GENERAIONS

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

Session Th3D - Actuators II

11:15 - 11:45

Th3D.01 INVITED PRESENTATION

11:45 - 12:00

Th3D.03 DESIGN OF BI-DIRECTIONAL VO2-KIRIGAMI ELECTROTHERMAL MICROACTUATOR WITH MILLIMETER LARGE STROKE

Masaaki Hashimoto, Tomoya Tsutsui, and Yoshihiro Taguchi
Keio University, JAPAN

12:00 - 12:15

Th3D.04 BANDWIDTH ENHANCEMENT OF PIEZOELECTRIC MEMS MICROSPEAKER BY MULTIPLE PISTON-MODES AND NOVEL CROSSOVER DRIVING METHOD

Ting-Chou Wei¹, Hsu-Hsiang Cheng¹, Sung-Cheng Lo², Yu-Chen Chen¹, Shu-Wei Chang¹, Zih-Song Hu¹, Jerwei Hsieh³, Ruey-Shing Huang⁴, Weileun Fang¹
¹*National Tsing Hua University, TAIWAN*, ²*Upbeat Technology Co., Ltd., TAIWAN*,
³*Asia Pacific Microsystem Inc., TAIWAN*, ⁴*National Sun Yat-sen University, TAIWAN*

12:15 - 12:30

Th3D.05 A MECHANICALLY-OPEN AND ACOUSTICALLY-CLOSED PIEZOMEMS SPEAKER FOR IN-EAR APPLICATIONS

Chiara Gazzola¹, Valentina Zega¹, Fabrizio Cerini², Silvia Adorno², and Alberto Corigliano¹
¹*Politecnico di Milano, ITALY* and ²*STMicroelectronics, ITALY*

12:30 - 12:45

Th3D.06 WIRELESS ACOUSTIC AIRBORNE JET PROPELLER

Akash Roy, Matin Barekatin, Jaehoon Lee, Baptiste Neff, and Eun Sok Kim
University of Southern California, USA

Session Th3E - Chemical Sensors III

11:15 - 11:30

Th3E.01 MICROFLUIDIC-BASED DIFFRACTED X-RAY TRACKING METHOD FOR REAL-TIME OBSERVATION OF ION CHANNEL TWIST MOTION UNDER SEQUENTIAL CHEMICAL STIMULI

Kentaro Kotoya¹, Ikkei Yamuchi¹, Hirofumi Shimizu², and Yoshikazu Hirai¹
¹Kyoto University, JAPAN and ²University of Fukui, JAPAN

11:30 - 11:45

Th3E.02 A METAL ORGANIC FRAMEWORK DERIVED NANO POROUS CARBON (NPC)-MWCNT HETEROSTRUCTURED NANOCOMPOSITE-BASED ELECTROCHEMICAL SENSING PATCH FOR SWEAT CA ION AND PH MONITORING

Md Asaduzzaman, Abu Zahed, Selim Reza, Hye Su Song, SeongHoon Jeong, and Jae Yeong Park
Kwangwoon University, KOREA

11:45 - 12:00

Th3E.03 HIGHLY CONDUCTIVE AND ENVIROMENTALLY STABLE MXENE-TI3C2TX NANOSHEETS FOR MULTIPLEXED DISEASE INFLAMMATORY BIOMARKER DETECTION

Md Selim Reza, Md Sharifuzzaman, Md Asaduzzaman, Seong Hoon Jeong, Hye Su Song, and Jae Yeong Park
Kwangwoon University, KOREA

12:00 - 12:15

Th3E.04 DIGITAL ASSAY FOR RAPID ELECTRONIC QUANTIFICATION OF CLINICAL PATHOGENS USING DNA NANOBALLS

Muhammad Tayyab¹, Donal Barrett², Gijs van Riel², Shujing Liu², Björn Reinius², Curt Scharfe³, Peter Griffin⁴, Lars Steinmetz⁴, Vicent Pelechano², and Mehdi Javanmard¹
¹Rutgers, State University of New Jersey, USA, ²Karolinska Institute, SWEDEN, ³Yale University, USA, and ⁴Stanford University, USA

12:15 - 12:30

Th3E.05 MONOLITHIC FABRICATION OF NANO GAP ELECTRODES FOR SINGLE-MOLECULE BIOSENSING

Ashesh Ray Chaudhuri¹, Manoj Jaysankar¹, Chulmin Choi², Raymond Lobaton², Prem Sinha², Carl W. Fuller², Barry Merriman², Paul W. Mola², Drew A. Hall³, Philippe Helin¹, and Simone Severi¹
¹imec, BELGIUM, ²Roswell Biotechnologies, USA, and ³University of California, San Diego, USA

12:30 - 12:45

Th3E.06 DEVELOPMENT OF AC NANOPORE MESUREMENT METHOD AND MICROBIAL IDENTIFICATION CONBINATED WITH MACHINE LEARNING

Maami Sakamoto, Kosuke Hori, Ayaka Nakama, and Takatoki Yamamoto
Tokyo Institute of Technology, JAPAN

Session Th3F - Flexible Devices & Fabrication

11:15 - 11:30

Th3F.01 HIGHLY SENSITIVE AND STRETCHABLE STRAIN SENSOR BASED ON SILVER NANOWIRE/GRAPHENE HYBRID WITH A NEAR-ZERO THERMAL CROSSTALK

Leilei Wang and Jungwook Choi
Chung-Ang University, KOREA

11:30 - 11:45

Th3F.02 LOCALIZED BIOMECHANICAL STRAIN SENSING WITH GRAPHENE/SU-8 NANOCOMPOSITE BASED HIGHLY FLEXIBLE PIEZORESISTIVE SENSOR

Faizan T. Beigh¹, Shivam Jaiswal², Mujeeb Yousuf¹, Nadeem T. Beigh¹, Pushpapraj Singh¹, and Dhiman Mallick¹

¹Indian Institute of Technology Delhi, INDIA and ²Defense Institute of Advanced Technology (DIAT), INDIA

11:45 - 12:00

Th3F.03 STRETCHABLE PEDOT: PSS-PRINTED FABRIC STRAIN SENSOR FOR HUMAN MOVEMENT MONITORING AND RECOGNITION

Caise Wei, Jinfeng Yuan, Yuzhong Zhang, and Rong Zhu
Tsinghua University, CHINA

12:00 - 12:15

Th3F.04 PLANAR METASTRUCTURE-BASED GAS SENSORS FOR HIGH STRETCHABILITY AND STABLE NO₂ SENSING

Jeonheyong Park, Hyeoncheol Lim, Chaehyun Ryu, Soon In Jung, Il Ryu Jang, and Hoe Joon Kim
Daegu Gyeongbuk Institute of Science and Technology (DGIST), KOREA

12:15 - 12:30

Th3F.05 MULTIFUNCTIONAL STRETCHABLE SENSOR FOR MONITORING HUMAN MOTION

Yuzhong Zhang, Jinfeng Yuan, Caise Wei, and Rong Zhu
Tsinghua University, CHINA

12:30 - 12:45

Th3F.06 IN-TUBE-CENTER PACKAGING OF FLEXIBLE MEMS AIRFLOW-RATE SENSOR AND ITS SENSITIVITY ENHANCEMENT

Muhammad Salman Al Farisi¹, Yang Wang¹, Yoshihiro Hasegawa¹, Miyoko Matsushima²,
Tsutomu Kawabe², and Mitsuhiro Shikida¹
¹Hiroshima City University, JAPAN and ²Nagoya University, JAPAN

12:45 - 13:00 Transition

Best Paper Award Ceremony and Closing Remarks

13:00 - 13:30

13:30 Conference Adjourns

Poster Presentations

All times are Japan Standard Time (JST)

Monday, 25 June	14:00 - 16:00
Tuesday, 26 June	14:15 - 16:15
Wednesday, 27 June	14:15 - 16:15

Classification Chart

(last character of poster number)

Actuators and Microsystems
Bio-Sensors and Microsystems Including In-Vitro Medical Applications
Chemical Sensors and Microsystems
Composite Materials, Polymers, and Fabrication Processes
Energy, Power and Thermal Management
Microfluidics Platform Technologies
Nanoscale Materials and Fabrication
Optical and Atomic Transducers
Packaging & Solid-State Materials and Fabrication Processes
Physical Sensors and Microsystems
RF MEMS, Resonators and Oscillators
Wearable and In-Vivo Medical Devices and Microsystems
Late News

Monday - Actuators and Microsystems

- M4P.001 ALN-BASED PMUT ARRAYS FOR DEXTEROUS CELL HANDLING**
Bart P. Weekers^{1,2}, Liesbet Lagae^{1,2}, Xavier Rottenberg², and Veronique Rochus²
¹*KU Leuven, BELGIUM* and ²*imec, BELGIUM*
- M4P.002 ASYMMETRICAL PMUTS FOR FOCUSED ACOUSTIC PRESSURE BY REINFORCEMENT LEARNING**
Wei Yue¹, Fanping Sui¹, Yande Peng¹, Fan Xia¹, Megan Teng¹, Peggy Tsao¹, Hanxiao Liu², and Liwei Lin¹
¹*University of California, Berkeley, USA* and ²*Tsinghua University, CHINA*
- M4P.003 DESIGN, REALIZATION AND VALIDATION OF A PIEZOELECTRIC FLEXIBLE HAPTIC INTERFACE**
Romain Le Magueresse^{1,2}, Fabrice Casset¹, Frédéric Giraud², Munique Kazar Mendes¹, Sébastien Brulais¹, Laure Peris Y Saborit¹, Anis Kaci², and Mikael Colin¹
¹*University Grenoble Alpes, FRANCE* and ²*University Lille, FRANCE*

- M4P.004 FABRICATION AND PERFORMANCE EVALUATION OF 61-ELECTRODE PIEZOELECTRIC MEMS DEFORMABLE MIRROR BASED ON PZT FILM**
Junhua Wang, Cao Xia, Yuanlin Xia, Liang He, and Zhuqing Wang
Sichuan University, CHINA
- M4P.005 HIGH OUTPUT TACTILE DISPLAY USING SMA THICK FILM ACTUATOR ARRAY WITH IMPROVED THERMAL AND FREQUENCY RESPONSE**
Ryo Saito, Haruto Amano, and Takashi Mineta
Yamagata University, JAPAN
- M4P.006 INTEGRATED 4-TERMINAL NANO-ELECTROMECHANICAL RELAYS IMPLEMENTED IN A SILICON FOUNDRY PLATFORM**
Yingying Li¹, Simon J. Bleiker¹, Pierre Edinger¹, Elliott Worsey², Mukesh K. Kulsreshath², Qi Tang², Alain Y. Takabayashi³, Niels Quack³, Peter Verheyen⁴, Wim Bogaerts^{4,5}, Kristinn B. Gylfason¹, Dinesh Pamunuwa², and Frank Niklaus¹
¹*KTH Royal Institute of Technology, SWEDEN*, ²*University of Bristol, UK*, ³*École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND*, ⁴*IMEC, BELGIUM*, and ⁵*University of Ghent, BELGIUM*
- M4P.007 LESS RESONANT FREQUENCY SHIFT AND MINOR SPL ATTENUATION OF PZT MEMS SPEAKER ACHIEVED BY RIB-REINFORCED DIAPHRAGM**
Hsu-Hsiang Cheng¹, Sung-Cheng Lo¹, Ting-Chou Wei¹, Mingching Wu², and Weileun Fang¹
¹*National Tsing Hua University, TAIWAN* and ²*CoretronicMEMS Co., Ltd., TAIWAN*
- M4P.008 ORIGAMI-INSPIRED FLEXURE-BASED ROBOT FOR ENDOMICROSCOPY PROBE MANIPULATION**
Xu Chen, Jinshi Zhao, Khushi Vyas, Michail E. Kiziroglou, and Eric M. Yeatman
Imperial College London, UK
- M4P.009 PZT MEMS TUNABLE LIQUID LENS WITH INTEGRATED PIEZORESISTIVE POSITION SENSORS**
Zhengnan Tang¹, Leo Soda^{1,2}, Andrea Vergara¹, Yukio Suzuki¹, and Shuji Tanaka¹
¹*Tohoku University, JAPAN* and ²*École des Mines de Saint-Étienne, FRANCE*

Tuesday - Actuators and Microsystems

- T4P.001 2-DOF MEMS MIRROR WITH LARGE MECHANICAL ANGLES USING ONE MAGNETIC FIELD FOR CLOSE RANGE SCANNING APPLICATION**
Dang D.H. Tran
Griffith University, AUSTRALIA
- T4P.002 3D-PRINTED MICRO-MANIPULATOR WITH COMPLIANT MECHANISM DESIGNED BY TOPOLOGY OPTIMIZATION FOR BIOLOGICAL APPLICATION**
Masaru Mukai¹, Yukihito Moritoki¹, Takayuki Yamada², Shinji Nishiwaki³, Tomoyuki Shimono¹, Tatsuto Kageyama^{1,3}, Junji Fukuda^{1,3}, and Shoji Maruo¹
¹*Yokohama National University, JAPAN*, ²*University of Tokyo, JAPAN*, ³*Kyoto University, JAPAN*, and ⁴*Kanagawa Institute of Industrial Science and Technology (KISTEC), JAPAN*
- T4P.003 A 3D SELF-ROLL INDUCTOR BASED ON THE AL-SIO₂ BIMORPH STRUCTURE**
Hengzhang Yang¹, Jian Gao¹, Yingtao Ding¹, Yuwen Su¹, Yangyang Yan², and Huikai Xie^{1,2}
¹*Beijing Institute of Technology, CHINA* and ²*BIT Chongqing Institute of Microelectronics and Microsystems, CHINA*
- T4P.004 BENDABLE POLYMER-BASED HIGH-FREQUENCY PMUTS ON TRANSPARENT SU8 AND POLYIMIDE SUBSTRATES**
Sanjog V. Joshi, Sina Sadeghpour, and Michael Kraft
KU Leuven, BELGIUM

- T4P.005 CROSSTALK EFFECTS IN PMUT ARRAYS**
 Omer M. O. Abdalla¹, Gianluca Massimino¹, Cristina D'Argenzio¹, Matteo Colosio¹,
 Marco Soldo², Fabio Quaglia², and Alberto Corigliano¹
¹Politecnico di Milano, ITALY and ²STMICROELECTRONICS, ITALY
- T4P.006 DEVELOPMENT OF PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCER WITH DUAL HETEROGENEOUS PIEZOELECTRIC THIN FILM STACKING**
 Xuanmeng Qi¹, Shinya Yoshida², Mohssen Moridi³, Sarah Risquez³, Anirban Ghosh³, and Shuji Tanaka¹
¹Tohoku University, JAPAN, ²Shibaura Institute of Technology, JAPAN, and ³Silicon Austria Labs, AUSTRIA
- T4P.007 ELECTRO-FORCE DISPLAY FOR NANO ROBOTICS**
 Kain Ichinohe, Ken Sasaki, and Takayuki Hoshino
 Hirosaki University, JAPAN
- T4P.008 HIGHLY MINIATURIZED IN-EAR MEMS LOUDSPEAKER FEATURING HIGH SPL**
 Fabian Stoppel, Johannes Fankhänel, Thorsten Giese, Isa Pieper, Dirk Kaden, and Christian Eisermann
 Fraunhofer ISIT, GERMANY
- T4P.009 MICRO-FABRICATED BI-STABLE MECHANICAL SWITCH ACTUATED BY SINGLE THERMAL ACTUATOR**
 Jiacheng Liu¹, Yuma Ohara², Zerui Xu³, Ruizi Liu¹, Zhangshanhao Li³,
 Xiaohong Wang³, Toshiyuki Tsuchiya², and Man Wong¹
¹Hong Kong University of Science and Technology, HONG KONG, ²Kyoto University, JAPAN, and
³Tsinghua University, CHINA
- T4P.010 ON THE USE OF 3D-PRINTED ULTRASONIC HORNS TO TUNE THE FREQUENCY RESPONSE OF AIRBORNE MEMS TRANSDUCERS**
 Gabriele Bosetti, Stefan Hofstetter-Spona, and Gabriele Schrag
 Technical University of Munich, GERMANY

Wednesday - Actuators and Microsystems

- W4P.001 A FORCE FEEDBACK CONTROLLED PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCERS (PMUT) WITH TUNABLE DYNAMIC PERFORMANCE**
 Tingzhong Xu, Rodrigo Tumolin-Rocha, Damiano Caponi, and Claire Bourquard
 Silicon Austria Labs GmbH (SAL), AUSTRIA
- W4P.002 CENTIMETER-SCALE CULTURED WHOLE-CUT CHICKEN MEAT FABRICATED USING A MICROFABRICATED HOLLOW FIBER BIOREACTOR**
 Minghao Nie, Ai Shima, and Shoji Takeuchi
 University of Tokyo, JAPAN
- W4P.003 DEVELOPMENT OF HAPTIC BIO-FEEDBACK RING USING ULTRA-THIN HAPTIC MEMS FILM**
 Toshihiro Takeshita, Yusuke Takei, Daniel Zymelka, and Takeshi Kobayashi
 National Institute of Advanced Industrial Science and Technology (AIST), JAPAN
- W4P.004 FABRICATION PROCESS OF CONVENTIONAL AND UNCONVENTIONAL 3D MICRO-COILS BASED ON 2D ARRAY OF SU-8 MICRO-POSTS STRUCTURE**
 Emil R. Mamleyev¹, Manfred Kohl¹, Jan G. Korvink¹, and Kirill V. Poletkin²
¹Karlsruhe Institute of Technology (KIT), GERMANY and ²Hefei University of Technology, CHINA
- W4P.005 HAPTIC INTERFACE BASED ON AN INNOVATIVE "PIEZO-IN-FLEX" PIEZOELECTRIC PATCH TECHNOLOGY**
 Fabrice Casset, Munique Kazar-Mendes, Nadine David, Remi Franiatte, Daniel Mermin, Marc Zussy,
 Jerome Dechamp, Laetitia Castagne, Jean-Charles Souriau, Kevin Benedetto, and Mikael Colin
 University Grenoble Alpes, FRANCE

W4P.006 LEAD FREE KNN THIN FILMS BASED ACTUATOR DEVICES REALIZED IN A 200 MM SILICON TECHNOLOGY FOR PIEZOELECTRIC TRANSDUCER APPLICATIONS

Hugo Kuentz^{1,2}, Alain Campo¹, Christel Dieppedale¹, Christophe Poulain¹, Maryline Guilloux-Viry², and Gwenael Le Rhun¹

¹University Grenoble Alpes, FRANCE and ²ISCR - UMR CNRS 6226, FRANCE

W4P.007 MULTIMODE MEMS MIRROR FOR HOMOGENEOUS ILLUMINATION IN RESONANT SCANNING OPERATION

Markus Bainschab, Rodrigo T. Rocha, Clement Fleury, Takashi Sasaki, Sara Guerreiro, Anton Lagosh, and Adrien Piot

Silicon Austria Labs GmbH (SAL), AUSTRIA

W4P.008 ON MEMS WAFER ASSESSMENT FOR SWITCHING DEVICES EXPOSED TO DIRECT METAL-CONTACTS AND THERMAL HISTORIES

Sushil Kumar¹, Dhairya S. Arya², Manu Garg¹, and Pushpapraj Singh¹

¹Indian Institute of Technology Delhi, INDIA and

²Central Scientific Instruments Organisation (CSIO), INDIA

W4P.009 PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCER ENABLES BUBBLE-BASED STIRRING AND RECONFIGURABLE PARTICLE PATTERNING

Xianbin Li¹, Jingui Qian¹, Junjie Zhang¹, Bowei Zhang¹, Joshua Lee², and Wei Zhang¹

¹Hefei University of Technology, CHINA and

²Agency for Science, Technology and Research (A*STAR), SINGAPORE

W4P.010 WIRELESS CRAWLING OF INCHWORM-LIKE ROBOT BY INDUCTION HEATING

Woojun Jung, Seonghyeon Lee, and Yongha Hwang

Korea University, KOREA

**Monday - Bio-Sensors and Microsystems Including
In-Vitro Medical Applications**

M4P.010 A MICROFLUIDIC FLOW CYTOMETRY WITH A UNIFORM OPTICAL FIELD ENABLING QUANTITATIVE ANALYSIS OF SINGLE-CELL PROTEINS WITH ARBITRARY DISTRIBUTIONS

Ting Zhang^{1,2}, Lixing Liu^{1,2}, Yuanchen Wei¹, Chiyuan Gao^{1,2}, Liangliang Ma³, Mengge Gao⁴, Xiaosu Zhao⁴, Yixiang Wang⁵, Deyong Chen^{1,2}, Lichao Sun³, Junbo Wang^{1,2}, and Jian Chen^{1,2}

¹Chinese Academy of Sciences (CAS), CHINA, ²University of Chinese Academy of Sciences, CHINA,

³Cancer Hospital Chinese Academy of Medical Sciences, CHINA, ⁴National Clinical Research Center for Hematologic Disease, CHINA, and ⁵Peking University Hospital of Stomatology, CHINA

M4P.011 A ZNO-BASED AUTOMATED ELECTRONIC NOSE FOR VOCs DETECTION WITH HIGH-SENSITIVITY MODULATED FRONT-END ELECTRONICS

Bianca Di Diodoro¹, Carmen Bax¹, Roberto Bernasconi¹, Alessandro Ticozzi¹, Luca Magagnin¹, Gianluigi Taverna², Fabio Grizzi³, Giacomo Langfelder¹, and Laura Capelli¹

¹Politecnico di Milano, ITALY, ²Humanitas Mater Domini Hospital, ITALY, and

³IRCCS Humanitas Research Hospital, ITALY

M4P.012 ASYMMETRICAL TITANIUM OXIDE PATTERNS FOR UNIDIRECTIONAL CELL GUIDANCE

Yijun Cheng and Stella W. Pang

City University of Hong Kong, HONG KONG

M4P.013 AUTOMATIC VASCULAR LOCALIZATION WITH A FLEXIBLE TACTILE SENSING DENSE-ARRAY

Yi Sun¹, Fang Wang^{1,2}, Ke Sun¹, Heng Yang^{1,2}, and Xinxin Li^{1,2}

¹Chinese Academy of Sciences (CAS), CHINA and ²University of Chinese Academy of Sciences, CHINA

M4P.014 COMPACT LSPR BIOSENSOR SYSTEM FOR EARLY VIRUS DETECTION INTEGRATED WITH A FILTER-FREE WAVELENGTH SENSOR AND LED

Tsugumi Sakae, Yong-Joon Choi, Tomoya Ide, Kazuhiro Takahashi, Toshihiko Noda, and Kazuaki Sawada
Toyoashi University of Technology, JAPAN

- M4P.015 DEVELOPMENT OF A HIGH SENSITIVITY, WIDE RANGE CMOS CAPACITIVE DNA SENSOR ARRAY**
Po-Hsuan Lai, Lien-Sing Tseng, Chia-Min Yang, and Michael S.C. Lu
National Tsing Hua University, TAIWAN
- M4P.016 ELECTROCHEMICAL BIOSENSOR BASED ON DISPOSABLE PAPER-BASED LASER-INDUCED GRAPHENE**
Panpan Gao, Toshihiro Kasama, Jungchan Shin, Yixuan Huang, Madoka Takai, and Ryo Miyake
University of Tokyo, JAPAN
- M4P.017 IN-VITRO TUMOR AND MICROENVIRONMENT RECONSTRUCTION LABCHIP APPLIED TO HIPEC DRUG SCREENING**
Jing-Wen Guo¹, Chin-Yung Hsu¹, Zhi-Yin Chao¹, Mao-Chih Hsieh²,
Yu-ting Tai², Hwan-You Chang¹, Si-Jin Dong¹, and Cheng-Hsien Liu¹
¹*National Tsing Hua University, TAIWAN* and ²*Taipei Medical University, TAIWAN*
- M4P.018 LUNG ON CHIP WITH AIR-LIQUID INTERFACE FOR STUDYING AIR POLLUTION AND IDIOPATHIC PULMONARY FIBROSIS**
Tsan-Yang Tsai¹, Yi-Ting Ke¹, Yu-Che Chueh¹, Kang-Yun Lee²,
Hsiao-Chi Chuang², Wei-Lun Sun¹, and Cheng-Hsien Liu¹
¹*National Tsing Hua University, TAIWAN* and ²*Taipei Medical University, TAIWAN*
- M4P.019 MACHINE LEARNING ASSISTED LARGE AREA CELL TRACTION STRESS MEASUREMENTS OF CONTINUOUS CELL SHEETS**
Xing Haw Marvin Tan^{1,2}, Tomohiro Yokota¹, Arjun Deb¹, and Pei-Yu Chiou¹
¹*University of California, Los Angeles, USA* and
²*Agency for Science, Technology and Research (A*STAR), SINGAPORE*
- M4P.020 MICROFLUIDIC THERMAL MODEL FOR EARLY DETECTION OF INFECTION IN AORTIC GRAFTS**
Signe L.K. Vehusheia¹, Cosmin I. Roman¹, Nikola Cesarovic^{1,2}, and Christofer Hierold¹
¹*ETH Zürich, SWITZERLAND* and ²*German Heart Center Berlin, GERMANY*
- M4P.021 MULTI-WAVELENGTH OPTOELECTRONIC SYSTEM WITH MACHINE LEARNING FOR ONLINE HEMODIALYSIS MONITORING**
Yao-Te Wang¹, Yi-Ting Chen², Fong-Shung Huang², Shuei-Liong Lin²,
Yu-Hsiang Chou², Cheng-Che Hsu¹, and Yen-Wen Lu¹
¹*National Taiwan University, TAIWAN* and ²*National Taiwan University Hospital, TAIWAN*
- M4P.022 MULTIFUNCTIONAL WOUND DRESSING PATCH FOR ADVANCED WOUND CARE**
Ji-Hwan Ha¹, Junseong Ahn¹, Yongrok Jeong¹, Byeongmin Kang¹, Jun-Ho Jeong², and Inkyu Park¹
¹*Korea Advanced Institute of Science and Technology (KAIST), KOREA* and
²*Korea Institute of Machinery and Materials, KOREA*
- M4P.023 OXYGEN DETECTION OF SINGLE CELLS WITH GUIDED MOVEMENTS**
Muting Wang and Stella W. Pang
City University of Hong Kong, HONG KONG
- M4P.024 NOVEL MICROFLUIDIC DEVICE FOR EFFECTIVE ISOLATION OF CIRCULATING TUMOR CELLS BY USING MAGNETIC PEARL-LIKE BEAD-CHAIN STRUCTURES**
Sasi Kiran Boilla, Yi Cheng Tsai, and Gwo-Bin Lee
National Tsing Hua University, TAIWAN

Tuesday - Bio-Sensors and Microsystems Including In-Vitro Medical Applications

- T4P.011 A 3D ENGINEERED PLATFORM FOR FUNCTIONAL MONITORING OF IN VITRO BRAIN MODELS**
Ali Maziz¹, Eduardo Martinez Marin¹, Asma Eddarir¹, Venkata Suresh Vajrala¹,
Sophie Pautot², and Christian Bergaud¹
¹LAAS-CNRS, FRANCE and ²SYNTAXYS Neuro Engineering Systems, FRANCE
- T4P.012 A NOVEL SPECTRAL PLATFORM FOR QUANTIFYING UROBILINOGEN USING A URINE DIPSTICK**
Ciao-Ming Tsai¹, Jyun-Wei Wen¹, Wei-Yi Kong², Wei-Huai Chiu², Weileun Fang¹, and Cheng-Hao Ko²
¹National Tsing Hua University, TAIWAN and
²National Taiwan University of Science and Technology, TAIWAN
- T4P.013 A QUANTITATIVE ANIMAL CELL MIGRATION MONITORING METHOD BY USING RETROREFLECTIVE JANUS MICROPARTICLE**
Eun Kyeong Yang, Kyung Won Lee, and Hyun C. Yoon
Ajou University, KOREA
- T4P.014 ACTIVE STROBE IMAGER THAT CAN MEASURE MECHANICAL IMPEDANCE BY USING INPHASE OPERATIONAL MODE**
Taiki Yamaguchi¹, Osamu Fukuda¹, Hideaki Ito¹, Kensuke Harada², Koji Mizoue⁴, and Makoto Kaneko³
¹Saga University, JAPAN, ²Osaka University, JAPAN, ³Meijo University, JAPAN, and
⁴Mizoue Project Japan Corp., JAPAN
- T4P.015 AN SPR MICROFLUIDIC DEVICES FOR IDENTIFICATION OF HUMAN HERPESVIRUS 4 AND SARS-COV-2**
Han-Yun Hsieh¹, Ray Chang¹, Er-Yuan Chuang¹, Yu-Jui Fan², Pei-Kuen Wei³, and Horn-Jiunn Sheen¹
¹National Taiwan University, TAIWAN, ²Taipei Medical University, TAIWAN, and
³Academia Sinica, TAIWAN
- T4P.016 FILLING SYSTEM OF CELL-LADEN HYDROGELS IN A PDMS MICROARRAY FOR ANALYZING MULTIPLE WELLS IN ONE-SHOT OF A MICROSCOPE**
Kazuki Nishimoto, Haruka Oda, and Shoji Takeuchi
University of Tokyo, JAPAN
- T4P.017 INSIGHT INTO MECHANISMS OF BLOOD-BRAIN BARRIER OPENING USING MICROFLUIDIC CHIP, MICROBUBBLES AND ULTRASOUND**
Mariia Zakharova, Martin R.P. van den Broek, Loes I. Segerink, and Tim Segers
University of Twente, NETHERLANDS
- T4P.018 INVESTIGATION OF FLOW-INDUCED INTRACELLULAR CA²⁺ INCREASE IN PROXIMAL TUBULE CELLS ON A MICROPHYSIOLOGICAL SYSTEM FOR ADPKD MODELING**
Cheng Ma, Ramin Banan Sadeghian, Kazuya Fujimoto, Akihiko Kawakami,
Toshikazu Araoka, and Ryuji Yokokawa
Kyoto University, JAPAN
- T4P.019 LOCAL REMOVAL TECHNIQUE OF MICROBUBBLES IN MICROFLUIDIC DEVICE THROUGH PDMS THIN WALL FOR LONG-TERM TISSUE CULTURE**
Yasunori Tokuoka¹, Keiichi Kondo², Noboru Nakaigawa², and Tadashi Ishida¹
¹Tokyo Institute of Technology, JAPAN and ²Yokohama City University, JAPAN
- T4P.020 MEMS-BASED ULTRA-HIGH FREQUENCY WIRELESS 10x10 QCM BIOSENSOR ARRAY CHIP**
Fumihito Kato¹, Junki Shinohara¹, Manabu Yoshino¹, Manabu Suzuki¹, and Hirotsugu Ogi²
¹Nippon Institute of Technology, JAPAN and ²Osaka University, JAPAN

T4P.021 MICROFLUIDIC DETECTION OF < 400 CFU/ML E. COLI IN WHOLE BLOOD WITHIN ONE HOUR

Henar Marino Miguélez¹, Sara Cabanas Altarriba¹, Jimmy Larsson², Johan Elf², and Wouter M. van der Wijngaart¹

¹*KTH Royal Institute of Technology, SWEDEN* and ²*Uppsala University, SWEDEN*

T4P.022 MICROWELLS WITH CONNECTING CHANNEL TO MODEL METASTATIC BEHAVIOR OF NASOPHARYNGEAL CARCINOMA CELLS

Xiao Hong, Yuanhao Xu, and Stella W. Pang

City University of Hong Kong, HONG KONG

T4P.023 SERS DETECTION OF SINGLE METHYLATED ADENINE IN A DNA OLIGOMER

Hiroki Ito, Tomoya Shinabe, Akio Uesugi, Koji Sugano, and Yoshitada Isono

Kobe University, JAPAN

T4P.024 SENSING BEYOND THE DEBYE LENGTH: DEVELOPMENT OF A HIGHLY SENSITIVE, WIDE-RANGE CMOS DNA SENSOR ARRAY

Lien-Sing Tseng, Po-Hsuan Lai, Chia-Min Yang, and Michael S.C. Lu

National Tsing Hua University, TAIWAN

T4P.025 PERITONEAL TUMOR MICROENVIRONMENT LABCHIP FOR THE SELECTION OF HIPEC DRUGS

Yin-Shan Chien¹, Chia-Peng Wang¹, Mao-Chih Hsieh², Yu-Ting Tai², Jen-Tsan Ashley Chi³, Si-Jin Dong¹, and Cheng-Hsien Liu¹

¹*National Tsing Hua University, TAIWAN*, ²*Taipei Medical University, TAIWAN*, and ³*Duke University, USA*

**Wednesday - Bio-Sensors and Microsystems Including
In-Vitro Medical Applications**

W4P.011 A CORAL-ON-A-CHIP MICROFLUIDIC PLATFORM ENABLING METABOLIC ANALYSIS OF A SINGLE CORAL POLYPS

Shih-hao Huang, Pei-Heng Tai, and Chien-Ting Kuo

National Taiwan Ocean University, TAIWAN

W4P.012 A FULLY PACKAGED MICROFLUIDIC THERMAL BIOSENSOR DESIGNED BASED ON MEMS TECHNOLOGY AND ITS ENZYME IMMOBILIZATION

Zhen Peng, Cao Xia, Yuanlin Xia, Liang He, and Zhuqing Wang

Sichuan University, CHINA

W4P.013 A HIGHLY EFFICIENT MICROFLUIDIC U-WELL ARRAY DEVICE FACILITATING HIGH-THROUGHPUT METASTATIC TUMOR SPHEROID CULTURE AND DRUG EVALUATION

Yu-Hsuan Cheng, Yi-Shan Huang, Meng-Hsun Wu, Ming-Hong Tai, and Ching-Te Kuo

National Sun Yat-sen University, TAIWAN

W4P.014 A NOVELTY ULTRA-MICRO SPECTRUM MEASUREMENT PLATFORM FOR MELAMINE DETECTION IN BIO-CHEMICAL APPLICATION

Wei-Yi Kong¹, Wei-Huai Chiu¹, Ciao-Ming Tsai², Guan-Yi Lin³, Weileun Fang², Chitsung Hong³, and Cheng-Hao Ko¹

¹*National Taiwan University of Science and Technology, TAIWAN*, ²*National Tsing Hua University, TAIWAN*, and ³*SpectroChip Inc., TAIWAN*

W4P.015 CYLINDRICAL NEURAL ELECTRODES USING PRE-SHAPED FLEXIBLE PRINTED CIRCUIT MADE OF LIQUID CRYSTAL POLYMER

Taichi Ishikawa¹, Yoshiaki Sakai¹, Noriko Tsuruoka¹, Hajime Mushiaki¹, Tomokazu Ohshiro¹, Yoichi Haga¹, and Makoto Osanai²

¹*University of Tohoku, JAPAN* and ²*University of Osaka, JAPAN*

- W4P.016 ELECTROPHYSIOLOGICAL CHARACTERIZATION OF A NOVEL, TRANSWELL-TRANSFERRED, HUMAN NEURAL NOCICEPTIVE MICROPHYSIOLOGICAL CIRCUIT ATOP POLYMER/STEEL 3D MICROELECTRODE ARRAYS**
Charles M. Didier¹, Kevin J. Pollard², Alexander Bosak², Nisha Iyer³,
Randolph S. Ashton³, Michael J. Moore², and Swaminathan Rajaraman¹
¹University of Central Florida, USA, ²Tulane University, USA, and ³University of Wisconsin-Madison, USA
- W4P.017 HIGH-DENSITY NEURAL MICROELECTRODE ARRAYS WITH COMPLEMENTARY WEDGE-SHAPED 3D ASSEMBLY INTERFACES FOR BRAIN ACTIVITY RECORDING**
Liang Geng, Yujie Yang, Dongcheng Xie, Dongliang Chen, Lei Xu, and Feng Wu
University of Science and Technology of China, CHINA
- W4P.018 HIGHLY STABLE PIEZOELECTRIC RESONATOR BASED AIRFLOW SENSOR USING TIME OF FLIGHT TECHNIQUE**
Parvin Akhkandi, Kevin Chan, Yasaman Majd, and Reza Abdolvand
University of Central Florida, USA
- W4P.019 IN-VITRO MICROFLUIDIC MODEL OF SEPSIS-ASSOCIATED ACUTE KIDNEY INJURY WITH SINGLE CELL IMAGING**
Yuya Araki, Tetsuya Koyama, Hidekuni Takao, Fusao Shimokawa, Daisuke Nakano, and Kyohei Terao
Kagawa University, JAPAN
- W4P.020 MICROFLUIDIC BLOOD PLASMA EXTRACTION FOR SERUM BIOMARKER DETECTION**
Hogi Hartanto and Ting-Hsuan Chen
City University of Hong Kong, HONG KONG
- W4P.021 MINIATURE TRANSPARENT DOPAMINE SENSOR BASED ON NANOSPHERE LITHOGRAPHY**
Yoojeong Kim and Eunyoung Jang
Korea Advanced Institute of Science and Technology (KAIST), KOREA
- W4P.022 SARS-COV-2 INFECTION CAUSED A DAMAGE ON VASCULAR BED CO-CULTURED WITH BRONCHIAL ORGANIDS IN MICROFLUIDIC DEVICE**
Kazuya Fujimoto, Yoshikazu Kameda, Yuta Nagano, Sayaka Deguchi,
Kazuo Takayama, and Ryuji Yokokawa
Kyoto University, JAPAN
- W4P.023 NON-CONTACT ELECTRICALLY INDUCED MICROBUBBLE MICRON DISTANCE SENSOR AND ITS APPLICATIONS**
Yibo Ma, Wenjing Huang, Keita Ichikawa, and Yoko Yamanishi
Kyushu University, JAPAN
- W4P.024 SUB-SKIN TEMPERATURE PREDICTION FROM SKIN TEMPERATURE DISTRIBUTION FOR FROSTBITE-FREE CRYO-ANESTHESIA**
Juhee Ko¹, Hyunjoon Son², Seongjin Lee², Gun-Ho Kim², and Jungchul Lee¹
¹Korea Advanced Institute of Science and Technology (KAIST), KOREA and ²Ulsan National Institute of Science and Technology, KOREA
- W4P.025 WIRELESS POWER-UP AND READOUT FROM A LABEL-FREE SENSOR RFID**
Hassan Raji, Pengfei Xie, Seyed Reza Mahmoodi, and Mehdi Javanmard
Rutgers, State University of New Jersey, USA

Monday - Chemical Sensors and Microsystems

- M4P.025 A BREATHEABLE CAPACITIVE HUMIDITY SENSOR BASED ON ELECTROSPUN PVDF/GO COMPOSITES**
Yize Liu, Long Chen, Qian Zhang, and Jianqiu Huang
Southeast University, CHINA

- M4P.026 DISPOSABLE IMPEDANCE SENSOR USING LASER-INDUCED GRAPHENE FOR HYDRAULIC OIL CONTAMINATION MONITORING**
 Yuki Okamoto¹, Tomoya Muaramoto¹, Yasuyuki Yamamoto¹, Ryo Matsuura², Nobuki Sasaki², Yusuke Takei¹, Toshiro Takeshita¹, Masaaki Ichiki¹, and Takeshi Kobayashi¹
¹National Institute of Advanced Industrial Science and Technology (AIST), JAPAN and ²Yamashin-Filter Corp., JAPAN
- M4P.027 FLEXIBLE NH₃ SENSOR BASED ON POLYANILINE/CARBON NANOTUBES WITH DETECTION LIMIT DOWN TO PPB-LEVEL**
 Xue Wang¹, Changhui Zhao², Gaoqiang Niu¹, and Fei Wang¹
¹Southern University of Science and Technology, CHINA and ²Anhui University, CHINA
- M4P.029 NOVEL 3D PRINTING PAPER-BASED MICROFLUIDIC DEVICES FOR PAPER SPRAY IONIZATIONS (μPAD-MS) AND CHROMATOGRAPHY ANALYSIS OF ILLICIT DRUGS**
 Muhammad Faizul Zaki¹, Pin-Chuan Chen¹, Yi-Xin Wu², Pai-Shan Chen², and Yi-Hsin Liu³
¹National Taiwan University of Science and Technology, TAIWAN, ²National Taiwan University, TAIWAN, and ³National Taiwan Normal University, TAIWAN
- M4P.030 SIMPLE AND SMART FLOW INJECTION-TYPE WATER QUALITY METER DRIVEN BY BRILLIANT-COLORED REAGENT**
 Ryo Miyake¹, Masayuki Kawakami¹, Tomomi Sato¹, Toshihiro Kasama¹, Madoka Takai¹, Hidekatsu Tazawa², Hiroshi Murakami³, and Kaito Maehara³
¹University of Tokyo, JAPAN, ²Institute of Microchemical Technology, JAPAN, and ³Next Computer System Engineering, JAPAN
- M4P.031 STATIC AND DYNAMIC MEMS INERTIAL GAS SENSORS**
 Matthew Ou¹, Yasser S. Shama^{1,2}, Bhoomi Mavani¹, Mohamed Arabi¹, Resul Saritas¹, Rana Abdelrahman¹, Sasan Rahmanian¹, Alaaeldin Elhady¹, Raafat Mansour¹, Alexander Penlidis¹, and Eihab M. Abdel-Rahman¹
¹University of Waterloo, CANADA and ²Benha University, EGYPT
- M4P.032 VISUALIZATION OF FLUID MIXING USING GHZ ULTRASONIC IMAGING**
 Anuj Baskota, Justin Kuo, Serhan Ardanuc, and Amit Lal
 Geegah Inc, USA

Tuesday - Chemical Sensors and Microsystems

- T4P.026 A PPT LEVEL PFOS (PERFLUOROOCETANESULFONIC ACID) SENSOR BASED ON AN ECO-FRIENDLY CHITOSAN BIOPOLYMER**
 Pawan Pathak, Pouya Borjian, Mohammadreza Chimera, and Hyoung Jin Cho
 University of Central Florida, USA
- T4P.027 A SINGLE-CHIP 4-CHANNEL QUADRILATERAL MOX GAS SENSOR WITH DIFFERENT SENSING MATERIALS FOR FOOD DISCRIMINATION**
 Ruichen Liu, Ruoyu Zhang, Dongcheng Xie, Chong Xing, Yujie Yang, Muhammad Mustafa, Lei Xu, and Feng Wu
 University of Science and Technology of China, CHINA
- T4P.028 COLORIMETRIC READOUT BASED PHOTOIONIZATION DETECTOR FOR GAS CHROMATOGRAPHS**
 Jingqin Mao¹, Longze Liu¹, Yahya Atwa¹, Junming Hou², and Hamza Shakeel¹
¹Queen's University Belfast, UK and ²Southeast University, CHINA
- T4P.029 DEVELOPMENT OF A STRIPED GATE POTASSIUM ION SENSOR WITHOUT ANION EXCLUSION MATERIAL FOR LONG-TERM MONITORING**
 Md Muztahidul Islam¹, Satoshi Tsuruta¹, Satoshi Ota¹, Satoshi Koike², Madoka Takai³, and Masato Futagawa¹
¹Shizuoka University, JAPAN, ²Vegetalia, Inc., JAPAN, and ³University of Tokyo, JAPAN

- T4P.030 FREQUENCY RESPONSE OF UNCOATED-MICROCANTILEVERS TO THE GAS FLOW AT DIFFERENT TEMPERATURES AND ITS APPLICATION IN MOISTURE SENSING**
Hemant K Verma¹, Faizan T. Beigh¹, Darkasha Khan¹, Manoj Kandpal², Satya N. Behra², Jaspreet Singh², and Akshay Naik¹
¹Indian Institute of Science Bangalore, INDIA and
²Semi-Conductor Laboratory, Department of Space, INDIA
- T4P.031 FUNCTIONAL DEMONSTRATION OF REAL-TIME VISUALIZATION OF DISSOLVED OXYGEN USING TWO-DIMENSIONAL ARRAY SENSOR WITH IRIIDIUM OXIDE AS SENSING MEMBRANE**
Rena Ueda, Ryosuke Iwatsuchi, Tomoko Horio, Yoshiko Noda, Daisuke Akai, Takeshi Hizawa, Hideo Doi, Choe Y.-J, Kazuhiro Takahashi, and Toshihiko Noda
Toyohashi University of Technology, JAPAN
- T4P.032 NEAR-INFRARED GAS SPECTROSCOPY BASED ON PLASMONIC PHOTODETECTOR APPLIED FOR MULTIPLE GAS SPECIES**
Utana Yamaoka¹, Masaaki Oshita¹, Yuuki Kaneda¹, Shiro Saito², and Tetsuo Kan¹
¹University of Electro-Communications, JAPAN and ²IMRA JAPAN CO., LTD., JAPAN
- T4P.033 SYNTHESIS OF ZNO BASED ONE-DIMENSIONAL HETEROSTRUCTURED NANOWIRES FOR HIGH-PERFORMANCE GAS SENSING**
Sikai Zhao, Yanbai Shen, Cong Han, and Lijun Jia
Northeastern University, CHINA

Wednesday - Chemical Sensors and Microsystems

- W4P.026 A CMOS-MEMS BASED MUTIPIXEL GAS SENSOR DESIGN**
Nishit Goel, Stephen Bart, Ilya Gurin, and Peter Hartwell
InvenSense Inc., USA
- W4P.027 A STUDY OF GRAPHENE HYSTERESIS EFFECT IN DIFFERENT SOLVENT ENVIRONMENT WITH SUSPENDED/SUPPORTED GRAPHENE DEVICE**
Yu-Xuan Lu, Ming-Hsiu Tsai, and Chih-Ting Lin
National Taiwan University, TAIWAN
- W4P.028 DEVELOPING OF PORTABLE UV-STIMULATED FLOURSECENCE SPECTRUM MEASUREMENT SYSTEM USING SPECTRAL CHIP**
Ciao-Ming Tsai¹, Wei-Yi Kong², Wei-Huai Chiu², Chitsung Hong¹, Cheng-Hao Ko², and Weileun Fang¹
¹National Tsing Hua University, TAIWAN and
²National Taiwan University of Science and Technology, TAIWAN
- W4P.029 ELECTROCHEMICAL SENSOR WITH 4-MERCAPTOPYRIDINE MODIFICATION FOR TRACE MERCURY DETECTION**
Mingjie Han^{1,2}, Yong Xie^{1,2}, Ri Wang^{1,2}, Yang Li¹, Chao Bian¹, and Shan hong Xia¹
¹Chinese Academy of Sciences (CAS), CHINA and ²University of Chinese Academy of Sciences, CHINA
- W4P.030 FABRICATION OF AC-DRIVEN VARIABLE GAS PERMEATION CONTROL DEVICES AND VERIFICATION OF CONTROLLABILITY IMPROVEMENT**
Naho Minowa¹, Manase Mizutani^{1,2}, Yoshihisa Suzuki², Yong-Joon Choi¹, Kazuhiro Takahashi¹, Kazuaki Sawada¹, and Toshihiko Noda¹
¹Toyohashi University of Technology, JAPAN and ²Sintokogio, LTD., JAPAN
- W4P.031 IN SITU INVESTIGATION OF SMALL MOLECULE MASS TRANSPORT IN SENSOR-BASED ORGAN-ON-CHIP SYSTEMS**
Johannes Dornhof, Kevin A. Beltran Ramirez, Jochen Kieninger, Stefan J. Rupitsch, Gerald A. Urban, and Andreas Weltin
University of Freiburg, GERMANY

W4P.032 MOF/PDMS HYBRID NANOFILM-BASED QCM FOR SELECTIVE VOC VIRTUAL SENSING IN HIGH-HUMIDITY ENVIRONMENTS

Mengyao Fu, Dongsheng Li, Chenyang Gao, Jin Xie, Dibo Hou, and Yunqi Cao
Zhejiang University, CHINA

W4P.033 MULTI-ION SENSOR CHIP FOR HEALTHCARE APPLICATIONS

Van Anh T. Dam and Marcel A.G. Zevenbergen
Holst Centre / Imec, NETHERLANDS

W4P.034 SYNTHESIS OF RGO-SNO₂ NANOCOMPOSITES USING GO AS ALKALI-RESISTANT SUBSTRATE FOR HIGH-PERFORMANCE DETECTION OF NO₂

Yanbai Shen, Guodong Li, Sikai Zhao, Dezhou Wei, and Zichuan Guan
Northeastern University, CHINA

Monday - Composite Materials, Polymers, and Fabrication Processes

M4P.033 IN-SITU FABRICATION PROCESS OF BACTERIAL CELLULOSE COMPOSITES FOR SOFT ROBOTS

Motonori Uchimura and Fujio Tsumori
Kyushu University, JAPAN

M4P.034 MICRO ADHESIVE STRUCTURE BIOINSPIRED BY TREE FROG TOE PAD -FEMTOSECOND LASER FABRICATION ON SPONGE AND FORCE EVALUATION-

Toshihiro Shiratori, Jinya Sakamoto, Yuki Kumokita, Masato Suzuki, Tomokazu Takahashi, and Seiji Aoyagi
Kansai University, JAPAN

M4P.035 MICROWAVE CHARACTERIZATION OF PARYLENE C DIELECTRIC AND BARRIER PROPERTIES

Nikolas Barrera¹, Jacob Pawlik², Eugene Yoon¹, James Booth², Christian Long², Nathan Orloff², Ellis Meng¹, and Angela Stelson²
¹*University of Southern California, USA* and ²*National Institute of Standards and Technology, USA*

M4P.036 NEAR- ZERO POISSON'S RATIO AND LARGE-AREA METAMATERIAL MADE OF UV-PDMS USING 3D BACKSIDE EXPOSURE

Riku Ito¹, Ten Sekiguchi¹, Vivek Menon², Ryo Ichige¹, Yuya Tanaka¹, Hiroshi Toshiyoshi², and Takaaki Suzuki¹
¹*Gunma University, JAPAN* and ²*University of Tokyo, JAPAN*

M4P.037 SPONTANEOUS ADAPTATION OF TOPOGRAPHY IN IMPLANTABLE DEVICES BY KIRIGAMI-INSPIRED SHAPE MEMORY POLYMER BASED MICROELECTRODES

Yuanhao Xu and Stella W. Pang
City University of Hong Kong, HONG KONG

Tuesday - Composite Materials, Polymers, and Fabrication Processes

T4P.034 3D PRINTED FLUIDIC OSCILLATOR CIRCUITS FOR AUTONOMOUS FLOW DRIVING AND SWITCHING

Liang-Yen Liu, Cheng-Hao Sun, and Yu-Chuan Su
National Tsing Hua University, TAIWAN

T4P.035 A NOVEL NORMAL TACTILE FORCE SENSOR USING ANISOTROPIC MAGNETO-RESISTIVE (AMR) SENSING CHIP

Shihwei Lin, Yuanyuan Huan, Fuchi Shih, Meifeng Lai, and Weileun Fang
National Tsing Hua University, TAIWAN

T4P.036 AUTONOMOUS SELF-HEALING, HIGHLY STRETCHABLE, AND ELASTIC CONDUCTIVE COMPOSITES FOR ARTIFICIAL SOFT ELECTRONICS

Yu-Chia Lin, Kuan-Yu Tu, Lung-Hao Hu, and Ching-Te Kuo
National Sun Yat-sen University, TAIWAN

T4P.037 BIOINSPIRED UNDULATORY COMPOSITE SURFACE WITH NANOSPIKE ARRAY FOR ANTIBIOFOULING

Hyeonseok Song, Hyejin Jang, Geonjun Choi, Minsu Kang, Somi Kim, Sang-Hyeon Lee, Kahyun Sun, and Hoon Eui Jeong
Ulsan National Institute of Science & Technology (UNIST), KOREA

Wednesday - Composite Materials, Polymers, and Fabrication Processes

W4P.035 MULTI-MODAL NANOWRINKLES ON TRANSPARENT AND FLEXIBLE FILMS FOR COVERT-OVERT STRUCTURAL COLORATION ACTIVELY MODULATED BY MECHANICAL BENDING

Sungjoon Ji, Jun Gyu Park, Yeong Hoon Jeong, and Taesung Kim
Ulsan National Institute of Science and Technology (UNIST), KOREA

W4P.036 MULTIFUNCTIONAL MAGNETO-RESPONSIVE PHOTOTHERMAL COMPOSITE CILIA FOR ACTIVE ANTI AND DE-ICING

Dong Kwan Kang, Sang-Hyeon Lee, Jaecil Kim, Minho Seong, Somi Kim, Hyejin Jang, and Hoon Eui Jeong
Ulsan National Institute of Science and Technology (UNIST), KOREA

W4P.037 POROUS PDMS MICROREACTOR ARRAY CHIP FOR DE NOVO DNA SYNTHESIS

Xiao Su, Xiaoping Li, Chunjie Sun, Duo Fu, Jiaming Ma, and Dachao Li
Tianjin University, CHINA

W4P.038 SYNTHESIS OF TiO₂/MOSX/AG NANOCOMPOSITES VIA PHOTODEPOSITION FOR ENHANCED PHOTOCATALYSIS AND FOULING RESISTANT MEMBRANE

Teayeop Kim, Yoonkyung Lee, and Kyunghoon Kim
Sungkyunkwan University, KOREA

Monday - Energy, Power and Thermal Management

M4P.038 3D STACKED MICRO THIN-FILM LITHIUM-ION BATTERIES FOR IMPROVING BOTH SPECIFIC CAPACITY AND CYCLING LIFE

Xinru Wu¹, Lihao Wang¹, Yonghe Zhuang², Hanzi Sun², Junfu Liu², Chao Wang², Nian Shi², and Xiaodong Huang¹
¹*Southeast University, CHINA* and ²*Anhui Province Key Laboratory of Microsystem, CHINA*

M4P.039 A FLEXIBLE PIEZOELECTRIC ENERGY HARVESTER SIMULTANEOUSLY SCAVENGING MECHANICAL ENERGY OF FISH MOVEMENT AND IMPACT ENERGY OF WATER FLOW

Tianyu Sheng¹, Yonggang Jiang¹, Qipei He¹, Wenqiang Zhang², and Kanda Kensuke³
¹*Beihang University, CHINA*, ²*China Agricultural University, CHINA*, and ³*University of Hyogo, JAPAN*

M4P.040 CIRCUIT SIMULATOR IMPLEMENTATION OF AN EQUIVALENT CIRCUIT MODEL OF SELF-ASSEMBLED ELECTRET VIBRATIONAL ENERGY HARVESTERS BASED ON AN ENERGY DIAGRAM

Kyosuke Tokuno¹, Shohei Kinoshita¹, Hideyuki Kayaguchi², Keisuke Kurihara², Hisao Ishii², Yuya Tanaka³, and Daisuke Yamane¹
¹*Ritsumeikan University, JAPAN*, ²*Chiba University, JAPAN*, and ³*Gunma University, JAPAN*

M4P.041 EYE-TEAR-DRIVEN ELECTRET ENERGY HARVESTER FOR SMART CONTACT LENSES

Adwait Deshpande, Erfan Pourshaban, Mohit U. Karkhanis, Md. Rabiul Hasan, Chayanjit Ghosh, Hanseup Kim, and Carlos H. Mastrangelo
University of Utah, USA

M4P.042 MEMS-BASED BROADBAND MICRO VIBRATION ENERGY HARVESTERS UTILIZING (MGHF)0.1AL0.9N

Hung H Nguyen^{1,2}, Le Van Minh¹, and Hiroki Kuwano^{1,2}

¹Tohoku University, JAPAN and ²Sendai Smart Machines Co., Ltd., JAPAN

M4P.043 METAL-ORGANIC FRAMEWORK AND MOLYBDENUM OXIDE HYBRIDIZED NANOCOMPOSITE-BASED TRIBOELECTRIC BIOMOTION SENSOR FOR WEARABLE SELF-POWERED HUMAN IOT APPLICATIONS

S M Sohel Rana, Omar Faruk, M. Robiul Islam, HongSeok Kim, Md Abu Zahed, and Jae Yeong Park
Kwangwoon University, KOREA

M4P.044 MONOLITHIC INTEGRATION OF SCALN MEMS FILTER ON RFSOI USING ALD AL₂O₃ AS VHF RELEASE BARRIER

Xinghua Wang¹, Ying Zhang¹, Chen Liu¹, Yi Zhun Woo¹, Wenjia Yang¹, Nan Wang², Yao Zhu¹, and Qingxin Zhang¹

¹Institution of Microelectronics, SINGAPORE and ²Shang Hai University, CHINA

Tuesday - Energy, Power and Thermal Management

T4P.038 A HIGHLY SENSITIVE TRIBOELECTRIC QUASI-ZERO STIFFNESS VIBRATION SENSOR WITH WIDE BANDWIDTH

Pengfan Wu, Fayang Wang, Shiwei Xu, Tao Liu, and Xiaojing Mu
Chongqing University, CHINA

T4P.039 A LIQUID METAL TRIBOELECTRIC NANOGENERATOR (LM-TENG) USING CF₄/O₂ PLASMA TREATED NONWETTING POLYMER FRICTION LAYER AND GALLIUM ALLOY LIQUID METAL

Jinwon Jeong and Jeong Bong (JB) Lee
University of Texas, Dallas, USA

T4P.040 A MEMS VIBRATIONAL ENERGY HARVESTER CAPABLE OF RESTLESS CHARGING CAPACITOR FROM RANDOM VIBRATIONS

Hiroaki Honma, Yukiya Tohyama, and Hiroshi Toshiyoshi
University of Tokyo, JAPAN

T4P.041 ELECTROSPINNING OF CANDLE SOOT NANOPARTICLES FOR SUPERCAPACITOR APPLICATION

Sparsh Gupta¹, Ankur Gupta², Dario Mager³, Jan G. Korvink³, and Monsur Islam³

¹Punjab Engineering College, INDIA, ²Indian Institute Of Technology Jodhpur, INDIA, and ³Karlsruhe Institute of Technology, GERMANY

T4P.042 LIGHT-CONTROLLED PYROELECTRIC EFFECT: DIRECT CONVERSION OF LIGHT-INDUCED HEAT TO PHYSICAL ACTUATION

Rui M.R. Pinto, Mohammadmahdi Faraji, and K. B. Vinayakumar
INL - International Iberian Nanotechnology Laboratory, PORTUGAL

T4P.043 ZERO-POWER WIRELESS SENSING SYSTEM BASED ON PIEZOELECTRIC ENERGY HARVESTING TOWARDS BATTERY-FREE IOT APPLICATIONS

Fangzhi Li, Zhao Chen, Tianyu Zhang, Yongqi Cao, Honglong Chang, Weizheng Yuan, and Kai Tao
Northwestern Polytechnical University, CHINA

Wednesday - Energy, Power and Thermal Management

- W4P.039 ADVANCEMENT OF SELF-ATTACHABLE FLEXIBLE TRANSPARENT ELECTRODES WITH REDUCED CONTACT IMPEDENCE AND STRONG MECHANICAL ADHESION**
Hyukjoo Kwon, Minho Seong, Seongjin Park, Hyejin Jang, Geonjun Choi, Jaeil Kim, Stalin Kondaveeti, and Hoon Eui Jeong
Ulsan National Institute of Science and Technology (UNIST), KOREA
- W4P.040 HYBRID 3D-PRINTING OF MOLTEN METAL MICRO-DROPLETS AND POLYMERS FOR PROTOTYPING OF PRINTED CIRCUIT BOARDS WITH INTEGRATED ELECTRICAL ENERGY STORAGE SYSTEMS**
Zeba Khan^{1,2}, Dheepesh Gururajan¹, Daniel Straubinger², Peter Koltay¹, Sabrina Kartmann^{1,2}, Roland Zengerle^{1,2}, and Zhe Shu^{1,2}
¹University of Freiburg, GERMANY and ²Hahn-Schickard, GERMANY
- W4P.041 NON-RESONANT VIBRATION ENERGY HARVESTER WITH WOUND MICRO-COIL ARRAYS**
Matin Barekatin, Junyi Wang, Akash Roy, Kianoush Sadeghian Esfahani, Jaehoon Lee, and Eun Sok Kim
University of Southern California, USA
- W4P.042 OPTIMIZATION OF THE ENERGY HARVESTED BY A TRIBOELECTRIC GENERATOR EXCITED WITH A SMALL NUMBER OF ACTUATIONS**
Ahmad Delbani¹, Naida Hodzic¹, Armine Karami², Tarik Bourouina^{1,2}, Malal Kane¹, Dimitri Galayko³, and Philippe Basset¹
¹University Gustave Eiffel, FRANCE, ²CNRS, FRANCE, and ³Sorbonne Université, FRANCE
- W4P.043 PIEZOELECTRIC ENERGY HARVESTER WITH ANTI-INTERFERENCE ABILITY FOR POWER LINE MONITORING APPLICATION**
Shanghao Gu, Kunling Xi, Anxin Luo, and Fei Wang
Southern University of Science and Technology, CHINA
- W4P.044 STRETCHABLE FLUORINATED ELECTRET FOR SKIN-ATTACHABLE ENERGY HARVESTER**
Rui Wang, Kuniko Suzuki, Masaya Takebe, Yucheng Zhang, Tomoya Miyoshi, and Yuji Suzuki
University of Tokyo, JAPAN

Monday - Microfluidics Platform Technologies

- M4P.045 A LABCHIP WITH CO-CULTURED SPHEROIDS APPLIED FOR HIPEC CANCER DRUG SCREENING**
Chang-Hung Hsieh¹, Wei-Yu Huang¹, Mao-Chih Hsieh², Yu-ting Tai², Jen-Tsan Ashley Chi³, Si-Jin Dong¹, and Cheng-Hsien Liu¹
¹National Tsing Hua University, TAIWAN, ²Taipei Medical University, TAIWAN, and ³Duke University, USA
- M4P.046 HIGH-THROUGHPUT GENERATION OF GIANT LIPOSOMES UTILIZING STEP EMULSIFICATION AND PRALLELIZED DROPLET TRANSFER CHANNELS**
Shota Nakagawa, Naotomo Tottori, Shinya Sakuma, and Yoko Yamanishi
Kyushu University, JAPAN
- M4P.047 LIQUID METAL DROPLETS FIBER FABRICATION BY THE CO-FLOW MICROFLUIDIC SYSTEM**
Xu Gao and Wei Wang
Peking University, CHINA
- M4P.048 LIGHT-FIELD MICROSCOPY-BASED COUNTING OF PARTICLES MOVING IN A MICROFLUIDIC VOLUME**
Xinglong Huang^{1,2}, Xing Cheng², and Boris Stoeber¹
¹University of British Columbia, CANADA and ²Southern University of Science and Technology, CHINA

M4P.049 NEW EWOD PLATFORM FOR FREELY TRANSPORTING DROPLET IN DOUBLE-PLATES AND SINGLE-PLATE STRUCTURES

Ting-Rui Huang¹, Yii-Nuoh Chang¹, Yi-Wei Lin^{1,2}, and Da-Jeng Yao¹

¹National Tsing Hua University, TAIWAN and ²Industrial Technology Research Institute, TAIWAN

M4P.050 PROGRAMMABLE ACTIVE FLOW CONTROL SYSTEM FOR MICROFLUIDIC PAPER-BASED ANALYTICAL DEVICES (μ PADS) BY SIMPLE SCREW DRIVE

Chia-Wen Tsao, Po-Heng Lee, Yi-Fang Lai, and Wen-Yih Chen

National Central University, TAIWAN

M4P.051 TUNABLE ACOUSTIC TWEEZERS FOR DROPLET CARRIER TRANSPORTATION AND PRETREATMENT OF LOADED MICRO-ANALYTES

Huaize Lan¹, Jingui Qian¹, Hongyu Chen², Yong Wang³, Liang Huang¹, Xuefeng Hu¹, and Wei Zhang¹

¹Hefei University of Technology, CHINA, ²Zhejiang University, CHINA, and

³Hangzhou City University, CHINA

Tuesday - Microfluidics Platform Technologies

T4P.044 3D-PRINTED, INTERNALLY FED MEMS ELECTROSPRAY THRUSTER WITH PRECISE FLOW RATE CONTROL FOR HIGH-IMPULSE CUBESAT MISSIONS

Hyeonseok Kim and Luis F. Velásquez-García

Massachusetts Institute of Technology, USA

T4P.045 DUAL GATE AND OTHER CFET DESIGN IMPROVEMENTS FOR INCREASED SWITCHING SPEED, SEALING EFFICACY, AND LIQUID VISCOSITY RANGE

Daniel Mak¹, Azadeh Hashemi¹, Claude Meffan^{1,2}, Julian Menges¹, Henrieke Meijer³,

Fabien Abeille³, Marko Blom³, Renwick C.J. Dobson¹, and Volker Nock¹

¹University of Canterbury, NEW ZEALAND, ²Kyoto University, JAPAN, and

³Micronit Micro Technologies B.V., NETHERLANDS

T4P.046 FRACTION COLLECTORS FOR CONDUCTING CHROMATOGRAPHY ON A CENTRIFUGAL PLATFORM

Chih-Hsin Shih, Yi-Hui Chen, and Yuan-Ting Cheng

Feng Chia University, TAIWAN

T4P.047 LATE-STAGE ZEBRAFISH EMBRYO MANIPULATION AND IMAGING WITH ACOUSTIC TWEEZERS BASED ON BESSEL BEAM TRAPPING

Baptiste Neff, Kianoush Sadeghian Esfahani, Matin Barekatin, Akash Roy, Jaehoon Lee, and Eun Sok Kim

University of Southern California, USA

T4P.048 LOW-COST AND RAPID FABRICATION OF MICROCHANNELS BY KIRIGAMI-BASED SOOT COATING FOR THE DETECTION OF EXPLOSIVES

Wei Yue¹, Hanxiao Liu², Xinyu Zhou³, Chunming Chen⁴, and Liwei Lin¹

¹University of California, Berkeley, USA, ²Tsinghua University, CHINA, ³Peking University, CHINA, and

⁴National Tsinghua University, TAIWAN

T4P.049 ULTRA-FAST ACOUSTOFLUIDIC PARTICLE FOCUSING USING LATERAL MODES OF A PLATE TRANSDUCER

Andreas Fuchsluger¹, Annalisa De Pastina², Tina Mitterramskogler¹, Rafael Ecker¹,

Thomas Voglhuber-Brunnmaier¹, Nikolai Andrianov², Alexander Shatalov²,

Norbert Cselyuszka², Mohssen Moridi², and Bernhard Jakoby¹

¹Johannes Kepler University Linz, AUSTRIA and ²Silicon Austria Labs, AUSTRIA

Wednesday - Microfluidics Platform Technologies

W4P.045 3D-PRINTED POROUS MICRONEEDLES FOR WOUND HEALING

Esraa Fakeih, Andres A. Aguirre-Pablo, Dana Al Sulaiman, Sigurdur T. Thoroddsen, and Khaled N. Salama
King Abdullah University of Science and Technology (KAUST), SAUDI ARABIA

W4P.046 A FACILE APPROACH FOR FABRICATING ORDERED SUBMICROMETER-WIDE SURFACE PATTERNS BY IMPRINTING POLYDIMETHYLSILOXANE CRACKS

Yang Bu, Sheng Ni, and Levent Yobas
Hong Kong University of Science and Technology, CHINA

W4P.047 COCKTAIL DRUGS DELIVERY CHIP WITH SELECTIVELY CROSSLINKING HYDROGEL FOR COLON CANCER DRUG SCREENING

Hsinyu Yang^{1,2} and Fangang Tseng^{1,2}
¹Academia Sinica, TAIWAN and ²National Tsing Hua University, TAIWAN

W4P.048 FABRICATION AND EVALUATION OF HIERARCHICAL SUPERHYDROPHOBIC AND SALVINIA SURFACES

Zhaohui R. Li, Xiaojie Tao, and Chang-Jin Kim
University of California, Los Angeles, USA

W4P.049 MICROFLUIDIC THROMBUS ANALYSIS SYSTEM

Ji-Seob Choi¹, Dong-Hwi Ham¹, Jin-Ho Choi², and Woo-Tae Park¹
¹Seoul National University of Science and Technology, KOREA and ²Samsung Medical Center, KOREA

Monday - Nanoscale Materials and Fabrication

M4P.052 ELECTRETIZATION OF NANO-THICK AL₂O₃ FILMS DURING ATOMIC LAYER DEPOSITION

Yoshito Iguchi, Momoko Narasaki, Akio Uesugi, Koji Sugano, and Yoshitada Isono
Kobe University, JAPAN

M4P.053 FABRICATION METHOD OF VERSATILE MICRO/NANO HIERARCHICAL STRUCTURE AND ITS USAGE AS SUPERHYDROPHOBIC FLEXIBLE FILM

Yongrok Jeong¹, Junseong Ahn¹, Byeongmin Kang², Ji-Hwan Ha^{1,2}, Jiwoo Ko¹, Soon Hyoung Hwang², Sohee Jeon², Jun-Ho Jeong², and Inkyu Park¹
¹Korea Advanced Institute of Science and Technology (KAIST), KOREA and ²Korea Institute of Machinery and Materials, KOREA

M4P.054 RESIDUE-FREE TRANSFER OF VERTICALLY ALIGNED CARBON NANOTUBE ARRAYS USING THIN ICE FILM

Hyunjun Han, Kyuhyun Hwang, Eunhwan Jo, Daeyeon Koh, and Jongbaeg Kim
Yonsei University, KOREA

M4P.055 TWO-DIMENSIONAL MOS₂-BASED FLEXIBLE SENSOR FOR SENSITIVE, REAL-TIME MONITORING OF LITHIUM-ION BATTERY TEMPERATURE

Dianhong Huo and Jungwook Choi
Chung-Ang University, KOREA

Tuesday - Nanoscale Materials and Fabrication

T4P.050 FLOW BEHAVIOR CHARACTERIZATION OF DNA MOLECULES IN PASSIVE NANOFLUIDIC DEVICES

Franziska M. Esmek, Phil Grzybeck, Rukan Nasri, Dennis Mors, Sadhana Tiwari, and Irene Fernandez-Cuesta
University of Hamburg, GERMANY

T4P.051 FORMATION DYNAMICS OF DNA CONDENSATES IN MONODISPERSE GUVS TOWARD CONSTRUCTION OF ARTIFICIAL CELLS WITH NUCLEUS

Ryotaro Yoneyama¹, Ryota Ushiyama¹, Tomoya Maruyama², Masahiro Takinoue², and Hiroaki Suzuki¹
¹Chuo University, JAPAN and ²Tokyo Institute of Technology, JAPAN

T4P.052 INDIVIDUALLY ADDRESSABLE, 3D-PRINTED CARBON NANOTUBE FIELD EMITTER ARRAYS FOR LARGE-AREA VACUUM ELECTRONICS

Alex Kachkine, Crystal Owens, Gareth McKinley, Anastasios J. Hart, and Luis F. Velasquez-Garcia
Massachusetts Institute of Technology, USA

T4P.053 NANO-WIDTH ZIGZAG FLEXURE STRUCTURES FOR HIGHLY TUNABLE GRATING PITCH

Atsuya Kiryu, Gaku Furusawa, Oshita Masaaki, and Tetsuo Kan
University of Electro-Communications, JAPAN

T4P.054 NANOSCALE STENCILS FABRICATED BY FOCUSED ION BEAM MILLING AND DRY TRANSFER OF SILICON-ON-NOTHING MEMBRANES

Taeyeong Kim and Jungchul Lee
Korea Advanced Institute of Science and Technology (KAIST), KOREA

Wednesday - Nanoscale Materials and Fabrication

W4P.050 CONTROLLABLY CONSTRUCTING GOLD NANOSTRUCTURES ON MICRO ELECTRODES FOR ENHANCING IMPEDANCE MEASUREMENT AND RAMAN SCATTERING

Shengsen Zhang, Shengjie Chen, Kunru Yu, and Rong Zhu
Tsinghua University, CHINA

W4P.051 DNA CROSS-LINKED MODULAR STIMULI-RESPONSIVE GEL SENSOR UTILIZING NUCLEIC ACID REACTION FOR MICROFLUIDIC SYSTEMS

Satofumi Kato¹, Yurika Ishiba¹, Masahiro Takinoue², and Hiroaki Onoe¹
¹Keio University, JAPAN and ²Tokyo Institute of Technology, JAPAN

W4P.052 INVESTIGATION OF ELASTIC SOFTENING AND STIFFENING EFFECT OF ALUMINUM NITRIDE UNDER STRESS LOADING BY BORN-LANDE' EQUATION

Cong Chen¹, Yuwen Lu¹, Jie Zhang¹, Libing Bai¹, Jiahao Wang¹, Yuhua Cheng¹, and Hong Zhou²
¹University of Electronic Science and Technology of China, CHINA and
²National University of Singapore, SINGAPORE

W4P.053 NANOGAP CONTROL OF GOLD NANOPARTICLE DIMER ELECTRODE TOWARD ELECTRICAL AND OPTICAL SINGLE MOLECULE MEASUREMENTS

Yuanzhi Chang, Takayuki Sumitomo, Yuga Nakamura, Akio Uesugi, Koji Sugano, and Yoshitada Isono
Kobe University, JAPAN

W4P.054 NEMS PRESSURE GAUGE BASED ON 2D TI3C2TX RESONATORS

Bo Xu
University of Electronic Science and Technology of China, CHINA

W4P.055 VISUALIZATION OF GAS SPATIOTEMPORAL DISTRIBUTION USING 2D LSPR GAS SENSOR

Masato Matsuoka, Lingpu Ge, Fumihiko Sassa, and Kenshi Hayashi
Kyushu University, JAPAN

Monday - Optical and Atomic Transducers

M4P.056 A NOVEL WATER-IMMERSIBLE METAL MICRO SCANNING MIRROR BASED ON ZIGZAG BEAM STRUCTURE

Erqi Tu, Xinlu Deng, Xiaoyong Fang, Senyuan Yu, Xianghao Kong, Jiazhe Liang, and Wen-Ming Zhang
Shanghai Jiao Tong University (SJTU), CHINA

- M4P.057 A RESONANT PIEZOELECTRIC MEMS MIRROR WITH 180-DEGREE OPTICAL SCAN ANGLE UNDER ATMOSPHERE PRESSURE**
 Hung-Yu Lin¹, Hao-Chien Cheng^{1,2}, Shi-Chi Liu¹, Chih-Chen Hsu¹, Si-Han Chen¹, Jerwei Hsieh³, Ruey-Shing Huang^{3,4}, Mei-Feng Lai¹, and Weileun Fang¹
¹National Tsing Hua University, TAIWAN, ²Coretronic MEMS Corporation, TAIWAN, ³Asia Pacific Microsystems, Inc., TAIWAN, and ⁴National Sun Yat-sen University, TAIWAN
- M4P.058 ABSOLUTE PRESSURE MEASUREMENT OF SUB-MILLIPASCAL ORDER USING LASER RADIATION FORCE**
 Yuki Takei, Yuki Okamoto, Tomoko Yamamoto, Masaaki Ichiki, and Hiromitsu Furukawa
 National Institute of Advanced Industrial Science and Technology (AIST), JAPAN
- M4P.059 COMBINING PIEZORESISTIVE AND PIEZOELECTRIC SENSING IN PZT-DRIVEN RESONANT MEMS MICROMIRRORS FOR OPTIMAL STABILITY**
 Paolo Frigerio¹, Andrea Bertazzoni¹, Roberto Carminati², Luca Molinari², Gianluca Mendicino², and Giacomo Langfelder¹
¹Politecnico di Milano, ITALY and ²STMicroelectronics, ITALY
- M4P.060 MEMS TE0-TEN MODE SELECTIVE SWITCH FOR MODE DIVISION MULTIPLEXING SYSTEMS**
 Haoyang Sun, Qifeng Qiao, and Guangya Zhou
 National University of Singapore, SINGAPORE
- M4P.061 MICROAPERTURE MODULATED ULTRATHIN ARRAY CAMERA FOR HIGH DYNAMIC RANGE (HDR) IMAGING**
 Young-Gil Cha, Hyun-Kyung Kim, Jae-Myeong Kwon, and Ki-Hun Jeong
 Korea Advanced Institute of Science and Technology (KAIST), KOREA

Tuesday - Optical and Atomic Transducers

- T4P.055 A 2-AXIS SCANNING COMB-DRIVE MICROMIRROR WITH POLYMER-FILLED ISOLATION TRENCHES**
 Yingchao Cao, Yingtao Ding, Yangyang Yan, and Huikai Xie
 Beijing Institute of Technology, CHINA
- T4P.056 A LIGHTWEIGHT 500 μ M THICK SCANNING MICROMIRROR (D=2MM, F >32KHZ) MADE OF ATOMIC-LAYER-DEPOSITION ALUMINA AND SILICON**
 Nguyen Thanh Tung¹, Takashi Sasaki¹, Daniel Greif², Katie Smyth², Sergey Lamansky², and Kazuhiro Hane¹
¹Tohoku University, JAPAN and ²Meta, USA
- T4P.057 CURRENT SENSING BASED ON MICROFABRICATED DIAMOND QUANTUM MAGNETOMETER**
 Qihui Liu^{1,2}, Hao Chen^{1,2}, Fei Xie^{1,2}, Yuqiang Hu^{3,4}, Nan Wang^{1,2}, Lihao Wang¹, Yichen Liu¹, Yang Wang¹, Zhichao Chen^{1,2}, Lingyun Li^{1,2}, Jianguo Cheng^{1,2}, and Zhenyu Wu^{1,2}
¹Chinese Academy of Sciences (CAS), CHINA, ²University of Chinese Academy of Sciences, CHINA, ³Shanghai University, CHINA, and ⁴Shanghai Industrial μ Technology Research Institute, CHINA
- T4P.058 LARGE STROKE PIEZO MEMS MIRROR FOR HIGH-SPEED FOURIER TRANSFORM SPECTROMETRY**
 Jaka Pribosek, Anton Lagosh, and Gerald Auböck
 Silicon Austria Labs GmbH (SAL), AUSTRIA
- T4P.059 MONOLITHIC CMOS-COMPATIBLE CO₂ SENSOR WITH THERMAL SOURCE AND DETECTOR**
 Cristina Consani¹, Nathanael Barlier¹, Gerald Stocker², Florian Dubois¹, Thang Duy Dao¹, Khaoula-Farah Ourak¹, Pooja Thakkar¹, Ulf Bartl², Christoph Kovatsch², Thomas Ostermann², Andreas Tortschanoff¹, Thomas Grille², and Clement Fleury¹
¹Silicon Austria Labs GmbH (SAL), AUSTRIA and ²Infineon Technologies Austria AG, AUSTRIA

T4P.060 OVER-COUPLED MODE BASED ON METAMATERIAL ABSORBER FOR ENHANCED MOLECULAR DETECTION

Dongxiao Li, Hong Zhou, Zhihao Ren, and Chengkuo Lee
National University of Singapore, SINGAPORE

Wednesday - Optical and Atomic Transducers

W4P.056 A MEMS RECONFIGURABLE TERAHERTZ METAMATERIAL ABSORBER BASED ON THE TUNABLE AIR GAP

Zhenci Sun¹, Chen Chen¹, Xiaomeng Bian², Yuanmu Yang¹, Rui You², Xiaoguang Zhao¹, and Jiahao Zhao¹
¹*Tsinghua University, CHINA* and ²*Beijing Information Science and Technology University, CHINA*

W4P.057 CHIP-SCALE DIGITAL MID-INFRARED COMPUTATIONAL SPECTROMETER POWERED BY MEMS TECHNOLOGY

Haoyang Sun, Qifeng Qiao, and Guangya Zhou
National University of Singapore, SINGAPORE

W4P.058 INTEGRATION OF (POLY-SILICON/AIR)N DISTRIBUTED BRAGG REFLECTORS IN A 150 MM BULK MICROMACHINED WAFERLEVEL MOEMS FABRICATION PROCESS FOR THE USAGE IN IR-SPECTROMETRY

Christian Helke^{1,2}, Jan Seiler², Marco Meinig¹, Toni Großmann¹, Thomas Werner¹, Jens Bonitz¹, Micha Haase^{1,2}, Sven Zimmermann^{1,2}, Martin Ebermann³, Steffen Kurth¹, Danny Reuter^{1,2}, and Karla Hiller^{1,2}
¹*Fraunhofer ENAS, GERMANY*, ²*TU Chemnitz, GERMANY*, and ³*Infratec GmbH, GERMANY*

W4P.059 NOVEL TERRACED CAVITIES DESIGN ON IR-ABSORBER SURFACE FOR CMOS-MEMS THERMOELECTRIC INFRARED SENSOR

Yung-Chen Li, Yuanyuan Huang, You-An Lin, Da-Jen Yen, Mei-Feng Lai, and Weileun Fang
National Tsing Hua University, TAIWAN

W4P.060 PIEZO-ACTUATED HIGHER ORDER WAVEFRONT CORRECTION LENS

Hitesh Gowda Bettaswamy Gowda¹, Matthias C. Wapler^{1,2}, and Ulrike Wallrabe¹
¹*University of Freiburg, GERMANY* and ²*Otto von Guericke University Magdeburg, GERMANY*

W4P.061 WIDE ANGLE AND HIGH FREQUENCY RESONANT PIEZOELECTRIC MEMS MIRROR FOR LASER BEAM SCANNING APPLICATION

Hung-Yu Lin¹, Hao-Chien Cheng^{1,2}, Shi-Chi Liu¹, Chih-Chen Hsu¹, Si-Han Chen¹, Mingching Wu², Kai-Chih Liang², Mei-Feng Lai¹, and Weileun Fang¹
¹*National Tsing Hua University, TAIWAN* and ²*Coretronic MEMS Corporation, TAIWAN*

Monday - Packaging & Solid-State Materials and Fabrication Processes

M4P.062 CROSS-SECTIONAL SHAPE CONTROL OF MICROCHANNEL ON MICROPOWDER BLASTING WITH NOZZLE TILTING ANGLE

Hiromasa Yagyu, Mikinari Takada, and Mao Hamamoto
Kanto Gakuin University, JAPAN

M4P.063 FABRICATION OF HIGH-DENSITY MICRO-BUMP ARRAYS FOR 3D INTEGRATION OF MEMS AND CMOS

Yunfan Shi¹, Zilin Wang¹, Rutian Huang¹, Jin Kang², Kai Zheng², Bu Weihai², and Zheyao Wang^{1,3}
¹*Tsinghua University, CHINA*, ²*Semiconductor Technology Innovation Center Corporation, CHINA*, and ³*Beijing Innovation Center for Future Chips, CHINA*

M4P.064 FABRICATION OF ULTRA-LOW RESONANCE FREQUENCY INERTIAL MEMS USING THROUGH-SILICON DEEP-RIE APPLIED TO SILICON-ON-GLASS

Jun Wu, Hui Zhang, and Tamio Ikehashi
Waseda University, JAPAN

M4P.065 ON-CHIP LASER BEAM DELIVERY FOR INTEGRATED ION TRAPS

Mario Grüneberg¹, Jaka Pribošek¹, Klemens Schüppert², Yves Colombe², Alexander Zesar², Matthias Preidl², Jakob Wahl², Clemens Rössler², Bernhard Lamprecht³, Philipp Hurdax³, and Matteo Montagnese¹
¹*Silicon Austria Labs GmbH (SAL), AUSTRIA*, ²*Infineon Technologies, AUSTRIA*, and ³*Joanneum Research, AUSTRIA*

M4P.066 ULTRASONIC TEST STRUCTURES FOR NON-DESTRUCTIVE MEASUREMENT OF TRAPEZOIDAL ANGLE IN BOSCH PROCESSES

Lucrezia Maini¹, Roman Furrer², Vicente Genovés Gomez¹, and Cosmin Roman¹
¹*ETH Zürich, SWITZERLAND* and ²*EMPA Dübendorf, SWITZERLAND*

M4P.067 ULTRATHICK LOW-STRESS POLY-SILICON FILM FOR MEMS PREPARED BY LPCVD PROCESS

Gen Shikida¹, Hideharu Itatani¹, Toshio Kudo¹, Shuntaro Machida¹, Yukio Suzuki², Shuji Tanaka², and Manabu Izumi¹
¹*Kokusai Electric Corporation, JAPAN* and ²*Tohoku University, JAPAN*

Tuesday - Packaging & Solid-State Materials and Fabrication Processes

T4P.061 200MM WAFER RECONSTITUTION FOR SENSOR APPLICATION

Wei Wei¹, Yunlong Li², Gauri Karve¹, Lei Zhang¹, Tim Stakenborg¹, and Deniz S. Tezcan¹
¹*imec, BELGIUM* and ²*Zhejiang University, CHINA*

T4P.062 A NOVEL ANISOTROPIC WET ETCHING PROCESS OF (100)-SILICON WITH AREA EFFICIENCY ON CONVEX CORNER COMPENSATION PATTERNS

Shaoxiao Nie, Xu Ma, Fanrui Meng, Cong Zhou, Jie Wang, Yunfei Liu, Wenhua Xu, Zhenchuan Yang, Yilong Hao, and Chengchen Gao
Peking University, CHINA

T4P.063 DESING AND FABRICATION OF A SMART VAPORASING LIQUID MICROTHRUSTER FOR CUBESAT APPLICATIONS

Georgios Spernovasilis, Henk W. van Zeijl, and Pasqualina M. Sarro
Delft University of Technology, NETHERLANDS

T4P.064 GAS PERMEABLE ENVIRONMENTAL PROTECTION CAPS FOR WAFER LEVEL CAPPING OF MEMS GAS AND PRESSURE SENSORS

Ole Behrmann, Thomas Lisec, and Björn Gojdka
Fraunhofer ISIT, GERMANY

T4P.065 LARGE-SCALE AND HIGH-ASPECT-RATIO MICRO/NANO GLASS STRUCTURES VIA A REFLOW PROCESS

Minjie Zhu, Xiaohui Du, Shuai Liu, and Fanhong Chen
Instrumentation Technology and Economy Institute, CHINA

T4P.066 SINGLE-CRYSTALLINE-SILICON TSV BASED ON DRY FILLING AND OXIDATION OF SUBMICRON SILICON PARTICLES

Biyun Ling¹, Biqing Zhou^{1,2}, Xiaoyue Wang¹, Yaming Wu¹, and Gang Quan¹
¹*Chinese Academy of Sciences (CAS), CHINA* and ²*University of Chinese Academy of Sciences, CHINA*

Wednesday - Packaging & Solid-State Materials and Fabrication Processes

W4P.062 DESIGN AND FABRICATION OF A PASSIVE PRESSURE SENSOR BASED ON BIOCOMPATIBLE ORMOCOMP

Yi Chiu¹, Chun-Hsiang Liao¹, Gianmario Scotti¹, Parvaneh Sardarabadi², and Cheng-Hsien Liu²
¹*National Yang Ming Chiao Tung University, TAIWAN* and ²*National Tsing Hua University, TAIWAN*

W4P.063 PLASMA-BASED ADDITIVE MANUFACTURING METHOD FOR MEMS USING APSLD (ATMOSPHERIC PRESSURE SPUTTERING LAYER DEPOSITION) TECHNOLOGY

Ha Duong Ngo¹, Jan Bickel¹, Roland Gesche², Martin Fieber², Joachim Scherer³, Reinhold Kovacs³, and Xiaodong Hu⁴

¹University of Applied Sciences Berlin, GERMANY, ²Beaplas GmbH, GERMANY,

³Aurion Anlagentechnik GmbH, GERMANY, and ⁴MSG Lithoglas GmbH, GERMANY

W4P.064 SINGLE PASCAL VACUUM SEALING OF MEMS RESONATOR BY SILICON MIGRATION WAFER-LEVEL PACKAGING WITHOUT GETTER

Yukio Suzuki¹, Muhammad Jehan Khan¹, Munehiro Honda², Hidetoshi Miyashita², Tianjiao Gong¹, Takashiro Tsukamoto¹, and Shuji Tanaka¹

¹Tohoku University, JAPAN and ²Sony Semiconductor Manufacturing Corporation, JAPAN

W4P.065 ULTRAFAST DIRECT WRITING OF POLYMERS AS A SIMPLE FABRICATION METHOD FOR ORGANIC ELECTROCHEMICAL TRANSISTORS

Alessandro Enrico¹, Sebastian Buchmann^{1,2}, Fabio De Ferrari¹, Yazhou Wang³, Wan Yue⁴, Göran Stemme¹, Frank Niklaus¹, Anna Herland^{1,2}, and Erica Zeglio^{1,2}

¹KTH Royal Institute of Technology, SWEDEN, ²Karolinska Institute, SWEDEN, ³King Abdullah University of Science and Technology (KAUST), SAUDI ARABIA, and ⁴Sun Yat-sen University, CHINA

Monday - Physical Sensors and Microsystems

M4P.068 A CMOS-MEMS THREE-AXIS MAGNETIC SENSOR WITH A FERROMAGNETIC CONCENTRATOR

Yun-Wen Lai, Yu-Lin Yang, and Shih-Jui Chen

National Central University, TAIWAN

M4P.069 A FAST CHARACTERIZATION METHOD FOR PRESSURE SENSORS WITH CONTINUOUSLY RAMPING PRESSURE AND TEMPERATURE

Chen Wang¹, Appo Van der Wie², Ben Maes², Maliheh Ramezani², Grim Keulemans¹, and Michael Kraft¹

¹KU Leuven, BELGIUM and ²Melexis Company, BELGIUM

M4P.070 A MINIATURIZED LEAF CUVETTE FOR VOLATILE ORGANIC COMPOUND MEASUREMENT ON BROAD LEAVES

Yasmina Frey, Simon Haberstroh, Mirjam Meischner, Christiane Werner, and Ulrike Wallrabe

University of Freiburg, GERMANY

M4P.071 A RESONANT GAS SENSOR WITH A FUNCTIONAL COMPOSITE STRESS GENERATOR

Na Ling, Wei Zhang, Jiajia Xiang, Jiayang Chen, Lijia Zhang, Cao Xia, Yuanlin Xia, and Zhuqing Wang

Sichuan University, CHINA

M4P.072 A RESONANT PRESSURE SENSOR WITH SUPER HIGH RESOLUTION AND STABILITY BASED ON NOVEL VOLUME SHRINKAGE METHOD

Toshiki Mitsuhashi¹, Ken Kanno², Shigeto Iwai¹, Atsushi Yumoto¹, Daisuke Hatori¹, and Ryuuchirou Noda¹

¹Yokogawa Electric Corporation, JAPAN and ²PT Yokogawa Indonesia, INDONESIA

M4P.073 A THREE-AXIS CO-OSCILLATING VECTOR HYDROPHONE BASED ON MEMS ELECTROCHEMISTRY

Lintao Hu^{1,2}, Tian Liang^{1,2}, Zhenyu Sun^{1,2}, Maoqi Zhu^{1,2}, Mingbo Zhang^{1,2}, Junbo Wang^{1,2}, Deyong Chen^{1,2}, and Jian Chen^{1,2}

¹Chinese Academy of Sciences (CAS), CHINA and ²University of Chinese Academy of Sciences, CHINA

M4P.074 AN ALL-SILICON RESONANT DIFFERENTIAL PRESSURE MICROSENSOR WITH TEMPERATURE COMPENSA

Jiahui Yao^{1,2}, Chao Cheng^{1,2}, Han Xue^{1,2}, Zongze Yu^{1,2}, Yulan Lu¹, Bo Xie¹, Junbo Wang^{1,2}, Deyong Chen^{1,2}, and Jian Chen^{1,2}

¹Chinese Academy of Sciences (CAS), CHINA and ²University of Chinese Academy of Sciences, CHINA

- M4P.075 DEVELOPMENT OF FLEXIBLE PIEZOELECTRIC HAIR-LIKE DUAL-MODE SENSOR FOR DETECTION OF AIRFLOW AND ACOUSTIC PARTICLE VELOCITY**
Biao Jin, Hongchao Cao, Qipei He, and Yonggang Jiang
Beihang University, CHINA
- M4P.076 DOUBLE-PROOF MASS SOI-BASED MATRYOSKA-LIKE 3-AXIS MEMS ACCELEROMETER**
Inês S. Garcia¹, José Fernandes¹, José B. Queiroz¹, Carlos Calaza¹, José Moreira², Rosana A. Dias¹, and Filipe S. Alves¹
¹*INL - International Iberian Nanotechnology Laboratory, PORTUGAL and*
²*Redes Electrica Nacional, S.A. (REN), PORTUGAL*
- M4P.077 FIRST DEMONSTRATION OF A PRINTABLE FUSED-SILICA GLASS-BASED MILLI-METER SIZED RESONATOR**
Yahya Atwa and Hamza Shakeel
Queen's University Belfast, UK
- M4P.078 IMPROVED REPRODUCIBILITY OF DEFLECTION CONTROL PROCESS FOR CANTILEVER-TYPE MEMS TACTILE SENSORS**
Harufumi Hosokawa, Yuki Kawasaki, Yingquan Zheng, Takashi Abe, and Masayuki Sohgawa
Niigata University, JAPAN
- M4P.079 NEST BOX FOR MONITORING THE WEIGHT AND HEART RATE CHANGES OF A GROWING SEABIRD CHICK**
Daiki Uematsu¹, Kazuki Harada², Sinichi Watanabe³, Katsufumi Sato², and Hidetoshi Takahashi¹
¹*Keio University, JAPAN,* ²*Tokyo University, JAPAN, and* ³*Research Institute of Rare Birds Japan, JAPAN*
- M4P.080 OPTICALLY PUMPED SOLID STATE QUANTUM MAGNETOMETERS FOR SPACE APPLICATIONS**
Andreas Gottscholl, Hannes Kraus, and Corey J. Cochran
NASA Jet Propulsion Laboratory, California Institute of Technology, USA
- M4P.081 PARAMETER OPTIMIZATION FOR AMPLITUDE-MODULATED RESONANT MEMS SENSORS FEATURING BLUE SIDEBAND EXCITATION**
Jingqian Xi¹, Huafeng Liu¹, Yuan Wang², Chun Zhao³, Xingyin Xiong⁴, and Xudong Zou⁴
¹*Huazhong University of Science and Technology, CHINA,* ²*University of Macau, CHINA,* ³*University of York, UK, and* ⁴*Chinese Academy of Sciences (CAS), CHINA*
- M4P.082 PRESSURE SENSOR WITH A CORRUGATED STRUCTURE UTILIZING LIG SENSING ELEMENT**
Ryo Oda, Rihachiro Nakashima, and Hidetoshi Takahashi
Keio University, JAPAN
- M4P.083 SLIP DETECTION USING A HEAT-FLOW-TYPE WARMTH SENSOR**
Hiro Kanamori and Yoshiyuki Hata
Meijo university, JAPAN
- M4P.084 TEMPERATURE BEHAVIOUR OF RAYLEIGH, SEZAWA AND LAMB MODE RESONANCE FREQUENCIES OF 30% SCALN/SI SAW DEVICES**
Alexandra Nicoloiu¹, George Boldeiu¹, Claudia Nastase¹, Monica Nedelcu¹, Cristina Ciornei¹, Ioana Zdru¹, George Stavrinidis², Dan Vasilache¹, Antonis Stavrinidis², Adrian Dinescu¹, George Konstantinidis², and Alexandru Muller¹
¹*IMT Bucharest, ROMANIA and* ²*FORTH MRG IESL Heraklion, GREECE*
- M4P.085 TEXTILE-BASED STRETCHABLE STRAIN SENSOR FOR HUMAN ACTIVITY AND HEALTH MONITORING**
Rui M.R. Pinto, Mohammadmahdi Faraji, and K.B. Vinayakumar
INL - International Iberian Nanotechnology Laboratory, PORTUGAL
- M4P.086 UNIVERSAL CONCEPT FOR FABRICATING LOW RESIDUAL STRESS PZT FILM-BASED PMUT ON SILICON WAFER USING BOTTOM-UP METHOD**
Yuh-Cherng Lai and Guo-Hua Feng
National Tsing Hua University, TAIWAN

M4P.087 UNIVERSAL OPTIMIZATION SOLUTION FOR DIELECTRIC GEOMETRY ON SENSITIVITY MAXIMIZATION IN FLEXIBLE CAPACITIVE TACTILE SENSORS

Tzu-Yi Hsu¹, Chieh-Cheng Wang¹, Padmanabh P. Pancham¹, Wen-Hsin Chiu¹, Daisuke Yamane², and Cheng-Yao Lo¹

¹National Tsing Hua University, TAIWAN and ²Ritsumeikan University, JAPAN

Tuesday - Physical Sensors and Microsystems

T4P.067 4.51 MILLION QUALITY FACTOR IN MICRO HEMISPHERICAL RESONATOR FABRICATED FROM LASER ABLATION AND WELDING

Weiyu Zhu, Xiang Xi, Kun Lu, Zhanqiang Hou, Bin Li, and Yan Shi

National University of Defense Technology, CHINA

T4P.068 A BIODEGRADABLE STACKED-INDUCTORS LC SENSOR FOR INTERNAL BODY TEMPERATURE MONITORING

Lifeng Wang, Jingjing Lu, Lei Dong, Qing-An Huang, and Zhenxiang Yi

Southeast University, CHINA

T4P.069 A MEMS RESONANT PRESSURE SENSOR BASED ON CAVITY-SOI

Han Xue^{1,2}, Jiahui Yao^{1,2}, Chao Cheng^{1,2}, Zongze Yu^{1,2}, Yulan Lu¹, Bo Xie¹, Junbo Wang^{1,2}, Deyong Chen^{1,2}, and Jian Chen^{1,2}

¹Chinese Academy of Sciences (CAS), CHINA and ²University of Chinese Academy of Sciences, CHINA

T4P.070 A SELF-ADAPTIVE PHASE DIFFERENCE MEASUREMENT SYSTEM FOR MEMS RESONANT ACCELEROMETER

Liangbo Ma^{1,2}, Xingyin Xiong¹, Zheng Wang¹, Kunfeng Wang^{1,2}, Zhaoyang Zhai^{1,2}, and Xudong Zou^{1,2}

¹Chinese Academy of Sciences (CAS), CHINA and ²University of Chinese Academy of Sciences, CHINA

T4P.071 AI-ENABLED E-SKIN WITH HIGH-ACCURACY MATERIAL AND TEXTURE RECOGNITION VIA STICK-SLIP AND CONTACT ELECTRIFICATION

Jiahao Yu¹, Jiyuan Zhang¹, Aocheng Bao¹, Jin Wu², Bowen Ji¹, Honglong Chang¹, Weizheng Yuan¹, and Kai Tao¹

¹Northwestern Polytechnical University, CHINA and ²Sun Yat-sen University, CHINA

T4P.072 A STRUCTURE-OPTIMIZED ACOUSTIC PARTICLE VELOCITY SENSOR WITH IMPROVED SENSITIVITY AND SELF-NOISE

Wangnan Chen, Zhezhen Zhu, Xu Ma, Lingmeng Yang, Lihao Ma, Wenhua Xu, Chengchen Gao, Yilong Hao, and Zhenchuan Yang

Peking University, CHINA

T4P.073 EVERYTHING AT ONCE--LINEARIZING SYSTEM RESPONSE AND ENHANCING SENSITIVITY IN PHOTOACOUSTIC GAS SENSORS BY DEDICATED DEMODULATION AND FILTER TUNING METHODS

Simon Essing¹, Gabriele Schrag¹, David Tumpold², Guillaume Dumas², Andrey Kravchenko³, and Mohammad Amir Ghaderi²

¹Technical University of Munich, GERMANY, ²Infineon Technologies AG, GERMANY, and

³Infineon Technologies Dresden GmbH, GERMANY

T4P.074 FLEXIBLE CENTRALIZED TRI-AXIS FORCE SENSOR BASED ON CAPACITANCE AND INTRINSIC RESISTANCE OF CIRCULAR BUMP STRUCTURE

Jie Jin, Yancheng Wang, and Deqing Mei

Zhejiang University, CHINA

T4P.075 FPGA-BASED ASYNCHRONOUS SPIKE PERCEPTRON FOR TINY MEMS TACTILE SENSORS

Masanori Aoki¹, Tatsuya Saito¹, Mitsuhito Ando¹, Masayuki Sohgawa², Tomonori Izumi¹, Junichi Akita³, and Haruo Noma¹

¹Ritsumeikan University, JAPAN, ²Niigata University, JAPAN, and ³Kanazawa University, JAPAN

- T4P.076 HIGH-SENSITIVE SLIP SENSOR FEATURING HIGH ASPECT RATIO MICROWALLS AND ITS MEASURING PRINCIPLE USING CONVOLUTIONAL NEURAL NETWORKS**
Motoki Ohashi, Shoki Kotani, Yusuke Tanaka, Masato Suzuki, Tomokazu Takahashi, and Seiji Aoyagi
Kansai University, JAPAN
- T4P.077 HUMAN ACTIVITY RECOGNITION USING INTELLIGENT RESONANT ACCELEROMETER EMPLOYING MEMS RESERVOIR COMPUTING**
Takahiro Mizumoto, Amit Banerjee, Jun Hirotani, and Toshiyuki Tsuchiya
Kyoto University, JAPAN
- T4P.078 MICRO-SENSORS WITH GIANT MAGNETOELECTRICAL COEFFICIENT**
KeLi Zhao, Peng Pang, ZhongGang Zhang, GuangYao Pei, YunZhe Liu, Tao Zhang, XingXu Zhang, Jian Luo, and BingHe Ma
Northwestern Polytechnical University, CHINA
- T4P.079 MICROSCOPIC BLOOD VISCOSITY MEASUREMENT USING OPTICAL FIBER TWEEZERS IMAGING SYSTEM**
Wei-Yu Chen, Ching-Jung Hung, and Cheng-Yang Liu
National Yang Ming Chiao Tung University, TAIWAN
- T4P.080 MONOLITHIC INTEGRATION OF GAS, HUMIDITY, ACCELERATION, MICROPHONE, TEMPERATURE AND PRESSURE COMPOSITE MICROCHIP**
Xiaohui Li, Tiger H. Tao, and Nan Qin
Chinese Academy of Sciences (CAS), CHINA
- T4P.081 MULTI-MODE PIEZOELECTRIC MICROMACHINED TRANSDUCERS FOR MULTI-CHANNEL ACOUSTIC POWER TRANSFER AND DATA TELEMETRY**
Teng Zhang and Ashwin A. Seshia
University of Cambridge, UK
- T4P.082 NEAR ZERO-POWER ENVIRONMENT TEMPERATURE MICROMECHANICAL SENSOR-SWITCH ENABLED BY SUB-MICRON GAP**
Duan Jian Goh¹, Yul Koh¹, Sagnik Ghosh¹, Jaibir Sharma¹, Yong Shun Teo¹, Amit Lal², and Joshua E.Y. Lee¹
¹Agency of Science Technology and Research (A*STAR), SINGAPORE and ²Cornell University, USA
- T4P.083 ON-LINE LASER POWER MEASUREMENT BASED ON MICROFABRICATED SENSOR DEVICE**
Yuqiang Hu^{1,2,3}, Fei Xie^{2,4}, Qihui Liu^{2,4}, Nan Wang^{2,4}, Jin Zhang², Yichen Liu², Yongquan Su^{1,2,3}, Lihao Wang², Hao Chen^{2,4}, and Zhenyu Wu^{1,2,3,4}
¹Shanghai University, CHINA, ²Chinese Academy of Sciences (CAS), CHINA, ³Shanghai Industrial μ Technology Research Institute, CHINA, and ⁴University of Chinese Academy of Sciences, CHINA
- T4P.084 PIEZOELECTRIC MEMS ACOUSTIC EMISSION SENSOR MODULE WITH A BUILT-IN PREAMPLIFIER**
Yongfang Li, Yuki Ueda, Takashi Usui, and Kazuo Watabe
Toshiba Corporation, JAPAN
- T4P.085 SAW PRESSURE SENSOR ON LITHIUM NIOBATE USING A TRANSFER OF THIN FILM ON SEPARATELY FABRICATED CAVITIES**
Sagun Shekhar, Ebinesh Abraham, and Prosenjit Sen
Indian Institute of Science, INDIA
- T4P.086 STIFFNESS IMBALANCE ERRORS TRIMMING FOR SILICON MEMS TUNING-FORK GYROSCOPES WITH LOW COST PICOSECOND LASERS**
Yuxian Liu, Qiancheng Zhao, Dacheng Zhang, and Jian Cui
Peking University, CHINA
- T4P.087 ULTRA-SENSITIVE PIEZORESISTIVE STRAIN SENSOR UTILISING LATERAL PHOTOVOLTAIC EFFECT IN 3C-SIC/SI HETEROJUNCTION**
Tuan-Hung Nguyen, Dang D. H. Tran, Trung-Hieu Vu, Van T. Dau, and Dzung V. Dao
Griffith University, AUSTRALIA

Wednesday - Physical Sensors and Microsystems

- W4P.066 3D ANISOTROPIC TACTILE SENSORS FOR NORMAL AND SHEAR FORCE DISCRIMINATION**
Kai-Ming Hu, Yi-Hang Xin, Xin-Lu Deng, Zhi-qi Dong, Jing-Lin Ye, and Wen-Ming Zhang
Shanghai Jiao Tong University (SJTU), CHINA
- W4P.067 A FLEXIBLE, EMBROIDERED STRAIN SENSOR FOR USE WITH TEXTILES**
Yoshiki Kondo, Satoko Honda, and Kuniharu Takei
Osaka Metropolitan University, JAPAN
- W4P.068 A HIGHLY SENSITIVE ELECTROMECHANICAL SMALL CURRENT AMMETER**
Xuecui Zou, Usman Yaqoob, Hossein Fariborzi, and Khaled Salama
King Abdullah University of Science and Technology (KAUST), SAUDI ARABIA
- W4P.069 A NOVEL WALL-SHEAR STRESS SENSOR WITH A COVERING FLOATING ELEMENT FOR HARSH ENVIRONMENTS**
Yunzhe Liu, Guanghui Ding, Tao Zhang, Peng Pang, Keli Zhao, Guangyao Pei, Jian Luo, and Binghe Ma
Northwestern Polytechnical University, CHINA
- W4P.070 A SINGLE-INPUT SINGLE-OUTPUT SENSING SCHEME FOR MULTIPLE TRACES VIA HIGH-ORDER NONLINEAR MODE LOCALIZATION**
Wei Zhang, Jiajia Xiang, Na Ling, Jiayang Chen, Lijia Zhang, Cao Xia, Yuanlin Xia, and Zhuqing Wang
Sichuan University, CHINA
- W4P.071 A SELF-POWERED TACTILE SENSING INTERFACE FOR HUMAN-MACHINE INTERACTION**
Yuyang Sun, Hanyang Li, Kaiyao Wang, Xiaowei Feng, Cheng Hou, Tao Chen, and Huicong Liu
Soochow University, CHINA
- W4P.072 AN ULTRA-SENSITIVE HYDROGEL TACTILE SENSOR WITH MICRO-CONE STRUCTURES FOR HUMAN-MACHINE INTERFACE**
Aocheng Bao¹, Jiahao Yu¹, Jiyuan Zhang¹, Jin Wu², Bowen Ji¹, Honglong Chang¹, Weizheng Yuan¹, and Kai Tao¹
¹Northwestern Polytechnical University, CHINA and ²Sun Yat-sen University, CHINA
- W4P.073 BY VARYING THE DISTANCE OF NI FLUX-GUIDE FOR OUT-OF-PLANE MAGNETIC FIELD SENSITIVITY ENHANCEMENT OF AMR SENSOR**
Shihwei Lin, Meifeng Lai, and Weileun Fang
National Tsing Hua University, TAIWAN
- W4P.074 DESIGN AND VALIDATION OF THE FIRST Z-AXIS MEMS ACCELEROMETER WITH IN-PLANE READOUT**
Gabriele Gattere¹, Valentina Zega², Manuel Riani¹, Francesco Rizzini¹, and Carlo Valzasina¹
¹STMicroelectronics, ITALY and ²Politecnico di Milano, ITALY
- W4P.075 DEVELOPMENT OF THE NASA MINI/MEMS TRI-AXIS SENSOR SYSTEM**
Kenneth G. Toro¹ and Jonathon D. Ponder²
¹NASA Langley Research Center, USA and ²NASA Glenn Research Center, USA
- W4P.076 ENHANCING LOW-FREQUENCY ACCELERATION RESOLUTION OF RESONANT ACCELEROMETERS BY MANIPULATING THE BIAS VOLTAGE NOISE**
Kunfeng Wang^{1,2}, Zheng Wang³, Liangbo Ma^{1,2}, Zhaoyang Zhai^{1,2}, and Xudong Zou^{1,2}
¹Tianjin University, CHINA, ²University of Chinese Academy of Sciences, CHINA, and ³Chinese Academy of Sciences (CAS), CHINA
- W4P.077 LARGE VERTICAL PIEZO-OPTOELECTRONIC EFFECT IN SIC/SI HETEROSTRUCTURE**
Cong T. Nguyen, Gia-Ninh Dinh, Tuan-Hung Nguyen, Trung-Hieu Vu, Dang Tran, Emily Lakis, Braiden Tong, Nam-Trung Nguyen, Van Dau, and Dzung V. Dao
Griffith University, AUSTRALIA

W4P.078 MICROSTRUCTURE-ENHANCED VISION-BASED TACTILE SENSOR

Mayue Shi, Yongqi Zhang, Xiaotong Guo, and Eric M. Yeatman
Imperial College London, UK

W4P.079 ONE STEP FABRICATION OF TRIAXIAL FORCE PLATE USING A FDM 3D PRINTER

Yukitake Nakahara and Hidetoshi Takahashi
Keio University, JAPAN

W4P.080 QUALITY FACTOR MODULATION IN MEMS RESONATORS BY ELASTIC WAVE INTERFERENCE IN THE ANCHOR REGION

Daniel Platz, Marco Stixenberger, Andre Gesing, Ioan Igant, Hendrik Kähler, and Ulrich Schmid
TU Wien, AUSTRIA

W4P.081 SELF-HEALING METAL INTERCONNECT USING SILICONE OIL DISPERSED WITH COPPER NANOPARTICLES

Akane Umeda, Naoki Suetsugu, Wakana Akema, and Eiji Iwase
Waseda University, JAPAN

W4P.082 SELF-OSCILLATING CALORIMETER BASED ON THERMAL-PIEZORESISTIVE RESONATOR

Aojie Quan¹, Hemin Zhang², Chengxin Li¹, Chen Wang¹, Xinyu Wu¹, and Michael Kraft¹
¹*KU Leuven, BELGIUM* and ²*Northwestern Polytechnical University, CHINA*

W4P.083 TENSION-INDUCED MOEMS GRAPHENE RESONANT PRESSURE SENSOR

Yujian Liu¹, Cheng Li^{1,2}, Zhengwei Wu³, Shangchun Fan¹, and Zhen Wan¹
¹*Beihang University, CHINA*, ²*Research Institute of Beihang University in Shenzhen, CHINA*, and ³*Chinese Academy of Sciences, CHINA*

W4P.084 UNCERTAINTY QUANTIFICATION OF MEMS DEVICES WITH HIGH-DIMENSIONAL CORRELATED PROCESS VARIATIONS

Lin-Feng Zhao, Zai-Fa Zhou, and Qing-An Huang
Southeast University, CHINA

W4P.085 UNCLOSED HEXAGONAL PIEZOELECTRIC MEMS HYDROPHONE BASED ON RIGID-FLEXIBLE COMPOSITE MEMBRANE

Zhiyong Hu, Qi Wang, Qingda Xu, Tao Ruan, Bin Yang, and Jingquan Liu
Shanghai Jiao Tong University (SJTU), CHINA

Monday - RF MEMS, Resonators and Oscillators

M4P.088 FULLY IMPEDANCE-MATCHED HIGH-OVERTONE BULK ACOUSTIC WAVE RESONATORS USING 2DEG ELECTRODES

Jingjie Cheng, Jiahao Wu, Yan Qiao, Penghui Song, Wenming Zhang, and Lei Shao
Shanghai Jiao Tong University (SJTU), CHINA

M4P.089 HIGH QUALITY FACTOR ALSCN LAMB WAVE RESONATORS USING NBN/AL TOP ELECTRODES AT CRYOGENIC TEMPERATURE

Zhifang Luo^{1,2,3,4}, Shuai Shao^{1,2,3}, Chengkuo Lee⁴, and Tao Wu¹
¹*ShanghaiTech University, CHINA*, ²*Chinese Academy of Sciences (CAS), CHINA*, ³*University of Chinese Academy of Sciences, CHINA*, and ⁴*National University of Singapore, SINGAPORE*

M4P.090 INVESTIGATION OF QUALITY FACTOR VARIATION BASED ON TAILORED MODE SHAPE ENGINEERING FOR PIEZOELECTRIC CONTOUR MODE RESONATORS

Wei Lin and Sheng Shian Li
National Tsing Hua University, TAIWAN

M4P.091 STRESS INDUCED GAP CLOSING ELECTRODES FOR SILICON RESONATORS ENABLING LOW BIAS VOLTAGE AND EQUIVALENT RESISTANCE

Hao Yu^{1,2}, Ke Sun¹, Chaoyue Zheng^{1,2}, Heng Yang^{1,2}, and Xinxin Li^{1,2}
¹*Chinese Academy of Sciences (CAS), CHINA* and ²*University of Chinese Academy of Sciences, CHINA*

Tuesday - RF MEMS, Resonators and Oscillators

- T4P.088 ALUMINUM SCANDIUM NITRIDE LAMB WAVE ACOUSTIC DELAY LINES WITH OVER 6% FRACTIONAL BANDWIDTH**
Zhifang Luo^{1,2,3,4}, Shuai Shao^{1,2,3}, Chengkuo Lee⁴, and Tao Wu¹
¹ShanghaiTech University, CHINA, ²Chinese Academy of Sciences (CAS), CHINA, ³University of Chinese Academy of Sciences, CHINA, and ⁴National University of Singapore, SINGAPORE
- T4P.089 AN 18 GHZ ALSCN FILM BULK ACOUSTIC WAVE RESONATOR WITH EPITAXIAL METAL ELECTRODES**
Mingyo Park, Jialin Wang, and Azadeh Ansari
Georgia Institute of Technology, USA
- T4P.090 PARAMETRIC IMPEDANCE MODULATION IN DEPLETION LAYER TRANSDUCED MICROMECHANICAL RESONATOR**
Satish K. Verma and Bhaskar Mitra
Indian Institute of Technology Delhi, INDIA
- T4P.091 SHEAR BULK MODE RESONATOR WITH HIGH ELECTROMECHANICAL COUPLING FOR WIDE BAND RF APPLICATIONS**
Seniz E. Kucuk Eroglu, Soumya Yandrapalli, Victor Plessky, and Luis Guillermo Villanueva
École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND
- T4P.092 TEMPERATURE-COMPENSATED PURE SILICON CANTILEVER RESONATOR WITH COUPLED TORSIONAL STRUCTURE AT ANCHOR**
Shunsuke Yamada and Shuji Tanaka
Tohoku University, JAPAN

Wednesday - RF MEMS, Resonators and Oscillators

- W4P.086 A PIEZOELECTRIC MEMS MECHANICALLY COUPLED FILTER BASED ON SUPPORT TRANSDUCER TOPOLOGY**
Ken-Wei Tang¹, Anurag Zope¹, Zhong-Wei Lin¹, Gayathri Pillai², and Sheng-Shian Li¹
¹National Tsing Hua University, TAIWAN and ²Indian Institute of Science, INDIA
- W4P.087 A PIEZOELECTRIC WIDTH-FLEXURAL MODE MEMS RESONATOR WITH HIGH QUALITY FACTOR AND LOW MOTIONAL RESISTANCE**
Yuhao Xiao¹, Wen Chen¹, Jinzhao Han¹, Kewen Zhu¹, and Guoqiang Wu^{1,2}
¹Wuhan University, CHINA and ²Hubei Yangtze Memory Laboratories, CHINA
- W4P.088 A THERMO-PIEZORESISTIVE RESONATOR WITH F-Q PRODUCTS OVER 4.5E14**
Chaowei Si¹, Yongmei Zhao^{1,2}, Guowei Han¹, Jin Ning^{1,2}, Xiaodong Wang^{1,2}, and Fuhua Yang^{1,2}
¹Chinese Academy of Sciences (CAS), CHINA and ²University of Chinese Academy of Sciences, CHINA
- W4P.089 GRAPHENE OXIDE INTEGRATED SURFACE ACOUSTIC WAVE HUMIDITY SENSOR WITH SIMULTANEOUS MULTI-FREQUENCY OPERATION**
Il Ryu Jang, Soon In Jung, Chaehyun Ryu, Jaconhyung Park, Aneeta Padhan, and Hoe Joon Kim
Daegu Gyeongbuk Institute of Science and Technology (DGIST), KOREA
- W4P.090 NON-LINEARITY CORRECTIONS OF TAPERED BAW TRANSDUCERS FOR ACCURATE FFT COMPUTATION USING ULTRASONIC WAVEFRONT COMPUTING**
Zaifeng Yang¹, Xing Haw Marvin Tan¹, Daniel Ssu-Han Chen², Viet Phuong Bui¹, Kevin Tshun Chuan Chai², Ching Eng Png¹, and Amit Lal³
¹Agency of Science Technology and Research (A*STAR), SINGAPORE,
²Agency for Science, Technology and Research (A*STAR), SINGAPORE, and ³Cornell University, USA

Monday - Wearable and In-Vivo Medical Devices and Microsystems

- M4P.092 A FLEXIBLE LC-TYPE PASSIVE WIRELESS PRESSURE SENSOR WITH HIGH SENSITIVITY AND WIDE DETECTION RANGE**
Yifei Pan¹, Xilin Qian¹, Bowen Tian¹, Boshuai Sheng¹, Haonan Yang¹, Zhe Wu¹, Zefang Chen¹, Jiacheng Tu¹, Chengxi Guo¹, Huiyang Yu¹, and Jianqiu Huang²
¹Nanjing Tech University, CHINA and ²Southeast University, CHINA
- M4P.093 A UNIVERSAL CAVITY-BASED FORCE SENSOR WITH RECONFIGURABLE PERFORMANCE FOR INTEGRATION WITH THIN FILM DEVICES**
Zehua Xiang, Haobin Wang, Ji Wan, Chen Xu, Pengcheng Zhao, Mengdi Han, and Haixia Zhang
Peking University, CHINA
- M4P.094 A WIRELESS BACKSCATTER, BLUETOOTH LOW ENERGY (BLE)-COMPATIBLE BIOSIGNAL ACQUISITION SYSTEM FOR INTEGRATED BIOELECTRONICS**
Yashwanth Vyza, James D. Rosenthal, Alix Trouillet, Ivan Furfaro, and Stéphanie P. Lacour
École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND
- M4P.095 A WIRELESS HEADSET BIOSENSOR MEASURING VOLATILE CHEMICALS EMITTED FROM THE AURIS EXTERNA FOR MONITORING METABOLISMS**
Kenta Iitani¹, Huang Di¹, Geng Zhang¹, Koji Toma², Takahiro Arakawa³, and Kohji Mitsubayashi¹
¹Tokyo Medical and Dental University, JAPAN, ²Shibaura Institute of Technology, JAPAN, and ³Tokyo University of Technology, JAPAN
- M4P.096 AN IMPLANTABLE PASSIVE WIRELESS TEMPERATURE SENSOR FOR MULTI-NODE MONITORING OF ARTIFICIAL KNEE JOINTS**
Zi-Ang Qi, Lei Dong, Qing-An Huang, Lei Han, and Meng Nie
Southeast University, CHINA
- M4P.097 IMPLANTABLE BIOSENSOR FOR CONTINUOUS SEROTONIN DETECTION IN FREELY MOVING CRAYFISH**
Jinjing Han, Justin M. Stine, Tawen Ho, Michael A. Straker, Jens Herberholz, and Reza Ghodssi
University of Maryland, USA

Tuesday - Wearable and In-Vivo Medical Devices and Microsystems

- T4P.093 A TETRAPOLAR BIOIMPEDANCE SENSOR-INTEGRATED CAPSULE FOR REAL-TIME MONITORING OF INTESTINAL TISSUES**
Brian M. Holt, Justin M. Stine, Luke A. Beardslee, and Reza Ghodssi
University of Maryland, USA
- T4P.094 A WEARABLE TRIPLE-SPIRAL SENSOR FOR IN-SITU REAL TIME SWEAT ANALYSIS BASED ON LASER-INDUCED-GRAPHENE**
Yaozheng Wang, Haobin Wang, Zehua Xiang, Pengchen Zhao, Yexing Fang, Ji Wan, Chen Xu, and Haixia Zhang
Peking University, CHINA
- T4P.095 CALIBRATION METHOD FOR WEARABLE SENSOR USING AIRFLOW AT MOUTH FOR QUANTITATIVE MONITORING OF RESPIRATION AND HEARTBEAT**
Kenta Horie¹, Muhammad Salman Al Farisi¹, Yoshihiro Hasegawa¹, Miyoko Matsushima², Tsutomu Kawabe², and Mitsuhiro Shikida¹
¹Hiroshima City University, JAPAN and ²Nagoya University, JAPAN
- T4P.096 CANTILEVER ACTUATOR MODULE FOR ON-COMMAND DRUG DEPLOYMENT FROM INGESTIBLE CAPSULES**
Joshua A. Levy, Michael A. Straker, Luke A. Beardslee, and Reza Ghodssi
University of Maryland, USA

- T4P.097 DEVELOPMENT OF FLEX-TO-RIGID CAPACITIVE MICROMACHINED ULTRASOUND TRNADUCER (CMUT) WITH BENDING MODULATION**
Sang-Mok Lee, Taemin Lee, Chaerin Oh, and Hyunjoo J. Lee
Korea Advanced Institute of Science and Technology (KAIST), KOREA
- T4P.098 SEROPILL: A MINIMALLY INVASIVE INGESTIBLE CAPSULE FOR SEROTONIN SENSING IN THE GI TRACT**
Michael Straker, Joshua Levy, Jinjing Han, Justin Stine, Luke Beardslee, and Reza Ghodssi
University of Maryland, USA
- T4P.099 SIMULTANEOUS AIRFLOW AND PRESSURE MEASUREMENTS BASED ON PITOT TUBE FOR EVALUATION OF EXPIRED AIR INSIDE LUNG AIRWAY**
Aoi Miyawaki¹, Muhammad Salman Al Farisi¹, Yoshihiro Hasegawa¹, Miyoko Matsushima², Tsutomu Kawabe², and Mitsuhiro Shikida¹
¹*Hiroshima City University, JAPAN* and ²*Nagoya University, JAPAN*

Wednesday - Wearable and In-Vivo Medical Devices and Microsystems

- W4P.091 HIGH-DENSITY ULTRA-FLEXIBLE NEURAL PROB FOR MONITORING ELECTROPHYSIOLOGICAL SIGNALS OF FREE-MOVING MICE WITH EPILEPSY**
Han Wang, Qian Cheng, Cunkai Zhou, Ye Tian, Chengjian Xu, Xiaoling Wei, Zhitao Zhou, Tiger H. Tao, and Liuyang Sun
Chinese Academy of Sciences (CAS), CHINA
- W4P.092 IMPLANTABLE IN-VIVO PH IMAGE SENSOR WITH INTEGRATED REFERENCE ELECTRODE FOR BIOLOGICAL EXPERIMENTS ON AWAKE MOUSE**
Mai Madokoro¹, Yuto Nakamura¹, Hiroshi Horiuchi², Tomoko Kobayashi², Junko Ishida², Tomoko Horio¹, Yasuyuki Kimura¹, Takeshi Hizawa¹, Daisuke Akai¹, Hideo Doi¹, Yong-Joon Choi¹, Kazuhiro Takahashi¹, Toshihiko Noda¹, Junichi Nabekura², and Kazuaki Sawada¹
¹*Toyohashi University of Technology, JAPAN* and ²*National Institute for Physiological Sciences, JAPAN*
- W4P.093 MAGNETOELECTRIC CORE-SHELL NANOPARTICLE BASED WEARABLE PATCH FOR HYBRID ENERGY HARVESTING IN BIOMEDICAL APPLICATIONS**
Nandan Murali¹, Dibyajyoti Mukherjee¹, G Vijay Malhaar², Dhiman Mallick¹, and Soutik Betal¹
¹*Indian Institute of Technology Delhi, INDIA* and ²*Birla Institute of Technology and Science-Pilani, INDIA*
- W4P.094 MULTIFUNCTIONAL NEURAL PROBE FOR SYNCHRONIZED STIMULATION AND MONITORING MULTIPLE SIGNALS**
Jiawei Cao, Longchun Wang, Zhejun Guo, Zhuo Wang, Kejun Tu, Qingda Xu, Mengfei Xu, Junyu Xiao, Bin Yang, and Jingquan Liu
Shanghai Jiao Tong University (SJTU), CHINA
- W4P.095 STRETCHABLE HYBRID ELECTRONICS BASED ON AUXETIC STRUCTURES**
Daniel Zymelka, Toshihiro Takeshita, Yusuke Takei, and Takeshi Kobayashi
National Institute of Advanced Industrial Science and Technology (AIST), JAPAN
- W4P.096 UTILIZING ORIGAMI INTEGRATED PIEZOELECTRIC FOIL ACOUSTIC EMISSION AND ACCELERATION SENSOR FUSED WITH OMNIDIRECTIONAL MOTION DETECTOR FOR KNEE JOINT HEALTH MONITORING**
Cheng-Da Lin and Guo-Hua Feng
National Tsing Hua University, TAIWAN
- W4P.097 WIRELESS URINE MONITORING WITH PASSIVE ANNTENA USING SPLIT RING METAMATERIAL**
Ashitaka Kurita¹, Gaku Furusawa¹, Hiroaki Onoe², and Tetsuo Kan¹
¹*University of Electro-Communications, JAPAN* and ²*Keio University, JAPAN*

Monday - Late News

- M4P.098 A 0.6 METER LONG LARGE-AREA FLEXIBLE PRESSURE SENSORS WITH OUTSTANDING UNIFORMITY AND THERMOSTABILITY**
Shoulu Gong, Ding Zhe Gan, Xinlu Deng, Wenming Zhang, and Lei Shao
Shanghai Jiao Tong University, CHINA
- M4P.099 A MICROFLUIDIC PLATFORM FOR ENHANCED LABELLING AND DETECTION OF EXTRACELLULAR VESICLES**
Shi Hu, Rui Hao, Zitong Yu, Huitao Zhang, Qisang Zuo, and Hui Yang
Chinese Academy of Sciences, CHINA
- M4P.100 A PLASMONIC-PHOTONIC HYBRID FIBER-OPTIC SENSOR FOR TUMOR MARKER DETECTION AND HETEROGENEITY CHARACTERIZING**
Nanxi Wang^{1,2}, Xin Li^{1,2}, Yimin Shi^{1,2}, Fei Wang^{1,2}, Lina Zhang³, Mingxiao Li¹, Hongyao Liu¹, Yang Zhao¹, Lingqian Zhang¹, and Chengjun Huang^{1,2}
¹Chinese Academy of Sciences, CHINA, ²University of Chinese Academy of Sciences, CHINA, and ³Beijing Chest Hospital, Capital Medical University, CHINA
- M4P.101 A STUDY OF FERROELECTRIC POLARIZATION SWITCHING AND NEGATIVE CAPACITANCE EFFECT FOR ENHANCED ENERGY STORAGE IN ELECTROSTATIC SUPERCAPACITORS**
Sadegh Kamaei Bahmaei, Michele Ghini, Ali Gilani, Carlotta Gastaldi, and Adrian Ionescu
École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND
- M4P.102 ACTIVE CONTROL OF VIBRATION-INDUCED FLOW USING A PNEUMATICALLY DRIVEN MICROBALLOON DEVICE**
Taku Sato, Kanji Kaneko, Takeshi Hayakawa, and Hiroaki Suzuki
Chuo University, JAPAN
- M4P.103 BEOL COMPATIBLE (< 400 °) NOVEL CROSS-POINT RRAM BASED RESISTIVE HYDROGEN SENSOR FOR DOWNSTREAM HYDROGEN USE**
Subhranu Samanta, Zhixian Chen, Doris K.T. Ng, Weiguo Chen, Linfang Xu, Fuu M. Kai, and Yao Zhu
*Agency for Science, Technology and Research (A*STAR), SINGAPORE*
- M4P.104 CRYSTALLIZATION OF DNA-FUNCTIONALIZED NANOPARTICLE IN GIANT UNILAMELLAR VESICLES**
Ryuta Tetsuya¹, Naotomo Tottori¹, Azusa Takao¹, Maasa Yokomori¹, Miho Tagawa², Shigeo S. Sugano³, Shinya Sakuma¹, and Yoko Yamanishi¹
¹Kyushu University, JAPAN, ²Nagoya University, JAPAN, and ³National Institute of Advanced Industrial Science and Technology (AIST), JAPAN
- M4P.105 EFFECT OF VAN DER WAALS FORCES ON DYNAMIC PROPERTIES OF GRAPHENE-BASED NEMS RESONATORS**
Zhiqi Dong, Kaiming Hu, and Xinlu Deng
Shanghai Jiao Tong University, CHINA
- M4P.106 EVALUATION METHOD OF OUT-OF-PLANE DEFORMATION ON KIRIGAMI STRUCTURE WITH REPETITIVE SLIT PATTERNS ON CONCENTRIC CIRCLES**
Miyako Mizuna and Eiji Iwase
Waseda University, JAPAN
- M4P.107 FABRICATION OF A MOVING-COIL-TYPE PDMS-BASED MEMBRANE ELECTROMAGNETIC MICRO-ACTUATOR BY DOUBLE-SIDED SCREEN PRINTING TECHNOLOGY**
Chao Qi, Naohiro Sugita, and Tadahiko Shinshi
Tokyo Institute of Technology, JAPAN
- M4P.108 FLEXIBLE THERMOPILE-TYPE WARMTH SENSOR**
Minoru Sasaki¹, Yoshiyuki Hata², and Yae Ito¹
¹Toyota Technological Institute, JAPAN and ²Meijo University, JAPAN

- M4P.109 HIGH CRYSTALLINE QUALITY A-AXIS ORIENTED AL_{0.56}SC_{0.44}N FILMS FOR HIGH COUPLING SAW APPLICATIONS**
Xuan Weipeng¹, Weilun Xie¹, Xingli He², Zhen Cao³, Hao Jin³, Shurong Dong³, and Jikui Luo³
¹Hangzhou Dianzi Univerisity, CHINA, ²Soochow University, CHINA and ³Zhejiang University, CHINA
- M4P.110 HIGH-THROUGHPUT SPERM SORTING MICROFLUIDIC DEVICE FOR LIVESTOCK'S SPERM MOTILITY ENHENCEMENT**
Nian-Je Wu¹, Hsien-Chih Peng¹, I-Jui Chen¹, Ren-Guei Wu¹, and Fan-Gang Tseng^{1,2}
¹National Tsing Hua University, TAIWAN and ²Academia Sinica, TAIWAN
- M4P.111 IMAGING RESONANT MEMS WITH ULTRA-BROAD SPECTRAL VIBROMETRY FROM 1000 HZ TO 10 GHZ**
Zhaoliang Peng, Jingjie Cheng, Jiahao Wu, Wenming Zhang, and Lei Shao
Shanghai Jiao Tong University, CHINA
- M4P.112 LITHIUM NIOBATE THIN FILM RESONANT INFRARED DETECTOR**
Mingye Du^{1,2,3}, Kangfu Liu^{1,2,3}, Jiawei Li^{1,2,3}, Yuxi Wang^{1,2,3}, Yushuai Liu^{1,2,3}, Fengyu Liu¹, and Tao Wu^{1,2,3}
¹Shanghaitech University, CHINA, ²Chinese Academy of Sciences, CHINA, and ³University of Chinese Academy of Sciences, CHINA
- M4P.113 MACHINE LEARNING ASISTED WAFER LEVEL BATCH FABRICATION OF AN MRI-COMPATIBLE MUNTIFUNCTIONAL NEURAL PROBE**
Ziqi Jia, Shuyu Shi, and Yong-Kyu Yoon
University of Florida, USA
- M4P.114 MICROFLUIDIC 3D HEPATIC CULTURES INTEGRATED WITH DROPLET-BASED BIOANALYSIS UNIT FOR MONITORING GLUCOSE METABOLISM UPON HORMONAL STIMULATION**
Jose M. de Hoyos-Vega¹, Alan M. Gonzalez-Suarez¹, Diana F. Cedillo-Alcantar¹, Gulnaz Stybayeva¹, Aleksey Matveyenko¹, Harmeet Malhi¹, Jose L. Garcia-Cordero², and Alexander Revzin¹
¹Mayo Clinic, USA and ²Centro de Investigación y de Estudios Avanzados del IPN, MEXICO
- M4P.115 MULTIFUNCTIONAL SENSING AND ACTUATION MINIATURIZED SYSTEM FOR BLOOD BIOMARKERS ON A BEAD**
Fernando Benito-Lopez¹, Adriana Caballe-Abalos¹, Sandra Garcia-Rey¹, Jon Mercader-Ruiz^{1,2}, and Lourdes Basabe-Desmots^{1,3}
¹University of the Basque Country, SPAIN, ²Arthroscopic Surgery Unit-UCA, SPAIN, and ³Basque Foundation of Science, IKERBASQUE, SPAIN
- M4P.116 PIEZOELECTRIC MEMS OSCILLATORS BASED ON FLEXURAL MODE MEMBRANE RESONATOR ARRAY FOR RESONANT SENSORS**
Hexu Luo, Menglun Zhang, Yi Gong, Yuan Ning, Xuejiao Chen, Quanning Li, and Wei Pang
Tianjin University, CHINA
- M4P.117 SELF-POWERED INTRUSION DETECTING SYSTEM USING A SPRAY-PAINT COATING BASED TRIBOELECTRIC NANOGENERATOR**
Jonghyeon Yun and Daewon Kim
Kyung Hee University, KOREA
- M4P.118 SIZE-BASED SEPARATION OF E. COLI USING VISCOELASTIC MICROFLUIDICS**
Tianlong Zhang^{1,2}, Ling Liu¹, David W. Inglis¹, Yoichiro Hosokawa², Yo Tanaka³, Yaxiaer Yalikun², and Ming Li¹
¹Macquarie University, AUSTRALIA, ²Nara Institute of Science and Technology, JAPAN, and ³Institute of Physical and Chemical Research (RIKEN), JAPAN
- M4P.119 TEXTURING TO DRAMATICALLY INCREASE THERMAL DEFORMATION OF FILM AND APPLYING TO ACTUATOR**
Daisuke Yamaguchi, Yuki Takahara, Shuichi Wakimoto, and Takefumi Kanda
Okayama University, JAPAN

M4P.120 THERMAL RECOVERY OF PALLADIUM NANOWIRE SENSOR FOR LONG-TERM RELIABLE HYDROGEN GAS DETECTION

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M4P.121 WEARABLE AND HYBRID POWER SOURCES FOR SMART CONTACT LENSES

Shiqi Wu, Yi Ding, Lunjie Hu, Daniella Marie Gatus, Wakutaka Nakagawa, and Takeo Miyake

Waseda University, JAPAN

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T4P.100 A BIMODAL "SENSOR CHIPLET" PLATFORM APPLIED FOR ALBUMIN AND PH MULTI-CHEMICAL SENSING

Ryugo Shimamura¹, Shun Yasunaga¹, Kei Misumi¹, Anne-Claire Eiler¹, Akio Higo¹, Gilgueng Hwang^{1,2}, Ayako Mizushima¹, Dongchen Zhu¹, Kikuo Komori³, Yasuyuki Sakai¹, Hiroshi Toshiyoshi¹, Agnès Tixier-Mita¹, and Yoshio Mita¹

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T4P.101 A MOLECULARLY IMPRINTED POLYMER /METHYLENE BLUE/ANODIC ALUMINUM OXIDE (MIP/MB/AAO) NANOCOMPOSITE ELECTRODE FOR THE DETECTION OF ULTRA-LOW CONCENTRATION TROPONIN T IN URINE

Chieh Chen¹, Yu-Ting Cheng¹, and Hsiao-En Tsai²

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T4P.102 A SMART REAL-TIME HUMAN RESPIRATORY MONITORING SYSTEM BASE ON A HIGH-PERFORMANCE FLOW SENSOR AND ACCURATE BREATHING RATE RECOGNITION ALGORITHM

Shiqian Cai, Zhongyi Liu, Gai Yang, Houbo Ding, Huikai Xie, and Xiaoyi Wang

Beijing Institute of Technology, CHINA

T4P.103 A THIN, FLEXIBLE ELECTROCHEMICAL SENSOR FOR INGESTIBLE CAPSULE-BASED IN-VIVO HYDROGEN SULFIDE MEASUREMENTS

Justin M. Stine, Katie L. Ruland, Joshua A. Levy, Luke A. Beardslee, and Reza Ghodssi

University of Maryland, USA

T4P.104 ADEPT - AN EMBEDDED MICROSYSTEMS MULTI-ELECTRODE CONTROL PLATFORM FOR VERSATILE μ M-PRECISION POSITIONAL TRAPPING AND ELECTROROTATION

Lourdes Albina Nirupa Julius, Dora Akgül, Gowri Krishnan, Henrik Scheidt, Omar Nassar,

Sarai M. Torres-Delgado, Dario Mager, Vlad Badilita, and Jan G. Korvink

Karlsruhe Institute of Technology, GERMANY

T4P.105 BROADBAND POWER GENERATION FROM ARM SWING DURING WALKING BY REPULSIVE-TORQUE-ENHANCED ROTATIONAL ELECTRET ENERGY HARVESTER

Tomoya Miyoshi and Yuji Suzuki

University of Tokyo, JAPAN

T4P.106 DEVELOPMENT OF DIGITAL NANOPLASMONMETRY METHOD FOR LABEL-FREE DETECTIONS OF SMALL BIOMOLECULES

Ting-Wei Chang, Sheng-Hann Wang, and Pei-Kuen Wei

Academia Sinica, TAIWAN

T4P.107 ELECTRICAL IMPEDANCE SPECTROSCOPY OF SINGLE PARTICLES BY AC NANOPORE METHOD -TOWARD EVALUATION OF DIELECTRIC PROPERTIES OF SINGLE NANOPARTICLES

Kosuke Hori, Ryusei Kowaka, Maami Sakamoto, and Takatoki Yamamoto

Tokyo Institute of Technology, JAPAN

- T4P.108 EXTREMELY SMALL LIMITING CURRENT-TYPE OXYGEN SENSOR WITH A WIDE RANGE PROPORTIONALITY OF THE OXYGEN CONCENTRATION**
Shunsuke Akasaka¹ and Isaku Kanno²
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- T4P.109 FABRICATION OF MEMS BULK SIC-BASED ACCELEROMETER AND ITS APPLICATION IN GROUND TEST OF AERO-ENGINE**
Yanxin Zhai, Tiantong Xu, Guoqiang Xu, Hengyi Wang, Xiaoda Cao, and Haiwang Li
Beihang University, CHINA
- T4P.110 FLUORESCENT POLYMERIC NANO-THERMOMETER FOR 3D TEMPERATURE DISTRIBUTION AND DYNAMIC MONITORING OF CHIMERIC TUMOR MICROENVIRONMENT**
Ashish Kumar, Venkanagouda S. Goudar, Kiran Kaladharan, and Fan-Gang Tseng
National Tsing Hua University, TAIWAN
- T4P.111 HIGH-PERFORMANCE PIEZOELECTRIC BIOMATERIALS FOR BIOCOMPATIBLE ENERGY HARVESTERS AND SENSORS**
Zhuomin Zhang^{1,2}, Xuemu Li^{1,2}, Zhenqi Wang¹, and Zhengbao Yang^{1,2}
¹City University of Hong Kong, HONG KONG and ²Hong Kong University of Science and Technology, HONG KONG
- T4P.112 HIGHLY STRETCHABLE, SUPER-TOUGH AND ANTI-BACTERIAL DEEP EUTECTIC SOLVENT IONIC GEL FOR HUMAN MOTION SENSING**
Jia-Yu Yang and Cheng-Hsin Chuang
National Sun Yat-sen University, TAIWAN
- T4P.113 IMMUNOGENICITY MONITORING SYSTEM INCORPORATING MICROFLUIDIC CELL CHIP AND PAPER-BASED ANALYTICAL DEVICE**
Kyung Won Lee, Eun Kyeong Yang, and Hyun Chul Yoon
Ajou University, KOREA
- T4P.114 LOW ELASTIC SPIN TORQUE SENSOR BASED ON ANGULAR MOMENTUM CONSERVATION LAW**
Masaya Toda, Kohei Oka, and Takahito Ono
Tohoku University, JAPAN
- T4P.115 MICRO PLASMA GENE TRANSFECTION SYSTEM FOR UNIFORM EXPRESSION**
Seiya Kato¹, Yuto Ando¹, Kiichiro Tomoda², Mime Kobayashi³, and Shinya Kumagai¹
¹Meijo University, JAPAN, ²Gladstone Institutes, USA, and ³Osaka Medical and Pharmaceutical University, JAPAN
- T4P.116 MODE-MATCHED MULTI-RING DISK RESONATOR USING (100) SINGLE CRYSTAL SILICON WITH 2 PPM FREQUENCY MISMATCH**
Shihe Wang, Jianlin Chen, Takashiro Tsukamoto, and Shuji Tanaka
Tohoku University, JAPAN
- T4P.117 ON-CHIP DIAMOND MEMS RESONATORS MAGNETIC SENSING UP TO 500 MHz**
Zilong Zhang, Guo Chen, Satoshi Koizumi, Yasuo Koide, and Meiyong Liao
National Institute for Materials Science, JAPAN
- T4P.118 RESIDUAL STRESS ANALYSIS OF THIN FILM MATERIALS FOR FABRICATING SUSPENDED LOW STRESS Si₃N₄ WAVEGUIDES ON SAPPHIRE**
Erwin Berenschot, Simen Martinussen, Kai Wang, Sonia Garcia-Blanco, Niels Tas, and Roald Tiggelaar
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- T4P.129 SELF-POWERED WIRELESS WIND SPEED SENSOR BASED ON AN ELECTRET GENERATOR**
Junchi Teng, Zeyuan Cao, Zibo Wu, Rong Ding, and Xiongying Ye
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Jack Guida, Gabriel Giribaldi, Luca Colombo, Matteo Rinaldi, and Siddhartha Ghosh
Northeastern University, USA
- T4P.121 THE MAXIMUM ELECTROWETTING FORCE ON DROPLETS**
Robert M. Hennig¹, Vito Cacucciolo², and Herbert Shea¹
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- T4P.122 VIRTUAL PARTICLE VALVE TOWARD GENERATION OF DOUBLE-CELLS ENCAPSULATED MICRODROPLET**
Yuma Kadomura, Naotomo Tottori, Shinya Sakuma, and Yoko Yamanishi
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- T4P.123 WSE2/SNSE2 HETEROSTRUCTURE TUNNEL FIELD-EFFECT TRANSISTOR FOR PH SENSING**
Xian Wu, Haojie Zhao, and Peng Li
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Chinese Academy of Sciences, CHINA
- W4P.099 A MONOLITHIC INTEGRATED MEMS ACOUSTIC DYADIC SENSOR**
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- W4P.100 A STRETCHABLE RESISTIVE STRAIN SENSOR BASED ON CRACK PROPAGATION, OPENING AND BLUNTING: DEVICE AND MECHANICS**
Katherine Moody, Shuang Wu, and Yong Zhu
North Carolina State University, USA
- W4P.101 A TWO-DEGREE OF FREEDOM MEMS MIRROR DRIVEN BY INTERNAL RESONANCE USING PIEZOELECTRIC TRANSDUCERS**
Changhao Wang^{1,2}, Jianlin Chen^{1,2}, Nan Wang^{1,2}, and Yuandong Gu¹
¹*Shanghai University, CHINA* and ²*Chinese Academy of Sciences (CAS), CHINA*
- W4P.102 ADVANCING INFRARED SENSING WITH HIGH-TCF 30%-DOPED SCALN RESONATORS AND ALN METAMATERIAL ABSORBERS**
Farah Ben Ayed, Aurelio Venditti, Gabriel Giribaldi, Ryan Tetro, Sila D. Calisgan, Pietro Simeoni, Zhenyun Qian, and Matteo Rinaldi
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- W4P.103 CRYSTAL ORIENTATION AND SPECIMEN SIZE DEPENDENCES OF CREEP PROPERTIES OF MICRON-THICK SILICON FOR 3D MICROSTRUCTURED MEMS**
Takanori Horikawa, Kazuma Sawada, Akio Uesugi, Koji Sugano, and Yoshitada Isono
Kobe University, JAPAN
- W4P.104 DUAL-MODE SURFACE LATTICE RESONANCES IN ASYMMETRIC OPTICAL METASURFACES FOR REFRACTIVE INDEX SENSING**
Liye Li¹ and Wengang Wu^{1,2}
¹*Peking University, CHINA* and ²*Beijing Advanced Innovation Center for Integrated Circuits, CHINA*
- W4P.105 ENCAPSULATION OF MICRORNAS IN EXOSOMES FOR EFFICIENT INTRACELLULAR DELIVERY BY A NANOFUIDIC PLATFORM**
Zitong Yu^{1,2}
¹*Chinese Academy of Sciences, CHINA* and ²*SomesTech Co., Ltd., CHINA*

- W4P.106 FABRICATION AND CHARACTERIZATION OF POLYCARBONATE SUBSTRATES FOR HIGH YIELD ASSEMBLY OF MULTICOMPONENT BIOHYBRID MICROROBOTS**
Taryn Imamura, Utku M. Sonmez, Matthew Travers, Sarah Bergbreiter, and Rebecca E. Taylor
Carnegie Mellon University, USA
- W4P.107 FABRICATION OF STRAIN-INDUCED GRAPHENE RESONANT MASS SENSOR USING ELASTOMER NANOSHEET FOR MOLECULAR DETECTION**
Motoki Kato¹, Ken Arano¹, Masato Saito², Toshinori Fujie², Tatsuro Goda³, Yong-Joon Choi¹, Toshihiko Noda¹, Kazuaki Sawada¹, and Kazuhiro Takahashi¹
¹*Toyohashi University of Technology, JAPAN*, ²*Tokyo Institute of Technology, JAPAN*, and ³*Toyo University, JAPAN*
- W4P.108 FROM FOE TO FRIEND: THERMAL NOISE DRIVEN SENSORS**
Yan Qiao¹, Alaaeldin Elhady², Mohamed Arabi³, Eihab Abdel-Rahman², and Wen-Ming Zhang¹
¹*Shanghai Jiao Tong University, CHINA*, ²*University of Waterloo, CANADA*, and ³*Applied Science University, BAHRAIN*
- W4P.109 HIGH-SENSITIVITY FIBER TIP SENSOR BASED ON DARK PLASMONIC RESONANCE MODE**
Fei Wang^{1,2}, Xin Li^{1,2}, Siyuan Wang^{1,2}, Yitao Cao^{1,2}, Xuqing Sun^{1,2}, Nanxi Wang^{1,2}, Lingqian Zhang¹, Hongyao Liu¹, Xinchao Lu¹, and Chengjun Huang^{1,2}
¹*Chinese Academy of Sciences, CHINA* and ²*University of Chinese Academy of Sciences, CHINA*
- W4P.110 HYDROTHERMALLY MODIFIED PD NANOPARTICLES DECORATED TiO₂ NANOSPHERES FOR VISIBLE LIGHT INDUCED ROOM TEMPERATURE HYDROGEN SENSING**
Thilini Thathsara, Christopher J. Harrison, Rosalie K. Hocking, and Mahnaz Shafiei
Swinburne University of Technology, AUSTRALIA
- W4P.111 INFLUENCE OF PERMANENT MAGNETIC PROPERTIES ON MAGNETIC PATTERN TRANSFER FOR MAGNETIC MEMS**
Keita Nagai, Naohiro Sugita, and Tadahiko Shinshi
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- W4P.112 LOW-POWER CO₂ GAS SENSOR BASED ON ELECTROLYSIS-INDUCED BUBBLES**
Steven Tran, Seungbeom Noh, and Hanseup Kim
University of Utah, USA
- W4P.113 MICROFABRICATED PLATFORM FOR DIRECTIONAL NEURAL MICROCIRCUITS IN SILICON-GLASS**
Dean de Boer¹, Torben W. van Voorst², Erwin J.W. Berenschot¹, L. Niels Cornelisse³, and Niels R. Tas¹
¹*University of Twente, NETHERLANDS*, ²*Vrije Universiteit Amsterdam, NETHERLANDS*, and ³*Amsterdam UMC, VUmc, NETHERLANDS*
- W4P.114 MULTI HEAT-SINK CMOS-BEOL INTEGRATED MEMS PIRANI GAUGE FOR VACUUM DETECTION IN PACKAGED MICROSENSORS**
Manu Garg^{1,2}, Fang W. Tsai², Sushil Kumar¹, Yi Chiu², and Pushpapraj Singh¹
¹*Indian Institute of Technology Delhi (IITD), INDIA* and ²*National Yang Ming Chiao Tung University, TAIWAN*
- W4P.115 ON-CHIP MAGNETOTHERMAL SYSTEM FOR SINGLE MICRO-PARTICLE HEATING**
Lin Zeng¹, Shengyu Wang¹, Hongwei Guan², Qisang Zuo¹, Yi Zhang¹, and Hui Yang¹
¹*Chinese Academy of Sciences, CHINA* and ²*Dalian Maritime University, CHINA*
- W4P.116 SELF-HEATING GAS SENSOR USING HETEROJUNCTION NANOWIRE ARRAY FOR HIGH SENSITIVITY AND LOW POWER CONSUMPTION**
Sung-Ho Kim¹, Min-Seung Jo¹, So-Yoon Park¹, Kwang-Wook Choi^{1,2}, Sang-Hee Kim^{1,2}, Jae-Young Yoo³, Beom-Jun Kim¹, and Jun-Bo Yoon¹
¹*Korea Advanced Institute of Science and Technology (KAIST), KOREA*, ²*Samsung Electronics Co., Ltd, KOREA*, and ³*Northwestern University, USA*

W4P.117 SENSING THE POINT DEFECTS BY SINGLE-CRYSTAL DIAMOND MEMS RESONATORS

Guo Chen^{1,2}, Zilong Zhang¹, Liwen Sang¹, Yasuo Koide¹, Satoshi Koizumi¹, Zhaohui Huang²,
and Meiyong Liao¹

¹National Institute for Materials Science, JAPAN and ²China University of Geosciences, CHINA

**W4P.118 STEP-AND-REPEAT UV NANOIMPRINT USING PFP GAS FOR REALIZING MICRONEEDLE
ARRAY WITH JAGGED TIP SHAPE BIOINSPIRED BY MOSQUITO**

Seiji Aoyagi, Hiroki Hamada, Tomokazu Takahashi, and Masato Suzuki

Kansai University, JAPAN

**W4P.119 THE MICROFLUIDIC MICROWELL ARRAY INTEGRATING SURFACE ENHANCED RAMAN
SCATTERING (SERS) PLATFORM ASSISTED WITH MACHINE LEARNING FOR BACTERIA
STRAIN IDENTIFICATION**

Po-Hsuan Chao and Nien-Tsu Huang

National Taiwan University, TAIWAN

W4P.120 VISUALIZATION OF ODOR SOURCE LOCALIZATION REALIZED BY SERS GAS SENSOR

Lin Chen, Hao Guo, Takuya Matsuo, Fumihiko Sassa, and Kenshi Hayashi

Kyushu University, JAPAN