

PROGRAM

The 26th IEEE International Conference on Micro Electro Mechanical Systems
IEEE MEMS 2013

January 20 – 24, 2013
Taipei International Convention Center

Monday, January 21, 2013

Welcome Address

8:30-9:00

Invited Talk 1

9:00-9:40

Prof. James Liao

UCLA, USA

1 BIO-MEMS

9:40-10:40

1-1

CONTROLLED DELIVERY OF ANTIANGIOGENIC DRUG TO HUMAN EYE TISSUE USING A MEMS DEVICE

Fatemeh Nazly Pirmoradi¹, Kevin Ou², John K. Jackson², Kevin Letchford², Jing Cui², Ki Tae Wolf¹, Florian Gräber², Tom Zhao², Joanne A. Matsubara², Helen Burt², Mu Chiao², and Liwei Lin¹

¹Berkeley Sensor and Actuator Center, University of California, USA

²University of British Columbia, CANADA

(1714)

1-2

QUANTITATIVE EVALUATION OF THE INFLUENCE OF DOPAMINERGIC NEURON ON FLAPPING LOCOMOTION

K. Azuma, H. Takahashi, T. Kan, J. Tanimura, K. Ito, K. Matsumoto and I. Shimoyama

The University of Tokyo, JAPAN

(1166)

1-3

MEMS STRUCTURE WITH TUNABLE STIFFNESS USING THE MAGNETORHEOLOGICAL EFFECT

Fu-Ming Hsu, Guang-Yu Liu and Weileun Fang

National Tsing Hua University, TAIWAN

(1627)

Break & Exhibition Inspection

10:40-11:10

2 Bio Inspired MEMS

11:10-12:30

2-1

A SELF-SWIMMING MICROBIAL-ROBOT USING MICROFABRICATED BIOPOLYMER

K. Higashi¹, T. Kano¹, and N. Miki^{1, 2}

¹Keio University, Kanagawa, JAPAN

²JST PRESTO, Tokyo, JAPAN

(1821)

2-2

MUSCLE BASED BIOACTUATOR DRIVEN IN AIR

Y. Morimoto¹, H. Onoe^{1,2}, and S. Takeuchi^{1,2}

¹Institute of Industrial Science, the University of Tokyo, JAPAN

²Takeuchi Biohybrid Innovation Project, ERATO, JST, JAPAN
(1489)

2-3

EFFECTIVENESS OF BRISTLED WING OF THRIPS

Ken Sato, Hidetoshi Takahashi, Minh-Dung Nguyen, Kiyoshi Matsumoto, and Isao Shimoyama
The University of Tokyo, JAPAN

(1704)

2-4

ELECTROSPUN NANOFIBRILS ENCAPSULATED IN HYDROGEL CUPULA FOR BIOMIMETIC MEMS FLOW SENSOR DEVELOPMENT

A.G.P Kottapalli¹, M. Asadnia¹, J.M. Miao¹ and M. S. Triantafyllou²

¹Nanyang Technological University, SINGAPORE

²Massachusetts Institute of Technology, USA
(1481)

Lunch & Exhibition Inspection

12:30-13:30

Poster/Oral Session 1

13:30-15:30

Break & Exhibition Inspection

15:30-16:00

3A Mechanical Sensor

16:00-18:00

3A-1

SILICON ACCELEROMETER WITH DIFFERENTIAL FREQUENCY MODULATION AND CONTINUOUS SELF-CALIBRATION

Alexander A. Trusov, Sergei A. Zotov, Brenton R. Simon, Andrei M. Shkel
University of California, USA

(1593)

3A-2

WAFER-LEVEL VACUUM-PACKAGED TRI-AXIAL ACCELEROMETER WITH NANO AIRGAPS

Y. Jeong¹, D. E. Serrano^{1,2}, V. Keesara², W. K. Sung¹, and F. Ayazi^{1,2}

¹Georgia Institute of Technology, USA

²Qualtré Inc., USA
(1368)

3A-3

DEVELOPMENT OF FLEXIBLE TACTILE SENSOR BASED ON CONTACT RESISTANCE OF INTEGRATED CARBON NANOTUBES

J.-I. Lee¹, S. Pyo¹, M.-O. Kim¹, T. Chung¹, H.-K. Lee², S.-C. Lim², J. Park² and J. Kim¹

¹Yonsei University, KOREA

²Samsung Advanced Institute of Technology, KOREA
(1801)

3A-4

HIGH SENSITIVE 3D TACTILE SENSOR WITH THE STRUCTURE OF ELASTIC PYRAMIDS ON PIEZORESISTIVE CANTILEVERS

N. Thanh-Vinh, N. Binh-Khiem, K. Matsumoto, and I. Shimoyama
The University of Tokyo, JAPAN

(1013)

3A-5

RESONANT PRESSURE SENSOR WITH ON-CHIP TEMPERATURE AND STRAIN SENSORS FOR ERROR CORRECTION

Chia-Fang Chiang¹, Andrew B. Graham², Brian J. Lee¹, Chae Hyuck Ahn¹, Eldwin J. Ng¹, Gary J. O'Brien², and Thomas W. Kenny¹

¹Stanford University, USA

²Robert Bosch RTC, USA

(1120)

3A-6

ON-CHIP INTEGRATED PS³ (PACKAGING-STRESS SUPPRESSED SUSPENSION) FOR THERMAL-STRESS FRESS PACKAGE OF PRESSURE SENSORS

Jiachou Wang, Lijian Yang, and Xinxin Li

Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, CHINA

(1435)

3B1 Bio Sensors

16:00-17:00

3B1-1

A HANDHELD, CELL PHONE-BASED ELECTROCHEMICAL BIODETECTOR

P. B. Lillehoj,¹ M.-C. Huang² and C.-M. Ho²

¹Michigan State University, USA

²University of California, USA

(1235)

3B1-2

INTRA/EXTRACELLULAR INVESTIGATION FOR ION CHANNELS WITH LIPID BILAYER ARRAY AT THE SINGLE MOLECULE LEVEL

R. Kawano¹, Y. Tsuji^{1,3}, M. Hirano^{4,5}, T. Osaki¹, K. Kamiya¹, N. Miki^{1,3}, T. Ide^{4,5}, S. Takeuchi^{1,2}

¹Kanagawa Academy of Science and Technology, ²The University of Tokyo,

³Keio University, ⁴Riken, ⁵The Graduate School for the Creation of New Photonics Industries, JAPAN

(1698)

3B1-3

MICRO FORCE PLATE ARRAY FOR MEASUREMENT OF GROUND REACTION FORCE OF INSECT RUNNING

H. Takahashi, K. Matsumoto and I. Shimoyama

Information and Robot Technology Research Initiative, The University of Tokyo, JAPAN

(1054)

3B2 Bio-Mimetic Actuators

17:00-18:00

3B2-1

MICRO PROPULSION IN LIQUID BY OSCILLATING BUBBLES

Jian Feng and Sung Kwon Cho

University of Pittsburgh, USA

(1728)

3B2-2

PARTICLE TRANSPORTER USING CILIA OF VORTICELLA

Moeto Nagai, Yo Hayasaka, Takahiro Kawashima, Takayuki Shibata

Toyohashi University of Technology, JAPAN

(1719)

3B2-3

SELF-ASSEMBLY OF CELL SPRINGS USING SMOOTH MUSCLE-LIKE CELLS DIFFERENTIATED FROM MULTIPOTENT CELLS

Amy Y. Hsiao¹, Teru Okitsu^{1,2}, Hiroaki Onoe^{1,2}, Mahiro Kiyosawa², Hiroki Teramae³, Shintaroh Iwanaga², Shigenori Miura², Tomohiko Kazama⁴, Taro Matsumoto⁴, and Shoji Takeuchi^{1,2}

¹Institute of Industrial Science, The University of Tokyo, JAPAN

²ERATO Takeuchi Biohybrid Innovation Project, Japan Science and Technology Agency, JAPAN

³Shumei University, JAPAN

⁴Nihon University School of Medicine, JAPAN

(1066)

Tuesday, January 22, 2013

Invited Talk 2

8:30-9:10

Prof. Shangjr (Felix) Gwo

National Tsing-Hua University, Taiwan

4 Fabrication

9:10-10:10

4-1

IN-LIQUID MEMS ASSEMBLY BY OPTICAL TRAPPING

M. R. Gullo, L. Jacot-Descombes and J. Brugger

Microsystems Laboratory, Ecole Polytechnique Federale de Lausanne (EPFL), SWITZERLAND

(1454)

4-2

THE GROWTH OF 3D VA-CNTS STACKS BY PREDEFINING MULTILAYERED AL/FE CATALYST FILMS FOR MEMS FABRICATION

C.-F. Hu¹, C.-L. Cheng¹, and W. Fang^{1,2}

¹National Tsing Hua University, TAIWAN

²Institute of NanoEngineering and MicroSystems, National Tsing Hua University, TAIWAN

(1188)

4-3

ELECTROSTATIC BOTTOM-DRIVEN ROTARY STAGE ON MULTIPLE CONDUCTIVE LIQUID-RING BEARINGS

Tingyi "Leo" Liu, Guangyi Sun, Jong Jin Kim, Chih-Kong Ken Yang, and Chang-Jin "CJ" Kim¹

University of California, USA

(1562)

Break & Exhibition Inspection

10:10-10:40

5 Cell & Diagnosis

10:40-11:40

5-1

CELLS ON ARRAYS OF MICROSPRINGS: AN APPROACH TO ACHIEVE TRI-AXIAL CONTROL OF SUBSTRATE STIFFNESS

Ryan D. Sochol^{1,2}, Yun Jung Heo¹, Shintaroh Iwanaga¹, Jonathan Lei², Ki Tae Wolf², Albert Lu², Makoto Kurihara¹, Saori Mori¹, Daniela Serien¹, Song Li², Liwei Lin² and Shoji Takeuchi¹

¹Institute of Industrial Science, The University of Tokyo, JAPAN

²Berkeley Sensor and Actuator Center, University of California, Berkeley, USA

(1183)

5-2

A NEW PATHOGEN DETECTION SYSTEM BY UTILIZING NANOGOLD MODIFIED SPECIFIC PROBE AND VANCOMYCIN COATED MAGNETIC BEADS ON AN INTEGRATED MICROFLUIDIC DEVICE

Chih-Hung Wang¹, Chia-Jung Chang¹, Jiunn-Jong Wu² and Gwo-Bin Lee¹

¹National Tsing Hua University, TAIWAN

²National Cheng Kung University, TAIWAN

(1191)

5-3

ELECTROMAGNET-ACTUATED DROPLET PLATFORM FOR SAMPLE-TO-ANSWER GENETIC DETECTION

C. H. Chiou^{1,2}, D. J. Shin¹, S. Hosmane¹, Y. Zhang^{1,3}, and T. H. Wang^{1,3,4}

¹Johns Hopkins University, USA, ²Industrial Technology Research Institute, TAIWAN, ³Sidney Kimmel Comprehensive Cancer Center, USA, and ⁴Institute of NanoBioTechnology, USA
(1286)

MEMS2014 Announcement

11:40-12:00

Lunch & Exhibition Inspection

12:00-13:00

Poster/Oral Session 2

13:00-15:00

Break & Exhibition Inspection

15:00-15:30

6A1 Power MEMS

15:30-16:30

6A1-1

AN ELECTROSTATIC SPRINGLESS INERTIAL HARVESTER FOR CONVERTING MULTI-DIMENSIONAL LOW-FREQUENCY MOTION

T. Galchev, R. Raz, and O. Paul

IMTEK, University of Freiburg, GERMANY

(1639)

6A1-2

LARGE POWER AMPLIFICATION OF A PIEZOELECTRIC ENERGY HARVESTER EXCITED BY RANDOM VIBRATIONS

Z. Wang, R. Elfrink, R. J. M. Vullers, V. van Acht, M. Tutelaers, S. Matova, J. Oudenhoven, and R. van Schaijk

Holst Centre/imec, THE NETHERLANDS

(1071)

6A1-3

ENERGY HARVESTERS WITH HIGH ELECTROMAGNETIC CONVERSION EFFICIENCY THROUGH MAGNET AND COIL ARRAYS

Qian Zhang and Eun Sok Kim

University of Southern California, USA

(1456)

6A2 High-Q Resonators

16:30-17:30

6A2-1

HIGH-Q CAPACITIVE-PIEZOELECTRIC ALN LAMB WAVE RESONATORS

Ting-Ta Yen, Albert P. Pisano, and Clark T.-C. Nguyen

Berkeley Sensor and Actuator Center, University of California at Berkeley, USA

(1430)

6A2-2

ENHANCEMENT OF MECHANICAL Q FOR LOW PHASE NOISE OPTOMECHANICAL OSCILLATORS

Tristan O. Rocheleau, Alejandro J. Grine, Karen E. Grutter, Robert A. Schneider, Niels Quack, Ming C. Wu, and Clark T.-C. Nguyen
University of California, USA
(1697)

6A2-3

PIEZOELECTRICALLY TRANSDUCED HIGH-Q SILICA MICRO RESONATORS

Zhengzheng Wu, Adam Peczkalski, Vikram A. Thakar, Zongliang Cao, Yi Yuan, Guohong He, Rebecca L. Peterson, Khalil Najafi¹, and Mina Rais-Zadeh
University of Michigan, USA
(1288)

6B1 Bio-inspired Structures

15:30-16:30

6B1-1

FLEXIBLE, ZERO POWERED, PIEZOELECTRIC MEMS PRESSURE SENSOR ARRAYS FOR FISH-LIKE PASSIVE UNDERWATER SENSING IN MARINE VEHICLES

M. Asadnia¹, A.G.P. Kottapalli¹, Z. Shen¹, J.M. Miao¹, G. Barbastathis², M.S. Triantafyllou²
¹Nanyang Technological University, SINGAPORE, ²Massachusetts Institute of Technology, USA
(1546)

6B1-2

SPECIALLY PATTERNED AND ALIGNED NEURAL BUNDLE FORMED BY NEURAL STEM CELL MICROFIBERS

Midori Kato-Negishi¹, Hiroaki Onoe^{1, 2} and Shoji Takeuchi^{1,2}
¹Institute of Industrial Science, The University of Tokyo, JAPAN,
²Takeuchi Biohybrid Innovation Project, ERATO, JST, JAPAN
(1759)

6B1-3

A THREE-DIMENSIONAL DEFORMABLE LIQUID LENS ARRAY FOR DIRECTIONAL AND WIDE ANGLE LAPAROSCOPIC IMAGING

K. Wei and Y. Zhao
The Ohio State University, USA
(1351)

6B2 Cell Tissue Analysis

16:30-17:30

6B2-1

A MINIATURE FIBER-OPTIC RASTER SCANNER FOR 2^D OPTICAL IMAGING OF BIOLOGICAL TISSUE

H. Mansoor¹, H. Zeng², I. T. Tai², J. Zhao² and M. Chiao¹
¹The University of British Columbia, CANADA
²British Columbia Cancer Agency Research Centre, CANADA
(1220)

6B2-2

THE EFFECT OF SHEAR-INDUCED LIFT FORCE ON THE HIGH-SPEED CELL MOTION IN MICROCHANNEL WITH ADHESIVE WALL

K. Morimoto, D. Rangsiwatakpong and Y. Suzuki
The University of Tokyo, JAPAN
(1642)

6B2-3

VERTICAL AND HORIZONTAL CONFOCAL IMAGING OF SINGLE CELLS ON MAGNETICALLY HANDLEABLE MICROPLATES

T. Teshima¹, H. Aonuma², H. Onoe^{1,3}, H. Kanuka², and S. Takeuchi^{1,3}
¹Institute of Industrial Science, The University of Tokyo, JAPAN

²The Jikei University School of Medicine, JAPAN

³Takeuchi Biohybrid Innovation Project, ERATO, JAPAN Science and Technology Agency (JST), JAPAN (1774)

Wednesday, January 23, 2013

Invited Talk 3

8:30-9:10

Prof. Albert van den Berg

University of Twente, The Netherlands

7 Microfluidics

9:10-10:10

7-1

SINGLE-LAYER "DOMINO" DIODES VIA OPTOFLUIDIC LITHOGRAPHY FOR ULTRA-LOW REYNOLDS NUMBER APPLICATIONS

Ryan D. Sochol, Casey C. Glick, Kye Y. Lee, Thomas Brubaker, Albert Lu, Melissa Wah, Shan Gao, Erica Hicks, Ki Tae Wolf, Kosuke Iwai, Luke P. Lee and Liwei Lin
Berkeley Sensor and Actuator Center, University of California, Berkeley, USA
(1184)

7-2

A COMPACT PASSIVE AIR FLOW REGULATOR FOR PORTABLE BREATH DIAGNOSTICS

Staffan B. Johansson, Göran Stemme and Niclas Roxhed
KTH Royal Institute of Technology, SWEDEN
(1601)

7-3

SPLIT-AND-CONTACT DEVICE TO FORM PLANAR LIPID BILAYERS

Y. Tsuji^{1,3}, R. Kawano¹, T. Osaki¹, K. Kamiya¹, N. Miki^{1,3}, and S. Takeuchi^{1,2}

¹Kanagawa Academy of Science and Technology, JAPAN

²Institute of Industrial Science, The University of Tokyo, JAPAN

³Keio University, JAPAN

(1664)

Break & Exhibition Inspection

10:10-10:40

8 Resonator

10:40-12:00

8-1

HIGH $k_t^2 \times Q$, MULTI-FREQUENCY LITHIUM NIOBATE RESONATORS

Renyuan Wang¹, Sunil A. Bhawe¹, and Kushal Bhattacharjee²

¹Cornell University, USA

²RF Micro Devices, Inc., USA

(1223)

8-2

EFFECT OF THICKNESS ANISOTROPY ON DEGENERATE MODES IN OXIDE MICRO-HEMISPHERICAL SHELL RESONATORS

L. D. Sorenson, P. Shao, and F. Ayazi

Georgia Institute of Technology, USA

(1355)

8-3

LARGE-DISPLACEMENT PARAMETRIC RESONANCE USING A SHAPED COMB DRIVE

Congzhong Guo, Erdinc Tatar, and Gary K. Fedder

Carnegie Mellon University, USA

(1028)

8-4

HIGH-Q FUSED SILICA BIRDBATH AND HEMISPHERICAL 3-D RESONATORS MADE BY BLOW TORCH MOLDING

J. Cho, J. Yan, J. A. Gregory, H. Eberhart, R. L. Peterson, and K. Najafi

University of Michigan, USA

(1059)

Lunch & Exhibition Inspection

12:00-13:00

Poster/Oral Session 3

13:00-15:00

Break & Exhibition Inspection

15:00-15:30

9A Physical MEMS & Others

15:30-17:30

9A-1

MEMS SENSOR ARRAY PLATFORM INTEGRATED WITH CMOS BASED OPTICAL READOUT

Refik Burak Erarslan¹, Sevil Zeynep Lulec¹, Ulas Adiyani¹, Selim Olcer¹, Yuksel Temiz², Yusuf Leblebici², Hamdi Torun³, Hakan Urey¹

¹Koç University, TURKEY

²Ecole Polytechnique Fédérale de Lausanne, SWITZERLAND

³Boğaziçi University, TURKEY

(1112)

9A-2

SUB-10 NANOMETER UNCOOLED PLATINUM BOLOMETERS VIA PLASMA ENHANCED ATOMIC LAYER DEPOSITION

Fabian Purkl¹, Tim English², Gary Yama³, J Provine², Ashwin K. Samarao³, Ando Feyh³, Gary O'Brien³, Oliver Ambacher¹, Roger T. Howe³ and Thomas W. Kenny³

¹University of Freiburg, GERMANY

²Robert Bosch LLC, USA

³Stanford University, USA

(1432)

9A-3

MICRO-EINZEL LENS FOR WAFER-INTEGRATED ELECTRON BEAM ACTUATION

Yue Shi, Serhan Ardanuç and Amit Lal

Cornell University, USA

(1760)

9A-4

DEVELOPMENT OF MULTI-AXES CMOS-MEMS RESONANT MAGNETIC SENSOR USING LORENTZ AND ELECTROMAGNETIC FORCES

C.-I. Chang¹, M.-H. Tsai², Y.-C. Liu¹, C.-M. Sun², and W. Fang^{1,3}

¹Institute of NanoEngineering and MicroSystems, National Tsing Hua University, TAIWAN

²PixArt Imaging Inc, TAIWAN

³National Tsing Hua University, TAIWAN

(1439)

9A-5

LATERALLY-DRIVEN PIEZOELECTRIC BIMORPH MEMS ACTUATOR WITH SOL-GEL-BASED HIGH-ASPECT-RATIO PZT STRUCTURE

N. Wang¹, S. Yoshida², M. Kumano³, Y. Kawai¹, S. Tanaka¹ and M. Esashi²

¹Tohoku University, JAPAN

²WPI-AIMR, Tohoku University, JAPAN

³Micro System Integration Center (μ SIC), Tohoku University, JAPAN
(1142)

9A-6

DIRECT-WRITE N- AND P-TYPE GRAPHENE CHANNEL FETS

Jiyoung Chang^{1,2}, Yumeng Liu², Heo Kwang³, Byung Yang Lee⁴, Seung-wuk Lee³ and Liwei Lin²

¹University of California at San Francisco, USA

²Berkeley Sensor and Actuator Center, University of California at Berkeley, USA

³University of California at Berkeley, USA

⁴Korea University, Korea
(1613)

9B1 Microjet

15:30-16:30

9B1-1

PATTERNABLE ATMOSPHERIC-PRESSURE PLASMA JETS WITH GAS DISCHARGE IN MICROFLUIDIC CHANNEL ARRAY

Hidetaka Yamasaki, Kyohei Terao, Takaaki Suzuki, Fusao Simokawa, and Hidekuni Takao
Kagawa University, JAPAN
(1268)

9B1-2

SIMULTANEOUS ABLATION AND INJECTION BY ELECTRICALLY-INDUCED MONO-DISPERSED BUBBLE KNIFE FOR BIOMEDICAL APPLICATIONS

H. Kuriki¹, Y. Yamanishi¹, S. Sakuma¹, S. Akagi² and F. Arai¹

¹Nagoya University, JAPAN

²National Agriculture and Food Research Organization, JAPAN
(1689)

9B1-3

STUDY OF NANO/MICRO JETS GENERATED BY LASER-INDUCED BUBBLES IN THIN FILMS

S. Xiong¹, T. Tandiono², C. D. Ohl¹ and A. Q. Liu¹

¹Nanyang Technological University, SINGAPORE

²Institute of High Performance Computing, A*STAR, SINGAPORE
(1398)

9B2 Bio Probes

16:30-17:30

9B2-1

IODINE-TREATED STARCH AS EASY-TO-USE, BIODEGRADABLE MATERIAL WITH CONTROLLABLE SWELLING AND STIFFENING PROPERTIES

Daniel Egert, Joshua Kaplan, Rebecca L. Peterson and Khalil Najafi

Center for Wireless Integrated MicroSensing and Systems (WIMS²), University of Michigan, USA
(1631)

9B2-2

NEUROSPHEROID ARRAY ON A FLEXIBLE SUBSTRATE FOR CORTICAL MICROSTIMULATION

Keisuke Okita¹, Midori Kato-Negishi^{1,2}, Hiroaki Onoe^{1,2}, and Shoji Takeuchi^{1,2}

¹Institute of Industrial Science, The University of Tokyo, JAPAN

²Takeuchi Biohybrid Innovation Project, ERATO, JAPAN Science and Technology (JST), JAPAN
(1566)

9B2-3

ON-CHIP OOCYTE ENUCLEATION BY ROBOT INTEGRATED MICROFLUIDIC CHIP

S. Sakuam and F. Arai

Nagoya University, JAPAN
(1682)

Thursday, January 24, 2013

Poster/Oral Session 4

8:30-10:30

10A Switches & Probes

10:30-12:10

10A-1

SILICON NANOWIRE AND CANTILEVER ELECTROMECHANICAL SWITCHES WITH INTEGRATED PIEZORESISTIVE TRANSDUCERS

Rui Yang¹, Tina He¹, Carine Marcoux², Philippe Andreucci², Laurent Duraffourg² and Philip X.-L. Feng¹

¹Case Western Reserve University, USA

²CEA-Leti, FRANCE

(1557)

10A-2

10-25 NM PIEZOELECTRIC NANO-ACTUATORS AND NEMS SWITCHES FOR MILLIVOLT COMPUTATIONAL LOGIC

Usama Zaghloul and Gianluca Piazza

Carnegie Mellon University, USA

(1691)

10A-3

RF SWITCHES USING PHASE CHANGE MATERIALS

Yonghyun Shim¹, Gwendolyn Hummel^{1,2}, and Mina Rais-Zadeh¹

¹University of Michigan, USA

²Illinois Institute of Technology, USA

(1591)

10A-4

NANOGAP MULTI-ELECTRODE ATOM AND CONDUCTIVITY PROBER

Kwame Amponsah and Amit Lal

Cornell University, USA

(1596)

10A-5

HEATED ATOMIC FORCE MICROSCOPE CANTILEVERS WITH WEAR-RESISTANT ULTRANANOCRYSTALLINE DIAMOND TIPS

H. J. Kim¹, N. Moldovan², J. R. Felts¹, S. Somnath¹, Z. Dai¹, T. D. B. Jacobs³, R. W. Carpick³, J. A. Carlisle², and W. P. King¹

¹University of Illinois at Urbana-Champaign, USA,

²Advanced Diamond Technologies Inc., USA,

³University of Pennsylvania, USA

(1551)

10B Microfluidics

10:30-12:10

10B-1

MICROMACHINED PIEZOELECTRIC SPIRALS AND ULTRA-COMPLIANT PACKAGING FOR BLOOD PRESSURE ENERGY HARVESTERS POWERING MEDICAL IMPLANTS

M. Deterre^{1, 2}, E. Lefeuvre¹, Y. Zhu¹, M. Woytasik¹, A. Bosseboeuf¹, B. Boutaud² and R. Dal Molin²

¹Univ. Paris-Sud, Institut d'Electronique Fondamentale, CNRS, UMR 8622, FRANCE

²Sorin Group, FRANCE

(1599)

10B-2**MAGNETIC VALVES WITH PROGRAMMABLE TIMING CAPABILITY FOR FLUID CONTROL IN PAPER-BASED MICROFLUIDICS**

P. Zwanenburg, X. Li, and X. Y. Liu
McGill University, CANADA
(1290)

10B-3**MULTI-LAYERED PLACENTAL BARRIER STRUCTURE INTEGRATED WITH MICROFLUIDIC CHANNELS**

S. Miura^{1,2}, Y. Morimoto¹, and S. Takeuchi^{1,2}
¹Institute of Industrial Science, The University of Tokyo, JAPAN
²ERATO Takeuchi Biohybrid Innovation Project, JAPAN
(1688)

10B-4**MICROFLUIDIC DEVICE FOR THE CONTINUOUS PREPARATION OF EUKARYOTIC CELLS FOR METABOLIC ANALYSIS**

N. Rajabi, J. Bahnemann, T.-N. Tzeng, A.-P. Zeng, and J. Muller
Hamburg University of Technology, GERMANY
(1769)

10B-5**A MICROFLUIDIC DROPLET PLATFORM FOR MULTIPLEXED SINGLE NUCLEOTIDE POLYMORPHISM ANALYSIS OF AN ARRAY PLANT GENOMIC DNA SAMPLES**

Helena C. Zec¹, Tushar D. Rane¹, Dr. Wen-Chy Chu², Vivian Wen Wang, Dr. Tza-Huei Wang¹
¹Johns Hopkins University, USA
²Pioneer Hi-Bred International, Inc., USA
(1387)

Award Announcement**12:10-12:30****POSTER ORAL SESSIONS****Monday Afternoon, January 21, 2013 13:30-15:30****Tuesday Afternoon, January 22, 2013 13:00-15:00****Wednesday Afternoon, January 23, 2013 13:00-15:00****Thursday Morning, January 24, 2013 8:30-10:30**

Poster Numbers end with: Mo (Monday), Tu (Tuesday), We (Wednesday) or Th (Thursday). Author of the paper is expected to stand by their poster during the interactive Poster Oral Session held on that day.

Fabrication Technologies**001-Mo****A ROOM TEMPERATURE, ZERO FORCE, WAFER-LEVEL ATTACHMENT METHOD FOR MEMS INTEGRATION**

Levent Beker, Özge Zorlu, and Haluk Klah
Middle East Technical University, TURKEY
(1117)

002-Tu**WAFER-TO-WAFER SELECTIVE FLIP-CHIP TRANSFER BY STICKY SILICONE BONDING AND LASER DEBONDING FOR RAPID AND EASY INTEGRATION TEST**

Shuji Tanaka¹, Masaki Yoshida¹, Hideki Hirano¹, Toshihiro Somekawa², Masayuki Fujita² and Masayoshi Esashi¹

¹Tohoku University, JAPAN

²Institute for Laser Technology, JAPAN
(1124)

003-We

PROCESS CONTROL MONITORS FOR SINGLE-WALLED CARBON NANOTUBE BASED SENSOR FABRICATION PROCESSES

K. Chikkadi, C. Roman, and C. Hierold
ETH Zurich, SWITZERLAND
(1195)

004-Th

MICROPARTICLES IN SILICON FILM USING MIST-JET TECHNOLOGY FOR A PHOTODETECTOR

Y. Yokoyama, T. Takahata, K. Matsumoto, and I. Shimoyama
The University of Tokyo, JAPAN
(1210)

005-Mo

MICROASSEMBLY OF MEMS ACTUATORS AND SENSORS VIA MICRO-MASONRY

Y. Zhang, H. Keum, and S. Kim
University of Illinois at Urbana-Champaign, USA
(1224)

006-Tu

HIGH-PERFORMANCE, 3D-MICROTRANSFORMERS ON MULTILAYERED MAGNETIC CORES

A. Moazenzadeh, N. Spengler and U. Wallrabe
IMTEK, University of Freiburg, GERMANY
(1227)

007-We

CENTRIFUGAL IMPRINTING DURING VITRIFICATION (CIV) OF COLLAGEN HYDROGEL FOR HIGHLY BIOCOMPATIBLE 3D MEMBRANE SCAFFOLD

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(1233)

008-Th

FLEXIBLE NEUROGATE ARRAY FOR LIVE NEURAL NETWORK STUDY

Jungwook Park, Jerome Pine, and Yu-Chong Tai
California Institute of Technology, Pasadena, USA
(1238)

009-Mo

SIMPLE THROUGH SILICON INTERCONNECT VIA FABRICATION USING DRY FILLING OF SUB-MICRON AU PARTICLES FOR 3D MEMS

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(1253)

010-Tu

SIMPLE AND HIGH-THROUGHPUT FABRICATION OF LARGE-AREA AND MULTILAYER FLEXIBLE POLYMER FILM STRUCTURES FOR MICROFLUIDIC ORGANIC LIGHT EMITTING DIODE

M. Tsuwaki¹, J. Mizuno², T. Kasahara¹, T. Edura³, S. Matsunami³, J. Oshima^{3, 4}, C. Adachi^{3, 5}, S. Shoji¹

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(1261)

011-We

DNA ORIGAMI ASSEMBLY ON PATTERNED SILICON BY AFM BASED LITHOGRAPHY

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(1324)

012-Th

SEALLESS ³-D MICROFLUIDIC CHANNEL FABRICATION BY SACRIFICIAL CARAMEL TEMPLATE DIRECT-PATTERNING

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(1364)

013-Mo

IONIC-LIQUID MICRO ION SOURCE ARRAY FOR FLEXYBLE CONCURRENT MEMS PROCESS

Tatsuya Suzuki, Motoaki Hara, Hiroyuki Oguchi, and Hiroki Kuwano

Tohoku University, JAPAN

(1422)

014-Tu

INTEGRATION OF SINGLE-WALLED CARBON NANOTUBE BUNDLE ON CANTILEVER BY DIELECTROPHORESIS

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³The University of Tokyo, JAPAN

(1431)

015-We

PIEZORESISTIVE CANTILEVER PROBES FOR SIMULTANEOUS NANOSCALE TOPOGRAPHY AND CONDUCTIVITY IMAGING

Yongliang Yang¹, Yue Ma¹, Alexandre Haemmerli¹, Keji Lai¹, Worasom Kundhikanjana¹, Nahid Harjee¹, Beth Pruitt¹, Xinxin Li², Michael Kelly¹ and Zhi-Xun Shen¹

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(1445)

016-Th

FORMATION AND CURVATURE TUNING OF MICRO LENS USING SURFACE TENSION AND HYDRAULIC PRESSURE ASSISTED MOLDING PROCESS

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(1452)

017-Mo

SINGLE-STEP FABRICATION OF SUPERHYDROPHOBIC MICRO/NANO DUAL-SCALE PDMS FILM REPLICATED FROM ULTRA-LOW-SURFACE-ENERGY MOLD

Xiao-Sheng Zhang¹, Bai-Hong Jin¹, Shi-Gan Chu¹, Nicolas Peter², Fu-Yun Zhu¹ and Hai-Xia Zhang¹,

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(1453)

018-Tu

CONE-SHAPED MICRO COIL FOR MAGNETIC RESONANCE IMAGING

T. Inamura and T. Dohi

Chuo University, JAPAN

(1483)

019-We

THREE DIMENSIONAL TRANSFORMATION OF PARYLENE THIN FILM STRUCTURES VIA THERMOFORMING

B. J. Kim, B. Chen, M. Gupta, and E. Meng
University of Southern California, USA
(1568)

020-Th

LOW TEMPERATURE ADHESIVE WAFER BONDING USING OSTE(+) FOR HETEROGENEOUS 3D MEMS INTEGRATION

Fredrik Forsberg, Farizah Saharil, Göran Stemme, Niclas Roxhed, Wouter van der Wijngaart, Tommy Haraldsson and Frank Niklaus
KTH Royal Institute of Technology, SWEDEN
(1598)

021-Mo

METHODS FOR THE MICROFABRICATION OF MAGNESIUM

Melissa Tsang, Florian Herrault, Richard H. Shafer, and Mark G. Allen
Georgia Institute of Technology, USA
(1607)

022-Tu

FABRICATION OF SILICA NANOWIRE BUNCH ARRAYS IN SIO VAPOR GENERATED BY OXYGEN PLASMA ETCHING OF SILICON

D.D. She, L.R. Zhao, C. Li, F.Q. Zhang, G.B. Cai and W.G. Wu
Institute of Microelectronics, Peking University, CHINA
(1654)

023-We

TECHNOLOGY FOR FABRICATING DENSE ³-D MICROSTRUCTURE ARRAYS FOR BIOMIMETIC HAIR-LIKE SENSORS

Y. Tang, R. L. Peterson, and K. Najafi
University of Michigan, Ann Arbor, MI, USA
(1687)

024-Th

PENDANT LIPOSOME SYSTEM TO ACCESS THE INTERNAL SOLUTION

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(1711)

025-Mo

DRIE OF FUSED SILICA

Zongliang Cao, Brian VanDerElzen, Kevin J. Owen, Jialiang Yan, Guohong He, Rebecca L. Peterson, Dennis Grimard, and Khalil Najafi
University of Michigan, USA
(1730)

026-Tu

VERIFICATION OF BENDING STRENGTH OF VAPOR-LIQUID-SOLID GROWN HIGH-ASPECT-RATIO SILICON-NEUROPROBES

T. Imashioya, H. Oi, S. Yagi, M. Ishida and T. Kawano
Toyohashi University of Technology, JAPAN
(1766)

027-We

VERTICAL CONTINUOUS FLOW LITHOGRAPHY FOR FABRICATING LONG 3D STRUCTURES

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²ERATO Takeuchi Biohybrid Innovation Project, JST, JAPAN

(1789)

Packaging Technologies

028-Th

HETERO MULTILAYER STRUCTURES BY RAPID PROTOTYPING FOR SIMULTANEOUS ENCAPSULATION AND INTERCONNECTION OF MICROCHIPS

S. Katano, Y. Teramachi, W. Tonomura and S. Konishi

Ritsumeikan University, JAPAN

(1196)

029-Mo

FABRICATION AND PACKAGING PROCESS OF SILICON RESONATORS CAPABLE OF THE INTEGRATION OF LSI FOR APPLICATION OF TIMING DEVICE

Nguyen Van Toan^{1,2}, Hidetoshi Miyashita², Masaya Toda^{1,2}, Yusuke Kawai¹ and Takahito Ono¹

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²Microsystem Integration Center (μ SIC), Tohoku University, JAPAN

(1369)

030-Tu

TEMPORARY WAFER BONDING AND DEBONDING BY AN ELECTROCHEMICALLY ACTIVE POLYMER ADHESIVE FOR 3D INTEGRATION

Hithesh K Gatty, Frank Niklaus, Göran Stemme and Niclas Roxhed

KTH Royal Institute of Technology, SWEDEN

(1645)

Materials and Device Characterization

031-We

IRREVERSIBLE DEFORMATION OF MICRONS THICK SINGLE CRYSTAL SILICON IN A TEMPERATURE RANGE OF 350-500°C

K. Sato, A. Sugimoto, and T. Nishimura

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(1021)

032-Th

EFFECTS OF DEPOSITION TEMPERATURE ON PARYLENE-C PROPERTIES

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²University of Cambridge, UK

(1065)

033-Mo

SUBSTRATE EFFECT IN SQUEEZE FILM DAMPING OF LATERAL OSCILLATING MICROSTRUCTURES

Mo Li, Vashwar T. Rouf and David A. Horsley

University of California, Davis, USA

(1094)

034-Tu

THE ROLE OF DISSOLVED GAS IN LONGEVITY OF CASSIE STATES FOR IMMERSED SUPERHYDROPHOBIC SURFACES

Wei-Yang Sun and Chang-Jin "CJ" Kim

University of California, Los Angeles, USA

(1096)

035-We

ARTICULATION OF ANGLED SEMICIRCULAR MICROFIBERS FOR A GECKO-INSPIRED ANISOTROPIC ADHESIVE

Sathya Chary, John Tamelier and Kimberly L. Turner

University of California, Santa Barbara, USA

(1098)

036-Th

TOPOLOGY OPTIMIZATION METHOD USING MULTISTEP MAPPING FROM 2D PHOTOMASK TO 3D MEMS

Takashi Ozaki, Tsuyoshi Nomura, Norio Fujitsuka, Keiichi Shimaoka and Teruhisa Akashi
Toyota Central R&D Labs., Inc., JAPAN
(1109)

037-Mo

DC AND AC ELECTROTHERMAL CHARACTERIZATION OF HEATED MICROCANTILEVERS USING SCANNING THERMOREFLECTANCE MICROSCOPY

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²Korea Advanced Institute of Science and Technology, KOREA
³University of Rhode Island, USA
⁴University of Illinois at Urbana-Champaign, USA
(1149)

038-Tu

LINEAR ACTUATION PIEZOELECTRIC MICROCANTILEVER USING TETRAGONAL COMPOSITION PZT THIN FILMS

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²Tokyo Institute of Technology, JAPAN
(1179)

039-We

MEASURES OF QUALITY-FACTOR IN GAP-CLOSING ELECTROSTATIC RESONATORS

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²Intel Electronics Ltd., ISRAEL
(1316)

040-Th

INFRARED-TO-VISIBLE TRANSDUCER USING TEMPERATURE SENSITIVE EU(TTA)³ ON SELF-SUSPENDED THIN FILM FOR INEXPENSIVE THERMAL IMAGING DEVICE

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(1399)

041-Mo

MECHANICAL STRENGTHENING OF SILICON TORSION BAR OF MEMS SCANNING MIRROR BY HYDROGEN ANNEAL

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(1476)

042-Tu

CMOS-BASED THERMOPILES USING VERTICALLY INTEGRATED DOUBLE POLYCRYSTALLINE SILICON LAYERS

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²Institute of Microelectronics, A*STAR, SINGAPORE
(1477)

043-We

FUNCTIONALIZED GOLD-NANOPARTICLES DIRECTLY GROWN ON GRAPHENE-OXIDE SHEETS TO FORM POROUS-STACKED SENSING MATERIAL FOR MICRO-GRAVIMETRIC GAS SENSING

Haitao Yu, Pengcheng Xu, and Xinxin Li
Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, CHINA
(1496)

044-Th

LOW VOLTAGE FIELD EMISSION FROM $\text{PbZr}_{0.2}\text{Ti}_{0.8}\text{O}_3$ -COATED SILICON NANOTIPS

P.C. Fletcher, R.V.K. Mangalam, L.W. Martin, and W.P. King
University of Illinois, USA
(1512)

045-Mo

CHARACTERIZATION AND FABRICATION OF ZINC OXIDE NANOWIRE DEVICES

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²WPI-AIMR, Tohoku University, JAPAN
³National Taiwan University, TAIWAN
(1570)

046-Tu

INVESTIGATION OF CONTACT RESISTANCE EVOLUTION OF Ir, Pt, W, Ni, Cr, Ti, Cu AND Al OVER REPEATED HOT-CONTACT SWITCHING FOR NEMS SWITCHES

F. K. Chowdhury, H. Pourzand, and M. Tabib-Azar
University of Utah, USA
(1592)

047-We

COMBUSTION AND MATERIAL CHARACTERIZATION OF POROUS SILICON NANOENERGETICS

Nicholas W. Piekielek, Wayne A. Churaman, Christopher J. Morris, and Luke J. Currano
Army Research Laboratory, USA
(1632)

048-Th

3D GENERAL PHOTOCURABLE MODEL OF RESIN WITH VARIOUS KINDS OF MICROPARTICLES

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²The University of Tokyo, JAPAN
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049-Mo

CHARACTERIZATION OF SOLID UV CROSS-LINKED PEGDA FOR BIOLOGICAL APPLICATIONS

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²University of Michigan, USA
(1635)

050-Tu

FRACTURE LIMIT IN THIN-FILM PIEZOELECTRIC-ON-SUBSTRATE RESONATORS: SILICON VS. DIAMOND

Hediyeh Fatemi and Reza Abdolvand
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(1652)

051-We

CORE-SHELL MAGNETIC NANOPARTICLES FOR ON-CHIP RF INDUCTORS

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²Harvard University, USA
³Samsung Electronics, USA
(1676)

052-Th**ADAPTABLE TEST-BED FOR CHARACTERIZATION OF MICRO-WINEGLASS RESONATORS**

D. Senkal, M.J. Ahamed, A. A. Trusov and A.M. Shkel

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(1737)

053-Mo**PAPER-BASED STRAIN SENSING MATERIAL**

E. Khajeh, W. Lou and B. Stoeber

The University of British Columbia, CANADA

(1747)

054-Tu**MICROMACHINED TIP-TO-PLATE CORONA DISCHARGER WITH SLIT DIELECTRIC BARRIER FOR MEASURING THE AIRBORNE PARTICLE NUMBER CONCENTRATION**

Hong-Lae Kim, Sang-Myun Lee, Chul Woo Park, Jung-ho Hwang and Yong-Jun Kim

Yonsei University, KOREA

(1761)

055-We**SELF-CURLING AND -STICKING FLEXIBLE SUBSTRATE FOR ECoG ELECTRODE ARRAY**

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(1767)

056-Th**ALD ALUMINUM OXIDE AS PROTECTIVE COATING AGAINST OXIDATION OF LPCVD SIC MICROHOTPLATES**

B. Morana, G. Fiorentino, G. Pandraud, J. F. Creemer and P. M. Sarro

Delft University of Technology, THE NETHERLANDS

(1772)

057-Mo**DIRECT TENSILE TESTING OF SUB-¹⁰⁰NM-SIZE SILICON NANOWIRES FABRICATED BY FIB-SAMPLING OF SON MEMBRANES**

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³JST PRESTO, JAPAN Science and Technology Agency, JAPAN

(1791)

Nano-Electro-Mechanical Devices and Systems**058-Tu****IN-PLANE FABRICATED INSULATED GOLD-TIP PROBE FOR ELECTROCHEMICAL AND MOLECULAR EXPERIMENTS**

Yexian Wu, Terunobu Akiyama, Sebastian Gautsch, Peter D. van der Wal, and Nico F. de Rooij

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(1043)

059-We**SUSPENDED CNT-FET PIEZORESISTIVE STRAIN GAUGES: CHIRALITY ASSIGNMENT AND QUANTITATIVE ANALYSIS**

Matthias Muoth, Kiran Chikkadi, Yu Liu, Christofer Hierold

ETH Zurich, SWITZERLAND

(1075)

060-Th**OPTICAL WAVELENGTH SIGNAL DETECTOR VIA TUNABLE MICRO-RING RESONATOR FOR SENSOR APPLICATIONS**

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(1146)

061-Mo

OPTICALLY CONTROLLABLE SI PHOTOCATHODE ARRAY

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³World Premier International Research Center Advanced Institute for Materials Research, Tohoku University (TU-WPI), JAPAN

(1207)

062-Tu

ELECTRICAL CONDUCTIVITY AND SEEBECK COEFFICIENT MEASUREMENTS OF SINGLE NANOWIRES BY UTILIZING A MICROFABRICATED THERMOELECTRIC NANOWIRE CHARACTERIZATION PLATFORM

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D. Kojda², R. Mitdank², S. F. Fischer², W. Toellner³, K. Nielsch³, and P. Woias¹

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(1330)

063-We

TRANSPARENT AND FLEXIBLE TOLUENE SENSOR WITH ENHANCED SENSITIVITY USING ADSORPTION CATALYST-FUNCTIONALIZED GRAPHENE

Jungwook Choi, Soonjae Pyo, Kyoungsoon Lee, Hee-Jin Ko, and Jongbaeg Kim

Yonsei University, Korea

(1521)

064-Th

ROBUST SILICON CARBIDE (SiC) NANOELECTROMECHANICAL SWITCHES WITH LONG CYCLES IN AMBIENT AND HIGH TEMPERATURE CONDITIONS

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²Keithley Instruments, Inc., USA

(1543)

065-Mo

LATERALLY ACTUATED NANOELECTROMECHANICAL RELAYS WITH COMPLIANT, LOW RESISTANCE CONTACT

M. Shavezipur^{1,2}, W. S. Lee¹, K. L. Harrison¹, J. Provine¹, S. Mitra¹, H.-S. P. Wong¹, and R. T. Howe¹

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²Ohio State University, USA

(1587)

Micro-Actuators

066-Tu

ACTIVE CMOS-MEMS DUAL PROBE ARRAY FOR STM BASED PARALLEL IMAGING AND NANOPATTERNING

Y. Zhang, Y. Tang, L. R. Carley, and G. K. Fedder

Carnegie Mellon University, USA

(1041)

067-We

A NOVEL CONTINUOUSLY VARIABLE ANGULAR VERTICAL COMB-DRIVE WITH APPLICATION IN SCANNING MICROMIRROR

Ralf Bauer, Gordon Brown, Li Li, and Deepak Uttamchandani
University of Strathclyde, UK
(1049)

068-Th

PANTOGRAPH MECHANISM FOR CONVERSION FROM SWELLING INTO CONTRACTION MOTION OF PNEUMATIC BALLOON ACTUATOR

Takuya Chishiro, Taiki Ono and Satoshi Konishi
(1199)

069-Mo

MICRO ACTUATOR ARRAY ON A FLEXIBLE SHEET - SMART MEMS SHEET -

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(1140)

070-Tu

BIMETALLIC MICROMOTOR AUTONOMOUSLY MOVABLE IN BIOFUELS

Y. Yoshizumi, Y. Date, K. Ohkubo, M. Yokokawa, and H. Suzuki
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(1204)

071-We

THE INTEGRATION OF TIOPC-BASED OPTOELECTRONIC TWEEZERS AND OPTOELECTROWETTING WITH FREQUENCY MODULATION

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(1245)

072-Th

MAGNETICALLY-ACTUATED VARIABLE OPTICAL ATTENUATORS USING FERROFLUID-DOPED ELASTOMER IMPLEMENTED BY COMBINATION OF SOFT LITHOGRAPHY AND INKJET PRINTING TECHNOLOGIES

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²EPFL, SWITZERLAND
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(1325)

074-Tu

DEVELOPMENT OF NOVEL MICROACTUATORS DRIVEN BY LIQUID CRYSTALLINE MATERIALS

S. Chono and T. Tsuji
Kochi University of Technology, JAPAN
(1379)

075-We

A MAGNETICALLY DRIVEN MICROMANIPULATOR INCORPORATED WITH A BUBBLE FOR BIO/MICRO-OBJECT MANIPULATION

Il Song Park, Jae Hun Shin, Young Rang Lee and Sang Kug Chung
Myongji University, KOREA
(1423)

076-Th

DESIGN, FABRICATION AND CHARACTERIZATION OF A SUSPENDED PLATE MECHANO-OPTICAL MODULATOR

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²FRIAS, University of Freiburg, GERMANY
(1455)

077-Mo

SUPERPARAMAGNETIC SWIMMING MICROROBOTS WITH ADJUSTED MAGNETIC ANISOTROPY

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(1581)

078-Tu

Wrinkle Meets MEMS: Tunable Grating and Hydrophobic Surface

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(1605)

079-We

LOW VOLTAGE – ENHANCED ACTUATION MEMS CANTILEVERS USING Al²O³-SiO² ELECTRETS

Pradeep Pai and Massood Tabib-Azar

University of Utah, USA
(1614)

080-Th

A 3-DOF PIEZOELECTRIC MICRO VIBRATORY STAGE BASED ON BULK-PZT/SILICON CRAB-LEG SUSPENSIONS

Ethem Erkan Aktakka, Rebecca L. Peterson and Khalil Najafi

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(1726)

081-Mo

PARAMETRICALLY DRIVEN RESONANT MICRO-MIRROR SCANNER WITH TUNABLE SPRINGS

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(1740)

082-Tu

PNEUMATIC-LESS HIGH-SPEED VACUUM MESO-PUMP DRIVEN BY PROGRAMMABLE HYDRAULICS

Jiyoung Son, Hyuntae Kim and Hanseup Kim

University of Utah, USA
(1831)

Mechanical Sensors and Systems

083-We

PIEZOELECTRIC PARAMETRIC AMPLIFIERS WITH INTEGRATED ACTUATION AND SENSING CAPABILITIES

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(1005)

084-Th

5.4 MHz DOG-BONE OSCILLATING AFM PROBE WITH THERMAL ACTUATION AND PIEZORESISTIVE DETECTION

Z. Xiong, E. Mairiaux, B. Walter, M. Faucher, L. Buchaillet and B. Legrand

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(1019)

085-Mo**HIGHLY SENSITIVE PRESSURE SENSOR USING A GOLD-COATED ELASTIC PYRAMID ARRAY PRESSING ON A RESISTOR**

N. Thanh-Vinh, K. Matsumoto and I. Shimoyama
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(1076)

086-Tu**AN INERTIAL MICRO-SWITCH WITH COMPLIANT CANTILEVER FIXED ELECTRODE FOR PROLONGING CONTACT TIME**

Yan Wang, Wenguo Chen, Zhuoqing Yang, Guifu Ding, Hong Wang and Xiaolin Zhao
Shanghai Jiao Tong University, CHINA
(1077)

087-We**QUADRATURE FM GYROSCOPE**

Mitchell H. Kline¹, Yu-Ching Yeh¹, Burak Eminoglu¹, Hadi Najar², Mike Daneman³,
David A. Horsley² and Bernhard E. Boser¹
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²University of California, Davis, USA
³Invensense, USA
(1093)

088-Th**OPTICAL ACCELEROMETER WITH MECHANICAL AMPLIFICATION VIA A V-BEAM MECHANISM**

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¹Imperial College London, UK
²AWE plc, UK
(1143)

089-Mo**A CMOS MEMS CAPACITIVE ULTRASONIC SENSOR ARRAY FOR THREE-DIMENSIONAL PHOTOACOUSTIC IMAGING**

Pei-Liang Liao¹, Po-Hsun Wang², Meng-Lin Li², and Michael S.-C. Lu^{1,2,3}
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²National Tsing Hua University, TAIWAN
³Institute of Electronics Engineering, National Tsing Hua University, TAIWAN
(1168)

090-Tu**A SENSITIVE LIQUID-CANTILEVER DIAPHRAGM FOR PRESSURE SENSOR**

Nguyen Minh-Dung, Phan Hoang-Phuong, Kiyoshi Matsumoto and Isao Shimoyama
The University of Tokyo, JAPAN
(1249)

091-We**PIEZORESISTIVE MEMBRANE-TYPE SURFACE STRESS SENSOR ARRANGED IN ARRAYS FOR CANCER DIAGNOSIS THROUGH BREATH ANALYSIS**

Frédéric Loizeau¹, Hans Peter Lang², Terunobu Akiyama¹, Sebastian Gautsch¹, Peter Vettiger¹, Andreas Tonin², Genki Yoshikawa³, Christoph Gerber² and Nico de Rooij¹
¹Ecole Polytechnique Fédérale de Lausanne, SWITZERLAND
²University of Basel, SWITZERLAND
³National Institute for Materials Science, JAPAN
(1274)

092-Th**EPITAXIALLY-ENCAPSULATED POLYSILICON DISK RESONATOR GYROSCOPE**

S. Nitzan¹, C.H. Ahn², T.-H. Su¹, M. Li¹, E.J. Ng², S. Wang², Z.M. Yang¹, G. O'Brien⁴, B.E. Boser³, T.W. Kenny² and D.A. Horsley¹
¹University of California, Davis, USA

²Stanford University, USA

³University of California, Berkeley, USA

⁴Bosch Research and Technology Center, USA
(1291)

093-Mo

DEVELOPMENT OF A MICRO SEISMOMETER BASED ON MOLECULAR ELECTRONIC TRANSDUCER TECHNOLOGY FOR PLANETARY EXPLORATION

Hai Huang¹, Bryce Carande¹, Rui Tang¹, Jon Oiler¹, Zaitsev Dmitriy², Agafonov Vadim² and Hongyu Yu¹

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²Moscow Institute of Physics and Technology, Moscow, Russia
(1294)

094-Tu

A MICROMACHINED SQUARE EXTENSIONAL MODE RESONANT MAGNETOMETER WITH DIRECTLY VOLTAGE OUTPUT

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(1296)

095-We

TACTICAL GRADE MICRO GYROSCOPE WITH DUAL CAPCITIVE/OPTICAL SENSING

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²Tel-Aviv University, ISRAEL
(1354)

096-Th

AN ON-CHIP OPTO-MECHANICAL ACCELEROMETER

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²Institute of Microelectronics, A*STAR, SINGAPORE
(1406)

097-Mo

ROTATIONAL MOTION EFFECT ON SENSITIVITY MATRIX OF MEMS THREE-AXIS ACCELEROMETER FOR REALIZATION OF CONCURRENT CALIBRATION USING VIBRATION TABLE

Atsushi Nakano¹, Yoshikazu Hirai¹, Koji Sugano¹, Toshiyuki Tsuchiya¹, Osamu Tabata¹ and Akira Umeda^{2,3}

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²National Institute of Advanced Industrial Science and Technology, JAPAN

³Vector Dynamics Corporation, JAPAN
(1416)

098-Tu

A COMBINED COMB / BULK MODE GYROSCOPE STRUCTURE FOR ENHANCED SENSITIVITY

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¹McGill University, CANADA

²Université du Québec à Montréal, CANADA
(1572)

099-We

NONLINEARITY-ASSISTED FREQUENCY STABILIZATION FOR NANOWIRE ARRAY MEMBRANE OSCILLATOR

Yuerui Lu and Amit Lal

Cornell University, USA
(1616)

100-Th

SI-CMOS-MEMS DUAL MASS RESONATOR FOR EXTRACTING MASS AND SPRING VARIATIONS

Y.-J. Fang, T. Mukherjee and G.K. Fedder
Carnegie Mellon University, USA
(1620)

101-Mo

BATCH-FABRICATED MEMS RETARDING POTENTIAL ANALYZER FOR HIGH-ACCURACY ION ENERGY MEASUREMENTS

E. V. Heubel and L. F. Velásquez-García
Massachusetts Institute of Technology, USA
(1625)

102-Tu

A HIGHLY-COMPLIANT ASYMMETRIC 2D GUIDED-MODE RESONANCE SENSOR FOR SIMULTANEOUS MEASUREMENT OF DUAL-AXIS STRAIN

Steven J. Foland and Jeong-Bong Lee
The University of Texas at Dallas, USA
(1660)

103-We

FABRICATION AND CHARACTERIZATION OF 3D MICRO-PLASMA FIELD EFFECT TRANSISTORS

Faisal K. Chowdhury, Yuying Zhang and M. Tabib-Azar
University of Utah, USA
(1677)

104-Th

HIGH SENSITIVITY, HIGH DENSITY MICRO-HYDRAULIC FORCE SENSOR ARRAY UTILIZING STEREO-LITHOGRAPHY FABRICATION TECHNIQUE

Mahdi M. Sadeghi, Karen Dowling, Rebecca L. Peterson and Khalil Najafi
University of Michigan, USA
(1684)

105-Mo

FABRICATION AND TESTING OF HEMISPHERICAL MEMS WINEGLASS RESONATORS

Pradeep Pai, Faisal K. Chowdhury, Hoorad Pourzand and Massood Tabib-Azar
University of Utah, USA
(1705)

106-Tu

STRETCHABLE FORCE SENSOR ARRAY USING CONDUCTIVE LIQUID

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²The University of Tokyo IRT Research Initiative, JAPAN
(1721)

107-We

A NOVEL INVERSE-MAGNETOSTRICTIVE TYPE PRESSURE SENSOR WITH PLANAR SENSING INDUCTOR

H.-C. Chang¹, S.-C. Liao¹, H.-S. Hsieh^{1,2}, S.-J. Lin¹, C.-H. Lai¹, R. Chen¹, and W. Fang¹
¹National Tsing Hua University, TAIWAN
²Delta Electronics, Inc., TAIWAN
(1752)

108-Th

INTEGRATING SOLDER BUMPERS FOR HIGH SHOCK APPLICATIONS

A. Delahunty and W.T. Pike
Imperial College London, UNITED KINGDOM
(1765)

Physical MEMS (Optical, Thermal, Magnetic)

109-Mo**3D LORENTZ FORCE MAGNETIC SENSOR USING ULTRA-THIN PIEZORESISTIVE CANTILEVERS**

S. Wattanasarn, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN
(1015)

110-Tu

MONOLITHIC COMPOSITE-SENSORS DESIGNED AND FABRICATED BY A LOW-COST SINGLE-SIDE 'SiN/POLY-Si/Al' MULTI-USER PROCESS-MODULE FOR VERSATILE SENSING-NETWORK NODES
Zao Ni, Chen Yang, Dehui Xu, Hong Zhou, Wei Zhou, Tie Li, Bin Xiong and Xinxin Li
Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, CHINA
(1086)

111-We**SPIRAL METAMATERIAL FOR TUNABLE CIRCULAR DICHROISM**

Tetsuo Kan¹, Akihiro Isozaki¹, Natsuki Kanda^{1, 2}, Natsuki Nemoto¹, Kuniaki Konishi¹, Makoto Kuwata-Gonokami¹, Kiyoshi Matsumoto¹ and Isao Shimoyama¹
¹The University of Tokyo, JAPAN
²RIKEN, JAPAN
(1129)

113-Mo**A MICROPLASMA CHIP FOR VUV LIGHT SOURCE**

Ryoto Sato¹, Daisuke Yasumatsu¹, Shinya Kumagai¹, Masaru Hori² and Minoru Sasaki¹
¹Toyota Technological Institute, JAPAN
²Nagoya University, JAPAN
(1258)

114-Tu**FLEXIBLE AND LARGE-AREA SOUND-EMITTING DEVICE USING REDUCED GRAPHENE OXIDE**

He Tian, Yi Yang, Dan Xie, Tian-Ling Ren, Yi Shu, Chang-Jian Zhou, Lu-Qi Tao and Li-Tian Liu
Tsinghua University, CHINA
(1308)

115-We**THZ POLARIZER USING TUNABLE METAMATERIALS**

W. Zhang^{1, 2}, W. M. Zhu¹, J. M. Tsai², G. Q. Lo², D. L. Kwong², E. P. Li³ and A. Q. Liu^{1,2†}
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²Institute of Microelectronics, A*STAR, SINGAPORE
³Institute of High Performance Computing, A*STAR, SINGAPORE
(1346)

116-Th**NANO ACTUATOR AND "PULL-BACK" NONLINEARITY**

M. Ren^{1, 2}, H. Cai², L. M. J. Tsai², D. L. Kwong² and A. Q. Liu^{1,2}
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²Institute of Microelectronics, A*STAR, SINGAPORE
(1394)

117-Mo**MEMS RESONANT MAGNETIC FIELD SENSOR BASED ON AN ALN/FEGAB BILAYER NANO-PLATE RESONATOR**

Y. Hui, T. X. Nan, N. X. Sun and M. Rinaldi
Northeastern University, USA
(1745)

118-Tu**METAMATERIAL TUNABLE FILTER WITH LIQUID METAL**

W. M. Zhu¹, W. Zhang^{1,3}, R. F. Huang², S. K. Ting², G. Q. Lo³, D. L. Kwong³, and A. Q. Liu^{1,3}
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²Temasek Laboratories, SINGAPORE

³Institute of Microelectronics, SINGAPORE
(1459)

RF MEMS

119-We

DESIGN AND IMPLEMENTATION OF TIME-DELAY SWITCH TRIGGERED BY INERTIA LOAD

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²Chung-Shan Institute of Science and Technology, TAIWAN
(1809)

120-Th

PIEZOELECTRIC PROPERTIES OF ScAlN THIN FILMS FOR PIEZO-MEMS DEVICES

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²National Institute of Advanced Industrial Science and Technology, JAPAN
(1020)

121-Mo

A LOW PHASE-NOISE VCO FOR MULTI-BAND TRANSCEIVER USING FULLY PACKAGED MEMS ELECTROSTATIC VARACTORS

Kenichiro Urayama¹, Koichiro Akahori¹, Nobuyuki Adachi¹, Hiroyuki Fujita² and Hiroshi Toshiyoshi³

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²Institute of Industrial Science, The University of Tokyo, JAPAN

³Research Center for Advanced Science and Technology, The University of Tokyo, JAPAN
(1024)

122-Tu

A 17.6-MHZ 2.5V ULTRA-LOW POLARIZATION VOLTAGE MEMS OSCILLATOR USING AN INNOVATIVE HIGH GAIN-BANDWIDTH FULLY DIFFERENTIAL TRANS-IMPEDANCE VOLTAGE AMPLIFIER

Tung-Tsun Chen¹, Jui-Cheng Huang¹, Yung-Chow Peng¹, Chia-Hua Chu¹, Chung-Hsien Lin¹, Chun-Wen Cheng¹, Cheng-Syun Li³ and Sheng-Shian Li^{2,3}

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²National Tsing Hua University, TAIWAN

³MicroSystems Institute, National Tsing Hua University, TAIWAN
(1141)

123-We

ROOM-TEMPERATURE THZ IMAGING BASED ON ANTENNA-COUPLED MOSFET BOLOMETER

Thomas Morf¹, Bernhard Klein^{1,3}, Michel Despont¹, Ute Drechsler¹, Lukas Kull¹, Dan Corcos², Danny Elad², Noam Kaminski², Matthias Braendli¹, Christian Menolfi¹, Marcel Kossel¹, Pier Andrea Francese¹, Thomas Toifl¹ and Dirk Plettemeier³

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²IBM Research – Haifa, ISRAEL

³Technical University of Dresden, GERMANY
(1181)

124-Th

ANALYSIS OF LINEARITY DEGRADATION IN MULTI-STAGE RF MEMS CIRCUITS

U. Shah, M. Sterner and J. Oberhammer

KTH Royal Institute of Technology, SWEDEN
(1218)

125-Mo

AN ULTRA-LOW POWER OVENIZED CMOS-MEMS RESONATOR MONOLITHICALLY INTEGRATED WITH INTERFACE CIRCUITS

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²National Tsing Hua University, Hsinchu, TAIWAN

(1264)

126-Tu

ELECTRONIC TUNING OF Q AND APPARENT TCF IN A PIEZORESISTIVE MICROMECHANICAL RESONATOR

H. Zhu, C. Tu, and J. E.-Y. Lee
City University of Hong Kong, HONG KONG
(1272)

127-We

CRYSTALLOGRAPHIC AND EIGENMODE DEPENDENCE OF TCF FOR SINGLE CRYSTAL SILICON CONTOUR MODE RESONATORS

H. Zhu, G.C. Shan, C. Tu and J. E.-Y. Lee
City University of Hong Kong, HONG KONG

(1293)

128-Th

ENHANCEMENT OF TEMPERATURE STABILITY VIA CONSTANT-STRUCTURAL-RESISTANCE CONTROL FOR MEMS RESONATORS

Cheng-Chi Chen¹, Huan-Tse Yu¹, Guan-Hsien Li¹ and Sheng-Shian Li^{1,2}
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²National Tsing Hua University, TAIWAN
(1458)

129-Mo

MICROWAVE POWER LIMITERS BASED ON RF-MEMS

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²Thales Alenia Space, Toulouse, FRANCE
(1469)

130-Tu

WAFER LEVEL PACKAGING FOR RF MEMS DEVICES USING VOID FREE COPPER FILLED THROUGH GLASS VIA

Ju-Yong Lee, Sung-Woo Lee, Seung-Ki Lee and Jae-Hyoung Park
Dankook University, KOREA
(1516)

131-We

COMPARISON OF f-Q SCALING IN WINEGLASS AND RADIAL MODES IN RING RESONATORS

Siddharth Tallur and Sunil A. Bhave
Cornell University, I USA
(1554)

132-Th

NONLINEAR UHF QUARTZ MEMS OSCILLATOR WITH PHASE NOISE REDUCTION

David T. Chang, Harris P. Moyer, Robert G. Nagele, Randall L. Kubena, Richard J. Joyce, Deborah J. Kirby, Peter D. Brewer, Hung D. Nguyen and Frederic P. Stratton
HRL Laboratories, LLC, USA
(1582)

133-Mo

MULTI-FREQUENCY WIDEBAND RF FILTERS USING HIGH ELECTROMECHANICAL COUPLING LATERALLY VIBRATING LITHIUM NIOBATE MEMS RESONATORS

Songbin Gong and Ginaluca Piazza
Carnegie Mellon University, USA
(1648)

134-Tu

TWO-PORT FILTERS AND RESONATORS ON ALN/³C-SIC PLATES UTILIZING HIGH-ORDER LAMB WAVE MODES

Chih-Ming Lin¹, Yung-Yu Chen², Valery V. Felmetzge³, Debbie G. Senesky^{1,4} and Albert P. Pisano¹

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²Tatung University, TAIWAN

³OEM Group Incorporated, USA

⁴Stanford University, USA

(1680)

135-We

NONLINEARITY REDUCTION IN SILICON RESONATORS BY DOPING AND RE-ORIENTATION

M. Shahmohammadi, H. Fatemi and R. Abdolvand

Oklahoma State University, USA

(1706)

Energy Harvesting and Power MEMS

136-Th

DIRECT PROTOTYPING OF 3D MICRO SUPERCAPACITORS BASED ON IN-SITU FABRICATED NANOPOROUS CARBON ELECTRODES

Caiwei Shen^{1,2}, Xiaohong Wang^{1,2}, Siwei Li^{1,2} and Xiaoming Wu^{1,2}

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²Institute of Microelectronics, Tsinghua University, CHINA

(1080)

137-Mo

THERMAL ENERGY HARVESTING USING AN ELECTROSTATIC GENERATOR

Shankar Karanilam Thundiparambu Ravindran, Prashant Nilkund, Michael Kroener and Peter Woias

IMTEK, University of Freiburg, GERMANY

(1106)

138-Tu

AN ELECTROMAGNETIC ENERGY HARVESTER FOR LOW FREQUENCY AND LOW-G VIBRATIONS WITH A MODIFIED FREQUENCY UP CONVERSION METHOD

Özge Zorlu, Serol Turkyılmaz, Ali Muhtaroglu and Haluk Kulah

Middle East Technical University, TURKEY

(1206)

139-We

A MICROFABRICATED PAPER-BASED MICROBIAL FUEL CELL

A. Fraiwan¹, S. Mukherjee², S. Sundermier¹ and S. Choi¹

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²University of Cincinnati, USA

(1232)

140-Th

A LOW-COST, HIGH-EFFICIENCY AND HIGH-OUTPUT-POWER NANOFLUIDIC ENERGY HARVESTER

Wei Ouyang¹, Wei Wang^{1,2}, Haixia Zhang^{1,2}, Wengang Wu^{1,2} and Zhihong Li^{1,2}

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(1299)

141-Mo

WIDEBAND MEMS ELECTROSTATIC VIBRATION ENERGY HARVESTERS BASED ON GAP-CLOSING INTERDIGITED COMBS WITH A TRAPEZOIDAL CROSS SECTION

R. Guillemet¹, P. Basset¹, D. Galayko², F. Cottone¹, F. Marty¹ and T. Bourouina¹

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²UPMC-Sorbonne Universités - LIP6, FRANCE

(1335)

142-Tu

PROOF MASS EFFECTS ON SPIRAL ELECTRODE D33 MODE PIEZOELECTRIC DIAPHRAGM-BASED ENERGY HARVESTER

Zhiyuan Shen¹, Shuwei Liu¹, Jianmin Miao,¹ Lye Sun Woh¹ and Zhihong Wang²

¹Nanyang Technological University, SINGAPORE

²King Abdullah University of Science and Technology, SAUDI ARABIA
(1327)

143-We

A SINGLE-WALLED CARBON NANOTUBES BETAVOLTAIC MICROCELL

Y.Y. Chang, C.C. Chen, P. Liu and J. Zhang

Institute of Microelectronics, Peking University, CHINA
(1378)

144-Th

STUDY OF THE WIDEBAND BEHAVIOR OF AN IN-PLANE ELECTROMAGNETIC MEMS ENERGY HARVESTER

Huicong Liu, You Qian, Nan Wang and Chengkuo Lee

National University of Singapore, SINGAPORE
(1390)

145-Mo

LEAD-FREE (K,Na)NbO₃ BASED IMPACT TYPE ENERGY HARVESTERS INTEGRATED WITH A CYLINDRICAL CAVITY FOR METAL BALL

Le Van Minh, Motoaki Hara, Hiroyuki Oguchi, and Hiroki Kuwano

Tohoku University, JAPAN
(1391)

146-Tu

HIGH Q AND LOW RESONANT FREQUENCY MICRO ELECTRET ENERGY HARVESTER FOR HARVESTING LOW AMPLITUDE HARMONIC OF VIBRATION

S.W. Liu, J.M. Miao and S.W. Lye

Nanyang Technological University, SINGAPORE
(1393)

147-We

PIEZOELECTRIC RUBBER FILMS FOR HUMAN PHYSIOLOGICAL MONITORING AND ENERGY HARVESTING

J.-W. Tsai, J.-J. Wang and Y.-C. Su

National Tsing Hua University, TAIWAN
(1401)

148-Th

HEAT ENERGY MANAGEMENT SCHEME OF THERMOELECTRIC GENERATOR USING PHASE CHANGE MATERIAL

S.E. Jo, M.S. Kim and Y.J. Kim

Yonsei University, KOREA
(1417)

150-Tu

STACKED FLEXIBLE PARYLENE-BASED 3D INDUCTORS WITH NI80FE20 CORE FOR WIRELESS POWER TRANSMISSION SYSTEM

Xuming Sun¹, Yang Zheng¹, Zhongliang Li¹, Xiuhan Li² and Haixia Zhang¹

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²Beijing Jiaotong University, CHINA
(1478)

151-We

A PACKAGED ELECTROSTATIC ENERGY HARVESTER WITH MICRO-MOLDED BULK ELECTRETS

L. Bu, X.M. Wu, X.H. Wang and L.T. Liu

Institute of Microelectronics, Tsinghua University, CHINA

Tsinghua National Laboratory for Information Science and Technology, CHINA
(1520)

152-Th**HIGH POWER LITHIUM ION MICROBATTERIES WITH LITHOGRAPHICALLY DEFINED 3-D POROUS ELECTRODES**

J. Pikul, H.-G. Zhang, J. Cho, P. Braun and W. King
University of Illinois at Urbana - Champaign, USA
(1547)

153-Mo**BISTABLE MULTIPLE-MASS ELECTROSTATIC GENERATOR FOR LOW-FREQUENCY VIBRATION ENERGY HARVESTING**

F. Cottone¹, P. Basset¹, R. Guillemet¹, D. Galayko², F. Marty¹ and T. Bourouina¹
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²UPMC-Sorbonne Universités / LIP6 - FRANCE
(1567)

154-Tu**ALL-POLYMER SOFT-X-RAY-CHARGED PIEZOELECTRET WITH EMBEDDED PEDOT ELECTRODE**

Yue Feng¹ and Yuji Suzuki¹
The University of Tokyo, Tokyo, JAPAN
(1641)

155-We**A MICRO-SCALE MICROBIAL FUEL CELL (MFC) HAVING ULTRAMICROELECTRODE (UME) ANODE**

Hao Ren¹, Sriram Rangaswami², Hyung-Sool Lee³, and Junseok Chae¹
¹Arizona State University, USA
²Corona del Sol High School, USA
³University of Waterloo, CANADA
(1701)

156-Th**MONOLITHICALLY-FABRICATED LAMINATED INDUCTORS WITH ELECTRODEPOSITED SILVER WINDINGS**

Minsoo Kim, Florian Herrault, Jooncheol Kim and Mark G. Allen
Georgia Institute of Technology, USA
(1703)

157-Mo**APPLICATION OF PARAELECTRIC TO A MINIATURE CAPACITIVE ENERGY HARVESTER REALIZING SEVERAL TENS MICRO WATT –RELATIONSHIP BETWEEN POLARIZATION HYSTERESIS AND OUTPUT POWER–**

T. Takahashi¹, M. Suzuki¹, T. Nishida², Y. Yoshikawa² and S. Aoyagi¹
¹Kansai University, JAPAN
²ROHM Co. Ltd., JAPAN
(1727)

158-Tu**STACKABLE COW DUNG BASED MICROFABRICATED MICROBIAL FUEL CELLS**

Vishnu Jayaprakash, Ryan D. Sochol, Roseanne Warren, Alina Kozinda, Kosuke Iwai and Liwei Lin,
Berkeley Sensor and Actuator Center, University of California, Berkeley, USA.
(1775)

159-We**DESIGN AND FABRICATION OF FUEL-SELF-PROPELLED REACTION DEVICE FOR PASSIVE MICRO DIRECT METHANOL FUEL CELL ANODES**

Y.-S. Wu¹, I.-C. Fang¹, C.-C. Chieng¹ and F.-G. Tseng^{1,2}
¹National Tsing Hua University, TAIWAN
²Academia Sinica, Taipei, TAIWAN
(1807)

Bio MEMS

160-Th**A FLEXIBLE IMPLANTABLE MICRO TEMPERATURE SENSOR ON POLYMER CAPILLARY FOR BIOMEDICAL APPLICATIONS**

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²National Institute of Advanced Industrial Science and Technology (AIST), JAPAN
(1008)

161-Mo**CELL MEMBRANE FIBERS FOR THE PLATFORM OF TRANSMEMBRANE PROTEIN ANALYSIS**

Koji Sato^{1,2} and Shoji Takeuchi^{1,2}

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²ERATO Takeuchi Biohybrid Innovation Project, JAPAN
(1072)

162-Tu**FABRICATION OF MICRO PORE ARRAYS IN FREE STANDING COC MEMBRANES AND THEIR APPLICATION FOR IN VITRO BARRIER TISSUE MODELS**

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¹CSIRO, Material Science and Engineering, AUSTRALIA

²Melbourne Center for Nanofabrication, AUSTRALIA

³The University of Melbourne, AUSTRALIA
(1128)

163-We**HIGH SENSITIVITY DNA SIEVING TECHNOLOGY BY ENTROPIC TRAPPING IN 3D ARTIFICIAL NANO-CHANNEL MATRICES**

Chung-Hsuan Wang^{1,2}, Cho-Lun Hsu¹, Wen-Cheng Chiu¹, Tung-Yen Lai¹, Tong-Huan Chou¹, Ivy Yang¹, ChiaHua Ho¹, Chenming Hu³, Fu-Liang Yang¹ and Y. C. Chou²

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²National Tsing-Hua University, TAIWAN

³University of California, Berkeley, USA
(1137)

164-Th**AN INTERGATED MICROFLUIDIC SYSTEM FOR DETECTING HUMAN IMMUNODEFICIENCY VIRUS IN BLOOD SAMPLES**

Wen-Hsin Chang¹, Jung-Hao Wang¹, Wei-Shuo Ling⁴, Lie Cheng⁵, Chih-Hung Wang¹, Shainn-Wei Wang^{4,5,6} and Gwo-Bin Lee^{1,2,3}

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(1164)

165-Mo**DIFFERENT OPTICAL IMAGES FOR OPTICALLY-INDUCED ELECTROPORATION OF MULTIPLE GENE TRANSFECTION**

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(1202)

166-Tu**SINGLE CELL ENZYME DIAGNOSIS ON THE CHIP**

Sissel Juul^{1,2,3}, Charlotte Harmsen¹, Maria Juul Nielsen¹, Magnus Stougaard¹, Kam W. Leong², Birgitta R. Knudsen^{1,3} and Yi-Ping Ho³

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(1266)

167-We

FABRICATIION OF 3D MICROFLUIDIC NETWORKS WITH A HYBRID STAMP

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²Institute of Applied Mechanics, National Taiwan University, TAIWAN
(1269)

168-Th

STRONG SERS BIOSENSOR WITH GOLD NANOSTRUCTURE SANDWICHED ON GRAPHENE

Hung-Yao Chu, Judy M. Obliosca, Pen-Cheng Wang, and Fan-Gang Tseng

Tsing Hua University, TAIWAN

(1405)

169-Mo

A HIGH DENSITY MONOLAYER CELLS SELF-ASSEMBLY CHIP FOR HIGH-THROUGHPUT RARE CELLS DETECTION

Tsung-Ju Chen¹, Jui-Chia Chang¹, Yu-Cheng Chang¹ and Fan-Gang Tseng^{1,2}

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²Academia Sinica, TAIWAN

(1348)

170-Tu

A PIEZORESISTIVE CELLULAR TRACTION FORCE SENSOR

U. G. Jung, H. Takahashi, T. Kan, K. Matsumoto and I. Shimoyama

The University of Tokyo, JAPAN

(1421)

171-We

COMBINATORIAL DIFFERENTIATION INDUCTION OF EMBRIONIC BODIES IN "PASCL (PNEUMATICALLY ACTUATED SPHEROIDS CULTURE LAB-ON-CHIP)"

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²PRESTO, JAPAN Science and Technology Agency, JAPAN

(1457)

172-Th

VESICLES IN A VESICLE: FORMATION OF A CELL-SIZED VESICLE CONTAINING SMALL VESICLES FROM TWO PLANAR LIPID BILAYERS USING PULSED JET FLOW

Koki Kamiya¹, Ryuji Kawano¹, Toshihisa Osaki¹ and Shoji Takeuchi^{1,2}

¹Kanagawa Academy of Science and Technology, JAPAN

²Institute of Industrial Science, The University of Tokyo, JAPAN

(1499)

173-Mo

INCREASED PROLIFERATION OF PRIMARY CHONDROCYTE CELLS BY NANOSTRUCTURE AND CYCLING MECHANICAL STIMULATION ON PDMS CELL CHIP

Tsung-Ju Chen¹, Tung-Yi Lin¹, Yu-Ling Wang¹ and Fan-Gang Tseng^{1,2}

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²Academia Sinica, TAIWAN

(1580)

174-Tu

CELL DETECTION USING A CMOS IMAGE SENSOR WITH MODIFIED PIXEL STRUCTURE SUITABLE FOR BIO-CHEMICAL SURFACE ACTIVATION

Javid Musayev¹, Yekbun Adıgöznel¹, Haluk Klah¹, Selim Eminoğlu² and Tayfun Akin^{1,2}

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(1597)

175-We**AN ELASTOMERIC POLYMER MICROCHIP FOR MECHANICALLY TUNABLE CELL TRAPPING**

Jing Zhu¹, Junyi Shang¹, David Brenner^{2,3} and Qiao Lin¹

Columbia University, USA

(1630)

176-Th**MECHANICAL PUMPLESS GIANT LIPOSOME TRAPPING SYSTEM USING PARYLENE MICRO FILTER FOR BIOLOGICAL ASSAY**

Y. Abe^{1,3}, K. Kamiya¹, T. Osaki¹, R. Kawano¹, N. Miki³ and S. Takeuchi^{1,2}

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²Institute of Industrial Science, The University of Tokyo, JAPAN

³Keio University, JAPAN

(1658)

177-Mo**MICROFLUIDIC DEVICE WITH CARBON NANOTUBE CHANNEL WALLS FOR BLOOD PLASMA EXTRACTION**

Yin-Ting Yeh¹, Nestor Perea-Lopez¹, Archi Dasgupta¹, Ramdane Harouaka¹, Mauricio Terrones^{1,2} and Si-Yang Zheng^{1,2}

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²Material Research Institute, The Pennsylvania State University, USA

(1724)

179-We**IMPEDANCE BIOSENSOR BASED ON INTERDIGITATED ELECTRODE ARRAYS FOR DETECTION OF LOW LEVELS OF E.COLI O157:H7**

S. Ghosh Dastider¹, S. Barizuddin², Y. Wu¹, M. Dweik² and M. Almasri¹

¹University of Missouri, USA ²Lincoln University, USA

(1763)

180-Th**DISSOLVABLE MOBILE MICROPLATES FOR HANDLING ADHERENT CELLS**

Shotaro Yoshida and Shoji Takeuchi

Institute of Industrial Science, The University of Tokyo, JAPAN

(1790)

181-Mo**NANOIMPRINTED HOLES TO IMMOBILIZE MICROBES**

T. Kano, T. Inaba and N. Miki

Keio University, JAPAN

(1797)

Chemical Sensors and Systems**182-Tu****INTEGRATED MICRO WOBBE INDEX METER TOWARDS ON-CHIP ENERGY CONTENT MEASUREMENT**

J.C. Lötters^{1,2}, T.S.J. Lammerink², M.G. Pap², R.G.P. Sanders², M.J. de Boer², A.J. Mouris³ and R.J. Wiegerink²

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³Hobré Instruments BV, THE NETHERLANDS

(1009)

183-We**A GRAPHENE FET GAS SENSOR GATED BY IONIC LIQUID**

A. Inaba, G. Yoo, Y. Takei, K. Matsumoto and I. Shimoyama

The University of Tokyo, JAPAN

(1126)

184-Th**A 3D METALLIC STRUCTURE ARRAY FOR REFRACTIVE INDEX SENSING WITH OPTICAL VORTEX**

E. Maeda¹, Y. Lee¹, Y.-L. Ho¹, S. Fujikawa² and J.-J. Delaunay¹

¹The University of Tokyo, JAPAN

²WPI-I2CNER, JST-CREST, Kyushu University, JAPAN

(1185)

185-Mo**A NOVEL GAS SENSOR USING POLYMER DISPERSED LIQUID CRYSTAL DOPED WITH CARBON NANOTUBES**

Yu-Tse Lai and Yao-Joe Yang

National Taiwan University, TAIWAN

(1222)

186-Tu**MEMS LC MICROCHIP WITH LOW DISPERSION AND LOW PRESSURE DROP TURN STRUCTURE USING DISTRIBUTION CONTROLLED MICRO PILLAR ARRAY**

K. Takatsuki¹, M. Isokawa², Y. Song², A. Nakahara¹, D. H. Yoon¹, T. Sekiguchi¹, J. Mizuno¹, T. Funatsu², M. Tsunoda² and S. Shoji¹

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²University of Tokyo, JAPAN

(1254)

187-We**DEVELOPMENT OF MWCNT EMBEDDED MICROMECHANICAL RESONATOR WORKING AS RAREFIED GAS SENSOR**

H. Kishihara¹, I. Hanasaki², N. Matsuzuka³, I. Yamashita⁴, Y. Uraoka⁴ and Y. Isono¹

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²Osaka University, JAPAN

³Akashi National College of Technology, JAPAN

⁴Nara Institute of Science and Technology, JAPAN

(1312)

188-Th**RESONANT CANTILEVERS WITH NANOPARTICLES-SPACED FUNCTIONAL GRAPHENE-OXIDE SHEETS FOR HIGH-PERFORMANCE SENSING TO PPT-LEVEL EXPLOSIVE VAPOR**

Pengcheng Xu, Haitao Yu, Xiaoyuan Xia, Feng Yu, Min Liu and Xinxin Li

Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, CHINA

(1433)

189-Mo**NANO-FRACTAL GAS SENSOR INTEGRATED ON MICRO HEATER FABRICATED WITH SUSPENSION COATING**

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³Tokyo Metropolitan University, JAPAN

⁴The University of Tokyo, JAPAN

(1475)

190-Tu**HIGH-SENSITIVITY MICRO-GAS CHROMATOGRAPHY USING STOCHASTIC INJECTION TECHNIQUES**

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²Université Paris Est, IFSTTAR, FRANCE

³Laboratoire National de Métrologie et d'Essais, FRANCE

(1527)

191-We

A PPB LEVEL, MINIATURIZED FAST RESPONSE AMPEROMETRIC NITRIC OXIDE SENSOR FOR ASTHMA DIAGNOSTICS

Hithesh K Gatty, S. Leijonmarck, M. Antelius, G. Stemme and N. Roxhed
KTH Royal Institute of Technology, SWEDEN
(1619)

192-Th

LOGIC GATE USING ARTIFICIAL CELL-MEMBRANE: NAND OPERATION BY TRANSMEMBRANE DNA VIA A BIOLOGICAL NANOPORE

Hiroki Yasuga^{1, 3}, Ryuji Kawano¹, Masahiro Takinoue⁴, Yutaro Tsuji^{1,3}, Toshihisa Osaki¹, Koki Kamiya¹, Norihisa Miki^{1,3} and Shoji Takeuchi^{1,2}

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²The University of Tokyo, JAPAN

³Keio University, JAPAN

⁴Tokyo Institute of Technology, JAPAN

(1651)

193-Mo

ELECTROKINETICALLY INTEGRATED MICROFLUIDIC ISOLATION AND AMPLIFICATION OF BIOMOLECULE- AND CELL-BINDING NUCLEIC ACIDS

J. Kim, J.P. Hilton, K.A. Yang, R. Pei, J. Zhu, M. Stojanovic, and Q. Lin

Columbia University, New York, USA

(1671)

194-Tu

HIGH-SENSITIVITY ELECTROCHEMICAL SENSOR USING PYROLYZED POLYMER-GOLD 3D PROBE ARRAYS FOR SPATIAL CHEMICAL SENSING

Wataru Tonomura, Yuki Mori and Satoshi Konishi

Ritsumeikan University, JAPAN

(1794)

195-We

HORIZONTAL LIPID BILAYERS FORMED BY DROPLETS CONTACT METHOD ON PATTERNED MICRO-DROPLETS

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²Kanagawa Academy of Science and Technology, JAPAN

(1771)

Medical Microsystems

196-Th

INTEGRATED MULTI-LED ARRAY WITH THREE-DIMENSIONAL POLYMER WAVEGUIDE FOR OPTOGENETICS

K. Kwon and W. Li

Michigan State University, USA

(1017)

197-Mo

ULTRATHIN, DUAL-SIDED SILICON NEURAL MICROPROBES REALIZED USING BCB BONDING AND ALUMINUM SACRIFICIAL ETCHING

Yu-Tao Lee^{1,2}, Dominik Moser¹, Tobias Holzhammer¹, Weileun Fang^{2,3}, Oliver Paul¹ and Patrick Ruther¹

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³National Tsing-Hua University, TAIWAN

(1044)

198-Tu

CELL FATIGUE TEST

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²Nagoya University, JAPAN

(1113)

199-We

ULTRACOMPACT OPTRODE WITH INTEGRATED LASER DIODE CHIPS AND SU-8 WAVEGUIDES FOR OPTOGENETIC APPLICATIONS

M. Schwaerzle¹, K. Seidl¹, U. T. Schwarz^{1,2}, O. Paul¹ and P. Ruther¹

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²Fraunhofer Institute for Applied Solid State Physics (IAF), GERMANY

(1116)

200-Th

REGIONAL 3-AXIS PLANTAR FORCES DURING STAIR ASCENT

M. Hori, H. Takahashi, A. Nakai, K. Matsumoto and I. Shimoyama

The University of Tokyo, JAPAN

(1118)

201-Mo

INTEGRATION OF CATHETER FLOW SENSOR ONTO TRACHEAL INTUBATION TUBE SYSTEM

Takuya Matsuyama, Kazuhiro Yoshikawa, Yudai Yamazaki, Mitsuhiro Shikida, Miyoko Matsushima and Tsutomu Kawabe

Nagoya University, JAPAN

(1170)

202-Tu

SPIRA MIRABILIS ENHANCED DENSITY GRADIENT CENTRIFUGATION

Sinéad M. Kearney, David J. Kinahan and Jens Ducreé

Dublin City University, Ireland

(1203)

203-We

PACKAGING STUDY FOR A 512-CHANNEL INTRAOCULAR EPIRETINAL IMPLANT

Jay Han-Chieh Chang¹, Yang Liu¹, Dongyang Kang¹, Manuel Monge¹, Yu Zhao¹, Chia-Chen Yu¹, Azita Emami-Neyestanak¹, James Weiland², Mark Humayun² and Yu-Chong Tai¹

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²Doheny Retina Institute at the Doheny Eye Institute, University of Southern California, USA

(1234)

204-Th

MULTI-MATERIAL PAPER-DISC DEVICES FOR LOW COST BIOMEDICAL DIAGNOSTICS

E. Vereshchagina, K. Bourke, L. Meehan, C. Dixit, D. Mc Glade and J. Ducreé

Dublin City University, Ireland

(1284)

205-Mo

AN INNOVATIVE SAMPLE-TO-ANSWER POLYMER LAB-ON-A-CHIP WITH ON-CHIP RESERVOIRS FOR THE POCT OF THYROID STIMULATING HORMONE (TSH)

W. Jung¹, J. Han², J. Kai², J.-Y. Lim³, D. Sul³ and C. H. Ahn^{1,2}

¹University of Cincinnati, USA

²Siloam Biosciences, Inc., USA

³Korea University, Korea

(1285)

206-Tu

2-DIMENSIONAL NEAR-FIELD MILLIMETER-WAVE SCANNING WITH MICROMACHINED PROBE FOR SKIN CANCER DIAGNOSIS

Fritzi Töpfer, Sergey Dudorov and Joachim Oberhammer

KTH Royal Institute of Technology, SWEDEN

(1362)

207-We

ALL-IN-ONE DROPLET PLATFORM FOR MULTIPLEXED GENETIC DETECTION IN BLOOD

Yi Zhang¹ and Tza-Huei Wang²
Johns Hopkins University, USA
(1376)

208-Th

ENDOSCOPIC OPTICAL PROBES FOR LINEAR AND ROTATIONAL SCANNING

N. Weber, H. Zappe and A. Seifert
IMTEK, University of Freiburg, GERMANY
(1443)

209-Mo

CONFORMALLY INTEGRATED STENT CELL RESONATORS FOR WIRELESS MONITORING OF PERIPHERAL ARTERY DISEASE

Anupam Viswanath¹, Scott R. Green¹, Jürgen Kosel² and Yogesh B. Gianchandani¹
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²King Abdullah University of Science and Technology, SAUDI ARABIA
(1550)

210-Tu

3D PARYLENE SHEATH PROBES FOR RELIABLE, LONG-TERM NEUROPROSTHETIC RECORDINGS

J.T.W. Kuo¹, B.J. Kim¹, S.A. Hara¹, C.D. Lee¹, L. Yu¹, C.A. Gutierrez¹, T.Q. Hoang¹, V. Pikov² and E. Meng¹
¹University of Southern California, USA
²Huntington Medical Research Institutes, USA
(1577)

211-We

LOW-POWER, SELF-CONTAINED, RECIPROCATING MICROPUMP THROUGH ELECTROLYSIS AND CATALYST-DRIVEN RECOMBINATION TOWARD DRUG DELIVERY APPLICATIONS

J. Marcial Portilla and Unyoung Kim
Santa Clara University, USA
(1621)

212-Th

ALL-IN-ONE MICROFLUIDIC DEVICE FOR MICROVASCULAR CONNECTION

Hirofumi Owaki¹, Taisuke Masuda¹, Tomohiro Kawahara^{2,3}, Kota Miyasaka⁴, Toshihiko Ogura⁴ and Fumihito Arai¹
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²Kyusyu Institute of Technology, JAPAN
³Massachusetts Institute of Technology, USA
⁴Tohoku University, JAPAN
(1636)

213-Mo

CONFOCAL MICROENDOSCOPIC 3D IMAGING USING MEMS SCANNERS FOR BOTH LATERAL AND AXIAL SCANS

Lin Liu, Erkang Wang, Xiaoyang Zhang, Yiqi Tang and Huikai Xie
University of Florida, USA
(1672)

214-Tu

PORTABLE CONTINUOUS GLUCOSE MONITORING SYSTEMS WITH IMPLANTABLE FLUORESCENT HYDROGEL MICROFIBERS

M. Takahashi^{1,3}, Y. J. Heo^{1,2}, T. Kawanishi^{1,3}, T. Okitsu^{1,2} and S. Takeuchi^{1,2}
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²The University of Tokyo, JAPAN
³TERUMO Co. R&D Headquarters, JAPAN
(1693)

215-We

ANTERIOR AND POSTERIOR TONGUE ACTIVITY SENSOR BASED ON TRIAXIAL FORCE SENSOR

Y. Takei¹, K. Noda¹, T. Kawai², T. Tachimura,^{2,3} Y. Toyama⁴, M. Takai⁴, K. Matsumoto¹, and I. Shimoyama¹

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³Osaka University, JAPAN,

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(1718)

216-Th

METAL/SILICON DIOXIDE MICROTUBE IMPROVES OPTICAL AND ELECTRICAL PROPERTIES OF NEUROPROBE

T. Nakamura¹, M. Sakata¹, A. Goryu^{1,2}, M. Ishida¹ and T. Kawano¹

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(1787)

217-Mo

MINI X-RAY IMAGING BASED ON SAFELY SHIELDED PURE BETA RADIOISOTOPES

Mahatasin Azad, Dong-Ok Choe and Hanseup Kim

University of Utah, USA

(1830)

Micro-Fluidic Components and Systems

219-We

RAPID MEASUREMENT OF SPECIFIC MEMBRANE CAPACITANCE AND CYTOPLASM CONDUCTIVITY ON SINGLE CELLS

Yi Zheng, Ehsan Shojaei-Baghini, Chen Wang and Yu Sun

University of Toronto, CANADA

(1060)

220-Th

INVESTIGATION ON THE THICKNESS EFFECT OF A HYDROPHOBIC LAYER FOR OPERATING VOLTAGE REDUCTION IN EWOD SYSTEMS

Jeong Byung Chae, Jun O Kwon, Ji Sun Yang, Kyehan Rhee and Sang Kug Chung

Myongji University, KOREA

(1064)

221-Mo

MICROPATTERNED SUPERHYDROPHOBIC TEXTILE FOR BIOFLUIDIC TRANSPORT

S. Xing, J. Jiang, and T. Pan

University of California, USA

(1095)

222-Tu

PATTERNING OF MICRO-DROPLETS IN NONPOLAR SOLVENT BY ELECTRO-EMULSIFICATION AND ELECTROPHORESIS

T. Nakakubo, K. Matsumoto and I. Shimoyama

The University of Tokyo, JAPAN

(1123)

223-We

A PARTICLE TRAPPING CHIP USING THE WIDE AND UNIFORM SLIT FORMED BY A DEFORMABLE MEMBRANE AND AIR BUBBLE PLUGS

I. Doh, Y. Kim and Y.-H Cho

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

(1139)

224-Th

OSMOTIC ACTUATION FOR MICROFLUIDIC COMPONENTS IN POINT-OF-CARE APPLICATIONS

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(1155)

225-Mo

A DIGITAL MICROFLUIDIC CONTROL SYSTEM WITH PRECISE CONTROL OF ELECTROSTATIC FORCE AND IMPEDANCE-BASED VELOCITY MEASUREMENT

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²University of Guelph, CANADA

(1228)

226-Tu

MULTI-COLOR MICROFLUIDIC ORGANIC LIGHT EMITTING DEVICE USING ELECTROLUMINESCENCE AND ELECTROCHEMILUMINESCENCE

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⁴Nissan Chemical Industries, Ltd., JAPAN

⁵International Institute for Carbon Neutral Energy Research, Kyushu University, JAPAN

(1251)

227-We

DYNAMIC STRESSING MEASUREMENT OF VISCOUS LIQUIDS USING MICROFLUIDIC CHIPS

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²Keio University, Tokyo, JAPAN

³Data Storage Institute, A*STAR, SINGAPORE

(1289)

228-Th

INTEGRATION OF MICROFLUIDIC DEVICES AND AN OPTICALLY-INDUCED DIELECTROPHORESIS DEVICE FOR MEDIUM REPLACEMENT AND CELL MANIPULATION/SEPARATION

Huan-Chun Wu and Gwo-Bin Lee

National Tsing Hua University, TAIWAN

(1343)

229-Mo

GENERATION OF PERPENDICULAR CHEMICAL AND OXYGEN GRADIENTS FOR CELL CULTURE IN A MICROFLUIDIC DEVICE

Melissa Tu¹, Yung-Ju Cheng², Ying-Hua Chen², Chien-Chung Peng² and Yi-Chung Tung²

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²Research Center for Applied Sciences, Academia Sinica, TAIWAN

(1345)

230-Tu

FLIP-DROP: DROPLET ARRAY CREATED BY SURFACE ENERGY TRAP FOR COMBINATORIAL SCREENING

Yi Zhang and Tza-Huei Wang

Johns Hopkins University, USA

(1382)

231-We

HIGH -THROUGHPUT SPERM SORTING IN A MICRO DIFFUSER TYPE FLUIDIC SYSTEM

Yu-Nan Lin and Peng-Chun Chen and Ren-Guei Wu and Li-Chern Pan and Fan-Gang Tseng

National Tsing Hua University, TAIWAN

(1407)

232-Th

NOVEL DRUG DELIVERY METHOD BY USING A MICROROBOT INCORPORATED WITH AN ACOUSTICALLY OSCILLATING BUBBLE

Jun O Kwon, Ji Sun Yang, Jeong Byung Chae and Sang Kug Chung

Myongji University, KOREA

(1424)

233-Mo

ATTOLITER ORDER DROPLET FORMATION USING NANOCANNELS AND ENZYME REACTION INSIDE A DROPLET

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(1438)

234-Tu

MULTI NOZZLE ELECTROHYDRODYNAMIC INKJET PRINTING HEAD BY BATCH FABRICATION

K. I. Lee^{1,2}, B. Lim¹, H. Lee¹, S. H. Kim¹, C. S. Lee¹, J. W. Cho¹, S. Chung² and Y. Hong²

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²Seoul National University, KOREA

(1449)

235-We

CONTACTLESS CATCH-AND-RELEASE SYSTEM FOR GIANT LIPOSOMES BASED ON NEGATIVE DIELECTROPHORESIS

Taiga Kodama^{1,2}, Toshihisa Osaki¹, Ryuji Kawano¹, Koki Kamiya¹, Norihisa Miki^{1,2} and Shoji Takeuchi^{1,3}

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²Keio University, JAPAN

³Institute of Industrial Science, The University of Tokyo, JAPAN

(1450)

236-Th

ENZYME-DOPED ION SELECTIVE MEMBRANE (ED-ISM) FORMED WITH SURFACE FORCE AND MICROSTRUCTURES FOR HIGH PERFORMANCE UREA DETECTION

Ting-Yi Chiang and Che-Hsin Lin

National Sun Yat-sen University, TAIWAN

(1466)

237-Mo

SHEATH-FLOW FORMING BY USING TWISTED MICRO-CHANNEL

T. Sato and R. Miyake

Research Institute for Nanodevice and Bio Systems, Hiroshima University, JAPAN

(1542)

238-Tu

LARGE RANGE VERSATILE WIRELESS MICROROBOTIC MANIPULATORS IN MICROFLUIDIC DEVICES

Gilgueng Hwang¹, Hugo Salmon¹, Ioan Alexandru Ivan², Joel Agnus², Nicolas Chaillet², Stéphane Régnier³ and Anne-Marie Haghiri-Gosnet¹

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³University Pierre et Marie Curie / Institute des Systèmes Intelligents et de Robotique, FRANCE

(1555)

239-We

TURBULENT DRAG REDUCTION ON SUPERHYDROPHOBIC SURFACES CONFIRMED BY BUILT-IN SHEAR SENSING

Hyungmin Park, Guangyi Sun and Chang-Jin "CJ" Kim
University of California, Los Angeles, USA
(1588)

240-Th

MINIATURIZED PUMPS AND VALVES, BASED ON CONDUCTIVE POLIMER ACTUATORS, FOR LAB-ON-CHIP APPLICATION

M. Hiraoka¹, P. Fiorini², B. Vandecasteele³, H. Tanaka¹, T. Podprocky³, S. van Put³,
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(1675)

241-Mo

HIGH-SPEED ELECTROSTATIC MICRO-HYDRAULICS FOR SENSING AND ACTUATION

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(1690)

242-Tu

GRAPHENE BASED DIGITAL MICROFLUIDICS

X.B. Tan, P. Zeng, W. W. Yi and M. M. C. Cheng

Wayne State University, USA

(1750)

243-We

CENTRIFUGE-BASED DYNAMIC MICROARRAY SYSTEM TOWARD AN ARRAY OF A FEW AMOUNT OF SAMPLE

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A BEAD-IN-DROPLET SOLUTION EXCHANGE SYSTEM VIA CONTINUOUS FLOW MICROFLUIDIC RAILING

Kosuke Iwai, Ryan D. Sochol and Liwei Lin

Berkeley Sensor and Actuator Center, University of California, Berkeley, USA

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245-Mo

EFFECTIVE THREE-DIMENSIONAL SUPERHYDROPHOBIC CHANNEL COATING USING ORGANICALLY MODIFIED SILICA AEROGEL

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