

MEMS 2008 Tucson



21st IEEE International Conference on Micro Electro Mechanical Systems

JANUARY 13 - 17, 2008



Advance PROGRAM

CONFERENCE CO-CHAIRMEN

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Georgia Institute of Technology

&
Yitshak Zohar, Ph.D.
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ROBOTICS AND AUTOMATION SOCIETY



Sunday, January 13, 2008

4:00 p.m. -
7:00 p.m. **REGISTRATION**

6:30 p.m. -
8:30 p.m. **WELCOME RECEPTION**

Monday, January 14, 2008

8:00 a.m. **WELCOME ADDRESS**

8:40 a.m. **INVITED SPEAKER**
CMOS BASED SENSORS: FROM A SAMPLE TO REAL PRODUCTS
Felix Mayer
SENSIRION AG, SWITZERLAND

SESSION I INTEGRATED MICROSYSTEMS

9:20 a.m. A 0.1DEG/HR BIAS DRIFT ELECTRONICALLY MATCHED TUNING FORK MICROGYROSCOPE
A. Sharma, M.F. Zaman, M. Zurcher and F. Ayazi
Georgia Institute of Technology, USA

9:40 a.m. FULLY MONOLITHIC CMOS NICKEL MICROMECHANICAL RESONATOR OSCILLATOR
W.-L. Huang¹, Z. Ren¹, Y.-W. Lin¹, H.-Y. Chen¹, J. Lahann¹ and C.T. Nguyen²
¹University of Michigan, USA and ²University of California, Berkeley, USA

10:00 a.m. **EXHIBITON INSPECTION AND BREAK**

SESSION II MICROFLUIDIC DEVICES & SYSTEMS

10:30 a.m. MICROFLUIDIC ARRAY CHIP FOR SINGLE-CELL ISOLATION USING TWO-WAY PNEUMATIC ACTUATION
Y.-J. Kim, J. Chung, H.-K. Lee and E. Yoon
University of Minnesota, USA

10:50 a.m. MICROFLUIDIC FORMATION OF LIPID BILAYER ARRAY FOR MEMBRANE TRANSPORT ANALYSIS
S. Ota, W. Tan, H. Suzuki and S. Takeuchi
The University of Tokyo, JAPAN

11:10 a.m. A NEW DROPLET FORMATION CHIP UTILIZING CONTROLLABLE MOVING-WALL STRUCTURES FOR DOUBLE EMULSION APPLICATIONS
C.H. Lee, Y.H. Lin and G.B. Lee
National Cheng Kung University, TAIWAN

11:30 a.m. SURFACE ACOUSTIC WAVE INDUCED DYNAMIC PATTERNING OF MICRO BEADS IN MICROFLUIDIC CHANNELS
J.J. Shi, D. Ahmed, X. Mao and T.J. Huang
Pennsylvania State University, USA

11:50 a.m. QUANTITATIVE KINETIC ANALYSIS OF DNA NANOCOMPLEX SELF-ASSEMBLY WITH QUANTUM DOTS FRET IN A MICROFLUIDIC DEVICE
Y.P. Ho¹, H.H. Chen¹, C.M. Puleo¹, H.C. Yeh¹, K.W. Leong² and T.H. Wang¹
¹Johns Hopkins University, USA and ²Duke University, USA

12:10 p.m. FULLY PASSIVE DEGASSING AND FUEL SUPPLY IN DIRECT METHANOL FUEL CELLS
N. Paust, C. Litterst, T. Metz, R. Zengerle and P. Koltay
University of Freiburg, GERMANY

12:30 p.m. **LUNCH**

1:30 p.m. -
3:30 p.m. **POSTER/ORAL SESSION I**

3:30 p.m. **EXHIBITON INSPECTION AND BREAK**

**SESSION III MICROACTUATORS**

- 4:00 p.m. **A KNUDSEN PUMP USING NANOPOROUS ZEOLITE FOR ATMOSPHERIC PRESSURE OPERATION**
N.K. Gupta and Y.B. Gianchandani
University of Michigan, Ann Arbor, USA
- 4:20 p.m. **LIQUID MOTOR DRIVEN BY ELECTROWETTING**
A. Takei, K. Nguyen, E. Iwase, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN
- 4:40 p.m. **NOVEL ELECTRO-THERMAL BIMORPH ACTUATOR FOR LARGE OUT-OF-PLANE DISPLACEMENT AND FORCE**
J. Wei, T. Chu Duc, G.K. Lau and P.M. Sarro
Delft University of Technology, THE NETHERLANDS
- 5:00 p.m. **A FULLY FUNCTIONAL MICRO TRANSPORTATION SYSTEM WITH STRIDER-LIKE MOVEMENT OF MICRO CONTAINERS**
D.V. Dao, P.H. Pham and S. Sugiyama
Ritsumeikan University, JAPAN
- 5:20 p.m. **ADJOURN FOR THE DAY**

Tuesday, January 15, 2008

- 8:00 a.m. **INVITED SPEAKER**
CELL MANIPULATION IN MICROSYSTEMS FOR CLINICAL APPLICATIONS
Mehmet Toner
Massachusetts General Hospital, USA

SESSION IV BIOMEDICAL APPLICATIONS

- 8:40 a.m. **IMPLANTABLE PARYLENE-BASED WIRELESS INTRAOCULAR PRESSURE SENSOR**
P.-J. Chen¹, D.C. Rodger², S. Saati³, M.S. Humayun² and Y.-C. Tai¹
¹*California Institute of Technology, USA*, ²*University of Southern California, USA* and ³*Doheny Eye Institute, USA*
- 9:00 a.m. **"MEMBRANE MICRO EMBOSS FOLLOWING EXCIMER LASER ABLATION (MEME-X) PROCESS" FOR PRESSURE-DRIVEN MICRO ACTIVE CATHETER**
M. Ikeuchi and K. Ikuta
Nagoya University, JAPAN
- 9:20 a.m. **MAGNETIC-BEAD-BASED MICROFLUIDIC SYSTEMS FOR DETECTION OF GENETIC DISEASES**
K.Y. Lien, C.J. Liu and G.B. Lee
National Cheng Kung University, TAIWAN
- 9:40 a.m. **A HYDROGEL-BASED WIRELESS SENSOR USING MICROMACHINED VARIABLE INDUCTORS WITH FOLDED FLEX-CIRCUIT STRUCTURES FOR BIOMEDICAL APPLICATIONS**
V. Sridhar and K. Takahata
University of British Columbia, CANADA
- 10:00 a.m. **EXHIBITON INSPECTION AND BREAK**

SESSION V MICRORESONATORS

- 10:30 a.m. **LIMITS OF QUALITY FACTOR IN BULK-MODE MICROMECHANICAL RESONATORS**
S.A. Chandorkar¹, M. Agarwal¹, R. Melamud¹, R.N. Candler², K.E. Goodson¹ and T.W. Kenny¹
¹*Stanford University, USA* and ²*Robert Bosch Corporation, USA*
- 10:50 a.m. **TEMPERATURE MEASUREMENT AND COMPENSATION BASED ON TWO VIBRATING MODES OF A BULK ACOUSTIC MODE MICRORESONATOR**
M. Koskenvuori¹, V. Kaajakari², T. Mattila² and I. Tittonen¹
¹*Helsinki University of Technology, FINLAND* and ²*VTT Technical Research Center of Finland, FINLAND*
- 11:10 a.m. **FROM VHF TO UHF CMOS-MEMS MONOLITHICALLY INTEGRATED RESONATORS**
J. Teva, G. Abadal, A. Uranga, J. Verd, F. Torres, J.L.L. López, J. Esteve, F. Pérez-Murano and N. Barniol
Universitat Autònoma de Barcelona, SPAIN

**SESSION VI PHYSICAL SENSORS & SYSTEMS**

- 11:30 a.m. **FOUR-DEGREE-OF-FREEDOM SOLID STATE MEMS JOYSTICK**
P. Gieschke¹, J. Richter², J. Joos¹, P. Ruther¹ and O. Paul¹
¹University of Freiburg, GERMANY and ²Technical University of Denmark, DENMARK
- 11:50 a.m. **A NOVEL DOUBLE-SIDE CMOS-MEMS POST PROCESSING FOR MONOLITHIC SENSOR INTEGRATION**
C.M. Sun¹, C. Wang¹, M.H. Tsai¹, H.S. Hsieh² and W. Fang¹
¹National Tsing Hua University, TAIWAN and ²Delta Electronics Inc, TAIWAN
- 12:10 p.m. **PROOFMASS-LESS VIBRATION SENSOR USING THE MOTION OF SELF-CHARGED ANION AND CATION IN AN ELECTROLYTE FOR ULTRA-HIGH FREQUENCY DETECTION**
K.-H. Kim and Y.H. Seo
Kangwon National University, KOREA
- 12:30 p.m. **LUNCH**
- 1:30 p.m. -
3:30 p.m. **POSTER/ORAL SESSION II**
- 3:30 p.m. **ADJOURN FOR THE DAY**

Wednesday, January 16, 2008

- 8:00 a.m. **INVITED SPEAKER**
FIBER OPTIC NERVE SYSTEMS FOR MATERIALS AND STRUCTURES THAT CAN FEEL PAIN
Kazuo Hotate
University of Tokyo, JAPAN

SESSION VII PACKAGING & ASSEMBLY

- 8:40 a.m. **IDENTIFICATION AND MANAGEMENT OF DIFFUSION PATHWAYS IN POLYSILICON ENCAPSULATION FOR MEMS DEVICES**
B. Kim¹, R.N. Candler², R. Melamud¹, S. Yoneoka¹, H.K. Lee¹, G. Yama² and T.W. Kenny¹
¹Stanford University, USA and ²Palo Alto Robert Bosch Research and Technology Center, USA
- 9:00 a.m. **IMPLANTABLE RF-COILED CHIP PACKAGING**
W. Li, D.C. Rodger and Y.C. Tai
California Institute of Technology, USA
- 9:20 a.m. **A MICROFLUIDIC-ELECTRIC PACKAGE FOR POWER MEMS GENERATORS**
F. Herrault, C.-H. Ji, S.-H. Kim, X. Wu and M.G. Allen
Georgia Institute of Technology, USA
- 9:40 a.m. **HIDDEN VERTICAL COMB-DRIVE ACTUATOR ON PDMS FABRICATED BY PARTS-TRANSFER**
E. Iwase, H. Onoe, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN
- 10:00 a.m. **EXHIBITON INSPECTION AND BREAK**

SESSION VIII OPTICAL MEMS

- 10:30 a.m. **ADAPTIVE FLUIDIC PDMS-LENS WITH INTEGRATED PIEZOELECTRIC ACTUATOR**
F. Schneider¹, D. Eberhard², D. Strohmeier², C. Müller¹ and U. Wallrabe¹
¹University of Freiburg, GERMANY and ²Fraunhofer Institute for Physical Measurement Technics, GERMANY
- 10:50 a.m. **NOVEL CONCAVE-BASED MICRO OPTICAL COMPONENTS**
S.-Y. Hsiao, C.-C. Lee and W. Fang
National Tsing Hua University, TAIWAN
- 11:10 a.m. **SINGLE MONOLAYER NANOCRYSTAL LED ON SCANNING OPTICAL MICROPROBE FOR MOLECULAR-RESOLUTION IMAGING AND PATTERNING**
K. Hoshino, A. Gopal, D. Ostrowski, L. Rozanski, R. Patel, A. Heitsch, B. Korgel, D. VandenBout and X.J. Zhang
The University of Texas at Austin, USA
- 11:30 a.m. **A NEW METHOD OF DRIVING AN AMOLED WITH MEMS SWITCHES**
J.O. Lee, H.-H. Yang, W.W. Jang and J.-B. Yoon
Korea Advanced Institute of Science and Technology, KOREA
- 11:50 a.m. **MEMS GRATINGS FOR NONDISPERSIVE OPTICAL PHASE MODULATION**
G. Zhou, Y. Du and F.S. Chau
National University of Singapore, SINGAPORE



12:10 p.m. **MECHANICALLY FLEXIBLE AND EXPANDABLE DISPLAY WITH CONDUCTIVE POLYMER COATED NYLON FABRIC**
S. Takamatsu, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN

12:30 p.m. **LUNCH**

1:30 p.m. -
3:30 p.m. **POSTER/ORAL SESSION III**

3:30 p.m. **EXHIBITON INSPECTION AND BREAK**

SESSION IX NEMS

4:00 p.m. **BIOMOLECULAR MOTOR-BASED CARGO TRANSPORTERS WITH LOADING/UNLOADING MECHANISMS ON A MICRO-PATTERNED DNA ARRAY**
S. Hiyama^{1,2}, S. Takeuchi², R. Gojo², T. Shima² and K. Sutoh²
¹NTT DoCoMo, Inc., JAPAN and ²The University of Tokyo, JAPAN

4:20 p.m. **DUAL-CHIRALITY HELICAL NANOBELTS: A NOVEL LINEAR-TO-ROTARY MOTION CONVERTER**
L.X. Dong, L. Zhang, B.E. Kratochvil, K.Y. Shou and B.J. Nelson
ETH Zurich, SWITZERLAND

4:40 p.m. **A MEMS READ-WRITE HEAD FOR FE PROBE STORAGE**
Y. Zhao, E. Johns and M. Forrest
Seagate Technology Inc., USA

5:00 p.m. **LOW POWER, WIDE DYNAMIC RANGE CARBON NANOTUBE VACUUM GAUGES**
A. Kaul and H. Manohara
Jet Propulsion Labs, USA

5:20 p.m. **ADJOURN FOR THE DAY**

6:00 p.m. -
10:00 p.m. **CONFERENCE BANQUET**

Thursday, January 17, 2008

8:00 a.m. -
10:00 a.m. **POSTER/ORAL SESSION IV**

10:00 a.m. - **EXHIBITON INSPECTION AND BREAK**

SESSION X IMPLANTABLE MICRODEVICES

10:30 a.m. **MEMS BASED BIO-ELECTRONIC NEURO-MUSCLE INTERFACES FOR INSECT FLIGHT CONTROL**
A. Bozkurt¹, R. Gilmour¹, D. Stern² and A. Lal¹
¹Cornell University, USA and ²Boyce Thompson Institute, USA

10:50 a.m. **A CYBORG BEETLE: INSECT FLIGHT CONTROL THROUGH AN IMPLANTABLE, TETHERLESS MICROSYSTEM**
H. Sato, C.W. Berry, B.E. Casey, G. Lavella, Y. Yao, and M.M. Maharbiz
University of Michigan, USA

SESSION XI RF MEMS

11:10 a.m. **IDENTIFYING DEGRADATION MECHANISMS IN RF MEMS CAPACITIVE SWITCHES**
R.W. Herfst¹, P.G. Steeneken¹ and J. Schmitz²
¹NXP Semiconductors, THE NETHERLANDS and ²University of Twente, THE NETHERLANDS

11:30 a.m. **INFLUENCE OF THE SUBSTRATE ON THE LIFETIME OF CAPACITIVE RF MEMS SWITCHES**
P. Czarnecki^{1,2}, X. Rottenberg^{1,2}, P. Soussan¹, P. Ekkels^{1,2}, P. Muller¹, P. Nolmans¹, W. De Raedt¹,
H.A.C. Tilmans¹, R. Puers², L. Marchand³ and I. De Wolf^{1,2}
¹IMEC, BELGIUM, ²Katholieke Universiteit Leuven, BELGIUM and ³ESA/ESTEC, THE NETHERLANDS

11:50 a.m. **A LOW-LOSS 1.8GHZ MONOLITHIC THIN-FILM PIEZOELECTRIC-ON-SUBSTRATE FILTER**
W. Pan, R. Abdolvand and F. Ayazi
Georgia Institute of Technology, USA

12:10 p.m. **HIGH-Q, TUNABLE-GAP MEMS VARIABLE CAPACITOR ACTUATED WITH AN ELECTRICALLY FLOATING PLATE**
H.S. Lee, Y.J. Yoon, D.-H. Choi and J.-B. Yoon
Korea Advanced Institute of Science and Technology, KOREA

12:30 p.m. **CONFERENCE ADJOURNS**



POSTER/ORAL PRESENTATIONS

MP	Monday	1:30 pm. - 3:30 p.m.	TP	Tuesday	1:30 pm. - 3:30 p.m.
WP	Wednesday	1:30 pm. - 3:30 p.m.	ThP	Thursday	8:00 a.m. - 10:00 a.m.

BIO & CHEMICAL SENSORS

- MP** **MAGNETIC BEAD RETENTION DEVICE FOR FULL ON-CHIP SANDWICH IMMUNO-ASSAY**
F. Lacharme, C. Vandevyver and M.A.M. Gijs
Ecole Polytechnique Fédérale de Lausanne, SWITZERLAND
- MP** **SINGLE MOLECULE DETECTION IN TRULY, NANOLITER-SIZED VOLUMES: COUPLING EVAPORATION-BASED, MICROFLUIDIC CONCENTRATION WITH CONFOCAL FLUORESCENCE SPECTROSCOPY**
C.M. Puleo, H.C. Yeh, K. Liu, T. Rane and T.H. Wang
Johns Hopkins University, USA
- MP** **UV ENHANCED OXYGEN SENSING OF ZNO NANOWIRES**
L. Luo, B. Sosnowchik and L. Lin
University of California at Berkeley, USA
- MP** **ENHANCED TOXIC GAS DETECTION USING A MEMS PRECONCENTRATOR COATED WITH THE METAL ORGANIC FRAMEWORK ABSORBER**
J. Yeom, I. Oh, Z. Ni, C. Field, A. Radadia, B. Bae, J.-H. Han, R.I. Masel and M.A. Shannon
University of Illinois, USA
- MP** **FLEXIBLE AND DISPOSABLE IMMUNOSENSORS BASED ON LAYER-BY-LAYER SELF ASSEMBLY OF CARBON NANOTUBES AND BIOMOLECULES**
M. Lu, D. Lee, W. Xue and T. Cui
University of Minnesota, USA
- TP** **AN SU-8 BASED FLUIDIC IMMUNO-SPECTROSCOPIC LAB-ON-A-CHIP FOR RAPID QUANTITATIVE DETECTION OF BIOMOLECULES**
L. Jiang, K.P. Gerhardt, B. Myer, Y. Zohar and S. Pau
The University of Arizona, USA
- TP** **GAS AND LIQUID PHASE SENSING OF VOLATILE ORGANICS WITH DISK MICRORESONATOR**
S. Truax¹, K.S. Demirci¹, J.H. Seo¹, P. Kurzawski², Y. Luzinova¹, A. Hierlemann², B. Mizaiakoff¹ and O. Brand¹
¹Georgia Institute of Technology, USA and ²ETH Zurich, SWITZERLAND
- TP** **FINGER-TOP TOTAL PROTEIN ANALYSIS SYSTEM BASED ON NEW BIOCHEMICAL IC CHIPS**
K. Ikuta, N. Satake, T. Ohashi and M. Shibata
Nagoya University, JAPAN
- WP** **DETECTION OF C-REACTIVE PROTEIN BASED ON MEASUREMENT OF BROWNIAN MOTION BY MICRO PARTICLE TRACKING VELOCIMETRY**
C.P. Liu, Y.J. Fan, C.J. Hsu, T.H. Wu and H.J. Sheen
National Taiwan University, TAIWAN
- WP** **EXPLOSIVE TRACE DETECTION WITH FBAR-BASED SENSOR**
A. Lin, H. Yu, M. Waters, E.S. Kim and S.D. Goodman
University of Southern California, USA
- WP** **FUNCTIONALIZED HYDROGEL SURFACE PATTERNED IN A CHIP FOR LOCAL PH SENSING**
H. Maruyama¹, H. Matsumoto², T. Fukuda¹ and F. Arai²
¹Nagoya University, JAPAN and ²Tohoku University, JAPAN
- ThP** **AN INTEGRATED MICROFLUIDIC SYSTEM FOR AFFINITY EXTRACTION AND CONCENTRATION OF BIOMOLECULES COUPLED TO MALDI-MS**
T.H.T. Nguyen, R. Pei, C. Mei, J. Ju, M. Stojanovic and Q. Lin
Columbia University, USA
- ThP** **BIOMOLECULAR DETECTION USING NANOSCALE OPTOFLUIDIC SENSOR ARRAYS**
S. Mandal, J. Goddard and D. Erickson
Cornell University, USA
- ThP** **EVALUATION OF CHEMICAL REACTION KINETICS USING A THERMALLY ACTIVE PIEZORESISTIVE MICROCANTILEVER ARRAY**
A. Choudhury¹, R. Vujanic², P.J. Hesketh¹, T. Thundat³ and Z. Hu³
¹Georgia Institute of Technology, USA, ²ETH Zurich, SWITZERLAND and ³Oak Ridge National Laboratory, USA

BIOMEDICAL SYSTEMS

- MP** **A SELF-ADAPTIVE FLUIDIC PROBE FOR ELECTRICAL CAVITIES DETECTION**
S.-H. Chang and Y.-C. Su
National Tsing Hua University, TAIWAN
- TP** **DUAL DRUG DELIVERY DEVICE FOR CHRONIC PAIN MANAGEMENT USING MICROMACHINED ELASTIC METAL STRUCTURES AND SILICON MICROVALVES**
A.T. Evans, J.M. Park, S. Chiravuri and Y.B. Gianchandani
University of Michigan, USA



- WP NOVEL PARYLENE CABLED SILICON PROBE SYSTEM FOR NEURAL PROSTHETICS
R. Huang, C. Pang, Y.C. Tai, J. Emken, C. Ustun, R.A. Andersen and J.W. Burdick
California Institute of Technology, USA
- WP AN IMPLANTABLE WIRELESS MICRODOSIMETER FOR RADIATION ONCOLOGY
C. Son and B. Ziaie
Purdue University, USA
- ThP FABRICATION AND TESTING OF A NOVEL ALL-DIAMOND NEURAL PROBE FOR CHEMICAL DETECTION AND ELECTRICAL SENSING APPLICATIONS
H.Y. Chan¹, D.M. Aslam¹, S.H. Wang¹, G.M. Swain¹ and K.D. Wise²
¹*Michigan State University, USA* and ²*University of Michigan, USA*

CELLULAR MANIPULATION

- MP INJECTION AND CUTTING METHODS OF ANIMAL CELLS USING A MICROFLUIDIC CHIP
A. Ichikawa¹, S. Takahashi², K. Matsukawa², T. Tanikawa¹ and K. Ohba¹
¹*National Institute of Advanced Industrial Science and Technology, JAPAN* and ²*NILGS, JAPAN*
- MP DESIGN AND CHARACTERIZATION OF A BIOMEDICAL DEVICE CAPABLE OF PICO-CI LEVEL BETA DETECTION FOR THE STUDY OF CELL METABOLISM
Z.T.F. Yu, N.T. Vu, C.J. Shu, K. Kamei, R.W. Silverman, O.N. Witte, C.G. Radu, A.F. Chatzioannou and H.-R. Tseng
University of California at Los Angeles, USA
- MP ELECTROFORMATION OF SOLVENT-FREE LIPID MEMBRANCES ON MICROAPERTURE ARRAY
K. Kuribayashi and S. Takeuchi
The University of Tokyo, JAPAN
- TP MICRONEEDLE ARRAYS FOR INTRACELLULAR RECORDING APPLICATIONS
J. Held¹, J. Gaspar¹, P.J. Koester², C. Tautorat³, A. Cismak³, A. Heilman³, W. Bauman², P. Ruther¹ and O. Paul¹
¹*University of Freiburg, GERMANY*, ²*University of Rostock, GERMANY* and ³*Fraunhofer Institute for Mechanics of Materials, GERMANY*
- TP BOTH PNEUMATIC AND MAGNETIC MANIPULATION OF SCATTERED CELLS ON MICRO CHANNEL ARRAY FOR CELLULAR ANALYSIS
T. Hiranishi¹, W. Tonomura¹, K. Ino², M. Okochi², H. Honda² and S. Konishi¹
¹*Ritsumeikan University, JAPAN* and ²*Nagoya University, JAPAN*
- TP ASSEMBLY OF SINGLE ADHERENT CELLS ON MOBILE MICROPLATES
H. Onoe and S. Takeuchi
The University of Tokyo, JAPAN
- WP A PDMS MICROFLUIDIC CHIP WITH NANOSTRUCTURES FOR BACTERIA CONCENTRATION AND FAST DETECTION
J.J. Yu, L.D. Xiao and M. Yang
The Hong Kong Polytechnic University, HONG KONG
- WP MICROCHIP FOR THE REGULATION OF SKELETAL MUSCLE DIFFERENTIATION
Y. Zhao
The Ohio State University, USA
- WP "HOUSING" FOR CELLS IN MONODISPERSE MICROCAGES
Y. Morimoto, W. Tan and S. Takeuchi
The University of Tokyo, JAPAN
- ThP TRANSFECTION OF MOLECULAR BEACONS IN MICROCHANNELS UNDER FLOW AND NO-FLOW CONDITIONS
N. Li¹, P.K. Wong², J. Lin¹ and C.M. Ho¹
¹*University of California at Los Angeles, USA* and ²*University of Arizona, USA*
- ThP MULTILAYER PARYLENE-C STENCILS FOR DYNAMICALLY CONTROLLING CELL-CELL INTERACTIONS
C.-L. Chen¹, S. Jinno², H. Moller², S.-H. Chao¹, S. Selvarasah¹, A. Khademhosseini² and M.R. Dokmeci¹
¹*Northeastern University, USA* and ²*Harvard Medical School, USA*
- ThP A COMPACT MICROFLUIDIC CONTINUOUS FLOW SEPARATOR FOR PARTICLE AND CELL SORTING
P.B. Lillehoj, N. Li, H. Tsutsui and C.M. Ho
University of California at Los Angeles, USA
- ThP MEMS BASED SENSORS TO EXPLORE THE ROLE OF TENSION IN AXONS FOR NEURO-TRANSMISSION
S. Yang, S. Siechen, J. Sung, A. Chiba and T. Saif
University of Illinois at Urbana-Champaign, USA

FABRICATION

- MP DESIGN AND CHARACTERIZATION OF A NOVEL ICP TOOL FOR HIGH SPEED AND HIGH ACCURACY DRIE PROCESSING
H.W. Van Zeijl¹, N. Launay² and P.M. Sarro¹
¹*Delft University of Technology, THE NETHERLANDS* and ²*Alcatel Micro Machining Systems, FRANCE*



- MP **AN IMPROVED ANISOTROPIC WET ETCHING PROCESS FOR THE FABRICATION OF SILICON MEMS STRUCTURES BY SINGLE ETCHING MASK**
P. Pal¹, K. Sato¹, M.A. Gosalvez² and M. Shikida¹
¹Nagoya University, JAPAN and ²Helsinki University of Technology, FINLAND
- MP **TWO-DIMENSIONAL DENSE-ARRAYED PROBE-CARDS WITH A HOE-SHAPED PROBING-TIP MICROMACHINING TECHNIQUE**
F. Wang, X.X. Li, H. Yang, Y. Wang, S. Feng and X. Ge
Shanghai Institute of Microsystem and Information Technology, CHINA
- MP **POST-CMOS INTEGRATION TECHNOLOGY OF THICK-FILM SOI MEMS DEVICES USING MICRO BRIDGE INTERCONNECTIONS**
H. Takao^{1,2}, T. Ichikawa¹, T. Nakata¹, K. Sawada^{1,2} and M. Ishida^{1,2}
¹Toyohashi University of Technology, JAPAN and ²JST-CREST, JAPAN
- MP **MICRO-ELECTRO-DISCHARGE MACHINING BY MEMS ACTUATORS WITH PLANAR ELECTRODES MICROFABRICATED ON THE WORK SURFACES**
C.R. Alla Chaitanya and K. Takahata
The University of British Columbia, CANADA
- MP **DIRECT PRINTING OF LEAD ZIRCONATE TITANATE THIN FILMS**
S.P. Bathurst, H.W. Lee and S.G. Kim
Massachusetts Institute of Technology, USA
- MP **INKJET PRINTING OF SU-8 FOR POLYMER-BASED MEMS; A CASE STUDY FOR MICROLENSES**
V. Fakhfour, N. Cantale, G. Mermoud, J.Y. Kim, D. Boiko, E. Charbon, A. Martinoli and J. Brugger
Ecole Polytechnique Fédérale de Lausanne, SWITZERLAND
- MP **BATCH FABRICATION OF POLYMER MICROSYSTEMS WITH SHAPE MEMORY MICROACTUATORS**
T. Grund and M. Kohl
Forschungszentrum Karlsruhe, GERMANY
- TP **HAREM: HIGH ASPECT RATIO ETCHING AND METALLIZATION**
E. Sarajlic¹, C. Yamahata¹, M. Cordero¹, D. Collard^{1,2} and H. Fujita¹
¹The University of Tokyo, JAPAN and ²LIMMS/CNRS-IIS, JAPAN
- TP **SIWALL EPITAXIAL PIEZORESISTOR PROCESS FOR IN-PLANE SENSING APPLICATIONS**
A.A. Barlian, N. Harjee, M. Vikram, T.H. Fung and B.L. Pruitt
Stanford University, USA
- TP **FABRICATION OF MICROPROBES ON A ULTRATHICK GLASS SUBSTRATE WITH NARROW-PITCH ELECTRICAL FEEDTHROUGHS FOR NEXT-GENERATION LSI BURN-IN TESTS**
S. Tanaka¹, S. Fujimoto², O. Itoh², S.-H. Choe¹ and M. Esashi¹
¹Tohoku University, JAPAN and ²MEMS Core Co., Ltd., JAPAN
- TP **SURFACE NANOSTRUCTURING OF BIOCOMPATIBLE POLYMER FOR WETTABILITY CONTROL IN MEMS**
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¹San Francisco State University, USA and ²Rochester Institute of Technology, USA
- TP **REAL-TIME WIRELESS MONITORING OF WORKPIECE MATERIAL AND DEBRIS CHARACTERISTICS IN MICRO-ELECTRO-DISCHARGE MACHINING**
M.T. Richardson and Y.B. Gianchandani
University of Michigan, USA
- TP **A NEW PARADIGM FOR HIGH RESOLUTION 3D LITHOGRAPHY**
L.A. Mosher¹, C.M. Waits², B. Morgan² and R. Ghodssi¹
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- TP **A NOVEL METHOD TO FABRICATE LENSED OPTICAL FIBER WITH SU-8 PHOTORESIST FOR EFFICIENT COUPLING TO HIGH-POWER LASER DIODES**
C.C. Wu, Y.T. Tseng and C.H. Lin
National Sun Yat-Sen University, TAIWAN
- WP **LOW-VOLTAGE LARGE-VALUE TUNABLE CAPACITORS USING SELF-ALIGNED HARPSS**
M. Rais-Zadeh, A.K. Samaroo, P. Monajemi and F. Ayazi
Georgia Institute of Technology, USA
- WP **FABRICATION METHOD OF SUB-MICROMETER SIZE PLANAR GAP FOR THE MICRO FABRY-PEROT INTERFEROMETER**
T. Dohi, H. Hayashi, H. Onoe, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN
- WP **FABRICATION AND EVALUATION OF V-SHAPED MOS TRANSISTOR PROBE WITH NANO TIP**
S.H. Lee¹, G. Lim¹, H. Shin² and W. Moon¹
¹Pohang University of Science and Technology, KOREA and ²Kookmin University, KOREA
- WP **POST-HYDROPHILIC TREATMENT FREE PLASTIC BIOCHIP FABRICATION METHOD USING POLYUREA FILM**
H. Shinohara¹, Y. Takahashi², J. Mizuno¹ and S. Shoji¹
¹Waseda University, JAPAN and ²So-Ken Co., Ltd., JAPAN
- WP **MASKLESS SELECTIVE ELECTROCHEMICALLY ASSISTED WET ETCHING OF METAL LAYERS FOR 3D MICROMACHINED SOI RF MEMS DEVICES**
M. Sterner, N. Roxhed, G. Stemme and J. Oberhammer
KTH – Royal Institute of Technology, SWEDEN



- WP AUTOMATED DYNAMIC MODE MULTIDIRECTIONAL UV LITHOGRAPHY FOR COMPLEX 3-D MICROSTRUCTURES
J.K. Kim¹, M.G. Allen² and Y.K. Yoon¹
¹University at Buffalo, USA and ²Georgia Institute of Technology, USA
- WP NEW METHODS FOR LIQUID ENCAPSULATION IN POLYMER MEMS STRUCTURES
S. Matsumoto and N. Ichikawa
National Institute of Advanced Industrial Science and Technology, JAPAN
- ThP OCTREE-SEARCH KINETIC MONTE CARLO ALGORITHM FOR THE SIMULATION OF COMPLEX 3D MEMS STRUCTURES
Y. Xing¹, M. Gosalvez² and K. Sato³
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- ThP FABRICATING CAPACITIVE MICROMACHINED ULTRASONIC TRANSDUCERS WITH DIRECT WAFER-BONDING AND LOCOS TECHNOLOGY
K.K. Park, H.J. Lee, M. Kupnik, O. Oralkan and B.T. Khuri-Yakub
Stanford University, USA
- ThP PARALLEL ELECTRON BEAM MICRO-COLUMN WITH SELF-ALIGNED CARBON NANOTUBE EMITTERS
C.H. Tsai, J.Y. Ho, T. Ono and M. Esashi
Tohoku University, JAPAN
- ThP MICRO-MACHINED MICRO ION SOURCE FOR FLEXIBLE AND CONCURRENT PROCESS
S. Tamonoki, H. Kuwano and S. Nagasawa
Tohoku University, JAPAN
- ThP ATOMIC LAYER DEPOSITED ALUMINA FOR MICROMACHINED RESONATORS
Y.J. Chang, K. Cobry and V.M. Bright
University of Colorado at Boulder, USA
- ThP CONTACT LENS WITH INTEGRATED INORGANIC SEMICONDUCTOR DEVICES
H. Ho, E. Saeedi, S.S. Kim, T. Shen and B.A. Parviz
University of Washington, USA
- ThP SEALING METHOD OF PDMS AS ELASTIC MATERIAL FOR MEMS
S. Sawano¹, K. Naka¹, A. Werber², H. Zappe² and S. Konishi¹
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- MATERIAL CHARACTERIZATION**
- MP HIGH-THROUGHPUT WAFER-SCALE MICROTENSILE TESTING OF THIN FILMS
J. Gaspar, M. Schmidt, J. Held and O. Paul
University of Freiburg, GERMANY
- MP EXPERIMENTAL STUDY ON THE DIELECTRIC-DEFORMATION BEHAVIOR OF SiO₂ IN A SANDWICH STRUCTURE
J.-Q. Huang, X.-D. Huang, Q.-A. Huang and M. Qin
Southeast University, CHINA
- TP DETERMINATION OF THE PIEZORESISTIVITY OF MICROCRYSTALLINE SILICON-GERMANIUM AND APPLICATION TO A PRESSURE SENSOR
S. Lenci¹, P. Gonzalez², K. De Meyer³, R. Van Hoof³, D. Frederickx³ and A. Witvrouw³
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- TP DEVELOPEMENT OF BI-AXIAL TENSILE TESTER TO INVESTIGATE YIELD LOCUS FOR ALUMINUM FILM UNDER MULTI-AXIAL STRESSES
Y. Nagai¹, T. Namazu¹, N. Araki¹, Y. Tomizawa² and S. Inoue¹
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- WP PREDICTION OF FATIGUE LIFETIME BASED ON STATIC STRENGTH AND CRACK EXTENSION LAW - FATIGUE TEST OF MEMS MATERIALS BECOMES UNNECESSARY
T. Kawai¹, S. Kamiya¹, S. Amaki¹, O. Paul², P. Ruther² and J. Gaspar²
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- TP CLOSELY SPACED POLYMER MICROSTRUCTURES AS A UNIQUE TOOL FOR CHARACTERIZATION AT THE SMALL SCALES
Y. Zhao
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- WP MECHANICAL CHARACTERIZATION OF SiC FILM AT HIGH TEMPERATURES BY TENSILE TEST
S. Nakao¹, T. Ando¹, L. Chen², M. Mehregany² and K. Sato¹
¹Nagoya University, JAPAN and ²Case Western Reserve University, USA
- ThP CRYSTAL ORIENTATION DEPENDENCE OF FATIGUE CHARACTERISTICS IN SINGLE CRYSTAL SILICON MEASURED USING A ROTATING MICRO RESONATOR
T. Ikehara¹ and T. Tsuchiya²
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- ThP MEASUREMENT AND EVALUATION FOR INTERFACE THERMAL RESISTANCE OF METAL-DIELECTRIC LAYERS
H.C. Chien¹ and D.-J. Yao²
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MICROACTUATORS

- MP DEVELOPMENT OF NOVEL CASCADE STRUCTURE FOR IMPROVING STROKE OF ELECTROSTATIC COMB-DRIVE ACTUATOR
J.C. Chiou, C.F. Kuo, Y.J. Lin, C.W. Chang and K.C. Hou
National Chiao Tung University, TAIWAN
- MP LARGE ANGLE SOI TILTING ACTUATOR WITH INTEGRATED MOTION TRANSFORMER AND AMPLIFIER
A. Ya'akobovitz, S. Krylov and Y. Shacham-Diamand
Tel-Aviv University, ISRAEL
- MP PERFORMANCE CHARACTERIZATION OF MINIATURIZED DIELECTRIC ELASTOMER ACTUATORS FABRICATED USING METAL ION IMPLANTATION
S. Rosset, M. Niklaus, P. Dubois and H.R. Shea
Ecole Polytechnique Fédérale de Lausanne, SWITZERLAND
- MP ELECTROTHERMAL MICROGRIPPER WITH LARGE JAWS DISPLACEMENT AND INTEGRATED FORCE SENSORS
T. Chu Duc, G.K. Lau, J.F. Creemer and P.M. Sarro
Delft University of Technology, THE NETHERLANDS
- MP A NOVEL SELF-HEATING PARAFFIN MEMBRANE MICRO-ACTUATOR
F. Goldschmidtboeing, P. Katus, A. Geipel and P. Woias
University of Freiburg, GERMANY
- TP FABRICATION OF POLYMER-BASED VERTICAL COMB DRIVE USING A DOUBLE-SIDE MULTIPLE PARTIAL EXPOSURE METHOD
J. Chung and W. Hsu
National Chiao Tung University, TAIWAN
- TP PREDICTING THE SWITCHING TIME OF ELECTROSTATIC ACTUATORS
V. Leus and D. Elata
Technion - Israel Institute of Technology, ISRAEL
- TP MEASUREMENT AND MODELING OF FRICTION IN LINEAR AND ROTARY MICROMOTORS SUPPORTED ON MICROBALL BEARINGS
N. Ghalichechian, M. McCarthy, M.I. Beyaz and R. Ghodssi
University of Maryland, USA
- TP A PIEZOELECTRICALLY-DRIVEN HIGH FLOW RATE AXIAL POLYMER MICROVALVE WITH SOLID HYDRAULIC AMPLIFICATION
X Wu, S.-H. Kim and C.-H. Ji
Georgia Institute of Technology, USA
- TP LARGE DEFORMATION BALLOON MICRO-ACTUATOR BASED ON PYROTECHNICS ON CHIP
D. Briand¹, P. Dubois², L.-E. Bonjour², L. Guillot¹, U. Bley³, S. Danninger³, S. Rosset², H. Shea² and N.F. de Rooij¹
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- WP LARGE DISPLACEMENT LOW VOLTAGE MULTI-STABLE ACTUATOR
Y. Gerson¹, S. Krylov¹, B. Ilic² and D. Schreiber¹
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- WP MAGNETIC COMB DRIVE ACTUATOR
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- WP CHARACTERIZATION OF SILICON PARALLEL PLATE ELECTROSTATIC ACTUATOR IN PARTIALLY CONDUCTING AQUEOUS SOLUTION
H.V. Panchawagh¹, T.L. Sounart², A. Kausik¹, D.S. Finch³ and R.L. Mahajan³
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- WP NON-CONTACT ELECTROSTATIC MICRO-BEARING USING POLYMER ELECTRET
Y. Tsurumi, Y. Suzuki and N. Kasagi
The University of Tokyo, JAPAN
- WP BRAILLE CODE DISPLAY DEVICE WITH A PDMS MEMBRANE AND THERMOPNEUMATIC ACTUATOR
H.J. Kwon, S.W. Lee and S.S. Lee
Korea Advanced Institute of Science and Technology, KOREA
- WP OPTICAL DRIVEN MASTER-SLAVE CONTROLABLE NANO-MANIPULATOR WITH REAL-TIME FORCE SENSING
K. Ikuta, F. Sato, K. Kadoguchi and S. Itoh
Nagoya University, JAPAN
- ThP MODELING AND EXPERIMENTAL VALIDATION OF ELECTROSTATIC ACTUATION IN AQUEOUS IONIC MEDIA
V. Mukundan, P. Ponce, H.E. Butterfield and B.L. Pruitt
Stanford University, USA
- ThP TOWARD AN AUTONOMOUS ELECTROSTATIC MICROMOTOR: INTEGRATED FEEDBACK CONTROL
M.I. Beyaz, N. Ghalichechian and R. Ghodssi
University of Maryland, College Park, USA
- ThP PULL-IN BEHAVIOR AND MULTISTABILITY OF A CURVED MICROBEAM ACTUATED BY A DISTRIBUTED ELECTROSTATIC FORCE
S. Krylov, S. Seretensky and D. Schreiber
Tel Aviv University, ISRAEL
- ThP CMOS-MEMS PROBES FOR RECONFIGURABLE IC'S
J. Liu, M. Norman, J.A. Bain, T.E. Schlesinger and G.K. Fedder
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MICROFLUIDIC COMPONENTS & SYSTEMS

- MP ELECTRICALLY TUNABLE ALIRBORNE PARTICLE CLASSIFER USING A VIRTUAL IMPACTOR
Y.H. Kim, D. Park, J. Hwang and Y.J. Kim
Yonsei University, KOREA
- MP DIRECT TRANSPORTATION AND ELECTROFUSION OF OIL DROPLETS IN A MICROFLUIDIC DEVICE
C. Bottier^{1,2}, M.C. Tarhan², J. Fattaccioli^{1,2}, F.O. Morin², B. Kim² and H. Fujita²
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- MP DESIGN SYNTHESIS AND EXPERIMENTAL VALIDATION OF MICROFLUIDIC CONCENTRATION GRADIENT GENERATORS
Y. Zhou¹, Y. Wang², T. Mukherjee³ and Q. Lin¹
¹Columbia University, USA, ²CFD Research Corporation, USA and ³Carnegie Mellon University, USA
- MP ELECTROHYDRODYNAMIC ENHANCED TRANSPORT AND TRAPPING OF AIRBORNE PARTICLES TO A MICROFLUIDIC AIR-LIQUID INTERFACE
N. Sandström, T. Frisk, G. Stemme and W. van der Wijngaart
KTH - Royal Institute of Technology, SWEDEN
- MP ALIQUOTING STRUCTURE FOR CENTRIFUGAL MICROFLUIDICS BASED ON A NEW PNEUMATIC VALVE
D.L. Mark¹, S. Haeberle², T. Metz¹, S. Lutz¹, J. Ducrée², R. Zengerle^{1,2} and F. von Stetten¹
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- MP A NOVEL VALVE FOR MICROFLUIDIC PDMS-BASED SYSTEMS
I. Klammer, A. Buchenauer, G. Dura, W. Mokwa and U. Schnakenberg
Institute of Materials in Electrical Engineering I, GERMANY
- MP DIELECTRIC DROPLET MANIPULATIONS BY ELECTROPOLARIZATION FORCES
T.H. Hsieh and S.K. Fan
National Chiao Tung University, TAIWAN
- TP DROPLET AND PARTICLE MANIPULATION IN EMULSIONS AND SUSPENSIONS BY USING 3D ELECTRO-OSMOTIC MICROPUMPS
W. Hilber, B. Weiss, M. Mikolasek, R. Holly, K. Hingerl and B. Jakoby
Johannes Kepler University Linz, AUSTRIA
- TP MICROMACHINED ELELCTRICAL MOBILITY ANALYZER
I.-H. Jung, D. Park, Y.-H. Kim, J. Hwang and Y.-J. Kim
Yonsei University, KOREA
- TP NANOPOROUS DEVICE FOR ACCURATE DOSE CONTROL IN HIGH THROUGHPUT SCREENING
S. Upadhyaya and P.R. Selvaganapathy
McMaster University, CANADA
- TP CONTINUOUS FLOW SWITCHING BY PNEUMATIC ACTUATION OF THE AIR LUBRICATION LAYER ON SUPERHYDROPHOBIC MICROCHANNEL WALLS
C.F. Carlborg, M. Do-Quang, G. Stemme, G. Amberg and W. van der Wijngaart
KTH - Royal Institute of Technology, SWEDEN
- TP NANO- LIPID MONODISPERSED DROPLETS FORMATION BASED ON FLOW INSTABILITY
Y.D. Wen, I.D. Yang, S.Y. Changcheng, C.C. Chieng and F.G. Tseng
National Tsing Hua University, TAIWAN
- TP NON-EQUILIBRIUM ELECTROKINETIC NANOFLUIDIC MIXERS
D. Kim, A. Raj, L. Zhu, R.I. Masel and M.A. Shannon
University of Illinois at Urbana-Champaign, USA
- TP DROPLET MANIPULATION ON HIGH-OPENING MICRO FILTER MESHES
Y. Zhao and S.K. Cho
University of Pittsburgh, USA
- WP APPLICATION OF VORTICELLA'S FEEDING MECHANISM AS A MICROMIXER -CHARACTERIZATION OF VORTICES GENERATED BY CILIA MOTION
M. Nagai, M. Oishi, N. Sakakai, O. Ducloux, M. Oshima, H. Asai and H. Fujita
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- WP PIV INVESTIGATION OF 3-DIMENSIONAL FLOW IN DROPS ACTUATED BY EWOD
H.-W. Lu¹, F. Bottausci², J. Fowler¹, A.L. Bertozzi¹, C.D. Meinhart² and C.-J. Kim¹
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- WP ON-CHIP CHARACTERIZATION OF TRANSPORT PROPERTIES OF LIQUID SOLUTIONS USING MICROFLUIDIC CHANNEL-BASED BROWNIAN MICROSCOPY
J. Kim and Y.S. Ju
University of California at Los Angeles, USA
- WP VIBRATION INDUCED DROPLET GENERATION ON TEXTURED SURFACES
E.Y. Erdem, R. Baskaran and K.B. Böhringer
University of Washington, USA
- WP MICROMACHINED SAMPLE DIVIDER FOR ANALYZING BIOCHEMICAL REACTION BASED ON SINGLE MOLECULE
M. Koyama, R. Imai, M. Shikida, M. Okouchi, H. Tsuchiya, H. Honda and K. Sato
Nagoya University, JAPAN



- WP **NEAR-WALL VELOCITY OF SUSPENDED PARTICLES IN MICROCHANNEL FLOW**
W.L.W. Hau¹, Z. Liu¹, J. Korvink¹, R. Zengerle¹ and J. Duccree²
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- WP **A RESETTABLE DYNAMIC MICROFLUIDIC DEVICE**
K. Iwai, W. Tan and S. Takeuchi
The University of Tokyo, JAPAN
- ThP **ADDRESSABLE FLUIDIC GATE ARRAYS FOR LAYER-TO-LAYER PARALLEL FLUIDIC TRANSPORTATION SYSTEM**
T. Morimoto and S. Konishi
Ritsumeikan University, JAPAN
- ThP **BIDIRECTIONAL TRANSPORT OF KINESIN OR DYNEIN-COATED MICROSPHERES ON POLAR ORIENTED MICROTUBULES**
R. Yokokawa¹, M.C. Tarhan², T. Kon² and H. Fujita²
¹Ritsumeikan University, JAPAN and ²The University of Tokyo, JAPAN
- ThP **FLOATING-DISK PARYLENE MICROVALVE FOR SELF-REGULATING BIOMEDICAL FLOW CONTROLS**
P.-J. Chen¹, D.C. Rodger², M.S. Humayun² and Y.-C. Tai¹
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- ThP **ELECTROSTATIC DROPLET MANIPULATION USING ELECTRET AS A VOLTAGE SOURCE**
T. Wu, Y. Suzuki and N. Kasagi
The University of Tokyo, JAPAN
- ThP **WRISTBAND-LIKE DROPLET PLATFORM BY DIGITAL MICROFLUIDIC MODULARIZATIONS**
H. Yang, S.-K. Fan and W. Hsu
National Chiao Tung University, TAIWAN
- ThP **A TWO-DIMENSIONAL PARTICLE FOCUSING CHANNEL USING THE POSITIVE DIELECTROPHORESIS (PDEP) GUIDED BY A DIELECTRIC STRUCTURE BETWEEN TWO PLANAR ELECTRODES**
H.J. Chu, I. Doh and Y.-H. Cho
Korea Advanced Institute of Science and Technology, KOREA
- ThP **DYNAMIC MAGNETIC MANIPULATION USING ELECTRIC FIELD ADDRESSED FERROFLUIDIC DROPLETS**
C. Pan¹, S. Park¹, L. Gao² and E. Chiou¹
¹University of California at Los Angeles, USA and ²Zhejiang University, CHINA

MICRORESONATORS

- MP **A SURFACE ACOUSTIC WAVE DYNAMIC CONTROL DEVICE BY GRATING STRUCTURE**
M. Miyashita, S. Nagasawa and H. Kuwano
Tohoku University, JAPAN
- TP **LINEAR TUNING OF RESONANCE FREQUENCY IN TILTING OSCILLATORS BY AN AXIALLY LOADED SUSPENSION FLEXURE**
T. Shmilovich and S. Krylov
Tel Aviv University, ISRAEL
- WP **HIGH-Q AND CMOS COMPATIBLE SINGLE CRYSTAL SILICON CANTILEVER WITH SEPARATED ON-CHIP PIEZOELECTRIC ACTUATOR FOR ULTRA-SENSITIVE MASS DETECTION**
J. Lu¹, T. Ikehara¹, Y. Zhang¹, T. Mihara², T. Itoh¹ and R. Maeda¹
¹National Institute of Advanced Industrial Science and Technology, JAPAN and ²Olympus Corp., JAPAN
- ThP **A NEW METHOD TO DETERMINE THE MECHANICAL RESONANCE FREQUENCY, QUALITY FACTOR AND CHARGING IN ELECTROSTATICALLY ACTUATED MEMS**
S. Kalicinski^{1,2}, H.A.C. Tilmans¹, M. Wevers² and I. De Wolf^{1,2}
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- ThP **PIEZOELECTRICALLY DRIVEN SPHERICALLY CONTOURED RESONATORS IN LGS FOR HIGH TEMPERATURE APPLICATIONS**
E. Ansorge¹, B. Schmidt¹, J. Sauerwald² and H. Fritze²
¹University of Magdeburg, GERMANY and ²Harz University of Applied Studies and Research, GERMANY

NEMS (NANO ELECTRO MECHANICAL SYSTEMS)

- MP **SPEED PERFORMANCE AND CONTROL OF MICROMACHINED LINEAR BROWNIAN MOTOR**
E. Altintas¹, E. Sarajlic¹, K.F. Bohringer² and H. Fujita¹
¹The University of Tokyo, JAPAN and ²University of Washington, USA
- MP **FABRICATION OF FREE-STANDING FULLERENE NANOWIRE USING DIRECT ELECTRONBEAM WRITING AND SACRIFICIAL DRY ETCHING**
T. Tsuchiya, T. Jomori, Y. Ura, K. Sugano and O. Tabata
Kyoto University, JAPAN
- MP **A PLASMONIC SWITCH BASED ON ORDERED AU NANODISK ARRAY AND PHOTORESPONSIVE LIQUID CRYSTALS**
Y.B. Zheng, V. Hsiao and T.J. Huang
Pennsylvania State University, USA
- MP **SILICON NANOWIRE COUPLED MICRO-RESONATORS**
N. Arellano¹, E.P. Quevy², J. Provine³, R. Maboudian¹ and R.T. Howe³
¹University of California, Berkeley, USA, ²Silicon Clocks, Inc., USA and ³Stanford University, USA



- MP FLEXURE-BASED NANOMAGNETIC ACTUATORS AND THEIR ULTIMATE SCALING LIMITS
D.J. Vasquez¹ and J.W. Judy²
¹University of California, Berkeley, USA and ²University of California, Los Angeles, USA
- TP SINGLE DNA MOLECULE MANIPULATION BY A SELF-ASSEMBLED MOTOR PROTEIN SYSTEM
J. Miwa¹, M.C. Tarhan², H. Fujita², M. Kasahara¹ and R. Yokokawa¹
¹Ritsumeikan University, JAPAN and ²The University of Tokyo, JAPAN
- TP RAPID, LOCALIZED SYNTHESIS OF TITANIUM-BASED NANOSWORDS ON MEMS
B.D. Sosnowchik, J.-Y. Ha, L. Luo and L. Lin
University of California at Berkeley, USA
- TP NANOPOROUS POLYMERIC STRUCTURES: FABRICATION AND APPLICATIONS IN BIOSENSING AND DRUG DELIVERY
W. Yan, V. Hsiao, Y.B. Zheng and T.J. Huang
Pennsylvania State University, USA
- TP ACTIVATION OF CNT NANO-TO-MICRO CONTACT VIA ELECTRICAL BREAKDOWN
Y.Q. Jiang, Q.H. Zhang, T. Kawano, C.Y. Cho and L.W. Lin
University of California at Berkeley, USA
- TP A PECVD CNT-BASED OPEN ARCHITECTURE FIELD IONIZER FOR PORTABLE MASS SPECTROMETRY
L.F. Velasquez-Garcia and A.I. Akinwande
Massachusetts Institute of Technology, USA
- WP SILICON NANOTWEEZERS: A NEW BIOPHYSICAL TOOL FOR MOLECULAR EXPERIMENTATION
C. Yamahata¹, D. Collard^{1,2}, A. Domenget³, M. Hosogi⁴, M. Kumemura¹, G. Hashiguchi⁴ and H. Fujita¹
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- WP CARBON NANOTUBE ARRAYS ON FLEXIBLE SUBSTRATE AND THEIR FIELD EMISSION CHARACTERISTICS
T.H. Chen, S.Y. Lu, C.M. Lin, W.K. Hsu and W. Fang
National Tsing Hua University, TAIWAN
- WP BATCH FABRICATION OF CARBON NANOTUBES ON AFM PROBE TIPS AND AFM IMAGING
K. Takagahara, Y. Takei, E. Iwase, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN
- WP HIGH PRECISION FLUIDIC ALIGNMENT OF CARBON NANOTUBES USING MAGNETIC ATTRACTION ON A METAL CATALYST
J.S. Shim, Y.H. Yun, M.J. Rust, J. Do, V. Shanov, M.J. Schulz and C.H. Ahn
University of Cincinnati, USA
- WP MODELING AND EXPERIMENTAL STUDY OF NANO-ELECTROMECHANICAL OSCILLATOR USING SINGLE ZINC OXIDE NANOWIRE
R. Zhu, D.Q. Wang, S.Q. Xiang, Z.Y. Zhou and X.Y. Ye
Tsinghua University, CHINA
- ThP OXIDE CHARGING AND MEMORY EFFECTS IN SUSPENDED GATE FET
D. Molinero¹, N. Abele², L. Castaner¹ and A. Ionescu³
¹UPC, SPAIN, ²ST Microelectronics, FRANCE and ³Ecole Polytechnique Fédérale de Lausanne, SWITZERLAND
- ThP MICROFABRICATION OF NANOPORE DEVICES WITHOUT NANOLITHOGRAPHY
L. Chen, Y. Wang and C.H. Mastrangelo
Case Western Reserve University, USA
- ThP PIEZORESISTIVE EFFECT IN TOP-DOWN FABRICATED SILICON NANOWIRES
K. Reck, J. Richter, O. Hansen and E.V. Thomsen
Technical University of Denmark, DENMARK
- ThP TEMPERATURE-DEPENDENT PROPERTIES OF AN INDIVIDUAL MEMS-INTEGRATED SINGLE-WALLED CARBON NANOTUBE
A. Jungen, J. Gauckler, C. Stampfer, L. Durrer, T. Helbling and C. Hierold
ETH Zurich, SWITZERLAND

OPTICAL MEMS

- MP A LARGE-APERTURE, PISTON-TIP-TILT MICROMIRROR FOR OPTICAL PHASE ARRAY APPLICATIONS
L. Wu¹, S. Maley², T. Nelson², P. McManamon² and H. Xie¹
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- MP SCANNING MICROMIRROR USING DEFORMATION OF A PARYLENE-ENCAPSULATED LIQUID STRUCTURE
Y. Yoshihata, B.K. Nguyen, A. Takei, E. Iwase, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN
- MP NANOSECOND-LEVEL WAVELENGTH TUNING USING MEMS COUPLED-CAVITY LASER
H. Cai¹, X.M. Zhang¹, J. Tamil¹, Q.X. Zhang² and A.Q. Liu¹
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- TP PACKAGED MEMS MICROMIRRORS FOR CRYOGENIC ENVIRONMENT
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- TP **TUNABLE SPR COUPLER BY FLEXIBLE POLYMER GRATING**
T. Kan, B.K. Nguyen, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN
- TP **RUBIDIUM VAPOR CELL WITH INTEGRATED NONMETALLIC MULTILAYER REFLECTORS**
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- WP **MICRO-MIRROR ON RIBBON-ACTUATOR (MOR) FOR HIGH SPEED SPATIAL LIGHT MODULATOR**
J. Suzuki, A. Komai, Y. Ohuchi, Y. Tezuka, H. Konishi, M. Nishiyama, Y. Suzuki and S. Owa
Nikon Corporation, JAPAN
- WP **ACTIVE SWITCHING OF SURFACE PLASMON POLARITON USING MEMS ACTUATORS**
X.M. Zhang, W.M. Zhu and A.Q. Liu
Nanyang Technological University, SINGAPORE
- WP **TAPERED WAVEGUIDE BY LIQUID FOR A COUPLER OF OPTICAL FIBERS TO MEMS DEVICES**
H. Terae, E. Iwase, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN
- ThP **THERMALLY ACTUATED ORGANIC DISPLAY DEVICE USING THERMO-CHROMATIC POLYMER COMPOSITE FILM WITH SELF-ALIGNED PATTERNS**
O. Yarimaga, M. Im, B. Gu, T.W. Kim, Y.K. Jung, H.G. Park and Y.K. Choi
Korea Advanced Institute of Science and Technology, KOREA
- ThP **RECONFIGURABLE FILTERS USING MEMS RESONATORS AND INTEGRATED OPTICAL MICROCAVITIES**
M.W. Pruessner¹, T.H. Stievater² and W.S. Rabinovich²
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- ThP **MEMS OPTICAL TUNNELING STRUCTURE FOR THERMO-OPTIC SWITCHING**
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¹Nanyang Technological University, SINGAPORE and ²Massachusetts Institute of Technology, USA

PACKAGING & ASSEMBLY

- MP **IMPLEMENTATION OF SOG DEVICES WITH EMBEDDED THROUGH-WAFER SILICON VIAS USING A GLASS REFLOW PROCESS FOR WAFER-LEVEL 3D MEMS INTEGRATION**
C.W. Lin¹, C.P. Hsu¹, H.A. Yang², W.C. Wang² and W. Fang¹
¹National Tsing Hua University, TAIWAN and ²Advanced Semiconductor Engineering, Inc., TAIWAN
- MP **LOW-POWER HERMETICALLY SEALED ON-CHIP PLASMA LIGHT SOURCE MICROMACHINED IN GLASS**
P. Carazzetti, P.H. Renaud and H. Shea
Ecole Polytechnique Fédérale de Lausanne, SWITZERLAND
- MP **MANIPULATION SYSTEM FOR NANO/MICRO COMPONENTS INTEGRATION VIA TRANSPORTATION AND SELF-ASSEMBLY**
Y. Higuchi, T. Kusakabe, T. Tanemura, K. Sugano, T. Tsuchiya and O. Tabata
Kyoto University, JAPAN
- MP **VARIABLE THERMAL RESISTORS (VTR) FOR THERMAL MANAGEMENT OF CHIP SCALE ATOMIC CLOCKS (CSAC)**
H.-S. Kim, H.-H. Liao, H.O. Song and T.W. Kenny
Stanford University, USA
- TP **GOLD-INDIUM TRANSIENT LIQUID PHASE (TLP) WAFER BONDING FOR MEMS VACUUM PACKAGING**
W.C. Welch III and K. Najafi
University of Michigan, USA
- TP **DEBRIS-FREE IN-AIR LASER DICING FOR MULTI-LAYER MEMS BY PERFORATED INTERNAL TRANSFORMATION AND THERMALLY-INDUCED CRACK PROPAGATION**
Y. Izawa¹, S. Tanaka², H. Kikuchi², Y. Tsurumi¹, N. Miyanaga¹, M. Esashi² and M. Fujita³
¹Osaka University, JAPAN, ²Tohoku University, JAPAN and ³Institute for Laser Technology, JAPAN
- TP **A MULTISTAGE IN-PLANE MICRO-THERMOELECTRIC COOLER**
A.J. Gross, G. Hwang, B. Huang, C. Lawrence, H. Kim, S.W. Lee, N. Ghafouri, M. Kaviani, C. Uher and K. Najafi
University of Michigan, USA
- WP **AL TO AL WAFER BONDING FOR MEMS ENCAPSULATION AND 3-D INTERCONNECT**
C.H. Yun, J.R. Martin, E.B. Tarvin and J.T. Winbigler
Analog Devices Inc., USA
- WP **MULTI-AXIAL SUPER-STRETCHABLE INTERCONNECTS WITH ACTIVE ELECTRONICS**
H.-J. Kim and B. Ziaie
Purdue University, USA
- WP **A PERFORATED PLATE STACKED SI/GLASS HEAT EXCHANGER WITH IN-SITU TEMPERATURE SENSING FOR JOULE-THOMSON COOLERS**
W. Zhu¹, M.J. White², G.F. Nellis², S.A. Klein² and Y.B. Gianchandani¹
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- ThP **WAFER LEVEL ENCAPSULATION TECHNOLOGY FOR MEMS DEVICES USING AN HF-PERMEABLE PECVD SIOC CAPPING LAYER**
G. Verheijden¹, G. Koops¹, K.L. Le Phan² and J.T.M. van Beek²
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- ThP **WAFER-LEVEL SANDWICHED PACKAGING FOR HIGH-YIELD FABRICATION OF HIGH-PERFORMANCE MEMS INERTIAL SENSORS**
K. Zhang and X.X. Li
Shanghai Institute of Microsystem and Information Technology, CHINA
- ThP **THREE DIMENSIONAL ARRANGEMENT OF SENSORS USING DEVELOPMENT**
A. Nakai, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN
- ThP **THERMAL SWITCHES BASED ON COPLANAR EWOD FOR SATELLITE THERMAL CONTROL**
J. Gong, G.H. Cha, Y.S. Ju and C.J. Kim
University of California at Los Angeles, USA

PHYSICAL SENSORS & SYSTEMS

- MP **STUDY OF THE LOWER RESOLUTION LIMIT AND THE TEMPERATURE-DEPENDENT PERFORMANCE OF A SURFACE MICROMACHINED GYROSCOPE**
A. Kulygin, C. Kirsch, U. Schmid and H. Seidel
Saarland University, GERMANY
- MP **HIGH-ASPECT-RATIO VERTICAL SURFACE PROFILER USING SENSITIVE DISPLACEMENT DETECTION BY OPTOMECHANICAL PROBE**
Y. Hamaguchi¹, M. Kubota¹, J.-B. Pourciel² and Y. Mita¹
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- MP **THE NANOGAP PIRANI — A PRESSURE SENSOR WITH SUPERIOR LINEARITY IN ATMOSPHERIC PRESSURE RANGE**
K. Khosraviani and A.M. Leung
Simon Fraser University, CANADA
- MP **AIR FLOW SENSOR FOR AN INSECT-LIKE FLAPPING WING**
H. Takahashi, E. Iwase, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN
- MP **DEVELOPMENT OF AIR-COUPLED ULTRASOUND TRANSDUCERS FOR NONDESTRUCTIVE EVALUATION**
X. Wang¹, Y. Fan¹, W.-C. Tian¹, H.-J. Kwon², S. Kennerly¹, G. Claydon¹ and A. May¹
¹*GE Global Research Center, USA* and ²*GE Sensing, USA*
- MP **A MICROMECHANICAL ELECTROMETER APPROACHING SINGLE-ELECTRON CHARGE RESOLUTION AT ROOM TEMPERATURE**
J. Lee, Y. Zhu and A.A. Seshia
University of Cambridge, UK
- TP **HIGH FREQUENCY XYZ-AXIS SINGLE-DISK SILICON GYROSCOPE**
H. Johari, J.S. Shah and F. Ayazi
Georgia Institute of Technology, USA
- TP **INHERENTLY ROBUST MICRO GYROSCOPE ACTUATED BY PARAMETRIC RESONANCE**
L.A. Oropeza-Ramos, C.B. Burgner and K.L. Turner
University of California, Santa Barbara, USA
- TP **MEMS CAPACITIVE FORCE SENSORS FOR MICRO-SCALE COMPRESSION TESTING OF BIOMATERIALS**
K. Kim, J. Cheng, Q. Liu, X.Y. Wu and Y. Sun
University of Toronto, CANADA
- TP **ORGANIC SEMICONDUCTOR BASED STRAIN SENSORS FOR INPUT SYSTEM ON FLEXIBLE OLEDs**
M. Muraki, S. Takamatsu, K. Matsumoto and I. Shimoyama
The University of Tokyo, JAPAN
- TP **HIGHLY SENSITIVE MICRO CORIOLIS MASS FLOW SENSOR**
J. Haneveld, T.S.J. Lammerink, M.A. Dijkstra, H. Droogendijk, M.J. de Boer and R.J. Wiegerink
University of Twente, THE NETHERLANDS
- TP **THREE-LAYER QUANTITATIVE EXTRACTION OF MOLECULE SELF-ASSEMBLY INDUCED SURFACE-STRESS BY CANTILEVER NANOMECHANICAL DETECTION**
G. Zuo and X.X. Li
Shanghai Institute of Microsystem and Information Technology, CHINA
- TP **A CHARGE CONVERSION NANOPARTICLE ENHANCED MICROGEIGER FOR ALPHA, BETA, GAMMA, AND NEUTRON DETECTION**
C. Whitney and C. Wilson
Louisiana Tech University, USA
- WP **A X-AXIS MICROMACHINED GYROSCOPE WITH DOUBLY DECOUPLED OSCILLATION MODES**
X.S. Liu, Z.C. Yang, X.Z. Chi, J. Cui, H.T. Ding, Z.Y. Guo, B. Lv and G.Z. Yan
Peking University, CHINA
- WP **TRI-AXIAL HIGH-G CMOS-MEMS CAPACITIVE ACCELEROMETER ARRAY**
A.E. Wung¹, R.V. Park², K.J. Rebello² and G.K. Fedder¹
¹*Carnegie Mellon University, USA* and ²*Johns Hopkins University, USA*
- WP **HIGH TEMPERATURE HIGH ACCURACY PIEZORESISTIVE PRESSURE SENSOR BASED ON SMART-CUT SOI**
S. Guo
Goodrich Corporation, USA
- WP **POROUS NYLON WITH ELECTRO-ACTIVE DOPANTS AS FLEXIBLE SENSORS AND ACTUATORS**
S.-L. Yu, D.-R. Chang, L.-C. Tsao, W.-P. Shih and P.-Z. Chang
National Taiwan University, TAIWAN



- WP **MINIATURIZATION OF ON-WALL IN-TUBE FLEXIBLE THERMAL FLOW SENSOR USING HEAT SHRINKABLE TUBE**
J. Naito, M. Shikida, M. Hirota, Z. Tan and K. Sato
Nagoya University, JAPAN
- WP **THE MAGNETIC CALIBRATION AND OPTIMIZATION OF SYMMETRIC HALL SENSORS MAY BE ACCOMPLISHED EVEN IN THE ABSENCE OF A MAGNETIC FIELD**
M. Cornils and O. Paul
University of Freiburg, GERMANY
- ThP **A NOVEL OPTICAL LAMELLAR GRATING OUT-OF-PLANE MICROGYROSCOPE**
G. Zhou, K.L. Cheo, Y. Du and F.S. Chau
National University of Singapore, SINGAPORE
- ThP **MONOLITHICALLY FABRICATED POLYMERMEMS 3-AXIS THERMAL ACCELEROMETERS DESIGNED FOR AUTOMATED WIREBONDER ASSEMBLY**
S.-H. Tsang, A.H. Ma, K.S. Karim, M. Parameswaran and A.M. Leung
Simon Fraser University, CANADA
- ThP **AEROMEMS PRESSURE SENSOR ARRAY FEATURING THROUGH-WAFER VIAS FOR HIGH-RESOLUTION WALL PRESSURE MEASUREMENTS**
A. Berns, H.-D. Ngo and E. Obermeier
Technical University of Berlin, GERMANY
- ThP **A SLOW-ADAPTING MICROFLUIDIC BASED TACTILE SENSOR**
W.Y. Tseng, J.S. Fisher, K.B. Rinaldi and A.P. Lee
University of California, Irvine, USA
- ThP **THERMODYNAMIC ANALYSIS OF A NOVEL THERMOELECTRIC MICRO-DROPLET SENSOR**
J. Ni, W. Benecke and W. Lang
Institute of Microsensors, -Actuators and -Systems, GERMANY
- ThP **HIGHLY SENSITIVE RESONANT MAGNETIC MICROSENSOR WITH μ T RESOLUTION**
S. Brugger and O. Paul
University of Freiburg, GERMANY

POWER MEMS & MICRO FUEL CELLS

- MP **MICROFABRICATION AND TEST OF AN INTEGRATED COLLOID THRUSTER**
R. Krpoun, M. Raeber and H.R. Shea
Ecole Polytechnique Fédérale de Lausanne, SWITZERLAND
- MP **MEMS FUEL CELL SYSTEM FOR PORTABLE POWER SOURCE: INTEGRATION OF METHANOL REFORMER, PROX, AND FUEL CELL**
T. Kim and S. Kwon
Korea Advanced Institute of Science and Technology, KOREA
- TP **VACUUM-PACKAGED MICRO FUEL REFORMER FOR HIGH THERMAL EFFICIENCY AND LOW PACKAGE TEMPERATURE**
A. Kasuga, S. Tanaka and M. Esashi
Tohoku University, JAPAN
- TP **PARYLENE HT BASED MICRO POWER GENERATORS**
H. Lo and Y. Tai
California Institute of Technology, USA
- WP **FUEL AND CO₂ SELF-EXCHANGE SYSTEM WITH MICRO FLUID CHANNELS FOR A MICRO DIRECT METANOL FUEL CELL**
H. Uehara, S. Morishita, A. Kamitani, H. Onishi and H. Kotaki
Sharp Corporation, JAPAN
- WP **A SILICON-BASED MICRO DIRECT METHANOL FUEL CELL WITH MICROBLOCKS IN ANODE STRUCTURE**
Q. Zhang, X.H. Wang, L.Y. Zhong, Y.A. Zhou, X.P. Qiu and L.T. Liu
Tsinghua University, CHINA
- WP **SELF-POWERED DISCHARGE-BASED WIRELESS TRANSMITTER**
S. Tin¹, R. Duggirala¹, R. Polcawich², M. Dubey² and A. Lal¹
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- ThP **MICROBATTERIES WITH TOBACCO MOSAIC VIRUS TEMPLATED ELECTRODES**
K. Gerasopoulos, M. McCarthy, E. Royston, J. Culver and R. Ghodssi
University of Maryland, College Park, USA
- ThP **FABRICATION OF A FULLY INTEGRATED ELECTROSPRAY ARRAY WITH APPLICATIONS TO SPACE PROPULSION**
B. Gassend¹, L.F. Velasquez-Garcia², A.I. Akinwande² and M. Martinez-Sanchez²
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- ThP **MECHANICAL RECTIFIER FOR MICRO ELECTRIC GENERATORS**
S. Nagasawa, T. Suzuki, Y. Takayama, K. Tsuji and H. Kuwano
Tohoku University, JAPAN

RF MEMS & SWITCHES

- MP **SOLENOIDAL MICRO COILS MANUFACTURED WITH A WIRE BONDER**
K. Kratt, U. Wallrabe and J.G. Korvink
University of Freiburg, GERMANY



- MP **LOW PHASE-NOISE UHF THIN-FILM PIEZOELECTRIC-ON-SUBSTRATE LBAR OSCILLATORS**
H. Miri Lavasani, R. Abdolvand and F. Ayazi
Georgia Institute of Technology, USA
- MP **INTERNAL ELECTRICAL PHASE INVERSION FOR FF-BEAM RESONATOR ARRAYS AND TUNING FORK FILTERS**
J. Yan¹, A.A. Seshia¹, K.L. Phan² and J.T.M. van Beek²
¹*University of Cambridge, UK* and ²*NXP Semiconductors, Philips Campus, THE NETHERLANDS*
- MP **PARAMETRICALLY AMPLIFIED MICROELECTROMECHANICAL MIXER**
M. Koskenvuori and I. Tittonen
Helsinki University of Technology, FINLAND
- TP **SUSPENDED NANOSCALE SOLENOID METAL INDUCTOR WITH TENS-NH LEVEL INDUCTANCE**
X.H. Lai, F. Ding, Z.G. Xu, W.G. Wu, J. Xu and Y.L. Hao
Peking University, CHINA
- TP **CHARACTERIZATION OF IN-IC INTEGRABLE IN-PLANE NANOMETER SCALE RESONATORS FABRICATED BY A SILICON ON NOTHING ADVANCED CMOS TECHNOLOGY**
C. Durand¹, F. Casset², B. Legrand³, M. Faucher³, P. Renaux², D. Mercier², D. Renaud², D. Dutartre¹, E. Ollier², P. Ancy¹ and L. Buchailot³
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- TP **SMALL-BANDWIDTH INTEGRATED TUNABLE BANDPASS FILTERS FOR GSM APPLICATIONS**
M. Rais-Zadeh, H.M. Lavasani and F. Ayazi
Georgia Institute of Technology, USA
- WP **FLIP-CHIP BONDED MEMS CAPACITOR**
Y.J. Chen¹, C.K. Kao², W.P. Shih¹, S.Y. Chung¹ and P.Z. Chang¹
¹*National Taiwan University, TAIWAN* and ²*Chung-Shan Institute of Science and Technology, TAIWAN*
- WP **DIGITALLY-TUNABLE MEMS FILTER USING MECHANICALLY-COUPLED RESONATOR ARRAY**
H. Chandralalim and S. Bhave
Cornell University, USA
- WP **SINGLE POLE FOUR THROW RF MEMS SWITCH WITH DOUBLE STOP COMB DRIVE**
S.C. Kang, H.C. Kim and K.J. Chun
Seoul National University, KOREA
- ThP **SURFACE MICROMACHINED GHZ TUNABLE CAPACITOR WITH 14:1 CONTINUOUS TUNING RANGE**
C.-Y. Lee, S.-J. Chen, D. Chi, H. Yu and E.S. Kim
University of Southern California, USA
- ThP **MECHANICAL PHASE INVERSION FOR COUPLED LAMÉ MODE RESONATOR ARRAY FILTERS**
J. Yan¹, A.A. Seshia¹, K.L. Phan² and J.T.M. van Beek²
¹*University of Cambridge, UK* and ²*NXP Semiconductors, Philips Campus, THE NETHERLANDS*
- ThP **2.45 GHZ SAW-BASED PASSIVE BINARY TRANSPONDER FOR WIRELESS INTERFACES OF INTEGRATED SENSORS**
J.H. Kuypers, S. Tanaka and M. Esashi
Tohoku University, JAPAN

SELF-ASSEMBLY METHODS

- MP **PART TILTING IN CAPILLARY-BASED SELF-ASSEMBLY: MODELING AND CORRECTION METHODS**
S.H. Abbasi¹, A.X. Zhou¹, R. Baskaran^{1,2} and K.F. Böhringer¹
¹*University of Washington, USA* and ²*Intel Corporation, USA*
- MP **A FULLY DRY SELF-ASSEMBLY PROCESS WITH PROPER IN-PLANE ORIENTATION**
S. Park and K.F. Böhringer
University of Washington, USA
- TP **GOLD NANOPARTICLE PATTERNING BY SELF-ASSEMBLY AND TRANSFER FOR LSPR BASED SENSING**
T. Ozaki, K. Sugano, T. Tsuchiya and O. Tabata
Kyoto University, JAPAN
- TP **CASCADED MECHANICAL ALIGNMENT FOR ASSEMBLING 3D MEMS**
N. Shaar, G. Barbastathis and C. Livermore
Massachusetts Institute of Technology, USA
- WP **DNA MEDIATED SEQUENTIAL SELF-ASSEMBLY OF NANO/MICRO COMPONENTS**
T.K. Kusakabe, T.T. Tanemura, Y.H. Higuchi, K.S. Sugano, T.T. Tshuchiya and O.T. Tabata
Kyoto University, JAPAN
- WP **CATALYST ENHANCED MICRO SCALE BATCH ASSEMBLY**
R. Baskaran, J. Hoo, B. Cheng and K. Böhringer
University of Washington, USA
- ThP **CONTACT POTENTIAL DIFFERENCE FOR SEQUENTIAL ASSEMBLY AND FACE ALIGNMENT OF SUBMILLIMETER COMPONENTS**
T. Tanemura, Y. Higuchi, T. Kusakabe, K. Sugano, T. Tsuchiya and O. Tabata
Kyoto University, JAPAN
- ThP **INTERFACING METHODS FOR FLUIDICALLY-ASSEMBLED MICROCOMPONENTS**
M.T. Tolley, A. Baisch, M. Krishnan, D. Erickson and H. Lipson
Cornell University, USA