

PRELIMINARY PROGRAM

2018

SOLID-STATE SENSORS, ACTUATORS AND MICROSYSTEMS WORKSHOP

HILTON HEAD

Sonesta Resort ★ Hilton Head, South Carolina

JUNE 3-7, 2018

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

Sunday, June 3

6:00 pm - Registration and Welcome Reception
9:00 pm

Monday, June 4

7:00 am Breakfast

7:45 am Welcome

Plenary Presentation I

8:15 am **ENABLING THE NEXT GENERATION OF MEMS TECHNOLOGY**
William Chappell
DARPA-MTO, USA

Session 1 - Physics of Microfluidics

9:05 am **PROBING THE FUNDAMENTAL EVAPORATION LIMIT
WITH A NANOPOROUS MEMBRANE DEVICE**
Z. Lu¹, K.L. Wilke¹, I. Kinefuchi², and E.N. Wang¹
¹Massachusetts Institute of Technology, USA and ²University of Tokyo, JAPAN

9:25 am **A MICROFLUIDIC DEVICE FOR MECHANICAL
PROFILING OF HYDROGEL MICROPARTICLES**
Y. Niu and Y. Zhao
Ohio State University, USA

9:45 am **DROPLET MANIPULATION ON A SURFACE WITH GRADIENT
WETTABILITY BY IN-PLANE SYMMETRIC CYCLIC VIBRATION**
L. Qi and Y. Zhao
Ohio State University, USA

10:05 am Break and Table Top Exhibits

Session 2 - Optical Microsystems

- 10:30 am** **DYNAMICALLY TUNABLE COLOR REFLECTOR USING A PHASE CHANGE MATERIAL**
M. Jafari, L.J. Guo, and M. Rais-Zadeh
University of Michigan, USA
- 10:50 am** **A RECONFIGURABLE OPTOFLUIDIC DEVICE FOR ADAPTIVE IMAGING AND POSITION ESTIMATION WITH A WIDE FIELD OF VIEW**
H. Huang and Y. Zhao
Ohio State University, USA
- 11:10 am** **BIOINSPIRED MULTIFUNCTIONAL NANOSTRUCTURES FOR MICRO-OPTICAL IMPLANTS**
V. Narasimhan¹, R.H. Siddique¹, J.O. Lee¹, S. Kumar¹, B. Ndjamen¹,
J. Du², N. Hong¹, D. Sretavan², and H. Choo¹
¹*California Institute of Technology, USA* and ²*University of California, San Francisco, USA*
- 11:30 am** **Poster Preview of Poster Session 1 Presentations**
- 12:15 pm** **Networking Lunch**

Poster Session 1

- 1:45 pm** **Contributed and Late News**
See page 9 for listing of poster presentations
- 4:15 pm** **End of Day**

Tuesday, June 5

7:30 am Breakfast

8:10 am Announcements

Plenary Presentation II

8:15 am **TOWARDS INDUSTRIALISATION OF MICROFLUIDIC SAMPLE-TO-ANSWER SOLUTIONS ENABLING POINT-OF-USE TESTING OF BIOSAMPLES: A DESIGN-FOR-MANUFACTURE LED PLATFORM APPROACH**

Jens Ducreé

Dublin City University, Ireland

Session 3 - Wearable Devices

9:05 am **PRECISION HIGH-BANDWIDTH OUT-OF-PLANE ACCELEROMETER AS CONTACT MICROPHONE FOR BODY-WORN AUSCULTATION DEVICES**

P. Gupta, Y. Jeong, J. Choi, M. Faingold, and F. Ayazi

Georgia Institute of Technology, USA

9:25 am **MICROFABRICATED ELECTRODYNAMIC WIRELESS POWER RECEIVER FOR BIOIMPLANTS AND WEARABLES**

N. Garraud, D. Alabi, J.D. Varela, D.P. Arnold, and A. Garraud

University of Florida, USA

9:45 am **A WIRELESSLY CONTROLLED FULLY IMPLANTABLE MICROSYSTEM FOR NANO-LITER RESOLUTION INNER EAR DRUG DELIVERY**

F. Forouzandeh¹, A. Alfadhel¹, X. Zhu², J.P. Walton², D.R. Cormier¹, R.D. Frisina², and D.A. Borkholder¹

¹*Rochester Institute of Technology, USA* and ²*University of South Florida, USA*

10:05 am Break and Table Top Exhibits

Session 4 - Microsystems for Biological Applications

10:30 am MULTISCALE LIQUID METAL THIN-FILM PATTERNING BASED ON SOFT LITHOGRAPHY FOR SKIN-MOUNTABLE, SOFT AND 3D-INTEGRATED BIOLOGICAL MICROSYSTEMS

M. Kim, C. Kim, H. Alrowais, P. Getz, O. Brand
Georgia Institute of Technology, USA

10:50 am ROBUST AND SCALABLE TISSUE-ENGINEERED ELECTRONIC NERVE INTERFACES

C. Kuliasha, B. Spearman, E.W. Atkinson, A. Furniturewalla, P. Rustogi,
S. Mobini, E.B. Nunamaker, A. Brennan, K. Otto, C. Schmidt, and J.W. Judy
University of Florida, USA

11:10 am One Man's Purpose – A Radio Play

12:15 pm - Networking Lunch
1:45 pm

7:00 pm - Tuesday Banquet
10:00 pm

Wednesday, June 6

7:30 am Breakfast

8:10 am Announcements

Plenary Presentation III

8:15 am

Khalil Najafi
University of Michigan, USA

Session 5 - Levitated, Flying & Running Microrobots

9:05 am **A SIX-LEGGED MEMS SILICON ROBOT USING MULTICHIP ASSEMBLY**
D.S. Contreras and K.S.J. Pister
University of California, Berkeley, USA

9:25 am **A 3D-PRINTED 1 MG LEGGED MICROROBOT RUNNING AT 15 BODY LENGTH/SEC**
R. St. Pierre¹, W. Gosrich², and S. Bergbreiter¹
¹University of Maryland, USA and ²State University of New York, Buffalo, USA

9:45 am **BATCH-FABRICATION OF DIAMAGNETICALLY LEVITATED MICROROBOTS**
C. Velez¹, R.E. Pelrine², and D.P. Arnold¹
¹University of Florida, USA and ²SRI International, USA

10:05 am **TAKEOFF OF A FLYING MICROROBOT WITH COTS SENSOR PAYLOAD USING ELECTROHYDRODYNAMIC THRUST PRODUCED BY SUB-MILLIMETER CORONA DISCHARGE**
D.S. Drew and K.S.J. Pister
University of California, Berkeley, USA

10:25 am Break and Table Top Exhibits

Session 6 - Micro-Resonators & Resonator-Based Frequency Combs

10:50 am A FERROELECTRIC CAPACITOR (FECAP) BASED UNRELEASED RESONATOR
Y. He¹, B. Bahr², and D. Weinstein¹
¹Purdue University, USA and ²Texas Instruments, USA

11:10 am PIEZOELECTRIC SINGLE CRYSTAL 6H SILICON CARBIDE MICROELECTROMECHANICAL RESONATORS
R. Perahia, L.D. Sorenson, J.L. Bregman, L.X. Huang, M.S. White, K.S. Holabird, and D.T. Chang
HRL Laboratories, USA

11:30 am FREQUENCY COMB GENERATION IN A NONLINEAR RESONATOR THROUGH MODE COUPLING USING A SINGLE TONE DRIVING SIGNAL
D.A. Czaplewski¹, S.W. Shaw², O. Shoshani³, M.I. Dykman², and D. Lopez¹
¹Argonne National Laboratory, USA, ²Michigan State University, USA, and ³Ben-Gurion University of the Negev, ISRAEL

11:50 am ULTRA-HIGH Q MONOCRYSTALLINE SILICON CARBIDE DISK RESONATORS ANCHORED UPON A PHONONIC CRYSTAL
J. Yang, B. Hamelin, S.D. Ko, and F. Ayazi
Georgia Institute of Technology, USA

12:10 pm - 12:55 pm Poster Preview of Poster Session 2 Presentations

12:55 pm - 2:25 pm Networking Lunch

Poster Session 2

2:25 pm - 5:25 pm Contributed and Late News
See page 13 for listing of poster presentations

Poster Session 3

6:30 pm - 8:00 pm Commercial and Open Posters

8:00 pm - 8:15 pm Awards Ceremony

8:15 pm - 10:00 pm RUMP Session

Thursday, June 7

7:30 am Breakfast

8:10 am Announcements

Plenary Presentation IV

8:15 am TOWARDS INTEGRATED OPTICAL GYROS USING BRILLOUIN LASERS
Kerry Vahala
California Institute of Technology, USA

9:05 am - Session 7 - Late News
10:05 am

10:05 am Break and Table Top Exhibits

10:30 am - Session 8 - Late News
11:10 am

11:30 am - Networking Lunch
1:00 pm

1:00 pm Workshop Adjourns

Poster Session 1
Contributed and Late News
Monday, June 4 **1:45 pm – 4:15 pm**

- MP-01** **A RADIO FREQUENCY NON-RECIPROCAL NETWORK BASED ON SWITCHED LOW-LOSS ACOUSTIC DELAY LINES**
R. Lu, T. Manzanegue, Y. Yang, A. Gao, L. Gao, and S. Gong
University of Illinois, Urbana-Champaign, USA
- MP-02** **PMUT-BASED HIGH DATA RATE ULTRASONIC WIRELESS COMMUNICATION LINK FOR INTRA-BODY NETWORKS**
B. Herrera Soukup, E. Demirors, G. Chen, R. Guida, F. Pop, N. Dave, C. Cassella, T. Melodia, and M. Rinaldi
Northeastern University, USA
- MP-03** **ELECTRIC-FIELD INDUCED INCREASE IN PARACELLULAR VASCULAR PERMEABILITY**
K.K. Rangharajan, P. Mohanasundaram, J. Morris, E. Akbari, G.B. Spsychalski, J.W. Song, and S. Prakash
Ohio State University, USA
- MP-04** **MULTIMODAL INTELLIGENT TRANSWELL SYSTEM**
P. Ramiah Rajasekaran, A.A. Chapin, D.N. Quan, S.-H. Jang, L. Hu, J. Herberholz, W.E. Bentley, and R. Ghodssi
University of Maryland, USA
- MP-05** **2D AND 3D DOPING OF SILICON MEMS STRUCTURES USING PHOSPHORUS-DOPED POLYSILICON AS A DOPANT SOURCE**
P.J. Newby¹, K. Zandi¹, K. Cute¹, J.P. Richard¹, K.A. Belarbi²
¹*Centre De Collaboration Miqro Innovation (C2mi), CANADA, and*
²*Teledyne Dalsa Semiconductor Inc., CANADA*
- MP-06** **ASSEMBLY AND FABRICATION OF ELECTROSTATICALLY ACTUATED SILICON NITRIDE MICROSHUTTER ARRAYS**
L.H. Oh¹, M.J. Li², K. Kim³, A.S. Kutyrev⁴, S.H. Moseley², N.P. Costen¹, G. Manos², and D.P. Kelly²
¹*SGT Inc., USA,* ²*NASA, USA,* ³*ASRC Inc., USA, and* ⁴*University of Maryland, USA*
- MP-07** **FABRICATION AND CHARACTERIZATION OF 3D PRINTED, 3D MICROELECTRODE ARRAYS WITH SPIN COATED INSULATION AND FUNCTIONAL ELECTROSPUN 3D SCAFFOLDS FOR DISEASE IN A DISH AND ORGAN ON A CHIP MODELS**
N. Azim, T. Ausaf, A. Kundu, L. Zhai, and S. Rajaraman
University of Central Florida, USA

- MP-08 FABRICATION OF SUB-MICRON METAL WIRES FOR HIGH-FREQUENCY LITZ WIRE**
K.J. Russell¹, D.J. Carter¹, E. Kim¹, P.H. Lewis¹, A. Aydin²,
L. Sun², C.M. Chang², R. Gordon², and A. Duwel¹
¹Draper, USA and ²Harvard University, USA
- MP-09 FIRST FATIGUE MEASUREMENTS ON THICK EPI-POLYSILICON MEMS IN ULTRA-CLEAN ENVIRONMENT**
A.L. Alter, I.B. Flader, Y. Chen, L. Comenencia Ortiz, D.B. Heinz,
D.D. Shin, and T.W. Kenny
Stanford University, USA
- MP-10 INCREASING THE THICKNESS AND DEPOSITION RATE OF HIGH-PERFORMANCE ELECTROPLATED COPT PERMANENT MAGNETS**
Y. Wang, J. Ewing, and D.P. Arnold
University of Florida, USA
- MP-11 MASKLESS 3D MICROFABRICATION OF DRUG-LADEN CAPSULATED MICROSTRUCTURES**
L. Qi and Y. Zhao
Ohio State University, USA
- MP-12 PRINTING BIOLOGICAL LIQUID ON HYDROPHOBIC 3D ELECTRODES**
S. Chu, M.J. Lerman, J.N. Culver, J.P. Fisher, and R. Ghodssi
University of Maryland, USA
- MP-13 A BIODEGRADABLE SENSOR HOUSED IN 3D PRINTED POROUS TUBE FOR IN-SITU SOIL NITRATE MEASUREMENT**
H. Jiang, W. Yu, R. Rahimi, and B. Ziaie
Purdue University, USA
- MP-14 A SUB-PPB-LEVEL INTEGRATED ELECTROCHEMICAL HEAVY METAL ION MICROSENSOR**
H. Jiang¹, C. Yang², K. Yang², and L. Dong¹
¹Iowa State University, USA and ²Analog Devices Inc., USA
- MP-15 FLEXIBLE IMPEDANCE SENSOR FOR WIRELESS MONITORING OF CATHETER BIOFILMS**
R.C. Huiszoon, J.M. Stine, L.A. Beardslee, P. Ramiah Rajasekaran,
W.E. Bentley, and R. Ghodssi
University of Maryland, USA
- MP-16 PHYSIOLOGICALLY AND BIOLOGICALLY REALISTIC ASSESSMENT OF A HYDROGEL CHECK-VALVE FOR THE TREATMENT OF HYDROCEPHALIC FLUID RETENTION**
J.H. Appel-Podlevsky¹, S. Lee¹, J.D. Podlevsky¹, M. Preul², R. Bristol³, and J. Chae¹
¹Arizona State University, USA, ²Barrow Neurological Institute, USA, and
³Phoenix Children's Hospital, USA

- MP-17** **FIRST LEAPS OF AN ELECTROSTATIC INCHWORM
MOTOR-DRIVEN JUMPING MICROROBOT**
J.T. Greenspun and K.S.J. Pister
University of California, Berkeley, USA
- MP-18** **SOFT ROBOTICS: FLUID-DRIVEN SELF-FOLDING PAPERS**
H. Chun, M. Mohammadifar, and S. Choi
State University of New York, Binghamton, USA
- MP-19** **THE μ HAMMER: INVESTIGATING CELLULAR RESPONSE TO
IMPACT WITH A HIGH THROUGHPUT MICROFLUIDIC MEMS DEVICE**
L.H.C. Patterson¹, J.L. Walker¹, E. Rodriguez-Mesa², K. Shields²,
J.S. Foster², M.T. Valentine¹, A.M. Doyle¹, and K.L. Foster¹
¹University of California, Santa Barbara, USA and ²Owl Biomedical, USA
- MP-20** **TRANSIENT BIOBATTERIES: MICROFLUIDIC CONTROL
FOR PROGRAMMABLE DISSOLUTION**
M. Mohammadifar and S. Choi
State University of New York, Binghamton, USA
- MP-21** **VOLTAGE GATED NANOFLUIDIC CHIP FOR PROTEIN
CAPTURE, AMPLIFICATION, AND RELEASE**
K.K. Rangharajan and S. Prakash
Ohio State University, USA
- MP-22** **A FLEXIBLE, MICROFABRICATED IMPEDIMETRIC
FLUID TEMPERATURE SENSOR**
A.B. Baldwin, T.Q. Hudson, E. Yoon, and E. Meng
University of Southern California, USA
- MP-23** **EFFECT OF DIELECTRIC LOSS ON THE QUALITY FACTOR OF
PIEZOELECTRICALLY DRIVEN LENGTH EXTENSIONAL MODE RESONATORS**
A. Qamar¹, S. Sherrit², X.-Q. Zhang³, P.X. Feng³, and M. Rais-Zadeh^{1,2,3}
*¹University of Michigan, USA, ²California Institute of Technology, USA, and
³Case Western Reserve University, USA*
- MP-24** **BROADBAND LONG-WAVELENGTH INFRARED MICROMECHANICAL
PHOTOSWITCH FOR ZERO-POWER HUMAN DETECTION**
S. Kang, S. Caliskan, Z. Qian, V. Rajaram, N. McGruer, and M. Rinaldi
Northeastern University, USA
- MP-25** **FBAR-BASED SENSOR FOR WIRELESS RFID AUTHENTICATION OF
INTEGRATED CIRCUITS**
A.A. Shkel, M. Barekatin, and E.S. Kim
University of Southern California, USA

- MP-26 THE EFFECT OF BIAS CONDITIONS ON ALGAN/GAN 2DEG HALL PLATES**
K.M. Dowling¹, H.A. Alpert¹, P. Zhang², A. Ramirez², A.S. Yalamarthy²,
H. Koeck³, U. Ausserlechner³, and D.G. Senesky¹
¹Stanford University, USA, ²Tsinghua University, CHINA, and
³Infineon Technologies, AUSTRIA
- MP-27 TRENCH-ISOLATED BULK-TYPE PRESSURE SENSOR IN SILICON-ON-INSULATOR FOR HIGH-TEMPERATURE AND HIGH-PRESSURE DOWNHOLE APPLICATIONS**
E. Chan¹, D. Lin², L. Lu¹, K. Chau², and M. Wong¹
¹Hong Kong University of Science and Technology, HONG KONG, and
²Chinese Academy of Sciences, CHINA
- MP-28 A YARN-BASED BACTERIA-POWERED BATTERY FOR SMART TEXTILES**
Y. Gao, L. Liu, and S. Choi
State University of New York, Binghamton, USA
- MP-29 A NANOMECHANICAL IDENTIFICATION TAG TECHNOLOGY FOR TRACEABILITY AND AUTHENTICATION APPLICATIONS**
M. Ramezani, A.R. Newsome, M. Ghatge, F. Zhang, S. Bhunia, and R. Tabrizian
University of Florida, USA
- MP-30 CIRCULARLY POLARIZED MECHANICAL RESONANCES**
P.-L. Yu and S.A. Bhave
Purdue University, USA
- MP-31 ENHANCING MICRO-OVEN POWER AND STIFFNESS IN ENCAPSULATED DEVICES FOR TIMING REFERENCE APPLICATIONS**
L. Comenencia Ortiz¹, D. Gerrard¹, I.B. Flader¹, G.D. Vukasin¹, D.B. Heinz¹,
J. Rodriguez¹, D.D. Shin¹, R. Kwon¹, S. Chandorkar², and T.W. Kenny¹
¹Stanford University, USA and ²IISc Bangalore, INDIA
- MP-32 HIGH K_t^2 -Q LAMB-WAVE SCALN-ON-SILICON UHF AND SHF RESONATORS**
M. Ghatge¹, V. Felmetsger², and R. Tabrizian¹
¹University of Florida, USA and ²OEM Group LLC., USA, USA

Poster Session 2
Contributed and Late News
Wednesday, June 6 2:25 pm – 5:25 pm

- WP-01 REALIZING RADIO FREQUENCY ACOUSTIC DELAYS AND TRANSVERSAL FILTERING WITH SUB-2 DB INSERTION LOSS AND 10% FRACTIONAL BANDWIDTH**
T. Manzanegue, R. Lu, Y. Yang, and S. Gong
University of Illinois, Urbana-Champaign, USA
- WP-02 SURFACE MICROMACHINED PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCERS WITH HIGH FILL FACTOR AND HIGH PERFORMANCE**
Q. Wang, G. Luo, Y. Kusano, and D.A. Horsley
University of California, Davis, USA
- WP-03 A TWO-MINUTE ASSAY FOR ELECTRONIC QUANTIFICATION OF ANTIBODIES IN SALIVA ENABLED THROUGH MULTI-FREQUENCY IMPEDANCE CYTOMETRY AND MACHINE LEARNING ANALYSIS**
Z. Lin, J. Sui, P. Xie, K. Ahuja, and M. Javanmard
Rutgers University, USA
- WP-04 ANTI-CANCER DRUG TREATMENT ANALYZED BY MULTICONSTRICTION MICROFLUIDIC CHANNELS AT SINGLE-CELL LEVEL MECHANICAL CHARACTERISTICS**
X. Ren, P. Ghassemi, J.S. Strobl, and M. Agah
Virginia Polytechnic Institute and State University, USA
- WP-05 MULTI-MODAL MICROELECTRODE ARRAYS FOR THE INVESTIGATION OF PROTEIN ACTIN'S ELECTRO-MECHANOSENSING MECHANISMS TOWARD NEURODEGENERATIVE DISEASE MODELS ON A CHIP**
N. Azim, N. Castaneda, A. Diaz, H. Kang, and S. Rajaraman
University of Central Florida, USA
- WP-06 A SIMPLE FABRICATION METHOD FOR DOUBLY REENTRANT OMNIPHOBIC SURFACES VIA STRESS INDUCED BENDING**
K.L. Wilke, M. Garcia, D.J. Preston, and E.N. Wang
Massachusetts Institute of Technology, USA
- WP-07 ACTIVE SELF-CLEANING SURFACES ON SOLAR MODULES**
D. Sun and K.F. Bohringer
University of Washington, USA
- WP-08 DIRECTED SELF ASSEMBLY OF NANOPARTICLES FOR HIGH ASPECT RATIO BANDS**
V. Lochab¹, A. Yee², Y. Li³, M. Yoda², A.T. Conlisk¹, and S. Prakash¹
¹Ohio State University, USA, ²Georgia Institute of Technology, USA, and ³Ibaraki University, JAPAN

- WP-09** **MECHANICAL CHARACTERIZATION OF ADDITIVELY MANUFACTURED MICROSTRUCTURES USING A PROCESS INTEGRATED MEMS TENSILE TESTER**
I.S. Ladner¹, J.H. Cho², D.R. Cayll², V.H. Nguyen¹, M.C. Cullinan², and S.K. Saha¹
¹Lawrence Livermore National Laboratory, USA and ²University of Texas, Austin, USA
- WP-10** **MULTILAYER ALD CERAMIC FILMS FOR ENHANCEMENT OF PARYLENE BARRIER PROPERTIES IN COMPLIANT NEURAL PROBES WITH BONDED CHIPS**
M. Forssell, X.C. Ong, and G.K. Fedder
Carnegie Mellon University, USA
- WP-11** **NANOPRINTING OF MINIATURE COMPOUND REFRACTIVE LENSES FOR DESKTOP HARD XRAY IMAGING**
M. Mirzaeimoghri¹, A. Morales², C. Maccue³, D. DeVoe³, and H. Wen¹
¹National Institute of Health, USA, ²University of Berkeley, USA, and ³University of Maryland, USA
- WP-12** **NANOSTENCIL FABRICATION WITH DOUBLE EXPOSURE OPTICAL LITHOGRAPHY FOR SCALABLE RESIST-FREE PATTERNING OF METAL ON POLYMERS**
J.S. Katz¹, W. Park¹, M.T. Barako², A. Sood¹, M. Asheghi¹, and K.E. Goodson¹
¹Stanford University, USA and ²Northrup Grumman Corporation, USA
- WP-13** **NOVEL ROOM TEMPERATURE MICROFLUIDIC DEVICE FABRICATION: A HIGHRESOLUTION, 3D PRINTING APPROACH USING ELECTROHYDRODYNAMIC JET PRINTING**
C.P. Pannier¹, Z. Wang², D.J. Hoelzle³, and K.L. Barton¹
¹University of Michigan, USA, ²University of Notre Dame, USA, and ³Ohio State University, USA
- WP-14** **PRECISE MICROSCALE PATTERNING OF BEAD-LESS AND UNIFORM NANOFIBER VIA EXTREME NEAR-FIELD ELECTROSPINNING**
D.W. Shin, J.H. Kim, and J.Y. Chang
University of Utah, USA
- WP-15** **A MICRO COLLECTOR INJECTOR (μ COIN) FOR μ GC SYSTEMS**
M. Akbar
University of Michigan, USA
- WP-16** **ENHANCING SELECTIVITY OF CANTILEVER-BASED RESONANT CHEMICAL SENSORS THROUGH TRANSIENT MEASUREMENTS AT ELEVATED TEMPERATURES**
P. Getz¹, C. Carron², and O. Brand¹
¹Georgia Institute of Technology, USA and ²Harris Corporation, USA

- WP-17** **MATTRESS-BASED SWEAT MONITORING FOR HUMAN HEALTH MONITORING AND SMART HOMES**
S. Pavlidis¹, M.-Y. Tsai², D.S. Jin², B. Brown²,
J.-D. Velilla³, M. Defranks³, and E.M. Vogel²
¹*North Carolina State University, USA*, ²*Georgia Institute of Technology, USA*, and
³*Serta Simmons Bedding, LLC, USA*
- WP-18** **RAPID DISCRIMINATION OF HOST AND PARASITE EXOSOMES USING LABEL-FREE OPTICAL BIOSENSOR**
Y. Wang, W. Yuan, M. Kimber, M. Lu, and L. Dong
Iowa State University, USA
- WP-19** **AERODYNAMIC FORCES GENERATED BY AN ELECTROSTATIC INCHWORM MOTORACTUATED MEMS CONTROL SURFACE INTEGRATED ON A FORCE-SENSING PLATFORM**
B.G. Kilberg, D.S. Contreras, J. Greenspun, H. Gomez, E. Liu, and K.S.J. Pister
University of California, Berkeley, USA
- WP-20** **CMOS COMPATIBLE GHZ ULTRASONIC FRESNEL MICROFLUIDIC ACTUATOR**
A. Ravi, J. Kuo, and A. Lal
Cornell University, USA
- WP-21** **A 5-BIT DIGITALLY OPERATED MEMS ACCELEROMETER**
A. Abbasalipour¹, V. Kumar¹, R. Jafari², and S. Pourkamali¹
¹*University of Texas, Dallas, USA* and ²*Texas A&M University, USA*
- WP-22** **EXPOSURE OF ANCHOR LOSS CHARACTERISTICS BY CONTROLLING THERMOELASTIC DAMPING IN TOROIDAL RING GYROSCOPES**
Y. Wang¹, Y. Lin¹, D.D. Shin², H.-K. Kwon², D.B. Heinz², Y. Chen²,
D.D. Gerrard², T.W. Kenny², and A.M. Shkel¹
¹*University of California, Irvine, USA* and ²*Stanford University, USA*
- WP-23** **CAPACITIVE TRANSDUCER ENHANCEMENT ON QUADRATURE COMPENSATION ELECTRODE OF YAW RATE GYROSCOPE**
P. Shao, E. Canales, and P. Zhu
NXP Semiconductors, USA
- WP-24** **FACILE FABRICATION OF LOW-COST PASSIVE WIRELESS HUMIDITY SENSOR FOR SMART PACKAGING VIA ALL-LASER PROCESSING OF METALIZED PAPER**
R. Rahimi, H. Jiang, J. Zhou, and B. Ziaie
Purdue University, USA
- WP-25** **NANOSCALE TUNING FORK CAVITY OPTOMECHANICAL TRANSDUCERS WITH DESIGNENABLED FREQUENCY TUNING AND TEMPERATURE COMPENSATION**
R. Zhang¹, R. Ilic², V. Aksyuk², and Y. Liu¹
¹*Worcester Polytechnic Institute, USA*, and
²*National Institute of Standards and Technology (NIST), USA*

- WP-26 SMARTPHONE BASED FOCUS-FREE MACROSCOPY USING AN ADAPTIVE DROPLET LENS**
H. Huang and Y. Zhao
Ohio State University, USA
- WP-27 TWO-CHANNEL WAKEUP SYSTEM EMPLOYING ALUMINUM NITRIDE BASED MEMS RESONANT ACCELEROMETERS FOR NEAR-ZERO POWER APPLICATIONS**
R.W. Reger, S. Yen, B. Barney, M.R. Satches, A.I. Young, T. Pluym, M. Wiwi, M.A. Delaney, and B.A. Griffin
Sandia National Laboratories, USA
- WP-28 MICRO BUCKLED BEAM BASED ULTRA-LOW FREQUENCY VIBRATION ENERGY HARVESTER**
R. Xu, H. Akay, and S.-G. Kim
Massachusetts Institute of Technology, USA
- WP-29 A SCS RESONATOR FOR AM DEMODULATION WITH PARAMETRIC AMPLIFICATION**
M.E. Galanko, Y.C. Lin, T. Mukherjee, and G.K. Fedder
Carnegie Mellon University, USA
- WP-30 CROSS-SECTIONAL QUASI-LAME MODES IN THIN-FILM PIEZOELECTRIC-ON-SILICON RESONATORS**
S. Shahraini¹, H. Fatemi², and R. Abdolvand¹
¹University of Central Florida, USA and ²Qorvo, USA
- WP-31 EIGENMODE OPTIMIZATION AND TOPOLOGICALLY PROTECTED STATES IN MAGNETIC ULF TRANSMITTER ARRAYS**
I. Grinberg, J. Kim, and G. Bahl
University of Illinois, Urbana-Champaign, USA
- WP-32 PRECISE LOCAL TEMPERATURE MEASUREMENT OF FULLY ENCAPSULATED OVENIZED MEMS DEVICES**
H.-K. Kwon¹, D.B. Heinz¹, D.D. Shin¹, Y. Chen², L.C. Ortiz¹, G.D. Vukasin¹, and T.W. Kenny¹
¹Stanford University, USA and ²Apple, USA