PRELIMINARY TECHNICAL PROGRAM

SOLID-STATE SENSORS, ACTUATORS AND MICROSYSTEMS WORKSHOP
HILTON HEAD
Sonesta Resort ★ Hilton Head, South Carolina
May 31–June 4, 2020
www.HH2020.org

Sponsored by

The Workshop Executive Committee reserves the right to amend the program if necessary.
Sunday, May 31

**Short Course - Microsystems Frontiers in the IoT Era**
Course Chair: Matteo Rinaldi, Northeastern University, USA

The course will discuss examples of enabling microsystems technologies for Internet-of-Things (IoT) and their commercialization efforts, including:

- near zero power
- event-driven
- sensors and RF devices
- low-power chip-scale piezoelectric ultrasonic platforms for sensing and imaging

Visit [website](#) for additional details.

**8:30 am** Short Course Registration

**9:00 am** SESSION 1 - ULTRASONIC TIME OF FLIGHT SENSING FOR THE IOT
David Horsley
*University of California, Davis, USA and TDK/Chirp Microsystems, USA*

**10:00 am** Break

**10:15 am** SESSION 2 - GIGAHERTZ ULTRASONICS FOR THE IOT
Amit Lal
*Cornell University, USA and Geegah, USA*

**11:15 am** Break

**11:30 am** SESSION 3 - NEAR ZERO-POWER MICROSYSTEMS FOR THE IOT
Matteo Rinaldi
*Northeastern University, USA*

**12:30 pm** Lunch on Own

*Afternoon Panel Presentation and Panel Discussion are open to all workshop attendees.*

**2:00 pm** Panel Presentation and Perspective from Government and Industry
Benjamin Griffin, *Defense Advanced Research Projects Agency (DARPA), USA*
Tanbir Haque, *InterDigital, Inc., USA*
David Howard, *TowerJazz, USA*
Arjun Kumar Kantimahanti, *SilTerra, MALAYSIA*
Ronald Polcawich, *Defense Advanced Research Projects Agency (DARPA), USA*
Keith Rebello, *Defense Advanced Research Projects Agency (DARPA), USA*

**3:30 pm** Break

**4:00 pm - 5:30 pm** Panel Discussion
Sunday, May 31

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

Monday, June 1

7:00 am  Registration and Breakfast

7:45 am  Welcome
Workshop Chair - Mina Rais-Zadeh, NASA Jet Propulsion Laboratory, USA
Program Chair - Reza Ghodssi, University of Maryland, College Park, USA

Plenary Presentation I
Session Chair: Carol Livermore, Northeastern University, USA

8:15 am  FUNCTIONAL ULTRASOUND (FUS) IMAGING: A NEW WHOLE BRAIN NEUROIMAGING MODALITY FROM BENCH TO BEDSIDE
Mickael Tanter, Ph.D.
ESPCI, FRANCE

Session 1 - Microsystems for Cell Biology
Session Chair: A. Faith Sarioglu, Georgia Institute of Technology, USA

8:55 am  A HYBRID BIOMONITORING SYSTEM FOR GUT-NEURON COMMUNICATION
Ashley Chapin, Jinjing Han, Tawen Ho, Jens Herberholz, and Reza Ghodssi
University of Maryland, College Park, USA

9:15 am  MULTI-LAYER MICRO-NANOFLOWDIDIC DEVICE FOR ISOLATION AND CAPTURE OF LIPOSARCOMA EXTRACELLULAR VESICLES
Prashanth Mohana Sundaram, Gonzalo Lopez, Danielle Braggio, Gita Balakirsky, Lucia Casadei, Raphael Pollock, and Shaurya Prakash
Ohio State University, USA

9:35 am  3D PROJECTION ELECTROPHORESIS FOR HIGH-DENSITY SINGLE-CELL IMMUNOBLOTTING
Samantha Grist, Andoni Mourdoukoutas, and Amy Herr
University of California, Berkeley, USA

9:55 am  APPLYING HIGH STRAIN TO SINGLE CELLS VIA MEMS ACTUATOR
Jennifer Walker¹, Luke Patterson¹, Evelyn Rodriguez-Mesa², Kevin Shields², John Foster², Megan Valentine¹, Adele Doyle¹, and Kimberly Foster¹,³
¹University of California, Santa Barbara, USA, ²Owl Biomedical, USA, and ³Tulane University, USA
10:15 am  Break and Table Top Exhibits
10:44 am  Wen Ko Leadership Award Announcement

**Invited Presentation I**
Session Chair: Sam Emaminejad, University of California, Los Angeles, USA

10:45 am  PRECISION MEDICINE IS ADVANCED BY PRECISION MICROSYSTEMS
Amy Herr, Ph.D.
University of California, Berkeley, USA

**Session Chair: Sam Emaminejad, University of California, Los Angeles, USA**

10:45 am  PRECISION MEDICINE IS ADVANCED BY PRECISION MICROSYSTEMS
Amy Herr, Ph.D.
University of California, Berkeley, USA

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University of California, Berkeley, USA

**Session 2 - Personal Biomonitoring**
Session Chair: Alireza Modafe, Nevro Inc., USA

11:15 am  A FULLY INTEGRATED ELECTRONICALLY-PROGRAMMABLE EPIDERMAL MICROFLUIDIC VALVING ARRAY FOR WEARABLE BIOFLUID MANAGEMENT
Jiawei Tan, Haisong Lin, Shuyu Lin, Wenzhuo Yu, Jialun Zhu, Yichao Zhao, Xuanbing Cheng, Siyang Yang, Eric Tang, and Sam Emaminejad
University of California, Los Angeles, USA

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11:35 am  ELECTRONIC IMMUNOAFFINITY ASSAY FOR DIFFERENTIAL LEUKOCYTE COUNTS
Ruxiu Liu, AKM Arifuzzman, Ningquan Wang, Ozgun Civelekoglu, and A. Fatih Sarioglu
Georgia Institute of Technology, USA

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11:55 am  A WEARABLE MICROFLUIDIC SYSTEM FOR HIGH SIGNAL-TO-NOISE RATIO SWEAT RATE SENSING VIA PROGRAMMABLE MICROBUBBLE GENERATION AND TRACKING
Haisong Lin, Shuyu Lin, Jorge Suarez, Harish Athavan, Yibo Wang, Wenzhuo Yu, and Sam Emaminejad
University of California, Los Angeles, USA

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University of California, Los Angeles, USA

12:15 pm  Poster Preview Session 1
Session Chair: John Foster, Advano, USA

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12:45 pm  Networking Lunch

**Poster Session 1**
Session Chair: Zhengzheng Wu, Qualcomm, USA

2:15 pm  Contributed and Late News
See page 12 for listing of poster presentations

4:45 pm  Adjourn for the Day
Tuesday, June 2

7:30 am  Breakfast

8:10 am  Announcements

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**Plenary Presentation II**
Session Chair: Roya Maboudian, *University of California, Berkeley, USA*

8:15 am  INNOVATION IN THE ERA OF VALUE BASED HEALTHCARE
*Catherine Mohr, M.D.*
*Intuitive Foundation, USA*

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**Session 3 - Advanced Manufacturing**
Session Chair: Jenna F. Chan, *General Technical Services, LLC, USA*

8:55 am  COMBINING MICRO FABRICATION AND ADDITIVE MANUFACTURING FOR MICROROBOTIC MECHANISMS
Camilo Velez¹, Dinesh Patel¹, Sukjun Kim¹, Mahnoush Babaei¹, Cory Knick², Gabriel Smith², and Sarah Bergbreiter¹
¹*Carnegie Mellon University, USA* and ²*Army Research Laboratory (ARL), USA*

9:15 am  COMPLEMENTARY CAPILLARY SYSTEM INTEGRATED MICRONEEDLES FOR AUTONOMOUSLY LOCALIZED THERAPEUTICS LOADING
Sangwook Chu, Nikhil Uplekar, Sanwei Liu, and Reza Ghodssi
*University of Maryland, College Park, USA*

9:35 am  THIN-FILM, MULTI-MATERIAL STRUCTURES: A FLEXIBLE 3D PRINTING APPROACH USING ELECTROHYDRODYNAMIC JET PRINTING
Zahra Afkami¹, Brian Lezzi¹, David Hoelzle², Max Shtein¹, and Kira Barton¹
¹*University of Michigan, USA* and ²*Ohio State University, USA*

9:55 am  Break and Table Top Exhibits

10:24 am  Denice Denton Mentoring Award Announcement

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**Invited Presentation II**
Session Chair: Mehrnaz Motiee, *Apple, USA*

10:25 am  TINY LEAPS FOR ROBOT-KIND: MICROSYSTEMS-ENABLED ROBOTICS
*Sarah Bergbreiter, Ph.D.*
*Carnegie Mellon University, USA*
Session 4 - RF Microsystems
Session Chair: Roozbeh Tabrizian, University of Florida, Gainesville, USA

10:55 am  PARAFFIN-BASED RECONFIGURABLE ANTENNAS OPERATING AT 100 GHZ
Behnam Ghassemiparvin and Nima Ghalichechian
Ohio State University, USA

11:15 am  LITHIUM NIOBATE-ON-SILICON ACOUSTOELECTRIC TRANSVERSAL FILTERS WITH MORE THAN 20-DB NONRECIPROCAL TRANSMISSION RATIO
Hakhamanesh Mansoorzare and Reza Abdolvand
University of Central Florida, USA

11:35 am  SILOCON-DOPED GAN BASED SAW RESONATORS FOR EXTREME ENVIRONMENT APPLICATIONS
Afzaal Qamar¹, Savannah R. Benbrook², Debbie G. Senesky², and Mina Rais-Zadeh¹,³
¹University of Michigan, USA, ²Stanford University, USA, and ³NASA Jet Propulsion Laboratory, USA

11:55 pm – 1:30 pm  Networking Lunch

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Early Career Faculty Development Session
Chair/Moderator: Svetlana Tatic-Lucic, Lehigh University, USA

2:00 pm - 4:00 pm  This session is open to all workshop attendees.

This session, targeting senior graduate students, postdocs, and junior faculty members in our community, aims to offer relevant guidance and advice for new faculty as well as those who aspire to become faculty members. Visit website for additional details.

Shubhra Gangopadhyay, National Science Foundation (NSF), USA
Ron Polcawich, Defense Advanced Research Projects Agency (DARPA), USA
Stephen D. Senturia, Massachusetts Institute of Technology (Emeritus), USA
Usha Varshney, National Science Foundation (NSF), USA
Michael Wolfson, National Institutes of Health, USA

6:00 pm - 7:00 pm  Graduate Student Networking Event

7:00 pm - 10:00 pm  Workshop Banquet
Wednesday, June 3

7:30 am  Breakfast

8:10 am  Announcements

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Plenary Presentation III
Session Chair: Behraad Bahreyni, Simon Fraser University, CANADA

8:15 am  PROBLEMS AND PROSPECTS FOR HEALTH EQUALITY
Thomas LaVeist, Ph.D.
Tulane University, USA

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Session 5 - Physical Microsystems for Energy Applications
Session Chair: Jason Gorman, National Institute of Standards and Technology (NIST), USA

8:55 am  FABRICATION AND DEMONSTRATION OF A SELF-ADAPTIVE MICROVALVE ARRAY FOR DISTRIBUTED LIQUID COOLING IN MICROELECTRONIC INTERPOSERS
Amrid Amnache, Gerard Laguna, Étienne Léveillé, Rajesh Pandiyan, Louis-Michel Collin, Montse Villarubi, Simon Hamel, Jérôme Barrau, and Luc Fréchette
1Université de Sherbrooke, CANADA, 2Universidad de Lleida, SPAIN, and 3Teledyne DALSA, CANADA

9:15 am  DEMONSTRATION OF ATMOSPHERIC-PRESSURE RADIOMETER WITH NANOCARDBOARD VANES
Mohsen Azadi, Zhipeng Lu, George Popov, Christopher Stanczak, John Cortes, Andy Eskenazi, Pratik Ponnarassery, Matthew Campbell, and Igor Bargatin
1University of Pennsylvania, USA and 2Lawrence Livermore National Laboratory, USA

9:35 am  MOISTURE-RESPONSIVE PAPER ROBOTS
Jihyun Ryu, Mehdi Tahernia, Maedeh Mohammadifar, and Seokheun Choi
State University of New York, Binghamton, USA

9:55 am  ZERO POWER CROP WATER-STRESS DETECTOR BASED ON A SHORTWAVE-INFRARED MICROMECHANICAL PHOTOSWITCH
Antea Risso, Vageeswar Rajaram, Sungho Kang, Sila Calisgan, Zhenyun Quian, and Matteo Rinaldi
Northeastern University, USA
10:15 am  Break and Table Top Exhibits
10:44 am  Mark Shannon Grand Challenges Award Announcement

**Invited Presentation III**
Session Chair: Kristen Dorsey, Smith College, USA

10:45 am  USING TECHNOLOGY AND EVERYTHING WE HAVE LEARNED TO ADDRESS THE CLIMATE GRAND CHALLENGE  
Leslie Field, Ph.D.  
Ice911 Research, USA and SmallTech Consulting, LLC, USA

**Session 6 - Micro-Acoustic Devices & Systems**
Session Chair: Sarah Bedair, Army Research Laboratory (ARL), USA

11:15 am  NOVEL HIGH BANDWIDTH LITHIUM NIOBATE BASED PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCER  
Flavius Pop, Bernard Herrera, and Matteo Rinaldi  
Northeastern University, USA

11:35 am  FREQUENCY TUNABLE SURFACE ACOUSTIC WAVE ACTUATORS FOR ADJUSTABLE PITCH DIFFRACTION GRATING  
Clifford F. Frez, Valerie J. Scott, Mustafa B. Coskun, and Mina Rais Zadeh  
NASA Jet Propulsion Laboratory, USA

11:55 am  BOTTLE-BEAM TRANSDUCER WITH LONG DEPTH-OF-FOCUS AND MULTIPLE TRAPPING ZONES BASED ON RING-FOCUSING FRESNEL ACOUSTIC LENS  
Yongkui Tang and Eun Sok Kim  
University of Southern California, USA

12:15 pm  Poster Preview Session 2  
Session Chair: Raviv Perahia, HRL Laboratory, USA

1:00 pm  Networking Lunch

**Poster Presentations - Session 2**
Session Chair: Nicole Nastaran Hashemi, Iowa State University, USA

2:30 pm – 5:00 pm  Contributed and Late News  
See page 18 for listing of poster presentations
**Poster Presentations - Session 3 and Reception**

Session Chairs: Debbie Senesky, *Stanford University, USA*
Alba Avila, *University at Los Andes, COLOMBIA*

5:30 pm - 7:00 pm  
**Commercial and Open Posters**

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**Rump Session**

Session Chair: Christian Zorman, *Case Western Reserve University, USA*

7:30 pm  
**What’s Wrong with this Picture? Making Microsystems Pictures:**  
*A Practical Guide to Presenting Your Work*  
Felice Frankel  
*Massachusetts Institute of Technology, USA*

This year’s Rump Session topic tackles one of the most important aspects of publishing in our field: Creating compelling images and graphics that showcase your work while clearly conveying the maximum amount of information to the target audience. Felice Frankel, a renowned expert on scientific imaging, will present tips and techniques to create cover-worthy images of your research. In rump session tradition, attendees will then have an opportunity to apply their hand at these skills, with the results being shared to the Hilton Head community. Visit [website](#) for additional details.

10:00 pm  
**Adjourn for the Day**
Thursday, January 4

7:30 am  Breakfast

8:10 am  Announcements

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**Plenary Presentation IV**
Session Chair: Chris Roberts, *University of Texas, El Paso, USA*

8:15 am  BEYOND DIGESTION: HOW THE GUT IS THE GATEWAY TO HEALTH AND WHAT CAN WE DO TO HARNESS ITS POTENTIAL
*Pankaj Jay Pasricha, M.D.*, *Johns Hopkins University, USA*

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**Session 7 - Physical Microsystems for Healthcare**
Session Chair: Matthew Hopcroft, *University of California, Santa Barbara, USA*

8:55 am  HYBRID AND PASSIVE TISSUE-ANCHORING MECHANISM FOR INGESTIBLE RESIDENT DEVICES
Sanwei Liu, Sangwook Chu, Luke Beardslee, and Reza Ghodssi
*University of Maryland, College Park, USA*

9:15 am  PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCERS FOR BLOOD VESSEL MOTION TRACKING
Xiaoyue (Joy) Jiang, Mei-Lin Chan, Bala Govind, and Peter Hartwell
*TDK InvenSense, USA*

9:35 am  TOWARD 3D NANOPRINTED MICROCAPSULES FOR CONTROLLED DRUG DELIVERY
Ruben Acevedo1, Michael Restaino1, Dongyue Yu2, Stephen Hoag2, Sharon Flank3, and Ryan Sochol1
1University of Maryland, College Park, USA,
2University of Maryland, Baltimore, USA, and 3InfraTrac, USA

9:55 am  Break and Table Top Exhibits
Invited Presentation IV
Session Chair: Luke Beardslee, Georgia Institute of Technology, USA

10:25 am  MINIATURE ELECTRONICS ENABLING INGESTIBLES FOR ADVANCED MONITORING OF THE GASTRO-INTESTINAL SYSTEM
Nick Van Helleputte, Ph.D.
imec, BELGIUM

Session 8 - Late News
Session Chair: Ryan Sochol, University of Maryland, College Park, USA

10:55 am  Late News Presentations

11:55 am  Award Ceremony
Chair: Nima Ghalichechian, Ohio State University, USA

12:30 pm  Networking Lunch

2:00 pm  Workshop Adjourns
Poster Presentations – Session 1
Contributed and Late News Posters
Monday, June 1
2:15 pm - 4:45 pm

Bio/Chemical and Biomedical Sensors

MP-01 A MINIATURIZED EHT PLATFORM FOR ACCURATE MEASUREMENTS OF TISSUE CONTRACTILE PROPERTIES
Milica Dostanic1, Laura Windt2, Jeroen Stein2, Berend van Meer2,
Massimo Mastrangeli1, Christine Mummery2, and Pasqualina Sarro2
1Delft University of Technology, NETHERLANDS and
2Leiden University Medical Center, NETHERLANDS

MP-02 CHARACTERIZATION AND CLINICAL SERUM TEST OF A MOLECULAR IMPRINTED POLYMER (MIP)-BASED CARDIAC TROPONIN T SENSING ELECTRODE FOR PATIENT MONITORING APPLICATIONS
Pei-S. Chen, Yu-T. Lin, Yu-T. Cheng, Chih-K. Lee, and Hsiao-E. Tsai
National Chiao Tung University, TAIWAN

MP-03 ENHANCING MICROSCALE MASS SENSING VIA INTEGRATING BISTABLE CIRCUITRY NETWORK AND CANTILEVER-BASED RESONANT SENSORS
Jinki Kim, Félicie Le Hir de Fallois, and Adam Bryant
Georgia Southern University, USA

MP-04 GRAPHENE ISFET SENSOR WITH POROUS ANODIC ALUMINUM OXIDE SUBSTRATE FOR NITRATE DETECTION
Jungyoon Kim1, Qingyuan Liu2, and Tianhong Cui1
1University of Minnesota, USA and 2Tsinghua University, CHINA

MP-05 LABEL-FREE IMPEDIMETRIC SENSING OF CORTISOL IN HUMAN SERUM BASED ON NANOWELL ARRAY ELECTRODES
Seyed Reza Mahmoodi1, Pengfei Xie1, Daniel Zachs2, Erik Peterson2,
Hubert Lim2, Mark Allen3, and Mehdi Javanmard1
1Rutgers University, USA, 2University of Minnesota, USA, and
3University of Pennsylvania, USA

MP-06 MICROMECHANICAL SWITCH BASED VOC DETECTORS FOR PLANT HEALTH MONITORING WITH ZERO STANDBY POWER
Sila Deniz Calisgan, Vageeswar Rajaram, Sungho Kang, Antea Risso,
Xuanhang Wu, Zhenyun Qian, and Matteo Rinaldi
Northeastern University, USA
MP-07  WIRELESS SENSOR-INTEGRATED PLATFORM FOR LOCALIZED DISSOLVED OXYGEN SENSING IN BIOREACTORS
Justin Stine, Luke Beardslee, Sangwook Chu, Sanwei Liu, Dana Motabar, William Bentley, and Reza Ghodssi
University of Maryland, College Park, USA

MP-08  A CERAMIC PZT-BASED PMUT ARRAY FOR ENDOSCOPIC PHOTOACOUSTIC IMAGING
Haoran Wang1, Zhenfang Chen2, Hao Yang3, Huabei Jiang3, and Huikai Xie1
1University of Florida, USA, 2MEMS Materials and Engineering Inc., USA, and 3University of South Florida, USA

MP-09  A FOULING-RESISTIVE VOLTAMMETRIC SENSING SYSTEM FOR WEARABLE ELECTROACTIVE BIOMARKER MONITORING
Shuyu Lin, Bo Wang, Wenzhuo Yu, Diana Ly, and Sam Emaminejad
University of California, Los Angeles, USA

MP-10  A PAPER-BASED FLEXIBLE TACTILE SENSOR ARRAY FOR LOW-COST WEARABLE HUMAN HEALTH MONITORING
Weijie Luo and Darrin Young
University of Utah, USA

MP-11  BIO-INSPIRED SOFT-TO-HARD INTEGRATION OF WEARABLE ELECTROCHEMICAL SENSING ELECTRONICS
Yichao Zhao, Bo Wang, Hannaneh Hojaiji, Zhaoqing Wang, Shuyu Lin, Xuanbing Cheng, Haisong Lin, and Sam Emaminejad
University of California, Los Angeles, USA

MP-12  COMPACT OPTICS ENGINE MODULE FOR OPTICAL COHERENCE TOMOGRAPHY (OCT)
Flavio Pardo1, Michael Eggleston1, Cristian Bolle1, Mark Earnshaw1, Rose Kopf1, Mark Cappuzzo1, Corey Pollock2, and David Bishop2
1Nokia Bell Labs, USA and 2Boston University, USA

MP-13  MEMS HEATER FOR CONTROLLED EVAPORATION OF LIQUIDS FOR PERSONALIZED DRUG DELIVERY TO THE LUNGS
Frank Goldschmidtboeing1, Uwe Pelz1, Muhamnad Ghanam1, Thomas Bilger1, Armin Jamali1, Mohammadreza Saberi1, Eiko Baeumker1, Jan Jaklin2, Marc Kessler2, Rene Schmidt2, David Schadow3, Patrick Scheunemann3, and Peter Woias1
1University Freiburg, GERMANY, 2Hauni Maschinenbau GmbH, GERMANY, and 3South Westphalia University of Applied Sciences, GERMANY
PRINTED ELECTROCEUTICAL DRESSINGS FOR THE ERADICATION OF BIOFILMS AND TREATMENT OF CHRONIC WOUNDS
Rachel Heald, Molly Bennett, Vish Subramaniam, Devendra Dusane, Varun Lochab, Prashanth Mohana Sundaram, Sarah Salyer, Paul Stoodley, and Shaurya Prakash
Ohio State University, USA

Characterization, Fabrication and Materials

A SCALABLE, HIERARCHICAL RIB DESIGN FOR LARGER-AREA, HIGHER-POROSITY NANOPOROUS MEMBRANES FOR THE IMPLANTABLE BIO-ARTIFICIAL KIDNEY
Benjamin Chui, Nathan Wright, Jimmy Ly, David Maginnis, Tariq Haniff, Charles Blaha, and Shuvo Roy
University of California, San Francisco, USA

ANCHOR DESIGN AFFECTS DOMINANT ENERGY LOSS MECHANISM IN A LAMÉ MODE MEMS RESONATOR
Gabrielle Vukasin, Veronica Sanchez, Janna Rodriguez, Hyun-Keun Kwon, Nicholas Bousse, David Heinz, Dongsuk Shin, Ernest Yen, and Thomas Kenny
1Stanford University, USA and 2Texas Instruments, USA

DETERMINATION OF ELASTIC MODULUS OF SILICON CARBIDE (SIC) THIN DIAPHRAGMS VIA MODE-DEPENDENT DUFFING NONLINEAR RESONANCES
Hailong Chen, Hao Jia, Christian Zorman, and Philip Feng
1Case Western Reserve University, USA and 2University of Florida, USA

DLP 3D PRINTED "INTELLIGENT" MICRONEEDLE ARRAY (IµNA) FOR STIMULI RESPONSIVE RELEASE OF DRUGS AND ITS IN VITRO AND EX VIVO CHARACTERIZATION
Parker Arnett, Avra Kundu, Arvind Bagde, Nilab Azim, Mandip Sachdeva, and Swaminathan Rajaraman
1University of Central Florida, USA and 2Florida A&M University, USA

FABRICATION OF INJECTABLE MICRO-SCALE OPTO-ELECTRONICALLY TRANSDUCED ELECTRODES (MOTES) FOR PHYSIOLOGICAL MONITORING
Sunwoo Lee, Alejandro Cortese, Aaron Mok, Chunyan Wu, Ju Uhn Park, Conrad Smart, Shahaboddin Ghajari, Devesh Khilwani, Sanaz Sadeghi, Yanxin Ji, Jesse Goldberg, Chris Xu, Paul McEuen, and Alyosha Molnar
Cornell University, USA
IMPROVING PRECISION OF FUSED DEPOSITION MODELING BY IN-SITU MONITORING AND PREDICTING 3D GEOMETRIC DEVIATION USING CONDITIONAL ADVERSARIAL NETWORKS
Ling Li, Ryan McGuan, Robert Isaac, Pirouz Kavehpour, and Robert Candler
University of California, Los Angeles, USA

SEEDEZ(TM) INTERDIGITATED ELECTRODES AND MULTIFUNCTIONAL LAYERED BIOSENSOR COMPOSITES (MLBCS): A PARADIGM SHIFT IN THE DEVELOPMENT OF IN VITRO BIOMICROSYSTEMS
Charles Didier1, Avra Kundu1, James Shoemaker2, Jelena Vukasinovic2, and Swaminathan Rajaraman1
1University of Central Florida, USA and 2Lena Biosciences, USA

TUNABLE FBAR WITH FERROELECTRIC BEHAVIOR BASED ON SPUTTERED SCALN THIN-FILM
Jialin Wang1, Mingyo Park1, Stefan Mertin2, Tuomas Pensala2, Farrokh Ayazi1, and Azadeh Ansari1
1Georgia Institute of Technology, USA and 2VTT Technical Research Centre of Finland, FINLAND

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Abdullah Alsharhan1, Anthony Stair1, Ryan Utz1, Ruben Acevedo1, Talha Razaulla2, Roseanne Warren2, and Ryan Sochol1
1University of Maryland, College Park, USA and 2University of Utah, USA

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Di Sun and Karl Böhringer
University of Washington, USA

MICROFLUIDIC GASKETLESS INTERCONNECT SEALED BY SUPERHYDROPHOBIC SURFACES
Xiaoxiao Zhao1, Daniel Park1, Steven Soper2, and Michael Murphy1
1Louisiana State University, USA and 2University of Kansas, USA

A FLUSH-MOUNTED DUAL-AXIS WALL SHEAR STRESS SENSOR
Brett Freidkes1, David Mills2, William Patterson2, and Mark Sheplak1
1University of Florida, USA and 2Interdisciplinary Consulting Corporation, USA
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MP-28  BI-STABLE ALUMINUM NITRIDE BASED PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCER (PMUT)
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Rebecca Campbell¹, Diane Buton¹, Seung Song², and Albert Kim¹
¹Temple University, USA and ²Sook Myung Women’s University, KOREA

MP-30  INCREASING THE WORK EFFICIENCY OF NITI UNIMORPH ACTUATORS
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MP-32  WHISPERING-GALLERY-MODE OPTICAL MICROSHELL RESONATOR INFRARED DETECTOR.
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¹International Iberian Nanotechnology Laboratory (INL), PORTUGAL and
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¹Lawrence Livermore National Laboratory, USA, ²Stanford University, USA, ³Fore Systems, USA, ⁴Massachusetts Institute of Technology, USA, and ⁵Infineon Technologies, AUSTRIA

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Gerrit Bücken¹ and Julia Körner²
¹Dresden University of Technology, GERMANY and
²Leibniz Universität Hannover, GERMANY
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James Walker¹, Arne Leinse², Douwe Geuzebroek²
¹LioniX International, USA and ²LioniX International, NETHERLANDS