

2020 IEEE 15th International Conference on Nano/Micro Engineered and Molecular System (NEMS 2020)

**San Diego, California, USA
27 – 30 September 2020**



**IEEE Catalog Number: CFP20NME-POD
ISBN: 978-1-7281-7231-6**

**Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP20NME-POD
ISBN (Print-On-Demand):	978-1-7281-7231-6
ISBN (Online):	978-1-7281-7230-9
ISSN:	2474-3747

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Table of Contents

PS1: Poster Session 1

The Comparison of Experimental and Theoretical Study on Graphene Peeling off from SiO₂ <i>Qi Zhang, Dongliang Zhang, Xing Pang, Yulong Zhao</i>	1
Smartphone-controlled Electrochemical Sensor for Copper Detection <i>Yang Li, Song Yu, Jianhua Tong, Chao Bian, Shanhong Xia, Hanpeng Dong</i>	5
A Module-level Weathering and Durability Testing on Silver Nanowire Transparent Conductors <i>Chiao-Chi Lin, Bo-Ju You, Yu-Xuan Yang, I-Hsiang Tseng</i>	9
Underground Water Flow Speed and Direction Measurement Using Differential Pressure Sensors <i>Yukito Fukushima, Manami Taie, Tomoaki Kageyama, Takahiro Tani, Yuki Kajikawa, Masamitsu Kuroiwa, Tetsuro Seiyama, Sang-Seok Lee</i>	14
Electrical and Optoelectronic Properties Analysis in Two-dimensional Multilayer WSe₂ Phototransistor for High Speed Device Applications <i>Avra Bandyopadhyay, Kishan Jayanand, Anupama Kaul</i>	18
Many-body Interactions in Halide-assisted CVD Grown WSe₂ for High Performance <i>Avra Bandyopadhyay, Kishan Jayanand, Anupama Kaul</i>	22
Microfluidic Enzymatic Glucose Biofuel Cell with MWCNT patterned Printed Circuit Board <i>Prakash Rewatkar, Sanket Goel</i>	26
Optimization and Characterization of Laser-Induced Graphene Electrodes for Chemical Fuel Cell to Realize a Microfluidic Platform <i>Lanka Tata Rao, Satish Kumar Dubey, Arshad Javed, Sanket Goel</i>	31
Wearable Self-Powered Pressure Sensor by Integration of Piezo-transmittance Microporous Elastomer with Organic Solar Cell <i>Jungrak Choi, Donguk Kwon, Byeongsu Kim, Jimi Gu, Jihwan Jo, Jung-Yong Lee, Inkyu Park</i>	N/A

IS1: Invited TS: Wearable Multifunctional Micro/Nanosystems

Wireless Electronic Tattoos for Personalized Mobile Sensing and Therapeutics <i>Nanshu Lu</i>	N/A
Stretchy Rubbery Electronics and Integrated System <i>Cunjiang Yu</i>	N/A
Smart and Connected Soft Bioelectronics for Advancing Human Healthcare and Human-Machine Interfaces <i>W. Hong Yeo</i>	N/A
Skin-interfaced Wearable Sweat Biosensors <i>Wei Gao</i>	N/A
Smart Textiles for Personalized Health Care <i>Jun Chen</i>	N/A

IS2: Invited TS: Microbiosensors

Enhanced Sensing Performance of Triboelectric Nanosensors by Solid-Liquid Contact Electrification <i>Zong-Hong Lin</i>	N/A
Integrated Magneto-electrochemical Sensing Platform for Liquid Biopsy Molecular Profiling <i>Hsing-Ying Lin</i>	N/A
Rapid Peptide Enrichment Microfluidic Chip for MALDI-TOF Mass Spectrometer Detection <i>Yen Heng Lin</i>	N/A
IL-6 Diagnostic Device for COVID-19 and Its Clinical Validation <i>Chao-Min Cheng</i>	N/A
Impedimetric Monitoring of Cancer Cells in 3D Environment <i>Kin Fong Lei</i>	N/A

IS3: Invited TS: Nanomaterials & Nano-Micro-Devices for Biosensing

Biosensors Based on Indium Oxide Nanoribbons <i>Chongwu Zhou</i>	N/A
Introducing the Virus Bioresistor: The World's Simplest Biosensor <i>Reginald M. Penner</i>	N/A
Profiling Protease Activities Using a Multiplex Electrochemical Sensor Array <i>Jun Li</i>	N/A
Hysteresis-Free Flexible Strain Sensor Based on Wavy-Structured Conductive Microchannel <i>Jing Chen, Zebang Luo, Lin Li, Yi Su, Jinjie Zhang, Jinyong Zhang, Lei Wang, Hui Li</i>	N/A
Near Full Light Absorption and Charge Collection in 1-micron thick QD film photodetectors using intercalated graphene electrodes <i>Seungbae Ahn, Wenjun Chen, Oscar Vazquez Mena</i>	N/A

TS1: MEMS/NEMS I

MEMS Based Triaxial Electrochemical Seismometer <i>Wenjie Qi, Deyong Chen, Junbo Wang, Jian Chen, Chao Xu, Bowen Liu, Xichen Zheng, Xu She, Tian Liang</i>	59
A MEMS Based Electrochemical Angular Vibration Sensor <i>Bowen Liu, Junbo Wang, Deyong Chen, Jian Chen, Chao Xu, Tian Liang, Wenjie Qi, Xichen Zheng, Xu She</i>	63
A Nonlinear 1D Model of Thermoresistive Micro Calorimetric Flow Sensor for Response Time Improving <i>Zongqin Ke, Xiaoyi Wang, Xuankai Xu, Xuanhao Cao, Izhar, Wei Xu</i>	67
UV-LED Lithography System and Characterization <i>Sabera Fahmida Shiba, Jace Beavers, Diego Laramore, Bo Lindstrom, James Broyles, Corey Gaither, Tyler Hieber, Jungkwun Kim</i>	73
Duhem Hysteresis Modeling of Magnetic Shape Memory Alloy Actuator via Takagi-Sugeno Fuzzy Neural Network <i>Chen Zhang, Yewei Yu, Jingwen Xu, Zhiwu Han, Miaolei Zhou</i>	77
Nanogap Device Engineering for Electrical Characterisation of Molecular Components <i>Erenn Ore</i>	83
Development of the Next Generation Microshutter Arrays for Space Telescope Applications <i>Meng-Ping Chang, Regis Brekosky, Ari Brown, Nicholas Consten, Matthew Greenhouse, Gang Hu, Kyowon Kim, Carl Kotecki, Alexander Kutayev, Mary Li, Stephan McCandliss, Frederick Wang, Ed Aguayo</i>	89

TS2: Sensors & Actuators I

Ultra-high Heat Flux Detection Based on Micromachined Thermal Couple <i>Wei Tian, Jiayu Wang, Yi Wang, Hong Zhou, Yuelin Wang, Tie Li</i>	N/A
Polymer/paper-based double touch mode capacitive pressure sensing element for wireless control of robotic arm <i>Rishabh B. Mishra, Wedyan Babatain, Nazek El-Atab, Aftab Hussain, Muhammad Hussain</i>	95
Wearable Sensors for On-Leaf Monitoring of Volatile Organic Compounds Emissions from Plants <i>Satyanarayana Moru, Hussam Ibrahim, Liang Dong</i>	565
Inkjet-Printed Capacitive Micromachined Ultrasonic Transducer (CMUT) for Moisture Sensing <i>Zhou Zheng, Naeun Kim, Jiaqi Wang, William Wong, John Yeow</i>	106
Floating Gate Perimeter Gated Single Photon Avalanche Diodes <i>Mohammad Aminul Haque, Nicole McFarlane</i>	110
Enhanced PVDF Electrospun Nanofiber Capacitive Pressure Sensor for Wearable Electronic <i>Romana Danova, venkatadinesh avvari, Robert Olejnik, Petr Slobodian, Jiri matyas, Dusan Kimmer</i>	115

TS3: Sensors & Actuators II

Ultralight Weight Piezoresistive Spongy Graphene Sensors for Human Gait Monitoring Applications <i>Debarun Sengupta, Ajay Giri Prakash Kottapalli</i>	120
--	-----

A Fully Transparent, Flexible μECoG Array Based on Highly Conductive and Anti-reflective PEDOT:PSS-ITO-Ag-ITO Thin Films	124
<i>Weiyang Yang, Qi Hua Fan, Wen Li</i>	
Motion nonlinearity of gimbaled micromirror in omnidirectional scanning for LiDAR application	130
<i>Katsuya Suzuki, Takashi Sasaki, Kazuhiro Hane</i>	
Low-Cost Parylene Based Micro Humidity Sensor for Integrated Human Thermal Comfort Sensing	134
<i>Izhar, Xiaoyi Wang, Wei Xu, Hadi Tavakkoli, Yi-Kuen Lee</i>	
Development of an All-Polyimide Flexible Airflow Sensor for Flow-Velocity and Flow-Direction Sensing	139
<i>Dawei Shen, Qipei He, Zhiqiang Ma, Yonggang Jiang</i>	
A Flexible Piezo-Composite Ultrasound Blood Pressure Sensor with Silver Nanowire-based Stretchable Electrodes	143
<i>Chang Peng, Mengyue Chen, Hun Ki Sim, Yong Zhu, Xiaoning Jiang</i>	
Capturing subtle changes during plant growth using wearable mechanical sensors fabricated through liquid-phase fusion	571
<i>Hussam Ibrahim, Satyanarayana Moru, Sung-Min Kang, Shihao Yin, Yuncong Chen, Liang Dong</i>	

IS4: Invited TS: Active Biomaterials for Diagnosis & Therapies

Biomimetic Materials as ECM Analogues to Identify Molecular Mechanisms and Promote Healing	N/A
<i>Shiny Varghese</i>	
Active Internal Modulation of Physical Stresses for Collective Invasion of Epithelial Cell Monolayer	N/A
<i>Jennifer H Shin</i>	
Engineering Materials that are Responsive to Disease Metabolites	N/A
<i>Szu Wang</i>	
Nanotopographical Cues for Engineering Cellular Behaviors and Tissue Regeneration	N/A
<i>Jangho Kim</i>	
Microenvironment Responsive Biomaterials Modulating Inflammatory Immune Cell	N/A
<i>Nisarg Shah</i>	

IS5: Invited TS: Impedance Based Biosensors

Impedance-based and Electrochemical Sensors for Label-free and In situ Probing of Bacterial Response to Environmental Stressors	N/A
<i>Aida Ebrahimi</i>	
Makerspace Micro/Nanofabrication Technologies for 2D, 3D and Nanoscale Electrodes for Interfacing with Electrogenic Cells	N/A
<i>Swaminathan Rajaraman</i>	
Rapid Label-Free Tools for Health and Environmental Monitoring	N/A
<i>Mehdi Javanmard</i>	
AC Electrokinetics-Enhanced Capacitive Detection of Pathogenic Virions and Viral Nuclei Acids	N/A
<i>Jayne Wu</i>	
Impedance Biosensor for Rapid Simultaneous Detection Of Waterborne Pathogens	N/A
<i>Mahmoud Almasri</i>	

IS6: Invited TS: Emerging Materials & Flexible Electronics

Biomimetic Polymer Electronics for Interfacing with Biological Systems	N/A
<i>Sihong Wang</i>	
Hierarchical-structured Ultrathin Flexible Electrostatic Actuators for Microrobots	N/A
<i>Hongqiang Wang</i>	
Smart Textiles towards Sustainable and Pervasive Energy Future	N/A
<i>Jun Chen</i>	
Silicon Nanowire Photodiodes with Whispering Gallery Modes	N/A
<i>Chang-Ki Baek</i>	

Origami and Kirigami Enabled Electronics N/A
Jhonathan Prieto Rojas

PS2: Poster Session 2

A Novel Peninsula-island Structure for Sensing Ultra-low Pressure Based on Dry-wet Combination Etching Process 167

Mimi Huang, Libo Zhao, Tingzhong Xu, Chen Jia, Ping Yang, Zhikang Li, Hongyan Wang, Wu Yongshun, Zhuangde Jiang

Modeling and Simulation of MEMS Capacitive Displacement Sensors 171

Mehadi Hasan Ziko, Mohammed Siraj Ghouri, Ants Koel

Polymer Micromachined Transmission for Insect-Inspired Flapping Wing Nano Air Vehicles 176

Daisuke Ishihara, Sunao Murakami, Naoto Ohira, Jyunpei Ueo, Masakatsu Takagi, Kohei Urakawa, Tomoyoshi Horie

A Contour Mode AIN Piezoelectric Resonator based on SOI Substrate 180

Sitao Fei, Hao Ren

Laser-etched grooves for sequential fluid delivery in a Paper-based Microfluidic Device N/A

Sidharth Modha, Hussein Chamouni, Yu Shen, Ashok Mulchandani, Hideaki Tsutsui

A Helicopter Drive Control Simulation System Using Dynamic Posture Surveillance Feedback 186

Wu Zhigang, Chen Fuzheng, Xu Kaiming, Peng Xianmin, Liu Jiayi, Guangyi Shi

Biocompatible Nanoclusters for Treatment of Cancer Tumors with Magnetic Hyperthermia N/A

Ananiya Demessie, Hassan Albarqi, Olena Taratula, Oleh Taratula

Study on the influence of doping process on resistance of semiconductor bridge region 190

Youqi Deng, Liang Zhang, Wei Zhang

Micro-nano fiber sensor with high sensitivity for temperature measurement 194

Fuzheng Zhang, Na Zhao, Qijing Lin, Feng Han, Libo Zhao, Ping Yang, Zhuangde Jiang

TS4: MEMS/NEMS II

3D Printed Random Lasers via Fused Deposition Modelling (FDM) N/A

YI-ZIH CHEN, YUN-TZU HSU, YEN-YU LIN, HSIA-YU LIN, YU-MING LIAO, CHENG-FU HOU, MIN-HSUAN WU, WEI-NING DENG, YANG-FANG CHEN

Deep Memcapacitive Network 200

Dat Tran, Christof Teuscher

Characterization of trap geometry in flow through dielectrophoretic-microfluidic device for particle trapping 206

Mohammad Rizwen Ur Rahman, Tae Joon Kwak, Jörg C. Woehl, Woo-Jin Chang

Fabrication of an integrated field emitter device with ultra-dense, ultra-sharp, and vertically aligned periodic silicon nanocones N/A

Dirk Jonker, J.W. Berenschot, R.M. Tiggelaar, N.R. Tas, A. Van Houselt, J.G.E. Gardeniers

Design and Analysis of a Band Pass Setback Arming Mechanism in MEMS Safety and Arming Device 213

Hengbo Zhu, Yun Cao, Zhanwen Xi, Weirong Nie

Mechanical Properties of Magnetic-Field-Assisted Electrospun Poly(vinylidene fluoride) (PVDF) Nanofibers 217

Dingwen Deng, Hongze Zhang, Yan Zhang, Yin Zhang, Kedong Bi

The Process of Stacked Nanowire FETs with Repetitive Isotropic Etching N/A

Ya-Chi Huang, Meng-Hsueh Chiang, Shui-Jinn Wang

TS5: Micro/Nano-Fabrication

Pattern Integrity Evaluation Method in Microfabrication N/A

Ting-Jeng Liu

A Highly Robust Silicon Nano-pillar Chip for Electroporation Chip for Delivering Molecules to Hela Cells 230

XU ZHAO, Haixiang LIU, Xiaoyi WANG, Cong ZHAO, Izhar, Benzhong TANG, Yi-Kuen LEE

3-D Printing Assisted Micromachined RF Patch Antenna <i>Jun Ying Tan, Tae-Soon Yun, Mohammad Almuslem, Jungkwun Kim</i>	234
Fabrication of a Carbon Chain Based Nanosensor for Maximizing Spatial Resolution in DNA Sequencing <i>Bo Ma, Steve Tung</i>	238
Fabrication of Small-Scale Solid-State Nanopores by Dielectric Breakdown <i>Zengdao Gu, Dexian Ma, Zhicheng Zhang, Yin Zhang, Jingjie Sha</i>	242
Performance Evaluation Of Via-free Non-spiral Planar Microcoils <i>Krishnapriya S, Rama Komaragiri, Suja K J</i>	247
TS6: Micro/Nano Fluidics I	
PARALLEL NANOLITER ARRAYS BASED MICROFLUIDIC DEVICE FOR QUICK ANTIMICROBIAL SUSCEPTIBILITY TESTING <i>Mohammad Osaid, Yi-Sin Chen, Chih-Hung Wang, Anirban Sinha, Gwo-Bin Lee</i>	251
A Programmable Nanodroplet Device with Direct Sample-to-Droplet Interface toward High-Throughput Screening <i>Fangchi Shao, Kuangwen Hsieh, Pengfei Zhang, Aniruddha Kaushik, Tza-Huei Wang</i>	255
An integrated microfluidic platform for cholangiocarcinoma diagnosis from clinical bile juice by utilizing multiple affinity reagents <i>Tsung-Han Lu, Nai-Jung Chiang, Chien-Jui Huang, Priya Gopinathan, Hsiu-Chi Tu, Yi-Cheng Tsai, Yen-Shen Shan, Shang-Cheng Hung, Gwo-Bin Lee</i>	261
A Microfluidic Device for Induction of Tumor Angiogenesis <i>Che-Yu Lin, Wen-Chih Yang, Yu-Hsiang Hsu</i>	N/A
Development of a Particulate-Matter-Collector by Using a Vortex-Aided Device with an Electrostatic Force <i>Wei-Hsuan Chang, Yu-Hsiang Hsu</i>	N/A
Impedimetric Quantification of Cell Invasion Process in a Hydrogel-filled Microchannel <i>Kin Fong Lei</i>	N/A
TS7: Sensing Materials & Energy Devices I	
On-skin Based Soft Triboelectric Nanogenerator for Electronics Skin <i>Jiwon Park, Da Eun Kim, Youn Tae Kim</i>	273
Glucose abiotic fuel cell <i>Dominic Nnanyelugoh, Ankit Baingane, Peyton Miesse, Gymama Slaughter</i>	277
Effect of The Twist Rod Angles on The Performance of An Inertial Rotary Electromagnetic Energy Harvester <i>Xiangtian Dai, Yifan Wang, Anxin Luo, Fei Wang</i>	281
A Highly Sensitive Non-Enzymatic Hydrogen Peroxide Sensor based on Palladium-Gold Nanoparticles <i>Saikat Banerjee, Faruk Hossain, Gymama Slaughter</i>	286
Numerical Simulation of a Microscale Dynamo Driven by Tethered, Magnetized Bacterial Cell <i>Jeremy Meyer, Jin-Woo Kim, Steve Tung</i>	290
Classification and Concentration Prediction of VOC Gas Based on Sensor Array with Machine Learning Algorithms <i>Yingming Liu, Changhui Zhao, Junqi Li, Huimin Gong, Fei Wang</i>	295
Direct graphene growth on Anodic Aluminum Oxide membrane using chemical vapor deposition for solar evaporator performance enhancement <i>Aamna AlShehhi, Irfan Saadat, Amal AlGhaferi</i>	301
PS3: Poster Session 3	
T4 Bacteriophage based Extended Gate Field Effect Transistors (T4B-EGFETs) for Bacteria Detection <i>Jingting Xu, Yi-Kuen Lee</i>	308

Vertically Aligned Carbon Nanotubes for Fast Humidity Sensing <i>Zichao Ma, Xiaoyi Wang, Lining Zhang</i>	312
A comparative molecular study between chlorpyrifos and parathion using CuO nanohair pesticide sensor <i>Nattida Rongwaree, Tongchatra Watcharawittayakul, Cholthisa Sooksamphanwong, Phichamon Sakdarat, Seeroong Prichanont, Chanchana Thanachayanont, Porpin Pungetmongkol</i>	316
Nanosecond Pulsed Laser Activated Massively Parallel Single-cell Intracellular Delivery Using Ti Micro-Dish <i>Pallavi Shinde, Kavitha Illath, Srabani Kar, Tuhin Subhra Santra</i>	320
Flexural Rigidity of Microtubules Measured by Gold Stripe-Patterned Substrate <i>Hang Zhou, Naoto Isozaki, Kazuki Ukita, Taviare L. Hawkins, Jennifer L. Ross, Ryuji Yokokawa</i>	325
Towards High-Throughput Single-Cell Proteomics Using Droplet Microfluidics <i>Mohsen Paryavi, Richie Chio, M. Arifur Rahman, Iain MacPherson, Aaron T. Ohta</i>	N/A
Prediction and design of breakdown voltage of MEMS spark gap switch based on BP neural network <i>Yuecen Zhao, Wenzhong Lou, Hengzhen Feng, Yi Sun</i>	N/A
Gas chamber and thermal isolation structure simulation for an integrated NDIR gas sensor <i>kaisheng zhang, Wenbo Luo, Tao Wang, Jing Yang, Yupeng Yuan, Zuwei Zhang, Yao Shuai, Chuangui Wu, Wanli Zhang</i>	338
Magnetic tweezers reversely manipulate the speed of DNA passing through the nanopre <i>Gang Wang</i>	342
IS7: Invited TS: Advances in 2D Materials and Their Applications	
Thermal Conductivities and Interfacial Thermal Conductance of One Atomic Layer WSe₂ <i>Xian Zhang</i>	575
Measuring slip-Mediated Bending in 2D Materials and Heterostructures via Scanning Transmission Electron Microscopy <i>Pinshane Y Huang</i>	N/A
Two-Dimensional Transition Metal Carbides (MXenes): From Mechanics to Electro-chemical Sensing <i>Chenglin Wu</i>	N/A
Robust Highly Stretchable Supercapacitors Enabled by MXene-Reduced Graphene Oxide Composite <i>Changyong Cao</i>	N/A
IS8: Invited TS: Micro/Nano Engineering for Advanced Bio/Medical Systems	
Controlled Embryo Implantation by using Soft Microrobot for Safer Reproductive Medicine <i>Masashi Ikeuchi</i>	N/A
Non-invasive Biosensing for Healthcare and Sports Applications <i>Hiroyuki Kudo</i>	N/A
Se/Ga₂O₃ Thin Film Micro-photodiodes for Flexible Color Sensor <i>Taizo Kobayashi</i>	N/A
Plant-on-a-chip: Applications of Microfluidics in Plant Biology <i>Hiroataka Hida</i>	N/A
MEMS Liquid Cell for In-liquid Electron Microscopy <i>Tadashi Ishida</i>	N/A
Microfluidic Platform Fabricated by Three-Dimensional Lithography Enables Drug Test and Disease Modeling In Vitro <i>Yoshikazu Hirai</i>	N/A
IS9: Invited TS: Micro-Nano Engineering & Smart Electronics	
Nanomechanical and Nanoelectromechanical Devices Based on Layered Two-Dimensional Materials <i>Zenghui Wang</i>	N/A

Tribotronics for Active Mechanosensation and Self-Powered Microsystems <i>Chi Zhang</i>	N/A
Graphene Plamons Modulated by Periodically Polarized Ferroelectric Domains for Tunable Infrared Photodetector <i>Wen Huang</i>	N/A
Triboelectrification based flexible sensor and its hybridized sensors towards multiple-functional robotic tactile sensing <i>Bo Meng</i>	N/A
Multimodal, Multilayered Soft Electronics in Advanced Devices for Cardiac Surgery <i>Mengdi Han</i>	N/A
Self-Powered Smart Electronics Based on Silk Fibroin <i>Xiaosheng Zhang</i>	N/A

PS4: Poster Session 4

Microscopic and Spectroscopic Insights on the MAPbBr ₃ Nanoparticle Thin Film Stability: Role of Oxygen and Moisture <i>Amitrajit Mukherjee, Mrinmoy Roy, Nithin Pathoor, Mohammed Aslam, Arindam Chowdhury</i>	N/A
Improving Photoresponse in Hybrid Graphene/PbS QDs using Pyrene for Enhanced Charge Collection <i>Maria Lucia Curri, Seungbae Ahn, Chiara Ingrosso, Oscar Vazquez Mena, Marinella Striccoli, Annamaria Panniello, Giovanni Bruno, Giuseppe Valerio Bianco, Angela Agostiano</i>	N/A
Assessing Cellulose Nanocrystals from Different Wood Species as Engineering Materials <i>Gurshagan Kandhola, Kalavathy Rajan, Angele Djioleu, Joseph Batta-Mpouma, Nicole Labbe, Joshua Sakon, D. Julie Carrier, Jin-Woo Kim</i>	N/A
Hybrid Cellulose Nanocrystal / Gold Nanoparticle Nanocomposites for Surface Plasmon Enhanced Property <i>Mahshid Iraniparast, Joseph Batta-Mpouma, Gurshagan Kandhola, Min Kim, Jaspreet Kaur, Joshua Sakon, Jingyi Chen, Jin-Woo Kim</i>	N/A
Monolithic Photo-activated Gas Sensor based on MicroLED and Metal Oxide Nanowire <i>Incheol Cho, Young Chul Sim, Minkyu Cho, Yong-Hoon Cho, Inkyu Park</i>	N/A
The effect of substrate on the tribological properties of graphene <i>Xin Feng, Lingling Li, Zhiyong Wei, Guiwen Zhang</i>	377
Molecular Dynamics Simulation for Protein Unfolding <i>Meng Yu, Wei Si, Jingjie Sha</i>	382
Multifunctional Theranostic Red Blood Cell Membrane coated Nanoparticles for the Treatment and Detection of Breast Cancer <i>Suphalak Khamruang Marshall, Soracha Dechaumphai</i>	N/A

TS8: Nanobiology/Nanomedicine I

Micro-scale extraction of cf-DNA from embryo culture medium using Electrowetting-on-Dielectric (EWOD) platform <i>Anand Baby Alias, Kai-Ti Lin, Da-Jeng Yao</i>	N/A
Rapid Enrichment of Extracellular Vesicles via Optically-induced Dielectrophoresis and Microfluidics <i>Yi-Sin Chen, Charles Pin-Kuang Lai, Chen-wei Fan, Chihchen Chen, Gwo-Bin Lee</i>	390
Accelerated, Reactive Aging Tests of Parylene C, SiO ₂ , and Si ₃ N ₄ Packages for Chronic Neural Implants <i>Yan Gong, Matthew Harris Brauer, Kristine Zheng, Wen Li</i>	394
A Low-drift Extended-Gate Field Effect Transistor (EGFET) with Differential Amplifier for Cordyceps Sinensis DNA Detection Optimized by gm/ID Theory <i>Yifan XU, Hadi TAVAKKOLI, Jingting Xu, Yi-Kuen Lee</i>	398
Effect of Size of Gold Nanoparticles (GNP) on Intracellular Uptake and Cytotoxicity in Breast Cancer Cells <i>Yuwen Zhao, Rui Yang, Shue Wang</i>	402

Bending Properties of Materials for Peripheral Nerve Interfaces	407
<i>Joshua Woods, Elissa Welle, Lei Chen, Julianna Richie, Paras Patel, Cynthia Chestek</i>	
TS9: Nanobiology/Nanomedicine II	
Flexible Electrochemical Lactate Biosensor	580
<i>Peyton Miesse, Gymama Slaughter</i>	
Operation stability of chitosan and nafion-chitosan coatings on bioelectrodes in enzymatic glucose biofuel cells	416
<i>Robinson Kuis, Md Qumrul Hasan, Ankit Baingane, Gymama Slaughter</i>	
Study on magnetic properties of artificial magnets induced by ferromagnetic/ferroelectric	N/A
<i>Akinobu Yamaguchi, Ryo Nakamura, Shunya Saegusa, Naoya Akamatsu, Aiko Nakao, Yuichi Utsumi, Masaki Oura, Takeshi Ogasawara, Keisuke Yamada, Takuo Ohkochi</i>	
Modeling of Plasmonic Organic Solar Cells using Core-Shell Metallic Nanoparticles	422
<i>Muath Bani Salim, Reza Nekovei, Amit Verma</i>	
3D PRINTED MICRO-SCAFFOLDS LOADED BY INKJET PRINTING WITH µg-PRECISE AMOUNT OF DRUG	426
<i>Fengyi Zheng, Jongmoon Jang, Christopher Tse, Juergen Brugger</i>	
Synthesis and Characterization of Citrus-derived Pectin nanoparticles based on their degree of esterification	N/A
<i>eden jacob, Ankita Borah, Amandeep Jindal, Sindhu Pillai, Yohei Yamamoto, Sakthi Kumar</i>	
Nanorobot for Cancer Biomarker Instrumentation	431
<i>Adriano Cavalcanti, Declan G. Murphy, Prokar Dasgupta</i>	
TS10: Micro/Nano Fluidics II	
Hysteresis Modeling of Magnetic Shape Memory Alloy using a NARMAX Structure Model	437
<i>Yewei Yu, Chen Zhang, Jingwen Xu, Zhiwu Han, Miaolei Zhou</i>	
Modular Magnetic Digital Microfluidic Platform with 3D-Printed Lego-Like Building Blocks for On-Demand Bioanalysis	N/A
<i>Pojchanun Kanitthamniyom, Aiwu Zhou, Yi Zhang</i>	
Low-Cost Rapid Prototyping of High-Resolution Printed Liquid-Metal Circuits and Devices	N/A
<i>Kareem Elassy, Jubeyer Rahman, Anthony W. Combs, David G. Garmire, Wayne A. Shiroma, Aaron Ohta</i>	
Intracellular Delivery using Anisotropic Gold Nanocrystals Synthesized by Microfluidic Device	448
<i>Kavitha Illath, Syrpailyne Wankhar, Moeto Nagai, Tuhin Subhra Santra, Pallavi Shinde, Ashwin Kumar Narasimhan</i>	
Investigation the Ionic Transport and Charge Inversion in Monovalent Nanofluidic Structures	N/A
<i>Mohsen Nami, Cody Ritt, Yukun Li, Jianyu Wang, Mark Reed</i>	
A Review of Nanofluids Synthesis for Oil and Gas Applications	455
<i>Surupa Shaw</i>	
IS10: Invited TS: Single-Cell Analysis	
Self-Assembled-Cells-Array (SACA) System for Single Circulating Tumor Cells/Microemboli (CTCs/CTM) Rapid Detection for Cancer Prognosis	N/A
<i>Fan-Gang Tseng</i>	
Dynamic Size-Tracking of Single Cells Using Microfluidics-Integrated Microwave Sensors	N/A
<i>Selim Hanay</i>	
Deep Learning Classifies Breast Cancer Cells by EGFR Trajectory	N/A
<i>Yen-Liang Liu</i>	
Massively Parallel Single-Cell Processing for Innovation in Medicine and Engineering	N/A
<i>Moeto Nagai</i>	
Single Cell Micro/Nano Electroporation and Photoporation	N/A
<i>Tuhin Subhra Santra</i>	

IS11: Invited TS: Smart Sensors for Healthcare Applications

Building a Body Area Sensor Network for Autonomous Biomonitoring <i>Jun Chen</i>	N/A
Microfluidic liquid crystal biosensing chips <i>Yu-Cheng Hsiao</i>	N/A
Intelligent and photo-responsive nanopolypyrrole for industrial and clinical applications <i>Er-Yuan Chuang</i>	N/A
Design of Wearable Triboelectric Nanogenerator for Self-Powered Healthcare and Biomedical Sensing <i>Yannan Xie</i>	N/A
Self-Powered Sensors Based on Triboelectric and Thermoelectric Effects <i>Zong-Hong Lin</i>	N/A

IS12: Invited TS: Energy Harvesting & Smart Systems

Vibrational energy harvesting techniques and self-powered sensing systems <i>Huicong Liu</i>	N/A
Micro Energy harvesting from vibration at ultra-low frequency <i>Fei Wang</i>	N/A
Fabrication of Piezoelectric Biomaterials for Energy Applications <i>Rusen Yang</i>	N/A
Capturing Energy through Triboelectric Nanogenerators: An Emerging Power Solution <i>Yunlong Zi</i>	N/A
A universal standardized method for output capability assessment of nanogenerators <i>Xin Xia, Jingjing Fu, Yunlong Zi</i>	N/A

TS11: Sensing Materials & Energy Devices II

Development of Silver-Nanoparticle-Based Planar Microcoil for Electromagnetic Cochlear Stimulation <i>Ressa Reneth Sarreal, Pamela Bhatti</i>	N/A
Construction Of NiCe-LDH Nanostructure From Ni-MOF As A Positive Electrode Material for High-Performance Asymmetric Supercapacitor Device <i>Rajendran Ramachandran, Changhui Zhao, Zong-Xiang Xu, Fei Wang</i>	485
Dielectric Constant and van der Waals Interlayer Interaction of MoS₂-Graphene Heterostructures <i>Amit Singh, Seunghan Lee, Hoonkyung Lee, Hiroshi Watanabe</i>	490
Electrical modeling of Copper and Mixed Carbon bundles as a composite for 3D Interconnect applications <i>Madhav Rao</i>	495
Poly (vinylidene fluoride-co-hexafluoropropylene) Electrospun Non-Woven Nanofibers based Piezoelectric Nanogenerator <i>venkatadinesh avvari, Robert Olejnik, Romana Danova, Jiri Matyas, Petr Slobodian, Martin Adamek, Dusan Kimmer</i>	500
A Self-Powered Vehicle Speed Sensor based on an Inertial Rotary Electromagnetic Energy Harvester <i>Yifan Wang, Xiangtian Dai, Anxin Luo, Fei Wang</i>	472

TS12: Nanomaterials/Nanomechanics I

Platinum Nanoparticles Decorated Multiwalled Carbon Nanotubes and Chemically Modified Graphene based Electrochemical Biosensor for Highly Sensitive and Selective Glucose Detection <i>Faruk Hossain, Insoo Kim, Gymama Slaughter</i>	506
Tuning the response of hybrid Graphene/Quantum Dot photodetectors with QD size, film thickness and intermediate layers <i>Seungbae Ahn, Wenjun Chen, Oscar Vazquez Mena</i>	N/A

Metal-Organic Framework Derived CeO ₂ Based Two-Dimensional Layered Nanocomposites for Selective Electrochemical Dopamine Detection <i>Chengjie Ge, Rajendran Ramachandran, Fei Wang</i>	512
TDDFT Studies on Sheet Size-Dependency of Optoelectronic Properties Of 2D Silicon Doped with Alkali Metals <i>MD Raiyan Alam, Muath Bani Salim, Ganesh Alwarappan, Aashka Bhandari, Sunil Patil, Sherin Alfalah, Mohamed Shibl, Walid Hassan, Reza Nekovei, Amit Verma</i>	518
Physicochemical Properties of Multifunctional Crosslinked Cellulose Nanocrystals <i>Joseph Batta-Mpoura, Joshua Sakon, Jin-Woo Kim</i>	N/A
Effects of Commensurability on the Friction and Energy Dissipation in Graphene/Graphene Interface <i>Rong Lin, Zhiyong Wei, Yunfei Chen</i>	524
Study of Gold Particles in HFSS with Varying Physical Parameters and Arrangements <i>Annesha Mazumder, Azeemuddin Syed, Tapan Kumar Sau, Prabhakar Bhimalapuram</i>	529

TS13: Nanomaterials/Nanomechanics II

A wireless self-powered glucose monitoring biosystem <i>Ankit Baingane, Gymama Slaughter</i>	533
DropPNA-GO: A Single-cell Uropathogen Sensor Based on PNA Probes and Graphene Oxide in Picoliter Droplets <i>Pengfei Zhang, Aniruddha Kaushik, Kuangwen Hsieh, Tza-Huei Wang</i>	537
2 x 3 Arrayed CMOS Capacitive Biosensors for Detection of microRNAs on a Microfluidic System <i>Yu-Hsuan Kuo, Chi-Chien Huang, Yi-Sin Chen, Po-Chiun Huang, Gwo-Bin Lee</i>	541
Scaling Effect Induced Rapid Quenching Improves the Performance of Microfabricated Electrostatic Micromirrors <i>Hao Ren, Weimin Wang, Haichao Cao, Sitao Fei, Yunping Niu, Zhihao Li</i>	545
A Novel Pulse Heating Approach for Gas Sensors with Concentration Estimation through Back Propagation Neural Network <i>Ye Tian, Gaoqiang Niu, Yushen Hu, Fei Wang</i>	549
AC Electrothermal Flow-Enhanced, Label-Free Immunosensor for Rapid Electrochemical Sensing <i>Jiran Li, Peter Lillehoj</i>	554
Interfacial Adhesion Behavior between Conductive Polymers and Functionalized Graphene via Molecular Dynamic Simulation <i>Bin Hu, kedong bi</i>	559