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Message from Chairpersons

Welcome to the 19th IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE-NEMS 2024), taking place at Kyoto University of Advanced Science (KUAS), Kyoto, Japan from May 2nd to 5th, 2024. We are pleased to welcome over 380 delegates from 21 countries as of April 25, 2024.

Since its inception in 2005, the IEEE-NEMS conference series sponsored by the IEEE Nanotechnology Council (IEEE NTC), has been a leading conference for the world’s top researchers in academia and industry. Here, we gather to share professional insights, extend our professional networks, and discover the latest breakthroughs in the field of N/MEMS, nanotechnology, and molecular technology.

This year, at the heart of IEEE-NEMS 2024, we have an engaging lineup of three plenary lectures, one keynote lecture, 106 invited talks in 21 sessions, 76 contributed talks in 12 sessions, and 130 posters in two poster sessions. Each presentation was meticulously selected by the Technical Program Committee (TPC) to ensure the highest quality. During the selection process, TPC collectively nominated finalists for the C. M. Ho Best Paper Award in Micro/Nanofluidics, the Best Conference Paper Award, the Best Student Paper Award, and the Best Conference Poster Award. All the finalists and Awardees will be also announced at the closing ceremony on May 5th.

Our conference is immensely enriched by the generous support of our exhibitors and subsidy from Kyoto City, and the Kyoto Convention & Visitors Bureau. Their contributions enable us to offer a suite of networking events, including a welcome reception, a conference banquet, luncheons, and coffee breaks designed to foster lively scientific exchange and inspire cross-disciplinary collaborations.

Kyoto, a city that served as Japan’s capital for over a millennium, is one of the most popular tourist destinations in Asia, where you can enjoy the historical atmosphere of Japan. The conference venue offers easy access to breathtaking temples and shrines that promise to enhance your experience during your stay in Kyoto.

In closing, we hope you will enjoy fruitful discussions in the technical presentations, networking, and exhibition. We are confident that IEEE-NEMS2024 will be an unforgettable conference for all delegates and accompanying person through interactive social events. On behalf of the organizing committee, we extend a warm welcome to you all. We are thrilled to host you in Kyoto, where tradition meets innovation!

Sincerely yours,

General Chair
Prof. Ryuji Yokokawa
Kyoto University,
Japan

General Co-Chair
Prof. Osamu Tabata
Kyoto University of Advanced Science (KUAS),
Japan
IEEE-NEMS 2024 Organization

International Advisory Committee
Chair: Tzyh-Jong TAM, Washington University, USA
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Alice H.X. ZHANG, Peking University, China
Daoheng SUN, Xiamen University, China
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Osamu TABATA, Kyoto University of Advanced Science, Japan
Wen J. LI, City University of Hong Kong, China
William C. TANG, University of California at Irvine, USA
Shuji TANAKA, Tohoku University, Japan
Yu-Chong TAI, California Institute of Technology, USA

Organizing Committee
General Chair: Ryuji Yokokawa, Kyoto University
General co-Chair: Osamu Tabata, Kyoto University of Advanced Science
Program Chair: Hiroyuki Kudo, Meiji University
Program co-Chair: Masaya Toda, Tohoku University
Publication Chair: Koji Sugano, Kobe University
Invited Session Chair: Yoshikazu Hirai, Kyoto University
Invited Session co-Chair: Hiroaki Onoe, Keio University
Local Organizing Chair: Koichi Nakamura, Kyoto University of Advanced Science
Local Organizing Co-Chair: Masayuki Nishi, Kyoto University of Advanced Science
Promotion Co-Chair: Akio Higo, The University of Tokyo
Promotion Co-Chair: Yoshihiko Isobe, MIRISE Technologies
Promotion Co-Chair: Kazuya Fujimoto, Kyoto University
Conference Secretariat: Yasuto Tsuruta, Kyoto University of Advanced Science
Technical Program Committee

Program Chair: Hiroyuki Kudo, Meiji University, Japan
Program co-Chair: Masaya Toda, Tohoku University, Japan
Members
- Mahmoud Almasri, University of Missouri, USA
- Ki Ando, Chiba Institute of Technology, Japan
- Victor J. Cadarso, Monash University, Australia
- Weiqiang Chen, New York University, USA
- Chang-Hwan Choi, Stevens Institute of Technology, USA
- Jungwook Choi, Chung-Ang University, Korea
- Cheng Hsin Chuang, National Sun Yat-sen University, Taiwan
- Han-Sheng Chuang, National Cheng Kung University, Taiwan
- Bo Cui, University of Waterloo, Canada
- Tatsuro Endo, Osaka Metropolitan University, Japan
- Scott Fan, Kansas State University, Taiwan
- Yu-Jui Fan, Taipei Medical University, Taiwan
- Kazuya Fujimoto, Kyoto University, Japan
- Motoaki Hara, National Institute of Information and Communications Technology, Japan
- Gen Hashiguchi, Shizuoka University, Japan
- Masaki Hirota, Kyushu University, Japan
- Jun Hirotani, Kyoto University, Japan
- Hiroaki Honma, Kobe University, Japan
- Nien-Tsu Huang, National Taiwan University, Taiwan
- Kuo-Yung Hung, Ming Chi University of Technology, Taiwan
- Kenta Itani, Tokyo Medical and Dental University, Japan
- Satoshi Ikezawa, Waseda University, Japan
- Naoki Inomata, Tohoku University, Japan
- Tadashi Ishida, Tokyo Institute of Technology, Japan
- Toshihiro Ito, The University of Tokyo, Japan
- Kentaro Iwami, Tokyo University of Agriculture and Technology, Japan
- Bumjin Jang, Hanyang University ERICA Campus, Korea
- Ji Won Jung, Ulsan University, Korea
- Tetsuo Kan, The University of Electro-Communications, Japan
- Kensuke Kanda, University of Hyogo, Japan
- Dae Won Kim, Kyunghee University, Korea
- Songkil Kim, Pusan National University, School of Mechanical Engineering, Korea
- Sun Kook Kim, Sungkyunkwan University, Korea
- Sung-Jae Kim, SNU, Korea
- Satoshi Konishi, Ritsumeikan University, Japan
- Momoko Kumemura, Kyushu Institute of Technology, Japan
- King Lai, City University of Hong Kong, Hong Kong, China
- Sang-Seok Lee, Tottori University, Japan
- Kin Fong Lei, Chang Gung University, Taiwan
- Thierry Leichle, LAAS-CNRS, France
- Tie Li, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China
- Wen Li, Michigan State University, USA
- Peter Lillehoj, Rice University, USA
Jun Woo Lim, Jeonbuk National University, Korea
Chih-Ting Lin, National Taiwan University, Taiwan
Qiao Lin, Columbia University, USA
Yen-Heng Lin, Chang Gung University, Taiwan
Yu-Sheng Lin, School of Electronics and Information Technology, Sun Yat-Sen University, China
Cheng-Hsien Liu, National Tsing Hua University, Taiwan
Huicong Liu, Soochow University, China
Yen-Wen Lu, National Taiwan Univ., Taiwan
Tadao Matsunaga, Tottori University, Japan
Nobuo Misawa, Azabu University, Japan
Yuya Morimoto, Waseda University, Japan
Yuji Murakami, Shizuoka Institute of Science and Technology, Japan
Moeto Nagai, Toyohashi University of Technology, Japan
Yuta Nakashima, Kumamoto University, Japan
Takahiro Namazu, Kyoto University of Advanced Science, Japan
Kenichi Nomura, National Institute of Advanced Industrial Science and Technology (AIST), Japan
Yuki Okamoto, National Institute of Advanced Industrial Science and Technology (AIST), Japan
Taiyu Okatani, Tohoku University, Japan
Jungyul Park, Sogang University, Department of Mechanical Engineering, Korea
Woo-Tae Park, Seoul National University of Science & Technology, Korea
Ken Saito, Nihon University, Japan
Kiyotaka Sasagawa, Nara Institute of Science and Technology, Japan
Min-Ho Seo, Pusan National University, Korea
Hirofumi Shintaku, Kyoto University, Japan
Masayuki Sohgawa, Niigata University, Japan
Yubing Sun, UMass-Amherst, USA
Takaaki Suzuki, Gunma University, Japan
Yukio Suzuki, Tohoku University, Japan
Miyuki Tabata, Tokyo University of Agriculture and Technology, Japan
Hidetoshi Takahashi, Keio University, Japan
Kazuhiro Takahashi, Toyohashi University of Technology, Japan
Seiichi Takamatsu, The University of Tokyo, Japan
Yusuke Takei, National Institute of Advanced Industrial Science and Technology (AIST), Japan
Noriko Tsuruoka, Tohoku University, Japan
Hideaki Tsutsumi, University of California, Riverside, USA
Steve Tung, University of Arkansas, USA
Yoshiaki Ukita, University of Yamanashi, Japan
Zenghui Wang, University of Electronic Science and Technology of China, China
Zheyaow Wang, Tsinghua University, China
Pak Kin Wong, Penn State, USA
Jin Xie, Zhejiang University, China
Akinobu Yamaguchi, University of Hyogo, Japan
Takatoki Yamamoto, Tokyo Institute of Technology, Japan
Bin Yang, Shanghai Jiao Tong University, China
Zhan Yang, Jiangsu Provincial Key Laboratory of Advanced Robotics & Collaborative Innovation Center of Suzhou Nano Science and Technology, Soochow University, China
Shinya Yoshida, Shibaura Institute of Technology, Japan
Shotaro Yoshida, Chuo University, Japan
Feng-Yuan Zhang, University of Tennessee, USA
Xiaojing (John) Zhang, Dartmouth College, USA
Guangya Zhou, National University of Singapore, Singapore
# Program Schedule at-a-glance

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Main hall</th>
<th>Room A</th>
<th>Room B</th>
<th>Room C</th>
<th>Room D</th>
<th>Room E</th>
<th>Poster &amp; Exhibit</th>
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<td>18:00-20:00</td>
<td>IEEE-NEMS 2024 Banquet @ Hotel Granvia Kyoto, adjacent to JR Kyoto Stn.</td>
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Conference Venue

Kyoto University of Advanced Science (KUAS)
South Building
Kyoto Uzumasa Campus

1st Floor, South Bldg.

Advanced Hall - Poster Session/Exhibition/Refreshment

Registration Desk at South Bldg, 1F:
- Thursday, May 2  17:00-21:00
- Friday, May 3    08:00-18:00
- Saturday, May 4  08:00-17:30
- Sunday, May 5    08:00-16:00

Conference Events:
- Welcome Reception on May 2
  18:00-20:00 at Advanced Hall, 1F
- Lunch and Learn Session on May 4
  12:00-13:00 at Room A, 3F
  Pick up lunch box and bring it to the room.
- Banquet on May 4
  18:00-20:00 at Hotel Granvia Kyoto, GENJI Room, 3F
  Banquet registration starts at 17:30, May 4.

Conference Lunch Box on May 3-5
- For dietary restrictions
  Pick up at the registration, 1F
- For regular lunch
  Pick up at the registration, 1F or at the desk near Room C, 3F.

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Plenary Speakers

9:25-10:15, May 3, 2024 at Main Hall (1F)

Quantum information technologies using photons -entangled photon sources, single light emitters, and their applications -
Prof. Dr. Shigeki Takeuchi
Professor
Graduate School of Engineering Division of Electronic Science and Engineering
Kyoto University, Japan
http://qip.kuee.kyoto-u.ac.jp/en/member.html

<Abstract>
The rapid development of quantum mechanics in the 1920s is called the quantum revolution. Recently, research on “quantum technology” that overcomes the limits of existing technology by utilizing the essential properties of quantum mechanics is progressing rapidly and is also called the “second quantum revolution.” Applications of quantum technologies to sensing and measurement, which are the foundations of various science and technology, are also highly expected. Quantum entanglement is a superposition of ‘different correlated states’ and is a crucial resource for quantum technologies.
In this talk, we will report our recent progress in developing novel quantum entangled-photon sources, single light emitters, and applications to quantum sensing, particularly infrared quantum absorption spectroscopy. Harnessing the quantum interference between generation processes of visible-infrared photon pairs, infrared quantum absorption spectroscopy (QIRS) enables the estimation of the optical properties of a medium in the infrared region from interferograms obtained by detecting visible photons. Since QIRS enables infrared spectroscopy using a light source or detector for the visible wavelength region like silicon CMOS sensors, infrared spectrometers can be made more compact and less invasive, which will find many alternative applications.

9:00-9:50, May 4, 2024 at Main Hall, 1F

Molecular Tips for AFM-Based Force Spectroscopy and Nano Lithography
Prof. Dr. Yoko Yamakoshi
Professor/Department of Chemistry and Applied Biosciences
ETH (Swiss Federal Institute of Technology) Zürich, Switzerland
https://www.yamakoshi.ethz.ch/

<Abstract>
To analyze and manipulate the surface substrate at a single molecular level and in a reproducible manner, tripod-shaped organic molecules, with a tetrahedral adamantane core and rigid acetylene legs were synthesized. It was expected that such tripod structure with wider platform may help the robust attachment of the organic molecule onto the AFM tip surface in a dispersed manner being advantageous for the single molecular study. The molecules were stably immobilized onto the gold surface by S-Au bonding as observed by NC-AFM imaging. For chemical recognition of the substrate surface, tripod with ligand moieties were subjected to the Au-coated AFM tip functionalization to observe single molecular interaction between the ligand and receptor with precise magnitude and reproducibility. When a tripod molecule with photocatalyst C60 was attached onto the AFM tip, localized oxidation of the substrate DNA origami was successfully performed under the temporal control of visible light irradiation that triggered the reactive oxygen species generation by C60 on AFM tip.
Plenary Speakers

9:00-9:50, May 5, 2024 at Main Hall, 1F

**Leveraging Semiconductor Eco-systems to MEMS**

*Prof. Weileun Fang*

NTHU Chair Professor/Power Mech. Eng. Department
National Tsing Hua University, Taiwan

http://mdl.pme.nthu.edu.tw/NTHU_PME_lab_ENG/mem.html

<Abstract>
Taiwan, with population of near 23 million and area of 36000km², is active in the semiconductor related industries and researches, especially in Hsinchu city where the National Tsing Hua University (NTHU) is located. The faculties and students of NTHU have the opportunity to frequently and closely interact with the semiconductor industries. This article would like to share the experience of NTHU MEMS group regarding how they leverage the huge semiconductor resources to promote MEMS technologies in the following four stages. First, employing the CMOS-MEMS technologies serves as the bridge to communicate with the semiconductor industries. Second, by preventing various mechanical issues from thin films, promising applications for CMOS-MEMS technologies are demonstrated. Third, the MEMS above CMOS technology established in the foundry further exhibits the win-win collaboration for MEMS and semiconductor technologies. Finally, due to the potential applications in Smart-X and Metaverse, semiconductor industries are even developing processes with new functional materials for MEMS recently. In conclusions, it is a win-win strategy between academia/research and industry/market to leverage the resources in mature semiconductor ecosystems for the development and commercialization of MEMS.

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**Keynote Speaker**

16:20-17:00, May 4, 2024 at Main Hall, 1F

**AI E-Skin Sensors for Human-Metaverse Interaction**

*Prof. Wen Jung LI*

Vice-President, and Chair Professor (Mechanical Eng. Dept.)
City University of Hong Kong, China

<Abstract>
This lecture explores the innovative applications of AI-powered e-skin sensors to enhance the human interaction experience with the metaverse – applications that present exciting possibilities for immersive experiences. AI e-skin sensors integrated into wearable devices such as gloves or suits enable metaverse avatars to interpret and respond to human gestures, movements, and emotions, elevating the human immersion experience with the meta-world. If coupled with appropriate actuators, the gloves or suits may also enable users to feel haptic feedback, temperature changes, and pressure variations while interacting with virtual objects.

We will discuss various materials and fabrication techniques to create e-skin sensors with highly responsive motion recognition capabilities, including the challenges associated with real-time sensory information capture and transmission. Moreover, we will also review the effectiveness of several AI-related algorithms in performing motion recognition using various e-skin sensors, spanning from recognizing facial micro-expressions, throat vibrations, and fingerprint-based tactile sensations to muscle activities of the limbs.

This lecture offers an insightful exploration of AI e-skin sensors and their potential to reshape human-metaverse interaction technologies. Attendees will gain a comprehensive understanding of this emerging technology and its implications for the future of immersive experiences in the metaverse.
Lunch and Learn Session

12:00-13:00, May 4, 2024 at Room A, 3F

Special Session: How to Actively Get Involved in the Organization of IEEE-NTC International Conferences

Prof. Kremera Makasheva
Senior Researcher at CNRS, Laboratory on Plasma and Conversion of Energy (LAPLACE), Toulouse, France

Prof. Osamu Tabata,
Vice President, Dean of Faculty of Engineering, Kyoto University of Advanced Science (KUAS), Japan
IEEE-NEMS 2024 - Program Schedule

10:30-12:30, May 3, 2024
Room A, 3F
Invited Lecture Session
3A1: Toward a Better Organ-on-a-Chip: Sensing, Analysis and Cell Culture in Microfluidic Device
Session Chair: Yi-Chung Tung, Academia Sinica, Taiwan

Invited Lecture
3A1 #7033
Deciphering CELL-NANOSTRUCTURE Interactions Using Advanced Imaging
Peilin Chen
Academia Sinica, Taiwan

Invited Lecture
3A1 #7146
A Physiological Approach to Develop an in VITRO Tumor Model with MICROVESSELS
Yu-Hsiang Hsu
National Taiwan University, Taiwan

Invited Lecture
3A1 #7049
Control and Sensing Oxygen Tension in Microfluidic Devices for Cell Culture Applications
Yi-Chung Tung
Academia Sinica, Taiwan

Invited Lecture
3A1 #7122
Generation of Physiological Oxygen Gradient in Tumor Microenvironment for Enhanced Drug Evaluation
Jen-Huang Huang
National Tsing Hua University, Taiwan

Invited Lecture
3A1 #7036
MACHINE-Learning Assisted Quantification of Cell Viability
Yi-Tin Lai, I-Chen Li, Meng-Ching Hsieh, Ji-Yen Cheng
Academia Sinica, Taiwan

10:30-12:30, May 3, 2024
Room B, 3F
Invited Lecture Session
3B1: NEMS/MEMS in Atomic Clock Devices
Session Chair: Motoaki Hara, National Institute of Information and Communications Technology

Invited Lecture
3B1 #7115
Microfabricated Vapor Cells for Compact Optical Clocks
Matthew Hummon
National Institute of Standards and Technology, United States

Invited Lecture
3B1 #7138
Current State of CHIP-Scale Atomic CLOCKS: OVERVIEW, Performance Enhancement METHODS, and Evaluation Systems
Shigeyoshi Goka
Tokyo Metropolitan University, Japan
Invited Lecture
3B1 #7012
MEMS Wavelength Tunable VCSEL for Chip-Scale Atomic Clock
Hiroshi Toshiyoshi{3}, Keiji Isamoto{1}, Nobuhiko Nishiyama{2}
{1}Santec OIS Corp., Japan; {2}Tokyo Institute of Technology, Japan; {3}University of Tokyo, Japan

Invited Lecture
3B1 #7044
Development of a Miniature ultra-High Vacuum Cell for Generation of Cold Atoms
Yuichi Kurashima{1}, Taisei Motomura{1}, Shinya Yanagimachi{1}, Takashi Matsumae{1}, Naoto Oshima{2}, Mitsuhiro Watanabe{2}, Hideki Takagi{1}
{1}National Institute of Advanced Industrial Science and Technology, Japan; {2}Nihon University, Japan

Invited Lecture
3B1 #7040
Multifunctional Dielectric metasurface for Microfabricated reflection-Type Vapor Cell
Kentaro Iwami
Tokyo University of Agriculture and Technology, Japan

Invited Lecture
3B1 #7072
Chip-Level Integrated Frequency Standard (CLIFS): How Do We Realize the Chip for the Atomic clock?
Motoaki Hara
National Institute of Information and Communications Technology, Japan

10:30-12:30, May 3, 2024 Room C, 3F
Invited Lecture Session
3C1: MEMS, NEMS and Metamaterials for Advanced Applications
Session Chair: Fei Wang, Southern University of Science and Technology (SUSTech) & Nan Wang, Shanghai University

Invited Lecture
3C1 #7004
Tunable N/MEMS Metadevices for Sensing Applications
Yu-Sheng Lin
Sun Yat-sen University, China

Invited Lecture
3C1 #7099
MEMS-Enabled and AI-Enhanced On-Chip Computational Spectrometers
Yiming Ma
Shanghai University, China

Invited Lecture
3C1 #7185
Artificial Intelligence-Assisted Optical, Visual, and Ion Mobility Spectroscopy for High-Sensitivity Molecules Sensing
Jianxiong Zhu
Southeast University, China

Invited Lecture
3C1 #7188
MEMS Gas Sensors with Compatible Fabrication Technology and Machine Learning Methods
Fei Wang
Southern University of Science and Technology, China
Invited Lecture

3C1 #7247
**AIr Based Lamb Wave Resonators with High Effective Coupling Coefficient**
Zhiyu Wang, Jiewei Jiang, Chen Ma, Qinghua Ren, Jianlin Chen, Fengyuan Yang, Yiming Ma, Nan Wang
Shanghai University, China

10:30-12:30, May 3, 2024 Room D, 3F

**3D1: Micro/Nano/Molecular Fabrication and Materials**
Session Chairs: Yukio Suzuki, Tohoku University & Hiroaki Honma, Kobe University

**3D1 #7024**
**Tunable Fluorescent nitrogen-Doped Ti3C2 MXene-Derived Quantum Dots for Ultrasensitive Tetracycline Sensing**
Van Thanh Nguyen, Ruey-An Doong
National Tsing Hua University, Taiwan

**3D1 #7220**
**Neurosynaptic Array Based on Two-Terminal Au Nanoparticle Floating Gate Memristor**
Hongwoon Yun, Woo Jong Yu
Sungkyunkwan University, Korea

**3D1 #7232**
**A RF Resonator-Based Structure for Wireless Passive Displacement Sensing**
Hu Shengze, Zhao Ziqi, Yamamoto Michitaka, Takamatsu Seichi, Itoh Toshihiro
University of Tokyo, Japan

**3D1 #7129**
**Flexible Transparent micropatterned Conductive Films Fabricated Using Liquid Film Rupture self-Assembly Method**
Xin-Ran Zhang, Xu Zeng, Yi-Lin Wang, Peng Huang, Xiao-Sheng Zhang
University of Electronic Science and Technology of China, China

**3D1 #7173**
**OSTE Micro Mushroom Forest: a Superhydrophobic Substrate by Polymer Off-Stoichiometry Thiol-Ene (OSTE)**
Haonan Li({2}), Muyang Zhang({2}), Shangneng Yu({2}), Ziejingqiu Chen({2}), Zitao Feng({2}), Jie Zhou({2}), Qinghao He({2}), Xingwei Zhang({2}), Huiru Zhang({1}), Weijin Guo({2})
{1}Guangdong Foshan Lianchuang Graduate School of Engineering, China; {2}Shantou University, China

**3D1 #7234**
**Accuracy Evaluation of 3 Dimensional Microstructures Fabricated by Prism-Assisted 3D Lithography**
Yafei Chen, Yuya Tanaka, Takaaki Suzuki
Gunma University, China; Gunma University, Japan

**3D1 #7168**
**Microextrusion-Based 3D Printing for Mesoscale Interfacial Structural Designing in Anode-Supported Solid Oxide Fuel Cells**
Haewon Seo
Korea Institute of Science and Technology, Korea

**3D1 #7104**
**Direct Electrical Heating and Multi-Cycle Stretching Method for Micro Wire Straightening**
Yan Xu, Xianghe Meng, Xingjian Shen, Xiaomo Wu, Hui Xie
State key Laboratory of Robotics and Systems, Harbin Institute of Technology, China
10:30-12:30, May 3, 2024  Room E, 3F  
3E1: Finalist Session 1  
Session Chair: Koji Sugano, Kobe University

3E1 #7114  
Selective Micro-Transfer Printing of Microspheres Using Adhesion-Switchable Stamp  
Lizhou Yang, Qinhua Guo, Jinyang Zhang, Yawen Gan, Yunda Wang  
The Hong Kong University of Science and Technology (guangzhou), China

3E1 #7153  
2–16 GHz Multifrequency X-Cut Lithium Niobate NEMS Resonators on a Single Chip  
Ryan Tetro, Luca Colombo, Matteo Rinaldi  
Northeastern University, United States

3E1 #7283  
Wafer Scalable Synthesis of MoS2 Nanostructures for Photosensing Applications  
Sharmila B, Priyanka Dwivedi  
Indian Institute of Information Technology, Sri City, India

3E1 #7166  
Through Silicon via (TSV)-Embedded Graphene-Silicon Photodetector Array for 3D Stacked CMOS Integration  
Xiaochen Wang, Yongliang Xie, Hao Ning, Feng Tian, Yunfei Xie, Muhammad Abid Anwar, Jiangming Lin, Srikrishna Chanakya Bodepudi, Bin Yu, Yang Xu  
Zhejiang University, China

3E1 #7233  
Quadrature Error Correction System for Disk Ring Gyroscope Using (100) Single Crystal Silicon  
Junying Yang, Tiantian Wang, Congchen Wang, Jianlin Chen, Qinghua Ren, Yiming Ma, Nan Wang  
Shanghai University, China

3E1 #7223  
3D Printed Cell and Fiber Guiding Scaffold Mimicking Periodontal Architecture  
Sarin Abraham{1}, Pallavi Gupta{1}, Kavitha Govarthanan{2}, Suresh Rao{1}, Tuhin Subhra Santra{1}  
{1}Indian Institute of Technology Madras, India; {2}Institute for Stem Cell Science and Regenerative Medicine, India

3E1 #7245  
Micro-Scale Modular CMOS Readout Electronics for Multi-Modal Sensor Arrays  
Roman Willaredt{2}, Daniel De Dorigo{2}, Christoph Grandauer{3}, Daniel Wendler{2}, Dhivya Manharan{1}, Stephan Knappmann{1}, Helmut Schottmann{1}, Alfons Dehé{1}, Matthias Kuhl{2}  
{1}Hahn-Schickard, Germany; {2}Laboratory for Microelectronics, Albert-Ludwigs-Universität Freiburg, Germany; {3}Laboratory for Microelectronics, University of Freiburg, Germany

3E1 #7363  
LIG-OSS: Integrated Laser-Induced-Graphene Sensor and Open-Source Silicon Chip for an Affordable and Robust Wearable Sensing System with Precise Temperature, Humidity, and Strain Sensing Capability  
Hongyi Wu{2}, Anhang Li{2}, Gregory Kielian{1}, Mehdi Saligane{2}  
{1}Google LLC Mountain View, United States; {2}University of Michigan, United States

1:30-2:50 PM, May 3, 2024  Room A  
Invited Lecture Session  
3A2: Single-Cell Handling and Analysis in Microfluidic Devices  
Session Chair: Alexis Vlandas, CNRS

Invited Lecture
3A2 #7319
Multi-Modal Cell Analysis via On-Chip Distributed Sensor Networks
A. Fatih Sarioglu
Georgia Institute of Technology, United States

Invited Lecture
3A2 #7299
Combining microfluidics and MEMS/NEMS Sensors for the Biophysical Characterization of Biomarkers (cells, exosomes, viruses)
Vincent Agache
CEA-Leti, France

Invited Lecture
3A2 #7286
Massively Parallel Single-Cell Transfection and Analysis
Tuhin Subhra Santra
Indian Institute of Technology Madras, India

Invited Lecture
3A2 #7339
On-Chip Extracellular Solution Exchange Method with Air Valve Function Using air-Liquid Interface Control
Shingo Kaneko{2}, Hirotaka Sugiiura{2}, Satoshi Amaya{2}, Tsujii Masaru{1}, Nobuyuki Uozumi{1}, Fumihito Arai{2}
{1}Tohoku University, Japan; {2}University of Tokyo, Japan

1:30-2:50 PM, May 3, 2024 Room B
Invited Lecture Session
3B2: Nanostructured Sensors 1
Session Chair: Dzung Dao, Griffith University

Invited Lecture
3B2 #7294
New Opportunities for MEMS in Silicon Photonics
Sangyoon Han
Daegu Gyeongbuk Institute of Science and Technology, Korea

Invited Lecture
3B2 #7295
Study on Elastic Strain Engineering of Semiconducting Nanowires
Yoshitada Isono
Kobe University, Japan

Invited Lecture
3B2 #7311
Highly Sensitive Physical Sensors Based on Si/SiC nanoheterojunction
Dzung Viet Dao
Queensland Micro- and Nanotechnology Centre, Griffith University, Australia

Invited Lecture
3B2 #7302
Single-Electron Sensing at Ambient Temperature and Pressure Using Silicon on Glass Technology
Yong Zhu
Griffith University, Australia

1:30-2:50PM, May 3, 2024 Room C
Invited Lecture Session
3C2: Fabrication and Application of Novel Nano/Micro Optical Devices
Session Chair: Tetsuo Kan, The University of Electro-Communications

Invited Lecture
3C2 #7123
A cutting-Edge Cell Sorting technology: the Power of Intelligent image-Activated Cell Sorting and Deep Learning in single-Cell Analysis
Akihiro Isozaki
Ritsumeikan University, Japan

Invited Lecture
3C2 #7290
All-Dielectric nanoantennas and metamaterials for Highly Sensitive Molecular Spectroscopy
Taka-Aki Yano
Tokushima University, Japan

Invited Lecture
3C2 #7149
Gallium Nitride micro-Cavity Fabrication Using laser-Assisted photo-Electrochemical Etching
Takeyoshi Tajiri
University of Electro-Communications, Japan

Invited Lecture
3C2 #7282
Microstructures for Terahertz Wave Control Fabricated by Ultrafast Laser Processing
Kuniaki Konishi
University of Tokyo, Japan

1:30-2:50PM, May 3, 2024  Room D
Invited Lecture Session
3D2: Emerging Gas Sensing Technologies and Their Applications
Session Chair: Hiroshi Ishida, Tokyo University of Agriculture and Technology

Invited Lecture
3D2 #7333
Novel system-in-Package Digital MOX Sensors with Exceptional Identification Capabilities Enabled by Impedance Readout and Machine Learning
Ivan Elmi{1}, Paolo Bruschi{3}, Andrea Ria{2}, Massimo Piotto{4}, Francesco Magliocca{2}, Michele Vitelli{2}, Stefano Zampolli{1}
{1}CNR-IMM, Italy; {2}SensiChips, Italy; {3}Univerdità di Pisa, Italy; {4}Università di Pisa, Italy

Invited Lecture
3D2 #7345
Mobile Robot Olfaction: Recent Advancements and Future Directions
Haruka Matsukura{2}, Hiroshi Ishida{1}
{1}Tokyo University of Agriculture and Technology, Japan; {2}University of Electro-Communications, Japan

Invited Lecture
3D2 #7343
Visualization of Odor Space with 2D plasmonic Sensor
Kenshi Hayashi
Kyushu University, Japan

Invited Lecture
IEEE-NEMS 2024 Program with Abstract & Keywords
May 2-5, 2024
Kyoto University of Advanced Science (KUAS)

3D2 #7334
Sensing Technology Based on Insect Olfactory receptor-Expressing Sensor Cells
Hidefumi Mitsuno, Yuji Sukekawa, Ryohet Kanzaki
University of Tokyo, Japan

1:30-2:50 PM, May 3, 2024 Room E
3E2: Finalist Session 2
Session Chair: Koji Sugano, Kobe University

3E2 #7056
A Dual-Aptamer Sandwich Assay for Detection of C-Reactive Protein on an Integrated Microfluidic System
To-Wen Chen, Chih-Hung Wang, Gwo-Bin Lee
National Tsing Hua University, Taiwan

3E2 #7076
Harnessing Nature’s Fury: Hyptis Suaveolens-IR775 Encapsulated Biodegradable Liposome for Combinatorial Photothermal Therapy of Lung Cancer
Sajimina Khatun, Monika Pebam, Anamika Verma, Aravind Kumar Rengan
Indian Institute of Technology Hyderabad, India

3E2 #7165
Machine-Learning Assisted Dual-Primer High-Resolution Melt for Bacterial and Fungal Infections Detection
Pei-Wei Lee, Marissa Totten, Amelia Traylor, Sean Zhang, Kuangwen Hsieh, Tza-Huei Wang
Johns Hopkins University, United States

3E2 #7271
Cancer Biomarker Detection in a Portable, Automated, Multi-Channel Magnetofluidic Platform
Alexander Hasnain, Alejandro Stark, Alexander Trick, Ke Ma, Kuangwen Hsieh, Yulan Cheng, Stephen Meltzer, Tza-Huei Wang
Johns Hopkins University, United States

3:00-4:20 PM, May 3, 2024 Room A
Invited Lecture Session
3A3: Nano/Micro-Fluidics and Its Applications
Session Chair: Akihiro Isozaki, Ritsumeikan University

Invited Lecture
3A3 #7002
Microfluidic Approaches for the Analysis of Cancer Cells Toward Precise Liquid Biopsy
Soo Hyeon Kim
Institute of Industrial Science, University of Tokyo, Japan

Invited Lecture
3A3 #7014
Combined Analysis of Cell Mechanics and transcriptome
Akifumi Shiomi
RIKEN, Cluster for Pioneering Research, Japan

Invited Lecture
3A3 #7009
The Development of Corneal epithelium-on-a-Chip for Drug Development and Disease Modeling
Rodi Kado Abdalkader
Ritsumeikan Global Innovation Research Organization R-GIRO, Ritsumeikan University, Japan

Invited Lecture
3A3 #7017
Micropillar and microfluidics for the Measurement of Plant Root Mechanical Properties
Marcel Beier
Hokkaido University, Japan

3:00–4:20 PM, May 3, 2024
Invited Lecture Session
3B3: Nanostructured Sensors 2
Session Chair: Dzung Dao, Griffith University

Invited Lecture
3B3 #7320
Advanced Healthcare Sensors Utilizing Nanostructured Materials and Electromechanical Devices
Takahito Ono
Tohoku University, Japan

Invited Lecture
3B3 #7324
Rapid Detection of Bacteria Using Ultrasonic nanosieve Technology
Victor Cadarso
Monash University, Australia

Invited Lecture
3B3 #7340
Sensor and its Application in Advanced Geotechnical Sensing for Smart Highway
Van Thanh Dau{1}, Dzung Viet Dao{2}
{1}Griffith University, Australia; {2}Queensland Micro- and Nanotechnology Centre, Griffith University, Australia

Invited Lecture
3B3 #7321
Novel Micro-Lens Piezoelectric Actuator and Sensor with Resonant Controller
Aron Michael
University of New South Wales, Australia

3:00–4:20 PM, May 3, 2024
Invited Lecture Session
3C3: MEMS-LSI integration for sensor applications
Session Chair: Masanori Muroyama, Tohoku Institute of Technology

Invited Lecture
3C3 #7164
Fast and Low-Temperature Bonding of Heterogeneous Materials
Maik Wiemer, Frank Roscher, Dirk Wiensch, Christian Hofmann, Dominic Richter, Knut Gottfried, Stefan E. Schulz
Fraunhofer Institute for Electronic Nano Systems ENAS, Germany

Invited Lecture
3C3 #7307
CMOS-MEMS Ultrasound Transducers and Their Applications
Sheng-Shian Li
National Tsing Hua University, Taiwan
Invited Lecture
3C3 #7313
Integrated Electrochemical Devices for bioimaging and bioanalysis
Kosuke Ino
Tohoku University, Japan

Invited Lecture
3C3 #7337
Flexible Wearable Sensing Platforms: Rapid Prototyping of Laser-Induced-Graphene Sensors Built Using an Open-Source Analog Front-Ends
Mehdi Saligane
University of Michigan, United States

3:00-4:20 PM, May 3, 2024 Room D
Invited Lecture Session
3D3: DNA/RNA Molecular Machines and Structures
Session Chair: Do-Nyun Kim, Seoul National University

Invited Lecture
3D3 #7078
Bio-Inspired Design of DNA NanoGripper for Virus Sensing and Potential Inhibition
Lifeng Zhou
Peking University, China

Invited Lecture
3D3 #7082
Programming Wireframe DNA Nanostructures Using Top-Down Geometric Specification
Hyungmin Jun, Minhchien Trinh
Jeonbuk National University, Korea

Invited Lecture
3D3 #7100
Paper Folding with DNA Origami
Do-Nyun Kim
Seoul National University, Korea

3:00-4:20 PM, May 3, 2024 Room E
3E3: Finalist Session 3
Session Chair: Koji Sugano, Kobe University

3E3 #7079
Distinguishing Between dsDNA and DNA with a Single-Base Mismatch Using Solid-State Nanopores
Xiaojing Hu, Yin Zhang
Southeast University, China

3E3 #7087
A Novel One-Aptamer-One-Antibody Assay for Detection of Alpha Defensins HNP 1-3 in Synovial Fluid for Diagnosis of Periprosthetic Joint Infections
Gwo-Bin Lee{2}, Rishabh Gandotra{2}, Hung-Bin Wu{2}, Feng-Chih Kuo{1}, Mel S Lee{3}
{1}Kaohsiung Chang Gung Memorial Hospital, Taiwan; {2}National Tsing Hua University, Taiwan; {3}Paochien Hospital, Taiwan
3E3 #7253
Controlled Synthesis of Branched Gold Nanoparticles by Microfluidic Device for Light-Activated Biomolecular Delivery
Kavitha Illath{1}, Moeto Nagai{3}, Tuhin Subhra Santra{1}, Srabani Kar{2}
{1} Indian Institute of Technology Madras, India; {2} Indian Institutes of Science Education and Research, India; {3} Toyohashi University of Technology, Japan

3E3 #7273
Membrane Protein Synthesis and Reconstitution Into Monodisperse Giant Unilamellar Vesicles Produced by Microfluidics
Satoshi Nanjo{1}, Mamiko Tsugane{1}, Tomoaki Matsuura{2}, Hiroaki Suzuki{1}
{1} Chuo University, Japan; {2} Tokyo Institute of Technology, Japan

4:20–6:00 PM, May 3, 2024
Poster Area 1
3P1: Poster 1

3P1: #7025
A Quality Factor Matching Method for MEMS Disk Resonator Gyroscope in Rate Mode
Jingbo Ren, Tong Zhou, Yi Zhou, Yixuan Li, Yan Su
Nanjing University of Science and Technology, China

3P1 #7026
Metallic Microneedle Electrode Array (m-MNEA) as a Novel Intracortical Neural Interface
Junshi Li{2}, Zhongyan Wang{2}, Xiaoyi Shi{2}, Dong Huang{1}, Yuqing Zheng{2}, Zhihong Li{2}
{1} Acimicro Medical Technology, Co., Ltd., China; {2} Peking University, China

3P1 #7027
An Enhanced Phononic Frequency Comb via Feedthrough Effect Cancellation
Hongyu Chen{2}, Dongyang Chen{2}, Yi Gao{1}, Ronghua Huan{2}, Jin Xie{2}
{1} Xi’an Jiaotong University, China; {2} Zhejiang University, China

3P1 #7038
Minimal Flame Spray Pyrolysis (mFP) - One-Step Synthesis of Nanoscale Metal Oxide (MOX) Material
Kuan Wen Lou, Chun Lung Ho, Yi Ping Ho
Chinese University of Hong Kong, Hong Kong

3P1 #7045
Mechanical Quality Factor Evaluation of Polymer Materials Using PZT/Polymer Integrated Piezoelectric Actuator
Xuchen Wang{2}, Chung-Min Li{1}, Yukio Suzuki{2}, Shuji Tanaka{2}
{1} AAC Technologies PTE LTD, Singapore; {2} Tohoku University, Japan

3P1 #7075
Electromechanical Characteristics of Free-Standing 20nm HfZrOx NEMS Resonator
Haoqi Lyu{1}, Wuhao Yang{1}, Hai Zhong{3}, Zhuohui Liu{2}, Zheng Wang{4}, Jingyi Zhang{1}, Chen Ge{2}, Xudong Zou{1}
{1} Aerospace Information Research Institute, Chinese Academy of Sciences, China; {2} Institute of Physics, Chinese Academy of Sciences, China; {3} Ludong University, China; {4} QiLu Aerospace Information Research Institute, China

3P1 #7081
SPICE Modeling of a Transistor-Like Droplet-Based Electricity Generator (DEG)
Huimin Zhang, Zhourui Liu, Nan Zhang, Xiaofeng Zhou
East China Normal University, China
3P1 #7124
Design and Manufacture of MEMS Deformable Mirror Based on Piezoelectric Actuator with 61 Electrodes
Xiang Guo{2}, Yuanlin Xia{2}, Cao Xia{2}, Isaku Kanno{1}, Zhuqing Wang{2}
{1}Kobe University, Japan; {2}Sichuan University, China

3P1 #7144
An Ultra-High Performance Bio-Triboelectric Nanogenerator via Interfacial Polarization
Fayang Wang{2}, Pengfan Wu{2}, Endian Cui{2}, Zhenfeng Ji{2}, Jizhen Li{2}, Xiaoqing Mu{1}
{1}Chongqing University, China; {2}Key Laboratory of Optoelectronic Technology & Systems Ministry of Education, International R & D, China

3P1 #7193
Nano-Pore Fabrication Using Conventional 3D Printer
Sungyeol Kwak, Seongjun Hong, Sungjae Ha, Sung Jae Kim
Seoul National University, Korea

3P1 #7196
GELMA Encapsulated Single to Multicell Patterning for Tissue Engineering Applications
Sarin Abraham{1}, Suresh Rao{1}, Moeto Nagai{2}, Tuhin Subhra Santra{1}
{1}Indian Institute of Technology Madras, India; {2}Toyohashi University of Technology, Japan

3P1 #7200
Porous Graphene-Based Flexible On-Chip Microsupercapacitors Enabled by Chitosan Oligosaccharide Laser Lithograph
Qian-Ming Huang{5}, Huiru Yang{3}, Shaogang Wang{4}, Guoqi Zhang{1}, Paddy French{1}, Huaiyu Ye{2}
{1}Delft University of Technology, Netherlands; {2}South University of Science and Technology of China, China; {3}Southern University of Science and Technology, China; {4}Southern University of Science and Technology, Delft University of Technology, China

3P1 #7202
AlN SAW Humidity Sensing Enhancement with MXenes
Zhong-Hong Yen{3}, Chien-Sheng Huang{3}, Shih-Hung Lin{3}, Jui-Yang Feng{2}, Hung-Yin Lin{2}, Po-Ching Kao{1}, Che-Hao Liao{3}
{1}National Chiayi University, Taiwan; {2}National University of Kaohsiung, Taiwan; {3}National Yunlin University of Science and Technology, Taiwan

3P1 #7241
Magnetic PN Junction Based on Van der Waals V-Doped in-Plane Heterostructure
Whan Kyun Kim, Namgun Kim, Woo Jong Yu
Sungkyunkwan University, Korea

3P1 #7265
ELEVATED-Temperature Creep Behaviors of Silicon Films with Crystallographic Dependences
Takanori Horikawa, Kazuma Sawada, Akio Uesugi, Koji Sugano, Yoshitada Isono
Kobe University, Japan

3P1 #7356
NEMS Force Sensors Based on Suspended Graphene Membranes
Xiaoya Liang, Qi Zhang, Xing Pang, Yulong Zhao, Hongzhong Liu
Xi’an Jiaotong University, China
4:20-6:00 PM, May 3, 2024  
Poster Area 2

3P2: Poster 2

3P2 #7029  
Bio-Inspired Adhesive Magnetic Soft Microrobot Based on Photolithography  
Xingyue Hu, Junfeng Wu, Lianqing Liu, Niandong Jiao  
Shenyang Institute of Automation, Chinese Academy of Sciences, China

3P2 #7040  
Diamond NEMS Resonators for Real-Time Dual Sensing of Magnetic Fields and Temperatures Up to 500°C  
Zilong Zhang{2}, Keyun Gu{2}, Guo Chen{1}, Yasuo Koide{2}, Satoshi Koizumi{2}, Meiyong Liao{2}  
{1}China University of Geosciences, National Institute for Materials Science, Japan; {2}National Institute for Materials Science, Japan

3P2 #7055  
Effect of Graphene Nanofluids Contact Angle on the Visualization and Metal Pulsating Heat Pipe  
Yachi Ho, Dajeng Yao  
National Tsing Hua University, Taiwan

3P2 #7069  
Design of MEMS Thermal Actuator by CNN and PSO  
Jiali Wang, Yun Cao, Mo Yang, Weirong Nie, Hutian Feng, Zhanwen Xi  
Nanjing University of Science and Technology, China

3P2 #7128  
A Microfluidic Platform for Collective Endothelial Cell Migration Assay Under Glucose Gradient and Cyclic Hypoxia Stimuli  
Chia-Pei Wang{1}, Kuang-Hsing Chiang{2}, Nien-Tsu Huang{1}  
{1}National Taiwan University, Taiwan; {2}Taipei Medical University, Taiwan

3P2 #7134  
Development of a Multiplex-crRNA CRISPR/Cas12a-Based Diagnostic Platform for Antibiotic-Resistance Genes  
Wen-Yu Kang, Hsin-Ying Ho, Wen-Hung Wang, Ling-Shan Yu  
National Sun Yat-sen University, Taiwan

3P2 #7135  
Rapid and Sensitive CRISPR/Cas12a-Based Diagnostic Utilizing Gold Nanoparticles for Enhanced Fluorescence Detection of Human Papillomavirus Type 16  
Fang-Ying Lai, Hsin-Ying Ho, Ling-Shan Yu  
National Sun Yat-sen University, Taiwan

3P2 #7158  
A Highly Compliant Piezoelectric Swallow Patch Sensor for NON-Invasive Swallow Sensing  
Meng-Siou Li, Chia-Hao Shih, Yu-Hsiang Hsu  
National Taiwan University, Taiwan

3P2 #7178  
Iontophoresis Patch with Bipolar Porous Microneedles for Transdermal Dual Delivery  
Shotaro Tottori, Gaobo Wang, Kosuke Kato, Sae Ichinose, Matsuhiro Nishizawa  
Tohoku University, Japan
3P2 #7192
Advanced NO2 Gas Sensor Fabrication Through UV Laser-Induced Selective Reduction Laser Sintering
Shaogang Wang{4}, Qihang Zong{2}, Huiru Yang{3}, Qian-Ming Huang{5}, Huaiyu Ye{2}, Paddy French{1}
{1}Delft University of Technology, Netherlands; {2}South University of Science and Technology of China, China; {3}Southern University of Science and Technology, China; {4}Southern University of Science and Technology, Delft University of Technology, Netherland

3P2 #7228
Accurate Detecting of Flammable and Toxic Gases Using Multi-Transduction Gas Sensor Array and Deep Learning
Mingu Kang{2}, Dionisio Del Orbe Henriquez{2}, Daesik Lee{1}, Inkyu Park{2}
{1}Electronics and Telecommunications Research Institute, Korea; {2}Korea Advanced Institute of Science and Technology, Korea; {2}Korea Advanced Institute of Science and Technology, Dominican Rep.

3P2 #7244
Effect of NANOGAP to RAMAN Intensity and Detection Probability of SURFACE-Enhanced RAMAN Spectroscopy
Yuga Nakamura, Tomaya Shinabe, Tomoya Nakanishi, Akio Uesugi, Koji Sugano, Yoshinada Isono
Kobe University, Japan

3P2 #7252
Application of Embedded Capacitive Pressure Sensors in Pressure Drop Measurement of Microchannels
Xiaoda Cao{2}, Tiantong Xu{2}, Zhi Tao{1}, Haiwang Li{2}, Yanxin Zhai{2}
{1}Beihang University, China; {2}Research Institute of Aero-Engine, Beihang University, China

3P2 #7258
Development of a Segmental Surface Treatment Method for a SELF-Priming TRI-Channel TUMOR-ON-A-Chip Device
Kai-Chieh Chang{2}, Yu-Zhou Lin{2}, Yu-Hsiang Hsu{2}, Yu-Chia Su{1}, Chi-Kuang Leo Wang{1}, Hsian-Jean Chin{1}
{1}National Laboratory Animal Center, Taiwan; {2}National Taiwan University, Taiwan

4:20-6:00 PM, May 3, 2024 Poster Area 3
3P3: Poster 3

3P3 #7034
Iterative Hierarchical Cascading Technique for Fast Dispersion Analysis of 3D Periodic Piezoelectric Resonators
Zihao Xie{2}, Dongze Lv{2}, Jin Xie{2}, Renjie Tan{1}
{1}Xi’an Jiaotong University, China; {2}Zhejiang University, China

3P3 #7048
Ultrahigh Responsivity of Diamond-Based Solar-Blind Photodetectors Using Hydrogen Plasma Treatment
Keyun Gu{2}, Zilong Zhang{2}, Guo Chen{1}, Liwen Sang{2}, Jian Huang{3}, Yasuo Koide{2}, Meiyong Liao{2}
{1}China University of Geosciences, National Institute for Materials Science, Japan; {2}National Institute for Materials Science, Japan; {3}Shanghai University, China

3P3 #7053
Polythiophene-Titanium Dioxide (PTh-TiO2) Nanocomposite Films for Hydrogen Peroxide Electrochemical Sensing
Ziliang Yang, Qianguo Yu, Kedong Bi, Yujuan Wang
Southeast University, China
3P3 #7061
A MEMS Spiral Power Inductor with a Magnetic Core for DC-DC Converters
Chongshu Shan{2}, Zilin Li{2}, Hengzhang Yang{2}, Yangyang Yan{3}, Bingyin Kang{1}, Huikai Xie{2}
{1}24th Research Institute of China Electronics Technology Group Corp., China; {2}Beijing Institute of Technology, China; {3}BIT Chongqing Institute of Microelectronics and Microsystems, China

3P3 #7067
The MEMS MIRROR-Based Lidar System with Vertical Focusing Function for LONG-Range Human Recognition
Donghai Yang, Qingjiu Chen, Meng Chen, Xiaodong Yu, Guanglie Zhang, Wen Jung Li
City University of Hong Kong, China

3P3 #7070
MASK-Guided Ultrasonic Atomization for Fabrication of Hydrophilic Arrays Enabling Controlled Droplet Generation and Reagent Delivery
Xiaochen Lai, Mingpeng Yang, Yanfei Sun, Yong Zhu, Xicheng Wang, Wangping Zhou
Nanjing University of Information Science & Technology, China

3P3 #7071
The Suppression Mechanism of Parasitic Capacitance for Comb Capacitor Fabricated with Silicon-on-Insulation
Renjie Tan{2}, Juan Yang{3}, Libo Zhao{2}, Xiangguang Han{2}, Wei Li{1}, Yong Xia{2}, Yi Gao{2}, Chenying Wang{2}, Zhuangde Jiang{2}
{1}Xi’an Aerospace Propulsion Institute, China; {2}Xi’an Jiaotong University, China; {3}Xi’an Satellite Control Center, China

3P3 #7094
Design Optimization of Graded Three-Dimensional Micropillar Wicks for Vapor Chamber Evaporators
Shangyang Shi{2}, Jianyu Du{2}, Shuyan He{2}, Hongxu Wu{2}, Huaiqiang Yu{1}, Chi Zhang{2}, Yafeng Jin{3}, Wei Wang{2}
{1}26th Research Institute of China Electronics Technology Group Corporation, China; {2}Peking University, China; {3}Peking University Shenzhen Graduate School, China

3P3 #7118
ULTRA-Thin Transparent MULTI-Functional Sensor Based on Silk Hydrogel
Yi-Lin Wang, Peng Huang, Xin-Ran Zhang, Xu Zeng, Xiao-Sheng Zhang
University of Electronic Science and Technology of China, China

3P3 #7121
A Microfluidic Platform for Analysis of Beating Characteristics of Sperm Cells
Aisha Hamidu{1}, Ahmed Azmeer{1}, Omar Abdelgawad{2}, Megan Ghaly{1}, Mohamed Abdelgawad{1}
{1}American University of Sharjah, U.A.E.; {2}Egypt-Japan University of Science and Technology, Egypt

3P3 #7141
Degradable Piezoelectric Energy Harvesters Based on Natural Cellulose NANOFIBRILS
Hangyu Qian, Yanyuan Ba, Xiao-Sheng Zhang
University of Electronic Science and Technology of China, China

3P3 #7159
Development of a Microfluidic Device for Cell Spheroid Filtration and Isolation
Chia-Yu Liu{3}, Yu-Chia Su{1}, Chi-Kuang Leo Wang{1}, Hsian-Jean Chin{1}, Yu-Hsiang Hsu{2}
{1}National Laboratory Animal Center, Taiwan; {2}National Taiwan University, Taiwan; {3}National Taiwan University, NTU Nano-BioMEMS Group, Taiwan
3P3 #7175
Nonlinear Ion Transport Within sub-1nm Radii Carbon Nanotubes
Zhenyu Wei, Yunfei Chen, Yan Zhang
Southeast University, China

3P3 #7208
Chain Pump for Micro Fluidic Applications
Andreas Loth, Ralf Förster
Berliner Hochschule für Technik, Germany

3P3 #7214
Glucose Biosensors Based on Amorphous Kenaf Cellulose Nanofibers
Thi Kim Tuoi Truong
Tohoku University, Japan

3P3 #7030
Silicon-Based MEMS Inertial Device Stability Analysis
Mo Yang, Weirong Nie, Yun Cao, He Wang, Jiali Wang, Jiong Wang
Nanjing University of Science and Technology, China

3P3 #7205
Shape Memory Polymer Assisted Transfer Printing of Large-Area Metal Thin Film
Yawen Gan, Kaiqi Chen, Jingyang Zhang, Qinhua Guo, Yunda Wang
The Hong Kong University of Science and Technology (guangzhou), China

3P3 #7248
A Medical Pressure Sensor for Multi-Pressure Mode and Multi-Media Measurement
Hongyuan Fu, Jianrong Wang, Yubo Fan, Xing Chen
Beihang University, China

3P3 #7277
Generation of Curcumin Loaded Aerosols for Inhalation Therapy via Ion Wind Induced ELECTROHYDRODYNAMIC
Trung-Hieu Vu{1}, Hoai-Duc Vu{1}, Thi Van Anh Hoang{4}, Tien Dung Nguyen{1}, Luan Mai{2}, Dang D.H. Tran{3}, Vuan-Hung Nguyen{3}, Dzung Viet Dao{3}, Van Thanh Dai{1}
{1}Griffith University, Australia; {2}Ho Chi Minh City University of Technology, Vietnam; {3}Queensland Micro- and Nanotechnology Centre, Griffith University, Australia; {4}University of Ulsan, Korea

3P3 #7041
Modeling and Experimental Verification of Coupled Beam Arrays for Mass Sensing
Mehdi Ghommem{1}, Fehmi Najar{2}, Toky Rabenimanana{3}, Vincent Walter{3}, Najib Kacem{3}
{1}American University of Sharjah, U.A.E.; {2}Prince Sattam bin Abdulaziz University, Saudi Arabia; {3}University of Franche-Comté, France

4:20–6:00 PM, May 3, 2024 Poster Area 4
3P4: Poster 4

3P4 #7039
P(VDF-TrFE) Piezoelectric Film-Based Wearable Sensors for Force Monitoring
Ji-Lan Liu, Ching-Te Kuo
National Sun Yat-sen University, Taiwan
3P4 #7050
THREE-Dimensional Electroless Dielectrophoresis Chip for Rapid Enrichment of Biomarkers in Plasma
Wei-Chen Xu{1}, Jun-Yan Lu{1}, Chung-Yu Chen{2}, Ju-Nan Kuo{1}
{1}National Formosa University, Taiwan; {2}National Taiwan University Hospital, Taiwan

3P4 #7059
Poisson Statistical Method to Quantify the Specific Binding Force Between S Spike Protein and ACE2
Shuai Yuan, Zebin Wang
Shenyang Jianzhu University, China

3P4 #7068
Reliability of Gold Wire Leads for MEMS Gyroscopes Under a Thermo-Mechanical Coupling Field
Yingyu Xu{3}, Chunhua He{2}, Qinwen Huang{1}, Guizhen Yan{4}
{1}CEPREI, China; {2}Guangdong University of Technology, China; {3}Guangdong University of Technology, CEPREI, China; {4}Peking University, China

3P4 #7088
The Anodic Aluminum Oxide Templates and Etching-Based Rapid Thermal Annealing for Fabricating Localized Surface Plasmon Resonance Sensors Integrating Micro-Channel for C-Reactive Protein Detection
Kuan-Chun Yeh, Hsiang-Yu Wang, Nien-Tsu Huang
National Taiwan University, Taiwan

3P4 #7106
Investigate the Role of Ventilation Parameter Settings in Regulating Lung Function
Hsuan Lin{5}, Hsih-Shin Wang{2}, Ping-Liang Ko{3}, Dao-Ming Chang{1}, Wei-Hao Liao{1}, Chien-Chung Peng{1}, Jean Lu{1}, Po-Nien Tsao{4}, Yi-Chung Tung{1}
{1}Academia Sinica, Taiwan; {2}Far Eastern Memorial Hospital, Taiwan; {3}National Taiwan University, Taiwan; {4}National Taiwan University Hospital, Taiwan; {5}Research Center for Applied Sciences, Academia Sinica, Taiwan

3P4 #7136
Jing-Wen Guo, Hsin-Ying Ho, Ling-Shan Yu
National Sun Yat-sen University, Taiwan

3P4 #7194
Printed Organic Microelectrode Arrays Using Carbon Nanotube/Paraffin Composites for Neural Activity Measurement
Tatsuya Murakami, Naoki Yada, Shotaro Yoshida
Chuo University, Japan

3P4 #7336
Enzymatic Nanorobots for Combination Chemotherapy of Glioblastoma
Junfeng Wu, Niandong Jiao, Xingyue Hu, Lianqing Liu
Shenyang Institute of Automation, Chinese Academy of Sciences, China

3P4 #7342
Reconfigurable Coacervate Liquid Microrobots
Kailang Liu, Haochen Ran, Cheng Qi, Zhou Liu, Tianjian Kong
Shenzhen University, China
3P4 #7349
Development of a Thin Reagent pre-Storage Cartridge for Molecular Detection
Cheng-Je Lee, Yu-Hsiang Hsu, Andrew Wo
National Taiwan University, Taiwan

3P4 #7350
Skin-Like Tactile Sensing Array Based on Triboelectricity
Wenjun Wang, Junfeng Zhong, Linlin Zheng, Bo Meng
Shenzhen University, China

3P4 #7351
Three-Dimensional Tissular Morphology and Two-Dimensional Cellular Characteristics for the Snapping Mechanism of the Venus Flytrap
Xiangli Zeng, Keisuke Morishima
Osaka University, Japan

3P4 #7353
Geometry Impact in Flexible microheaters and the Use of Novel Temperature Sensors
Maider Calderon-Gonzalez{1}, Suparna Mondal{1}, David Cheyns{1}, Rob Ameloot{2}, Jan Genoe{1}
{1}imec, Belgium; {2}Katholieke Universiteit Leuven, Belgium

3P4 #7355
Vascularization of a COLLAGEN-Containing TRI-Culture Liver Spheroid in a Microfluidic Device
Satomi Matsumoto{1}, Sun Yixin{1}, Jo Sugawa{1}, Anna Kopec{2}, Julie Harney{2}, Lindsay Tomlinson{2}, Nasir Khan{2}, Kazuya Fujimoto{1}, Ryuji Yokokawa{1}
{1}Kyoto University, Japan; {2}Pfizer, Inc., United States

3P4 #7359
Investigating the Impact of Nano- and Microscale Topography on Bacterial Adhesion in Rumen Liquid Environment
Yajun Hua, Michitaka Yamamoto, Toshihiro Itoh
University of Tokyo, China; University of Tokyo, Japan

10:00-12:00 PM, May 4, 2024 Room A
Invited Lecture Session
4A1: Biomaterials and Biodevices 1
Session Chair: Michinao Hashimoto, Singapore University of Technology and Design

Invited Lecture
4A1 #7190
Electromyographic Analysis of the Palm Muscle During Baseball Pitching Using an Elastic Kirigami Patch
Kento Yamagishi
University of Tokyo, Japan

Invited Lecture
4A1 #7204
Flexible 3D Bioelectronic Interfaces for Investigating Neuromuscular Systems
Amir Vahabikashi{1}, Maria Jose Quezada{2}, Isabel O'Malley-Kroh{2}, Yong-Woo Kang{2}, Shreyaa Khanna{2}, Minkyu Lee{2}, Andrea Domenighetti{2}, Colin Franz{2}, John A. Rogers{2}
{1}Northeastern University, United States; {2}Northwestern University, United States

Invited Lecture
4A1 #7261
Addressing Unmet Needs with 3D Printed Electronics
Yong Lin Kong
University of Utah, United States
Invited Lecture
4A1 #7298
3D Printing with Light for Light
Joel Yang
Singapore University of Technology and Design, Singapore

Invited Lecture
4A1 #7327
GNN for Protein Melting Temperature Prediction from Structural and Dynamical Multigraphs Representations
Yen-Lin Chen, Shu-Wei Chang
National Taiwan University, Taiwan

Invited Lecture
4A1 #7328
Atomistic Modeling for the KERATIN-Based Polymer Materials in Bioengineering Application
Yu-Cheng Lai, Chia-Hung Wu, Cheng-Wei Wang, Chia-Ching Chou
National Taiwan University, Taiwan

Invited Lecture Session
4B1: Advanced Microengineering for Neuroscience
Session Chair: Patrick Ruther, University of Freiburg

Invited Lecture
4B1 #7152
Nanofabricated Neural Electrodes for intracortical Recording and Stimulation
Chong Xie
Rice University, United States

Invited Lecture
4B1 #7156
Fully Integrated Digital CMOS Neural Probes
Daniel De Dorigo, Daniel Wendler, Roman Willaredt, Matthias Kuhl
Laboratory for Microelectronics, Albert-Ludwigs-Universität Freiburg, Germany

Invited Lecture
4B1 #7148
Highly Flexible μLED Implants for Preclinical Neurotechnological Research
Eric Klein
Albert-Ludwigs-Universität Freiburg, Germany

Invited Lecture
4B1 #7091
Wireless Optogenetic Brain Implant: a Tool for Neuroscientific Research and Therapeutics
Jae-Woong Jeong
Korea Advanced Institute of Science and Technology, Korea

Invited Lecture
4B1 #7127
Brain Interface: Electrophysiology to Neuromodulation and Extension to Multi-Modalities
Euisik Yoon
University of Michigan, United States
10:00-12:00 PM, May 4, 2024  Room C
Invited Lecture Session
4C1: More than energy harvesting - Advances in Piezoelectric/Triboelectric Applications
Session Chair: Bin Yang, Shanghai Jiao Tong University  Sanghoon & Lee Daegu, Gyeongbuk institute of science & technology (DGIST)

Invited Lecture
4C1 #7184
Triboelectric Nanogenerator-Driven Resistive Sensing Systems for Multimodal Monitoring and Interactions
Qiongfeng Shi, Jianlong Hong, Jun Wu
Southeast University, China

Invited Lecture
4C1 #7187
Hybrid Bionic Nerve Interface and Triboelectric Neurostimulator for Application in Bionic Limbs
Sanghoon Lee
Daegu Gyeongbuk Institute of Science and Technology, Korea

Invited Lecture
4C1 #7186
Fusion of AI-Assisted Smart Sensing and Haptic Feedback Techniques
Minglu Zhu, Tao Chen
Soochow University, China

Invited Lecture
4C1 #7182
Flexible Piezoelectric MEMS Sensors and Actuators Based on PZT Thick Films
Bin Yang
Shanghai Jiao Tong University, China

10:00-12:00 PM, May 4, 2024  Room D
4D1: Solid state Micro/Nano Sensors and Actuators 1
Session Chair: Kentaro Iwami, Tokyo University of Agriculture and Technology

4D1 #7010
Noninvasive Fluid Flowrate Detection Using Capacitive Micromachined Ultrasonic Transducers
Jiawei Yuan, Zixuan Li, Qi Ma, Shaohui Qin, Xuan Shi, Zheng Yuan, Yihe Zhao, Xiaozhang Wang, Zhikang Li, Libo Zhao
Xi’an Jiaotong University, China

4D1 #7011
Noninvasive Flow Bubble Detection for Small Pipes Based on Piezoelectric Micromachined Ultrasonic Transducers
Zixuan Li, Jiawei Yuan, Qi Ma, Shaohui Qin, Zheng Yuan, Yihe Zhao, Tong Wang, Xiaozhang Wang, Zhikang Li, Libo Zhao
Xi’an Jiaotong University, China

4D1 #7080
Performance Optimization of Piezoelectric MEMS Speaker with Cantilever Diaphragm Array
Yue Fei, Huimin Zhang, Zhourui Liu, Nan Zhang, Xiaofeng Zhou
East China Normal University, China
4D1 #7083
Dielectric Losses During CBD of Silicon Nitride Nanopores
Jun Yang{1}, Jingjie Sha{2}
{1}Mechanical Engineering of Southeast University, China; {2}Southeast University, China

4D1 #7084
Ion Selective Membrane with Dual-Gate Ion-Sensitive Field-Effect Transistor Integrating the Microfluidic Channel for Heavy Metal Ions Test in Wastewater
Tzu-Yu Liu, Nien-Tsu Huang
National Taiwan University, Taiwan

4D1 #7093
Single-Molecule Detection Based on Graphene Cage-Like Nanopores
Wei Xu, Gang Wang, Fangzhou Fu, Chaofan Ma, Jingjie Sha
Southeast University, China

4D1 #7112
BLU-Ray Based Millimeter Range HIGH-Speed Atomic Force Microscope
Edwin Hwu{2}, Jorge Pereda{2}, Jen-Hung Wang{2}, Hsien-Shun Liao{1}
{1}National Taiwan University, Taiwan; {2}Technical University of Denmark, Denmark

10:00-12:00 PM, May 4, 2024 Room E
4E1: Biomicrosystems
Session Chair: Kenta Itani,
Tokyo Medical and Dental University

4E1 #7037
Detection of Low-Frequency Vibrations of Proteins Using Biological Nanopores
Chaofan Ma, Wei Xu, Jingjie Sha
Southeast University, China

4E1 #7169
A Novel Digital Magnetic Proximity Extension RPA-CRISPR/CAS12A-Assisted Immunoassay with ATTOMOLAR Sensitivity
Fangchi Shao, Jiumei Hu, Kuangwen Hsieh, Pengfei Zhang, Pataraiarin Akarapipad, Joon Soo Park, Tza-Huei Wang
Johns Hopkins University, United States

4E1 #7221
Titanium nitride-a plasmonic Bio-Compatible nanomaterial for Effective Intracellular Delivery
Nandhini Balasubramaniam{4}, Moeto Nagai{3}, Amal Bera{1}, Tuin Subhra Santra{1}, Srabani Kar{2}
{1}Indian Institute of Technology Madras, India; {2}Indian Institutes of Science Education and Research, India; {3}Toyoashi University of Technology, Japan; {4}Toyoashi University of Technology, Indian Institute of Technology Madras, Japan

4E1 #7341
Oscillating-flow Rapid real-Time PCR Microfluidic
Chia-Tse Hung, Wei Chang, Chituan-Chian Chiou, Yen-Heng Lin
Chang Gung University, Taiwan

4E1 #7358
Constructing a Bladder-on-a-Chip Demonstrating Stratification and Umbrella Cell Expression Through Fibroblast Coculture
Taiki Nishimura{2}, Yaji Takata{2}, Kazuhiro Ofuji{1}, Kazuya Fujimoto{2}, Ryuji Yokokawa{2}
{1}Center for Biosystems Dynamics Research, RIKEN, Japan; {2}Kyoto University, Japan
4E1 #7357
Development of an ON-Chip Pancreatic Ductal Adenocarcinoma Model with a Vascularized Microenvironment
Shota Koishi{2}, Hang Zhou{2}, Kazuya Fujimoto{2}, Mayu Shibuta{1}, Ichiji Namatame{1}, Kazuhiro Tetsuka{1}, Ryuji Yokokawa{2}
{1} Astellas Pharma Inc., Japan; {2} Kyoto University, Japan

4E1 #7281
Enhanced Glomerular Filtration and Podocyte Expression in Human iPSC-Derived On-Chip Glomerular Barriers with Spontaneous GBM Formation
Ayumu Tabuchi{1}, Darryl Koh{1}, Kensaue Yabuuchi{2}, Yoshiki Sahara{2}, Minoru Takasato{2}, Kazuya Fujimoto{1}, Ryuji Yokokawa{1}
{1} Kyoto University, Japan; {2} RIKEN, Japan

4E1 #7257
Numerical Modeling and Morphological Analysis of Vascular Bed Formation Toward Vascularized MPS Engineering
Kazuya Fujimoto, Yoshikazu Kameda, Ryuji Yokokawa
Kyoto University, Japan

1:00-3:00 PM, May 4, 2024 Room A
Invited Lecture Session
4A2: Biomaterials and Biodevices 2
Session Chair: Kento Yamagishi, The University of Tokyo & Michinao Hashimoto, Singapore University of Technology and Design

Invited Lecture
4A2 #7306
Towards active, Dynamic and Configurable microfluidics
Ho Cheung Anderson Shum
University of Hong Kong & Advanced Biomedical Instrumentation Centre, Hong Kong

Invited Lecture
4A2 #7329
Extracorporeal Blood Cleansing Using Cell MEMBRANE-Coated Magnetic NANOCLUSTERS Mitigates Sepsis in Swine
Joo H. Kang
Ulsan National Institute of Science and Technology, Korea

Invited Lecture
4A2 #7312
Identifying BBB-Penetrating Aptamers Using Human Microphysiological Systems-Based SELEX Technology
Jeong-Won Choi{2}, Minwook Seo{2}, Kyungwhan Kim{2}, A-Ru Kim{1}, Jinmyoung Joo{2}, Tae-Eun Park{2}
{1} Nexmos, Korea; {2} Ulsan National Institute of Science and Technology, Korea

Invited Lecture
4A2 #7318
Organ-on-a-Chip Fabrication Using Dynamic Photomask
Michinao Hashimoto
Singapore University of Technology and Design, Singapore
Invited Lecture
4A2 #7308
Biodegradable Silicon MICROMATRIX for Controllable RETINOIC Acid Supplement in NEUROAL Differentiation
Jinmyoung Joo
Ulsan National Institute of Science and Technology, Korea

1:00-3:00 PM, May 4, 2024 Room B
Invited Lecture Session
4B2: Micro-Nano Robots and Their Biomedical Applications
Session Chair: Lianqing Liu, Shenyang Institute of Automation, Chinese Academy of Sciences

Invited Lecture
4B2 #7285
Modularized microrobot for Targeted Cell Delivery
Li Zhang
Chinese University of Hong Kong, Hong Kong

Invited Lecture
4B2 #7003
Microrobotic Systems for Single Cell Analysis
Chengzhi Hu
Southern University of Science and Technology, China

Invited Lecture
4B2 #7370
Investigating the Influence of Surfactants on Surface Characteristics of Chemical Vapor Deposition (CVD) Graphene
Uchechukwu Wejinya
University of Arkansas, United States

Invited Lecture
4B2 #7131
Micromanipulator-Actuated Characterization of Engineered Functional myobundles for Drug Screening
Tao Sun
Beijing Institute of Technology, China

Invited Lecture
4B2 #7315
A FPGA-Based Integrated low-Power System Towards to Electrophysiological Signal Acquisition
Fanmu Qiu, Xikai Sun, Shuo Zhang, Zhan Yang
Soochow University, China

Invited Lecture
4B2 #7335
Marsupial Robotic System for Targeting Drug Delivery in Glioblastoma Treatment
Niandong Jiao
Shenyang Institute of Automation, Chinese Academy of Sciences, China

1:00-3:00 PM, May 4, 2024 Room C
Invited Lecture Session
4C2: Micro/Nano Resonant Transducers
Session Chair: Ming-Huang Li, National Tsing Hua University
Invited Lecture
4C2 #7255
Recent Advances in Monolithic CMOS-MEMS Ultrasonic Transducers
Ming-Huang Li
National Tsing Hua University, Taiwan

Invited Lecture
4C2 #7305
Sensor Platform Using Flexural Mode Piezoelectric MEMS Resonators
Gayathri Pillai
Indian Institute of Science, India

Invited Lecture
4C2 #7338
Nanomechanical Resonance Modes and Frequency Combs for Temperature Sensing
Azadeh Ansari
Georgia Institute of Technology, United States

Invited Lecture
4C2 #7331
CMOS-Compatible Piezoelectric MICROACOUSTIC METAMATERIALS for Radio Frequency Applications
Cristian Cassella
Northeastern University, United States

1:00-3:00 PM, May 4, 2024 Room D
4D2: Solid state Micro/Nano Sensors and Actuators 2
Session Chair: Kentaro Iwami, Tokyo University of Agriculture and Technology

4D2 #7133
Enhancing Lateral Photovoltage Through Light-Trapping 3C-Sic/Si Microstructures
Tuan-Hung Nguyen[2], Dang D.H. Tran[2], Van Thanh Dau[1], Dzung Viet Dao[2]
{1}Griffith University, Australia; {2}Queensland Micro- and Nanotechnology Centre, Griffith University, Australia

4D2 #7177
Comparison of WS2 and MoS2 Nanopores for Identification of Different Proteins
Wenhao Yang[2], Wei Xu[2], Lei Li[2], Han Qi[1], Yujuan Wang[2], Kedong Bi[2]
{1}Nanjing Institute of Technology, China; {2}Southeast University, China

4D2 #7198
A High-Aspect-Ratio Gold Nanoring Array Optical Resonator
Mengcheng Wang, Dongyu Cui, Zhijuan Su, Faheng Zang
Shanghai Jiao Tong University, China

4D2 #7216
Advancing Near-Infrared Photodetection and Spectroscopy Through Interlayer Schottky Plasmonic Photodetectors
Eslam Abubakr[2], Masaaki Oshita[2], Shiro Saito[1], Tetsuo Kan[2]
{1}IMRA Japan Co., Ltd., Japan; {2}University of Electro-Communications, Japan
4D2 #7243
Nanoantenna-Enhanced Palladium Diselenide Mid-Infrared Photodetector
Hongzhi Zhu, Xiaoxiao Han, Qian Huang, Qinghua Ren, Nan Wang, Yiming Ma
Shanghai University, China

1:00-3:00:00 PM, May 4, 2024   Room E
4E2: Biosensors
Session Chair: Kazuya Fujimoto, Kyoto University

4E2 #7174
Development of a Immunosensing smartphone Platform for Determination of Skin interleukin-1α
Mao Naito, Hiroyuki Kudo, Miku Sarubo, Yuka Numazaki
Meiji University, Japan

4E2 #7074
Aptamer-functionalized Extended Gate Field-Effect Transistor (EGFET) Integrating Whole-Blood Processing Microfluidics for Troponin I Detection
Syuan-Rong Huang, Nien-Tsu Huang
National Taiwan University, Taiwan

4E2 #7090
A Microfluidic Platform Integrating Electrochemical Sensors for on-Chip Whole Blood Processing and in-situ Dual Cardiac Vascular Disease Biomarker Detection
Yen-An Chen, Nien-Tsu Huang
National Taiwan University, Taiwan

4E2 #7154
Integrated Magneto-Electrochemical Sensing Arrays for Multi-Parametric Screening of Alzheimer’s Disease Related Biomarkers
Jieyu Wang{1}, Jianan Hui{2}, Pengcheng Zhao{1}, Bo Lin{2}, Huaying Liu{1}, Guowu Ma{1}, Hongju Mao{2}
{1}Dalian Medical University, China; {2}Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China

4E2 #7179
Development of Wearable Multi-Analyte Sweat Monitor
Ryoka Kaino, Shotaro Kawana, Yuki Akaba, Shoto Nakatsuka, Mikio Yamada, Kazuki Horie, Hiroyuki Kudo
Meiji University, Japan

4E2 #7251
Evaluation of a Single DNA Oligomer Measurements by SURFACE-Enhanced RAMAN Spectroscopy
Tomoya Shinabe, Yuga Nakamura, Tomoya Nakanishi, Akio Uesugi, Koji Sugano, Yoshitada Isono
Kobe University, Japan

4E2 #7167
A Highly Sensitive Fluorometric Acetaldehyde Biosensor by Using Enzymatic Recycling Reactions for Signal Amplification
Kenta Itani{2}, Yuki Maeno{2}, Geng Zhang{2}, Koji Toma{1}, Takahiro Arakawa{3}, Kohji Mitubayashi{2}
{1}Shibaura Institute of Technology, Japan; {2}Tokyo Medical and Dental University, Japan; {3}Tokyo University of Technology, Japan
**3:00-4:20 PM, May 4, 2024**  
**Poster Area 1**  
**4P1: Poster 5**

**4P1 #7065**
**Generation of Airborne Particles Toward Inhalation Drug Delivery via Electro-Neutralization Electrospray**
Hoai-Duc Vu\(^1\), Tien Dung Nguyen\(^1\), Trung-Hieu Vu\(^1\), Thi Van Anh Hoang\(^4\), Luan Mai\(^2\), Dang D.H. Tran\(^3\), Tuan-Hung Nguyen\(^3\), Dzung Viet Dao\(^3\), Yong Zhu\(^1\), Van Thanh Dau\(^1\)
\(^1\)Griffith University, Australia; \(^2\)Ho Chi Minh City University of Technology, Vietnam; \(^3\)Queensland Micro- and Nanotechnology Centre, Griffith University, Australia; \(^4\)University of Ulsan, Korea

**4P1 #7125**
**Studying Sprouting Angiogenesis of Endothelial Cells Under Oxygen Gradients and Inhibition of Hypoxia Induced Factor (HIF) Using Microfluidic Devices**
Hsiu-Chen Shih, Wei-Hao Liao, Yi-Chung Tung
Academia Sinica, Taiwan

**4P1 #7139**
**Integration of Free Flow Electrophoresis and Surface-Enhanced Raman Scattering for Multiplex Biomolecule Analysis**
Ming-Chun Lin, Nien-Tsu Huang
National Taiwan University, Taiwan

**4P1 #7140**
**Time-Domain Integrated-Circuit-Based Biosensors on an Integrated Microfluidic System for Detecting Cardiovascular Biomarkers**
Sasi Kiran Boilla\(^2\), Pei-Rong Li\(^2\), Pei-Chien Lin\(^1\), Tsung-Heng Tsai\(^3\), Gwo-Bin Lee\(^2\)
\(^1\)National Chung Cheng University, Taiwan; \(^2\)National Tsing Hua University, Taiwan; \(^3\)National Yang Ming Chiao Tung University, Taiwan

**4P1 #7160**
**Effect of Shear Stress on Cellular Uptake of Estrone Liposomes for Breast Cancer Therapy**
Rouba Al-Bostami, Ghaleb Husseini, Mohamed Abdelgawad
American University of Sharjah, U.A.E.

**4P1 #7180**
**Graphene-Modified Ru-Based Infrared Detector Array for Human Identification**
Yufei Zhai, Song Li, Yuxuan Dong, Min Wang
Southern University of Science and Technology, China

**4P1 #7189**
**Delivery of Large Cargo in Mammalian Cells Enhanced by Infrared Light Pulse-Activated Micro-Ring Device**
Ashwini Shinde\(^1\), Pallavi Shinde\(^1\), Moeto Nagai\(^3\), Tuhin Subhra Santra\(^1\), Srabani Kar\(^2\)
\(^1\)Indian Institute of Technology Madras, India; \(^2\)Indian Institutes of Science Education and Research, India; \(^3\)Toyohashi University of Technology, Japan

**4P1 #7211**
**Magnetic Resonance Sensor for Atmospheric Free Radical Detection**
Naoki Hirokawa, Takahito Ono, Masaya Toda
Tohoku University, Japan

**4P1 #7215**
**Off-Stoichiometry Thiol-Ene (OSTE) Hollow Microneedle Array for Liquid Collection and Delivery**
Yeqian Liu\(^2\), Haonan Li\(^2\), Zitao Feng\(^2\), Zejingqiu Chen\(^2\), Muyang Zhang\(^2\), Jie Zhou\(^2\), Qinghao He\(^2\), Huiru Zhang\(^1\), Tao Jiang\(^1\), Weijin Guo\(^2\)
\(^1\)Guangdong Foshan Lianchuang Graduate School of Engineering, China; \(^2\)Shantou University, China
4P1 #7222
HZO and MoS2-Based large-Scale ferroelectric-FET for next-Generation non-Volatile Memory
Jeehwan Lee{1}, Nguyen Minh Chien{2}, Woo Jong Yu{2}
{1}Samsung Electronics, Sungkyunkwan University, Korea; {2}Sungkyunkwan University, Korea

4P1 #7230
Cell Morphological Control and Differentiation Induction by Hydrogel Patterning Technique
Yuta Nakashima, Haruhiko Takemoto, Yoichi Saito, Yoshitaka Nakanishi
Kumamoto University, Japan

4P1 #7238
Seebeck Coefficient of the Chlorosulfonic Acid Doped Carbon Nanotube Fiber with Two Junctions
Guanyu Zhu{2}, Junki Sakamoto{2}, Ahmed Zubair{1}, Tadao Matsunaga{2}, Sang-Seok Lee{2}
{1}Bangladesh University of Engineering and Technology, Bangladesh; {2}Tottori University, Japan

4P1 #7249
Reciprocating Arc Design to Improve Sensitivity of Silicon Strain Gauges
Ji-Hoon Han{1}, Eun Sang Lee{1}, Nam Ki Min{2}
{1}Inha University, Korea; {2}Korea University, Korea

4P1 #7254
Stent-Based Wireless Glucose Monitoring System
Zhidong Zhao{1}, Huaxuan Cai{1}, Haiyang Wang{1}, Liu Wang{1}, Jinda Wang{3}, Xiangyu Cao{2}, Xing Chen{1}
{1}Beihang University, China; {2}Chinese People's Liberation Army General Hospital, China; {3}Sixth Medical Center of PLA General Hospital, China

4P1 #7272
Prussian Blue Nanocube Clusters for Pulsed Laser Optoporation of Cells
Aniket Mishra, Shalini Nagabhooshnam, Shunya Okamoto, Takayuki Shibata, Moeto Nagai
Toyohashi University of Technology, Japan

3:00-4:20 PM, May 4, 2024 Poster Area 2
4P2: Poster 6

4P2 #7032
Electro-Deformation Spectroscopy of Biological Cells
E Du, Hongyuan Xu, Jianming Wei
Florida Atlantic University, United States

4P2 #7054
An Eight-Mass MEMS Gyro with Area-Variable Comb Capacitance
Bo Jiang, Juan Jiao, Yixuan Li, Zhenjun Wang, Yan Su
Nanjing University of Science and Technology, China

4P2 #7066
ITO Thin Film Resistance Temperature Detector with Al/Al2O3 Protective Coating for High-Temperature Application
Tao Zhang, Peng Pang, Yunze Liu, Jian Luo, Jinjun Deng, Xingzu Zhang, Binghe Ma
Northwestern Polytechnical University, China

4P2 #7077
3D Microstructure Dynamic Reconstruction by MEMS Mirror Integrated Laser Differential Confocal Microscopy
Qingjiu Chen, Donghai Yang, Wen Jung Li
City University of Hong Kong, Hong Kong
4P2 #7089
Studying Stiffness of Lung Connective Tissue Under Different Oxygen Levels and Gradient in VITRO
Heng Hua Hsu
Research Center for Applied Sciences, Academia Sinica, Taiwan

4P2 #7110
Active Learning Enhanced Deep-Learning Surrogate Model for Fast MEMS Design with High-Dimensional Design Parameter Spaces
Chenzi Wang{2}, Lihong Feng{1}, Wenshuai Lu{2}, Wei Bian{2}, Zheng You{2}, Peter Benner{1}
{1}Max Planck Institute for Dynamics of Complex Technical Systems, Germany; {2}Tsinghua University, China

4P2 #7132
Triboelectric nanogenerator Employing ion-Doped Natural nanofibrils with a single-Layer Design
Xu Zeng, Yan-Yuan Ba, Xin-Ran Zhang, Yi-Lin Wang, Peng Huang, Hangyu Qian, Hao Zheng, Xiao-Sheng Zhang
University of Electronic Science and Technology of China, China

4P2 #7157
Enhancing the Photo-Electric Conversion Efficiency of Heterojunction by Ultra-Thin Amorphous Buffer Layer
Zih-Fei Chen{1}, Po-Hsien Tseng{2}, Cheng-Ming Huang{3}, Yu-Sheng Lai{3}, Meng-Hsueh Chiang{1}
{1}National Cheng Kung University, Taiwan; {2}National Yang Ming Chiao Tung University, Taiwan; {3}Taiwan Semiconductor Research Institute, Taiwan

4P2 #7161
DFT Based Analysis of Boron and Nitrogen Passivation at the Edge of Armchair Graphene Nanoribbon for Low Power Applications
Anshul Anshul, Rishu Chaujar
Delhi Technological University, India

4P2 #7191
High-Performance N77 Band Filters on Sapphire-Based Heterogenous Substrates
Xuedi Tian{2}, Jinhao Wu{1}, Xiaoli Fang{1}, Juxing He{1}, Tiangui You{1}, Yi Yang{2}, Shibin Zhang{1}, Xin Ou{1}
{1}Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China; {2}University of Shanghai for Science and Technology, China

4P2 #7217
Molecular Dynamics and Artificial Neural Network Crossover Study of N-DLC Film Growth and Properties
Guangyu Du, Zhiyang Shi, Linma Cai, Zhili Chen, Kun Liu, Xiaodong Wang
Northeastern University, China

4P2 #7225
Fabrication of Vertical Oxide Thin Film Transistors Using Electrodeposited Copper Oxide Channels
Hyun-Joon Ryu, Dong Su Kim, Dong-Wook Kim, Hyungkoun Cho
Sungkyunkwan University, Korea

4P2 #7242
Comparative Study of the Ar and He Sputtering in Atomic Layer Etching Processes for Silicon
Namgun Kim{2}, Whan Kyun Kim{2}, Jong Kyu Kim{1}, Chan Min Lee{1}, Kuk Han Yoon{1}, Heyeop Chae{2}
{1}Samsung Electronics, Korea; {2}Sungkyunkwan University, Korea

4P2 #7256
Micro Fuel Cells with Ceramic Flow Fields for Application in e-Bikes
Ralf Förster, Andreas Loth, Salmen Behi, Annette Juhr
Berliner Hochschule für Technik, Germany
Cell Encapsulation Within Hydrogel Using LCD 3D Printer for Single-Cell Screening
Venkatesh Kumar Panneer Selvam, Shunya Okamoto, Takayuki Shibata, Moeto Nagai
Toyohashi University of Technology, Japan

A Highly Sensitive Resonant Mass Sensor Enabled by Mode-Localized Sensing and Parametric Pump
Chengqi Lin[1], Jianlin Chen[1], Yuan Wang[2], Qinghua Ren[1], Yiming Ma[1], Nan Wang[1]
{1}Shanghai University, China; {2}University of Macau, China

A Novel Capacitive Pressure Sensor Using a Spiral Comb Electrode Structure
Qi Liu, Cao Xia, Yuanlin Xia, Zhuqing Wang
Sichuan University, China

A Novel Method for Co-Rich Amorphous Alloy Wire Electrical Interconnection by Using PI Film as Solder Mask
Chuan Chen[1], Yan Wang[1], Bo Zhang[2], Yadong Wan[2], Chao Zhang[2], Jianhua Li[2]
{1}State Grid Smart Grid Research Institute co., Ltd, China; {2}University of Science and Technology Beijing, China

Diameter Optimization of PVAc and TiO2 Nanofibers Using Surface Response Method
Qianguo Yu, Ziliang Yang, Zhaobang An, Zhuoliang Zan, Yijuang Wang, Kedong Bi
Southeast University, China

Numerical Study of Conical Jet Formation Mechanism in Electrospray Microfluidic Chip
Yue Jiang, Yan Yan, Ming Hao, Shulei Chen, Guipeng Wang, Yuanhua Xie, Dechun Ba, Kun Liu
Northeastern University, China

A Transformable Kirigami metamaterials Platform for Reconfigurable Electromagnetic Induced Transparent Electromagnetic metamaterial
Yuxin Liu, Yu-Sheng Lin
Sun Yat-sen University, China

Design and Manufacture of a MEMS Capacitive Differential Pressure Sensor with High Linearity and Low Sensitivity
Di An, Haiwang Li, Xiaoda Cao, Yanxin Zhai, Tiantong Xu
Research Institute of Aero-Engine, Beihang University, China

Characterization of Contamination Degradation of MEMS Accelerometer Comb Structures
Jinchuan Chen[5], Xiao Wen[5], Yingyu Xu[3], Qinwen Huang[1], Wanchun Ren[4], Chunhua He[2]
{1}CEPREI, China; {2}Guangdong University of Technology, China; {3}Guangdong University of Technology, CEPREI, China; {4}Southwest University of Science and Technology, China; {5}Southwest University of Science and Technology, CEPREI, China
4P3 #7113
Influence on Contact Resistance and Other Electrical Properties of Graphene on Silicon Dioxide Periodic Grating
Wei-Yu Long, Po-Han Shia, Yu-Xuan Lu, Fang-Min Lin, Chih-Ting Lin
National Taiwan University, Taiwan

4P3 #7150
A PIEZOELECTRIC-YARN-Based Muscle Patch Sensor for the Application of Gait Analysis
Liang-Yu Hsu, Guo-Ren Chu, Yu-Hsiang Hsu
National Taiwan University, Taiwan

4P3 #7151
The Suppression of Transverse Modes in POI SAW Resonator with Groove Configuration
Menghui Li, Mengke Qi, Yuanhang Chen, Yimin Cheng, Liang Cao, Xiaojing Mu
Chongqing University, China

4P3 #7195
An Asymmetrical 3D Subwavelength Metasurface with Tunable Morphology for Refractive Index Sensing
Dongyu Cui, Mengcheng Wang, Zhijuan Su, Faheng Zang
Shanghai Jiao Tong University, China

4P3 #7199
The Resistive Switching Properties of SrTiO3 Fabricated Through the RF Magnetron Sputtering Process
Min-Chen Cai, Yu-Ting Liu, Che-Hao Liao, Shih-Hung Lin
National Yunlin University of Science and Technology, Taiwan

4P3 #7201
A Study on Driving Experiments for Leg of Insect-Type Microrobot Using Rotary-Type Electrostatic Motor
Shuxin Lyu, Yudai Tominaga, Yuya Tamaki, Daichi Kiya, Katsuyuki Morishita, Ken Saito
Nihon University, Japan

4P3 #7227
Impact of AlScN Gate Dielectric on Electrical Properties of AlScN/AlGaN/GaN Ferroelectric HEMTs
Yuxi Liu, Zexin Ding, Guoming Zhang, Qingnan Qian, Qunhui Zhou, Yiming Ma, Nan Wang, Qinghua Ren
Shanghai University, China

4P3 #7235
Mid-Infrared Plasmonically Enhanced Waveguide-Integrated PdSe2 Zero-Bias Photodetector
Xiaoxiao Han, Hongzhi Zhu, Qian Huang, Qinghua Ren, Nan Wang, Yiming Ma
Shanghai University, China

4P3 #7237
A Mode Matched Tuning Fork Gyroscope Using ScAlN-Based Piezoelectric Driving and Sensing
Mei Wang, Jianlin Chen, Qinghua Ren, Yiming Ma, Nan Wang
Shanghai University, China

4P3 #7275
Deposition of Sr-Doped Hydroxyapatite by Magnetron Sputtering on 3D-Printed Titanium-Alloy Applied for Biomedical Implants
Chun-Ming Chang{2}, Sin-Liang Ou{1}, Bo-Yan Zhang{1}, Jane-Yi Wu{1}, Shi-Hua Deng{1}, Yi-Zhen Zhang{1}
{1}Da-Yeh University, Taiwan; {2}Taiwan Instrument Research Institute, National Applied Research Laboratories, Taiwan
3:00-4:20 PM, May 4, 2024  Poster Area 4
4P4: Poster 8

4P4 #7060
Enhancement of Two-Photon Fluorescence Microscopy Through Auxiliary Microspheres for Microscopic Observation
Feng Zhang[2], Zijian Jin[2], Chaodi Jiang[2], Shuai Yuan[2], Xiaoduo Wang[1]
{1}Shenyang Institute of Automation, Chinese Academy of Sciences, China; {2}Shenyang Jianzhu University, China

4P4 #7085
Properties of multi-Electrodes and Rarefied Gas Collisions Influencing Ion Mobility on a Miniaturized Ion Source Chip
Ming Hao[1], Yue Jiang[1], Shulei Chen[1], Guipeng Wang[1], Rui Jiang[1], Yaoshuai Ba[1], Dechun Ba[1], Zhengwei Chen[2], Kun Liu[1]
{1}Northeastern University, China; {2}Poiseuille Vacuum Technology (Shenyang) Co., Ltd., China

4P4 #7162
Impact of LCAO-DFT Analysed Si-HfO2 on GS-NCFET with its Digital Application
Rashi Mann, Rishu Chaujar
Delhi Technological University, India

4P4 #7172
An Off-Stoichiometry Thiol-Ene (OSTE) Microfluidic Chip for Storage of Nanoliter Liquid Sample
Zitao Feng, Guang Chen, Zejngqiu Chen, Ke Ni, Jiaying Yang, Haonan Li, Muyang Zhang, Qinghao He, Jie Zhou, Weijin Guo
Shantou University, China

4P4 #7276
Fabrication of Acetone Gas Sensor Based on MoS2/PtS2 Van der Waals Heterobilayer
Sin-Liang Ou[1], Chuan-Yi Lin[2], Yan-Si Jiang[1], Yi-Zhen Zhang[1], Shi-Hua Deng[1]
{1}Da-Yeh University, Taiwan; {2}Taiwan Instrument Research Institute, National Applied Research Laboratories, Taiwan

4P4 #7279
WS2 Monolayer with High-Quality and Large-Area Prepared by a Novel Process for Gas Sensor Applications
Ming-Hua Shiao[2], Chun-Ming Chang[2], Sin-Liang Ou[1], Xiang-Bin Yang[1], Yi-Chen Hsiao[1]
{1}Da-Yeh University, Taiwan; {2}Taiwan Instrument Research Institute, National Applied Research Laboratories, Taiwan

4P4 #7344
Polymer-Based Wafer-Level Warpage Prediction and Regulation for the Advanced Packaging
Lang Chen[1], Peijue Lyu[2], Qi Wang[2], Yufeng Jin[2], Wei Wang[1], Wei Wang[1]
{1}Peking University, China; {2}Peking University Shenzhen Graduate School, China

4P4 #7347
Research on the Two-Dimensional Polynomial Fitting Method of Piezoresistive Differential Pressure Transducer
Yang Yang[3], Yuan Wang[4], Guangyi Shi[1], Yufeng Jin[2]
{1}Peking University, China; {2}Peking University Shenzhen Graduate School, China; {3}Shenzhen Graduate School of Peking University, China; {4}University of Electronic Science and Technology of China, China
4P4 #7366
Covalent Fabrication and Conductometric Transduction of Robust Thin Films of Integrated Polyaniline and Polypyrrole Patterns Defined by Selective Soft Lithography on Polydimethylsiloxane Substrates
{1}National Health Research Institutes, Taiwan; {2}National Tsing Hua University, Taiwan

4P4 #7369
Surface Roughness Measurement of Functionalized CVD Graphene and Hexagonal Boron Nitride Heterostructures Using Atomic Force Microscopy
Evans Addo-Mensah, Ashby Philip John, Katlin Reynolds, Fernando Maia de Oliveira, Hugh Churchill, Uchechukwu Wejinya
University of Arkansas, United States

4P4 #7362
Jellyfish-Inspired Hydrogel Microneedle Robots for Precision Medication Delivery Within the Gastrointestinal Tract
Zhou Liu, Lang Chu, Lei Chi, Tiantian Kong
Shenzhen University, China

4P4 #7364
Advancing Cationic Biopolymer Nanospheres for Endothelial Barrier Transport
Chao Lu, Jin Zhang
Western University, Canada

4P4 #7367
Stiffness Haptic Display Based on Magneto-Rheological Elastomer
Seok-Han Lee, Sang-Youn Kim
Interaction Laboratory, Future Convergence Engineering, Korea University of Technology and Education, Korea

4P4 #7360
DNA Circuit Based Amplification and Detection of MicroRNA Through a Time Encoded Silicon Nanowire Field Effect Transistor Readout
Gurpreet Kaur{2}, Marcel Tintelott{3}, Antoine Masurier{1}, Guillaume Gin{1}, Yannick Rondelez{1}, Sven Ingebrandt{3}, Yannick Coffinier{2}, Vivek Pachauri{3}, Alexis Vlandas{2}
{1}Gulliver, ESPCI Paris, France; {2}IEMN/CNRS, France; {3}RWTH Aachen University, Germany

4P4 #7361
Ionic Nanofluidic Device Emulate Inhibitory Synaptic Behavior with Amino Material
Peiyue Li, Pan Zhang, Yechang Guo, Shaofeng Wang, Wei Wang
Peking University, China

4P4 #7371
Ti3C2TX MXENE Modified Flexible Carbon Cloth Electrode For Highly Sensitive Detection Of Neurotransmitter Dopamine
Ganesh Pattan-Siddappa, Seok-Han Lee, Sang-Youn Kim
Korea University of Technology and Education, Korea
10:05-12:20 PM, May 5, 2024    Room A
Invited Lecture Session
5A1: Biomaterials and Biodevices 3
Session Chair: Kento Yamagishi, The University of Tokyo & Michinuo Hashimoto, Singapore University of Technology and Design

Invited Lecture
5A1 #7046
Continuous Perfusion of Spheroids on a Flexibly Reconfigurable Microfluidic Chip
Yong-Ak Song, Hiba Aljayyousi, Sarah Sahloul, Ajymurat Orozaliev, Navajit Baban, Jongmin Kim
New York University Abu Dhabi, U.A.E.

Invited Lecture
5A1 #7287
Self-Enriching Coacervates for Ultra-Sensitive Biosensing
Chaofeng Cen{1}, Xudong Ma{1}, Zhou Liu{1}, Cheng Qi{1}, Ho Cheung Anderson Shum{2}, Tiantian Kong{1}
{1}Shenzhen University, China; {2}University of Hong Kong & Advanced Biomedical Instrumentation Centre, Hong Kong

Invited Lecture
5A1 #7291
How Far Is Lignin from Being a Biomedical material?
Dan Kai
Institute of Sustainability for Chemicals, Energy, and Environment, Singapore

Invited Lecture
5A1 #7293
Origami Paper Device for point-of-Care Testing
Zhugen Yang
Cranfield University, United Kingdom

Invited Lecture
5A1 #7310
Cryomicroneedles for Transdermal Cell Delivery for Immunotherapy
Chenjie Xu
City University of Hong Kong, Hong Kong

Invited Lecture
5A1 #7330
Living Metasurface Immunosorbent Assay for Single-Cell Immune Functional Profiling
Chia-Hung Chen
City University of Hong Kong, Hong Kong

10:05-12:20:00 PM, May 5, 2024 Room B
Invited Lecture Session
5B1: Micro/nano-technologies for next generation sensors
Session Chair: Inkyu Park, KAIST

Invited Lecture
5B1 #7304
Skin-Interfaced Flexible Patch with Programmable Adhesion
Hoon Eui Jeong, Geonjun Choi, Jaeil Kim, Seongjin Park, Dong Kwan Kang
Ulsan National Institute of Science and Technology, Korea
Invited Lecture  
5B1 #7301  
Ultra-Flexible Organic Devices for Health Monitoring  
Tomoyuki Yokota  
University of Tokyo, Japan

Invited Lecture  
5B1 #7326  
Breaking Sensitivity Barriers: Soft Bioelectrochemical Transistors  
Shiming Zhang  
University of Hong Kong, Hong Kong

Invited Lecture  
5B1 #7314  
Soft Matter Hydrodynamics for Coating and Patterning Technology  
Hyoungsoo Kim  
Korea Advanced Institute of Science and Technology, Korea

Invited Lecture  
5B1 #7296  
Aluminum-Based Multiscale 3D Lithography Enables Customizable Flexible Sensors  
Liaoyong Wen  
Westlake University, China

Invited Lecture  
5B1 #7322  
Biochemical Hydrogel Sensor Using DNA Nanotechnology  
Hiroaki Onoe  
Keio University, Japan

Invited Lecture  
5B1 #7325  
Micro-Led Based Monolithic Gas Sensors for low-Power e-Nose System  
Inkyu Park  
Korea Advanced Institute of Science and Technology, Korea

10:05-12:20 PM, May 5, 2024  
Room C  
5C1: M/NEMS  
Session Chair: Masaya Toda, Tohoku University & Meiyong Liao, National Institute for Materials Science

5C1 #7042  
Temperature Control for MEMS Gyroscope with Thermoelectric Cooler  
Zhenjun Wang, Yanjun Yue, Yi Zhou, Chaorong Ke, Bo Jiang, Tong Zhou, Yan Su  
Nanjing University of Science and Technology, China

5C1 #7047  
A High-Dynamic and Ultra-Low Pressure Sensor with a Novel Beam-Island-Membrane Structure  
Yi Gao{2}, Juan Yang{3}, Wei Li{1}, Yushan Gao{1}, Libo Zhao{2}, Xiangguang Han{2}, Feng Han{2}, Mimi Huang{2}, Renjie Tan{2}  
{1}Xi’an Aerospace Propulsion Institute, China; {2}Xi’an Jiaotong University, China; {3}Xi’an Satellite Control Center, China
5C1 #7145
A Wearable Acoustic Sensor for Identification in Harsh Noisy Environments
Tao Liu, Dongxiao Li, Mingyang Zhang, Hanjie Dou, Jiaqian Yang, Xiaojing Mu
Chongqing University, China

5C1 #7137
Optimization of the Design and Microfabrication of a Biologically Inspired Nano-Aerial Flapping Wing Vehicle
Marguerite de La Bigne[2], Eric Cattan[2], Ahmad Itawi[2], Sofiane Ghenna[2], Sébastien Grondel[2], Olivier Thomas[1]
{1} Arts et Métiers Institute of Technology, LISPEN, HESAM, Université de Lille, France; {2} Université Polytechnique Hauts-de-France, IEMN, CNRS, Université de Lille, France

5C1 #7147
A Large In-Plane-Displacement Micro-Platform Based on Electrothermal Bimorph Actuation
Jingyi Chen, Hengzhang Yang, Shaoyu Zhao, Huikai Xie
Beijing Institute of Technology, China

5C1 #7064
NOEMS Power Multiplied: A Novel Array-Based Multiplexing Scheme
Wioletta Trzpil[2], Thomas Furcatte[2], Mathis Lefebvre[2], Marc Gely[2], Munique Kazar Mendes[2], Christophe Masselon[1], Guillaume Jourdan[2], Marc Sansa[2]
{1} CEA-IRIG, Université Grenoble Alpes, Biologie à Grande Échelle, INSERM, France; {2} CEA-Leti, Université Grenoble Alpes, France

5C1 #7043
High-Order Resonance of Single-Crystal Diamond MEMS with High-Quality Factor at High Temperatures
Guo Chen[2], Zilong Zhang[3], Keyun Gu[3], Liwen Sang[3], Satoshi Koizumi[3], Masaya Toda[4], Yasuo Koide[3], Zhaohui Huang[1], Meiyong Liao[3]
{1} China University of Geosciences, China; {2} China University of Geosciences, National Institute for Materials Science, China; {3} National Institute for Materials Science, Japan; {4} Tohoku University, Japan

5C1 #7365
Atomically Thin NEMS Frequency Comb with Both Frequency Tunability and RECONFIGURABILITY via Simultaneous Mode Coupling
Bo Xu, Jiaqi Wu, Zenghui Wang
University of Electronic Science and Technology of China, China

5C1 #7170
A Sharp Phase Transition Shape Memory Polymer for Micro-Transfer Printing
Jingyang Zhang, Xin Shu, Qinhua Guo, Dong Lu, Yunda Wang
The Hong Kong University of Science and Technology (Guangzhou), China

10:05-12:20 PM, May 5, 2024 Room D
5D1: Nanogenerators - Fundamentals and Applications - Session Chair: Hiroaki Honma, Kobe University

5D1 #7116
Opto-Mechanical Strain Coupling Effect in n-3C-SiC/n-Si Heterojunction: Toward Mechanical Sensing and Light Harvesting Applications
Dang D.H. Tran[2], Tuan-Hung Nguyen[2], Cong Nguyen[1], Erik Streed[1], Van Thanh Dau[1], Dzung Viet Dao[2]
{1} Griffith University, Australia; {2} Queensland Micro- and Nanotechnology Centre, Griffith University, Australia
5D1 #7119
A Printed Flexible Triboelectric NANOGENERATOR Based SILK-Fibrin for MULTI-Functional Wearable Sensing
Peng Huang, Yi-Lin Wang, Xin-Ran Zhang, Xu Zeng, Hangyu Qian, Xiao-Sheng Zhang
University of Electronic Science and Technology of China, China

5D1 #7120
Nanogenerator Integrated Wings Towards Mechanical Energy Conversions for Bionic Flying Robots
Hao Zheng, Zhonglai Wang, Xiao-Sheng Zhang
University of Electronic Science and Technology of China, China

5D1 #7018
A Triboelectric Tactile Sensor for Shore Hardness Measurement
Zheng Limin, Kangyu Su, Hongyu Cheng, Wenjun Wang, Yating Xie, Bo Meng
Shenzhen University, China

10:05-12:20 PM, May 5, 2024  Room E
5E1: Micro/Nano Fluidics and Devices
Session Chairs: Moeto Nagai, Toyohashi University of Technology & Hiroaki Suzuki, Chuo University

5E1 #7213
Biophysical Phenotyping Activated Sorting of Single Cells and Droplets in Microfluidics
Ye Ai
Singapore University of Technology and Design, Singapore

5E1 #7126
Integration of air-Liquid microfluidics Integrating Sers Substrate for Bacteria Identification Based on Adsorptive Separation
Chi-Yao Ku, Nien-Tsu Huang
National Taiwan University, Taiwan

5E1 #7288
Direct single-Molecule Imaging Based on a Microfluidic magnetophoretic Device
Yun Hui{2}, Fengshan Shen{2}, Shuling Hao{1}
{1}Institute of Software Chinese Academy of Sciences, China; {2}Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China

5E1 #7226
Microfluidic Device for Diffracted X-Ray Tracking Method to Measure the Conformational Change of Ion Channel in Response to Chemical Stimuli
Yusuke Asagoe{1}, Hirofumi Shimizu{2}, Yoshikazu Hirai{1}
{1}Kyoto University, Japan; {2}University of Fukui, Japan

5E1 #7229
PARAFFIN-Embedded IFAST-Based Microfluidic Platform for ROBUST, Integrated Extraction and Detection of Nucleic Acids
Fengshan Shen, Jitao Mo, Yun Hui, Liwei Ouyang, Zongwen Jin, Wenhua Zhou, Xuefeng Yu
Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China

5E1 #7274
Controlled Formation of DNA Gels Using VIBRATION-Induced Local VORTICES
Zhitai Huang{1}, Kanji Kaneko{1}, Ryotaro Yoneyama{1}, Tomoya Maruyama{2}, Takeshi Hayakawa{1}, Masahiro Takinoue{2}, Hiroaki Suzuki{1}
{1}Chuo University, Japan; {2}Tokyo Institute of Technology, Japan
5E1 #7181
Streaming Current Generation: Investigating the Non-Negligible Electrokinetic Effect of a Highly Charged Nanoporous Layer
Sehyuk Yoon{2}, Jihee Park{2}, Hyomin Lee{1}, Sung Jae Kim{2}
{1}Jeju National University, Korea; {2}Seoul National University, Korea
1:20-3:00 PM, May 5, 2024 Room A
Invited Lecture Session
5A2: Micro/Nano-Biological Application
Session Chair: Yuya Morimoto, Waseda University

Invited Lecture
5A2 #7239
Hydrogel-Based Isolation of Extracellular Vesicles
Junbeom Kim{1}, Ji Yoon Kang{1}, Ki Wan Bong{2}, Nakwon Choi{1}
{1}Korea Institute of Science and Technology, Korea; {2}Korea University, Korea

In vitro Platforms to Study Biomechanics and mechanobiology for 3D Spheroid Models
Jeonghyun Kim, Takashi Inagaki, Kotone Niioka, Eijiro Maeda, Takeo Matsumoto
Nagoya University, Japan

Invited Lecture
5A2 #7016
All-Organic Electro-Mechanical Devices for Bioelectric Transduction
Shotaro Yoshida
Chuo University, Japan

Invited Lecture
5A2 #7176
Microdevice for Multi-Scale Analysis of in Vitro Neuronal Networks
Kenta Shimba
University of Tokyo, Japan

1:20-3:00 PM, May 5, 2024 Room B
Invited Lecture Session
5B2: Micromechanical Coupled Resonators
Session Chair: Honglong Chang, Northwestern Polytechnical University

Invited Lecture
5B2 #7171
Parity-Time Symmetry in Weakly Coupled Silicon Resonators
Qing-An Huang
Southeast University, China
Invited Lecture
5B2 #7316
Using Coupled-Modes of Micro/Nanomechanical Resonators for Sensor Enhancement
Xudong Zou
Aerospace Information Research Institute, Chinese Academy of Sciences, China

Invited Lecture
5B2 #7292
MEMS Resonator and Control System for Mode Localization Sensing
Takashiro Tsukamoto
Tohoku University, Japan

Invited Lecture
5B2 #7297
Towards Multi-Modal Multi-Resonator MEMS Sensors: Exploiting Nonlinear Effects and Modal Interactions Within MEMS Resonators
Chun Zhao
University of York, United Kingdom

Invited Lecture
5B2 #7303
Energy Transfer in Coupled Microelectromechanical Resonators
Hemin Zhang
Northwestern Polytechnical University, China

1:20-3:00 PM, May 5, 2024 Room C
Invited Lecture Session
5C2: Next Generation Conductive Materials
Session Chair: Hiroki Ota, Yokohama National University

Invited Lecture
5C2 #7206
Low Temperature Fusion of metals. Observation and Property
Tetsu Yonezawa
Hokkaido University, Japan

Invited Lecture
5C2 #7035
Stretchable Liquid Metal Antennas Using Direct Ink Writing (DIW) 3D Printed microchannels
Kento Yamagishi
University of Tokyo, Japan

Invited Lecture
5C2 #7105
Highly-Stretchable and High-Performance Electronic Devices by Electronic Component Mounting Using Liquid Metal
Takashi Sato
Waseda University, Japan

Invited Lecture
5C2 #7143
Smart Stretchable Hybrid Devices Using Liquid Metal
Hiroki Ota
Yokohama National University, Japan
Invited Lecture  
5C2 #7022  
Printed Soft Sensors Based on Liquid Metals  
Shizuo Tokito{1}, Yi-Fei Wang{2}  
{1}Yamagata University, Japan; {2}Yamagata University, Japan

1:20-3:00 PM, May 5, 2024  
Room D  
5D2: Flexible Sensors, Actuators and Robotics  
Session Chair: Tadao Matsunaga, Tottori University & Hiroaki Suzuki, Chuo University

5D2 #7096  
Fabricable Polymer Micromachined Insect Mimetic Wing for Pico Air Vehicles  
Vinay Shankar, Nagi Shirakawa, Daisuke Ishihara  
Kyushu Institute of Technology, Japan

5D2 #7073  
Curved Surfaces Induced Miniaturized METACHRONAL Motion of Magnetic Artificial Cilia  
Zhiwei Cui, Tanveer Ui Islam, Ye Wang, Jaap Den Toonder  
Eindhoven University of Technology, Netherlands

5D2 #7259  
Photostimulating and Migrating Euglena Gracilis in a Microfluidic Channel with a Light Irradiation System  
Pulasta Chakrabarty{2}, Ryoga Ono{3}, Tuhin Subhra Santra{1}, Shunya Okamoto{3}, Takayuki Shibata{3}, Moeto Nagai{3}  
{1}Indian Institute of Technology Madras, India; {2}Indian Institute of Technology Madras, Toyohashi University of Technology, India; {3}Toyohashi University of Technology, Japan

5D2 #7109  
An Artificial Muscle Device Driven Powered by methanol-Based Catalytic Combustion of nanoparticle-Coated Shape Memory Alloy  
Sanghoon Lee, Pritish Nagwade, Minseok Kang, Jaeu Park, Jinwoong Jeong, Heejae Shin, Youngjun Cho  
Daegu Gyeongbuk Institute of Science and Technology, Korea

5D2 #7058  
A Novel Flexible Thermoelectric Generator for Harvesting Low Thermal Heat Waste for Self-Powered Sensing System  
Nguyen Van Toan{1}, Thi Kim Tuoi Truong{1}, Masaya Toda{1}, Nguyen Van Hieu{2}, Takahito Ono{1}  
{1}Tohoku University, Japan; {2}Vietnam National University, Vietnam
Logo and banner competition

IEEE-NEMS 2024 committee is pleased to announce the winners of the conference logo and banner contest.

Winner for IEEE-NEMS 2024 conference logo
Karan K C, KUAS, Kyoto University of Advanced Science

Winner for IEEE-NEMS 2024 conference banner
DANG Thanh Hang, Kyoto University of Advanced Science

Contact:
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