
# PROGRAM HANDOUT

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IEEE

IEEE NANO Nanotechnology Council

KUAS KYOTO UNIVERSITY of ADVANCED SCIENCE 京都先端科学大学

# Index

# 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

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Guangya Zhou, National University of Singapore, Singapore

# Program Schedule at-a-glance

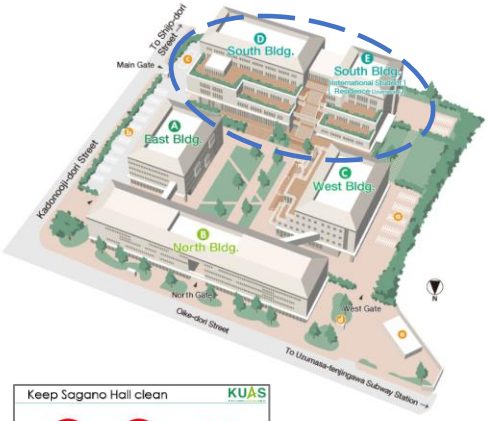
| Date | Time | | Main hall | Room A | Room B | Room C | Room D | Room E | Poster & Exhibit |
|---|---|---|---|---|---|---|---|---|---|
| | | | Sagano Hall | Room S306 | Room S307 | Room S311 | Room S312 | Room S313 | Advanced Hall |
| | | | 1F, South Bldg. | 3F, South Bldg. | | | | | 1F, South Bldg. |
| 2-May | 17:00 | | Registration opens at 1F South Bldg. | | | | | | |
| | 18:00- | | Welcome reception @ Advanced Hall, KUAS | | | | | | |
| 3-May | 8:00 | | Registration opens | | | | | | |
| | 9:00-9:25 | Opening | Opening Ceremony | | | | | | |
| | 9:25-10:15 | Plenary Talk | PS1 Plenary talk<br>Prof. Shigeki Takeuchi<br>Kyoto University, Japan | | | | | | |
| | 10:15-10:30 | | Break | | | | | | |
| | 10:30-12:30 | Oral Session | | 3A1<br>Invited | 3B1<br>Invited | 3C1<br>Invited | 3D1 | 3E1<br>Finalist | |
| | 12:30-13:30 | | Lunch | | | | | | |
| | 13:30-14:50 | Oral Session | | 3A2<br>Invited | 3B2<br>Invited | 3C2<br>Invited | 3D2<br>Invited | 3E2<br>Finalist | |
| | 15:00-16:20 | Oral Session | | 3A3<br>Invited | 3B3<br>Invited | 3C3<br>Invited | 3D3<br>Invited | 3E3<br>Finalist | |
| | 16:20-16:30 | | Break | | | | | | |
| | 16:30-18:10 | Poster Session & Exhibition | | | | | | | Poster Session 3P1~4 & Exhibition |
| 4-May | 8:00 | | Registration opens | | | | | | |
| | 9:00-9:50 | Plenary Talk | PS2 Plenary Talk<br>Prof. Yoko Yamakoshi, ETH Zürich, Switzerland | | | | | | |
| | 9:50-10:00 | | Break | | | | | | |
| | 10:00-12:00 | Oral Session | | 4A1<br>Invited | 4B1<br>Invited | 4C1<br>Invited | 4D1 | 4E1 | |
| | 12:00-13:00 | Oral Session | | SS1: Lunch and Learn Session<br>Prof. Kremena Makasheva, CNRS, France<br>Prof. Osamu Tabata, KUAS, Japan | | | | | |
| | 13:00-14:50 | Oral Session | | 4A2<br>Invited | 4B2<br>Invited | 4C2<br>Invited | 4D2 | 4E2 | |
| | 14:50-15:00 | | Break | | | | | | |
| | 15:00-16:20 | Poster Session & Exhibition | | | | | | | Poster Session 4P1~4 & Exhibition |
| | 16:20-17:00 | Special Keynote Lecture | SS2: Special Keynote Lecture<br>Prof. Wen J. Li<br>City University of Hong Kong, China | | | | | | |
| | 18:00-20:00 | | IEEE-NEMS 2024 Banquet @ Hotel Granvia Kyoto, adjacent to JR Kyoto Stn. | | | | | | |
| 5-May | 8:00 | | Registration opens | | | | | | |
| | 9:00-9:50 | Plenary Talk | PS3<br>Prof. Weileun Fang<br>National Tsing Hua University, Taiwan | | | | | | |
| | 9:50-10:05 | | Break | | | | | | |
| | 10:05-12:20 | Oral Session | | 5A1<br>Invited | 5B1<br>Invited | 5C1 | 5D1 | 5E1 | |
| | | | | Exhibition at foyer, 3F | | | | | |
| | 12:20-13:20 | | Lunch | | | | | | |
| | 13:20-15:00 | Oral Session | | 5A2<br>Invited | 5B2<br>Invited | 5C2<br>Invited | 5D2 | | |
| | 15:00-15:10 | | Break | | | | | | |
| | 15:10-15:30 | Closing | Closing Ceremony | | | | | | |

# Conference Venue

**Kyoto University of Advanced Science (KUAS)**

South Building

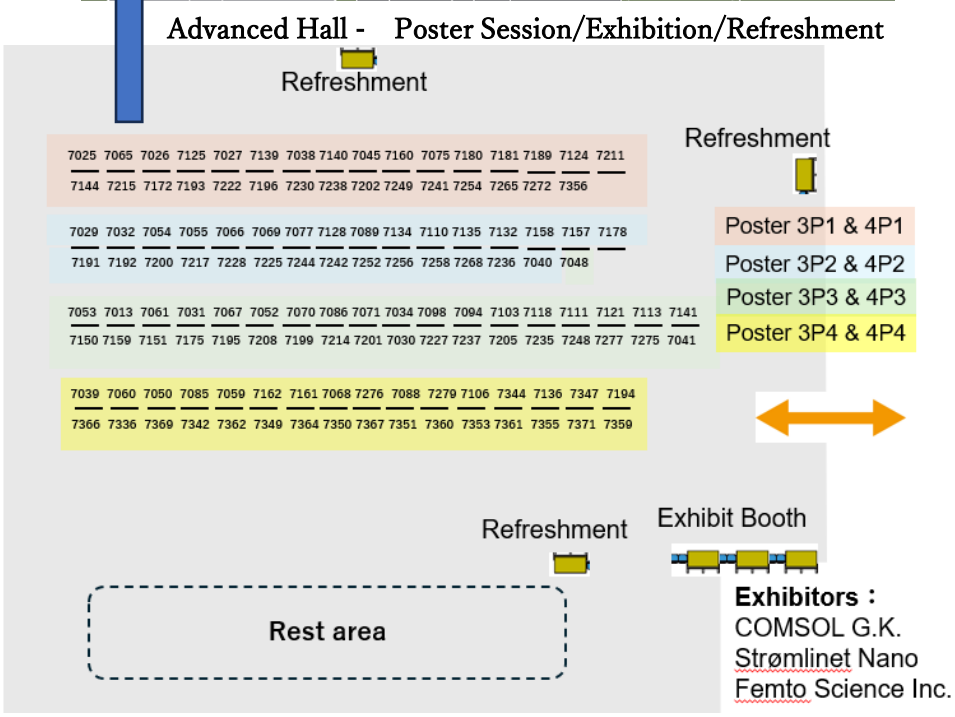
Kyoto Uzumasa Campus




## 1st Floor, South Bldg.

No FOOD at Sagano Hall






**Exhibitors：**
COMSOL G.K.
Strømlinet Nano Femto Science Inc.

**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.

**Wireless LAN**
SSID: kuas-wlan
Security key: Kyotosentan2019
ID: xgst24105
PW: savz889U

## 3rd Floor, South Bldg.

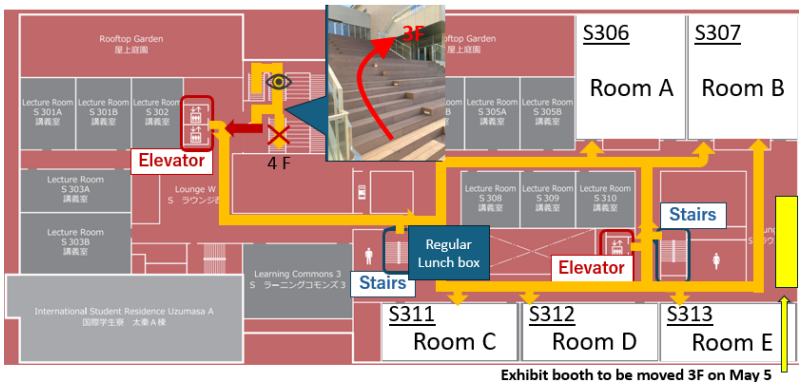



Exhibit booth to be moved 3F on May 5

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**This conference is supported by a subsidy from Kyoto City and the Kyoto Convention & Visitors Bureau.**

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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.stract>

# 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 Confereces**

*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 Scinence (KUAS),
Japan

# IEEE-NEMS 2024 - Program Schedule

## 10:30-12:30 May 3, 2024Room 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 #7300**
**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 Moleculers 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**
**AlN 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 Seiichi, 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}, Zejingqiu 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**
*Yufei 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, Jingyang 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 Sugiura{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**

**3D2 #7334**
**Sensing Technology Based on Insect Olfactory receptor-Expressing Sensor Cells**
*Hidefumi Mitsuno, Yuji Sukekawa, Ryohei 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**
*Sajmina 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 Room B
## 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 Room C
## 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 Wuensch, 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

## 3:00-4:20PM, 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}, Xiaojing 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, Matsuhiko 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, Nethe

**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}, Dae-Sik 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, Tomoya Shinabe, Tomoya Nakanishi, Akio Uesugi, Koji Sugano, Yoshitada 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}, Yufeng Jin{3}, Wei Wang{2}*
{1}26th Research lnstitute 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}, Tuan-Hung Nguyen{3}, Dzung Viet Dao{3}, 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

**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**

**Single-Tube, Single-Strip Lateral Flow Assays Utilizing Loop-Mediated Isothermal Amplification for Simultaneous Hepatitis B and C Virus Detection**

*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, Tiantian 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, Limin 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

## 10:00-12:00 PM, May 4, 2024 Room B
## 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}, 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; {4}Toyohashi University of Technology, Indian Institute of Technology Madras, Japan

**4E1 #7341**
**Oscillating-flow Rapid real-Time PCR Microfluidic**
*Chia-Tse Hung, Wei Chang, Chiuan-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}, Yuji 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}, Kensuke 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}, Kyunghwan 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

**Invited Lecture**
**4C2 #7006**
**MEMS Acoustic Waves in Piezoelectric Thin Films for RF Applications**
*Yansong Yang*
Hong Kong University of Science and Technology, Hong Kong

## 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}, Huiying 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 Iitani{2}, Yuki Maeno{2}, Geng Zhang{2}, Koji Toma{1}, Takahiro Arakawa{3}, Kohji Mitsubayashi{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}, Nguten 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**
*Zhixiong 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, Jianning 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, Yunzhe Liu, Jian Luo, Jinjun Deng, Xingxu 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}, Jinbo 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, Zhanyang Shi, Linna 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}, Heeyeop 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

**4P2 #7268**
**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

**4P2 #7236**
**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

## 3:00-4:20 PM, May 4, 2024 Poster Area 3
## 4P3: Poster 7

**4P3 #7013**
**A Novel Capacitive Pressure Sensor Using a Spiral Comb Electrode Structure**
*Qi Liu, Cao Xia, Yuanlin Xia, Zhuqing Wang*
Sichuan University, China

**4P3 #7031**
**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

**4P3 #7052**
**Diameter Optimization of PVAc and TiO2 Nanofibers Using Surface Response Method**
*Qianguo Yu, Ziliang Yang, Zhaobang An, Zhuoliang Zan, Yujuan Wang, Kedong Bi*
Southeast University, China

**4P3 #7086**
**Numerical Study of Conical Jet Formation Mechanism in Electrospray Microfluidic Chip**
*Yue Jiang, Yian Yan, Ming Hao, Shulei Chen, Guipeng Wang, Yuanhua Xie, Dechun Ba, Kun Liu*
Northeastern University, China

**4P3 #7098**
**A Transformable Kirigami metamaterials Platform for Reconfigurable Electromagnetic Induced Transparent Electromagnetic metamaterial**
*Yuxin Liu, Yu-Sheng Lin*
Sun Yat-sen University, China

**4P3 #7103**
**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

**4P3 #7111**
**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-Yii 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, Zejingqiu 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}, Chi Zhang{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**
*Yu-Chieh Shih{2}, Sin-Yun Jheng{2}, Tzu-Hsiang Lin{2}, Tsan-Feng Lu{2}, Yu-Tun Chao{2}, Chih-Chieh Fan{2}, Hui-Shan Tsai{2}, Kuan-Hsun Li{2}, Li-Hung Liu{2}, Leu-Wei Lo{1}, Hui-Yu Tsai{2}, Ming-Wei Lin{2}, Pen-Cheng Wang{2}*
{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 Gines{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 & Michinao 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 Echelle, 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-Fibroin 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

**Invited Lecture**
**5A2 #7016**
**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 #7057**
**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

**Invited Lecture**
**5A2 #7008**
**Biohybrid system, Composed of Cultured Tissue and Artificial components, Formed with microfabrication Techniques**
*Yuya Morimoto*
Waseda university, 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 #7207**
**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 Univertsity, 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


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