

Advanced Program

November 23 (Sun.)

Opening Remarks

Room 1

Chairperson: *Fumihito Arai, The University of Tokyo*

8:45-9:00 *Prof. Toshio Fukuda, Nagoya University (Honorary Chair)*
Prof. Fumihito Arai, The University of Tokyo (General Chair)

Plenary Talk

Room 1

Chairperson: *Fumihito Arai, The University of Tokyo*

9:00-9:45 Plenary Talk 1
Smart micro-fingers for tactile microscope and their applications
Prof. Satoshi Konishi
Ritsumeikan University, Japan

9:45-10:00 **Break**

Session SuA1-1: (Spotlight Session 1):

MEMS

Room 1

Chairperson: *Junpei Sakurai, Sojo University*

10:00-10:30 Multi-Modal MEMS Tactile Sensors: Quantifying Complex Tactile Properties in Material Evaluation and Medical Palpation
Masayuki Sohawa
Nigata University

10:30-11:00 A MEMS-Electret Integration Technology without Charging Processes
Daisuke Yamane
Ritsumeikan University

Session SuA2-1: (Spotlight Session 3)

Human-Robot Interaction

Room 2

Chairperson: *Hisataka Maruyama, Nagoya University*

10:00-10:30 Innovative Actuation Principles for Next-Generation Mechanical Systems
Akira Heya
Department of Mechanical Systems Engineering, Nagoya University

10:30-11:00 The FUNABOT Series: Fabric Utilized Natural Actuated roBOTS for Human-Centered Wearable Robotics
Yuki Funabora
Nagoya University

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Session SuA1-2: (Spotlight Session 2):

Advancing Technologies for The Frontiers of Micro/Nano-fluidics

Room 1

Chairperson: *Shinya Sakuma, Kyushu University*

- 11:00-11:30 Microfluidic devices for cell experiments with controllability of dissolved gas concentration
Kenichi Funamoto
Tohoku University
- 11:30-12:00 Chemical Sensor Devices for Simultaneous Detection of Analogues/Isomers
Tsukuru Minamiki
National Institute of Advanced Industrial Science and Technology (AIST)

Session SuA2-2: (Spotlight Session 4)

Human-Robot Interface

Room 2

Chairperson: *Tadayoshi Aoyama, Nagoya University*

- 11:00-11:30 Human-Robot Interfaces for an Aging Society
Hidenobu Sumioka
Advanced Telecommunications Research Institute International
- 11:30-12:00 Interactions Between Personal Mobility Vehicles and Humans
Chihiro Nakagawa
Osaka Metropolitan University

12:00-13:30 **Lunch**

Session SuP: Poster Session

13:30-14:30

- SuP-01 Enhancing Optoporation Precision: A Deep Learning-Based Approach to Single-Cell Targeting for Intracellular Delivery
Muhammad Hamza, Aniket Mishra, Shunya Okamoto, Takayuki Shibata, Moeto Nagai
Department of Mechanical Engineering, Toyohashi University of Technology
- SuP-02 Light-Driven, Size-Tunable Hydrogel Microgripper with Variable Stiffness for Single-Cell Manipulation
Hisataka Maruyama, Yoshikatsu Yamaguchi
Department of Mechanical Systems Engineering, Nagoya University

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- SuP-03 Programmable Flow Switching in a Centrifugal Microfluidic Device for the Nucleic Acid Extraction at a Constant Rotational Speed
Daigo Natsuhara¹, Marin Goto², Shunya Okamoto², Moeto Nagai², Takayuki Shibata²
¹*Department of Micro-Nano Mechanical Science and Engineering, Nagoya University*
²*Department of Mechanical Engineering, Toyohashi University of Technology*
- SuP-04 A Processor-Free Self-Rerouting Network for E-Skin: Empirical Validation and Scaling
Takashi Ozaki, Norikazu Ohta, and Motohiro Fujiyoshi
Frontier Research Management Office, Toyota Central R&D Labs. Inc.
- SuP-05 Robust Scan Matching in Tunnel Environments using 3D Structural Features
Rintaro Murai¹, Shiryu Kuroda¹, Yoshiki Ninomiya², Junichi Meguro¹
¹*Meijo University*
²*Nagoya University*
- SuP-06 A Preliminary Study on Passive Attitude Control System with Magnetorquer Using Permanent Magnet for Ultra-Small Satellite
Mao Watanabe¹, Yuta Takiya², Towa Inoue², Toru Yumoto³, Hiroto Tanaka³, Satoshi Yasuda³, Nobuto Hirakoso¹
¹*Department of Mechanical Engineering, National Institute of Technology, Gunma College*
²*Production System Engineering, National Institute of Technology, Gunma College*
³*MITSUBA Corporation*
- SuP-07 Lump Detection in Skin Phantoms Using Tactile Sensors Encapsulated in Urethane Gel
Sora Oono, Daiki Hamanishi, Ryusuke Mitobe, Takashi Abe, Masayuki Sohgawa
Graduate School of Science and Technology, Niigata University
- SuP-08 Detection of Magnetic Beads Using Amorphous Wires in Biosensor Applications
Jiaju Ma, Takashi Ozaki, Yuri Yamada, Takaaki Hatanaka, Norikazu Ohta, Motohiro Fujiyoshi, Yusuke Hirata and Minoru Hirano
TOYOTA CENTRAL R&D LABS., INC.
- SuP-09 3D Printed Hydrogel Organ Model with Tunable Multiphysical Properties
Hisataka Maruyama¹, Takeshi Yura², Kento Kawafuku¹
¹*Department of Micro-Nano Mechanical Science and Engineering, Nagoya*

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University

²Department of Mechanical and Aerospace Engineering, Nagoya University

- SuP-10 Walking Support Device with Pulse-Responsive Load Adjustment for Exercise Intensity Control
Shu Moriyama, Hisataka Maruyama, Takayuki Hoshino
Department of Micro-Nano Mechanical Science and Engineering, Nagoya University
- SuP-11 Hybrid CNN/RNN Model Development and Its SoC-FPGA Inference Engine Implementation for Electrocardiogram Detection Applications
Song-Nien Tang and Hao-Hsuan Yang
Information and Computer Engineering Department, Chung Yuan Christian University
- SuP-12 Evaluation of Power Generation from Soft Magnetostrictive Materials in MEMS Devices
Tatsuya Sakamoto, Jyunya Muramatsu, Chiemi Oka, Junpei Sakurai, Seiichi Hata
Nagoya University
- SuP-13 Enhancing the Irradiation Area of a Novel Fast Atom Beam Source Using a Bidirectional Magnetic Field
Yuki Miyoshi¹, Taisei Kato¹, Kyosuke Oshima¹, Taichi Hino¹, Takahiro Yamadera², Chiemi Oka¹, Junpei Sakurai¹ and Seiichi Hata¹
¹Nagoya University
²NGK INSULATORS, LTD.
- SuP-14 Microfluidic Fabrication of Polyethersulfone Hollow Fibers Including Magnetic Nanoparticles
Kazushi Yoshioka¹, Atsuki Kobayashi¹, Yuta Bando², Junpei SAKURAI¹, Yuta Kurashina², Seiichi Hata¹, Chiemi Oka¹
¹Nagoya University
²Tokyo University of Agriculture and Technology
- SuP-15 A Structural Approach Using MEMS for Residual Stress Evaluation in Thin Films
Yuki Ashikari, Shun Takase, Ryoya Yamama, Chiemi Oka, Junpei Sakurai and Seiichi Hata
Nagoya University
- SuP-16 Fabrication of HFSMA micro pillar for active micro-nano surface
Koyo Izumi¹, Chiemi Oka¹, Seiichi Hata¹, Junpei Sakurai²
¹Nagoya University
²Sojo University,

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- SuP-17 High-time-resolution measurement and kinetic analysis of the curing process of photocurable liquid films confined in nanogaps
Lianhong Lang¹, Shintaro Itoh¹, Kenji Fukuzawa¹, Masaru Nakagawa², Ryohei Suzuki³, Junichi Seki³, Naoki Azuma¹, Hendong Zhang¹
¹*Nagoya University*
²*Tohoku University*
³*Canon Inc*
- SuP-18 Evaluation of a Crutch-Type Robotic Limb with a Variable Grounding Point Mechanism for Sit-to-Stand Assistance
Taisei Urata¹, Atsushi Tsukahara², Yahiro Ito¹, Yasuhisa Hasegawa¹
¹*Nagoya University*
²*NCGG*
- SuP-19 Neural Activity Measurements Induced by Quantitative Tactile Stimulus for Sensory Feedback via Neural Stem Cell Transplantation
Riko Masamura, Masaru Takeuchi, Madoka Higa, Hitoshi Hirata, Michiro Yamamoto, and Yasuhisa Hasegawa
Nagoya University
- SuP-20 Visual Feedback Control for Compensating Individual Differences in Skeletal Muscle Bio-Actuator
Ishin Goto, Eunhye Kim, Masaru Takeuchi, Yasuhisa Hasegawa, Toshio Fukuda
Nagoya University
- SuP-21 A Dynamic Object Collision Avoidance Algorithm for a Cane-Type Accompanying Robot
Yuki Miyachi¹, Yasuhisa Hasegawa¹, Kenji Kato²
¹*Nagoya University*
²*NCGG*
- SuP-22 Control of Functional Electrical Stimulation for Muscle Fatigue Compensation by EMG-based Model Predictive Control
Kohei Watase, Masaru Takeuchi, Sota Saeki, Hitoshi Hirata, Yasuhisa Hasegawa
Nagoya University
- SuP-23 Semi-Autonomous Control based on Vision-Based Tactile Information for Acquiring Human Skills in Contact-Rich Tracing Tasks
Yuki Yamashita¹, Yaonan Zhu², Yasuhisa Hasegawa¹
¹*Nagoya University*
²*University of Tokyo*
- SuP-24 Force-Based Sliding Control for Garment Manipulation
Ryusei Kihara, Jayant Unde, Yasuhisa Hasegawa
Nagoya University

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- SuP-25 Compact Assistance Robot Following Human CoG Transition during Stit-to-Stand
Yahiro Ito¹, Jayant Unde¹, Taisei Urata¹, Atsushi Tsukahara² and Yasuhisa Hasegawa¹
¹Nagoya University
²NCGG
- SuP-26 Development and Characterization of Microfluidic Ion Sponge Diodes
Akihide Arima¹, Mitsuo Hara², Makusu Tsutsui³, Tomoji Kawai³, Yoshinobu Baba^{1,4}
¹Nagoya University
²Kagawa University
³Osaka University
⁴National Institutes for Quantum Science and Technology (QST)
- SuP-27 Effect of the Internal Electrode Aperture Geometry in a Fast Atom Beam Source
Taichi Hino, Yuki Miyoshi, Kyosuke Oshima, Chiemi Oka, Jumpei Sakurai, Seiichi Hata
Nagoya University

Session SuP1-1: (Organized Session 3-1)

Designed cell-cell communication: Technologies and Applications

Room 1

Chairpersons: *Shinya Sakuma, Kyushu University*
Yoshitaka Shirasaki, The University of Tokyo
Niko Kimura, Tokyo University of Agriculture and Technology

- 14:30-15:00 Keynote Talk 1
Addressing the Functional Data Gap: Generating More Complete Single-Cell Data at Scale with Nanovial Technology
Joseph de Rutte
Partillion Bioscience
- 15:00-15:15 ELECTRO-MECHANICAL-PORATION INCREASES CELLULAR APPETITE FOR LIPIDS-BASED NANOPARTICLES
Niko Kimura¹, Yoko Yamanishi², Yoshitaka Shirasaki³, Satoshi Yotsumoto⁴, Shigeo S. Sugano⁵, and Shinya Sakuma²
¹Tokyo University of Agriculture and Technology
²Kyushu University
³The University of Tokyo
⁴Tokyo University of Pharmacy and Life Sciences
⁵National Institute of Advanced Industrial Science and Technology (AIST)
- 15:15-15:30 Observation of the migration of non-adherent cells in 3D collagen gels with different stiffnesses
Takumi Ishiguro¹, Xueping Yu¹, Fumiya Ito^{2,3}, Akiko Takahashi^{2,3,4}, Takeshi

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Hayakawa¹

¹*Department of Precision engineering, Chuo University,*

²*Cancer Cell Communication Project, NEXT-Ganken Program, Japanese Foundation for Cancer Research*

³*Division of Cellular Senescence, Cancer Institute, Japanese Foundation for Cancer Research,*

⁴*Laboratory of Cellular Senescence Biology, Graduate School of Pharmaceutical Sciences, The University of Tokyo*

- 15:30-15:45 Development of a cell elimination system using plant hormone.
Satoshi Yoshimoto¹, Zhuohao Yang², Yoshitaka Shirasaki², Satoshi Yotsumoto³, Kosuke Dodo¹
¹*RIKEN*
²*University of Tokyo*
³*Tokyo University of Pharmacy and Life Sciences*
- 15:45-16:00 Non-stationary microfluidic flow enables live-cell imaging of triggered cellular dynamic responses
Rinko Kurogi¹, Satoshi Yoshimoto², Nariaki Kiyama¹, Makoto Saito¹, Yoko Yamanishi¹, Kosuke Dodo², Takashi Kamatani³, Yoshitaka Shirasaki⁴, Shigeo S. Sugano⁵, Satoshi Yotsumoto⁶, and Shinya Sakuma⁷
¹*Department of Mechanical Engineering, Kyushu University*
²*Catalysis and Integrated Research Group, RIKEN Center for Sustainable Resource Science*
³*Department of AI Technology Development, Institute of Science Tokyo*
⁴*Research center for advanced science and technology, The University of Tokyo*
⁵*School of Life Sciences, Tokyo University of Pharmacy and Life Sciences*
⁶*Biomanufacturing process research center, The National Institute of Advanced Industrial Science and Technology*

Session SuP2-1: (Organized Session 1)

Advanced Micro-Nano Systems for Biomedical Applications

Room 2

Chairperson: *Hisataka Maruyama, Nagoya University*

- 14:30-14:45 Isolation System for Organoids Embedded in Hydrogel Using a Piezoelectric-Driven Micro-Gripper
Kohki Tanabe¹, Taisuke Masuda¹, Satoshi Amaya¹, Yasuto Aoyama², and Fumihito Arai¹
¹*Graduate School of Engineering, The University of Tokyo*
²*Faculty of Engineering, The University of Tokyo*
- 14:45-15:00 Demonstration of a micropump using thin-film PDMS driven by molecular artificial muscle
Tomoya Nakanishi¹, Yingzhe Wang¹, Chao-Shin Hsu¹, Takahiro Nitta², Yuichi Hiratsuka³, Keisuke Morishima¹
¹*Department of Mechanical Engineering, The University of Osaka*

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²*Applied Physics Course, Faculty of Engineering, Gifu University*

³*School of Materials Science, Japan Advanced Institute of Science and Technology (JAIST)*

- 15:00-15:15 In-situ 3D Shape Reconstruction of Micro-tools for Digital Twin-Enabled Underwater Micromanipulation
Kaito Tojo, Hisataka Maruyama
Department of Micro-Nano Mechanical Science and Engineering, Nagoya University
- 15:15-15:30 A PINN-Based Reconstruction and Evaluation Framework for Microscale Flow with Moving Boundaries Using PIV-Validated Experimental Data
Kosei Sumida, Hisataka Maruyama
Department of Micro-Nano Mechanical Science and Engineering, Nagoya University
- 15:30-15:45 In situ patterning of on-chip gel actuators by using direct laser writing for high integration of gel actuators
Iori Urabe¹, Yoshiyuki Yokoyama², Takeshi Hayakawa¹
¹*Department of Precision engineering, Chuo University*
²*Toyama Industrial Technology Research and Development Center*
- 15:45-16:00 Magnetic Soft Microrobot with Enhanced Stability for Intestinal Navigation and Drug Release
Zaiyang Chen, Lingze Zhang, Shengyuan Wang and Lin Feng
School of Mechanical Engineering & Automation, Beihang University

16:00-16:15 **Break**

Session SuPI-2: (Organized Session 3-2)

Designed cell-cell communication: Technologies and Applications

Room 1

Chairpersons: *Shinya Sakuma, Kyushu University*
Yoshitaka Shirasaki, The University of Tokyo
Niko Kimura, Tokyo University of Agriculture and Technology

- 16:15-16:45 Keynote Talk 2
Voiceprint Features for Label-Free Real-Time Microdroplet Identification
Chia-Hung Dylan Tsai
Department of Mechanical Engineering, National Yang Ming Chiao Tung University
- 16:45-17:00 Real-Time Visualization of Engineered Immune Cell Cytotoxicity Using Live FluoroSpot
Zhuohao Yang¹, Mai Yamagishi², Nubutake Suzuki¹, Takashi Kamatani³, Shigeo Sugano⁴, Yoko Yamanishi⁵, Shinya Sakuma⁵, Akiko Takahashi⁶, Satoshi Yotsumoto⁷ and Yoshitaka Shirasaki¹

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¹Research Center for Advanced Science and Technology, The University of Tokyo

²Live Cell Diagnosis, Ltd.

³Institute of Integrated Research, Institute of Science Tokyo

⁴National Institute of Advanced Industrial Science and Technology (AIST),

⁵Department of Mechanical Engineering, Kyushu University

⁶Japanese Foundation for Cancer Research (JFCR)

⁷School of Life Sciences, Tokyo University of Pharmacy and Life Sciences

- 17:00-17:15 Lysosomal dysfunction impairs lipid peroxidation and ferroptosis in senescent cells
Xiangyu Zhou¹, Tze Mun Loo¹, Yoko Tanaka¹, Sho Sugawara¹, Shota Yamauchi¹, Hiroko Kawasaki¹, Yuta Matsuoka², Yuki Sugiura², Shinya Sakuma³, Yoko Yamanishi³, Satoshi Yotsumoto⁴, Kosuke Dodo⁵, Yoshitaka Shirasaki⁶, Takashi Kamatani⁷ & Akiko Takahashi¹
¹Japanese Foundation for Cancer Research
²Kyoto University Graduate School of Medicine
³Department of Mechanical Engineering, Kyushu University
⁴School of Life Sciences, Tokyo University of Pharmacy and Life Sciences
⁵RIKEN Center for Sustainable Resource Science
⁶Research Center for Advanced Science and Technology, The University of Tokyo
⁷Institute of Integrated Research, Institute of Science Tokyo
- 17:15-17:30 Kill Switch-Controlled Agrobacterium for Optimized Plant-Microbe Interaction
Haruka Suwazono^{1,2}, Mika Ikegaya¹, Shigeo, S. Sugano^{1,2}
¹National Institute of Advanced Industrial Science and Technology (AIST),
²Tokyo University of Science
- 17:30-17:45 Toward Intercellular Communication: Development of Short Oligonucleotide-Based Gene Regulation Technologies
Ririka Taniguchi¹, Yousuke Katsuda^{1,2}, Tomoki Kida¹, Yua Hasegawa¹, Shin-ichi Sato^{1,2}, Masaki Hagihara³, Toshihiro Ihara¹
¹Division of Materials Science and Chemistry, Faculty of Advanced Science and Technology, Kumamoto University
²StapleBio Inc.
³Graduate School of Science and Technology, Hirosaki University
- 17:45-18:00 On-chip pump utilizing spiral structure for precise single cell manipulation
Nariaki Kiyama¹, Makoto Saito¹, Yoko Yamanishi¹, Yoshitaka Shirasaki², Shinya Sakuma¹
¹Kyushu University
²The University of Tokyo

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Session SuP2-2: (Organized Session 11)

Cognitive Robotics

Room 2

Chairperson: *Naoyuki Kubota, Tokyo Metropolitan University*

- 16:15-16:30 Real Time Lidar-Based Step Detection for Autonomous Mobile Robots
Tatsuki Imai, Tomohito Takubo, Tetsuo Tsujioka
Department of Electrical and Electronic Systems Engineering, Osaka Metropolitan University
- 16:30-16:45 The Influence of Intonation Changes Based on Heart Rate on Empathy Formation with a Chatbot
Yuuta Noguchi¹ and Makoto Nokata¹
¹Ritsumeikan University
- 16:45-17:00 Effect of Vibration Stimulation Location on Kinesthetic Illusion and Tonic Vibration Reflex Response in Human Trunk Lateral Bending Motion
Yue Hou, Satoshi Nishikawa, Kazuo Kiguchi
Dept. of Mechanical Engineering, Kyushu University
- 17:00-17:15 Attention and Posture in Perceiving-acting Cycle based on Topological Intelligence for Reaching Tasks of Robot Partners
Naoyuki Kubota, Takumi Miya, Takenori Obo
Department of Mechanical Systems Engineering, Tokyo Metropolitan University
- 17:15-17:45 Keynote Talk 3
Understand Human Behaviour for NeuroRegulation
Honghai Liu
University of Portsmouth
- 18:00-18:15 **Break**
- 18:15-19:30 **Beer Party**

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November 24 (Mon.)

Plenary Talk

Room 1

Chairperson: *Takeshi Hayakawa, Chuo University*

9:00-9:45 Plenary Talk 2
Small Robots for Big Cures: Translating Milli- and Microrobots into Innovative Interventions
Principal Investigator Hakan Ceylan
Mayo Clinic, USA

9:45-10:00 **Break**

Session MoA1-1: (Organized Session 5-1)

In-body Cybernetic Avatars

Room 1

Chairperson: *Fumihito Arai, The University of Tokyo*

10:00-10:30 Keynote Talk 4
Stomach-Acid-Charged Tablet-Type Digital Pills with Long-Term In-Body Monitoring
Kiichi Niitsu
Kyoto University

10:30-10:45 Development of Ingestible Conductometric pH Sensor Utilizing Polyaniline Thin Film
 Ibuki Sugasawa, Hiroshi Miyaguchi and Shinya Yoshida
College of Engineering, Shibaura Institute of Technology

10:45-11:00 Swallowable Folded Ring-shaped Scaffold for Site-specific Deployment and Wireless Power Transmission and Communication between Inside the Intestine and Outside the Body
Qifeng Wang¹, Noriko Tsuruoka², Yuto Sakaguchi², Fumihito Arai³, Yoichi Haga^{1,2}
¹Graduate School of Biomedical Engineering, Tohoku University
²Graduate School of Engineering, Tohoku University
³Graduate School of Engineering, The University of Tokyo

11:00-11:15 Traction Cybernetic Avatar System with Real-time Force Sensing for Colon ESD
Xinchi Gao¹, Noriko Tsuruoka², Wenrui Liu¹, Yuto Sakaguchi², Yosuke Tsuji³, Mitsuhiro Fujishiro³, Fumihito Arai⁴, Yoichi Haga^{1,2}
¹Graduate School of Biomedical Engineering, Tohoku University
²Graduate School of Engineering, Tohoku University
³Graduate School of Medicine The University of Tokyo
⁴Graduate School of Engineering, The University of Tokyo

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- 11:15-11:30 Motion demonstration of a magnetically movable mini-crawler for large intestine endoscopy
Toshiro Yamanaka and Fumihito Arai
Department of Bioengineering, the University of Tokyo
- 11:30-11:45 Immersive Operation Interface to Simplify Colonoscopy Using Head and Hand Motion
Kenta Yokoe¹, Teruaki Ito¹, and Tadayoshi Aoyama^{1,2}
¹Department of Mechanical Systems Engineering, Nagoya University
²Center for One Medicine Innovative Translational Research, Gifu University
- 11:45-12:00 Stiffness-Tunable Conductive Hydrogel Sensors for Stress Sensing
Hisataka Maruyama, Kento Kawafuku
Department of Mechanical Systems Engineering, Nagoya University

Session SuA2-1: (Organized Session 6-1)

Core Technologies and Applications for Intelligent Robot systems

Room 2

Chairpersons: *Kenichi Ohara, Mmeijo University*
Takahiro Ikeda, Gifu University

- 10:00-10:15 Traversing Small Obstacles of Mobile Robots Using Model Predictive Control Considering Impact
Ryugo Tanaka, Tomohito Takubo and Tetsuo Tsujioka
Osaka Metropolitan University
- 10:15-10:30 Enhancing self-localization accuracy using confidence from monocular distance estimation and 3D map
Masaya Kato, Tsuyoshi Tasaki
Graduate School of Science and Technology, Meijo University
- 10:30-10:45 Flexible Monitoring Service for Real-Time Multi-Robot State Observation
Toru Otake and Kenichi Ohara
Division of Mechanical and Engineering, Meijo University
- 10:45-11:00 Selective Integration of Estimation Results Using a 3D Map for Improved Distance Estimation Accuracy
Ryoichiro Moriya, Tsuyoshi Tasaki
Graduate School of Science and Technology, Meijo University
- 11:00-11:15 Learning Whole-Body Control for End-Effector Stabilization of a Quadruped Manipulator
Yanzhou Jin¹, Yaonan Zhu¹, Yusuke Iwasawa¹, Yasuhisa Hasegawa², and Yutaka Matsuo¹
¹Graduate School of Engineering, The University of Tokyo
²Department of Micro-Nano Mechanical Science and Engineering, Nagoya University,

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- 11:15-11:30 McKibben Artificial Muscle Arrangement for Fabric Robotic Suits
Enabling Elbow Angle Guidance during High-Speed Movements
Shota Kanamori¹, Kenta Yokoe², Yuki Funabora³, and Tadayoshi Aoyama^{2,4}
¹Dept. of Micro-Nano Mechanical Science and Engineering, Nagoya Univ.
²Dept. of Mechanical Systems Engineering, Nagoya Univ.
³Dept. of Information and Communication Engineering, Nagoya Univ.
⁴Center for One Medicine Innovative Translational Research, Gifu Univ.,
- 11:30-11:45 Improvement of distance estimation accuracy based on Transformer with
3D map
Itsuki Takeuchi, Tsuyoshi Tasaki
Graduate School of Science and Technology, Meijo University

12:00-13:30 **Lunch**

Session MoPI-1: (Organized Session 5-2)

In-body Cybernetic Avatars

Room 1

Chairperson: *Fumihito Arai, The University of Tokyo*

- 13:30-14:00 Keynote Talk 5
High-Performance Piezoelectric MEMS Devices Enabled by
Monocrystalline Piezoelectric Thin Films
Shinya Yoshida
Shibaura Institute of Technology
- 14:00-14:15 Magnetic-Optical Tracking System of In-body Capsule for Physiological
Data Mapping
*Juzheng Zhang¹, Ruka Gokyu¹, Takumi Kobayashi², Bolan Zhang¹, Kenji
Takeda¹, Daisuke Anzai², and Fumihito Arai¹*
*¹Department of Mechanical Engineering, Graduate School of
Engineering, The University of Tokyo*
²Graduate School of Informatics, Osaka Metropolitan University,
- 14:15-14:30 Performance Evaluation on 2-D In-Body CA Localization in Different
Directions
Yuki Matsuhira¹, Takumi Kobayashi², Daisuke Anzai²
¹Graduate School of Engineering Nagoya Institute of Technology
²Graduate School of Informatics Osaka Metropolitan University

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Session MoP2-1: (Organized Session 6-2)

Core Technologies and Applications for Intelligent Robot systems

Room 2

Chairpersons: *Kenichi Ohara, Mmeijo University*
Takahiro Ikeda, Gifu University

- 13:30-13:45 Towards Distributed Operation: Enhancement of an RT System Integration Framework
Manato Fukuta and Kenichi Ohara
Graduate School of Science and Technology, Meijo University
- 13:45-14:00 Multi-View Feature Fusion Based on Poseclass Confidence for Pose Estimation of Simple-Shaped Objects
Kano Muragishi, Tsuyoshi Tasaki
Graduate School of Science and Technology, Meijo University
- 14:00-14:15 Unidirectional Input-Driven Mechanism for Bidirectional Intermittent Rotation
Haruki Isaka, Hisataka Maruyama, Takayuki Hoshino
Department of Micro-Nano Mechanical Science and Engineering, Nagoya University
- 14:15-14:30 Motion Planning for Arm Robots Using Waypoints from Neural Motion Planners
Keigo Okamoto, Tsuyoshi Tasaki
Graduate School of Science and Technology, Meijo University
- 14:30-14:45 Pilot Study on Suitable Motion Scaling between Visual Camera and Manipulator for Embodiment of Remote-Controlled Construction Robots
Keigo Kajihara¹, Takahiro Ikeda², Satoshi Ueki² and Hironao Yamada²
¹Dept. of Intelligence Science and Engineering, Gifu Univ
²Dept. of Mechanical Engineering, Gifu Univ
- 14:45-15:00 **Break**

Session MoP1-2: (Organized Session 2-1)

Cutting-edge sensors and actuators utilizing micro-nano science

Room 1

Chairpersons: *Hirota Sugiura, The University of Tokyo*
Taisuke Masuda, The University of Tokyo
Kazuyoshi Tsuchiya, Tokai University

- 15:00-15:30 Keynote Talk 6
Biodegradable GHz Metamaterials for Sensing Applications
Tetsuo Kan
The University of Electro-Communications

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- 15:30-15:45 Electrospun PEDOT:PSS–AgNW/PVDF-Based Flexible Capacitor for Energy Harvesting and Wearable Sensing Applications
Muhammad Nabeel Iman bin Mohamad Fazaly^{1,2}, Jyoti Jaiswal³, Kazuyoshi Tsuchiya^{1,2}, Ryuji Ishigaki^{1,2}, Mohd Yusri bin Saidin^{1,2}
¹*Department of Mechanical Engineering, Tokai University*
²*Micro/Nano Technology Center, Tokai University*
³*Department of Physics, Rajiv Gandhi University*
- 15:45-16:00 High throughput cell transportation using multi-sensor integrated chip-on-robot
Nobuhiro Kaku, Shuzhang Liang, Hirotaka Sugiura, Satoshi Amaya, Fumihito Arai
Department of Mechanical Engineering Graduate School of Engineering The University of Tokyo
- 16:00-16:15 Tissue isolating system using perforation and twisting with translational/rotational piezo impact drive mechanism
Hiroki Kunii, Hirotaka Sugiura, Satoshi Amaya, and Fumihito Arai
Department of Mechanical Engineering, Graduate School of Engineering, The University of Tokyo

Session MoP2-2: (Organized Session 8-1)

Micro/Nano Functional Devices for in vivo/vitro applications

Room 2

Chairpersons: *Masaru Takeuchi, Nagoya University*
Tadayoshi Aoyama, Nagoya University

- 15:00-15:15 Gas Sensor Feedback Cyborg Insects for Odor-Source Exploration
Ryo Koshizuka and Kan Shoji
Department of Mechanical Engineering, Nagaoka University of Technology
- 15:15-15:30 Gait Cycle Detection and Swing Phase Prediction of Paralyzed Leg using Marker-less Tracking for Neurostimulation Control
Masaru Takeuchi¹, Kako Okada¹, Sota Saeki², Hitoshi Hirata³ and Yasuhisa Hasegawa¹
¹*Department of Micro-Nano Mechanical Science and Engineering, Nagoya University*
²*Department of Human Enhancement and Hand Surgery, Nagoya University*
³*Department of Personalized Medical Technology, Nagoya University*
- 15:30-15:45 Engineering Perfusable Vascular Architectures for Improved Tissue Viability
Eunhye Kim, Masaru Takeuchi, Yasuhisa Hasegawa, and Toshio Fukuda
Department of Micro-Nano Mechanical Science and Engineering, Nagoya University

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- 15:45-16:00 Personalized AI Guidance for Micromanipulation via Expert–Novice Matching Based on Transformer-Enabled Deep Individual Manipulation Signature Analysis
Ryoya Mori¹, Taisuke Kobayashi^{2,3}, Tatsuya Kobayashi^{4,5}, and Tadayoshi Aoyama^{1,6}
¹*Graduate School of Engineering, Nagoya Univ.*
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⁴*Dept. of Regulatory Science, Fujita Health Univ.*
⁵*Graduate School of Medicine, Chiba Univ.*
⁶*Center for One Medicine Innovative Translational Research, Gifu Univ.*

16:15-16:30 **Break**

Session MoP1-3: (Organized Session 2-2)

Cutting-edge sensors and actuators utilizing micro-nano science

Room 1

Chairpersons: *Hirota Sugiura, The University of Tokyo*
Taisuke Masuda, The University of Tokyo
Kazuyoshi Tsuchiya, Tokai University

- 16:30-16:45 A Dialysis Membrane Integrated Microphysiological System to Improve the Predictive Accuracy of Antibody–Drug Conjugate Efficacy
Hajime Miyashita¹, Kenta Shinha² and Hiroshi Kimura^{1,2}
¹*Graduate School of Science and Technology, Tokai University*
²*Micro/Nano Technology Center, Tokai University*
- 16:45-17:00 On-Chip Pump-Based Multi-Organ Microphysiological Systems with Three Culture Chambers for Drug Evaluation Studies
Satoshi Ishizaki¹, Kenta Shinha² and Hiroshi Kimura^{1,2}
¹*Department of Mechanical Engineering, Tokai University*
²*Micro/Nano Technology Center, Tokai University*

Session MoP2-3: (Organized Session 8-2)

Micro/Nano Functional Devices for in vivo/vitro applications

Room 2

Chairpersons: *Masaru Takeuchi, Nagoya University*
Tadayoshi Aoyama, Nagoya University

- 16:30-16:45 Microservices-Inspired Distributed Control Architecture for Modular Closed-Loop Mechanisms Driven by Multiple Micromanipulators
Haoran Yao, Hirota Sugiura, Fumihito Arai
Department of Mechanical Engineering, The University of Tokyo

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- 16:45-17:00 AI-based Assistive System for Oocyte Rotation with Task Switching
Considering Ambiguity in Polar Body Recognition
*Hayato Hagiwara¹, Ryoya Mori¹, Yuichiro Hayashi², Kensaku Mori²,
Kazuki Hano³, Masaki Takasu³, and Tadayoshi Aoyama^{1,3}*
¹*Graduate School of Engineering, Nagoya Univ.*
²*Graduate School of Informatics, Nagoya Univ.*
³*Institute for Advanced Study, Gifu Univ.*
- 17:00-17:15 Haptic Training System for Micromanipulation Based on Expert–Novice
Operation Similarity
Shuma Wakahara¹, Kenta Yokoe² and Tadayoshi Aoyama^{2,3}
¹*Dept. of Micro-Nano Mechanical Science and Engineering, Nagoya Univ.*
²*Dept. of Mechanical Systems Engineering, Nagoya Univ.*
³*Center for One Medicine Innovative Translational Research, Gifu Univ.*
- 17:15-17:45 **Break**
- 17:45-19:45 **Reception Party**

Advanced Program

November 25 (Tue.)

Plenary Talks

Room 1

Chairperson: *Hisataka Maruyama, Nagoya University*

9:30-10:15 Plenary Talk 3
Toward Social Integration of Robotics that Supports Human Challenges
through Co-Creation
Deputy Director Kenji Kato
Assistive Robotics Center, National Center for Geriatrics and Gerontology
(NCGG), Japan

10:15-10:30 **Break**

Session TuA1-1: (Organized Session 4)

Functional Interfaces and Hydro-Electrochemical Mechatronics

Room 1

Chairpersons: *Yoko Yamanishi, Kyushu University*
Shingo Maeda, Institute of Science Tokyo

10:30-11:00 Keynote Talk 7
MEMS Probes to Visualize Hydrogel Friction Interface at the Nanoscale
Tadashi Ishida
Laboratory for Future Interdisciplinary Research of Science and
Technology, Institute of Integrated Research, Institute of Science Tokyo

11:00-11:15 Evaluation of tensile strength properties of micro-sized polylactic acid test
piece due to degradability using digital image correlation
Ryoutaroh Horibe, Hikaru Asai and Akira Yamada
Department of Mechanical Engineering, Graduate School of Engineering,
Aichi Institute of Technology

11:15-11:30 Injection of genetic materials to suspension cells via electromechanical
poration
Nobutoshi Ota¹, Yibo Ma¹, Kei Tateishi¹, Shigeo S. Sugano², Yoko
Yamanishi¹
¹Kyusyu University
²National Institute of Advanced Industrial Science and Technology (AIST)

11:30-11:45 Controlling Reaction Dynamics in Belousov-Zhabotinsky Gels
Shunsuke Kanzawa¹, Yuhei Yamada², Naoki Hosoya³, Shingo Maeda^{1,2}
¹Department of Mechanical Engineering, Institute of Science Tokyo
²Research Center for Autonomous Systems Materialogy (ASMat), Institute
of Science Tokyo
³Faculty of Engineering, Shibaura Institute of Technology

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11:45-12:00 Design for stabilization of EHD pump considering external load
Yuhei Yamada
Research Center for Autonomous Systems Materialogy, Institute of Integrated Research, Institute of Science Tokyo

Session TuA2-1: (Organized Session 7)

Machine-fluid interactions in microscale

Room 2

Chairpersons: *Takeshi Hayakawa, Chuo University*

10:30-10:45 Local Osmotic Concentration Control in Open Microfluidic Environment Using Monolithic Coaxial Double Pipette
Yuta Hirano¹, Satoshi Amaya¹, Hirotaka Sugiura¹, Yuko Ukai², Yoshikatsu Sato², Fumihito Arai¹

¹*Department of Mechanical Engineering, The University of Tokyo*

²*Institute of Transformative Bio-Molecules, Nagoya University*

10:45-11:00 Rotational angle control system for single cells based on vibration-induced flow
Hatsuhiko Ishiguro and Takeshi Hayakawa
Department of Precision Engineering, Chuo University

11:00-11:15 Evaluation of acoustic lens integrated with a microfluidic device toward high-power and high-throughput cell manipulation
Sota Kurihara, Takeshi Hayakawa
Department of Precision engineering, Chuo University

11:15-11:30 Fluorescence-Activated Multi-Sorting for Large Bio-Particles Utilizing Microvortex Generation
Makoto Saito¹, Nariaki Kiyama¹, Yoko Yamanishi¹, Niko Kimura², Shigeo S. Sugano³ and Shinya Sakuma¹

¹*Department of Mechanical Engineering, Kyushu University.*

²*Department of Mechanical Systems Engineering, Tokyo University of Agriculture and Technology*

³*National Institute of Advanced Industrial Science and Technology*

11:30-12:00 Keynote Talk 8
Water-Induced Deformation of Elastic Nanofilms on Soft Substrates
So Nagashima
Department of Mechanical Systems Engineering, Nagoya University

12:00-13:30 **Lunch**

Advanced Program

Session TuP1-1: (Organized Session 9)

New materials and processing for micro/nano devices

Room 1

Chairpersons: *Junpei Sakurai, Sojo University*

Mizue Mizoshiri, Nagaoka University of Technology

Ai Ueno, Nagoya University

- 13:30-13:45 Fabrication of Thin Heat Transfer Devices Using MEMS
Madoka Kurosaki¹, Masaaki Hashimoto², Ryobu Nomura¹, Abdulkareem Alasli¹, Hosei Nagano¹, and Ai Ueno¹
¹*Dept. of Mechanical System Eng., Nagoya Univ.*
²*Dept. of System Design Eng., Keio Univ.*
- 13:45-14:00 Fabrication and characterization of three-electrode-integrated D-glucose sensors using femtosecond laser direct writing
Yudai Uchiyama¹, Shoto Mashiko¹, Vu Hoai Nam¹, Ilya Tumkin², Andreas Ostendorf², Mizue Mizoshiri¹
¹*Department of Mechanical engineering, Nagaoka Univ. of Tech.*
²*Ruhr University Bochum, Applied Laser Technologies*
- 14:00-14:15 Classification of femtosecond laser-induced carbonization on polyimide films using machine learning
Koshiro Nakayama¹, Shoto Mashiko¹, Ilya I. Tumkin², Jonas B. Ullrich², Malte Becher², Philipp Maack², Andreas Ostendorf², Mizue Mizoshiri¹
¹*Department of Mechanical Engineering, Nagaoka University of Technology*
²*Ruhr University Bochum, Applied Laser Technologies*
- 14:15-14:30 Grain Growth in Cu Thin Films Induced by High-Frequency Current under Quasi-Room-Temperature Conditions
Yi Zhang¹, Shaojie Gu², Yasuhiro Kimura³, Yang Ju⁴ and Yuhki Toku⁵
¹*Department of Micro/Nano Mechanical Science and Engineering, Graduate School of Engineering, Nagoya University*
²*Magnesium Research Center, Kumamoto University*
³*Department of Mechanical Engineering, Kyushu University*
⁴*State Key Laboratory of Fluid Power and Mechatronic Systems, School of Mechanical Engineering, Zhejiang University*
⁵*Kumamoto University Faculty of Advanced Science and Technology, Faculty of Advanced Science and Technology, Kumamoto University*
- 14:30-14:45 Comparative Study of Annealing Effects in NiTi SMA Wires Using Pulsed Electric Current and Conventional Heating
Bochen Li¹, Shaojie Gu², Yasuhiro Kimura³, Yang Ju⁴, Yuhki Toku⁵
¹*Department of Micro-Nano Mechanical Science and Engineering, Graduate School of Engineering, Nagoya University*
²*Magnesium Research Center, Kumamoto University*
³*Department of Mechanical Engineering, Kyushu University,*
⁴*State Key Laboratory of Fluid Power and Mechatronic Systems, School of Mechanical Engineering, Zhejiang University*

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Session TuP2-1: (Organized Session 10)

Micro/nano devices and platforms for soft matter

Room 2

Chairperson: Masaru Kojima, Osaka University

13:30-13:45 Comparison and evaluation of various end effectors used to measure the stiffness of soft micro-objects
Masaru Kojima, Masahiro Kawakami
Graduate School of Engineering Science, The University of Osaka

13:45-14:00 Investigation of Conditions of Pipette Tip Shape for Cell Nucleus Injection
Tomohiro Umetani¹, Atsumi Ohara¹, Masaru Kojima², Mitsuhiro Horade³
and Tatsuo Arai⁴
¹Department of Intelligence and Informatics, Konan University
²Graduate School of Engineering Science, Osaka University
³Faculty of Science and Engineering, Setsunan University
⁴Center for Neuroscience and Biomedical Engineering, The University of Electro-Communications

14:00-14:15 Development of an Agitation Device for the Automation of Tapping and Scrubbing
Kaoru Uesugi
Department of Robotics, College of Science and Engineering, Ritsumeikan University

14:15-14:45 Keynote Talk 9
Stimuli-Responsive Microcapsules with Liquid Crystalline Shells
Yoshiaki Uchida
Graduate School of Engineering Science, The University of Osaka, Japan

14:45-15:00 **Break**

Session TuP1-2: (Spotlight Session 5):

Physical AI

Room 1

Chairperson: Kenichi Ohara, Meijo University

15:00-15:30 Autonomous Assistance with AI-Robot AIREC towards Inclusive and Person-Centered Care
Tamon Miyake
Waseda University

15:30-16:00 From Lab to Field: Deploying Skill-Specialized Physical AI at the Osaka-Kansai Expo
Hitoshi Ito
Hitachi Co., Ltd.

Advanced Program

Session TuP2-1: (Spotlight Session 6)

Next-Generation Microphysiological Systems for Human Science

Room 2

Chairperson: *Shinya Sakuma, Kyushu University*

15:00-15:30 Microengineered Contractile Skeletal Muscle Tissues for Functional Evaluation of Bioactive Compounds

Kazunori Shimizu

Nagoya University

15:30-16:00 Bioiontronic devices for interactive communication with biology

Takeo Miyake

Waseda University

16:00-16:30 ***Award Ceremony and Closing***