Advanced Program

December 1 (Tue.)

Opening Remarks ***Room 1***

Chairperson: *Fumihito Arai, The University of Tokyo*

9:00-9:15 *Prof. Toshio Fukuda, Nagoya University (Honorary Chair)*
Prof. Fumihito Arai, The University of Tokyo (General Chair)

Plenary Talk ***Room 1***

Chairperson: *Hirotaka Sugiura, The University of Tokyo*

9:15-10:00 Plenary Talk 1
Almost Alive: Soft, Musculoskeletal, and Biohybrid Robots ·····PL1
Prof. Robert Katzschmann
ETH Zurich, Switzerland

10:00-10:15 Break

Session TuA1-1: (Organized Session 4)
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

10:15-10:30 Microfluidic Live-Cell Analysis via Meniscus-Guided Loading and Diffusive Stimulation·····2641
R. Kurogi[1], M. Saito[1], N. Kiyama[1], S. Yoshimoto[2], K. Dodo[2], S. Yotsumoto[3], T. Hayakawa[4], T. Kamatani[5], N. Kimura[6], Y. Shirasaki[7], S. S. Sugano[8], Y. Yamanishi[1], and S. Sakuma[1]
[1] Kyushu University, Japan
[2] RIKEN, Japan
[3] Tokyo University of Pharmacy and Life Sciences, Japan
[4] Chuo University, Japan
[5] Japanese Foundation for Cancer Research, Japan
[6] Tokyo University of Agriculture and Technology, Japan
[7] The University of Tokyo, Japan
[8] National Institute of Advanced Industrial Science and Technology, Japan

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10:30-10:45 Strategic LNA Modification of DNA-AuNP Nanomachines for Enhanced Intracellular microRNA Imaging ·····2639

Maasa YOKOMORI[1],[2], Keitaro YOSHIMOTO[2], Takeshi HAYAKAWA[1], Yoko YAMANISHI[3]

[1] School of Science and Engineering, Chuo University, Japan

[2] Department of Life Sciences, Graduate School of Arts and Sciences, The University of Tokyo, Japan

[3] Department of Mechanical Engineering, Faculty of Engineering, Kyushu University, Japan

10:45-11:00 Selection of High-Efficiency Antibody-Secreting Cells Based on Real-Time Imaging·····2642

Junnan Liu[1], Nobutake Suzuki[2], Zhuohao Yang[2], Nariaki Kiyama[5], Mai Yamagishi[3], Satoshi Yotsumoto[4], Yoko Yamanishi[5], Shinya Sakuma[5], Yoshitaka Shirasaki[1],[2]

[1] Department of Advanced Interdisciplinary Studies, The University of Tokyo

[2] Research Center for Advanced Science and Technology, The University of Tokyo

[3] Live Cell Diagnosis Ltd

[4] School of Life Science, Tokyo University of Pharmacy and Life Sciences

[5] Department of Mechanical Engineering, Kyushu University

11:00-11:15 Migration of Lymphocytes Across Physiologically Relevant Extracellular Matrix Stiffness in Three-dimensional Collagen Gels ·····2638

Takumi ISHIGURO[1], Satoshi YOTSUMOTO[2], Yoshitaka SHIRASAKI[3], Takeshi HAYAKAWA[1]

[1] Department of Precision Engineering, Chuo University, Japan

[2] School of Life Sciences, Tokyo University of Pharmacy and Life Sciences, Japan

[3] Research Center for Advanced Science and Technology, The University of Tokyo, Japan

11:15-11:30 Capped Nanovials: Self-Assembling Suspendable Microcompartments for Probing Cell-cell and Colonial Functional Biology ·····2643

Yuta Nakagawa[1],[2], Michael Mellody[2], Alyssa Arnheim[2], Lily Shang[2], Dino Di Carlo[1],[2]

[1] The University of Tokyo, EXPERT-GRI Office and Graduate School of Science, Japan

[2] University of California Los Angeles, Samueli School of Engineering, U.S.A.

11:30-11:45 Dynamic Tuning of Hydraulic Resistance via Bi-directional High-Speed Flow Oscillation in Microchannels·····2640

Makoto Saito, Yoko Yamanishi, and Shinya Sakuma

Department of Mechanical Engineering, Kyushu University, Japan

Advanced Program

Session TuA2-1: (Organized Session 12)
Cognitive Robotics ***Room 2***
Chairperson: *Naoyuki Kubota, Tokyo Metropolitan University*

10:15-10:45 Keynote Talk 1
Topological Intelligence for Adaptive Legged Robots: From Sensorimotor Control to Cognitive Planning ····· KE1
Azhar Aulia Saputra
Kobe University, Japan

10:45-11:00 Topological Intelligence for Dual-Gantry Quad-Arm Ceiling Robot System in Trailer Living Lab ····· 2614
Raditya Artha Rochmanto, Muhammad Ramadhan Hadi Setyawan, Hafizh Irfansyah Putra, Naoyuki Takesue, and Naoyuki Kubota
Department of Mechanical Systems Engineering, Tokyo Metropolitan University

11:00-11:15 A Comparative Evaluation of Motion Representations and Facial Preprocessing Strategies for PTSR-Based Micro-Expression Recognition ····· 2682
Afandi Nur Aziz Thohari, Yogiek Indra Kurniawan, Aprinaldi Jasa Mantau, Vektor Dewanto, and Wisnu Jatmiko
Faculty of Computer Science, University of Indonesia, Beji, Depok, Indonesia

11:15-11:30 Comparison of Edge-Only and Cascade Edge-Fog Inference in a MEMS-Based Acoustic Sensor Network over a LoRa Mesh for Chainsaw Sound Detection ····· 2684
Zaidan Naufal Ilmi[1], Yogiek Indra Kurniawan[1], Aprinaldi Jasa Mantau[1], and Wisnu Jatmiko[1]
[1] Faculty of Computer Science, Universitas Indonesia, Indonesia

11:30-11:45 Evaluation of Indication Methods for the Amount of Kinesthetic Illusion Induced by Mechanical Vibration Stimulation ····· 2613
Sayaka Morinaga[1], Satoshi Nishikawa[2], Kazuo Kiguchi[2]
[1] Department of Mechanical Engineering, Kyushu University
[2] Kyushu University

11:45-12:00 Break

Keynote Talk ***Room 1***
Chairperson: TBD

12:00-12:30 Keynote Talk 2
Soft and Deployable Magnetic Microrobots ····· KE2
Minsoo Kim
DGIST, Republic of Korea

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Keynote Talk ***Room 2***

Chairperson: TBD

12:00-12:30 Keynote Talk

Novel Mechanism Design toward Highly Functional Robotic Hands with Fewer Actuators ····· KE3

Toshihiro Nishimura

Kanazawa University, Japan

12:30-13:30 Lunch

Session TuP: Poster Session

13:30-14:30

TuP-01 Distinct Spatiotemporal EEG Correlates of Sensory Input and Prediction Error Effects in Pain Perception ·····2672

Rei Taomote a, Ryota Ishikawa b, Jun Izawa c

a Intelligent and Mechanical Interaction Systems, University of Tsukuba, Japan

b Ph. D. Program in Humanics, University of Tsukuba, Japan

c Institute of Systems and Information Engineering, University of Tsukuba, Japan

TuP-02 A Study on Dual Reaction Wheel System for Ultra-Small Satellite on Orbit·····2673

Kaito Kushida[1], Masahiro Tokumitsu[2], Hitoshi Tsukamoto[3], Ryota Ishizuka[3], Nobuto Hirakoso[2]

[1] Production System Engineering, National Institute of Technology, Gunma College

[2] Department of Mechanical Engineering, National Institute of Technology, Gunma College

[3] MITSUBA Corporation

TuP-03 Driver's perception of driving behavior with a focus on deceleration in electric wheelchair operation·····2674

Hayato KITAGAWA[1], Junichi MEGURO[1]

[1] Meijo University, Japan

TuP-04 The Sense of Body Mismatch in VR Experiences in the Supine Position ~Focusing on Differences in VR Environments~·····2675

Yudai Yamoto[1], Noritaka Yokoi[1], Yu Toyama[1], Junichi Meguro[1]

[1] Meijo University, Japan

TuP-05 Development and Functional Testing of a VR-Based Color-Stimulation System for Heart Rate Variability Monitoring ····· 2676
Shinnosuke Tajiri[1], Takayuki Hoshino[2], Daigo Natsuhara[2], Hisataka Maruyama[2,3]
[1] Department of Mechanical Systems Engineering, Nagoya University
[2] Department of Micro-Nano Mechanical Science and Engineering, Nagoya University
[3] National Center for Geriatrics and Gerontology

TuP-06 Biomimetic Actuators Using Anisotropic Hydrogels for Organ Model Applications ····· 2677
Hiroto Okui, Hisataka Maruyama
Department of Micro-Nano Mechanical Science and Engineering, Nagoya University, Japan

TuP-07 Development of a Squat Training Guidance System Integrating Physiological Internal Load and Visualization of Form State ····· 2678
Kenshin Muto[1,2], Eiko Takano[2], Daigo Natsuhara[1], Takayuki Hoshino[1] and Hisataka Maruyama[1,2]
[1] Department of Mechanical Systems Engineering, Nagoya University, Japan
[2] National Center for Geriatrics and Gerontology, Japan

TuP-08 Force-Feedback Interface for Assisting in the Traction of Tumors Using an Endoscopic Capsule Robot ····· 2679
Tomoya Nishi, Kenji Takeda, Bangzhang Ma, Yuchang Liu, Bolan Zhang, Fumihito Arai
Graduate School of Engineering, The University of Tokyo, Japan

TuP-09 Mode Design for a Surrogate Model of the Quartz Crystal Resonator ·2680
Seigo Uno, Satoshi Amaya, Fumihito Arai, Hirotaka Sugiura
Department of Mechanical Engineering, Graduate School of Engineering, The University of Tokyo

Spotlight Session 1
Frontiers in Soft Assistive Robotics ***Room 1***
Chairperson: *Hisataka Maruyama, Nagoya University*

14:30-15:00 Keynote Talk 4
Comprehensive Robotics: Theory and Application of Rigid-Soft Hybrid Robot Motion Computation ····· KE4
Ko Yamamoto
University of Tsukuba, Japan

15:00-15:30 Keynote Talk 5
Pneumatically Driven Sports Training Assistance Robots ····· KE5
Satoshi Nishikawa
Kyushu University, Japan

Spotlight Session 2
Frontiers in Advanced Flexible Devices ***Room 2***
Chairperson: TBD

14:30-15:00 Keynote Talk 6
Soft optoelectronic materials for bioadaptive interfaces ····· KE6
Naoji Matsuhisa
The University of Tokyo, Japan

15:00-15:30 Keynote Talk 7
Engineering Flexible Tactile Sensors for Soft Robotic Hands from Organic Materials to Device Integration ····· KE7
Tomohito Sekine
Yamagata University, Japan

15:30-15:45 Break

Session TuP1-1: (Organized Session 3-1)
Core Technologies and Applications for Intelligent Robot Systems ***Room 1***
Chairpersons: *Kenichi Ohara, Meijo University*
Takahiro Ikeda, Gifu University

15:45-16:00 Autonomous Bimanual Demonstration Generation via Vision-Language Teleoperation and Policy Distillation ····· 2624
Jacinto Colan[1], Ana Davila[2] and Yasuhisa Hasegawa[2]
[1] Dept. of Micro-Nano Mechanical Science and Engineering, Nagoya University, Nagoya, Aichi, Japan
[2] Institutes of Innovation for Future Society, Nagoya University, Nagoya, Aichi, Japan

16:00-16:15 Whole-Body Teleoperation with Active Viewpoint and Dexterous Hands for Humanoid Robots ····· 2631
Yanzhou Jin, Yaonan Zhu, Yusuke Iwasawa, and Yutaka Matsuo
Graduate School of Engineering, The University of Tokyo, Japan

16:15-16:30 Task-Oriented Optimization of Dexterous-Hand Mounting Configurations for a Dual-Arm Robotic System ····· 2634
*Fei Suo, Yanzhou Jin, Zeyu Ping, Yutaka Matsuo, Yaonan Zhu**
Graduate School of Engineering, The University of Tokyo, Tokyo , Japan

16:30-16:45 Next-View Selection Using Pseudo Pose Estimation Confidence of Predicted Images for Simple-Shaped Object Pose Estimation ····· 2627
Madoka Takaoka[1], Kano Muragishi[1] and Tsuyoshi Tasaki[1]
[1] Meijo University, Nagoya, Japan

16:45-17:00 A Symbolic Kinematic Representation for Modular Closed-Loop Mechanisms ····· 2637
Haoran Yao, Hirotaka Sugiura, Fumihito Arai
Department of Mechanical Engineering, The University of Tokyo, Japan

17:00-17:15 Model Identification of Hysteresis and Dynamic Characteristics for a Soft Actuator Under Varying Endoscope-Insertion Conditions for Surgical Applications ····· 2623
Yuna Tanno, Yuto Tanizaki, Wenwei Yu
Graduate School of Science and Engineering, Chiba University, Japan

17:15-17:30 A Fundamental Study on the Effect of Winding on an Axially Extension-Constrained Small Tube Mechanism for a Bendable Laparoscopic Device with a Pneumatic Balloon ····· 2690
Kishin Mikami, Shinri Ikeda, Shota Miyake, Kazuki Abe, Masahiro Watanabe, Kenjiro TADAKUMA
Osaka University

Session TuP2-1: (Organized Session 5)
Emerging Microfluidic Technologies for Next-Generation Micro-NanoMechatronic Systems ***Room 2***
Chairperson: *Takeshi Hayakawa, Chuo University*

15:45-16:00 Rapid Fabrication Method for Multi-layered Cell Spheroids Using Vibration-induced Vortex Flow ····· 2645
Toshihiro TANIHATA, Takeshi HAYAKAWA
Department of Precision Engineering, Chuo University, Japan

16:00-16:15 An Acoustic-Lens-Focused Ultrasound Microfluidic System with Image-Based Tracking toward High-Throughput Mechanical Characterization of Large Bioparticles ····· 2644
Kazusa SUZUKI[1], Hiroki WADA[1], Nariaki KIYAMA[2], Shinya SAKUMA[2], Takeshi HAYAKAWA[1]
[1] Department of Precision Engineering, Chuo University, Japan
[2] Department of Mechanical Engineering, Kyushu University, Japan

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16:15-16:30 Absorption based self-alignment method of Drosophila embryo using a locally patterned porous PDMS aperture ····· 2648
Nobuhiro Kaku[1], Hirotaka Sugiura[1], Satoshi Amaya[1], Kuniaki Saito[2], Fumihito Arai[1]
[1] Department of Mechanical Engineering, Graduate School of Engineering, The University of Tokyo
[2] National Institute of Genetics, Research Organization of Information and Systems

16:30-16:45 Sub-Kilohertz On-Chip Liquid Replacement Using Traveling Vortices for Rapid Cellular Stimulation ····· 2646
Kyogo Ichimiya, Makoto Saito, Yoko Yamanishi and Shinya Sakuma
Department of Mechanical Engineering, Kyushu University

16:45-17:00 Non-Contact Mechano-Indexing Based on Ultrasound Reflections for High-Throughput On-Chip Cell Sorting ····· 2647
Nariaki Kiyama, Makoto Saito, Yoko Yamanishi, and Shinya Sakuma
Faculty of Mechanical engineering, Kyushu University, Japan

17:00-17:30 Keynote Talk 8
TBD ····· KE8
Wael Othman
Biomedical Engineering and Biotechnology, Khalifa University

17:30-17:45 Break

17:45-19:00 Beer Party

Advanced Program

December 2 (Wed.)

Plenary Talk ***Room 1***

Chairperson: TBD

9:15-10:00 Plenary Talk 2

Fabrication of practical tactile sensors for humanoids ····· PL2

Prof. Unyong Jeong

Pohang University of Science and Technology, Korea

10:00-10:15 Break

Session WeA1-1: (Organized Session 7)

In-body Cybernetic Avatars ***Room 1***

Chairperson: *Fumihito Arai, The University of Tokyo*

10:15-10:30 Development of Ingestible Multimodal Sensor for Simultaneous Measurement of Temperature, pH, Pressure, and Attitude ····· 2653

Shinya Yoshida, Hiroshi Miyaguchi, Ryotaro Isshiki, Souma Nakahara and Seijiro Tezuka

Shibaura Institute of Technology

10:30-10:45 Three-Dimensional In-Body CA Localization Based on Sim-to-Real Magnetic Field Transfer Learning ····· 2659

Yuki Matsuhiro[1], Yujiro Kushiyama[2], Takumi Kobayashi[2], Daisuke Anzai[2]

[1] Graduate School of Engineering, Nagoya Institute of Technology, Japan

[2] Graduate School of Informatics, Osaka Metropolitan University, Japan

10:45-11:00 In-body Capsule Localization and Visualization System Using a Personalized Human Body Model ····· 2656

Ruka Gokyu[1], Juzheng Zhang[1], Kenji Takeda[1], Takumi Kobayashi[2], Bolan Zhang[1], Daisuke Anzai[2], and Fumihito Arai[1]

[1] Department of Mechanical Engineering, Graduate School of Engineering, the University of Tokyo, Japan

[2] Graduate School of Informatics, Osaka Metropolitan University, Japan

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11:00-11:15 Ring-Shaped Scaffold Placed at Local Intestinal Site for Long-Term Sampling and Drug-Delivering ·····2655

Yuto Sakaguchi[1], Noriko Tsuruoka[1], QiFeng Wang[2], Yusuke Mizukawa[1], Hisataka Maruyama[3], Mitsuhiro Fujishiro[4], Yosuke Tsuji[4], Fumihito Arai[5], Daisuke Anzai[6], Takumi Kobayashi[6], Yujiro Kushiyama[6], Yuto Kishimoto[7] and Yoichi Haga[1,2]

[1] Graduate School of Engineering, Tohoku University, Japan
[2] Graduate School of Biomedical Engineering, Tohoku University, Japan
[3] Graduate School of Engineering, Nagoya University, Japan
[4] Graduate School of Medicine, The University of Tokyo, Japan
[5] Graduate School of Engineering, The University of Tokyo, Japan
[6] Graduate School of Informatics, Osaka Metropolitan University, Japan
[7] Graduate School of Engineering, Nagoya Institute of Technology, Japan

11:15-11:30 Analysis of Transverse Magnetic Torque in a Screw-Driven Sampling Mechanism for an Intestinal Capsule ·····2660

Yuguo Dai[1], Huaiyi Zhang[2], Fumihito Arai[1,2]

[1] Department of Bioengineering, School of Engineering, The University of Tokyo, Japan
[2] Department of Mechanical Engineering, School of Engineering, The University of Tokyo, Japan

11:30-11:45 Image-Based Traction Force Estimation Using a Soft Magnetic Conical Spiral Tool in Endoscopic Submucosal Dissection ·····2654

Rin Shibano, Bolan Zhang, Kenji Takeda, Toshiro Yamanaka, and Fumihito Arai

Department of Mechanical Engineering, The University of Tokyo, Japan

11:45-12:00 Multi-Cue Automatic Angle-Knob Control Fusing Monocular Depth and Appearance Priors for Colonoscope Insertion Assistance ·····2657

Taehyeong Kim[1], Kenta Yokoe[2], and Tadayoshi Aoyama[2,3]

[1] Dept. of Micro-Nano Mechanical Science and Engineering, Nagoya Univ., Nagoya, Aichi , Japan
[2] Dept. of Mechanical Systems Engineering, Nagoya Univ., Nagoya, Aichi, Japan
[3] One Medicine Transdisciplinary Life science-Medicine co-creation Platform, Nagoya Univ., Nagoya, Aichi , Japan

12:00-12:15 Post-Printing Control of Volume and Young's Modulus of 3D-Printed Gels via Glycerin–Water Solvent Exchange ·····2658

Takeshi Yura[1], Daigo Natsuhara[1], Takayuki Hoshino[1], Hisataka Maruyama[1]

[1] Department of Micro-Nano Mechanical Science and Engineering, Nagoya University

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Session WeA2-1: (Organized Session 9)
Micro/nano devices and platforms for soft matter ***Room 2***

Chairperson: *Masaru Kojima. Meijo University*

10:15-10:30 Fiberization Method and Mechanical Evaluation of Non-Contact Actuator Materials ····· 2665
Joichiro Sonoda[1], Gaoyue Guo[1], Jiajie Liu[1], Seiji Omata[2], and Yasuyuki Morita[2]
[1] Graduate School of Science and Technology, Kumamoto University
[2] Faculty of Advanced Science and Technology, Kumamoto University

10:30-10:45 Light-Driven On-Chip Gel Valves Fabricated by Direct Laser Writing for Single-Cell Chemotaxis Assay ····· 2666
Iori Urabe[1], Hiroki Wada[1], Yoshiyuki Yokoyama[2], Takeshi Hayakawa[1]
[1] Department of Precision Engineering, Chuo University, Japan
[2] Toyama Industrial Technology Research and Development Center, Japan

10:45-11:00 Automated Tool Control System for Cell Nuclear Injection Using Image Processing ····· 2667
Taro Yoshikawa[1], Tomohiro Umetani[1], Masaru Kojima[2], Mitsuhiro Horade[3] and Tatsuo Arai[4]
[1] Department of Intelligence and Informatics, Konan University, Japan
[2] Faculty of Science and Technology, Meijo University, Japan
[3] Faculty of Science and Engineering, Setsunan University, Japan
[4] Center for Neuroscience and Biomedical Engineering, The University of Electro-Communications, Japan

11:00-11:15 Measurement and Manipulation of Microorganisms Using Locally Deployable Microstructures ····· 2668
Yuki Noguchi, Masaru Kojima
Faculty of Science and Technology, Meijo University, Japan

11:15-11:30 Development of a Microfluidic Device Capable of Simultaneously Analyzing Cell Flow Velocity and Nuclear Morphology for Cell Characterization ····· 2669
Nozomu Hirai, Masaru Kojima
Faculty of Science and Technology, Meijo University

11:30-11:45 Pipe-Shaped Skeletal Muscle Actuators for Bidirectional Actuation of a Biohybrid Gripper ····· 2670
Yu Dingliang and Fumihito Arai
Department of Mechanical Engineering, Graduate School of Engineering, The University of Tokyo, Japan

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11:45-12:15 Keynote Talk 9
Experimental and Numerical Approaches for Estimating Mechanical Loads on Cells during Cell Culture Operations ····· KE9
Ikki Horiguchi
Akita University, Japan

12:15-13:15 Lunch

Keynote Talk ***Room 1***
Chairperson: TBD

13:15-13:45 Keynote Talk 10
Self-Heated Oxide Nanosensors: Toward Robust and Energy-Efficient Chemical Sensor Arrays for Odor Analysis ····· KE10
Tsunaki Takahashi
The University of Tokyo, Japan

Keynote Talk ***Room 2***
Chairperson: TBD

13:15-13:45 Keynote Talk 11
How Can We Teach Surgical AI ····· KE11
Maina Sogane
The University of Tokyo, Japan

13:45-14:00 Break

Session WeP1-1: (Organized Session 11)
New materials and processing for micro/nano devices ***Room 1***
Chairpersons: *Junpei Sakurai, Sojo University*
Mizue Mizoshiri, Tohoku University of Technology
Ai Ueno, Nagoya University

14:00-14:15 Size effects of Cu nanospheres on femtosecond laser pulse-induced local heating in Cu2O/Cu mixed nanospheres ····· 2611
Manato Sato[1], Shuki Sunakawa[1], Philipp Gabriel[2], Max Stutzenberger[2], Anna Rosa Ziefuss[2], Stephan Barcikowski[2], Mizue Mizoshiri[3]
[1] Department of Mechanical Engineering, Nagaoka University of Technology, Japan
[2] University of Duisburg-Essen, Germany
[3] Tohoku University, Japan

14:15-14:30 Classification of polyimide carbonization irradiated by green femtosecond laser pulses using machine learning ····· 2609
Shoto Mashiko[1], Koshiro Nakayama[1], Mizue Mizoshiri[2]
[1] Department of Mechanical Engineering, Nagaoka University of Technology, Japan
[2] Tohoku University, Japan

14:30-14:45 Design and MEMS Fabrication of a 30 W-Class Thin Silicon Loop Heat Pipe for 3D-IC Thermal Management ····· 2612
Soichiro SUZUKI[1], Masaaki HASHIMOTO[2], Noriyuki WATANABE[1], Makoto KAMATA[1], Jiang DIANPING[2], Munehiro TADA[2], Hosei NAGANO[1], and Ai UENO[1]
[1] Dept. of Mechanical System Eng., Nagoya Univ., Japan
[2] Dept. of System Design Eng., Keio Univ., Japan

14:45-15:00 Fabrication of Double-Tiered Nanopillar Structures and Their Unique Optical Properties for the use to improve the efficiency of Dye-Sensitized Solar Cells ····· 2610
Ryutaro KIMURA[1], Chiemi OKA[1], Seiichi HATA[1], and Junpei SAKURAI[1,2]
[1] Graduate Department of Micro-Nano Mechanical Science and Engineering, Nagoya University, Japan
[2] Department of Mechanical Engineering, Sojo University, Japan

Session WeP2-1: (Organized Session 3-2)
Core Technologies and Applications for Intelligent Robot Systems ***Room 2***

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

14:00-14:15 Object Distance Estimation for Autonomous Driving via Correlation between Color Images and Distance Images Created by a 3D Map ···· 2626
Wataru Ikai, Tsuyoshi Tasaki
Graduate School of Science and Technology, Meijo University, Japan

14:15-14:30 Improving Monocular Distance Estimation Accuracy by Removing Small Dynamic Object Regions from 3D Map ····· 2632
Tomoki Hara and Tsuyoshi Tasaki
Meijo University, Nagoya, Japan

14:30-14:45 Improving Monocular Distance Estimation with 3D Map Point Cloud Features ····· 2636
Ryo Imaeda and Tsuyoshi Tasaki
Meijo University, Nagoya, Japan

14:45-15:00 Application of AI-Based Depth Estimation to Artifact Suppression in Real-Time Intermediate View Synthesis ····· 2688
Tomonori Sawa[1], Sho Hatano and Yasuhisa Hasegawa[1]
[1] Department of Micro-Nano Mechanical Science and Engineering, Nagoya University

15:00-15:15 Break

Session WeP1-2: (Organized Session 8)
Micro and nanoscale technologies for sensors and actuators ***Room 1***
Chairpersons: *Hirotaka Sugiura, The University of Tokyo*
Kazuyoshi Tsuchiya, Tokai University

15:15-15:30 Acoustically Powered Micro-Clampbot for Single-Particle Transportation ····· 2661
Zhikun Miao[1], Tao Feng[1], An Ren[2], Hongshu Huang[1], Siyang Li[1], Yaoting Xue[1], Yifeng Shen[1], Xuhan Liu[1], Zhe Chen[1], Piaopiao Jin[1], Tuck-Whye Wong[1,3], Fanghao Zhou[1], Tiefeng Li[1,4], Xuxu Yang[1], Wei Yang[1]
[1] Center for X-Mechanics, Dept. of Engineering Mechanics, Zhejiang University, Hangzhou, China
[2] State Key Laboratory of Fluid Power and Mechatronic Systems, Zhejiang University, Hangzhou, China
[3] Dept. of Biomedical Engineering and Health Sciences, Universiti Teknologi Malaysia, Johor Bahru, Malaysia
[4] The First Affiliated Hospital, College of Medicine, Zhejiang University, Hangzhou, China

15:30-15:45 Force Characterisation of an Internally Operated Electromagnetic Actuator for an Ingestible Gut Microbiome Sampling Capsule ····· 2662
Angus Quigley[1], Adam Carlisle[1], David Thomas[2], Volker Nock[1] and Ebubekir Avci[1]
[1] Department of Electrical and Computer Engineering, University of Canterbury, New Zealand
[2] School of Agriculture and Environment, Massey University, New Zealand

15:45-16:00 Evaluation of Mini-Motor Actuation for Mucosal Microbiota Sampling Capsule Robots ····· 2687
Adam Carlisle[1], Angus Quigley[1], Muhammad Rehan[2], David Thomas[3], Volker Nock[1], Ciaran Moore[1] and Ebubekir Avci[1]
[1] Department of Electrical and Computer Engineering, University of Canterbury, New Zealand
[2] Department of Computer Science, Al Ghazali University, Pakistan
[3] School of Agriculture and Environment, Massey University, New Zealand

16:00-16:15 DG-ArUco: A Diffraction-Grating-Integrated Marker for Single-Oocyte Dispensing under a Microscope ····· 2663
Haruki Sato, Satoshi Amaya, Nobuhiro Kaku, Fumihito Arai, Hirotaka Sugiura
Department of Mechanical Engineering, Graduate School of Engineering, The University of Tokyo

16:15-16:30 Variable Stiffness Actuator with Improved Thermal Conductivity····· 2664
Shoi Ishimoto, Satoshi Amaya, Fumihito Arai, and Hirotaka Sugiura
Department of Mechanical Engineering, Graduate School of Engineering, The University of Tokyo, Japan

16:30-17:00 Keynote Talk 12
MEMS force sensor for animal biomechanics····· KE12
Hidetoshi Takahashi
Keio University, Japan

Session WeP2-2: (Organized Session 3-3)
Core Technologies and Applications for Intelligent Robot Systems ***Room 2***

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

15:15-15:30 Pilot Study on a Pointing Gesture Recognition Model Using Deep Learning Based on Depth Images ····· 2625
Souya SHIBAYAMA, Takahiro IKEDA, Satoshi UEKI, Hironao YAMADA
Dept. of Mechanical Engineering, Gifu Univ., Japan

15:30-15:45 Self-localization using a monocular camera and an importance map that considers moving objects ····· 2629
Keisuke Yamagata, Tsuyoshi Tasaki
Graduate School of Science and Technology, Meijo University, Japan

15:45-16:00 2D-3D Matching via Paired Learning of Color and Depth Images for Visual Localization in Autonomous Driving ····· 2633
Koki Oshima, Tsuyoshi Tasaki
Graduate School of Science and Technology, Meijo University, Japan

16:00-16:15 Ground Step Detection and Mapping Using SVM and a Spatiotemporal Filter for Autonomous Mobile Robots with 3D LiDAR ····· 2622
Tatsuki Imai, Tomohito Takubo, Tetsuo Tsujioka
Osaka Metropolitan University, Department of Electrical and Electronic Systems Engineering

16:15-16:30 Grapevine Localization for Autonomous Pruning Robots Using Point Cloud Segmentation and SLAM ·····2689
Shun Ueno[1], Tsubasa Kono[1], Yutaro Yamada[1], Yasuhisa Hasegawa[1] and Jacinto Colan[1]
[1] Department of Micro-Nano Mechanical Science and Engineering, Nagoya University, Japan

17:00-17:15 Break

Keynote Talk ***Room 1***
Chairperson: *Hisataka Maruyama, Nagoya University*

17:15-17:45 Keynote Talk 13
From Physiological Dynamics to Functional Biointerfaces: Engineering the Next Generation of Biomedical Systems ····· KE13
Shinjiro Umezu
Waseda University, Japan

17:45-19:45 Reception Party

Advanced Program

December 3 (Thu.)

Plenary Talk ***Room 1***

Chairperson: *Hisataka Maruyama, Nagoya University*

9:15-10:00 Plenary Talk 3
AI-driven approach for biomedical engineering and drug discovery ····PL3
Prof. Yoshihiro Yamanishi
Nagoya University, Japan

10:00-10:15 Break

Session ThA1-1: (Organized Session 6)
Functional Interfaces and Hydro-Electrochemical Mechatronics ***Room 1***

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

10:15-10:30 Relaxation time measurement of large DNA molecules using the difference in electrophoretic velocity in a nanochannel·····2650
Rui SHI, Shintaro ITOH, Kenji FUKUZAWA, Naoki AZUMA, Hedong ZHANG
Department of Micro-Nano Mechanical Science and Engineering, Nagoya University

10:30-10:45 A Microfluidic Platform for Direct Harvesting of Solid Precipitates from Microdroplets·····2649
*Masashi Kobayashi, Risa Fujita, Faisal bin Nasser Sarbaland, Masahiro Furuya, Daiki Tanaka**
Faculty of Science and Engineering, Waseda University

10:45-11:00 Investigation of Electrostatic Actuators Using Conductive FFF Materials with Contact-Mediated Charge Transfer ·····2651
Yuma Nagasawa, Takahiro Aruga, Hiroyuki Nabae
Department of Mechanical Engineering, School of Engineering, Institute of Science Tokyo

11:00-11:15 Dual-mode electrosurgical device for selective tissue perforation via electrically-induced bubbles and discharge ·····2652
Shigeaki Miura, Yuudai Aokusa, Mayu Nakahigashi, Nobutoshi Ota, Yoko Yamanishi
Kyushu University, Japan

11:15-11:45 Keynote Talk 14
Beyond Sensor Size: Inferring the Thermal Properties of Intracellular Organelles ····· KE14
Naoki Inomata
Tohoku University, Japan

Session ThA2-1: (Organized Session 10)
Micro/Nano Functional Devices for in vivo/vitro applications ***Room 2***
Chairpersons: *Masaru Takeuchi, Nagoya University*
Tadayoshi Aoyama, Nagoya University

10:15-10:45 Keynote Talk 15
Toward Seeing How Movement Is Produced: Development and Integration of Wearable Multimodal Sensors ····· KE15
Shotaro Okajima
Nagoya University, Japan

10:45-11:00 Construction of a skeletal muscle bio-actuator with electrode-integrated tendon structures ·····2607
Haruki Mizuno, Masaru Takeuchi and Yasuhisa Hasegawa
Dept. of Micro-Nano Mechanical Science and Engineering, Nagoya University, Japan

11:00-11:15 Fabrication of a Cell Membrane Perforator for Photochemical Cell Membrane Perforation Using Ultra-Precision Polishing Films·····2681
Naoya Harada[1], Sota Ochiai[1], Daisuke Furukawa[2], Takashi Kei Saito[2]
[1] Department of Integrated System Engineering, Akita Prefectural University Graduate School of Systems Science and Technology
[2] Department of Intelligence Mechatronics, Faculty of Systems Science and Technology, Akita Prefectural University

11:15-11:30 Cost Reduction Trial of Photochemical Cell Membrane Perforator, and Evaluation of the Perforation Performance ·····2683
Sota Ochiai[1], Naoya Harada[1], Daisuke Furukawa[2], Takashi Kei Saito[2]
[1] Department of Integrated System Engineering, Akita Prefectural University Graduate School of Systems Science and Technology
[2] Department of Intelligence Mechatronics, Faculty of Systems Science and Technology, Akita Prefectural University

11:30-11:45 Improvement of Directional Selectivity in Rat Vagus Nerve Stimulation Using Non-Rectangular Waveforms ·····2608
Rui Shibata[1], Masaru Takeuchi[1], Sota Saeki[2], Hitoshi Hirata[3], Yasuhisa Hasegawa[1]
[1] Dept. Micro-Nano Mechanical Science and Engineering, Nagoya University, Japan
[2] Dept. Human Enhancement and Hand Surgery, Nagoya University, Japan
[3] Dept. Personalized Medical Technology, Nagoya University, Japan

Advanced Program

11:45-12:45 Lunch

Keynote Talk ***Room 1***

Chairperson: TBD

12:45-13:15 Keynote Talk 16
Rethinking Robotic Intelligence: From More Control to Better Design ····· KE16
Keehoon Kim
POSTECH, Republic of Korea

Keynote Talk ***Room 2***

Chairperson: Tadayoshi Aoyama, Nagoya University

12:45-13:15 Keynote Talk 17
Untethering Research: Wireless Power for Sensors and Neural Interfaces ····· KE17
Takuya Sasatani
The University of Tokyo, Japan

13:15-13:30 Break

Session ThP1-1: (Organized Session 2)
AI Models and Assistive Systems for Life Sciences ***Room 1***

Chairpersons: *Tadayoshi Aoyama, Nagoya University*
Yuki Funabora, Nagoya University

13:30-13:45 Effects of Wrapping Tightness on the Force Distribution Generated by a Fabric-Based Haptic Feedback Device ····· 2620
Ayato Kuno, Yuki Funabora and Shinji Doki
Graduate School of Engineering, Nagoya University, Japan

13:45-14:00 Evaluation of Force and Surface Tactile Feedback of Pipette Penetration Depth for Stopping Decision Support in Piezo-ICSI ····· 2619
Ryota Asano[1], Kenta Yokoe[1] and Tadayoshi Aoyama[1]
[1] Dept. of Mechanical Systems Engineering, Nagoya Univ., Aichi , Japan

14:00-14:15 Layer-jamming Reinforcement for Improved Motion Transmission in a Pneumatic Elbow Soft Wearable Device ····· 2621
Zheyu LI and Yuki FUNABORA
Graduate School of Engineering, Nagoya University, Japan

14:15-14:30 A Non-Wearable, Environment-Fixed Fingertip Force Sensing System Based on Dual-View Finger Images for Material-Robust Three-Axis Force Estimation ····· 2615
Erina Ifuku[1], Masahiro Ohka[2], and Hiraku Komura[1]
1 Kyushu Institute of Technology
3 Reitaku University

14:30-14:45 Vision-Language Affordance Reasoning for Grounding Ambiguous Surgical Instructions ····· 2616
Ana Davila[1], Jacinto Colan[2] and Yasuhisa Hasegawa[1]
[1] Institutes of Innovation for Future Society, Nagoya University, Aichi, Nagoya, Japan
[2] Dept. of Micro-Nano Mechanical Science and Engineering, Nagoya University, Aichi, Nagoya, Japan

14:45-15:00 Characterizing Expert–Novice Cell Micromanipulation through Conditional Measure Transport and Sparse Attention ····· 2617
Wendyam Eric Lionel Ilboudo[1] and Taisuke Kobayashi[1,2]
[1] National Institute of Informatics (NII), Japan
[2] The Graduate University for Advanced Studies (SOKENDAI), Japan

15:00-15:15 GMM–LSTM and CNN–LSTM Control for the Three Subtasks of Micro-Electrode Fusion in Somatic Cell Nuclear Transfer ····· 2618
Shoma Amano[1], Kenta Yokoe[1], Kazuki Hano[2], Masaki Takasu[2], and Tadayoshi Aoyama[1]
[1] Graduate School of Engineering, Nagoya Univ., Japan
[2] Institute for Advanced Study, Gifu Univ., Japan

15:15-15:45 Keynote Talk 18
Bridging biomedical science and engineering to decode tacit knowledge in reproductive biotechnology ····· KE18
Masaki Takasu
Gifu University, Japan

Session ThP2-1: (Organized Session 1)
Advanced Micro-Nano Systems for Biomedical Applications ***Room 2***

Chairpersons: *Hisataka Maruyama, Nagoya University*
Kaoru Uesugi, Ritsumeikan University

13:30-14:00 Keynote Talk 19
TBD ····· KE19
Masahiro Shimizu
Nagahama University of Bio-Science and Technology, Japan

Advanced Program

14:00-14:15 Enhancement of Heterogeneous Magnetic Particle Swarms by Ferromagnetic Cobalt Cores ·····2602

*Chutian Wang, Kaiyi Peng, Shengyuan Wang, Jiajun Zhang, Shuzhang Liang, and Lin Feng**
School of Mechanical Engineering and Automation, Beihang University, Beijing, China

14:15-14:30 Exploring Structural Control of Optical Force-Induced Microrobotic Assembly·····2604

Nicholas Carlisle[1], Ebubekir Avci[1] and Volker Nock[1]
[1] Department of Electrical and Computer Engineering, University of Canterbury, New Zealand

14:30-14:45 A 5-DOF Manipulator Based on an Origami Structure with Embedded Electrical Wiring and Fluidic Channels in Its Hinges ·····2603

Kanade Sasa, Hirotaka Sugiura, Haoran Yao, Satoshi Amaya, Fumihito Arai
Department of Mechanical Engineering, Graduate School of Engineering, The University of Tokyo

14:45-15:00 A Cyber-Physical Micromanipulation Interface for Microscopic Object Retrieval·····2605

Kaito Tojo, Daigo Natsuhara, Takayuki Hoshino, Hisataka Maruyama
Department of Micro-Nano Mechanical Science and Engineering, Nagoya University

15:00-15:15 Time-Series Analysis of Incision Behavior in an Artificial Glaucoma Model·····2686

Shotaro Mizuguchi[1], Yuki Hata[1], Seiji Omata[2], Kanako Harada[3], Mamoru Mitsuishi[4], Takahiro Arai[5], Takashi Ueta[5], Tomoyasu Shiraya[5], Ryo Terao[5], Yasuyuki Morita[2], Fumihito Arai[3]
[1] Graduate School of Science and Technology, Kumamoto University
[2] Faculty of Advanced Science and Technology, Kumamoto University
[3] Department of Mechanical Engineering, The University of Tokyo
[4] Advanced Comprehensive Research Organization, Teikyo University
[5] Department of Ophthalmology, Graduate School of Medicine, The University of Tokyo

15:15-15:30 Development of a Unidirectional Tensile–Driven Bidirectional Intermittent Rotation Mechanism for Self-Holding Rotatable Mirror Endoscopes··2606

Haruki Isaka, Daigo Natsuhara, Takayuki Hoshino, Hisataka Maruyama
Department of Micro-Nano Mechanical Science and Engineering, Nagoya University, Japan

15:30-15:45 Proposal of a Water Surface-Driven Insect Drone Propelled by Water Striders……2601
Can Li, Shogo Mizoguchi, Kaoru Uesugi
Department of Robotics, College of Science and Engineering, Ritsumeikan University, Japan

15:45-16:00 Break

Spotlight Session 3
Frontiers in Physical AI ***Room 1***
Chairperson: TBD

16:00-16:30 Keynote Talk 20
AI for Team Sports Analytics…… KE20
Keisuke Fujii
Nagoya University, Japan

16:30-17:00 Keynote Talk 21
From Teleoperation to Physical AI for Human-Robot Symbiosis …… KE21
Yaonan Zhu
The University of Tokyo, Japan

17:00-17:30 Award Ceremony and Closing