

MHS2019

*2019 International Symposium on Micro-NanoMechatronics and Human Science
(From Micro & Nano Scale Systems to Robotics & Mechatronics Systems)*

Symposium on “Science of Soft Robots”

Grant-in-Aid for Scientific Research on Innovative Areas, MEXT, Japan

Dec. 1 - 4, 2019, Nagoya, Japan

December 2 (Mon)

Location: Toyoda Auditorium

Opening Remarks

Conference Room 1

Chairperson: *Fumihito Arai, Nagoya University*

9:00-9:20 *Prof. Toshio Fukuda, Meijo University, Japan (Honorary Chair)*
Prof. Fumihito Arai, Nagoya University, Japan (General Co-Chair)
Prof. Koichi Suzumori, Tokyo Institute of Technology (General Co-Chair)

Plenary Talks

Conference Room 1

Chairperson: *Koichi Suzumori, Tokyo Institute of Technology*

9:20-10:05 **Plenary Talk 1**
Soft Robots with Physically Embodied Intelligence
Kyujin Cho, Seoul National University

10:05-10:20 ***Coffee Break***

Session MA1-1: (Organized Session 4-1):

Emerging Micro/Nano Technologies for Spatial, Temporal and Hierarchical Analyses of Single Cells

Conference Room 1

Chairperson: *Shinya Sakuma, Nagoya University,*
Hirofumi Shintaku, RIKEN

10:20-10:50 **Keynote Talk 1**
Vibrational Flow Cytometry for Label-free Large-scale Single-cell Analysis
Kotaro Hiramatsu and Keisuke Goda
The University of Tokyo

- 10:50-11:05 Length Bias-free Extraction of Cytoplasmic RNA from Single Cells by Electrical Lysis and Electrophoresis
Mahmoud N. Abdelmoez, Yusuke Oguchi, Yuka Ozaki, Ryuji Yokokawa, Hidetoshi Kotera and Hirofumi Shintaku
RIKEN Cluster for Pioneering Research
Kyoto University
- 11:05-11:20 Spatiotemporally Generated Microfluids: Traveling Vortex for On-chip Sorting of Large Particles
Yusuke Kasai, Shinya Sakuma and Fumihito Arai
Nagoya University
- 11:20-11:35 Spatiotemporally Generated Microfluids: Asymmetric Flow Resistor for On-chip Pumping
Makoto Saito, Shinya Sakuma, Yusuke Kasai and Fumihito Arai
Nagoya University
- 11:35-11:50 Design and Evaluation of Micromixer with Low Dead Volume Based on Vibration-induced Flow
Toshiyuki Matsui, Hiroaki Suzuki and Takeshi Hayakawa
Chuo University

Session MA2-1: (Organized Session 7)
Biorobotics and Microsystem

Conference Room 2

Chairperson: *Akihiko Ichikawa, Meijo University*

- 10:20-10:35 Magnetized Cell-robot Propelled by Regular Tetrahedron Magnetic Actuation System
Yuguo Dai, Yuanyuan Chen, Yanmin Feng, Dixiao Chen, Xue Bai and Lin Feng
Beihang University
- 10:35-10:50 Observation of Charge Distribution of Biological Tissue Sections using Scanning Ion Conductance Microscopy
Yuichiro Katsura, Yusuke Mizutani, Kenta Nakazawa, Tatsuo Ushiki and Futoshi Iwata
Shizuoka University
Niigata University
- 10:50-11:05 Parallel Liquid Manipulation using Vacuum-driven Pumps and Phaseguides for Analysis of Algal Behavior and Gene Expression
Kento Hisa, Atsushi Fujii, Musashi Kakugawa, Daisuke Yamane,

Takayuki Shibata and Moeto Nagai
Toyohashi University of Technology Mechanical Engineering
Tokyo Institute of Technology Institute of Innovative Research

11:05-11:20 Dynamic Behavioral Analysis of Stimulus Response of Running Ants by High-speed Robotic Platform
Tomohiro Kawahara, Yuuki Kawajiri, Motoki Furukawa, Ahmad Belal, , Hirofumi Ohtsuka and Idaku Ishii
Kyushu Institute of Technology
AS2M Department, FEMTO-ST Institute
National Institute of Technology Kumamoto College
Hiroshima University

11:20-11:50 Keynote Talk 2
Fusion of Life and Machine to Create Novel Principle Device
Yo Tanaka
RIKEN

11:50-12:50 **Lunch**

Poster Session I

Poster Area (1st Floor)

Chairperson: *Yasuhisa Hasegawa, Nagoya University*
Seiichi Hata, Nagoya University

12:50-13:50

MP-01 Characterization of Bio-degradable Materials for Soft Robotics
Toshiaki Nagai and Jun Shintake
University of Electro-Communications

MP-02 Study of a Dura Mater Model using Fiber Materials
Shusaku Hayakawa, Akihiko Ichikawa, Masaru Takeuchi and Toshio Fukuda
Meijo University
Nagoya University
Beijing Institute of Technology

MP-03 4 DOF High-speed Cell Manipulation Magnetic-tweezers and the Operating System Driven by Piezo Ceramics
Dixiao Chen, Wei Zhang, Yuguo Dai, Yanmin Feng, Yuanyuan Chen, Xue Bai and Lin Feng
Beihang University

- MP-04 Soft Microrobot having Soft-rigid Hybrid Structure Driven by Laser
Tomoki Watanabe, Yoshiyuki Yokoyama and Takeshi Hayakawa
Chuo University
Toyama Industrial Technology Research and Development Center
- MP-05 Development of Organs-on-a-chip Model Mimicking Physiological
Parameters for Pharmacokinetic Study
Kenta Shinha and Hiroshi Kimura
Tokai University
- MP-06 Proposal of a Method to Get Over Steps by Deformed Wheels
Masafumi Kojima, Akihiko Ichikawa, Kazuhiro Kuno, Masaki Okada,
Yutaka Watanabe, Kyohei Katada, Munehisa Horiguchi and Toshio Fukuda
Meijo University
EQUOS RESERCH. CO. LTD.
- MP-07 Flower Stick Rotation Manipulation Scheme Not Requiring High-speed
Robotic Motion
Yuto Asai, Tadayoshi Aoyama, Masaru Takeuchi and Yasuhisa Hasegawa
Nagoya University
- MP-08 Development of Exercise Support Apparatus for Prevention of
Locomotive Syndrome
Kazuto Miyawaki, Ayuko Saito, Yoshikazu Kobayashi, Satoru Kizawa,
Toshiki Matsunaga and Yoichi Shimada
National Institute of Technology Akita College
Akita University Hospital
Akita University
- MP-09 Validation of the Hip Contact Force for a Novel Lower Extremity
Musculoskeletal Model
Kotaro Suzuki, Akira Komatsu, Kazutoshi Hatakeyama, Jumpei Iida,
Takehiro Iwami and Yoichi Shimada
Akita University
- MP-10 Stress Analysis of Shelf Acetabuloplasty for Acetabular Dysplasia Patients
using Dynamical Load During Walking
Akira Komatsu, Takehiro Iwami and Yoichi Shimada
Akita University
- MP-11 A Preliminary Study on On-board Attitude Detection System for
Ultra-small Satellite with Omnidirectional Camera
Nobuto Hirakoso, Riku Tomizawa, Yamato Mutou, Yusuke Hiramata, Yoichi
Shigematsu, Kazumasa Imai, Taku Takada, Hironoshin Kawabata and
Tadao Arai
National Institute of Technology, Gunma College

*National Institute of Technology, Kochi College
YAMATO CORPORATION*

- MP-12 Auditory Locomotion Guidance System for Spatial Localization
Felix Dollack, Monica Perusquía-Hernández, Hideki Kadone and Kenji Suzuki
University of Tsukuba
NTT Communication Science Laboratories
- MP-13 Development of Drive Mechanism of Forceps for Single Incision
Laparoscopic Surgery
Ryoichiro Ono and Makoto Nokata
Ritsumeikan University
- MP-14 Development of Sleep Apnea Syndrome Improvement System
“Examination of Respiratory Monitoring System using KINECT®”
Taihei Asaina and Makoto Nokata
Ritsumeikan University

Plenary Talks

Chairperson: *Fumihito Arai, Nagoya University*

13:50-14:35 Plenary Talk 2
Bio-inspired Robotics Depending on the Size
Isao Shimoyama, Toyama Prefectural University

14:35-14:50 ***Coffee Break***

Session MPI-1: (Organized Session 1-1)
Science of Soft Robots

Conference Room 1

Chairperson: *Ryuma Niiyama, The University of Tokyo*

14:50-15:20 Keynote Talk 3
Towards a Novel Information Processing Scheme for Soft Robots
Kohei Nakajima
The University of Tokyo

15:20-15:35 Soft Bodies as Input Reservoir; Role of Softness from the Viewpoint of
Reservoir Computing
Katsuma Inoue, Kohei Nakajima and Yasuo Kuniyoshi
The University of Tokyo

- 15:35-15:50 Stability Analysis of Self-folding Sheets on Water Surface
Masato Yamada, Hiroki Shigemune and Hideyuki Sawada
Waseda University
- 15:50-16:05 Effects of Mechanical Properties and Morphologies of Collagen
Hydrogels on Tissue Hierarchical Structures of 3D Engineered Muscle
Tissues
Kazuya Furusawa
Fukui University of Technology
- 16:05-16:20 Fabrication of Transparent Soft Actuator Toward Realizing
Three-dimensional Transparent Soft Actuator
Natsumi Koike and Takeshi Hayakawa
Chuo University

Session MP2-1: (Organized Session 12)
Intelligent Robot Systems and Its Applications

Conference Room 2

Chairperson: *Kenichi Ohara, Meijo University*

- 14:50-15:05 Proposal of Wireless Nerve-net Sensing System
Ryouya Ozeki, Yusuke Saganuma, Tomomi Mizutani, Kohei Suzuki,
Shota Ito, Masanori Muroyama and Yutaka Nonomura
Meijo University
Tohoku University
- 15:05-15:20 A Study for Motion-planning Method Resident-tracking Robot Based on
Reinforcement Learning
Masashi Sugimoto, Takashi Yoshioka, Kohei Ishii, Shogo Nonaka, Mikio
Deguchi, Shinji Tsuzuki and Masatsugu Hirano
Ehime University
National Institute of Technology, Kagawa College
National Institute of Technology, Tsuyama College
National Institute of Technology, Niihama College
- 15:20-15:35 Elucidation of Velvet Hand Illusion using LABNIRS toward a New
Haptic Display
Hiraku Komura, Hiroaki Kosugi and Masahiro Ohka
Nagoya University
- 15:35-15:50 Wide-range Load Sensing of Newborn's Biosignals with Quartz Crystal
Resonator
Shiro Watanabe, Yuichi Murozaki, Yoshiaki Sato, Kazuya Honbe and
Fumihito Arai

*Nagoya University
Nagoya University Hospital*

15:50-16:20 Keynote Talk 4
Low-cost Accurate Positioning System in Urban Area
~How to use GPS/GNSS for Intelligent Vehicle~
Junichi Meguro, Aoki Takanose, Takuya Arakawa and Syunsuke Mizutani
Meijo University,

16:20-16:35 **Coffee Break**

Session MPI-2: (Organized Session 1-2)
Science of Soft Robots

Conference Room 1

Chairperson: *Kohei Nakajima, The University of Tokyo*

16:35-17:05 Keynote Talk 5
Toward Flexible Movement of Soft Robots: the Possibility of
Ultraflexible/Stretchable Electronic Devices
Kenjiro Fukuda, Kilho Yu, Steven Rich and Takao Someya
RIKEN
The University of Tokyo

17:05-17:20 Frequency Response of Honeycomb Structured IPMC Actuator Fabricated
through 3D Printing with Dispersion Liquid
*Hiroyuki Nabae, Asuka Ishiki, Tetsuya Horiuchi, Kinji Asaka, Gen Endo
and Koichi Suzumori*
Tokyo Institute of Technology
The National Institute of Advanced Industrial Science and Technology

17:20-17:35 Nemertea Proboscis Inspired Extendable Mechanism
*Kenjiro Tadakuma, Tomoya Takayashi, Natsumi Hookabe,
Masahiro Watanabe, Yu Ozawa, Tori Shimizu, Eri Takane,
Hiroshi Kajihara, Takeshi Yamazaki, Masashi Konyo and
Satoshi Tadokoro*
Tohoku University
Hokkaido University
Yamashina Institute for Ornithology

17:35-17:50 Development of a Soft Robot-like Snail using Mucus
Jun Takeyama, Akihiko Ichikawa, Eunhye Kim and Toshio Fukuda
Meijo University

- 17:50-18:05 Manipulation of One-dimensional Nanomaterials using a High-speed Atomic Force Microscope in tapping Mode
Kenta Katakura, Kenta Nakazawa and Futoshi Iwata
Shizuoka University
- 18:05-18:20 Development of Modular Bio Actuators Used Artificial Tendon Structure
Takuto Nomura, Masaru Takeuchi, Akihiko Ichikawa, Eunhye Kim and Toshio Fukuda
Meijo University
Nagoya University

Session MP2-2: (Organized Session 10)
Cytoanalysis and Biomonitoring

Conference Room 2

- Chairperson: *Taisuke Masuda, Nagoya University*
Seiji Omata, Nagoya University
- 16:35-16:50 Quantitative Signal Analysis of a Ligand-gated Ion Channel on a Lipid Bilayer using Continuous-time Wavelet Transformation
Hiroataka Sugiura, Tetsuya Yamada, Atsufumi Ozoe, Yuki Kodama, Yasuhiko Takahashi, Toshihisa Osaki and Shoji Takeuchi
Kanagawa Institute of Industrial Science and Technology
Sumitomo Chemical Company
The University of Tokyo
- 16:50-17:05 Real Time, Flexible RF Sputtered ZnO Nano-film CO₂ Sensor for Capnographic Applications
Anuroop Shrivastava, Ganesh Kumar Mani, and Kazuyoshi Tsuchiya
Tokai University
- 17:05-17:20 Detection and Control of Air Liquid Interface with an Open-channel Microfluidic Chip for Rare Cell Isolation
Bilal Turan, Taisuke Masuda and Fumihito Arai
Nagoya University
- 17:20-17:35 CNN-based Cellular Contractile Force Evaluation Algorithm
Honghan Li, Daiki Matsunaga, Tsubasa S. Matsui and Shinji Deguchi
Osaka University
- 17:35-17:50 Tenocyte Response to Interleukin-1 Beta Depends on Substrate Stiffness: Implication to the Etiology of Tendon Inflammation
Eiji Maeda, Kaname Kuroyanagi, Yoriko Ando and Takeo Matsumoto
Nagoya University

17:50-18:20 Keynote Talk 6
3D Model of Intracellular Ca²⁺ Wave and PKC α Translocation in
Endothelial Cell
Toshihiro Sera
Kyushu University

18:30-19:30 ***Beer Party***

December 3 (Tue)

Location: Toyoda Auditorium

Plenary Talks

Chairperson: *Hisataka Maruyama, Nagoya University*

9:00-9:45 Plenary Talk 3
Internet of Bionic Things with Cyber-enabled Bionic Organisms
Alper Bozkurt, NC State University

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

Session TA1-1: (Organized Session 1-3)
Science of Soft Robots

Conference Room 1

Chairperson: *Kenjiro Fukuda, RIKEN*

10:00-10:15 Anthropomorphic Face Robot having Soft Mouth Mechanism
with Embedded Artificial Facial Muscles
Yoshiki Usui, Ryuma Niiyama and Yasuo Kuniyoshi
The University of Tokyo

10:15-10:30 Unpredictable as a Dice: Analyzing Riddled Basin Structures in Passive
Dynamic Walker
Nozomi Akashi, Kohei Nakajima and Yasuo Kuniyoshi
The University of Tokyo

- 10:30-10:45 Open Soft Machines: Open Platform to Enrich the Creation and Research of Soft Robots.
Young ah Seong, Hiroshi Sugihara, Ryuma Niiyama, Yasuaki Kakehi and Yoshihiro Kawahara
The University of Tokyo
- 10:45-11:00 High-speed Flexible Arm to Reduce the Effect of Spinning Ball in Table Tennis
Mitsuru Takeda, Satoshi Nishikawa, Ryuma Niiyama and Yasuo Kuniyoshi
The University of Tokyo
- 11:00-11:15 A Basic Idea of Identifying the Stiffness of an Elastic Rod along its Backbone
Hiromi Mochiyama
University of Tsukuba
- 11:15-11:30 Cell Culturing on Electrical Circuit with Printed Electronics Technics
Masahiro Shimizu, Hiroki Kawashima, Takuya Umedachi, Shunsuke Shigaki, Toshihiko Ogura and Koh Hosoda
Osaka University
The University of Tokyo
Tohoku University
- 11:30-11:45 Fabrication of a Hummingbird-mimetic Flexible Flapping Wings
Akio Kawahara, Masahiro Aizawa, Takeshi Yamasaki and Hiroto Tanaka
Tokyo Institute of Technology
Yamashina Institute for Ornithology
- 11:45-12:00 Morphological Design of Soft Capacitive Force Sensor
Shinichi Hirai and Takahiro Matsuno
Ritsumeikan University

Session TA2-1: (Organized Session 9)
Advanced Micro-Nano Systems for Biomedical Applications

Conference Room 2

Chairperson: *Hisataka Maruyama, Nagoya University*

- 10:00-10:30 Keynote Talk 7
Wearable Devices for Vital Sensing with Advanced Organic and Liquid Materials
Hiroki Ota
Yokohama National University

- 10:30-10:45 Advanced Embryo Transfer System by using Magnetically Controlled
Microrobot for Safer Reproductive Medicine
*Susumu Koseki, Yorino Sato, Naoki Okamoto, Futoshi Inoue, Kazuhiro
Kawamura and Masashi Ikeuchi*
The University of Tokyo
The International University of Health and Welfare
Kitazato Corporation
- 10:45-11:00 Multi-pattern Cell Stretching Device to Elucidate the Mechanobiology of
Cardiomyocytes
Toshiki Inamura, Koji Ikuta and Masashi Ikeuchi
The University of Tokyo
- 11:00-11:15 Nozzle Array with Deterministic Encapsulation of Single Cells for
Massively Parallel 3D Cell Assembly
*Kentaro Tanagi, Rohit Bhardwaj, Azusa Kage, Takayuki Shibata and
Moeto Nagai*
Toyohashi University of Technology
- 11:15-11:30 Effect of Block Length on the Self-assembly of Elastin-like Block
Polypeptides
*Ayae Sugawara-Narutaki, Sawako Yasunaga, Jin Nakamura and Chikara
Ohtsuki*
Nagoya University
- 11:30-11:45 Assembly and Monitoring of Modular Tissue Structure of Micro-fibers
*Zhaoyu Wang, Taisuke Masuda, Ruixuan Weng, Hisataka Maruyama
and Fumihito Arai*
Nagoya University
- 11:45-12:00 Fluorescence Microsensor Using Near-infrared Light for Physiological
Measurement inside Tissue
*Hisataka Maruyama, Taisuke Masuda, Weng Ruixuan, Wang Zhaoyu,
Eiji Tokai and Fumihito Arai*
Nagoya University
- 12:00-13:00 **Lunch**

Poster Session II

Poster Area (1st Floor)

Chairperson: *Yasuhisa Hasegawa, Nagoya University*
Seiichi Hata, Nagoya University

13:00-14:00

- TP-01 Making Micro Structure with Biodegradable Materials
Taro Kozuka, Masaru Takeuchi, Akihiko Ichikawa and Toshio Fukuda
Meijo University
Nagoya University
- TP-02 Three-dimensional View-expansive Microscope Based on Focal Point
Adjustment and Viewpoint Movement
Shoki Yamada, Tadayoshi Aoyama, Sarau Takeno, Masaru Takeuchi and
Yasuhisa Hasegawa
Nagoya University
PREST
- TP-03 A Study of Reliable Implant UWB Weak-Radio Communications with
MIMO
Kento Kamiya, Masahiro Ohta, Daisuke Anzai and Jianqing Wang,
Nagoya Institute of Technology
- TP-04 Photoelastic Stress Measurement in Real-time for Surgery Simulator using
Gel Materials
Daichi Yamada, Simon Hori, Chiemi Oka, Junpei Sakurai and Seiichi
Hata
Nagoya University
- TP-05 Enhanced Conversion Efficiency in Dye-sensitized Solar Cells using
Optical Textured Glass Substrates
Yuji Nishiyasu, Na Yang, Chiemi Oka, Seiichi Hata and Junpei Sakurai
Nagoya University
- TP-06 Improvement of Strength and Porosity of β -TCP/HA Compositated Bone
Filling Material Synthesized by Hydrothermal Hot-pressing
Kento Tanaka, Seiichi Sugimoto, Takanobu Tamiya, Kazuo Yagi
and Satoshi Kobayashi
Tokyo Metropolitan College of Industrial Technology
Tokyo Metropolitan University
- TP-07 Effects of Collagen Microparticles on Formation of Three Dimensional
Composite Tissue Models of Primary Hepatocytes
Akihiro Morita, Rie Utoh, Masumi Yamada and Minoru Seki
Chiba University

- TP-08 Size Separation Method of Microparticles Based on Gravity-aided
Vibration-induced Flow
Naoki Kitada and Takeshi Hayakawa
Chuo University
- TP-09 Glucose Powered Electroosmotic Pump Array Film
Toshiro Yamanaka and Fumihito Arai
Nagoya University
- TP-10 Influence of Cooling and Warming Rates to Cell Viability in
Cryoprotectant-free Cryopreservation
Hiroki Watanabe, Hideyo Takizawa and Yoshitake Akiyama
Shinshu University
- TP-11 Evaluation of Pole Walking using 3D Motion Analysis Equipment
Masahiro Isogai, Kaito Onaka and Kazuto Miyawaki
Aichi University of Technology
National Institute of Technology Akita College
- TP-12 Textile-based Electrode Array for FES and sEMG Recording Fabricated
by Screen Printing
Wenguang Lu, Dai Owaki and Mitsuhiro Hayashibe
Tohoku University
- TP-13 Development of Wireless Gait Recognition System using IMU Sensors
Agung W. Setiawan and Alfie R. Ananda
Institut Teknologi Bandung
- TP-14 Evaluation and Improvement of Temperature Characteristics of a Load
Sensor using Quartz Crystal Resonator
Yusuke Hirota, Yuichi Murozaki and Fumihito Arai
Nagoya University
- TP-15 Integrating Bionic Models and Sensors for Eye Surgical Training System
Seiji Omata, Tomonori Niino, Kanako Harada, Mamoru Mitsuishi,
Koichiro Sugimoto, Takashi Ueta, Kiyohito Totsuka, Fumiyuki Araki,
Muneyuki Takao, Makoto Aihara and Fumihito Arai
Nagoya University
The University of Tokyo
- TP-16 Injection of Fluorescence Microsensor by Manipulation and Heating using
Multiple Wavelength Lasers for Temperature Measurement of Cell
Ryota Yanagawa, Hisataka Maruyama and Fumihito Arai
Nagoya University

- TP-17 Evaluation of New Control Method for Neck Myoelectric Control-type
Electrolarynx
Katsutoshi Oe, Sho Oda and Shoya Uno
Daiichi Institute of Technology
- TP-18 Production of Bovine Embryos using Freeze-dried Somatic Cells
Kazutsugu Matsukawa and Akihiko Ichikawa
Kochi University
Meijo University

Plenary Talks

Chairperson: *Yasuhisa Hasegawa, Nagoya University*

14:00-14:45 Plenary Talk 4
Microfluidic Approach to the Development of Hemolysis Simulator
Masanori Nakamura,
Nagoya Institute of Technology

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

Session TP1-1: (Organized Session 5)
Functional Interfaces and Hydro-electrochemical Mechatronics

Conference Room 1

Chairperson: *Yoko Yamanishi, Kyushu University,*
Shingo Maeda, Shibaura Institute of Technology

15:00-15:30 Keynote Talk 8
Introduction to Soft Robotics
Ryuma Niiyama
The University of Tokyo

15:30-15:45 Unit type Dielectric Elastomer Motor
Ayato Minaminosono and Shingo Maeda
Shibaura Institute of Technology

15:45-16:00 Strength Changes due to the Immersion for Poly(lactic acid) Test Pieces
Made by a 3D Printer
Asahi Yonezawa, Miho Suzuki, Kohei Takeda and Akira Yamada
Aichi Institute of Technology

16:00-16:15 Nanosecond Laser Irradiation on Cells using Titanium Thin Film for Massively Parallel Cell Intranuclear Delivery
Shin Sawai, Harsh Gupta, Tuhin Santra, Azusa Kage, Takayuki Shibata and Moeto Nagai
Toyohashi University of Technology
Indian Institute of Technology Madras

16:15-16:30 All-in-one Unified Microfluidic Chip for Automatic Injection Systems to Cells by Electrically-induced Bubbles
Kevin Theodric Uning, Taiga Michimoto, Keita Ichikawa and Yoko Yamanishi
Kyushu University

Session TP2-1: (Organized Session 6)
Cognitive Robotics

Conference Room 2

Chairperson: *Naoyuki Kubota, Tokyo Metropolitan University*
Kazuo Kiguchi, Kyushu University

15:00-15:15 A Study of Sense of Approaching Index based on Considering Direction of Approaching Objects
Yuta Kumano, Hiroyuki Masuta, Tatsuo Motoyoshi and Kei Sawai
Toyama Prefectural University

15:15-15:30 Fusion System of Vision and Hearing Sensation using Deep Learning
Kazuto Tsumura, Futoshi Kobayashi and Hiroyuki Nakamoto
Kobe University

15:30-15:45 Fundamental Study on Tremor Suppression with Tonic Vibration Reflex during Upper Limb Movement
Wenbin Liu, Takeru Kai and Kazuo Kiguchi
Kyushu University

15:45-16:00 Multi-robot Communication for Interactive Team Teaching
Noriko Takase, Naoyuki Kubota, Wei Hong Chin, Akihiro Yorita and Simon Egerton
Tokyo Metropolitan University
La Trobe University

16:00-16:30 Keynote Talk 9
On Realization of a Reaching Movement by a Musculoskeletal Arm: From a Control Viewpoint
Kenji Tahara
Kyushu University

16:30-16:45 **Coffee Break**

Session TP1-2: (Organized Session 3)

Micro-Nano Sensing/Manipulation and Its Biological Applications

Conference Room 1

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

16:45-17:15 Keynote Talk 10
Wearable Network using Conductive Textile for On-body Distributed
Micro-nano Sensors and Actuators
Akihito Noda
Nanzan University
JST PRESTO

17:15-17:30 Assembly of Magnetic Fibers to Form Perfusable Vascular Network with
a Three-dimensional Tissue
Eunhye Kim, Masaru Takeuchi, Ryohei Sakurai, Taro Kozuka, Takato
Nomura, Akiyuki Hasegawa, Akihiko Ichikawa and Toshio Fukuda
Meijo University
Nagoya University

17:30-17:45 View-expansive Microscope with Focus Adjustment using Galvanometer
Mirror and Electrically Tunable Lens
Sarau Takeno, Tadayoshi Aoyama, Masaru Takeuchi and Yasuhisa
Hasegawa
Nagoya University
Japan Science and Technology Agency, PREST

17:45-18:00 Automatic Stiffness Measurement of Micro Objects using
Multi-scale Simultaneous Observation System
Ryo Yoshikawa, Masaru Kojima, Yasushi Mae, Takato Horii, Takayuki
Nagai and Tatsuo Arai
Osaka University
Kansai University
Beijing Institute of Technology
The University of Electro-Communications

18:00-18:15 Calibration Process for the Young's Modulus of a Mechanically Trapped
Microbead Measured by Atomic Force Microscopy
Di Chang, Takahiro Hirate, Chihiro Uehara, Nobuyuki Uozumi and
Fumihito Arai
Nagoya University
Tohoku University

Session TP2-2: (Organized Session II)
Human Assistive Technology

Conference Room 2

- Chairperson: *Yasuhisa Hasegawa, Nagoya University*
- 16:45-17:00 Torso Control System with a Sensory Safety Bar for a Standing Mobility Device
Yang Chen, Diego Paez-Granados and Kenji Suzuki
University of Tsukuba
- 17:00-17:15 Super Twisting Control of Passive Gait Training Exoskeleton Driven by Pneumatic Muscles
Mengshi Zhang, Jian Huang, Yu Cao and Hai-Tao Zhang
Huazhong University of Science and Technology
- 17:15-17:30 A Novel Quantification Method for Gait Assessment in Knee Osteoarthritis Patients
Kiyoshi Tsurumiya, Wataru Hayasaka, Yu Igarashi, Akira Komatsu, Hiroaki Tsukamoto, Tomohiro Suda, Takehiro Iwami and Yoichi Shimada
Akita University
Akita University Hospital
- 17:30-17:45 Development of Assist Torque Optimization System using Reinforcement Learning in Gait Rehabilitation Robot
Tetsuya Yamaguchi, Daiki Miura, Kai Maeda, Iori Usuda, Junichi Inoue, Ryota Kimura, Takehiro Iwami and Yoichi Shimada
Akita University
- 17:45-18:00 Usability Study on Hands-on User Interface for Neurosurgical Articulated Forceps: Joystick and Serial Link based Design
Daisuke Uozumi, Jacinto E. Colan Zaita, Jun Nakanishi, Tadayoshi Aoyama and Yasuhisa Hasegawa
Nagoya University
Meijo University
- 18:00-18:15 Study on Ultrasonic Transducer Material for a Sample Spinning in NMR Spectroscopy
Masato Kanno, Marie Obayashi, Takahiro Yano, Takefumi Kanda, Shuichi Wakimoto and Kiyonori Takegoshi
Okayama University
Kyoto University
- 19:00-21:00 **Welcome Reception**

December 4 (Wed)

Location: Toyoda Auditorium

Session WA1-1: (Organized Session 4-2)

Emerging Micro/Nano Technologies for Spatial, Temporal and Hierarchical Analyses of Single Cells

Conference Room 1

Chairperson: *Shinya Sakuma, Nagoya University*
Yoshitaka Shirasaki, The University of Tokyo

- 9:00-9:30 Keynote Talk 11
Future Medical Applications of Single Cell Analysis
Yohei Mineharu
Kyoto University
- 9:30-9:45 A Sample Carrier Device for Tensile Characterization of Ultra-thin and
Small Biomembrane
Hiroki Kumon, Shinya Sakuma, Yuichi Murozaki and Fumihito Arai
Nagoya University
- 9:45-10:00 Massive-integrated On-chip Gel Actuators for Single Cell Manipulation
Yuha Koike, Yoshiyuki Yokoyama and Takeshi Hayakawa
Chuo University
Toyama Industrial Technology Research and Development Center
- 10:00-10:15 Extraction of RNA from an Intact Single Plant Cell with Cell Wall using
Focused Electric Field
Sangamithirai Subramanian Parimalam, Naoyuki Sotta, Takashi
Kuromori, Toru Fujiwara, Masami Yokota Hirai and Hirofumi Shintaku
RIKEN Cluster for Pioneering Research
The University of Tokyo
RIKEN Center for Sustainable Resource Science
- 10:15-10:30 Mathematical Enhancement in the Spatiotemporal Resolution of Secretion
Imaging
Yoshitaka Shirasaki, Yumiko Tanaka, Nobutake Suzuki, Mai Yamagishi,
Kazuyo Moro and Sotaro Uemura
The University of Tokyo
Japan Science and Technology Agency
RIKEN Center for Integrative Medical Sciences

Session WA2-1: (Organized Session 8)
New Materials and Processing for Micro/Nano Devices

Conference Room 2

- Chairperson: *Junpei Sakurai, Nagoya University,*
Mizue Mizoshiri, Nagaoka University of Technology
- 9:00-9:15 Novel Dynamic Force Sensing System using Magnetostrictive Energy Harvester
Takahiro Yamazaki, Yasubumi Furuta, Wataru Nakao and Seiichi Hata
Nagoya University
Tohoku University
Yokohama National University
- 9:15-9:30 Development of Novel Tensile Testing Device for SEM Observation of Thin Films under Tension
Kensuke Nakata and Taeko Ando
Ritsumeikan University
- 9:30-9:45 Microvalves Utilizing Heat Generation of Magnetic Nanoparticles
Daiki Miwa, Junpei Sakurai, Seiichi Hata and Chiemi Oka
Nagoya University
- 9:45-10:00 Femtosecond Laser Direct-writing Technique using Reduction of Glyoxylic Acid Metal Complexes
Mizue Mizoshiri, Junya Narushima, Tomoyuki Imakita, Hikaru Nakatani, Akira Uetsuki and Tomoji Ohishi
Nagaoka University of Technology
Shibaura Institute of Technology
- 10:00-10:30 Keynote Talk 12
Adhesion Properties of Nanowire Surface Fastener
Yuhki Toku and Yang Ju
Nagoya University

10:30-10:45 **Coffee Break**

Plenary Talks

- Chairperson: *Kenji Fukuzawa, Nagoya University*
- 10:45-11:30 Plenary Talk 5
Energy-autonomous AI/IoT Platform for Unconscious Healthcare
~Stand-alone Continuous Glucose Monitoring Smart Contact Lenses~
Kiichi Niitsu
Nagoya University

11:30-11:45 *Coffee Break*

11:45-12:10 *Award Ceremony*

12:10-13:30 *Lunch*

13:30-15:00 *Laboratory tour (at Nagoya University)*