SCIENTIFIC PROGRAM
The Second Conference on Artificial Muscles - Biomimetic System Engineering
May. 20 (Thu)
9 : 30 - 9 : 40  Opening Remarks,
Takahisa Taguchi (National Institute of Advanced Industrial Science and Technology)

Chairperson: Keisuke Oguro (National Institute of Advanced Industrial Science and Technology)
9 : 40 - 10 : 25  Invited Speech,
Biomimetic Robots using EAP as Artificial Muscles – Progress and Challenges
Yoseph Bar-Cohen (Jet Propulsion Laboratory, USA)

Chairperson: Zhi-Wei Luo (BMC RIKEN)
10 : 25 - 11 : 10  Invited Speech,
Haptic Virtual Reality
Tsuneo Yoshikawa (Kyoto University)

Invited Lectures
Chairperson: Kinji Asaka (National Institute of Advanced Industrial Science and Technology)
11 : 10 - 12 : 10  Session I,
Conducting Polymer Actuators Working in Air
Hidenori Okuzaki (Interdisciplinary Graduate School of Medicine and Engineering, University of Yamanashi)

Electroactive paper actuator coated with Conducting Polypyrrole
Jaehwan Kim, S. D. Deshpande, Sung-Ryul Yun, Lie-Jie Zhao (Department of Mechanical Engineering, Inha University)

Artificial Muscles Based on Polypyrrole Actuators with Large Strain and Stress Generated Electrochemically
Susumu Hara¹, Tetsuji Zama¹², Wataru Takashima², Keichi Kaneto²
(¹EAMEX Co., ²Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology)

12 : 10 - 13 : 00  Lunch

Chairperson: Kinji Asaka (National Institute of Advanced Industrial Science and Technology)
13:00 - 13:45  Invited Speech,
Super Tough Nanotube Composite Fibers for Artificial Muscle Applications
Ray. H. Baughman (University of Texas at Dallas)

Chairperson: Yoshihiro Nakabo (BMC RIKEN)

13:45 - 14:30  Invited Speech,
Creeping of plasticized poly(vinyl chloride) gel
Toshihiro Hirai (Shinshu University)

Chairperson: Yoshihiro Nakabo (BMC RIKEN)

14:30 - 15:30  Session II,
Liquid Crystal Elastomers Swollen with Nematic Liquid Crystals As an Electrically Driven Artificial Muscle
Yusril Yusuf, P. E. Cladis, Helmut R. Brand, Heino Finkelmann, Shoichi Kai
(1Graduate School of Engineering, Kyushu University, 2Faculty of Engineering, Kyushu University, Advanced Liquid Crystal Technologies, 3Faculty of Engineering, Kyushu University, Theoretische Physik III, Universität Bayreuth, 4Makromolekulare Chemie, Universitat Freiburg, 5Graduate School of Engineering, Kyushu University, Department of Applied Physics, Faculty of Engineering, Kyushu University, Department of Life Engineering, Graduate School of Systems Life Sciences, Kyushu University)

Ionic Conduction and Electrostatic Cluster Response in Ionomeric Polymer Transducers
Donald Leo, Barbar Akle, Lisa Weiland, Matthew Bennett, Mike Hickner, James McGrath
(1CIMSS/Mechanical Engineering Department Virginia Tech, 2Chemistry Department Virginia Tech)

Self-oscillating gels and their application to biomimetic micro/nano-actuating systems
Ryo Yoshida, Yusuke Hara, Takamasa Sakai, Masahiro Tanaka (Graduate School of Engineering, The University of Tokyo)

15:30 - 16:30  Poster Session • Demonstration • Coffee Break

Chairperson: Yoshihiro Nakabo (BMC RIKEN)

16:30 - 17:15  Invited Speech,
Calcium ion regulation of muscle contraction

Iwao Ohtsuki (Department of Physiology, Jikei University School of Medicine)

Chairperson: Keiichi Kaneto (Kyushu Institute of Technology)
17:15 - 18:00 Invited Speech,

Natural Resolution of Ill-posedness of Inverse Kinematics for Redundant Multi-joint Movements

Suguru Arimoto (Graduate School of Science and Engineering, Ritsumeikan University)

18:30 - 20:00 Welcome Party

May. 21 (Fri)
Chairperson: Takahisa Taguchi (National Institute of Advanced Industrial Science and Technology)
9:30 - 10:00 Invited Speech,

Modelling on electromechanical response of polymer electrolyte actuators (Tentative)

Kinji Asaka (National Institute of Advanced Industrial Science and Technology)

10:00 - 11:00 Keynote Speech,

Intelligent Gels-An Approach to Artificial Muscles

Yoshihito Osada (Hokkaido University)

11:00 - 11:10 Coffee Break

Chairperson: Toshiharu Mukai (BMC RIKEN)
11:10 - 12:30 Session III,

Wave-shape pattern generation of electroactive polymer gel in controlled electric fields

Mihoko Otake, Yoshihiko Nakamura, Hirochika Inoue (University of Tokyo)

Underwater Micro Biped Robot with Multi DOF

Yuya Okuda¹, Shuxiang Guo¹, Kinji Asaka² (¹Kagawa Univ., ²National Inst. of AIST)

Control of Biped Walking Robots with IPMC Linear Actuator with Re-doping
Capability

Masaki Yamakita¹², Norihiro Kamamichi¹, Takahiro Kozuki¹, Kinji Asaka²³, Zhi-Wei Luo² (¹Tokyo Institute of Technology, ²RIKEN, ³AIST)

A multi-DOF robot manipulator with a patterned artificial muscle

Yoshihiro Nakabo¹, Toshiharu Mukai¹, Kinji Asaka¹² (¹BMC RIKEN, ²AIST)

12:30 - 13:30  Lunch

Chairperson: Masaki Yamakita (Tokyo Institute of Technology)
13:30 - 14:15  Invited Speech,
   Bio-mimetic control ----- The present status and the subjects
   Shigeyuki Hosoe (RIKEN, Nagoya University)

Chairperson: Masaki Yamakita (Tokyo Institute of Technology)
14:15 - 15:15  Session IV,
   Actuator Using Electrostriction Effect of Fullerene-Doped Polyurethane Elastomer (PUE) Films
   Jun Kyokane¹, Naoki Tsujimoto¹, Yuki Yanagisawa¹, Tsutomu Ueda²,
   Masumi Fukuma³ (¹Nara National College of Technology, ²Nitta Corporation, ³Matsue National College of Technology)

   Application of a Solid Polymer Electrolyte Membrane-Gold to an Active Graft
   Tadashi Ihara¹, Taro Nakamura¹, Yoshito Ikada¹, Kinji Asaka², Keisuke Oguro², Naoko Fujiwara² (¹Suzuka University of Medical Science, ²National Inst. of AIST)

   Electroactive Polymer Artificial Muscle (EPAM) for Biomimetic Robots
   Scott Stanford, Ron Pelrine, Roy Kornbluh, Qibing Pei, Seiki Chiba (SRI International)

15:15 - 16:15  Poster Session • Demonstration • Coffee Break

Chairperson: Zhi-Wei Luo (BMC RIKEN)
16:15 - 17:00  Invited Speech,
   Muscle-like mechanical impedance aids interactive robotics
Neville Hogan (MIT)

Chairperson: Toshihiro Hirai (Shinshu University)
17:00 - 17:45 Invited Speech,
Enhancement of electrochemomechanical deformations in conducting polymers, polyaniline films
Keiichi Kaneto (Kyushu Institute of Technology)

17:45 - 18:00 Closing Remarks,
Yoseph Bar-Cohen (Jet Propulsion Laboratory, USA)

Poster Session
1. Chaotropic effect of supporting electrolytes on Electroactive Polymers (EAP) and their applications for Artificial Muscles Biomimetic Systems (AMBS)
   Afshad Talaie¹, Takahisa Taguchi² (¹Frontier Research Center, Department of Applied Chemistry, Faculty of Engineering, Osaka University, ²Human life Technology, National Institute of Advanced Industrial Science and Technology)

2. The theory and simulation of the bending dynamics of polyelectrolyte membrane by electric stimuli
   Tatsuya Yamaue¹², Hiroto Mukai¹, Masao Doi¹ (¹Department of Computational Science and Engineering, Nagoya University, ²Biorheo project, CREST, Japan Science and Technology Agency)

3. A linear actuator using composites based ionic polymer and minute carbon particles
   Masayoshi Ishibashi, Midori Kato (Hitachi Ltd., Advanced Research Lab.)

4. Spinning of Conducting Microfibers for Artificial Muscular Filaments
   Takumi Takahashi, Masayoshi Ishihara, Hidenori Okuzaki (Interdisciplinary Graduate School of Medicine and Engineering, Univ. of Yamanashi)

   Kunihiko Ito¹², Katsumi Mita¹², Zhi-Wei Luo², Kumi Akataki¹, Makoto Watanabe¹ (¹Aichi Human Service Center, ²BMC RIKEN)
6. Control of Mechanical Impedance of IPMC Linear Actuator with Antagonism Structure
   Masaki Yamakita\textsuperscript{1,2}, Yasuaki Kaneda\textsuperscript{1}, Norihiro Kamamichi\textsuperscript{1}, Kinji Asaka\textsuperscript{3}, Zhi-Wei Luo\textsuperscript{2}
   (\textsuperscript{1}Tokyo Institute of Technology, \textsuperscript{2}RIKEN, \textsuperscript{3}AIST)

7. A snake-like swimming artificial muscle
   Koji Ogawa\textsuperscript{1}, Yoshihiro Nakabo\textsuperscript{2}, Toshiharu Mukai\textsuperscript{2}, Kinji Asaka\textsuperscript{2,3}, Noboru Ohnishi\textsuperscript{1}
   (\textsuperscript{1}Graduate School of Information Science, Nagoya University, \textsuperscript{2}Bio-mimetic Control Research Center, RIKEN, \textsuperscript{3}National Institute of AIST)

8. Adjustment of Impedance Center for Passive Interaction between A Robot and Its Environment
   Zhi-Wei Luo\textsuperscript{1}, Yasuo Kishi\textsuperscript{2}, Fumihiko Asano\textsuperscript{1}, Shigeyuki Hosoe\textsuperscript{1,3} (\textsuperscript{1}RIKEN, \textsuperscript{2}Yasukawa Corp., \textsuperscript{3}Nagoya Univ.)

9. Development of A Dynamic Human Movement Analysis Platform
   Kenji Tahara\textsuperscript{1}, Tadashi Odashima\textsuperscript{1}, Masaki Onishi\textsuperscript{1}, Fumihiko Asano\textsuperscript{1}, Zhi-Wei Luo\textsuperscript{1},
   Shigeyuki Hosoe\textsuperscript{1,2} (\textsuperscript{1}RIKEN, \textsuperscript{2}Nagoya Univ.)

10. Fibrous Artificial Muscles Comprising Polypyrrole-Metal Coil Composites
    Tetsuji Zama\textsuperscript{1,2}, Susumu Hara\textsuperscript{1}, Wataru Takashima\textsuperscript{2}, Keiichi Kaneto\textsuperscript{2}
    (\textsuperscript{1}EAMEX Co., \textsuperscript{2}Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology)

11. Flow Control around an Airfoil by an Artificial Muscle
    Masaki Fuchiwaki\textsuperscript{1}, Kazuhiro Tanaka\textsuperscript{1}, Kazuo Onishi\textsuperscript{2}, Shingo Sewa\textsuperscript{2} (\textsuperscript{1}Kyushu Institute of Technology, \textsuperscript{2}EAMEX Co.)

Demonstration

1. Electroactive Polymer Artificial Muscle (EPAM) Actuators
   Scott Standford, Ron Pelrine, Roy Kornbluh, Qibing Pei, Seiki Chiba (SRI Internathional)

2. Polymer Actuator Devices
   Kazuo Onishi (EAMEX Co.)

3. An Application of Artificial Muscles on Robotics
   Yoshihiro Nakabo\textsuperscript{1}, Toshiharu Mukai\textsuperscript{1}, Zhi-Wei Luo\textsuperscript{1}, Kinji Asaka\textsuperscript{1,2} (\textsuperscript{1}BMC RIKEN, \textsuperscript{2}AIST)