Programs

Session Program

Venue: Marine Theater (1F) of Aquamarine Fukushima on July 22nd - 24th.

July 22nd (Thursday)

09: 15 – 09: 30	Opening Address and Announcement: K. Ohnishi
09: 30 – 10: 30	Keynote Lecture and Discussions: M. Kumamoto
10: 30 – 10: 40	Break
10: 40 – 12: 30	Biological Evolution in terms of Motion Control I, Chair: T. Yamada
12: 30 – 14: 30	Lunch Break
14: 30 – 16: 20	Biological Evolution in terms of Motion Control II, Chair: M. Okabe

July 23rd (Friday)

09: 30 – 10: 40	Biological and Engineering Reviews of Motion Control through Landing I, Chair: T. Miyake
10: 40 – 10: 45	Break
10: 45 – 12: 25	Biological and Engineering Reviews of Motion Control through Landing I, Chair: T. Miyake
12: 25 – 14: 00	Lunch Break **(12: 45 – 13: 45 - Dialogue Session I, Odd numbers)**
14: 00 – 15: 50	Biological and Engineering Reviews of Motion Control through Landing II, Chair: M. Kumamoto
15: 50 – 16: 00	Break
16: 00 – 17: 20	Biological and Engineering Reviews of Motion Control through Landing II, Chair: M. Kumamoto

July 24th (Saturday)

09: 30 – 10: 40	Physiological and Engineering Aspects of Neuro-muscular Characteristics in Motion Control, Chair: K. Ohnishi
10: 40 – 10: 50	Break
10: 50 – 12: 35	Physiological and Engineering Aspects of Neuro-muscular Characteristics in Motion Control, Chair: K. Ohnishi
12: 35 – 14: 00	Lunch Break **(12: 45 – 13: 45 - Dialogue Session II, Even numbers)**
14: 00 – 15: 50	Mechatronics and Motion Control, Chair: I. Godler
15: 50 – 16: 00	Break
16: 00 – 17: 10	Mechatronics and Motion Control, Chair: I. Godler
17: 10 – 17: 20	Break
17: 20 – 18: 20	General Discussions and Concluding Remarks, Co-chairs: M. Kumamoto & K. Ohnishi

Dialogue Program

Venue: Aqua-room I (1F) of Aquamarine Fukushima

Dates: July 23rd and 24th

All presentations should be posted between 09: 30 – 12: 00 on July 23rd and should be taken down between 16: 30 – 17: 00 on July 24th.

Session I **July 23rd** 12: 45 – 13: 45	Odd-numbered presentations chaired by T. Tsuji (Saitama University)
Session II **July 24th** 12: 45 – 13: 45	Even-numbered presentations chaired by S. Oh (The University of Tokyo)

Exhibits

Venue: **Lobby in front of Marine Theater**

Dates: **July 22nd (Thursday) - 25th (Sunday)**

The exhibits have been organized and arranged by M. Kumamoto (Kyoto University, Japan), T. Oda and N. Hata (OKI Electric Industry Co., Ltd., Japan) and M. Iwata and C. Nakamura (Aquamarine Fukushima, Japan).

Experimental exhibition:

A series of Research and Development (R&D) outcome was prepared parallel to the panel session, to visually confirm and physically experience how motion control properties contribute to biological evolution. The 18 items of the R&D outcomes are introduced with three areas: **Engineering Review**, **Engineering Verification**, and **Technology Application**.

Exhibition Induction Area

A. A symposium poster and exhibition advice

Engineering Review Area

1. An evolutionary history board
2. An introduction movie on animal evolution in terms of motion control
3. A flagellum robot by Kanazawa Institute of Technology
4. Live lancelets. They had emerged in early Cambrian period about 570 million years ago. They came from the Ariake Sea in the middle west of Kyushu Island. Live specimens were arranged by Dr. K. Yasui at Marine Biological Laboratory, Hiroshima University, Japan, and provided by Dr. Y. Henmi at Center for Environmental Studies, Kumamoto University, Japan.
5. A lancelet robot driven by time sequential mode of antagonistic pair muscle control systems (TSCS) (Saitama University)

6. A coelacanth pectoral fin robot driving with TSCS (Kanazawa Institute of Technology)
7. A Simulator for Devonian tetrapod limb driven by phase different mode of antagonistic pair muscle control systems (PDCS) (OKI Electric Industry, Co., Ltd.)
8. A BiCCOM arm robot driving with PDCS (OKI Electric Industry, Co., Ltd.) BiCCOM: Bi-articular muscle provided Coordination Control Model

Engineering Verification Area

9. Link parameter models
10. Hand-on corner to learn motion control properties of biological link model equipped with mono- and bi-articular muscles
    - Output force characteristics of biological link model
    - Link parameter model by Kanazawa Institute of Technology.
    - Link and spring model by OKI Electric Industry, Co., Ltd.
11. A BiCCOM jump robot by OKI Electric Industry, Co., Ltd.
12. A jump robot by Toyama Prefectural University
13. A quadruped walk robot by Toyama Prefectural University
14. FEMS (Functionally differential Effective Muscles System) program by RCCM, Inc.
15. A physical simulation model of human motion

Technology Application Area

16. A bi-articular activated manipulator by Tokyo Denki University
17. An arm-training robot by Saitama University
18. A chair, Leopard, by OKI Electric Industry, Co., Ltd. and Okamura Corporation