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Workshop on Engineering/Information Science for Integrated Life Science and Predictive Medicine

February 27-28, 2012

Grand Park City Hall, 10 Coleman Street, Singapore

Invitation Letter

February 10, 2012

Dear Professor Ming-Dou Ker,

On behalf of the organizers of the *Workshop on Engineering/Information Science for Integrated Life Science and Predictive Medicine* that will be held in Singapore on February 27 and 28, 2012, it is our great honor to invite you to the workshop as an invited lecturer. The expected title of your lecture is "Closed-Loop Epileptic Seizure Detection and Stimulation".

Sincerely yours,

Masao Tanaka, Ph.D.
Workshop Chair

Professor, Department of Mechanical Science and Bioengineering
Graduate School of Engineering Science, Osaka University
Chair, Division for Education
The Center for Advanced Medical Engineering and Informatics, Osaka University
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Global-COE Workshop on Engineering/Information Science for Integrated Life Science and Predictive Medicine

Programme
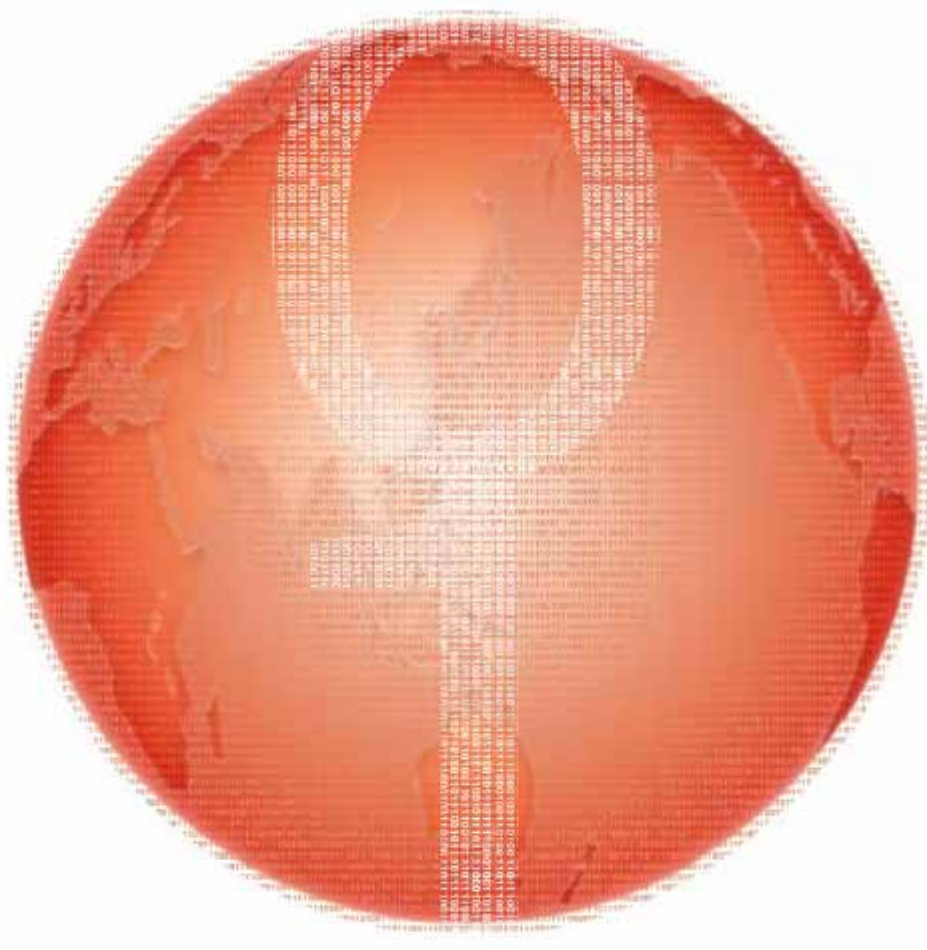
Global COE (Centers of Excellence) Program

in silico medicine

February 27-28, 2012
Grand Park City Hall
10 Coleman Street, Singapore

Osaka University

08:45   Opening Address
Taishin Nomura, Principal Investigator of gCOE program, Osaka University

1a: Biological/physiological system modeling and simulation (a) (Chair: T. Nomura)

08:50-09:30   **Toward integrative biological and medical engineering**
Taishin Nomura, Osaka University

09:30-10:10   **Quantifying Gastrointestinal Cell Electromechanics**
Martin Buist, National University of Singapore

10:10-10:50   **Probabilistic approximation techniques for biopathway modeling**
Bing Liu, Singapore National University

tea break

2a: Biomedical modeling and analysis (a) (Chair: T. Araki)

11:10-11:50   **Imaged-based upper limb musculoskeletal model**
Fong-Chin Su, National Cheng Kung University

11:50-12:30   **Modeling of pulmonary microstructure for the multiscale analysis of lung mechanics**
Shigeo Wada, Osaka University

lunch break

2b: Biomedical modeling and analysis (b) (Chair: S. Wada)

14:00-14:40   **Modeling and Analysis of Spinal Musculoskeletal System**
Yoon Hyuk Kim, Kyung Hee University

14:40-15:00   **Interactive and Multi-sensory Biomedical Simulation for Surgical Training**
Yoshihiro Kuroda, Osaka University

15:00-15:20   **Knowledge-dependent modeling of expert decisions in orthodontic treatment planning**
Masakazu Yagi, Osaka University

15:20-15:40   **Design and analysis of a lifting, standing and mobility robot**
Chieh-Hsiang Hsu, National Cheng Kung University

tea break

1b: Biological/physiological system modeling and simulation (b) (Chair: M. Tanaka)

16:00-16:40   **Multi-scale electrophysiology models of the heart and the gastrointestinal tract**
Alberto Corrias, Singapore National University

16:40-17:00   **A Theoretical Proposal of Postural Control Strategies during Quiet Standing: Based on a Double Inverted Pendulum Model**
Yasuyuki Suzuki, Osaka University

17:00-17:20   **Gait Simulation based on Neuro-Musculo-Skeletal Model**
Masao Tanaka, Osaka University

break

3: Informal discussion (18:00-20:00)

Tuesday, Feb. 28

4: Hybrid organs for advanced medicine (Chair: T. Yagi, M. Imai)
(organized by hybrid organ project)

09:00-09:40	**From in silico to hybrid organs** **Tetsuya Yagi**, Osaka University
09:40-10:20	**Reliability Enhancement and Energy Consumption Reduction in Biological Information Sensing System for Medical and Healthcare Applications** **Masahiro Imai**, Osaka University

tea break

10:40-11:20	**Closed-Loop Epileptic Seizure Detection and Stimulation** **Ming-Dou Ker,** National Chiao-Tung University
11:20-11:40	**A micro universal bio device for artificial vision** **Seiji Kameda**, Osaka University
11:40-12:00	**Three-dimensional kinematic measurement for development of hybrid artificial joint** **Takaharu Yamazaki**, Osaka University

lunch break

5: Life science and high performance computing (Chair: H. Matsuda)

13:30-14:10	**A Novel Contextualization Approach to Proteomic Profile Analysis** **Limsoon Wong**, National University of Singapore
14:10-14:50	**Sampling with Expectation maximization for Motif Elicitation (SEME)** **Wing-Kin Sung**, National University of Singapore

tea break

15:10-15:50	**Computational Methods for Detecting Protein Complexes from Protein-Protein Interaction Networks** **Hon Wai Leong**, National University of Singapore
15:50-16:10	**Rupture of Red Blood Cell Membranes during High-speed Stretching: Molecular Dynamics Simulations** **Kenichiro Koshiyama**, Osaka University
16:10-16:50	**Large-Scale Gene Regulatory Network Analysis for Adipocyte Differentiation on High-Performance Computing Environment** **Hideo Matsuda**, Osaka University
16:50-17:00	Address: **Tetsuya Yagi**, Vice-Director, The Center for Advanced Medical and Engineering and Informatics, Osaka University

Note: Each lecture slot includes 10/5 minute Q&A.

Closed-Loop Epileptic Seizure Detection and Stimulation

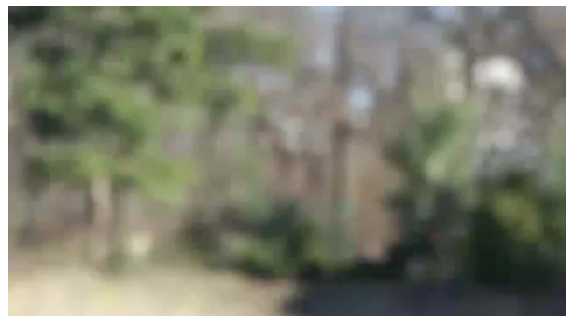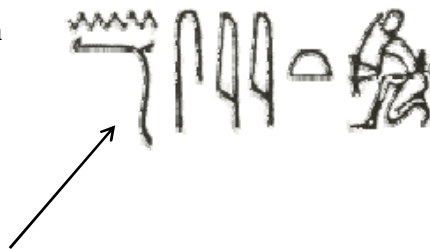## Morris (Ming-Dou) Ker, Peter (Chung-Yu) Wu, and Herming Chiueh

Biomedical Electronics Translational Research Center National Chiao-Tung University (交通大學), TAIWAN.

BETRC Biomedical Electronics Translational Research Center
生醫電子轉譯研究中心

Feb. 28, 2012

交通大學 National Chiao Tung University

What is Epilepsy ?

Ancient Egyptian word describing epilepsy

To the ancient Egyptians the term 'nsjt' (= nesejet = epilepsy) signified a disease which was sent by the gods and which was extremely dangerous.

■ **Epilepsy is defined as a tendency to have recurrent seizures.**

■ **An epileptic seizure is caused by a sudden burst of excess electrical activity in the brain.**

■ **50 million people have epilepsy worldwide.**

交通大學 National Chiao Tung University