



FONDS NATIONAL SUISSE
SCHWEIZERISCHER NATIONALFONDS
FONDO NAZIONALE SVIZZERO
SWISS NATIONAL SCIENCE FOUNDATION

Joint JSPS-SNSF Seminar on

**COMPUTER-AIDED SURGERY:
PRESENT STATE AND FUTURE TECHNICAL AND CLINICAL CHALLENGES**

Dates: 22-24 September 2007

Venue: Osaka University, Ichō Kaikan, Suita Campus
(<http://www.office.med.osaka-u.ac.jp/icho/icho-jp.html>)

Co-chairs:

Yoshinobu Sato (Osaka University)
Miguel A. González Ballester (University of Bern)

Host Organizations

- Japan Society for the Promotion of Science (JSPS)
- Swiss National Science Foundation (SNSF)

Gold Sponsors:

- Global COE Program at MEI Center: A center of excellence for an *in silico* medicine-oriented worldwide open platform, Osaka University
- The National Centre of Competence in Research (NCCR) Co-Me, Switzerland
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Supported by Japan Society of Computer Aided Surgery

Program

Saturday, 22 September 2007

Opening

- 13:00 – 13:10 *Opening Remark*
Yoshihisa Kurachi (Director, MEI Center, Osaka University)
- 13:10 – 13:25 *Introduction*
Miguel González (University of Bern) and Yoshinobu Sato (Osaka University)

Talks about Surgical Robotics

Chair: Takeyoshi Dohi

- 13:30 – 13:50 *Fusion of surgical robotics and navigation in computer aided surgery*
Ichiro Sakuma and Etsuko Kobayashi (University of Tokyo)
- 13:50 – 14:20 *Haptic interface for surgery simulation*
Hannes Bleuler (EPFL, Lausanne)
- 14:20 – 14:40 *Tele-surgery*
Mamoru Mitsuishi (University of Tokyo)
- 14:40 – 15:00 *Advanced visualization and robotics system for intra-operative image guided surgery*
Ken Masamune and Takeyoshi Dohi (University of Tokyo)

15:00 – 15:30 Coffee break

Video Surgery

Chair: Hiroshi Iseki

- 15:30 – 16:00 *2nd endoscopic computer aided revision of a recurrent inverted papilloma of the posterior ethmoid/sphenoid sinus/skull base*
Marco Caversaccio (University of Bern)

Talks about Medical Robotics

Chair: Mamoru Mitsuishi

- 16:00 – 16:15 *Smart surgical instrumentation for spinal interventions*
Sveva Ambrosetti (Bernese Technical University in Biel)
- 16:15 – 16:30 *Rehabilitation systems for upper limbs with high safety*
Takehito Kikuchi and Junji Furusho (Osaka University)
- 16:30 – 16:50 *Intelligent robotics based medicine*
Masakatsu Fujie (Waseda University)

- 16:50 – 17:40 **Round Table** about Surgical and Medical Robotics
Chairs: Hannes Bleuler and Takeyoshi Dohi
Panelists: Ken Masamune, Masakatsu Fujie, Lutz-Peter Nolte,
Makoto Hashizume, and Mamoru Mitsuishi
- 17:50 – 20:00 Welcome Reception (at Icho Kaikan)
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Sunday, 23 September 2007

- Talks about Surgery 1** Chair: Marco Caversaccio
- 9:00 – 9:20 *Computer assisted methods in limb reconstruction and fracture surgery*
Isao Ohnishi (University of Tokyo)
- 9:20 – 9:40 *CT based navigation and laser guidance for resurfacing hip arthroplasty*
Nobuhiko Sugano (Osaka University)
- 9:40 – 10:10 *Computer aided surgery in real cranio-maxillofacial operations*
Tateyuki Iizuka (Univ. of Bern)
- 10:10 – 10:40 Coffee break
- Talks about Surgery 2** Chair: Isao Onishi
- 10:40 – 11:00 *Image-guided robot-assisted minimally invasive surgery*
Makoto Hashizume (Kyushu University)
- 11:00 – 11:20 *Computer aided surgery in neurosurgical field – creation of surgeon's advanced eye, hands and brain –*
Hiroshi Iseki (Tokyo Women's Medical University)
- 11:20 – 11:50 *Impact of a self-developed planning and self-constructed navigation system on skull base surgery: 10 years experience*
Marco Caversaccio (University of Bern)
- Luncheon Seminar** Chair: Nobuhiko Sugano
- 12:00 – 13:00 *The future of navigation at Stryker, a technological approach to surgical excellence*
Jerome Douaze (Stryker Japan K.K.)

Talks about Surgery 3

Chair: Makoto Hashizume

- 13:00 – 13:15 *Real-time synchronization of virtual and video mediastinoscopy for intraoperative navigation*
Hiroyuki Shiono (Osaka University)
- 13:15 – 13:30 *Initial clinical use of augmented reality during urological laparoscopic surgery*
Osamu Ukimura (Kyoto Prefectural University of Medicine)
- 13:30 – 13:50 *3D imaging and surgical navigation in breast cancer surgery*
Yasuhiro Tamaki (Osaka University)

Talk about CAS in Micro/nano scale

Chair: Ken Masamune

- 13:50 – 14:10 *Remote surgery robots in micro and nano scale*
Koji Ikuta (Nagoya University)

- 14:10 – 14:40 Coffee break

Guest speakers

Chair: Miguel González

- 14:40 – 15:10 *Therapy imaging and model and management systems (TIMMS)*
Javier Herrero (Teknon Clinic, Barcelona)
- 15:10 – 15:25 *Dental implant surgery support system using haptic device and CAD/CAM method*
Taiji Sohmura (Osaka University)
- 15:25 – 15:45 *Swiss-Japanese Collaboration in R&D*
Felix Moesner (Swiss Embassy, Tokyo)

- 15:45 – 16:50 **Round Table** about Japan-Switzerland Collaboration on CAS

Chairs: Miguel González and Ichiro Sakuma

Panelists: Hannes Bleuler, Etsuko Kobayashi, Yoshinobu Sato, Makoto Hashizume, Tateyuki Iizuka, Koji Ikuta, Felix Moesner, Nobuhiko Sugano, Yasuhiro Tamaki

- 18:00 – 20:00 Faculty Meeting & Dinner (in Senri Chuo)
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Monday, 24 Sept. 2007

Talks about Imaging and Simulation Chair: Matthias Harders

- 9:00 – 9:30 *Statistical shape models for CAS and implant design*
Miguel González (University of Bern)
- 9:30 – 9:50 *Atlas-based patient modeling and automated surgical planning*
Yoshinobu Sato and Masahiko Nakamoto (Osaka University)
- 9:50 – 10:20 *From MRI data to the 3D simulation of the individual hip motion*
Nadia Magnenat-Thalmann (University of Geneva)

10:20 – 10:50 Coffee break

Guest speakers (Imaging and Simulation) Chair: Yoshinobu Sato

- 10:50 – 11:05 *GPU-accelerated volume reconstruction*
Fumihiko Ino and Kenichi Hagihara (Osaka University)
- 11:05 – 11:20 *Image-based TMJ biomechanics: Modeling and simulation analysis*
Masao Tanaka (Osaka University)

Talks about Simulation and Navigation Chair: Lutz-Peter Nolte

- 11:20 – 11:50 *Virtual and augmented reality for surgical simulation*
Matthias Harders (ETH Zurich)
- 11:50 – 12:10 *Virtual endoscopic navigation and simulation for chest and abdomen*
Kensaku Mori (Nagoya University)

Luncheon Seminar Chair: Ichiro Sakuma

- 12:10 – 13:10 *Research and development of computer aided surgery products at Mizuho Ikakogyo*
Toshimi Shiun (Mizuho Ikakogyo Co., Ltd.)

Video Surgery Chair: Tateyuki Iizuka

- 13:10 – 13:40 *Imaging, simulation and navigation of rotational acetabular osteotomy for hip dysplasia*
Nobuhiko Sugano (Osaka University)

Talks about Imaging and Navigation

Chair: Nadia Magnenat-Thalmann

- 13:40 – 14:00 *Technical developments for interventional MR*
Kagayaki Kuroda (Tokai University)
- 14:00 – 14:30 *Surgical navigation in orthopaedics*
Lutz-Peter Nolte (University of Bern)
- 14:30 – 14:50 *Surgical simulation with haptic sensation and navigation surgery using real time imaging*
Naoki Suzuki (Jikei University)
- 14:50 – 15:20 *Image guided planning and non-invasive execution of interventions in functional neurosurgery based on MR guided focused ultrasound therapy*
Gábor Székely (ETH Zurich)
- 15:20 – 15:50 Coffee break
- 15:50 – 16:40 **Round Table** about Imaging, Simulation, and Navigation
Chairs: Gábor Székely and Kensaku Mori
Panelists: Marco Caversaccio, Hiroshi Iseki, Kagayaki Kuroda, Matthias Harders, Nadia Magnenat-Thalmann, Lutz-Peter Nolte, Isao Ohnishi, Hiroyuki Shiono, Osamu Ukimura, Jerome Douaze
- 16:40 – 16:50 Closing (Lutz-Peter Nolte and Nobuhiko Sugano)
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Guest of honor:

Yoshihisa Kurachi, MD, PhD

Professor and Director of the Center for Advanced Medical Engineering and Informatics (MEI Center), Osaka University

Japanese Participants:

CAS Technology, Image Analysis and Simulation:

Kagayaki Kuroda, PhD

Associate Professor, Faculty of Electronic Information, Tokai University

Molecular Imaging Research Group, Institute of Biomedical Research and Innovation

Kensaku Mori, PhD

Associate Professor, Graduate School of Information Science, Nagoya University

Masahiko Nakamoto, PhD

Assistant Professor, Division of Image Analysis, Department of Medical Engineering, Osaka University Graduate School of Medicine

Yoshinobu Sato, PhD

Associate Professor, Division of Image Analysis, Department of Medical Engineering, Osaka University Graduate School of Medicine

Naoki Suzuki, PhD

Professor, Institute for High Dimensional Medical Imaging, Jikei University School of Medicine

Robotics:

Takeyoshi Dohi, PhD

Professor, Graduate School of Information Science and Technology, The University of Tokyo

Masakatsu Fujie, PhD

Professor, Department of Modern Mechanical Engineering, Faculty of Science and Engineering, Waseda University

Koji Ikuta, PhD

Professor, Department of Micro-Nano System Engineering, Graduate School of Engineering, Nagoya University

Etsuko Kobayashi, PhD

Associate Professor, Department of Precision Engineering, Graduate School of Engineering, The University of Tokyo

Ken Masamune, PhD

Associate Professor, Graduate School of Information Science and Technology, The University of Tokyo

Mamoru Mitsuishi, PhD

Professor, Department of Engineering Synthesis, School of Engineering, Graduate School of Engineering, The University of Tokyo

Ichiro Sakuma, PhD

Professor, Department of Precision Engineering, Graduate School of Engineering, The University of Tokyo

Surgery:

Makoto Hashizume, MD, PhD

Professor and Chairman, Department of Advanced Medical Initiatives, Faculty of Medical Sciences, Kyushu University

Hiroshi Iseki, MD, PhD

Professor, Faculty of Advanced Techno-Surgery, Division of Advanced Biomedical Engineering & Science, Graduate School of Medicine, Tokyo Women's Medical University

Isao Onishi, MD, PhD

Associate Professor, Department of Orthopaedic Surgery, The University of Tokyo

Hiroyuki Shiono, MD, PhD

Associate Professor, Department of General Thoracic Surgery, Osaka University Graduate School of Medicine

Nobuhiko Sugano, MD, PhD

Associate Professor, Department of Orthopaedic Surgery, Osaka University Graduate School of Medicine

Yasuhiro Tamaki, MD, PhD

Associate Professor, Department of Surgical Oncology, Osaka University Graduate School of Medicine

Osamu Ukimura, MD, PhD

Associate Professor, Department of Urology, Kyoto Prefectural University

Swiss Participants:

CAS Technology, Image Analysis and Simulation:

Miguel Ángel González Ballester, PhD

Director of the Surgical Technology Division, Institute for Surgical Technology and Biomechanics, MEM Research Center, University of Bern

Lutz-Peter Nolte, PhD

Professor and Director, Institute for Surgical Technology and Biomechanics, MEM Research Center, University of Bern

Matthias Harders, PhD

Group Leader, Virtual Reality in Medicine, Computer Vision Laboratory, ETH Zürich

Nadia Magnenat-Thalmann, PhD

Professor and Director of the Computer Research Centre (CUI), University of Geneva

Gábor Székely, PhD

Professor and Director of NCCR CO-ME, Computer Vision Laboratory, ETH Zürich

Robotics:

Hannes Bleuler, PhD

Professor, Laboratory of Robotic Systems, EPFL

Sveva Ambrosetti, MSc

PhD student, Bernese Technical University in Biel

Surgery:

Marco Caversaccio, MD

Deputy Chief, Department of Otorhinolaryngology, Head and Neck Surgery, Inselspital
Hospital Bern

Tateyuki Iizuka, MD

Professor, Department of Cranio-Maxillofacial Surgery, Inselspital Hospital Bern

Guest Speakers:

Takehito Kikuchi, PhD

Assistant Professor, Graduate School of Engineering, Osaka University

Junji Furusho, PhD

Professor, Graduate School of Engineering, Osaka University

Jerome Douaze, MSc

Special Project & Advanced Technology Project Manager, Stryker Japan K. K.

Felix Moesner, PhD

Science and Technology Attaché, Swiss Embassy in Tokyo

Javier Herrero Jover, MD PhD

Head Surgeon (Plastic and reconstructive surgery), Teknon Clinic, Barcelona

President, Alma IT Systems

Taiji Sohmura, PhD

Professor, Osaka University Graduate School of Dentistry

Fumihiko Ino, PhD

Assistant Professor, Graduate School of Information Science and Technology, Osaka University

Kenichi Hagihara, PhD

Professor, Graduate School of Information Science and Technology, Osaka University

Masao Tanaka, PhD

Professor, Graduate School of Engineering Science, Osaka University

Toshimi Shiun, MSc

Senior Director, Research & Development Dept., Mizuho Ikakogyo Co., Ltd.
