

Preface

A novel partnership between surgeons and machines, made possible by advances in computing and engineering technology, could overcome many of the limitations of traditional surgery. By extending surgeons' ability to plan and carry out surgical interventions more accurately and with less trauma, computer-integrated surgery (CIS) systems could help to improve clinical outcomes and the efficiency of health care delivery. CIS systems could have a similar impact on surgery to that long since realized in computer-integrated manufacturing. Mathematical modeling and computer simulation have proved tremendously successful in engineering. Computational mechanics has enabled technological developments in virtually every area of our lives. One of the greatest challenges for mechanists is to extend the success of computational mechanics to fields outside traditional engineering, in particular to biology, the biomedical sciences, and medicine.

Computational Biomechanics for Medicine Workshop series was established in 2006 with the first meeting held in Copenhagen. The fifth workshop was held in conjunction with the Medical Image Computing and Computer Assisted Intervention Conference (MICCAI 2010) in Beijing on 24 September 2010. It provided an opportunity for specialists in computational sciences to present and exchange opinions on the possibilities of applying their techniques to computer-integrated medicine.

Computational Biomechanics for Medicine V was organized into two parts: "Computational Biomechanics of Soft Tissues, Flow, and Injury Biomechanics" and "Computational Biomechanics of Musculoskeletal System and Its Tissues. Generation of Patient-Specific Finite Element Meshes." The application of advanced computational methods to the following areas was discussed:

- Medical image analysis
- Image-guided surgery
- Surgical simulation
- Surgical intervention planning
- Disease prognosis and diagnosis
- Injury mechanism analysis

After a rigorous review of manuscripts (8–12 pages), we accepted 13 papers which are included in this volume. The proceedings also include abstracts of two invited

lectures by world-leading researcher Professor Ming Zhang from The Hong Kong Polytechnic University, and Tsuyoshi Yasuki, General Manager of Advanced CAE Division at Toyota Motor Corporation, Japan.

Information about Computational Biomechanics for Medicine Workshops, including proceedings of previous meetings is available at <http://cbm.mech.uwa.edu.au/>.

We thank the MICCAI 2010 organizers for help with administering the workshop, the invited lecturers for deep insights into their research fields, the authors for submitting high quality work, and the reviewers for helping with paper selection.

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Computational Biomechanics for Medicine
Soft Tissues and the Musculoskeletal System
Wittek, A.; Nielsen, P.M.F.; Miller, K. (Eds.)
2011, XII, 155 p., Hardcover
ISBN: 978-1-4419-9618-3