



SSBE
2004

2004 Annual Meeting
Swiss Society for Biomedical Engineering

Venue ETH Zürich

Dates September 2-3, 2004

Program

www.ssbe.ch/2004_Meeting

Welcome

The Swiss Society for Biomedical Engineering (SGBT, SSGB, SSBE) is pleased to announce the SSBE 2004 Meeting which will take place September 2nd and 3rd at ETH Zürich. Biomedical Engineering in Switzerland is a scientific and professional discipline with a wide range of career options. The meeting organizers aim to bring together scientists and educators involved in basic and applied biomedical engineering research and teaching. One of the main motivations for the meeting is to draw a map of biomedical engineering in Switzerland. With this respect, a series of invited lectures on selected topics will be presented. As you can see from the description below the program is quite broad and shows the multiple facets of our society. A special emphasis will be placed on student research at both the Masters and Doctoral level and ample time for showcasing the student work will be provided. As of today, additionally to the presentations of the 11 invited speakers, we have received almost 60 abstracts for our two poster sessions and we are expecting around 100 people at our annual meeting.

I am looking forward to welcoming you in Zürich this September!



Prof. Dr. Ralph Müller
President, Swiss Society for Biomedical Engineering
Chairman, SSBE 2004

Sponsors

The organizers of the SSBE 2004 Annual Meeting would like to thank the following sponsors for their contribution:



Schweizerische Gesellschaft für Biomedizinische Technik (SGBT)
Swiss Society for Biomedical Engineering (SSBE)
Société Suisse de Génie Biomédical (SSGB)

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Swiss Federal Institute of Technology Zurich



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zimmer

Meeting objectives

The meeting organizers aim to bring together scientists and educators involved in basic and applied biomedical engineering research and teaching. One of the main motivations for the meeting is to draw a map of biomedical engineering in Switzerland. With this respect, a series of invited lectures on selected topics will be presented. A special emphasis will be placed on student projects at both the Masters and Doctoral level and ample time for showcasing their work will be provided

Organizing Committee

The meeting is organized on behalf of the Swiss Society for Biomedical Engineering by the Institute for Biomedical Engineering. This Institute is a joint laboratory of the Swiss Federal Institute of Technology (ETH) in Zürich and the University of Zürich.

The organizers are:

Prof. Dr. Ralph Müller, Meeting Chairman

Dr. Harry van Lenthe, Secretary General

Dr. Jess Snedeker, Program Chair

Contact

Esther Singer

Secretariat SSBE Annual Meeting 2004

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http://www.ssbe.ch/2004_Meeting

General information

Venue and date

The meeting will be held at ETH Zurich Zentrum on September 2 and 3, 2004. More specifically, the conference reception/registration and poster sessions will be located on the “E” floor of building ETZ (Gloriastrasse 35). Various sessions of the meeting, such as the invited speaker presentations, will take place next door in the lecture room “B1” of building VAW (Gloriastrasse 37). Detailed maps of the venue can be found on the next pages.

Language

The official language during the meeting is English.

Registration

The 2004 Annual Meeting is open to both members and non-members. The meeting fees cover the costs of two lunches, several coffee breaks, drinks and snacks during the two poster sessions, and the SSBE Barbecue on Thursday evening. In addition, a one year membership in the SSBE is included in the registration fee for non-members (subject to society membership guidelines).

Registration fees are as follows:

	Registration <i>before</i> August 15	Registration <i>on or after</i> August 16
Member	CHF 25	CHF 50
Non-member	CHF 50	CHF 75

We recommend to use the conference website to register: http://www.ssbe.ch/2004_Meeting/

On-site registration will be located at the “E” floor of building ETZ. Note that during the conference only cash payments can be accepted.

Badges

Upon registration at the reception desk at ETZ, you will receive a personal badge and other conference information. We kindly ask you to wear your badge during the whole meeting.

The organizers would appreciate if you return your badge to the registration desk at the end of the conference.

Lunch, coffee, tea

Coffee and tea will be served for all the participants of the conference near the poster exhibition area. Participants will receive vouchers for the lunches, which will be served at the ETH Mensa. The Mensa is located in the ETH Main Building, a short 10 minute-walk from the conference site (see map). If you possess a University ID from any of the Swiss universities, please bring it along for the lunch.

Plenary Presentations

All plenary presentations will be held in lecture room B1 in building VAW (Gloriastrasse 37).

Commented Poster Presentations

Two poster sessions will be held during which you can discuss your work with interested participants. Each poster session will be divided into two parts. It will start with a 'Commented Poster Session'. This will be a plenary session, in which the authors will be given the opportunity for a two-minute presentation of their posters to the audience. Two to three PowerPoint slides can be used to support the presentation. Please use the template as provided on the conference web site when preparing, and uploading, your slides. The deadline for slides submission is Monday August 30th at midnight.

Posters

During the second part of the poster session, the posters can be visited. This will give ample time for discussing the posters in detail. Wine, beer, and light snacks will be served during the Thursday poster sessions. During the poster session on Friday, coffee, tea and desserts will be served.

Posters can be up to a maximum of 1200 mm high and 880 mm wide (A0 - portrait orientation). Guidelines for formatting the poster can be found on the conference website. Posters should be mounted before 12 o'clock on Thursday and should be removed at the end of the meeting. The number of the abstract in the abstract book corresponds with the number of the poster; each poster will be assigned a poster board.

General Assembly

The General Assembly of the SSBE will take place as an integral part of the 2004 Annual Meeting. One of the highlights of the General Assembly will be the Presentations of the SSBE Awards. Although the General Assembly is open to both SSBE members and non-members, only members are allowed to vote. Members have received a separate mailing with this year's General Assembly and the Minutes of last year's meeting.

Awards

At the General Assembly the winners of the *SSBE Research Award* and the *SSBE Student Award* will be announced. In a 15-minute presentation the winner of the *SSBE Research Award* will present his/her work.

On Friday, after the second Poster Session, the winners of the two *SSBE Annual Meeting Poster Awards* will be presented.

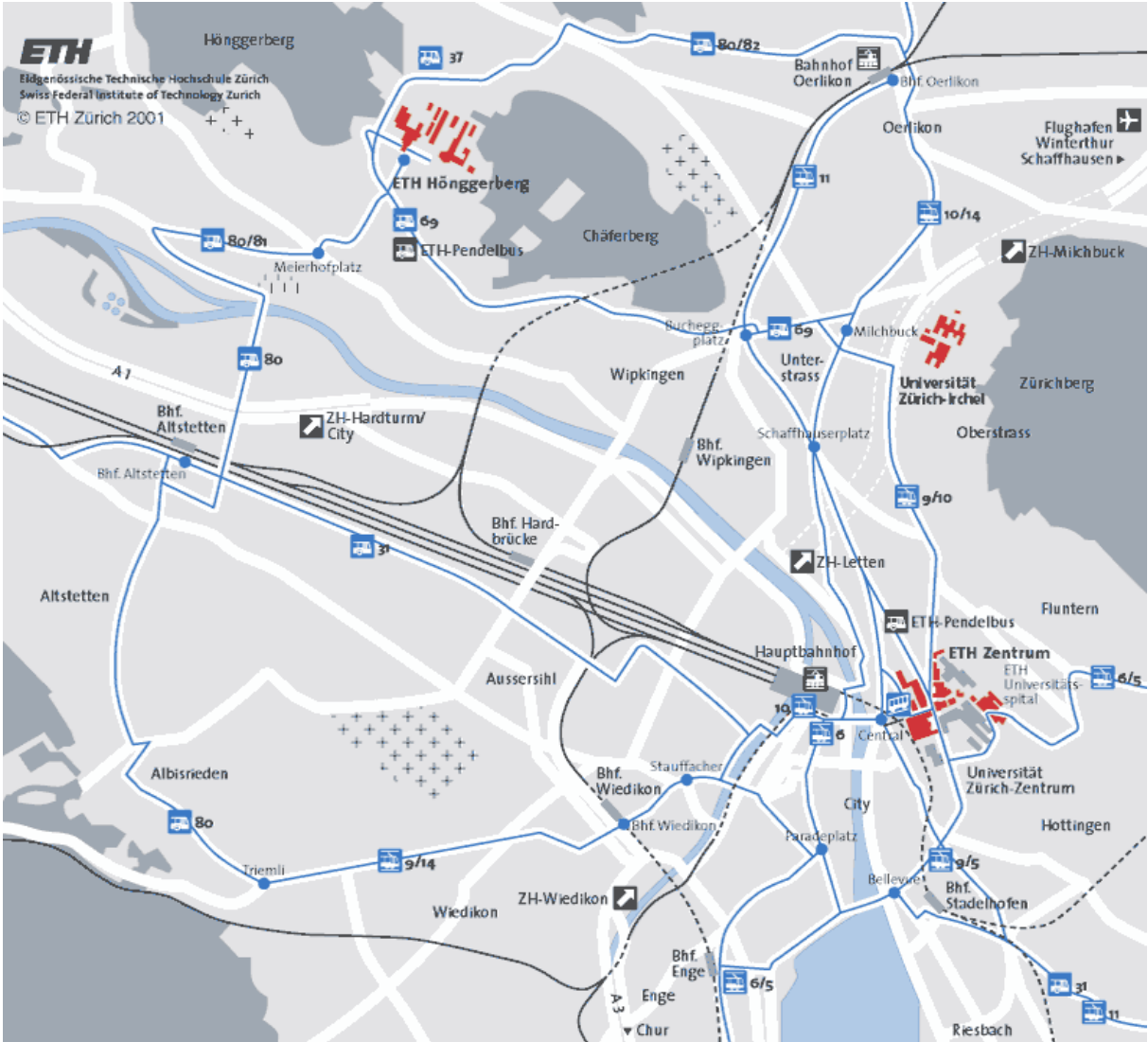
Social Program

On Thursday evening, from 20.00 to 23.30, the SSBE Barbecue will take place. This lake-side barbecue will be held at the *Strandbad Mythenquai*, Mythenquai 95, Zürich. Participants will receive a voucher for free admission, drinks and food. Information on the venue and how to get there can be found on the next pages.

Housing

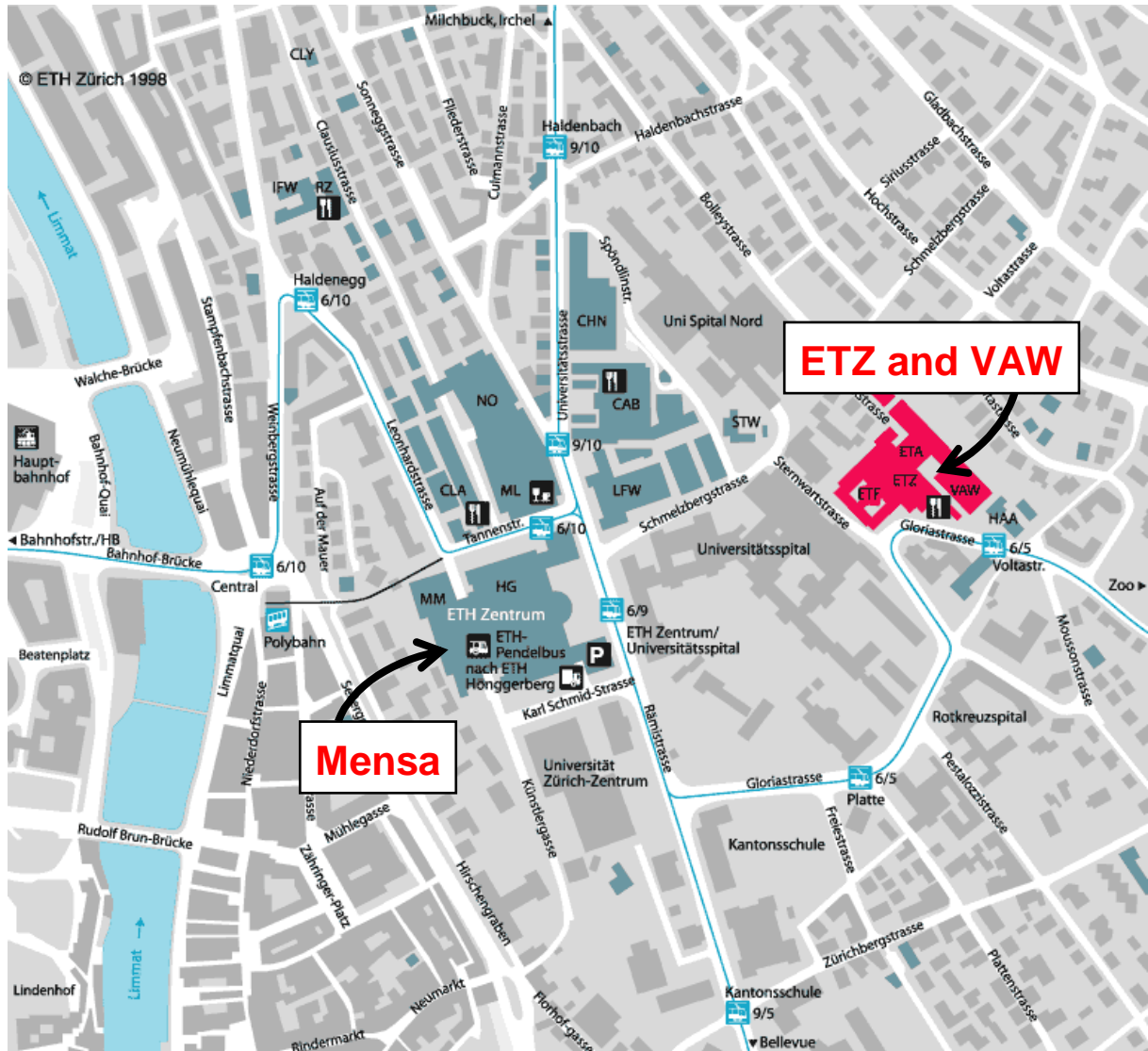
Conference attendees are responsible for their own hotel arrangements. The Zurich travel bureau (<http://www.zuerich.com/>) provides an excellent reservation service.

Map of the city of Zurich



The conference venue is *ETH Zentrum*, Department of Information Technology and Electrical Engineering, located close to Zurich Main Station.

Map of the conference venue



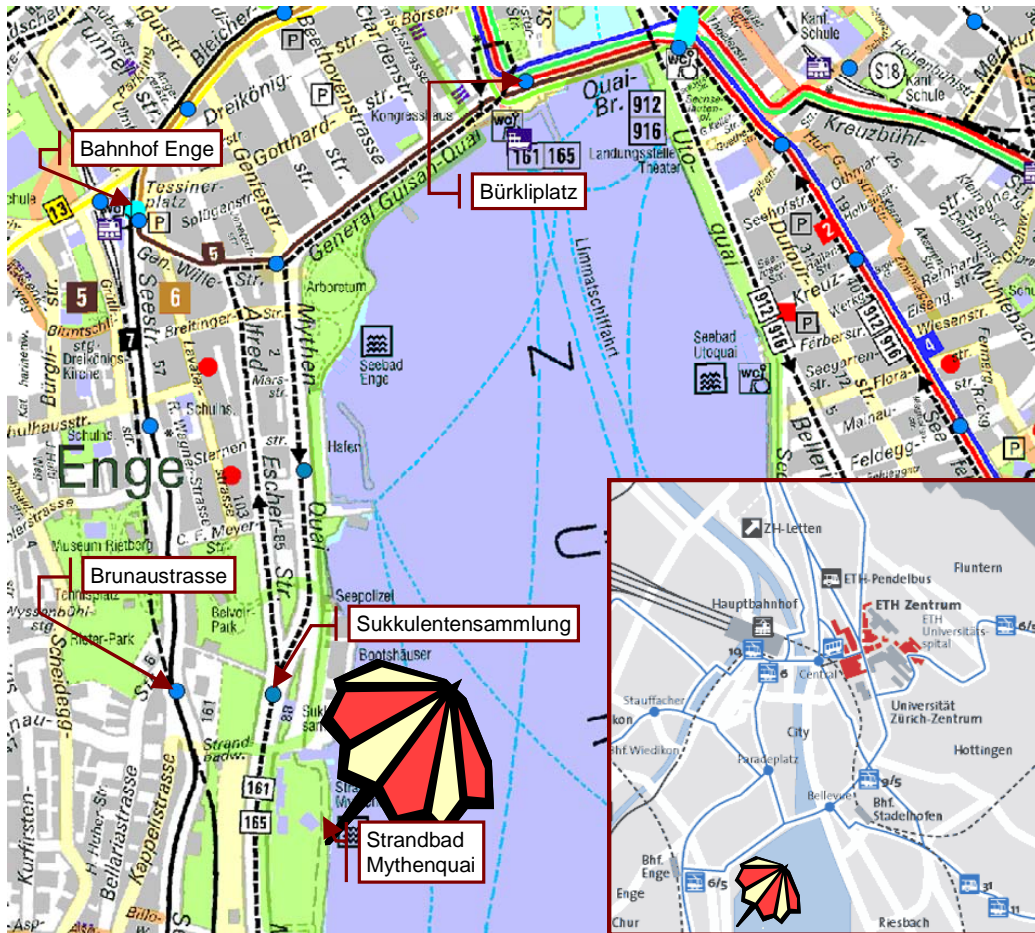
Detailed map of the conference venue *ETZ* and *VAW* at *ETH Zentrum*.

The numbers indicate the tram lines. An easy and convenient way to get to *ETZ* (Gloriosastrasse 35) and *VAW* (Gloriosastrasse 37) is to take tram 6 from Zürich Main Station to tram stop 'Voltastrasse' (10 minutes, 8 times/hour)

Lunches will be served at the *Mensa Polyterasse*, located at the *Main Building* of ETH, a short 10 minute-walk from *ETZ* and *VAW*. If you buy a tram day pass (recommended) you could also use tram 6 to get to *ETH Main Building* (take tram 6 from 'Voltastrasse' to 'ETH/Universitätsspital').

Map of the SSBE Barbecue venue

On Thursday evening the SSBE Barbecue will be held at *Strandbad Mythenquai*, Mythenquai 95, Zürich. *Strandbad Mythenquai* is located on the left bank of Lake Zürich; it provides a very nice environment, with great views towards the Alps as well as to the city of Zurich.



How to get there:

The venue is easily accessible by tram and bus. It is within the city limits of Zürich, so a tram day pass will get you there. From the conference venue, walk up to tram stop *Voltastrasse*, from where you can take tram 5 downhill to *Bürkliplatz*. At *Bürkliplatz* you can take either bus 161 to Kilchberg or bus 165 to Rüslikon. After only 3 minutes, get off at *Sukkulentensammlung*. From there it's a two-minute walk further south along the lake to the *Strandbad Mythenquai*. The buses from Bürkliplatz to Sukkulentensammlung leave at:

161 Kilchberg	19.19	19.34	19.49
165 Rüslikon	19.09	19.24	19.54

Another option is to take tram 5 from *Voltastrasse* to *Bahnhof Enge*. There you can take tram 7 to *Brunaustasse* and walk down to the lake.

Be aware that in September the nights are colder than in summer time, so you might want to bring warm clothes!

Program

Thursday, September 2

09.30 – 10.15	Registration, Coffee and Gipfeli	ETZ
10.15 – 10.30	Welcome	VAW
10.30 – 12.00	Orthopedic Bioengineering	VAW
10:30	<i>New Trends in Computer Aided Orthopaedic Surgery</i> Prof. Dr. Lutz Nolte, University of Bern	
11:00	<i>In vivo, in vitro, and ex vivo Bioengineering Research at the AO Research Institute</i> Prof. Dr. Keita Ito, AO Research Institute, Davos	
11:30	<i>Research at the Laboratory for Biomechanics ETH Zurich</i> Prof. Dr. Edgar Stüssi, Swiss Federal Institute of Technology, Zürich	
12.00 – 13.30	Lunch	Mensa
13.30 – 15.00	Tissue Engineering and Nanotechnology	VAW
13:30	<i>Natural patterning of extracellular morphogen gradients by the micromechanical environment</i> Prof. Dr. Melody A. Swartz, Swiss Federal Institute of Technology, Lausanne	
14:00	<i>Bioreactors for skeletal tissue engineering</i> Dr. Ivan Martin, University of Basel	
14:30	<i>The potential of nanopatterning for life sciences applications</i> Dr. Jens Gobrecht, Paul Scherrer Institut, Villigen	
15.00 – 16.00	Commented Posters	VAW
16.00 – 17.30	1st Poster Session with beer, wine, and cheese	ETZ
17.30 – 18.15	General Assembly + Presentation of the SSBE Awards	VAW
20.00 – 23.30	SSBE Barbecue	

Friday, September 3

09.00 – 10.30	Biomedical Imaging	VAW
09:00	<i>Recent developments in functional magnetic resonance imaging</i> Prof. Dr. Peter Boesiger, Swiss Federal Institute of Technology, Zürich	
09:30	<i>Fractals, wavelets and medical image analysis</i> Prof. Dr. Michael Unser, Swiss Federal Institute of Technology, Lausanne	
10:00	<i>Molecular imaging of biochemical functions using small animal PET</i> PD Dr. Simon Ametamey, Paul Scherrer Institut, Villigen	
10.30 – 11.00	Coffee and tea break	ETZ
11.00 – 12.00	Biomedical Photonics	VAW
11:00	<i>Optical methods in biology and medicine: Scientific background and Potential</i> PD Dr. Martin Wolf, University of Zürich	
11:30	<i>Optical Methods in Biology and Medicine: Needs and Applications</i> Prof. Dr. Paolo Meda, University of Geneva	
12.00 – 13.30	Lunch	Mensa
13.30 – 14.30	Commented Posters	VAW
14.30 – 16.00	2nd Poster Session with extended Dessert Bar	ETZ
16.00 – 16.15	Presentation of the Poster Awards + Closing remarks	VAW
16.15 – 17.30	Visit of the Institute for Biomedical Engineering	

Legend

ETZ 'E floor' in ETZ

VAW Lecture room B1 in VAW

Mensa Mensa Polyterrasse, Main Building ETH

**LIST OF
POSTERS**

- | Poster # | Poster Title & Author List |
|-----------------|---|
| 1 | CO-OPERATIVE CONTROL FOR REHABILITATION ROBOTS
M. Frey, T. Nef, M. Bernhardt, & R. Riener
<i>IFA, ETH Zurich and University Hospital Balgrist, Zurich, Switzerland</i> |
| 2 | MEMS FORCE SENSOR FOR BIOLOGICAL APPLICATIONS
F. Beyeler, Y. Sun, & B.J. Nelson
<i>Institute of Robotics and intelligent Systems, ETHZ, Zürich, Switzerland</i> |
| 3 | ENGINEERING CARTILAGE-LIKE TISSUE FROM HUMAN MESENCHYMAL STEM CELLS ON SILK SCAFFOLDS
S. Hofmann ^{1,2} , D. Kaplan ² , G. Vunjak-Novakovic ³ , H.P. Merkle ¹ , R. Langer ³ , L. Meinel ^{1,3}
¹ <i>Institute of Pharmaceutical Sciences, ETH Hoenggerberg, HCI, 8093 Zurich, Switzerland</i>
² <i>Department of Biomedical Engineering, Tufts University, Medford, MA</i>
³ <i>Division of Health Sciences and Technology, M.I.T. Cambridge, MA</i> |
| 4 | ENHANCED TRABECULAR BONE IN TRANSGENIC MICE OVEREXPRESSING OSTEOGENIC GROWTH PEPTIDE
T. Kohler ¹ , E. Smith ² , T. Meyerrose ² , J. Nolta ² , R. Müller ¹ , I. Bab ³ and B. Frenkel ²
¹ <i>Institute for Biomedical Engineering, ETHZ and University of Zurich, Switzerland</i>
² <i>Keck School of Medicine, University of Southern California, USA</i>
³ <i>Institute of Dental Sciences, Hebrew University of Jerusalem, Israel</i> |
| 5 | OPTIMAL WIENER FILTERING FOR fMRI IMAGES WITH POLYHARMONIC SMOOTHING SPLINES
S. Tirosh, D. van de Ville, & M. Unser
<i>Biomedical Imaging Group, EPFL, Lausanne, Switzerland</i> |
| 6 | SEMI-AUTOMATIC CARTILAGE SEGMENTATION FROM MRI SCANS
C. Pirnog ¹ , E. Stüssi ² & G. Székely ¹
¹ <i>Computer Vision Laboratory, ETHZ, Zürich, Switzerland</i>
² <i>Laboratory for Biomechanics, ETHZ, Zürich, Switzerland</i> |
| 7 | HAPTIC SOFT TISSUE INTERACTION
P. Leskovsky, M. Harders, & G. Szekely
<i>Computer Vision Laboratory, ETHZ, Zürich, Switzerland</i> |

- 8 MECHANICAL CHARACTERISATION OF A PEEK-OPTIMA POLYMER UNDER SIMULATED PHYSIOLOGICAL CONDITIONS**
A. Polikeit, J.M.A. Visser, S.J. Ferguson
M.E. Müller Institute for Surgical Technology and Biomechanics, University of Bern, Switzerland
- 9 CELL MANIPULATION USING ULTRASOUND**
A. Neild, A. Haake, & J. Dual
Center of Mechanics, ETHZ, Zürich, Switzerland
- 10 EVALUATING CARDIAC FUNCTION USING TRANS-THORACIC ECHOCARDIOGRAPHY AND THE CONDUCTANCE CATHETER.**
D. Jegger^{1,2}, M. Nasratullah⁴, X. Jeanrenaud⁴, P-G. Chassot⁵, A. Mallik¹, H. Tevaearai³, LK. von Segesser², N. Stergiopulos¹.
¹*Laboratory of Haemodynamics and Cardiovascular Technology, EPFL, Lausanne, Switzerland;*
²*Department of Cardiovascular Surgery, CHUV, Lausanne, Switzerland*
³*Department of Cardiovascular Surgery, Inselspital, Bern, Switzerland*
⁴*Department of Cardiology, CHUV, Lausanne, Switzerland*
⁵*Department of Anaesthesiology, CHUV, Lausanne, Switzerland*
- 11 VENOUS OXYGEN SATURATION AND THE COMPARTMENTAL DISTRIBUTION OF CEREBRAL BLOOD VOLUME IN THE ADULT HUMAN HEAD**
D.W. Brown¹, D. Haensse^{1,2}, & M. Wolf^{1,2}
¹*Clinic for Neonatologie, University Hospital, Zurich, Switzerland*
²*Biomedical Engineering Laboratory, Swiss Federal Institute of Technology*
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Laboratory of Hemodynamics and Cardiovascular Technology, EPFL, Lausanne, Switzerland
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Diana Trentin¹, Jeffrey A. Hubbell^{1,2} and Heike Hall¹
¹*Institute for Biomedical Engineering and Department of Materials, ETHZ, Zürich, Switzerland*
²*Current address: Institute for Biological Engineering and Biotechnology, EPFL, Lausanne, Switzerland.*

- 14** **OSTEOGENIC DIFFERENTIATION OF HUMAN BONE MARROW STROMAL CELLS EXPOSED TO A CONTROLLED REGIME OF FLUID INDUCED SHEAR STRESS**
S. Scaglione^{1,2}, S. Miggino², D. Wendt¹, F. Beltrame², R. Quarto³, I. Martin¹
¹ *Institute for Surgical Research and Hospital Management, University Hospital Basel, Switzerland*
² *Department of Communication, Computer and System Sciences, University of Genoa, Italy*
³ *Department of Oncology, Biology and Genetics, University of Genoa, Italy*
- 15** **RESOLUTION ENHANCEMENT IN OPTICAL COHERENCE TOMOGRAPHY**
R. Langoju, T. Blu, & M. Unser
Biomedical Imaging Group, EPFL, Lausanne, Switzerland
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Laboratory of Hemodynamic and Cardiovascular technology, EPFL, Lausanne, Switzerland
- 17** **MEASURING THE MECHANICAL PROPERTIES OF SOFT BIOLOGICAL TISSUES IN-VIVO**
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Institute of Mechanical Systems, ETHZ, Zürich, Switzerland
- 18** **PDMS CHANNEL SYSTEM TO ACHIEVE DEFINED NEURONAL NETWORK TOPOLOGIES**
Frauke Greve¹, Andreas Hierlemann¹, Heike Hall²
¹ *Physical Electronics Laboratory*
² *Institute for Biomedical Engineering and Department of Materials ETHZ, Zürich, Switzerland.*
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Institute for Biomedical Engineering, University and ETH Zurich, Zurich, Switzerland

- 20 CHONDROCYTE PERFUSION SEEDING/CULTURING IN 3D SCAFFOLDS**
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F. Wiesinger¹, P.-F. Van De Moortele², G. Adriany², N. De Zanche¹, K. Ugurbil², K.P. Pruessmann^{1,2}
¹ *Institute of Biomedical Engineering, University and ETH Zurich, Switzerland*
² *Center for MR Research (CMRR), University of Minnesota, Minneapolis, USA*
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Laboratory of Hemodynamics and Cardiovascular Technology, EPFL, Lausanne, Switzerland
- 23 TOWARDS A FINITE ELEMENT MODEL OF THE UTERUS**
S. Weiss¹, M. Bajka², T. Jaermann¹, P. Schmid¹, P. Staempfli¹ & P. Niederer¹
¹ *Institute for Biomedical Engineering, University and ETH Zurich, Switzerland*
² *Clinic of Gynecology, University Hospital Zurich, Switzerland*
- 24 3D IN VIVO ARTIFICIAL KNEE JOINT KINEMATICS OF A FULL GAIT CYCLE USING A MOVING SINGLE PLANE VIDEO-FLUOROSCOPE**
M.S. Zihlmann¹, H. Gerber¹, K. Burckhardt², M. Foresti¹ & E. Stüssi¹
¹ *Laboratory for Biomechanics, ETHZ, Zürich, Switzerland*
² *Computer Vision Laboratory, ETHZ, Zürich, Switzerland*
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¹ *Biophysics group, Institute for Biomedical Engineering, University and ETH Zurich*
² *Division of Radiology, University Hospital Zurich;*
³ *Division of Gastroenterology, University Hospital, Zurich*

26 BIOCOMPATIBLE PACKAGING OF A FLOWSENSOR FOR HYDROCEPHALUS

J. Burger¹, F. Zumkehr¹, A. Ginggen², T. Bork²

¹ HTI Biel, Department of Microtechnology and Medical Technology, CH-2501 Biel, Switzerland

² Medos/Codman S.A., CH-2400 Le Locle, Switzerland

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Martin Reidy¹, Pius Zihlmann¹, Jeffrey A. Hubbell^{1,2} and Heike Hall¹

¹Institute for Biomedical Engineering and Department of Materials, ETHZ, Zürich, Switzerland

²Current address: Institute for Biological Engineering and Biotechnology, EPFL, Lausanne, Switzerland

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S. Ghosh¹, M. Jassal², A. R. Ray³

¹ICFS & Department of Research, University Hospital, Basel, Switzerland

²Department of Textile Technology, Indian Institute of Technology, Delhi, India

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M. Dettwyler, A. Stacoff, & E. Stüssi

Laboratory for Biomechanics, ETHZ, Zürich, Switzerland

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Biomedical Imaging Group, EPFL, Lausanne, Switzerland

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S. Schweizer, P. Schneider, R. Müller
Institute for Biomedical Engineering, Swiss Federal Institute of Technology / ETH, Zürich, Switzerland
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S. Heinzer¹, T. Krucker², E. P. Meyer³, A. Schuler³, M. Stampanoni⁴, R. Abela⁴, R. Müller¹
¹ *Institute for Biomedical Engineering, Swiss Federal Institute of Technology / ETH, Zürich, Switzerland*
² *Department of Neuropharmacology, The Scripps Research Institute, La Jolla, CA, USA*
³ *Department of Neurobiology, University of Zürich, Zürich, Switzerland*
⁴ *Swiss Light Source (SLS), Paul Scherrer Institut (PSI), Villigen, Switzerland*
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¹ *Institute for Biomedical Engineering, University and ETH Zurich, Switzerland*
² *Institute of Neuroradiology, University Hospital Zurich, Switzerland*
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B. San Miguel^{1,2,3}, M.H. Textor² & F.E. Weber^{1,3}
¹ *Institute for Oral Biology, Section Bioengineering, University of Zurich, Switzerland.*
² *Laboratory for surface Science and Technology, Dept. of Materials, ETH-Zürich, Switzerland.*
³ *Dept. Of Cranio-Maxillofacial Surgery, University Hospital Zürich, Switzerland.*
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¹ *Institute for Biomedical Engineering, Swiss Federal Institute of Technology and University of Zürich, Switzerland*
² *Bone Laboratory, Hebrew University of Jerusalem, Israel,*
³ *Institute for Oral Biology and Dept. Craniomaxillofacial Surgery Univ. Zurich, Switzerland*

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Biomedical Imaging Group, EPFL, Lausanne, Switzerland
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F. Dorri¹, P. Niederer¹, P. Lunkenheimer²
¹*Institute of Biomedical Engineering, ETHZ, Zurich, Switzerland*
²*Exp. Thorax, Heart and Vessel Surgery, University of Munster, Munster, Germany*
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¹*Clinic of Neonatology, University Hospital, Zurich, Switzerland*
²*Biomedical Engineering Laboratory, Swiss Federal Institute of Technology, Zurich, Switzerland*
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Institute of Biomedical Engineering, ETHZ, Zürich, Switzerland¹
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R. Fedosseev¹, Y. Belyaev¹, H. Ewers², A. Stemmer¹
¹ *Nanotechnology Group, Swiss Federal Institute of Technology, CH-8092 Zurich, Switzerland*
² *Institute of Biochemistry, Swiss Federal Institute of Technology, CH-8093 Zurich, Switzerland*
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K. Stok & R. Mueller
Institute for Biomedical Engineering, Swiss Federal Institute of Technology (ETH) and University of Zurich, Switzerland
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T. L. Mueller¹, J. Watson², J. Schense², N. H. Andrianaly³, B. von Rechenberg³ & R. Müller¹
¹ *Institute for Biomedical Engineering (IBT), ETH & University, Zürich, Switzerland*
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