

European Society of Biomechanics

Newsletter

January 2003

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THE SOCIETY'S E-MAIL LIST

All members are requested to e-mail their e-mail address to the Secretary-General Dr Keita Ito at keita.ito@ao-asif.ch as soon as possible. The ESB intends to use electronic communication exclusively in the future.

President's Address

Patrick J. Prendergast, Trinity College Dublin, Ireland

President of the ESB

When the ESB was founded in 1976, it marked the start of building a research community for biomechanics in Europe. It was motivated by a recognition of the benefits of exchanging ideas, of scientific collaboration, and of networking. Recently a European Research Area has been proposed by the European Commission – this provides an opportunity for the ESB to further achieve its goals and a challenge for us to promote biomechanics as a scientific field.

EU expansion to include countries from Central and Eastern Europe is also imminent, and I am happy to say that the ESB is ahead of the game, first by naming corresponding members in many of those countries (see www.utc.fr/esb for recent reports from these members), and secondly by holding our biennial conference in Wrocław, Poland, in August 2002. It is a pleasure to thank Professor Będziński and his team for the successful conference they organised in 'the capital of Lower Silesia', and to express our appreciation to the AO Foundation for their sponsorship of the S.M. Perren Award which was inaugurated at the Wrocław conference (see page 9 of this issue).

In thinking of what to say in this Address, I looked back at old Newsletters and saw that Leif Ryd exhorted us "Apply Biomechanics!", which certainly makes sense from his perspective as an orthopaedic surgeon, and

Georges Van der Perre proposed Focus Groups and targeted their introduction as an aim of his presidency. Georges' Focus Groups will identify unanswered questions in biomechanics and formulate strategies to try to solve them. In doing so, no doubt we will find that there is a large gap between theory and what is needed to apply biomechanics in clinical practice. This gap between the theory and the clinical reality emphasises the extent of the work to be done in biomechanics research. There are many factors that could divert biomechanics from meeting its potential, such as (i) the difficulties of using biomechanics to quickly solve clinical problems and (ii) the consequent perception by some that biomechanics lacks potential for high scientific impact; it is incumbent on us biomechanicians to convince others, including the funding agencies, that biomechanics, though difficult, has the potential to provide clinical solutions if the gap between the theory and the clinical reality can be bridged. I read somewhere that scientific problems are never really solved, they are just abandoned – let us ensure that biomechanical problems are not abandoned before we have had a good shot at solving them. I believe these arguments will become even more important as research under FP6 becomes a driving force in the European Research Area. In this issue of the Newsletter you will find how the Council of the ESB is planning to respond to these changing times, under the direction of our new

EU Liaison Committee Chair, Marco Viceconti from Bologna.

In concluding I would like to record our appreciation to the outgoing council members, Georges Van der Perre who, as president from 1998 to 2002, showed us how to achieve a lot in a friendly and co-operative atmosphere. Although Georges' term as President is over, his commitment to the ESB is still strong, as you will read on page 4 of this Newsletter. To Yannis Missirlis from Patras who served as a council member from 1994 to 2002, we offer our thanks for much well-considered advice and work with the Award Committee. To Michel Dalstra, a Dutchman in Denmark, we thank for his work as Newsletter Editor for four years from 1998 to 2002, and also to Hilaire Jacob from Zürich for several years of service to the society as an Auditor.

To our members, I say that this council will do our best to bring you an active society, and one that will work for the interests of the biomechanics research community in Europe. One important way we will do this is through the ESB2004 conference (see page 14) and by promoting the society's Awards. However we also aim to bring you further initiatives in relation to the European Research Area, Focus Groups, and member services.

Finally I would like to invite members to communicate with any council member with any suggestions or proposals (see e-mail addresses in this issue of the Newsletter). We will always appreciate to hear from you.

Dublin, 1st December, 2002

EU Liaison committee: a preliminary activity plan

Marco Viceconti, Istituti Ortopedici Rizzoli, Italy

A European Research Area for Biomechanics

At the last biannual meeting in Wrocław the ESB Council was reorganised with the arrival of three new council members. The Council agreed to create a new committee called EU Liaison committee, and asked me to co-ordinate it. I was happy and honoured to accept this duty, because these are exactly the kind of activities that I always considered necessary for biomechanics in Europe. Working towards a more visible role of biomechanics in Europe was also the main motivation behind my candidature to the Council.

The EU Liaison committee will be formally appointed in the next Council meeting. However, I would like to describe here some of my ideas on the activities that this committee may promote. This should also stimulate a discussion within the society in preparation of the next council meeting, where the activity plan will be formally approved.

I shall start from a concept developed by the European commission in preparation of the 6th Framework Program: the *European Research Area*, or ERA for short. The ultimate goal of this long-term initiative is to do for research what the single market concept did for economy. If you are interested you can find more information on the Europa web page.

(http://europa.eu.int/comm/research/era/index_en.html)

Why should we care?

There are recent case studies in biomechanics showing that this type of EC networking, involving trans-nationality and multi-disciplinarity, has a positive effect for all researchers involved. For some countries the EC may be the only opportunity to get substantial research grants, distributed essentially on the basis of excellence. Last, but not least, in the long term the scope of ERA is to homogenise and structure all research activities in Europe, also those supported by national or regional grants. Thus, since in the long run it will be very difficult to avoid ERA, it is better to take an active role in it, in order to ensure that this integration process will not damage our community.

I also believe that there is a scientific reason why we as a society should support ERA. Biomechanics research in Europe is traditionally carried out by small research groups, frequently formed by one or two staff members, maybe two post-docs and a few students. Unfortunately, most biomechanics research today requires a huge array of skills and knowledge. A typical research project may involve knowledge on engineering, medical imaging and medical physics, anatomy, physiology and pathology, biology, genetics, statistics, etc. Even within the specific domain of biomechanics, the traditional separation between rigid body dynamics, solid mechanics, fluid dynamics is blurring more and more. As these small research groups can hardly cover all these skills,

extramural collaboration appears to be the only solution. It is the same reason that motivated my efforts in promoting the sharing of scientific data within biomechanics. If you are interested in this argument I suggest you to read the consensus document that was compiled during the BioNet initiative.

(http://www.mk.dmu.ac.uk/bionet/postevent_consensus_vrlab.htm)

What should we do?

The European Society of Biomechanics should become the key player in the construction of ERA for biomechanics. This can be achieved only by working at multiple levels: increasing awareness, lobbying, internal networking, external networking, mobility and education, and above all a continuous strive for excellence in research.



The ESB as key player in the construction of the European Research Area for biomechanics.

We must be able to convince the citizen of Europe that biomechanics is a good place to invest taxpayers' money. The best way is probably trying to show that with biomechanics you can get good "bang for the buck", also known as Return on Investment.

The MBE_Europe forum promoted some positive lobbying actions some time ago, but now it has clearly finished its life cycle. We should be part of bioengineering lobbying through the PROTERM group, while a similar forum called Biomech_Europe could replace MBE_Europe, and serve as the common workplace from which to co-ordinate our awareness campaign.

(http://groups.yahoo.com/group/mbe_europe/)

(<http://www.eambes.org/protermgroup.asp>)

ESB should promote internal networking because it is part of its mission and it would simplify some ESB activities, such as focus groups. In addition it may bring European biomechanics to the critical mass that is

required to affect the implementation of the ERA. Last, but not least, it may be an effective way to bring researchers into ESB working in areas of biomechanics that are currently underrepresented in the society.

In the medium term we will need the appropriate technological infrastructure required to perform on a wider scale data sharing, knowledge management and community building. A good opportunity to build such infrastructure could be the VRLAB network of excellence that we are willing to submit in the first call of FP6, aimed at the creation of the *Biomechanics European Laboratory*, an Internet-based virtual lab within which we shall be able to collaborate seamlessly. If you are interested to join this effort, send an e-mail at register.vrlab@tecno.ior.it with all your data, affiliation etc.

(<http://www.tecno.ior.it/VRLAB/index.html>)

Even assuming that this initiative is successful we shall not see anything operational before the end of 2003. Meanwhile we have to build our internal networking initiative on the basis of voluntary efforts. Four possible tasks were identified so far:

- Management of the existing BioNet forums handed from the BioNet consortium to the ESB when the BioNet project finishes at the end of 2002.
- Possible extension of the forum lists and use as replacements for the ESB focus groups. We must be able to identify a group of people responsible for moderating and animating each forum for each subtopic.
- Launch of collaborative projects, where each partner supports its research effort with its own money. This requires the creation of a password-protected Internet repository for sharing large volumes of data.
- Identification and showcase of biomechanics researchers and projects, which were able to successfully, secure EU funding in previous Framework Programs.

These are just a few preliminary ideas that the society at large should consider and discuss, before formal submission to the Council for the next board meeting. Needless to say any input, both constructive and destructive, is more than welcome. As the Biomech_Europe list is not active yet, I suggest that you address all your comments related to the VRLAB initiative to the BioNet_VRLab mailing list.

(http://www.mk.dmu.ac.uk/bionet/postevent_workgroups_join.htm)

From Mini Symposia to Focus Groups: building and managing knowledge in Biomechanics

Georges Van der Perre, Katholieke Universiteit Leuven, Belgium

Mini symposia and Focus Groups

In the closing session of the Wrocław conference under the theme “From Mini Symposia to Focus Groups” an attempt was made to identify the main issues and questions in the different areas of Biomechanics research as they emerged from the conference’s Mini Symposia. The same issues and questions were proposed as potential starting points for Focus Groups.

The “Focus Group” initiative was launched at the 2000 General Assembly in Dublin. Focus groups are experts groups for the consolidation and management of knowledge in specific areas of biomechanics. They will draft and continuously update a critical inventory of essential research questions and answers, clinical problems and solutions, as well as questions and problems remaining to be solved.

Focus groups will work and communicate through regular workshops (once or twice a year) as well as a discussion group on the ESB website. Fully documented state of the art reports will be published regularly. This could be done for example using the pages allocated to the ESB in Journal of Biomechanics.

The Wrocław session

For the closing session in Wrocław, fourteen areas had been tentatively defined and some representative conference participants (available the last day) had been interviewed according to the following list:

1. Bone, Osteoporosis and Ultrasound (Hobatho, Oddou, Van der Perre)
2. Bone remodelling (Weinans, Vander Sloten)
3. Tissue Engineering and Mechanobiology (Prendergast, Missirlis, Ito)
4. Dental Biomechanics (Dalstra, Natali, Middleton)
5. Implant fixation (Viceconti, Morlock, Ryd, Verdonshot, Schneider, Duda, Burny, Donckerwolcke)
6. Fracture Healing and Fixation (Ito, Donckerwolcke, Burny)
7. Biofluid Mechanics (Liesch)
8. Musculoskeletal Loading (Duda)
9. Limb, Joint, Spine Biomechanics (Van Audekercke)
10. Soft Tissue Biomechanics (Telega, Missirlis)
11. Rehabilitation Biomechanics (Burny, Van Audekercke)

12. Occupational and Impact Biomechanics (Danuta, Liu, Kedzior)
13. Sports Biomechanics (Bober)

All the interviewees had been asked to provide input for their subject area to the following items:

- A. Unanswered questions (old and new)
- B. Not falsified (not validated) theories (old and new)
- C. Unsolved clinical problems (old and new)
- D. Expectations and dreams
- E. Certainties and statements

Summaries of these inputs were presented to the plenary session and discussed with the audience. The aim of the exercise was to demonstrate what the Focus Groups could be about, to stimulate interest for the idea, and to encourage people to take an initiative in their own field.

Case: Implant Fixation

For area (5), Implant Fixation, a group of interviewees (Viceconti, Morlock, Ryd, Verdonshot, Schneider, Duda) had already organised their own mini-brainstorm on beforehand, and a synthesis was presented to the plenary meeting by Marco Viceconti.

In addressing the five items listed above, they proposed the following *statement*: “Fixation is today the most clinically relevant issue in implant biomechanics, especially in poor bone stock (including drug abuse etc.)”.

And it continued as follows:

Unanswered questions:

- What is the lowest level of complexity that is required to accurately assess *in vitro* the primary stability of cementless implants *in vivo*?
- How can we include patient specific data (e.g. bone quality) in preoperative planning?
- How can we get bone strength predictors *in vivo* better than mineral density?
- How can we account for the effect of the surgical procedure in biomechanics?
- How can we exchange knowledge more effectively?

(Other (very broad) questions were added during the session: what are the processes that occur in the initial stage, how do mechanical and biological effects interact in this stage, and what is the relation between the initial stage and the long term effects?)

Unsolved clinical problems:

- Solving implant fixation problems in weak/osteoporotic bone and in other joints than the knee or the hip.
- Criteria for preoperative planning, intra-operative control and postoperative rehabilitation to improve implant fixation.
- Bringing the survival rate of THR from 90% to 99%.
- Coping with the treatment of the ageing population.
- Non invasive clinical monitoring of implant fixation.
- Physical exercise after THA: too much or too little?

Unfalsified theories:

- How can we falsify the new models of interface adaptation?
- How reliable are our cement damage models at the bone-cement interface?

Expectations:

- To develop a set of (computational and experimental) procedures allowing the prediction of the clinical performance of a new implant design.
- To understand why in a joint replacement for one patient out of 10 or 15 we observe aseptic loosening.
- Bring biomechanics expertise at the finger tip of the surgeon (*in vivo* stability predictions, preoperative planning, cartilage testing, etc.).

(A dream added during the session: to develop clinical or tissue engineering techniques to stop loosening and to restore fixation.)

Finally the group asked the question if the Focus Groups activities should not result in consensus meetings, and whether and how the ESB could and should coordinate its “Focus Group” initiative with existing activities such as the Gordon Conferences, the NIH consensus meetings, the AO meetings and publications, the WHO consensus documents.

Conclusion

The ESB can support Focus Groups in different ways: through this Newsletter by launching questions and debates, announcing activities and publishing activity reports; through the ESB website by hosting homepages and discussion groups; through the ESB meetings by organising special workshops within the biennial conference or by organising intermediate focus group oriented meetings; through the pages in Journal of Biomechanics, allocated to the ESB, as suggested above; and furthermore by finding and providing sponsoring and financial support (e.g. through support actions within the EU 6th framework research programme) for the organisation of workshops and by initiating and supporting cooperation with other scientific societies.

I do hope that we will be able to start the activities of the Focus Group “Implant Fixation” right now, and that others will follow very soon.

In the next issue of the Newsletter, we will present an overview of the inputs gathered in Wrocław for the thirteen other subject areas.

Looking back at the 13th ESB Conference... Wrocław 2002

Romuald Będziński, Wrocław University of Technology, Poland

Chairman of ESB2002

About the conference

The 13th Conference of the European Society of Biomechanics was held between September 1 – 4, 2002. The Conference was organised by Wrocław University of Technology – the Faculty of Mechanics and the Polish Biomechanics Society, the Polish Engineers and Mechanists Association (division in Wrocław). A number of other organisations co-organised the Conference: the Polish Orthopaedics and Traumatology Association, the Rehabilitation and Social Adaptation Committee of the

Polish Academy of Sciences, the Mechanics Committee of the Polish Academy of Sciences and the Biocybernetics and Biomedical Engineering Committee of the Polish Academy of Sciences. National and international scientific authorities were invited to contribute to the work of scientific and organisational committees of the conference.

The patronage over the conference was adopted by: Prof. Michał Kleiber – the Minister of Science and Head of State Committee of Scientific Research; Ryszard Nawrat – the Governor of Lower Silesia; Stanisław Huskowski –

the Mayor of the City of Wrocław; Prof. Andrzej Mulak and Prof. Tadeusz Luty – the Rectors of Wrocław University of Technology; Prof. Leszek Paradowski – the Rector of Wrocław Medical Academy; Prof. Zdzisław Zagrobelny and Prof. Tadeusz Koszczyk – The Rectors of the Academy of Physical Education in Wrocław.

It is noteworthy that it was for the first time that the conference was held in Poland and in this part of Europe in general. The conference is a cyclical biannual event; the previous one took place in Dublin in 2000 (Ireland). Thus organising such a conference of international scale was an uncommon privilege for us and rendered it possible to extensively present the scientific output of Central and Eastern Europe.

There were nearly 500 participants to the conference coming from 40 countries of the world. As many as 438 papers were presented in various forms including invited lectures, oral presentations, posters and commented posters. Another essential feature was the fact that some 200 participants represented the countries of Central and Eastern Europe, which is an outstanding success in the 26-year history of this conference. It is also worth mentioning that currently Poland is treated as a representative of bioengineering in this part of Europe.

The formal opening ceremony was attended by numerous distinguished guests including the President of the European Society of Biomechanics Prof. Georges Van der Perre.



The opening ceremony of the conference took place in the presence of the President of the ESB, the President of Polish Society of Biomechanics, the Head of the Organising Committee and the Rector of the Wrocław University of Technology.

Coincidentally the formal opening of the Conference constituted one of the actions performed by the new President of Wrocław University of Technology Prof. Tadeusz Luty on his first day of office. He honoured the event with his presence and gave the official welcome to conference participants.

The Conference was preceded by a pre-course titled *Modern Investigational Tools in Biomechanics*. Within this course the presentation of the following 45-minute long lectures took place:

- Finite Element Analysis as a Tool for Biomechanics Research (Patrick Prendergast, Trinity College Dublin, Ireland)
- Toward a Clinical Application of Subject-specific Finite Element Models of Bone Segments (Marco Viceconti, Istituti Ortopedici Rizzoli, Italy)
- Applications of experimental methods in biomechanics investigations (Romuald Będziński, Wrocław University of Technology, Poland)
- Genetic algorithms in selected problems of biomechanics (Tadeusz Burczyński, Silesian University of Technology, Poland)
- Fractal models of tissue evolution and transportation processes (Marek Rybaczuk, Wrocław University of Technology, Poland)
- Pre-clinical Testing of Implants (Michael M. Morlock, Technical University Hamburg-Hamburg, Germany)
- Cartilage Tissue Engineering: a synergistic interaction of mechanical engineers and cell biologists (Gerjo Van Osch, Erasmus University Rotterdam, Netherlands)
- OrthoPilot, an advanced tool in supporting knee and hip procedures (Hanns-Peter Tümmeler, Aesculap Co, Germany).

The Conference concerned the problems and questions of biomechanics. Due to the interdisciplinary character of this scientific field, the issues presented at the conference encompassed a wide spectrum of scientific problems connected with: engineering biomechanics, medical biomechanics, biomaterials engineering, sport and labour biomechanics. The Conference was organised in the form of 19 mini-symposia: Spine Biomechanics, Challenges to computer simulations, Practical application of biomechanical solutions, Rehabilitation medicine and biomechanics, Hip biomechanics, Upper and lower limb joints biomechanics, Bone biomechanics, Soft tissue mechanics and tissue engineering, Biofluids, Optimisation in biomechanics systems, Sport biomechanics, New trends in implantology, Biomaterials, Signal processing in human body, Bone remodelling Fracture fixation, Dental biomechanics, Biomechanics of impact, EC supported RTD projects on biomechanics and engineering.

The sessions within the mini-symposia were preceded by keynote lectures, which constituted an introduction to a given scientific discipline.

An important accomplishment of this Conference were Invited Lectures about interdisciplinary problems that involve medicine, biology and mechanics. They were

delivered by world experts: Georg Bergmann – Biomechanics of the Hip Joint, Shu Chien, John Shyy – Mechanism of Mechanochemical Transduction in Endothelial Cells, Stephen C. Cowin – Bones have ears, Rik Huiskes – Biomechanical Stimuli in the Regulation of Bone Morphology and Mechanical Fitness, Andrzej Wall – Clinical Aspects of Total Hip Arthroplasty, Joachim Mester – Vibration Load in Sports: From Biomechanical Fundamentals to Application in Sports, Edmund S. Chao – Simulation Technology for Biomechanical Analyses of Musculoskeletal System.

The second day of the Conference was an opportunity for its participants to meet the president of Wrocław Stanisław Huskowski at the town hall as well as the Rectors of Wrocław universities and state organisations.

The core of the Conference Organisational Committee constituted: Prof. Romuald Będziński – the President, Prof. Krzysztof Kędzior – the vice-president, Celina Pezowicz, PhD – the Secretary General, Jarosław Filipiak, PhD – the Secretary and Krzysztof Ścigała, MSc – the Secretary.

The complete Conference programme as well as other information concerning the Conference are still available on the website: <http://www.esb2002.pwr.wroc.pl>.



The main building of Wrocław University of Technology was at these days full of biomechanical knowledge.

During the Conference the election of the new Council of the European Society of Biomechanics took place. On page 11-13 of this issue all Council members are presented, together with a short CV of each member.

Currently we are receiving numerous letters rating the scientific and organisational level of the 13th Conference of the European Society of Biomechanics very high. Thus one can assume that the Conference was an outstanding success and the best way to promote Polish science and Poland itself.

The city of Wrocław

Wrocław is the economical, cultural and intellectual capital of Lower Silesia, located in southwestern Poland, 160 km from Germany and 120 km from the Czech Republic. It is well equipped with transportation facilities: international airport, railways, highways and river ports. Medium - light industry, trade, service and education are major employers. The city with its charming historical centre, parks, good restaurants, hotels and friendly people (700.000 inhabitants) is a pleasant place to visit and to do business.

Wrocław is one of the oldest and most beautiful cities in Poland. Situated at the foot of the Sudety Mountains, upon the Odra River and cut through by its numerous tributaries and canals, it is an exceptional city of 12 islands and 112 bridges.

Wrocław's complex and dramatic history is embedded in the city walls. We are reminded of the early medieval times in Ostrów Tumski, where one of the most beautiful sacral architecture buildings in Europe has been preserved.



View of the Old Market of Wrocław.

Visitors coming to Wrocław remember the city mainly as a cultural centre. Its theatres, including the Opera, Musical Theatre and Philharmonic Hall, various clubs, museums and galleries provide a continuous series of artistic events. Internationally acknowledged musical festivals have become the city's cultural landmark. The biggest of them is the international festival *Wrocław Cantans* - Music and Fine Arts. Wrocław is the fourth biggest city in Poland. It belongs to the biggest university centres in the country (100.000 students). The city's intellectual life is focused around 13 academic schools including Wrocław University of Technology.

Wrocław is a wonderful city with an interesting history and unique beauty, which is appreciated both by its inhabitants and visitors. Surely, also the participants to the conference have enjoyed the wonderful atmosphere that characterises this city, as you may appreciate from the next contribution in this Newsletter.

The ESB conference in Wrocław...

an alternative impression

Thanks to the contribution of Prof. Romuald Będziński we obtain an excellent overview of the scientific programme of the latest ESB conference. At the same time we already get a glimpse of all the beauties that Wrocław has to offer to the visitor. Every experienced conference participant knows of course that a conference can be a very intense and exhausting event, and this not only due to the scientific programme. In particular, a conference is an excellent meeting place, where you have a wonderful opportunity to get to know scientists from all over the world, but also to discover some of the local cultural and socio-economic aspects of an other country – albeit in a nutshell. Below you find a report on the impressions of a young scientist, Mrs. Sabine Bensamoun, from Université de Technologie de Compiègne, who participated in the conference. However, after reading her report, you will notice that the scientific programme was not the only interesting aspect in Wrocław...

First foot in Wrocław

Being in the centre of Europe, Wrocław is only about 4 hours by flight from France or Belgium. Its proximity facilitated students to participate easily in the ESB conference.

The reception at the airport was very well organised; the team of Prof. Będziński was there to take care of everyone and to drive us to our hotel. The first observation about Polish people was their unbelievable fashion to drive very fast, which made me change my mind about the reputation of the French driving style...

(After) the conference

The conference was organised in different thematic parallel sessions, which enabled participants to attend the sessions within their own research field, but also to extend their knowledge in other fields. During the coffee break it was possible to ask questions to the speakers of the previous sessions in a friendly atmosphere. Furthermore during lunch time students could eat together and exchange different points of view.

After a full day spent inside the conference centre I was happy to come back to the hotel and have a rest. However I must admit that a good night sleep and a Polish wedding – that was organised in our hotel – were far from an ideal combination. One of the advantages is of course that in this way participating in a conference turns into a real cultural experience, because of all the Polish songs you learn...

The Wrocław market square was the main meeting place for all the participants after the conference. Here you

could find countless pubs and restaurants, making it a very pleasant spot to sit outside, relax and eat something even until late at night.

Polish evening

The Polish evening was another highlight, where we were welcomed with traditional Polish food and Polish music. This kind of event enabled everyone to meet and to talk to famous scientists in a convivial atmosphere. At the end of the evening, a course was given on Polish dances.



The Polish evening...

On the picture above, you can see a very long queue of men, waiting for their turn to take part in the dance. This very clearly demonstrates that there is an acute lack of women in the field of biomechanics, which leads to such embarrassing situations. Hopefully this problem will be solved by the time of the next conference...

The ESB general assembly

I had the opportunity to attend this general assembly where various interesting items were discussed, like e.g. the location of the next conference, the election of the new president of the ESB and the new Council members and the presentation of different thematic groups. I can really recommend students to become a member of the Society in order to better follow European research in biomechanics!

Finally, a gala dinner closed the ESB conference where the different awards were given to the winners of the different categories. It enabled students to meet again and to establish further contacts.

Acknowledgements

I thank again Professor Będziński and his dynamic team for the organisation of this conference in Wrocław. I

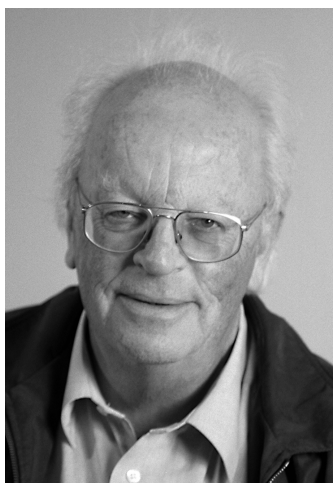
would also like to thank my colleague Luis Cardoso for the picture.

ESB Awards 2002

Marie-Christine Ho Ba Tho, U.T.C., France
Erich Schneider, AO Research Institute, Switzerland

S.M. Perren Award

The *ESB Research Award* is given at each bi-annual General Meeting to the best manuscript, submitted for that purpose to the Award Committee. This award has been renamed as the *S.M Perren Award* by the council in January 2002, and is sponsored by the AO Foundation, Davos, Switzerland. The award is named after Prof. Dr. med. Stephan Marcel Perren.



Prof. S.M. Perren

Prof. Perren is a world-renowned research trauma surgeon. He is a Founding Member of the AO Foundation and directed the AO Research Institute for more than 30 years and in that function became one of the fathers of modern fracture treatment. He received several awards, such as the *Danis Prize* of the *Société Internationale de Chirurgie* and multiple academic honours. His main contributions were *in vivo* investigations regarding the effect of bone compression, loosening of implants, strain control of bone healing, and the relationship between implant design and tissue repair and differentiation. He is first author of 146 publications and co-author in another 854 papers. He is a member of the major trauma-related professional societies. He is a Founding Member of the ESB and was its President between 1985-1988.

The AO Foundation (<http://www.ao-asif.ch>) is a non-profit organisation, devoted to the improvement of surgical fracture treatment, with the main goal of restoring immediate and full function. Its principal activities include research, development, clinical investigation, quality assurance and teaching. The AO Foundation has built a global network of surgeons and scientists to exchange latest knowledge and experience. The income of the Foundation is generated from licensing its technology within the leading group in trauma surgery of the musculo-skeletal system.

ESB Award winners 2002

The winner of the *S.M Perren Award* 2002 was **Jean-Pierre Kassi** from Charité, Humboldt University, Berlin, Germany, for the work:

Muscle activity is essential for a realistic pre-clinical evaluation of primary stability in THA



S.M. Perren Award winner Jean-Pierre Kassi (middle) and Georg Duda (right), together with Erich Schneider (director of AO Research Institute) (left) at the ESB Awards ceremony in Wrocław.

The co-authors of the work were M.O.W. Heller, U. Stoeckle, C. Perka and G.N. Duda from the same institute. Their manuscript clearly demonstrated the importance of including relevant muscle forces and loading cases for the *in vitro* assessment of primary

stability (micromotion) in total hip arthroplasty. By means of a mechanical test set-up of an implanted synthetic femur, they measured up to five times higher movements for loading conditions that involved physiological muscle loading, compared to a loading condition that only consisted of an equivalent hip contact force.

The *Clinical Biomechanics Award* winner was **L. Cristofolini** from the Laboratorio di Tecnologica Medica, Istituti Ortopedici Rizzoli, Bologna and the Engineering Faculty, University of Bologna, Italy for the work:

Ex vivo and in vitro cement mantle fatigue damage around femoral stems: Validation of a protocol to simulate real-life loading in hip replacement patients.

The co-authors of the work were P. Savigni, A. Saponara Teutonico and A. Toni from the Istituti Ortopedici Rizzoli.

The *ESB Student Award* winner was *L.M. McNamara* from the Bioengineering Group, Department of Mechanical Engineering, Trinity College, Dublin, Ireland for the work:

High stresses occur in bone trabeculae under low loads! A study using micro-serial sectioning techniques and finite element analysis.

The co-authors of the work were J.C Van der Linden, H. Weinans from the Orthopaedic Research Laboratory, Rotterdam, The Netherlands and P.J Prendergast from Trinity College.

The *ESB Poster Award* was won by **A.H. Murdoch** from the University of Aberdeen for the work:

Design of a retractable intra-medullary nail for the humerus

The co-authors of the work were D.E.T. Shepherd, K.J. Mathias and E.C. Stevenson from the Department of Bio-Medical Physics and Bio-Engineering, University of Aberdeen, Scotland, United Kingdom.

The *Best Commented Poster* was obtained by **M. Stauber** from the Swiss Federal Institute of Technology (ETH) and University of Zürich, Switzerland, for the work:

An FE beam-model for efficient simulation of large-scale porous structures

The co-authors were M. Huber, S.K. Boyd and R. Mueller from the same research institutes.

The *ESB travel grants* were given to the following candidates:

- N. Bazulev (Heat and Mass Transfer Institute, Minsk, Belarus)
- S. Bauer (Dpt. Theoretical and Applied Mechanics, St Petersburg State University, Russia)
- M. Stanczyk (Institute of Fundamental Technological Research, Warsaw, Poland)
- B. Lesniak (Institute of Precision and Biomedical Engineering, Warsaw University of Technology, Poland)
- A. Mironov (Dpt of Hydroelasticity Faculty of Mathematics and Mechanics, St Petersburg State University, Russia)
- E. Federova (Faculty of Physics and Mechanics, St Petersburg State University, Russia)
- N. Zdravkovic (Lab. Engineering Software, Faculty of Mechanical Engineering, University of Kragujevac, Serbia, Yugoslavia)
- N. Filipovic (Lab. Engineering Software, Faculty of Mechanical Engineering, University of Kragujevac, Serbia, Yugoslavia)

Records of the previous ESB awards can be found on the ESB website (<http://www.utc.fr/esb>).

New ESB Council

Patrick J. Prendergast

President

Department of Mechanical Engineering
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Patrick Prendergast has a Mechanical Engineering Degree and PhD degree from the University of Dublin, Trinity College. In 1995, he joined the staff of Trinity College Dublin. Before that he held a Council of Europe Scholarship at the Istituti Ortopedici Rizzoli, Bologna, and a Marie Curie Fellowship at the University of Nijmegen. On a sabbatical year in 2000, he was a Visiting Professor at the Institute of Fundamental Technological Research, Polish Academy of Sciences, and a Senior Research Fellow at the Technical University of Delft, The Netherlands. His research interests relate to tissue mechanics, particularly prediction of bone remodelling and tissue differentiation, and in the design of orthopaedic and cardiovascular implants. Prof. Prendergast is married to Petra Cuperus, and they have two daughters, Eimer and Eilis.

Marie-Christine Ho Ba Tho

Vice-President and Award Committee

U.T.C. (Université de Technologie de Compiègne)
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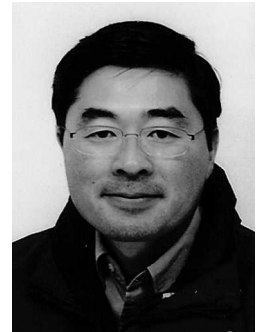
Marie-Christine Ho Ba Tho is Professor in Mechanics since 1998 at U.T.C in Compiègne and has an M.S. in Physics (1985), a postgraduate diploma in Radiological Physics (1986) and a PhD in Biomechanics (1989), all at the Université Paul Sabatier, Toulouse. Her research is focused on bone and joint modelling, derived from medical imaging techniques and multiscale characterisation of musculoskeletal tissues (by means of mechanical and ultrasonic testing). The application domains are the evaluation of bone and joint deformities

in children (congenital dislocation of the hip, clubfoot torsion of lower limbs and scoliosis) and adult arthroplasties (hip, shoulder and knee).

Keita Ito

Secretary-General

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Keita Ito received his Doctor of Science in Medical Engineering and Medical Physics from the Massachusetts Institute of Technology (1994) and his medical doctorate from Harvard University (1995). Forsaking clinical work, he began full time research as a post-doctoral fellow at the AO Research Institute in Davos, Switzerland. This slowly evolved into the formation of a research group investigating fracture treatment and the intervertebral disc. More recently his research has emphasised the principles of mechanobiology. In particular, they are using numerical, *in vitro* and *in vivo* models to study mechanotransduction factors in bone healing and disc degeneration as well as regeneration.

Monique Donkerwolcke

Treasurer

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Monique Donkerwolcke received a Master Degree in Telematics and Organisation from Brussels University. She is a staff officer of the Research Laboratory affiliated to the Department of Orthopaedics and Traumatology. She is a Founding Member of the European Society of Biomechanics (Brussels, 1976) and acted as executive secretary of the Society from 1976 to 1982. Her research areas of interest include implant fixation, monitoring of fracture healing and of implant deformation, biomechanics of external fixation and of

percutaneous implants and history of biomaterials and of biomechanics.

Hannu T. Aro

Student Committee

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Hannu Aro is an orthopaedic surgeon who currently acts as Associate Professor of Surgery and Vice Chairman in the University of Turku, Turku, Finland. After his doctoral thesis on experimental surgery in 1985, he served 2.5 years as a Research Fellow and Senior Research Fellow at the Orthopaedic Biomechanics Laboratory of Mayo Clinic/Mayo Foundation in Rochester, USA. From 1994 to 1995 he served as Associate Professor of Orthopaedic Surgery at the Johns Hopkins University and as Consultant at Johns Hopkins Bayview Medical Centre in Baltimore. His research interests involve the biomechanics and molecular biology of bone healing. Currently, his main research focus is on bioactive coatings of orthopaedic implants.

Romuald Będziński

Education Committee

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Romuald Będziński is Full Professor and head of the BEaEM unit. He obtained an MSc (1964), a PhD (1973) and DSc (hab) in 1990. His research activities involve a wide range of different aspects in biomechanics and experimental mechanics, including the mechanical behaviour of soft and hard tissues, modelling and analysis of joints, implants and external fixation (limb elongation) and experimental techniques for strain measurement (photoelasticity, holographic interferometry, electronic speckle pattern interferometry, strain gauges).



Dieter W. Liepsch

Meeting Committee

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Dieter Liepsch obtained his Dr.-Ing. degree in 1974 and his Dr.-habil degree in Biofluid Mechanics in 1986, both at the Technical University of München. From 1987 to 1989 he was Director of the Cardiovascular Research Hal B. Wallis Research Facility at the Eisenhower Medical Centre (Rancho Mirage, California, U.S.A). Currently he is Professor at the University of Applied Science in München in Fluid Mechanics and Heat Transfer (since 1989), where he leads the Laboratory of Fluid and Biofluid Mechanics. He is also Professor Chairman of the Institute of Biotechnik, München (since 1986). His main research area is biofluid mechanics.

Ralph Mueller

Membership Committee

Institute for Biomedical
Engineering

ETH and University Zürich

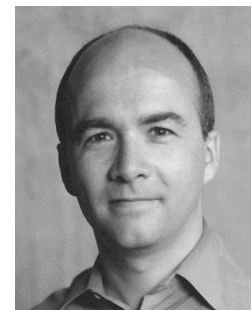
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Ralph Müller has been an SNF Professor of Bioengineering at the Institute for Biomedical Engineering, Swiss Federal Institute of Technology (ETH) and University of Zürich since July 2000 after serving as an Assistant Professor of Orthopedic Surgery at the Harvard Medical School in Boston. He studied electrical engineering at the ETH in Zürich, where he also received his Ph.D. in 1994. The research he has completed and is currently pursuing employs state-of-the-art bio-imaging of bone and tissue engineered constructs as well as the development of novel biomechanical testing and simulation techniques. He is an author of over 250 refereed publications in international scientific journals and conferences. He has received a number of awards, most recently, the Promising Young Scientist Award (1999) from the International Society of Biomechanics (ISB). He is also active as an organiser of international symposia and

working groups as well as a reviewer for scientific journals and funding agencies.

Jos Vander Sloten

Publication Committee

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Jos Vander Sloten obtained his M.Sc. in Mechanical Engineering in 1985 from the Katholieke Universiteit Leuven. In his Ph.D. project he studied the functional adaptation of bones and the consequences for implant design, funded by a grant from the Fund for Scientific Research - Flanders and with Georges Van der Perre as his promoter. Currently Jos Vander Sloten is professor of descriptive geometry, engineering design, engineering mechanics and bioengineering at the Katholieke Universiteit Leuven. His main research interests are the mechanics of adaptive bone remodelling and computer integrated surgery systems. He has been the secretary-general of the European Society for Engineering and Medicine since 1997, and chairman of the Committee for Bioengineering and Health Care of the Royal Flemish Chamber of Engineers in 1999 and 2000.



Marco Viceconti

EU Liaison Committee

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Marco Viceconti is the Co-ordinator of the Computational biomechanics Unit at the Laboratorio di Tecnologia Medica of the Istituti Ortopedici Rizzoli in Bologna (Italy). He was born in 1961 in Milano and holds an MS in Mechanical Engineering from the University of Bologna and a PhD in Engineering from the University of Firenze. His main research interests are Orthopaedic biomechanics, Computational Biomechanics and Computer aided medicine. He is author or co-author of more than 50 papers indexed in Medline. He is currently the President of the BioComputing Competence Centre (B3C), a consortium of Italian research institutions promoting the creation of a European Laboratory without walls, called Biomechanics European Lab.

Contact information on all Council members can also be found on the ESB website
(<http://www.utc.fr/esb/esb/council.htm>).

New ESB Representatives of the Editorial Board of the Journal of Biomechanics

The Society has the right to have two representatives on the Editorial Board of the *Journal of Biomechanics*. The two members selected by the Editors are Prof. Dr.-Ing. D. Liepsch and Dr. Keita Ito, M.D., Sc.D. These

members are your representatives on the board of the Journal and you should contact them if you feel that there are any issues relevant to the ESB that should be brought up at the Editorial Board level.

Looking ahead to the 14th ESB Conference... 's-Hertogenbosch 2004

Frank Baaijens, Eindhoven University of Technology, The Netherlands

The 14th Conference of the European Society of Biomechanics, ESB2004, will take place in 's-Hertogenbosch, The Netherlands, from July 4-7, 2004. The division of Biomechanics and Tissue Engineering of the Department of BioMedical Engineering of the Eindhoven University of Technology organises the conference. The city of 's-Hertogenbosch (also called Den Bosch) is a mediaeval city, dating back to 1200. 's-Hertogenbosch is easily accessible by train, approximately 1 hour, from Schiphol Airport (Amsterdam).



's Hertogenbosch

The conference will be scheduled around seven conference themes. Each theme will be co-ordinated by a member of the local organisation committee:

- Cardiovascular and Biofluid Mechanics (Frans van de Vosse)
- Tissue and Cellular Engineering (Frank Baaijens)
- Soft Tissue Biomechanics (Jacques Huyghe)
- Bone Biomechanics (Bert van Rietbergen)
- Orthopaedic Biomechanics (Rik Huiskes)
- Musculo-Skeletal Dynamics (Frans van der Helm)
- General Biomechanics (committee)

Each conference theme is split into topical mini-symposia, each organised by one Chairperson, who is a renowned expert in the field. The Chairperson is in charge of organising the scientific program of each mini-symposium, and therefore, by definition, a member of the Scientific Committee.

Further information: <http://www.esb2004.tue.nl>
e-mail: esb2004@tue.nl

ESB Membership

As this issue of the Newsletter focused on the latest ESB conference in Wrocław and on the future activities of the ESB we found it important to not only send this Newsletter to all our current members, but also to all conference participants, including those that are not (yet) member of the ESB. If you are not yet a member, but are interested to become one, please fill out the application form on the last page of this Newsletter and mail it to Dr. Keita Ito, Secretary-General of the ESB:

Dr. Keita Ito
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fax: +41 81 414 2288
e-mail: keita.ito@ao-asif.ch

Membership fees:

- regular membership: 90 €
- regular membership without Journal of Biomechanics: 60 €
- student membership: 70 €
- student membership without Journal of Biomechanics: 25 €

The ESB is affiliated with the Journal of Biomechanics published by Elsevier Science. As part of this affiliation, each member receives an individual subscription. The

fee for this subscription is included in the annual dues. However, if the member can provide written proof that he/she already has an individual subscription to the Journal of Biomechanics, they are eligible for reduced membership dues.

Regardless, ESB members are also eligible to receive optional journal subscriptions at special reduced rates. If you would like to take advantage of this option for 2003, please fill out the appropriate order forms and provide them with a copy of your ESB Membership invoice and a proof of payment (credit card bill, bank record, etc.). Please also remember that all journal subscriptions through the ESB must be treated as personal copies and cannot be used in libraries. ESB members can obtain reduced subscription rates for the following journals:

- Bone
- Clinical Biomechanics
- Computer Methods in Biomechanics and Biomedical Engineering
- Gait and Posture
- Journal of Electromyography and Kinesiology
- Journal of Orthopaedic Research
- Medical Engineering and Physics

For more information on ESB Membership and on the Society itself, please consult our website: <http://www.utc.fr/esb>. The application form can also be downloaded from the website.

European Society of Biomechanics • Membership Application

I hereby submit my application for active membership of the European Society of Biomechanics

I (a) Family Name:

I (b) Given Names:

II Date of birth (day/month/year):

III Office address:

Tel:

Fax:

E-mail:

IV Private address:

Tel:

Fax:

V Academic degrees: Title Year awarded Awarding Institution

VI Present affiliation and position:

VII Field of biomechanics research:

VIII Attach a brief curriculum vitae and a list of relevant publications

Date:

Signature: