

European Society of Biomechanics  
**Newsletter**

December 2004

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## President's address

**Keita Ito, AO Research Institute, Davos, Switzerland**

### President of the ESB

In 1976, when the European Society of Biomechanics was created, the founders sought to build an association to bring the biomechanics community together. One of the purposes for our society was to "encourage, foster, promote and develop research, progress and information concerning the science of biomechanics." In this respect, our society can be proud of what has been achieved in the last 28 years.

As was the case with our most recent biennial conference in 's-Hertogenbosch (page 3), the conferences are an opportunity for us to come together and share the most current and exciting research results. During this conference, we recognize the best accomplishments (page 5) along with a significant financial reward. Many of us encourage our students to come and present their work. Those more advanced can present their finished results and compete for recognition. Those just starting can present their initial work, returning encouraged by the feedback as well as with the seeds of new ideas. Between the conferences, we try to provide our members with information, both scientific and non-scientific. The former is facilitated by offering reduced subscription rates to journals and taking part in the editorial board of the *Journal of Biomechanics*. The latter is mostly through our Newsletter. But, is this enough?

As research evolves, our society must also evolve to meet the needs of our members and to serve our purpose. The biennial conference provides a forum for all disciplines of biomechanics and the opportunity for cross-pollination. However, it is only every two years and the discussions are limited. We hear what has been

accomplished, but we rarely get a chance to discuss where we should go. Our students and junior researchers are encouraged and promoted in scientific terms, but do they receive our support in terms of their careers? Today communication is becoming increasingly electronic and printed matter is often too slow. Many of our members have open access to online journals and require more up date to information.

In response to some of these points, the council is attempting to implement new services. In the "off-years" of the biennial conference, we would like to organize an ESB Summer Workshop. The workshop will be a small and short meeting focused on a current topic of interest to a significant portion of our members. It will be organized to foster interaction between both junior and senior researchers as well as allow ample time for discussion and identification of future directions. The first such workshop will be organized by Jos Vander Sloten in the summer of 2005 at the Katholieke Universiteit Leuven and will be on mechanobiology of tissue regeneration.

To solve some of our communication problems, a new agreement has been made with Elsevier, and we would like to move towards internet-based communication. As of 2005, it will no longer be obligatory for members to subscribe to the *Journal of Biomechanics*. This should free up some funds to invest towards the development of a new dynamic web site with more functionality. However, I would encourage you not to simply cancel your personal subscription. As a scientific society, it is imperative that we have

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influence, as authors, readers and editors, in one of the major scientific journals in our field. We also must offer access to this journal to all of our members at a reasonable cost. If our number of subscriptions should fall dramatically over the next year, we may lose this privileged relationship.

As for the junior members of our society, we will start by trying to provide you with current information about career opportunities. It is well recognized that an important aspect of career development in science is to gain a broad experience earlier in your careers. This is most efficiently done by working in various laboratories. For this purpose, we are creating a dynamic database of European funding sources and also a geography-based world-wide list of laboratories in which our members are active.

In concluding, I would like to show our appreciation to those who have already served our society for many years, the outgoing council members. Two years ago, Patrick Prendergast (President, 2002-2004; Secretary-General, 1998-2002) created the EU Liaison Committee to increase our influence within the EU and to foster our collective efforts. We hope to continue in this direction with our participation in EAMBES, where we are now a full member (see [www.eambes.org](http://www.eambes.org)). Marie-Christine Ho Ba Tho (Vice President, 1998-2004) created the ESB Students

Award and was always on the look-out for the welfare of students. Congratulations on the recent birth of your son, and we hope that you are enjoying your maternity leave. Hannu Aro and Dieter Liepsch both served on the council for eight years in various capacities. As a practicing orthopaedic surgeon Hannu helped us to maintain our clinical perspective. Dieter helped to support the interest of our members working in the cardiovascular field. Now he has the enormous task to organize the World Congress of Biomechanics in 2006 ([www.web2006.org](http://www.web2006.org)) within which our next biennial congress will be held. Last but not least is Romuald Będziński, who organized our first conference in Central and Eastern Europe. Although the divide between East and West is no longer as large, we must keep working on it.

Finally to our members, old and new, I would like to assure you that your new council is working hard to increase the activity of our society for your interests and those of the biomechanics community in Europe. We hope that some of our new initiatives will help in this endeavour, but we cannot do it alone. It will take some innovation and hard work to make it a success. So, please do not hesitate to contact us with ideas or to volunteer. Together, we hope to make our Society work for the benefit of us all.

Davos, 15 November 2004

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# Mechanobiology of cells and tissue regeneration

## First ESB Thematic Workshop August 28-30, 2005, Leuven, Belgium

Although mechanobiology is a fairly recent term, the study of the regulation of organ, tissue and cellular properties and processes by means of mechanical signals has always been of key importance to the biomechanical community. Thanks to new developments in such diverse disciplines as cell biology, molecular biology, computer technology, computational mechanics, experimental mechanics, bioinformatics and bio-imaging, we nowadays have the instruments to increase our understanding of the interplay between mechanics and biology.

This three-day workshop, which is the First Thematic Workshop organised by the European Society of Biomechanics, will focus on the mechanobiology of tissue regeneration and will be structured around four main topics:

- Cellular mechanotransduction
- Mechanobiology of tissue engineering
- Computational modelling of cells, tissues and tissue regeneration
- In vivo and ex vivo models of tissue regeneration

The workshop wants to bring the most recent developments in this fascinating and fast growing research field, and will be an opportunity for both senior and junior researchers to present their work in an informal and open atmosphere, with plenty of room for discussion. This will allow to identify key issues and directions for the future. The programme will be equally balanced between experimental (*in vivo*, *ex vivo*, *in vitro*) and computational work, between soft and hard tissue applications, between mechanics and biology.

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The workshop will be chaired by Jos Vander Sloten from the Katholieke Universiteit Leuven, Belgium. Meeting venue is the city of Leuven, a charming, Medieval town in the heart of Belgium. With one of the oldest universities in Europe, Leuven has been a student town for centuries and obviously this has led to a vivid atmosphere.



*The Old Market Square, the 'largest bar in Western Europe'*

Important dates to remember:

- Abstract submission deadline: February 28, 2005
- Notification of acceptance: March 31, 2005
- Early registration deadline: May 31, 2005

The local organising committee, together with the ESB Council, cordially invite you to take part in this workshop. More information will be shortly announced through the ESB\_Forum list.

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## **The 14th European Society of Biomechanics conference in 's-Hertogenbosch**

**Cees Oomens, Eindhoven University of Technology, Eindhoven, The Netherlands**

From July 4th until July 7th the 14th European Society of Biomechanics conference was held in 's-Hertogenbosch, the Netherlands. The conference was organized by a team of the Department of Biomedical Engineering from the Eindhoven University of Technology under the supervision of professor Frank Baaijens. The primary objective was to organize a high quality meeting and to broaden the scope of the ESB meetings. The organizers also wanted to attract more participants in areas that used to be small in the past and to bring new areas to the attention of the community. This included attraction of researchers from a variety of disciplines, including (cell)biology, solid and fluid mechanics and clinicians. It was decided to organize the meeting around 6 major tracks and within each track a number of mini-symposia, organized by experts in the field. The tracks with their track chairman were:

1. Cardiovascular and Biofluid Mechanics (Frans van de Vosse – TU/e)
2. Tissue and Cellular Engineering (Frank Baaijens – TU/e)
3. Soft Tissue Biomechanics (Jacques Huyghe – TU/e)
4. Bone Mechanics (Bert van Rietbergen – TU/e)
5. Orthopaedic and Dental Biomechanics (Rik Huiskes – TU/e)

6. Musculo- Skeletal Dynamics (Frans van der Helm – Technical University Delft)

The track chairmen all were members of the local organizing committee. They invited symposium organizers from the international scientific community and together they formed the scientific committee. All symposium organizers actively approached researchers to give invited lectures and performed the review process on the open submissions. A second major objective of the organizers was to attract PhD students and to give these young researchers the chance to present their work at an international meeting.

A one-day course, entitled “New tools for the biomechanist”, preceded the meeting in 's-Hertogenbosch. The course was organized by Carlijn Bouten, given at the Department of Biomedical Engineering of the Eindhoven University of Technology and presented by international experts in the consecutive field. Course topics were:

- Cellular engineering/vital imaging - dr. M. Knight, Queen Mary University of London
- Biomolecular engineering/ Protein engineering - dr. M. Merkkx, TU/e
- Biomedical Imaging and image analysis - prof.dr.ir. B. ter Haar Romeny, TU/e

- Tissue Engineering - dr. R. Kuijer, Maastricht University
- Computational modeling - dr.ir. R. Breuls, Irvine University, USA

The course was attended by 25 participants and was a great success.

You might say that the organizers succeeded very well in reaching their goals. It became a meeting with 589 registered participants from 33 countries all over the world. Remarkable in this respect is to mention that 23 participants came from Japan and 64 participants from the United States of America. Many of the participants had never attended a meeting of the European Society of Biomechanics before, but responded very positive to the meeting and mentioned that they will return at the next meeting. In total 203 participants were registered as students, which is a bit more than one third of the total number.

It is not surprising that the track with the largest number of contributions was Orthopaedic and Dental Biomechanics (156 papers), but Musculo-Skeletal Biomechanics (138) and Cardiovascular and Biofluid Mechanics (134) were both comparable in size. Bone mechanics had 114 contributions. Remarkable was the number of 98 contributions for Soft Tissues, traditionally a rather small topic at international meetings and 74 contributions for the new, but rapidly increasing research area of Tissue Engineering.

In total 714 contributions were accepted for presentation. With 7 parallel sessions 420 slots were

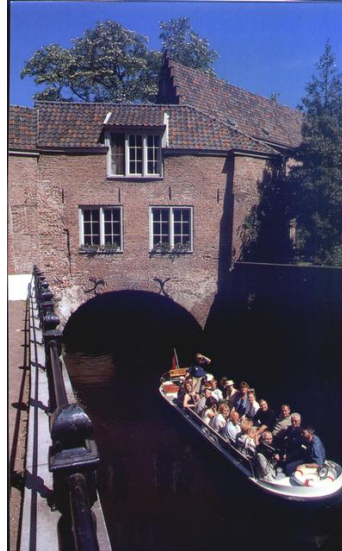
available for oral presentation, meaning that 294, often high quality papers had to be presented as posters. Each day the poster session was combined with a happy hour, creating an informal atmosphere with a lot of interaction and discussions at the poster site.

Each afternoon started with two plenary lectures presented by leading international scientists. On Monday, Simon Hoerstrup (University Hospital Zurich) and Carlijn Bouten (TU/e) presented their work on tissue engineering of heart valves. Cardiovascular research was the topic of Nico Pijls (Catharina Hospital Eindhoven) and Nikos Stergiopulis (EPFL) on Tuesday. Farshid Guilak (Duke University) and Patrick Prendergast (Trinity College, Dublin) presented their work on cartilage and bone during the last plenary session on Wednesday afternoon.

The meeting venue was the ‘Theater aan de Parade’, which is located in the heart of the city. It is a theatre and a cinema, perfectly suited for a meeting of this size. The theatre is lying on a square with lots of bars and restaurants in the neighbourhood. This, together

with the very nice weather in the beginning of July, created the perfect informal atmosphere for the meeting.

In conclusion, we believe that the ESB2004 was a scientifically and socially successful meeting. The key objectives of organizers have been met in terms of widening the scope of the ESB meeting and attracting a wider scientific audience to this meeting.



*The boat trip on the Binnendieze was enjoyed by many conference delegates*

# ESB Awards 2004

*At every biennial meeting of the ESB the best scientific studies or presentations are rewarded. It is a pleasure to present all the award winners here and to congratulate them again with their outstanding work.*

## S.M. Perren Award

The S.M. Perren Award is sponsored by the AO Foundation (Davos, Switzerland) and is named after prof. Stephan Perren, one of the Founding Members of both the AO Foundation and the ESB. It is given to the best manuscript that has been submitted to the Award Committee.

This year's winner of the S.M Perren Award 2004 was *Dr. Francesco Migliavacca* from the Bioengineering Department of the *Politecnico di Milano*, Italy for the work:

*Multiscale modelling in biofluidynamics: application to reconstructive paediatric cardiac surgery*



*Prof. Perren, prof. Ho Ba Tho and Dr. Migliavacca at the Award ceremony*

The co-authors of the work were R. Balossino, G. Pennati, G. Dubini, T.Y. Hsia, M.R. de Leval and E.L. Bove. Their paper described the use of a multiscale modelling approach to quantitatively compare postoperative hemodynamics in congenital heart diseases. 3D computer models representing different surgical interventions were developed and implemented using the finite volume method. The 3D model was coupled to a lumped parameter model of the blood circulation. Computer simulation results corresponded well with post-operative catheterisation data and demonstrated the potential of a multiscale modelling approach in the design and assessment of surgical procedures.

## Clinical Biomechanics award

The Clinical Biomechanics Award (sponsored by Elsevier) was won by *prof. Timo Jamsa* from the Department of Medical Technology, *University of Oulu*, Finland for the work:

*Effect of daily physical activity on bone.*

The co-authors of the work were A. Vainionpää, R. Korpelainen and J. Leppäluoto. Their study investigated the effect of the quantity and quality of high-impact exercise on bone mineral density (BMD), using long-term (12 months) quantification of physical activity. The authors were able to show that increased physical activity indeed resulted in increased BMD in premenopausal women, and that the sensitivity to the impact level appeared to be site-specific.

## ESB Student Awards

Within the ESB Student Award competition (sponsored by Elsevier) 4 studies competed with each other. Finally the work of *Ze'ev Bomzon* (*Technion-Israel Institute of Technology*, Israel) received most appreciation of his colleague students and won the competition for the study entitled:

*Intracellular strain fields in compressed chondrocytes exhibit strain amplification associated with cytoskeletal networks*

The co-authors of this work were M.M. Knight, A.M. Sharma, D.A. Lee, E. Kimmel and D.L. Bader. The purpose of this study was to characterize intracellular displacement and strain fields within compressed chondrocytes and examine their relationship with intracellular organisation. On page 6 you can read more about Ze'ev and how he became involved in biomechanics.

The three other studies that took part in the competition were:

*F. Gervaso, C. Natoli, L. Socci, P. Vena and G. Pennati, A finite element model for strain-induced growth of skin in tissue expansion (Politecnico di Milano, Italy)*

*P.A. Clark, L. Hong, E.K. Moioli, A. Pepta, M. Stosich and J.J. Mao, In vitro migration and proliferation of rat mesenchymal stem cells in collagen packed titanium implants (University of Illinois at Chicago, USA)*

S. Eloot, P. De Bond and P.R. Verdonck, *Three dimensional flow assessment in hemodialyzers using spect imaging and computational fluid dynamics* (Institute Biomedical Technology, Ghent University, Belgium)



*Student award ceremony with (from left to right) Paul Clark, Ze'ev Bomzon, Marie-Christine Ho Ba Tho, Francesca Gervaso, Sunny Eloot and Ralph Müller*

### ESB Poster awards

The ESB Poster Award was won by *Dr. Annette Kettler* from the *University of Ulm*, Germany for the work:

*Influence of the crash pulse shape on the loading of the neck and the injury risk in in-vitro low-speed side-collisions*

The co-authors of the work were K. Fruth, E. Hartwig, L.E. Claes and H.J. Wilke.

The two other nominees for the poster competition were:

W. den Hartog, M.C.M. Rutten, A. Mol and F.N. van de Vosse, *Blood analogue culture media for use in cardiovascular tissue engineering* (Eindhoven University of Technology, The Netherlands)

W. Swieszkowski, A.J. van der Pijl and H.E.N. Bersee, *In vitro wear performance of total shoulder arthroplasty - preliminary study* (Delft University of Technology, The Netherlands)

### ESB Travel grants

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

- Andrzej Przybyla, Dept. of Anatomy, University of Bristol, Bristol, United Kingdom
- Dmitri Sayenko, Russian Federation State Scientific Center, Institute for Biomedical Problems, Moscow, Russia
- Magdalena Kobielarz, Division of Biomedical Engineering and Experimental Mechanics, Wrocław University Of Technology, Wrocław, Poland
- Sylwia Szotek, Institute of Machine Design and Operation, Wrocław University of Technology, Wrocław, Poland
- Sabine Bensamoun, Laboratoire Biomécanique et Génie Biomédical, Université de Technologie de Compiègne, Compiègne, France
- Nebojsa Zdravkovic, Faculty of Mechanical Engineering, University of Kragujevac, Serbia And Montenegro, Yugoslavia
- Masanori Nakamura, Graduate School of Engineering, Tohoku University, Sendai, Japan
- Natalya N. Kizilova, Dept. of Theoretical Mechanics, Kharkov National University, Kharkov, Ukraine

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## From Mathematics to Biomechanics - a personal account on how I ended up winning the ESB Student Award.

**Ze'ev Bomzon, Technion-Israel Institute of Technology, Haifa, Israel**

More than three months have passed since the ESB conference, and I am still not sure how I ended up winning a student prize for my work in biomechanics. The truth is that prior to beginning my PhD I never even considered getting involved in this field. So how did I get here?

I have always been inclined towards science. However, prior to beginning my PhD I never thought of getting involved in life sciences. Biology just did not have as much appeal as physics or mathematics. So when I began my university studies, I decided to study for a degree in Mathematics and Physics at the Technion-Israel Institute of Technology. I had always

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planned to study for a graduate degree, but I assumed it would be in pure mathematics or theoretical physics. But life is full of surprises. During the final year of my undergraduate studies I got involved in a project involving applied optics. It was the first time that I had been exposed to experimental research, and I enjoyed it so much, that I continued along this path and did my masters degree in optical engineering. I still had no inclination to get involved in anything that reminded me of biology. However, two years later, when I finished my second degree, I felt that I needed a new challenge. This is when I came across Prof. Eitan Kimmel, who was looking for a PhD student to begin a collaborative project in cell mechanics with Prof. Dan Bader from Queen Mary University of London. The project appealed to me, and the metamorphosis was complete. I had gone from studying mathematics to studying biomechanics.

But what was the appeal of this project? I think there were several issues that appealed to me. First of all I had no background in either cell biology or mechanics, so this was definitely going to be a challenge. The complexity of cell mechanics presented an additional challenge. In optics, virtually any problem could be solved using some known theory. No matter how complex the problem, in principle, it could be traced back to a set of four equations (Maxwell's equations). But cell-mechanics was something different. The system is so complex, that I doubt there are no four equations that describe the behavior of the entire system. The basic questions remain unclear. Can the cell be described as a continuum? What are the limitations of tensegrity? What determines the

mechanical properties of cells? The chance to work on such basic problems was definitely appealing. But I think it was the multidisciplinary nature of biomechanics that really appealed to me. That idea of collaborating with biologists, physicists and engineers on a single problem had great appeal. It was even more appealing because of the international nature of this collaboration, which would allow me to travel to London and meet new people. The multidisciplinary nature of the project has made life difficult, but it also made it very interesting and fruitful. After two years of research in this field, I am certain I made the right choice by going into cell mechanics. I am finally beginning to see the fruits of my efforts in the form of emerging publications, and in the form of the ESB 2004 student award that I won. But I think the most rewarding aspect of this project is the fact that it has allowed me to meet new people, and discuss science with them.

Well that's it. I've almost completed this article. All that's left is to thank all the people that helped me to get where I am at the moment. So here I go. I would like to thank my research partners Martin, Arti, David and Dan for the fruitful collaboration. I would like to thank the awards committee for selecting my work for the Student Award plenary session, and I would like to thank the students for voting for me. I would like to thank Dr. Dror Seliktar from the Technion for his input. . Last but not least, I would like to thank my supervisor Eitan Kimmel for all his help, advise and support. Thank you to all the people I spent time with during the ESB 2004 conference. I look forward to meeting you again, and hope to see you at future ESB conferences.

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## Once upon a time in 's-Hertogenbosch... a student's impression

**Sabine Bensamoun, Mayo Clinic College of Medicine, Rochester, USA**

*Once upon a time the plays of the theatre were transformed into seminars...*



The 2004 ESB congress venue was the 'Theater aan de Parade', where the different halls were organised

according to the different topics of the congress. The friendly atmosphere has always been one of the ESB traditions, which allows to increase our knowledge in a pleasant environment. The breaks consisted of a coffee with a traditional 's-Hertogenbosch cream puff "Bosche bol", in which the first bite was quite funny. This coffee break enabled a lot of exchanges between professors and students.

*The ESB congress is not only a European congress, but definitively also a worldwide congress*

I have started my post-doc at the Mayo Clinic (Rochester, USA) and I was very surprised to know that many professors from my laboratory (orthopaedics and biomechanics) had planned to attend the ESB congress. We can definitively attest that the ESB congress attracts many people from all over the world. The ESB congress reflects a high scientific level showing the scientific progress every two years.

*The ESB Council and the Local Organising Committee are composed of very active members who never stop doing some improvements*

One of the best reforms introduced this year was the inclusion of ESB membership (both for 2004 and 2005) within the congress registration fee, as agreed between the ESB Council and the Local Organising Committee. Moreover the student membership fee (without subscription to Journal of Biomechanics) has been lowered to only 20 Euro!!!. In this way, it enables many students to become a member of the Society. The ESB congress always continues to improve the "student section" (originally created by prof. Ho Ba Tho), which never stops offering advantages for the students. This congress always keeps in mind that the future generation will be the researchers of the future. Moreover, a number of travel grants are offered at each ESB congress. Thanks to one of them, I was able to attend the congress this year, for which I would like to thank the Award Committee.

*Having fun at the ESB congress*

After the different sessions, a boat trip in 's-Hertogenbosch city was organised for the congress

delegates, and the scientific discussions were replaced by Medieval history.

When you go to the ESB congress, do not think that you go on vacation and be sure that your schedule will be full every day. To unwind in the evening, some students used to eat together around a good meal. But, most of the time the empty chairs were quickly taken by professors staying in the same hotel and thus the scientific discussions could continue until late at night.

*Special thanks !!!!!*



*Marie-Christine Ho Ba Tho and Patrick Prendergast, looking back at many years of service within the ESB*

We would like to thank prof. Patrick Prendergast (ex president) and prof. Marie-Christine Ho Ba Tho (ex vice-president) for many years of service within the ESB Council. Good luck to the new Council!!!!

## New ESB Council

### **Keita Ito**

*President*

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Keita Ito is the Vice Director of the AO Research Institute in Davos, Switzerland. He is also a Professor in the Department of Biomedical Engineering at the Eindhoven University of Technology. After receiving 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), he decided to concentrate on research and came to Europe for a post-doctoral fellowship at the AO Research Institute. This slowly evolved into the formation of a research group. Currently, he leads the Mechano-Biology Program focusing on the intervertebral disc and fracture healing. The group is an international and interdisciplinary collection of students, PhD, MD and DVM candidates as well as post-doctoral fellows and research scientists. They use a wide variety of methods including computational, *in vitro* and *in vivo* models to study the influence of the mechanical environment on the biology of bone healing and disc degeneration/regeneration. In addition to his teaching duties in the classroom and laboratory, he is on the editorial board of the Journal of Biomechanics as the

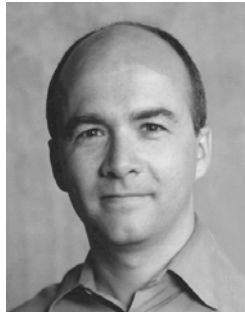


Survey Co-Editor. He has been on the ESB Council since 2000 and was the Secretary-General for the last two years.

### **Ralph Müller**

*Vice-President*

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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. Before he was 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 doctorate degree in 1994. The research he has completed and is currently pursuing employs state-of-the-art bioimaging of bone and tissue engineered constructs as well as the development of novel biomechanical testing and simulation techniques. He is an author of over 350 refereed publications in international scientific journals and conference proceedings. He has received a number of awards, including the Inaugural John Haddad Young Investigator Award (1998) from the American Society for Bone and Mineral Research (ASBMR) and Advances in Mineral Metabolism (AIMM) as well as the Promising Young Scientist Award (1999) from the International Society of Biomechanics (ISB). In 2004, he was named Young Leader by the American-Swiss Foundation. He is also active as an organiser of international symposia and working groups as well as a reviewer for scientific journals and funding agencies.

### **Marco Viceconti**

*Secretary-General*

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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.

### **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.

### **Damien Lacroix**

*Student Committee*

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Damien Lacroix is a Research Fellow at the Technical University of Catalonia in the Department of Material Sciences and Metallurgy. He received his Mechanical Engineering Degree from the National Institute of Applied Sciences (INSA) in Lyon (France) in 1996, and read his PhD from the University of Dublin (Ireland), Trinity College, in 2000. After working for

Smith & Nephew at the Biomechanics Laboratory of Toulouse (Purpan Hospital), he was awarded a Marie-Curie post-doctoral grant to work at the Technical University of Catalonia. Recently, he has received a *Ramon y Cajal* grant from the Minister of Science and Technology of Spain. His research interests relate to computer simulations of mechanobiological processes applied to fracture healing, bone distraction and intervertebral disc, and also to design of orthopaedic devices.

### **Jimmy Cunningham**

#### *Education Committee*

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<http://www.bath.ac.uk/ortho-biomechanics/>

Dr Jimmy Cunningham has worked in the area of biomedical engineering since 1985 at the Universities of Oxford, Durham, Bristol and Bath. Currently he is Reader in Biomechanics at the University of Bath. His basic interests lie in how bone repair and regeneration are influenced by the local mechanics and the quantification of these mechanical parameters. This research interests have produced work on the effects of the mechanical environment on fracture healing, distraction osteogenesis and physal distraction. Allied to this work has been the development of systems and protocols for the measurement of bone repair in-vivo. This has led to the investigation and application of a number of techniques (including vibration, ultrasound, mechanical loading) to describe the process of fracture healing in quantitative terms, which both enables a direct comparisons of treatments to be made and can also define when repair is complete or when it is delayed.

### **Georg Duda**

#### *Meeting Committee*

Musculoskeletal Research Center  
Berlin  
Center for Musculoskeletal Surgery  
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Free and Humboldt-University of  
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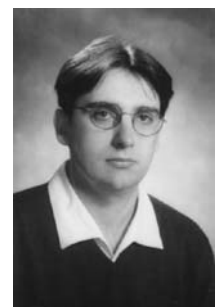
Prof. Dr. Georg N. Duda is head of the research lab of the Center for Musculoskeletal Surgery at the Charité – University Medicine Berlin, Germany and the clinical research group “Biomechanics and Biologie of Bone Healing”, funded by the German Research Foundation (DFG). Professor Duda is acknowledged for his work in the field of biomechanical aspects of musculoskeletal loading and bone healing. His work has been distinguished with several scientific awards such as the Gisela Strum Award from the Schulthess Klinik (2001), the S. M. Perren Award from the European Society of Biomechanics (2002) and the 1<sup>st</sup> Novel Award (2004). These awards recognise his work in developing new methods in determining the musculoskeletal loading conditions in healthy and injured and their influence on the biology of bone healing.

Born and raised in Berlin, Professor Duda graduated from the Technical University, Berlin in 1991, after studying biomedical engineering. He began his career at the biomechanics laboratories of the Mayo Clinic, USA and of the John-Hopkins-University, USA, before he received his PhD from the Technical University of Hamburg-Harburg in 1996. He then continued his scientific work at the Institute of Orthopaedic Research and Biomechanics in Ulm. In 1997, Professor Duda returned to Berlin to become head of research at the Center for Musculoskeletal Surgery and Head of the Medical-Technical Laboratories at the Charité – University Medicine Berlin. Since then he has been successful in applying for a variety of research projects. Of special note are, beside the clinical research group, the AO Collaborative Research Center and the Musculoskeletal Research Center Berlin (MRCB), funded by the European Union.

### **José Manuel Garcia**

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José Manuel García Aznar is Associate professor since 1996 at the Department of Mechanical Engineering, University of Zaragoza, Spain. He obtained his PhD in Computational Mechanics at the University of Zaragoza in 1999 and was a post-doctoral fellow at the Institute of Science and Technology in Medicine

(University of Keele, England) in 2001. He received the Juan C. Simo Young Investigator Award by SEMNI (2004). He is a member of I3A (Aragón Institute of Engineering Research). His present research focuses on computational biomechanics (mainly mechanics of hard tissue, mechanobiology of skeletal tissue regeneration, tissue growth and development), orthopaedic biomechanics and fractures of long bones.

### **Nikos Stergiopoulos**

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Nikos Stergiopoulos has obtained his BS in Mechanical Engineering from the National Technical University of Athens, Greece in 1986 and his MS and Ph.D. in Biomedical Engineering from Iowa State University, in 1997 and 2000, respectively. At present he is Professor and Director of the Laboratory of Hemodynamics and Cardiovascular Technology of the Swiss Federal Institute of Technology, Lausanne, Switzerland. His main research focus is hemodynamics and cardiovascular mechanics. Nikos Stergiopoulos is also the founder and Scientific Director of EndoArt SA, PSE B-Ecublens, Switzerland. EndoArt is a medical technology company developing vascular implants for the interventional cardiology and radiology market as well as telemetric blood flow

controllers for the treatment of congenital heart disease.

### **Jos Vander Sloten**

#### *Liaison 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 problem solving and 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 from 1997 to 2003, and chairman of the Committee for Bioengineering and Health Care of the Royal Flemish Chamber of Engineers in 1999 and 2000. Currently he is secretary-general in the interim Executive Board of the European Alliance for Medical and Biological Engineering and Science.

## **SOCIETY NEWS**

### **Council meeting**

*On November 8, 2004 the new Council, as elected during the General Assembly on July 6, 2004 in 's-Hertogenbosch, had its first meeting. The meeting was held in Barcelona and was hosted was Damien Lacroix, our new Student Committee Chairmain. In order to keep you up to date with what is happening in our Society we present you a summary of the main decisions taken during the meeting.*

58 applications for membership have been approved. The Society warmly welcomes these new members

and hopes they will be able to play an active role in the Society.

A new agreement with Elsevier has been approved. Financial rewards have been increased for both the *Clinical Biomechanics award* and the *Student award*. For both awards the winner will receive 1,000 Euro. The winner of the Perren Award will receive 10,000 CHF (6,600 Euro).

The first *ESB Summer Workshop* has been approved and will be held in Leuven. Jos Vander Sloten will organise the Workshop, which will focus on the mechanobiology of tissue regeneration (see page 2).

The Society is defining the basis for *Corporate Membership*. Corporate Members would receive:

- their logos included in the corporate members web page.
- like all members corporate members are allowed to submit content to the Newsletter, but not of commercial nature.
- priority right to be a lead sponsor for ESB activities and exhibition booths at ESB congresses.
- access to ESB information resources, but not for commercial purposes.
- Enrolment of the contact person plus up to additional 2 employees as Regular Members for all ESB seminars, conferences and special events.
- a personal subscription to Journal of Biomechanics for the contact person.

Corporate Members are not eligible for the Council. More details about Corporate Membership will follow. If you know a company interested in supporting the Society and becoming a Corporate Member, please bring them in contact with our Membership Committee Chairman, Manuel Garcia ([jmgaraz@unizar.es](mailto:jmgaraz@unizar.es)).

As already decided during the General Assembly in 's-Hertogenbosch, the European Society of Biomechanics has become a member of the *European Alliance of Medical and Biological Engineering and Science (EAMBES)*. Information on the aims and objectives of EAMBES was already published in the previous Newsletter (June 2004) and can also be found on [www.eambes.org](http://www.eambes.org). The President, Vice-President, and Secretary-General will represent the Society within EAMBES. Financially EAMBES membership of the Society means that 2 Euro per ESB member are transferred to EAMBES.

The issue of *unpaid membership dues* for 2004 was raised. Currently, some members did not yet pay their dues, possibly because the Society does not have the most recent member's address. Council members will contact these members soon, in order to verify whether the address is correct. Again, this shows the necessity, but also the difficulty of maintaining the member's database up to date. Therefore we would like to ask you to notify us of any change of address (also e-mail address!).

A new and faster procedure has been defined for the *acceptance of new members*. Membership applications are received by the Secretary-General, who performs a preliminary check and then submits the application to the other Council members. If no one objects, the application will be approved immediately. Only if there are any objections the application will be dealt with during the next Council meeting. Once approved, the new member's name will immediately be added to the ESB\_Forum mailing list and the Newsletter

distribution list and will be published in the Newsletter. A welcome package will be sent, together with the New Membership invoice, which will cover the current year (no matter when it is issued).

In order to promote the involvement of the members in the Society and the Society's transparency the *minutes of the General Assembly* will be posted on the ESB\_Forum, where members have the ability to comment. Based on these comments a final draft will be formulated and posted again on the ESB\_Forum, together with the invitation for the next General Assembly. A summary of every *Council meeting* will be published in the Newsletter (as in this Newsletter).

## New members

Apart from the 58 new memberships approved during the last Council meeting, 4 more applications have been approved according to the new procedure. We welcome all the new members and hope they will find their way in the Society.

The new members are: Allen, Robert; Bader, Dan; Bakker, Astrid; Baumgartner, Daniel; Bomzon, Ze'ev; Brennan, Orlaith; Butscher, Andre; Clark, Paul; De Beule, Matthieu; Di Puccio, Francesca; Downs, Crawford; Durand, Louis-Gilles; Ellison, Peter; Feipel, Veronique; Fotouhi, Reza; Geris, Liesbet; Ghadiali, Samir; Giri, Bijay; Giuliani, Alessio; Goicolea, José; Hazenberg, Jan; Heidari, Behnam; Hermans, Erik; Herzog, Walter; Hose, Rodney; Kennedy, Oran; Kholodov, Alexander; Krams, Rob; Laugier, Pascal; Lawford, Patricia; Lima, Rui; Limbert, Georges; Linder-Ganz, Eran; Migliavacca, Francesco; Moioli, Eduardo; Niebur, Glen; Obradovic, Borislav; O'Brien, Fergal; Prina Mello, Adriele; Reinisch, Georg; Salem, Walid; Screen, Hazel; Shelton, Julia; Smeulders, Mark; Swartz, Melody; Tran, Hung Viet; Van de Keere, Isabel; van Donkelaar, René; van Sint Jan, Serge; Varini, Elena; Villa, Tomaso; Wood, Nigel; Yourek, Gregory; Abdulghani, Saba; Henriksen, Marius; Svanadze, Merab; Taddei, Fulvia; Testi, Debora; Stefanou, Maria; Jimenez Bescos, Carlos; Lamvohee, Jean-Marie; Nowlan, Niamh.

## ESB website - call for volunteers

As already announced by Keita Ito in his Presidential Address the Society is working very hard to implement a new website with some new functionalities, a.o. a student section with job opportunities and course information in the field of biomechanics and biomedical engineering. The address will be [www.esbiomech.org](http://www.esbiomech.org). Once the website will be up and running, we will need a webmaster to take care of the technical maintenance of the website. As posted by Marco Viceconti on the ESB\_Forum list the Society is looking for a volunteer webmaster. The

ideal candidate is a member of the Society with some skills in computer science. Major website revisions will be contracted to professionals, and the content of the web site will be managed by a Content Management Board that will be defined by the Council. Candidates should send a brief CV to Marco Viceconti ([viceconti@tecnio.ior.it](mailto:viceconti@tecnio.ior.it)), highlighting their technical skills and specific background.

## ESB 2008 – preliminary expression of interest

Although it may still seem far away it is about time to start thinking of the venue for ESB 2008. The venue for this congress will be formally announced during

the 2006 General Assembly in Munich. Colleagues interested in hosting ESB 2008 are invited to send a preliminary expression of interest to Marco Viceconti ([viceconti@tecnio.ior.it](mailto:viceconti@tecnio.ior.it)), secretary-general. Expressions of interest should be received no later than April 10, 2005.

Such expression of interest does not constitute any obligation at this time. At the next council meeting, scheduled for mid April 2005, the formal procedure to candidate for ESB 2008 will be decided, which will then be made public soon after. These preliminary expressions of interest will aid the Council in getting a first idea of the potential venues.

## ESB GOSSIP

The Society is very pleased to announce the birth of **Quentin**, son of **prof. Marie-Christine Ho Ba Tho**, on September 8, 2004. Mother, father and sister Naomi are proud and are very much enjoying Quentin's company. We would like to congratulate Marie-Christine with the birth of her son.

**Prof. Jos Vander Sloten** was elected by the interim council of EAMBES (European Alliance for Medical and Biological Engineering and Science) as president elect for 2005. This implies that he will be the president in 2006 and past-president in 2007. **Prof. Patrick Prendergast** will be the vice-chair of the

division of societies within EAMBES and **Dr. Marco Viceconti** will be a member of the council, representing the ESB in the Division of Societies.

**Dr. Harry van Lenthe**, senior research associate at the Institute for Biomedical Engineering, ETH Zürich, Switzerland, has won this year's Young Investigator Award from the International Workshop on Bone Densitometry held in Annecy, France on 20-24 June, 2004. The price is awarded with US\$ 10,000 and honors exceptional contributions to the field of skeletal imaging.

## Announcements

### Conferences

**First International Conference on Mechanics of Biomaterials & Tissues**, Hawaii, USA, December 11-14, 2005

Organized by *Elsevier* in association with *Engineering Fracture Mechanics* and *International Journal of Fatigue*, this Conference will explore how the study of engineering materials can be relevant to the study of biomaterials. Abstract submission is due April 1, 2005. More information can be found on the conference website ([www.icmobt.elsevier.com](http://www.icmobt.elsevier.com))

**5<sup>th</sup> World Congress of Biomechanics**, Munich, Germany, July 29-August 4, 2006

The conference will be chaired by prof. Dieter Liesch from the Laboratory of Biofluid Mechanics of the Munich University of Applied Sciences. For the first time the biennial congress of the ESB will be held within the WCB. Further information can be found on the congress website ([www.wcb2006.org](http://www.wcb2006.org)).

### New books

**Biomechanics and Sports: Proceedings of the XXI Winter Universiads 2003**, Paolo B. Pascolo (Ed.), CISM International Centre for Mechanical Sciences Number 473, Springer, 2004, price: 49.00€, 171 pp., ISBN: 3-211-21210-8 (see also: [www.springeronline.com](http://www.springeronline.com)).

**Biomechanics of Human Movement**, Robert E. Schleihauf, AuthorHouse, price: \$24.50, ISBN: 1418469580 (see also: [www.authorhouse.com](http://www.authorhouse.com)).

**Biomedical Engineering Principles in Sports**, G.K. Hung, J.M. Pallis (Eds.), Springer, 2004, price: 117.00€, 528 pp., ISBN: 0-306-48477-3 (see also: [www.springeronline.com](http://www.springeronline.com)).

**Computational Models for the Human Body**, Handbook of Numerical Analysis Volume XII, N. Ayache (Ed.), Elsevier, 2004, price: 215.00€, 676 pp., ISBN: 0-444-51566-6 (see also: [www.springeronline.com](http://www.springeronline.com)).

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[www.elsevier.com/wps/find/bookvolume.cws\\_home/501439/vol12](http://www.elsevier.com/wps/find/bookvolume.cws_home/501439/vol12)).

**Dynamics of the Vascular System**, Series on Bioengineering & Biomedical Engineering - Vol. 1, John K-J Li, World Scientific, 2004, price: \$46.00, 272 pp., ISBN: 981-02-4907-1 (see also: [www.worldscibooks.com](http://www.worldscibooks.com)).

**Muscle/Bone Interaction in the Musculo-Skeletal System**, J. Mizrahi, IPPT PAN, CoE ABIOMED, 2004, price: 25.00€, 129 pp., ISSN: 1733-0874 (see also: [www.ippt.gov.pl/abiomed](http://www.ippt.gov.pl/abiomed)).

**Nonlinear Homogenization and its Applications to Composites, Polycrystals and Smart Materials**, P.

Ponte Castaneda, J.J. Telega, B. Gambin (Eds.), NATO Science Series Vol.170, Springer, 2004, price: 60.00€, 355 pp., ISBN: 1-4020-2622-6 (see also: [www.springeronline.com](http://www.springeronline.com)).

**Proceedings of the Workshop on Ultrasound in Biomeasurements, Diagnostics and Therapy**, A. Nowicki, J. Litniewski (Eds.), IPPT PAN, CoE ABIOMED, 2004, price: 25.00€, 182 pp., ISSN: 1733-0874 (see also: [www.ippt.gov.pl/abiomed](http://www.ippt.gov.pl/abiomed)).

**Trauma Biomechanics: Introduction to Accidental Injury**, Kai-Uwe Schmitt, Peter Niederer, Felix Walz, Springer, 2004, price: 49.95€, 173 pp., ISBN: 3-540-22299-5 (see also: [www.springeronline.com](http://www.springeronline.com)).

