International Society of Biomechanics Newsletter

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ISB President's Message

I have recently returned from attending the 7th Australasian Biomechanics Conference (ABC7), which was hosted on the idyllic Gold Coast of Queensland, Australia. This is the biennial meeting of the Australian & New Zealand Society of Biomechanics (ANZSB), a relative new Society that was founded in February 1996 as a forum for biomechanists from all variety of disciplines within Australia and New Zealand, to meet and communicate.

It was especially gratifying to see such a packed program and active attendance by biomechanists from across Australia, New Zealand, and other parts of the world as far away as Canada and South Africa. The vibrancy during the conference was particularly pleasing given that the ANZSB has experienced a "rocky" period in its recent history. Despite its enthusiastic beginnings and being unanimously approved as an Affiliated Society of ISB at the ISB General Assembly held in Dunedin in 2003, the need for a national society of biomechanics was questioned in 2007 by a member of the ANZSB Executive. In fact, the ISB Executive was approached by this member with the prospect of "rolling ANZSB into ISB", as they felt there was no need to have a separate national society.

After careful deliberation of this request at the 2007 ISB Council meeting, the ISB Executive unanimously agreed that it would *not* support the proposal to disband the ANZSB but rather look at ways the local group could support and strengthen the Affiliated Society. The ANZSB Executive was encouraged to consider several strategies designed to revitalise its activity, together with the offer of support during this process by ISB Council members, particularly those ISB Council members from Australia and New Zealand.

At this year's ABC7 conference, the effectiveness of this support was realised, with the newly elected ANZSB Executive taking office at the Society's Annual General Meeting, with launching of a new web-site, discussion by the members of new directions for the Society, together with announcement of the ABC8 conference to be held in 2 years time. As an Affiliated Society, ISB supported a keynote speaker for ABC7, Walter Herzog, whose inspirational keynote lecture on "*Force enhancement/force depression and mechanisms of contraction in skeletal muscles*", set the high standard for the rest of the meeting. Walter's eager and deep questioning throughout the conference also promoted extensive discussion during the seminar and free paper sessions, and was an educational experience in itself for the many research students (and their supervisors) attending the conference.

The experiences of the ANZSB over the past 2 years have highlighted the mutual benefit that can be realised between an Affiliated Society and ISB. National societies provide an ideal environment to promote communication and collaboration amongst biomechanists from all variety of disciplines on a local level, often focusing on interests unique to the local environment and culture (I am not sure if Walter yet understands what the sport "netball" is all about). National societies are especially suitable as a launching platform for research students to present their research, particularly with the inclusion of "work in progress sessions", which provide opportunities for research students to gain valuable feedback during their research training. National societies, however, can gain even further benefits in terms of collaboration and communication from international bodies such as ISB, often gaining the critical mass and broader international perspectives not available on a local level. I encourage all Affiliated Societies to seek the support of ISB, should they need assistance with strategies to reinvigorate, strengthen or further expand their activities and take advantage of our schemes to support Affiliated Societies, particularly international student travel initiatives, which are described on our web page.

With the year coming to a close, I wish all ISB members a safe and relaxing holiday period, whether it be during the extended summer break of the Southern Hemisphere or the cooler climates of our Northern counterparts. I look forward to working with you on initiatives described elsewhere in this Newsletter during the New Year.

Warmest regards
Julie

Meet Your Executive – President Elect

I was asked to write a short piece to introduce myself as the new President-Elect of the ISB. First, I want to thank the members for trusting me with this great responsibility. In the next two years, the society will be in the capable hands of President Julie Steele so I have some time to prepare. My main responsibility now is to find a host organization for the 2013 congress (see elsewhere in the newsletter).

Ton manually digitizing a 16 mm film. Background shows the Apple II computer for data collection. Circa 1988.

The recent ISB congress in Cape Town reminded me why the ISB is special. The atmosphere is welcoming and friendly, not competitive and corporate like some other large meetings you might have been to. The ISB is like a family and it has been like that since I attended my first ISB Congress in 1987 in Amsterdam. As a graduate student at the University of Utrecht, I was determined to attend this conference so close to home, even though I had never heard of the ISB. I decided to do my first animal experiment on January 27th so I could submit something. It so happened that it had been freezing that week, and if you know anything about the Dutch, you will not be surprised that the Department was closed on the afternoon of the 26th and we all went skating.

Ton (far left) and Rene van Weeren discussing placement of CODA markers. Circa 1990.

ISB 1989 participants at the L.A. Dodgers baseball game. Jim Hay is in the green shirt at center, Ton is right behind him. How many other ISB members do you recognize?

From Utrecht to Muiden and back, my advisor and I skated together for hours and went over the details of the upcoming 16-hour experiment. Things went flawlessly the next day, including our recordings of EMG and tendon strain on UV-

sensitive paper, kinematics on 16 mm film, and the post-mortem load-strain calibrations. I was able to process the data, submit my abstract, and it was accepted!

Ton (center) with Hiroshi Kinoshita (left) and Takei Kojima (right) during the ISB 1987 banquet at the Amsterdam zoo.

I do not remember how the presentation went, but I do remember being very relieved that Gerrit-Jan van Ingen Schenau liked my 6-page paper for the proceedings that he had reviewed. The organizers had the brilliant idea to have each session co-chaired by a senior biomechanist and a local graduate student. So I was invited to the V.I.P. barbecue! I was co-chairing a session with Benno Nigg, and he was just the perfect mentor. Years later he would offer me a job. I had great discussions with well-known biomechanists, never expecting to even meet them, and some of them are now good friends. Peter Cavanagh's Muybridge Lecture was unlike anything I had ever experienced; it made me want to move to the U.S. and do the same kind of work. Years later, he would become my boss also. On the spur of the moment, we organized a lab tour. I mentioned it to a few people, and on the message board I posted directions to take the train. Waiting at the train station in Utrecht, I could not believe my eyes when people like Kit Vaughan and Graeme Wood, and many others, actually showed up. These are the sort of things that make people excited about being part of the ISB.

I felt and saw that again in South Africa, where there was just a perfect balance between a community of old friends and a welcoming atmosphere for new participants and students. Many of these students will eventually become lifelong members and leaders in their own right. At least, that is how it went for me, and that is why I am excited to have been elected to a leadership role in this wonderful society.

Ton preparing his subject. Note the Kistler charge amplifier on the back. This was needed for the piezoelectric accelerometer that was used as a heelstrike detector

Ton van den Bogert
ISB President Elect

Notes from the Archives

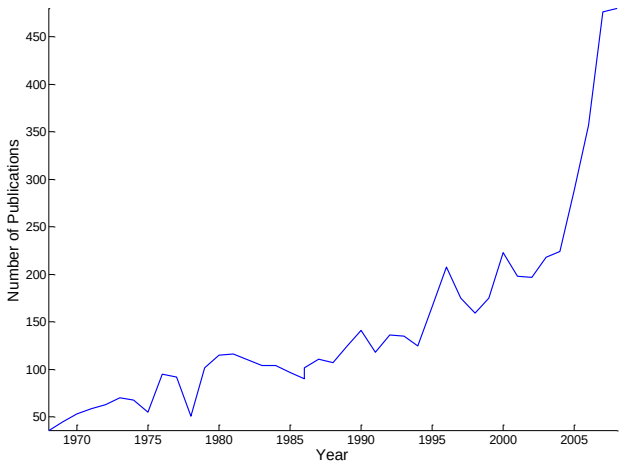
The muscle physiologist Wallace O. Fenn (1893-1971) is perhaps best known for his observation of the energy liberated by muscles as they produce work. Fenn (1923) wrote

> "*In particular it can now be shown that there is a fairly good quantitative relation between the heat production of muscles and the work which they perform, and that a muscle which does work liberates, ipso facto, an extra supply of energy which does not appear in an isometric contraction.*"

This was subsequently named the Fenn Effect by Nobel Laureate A.V. Hill. In a retrospective essay on his life in science Professor Fenn commented on the literature in his area of interest,

> "*…the vast and expanding literature is certainly a sign that physiology and the biological sciences are flourishing as they never have before.*" (Fenn, 1962).

Journals specifically addressing biomechanics did not arise until 1968 with the publication of the first issue of the Journal of Biomechanics. The International Society of Biomechanics (ISB) has a long association with this journal as an affiliated society, and with two ISB designated members on the editorial board. Tracking the number of publications per year in this journal indirectly tracks the development of our discipline.



There is certainly increasing activity in our discipline although the recent increase in number of publications is daunting. Despite being described as a man who,

> "*…led a most vigorous life and up to his very last days was working in the laboratory.*" (Rahn, 1976)

even in 1962 Fenn himself had cause to comment,

> "*When scientific papers are being printed faster than they can be read and digested there is real danger of intellectual indigestion.*"

Of course Fenn can also be held in part responsible for this proliferation of publications, for example, with his instrumental role in the founding of the Journal of Applied Physiology in 1948 (Otis, 1998). Garfield (2006) reports that there were some 38 million scientific papers published between 1900 and 2005. Approximately 75,000 of these had been cited more than 200 times. However, any biomechanist dispirited by the citation rate for their personal body of work should consider that they are likely to be in good company since Garfield also reported that approximately half of the 38 million had yet to be cited. But not being cited does not mean they are not being read and we can perhaps draw comfort from this description of Fenn's personal philosophy, described by Rahn (1976), that,

> "*…continuous striving, striving to obtain his scientific goals, was more important than arriving.*"

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[*The ISB has an archive of its important materials, kept at Penn State University. If you have any materials you think should be in the archive, and you would consider donating them to the archive please contact John Challis (jhc10@psu.edu).*]

Affiliate Societies - The German Society of Biomechanics

The German Society of Biomechanics (**DG*f*B** Deutsche Gesellschaft für Biomechanik e.V.) was founded in 1997 mainly based on an initiative of Prof. Lutz Claes (the Society's Honorary President) from the Institute of Orthopaedic Research and Biomechanics of the University of Ulm. A group of about 40 founding members got together in Ulm and agreed on the by-laws that were necessary to get the Society started and officially registered as a non-profit organization.

The mission of the **DG*f*B** is to advance and support biomechanical science in biology, medicine, sports and related areas. This goal is achieved by organizing workshops and congresses in order to exchange and expand biomechanical knowledge but also to engage in public relations. Already in 1999, the first meeting of the Society took place in Ulm and new members were added. Since then, the Society has grown to a current membership of just above 300 members. Membership is open to all professions interested in the field of biomechanics as well as to applicants from other countries. Current members come from various backgrounds and work environments as can be seen in the recent distribution of professions of member that indicates the largest sub-groups coming from engineering, sports, or clinical backgrounds (Figure below).

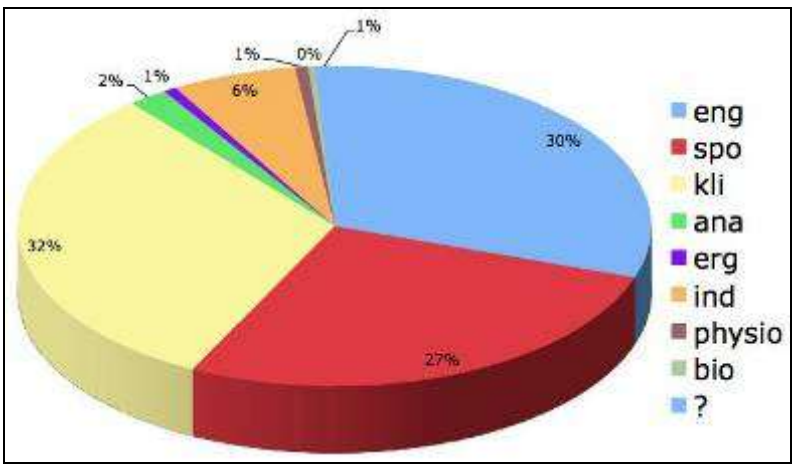
The Society's meeting is held bi-annually and shows a continuously increasing number of participants. The **DG*f*B** congress is organized by the current President of the Society and has been held for the 6th time this year, with the venue in the Anatomy Institute of the University Hospital in Münster. A total of 312 scientists coming from Germany, Austria, Switzerland, Denmark, the U.K., France, Australia and China attended the meeting. During the 2½-day program 64 oral presentations and 40 poster presentations were offered. Three keynote speakers offered an overview about their line of research (Prof. Dieter Felsenberg, Berlin, Dr. Robert van Deursen, Cardiff, Prof. Peter Augat, Salzburg/Murnau). An anatomy workshop and a symposium for young scientists were held right before and were well attended with a strong participation of young pre-doctoral and post-doctoral students.

The Society offers five travel grants per year in order to support students to attend international conferences and awards the best presentations of young researchers during the bi-annual meeting.

More information (in German language) can be found on the society's homepage:
http://www.biomechanics.de/dgbiomech/dgbiomech.html

For further information, please contact the current President Dieter Rosenbaum (diro@uni-muenster.de) or the President-elect Peter Augat (biomechanik@bgu-murnau.de) who will take over the presidency in January, 2010.

Dieter Rosenbaum



Distribution of the about 300 members of the **DGfB** according to professional background: eng=engineering; spo=sports, kli-clinical, ana=anatomy, erg=ergonomics, ind=industry, physio=physiotherapy, bio=biology, ?=not specified.

ISB Activities in Developing Countries

In the last few years ISB has taken new initiatives in terms of helping to develop Biomechanics worldwide by creating new labs in developing countries. The first initiative was driven by Prof. Brian Davies (former ISB President), who developed a new gait analysis lab in Tanzania (known as the TATCOT Project, 2005-2007). Following this path, Miss Ediuska Laurens, past ISB Student Representative, was extremely successful in terms of developing a second gait analysis lab at the Universidad Simon Bolivar in Venezuela (2008-2009). A third group of ISB members, Prof. Li Li and Prof. Joseph Hamill, are currently installing a third lab also in Venezuela, at the Universidad Los Andes (this lab should be up and running by January 2010). Finally, a fourth initiative was taken by Prof. Kenneth Chelule, who recently (August 2009) received a donation of a Motion Analysis MAC Falcon System by the Leeds University, and is also organizing a gait analysis lab at the Moi Teaching and Referral Hospital at the Moi University in Kenya. This lab should be functional by April 2010.

All these initiatives are really important for the development of Biomechanics worldwide, and represent concrete actions of our Society in terms of bringing these developing countries closer to what seems to be common knowledge at developed countries. These initiatives would not be possible without the effort of several ISB members (Presidents, Executive Council Members, scientists and students), and of several partners or ISB collaborators (Motion Analysis Corp., Delsys, Vicon, MTI).

These initiatives hopefully will have a huge social impact at the local communities, as students and professors of the local universities will benefit and have a unique chance of doing research using state of the art technology. In addition, local populations will benefit from clinical evaluation using quantitative measurements, which will allow for an objective and precise evaluation of clinical problems.

However, despite the importance and value of these initiatives, their success does not depend solely on advanced technology, new equipment and local needs. These initiatives will only flourish if ISB is able to establish some guidelines that should be followed by ISB members that take the first steps towards these initiatives. These guidelines include the following aspects:

1) a "brain" (professor) at the local university/lab that will be responsible for making the effort of getting not just money, but mainly will be organizing projects, supervising students and getting people involved. Therefore we need to identify who is this person at the local university;
2) a good and strong collaborator, someone willing to visit the lab perhaps one time a year or even one time every other year if there is a time constraint, but someone who will start research projects in collaboration with and who will maintain regular contact with the professor at the lab. Without this person, starting research is very difficult, as usually there is no expert in these new labs, and expertise comes with training over a long period of time;
3) a mentor, which can be the collaborator or, if not, someone who might know people in the new lab and people with expertise in the area of research of the new lab;
4) students need to be involved, as they will be the ones in the front line, who will be using the equipment;
5) identification of the possible areas of research to be developed in this new lab, which might be related to the specific characteristics of the local area, the personnel expertise and the needs from the local community. These might include musculoskeletal, orthopaedic or clinical problems, and they might be a starting point to define which kind of research projects could begin at these new labs, and might help as well in defining the collaboration person with expertise in that specific area of interest.

If these guidelines are followed, then ISB can help to strengthen these initiatives to make sure

that a new "biomechanical seed" is placed in good soil. ISB actions might include:

1) seeking partners and/or collaborators interested in helping with equipment donation, installation and personnel training;
2) organizing workshops as done by Ediuska Laurens last year both in Venezuela and in Brazil, where an ISB member with expertise in the area of the new lab visits the place, discusses projects with the students and helps with technical details that might improve the quality of what is being planned;
3) keeping track of what is happening at these new places so that we make sure that research is being conducted in these new labs;
4) helping students financially (we have very good grants that ISB is giving to these students, which allow them to visit other labs, go to an ISB conference and get some funding for their thesis/dissertation projects);
5) helping professors from these new labs to get some training overseas in labs of developed countries, as this might help them to get a good start and good research collaboration, and might help to strengthen the bounds between mentors/collaborators and these researchers from these developing countries.

These guidelines have proven to work really well and are a result of trial through strong long-term (of about two decades) collaboration between Canadian and Brazilian scientists. The impact that such initiatives have on a country (or even on a continent) is overwhelming and represents the true spirit of our international society.

Marco Vaz
ISB Affiliated Societies Representative

Walter Herzog
ISB Past President

Progress on Improvement of Biomechanics Education and Research in Thailand

The overall goal of this project is to provide an opportunity for the researchers, educators, clinicians, and students in the area of biomechanics to continue their collaborative work to promote and improve biomechanics education and research in Thailand. Since 2005, Dr. Mathiyakom and Dr. Vachalathiti have worked collaboratively to provide opportunities for researchers, clinicians, and students to learn more about biomechanics via workshops to clinicians, group and one-on-one discussion sessions with researchers and students.

Work Completed (2009)

Mahidol University: Drs. Mathiyakom and Vachalathiti had a productive 2-week period with graduate students and the faculty members. Drs. Mathiyakom and Vachalathiti worked with 4 doctorate students: Anong Tantisuwat; Chaiyong Jorrakate; Soontharee Thaweetanalarp; and Komsak Sinsurin. These four students were at different stages of progress in their doctoral program. For Anong, Chiyong, and Soontharee, the focus of our sessions was on verification of kinematic and kinetic data, identification of variables of interest, and summarization of the results. Group and one-on-one discussion/hands-on experience were utilized. For Komsak, we worked on organizing his ideas for his proposal. Dr. Mathiyakom has been in contact with the students to continue his support. In addition, Dr. Mathiyakom also gave a lecture "Introduction of Vestibular Rehabilitation" to the faculty and graduate students at the Mahidol University. The lecture was well received by the faculty and graduate students.

Chiang Mai University: Dr. Mathiyakom has been in contact with Kanokporn Ooneklabh and Dr. Pothongsunun to follow up on Mr. Ooneklabh's PhD proposal entitled "*Risk assessment & ergonomic interventions for the wood carving workers"*. Currently, we are in the process of reviewing her proposal. Dr. Mathiyakom and Dr. Ratanapinanchai were unable to work on the manuscripts as planned due to Dr. Ratanpinanchai's family emergency. However, we have been in contact and will continue to work on our project.

Rangsit University**:** While visiting Mahidol University, Dr. Mathiyakom was contacted by

the faculty of Physical Therapy, Rangsit University to give a lecture on a recent update issue in Physical Therapy. Dr. Mathiyakom gave a lecture and hands-on session entitled "Movement Impairment Syndromes of the Hip" to the faculty members.

Work Proposed (2010)

Although I proposed to work on a collaborative research project "Lower mechanics during turning while walking tasks" during my visit in the summer, I spent most of my time working with students at Mahidol University and their projects. This assisted the students to progress with their degrees and be able to complete their projects with confidence in their data/outcomes. During this coming summer, I will continue my collaborative work on education and research with Dr. Vachalatithi (Mahidol University) and Drs. Rataninanchi and Pothongsunun (Chiang Mai University). I will continue to serve as a consultant for doctoral students at Mahidol University and a Co-advisor of a doctoral student (Ms. Ooneklabh) at Chiang Mai University.

Witaya Mathiyakom
Roongtiwa Vachalathiti

Reflections from an ISB Supported Member

I would like to thank you for giving me an opportunity to share my experience with you. Over the past few years, I have collaborated with researchers and physical therapists in Thailand to pursue biomechanics research projects and educational programs. After graduating from Mahidol University with a degree in Physical Therapy, I moved to the United States where I have earned a masters degree in Physical Therapy and a doctorate in biomechanics at USC. Since then, I have had the privilege to collaborate with my mentors to use my research and clinical backgrounds to help strengthen the clinical program at my alma mater. With the generous travel funding from Mahidol University and ISB, I was able to travel to Thailand for several weeks which allowed me to provide research and educational seminars to students, researchers, and clinicians.

My first opportunity occurred in 2005 when I visited the Faculty of Physical Therapy, Mahidol University. During that first visit, I worked with Dr. Vachalatithi, one of my previous instructors who is now the Dean of the department, and her students. I presented a series of lectures to the faculty and graduate students on fundamental kinetic analysis of human movements and how to apply kinetic information in a clinical setting. This added information allowed clinicians, students, and faculty members to gain a better appreciation of the cause of abnormal movements observed. The first series of lectures ignited interest in these topics from many students, faculty members, and clinicians in the field of clinical biomechanics in Thailand. Since my first visit, I have maintained a line of communication with several of the students and researchers I met. We have exchanged our experiences and ideas on topics such as jumping mechanics and lower extremity biomechanics during fall recovery. In 2006-07, Dr. Vachalatithi invited me to present several presentations and educational courses on the clinical biomechanics of the shoulder and lumbar spine in order to promote clinical biomechanics education and research in Thailand. During my most recent visit, my goal was to provide hands-on experience for clinicians and graduate students on verification of kinematic and kinetic data, identification of variables of interest, and summarization of results. We utilized one-on-one and group discussion sessions to promote students' learning experience. In addition to student projects, Dr. Vachalatithi and I have worked on a research project on the lower extremity biomechanics during turning tasks to generate preliminary data for a grant proposal.

I also have had a great opportunity to collaborate on research with Dr. Ratanapinanchai, Department of Physical Therapy, Faculty of Associated Medicine, Chiang Mai University. Dr. Ratanapinanchai is interested in the clinical biomechanics of the shoulder, particularly in patients with central nervous system disorders. I served as a co-investigator on one of her grants, which was funded and completed. Currently, we are working on manuscripts of our research project. In addition, I served as a co-advisor of two graduate students in her department.

My experience in working with the researchers, clinicians, and students in Thailand has been

wonderful. All of us enjoyed our time together. We shared good conversations over good food and wine. I look forward to my visits in the upcoming years.

Cheers,
Dan Witaya Mathiyakom

Student Travel Report

Thanks to the International Society of Biomechanics Council I received an ISB Student International Travel Award, which allowed me to visit the Gait & Motion Analysis Laboratory at Gillette Children's Specialty Healthcare Center in St. Paul (MN). I'm just back from this trip to the US, which was an amazing inspiring experience!! I saw and learned so much, what seems to be almost impossible for the 3.5 weeks that I spent at Gillette's.

Dr. Michael Schwartz was my host and organized a complete program at the Gait & Motion Laboratory. Their research group has extended experience with gait analyses in children with cerebral palsy (CP) and has, similar to my PhD project, interest in the long-term outcomes of interventions. In Cape Town I collected 3D gait (Vicon) data of 31 patients with spastic diplegia who received selective dorsal rhizotomy (SDR) in the 1980's. Since I was not confident with the processing, analyses and interpretation of my data, we used this as one of the main projects to work on during my visit.

In addition, I was able to observe and interact with the daily activities in this busy well-organized children's gait lab. At Gillette four engineers are responsible for data processing, while four physical therapists conduct gait analyses (3D analyses with Vicon system, video, EMG, plantar pressure testing and oxygen uptake measures) and physical assessments (muscle tone, strength, motor control and bone alignment). After analyses, the physical therapist spends some time with an orthopaedic surgeon, they interpret the data, which finally results in a treatment plan or if other disciplines should be involved the patient will be seen and discussed in a combined clinic.

The Gait & Motion Laboratory is located in the hospital, and so Dr Michael Schwartz was able to organise that I also could observe all the different clinics including: Spasticity and Neuromuscular Clinic, Center for Paediatric Orthopaedics, Paediatric Rehabilitation and a specific Center for CP. Since my own research is focused on adults with CP and I am familiar with the problems of transition from adolescents into adults, I also spent some time at the Gillette's Lifetime Specialty Healthcare Center, who were very interested in my experiences in South Africa.

Being a physical therapist, human movement scientist (MSc), who just handed in my PhD thesis in biomedical engineering and my special interest in clinical gait analyses of patients with CP, this visit to Gillette was a great combination of everything. I really appreciate that I got this opportunity, and was able to gain so much experience, which I will share with my colleagues in South Africa. In addition, I will be able to finalise and write up a very interesting paper about the long-term outcomes of SDR, and hope to further collaborate with Dr Michael Schwartz and his research group in the future.

I would like to thank you again for this great opportunity you gave me!

Kind regards,
Nelleke Langerak

Meet the Working Group on Robotic Applications in Biomechanics (wGrab)

Robots, mechanisms that can move automatically, have been applied to study questions in biomechanics for decades. The fairly recent advances in computing power have really opened up the field of robotics and enabled applications in biomechanics. The Working Group on Robotic Applications in Biomechanics (wGRAB) was envisioned to provide a forum for those interested in applying robotics in the field of biomechanics. More specifically, wGRAB is intended to provide a forum for those interested in using robots as tools to gain insight into biomechanical issues such as joint mechanics through cadaveric testing, or material testing of orthopedic implants, sports equipment (including shoes), orthotics, and prosthetics or neurophysiologic responses in normal subjects and in rehabilitation settings. The specific focus is on the application of robots as tools to perform biomechanical investigations and is neither on robots themselves nor on developing walking robots.

Figure 1: Human knee joint mounted to the robotic joint simulator in Hiromichi Fuji's laboratory at Kogakuin University, Tokyo, Japan.

The first relevant mechanisms were "joint simulators" for applications studying the spine, knees and elbows. Maletsky et al (2005) present a good overview of these mechanisms. These purpose-built mechanisms rely on the arrangement of joints and constraints in order to control the resulting motion of the mechanism. Many of the initial simulators were static or quasi-static. Advanced 6 degree of freedom mechanisms are still being developed, for example the joint simulator at Kogakuin University, Tokyo, Japan (Figure 1). The first industrial robot with six electromechanically driven axes was released in the early 1970s, and the increasing computer power enabled more sophisticated control and actuation of these versatile machines. Dr Savio Woo pioneered the use of commercial robots in biomechanics and performed ground-breaking research measuring the kinematic response of the knee to external loads and the corresponding in-situ loads within individual ligaments (Figure 2).

Figure 2: Human knee joint mounted to a serial robot in Dr Woo's laboratory.

The number of research groups applying robots to biomechanical problems has rapidly expanded in the last 10 years, due in part to the decreasing cost of the hardware, improvements in the sophistication and versatility of the control software and the appreciation of the many applications that can be advanced using robotic technology. Recently several groups have adopted parallel robots (platform mechanisms with 6 legs rather than shoul-

der, elbow and wrist joints of serial robots). These mechanisms are similar to those in flight simulators and amusement rides; they offer high load capacities and very high positioning accuracy, but have limited workspace volumes compared to serial robots. The first of these mechanisms were installed at the University of Calgary (Canada; Figures 3 and 4) and have also been installed at the University of Edmonton (Alberta, Canada), the University of Guelph (Ontario, Canada), University of Western Ontario (London, Ontario, Canada), and Cleveland Clinic (Cleveland, Ohio, USA), among others.

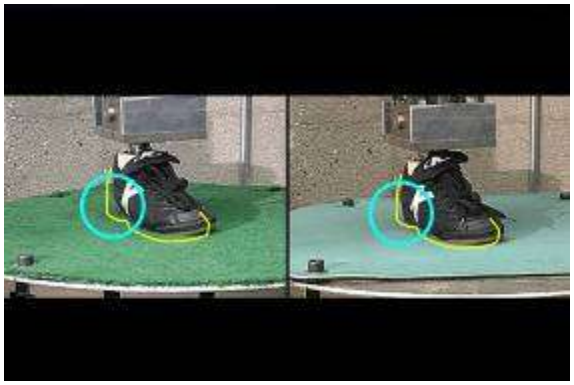


Figure 3: Dr Benno Nigg's parallel robotic application evaluating the shoe-ground interface.

Figure 4: Dr Nigel Shrive, Shon Darcy & Josh Rosvold using a FARO arm to digitize points on a sheep stifle joint (knee) to define the alignment

The range of applications of this technology in biomechanics has expanded considerably as well. The robots have been used to simulate gait (Center of Excellence for Limb Loss Prevention and Prosthetic Engineering, Seattle, Washington, USA), evaluate chiropractic manipulations (Dr Greg Kawchuk, University of Edmonton, Alberta, Canada) and evaluate the biodynamic response to whole-body vibrations (Dr Michelle Oliver, University of Guelph and Dr Jim Dickey, University of Western Ontario).

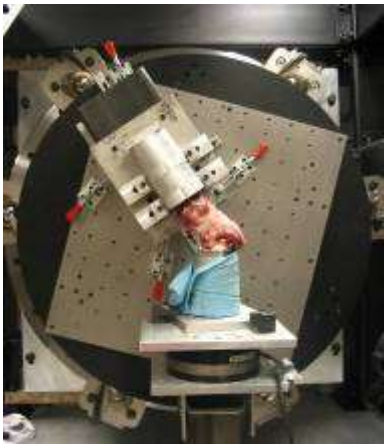


Figure 5: Sheep stifle (knee) mounted to a parallel robot in Dr Jim Dickey's laboratory.

The Working Group on Robotic Applications in Biomechanics (wGRAB) first met in May 2007. This first conference has been organized in Banff, Canada, attended by 30 participants from Canada, US, Germany, and Japan. This group intends to become one of the ISB Technical Groups in the future. One of the foci of this group is about the shared technology, but there is also overlap in scientific interests as well. The group went through an exercise identifying the current limitations and the wish list for future developments, and these issues were directly communicated to the robotic manufacturers. The working group has not yet organized a second conference, and has subsided with communications between the members. We envision developing a mailing list, information exchange (Wiki), and a software repository. Any interested individuals should contact one of the board members.

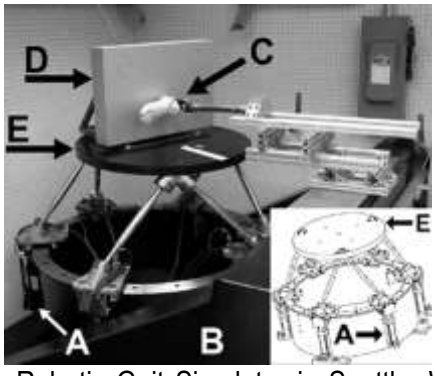


Figure 6: Robotic Gait Simulator in Seattle, Washington, USA, at the Center of Excellence for Limb Loss Prevention and Prosthetic Engineering.

Board members
James Dickey
Nigel Shrive
Ton van den Bogert
Rich Debski

Past-President's Grants for Affiliated Societies

As President of the ISB, I instigated a grant program aimed at supporting keynote lecturers and young investigator awards for ISB affiliated societies. For 2010 and 2011, these awards will continue to be available.

1. **The keynote lecturer award** is worth up to $2,000 (US) and can be used by an ISB affiliated society to invite a prominent international keynote speaker to their conference. The rules and application procedures are straight forward to maximize participation in the programme.

(i) the applicant organization must be an ISB affiliated society.
(ii) the invited keynote speaker must present her/his work at the annual (bi-annual) conference organized by the affiliated society.
(iii) the invited keynote speaker must be an ISB member in good standing.
(iv) applications for such an award can be sent directly to Walter Herzog (walter@kin.ucalgary.ca) and they must contain the name of the proposed keynote speaker, the date and location of the conference and a short (max 1 page) justification for why this specific speaker is requested.
(v) If approved, up to US $2,000 can be requested for travel and accommodation of the proposed keynote speaker.

2. **The young investigator award** is worth up to US $500 and is aimed as prize money for the winner of a young investigator type of competition at the annual (bi-annual) conference of the affiliated society. The rules governing this award are as follows:

(i) the applicant organization must be an ISB affiliated society.
(ii) the young investigator award must be given at the conference organized by the affiliated society.
(iii) applications for such an award can be sent directly to Walter Herzog (walter@kin.ucalgary.ca) and they must contain a description of the young investigator award and the criteria by which the winner will be selected (max 1 page).
(iv) if approved, up to US $500 will be made available for the winner of the award.

General considerations: if successful with either a keynote or young investigator award, you must acknowledge in the conference programme and when presenting the keynote or young investigator award that it was sponsored by the ISB. If possible, the keynote lecturer will be introduced by an ISB member and the young investigator award will be given by an ISB member.

I hope to receive many applications for 2010 and 2011.

Walter Herzog
Past-President

ISB 2013 Congress Call for Proposals

Persons or groups interested in organizing the XXIVth Congress of the International Society of Biomechanics in 2013 are invited to prepare and submit a formal proposal to the ISB Executive Council. Written proposals are due by April 1st, 2010. For the 2013 congress, we especially encourage proposals from ISB members in North and South America.

Shortlisted candidates will be invited to present their proposal to the ISB Executive Council at their meeting during the 2010 World Congress of Biomechanics, August 1-6, in Singapore. The final decision will be made during this meeting through a vote by the Executive Council.

As President-Elect of the ISB, I will be coordinating the bidding process. If you are interested in applying, please contact me and I will be happy to provide detailed additional information and guidance on proposal preparation.

Ton van den Bogert
ISB President-Elect
bogerta@ccf.org

ISB Student Plans Honeymoon around ISB Conference

Patrick Theeven, a PhD-student at the Adelante zorggroep in Hoensbroek, The Netherlands attended the ISB congress 2009 to present his research on functional added value of microprocessor controlled leg prostheses in unilateral leg amputees. Just before the conference, he got married. He spent his honeymoon in South Africa, but he first wanted to attend the conference. (He is a very conscientious person: "Work before fun".)

His colleagues at the Adelante Research department in Hoensbroek Department of Rehabilitation Medicine at the University of Maastricht in the Netherlands would like to congratulate Patrick and Esther.

Henk Seelen
Brian Davis

Patrick and his wife Esther.

ISB 2011 First Announcement

ISB

ISB2011 Brussels

July 3 • 7 2011

ISB2011, proudly hosted by the capital of Europe, will be an exciting opportunity for scientists, experts and students to exchange about the most recent advances concerning topics and approaches in the fields related to Biomechanics. Tutorials will take place on July 3rd. Attractive arrangements for social and networking activities will complete the scientific program.

- Call for papers : Autumn 2010
- Deadline for submission of abstracts: February 15th, 2011
- Deadline for Registration (early bird): April 30th, 2011
- Congress Days: July 3rd – 7th, 2011

www.isb2011.org • info@isb2011.org

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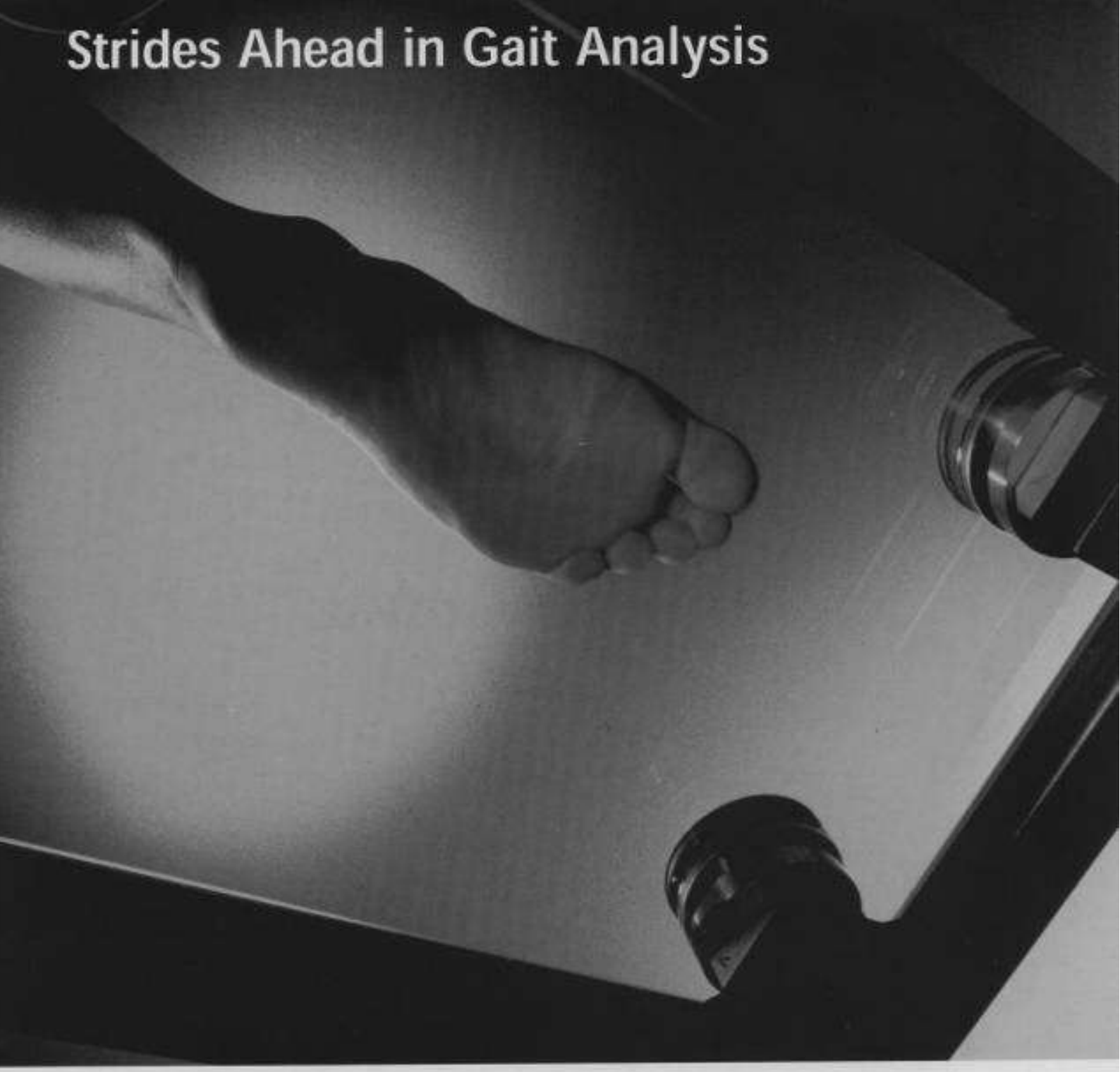

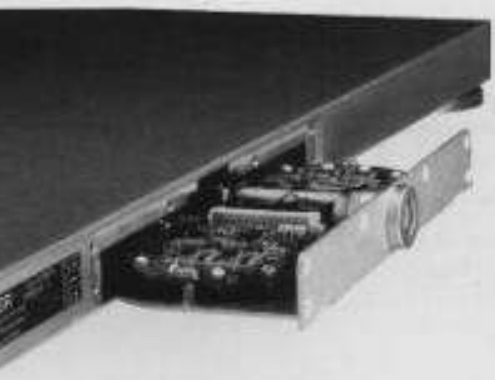

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