

March 2014

ISB *Now*



March
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Table of Contents

President's Blog - March 2014	1
Students' Corner	2
Technical Groups Update - HWBI	4
ISB Congress Travel grants (Natal, Brazil)	4
List of new members, March 2014	7
ISB International Travel Grant Reports	8
ISB Matching Dissertation Grant Reports	12
Meet your executive: Kelsey Collins	13

President's Blog - March 2014

By Ed Chadwick | March 2014

As biomechanists we are active with some aspect of biomechanics most days, even if it is thinking about the experiment we would be conducting if the day was not too busy to find time to get into the lab. A very popular soap opera is the Australian series "Neighbours". In the area of fetal memory it has served as interesting test bed, as there is evidence that newborn infants whose mothers watched the show reacted to the theme tune, children of mothers who did not watch the show have no such reaction. For me this show is significant as it offered a glimpse of a potential higher profile for biomechanics; my students were excited to tell me that in one episode they had mentioned biomechanics as one of the characters ran across a force plate. This was in the 1990's and I hoped that biomechanics was finally on the map of scientific disciplines in the forefront of public awareness. This did not lead to the world wide recognition I had hoped but the recent Sochi Winter Olympics reminded me that biomechanics has made, and will to continue to make, significant contributions to society even if sometimes that contribution is unheralded.



The role of biomechanics at the Winter Olympics comes in many forms, but what struck me watching some of the Games is that many of our members have made significant contributions to our understanding of the Winter Olympic sports. For example, our second President Dick Nelson did significant work on the biomechanics of cross-country skiing. Our third President, Paavo Komi, amongst other areas has performed important research on ski jumping. The fourth President, Benno Nigg, has performed extensive studies of alpine skiing. If we jump to the 19th President, Ton van den Bogert has examined speed skating, once

again amongst other activities. One of the larger impacts on Winter Olympic sports was the work from the Faculty of Human Movement Sciences of the Vrije Universiteit, Amsterdam. This group led by the late Gerrit Jan van Ingen Schenau developed a new design of skate, the clap skate or slap skate, which because of a hinge towards the toe end of the skate permits skaters to exploit a powerful ankle extension not possible in traditional skates. The introduction of these new skates, now used by all long course skaters, resulted in a significant reduction in world record speed skating times. This (incomplete) preceding list shows how biomechanics has contributed to our understanding and the practice of the Winter Olympic sports.

As the Winter Olympics ended the Sochi 2014 Paralympic Winter Games started. The ability of these athletes is remarkable, yet again considerable biomechanical research has been conducted on the disabled. Sixth ISB President, John Paul, did early fundamental work into prosthetics. Eighth President Aurelio Cappozzo has also performed research in this area, as has 14th President Sandra Olney. The current highest profile paralympian is the South African runner Oscar Pistorius. When he petitioned to compete in the 2012 Olympics and run alongside able-bodied athletes a number of biomechanists became engaged in trying to establish whether the prosthetic blades he wears confer an unfair advantage (see for example, Brüggemann et al., *Sports Technology* 1: 220-227, 2008. and Grabowski et al., *Biology Letters* 6: 201-204, 2010). Sadly Pistorius has been recently embroiled in other problems where the expertise of a biomechanist with forensic skills might be beneficial.



There is a US situation comedy, *The Big Bang Theory*, where some of the humor in every episode arises from aspects of physics. Biomechanics has not achieved that high level of recognition but evidence suggests that biomechanics is making contributions in many ways without perhaps the public awareness. When you get the chance publicize the importance and contributions of biomechanics. Let us all work to raise our profile.

Regards,

John.

John Challis
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Students' Corner

By Ed Chadwick | March 2014

Professional Development and Effective Mentorship

Hi Trainees!

Mentoring is a crucial part of our training environment. However, mentors are an underutilized commodity.¹ There is an evolving body of research demonstrating that mentorship is an incredibly influential factor on personal development, productivity, career trajectory, success, and career satisfaction.² With these factors in mind, it is incredibly important and we select mentors that understand our goals and can help us achieve them. Here are five steps to cultivate effective mentorships:

Step 1: Identify your goals.

Using the Individual Development Plan (IDP): The IDP is a fabulous resource that can be accessed at <http://myidp.sciencecareers.org>. It will help you identify some SMART professional development goals and identify strengths.² Further, the site provides feedback on areas which you could improve upon for jobs that are of interest to you. This way, you can take your training in your own hands to prepare yourself now!

Step 2: Create a mentorship statement.

To increase the effectiveness of each mentorship relationship and session, use *specific information* gained from your IDP to create a mentorship statement. This will direct the mentorship session.

Good mentorship statements include 3 components: (1) what? specific plans (2) when? timelines and (3) how?

These statements will help you outline tangible SMART goals - increasing the risk that the goals will be met.³

Step 3: Select effective mentors.

What is an effective mentor?

Here is a summary of insight from a recent Stanford Social Innovation Review entitled "Seven Habits of

Highly Effective Mentors (3).” These seven habits can help you evaluate mentors and your mentor-mentee interactions. Effective mentors:

1. Are relatable.
2. Make regular appearances.
3. Provide balanced feedback
4. Ask for something in return - cultivate new collaborations to avoid one-sidedness
5. Foster community - interact outside of the lab or academic setting.
6. Help make introductions - help mentees network.
7. Have experience as a mentee - seeing things from both sides makes you a better mentor.

What are some types of Mentors?

- Academic Supervisor
- Co-Mentor: someone in another field who can provide perspective about growth or opportunities given your specific expertise
- Career Advisor: someone who is mid-late career who can help you focus on career development
- Early Career advisor: someone is early career who can help you focus on immediate next steps in career development
- Personal Development Advisor: an individual who can help you meet a personal goal (e.g. work/life balance, exercise/fitness goals, extracurriculars)

Step 4: Have a face-to-face meeting.

Decide if this mentorship relationship will meet your expectations. Are they willing to be your mentor? Is this person a good match? Do they have the expertise you thought? Do you get along? Be transparent in your expectations and ask the mentor to be transparent in return. Hopefully this mentorship will continue to be mutually beneficial and provide valuable insight!

Step 5: Learn to be an effective Mentor

As trainees, we are often mentors ourselves. Take opportunities to mentor others, and you will learn by “role reversal” about how to create more effective mentor-mentee interactions.

Don't forget to use ISB resources for mentorship connections. This spring we will begin to design our ISB member database. This will add another dimension to potential mentor-mentee connections for members. If you have any ideas of information that should be added to that database, please contact me. Stay tuned!

As always, feel free to contact me with any questions or suggestions. Don't forget to follow @ISBiomechanics (twitter), International Society of Biomechanics (Facebook), International Society of Biomechanics Student Group, and the International Society of Biomechanics members LinkedIn page.

All the best,

Kelsey Collins

isb.studentrepresentative@gmail.com

References:

1. Meinel FG, Dimitriadis K, von der Borch P, Stormann S, Niedermaier S and Fischer MR. More mentoring needed? A cross-sectional study of mentoring programs for medical

students in Germany. *BMC Medical Education*. 2011;11:13

1. Sambunjak D, Straus SE and Marusic A. Mentoring in academic medicine: a systematic review. *Journal of the American Medical Association*. 2006;296:1103-15
2. Bogue, Robert. "[Use S.M.A.R.T. goals to launch management by objectives plan](#)". TechRepublic. Retrieved 20 November 2013.

Technical Groups Update - HWBI

By Ed Chadwick | March 2014

Hand and Wrist Biomechanics International

A Technical/Working Group of the International Society of Biomechanics

The Hand and Wrist Biomechanics International (HWBI) is delighted to be affiliated with the International Society of Biomechanics (ISB). With this affiliation, the HWBI benefits from ISB's established excellence as the premier international organization promoting the science of human movement. In turn, the HWBI contributes its specialty knowledge to the ISB community and biomechanics field.

The HWBI has a history of more than 20 years that began at the 1st Triennial International Symposium on Hand and Wrist Biomechanics in 1992 in Brussels, Belgium. Subsequently, the triennial event has taken place in San Francisco (USA), Minneapolis (USA), Izmir (Turkey), Syracuse (USA), Tainan (Taiwan), Cleveland (USA), and Yokohama (Japan). These symposia have provided a valuable forum for global scientific exchange among surgeons, therapists, and researchers who are interested in hand and wrist biomechanics and its clinical applications.

At the most recent symposium, the 8th Triennial International Hand and Wrist Biomechanics Symposium in 2012 in Yokohama, Japan, the international advisory board decided to form the HWBI to enhance the development of hand/wrist biomechanics through collaborative efforts across multiple disciplines and countries. At that time, the HWBI Board of Directors was established; its members include Kai-Nan An, PhD, Moroe Beppu, MD, Marc Garcia-Elias, MD, Zong-Ming Li, PhD, David L. Nelson, MD, Frederic Schuind, MD, PhD, William H. Seitz Jr., MD, Fong-Chin Su, PhD, and Frederick W. Werner, MME. Collectively, the HWBI strives for excellence in hand and wrist research and clinical translation.

The planning of the next HWBI Symposium is currently underway. It is scheduled to take place in Milan, Italy during June 16-20, 2015. This time, the symposium will be held in conjunction with the XXth Congress of Federation of European Societies for Surgery of the Hand (FESSH). We cordially invite ISB members who are interested in hand and wrist biomechanics to join our symposium. By bringing together hand and wrist researchers in diverse areas, we hope to integrally advance hand science and to collectively address challenging clinical problems of the hand. Please visit our website (www.hwbi.org) for more information about the HWBI and our upcoming symposium.

Zong-Ming Li, PhD

Chair, HWBI Board of Directors

ISB Congress Travel grants (Natal, Brazil)

By Ed Chadwick | March 2014

Silvia Cabral

I am very grateful to the International Society of Biomechanics for awarding me with a Congress Travel Grant. Without this grant I would not have been able to attend the ISB meeting in Natal. This was my second ISB meeting as a PhD student, and it was the first time that I took the opportunity to participate in the organized student events. My colleague and good friend had already told me how great the ISB is, as a scientific society with a high consideration for students, and how their meetings are always of great scientific level and provide students with not only fun but also (and more importantly) highly enriching events. This year I listened to her, and she was absolutely right!

During the meeting I had the chance to spend time and exchange ideas with great researchers in Biomechanics. The ISB meetings are great at bringing the researchers' community together, which gave me the opportunity to meet other researchers and students for the first time, and to finally meet again with others that live in a different continent. I have very much enjoyed the presentations that I attended to, particularly the invited speaker's sessions, and I also had the opportunity to present my work, and discuss it with others in the end of the session. It is a great feeling to know someone whose area of study is very close to ours and have similar questions that we can debate. I find that when I go back home I go with an extra charge of motivation to move forward with my studies.

As I already mentioned, during this conference I also attended to the student events (the roundtable mentoring workshop and the beach excursion). I found them both very well organized and very good experiences. During the beach excursion I had lots of fun and I got to know some of Natal's natural beauty. I was mostly looking forward to the mentoring session, which as I expect was an enriching experience. The picked themes were very appropriate and met my concerns as a PhD student, and I was lucky to be on the table of some of my favorite researchers.

Once again, I would like to thank the ISB for this great opportunity and I'm looking forward to the next ISB meeting.

Silvia Cabral

*Biomechanics and Functional Morphology Laboratory
Neuromechanics of Human Movement Research Group
Faculty of Human Kinetics - University of Lisbon
Portugal*

Eng Kuan Moo

First of all, I would like to thank the International Society of Biomechanics (ISB) for offering me the economically developing countries (EDC) travel grant that allow me to attend the 24th Congress of ISB held in Brazil. I am a student in University of Malaya, Malaysia, but was at University of Calgary, Canada receiving training in Dr. Walter Herzog's group at the time of the conference. Therefore, I flew from Calgary to Natal for the ISB conference.

I felt honoured to be elected to take part in the David Winter Young Investigator award. In that oral session, I received some constructive feedback from the audience after my talk. Besides, I also learned a lot from studies outside my research field from other contestants in the same session. For example, Panizzolo *et al.* believe that the chronic heart failure can potentially be predicted from morphology of calf muscle; and Dorn *et al.* can predict human running through a 3D musculoskeletal model. Besides the

award session, I also come across with some interesting studies throughout the conference. For example, I was intrigued by a talk that explained an unknown, sticky response specifically from osteoarthritic cartilage through nanoindentation technique.

Apart from the various oral and poster sessions, I also took part in the roundtable mentoring workshop and beach excursion, designed for the ISB student members around the world. Credits to the ISB student committee for making those events a success. I felt privileged to have the chance to learn from Dr. Darren Stefanyshyn on his experience in expanding his academic career through collaboration with industrial company. Besides, I also enjoyed chatting with Dr. Andrew Creswell about balancing life between work and fun. After the roundtable mentoring, the exciting beach excursion on a dune buggy that followed suit allowed me to mingle with other students and the mentors, and help build a strong bond between us.

In short, the trip to Natal was of immense benefit to me. Not only did the trip offer a perfect get-away chance, I also came back with several new ideas that could potentially improve my research study. I also get the chance to catch up with some old friends in the conference. Many thanks to ISB for making this trip possible. I am looking forward to the World Congress of Biomechanics 2014 held in Boston, and the 25th ISB congress held in Glasgow.

Eng Kuan Moo

PhD student

*Department of Biomedical Engineering, Faculty of Engineering
University of Malaya, Malaysia.*

Morgana Alves de Britto

I became a student member of the ISB in 2011 after professor Dr Felipe Carpes tells me about the importance of the International Society of Biomechanics and the opportunities the society provides. I applied for the ISB Congress Travel Grant in the end of 2012. Professor Felipe Carpes, who is my supervisor in the Federal University of Pampa in Brazil, encouraged me and sponsored my application. I decided to apply for the congress grant to have the opportunity to be at an international congress of such importance, and if possible, present my work at this event. In the congress in Natal I presented two abstracts from research I am performing at my University. The abstracts presented results of research concerning risks for ACL injury in sports. In the abstract submitted to ISB Congress we showed that landing kinetic asymmetry depends on the type of landing performed, with the forward landing task eliciting greater asymmetries.

Our data suggest that the preferred leg experiences greater impact during landing. After sending the application we also wrote another abstract about the work in collaboration with Dr Evangelos Pappas, which was also presented in the event. After I sent the application, I waited anxiously a couple of months for the result. In the beginning of 2013 I checked my e-mail box and saw the email confirming that I have received the grant. I was very happy and excited with the trip, since I was going to be at the biggest biomechanics event in the world and would have the opportunity to meet several researchers I use to read the papers and books. After reading the letter stating that I was the recipient of the award, the first action was to forward the message to my research group colleagues and of course for my supervisor professor Carpes. The travel planned for August 2013 was confirmed.

The grant was enough to buy the flight tickets to Natal and book a hotel for my stay. On the first day of the congress I and my group of colleagues did the registration at the event and visited the place where the event was happening. The opening ceremony was beautiful followed by a great talk of the Brazilian scientist Miguel Nicoletis. In the second day of the event I participated in a Roundtable Mentoring session, where I had a chance to know several other researchers and some of the great names of

biomechanics. I followed the schedule of the event, going to the main lectures and choosing the oral presentations that were related to my area of research. Both my poster presentations were at the same day and my two posters were next to each other. I found the experience very interesting, and it was possible for me to know several other researchers that work with the same topic that I do. I also got to practice my English a little more, and got the opportunity to answer and think about several questions. In addition to the scientific program of the congress, it was possible to join ISB student meetings and have fun in the city of Natal. Along the opportunities, a lot of contacts and discussions were possible during the event. I am looking forward to join the next ISB Congress in Scotland, when I will be probably finishing my master and with a lot of results to divulged in the congress.

I would like to express my gratitude to professor Felipe Carpes for his confidence and the countless opportunities he provides for students in Brazil. I am also thankful for my colleagues at the Applied Neuromechanics Reserch Group. Thank you very much International Society of Biomechanics for this amazing opportunity. I would like to encourage the biomechanics students to join the ISB and apply for these grants.

Morgana Alves de Britto
Applied Neuromechanics Reserch Group
Federal University of Pampa

Chia-Chi Yang

First of all, I would like to thank International Society of Biomechanics (ISB) for providing ISB Student Congress Travel Grant. With this rare opportunity, I was able to attend the XXIV ISB Congress and present my recent work in Natal, Brazil. The congress and its special social-scientific program made it possible to strengthen bonds between biomechanists around the world. The valuable experience during the congress was deeply impressive for me.

At this congress, I presented a poster entitled "Comparison of Neck Movement Smoothness between Clients with Mechanical Neck Disorder and Asymptomatic Individuals Using Spectrum Entropy Method." I not only stated my recent findings but also discussed my work with many biomechanical scientists. All of the valuable comments and the constructive recommendations made my academic research better and improved. Additionally, there were many insightful lectures, keynote talks, and oral and poster presentations from different fields of Biomechanics. Through these presentations, I learned so much information and obtained some inspired thoughts as well as the skills of presentation. Meanwhile, I was able to exchange my research experience and knowledge with other researchers and scientists. Besides academic meeting, the fantastic scenery and the beautiful culture of Brazil were very attractive to me.

Finally, I am grateful to International Society of Biomechanics for providing ISB Student Congress Travel Grant, again. With the financial support, it helped reduce the travel expenses to attend the XXIV ISB Congress in Natal, Brazil. It is believed that this wonderful experience would provide very positive influences on my academic development stage.

Looking forward for the next ISB congress.

Chia-Chi Yang
Department of Biomedical Engineering,
National Cheng-Kung University, Tainan, Taiwan

List of new members, March 2014

By Ed Chadwick | March 2014

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ISB International Travel Grant Reports

By Ed Chadwick | March 2014

Claudio Pizzolato

Currently I am a PhD student in the Centre for Musculoskeletal Research (CMR), Griffith Health Institute, Griffith University (GU), Australia, under the supervision of Prof David Lloyd. I have recently been awarded with an International Society of Biomechanics International Travel Grant that allowed me to travel between my current PhD location and the Rehabilitation Engineering Group (REG), Department of Management and Engineering, University of Padua to work with Dr Monica Reggiani from January to April 2013.

While the CMR research research topics spans from technology development and fundamental science to the patient specific clinical management of musculoskeletal conditions and prevention of injury, Dr Reggiani research group focuses on the advancement of rehabilitation technologies and, particularly, on software engineering. An important and shared research topic between the two groups is the development of neuromusculoskeletal models, which can be used to estimate the forces inside the human body and have been used to determine knee joint contact forces during walking in people with knee osteoarthritis (OA). These models are a representation of the neurological, physiological, and anatomical characteristics of an individual. Notably, the Calibrated EMG-Informed Neuromusculoskeletal Modelling Toolbox (CEINMS) is the modelling method developed in collaboration between the CMR and the REG. As part of the my PhD, I have been heavily involved in the recent development of CEINMS, and the ISB Travel Grant has been of great importance for the advancement of my research. Working at the University of Padua with Dr Reggiani helped to expand the functionalities and the usability of CEINMS moving it from a difficult to use research tool, characterised by slow computation to an integrated, easy to use, robust and computationally rapid toolbox. Moreover, the funds from ISB allowed me to attend the Advanced OpenSim Workshop at Griffith University in February 2013, which has been an occasion to receive feedback and suggestion on the development of CEINMS as tool for the biomechanics community.

As a first outcome, CEINMS has become a complete and full operational toolbox for OpenSim (<https://simtk.org/home/opensim>), which is one of the most often used software frameworks for modelling, simulating, controlling, and analysing the neuromusculoskeletal system of humans and animals. The integration of CEINMS in OpenSim will allow researchers to perform EMG-Informed analysis without requiring highly specialised programming skills. Moreover, no EMG-Informed NMS model is currently available to the research community, and providing a complete and easy to use software like CEINMS will promote consistent inter research group data validation and data sharing.

As a second outcome, the months of close collaboration with Dr Reggiani consolidated the foundation of my research, which long term goal is to move CEINMS from a toolbox to analyse muscle forces and joint contact forces to a rehabilitation instrument to restore function in people suffering from knee OA. This will be achieved using CEINMS to provide real-time estimation of several gait variables during walking, as joint contact forces that will be used as biofeedback for retraining gait of affected people. The collaboration with Dr Reggiani was essential in order to learn the best practice and technique that must be followed when developing large software projects. Moreover, her guidance was useful to anticipate

and tackle difficulties related to the real-time development of CEINMS. Nevertheless, the opportunity to attend the Advanced OpenSim Workshop resulted in a fruitful learning and networking experience, that gave me the occasion to meet and discuss with other biomechanics students and researchers.

*Claudio Pizzolato,
Centre for Musculoskeletal Research,
Griffith Health Institute
Griffith University,
Gold Coast Campus,
Australia*

Ted Yeung

I am a PhD student currently studying at the Auckland Bioengineering Institute, New Zealand. In early 2013, I received the International Travel Grant from the International Society of Biomechanics. This grant allowed me to visit Professor Joseph Crisco's Lab and use the X-ray Reconstruction of Moving Morphology (XROMM) facility at Brown University in USA.

XROMM uses bi-plane X-ray fluoroscopy to reconstruct the in-vivo 3D kinematics of skeletal structure.

For my project, I used the XROMM technology to investigate the in-vivo 3D kinematics of the shoulder complex and compared it to the 3D kinematics obtained from conventional motion capture system. Since bi-plane X-ray fluoroscopy is a technology that is not available in New Zealand, we established collaboration with Brown University.

The shoulder complex consists of three bones (Clavicle, Scapula and Humerus) and three joints (Sternoclavicular, Acromioclavicular and Glenohumeral joint) and is one of the difficult joints to model due to the complexity involved in its range of motion. Furthermore, the shoulder complex is surrounded by a thick layer of soft tissue which readily deforms during motion. It is also an obstruction that prevents access to certain anatomical landmarks where external or skin-mounted markers can be placed. This in turn will reduce the degrees of freedom that can be tracked. These factors significantly influence the accuracy of the predicted kinematics using external measurements (skin mounted reflective markers).

A computational model that is capable of predicting shoulder complex kinematics accurately has a wide range of uses ranging from entertainment (film animation to computer games) to clinical applications. The experiments I conducted during my visit to Brown University were aimed at shedding light on the soft tissue influences on the accuracy of kinematics measurements. Our experimental programme involved acquiring data from five healthy adult males aged between 18-40 years without a history of shoulder injury and has a normal range of motion. These subjects were asked to perform six pre-defined tasks in 25 seconds during which both optical motion capture and XROMM data were simultaneously collected. The total data record phase in the experiments limited to 25 seconds to minimise the radiation exposure. Even though this is a short amount of time we were able to get at least one cycle of motion for each task.

I am very grateful to ISB for the travel grant without which I would not be able to collect this valuable data for my current study. This data will help in the development of an accurate kinematics model of the shoulder complex.

This was also an incredible opportunity for me to experience different culture and learn from one of the leading experts in the field of Orthopedics. For which I would like to thank Professor Joseph Crisco and the rest the colleagues in his lab for helping me with the experiment and introducing me to the American way of life.

Lastly I would like to thank to my supervisor Dr Kumar Mithraratne and my advisory committee member

Dr Thor Besier for their help, guidance and all the additional work they have done to establish this collaboration.

Ted Yeung
PhD Student
Auckland Bioengineering Institute
New Zealand

Václav Čibera

While completing my PhD thesis, I always intended to spend some part of my study abroad. I preferred to go somewhere overseas to see the main biomechanics topics in different countries. Since I come from Czech Republic, Canada always seemed to be an ideal overseas destination to me. Once I heard about Human Performance Laboratory (HPL) at The University of Calgary, I was interested in their topics. Very luckily I have found that one of their various themes coincides with mine, i.e. mathematical modeling concerning muscle movement – especially modeling based on the cross-bridge theory. I did not hesitate to contact the HPL and after a few emails, I convinced myself that it was the best place to stay for at least one academic year.

So in January 2013 I applied for the International Society of Biomechanics Student International Travel Grant (ITG). I was very pleased to be awarded the ITG in July 2013. Due to the huge differences in daily living costs between Canada and the Czech Republic, this ITG helped me a lot, especially, at the beginning of my stay when I needed to pay for entry visas, accommodation, public transport tickets, etc. ITG facilitated my integration with the University of Calgary and to start the Canadian way of life.

Currently (January 2014), I am approximately halfway through my internship and my project on the mathematical modeling of sarcomere behavior at the HPL is progressing well. I have had a lot of opportunities to debate my topic with experts from various scientific fields. In view of the fact that my background is mainly theoretical modeling, I really appreciate the chance to chat with professionals doing experimental measurements on the sarcomere and filament level. I am aware that this is great opportunity to reconcile theoretical and practical results within one unified framework. I am convinced this will be one of the most pivotal parts of my PhD thesis.

As I already noted above, my main topic is mathematical modeling of sarcomere contraction based on the cross-bridge model. A great advantage of my work here is that I can see the latest results conducted by specialists at the HPL. I can now see that the classic Huxley's cross-bridge theory needs to be discussed more profoundly with respect to the latest results obtained in last two decades. During the last five months, I have been working with my supervisor here, Dr. Walter Herzog, and with other members of his group on dynamic mathematical model of sarcomere. Although the work is still in progress and the model is still under development, I convinced myself that Huxley's classical cross-bridge model is still good starting point for mathematical/mechanical description of muscular contraction phenomena. However, it is obvious from conducted experiments that new properties must be added to this approach. In particular, the addition of a third crucial filament, titin, needs to be formulated. Successful integration of this component is the main task and challenge of my project at the Human Performance Laboratory.

I would like to thank for the ISB International Travel Grant and to Human Performance Laboratory at The University of Calgary for enabling me to take a part in an interesting project, and to be a part of great international working team.

Václav Čibera
PhD student at:
Department of Mechanics
University of West Bohemia, Czech Republic

Julio César Lima da Silva

A visit from Exercise Research Laboratory of Federal University of Rio Grande do Sul to The Swedish School of Sport and Health Science (GIH).

Supervision: Dr. Toni Arndt. In 2012 my supervisor Dr. Marco Vaz told me about a new collaboration together a university in Stockholm, and gave me the email of Prof. Toni Arndt to my presentation and for maybe we start a collaboration during my masters studies. Well, after some emails, we planned that I would go to Stockholm during a few days to visit Prof. Toni and the laboratory at GIH, after this visit, Prof. Toni was guest to a event in Porto Alegre. So, months later Prof. Toni was in our university for the International Symposium on Sports Biomechanics. During the symposium, I was invited by Marco Vaz and Prof. Toni to do an exchange for some months in Sweden. Of course, that I accepted this idea. Who wouldn't like to do an exchange? So, our plan was applied to ISB ITG on December of 2012 for go to Sweden on February of 2013 during 6 months. I was really excited to decision from ISB, and for my surprise, I was honored with award. I made my bags and flew to Scandinavia.

I arrived in Stockholm during winter, my first contact with snow, nice in the first time, not so good after some days. I was well received by Toni and Paulo Gago (PhD student from Portugal), during these 6 months I participated of data collection from Paulo and seminar on intramuscular EMG. We worked together on development a structure to fix the ultrasound probe in *gastrocnemius* myotendinous junction, which was tested during pedaling. In the same time I was analyzing my data from Brazil and writing my masters thesis about knee muscle function on different cadences, where Prof. Toni was collaboration, In December of 2013 I returned to Stockholm, now to do my PhD, more one opportunity that this excellent collaboration gave me. I'm really excited to continue these projects in my PhD.



Photos of gastrocnemius myotendinous junction during pedaling at 90 RPM - pilot test, MJ (myotendinous junction).

The GIH was founded in 1813 by Pehr Henrik Ling, which makes it the oldest University College in the world within its field. The university offers degree programmes and courses for the teaching profession in physical education as well as for career in Sports Coaching or Preventive Health. It has co-operation with research departments at the Karolinska Institute, The Stockholm Institute of Education and Stockholm University. Formal contacts with the Swedish Sports Confederation, that is considerable important to education and research. The focuses of researches are in human biology (fatigue, adaptation to training, energy processes), behavioral science, biomechanics and motor control (EMG, patterns of movement in different sports, different loads on the body). The University College is centrally located next to a beautiful eco park, which has both natural and cultural values and also offers excellent opportunities for sports and recreation. The 1912 Olympic Stadium is situated near the campus and gives the area a special atmosphere.

I would like to thank the ISB by the award and Marco Vaz who helped me to make my academic way at Federal University of Rio Grande do Sul and for encourage all students to an interchange out of the Brazil, certainly this experience is brought to whole life. And thanks Toni Arndt for your time to help me and for accept me as your new PhD student.

Julio César Lima da Silva
Federal University of Rio Grande do Sul
Brazil

ISB Matching Dissertation Grant Reports

By Ed Chadwick | March 2014

Rachel L. Lenhart

My dissertation work focuses on understanding and improving surgical techniques for children with cerebral palsy, specifically those who walk in a crouched posture. Treatment for this abnormality historically has produced inconsistent outcomes. However, a new procedure, recently developed by our collaborators, has shown great promise for treating crouch. Still, questions remain about the appropriate subject selection criteria and parameters of the surgery. Understanding the effects of a surgical procedure usually takes many years due to the time it takes to accrue sufficient patient data. My work aims to reduce this time period by using computational modeling and imaging studies to better understand the implications of the surgery for knee joint mechanics and function during gait. In particular, we are creating computational models to simulate the surgery and understand the sensitivity of resulting outcomes (e.g. knee extension strength) to surgical parameters. We are also collecting dynamic MRI images to assess the veracity of model-predictions of post-surgical joint kinematics and contact. The ultimate goal is to make recommendations regarding the surgical criteria and procedure that would enhance outcomes. The work has the potential to affect innumerable patients around the world as this procedure is adopted globally.

I was honored to receive the Dissertation Matching Grant from the International Society of Biomechanics in 2013. This grant has greatly benefitted me by allowing me to pursue my dreams of using engineering to enhance understanding of orthopedics, chiefly to improve gait in children with disabilities. It has also let me develop my fruitful collaboration with the surgeons and engineers invested in understanding the effects of crouch gait and the corrective surgical procedure. I would like to sincerely thank the International Society of Biomechanics for this award, and I look forward to presenting my work in Glasgow next summer.

Jennifer Bagwell

I would like to thank the International Society of Biomechanics (ISB) for awarding me the Student Dissertation Matching Grant in 2013. Using the funds from ISB (\$2,500) and the matched support (\$2,500) from the Division of Biokinesiology and Physical Therapy at the University of Southern California, I have been able to complete 50% of data collections for my dissertation entitled "Femoroacetabular Impingement: An analysis of hip and pelvis kinematics, bony morphology, and acetabular cartilage stress." Eleven persons with femoroacetabular impingement and five matched controls have completed data collections for my dissertation. Detailed information regarding how the funds were spent is included in the table below. Since the period of funding began, one abstract has been submitted regarding this work. Completion of three additional papers is anticipated from this data. ISB support will be acknowledged in each manuscript/abstract.

*Jennifer Bagwell, PT, DPT
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Meet your executive: Kelsey Collins

By Ed Chadwick | March 2014



I am Kelsey Collins and I am the current Student Representative for the International Society of Biomechanics. I am a member of the Herzog Group in the Human Performance Laboratory at the University of Calgary, Calgary, Alberta, Canada. My project is focuses on understanding the effects of obesity on osteoarthritis onset and progression using a rat model. I also collaborate with other biomechanists, applied, clinical and health services researchers on two different human research studies involving body fat and osteoarthritis.

Previously, I completed undergraduate research at the Human Performance Lab at the University of California Davis under the direction of Dr. David Hawkins and Dr. Jennifer Neugebauer. Specifically, I worked on two projects involving activity monitoring and kinetic outcomes in children and university participants. I have been an ISB member since 2013 and enjoyed meeting many ISB members at the 2013 ISB Congress in Natal. I am looking forward to meeting more ISB members and seeing some friendly familiar faces at the World Congress in August.

I am widely involved in committees within the Faculty of Kinesiology and Biomedical Engineering Program, the University of Calgary, and Alberta-wide. I also serve as the co-Editor-in-Chief for the Journal of Undergraduate Research in Alberta. Involvement and service are a crucial component to training as a PhD Student, and I enjoy participating and giving back to the local and international research community. I have a breadth of experience with planning scientific and social events, and look forward to planning some awesome events with Dr. Philip Rowe for the ISB 2015 Congress in Glasgow.

Thank you for giving me the opportunity to represent trainees on the current ISB Executive Council. As Student rep, I am excited to maximize networking opportunities for collaboration with other labs by organizing social events and utilizing social media. The ISB Executive council is creating a database containing data from ISB 2011 and 2013. I have recently begun combining these data to provide preliminary data for the database. Stay tuned for more details!