Greetings from the President

I hope this newsletter finds you well and trust you are all having a successful and happy academic year. On behalf of the International Society of Biomechanics in Sport I would like to express my sincere gratitude and thanks to Professor Michiyoshi Ae and his team for delivering a World Leading conference at the University of Tsukuba. The conference provided an outstanding platform for the development of scientific engagement and professional networking for students, emerging researcher and established scientists.

Since the last newsletter we have continued to develop the infrastructure, operational clarity, and visibility of the Society. With enhancements to the new website, relocating the Society’s financing to Switzerland and discussing more research funding opportunities for members. The boards and directors and executive work tirelessly to improve the society and I would like to thank Tim Exell, Sarah Clarke, Gerda Strutzenberger, Silvio Lorenzetti and Randall Jenson, for their work leading and managing this process.
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Visibility has been enhanced through a joint venture with the American Society of Biomechanics. Congratulations to Professor Duane Knudson (ISBS fellow and Life Member) for delivering an informative and well received inaugural lecture at the 40th Annual Meeting of ASB in Raleigh, North Carolina, USA. Further ventures are being explored with the International Society of Biomechanics, World Congress and the International Society of Sports Engineering.

Finally, I would like to encourage you to submit your research to the 35th ISBS conference, being held in the beautiful city of Cologne, Germany, 14-18 June 2017. Professor Wolfgang Potthast is working hard to ensure this will be another successful conference with high profile key note speakers and an engaging applied session.

Kind Regards.

Gareth Irwin

President The International Society of Biomechanics in Sport
In the 4th week (18th to 22nd) of this July, we experienced two unusual matters; for a Japanese summer it was much cooler than we expected, and a huge number of foreigners were walking around, sitting in our classrooms, and talking each other in the buildings of the School of Physical Education and Health, University of Tsukuba. Some student staff were heard saying “I have never seen such many foreigners here.” With the great and immeasurable assistance of participants, board members, five ISBS sponsors, nineteen local sponsors and supporters, the organizing committee members, and our dedicated staff including three office members and 70 students, the 34th International Conference on Biomechanics in Sports, ISBS2016 was successfully held at the University of Tsukuba.

The map and associated video above illustrate the range of countries and participants who attended ISBS2016. We had officially 421 participants from 30 countries, the maximum was 166 from Japan, followed by 40 from Taiwan, 35 from South Korea, 27 from United Kingdom, 26 from USA. The next host country, Germany sent 15 researchers. The total number of delegates including our staff exceeded 500. 107 of these delegates became new members of ISBS. The interest in sport biomechanics is clearly worldwide.
The ISBS2016 conference held three sponsored workshops (figure 1), two official ceremonies, two award lectures (Geoffrey Dyson Lecture and Hans Gros Award lecture), five keynote lectures (Figure 2), seven applied sessions (Figure 3), 21 oral sessions (Figure 4) and 9 poster sessions, as well as five social programs and four conference tours. There was a total of 111 oral presentations and 203 poster presentations, chaired by 60 ISBS members. The organizing committee would like to thank them for an excellent job.

Dr. Hume’s dedication to sport biomechanics at the Geoffrey Dyson lecture was extremely impressive and Dr. Donnelly’s Hans Gros Award lecture inspired young researchers. Keynote lecturers demonstrated us their cutting-edge topics, for example Dr. Sankai, University of Tsukuba, presented “Leading edge of Cybernics: Innovative cyborg-type robot “HAL” to improve, support and expand human’s ability”, which a senior member praised as the best keynote lecture in ISBS. Many participants and students enjoyed the workshops and the student mentor program (Figure 5) which is one of traditions at ISBS conferences.

We, the organizing committee set four objectives for ISBS2016; to allow the exchange of scientific information, to develop and strengthen friendships, to meet new people and finally to experience different cultures. I am convinced that the objectives were achieved, as I proclaimed at the closing ceremony on July 22.

Finally, I would like to express my deepest appreciation to all participants for your contribution and generosity, and to our staff for their dedication to organizing and running this conference.
**ISBS Conference 2016 Student Experience**

**Gillian Weir, UMass Amherst**

**ISBS Student Rep**

Bill Johnson, Jon Staynor and Dan Cottam are all PhD candidates in biomechanics and share an office at The University of Western Australia in Perth. They attended ISBS 2016 in Tsukuba in July and we asked them for some of the highlights of their time in Japan.

**Dan:** When I think about the trip to ISBS 2016 in July, I realise how lucky I was to experience not only the incredible, friendly Japanese culture for the first time but to also attend an excellent conference that really placed a focus on meeting new people and sharing ideas and research with like-minded academics. Highlights at the conference itself were definitely the keynote lectures, especially Professor Patria Hume’s uplifting and inspiring Geoffrey Dyson address to open proceedings on the Monday evening. The standard of research presented over the week in the oral and poster presentations was also very high. This was particularly evident in the finals for the New Investigator Awards, which saw some exceptional presentations given. Outside of the presentation rooms, it was the social tour on the Thursday afternoon and the closing dinner on the Friday evening which stand out most clearly in my mind. Our tour group was privileged to visit the truly breathtaking Ushiku Great Buddha (pictured), which is an astonishing 120 metres tall. The closing dinner was memorable for different reasons; namely the amazing food, the drink, the entertainment and most of all, the company of new found friends. Finally, domo arigato to the organising committee for pulling off a terrific conference and to the people of Tsukuba who were so welcoming, happy and understanding of my terrible lack of Japanese.
Jon: ISBS is an example of a great conference that creates so many opportunities for students attending to network, socialise and develop. You can't help but leave with a better understanding of just how big the Sports Biomechanics society is worldwide. Highlights of the trip would have to be the food, great keynotes, the social tour and did I mention how good the food was?

Bill: I enjoyed Prof Patria Hume's keynote and her three pieces of advice (1) to exchange scientific ideas, (2) develop existing friendships and (3) to meet new people. Compared to other conferences I certainly found the ISBS attendees more friendly. It was fun being the support crew for my roommates’ presentations (hint: always carry a spare USB stick) and they both did a great job (Jon coming second in the NIA). I particularly enjoyed our visits to a random yakitori bar and the bus station open burgers for breakfast. Aside from the conference my favourite Japanese experience was watching the Tokyo Swallows beat Chunichi Dragons at Meiji Jingu stadium. Japanese baseball is sugoi!
ISBS Awards 2016

The Awards Committee announced the following awards for 2016:

Geoffrey Dyson Award

The Geoffrey Dyson Award is the most prestigious award of ISBS. It recognizes sport scientists who, throughout their professional careers, have bridged the gap between biomechanics research and practice in sport.

The award is named after one of the founding fathers of Sports Biomechanics, Geoffrey Dyson OBE. (1915-1981). Geoffrey Dyson had a long and strong academic and coaching career. He was the coach of the British Olympic Team in 1952, 1956, and 1960. In 1962, he first published his book on the Mechanics of Athletics. He was a speaker for the International Olympic Academy and conducted athletic courses in 14 countries. According to John Disley, one of Geoffrey Dyson's favourite pupils, “he devoted his life to making coaching a science and to exposing the charlatan whose only effective advice was Do it again, but harder”.

This year’s recipient was:

Dr Patria Hume
Auckland University of Technology, New Zealand.

Patria delivered a presentation on Motion Matters on the opening night of the ISBS2016 conference. Patria's paper can be accessed here.
A special membership category that is reserved for members who have made outstanding contributions to ISBS. The work of the member should have enabled ISBS to further develop and thrive. This work is typically not academic (research-related) and is therefore not covered by other ISBS awards. A Life member has all of the privileges of membership but does not pay annual membership fees.

This year’s recipient was:

Dr Duane Knudson  
Texas State University, USA

Duane has dedicated his professional career to the exploration and understanding of the role of biomechanics in sports both from an injury and performance perspective. Whilst Duane has an impressive academic track record he has been a significant contributor to the Society serving as a member of the board of Directors for over a decade and a half, becoming an ISBS fellow in 2007, then ISBS Vice President from 2008-2012. In accordance with the mission of ISBS Duane has throughout his professional career, bridged the gap between biomechanics research and practice in sport.
Hans Gros Emerging Researcher

The Hans Gros Emerging Researcher Award recognizes excellence in early career research. This prestigious award is given annually to an individual who has excelled in their early research career (2-5 years post PhD) and has embodied the ISBS philosophy of applied science and ‘bridging the gap’ between research and application in practice.

The award was named to commemorate Hans Gros for his contribution to ISBS. Han Gros was a founding member of ISBS and was President in 1998-1999. Hans established the first ISBS website and was awarded Life Membership in 2001 in San Francisco. He was a faculty member at the University of Stuttgart in Germany and taught biomechanics, skiing, and track and field.

His research interests focused on sports equipment design for gymnastics, archery, and the biomechanics of track and field.

This year’s recipient was:

Cyril delivered a presentation on Bridging the nexus between simulation and injury prevention research on the final day of the ISBS2016 conference.

Dr Cyril Donnelly
University of Western Australia, Australia.

Proceedings

Read the papers for all our awardees on the ISBS open access proceedings archive.
This year’s recipients for the oral competition (first to third place) were:

**Sina David** | German Sport University

*Victory or defeat – how movement strategies distinguish fast direction changes from cutting manoeuvres with high injury risk*

**Jonathan Staynor** | The University of Western Australia

Identifying the relationship between preparatory mechanics and an athlete’s risk of sustaining an ACL injury: A preliminary analysis

**Steffi Colyer** | The University of Bath

*The influences of changes in sprint ability on the sled velocity profile during the skeleton start*

This year’s recipients for the poster competition (first to third place) were:

**Kenneth Smale** | University of Ottawa

The effects of constraining opensim inverse kinematics to a bone pin marker defined range: constraining opensim inverse kinematics

**Johannes Funken** | German Sport University

Amputation side and site determine performance in paralympic curve sprinting

**Yutaka Shimzu** | University of Tsukuba

Three-Dimensional Analysis of the take-off preparatory motion in the long jump
ISBS Mini Student Research Grant Report

Eoin Synnott
University of Limerick

“Research is to see what everyone else has seen, and to think what nobody else has thought”

Albert Szent - Gyorgyi

As the recipient of the 2015 ISBS mini student grant I am both honoured and extremely humbled and as a undergraduate student, such an opportunity has fortified my ambition, passion and drive to continue to pursue the field of research for many years to come. It was under the supervision and guidance of Dr. Andrew Harrison whose considerable expertise, advice and welcomed direction underpinned the success of this study titled “An Analysis of the Postactivation Potentiation of the Primary Gluteal Muscles following Habitually Prescribed Activation and Conditioning Exercises”.

An inconsistency exists among recent available evidence on gluteal specific warm up protocols with the goal of eliciting a postactivation potentiation (PAP) effect due to the lack of data on muscle activation levels. Therefore, the aim of this study was to investigate if an acute enhancement in jump performance followed a high load gluteal activation protocol (GAP) and if these changes were representative of greater gluteal electromyographic (EMG) amplitudes and increases in the duration of time that the primary gluteal muscles were considered highly active.

10 elite sprint trained athletes were recruited. Following a familiarisation period, the primary testing days consisted of baseline EMG measures for each gluteal muscle using maximal voluntary isometric (MVIC) tests. Participants performed 5 pre intervention CMJ’s before undertaking the activation protocol and afterwards, performed a further 5 CMJ at time intervals of 1, 3, 5, 10, 15 mins post intervention. Analysis was conducted on 5 dependent force variables including peak force, peak rate of force development, flight time, height jumped, peak power and modified reactive strength index. Peak amplitude for each gluteal muscle for all pre and post CMJ was expressed as a percentage of their respective MVIC. The EMG data was then normalised against a time parameter and peak amplitude of each gluteal muscle during each trial. Activation values for each gluteal muscle was recorded for both pre and post intervention and statistical analyses conducted. Paired samples T tests found increases across the majority of force variables for both days with small to moderate effect sizes. A significant increase (P<0.005) in jump height found on the second day. For EMG amplitude, both increases and decreases were found for post intervention peak gluteal amplitude levels with small to moderate effect sizes and high activation duration times, however none of these results were statistically significant. The results of the investigation suggested that an acute enhancement was observed through increases in force variables and EMG amplitudes and durations although these changes were inconsistent in nature and not representative of a true PAP response. As this was the first study to investigate the effects of gluteal activation protocols on eliciting PAP responses through the use of electromyography and performance measures, further research is warranted to bridge this gap within research.

I would like to take this opportunity to thank the ISBS committee for their confidence in my ability and in the proposed project to entrust me with the mini student grant. Without doubt I have relished the opportunity to develop my skills as a researcher, to conduct my own primary research, to travel and present the results to my academic peers, to meet and network with some of the leading and up and coming researchers in the world and ultimately, to gain such experience that I believe will stand to me for many years to come.
In 2015, I was fortunate enough to be one of the co-winners of the Mini Student Research Grant to support work related to my thesis titled *Neuromuscular Control in Dynamic Knee Joint Stability After Anterior Cruciate Ligament Injury*. The objective of my dissertation is to identify neuromuscular changes occurring in ACL injured populations and relate these alterations to knee joint stability and loading. This aim will be achieved by conducting a three-pronged approach including in vivo, in silico, and in vitro methods.

To date, 105 participants have been collected, which include 34 healthy controls, 36 ACL deficient (ACLd) and 35 ACL reconstructed (ACLr) individuals. During these data collections, participants completed a target match protocol and various dynamic tasks of which, my thesis focuses on the jump lunge and side cut manoeuvres. Kinetics, kinematics, and electromyography were all procured and will be used in a robust analysis of these populations.

To complete an in vivo analysis of these three groups, muscle synergies and inverse dynamics have been completed and have shown many significant differences associated with both sex and status of the ACL. In terms of the jump lunge, all groups completed the movement with the same flexion/extension knee joint angles and moments but females in all groups had significantly greater abduction angles throughout the entire movement. Major sex differences were also observed in the muscle synergies of all groups and it was observed that after ACL reconstruction, males and females show more similar activation profiles compared to healthy controls or ACLd populations.

When investigating the side cut manoeuvre, no sex differences were seen in sagittal plane knee joint angles in any groups but the males in the healthy group had a greater extensor moment during mid-stance compared to the healthy females. Similar to the jump lunge, females of all groups completed the entire side cut movement with the knee in a more abducted state. The synergies that represent the side cut manoeuvre were relatively similar in all groups. It appears as though that the healthy and ACLr males and females are implementing the same muscle activation strategies as each other. With respect to the ACLd, two of the three synergies are very closely related while the third synergy differs between the males and females and therefore are exhibiting an altered control strategy compared to their healthy and ACLr counterparts. (Fig. 1).

Upon taking these data to the next phase of our research scheme, we noticed large amounts of soft tissue artifact when we began the in silico modelling of these movements. To reduce these errors, we then applied bone bine derived kinematic constraints to the knee joint, which were time-varying and dependent on the participants’ sagittal knee angles at each time step. This work was presented at the ISBS congress recently held in Tsukuba, Japan and was fortunate to win the New Investigator Award for the poster division.

I would like to thank the entire ISBS community including the board members and conference organizing committee. Your financial support to conduct these experiments and attend this year’s congress was greatly appreciated as it provided me an opportunity to meet some very esteemed researchers and gain valuable feedback and direction in regards to my current work. I hope ISBS continues their gracious support of their student members and look forward to meeting other fellow members at future congresses.

**Figure 1.** Muscle synergies for male and female ACLd participants during the side cut movement. Vertical line represents contact time while $S$ represents the vector weighting for each muscle and $C$ represents the time domain weighting.
Preview of ISBS 2017 Cologne, Germany

Professor Wolfgang Potthast, Conference chair, 2017
ISBS Vice President (Public Relations)

14. - 18. JUNE 2017
GERMAN SPORT UNIVERSITY COLOGNE

Call for papers / Submission Opens: November 2016
Submission Deadline: January 29th, 2017
Notification of Authors: April 3rd, 2017

Please visit http://isbs2017.com for further details on the venue, available accommodations, and student incentives.
The 36th International Conference on Biomechanics in Sports will be hosted at Auckland University of Technology (AUT), in Auckland, New Zealand, from Monday 10th to Friday 14th September 2018.

The weather in September will be the start of spring which will enable delegates to enjoy the great New Zealand outdoors. A variety of half-day social tour options will be provided in the ISBS conference programme including a range of physical activity, adventure, and cultural options.

The main venue for the conference will be the new, award winning Sir Paul Reeves building at AUT. This is centrally located in the heart of downtown Auckland and is within walking distance to a variety of accommodation. It is also close to recreational parks and waterfront walks and bicycle rides. There is full technical conference support at the venue, with all sessions in the eco-friendly building. The quality of the catering is excellent (AUT has a Masters of gastronomy and several AUT restaurants on site where students learn to provide silver service dining). Traditional New Zealand and international food will be provided during the opening evening, and the poster and exhibitor sessions with coffee/tea breaks and lunch breaks. The closing banquet will be held at the Cloud on the Auckland waterfront, which is a 5-minute walk from the AUT conference centre. Auckland’s stunning surroundings are home to many world-class and iconic venues. ISBS delegates will be inspired as they gather to celebrate and connect in memorable surroundings for the various social functions.
AUT is a contemporary New Zealand university focusing on student success, research and industry connectivity. AUT is the second largest university in New Zealand, and has established itself as an institution of global standing and impact. AUT is collaborating with High Performance Sport New Zealand who provides support for NZ’s elite athletes to ensure the academic programme will showcase the translation of biomechanics research into practise. The half day interactive applied programme will be held at the AUT Millennium precinct, which has world-class extensive training facilities for a range of sports including: Two 50m Olympic pools; Outdoor 400m running track; Five world-class sports science clinics; High Performance Centre (sports hall, carded athlete training zone); World class gyms and full medical facilities. The 10-minute bus trip from the city campus will go over the Auckland harbour bridge, providing delegates with views of Auckland harbour.

The scientific programme has international leaders committed to being section editors for the conference session themes encompassing keynotes, oral, poster and exhibitor sessions. In addition to the usual ISBS scientific and applied format, we will run three Keynote Panel sessions involving coaches, athletes, biomechanists and other sport science and sport medicine speakers. The student programme will include mentoring sessions, a student evening event, student competitions, student travel grants and a student buddy programme.

Our website will be operational shortly, and will include full details of academic and social programmes, key dates and costs, to enable delegates to start planning their visit well in advance. An expression of interest in attending the conference will shortly be sent to all ISBS members to enable priority selection of ISBS tours, accommodation and other conference events.
New Zealand is a safe place to travel. It has a high standard of living and has natural landscapes and man-made facilities that will be of interest to ISBS delegates. A variety of accommodation is available to suit the student to professorial budgets. Pre- & post-conference touring options will be outlined on the ISBS2018 website with links to the AUT travel agency who will facilitate your travel options. This will enable delegates to easily book tours and accommodation in Auckland and throughout New Zealand, and spend more time in New Zealand pre- or post-conference to maximise their travel and networking opportunities. Travel to NZ is easy on the national airline carrier Air New Zealand and star alliance partners. Visas are not needed for many countries, and for those who need visas, there will be help and support available.

The conference name has been specially chosen in consultation with our AUT Māori Kaumatua who will open the conference with a traditional Māori welcome. The conference name is Te Hōkai Tapuwae – the Māori phrase meaning the Breadth of Stride. Within the Māori Karakia (prayer) ‘Tenei au tenei au’ is the line ‘te hōkai nei i o taku tapuwae’ – The breadth of stride as Tane ascends to the heavens to retrieve the three baskets of knowledge. This embodies human movement and the pursuit of knowledge – the goals of ISBS. We have the award winning AUT Kapahaka performance group who will provide entertainment at the closing banquet.

We have gathered support from the highest levels of sport, education and local government in New Zealand for the conference including the Minister of Sport and Recreation, the Mayor of Auckland, the AUT Vice-Chancellor, the AUT Pro Vice-Chancellor AUT Millennium, the Chair of the NZ Olympic Committee, the Chief Executive of High Performance Sport New Zealand, the Chief Executive of New Zealand Tourism, and the Chief Executive of Auckland Tourism Events and Economic Development.

We look forward to welcoming you to AUT in Auckland for ISBS2018.

Professor Patria Hume, Chair ISBS2018.
Call for future hosting of ISBS conferences

Dear ISBS members, where will we meet 2020?

1st call for hosting the 38th Conferences (2020) of the International Society of Biomechanics in Sports.

The annual ISBS conference is a key-event for the international scientific exchange and networking within the field of sports biomechanics. At this time of the year, we are seeking for ISBS members interested in hosting this attractive event in the year 2020.

This first call is open to interested ISBS members in the preferred region Europe/Africa, with the deadline 31st of March, 2017.

If no proposals are received from the preferred region, a 2nd call for hosting will be made on the 15th of March 2017, opening the invitation to all global regions. The deadline for submission will then be 1st of Mai 2017.

Preparation of bid:
In case of your interest in hosting the 38th ISBS conference 2020, please prepare your bid according to the 'Policy Manual for the VP of Conferences and Meetings of ISBS' to be found at the ISBS homepage. This document contains all relevant information to prepare and organize the ISBS Conference.

Submission of bid:
Submit the electronic file of the application to the VP of Conferences and Meetings (gerda.strutzenberger@sbg.ac.at) by the 31st of March, 2017.

Please don't hesitate to contact me in case any further information is needed.

I am looking forward to receiving your bid.

Kind regards

Gerda Strutzenberger

ISBS Vice President (Conferences and Meetings)
ISBS 2016 Proceedings
Dr Sarah Clarke
ISBS Vice President (Publications)

The proceedings of the 34th conference on Biomechanics in Sports held in Tsukuba, Japan from July 18 to 22 this year are available online at (https://ojs.ub.uni-konstanz.de/cpa/). I would like to express my gratitude to Dr Manfred Vieten and Jaina Vieten for their work in maintaining the proceedings archive for the ISBS Society. The archive will be transferred to a new location in 2017.

ISBS 2016 Election
Dr Randall Jensen
ISBS Secretary General

Greetings fellow ISBS members,

The 2016 ISBS election was closed in June 2016 and the ballots were tallied. There were 160 ballots completed from 317 eligible members. Results are reflected in the officers and board of directors information at the rear of the newsletter. A news item with information on all candidates is available on the ISBS website.

ISBS Sponsors
Prof. Wolfgang Potthast
ISBS Vice President (Public Relations)

The society would like to thank the corporate sponsors of ISBS: Sensix, Contemplas, Simi, Kistler & Tekscan. These sponsors provide important support to the mission of ISBS thorough their quality products and financial support to the society. Remember to consider these fine vendors of sports biomechanics research equipment and software when updating your lab. Contact Dr. Wolfgang Potthast, Vice President (Public Relations) for more information about ISBS sponsorship.
ISBS Sponsors
ISBS Officers & Directors

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Vice President (Publications):
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### ISBS Officers & Directors

#### ISBS Directors

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