

ISBS 2023 Conference Proceedings

41st Conference of the
International Society of Biomechanics in Sports



Host University



Conference Organizing Committee:
Kristof Kipp (Marquette University)
Christopher Geiser (Marquette University)
Nayun Ahn (Marquette University)

**41st Conference of the International Society of Biomechanics in Sports
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Editors:

Kristof Kipp (Marquette University)

Christopher Geiser (Marquette University)

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Each paper in these proceedings has been reviewed by at least two members of the scientific committee. The scientific committee comprises the current members of the board of directors of the ISBS and the keynote speakers for the upcoming conference.

The correct format for citations as per APA style guidelines for the Sports Biomechanics journal (http://www.tandf.co.uk/journals/authors/style/reference/tf_APA.pdf) is as follows:

Author, A. A. (Year). Title of article. Title of the Journal, Volume(Issue), pp-pp.
Retrieved from WEBSITE A sample citation using the 2014

The correct format for citations of the Dyson lecture is follows:

Harrison, A. J. (2014, July). Applications of Functional Data Analysis in Sport Biomechanics. In K. Sato, W. A. Sands, & S. Mizuguchi (Eds.), Proceedings of the 32nd International Conference of Biomechanics in Sports. (pp. 1-9). Konstanz, Germany: International Society of Biomechanics in Sports. Retrieved from <https://ojs.ub.uni-konstanz.de/cpa/article/view/5905/5390>



The International Society of Biomechanics in Sports

Primary Purposes

- To provide a forum for the exchange of ideas for sports biomechanics researchers, coaches, and teachers.
 - To bridge the gap between researchers and practitioners.
- To gather and disseminate information and materials on biomechanics in sports.

Members

The International Society of Biomechanics in Sports (ISBS) is composed of members from all over the world who share a common desire to study and understand human movement, especially as it relates to sports biomechanics. Members come from a wide range of backgrounds e.g., exercise science, education, engineering, computer science, rehabilitation, and medicine.

Annual Conference

The first full scale conference of the International Society of Biomechanics in Sports was held June 20-25, 1982, in San Diego, California, with 123 participants. The Annual Conference of the ISBS is conducted in an atmosphere that favors and encourages wide participation, and the general collegiality and congeniality are dear to its members. The research presented and materials produced are at the cutting edge of knowledge and technology of the field. In addition to oral and poster research presentations select sport science topics are covered in depth each year through special lectures. A special feature includes the Geoffrey H.G. Dyson lecture, which is presented by an outstanding individual who has demonstrated lifelong excellence in the field of sports biomechanics. Other presentations are given by the winners of the New Investigator Award and the Hans Gros Emerging Researcher Award.

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Award Lectures

Geoffrey Dyson Award

Jill McNitt-Gray
University of Southern California

Make an Impact: going full circle together

Our research over 30+ years aims to bridge the gap between ‘what we know’ and ‘what we do’ in practice - something that was valued by Geoff Dyson. As with sport diversification, our multidisciplinary approach has provided multiple opportunities for all involved to establish a growth mindset, become more agile in varied environments, and develop and test robust strategies to improve performance together with coaches and athletes. Through the lens of sport, we have focused on the ongoing interaction between the nervous system, musculoskeletal system, and the environment by using integrated experimental and modeling approaches to study well-practiced, goal-directed tasks in controlled laboratory and realistic field settings. In the spirit of the Dyson award, I will use multiple examples to shine a light on key ‘takeaways’ from our translational work, grounded in basic science, that have made us rethink and have inspired further investigation.

Hans Gros Emerging Researcher Award

John Warmenhoven
University of Technology Sydney

Over 30 years of functional data analysis in human movement: What do we know, and is there more for sports biomechanics to learn?

John is a Research Fellow in Sports Meta-Science at the University of Technology in Sydney. He is interested in communication and knowledge transfer of different analytical concepts between theoretical and applied areas of work. From an applied perspective this includes human movement research, clinical orthopaedic research, talent identification and development and high-performance coaching.

Keynote Lectures

Sarah Kessler, PhD, CSCS
Indiana Fever

Where Art Meets Science: Individualizing Biomechanical Profiles

Dr Sarah Kessler is the head of performance science for the Indiana Fever. Sarah's work focuses primarily on using a variety of biomechanical analyses to improve understanding of athlete wellbeing and monitor performance outcomes. Previously, Sarah was at Harvard University as a post-doctoral researcher working to understand foot and ankle mechanics.

Bryan Heiderscheit, PT, PhD, FAPTA
University of Wisconsin – Madison

Determining Return to Play Readiness Following Hamstring Strain Injury

Dr Heiderscheit's research focuses on understanding and enhancing the clinical management of sports-related injuries. His talk at ISBS will involve the determination of return-to-play readiness following hamstring strain injury.

Marian Kersh, PhD
University of Illinois at Urbana Champaign

Multi-Scale Simulations for Tissue Mechanics

Dr. Kersh's research focuses on bone and joint diseases, and the relationship between properties of musculoskeletal tissues and their function in order to help in the diagnosis and treatment of musculoskeletal disorders. Her presentation will focus on how multi-scale simulations can be used to assess tissue mechanics in athletes.

Hiroshi Tanaka, PhD
Institute of Biomechanics, Nobuhara Hospital

Baseball Biomechanics

Dr Tanaka's work focuses on scapular motion for the understanding, prevention, and treatment of shoulder injuries.

Felipe Carpes, PhD
Federal University of Pampa

Asymmetrical Leg Movement in Sports

Dr Carpes' research focuses on the production and regulation of human movement and other pre-clinical models applying the research progress into training and rehabilitation, especially in regard to cycling. His talk will revolve around the role of asymmetrical movement in the legs during sports. Dr Carpes also dedicates time into helping different groups across the world establish laboratory and research groups in the field of biomechanics and the organization of new biomechanics societies in economically developing countries.

Scientific Program

A total of 119 papers were accepted into this year's proceedings. The program included 21 oral sessions and two poster sessions. Conference papers covered the following topics:

Anterior Cruciate Ligament

Baseball

Basketball

Coaching

Coordination

Helmets & Darts

Injury

Jumping & Landing

Lower Body

Machine Learning

Methods & Journal

Running Biomechanics

Running Performance

Shoes & Surfaces

Sprint

Strength & Conditioning

Track & Field

Wearables

Applied Program

The applied program for this year's conference included sessions on the following topics:

- Markerless motion capture as the basis for the next level of functional movement analysis using Computed Myography (CMG)
- Growth and integration of biomechanics in baseball
- Using OpenCap for biomechanics data collection
- The art of applying science and being impactful in high performance sport
- Using biomechanics data to guide training recommendations for weightlifting coaches and athletes
- A workshop with biomechanics industry: learn to use Python to analyze your biomechanical data

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Additional Exhibitors



Acknowledgements

The organising committee for the 2023 ISBS conference would like to thank all members of the scientific committee for their time and effort dedicated to reviewing submitted papers. In addition, the organization of the conference was aided by help from VP Conferences Tim Exell (& Gerda Strutzenberger), VP Publications Stuart McErlain-Naylor, VP Research & Projects Ina Janssen, and VP Awards Neil Bezodis – thank you for your assistance. We would also like to acknowledge the financial support from all exhibitors and sponsors.

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