

25 YEARS OF THE ISBS: A SILVER SALUTE TO SPORTS BIOMECHANICS RESEARCH PRESENTATIONS

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The purpose of this report was to assemble a preliminary database of the research that has been presented at ISBS conferences over the past 25 years. Data were compiled using available proceedings from previous years. Of interest were the volume of presentations, the distribution by continent, region, and nation, and the level of collaborative effort made by participating affiliates. A special focus was also placed on the last 5 conferences to demonstrate recent trends. With over 2,400 presentations, tremendous diversity has been seen so far, though it is recommended that concerted efforts be made to promote sports biomechanics in certain areas of the world, particularly South America, Africa, and Central and West Asia. Future research will determine the best way to facilitate their future contributions to ISBS.

KEY WORDS: archive, history, collaboration.

INTRODUCTION:

The International Society of Biomechanics in Sports (ISBS) held its first conference in San Diego, CA, USA in 1983 and has since held conferences every year, save 2003, in exotic locations throughout the world including Spain, Italy, Greece, Australia, China, and throughout North America. Each year the conference organizers strive to present the participants with both a great cultural and scientific experience. Oral and poster presentations are combined with keynote lectures and applied sessions to display the most innovative technology and ground-breaking research. This international organization consistently brings together individuals from all across the globe to share and discuss ideas and build new friendships between nations, regions, and continents. This exchange also spawns the possibility of collaborative research opportunities, helping to satisfy the ISBS's objectives of expanding sports biomechanics knowledge and disseminating it to coaches, researchers, and other practitioners. The purpose of this study was to identify the most prolific regions, sub-regions, nations, and specific affiliates in presenting research at ISBS each year. It was purported that this information would aid future researchers and ISBS officials in locating the most reliable affiliates for producing sports biomechanics research, while also recognizing areas of the world deficient in this field of research that need to be developed.

METHODS:

Copies of ISBS proceedings from each year (1983-2006) were obtained both from personal collections and requests made through interlibrary loans. Certain years (1983-85, 2002-03) were not available. Data was entered from each article of the volume by paging through the texts and retrieving key items. From the article, the lead author's last name, affiliation, and location of the affiliate were recorded. The author's name was only used to facilitate tracking. The affiliates and their corresponding locations of supporting authors were also recorded. As for documenting collaboration, supporting authors were categorized as contributing to an article from the same affiliate, a domestic affiliate, or a foreign affiliate. All affiliates were also identified with a particular country, region, and sub-region based on the classifications set forth by the United Nations Statistics Division (Standard Country and Area Codes). The last 5 conferences with available data were used in order to discover recent trends in the field of sports biomechanics.

Frequency analysis was used to measure the volume and distribution of presentations for each year of the conference. Domestic collaborations were counted once per paper for the nation involved and then again to give credit to each affiliate. Foreign collaborations were

also counted once per paper for a grand total and then twice more for each nation and each affiliate involved.

RESULTS:

Data spanning the 25-year history of the conference is presented initially. In total 2,428 presentations were accounted. Figure 1 charts the growth in the number of presentations by year, with a maximum of 262 occurring in 2005 (Beijing, China). With respect to lead authorship by global region, Europe has contributed 40.9%, the Americas 27.4%, Asia 23.8%, Oceania 7.7%, and Africa 0.2%. The leading sub-regions for lead authorship have been Northern America (25.9%), Eastern Asia (21.5%), Western Europe (13.4%), and Southern Europe (11.2%). Table 1 lists the top 10 countries in lead authorship at the conference along with the number of affiliates that have contributed from that country, and Table 2 lists the top 10 affiliates in lead authorship.

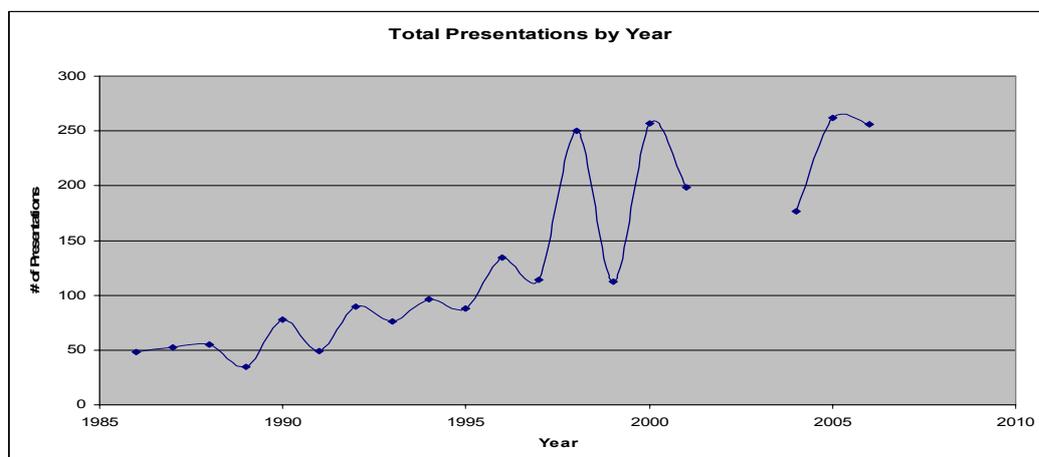


Figure 1 Total number of oral and poster presentations made each year at ISBS conferences.

Table 1. Top 10 countries in lead authorships.

Country	Participating Affiliations	Lead Authorships
1. United States of America	181	474
2. China	120	272
3. Germany	52	211
4. Canada	33	154
5. Australia	27	142
6. United Kingdom	38	132
7. Taiwan	35	112
8. Japan	69	106
9. Italy	35	99
10. Poland	12	56

Table 2. Top 10 affiliates in lead authorships.

School	Country	Lead Authorships
1. Chinese University of Hong Kong	China	42
2. Politecnico di Milano	Italy	38
3. University of Western Australia	Australia	36
4. Deutsche Sporthochschule Köln	Germany	34
5. Universidade Técnica de Lisboa	Portugal	34
6. Univerza v Ljubljani	Slovenia	34
7. National Taiwan Normal University	Taiwan	31
8. Kanazawa University	Japan	29
9. Beijing Research Institute of Sports Science	China	24
10. Institut für Angewandte Trainingswissenschaft	Germany	24

Since the 2000 conference in Hong Kong, the regional breakdown of the approximate 1,150 presentations by lead authorships has been: Asia (37.8%), Europe (31.6%), Americas (22.5%), Oceania (8.3%), and Africa (0.2%). The leading sub-regions since 2000 have been Eastern Asia (34.4%), Northern America (20.7%), Western Europe (11.8%), and Northern Europe (10.5%). The top affiliates have been Chinese University of Hong Kong (35), National Taiwan Normal University (26), University of Limerick (20), Beijing Research Institute of Sports Science, Kanazawa University, and Universität Salzburg (19), and University of Western Australia (17).

Additionally, there have been nearly 600 domestic and over 200 foreign collaborations in the 25 years of the ISBS. Table 3 shows the top 10 nations in domestic and foreign collaborations.

Table 3. Top 10 countries in domestic and foreign collaboration.

Country	Domestic Collaborations	Country	Foreign Collaborations
1. United States	98	1. United States	86
2. China	94	2. Australia	40
3. Taiwan	65	3. United Kingdom	37
4. Japan	49	4. Germany	27
5. Germany	41	5. Canada	26
6. Australia	32	6. Greece	20
7. United Kingdom	23	7. New Zealand	19
8. Italy	19	8. China	18
9. Canada	18	9. Korea	13
10. Spain	15	10. France	11

DISCUSSION AND CONCLUSION:

As seen in Figure 1, the amount of presentations has grown steadily each year, and it appears the promise of even more presentations in the following years can be realized. A drop was seen in 1999, but that was most likely due to the conference's remote location of Perth, Australia, a site for which many annual participants may not have had fiscal accessibility. However, this should not affect the The top countries in lead authorship seem

to coincide well with the hosting sites. That is, the host countries of the conference seemed to have a proportionally larger number of presentations, and these figures, though not reported, were markedly higher in the year(s) in which it served as host. This pattern of greater involvement based on proximity to the hosting site continued when divisions were made by continent and region. The list of top affiliates carries a similar pattern, though it is less noticeable. However, from this pattern it is somewhat difficult to ascertain whether countries are being rewarded for excellent research by serving as hosts or the hosts are subsequently given an opportunity to further their research credentials. Most likely it is a combination of both. Either way, the increased number of presentations by host countries and neighboring affiliates substantiates the promotion of even more diversity in host sites to recruit new and old researchers alike. Recruiting sports biomechanists from underrepresented areas will add to the richness of both the scientific and cultural aspects of the conference. When looking at presentation trends over the last few conferences (i.e. since 2000), the top three sub-regions (Eastern Asia, Northern America, and Western Europe) have presented over two-thirds (66.9%) of the presentations, while the top three sub-regions prior to 2000 (Northern America, Southern Europe, and Western Europe) accounted for just 60.9%. This trend can serve as a warning that the ISBS's diversity may be in jeopardy. Efforts to promote sports biomechanics in underrepresented areas may stimulate an increase in their presentations. One suggestion for promotion may be through collaborative work, pairing reputable affiliates with developing ones.

Domestic collaborative efforts have been seen prodigiously in the United States and several nations of the Eastern Asia region (China, Taiwan, and Japan). In keeping with the ISBS's ideals of sharing knowledge to help promote sports biomechanics, a follow-up report to the present study will inquire affiliates in this region how they successfully work with other domestic affiliates to present so prolifically at ISBS conferences. Perhaps affiliates in developing nations can benefit from working together to produce a greater volume of quality sports biomechanics research.

The core of foreign collaborations has been spear-headed by nations such as the United States, Australia, the United Kingdom, and Canada. While these nations are hotbeds for sports biomechanics research, the most compelling and logical explanation for this is that the ISBS requires its presentations to be in English, and these nations are English-speaking. Another suggestion to promote the ISBS in developing countries would be an exchange program available to faculty, students, and other researchers, funding individuals from English-speaking countries to visit foreign affiliates and vice-versa. If insufficient funding existed, electronic communication would at least help pave the way for a new, more diversified, and more robust ISBS.

REFERENCES:

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