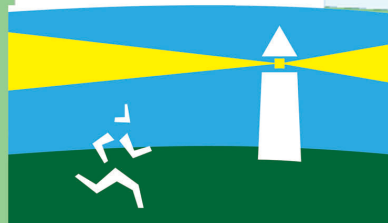


A large, stylized lighthouse graphic. The lighthouse is white with a yellow square at the top of the tower. Two yellow beams of light emanate from the top, spreading outwards. The background is light blue.

**XXVIIIth  
International Society of  
Biomechanics in Sports  
Conference**



**ISBS**  
MARQUETTE • 2010

July 19 - 23, 2010  
Northern Michigan University • Marquette, Michigan, USA

# **28<sup>th</sup> Conference of the International Society of Biomechanics in Sports**

**July 19-23, 2010  
NORTHERN MICHIGAN UNIVERSITY  
MARQUETTE, MICHIGAN USA**

**Randall Jensen  
Department of Health Physical Education and Recreation  
College of Professional Studies  
Northern Michigan University**





## Welcome to ISBS 2010

On behalf of the International Society of Biomechanics in Sports and Northern Michigan University we are very happy to welcome all delegates of the 28<sup>th</sup> Conference of the International Society of Biomechanics in Sports to Marquette and the Upper Peninsula of Michigan.

While planning the program for this meeting we have tried to keep in the forefront the mission of ISBS to bridge the gap between scientists and practitioners in sport biomechanics. We believe we have accomplished this with an excellent applied program, keynote lectures, and for the first time, a thematic session on Paralympic Sports. This session will be comprised of posters with an abbreviated oral presentation to summarize the paper. An extended question and answer session will allow for audience participation.

This year's applied sessions include Nordic Skiing, chaired by Gerald Smith; Olympic Weightlifting, chaired by Andy Tysz; Motion Analysis, chaired by Rene Ferdinands; Feedback to Athletes, chaired by Kevin Ball; Gymnastics, chaired by Gareth Irwin; and Writing and Reviewing Manuscripts, presented by Young-Hoo Kwon, the editor of the Society's journal, *Sports Biomechanics*.

As usual, the Geoffrey Dyson Award is a major highlight of the ISBS conference and for 2010, Barry Bates will present a lecture titled "*Accommodating Strategies for Preventing Chronic Lower Extremity Injuries*." The program also includes keynote lectures by Karen Roemer (USA), Justin Keogh (New Zealand), Andrew Harrison (Ireland), Thorsten Strerzing (Germany), Glenn Fleisig (USA), Elizabeth Bradshaw (Australia), and Ezio Preatoni (Italy). The scientific program is filled out with 90 oral presentations and 107 posters covering a wide range of sports biomechanics.

In addition to the regular program, we are pleased to include a Preconference Symposium on Teaching Biomechanics in conjunction with members from Biomechanics Academy of the National Association for Sport and Physical Education (NASPE). The symposium will incorporate suggestions for novel and online teaching techniques, variations of capstone projects, and roundtables on dealing with

different types of students and situations in the classroom.

The scientific and applied sessions will be complemented by a display of equipment, software, and literature related to sport biomechanics by leading commercial vendors in the field.

The Upper Peninsula (known locally as the U.P.) is famous for its outdoor activities and ISBS 2010 will take full advantage of this. On Tuesday, we will have an Adventure Activities Afternoon. Delegates and accompanying persons will enjoy hiking through the woods with views of Lake Superior (the largest freshwater lake in the world), kayaking on the lake, canoeing one of our scenic rivers, rock climbing in NMU's first-class recreation facility, or touring an open pit iron mining operation. On Thursday we will enjoy a picnic on the shores of Lake Superior before experiencing the impressive Pictured Rocks National Lakeshore during an evening boat cruise.

In hosting ISBS 2010 we will do our best to ensure your time at the conference and in the U.P. is a memorable one, with an excellent scientific, social, and cultural experience. We hope that you will enjoy your time enough to wish to return again.

**Randall Jensen**  
**ISBS 2010 Conference Chair**



# THE PEOPLE

## Conference Chair

Randall Jensen

## Conference Executive Committee

Randall Jensen, Rebecca Tavernini, Phil Watts

## Conference Planning Committee

Kevin Ball, Pat Black, Eduoard Rene Ferdinands, Gareth Irwin, Maureen Jensen, Young-Hoo Kwon, Judy Marra, Sally Olson, Cindy Paavola, Wolfgang Potthast, Julie Rochester, Pamela Russell, Gerald Smith

## Conference Organization Team

Travis Alexander, Andrew Becker, Ron Berry, Breanne Carlson, Britta Carlson, Linnea Carlson, Paul Ewbank, Lance Fulsher, Ann Marie Hall, Stephanie Hamilton, David Hoffman, Mary Leopold, Chelsea Matthew, Brian McGowan, Amanda Nixon, Cora Ohnstad, Erika Purdy, Jennifer Sansom, Mitch Stephenson, Jodi Tervo

## Editorial Board

Randall Jensen, William Ebben, Erich Petushek, Chris Richter, Karen Roemer

## ISBS Executive Committee

Manfred Vieten, *President*

Youlian Hong, *Past President*

Gareth Irwin, *VP Awards*

Ross Sanders, *VP Projects and Research*

Chenfu (Peter) Huang, *VP Conferences*

Duane Knudson, *VP Publications*

Hermann Schwameder, *VP Public Relations*

John Ostarello, *Secretary General*

Manfred Vieten, *Treasurer*

## ISBS Directors 2008-2010

Randall Jensen, *USA*

Cassie Wilson, *UK*

Karen Roemer, *USA*

Kevin Ball, *Australia*

Young-Hoo Kwon, *USA*

Jing Xian Li, *Canada*

Wolfgang Potthast, *Germany*

Antonio Veloso, *Portugal*

Mark Walsh, *USA*

## ISBS Directors 2009-2011

Rafael Bahamonde, *USA*

Ian Bezodis, *UK*

Elizabeth Bradshaw, *Australia*

Daniel Fong, *Hong Kong*

David Fortenbaugh, *USA*

Justin Keogh, *New Zealand*

Hans Joachim Menzel, *Brazil*

Pamela Russell, *USA*

Gongbing Shan, *Canada*

Bing Yu, *USA*



## Scientific Committee

Debra Allyn, *USA*

Ross Anderson, *Ireland*

Rafael Bahamonde, *USA*

Kevin Ball, *Australia*

Ian Bezodis, *UK*

Athanassios Bissas, *UK*

Elizabeth Bradshaw, *Australia*

Jennifer Bridges, *USA*

Peter Brüggemann, *Germany*

Angus Burnett, *Australia*

Nick Caplan, *UK*

Loren Chiu, *Canada*

Tom Comyns, *Ireland*

Bruce Elliott, *Australia*

Orna Donoghue, *UK*

Rene Ferdinands, *Australia*

Eamonn Flanagan, *UK*

Glenn Fleisig, *USA*

Daniel Fong, *Hong Kong*

Dave Fortenbaugh, *USA*

Marianne Gittoes, *UK*

Paul Grimshaw, *Australia*

Greg Haff, *USA*

Joseph Hamill, *USA*

Drew Harrison, *Ireland*

Mike Hiley, *UK*

H.C. Holmberg, *Sweden*

Gareth Irwin, *UK*

Thomas Joellenbeck, *Germany*

Ian Kenny, *Ireland*

Justin Keogh, *New Zealand*

Duane Knudson, *USA*

Young-Hoo Kwon, *USA*

Jing Xian Li, *Canada*

Young-Tae Lim, *Korea*

Chris Low, *UK*

Kathryn Ludwig, *USA*

Wayne Marino, *Canada*

Jeff McBride, *USA*

Peter McGinnis, *USA*

Hans-Joachim Menzel, *Brazil*

Marilyn Miller, *USA*

Kieran Moran, *Ireland*

Greg Myer, *USA*

Wolfgang Potthast, *Germany*

Ezio Preatoni, *Italy*

Pamela Russell, *USA*

Aki Salo, *UK*

Ross Sanders, *UK*

Miriam Satern, *USA*

Hermann Schwameder,  
*Germany*

Gongbing Shan, *Canada*

Darla Smith, *USA*

Gerald Smith, *USA*

Thorsten Sterzing, *Germany*

Jake Streepy, *USA*

Lothar Thorwesten, *Germany*

Antonio Veloso, *Portugal*

Manfred Vieten, *Germany*

Mark Walsh, *USA*

Cassie Wilson, *UK*

Jason Winchester, *USA*

Kerstin Witte, *Germany*

Bing Yu, *USA*

## ISBS SPONSORS



## ISBS 2010 EXHIBITORS



BERTEC



VICON



# CONFERENCE DETAILS

## Conference Office

The ISBS Conference Office is located in the Superior Room of the University Center where Registration Check-in will take place. The conference office hours are:

Sunday, 18 July	15:00-18:00
Monday, 19 July	08:00-18:30
Tuesday, 20 July	07:45-16:00
Wednesday, 21 July	08:00-18:00
Thursday, 22 July	08:00-16:00
Friday, 23 July	08:00-16:00

The conference organizers can be contacted from 07:30 to 16:30 Eastern Daylight Time at 1-906-227-2130 prior to the conference. During the conference please phone 1-906-204-4274. This number will be available and monitored 24/7.

## Name Badges

You will obtain a name badge when you check in at registration. Please make sure you wear your badge at all times during the conference activities. The badge allows delegates entry to all conference activities including the scientific program and social activities. It also will be the entrance ticket for accompanying persons to the social activities.

## Conference Staff

Conference staff will be available to assist you and answer questions throughout the conference. All conference staff will be identifiable by the ISBS conference shirts with STAFF printed on the shirt.

## Lunch and Breaks

Lunch will be served in the Peter White Lounge located one floor below the conference venue. Breaks will be served in the Exhibit Hall of the Explorer Rooms.

## Speaker Ready Room

The speaker ready room is located across from the Exhibit Hall in Pioneer A. We ask that all presenters load their presentations onto the ISBS 2010 laptops in the speaker ready room according to the

schedule that will be posted. ALL speakers are required to load their presentations onto the ISBS 2010 laptops prior to their presentation. The hours for the speaker ready room are:

Sunday, 18 July	15:00-18:00
Monday, 19 July	08:00-18:30
Tuesday, 20 July	07:45-16:00
Wednesday, 21 July	08:00-18:00
Thursday, 22 July	08:00-16:00
Friday, 23 July	08:00-16:00

## Geoffrey Dyson Award

The Geoffrey Dyson Award is the most prestigious award of the ISBS. The award is given to an individual in recognition of work in Sports Biomechanics that exemplifies the ISBS mission to bridge the gap between academic research and sports practice. This year's recipient of the Geoffrey Dyson Award is Dr. Barry Bates, University of Oregon professor emeritus, adjunct professor at the University of Nevada-Las Vegas and president of Human Performance & Wellness, Inc. His interests and activities include: human performance/human factors consulting, forensic services, biomechanics research, lower extremity function, running and running injuries, athletic footwear expertise, backward (retro) locomotion, exercise equipment design and evaluation and single subject performance strategies. The 2010 Geoffrey Dyson Award Lecture will take place on Tuesday, 20 July at 08:30 to 09:20. The title of the presentation is: *"Accommodating Strategies for Preventing Chronic Lower Extremity Injuries."*

## Hans Gros New Investigator Award

The Hans Gros New Investigator Award will include separate awards for the best oral and best poster papers by young investigator entrants. The best papers will be selected by a panel of judges appointed by the vice president of awards. The judges will select the best two oral presentations and these papers will be presented to all delegates and the judges at the final session of the conference. The award winners will be announced at the closing banquet.

### **Scientific Program**

The scientific program for ISBS 2010 includes the Geoffrey Dyson Lecture, seven keynote lectures, six applied sessions, a thematic session on paralympics with eight presentations, 20 oral sessions with 90 presentations, and four poster sessions with 107 presentations.

### **Applied Program**

ISBS 2010 is pleased to offer six applied sessions for delegates to attend. These include sessions on: Nordic Skiing Mechanics and Physiology (Chair - Gerald Smith); Olympic Weightlifting (Chair – Andy Tysz); Motion Analysis (Chair - Rene Ferdinands); Feedback to Athletes (Chair – Kevin Ball); Writing and Reviewing Manuscripts (Chair – Young-Hoo Kwon); and Gymnastics (Chair – Gareth Irwin). With the exception of the session on Olympic Weightlifting, all applied sessions will be held in the Charcoal Room of the University Center. The Olympic Weightlifting session will be held in the Superior Dome (reference 3 on the campus map). The walk to the Superior Dome will take approximately 10 minutes and those participating are asked to gather outside the registration check-in desk immediately after the keynote lecture, where an ISBS 2010 representative will guide you to the session.

### **Technical Exhibition**

A technical exhibition by 14 international exhibitors will take place in the Exhibition Hall also known as the Explorer Rooms. The Exhibition Hall will be the location of the morning break and poster presentations. Open hours are:

Monday, 19 July	08:00 – 16:15
Tuesday, 20 July	08:00 – 15:30
Wednesday, 21 July	08:00 – 18:00
Thursday, 22 July	08:00 – 15:30
Friday, 23 July	08:00 – 12:00

### **Thematic Session**

ISBS 2010 is pleased to present a thematic poster session on Disabled Sports and the Paralympics. This session will feature eight papers that will be presented as posters in addition to an abbreviated five minute oral presentation. The audience will be invited to participate in the question and answer

session. The session will take place from 14:00 to 15:30 on Tuesday, 20 July in the Pioneer B room across from the Exhibition Hall. Posters will be available for viewing beginning at 10:00.

### **Oral Presentations**

Oral presentations (excluding keynotes) will be 10 minutes followed by 5 minutes of questions. All presenters are required to use the ISBS 2010 laptops and the presentation must be compatible with Microsoft PowerPoint 2003 or later. We ask that presenters load their presentation onto the ISBS 2010 laptops in the Speaker Ready Room according to the posted schedule. Please test your presentation to see that it is copied and runs properly. This is especially important if you plan to use video or animation files as part of your presentation. Please report to the scheduled presentation room at least 10 minutes before the start of the session in which you are presenting and introduce yourself to the session chairperson. A laser pointer/remote control for the laptop will be provided. The session chairperson will ensure that all presentations run on time.

### **Posters**

Posters should be prepared in A0 size (841mm x 1189mm or 33.11" x 46.81") in a PORTRAIT format; i.e. tall. Each poster presenter will be provided a poster number to identify the location of their poster in the Exhibit Hall (Explorer Rooms). Posters should be fixed in their location between 8:00 and 9:30 on the day of presentation and removed after 12:00. Please use Velcro tape provided by ISBS 2010 to fix your poster to the wall. Poster presenters are required to be present at their poster during the scheduled time and to answer questions of the delegates regarding it.

### **Annual General Meeting of ISBS**

The annual general meeting of ISBS is scheduled for Friday 23 July from 13:00-14:00 in the Lakes Room (Conference Map Location 1). All members in good standing are encouraged to participate and contribute to the meeting.

### **Internet Access**

Wireless internet access is available in all Northern Michigan University buildings. "NMU\_GUEST" is the network delegates should search for on their

laptops. In addition, desktop computers are located in the university library (reference 4 on the map) located only 5 minutes walk away from the conference venue.

### **Airport Transfers**

ISBS 2010 will provide shuttle service from Marquette's K. I. Sawyer airport at 10:30, 15:30, 17:00, and from 21:00 to 22:00 on 18 and 19 July. In addition, there will be a shuttle from the airport in Green Bay, Wisconsin, at 16:00 CDT on 18 July and 12:00 CDT on 19 July. Car rentals are available at both airports. For those arriving at other times, taxi and bus service are available to use within and around Marquette. The phone number of the local bus line (Marq-Tran) is 1-906-225-1112. Taxis can be arranged from the following phone numbers: 1-906-226-7777; 1-906-249-4428; or 1-906-226-9999.

### **Accommodation**

#### **On-campus housing is in Magers/Meyland Hall**

Those who have booked on-campus accommodations will be housed in Magers/Meyland Hall (reference 2 on the map). Please go directly to the Magers/Meyland Hall front desk to pick up the key to your room. Normal hours for the front desk are 8:00 to 16:00 and 18:00 to 20:00. Extended hours will take place on Sunday and Monday. For arrivals after 20:00 a member of the staff will be on call. Directions will be posted on the front door advising how to contact the on-call staff member. Please note that check out is at noon on the day of departure. Luggage can be stored at the front Desk during the day prior to departure. Lots 14 and 24 allow overnight parking for those staying in Magers/Meyland Hall.

### **Campus Parking**

If you are driving to the conference, please take note of the signage on campus relating to parking. There are parking lots next to the conference venue at the University Center (Lot 8) and near to Magers/Meyland Hall for those with on-campus accommodations (Lots 14 & 24). Parking is free, however, parking contrary to any posted signs will result in a parking ticket.

### **Sports Facilities**

We have secured the use of the Physical Education Instructional Facility (PEIF) (Conference Map Location 3) for all of our delegates; please show your conference badge to gain admission—see <http://webb.nmu.edu/SportsAthletics/SiteSections/Facilities/PEIF.shtml> for a summary of the facilities. For those interested in walking or running, a map with routes is available at check in.

### **After Hours**

NMU Conference and Catering will host the *ISBS 2010 Pub* in the University Center's Charcoal Room, on the second floor, Tuesday and Wednesday 20:00-23:30. A cash bar will be available to conference delegates.

## APPLIED SESSIONS

The applied program of ISBS 2010 consists of five two-hour sessions and a one-hour session on scientific writing as well as a 90-minute thematic session on Paralympic Sports. Please see the Proceedings on your ISBS jump drive for papers and authors.

**Nordic Skiing** provides unique movement patterns and unique athletes for sport science research. The integration of physiology and biomechanics into research projects has provided insights into systemic solutions regarding high intensity, whole body exercise and how workload is distributed. This session will review research into technique and training for Nordic skiing.

*Gerald Smith (Chair), Utah State University, USA*

*Hans-Christer Holmberg, Swedish Winter Sports Research Centre, Sweden*

Time and Room: Tuesday, 9:45 to 12:00,  
Charcoal Room University Center

**Thematic Session on Paralympic Sports** will provide a new method of presenting original research at the ISBS meeting. Authors will make a brief five minute oral presentation of a poster that will be available for viewing before and after the presentation. Time for group discussion will also be provided for.

*Wolfgang Potthast (Chair), German Sport University, Cologne, Germany*

Time and Room: Tuesday, 14:00 to 15:30,  
Pioneer Room, University Center

**Olympic Weightlifting** can be used as a training regimen as well as a competitive sport. This session will focus on the sporting aspect, including performance cues for lifting, formation of a training regimen, and developmental aspects of weightlifting athletes. Demonstration of techniques will be included in this session.

*Andy Tysz (Chair), United States Olympic Education Center, USA*

*Kyle Pierce, Louisiana State University-Shreveport, USA*

Time and Room: Wednesday, 9:45 to 12:00,  
Superior Dome Weightlifting Center

**Motion analysis** is utilized to capture information of a body performing a movement sequence in sport. The application of motion analysis involves biomechanical modeling to calculate various kinematic and kinetic derived variables to understand the principles of motion. Techniques to accomplish this are often varied and interrelated. The presenters of this session will provide background in different methods of state of the art motion analysis in the lab and on the field, court, or water.

*Rene Edouard Ferdinands (Chair), University of Sydney, Australia*

*Young-Hoo Kwon, Texas Woman's University, USA*

*Joseph Hamill, University of Massachusetts-Amherst, USA*

*Richard Smith, University of Sydney, Australia*

*Dustin A. Hatfield and Gerald L. Scheirman, Motion Analysis Corporation, USA*

Time and Room: Wednesday, 2:00 to 4:45,  
Charcoal Room, University Center

**Feedback to Athletes** is an integral component in improving athletic performance. The types of feedback are as varied as the sport. A major limitation in providing feedback is that it be available to the athlete as quickly as possible, and ideally in real time. The presenters in this session will provide considerations and suggestions of how to do this in various sporting situations.

*Kevin Ball (Chair), Victoria University, Australia*

*Ross Anderson, University of Limerick, Ireland*

*Ross Sanders, University of Edinburgh, UK*

*John Baker, Australian Institute of Sport, Australia*

Time and Room: Thursday, 9:45 to 12:00,  
Charcoal Room University Center

**Writing and Reviewing in Biomechanics** serves to make research in the discipline available to other researchers as well as athletes and other practitioners. This session will outline the fundamental writing principles for the manuscripts to be submitted to *Sports Biomechanics* and how to respond to the reviewers' comments after a review. General and section-specific writing guidelines will be presented along with recommendations for the preparation of the point-by-point responses to reviewers' comments.

*Young-Hoo Kwon (Chair), Texas Woman's University, USA*

Time and Room: Friday, 9:45 to 10:45,  
Great Lakes Rooms, University Center

In **Gymnastics**, the Coaching-Biomechanics Interface and Injury and Biological Loading are two interrelated themes that underpin the understanding and knowledge needed to provide a safe and effective environment for the development of gymnastics skills and for the well being of performers. The four presentations will use examples from evidenced based research on these themes.

*Gareth Irwin (Chair), Cardiff School of Sport, University of Wales Institute, UK*

*Michael J. Hiley, Loughborough University, UK*

*Marianne Gittoes, Cardiff School of Sport, University of Wales Institute, UK*

*Gert Peter Brüggemann, German Sport University-Cologne, Germany*

Time and Room: Friday, 9:45 to 12:00,  
Charcoal Room, University Center

## SOCIAL EVENTS

Please remember your ticket when attending any of the events listed below; these were distributed with your conference pack during registration.

### **SOCIAL PROGRAM**

#### **Welcome Reception:**

Monday

18:30-23:00

The welcome reception will be held in the University Center on Monday 19 July. Following a welcome to Northern Michigan University (NMU) and Marquette, you will be treated to a performance of the Lake Superior Theatre Company's music and songs of the Upper Peninsula. The opening keynote lecture will be followed by a buffet reception in the Peter White Lounge.

#### **Adventure Activity Afternoon:**

Tuesday

16:00-18:30

Conference attendees will be able to experience the great outdoors of the Upper Peninsula during Tuesday afternoon. Different options for hiking will allow you to enjoy the Northwoods with views of Lake Superior. Kayaking will allow you to see the lake from a different perspective as you go out in the water near Presque Isle, Marquette's picturesque park. Canoeing down the AuTrain River will take you into the woods and be followed by time to walk on the beach of Lake Superior. Spend time rock climbing on the 135 m<sup>2</sup> wall at the NMU recreation facility with onsite belayers. Take a tour of an open pit iron mine and see how the ore is moved with massive trucks (3.5 m high tires) to where it is processed. Appropriate attire is recommended. You will get wet canoeing and kayaking, need sturdy shoes for hiking, and no open-toed shoes (sandals or flipflops) will be allowed on the mine tour.

#### **Pasty picnic and Sunset Cruise of the Pictured Rocks National Lakeshore:**

Thursday

16:00-22:00

We will have a pasty picnic on the shores of Lake Superior at Marquette's Presque Isle Park. Pasties are known as "U.P. fast food" and a traditional meal for miners in the past. You can see what our pasties are like at [www.jeankayspasties.com](http://www.jeankayspasties.com). There will also be ice cream cones with locally made Jilbert's ice cream, a local favorite. After the picnic, we will travel by bus (70 km) to Munising a sunset cruise of the Pictured Rocks National Lakeshore, with breathtaking views of sandstone cliffs, waterfalls, lush forest, and shoreline of Lake Superior. We will return to Marquette at about 23:00 and you will be dropped off at your hotel or campus lodging.

#### **Gala Dinner:**

Friday

19:30-midnight

The gala dinner will be held at the downtown Marquette restaurant/nightclub UpFront and Company. Shuttle transportation will be provided departing from Magers/Meyland Hall at 19:00. Please bring your ticket with you.

#### **Partner Social and Tour Programs**

*(Guests who have been pre-registered are also invited to participate in all of the above activities.)*

#### **Get acquainted with the city on a tour of Marquette:**

Tuesday

09:00 – 12:00

Get to know Marquette on an informal guided tour departing from campus. You'll see the city's lakeshore, beautiful Presque Isle Park, our shopping and restaurant districts and key points of interest, including local museums. We'll include plenty of time to get out and take photos, explore and shop downtown and stop for ice cream at Jilbert's Dairy Barn. Participants will be given shopping and dining guides, a Marquette map and special coupons for downtown businesses.

## GENERAL INFORMATION

### Climate

The Upper Peninsula of Michigan has a temperate climate resulting in relatively cool summers. The mean daily temperature in July is 15-20 degrees Celsius. It is generally quite dry in July but it is possible to experience many climate changes in one day. Rain can occur at any time, so come prepared!

### Electricity Supply

The United States works off a flat two-pin plug system. Electrical current is 110 volts, 60 cycles alternating current (AC). You are advised to purchase the appropriate adapters in advance. These are available at most large airports.

### Credit Cards

Credit cards are widely used in Michigan and all leading credit cards are accepted. Please consult your own bank. Accepted credit cards for conference fees include Visa, Mastercard, and Discover; American Express is not accepted by NMU.

### Clothing

The Upper Peninsula is generally informal about clothes. Warm sweaters, comfortable walking shoes and rainwear are advisable throughout the year.

### Shopping

Shops are generally open Monday to Saturday from 9:00 to 18:00 with late night shopping until 20:00 or 21:00 at many of the larger stores. On Sunday, many supermarkets and some of the bigger shops will open from midday until 21:00. There is a small store near Magers/Meyland Hall and a full-size grocery store is within walking distance of campus.

### Driving

A valid license is required for driving in the United States. Driving is on the right side of the road and seat belts must be worn at all times. In Michigan, the speed limits are 25 mph in built-up areas, 55 mph on rural roads. The signposts denoting speed and distance are in miles per hour.

### Smoking Ban

Since 1 May, 2010, the Michigan government has implemented a wide reaching ban on smoking. This means that smoking is forbidden in enclosed places of work in Michigan. This includes office blocks, public/state buildings (including universities), public houses/bars, restaurants, shops and stores.

### Alcoholic Beverages

The legal drinking age in Michigan is 21. When buying alcohol the seller will request photo identification to verify that the buyer is over 21. The inability to provide this identification will result in refusal of service. In addition, alcohol is not allowed on the Northern Michigan University campus unless at official university functions. The "ISBS 2010 Pub" is considered part of a university function.

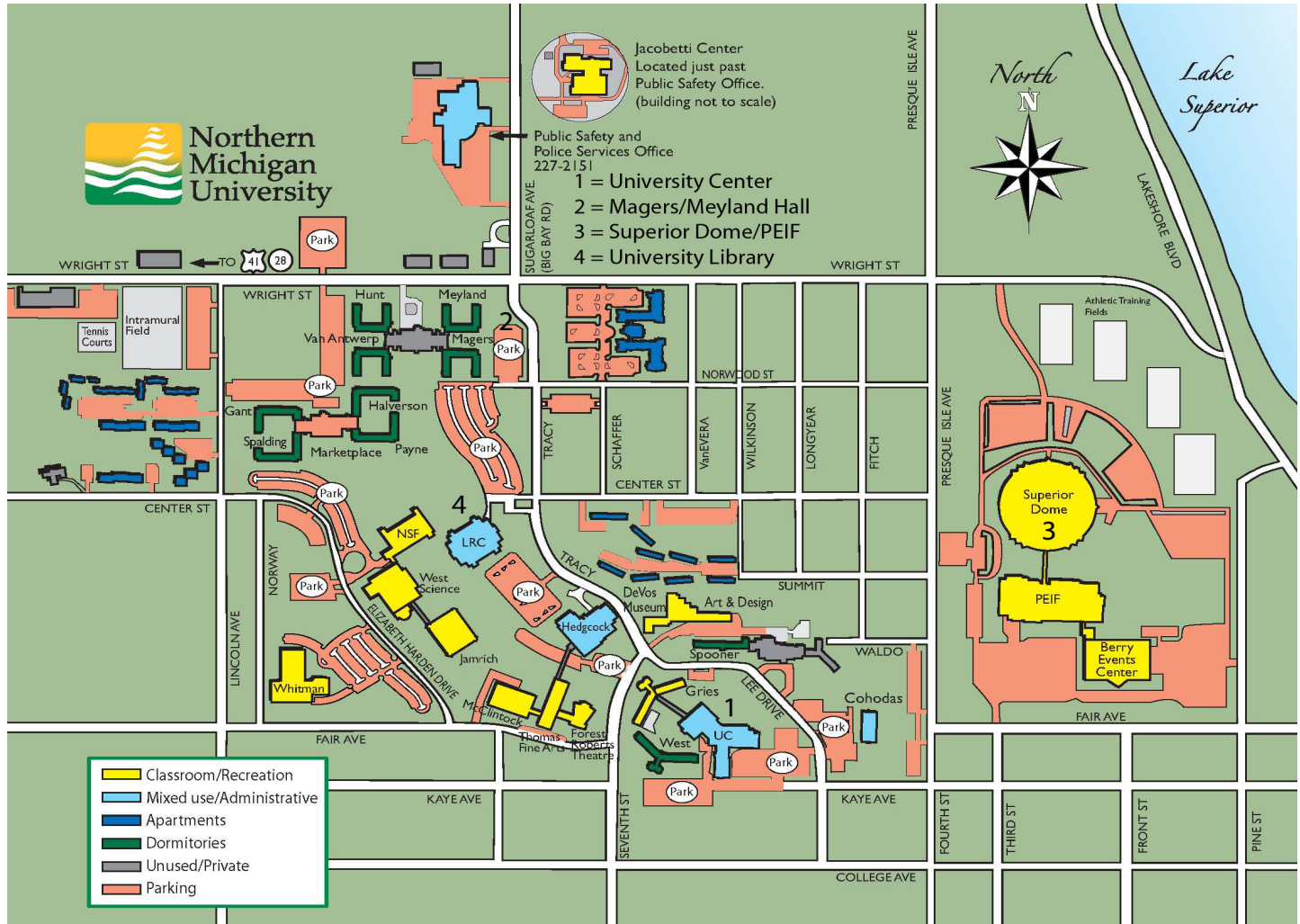
### Currency

The dollar is the local currency of the United States. One dollar consists of 100 cents. Notes are \$1, \$5, \$10, \$20, \$50 and \$100. Coins are 50 cents, 25c, 10c, 5c, and 1c.

### Emergency Numbers

For emergency police, fire, ambulance, telephone 911. This number is free of charge but should be used only in cases of genuine emergency. On answer, state which service you require, wait to be connected to that service, and then clearly state the location of where the assistance is required.

# NMU CAMPUS MAP



1. The University Center



2. Magers and Meyland Hall lodging

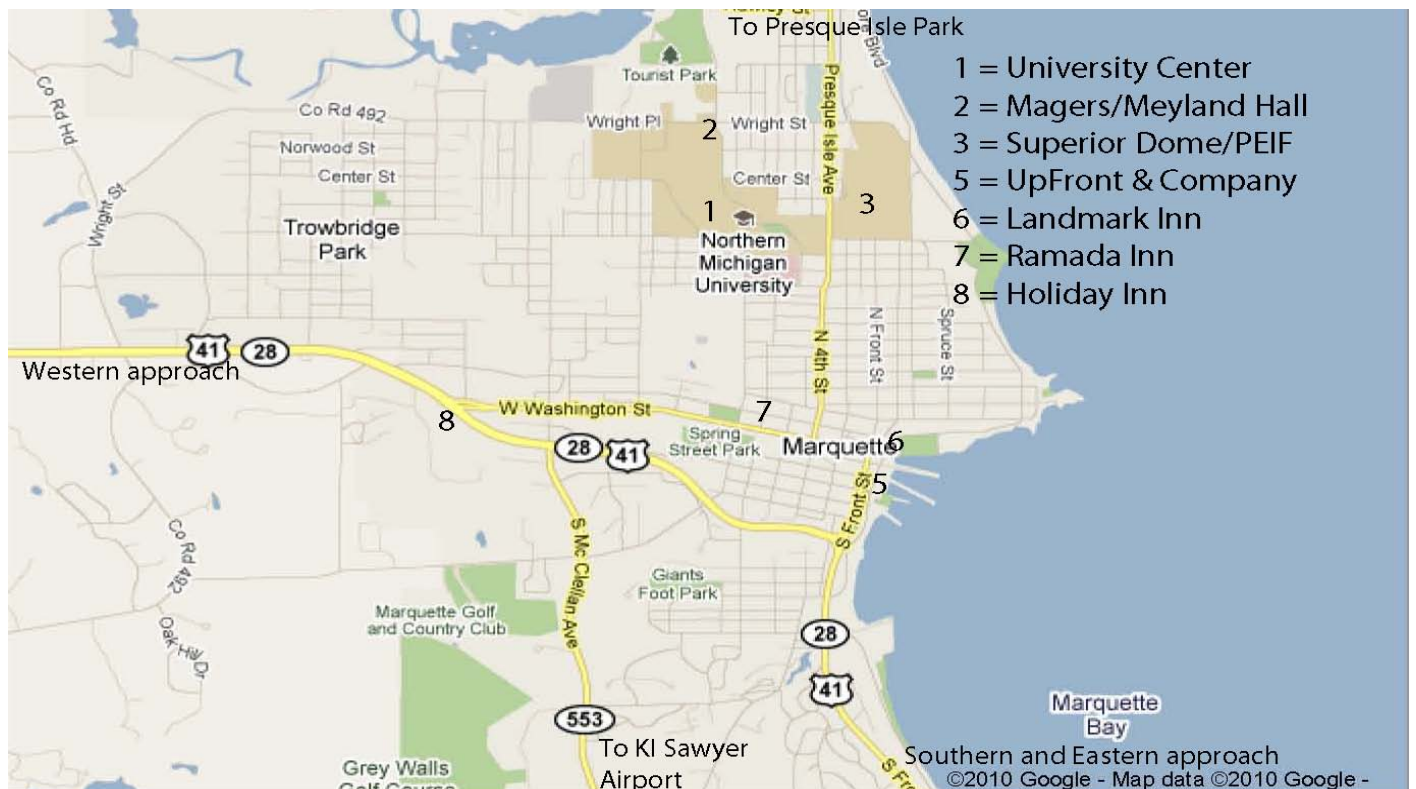


3. Superior Dome and adjoining PEIF recreational facility



4. University library (Lydia Olson Library/Learning Resources Center)

## MARQUETTE MAP



## PICTURED ROCKS NATIONAL LAKESHORE



# CONFERENCE SCHEDULE

Monday, 19 July	
	<b>National Association for Sport and Physical Education Preconference Symposium</b>
09.00 - 10.00	<b>Keynote:</b> Jackie Hudson: <i>BIOMECHANICS DONE BACKWARDS</i> . [Session Chair: Scott Strohmeyer] //Michigan Room
10.15 - 11.15	Darla Smith, Manfred Vieten, and Mark Walsh: <i>Panel Discussion of Online teaching</i> [Session Chair: Michael Bird] //Michigan Room
11.30 - 12.30	Peter McGinnis: <i>Novel teaching techniques</i> [Session Chair: Erin Learoyd] //Michigan Room
12.30 - 14.00	Lunch
14.00- 15.00	Round tables: [Session Chair: Pamela Russell] //Huron Room  <i>Strategies for Teaching Students with Learning Disabilities</i> [Moderator: Kathryn Ludwig] <i>Possible Pedagogical Use of Social Networking</i> [Moderator: Jennifer Bridges] <i>Meaningful Assessment</i> [Moderator: Miriam Satern] <i>Syllabi Design and Course Content</i> [Moderator: Darla Smith] <i>Approaches to Teaching Biomechanics</i> [Moderator: Jake Streepy]
15.15 - 16.15	Debra Allyn and Pamela Russell: <i>Capstone Experiences</i> [Session Chair: Saori Hanaki-Martin] // Michigan Room
16.15 - 18.30	Free time
16.30 – 18.15	Preconference ISBS Board of Directors Meeting
18.30 – 23:00	<b>Opening Ceremony of ISBS 2010 Congress</b>
19.00 - 20.00	<b>Opening Lecture (at Ceremony):</b> Karen Roemer: <i>BIOMECHANICAL MODELING APPLIED TO HUMAN MOVEMENT ANALYSIS</i> . [Session Chair: Young Tae Lim] //Michigan Room

Tuesday 20 July		
08.30 - 09.30	<b>Geoffrey Dyson Lecture-</b> Barry Bates: <i>ACCOMMODATING STRATEGIES FOR PREVENTING CHRONIC LOWER EXTREMITY INJURIES</i> [Session Chair: Joseph Hamill] //Michigan Room	
09.45 - 10.45	<b>Poster Session 1 &amp; Coffee Break</b> // Exhibit Hall	
09.45 – 12.00	<b>Applied Session 1 Nordic Skiing Mechanics and Physiology</b> //Charcoal Room	
10.45 - 12.00	<b>Oral Session 1 Jumping 1</b> [Session Chair: Hans Joachim Menzel] // Michigan Room	<b>Oral Session 2 Weightlifting</b> [Session Chair: Angus Burnett] // Huron Room
10.45 – 11.00	VALIDATION OF ACCELEROMETER DATA FOR MEASURING IMPACTS DURING JUMPING AND LANDING TASKS. Jacqueline Tran, Paul Gastin, Kevin Netto and Brad Aisbett	PRELIMINARY STUDY: INTERPRETATION OF BARBELL BACK SQUAT KINEMATICS USING PRINCIPAL COMPONENT ANALYSIS. Kimitake Sato, Dave Fortenbaugh, J. Kyle Hitt
11.00 – 11.15	RELATIONSHIP OF GROUND AND KNEE JOINT REACTION FORCES IN PLYOMETRIC EXERCISES. Sarah K. Leissring, Erich J. Petushek, Mitchell L. Stephenson, Randall L. Jensen	INERTIAL SENSOR FEEDBACK DURING SQUAT EXERCISE. Valentina Camomilla, Giovanni Di Maio, Marco Vasellino, Marco Donati, Aurelio Cappozzo, Pasquale Bellotti
11.15 – 11.30	THE EFFECTS OF ACUTE WHOLE-BODY VIBRATION ON MAXIMAL COUNTERMOVEMENT VERTICAL JUMP IN RECREATIONALLY ACTIVE MALES AND FEMALES. Sarah Hilgers and Bryan Christensen	THE EFFECTS OF WEIGHTLIFTING SHOES ON SQUAT KINEMATICS. Dave Fortenbaugh, Kimitake Sato, and J. Kyle Hitt
11.30 – 11.45		BCH ANGLES OF YOUNG FEMALE WEIGHTLIFTERS DURING SNATCH MOVEMENT. Hung Ta Chiu and Jih Lei Liang
11.45 – 12.00	Free time	
12.00 - 13.00	Lunch	
13.00 - 14.00	<b>Keynote:</b> Justin W.L. Keogh: <i>PARALYMPIC SPORTS, THE NEXT FRONTIER FOR SPORTS SCIENCE.</i> [Session Chair: G. Wayne Marino] //Michigan Room	

Tuesday, continued

14.00 - 15.30	<b>Thematic Session Paralympics</b> [Session Chair: Wolfgang Potthast & Peter Brüggemann] //Pioneer A	
	<b>Oral Session 3 Modeling</b> [Session Chair: Marianne Gittos] // Michigan Room	<b>Oral Session 4 NIA Rapid Movement</b> [Session Chair: Ian Kenny] //Huron Room
14.00 – 14.15	A COMPUTATIONAL MODEL TO INVESTIGATE SHOE AND SHOE-SURFACE INTERFACE EFFECTS ON ANKLE LIGAMENT STRAINS DURING A SIMULATED SIDESTEP CUTTING TASK. Feng Wei, John W. Powell, Roger C. Haut	JUMP KINETICS, BONE HEALTH AND NUTRITION IN ELITE ADOLESCENT FEMALE ATHLETES. Mark Moresi, Elizabeth Bradshaw, David Greene, Geraldine Naughton
14.15 – 14.30	A NEW METHOD FOR UNCONSTRAINED MEASUREMENT OF KNEE JOINT ANGLE AND TIMING IN ALPINE SKIING : COMPARISON OF CROSSOVER AND CROSSUNDER TURNS. Julien Chardonens, Julien Favre, Gérald Gremion, Kamiar Aminian	HAMSTRINGS, QUADRICEPS, AND GLUTEAL MUSCLE ACTIVATION DURING RESISTANCE TRAINING EXERCISES. McKenzie L. Fauth, Luke R. Garceau, Brittney Lutsch, Aaron Gray, Chris Szalkowski, Brad Wurm, William P. Ebben
14.30 – 14.45	CREATION OF THEORETICAL DATA SETS TO EXAMINE MOVEMENT VARIABILITY USING MODELLING. Ross Anderson, Ian C. Kenny, Catherine Tucker, Joseph O'Halloran	ANTAGONIST CONDITIONING CONTRACTIONS IMPAIR AGONIST FUNCTIONING. Luke R. Garceau, Aaron Gray, McKenzie L. Fauth, Phillip Hanson, Brittney Hsu, Tejin Yoon, Chris Szalkowski, Brittney Lutsch, William P. Ebben
14.45 – 15.00	METHOD TO VISUALIZE AND ANALYZE SIMILARITIES OF MOVEMENTS – USING THE EXAMPLE OF KARATE KICKS. Kerstin Witte, Peter Emmermacher, Nico Langenbeck	ACTIVATION AND CONTRIBUTION OF TRUNK AND LEG MUSCULATURE TO FORCE PRODUCTION DURING ON-WATER SPRINT KAYAK PERFORMANCE. Mathew B. Brown, Mike Lauder, Rosemary Dyson
15.00 – 15.15		THE EFFECT OF MYOELECTRIC STIMULATION ON PERONEAL MUSCLES TO RESIST SUDDEN SIMULATED ANKLE SPRAIN MOTIONS. Daniel Tik-Pui Fong, Vikki Wing-Shan Chu, Mandy Man-Ling Chung, Yue-Yan Chan, Patrick Shu-Hang Yung, Kai-Ming Chan
15.15 – 16.00	Free time	
16:00 – 18.30	<b>Adventure Activities</b>	

Wednesday 21 July		
08.30 - 09.30	<b>Keynote:</b> Andrew J. Harrison: <i>BIOMECHANICAL FACTORS IN SPRINT TRAINING—WHERE SCIENCE MEETS COACHING.</i> [Session Chair: Cassie Wilson] // Michigan Room	
09.45 - 10.45	<b>Poster Session 2 &amp; Coffee Break</b> //Exhibit Hall	
10.45 - 12.00	<b>Applied Session Olympic Weightlifting</b> //Superior Dome	
	<b>Oral Session 5 NIA Other</b> [Session Chair: Hermann Schwameder] // Michigan Room	<b>Oral Session 6 Cycling</b> [Session Chair: Jennifer Bridges] // Huron Room
10.45 – 11.00	PROJECTED LIGHT SYSTEM FOR TRUNK SURFACE RECONSTRUCTION AND VOLUME MEASUREMENT DURING RESPIRATION. Angelica Lodovico, Pietro Cerveri, Giancarlo Ferrigno, Ricardo M. L. Barros	JOINT-SPECIFIC POWER PRODUCTION DURING SUBMAXIMAL AND MAXIMAL CYCLING. Steven Elmer, Paul Barratt, Tom Korff, James Martin
11.00 – 11.15	TRANSMISSION OF VIBRATION ABOUT THE KNEE. Trentham Furness, Corey Joseph, Bianca Share, Geraldine Naughton, Wayne Maschette, Christian Lorenzen	THE INFLUENCE OF WORK RATE AND CADENCE ON MOVEMENT COORDINATION IN CYCLING. Cassie Wilson, Deborah Sides
11.15 – 11.30	ULTRASONIC MONITORING FOR THE EVALUATION OF CONDITIONING BY TRAINING SESSION FOR ATHLETES. M. Zakir Hossain, Wolfgang Grill	A COMPARISON OF PEDALING MECHANICS IN EXPERIENCED POSE AND TRADITIONAL CYCLISTS. Graham Fletcher, Tom Korff, Lee Romer, Dave Brown, Nicholas Romanov
11.30 – 11.45	BALANCE TRAINING ALTERS POSTURAL DYNAMICS UNIQUELY FOR STANCE ON COMPLIANT VS. NON-COMPLIANT SURFACES. Brittany Caserta, Adam Strang, Mathias Hieronymus, Josh Haworth, Mark Walsh	FORWARD SEAT POSITION EFFECTS ON CYCLING KINEMATICS. Saori Hanaki-Martin, David R. Mullinaeux, Kyoungkyu Jeon, Robert Shapiro
11.45 - 12.00	QUANTITATIVE ANALYSIS OF CORE MUSCULATURE DURING TWO TYPES OF BASEBALL PITCHES: FASTBALL AND CHANGE-UP. Gretchen D. Oliver, Masamichi Abe, David Keeley	
12.00 - 13.00	<b>Lunch</b>	
13.00 - 14.00	<b>Keynote:</b> Thorsten Sterzing: <i>KICKING IN SOCCER.</i> [Session Chair: Kevin Ball] // Michigan Room	

Wednesday, continued

14.00 - 15.30	<b>Applied Session Motion Analysis //Charcoal Room</b>	
	<b>Oral Session 7 Sprinting</b> [Session Chair: Ian Bezodis] // Michigan Room	<b>Oral Session 8 NIA Jumping 2</b> [Session Chair: Andrew Harrison] // Huron Room
14.00 – 14.15	FOOT PLANTING TECHNIQUES WHEN SPRINTING AT CURVES. Oleg Nemtsev, Andrei Chechin	FORCE, VELOCITY, AND POWER ADAPTATIONS IN RESPONSE TO A PERIODIZED PLYOMETRIC TRAINING PROGRAM. Erich J. Petushek, Luke R. Garceau, William P. Ebben
14.15 – 14.30	KINEMATIC ASPECTS OF BLOCK PHASE TECHNIQUE IN SPRINTING. Neil E. Bezodis, Aki I.T. Salo, Grant Trewartha	EFFECTS OF AGE, GENDER AND ACTIVITY LEVEL ON COUNTER-MOVEMENT JUMP PERFORMANCE AND VARIABILITY IN CHILDREN AND ADOLESCENTS. Anne Richter, Darko Jekauc, Alexander Woll, Hermann Schwameder
14.30 – 14.45	KINEMATIC ANALYSIS OF HURDLE CLEARANCE OF 60-M HURDLES IN ELITE HURDLE SPRINTERS DURING WORLD INDOOR CHAMPIONSHIPS 2010. Sami Kuitunen, Stephen Poon	EFFECTS OF EIGHT WEEKS PILATES TRAINING ON JUMP PERFORMANCE AND LIMITS OF STABILITY IN ELEMENTARY DANCERS. Yen-Ting Wang, Chen-fu Huang, Alex J.Y. Lee
14.45 – 15.00	PERFORMANCE DETERMINING FACTORS IN ELITE SPRINTERS DURING SPRINT START AND TWO FOLLOWING SUCCESSIVE SUPPORTS. Sofie Debaere, Ilse Jonkers, Dirk Aerenhouts, Friso Hagman, Bart Van Gheluwe, Christophe Delecluse	ANALYSIS OF STABLE FLIGHT IN SKI JUMPING BASED ON PARAMETERS MEASURED WITH A WEARABLE SYSTEM. Julien Chardonens, Julien Favre, Florian Cuendet, Gérald Gremion, Kamiar Aminian
15.00 – 15.15	CHANGES IN SPLIT VELOCITIES DURING SPRINT PERFORMANCE DEVELOPMENT. Laura Charalambous, David G. Kerwin, Gareth Irwin, Ian N. Bezodis	SHORT-TERM PLYOMETRIC TRAINING IMPROVES ALTERED NEUROMOTOR CONTROL DURING RUNNING AFTER CYCLING IN TRIATHLETES. Jason Bonacci, Daniel Green, Philo U. Saunders, Melinda Franettovich, Andrew R. Chapman, Peter Blanch, Bill Vicenzino
15.15	Free time	
15.30 - 16.45	<b>Applied Session Motion Analysis // Charcoal Room</b>	
	<b>Oral Session 9 NIA Running</b> [Session Chair: Thorsten Sterzing] // Michigan Room	<b>Oral Session 10 Soccer &amp; Tennis</b> [Session Chair: Rafael Bahamonde] // Huron Room
15.30 – 15.45	TRAINING FOR THE BIKE TO RUN TRANSITION IN TRIATHLON. Josh Haworth, Mark Walsh, Adam Strang, Jeff Hohl, Sarah Spraeets, Michelle Wilson, Cory Brown	<i>'BEND IT LIKE BECKHAM'</i> : BALL ROTATION IN THE CURVED FOOTBALL KICK. David Whiteside, Jacqueline Alderson and Bruce Elliott
15.45 – 16.00	EFFECT OF RESPIRATION DYNAMICS ON POSTURAL CONTROL FOLLOWING A 5K RUN. Erin Harper, Adam Strang, Mark Walsh, Brittany Caserta, Joshua Haworth, Mathias Hieronymus	TASK DECOMPOSITION AND THE HIGH PERFORMANCE JUNIOR TENNIS SERVE. Machar Reid, Bruce Elliott, David Whiteside

16.00 – 16.15	THE INTER-DAY RELIABILITY OF A METHOD USED TO DETERMINE VERTICAL, KNEE AND ANKLE STIFFNESS DURING RUNNING. Corey Joseph, Elizabeth Bradshaw, Ross Clark	THE SURFACE EMG ACTIVITY OF THE UPPER LIMB MUSCLES IN TABLE TENNIS FOREHAND DRIVES. Chien- Lu Tsai, Kuang-Min Pan, Kuei-Shu Huang, Ting-Jui Chang, Yin-Chang Hsueh, Lu-Min Wang, Shaw-Shiun Chang
16.15 – 16.30	THE TRUNK ORIENTATION DURING SPRINT START ESTIMATED USING A SINGLE INERTIAL SENSOR. E. Bergamini, P. Guillon, H. Pillet, V. Camomilla, W. Skalli, A. Cappozzo	AN INVESTIGATION OF SOCCER BALL VELOCITY ON INSTEP KICK WITH AND WITHOUT ARM SWAYING. Yo Chen, Jia-Hao Chang
16.30 – 16.45	TOWARDS AN AUTOMATED FEEDBACK COACHING SUPPORT SYSTEM FOR SPRINT PERFORMANCE MONITORING. Gregor Kuntze, Lawrence Cheng, Huiling Tan, David G. Kerwin, Stephen Hailes, Alan Wilson	SCREENING TEST FOR THE POTENTIAL RISK OF ACL RUPTURE OF FEMALE AND MALE SOCCER PLAYERS. Thomas Jöellenbeck, Dorothee Neuhaus, Katharina Beck, Sandra Wojtowicz, and Markus Roeckel
16.45 - 18.00	<b>Oral Session 11 Balance</b> [Session Chair: Kerstin Witte] // Michigan Room	<b>Oral Session 12 NIA Kinematics / Kinetics</b> [Session Chair: Ross Anderson] // Huron Room
16.45 – 17.00	A CASE STUDY ON BALANCE RECOVERY IN SLACKLINING. Philipp Huber, Reinhard Kleindl	KINEMATICS OF THE TRUNK AND THE SPINE DURING UNRESTRICTED AND RESTRICTED SQUATS – A PRELIMINARY ANALYSIS. Renate List, Turgut Gülay, Silvio Lorenzetti
17.00 – 17.15	EFFECT OF COMBINED LOCAL TOPICAL ANESTHESIA AND PHYSICAL ACTIVITY ON KNEE PROPRIOCEPTION SENSES, AND STATIC BALANCE IN HEALTHY YOUNG INDIVIDUALS. Khalil Khayambashi, Javad Baharlue, Shahram Lenjannejadian	KINETIC ANALYSIS OF SEVERAL VARIATIONS OF PUSH-UPS. Bradley Wurm, Tyler L. VanderZanden, Mark Spadavecchia, John Durocher, Curtis Bickham, Erich J. Petushek, William P. Ebben
17.15 – 17.30	THE EFFECT OF KOREAN FOLK DANCE EXERCISE TO THE KINEMATIC PARAMETERS FOR DOWN STAIRCASE WALKING OF ELDERLY PEOPLE. Young-tae Lim, Yang-sun Park, Eui-hwan Kim, Tae-whan Kim, Woen-sik Chae	THE KINEMATICS OF TETHERED WALKING AND JOGGING. Darpan Singhal, Marilyn K. Miller, and Swapan Mookerjee
17.30 – 17.45	BIOMECHANICAL ANALYSIS OF TAI CHI CHUAN FIXED-STEP PUSH-HAND. Yao-Ting Chang, Jia-Hao Chang	A COMPARISON OF PRE- AND POST-OPERATIVE THREE-DIMENSIONAL HIP KINEMATICS DURING LEVEL WALKING IN PATIENTS WITH CAM FEMOROACETABULAR IMPINGEMENT. Nicholas Brisson, Mario Lamontagne, Matthew Kennedy, Paul Beaulé
17.45 – 18.00	AN ARTIFICIAL NEURAL NETWORK METHOD FOR PREDICTING LOWER LIMB JOINT MOMENTS FROM KINEMATIC PARAMETERS DURING COUNTER-MOVEMENT JUMP. Chen-Fu Huang and Szu-Ming Shih	

Thursday 21 July		
08.30 - 09.30	<b>Keynote:</b> Glenn Fleisig: <i>BIOMECHANICS OF BASEBALL PITCHING: IMPLICATIONS FOR INJURY AND PERFORMANCE.</i> [Session Chair: Edouard Rene Ferdinands] // Michigan Room	
09.45 - 10.45	<b>Poster Session 3 &amp; Coffee Break</b> // Exhibit Hall	
10.45 - 12.00	<b>Applied Session Feedback to Athletes</b> // Charcoal Room	
	<b>Oral Session 13 Throwing</b> [Session Chair: Bing Yu] // Michigan Room	<b>Oral Session 14 Walking and Running on a Treadmill</b> [Session Chair: Jing Xian Li] // Huron Room
10.45 – 11.00	INDIVIDUALIZED OPTIMAL RELEASE ANGLE IN DISCUS THROWING. Bing Yu, Steve Leigh, Hui Liu	THE INFLUENCE OF MANUALLY ADJUSTING THE RUNNING SPEED ON THE IMPACT ACCELERATION OF THE TIBIA DURING TREADMILL RUNNING. I Shan Tsai, Hung Ta Chiu
11.00 – 11.15	EFFECTS OF MOVEMENT SEQUENCE ON THE PERFORMANCE OF JAVELIN THROWING. Hui Liu, Steve Leigh, Bing Yu	THE IMPACT ACCELERATION ON THE BILATERAL TIBIA DURING TREADMILL RUNNING. Ya Han Chang, Hung Ta Chiu
11.15 – 11.30	ASSOCIATIONS BETWEEN JAVELIN THROWING TECHNIQUE AND RELEASE SPEED. Steve Leigh, Hui Liu, Bing Yu	RELIABILITY OF 3D FRONTAL PLANE KNEE AB/ADDUCTION RANGE OF MOTION DURING RUNNING IN YOUNG ATHLETES. Kelly Sheerin, Chris Whatman, Patria Hume, James Croft
11.30 – 11.45	ASSOCIATIONS BETWEEN JAVELIN THROWING TECHNIQUE AND AERODYNAMIC DISTANCE. Steve Leigh, Hui Liu, Bing Yu	CHANGES IN STEP LENGTH AND WIDTH DURING TREADMILL RUNNING. Yen Tzu Huang, Kuangyou Bruce Cheng
11.45 - 12.00	COMING DOWN: THROWING MECHANICS OF BASEBALL CATCHERS. Dave Fortenbaugh, Glenn Fleisig, Becky Bolt	IDENTIFICATION OF EMG FREQUENCY PATTERNS IN RUNNING BY WAVELET ANALYSIS AND SUPPORT VECTOR MACHINES. Thomas Jaitner, Daniel Janssen, Ronald Burger, Uwe Wenzel
12.00 - 13.00	<b>Lunch</b>	
13.00 - 14.00	<b>Oral Session 15 Running/Walking</b> [Session Chair: Ezio Preatoni] // Michigan Room	<b>Oral Session 16 Training</b> [Session Chair: Justin Keogh] // Huron Room
13.00 – 13.15	CHANGE IN FOOTSTRIKE POSITION IS RELATED TO ALTERATIONS IN RUNNING ECONOMY IN TRIATHLETES. Jason Bonacci, Daniel Green, Philo U. Saunders, Peter Blanch, Melinda Franettovich, Andrew R. Chapman, Bill Vicenzino	ELECTROMYOGRAPHICAL ANALYSIS OF LOWER EXTREMITY MUSCLE ACTIVATION DURING VARIATIONS OF THE LOADED STEP UP EXERCISE. Christopher J. Simenz, Luke R. Garceau, Brittney N.

Thursday, continued

13.15 – 13.30	ANALYSIS OF THE BACKPACK LOADING EFFECTS ON THE HUMAN GAIT. Leandro Machado; Marcelo P. de Castro; Sofia Abreu; Helena Sousa; Pedro Gonçalves; Filipa Sousa; Rubim Santos; Viviana Pinto; Mário Vaz; J. Paulo Vilas-Boas	SIX WEEK CONSISTENCY OF SENSORIMOTOR TEST METHODS. Samuel Volery, Renate List, Eling D. de Bruin, Marc Morten Jaeggi, Brigitte Mattli Baur, Silvio Lorenzetti
13.30 – 13.45	CUSHIONING OF THE RUNNING SHOES AFTER LONG-TERM USE. Jih-Lei Liang. Hung-Ta Chiu	MUSCULAR SYNERGISM DURING CORE STABILITY EXERCISES. Gustavo Leporace, Jomilto Praxedes, Leonardo Metsavaht, Sérgio Pinto, Daniel Chagas, Glauber Pereira, Luiz Alberto Batista
13.45 – 14.00	EFFECTS OF BACKWARD WALKING AS A MODALITY FOR LOW BACK PAIN REDUCTION IN ATHLETES. Janet Dufek, Anthony House, Brent Mangus, John Mercer, Geoffrey Melcher	INTEGRATING SPORT BIOMECHANICS AND EXERCISE PHYSIOLOGY FOR TRAINING COLLEGIATE ATHLETES DURING A COMPETITION SEASON. Amy Molenaar, Gregg Schmidt
14.00 - 15.30	<b>Oral Session 17 Gymnastics</b> [Session Chair: Mike Hiley] // Michigan Room	<b>Oral Session 18 Aquatics</b> [Session Chair: Bruce Elliott] // Huron Room
14.00 – 14.15	TECHNIQUES TO START THE STOOP CIRCLE (ADLER) ON HIGH BAR. Falk Naundorf, Thomas Lehmann, Kerstin Witte	COMPUTATION OF HIP AND SHOULDER TORQUES IN COMPETITIVE SWIMMING. Axel Schüler, Falk Hildebrand
14.15 – 14.30	BIOMECHANICAL CHARACTERISTICS OF WHOLE-BODY FAST REACHING MOVEMENTS. Chi-Kang Wang, Kuangyou B. Cheng, & Yung-Hsien Huang	THE CONSISTENCY OF FORCE AND MOVEMENT VARIABLES AS AN INDICATOR OF ROWING PERFORMANCE. Matthew Doyle, Andrew Lyttle, Bruce Elliott
14.30 – 14.45	KINEMATIC CHANGES DURING LEARNING THE LONGSWING ON HIGH BAR. Genevieve Williams, Gareth Irwin, David G. Kerwin	MEASURING THE WAVE DISSIPATION PRODUCED BY A SWIMMING-LINE SEPARATION ROPE. J. Paulo Vilas-Boas ; Diana Silva; Ricardo Fernandes; Pedro Gonçalves; Pedro Figueiredo; Suzana Pereira; Hélio Roeseler; Leandro Machado
14.45 – 15.00		LEVELS OF MUSCLE ACTIVATION IN STRENGTH AND CONDITIONING EXERCISES AND DYNAMOMETER HIKING IN JUNIOR SAILORS. Wing Kuen Wee, Angus Burnett, Wei Xie
15.00 – 16.00	Free time	
16:00 – 22:00	<b>Picnic &amp; Boat Cruise</b>	

Friday 23 July		
08.30 - 09.30	<b>Keynote:</b> Elizabeth Bradshaw: <i>PERFORMANCE AND HEALTH CONCEPTS IN ARTISTIC GYMNASTICS</i> [Session Chair: Gareth Irwin] // Michigan Room	
09.45 - 10.45	<b>Applied Session:</b> Young Hoo Kwon: <i>WRITING AND REVIEWING MANUSCRIPTS</i> [Session Chair: Ross Sanders] // Michigan Room	
	<b>Poster Session 4 &amp; Coffee Break</b> // Exhibit Hall	
10.45 - 12.00	<b>Applied Session Gymnastics</b> //Charcoal Room	
	<b>Oral Session 19 Sports Injury</b> [Session Chair: Daniel T.P. Fong] // Michigan Room	<b>Oral Session 20 Kicking</b> [Session Chair: Kathryn Ludwig] // Huron Room
10.45 – 11.00	EXCESSIVE TIBIAL ROTATION IS RESTORED AFTER ANATOMICAL DOUBLE BUNDLE ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION. Mak-Ham Lam, Daniel Tik-Pui Fong, Patrick Shu-Hang Yung, Eric Po-Yan Ho, Kwai-Yau Fung, Kai-Ming Chan	KICK IMPACT CHARACTERISTICS FOR DIFFERENT RUGBY LEAGUE KICKS. Kevin Ball
11.00 – 11.15	PREDICTION OF ANKLE JOINT TORQUES USING ARTIFICIAL NEURAL NETWORKS. Kaitlyn Kopke, Jerrod Braman, Charles Bardel, Tariq Khan, John Powell, Lalita Udpa, Roger Haut	THE SUCCESS OF A SOCCER KICK DEPENDS ON RUN UP DECELERATION. Wolfgang Potthast, Kai Heinrich, Johannes Schneider, Gert-Peter Brueggemann
11.15 – 11.30	LUMBAR KINEMATICS AND KINETICS OF YOUNG AUSTRALIAN FAST BOWLERS. René E.D. Ferdinands, Max Stuelcken, Andy Greene, Peter Sinclair, Richard Smith	COORDINATION PATTERNS OF PREFERRED AND NON-PREFERRED KICKING OF THE DROP PUNT KICK: A KINEMATIC ANALYSIS OF THE PELVIS, HIP AND KNEE. Jamie Falloon, Kevin Ball, Clare MacMahon, Simon Taylor
11.30 – 11.45	THE APPLICATION OF A SPORT-SPECIFIC 3D STEREOSCOPIC STIMULUS TO EXAMINE PRE-PLANNING TIME AND GAZE CHARACTERISTICS DURING EVASIVE SIDE-STEPPING MANOEUVRES. Jacqueline Alderson, Marcus Lee, Paul Bourke, Brendan Lay, David Lloyd, Bruce Elliott	KICK IMPACT CHARACTERISTICS OF JUNIOR KICKERS. Kevin Ball, Jason Smith, Clare MacMahon
11.45 - 12.00	AMATEUR BOXER BIOMECHANICS AND PUNCH FORCE. Jacob Mack, Sarah Stojish, Don Sherman, Nathan Dau, Cynthia Bir	
12.00 - 13.00	<b>Lunch</b>	
13.00 - 14.00	Annual General Meeting: Manfred Vieten, President of ISBS // Michigan Room	
14.00 - 15.30	<b>Youngblood Keynote:</b> Ezio Preatoni : <i>MOTOR VARIABILITY AND SKILLS MONITORING IN SPORTS.</i> [Session Chair: Elizabeth Bradshaw] // Michigan Room	

15:00 – 15:30	<b>New Investigator Award Finalists</b> [Session Chair: Elizabeth Bradshaw] // Michigan Room
15:30 - 18:30	Post-conference Board of Directors Meeting
19:30 – 24:00	<b>Closing Banquet</b>

# POSTER SESSIONS

## Poster Session PS1 – Tuesday (9:45 – 10:45)

PS1	1	INTRA-RATER AND INTER-RATER RELIABILITY OF A MODEL-BASED IMAGE-MATCHING MOTION ANALYSIS TECHNIQUE IN MEASURING ANKLE JOINT KINEMATICS - Aaron See-Long Hung, Kam-Ming Mok, Daniel Tik-Pui Fong, Tron Krosshaug, Kai-Ming Chan
PS1	2	UNDERWATER NON-LINEAR CAMERA CALIBRATION: AN ACCURACY ANALYSIS - Amanda P. Silvatti, Thiago Telles, Marcel M. Rossi, Fábio A. S. Dias, Neucimar J. Leite, Ricardo M. L. Barros
PS1	3	GROUND REACTION FORCE AND RATE OF FORCE DEVELOPMENT DURING LOWER BODY RESISTANCE TRAINING EXERCISES - Brad J. Wurm, Luke R. Garceau, Tyler L. Vander Zanden, McKenzie L. Fauth, William P. Ebben
PS1	4	DYNAMIC STABILIZATION DURING THE LANDING PHASE OF PLYOMETRIC EXERCISES - Erich J. Petushek, Luke R. Garceau, Tyler VanderZanden, Bradley J. Wurm, Christina R. Feldmann, William P. Ebben
PS1	5	QUANTIFYING sEMG IN PRE-FATIGUE AND FATIGUE STATES DURING THE FASTBALL BASEBALL PITCH - Gretchen D. Oliver, Hillary Plummer
PS1	6	KINEMATIC ANALYSIS OF LOWER LIMB IN FUTSAL BALL KICKING - Hiroki OZAKI, Shunsuke SUNAMI, Hideyuki ISHII
PS1	7	MODEL-BASED IMAGE-MATCHING KINEMATICS ANALYSIS OF THREE ANKLE SUPINATION SPRAIN INJURY CASES IN SPORTS - Kam-Ming Mok, Aaron See-Long Hung, Daniel Tik-Pui Fong, Tron Krosshaug, Kai-Ming Chan
PS1	8	THE ACUTE TIME COURSE OF CONCURRENT ACTIVATION POTENTIATION - Luke R. Garceau, Erich J. Petushek, McKenzie L. Fauth, William P. Ebben
PS1	9	THE EFFECT OF REMOTE VOLUNTARY CONTRACTIONS ON STRENGTH AND POWER TASKS OF WOMEN - McKenzie L. Fauth, Erich J. Petushek, Clare E. Kaufman, William P. Ebben
PS1	10	THE EFFECT OF ANTAGONIST CONDITIONING CONTRACTIONS ON LOWER AND UPPER BODY POWER TESTS - Timothy J. Suchomel, Luke R. Garceau, Bradley J. Wurm, Kasiem D. Duran, William P. Ebben
PS1	11	DETERMINATION OF BODY SEGMENT INERTIA PARAMETERS USING 3D HUMAN BODY SCANNER AND 3D CAD SOFTWARE - Toshiyuki ABE, Toshiharu YOKOZAWA, Junji TAKAMATSU, Yasushi ENOMOTO, Hidetaka OKADA
PS1	12	THE EFFECT OF REACHING TO AN OVERHEAD GOAL WHILE PERFORMING THE COUNTERMOVEMENT JUMP - Tyler L. VanderZanden, Bradley Wurm, John Durocher, Curtis Bickham, Erich J. Petushek, William P. Ebben
PS1	13	A NEW APPROACH FOR ASSESSING KINEMATICS OF TRUNK TWIST IN BASEBALL BATTING: A PRELIMINARY REPORT - Yoshitaka Morishita, Toshimasa Yanai, Yuichi Hirano
PS1	14	KINETICS OF DODGEBALL THROWING WITH AN IMPLICATION ABOUT INJURY MECHANISMS OF ELBOW JOINT - Zefeng Wang, Shinji Sakurai, Takuya Shimizu
PS1	15	SHOULDER STABILITY TRAINING AND SHOULDER AILMENTS IN HIGH SCHOOL SWIMMERS - Jody L. Riskowski
PS1	16	INFLUENCE OF BODY MASS INDEX ON ROWING KINEMATICS - Chris Richter, Stephanie Hamilton, Karen Roemer
PS1	17	SPATIAL—TEMPORAL ANALYSIS OF BUTTERFLY STROKE PATTERN - Ning Wang, Yeou-Teh Liu
PS1	18	GROUND REACTION FORCES OF VARIATIONS OF PLYOMETRIC EXERCISES ON HARD SURFACES, PADDED SURFACES AND IN WATER - William P. Ebben, Eamonn P. Flanagan, Jennifer K. Sansom, E.J. Petushek, Randall L. Jensen

PS1	19	THE EFFECT OF WHOLE BODY VIBRATION ON THE DYNAMIC STABILITY OF WOMEN BASKETBALL PLAYERS - William P. Ebben, Erich J. Petushek, Angela S. Nelp
PS1	20	THE EFFECT OF SQUAT DEPTH ON MUSCLE ACTIVATION IN MALE AND FEMALE CROSS-COUNTRY RUNNERS - Joshua Gorsuch, Janey Long, Katie Miller, Kyle Primeau, Sarah Rutledge, Andrew Sossong, John J. Durocher
PS1	21	SPEED, STRENGTH & POWER CHARACTERISTICS OF HORIZONTAL JUMPERS - Philip Graham-Smith, Paul Brice
PS1	22	RELATIONSHIP BETWEEN LOWER EXTREMITY STIFFNESS AND ECCENTRIC LEG STRENGTH IN HORIZONTAL JUMPERS - John McMahon, Philip Graham-Smith
PS1	23	CORRELATION BETWEEN CLINICAL AND LABORATORIAL MEASUREMENT OF HAMSTRING FLEXIBILITY - Beatriz Magalhães Pereira, Fabrício Anício de Magalhães, Hans-Joachim Menzel, Antônio Eustáquio Pertence de Melo, Mauro Heleno Chagas
PS1	24	ACUTE EFFECTS OF STRENGTH TRAINING ON RUNNING ECONOMY - Kuok Wai Ho, Morgan D Williams, Cameron J Wilson, Christian Lorenzen, Daniel L Meehan, Corey Joseph
PS1	25	A COMPARISON OF LOWER BODY ANGLES BETWEEN FREE HIGH PULLS AND A FIXED HIGH PULL APPARATUS - Bryan Christensen, Kim Pinske, Sarah Hilgers
PS1	26	THE VALIDITY OF VELOCITY MEASUREMENT DURING UPPER-BODY RESISTANCE EXERCISES UNDER VARIABLE LOADS - Daniel Jandacka, David Zahradnik
PS1	27	ANALYSIS OF THE TRAJECTORY OF CENTER OF MASS ON DIFFERENT SQUAT POSTURES AND LOADINGS - Jia-Hao Chang, Ko-Yin Huang, Tzu-Chien Lin
PS1	28	EFFECT OF LOAD POSITIONING ON THE KINEMATICS AND KINETICS OF WEIGHTED JUMPS - Paul Swinton, Ioannis Agouris, Ray Lloyd, Arthur Stewart, Justin Keogh

## Poster Session PS2 – Wednesday (09:45 – 10:45)

PS2	29	ACUTE EFFECTS OF VERBAL FEEDBACK ON EXPLOSIVE UPPER-BODY PERFORMANCE IN ELITE ATHLETES - Christos Argus, Nicholas Gill, Justin Keogh, Will Hopkins
PS2	30	COMPARISON OF JUMP HEIGHT VALUES DERIVED FROM A FORCE PLATFORM AND VERTEC - Erich J. Petushek, Tyler VanderZanden, Brad Wurm, William P. Ebben
PS2	31	KINETIC QUANTIFICATION OF PLYOMETRIC TAKE OFF, FLIGHT, AND LANDING CHARACTERISTICS - William P. Ebben, Tyler VanderZanden, Bradley J. Wurm, Luke R. Garceau, Christine R. Feldmann, Erich J. Petushek
PS2	32	THE OSTEOGENIC POTENTIAL OF SUPERMAXIMAL SQUAT LOADS - Luke R. Garceau, Bradley J. Wurm, Timothy J. Suchomel, Kasiem Duran, William P. Ebben
PS2	33	GENDER DIFFERENCES IN KNEE EXTENSOR AND FLEXOR PERFORMANCE - Luke R. Garceau, Erich J. Petushek, McKenzie L. Fauth, William P. Ebben
PS2	34	JOINT LOADING AT DIFFERENT VARIATIONS OF SQUATS - Gerda Strutzenberger, Christian Simonidis, Frieder Krafft, Daniel Mayer, Hermann Schwameder
PS2	35	ECCENTRIC MUSCLE ACTIONS PRODUCE 36% TO 154% LESS ACTIVATION THAN CONCENTRIC MUSCLE ACTIONS - McKenzie L. Fauth, Luke R. Garceau, Bradley J. Wurm, William P. Ebben
PS2	36	ELECTROMYOGRAPHIC ANALYSIS IN ABDOMINAL MUSCLES DURING CURL-UP EXERCISES - Kai-Han Liang, Yi-Wen Chang, Hsiu-Mei Hsieh, Hong-Wen Wu
PS2	37	EFFECT OF INCREASING VERTICAL CENTRE OF MASS DISPLACEMENT ON THE BIOMECHANICAL STIMULUS OF TRADITIONAL RESISTANCE TRAINING EXERCISES - Paul Swinton, Ioannis Agouris, Ray Lloyd, Arthur Stewart, Justin Keogh
PS2	38	LOWER EXTREMITY BIOMECHANICAL ANALYSIS OF A STOP-JUMP TASK WITH DIFFERENT STEP LENGTHS IN THE APPROACH RUN - Wei-Ling Chen, Chin-Yi Gu, Li-I Wang, Jen-Feng Lu
PS2	39	KINETIC COMPARISON BETWEEN HIGH-IMPACT AND LOW-IMPACT STEP AEROBIC DANCES - Lin-Hwa Wang, Hsiu-Mei Hsieh, Chia-Hui Li, Hong-Wen Wu
PS2	40	A PRELIMINARY ELECTROMYOGRAPHIC INVESTIGATION INTO SHOULDER MUSCLE ACTIVITY IN CRICKET SEAM BOWLING - Kathleen Shorter, Neal Smith, Mike Lauder, Paul Khoury
PS2	41	RELATIONSHIP BETWEEN REACTION TIME AND ONSET OF THE MUSCLE ACTIVATION DURING DROP LANDING - Rieko Sasaki, Yukio Urabe, Yuki Yamanaka, Takeshi Akimoto
PS2	42	DIFFERENCES IN THE FREQUENCY OF MYOELECTRIC ACTIVATION OF LOWER LIMBS BETWEEN SINGLE AND DOUBLE LEG LANDINGS IN MALES - Gustavo Leporace, Glauber Pereira, Jomilto Praxedes, Daniel Chagas, Leonardo Metsavaht, Jurandir Nadal, Luiz Alberto Batista
PS2	43	EFFECTS OF FEMALE MATURATION ON THE LOWER EXTREMITY BIOMECHANICS DURING THE SIDE-STEP TASK - Chang-Soo Yang, Chul-Soo Chung, In-Sik Shin, Gye-San Lee, Mi-Young Kim, Young-Hoo Kwon, Bee-Oh Lim
PS2	44	EFFECT OF ANKLE TAPING ON STANDING BALANCE IN THE INDIVIDUALS WITH FUNCTIONAL ANKLE INSTABILITY - Yi-Wen Chang, Hong-Wen Wu, Wei Hung, Yen-Chen Chiu
PS2	45	PROPRIOCEPTION OF FOOT AND ANKLE COMPLEX IN YOUNG REGULAR PRACTITIONERS OF WUSHU, TABLE TENNIS AND RUNNING - Jing Xian Li, Hong Po Pan
PS2	46	MUSCLE ACTIVITY IN THE SUBJECTS WITH FUNCTIONAL INSTABILITY OF THE ANKLE DURING A SINGLE-LEG DROP JUMP - Ryo Okuma, Yukio Urabe, Yuki Yamanaka, Takeshi Akimoto, Hiroshi Shinohara
PS2	47	THE KNEE JOINT MOMENT AND POWER DURING BALLET'S SIMPLE GROUND ÉCHAPPÉ- COMPARISON OF DIFFERENTIAL PHYSICAL CONDITION IN DANCERS WITH AND WITHOUT KNEE PAIN - Hsien-Te Peng, Chen-Yi Song, Wei-Ling Cheng, Yu-Han Wang

PS2	48	THE EFFECTS OF A CLOTH WRAP IN STABILIZATION OF THE ANKLE - Chelsea L. Matthew, Randall L. Jensen
PS2	49	HIP ROTATION RANGE OF MOTION AND ITS IMPACT ON LOWER LIMB ALIGNMENT ON LANDING - Sarah Breen, Drew Harrison, Ian Kenny
PS2	50	HAMSTRING MUSCLE ACTIVATION DIFFERENCES BETWEEN GENDERS WHILE PERFORMING SINGLE LEG LANDINGS - Matthew K. D. Lewis, Shinya Abe, Krishnakumar Malliah, Paris L. Malin, Randall L. Jensen
PS2	51	THE INFLUENCE OF TWO DIFFERENT BRACES ON LATERAL PATELLAR DISPLACEMENT – A CADAVERIC STUDY - Kai Heinrich, Wolfgang Potthast, Andre Ellermann, Gert-Peter Brueggemann
PS2	52	EFFECT OF ACTIVE VS. PASSIVE END-RANGE DETERMINATION ON SHOULDER AXIAL ROTATION IN THROWER ATHLETES - Andrea Ribeiro, Augusto Gil Pascoal
PS2	53	EFFECT OF PERFORMANCE FEEDBACK DURING 6 WEEKS OF VELOCITY BASED SQUAT JUMP TRAINING - Aaron Randell, John Cronin, Justin Keogh, Nic Gill, Murray Pedersen

## Poster Session PS3 – Thursday (09:45 – 10:45)

PS3	54	THE TIME COURSE OF RECOVERY FROM A MESOCYCLE OF PERIODIZED PLYOMETRIC TRAINING - William P. Ebben, Mckenzie L. Fauth, Tyler VanderZanden, Erich J. Petushek, Christina R. Feldmann
PS3	55	EVALUATING PLYOMETRIC EXERCISE USING REACTIVE STRENGTH INDEX-MODIFIED - William P. Ebben, Erich J. Petushek
PS3	56	THE EFFECT OF CONCURRENT ACTIVATION POTENTIATION ON THE KNEE EXTENSOR AND FLEXOR PERFORMANCE OF MEN AND WOMEN - Luke R. Garceau, Erich J. Petushek, McKenzie L. Fauth, William P. Ebben
PS3	57	THE EFFECT OF REMOTE VOLUNTARY CONTRACTIONS DURING FAST STRETCH SHORTENING CYCLE ACTIVITY - Erich J. Petushek, Luke R. Garceau, William P. Ebben
PS3	58	KINETIC ANALYSIS OF LOWER BODY RESISTANCE TRAINING EXERCISES - McKenzie L. Fauth, Luke R. Garceau, Brittney Lutsch, Aaron Gray, Chris Szalkowski, Brad Wurm, William P. Ebben
PS3	59	BIOMECHANICAL STRATEGY DURING PLYOMETRIC BARRIER JUMP- INFLUENCE OF DROP-JUMP HEIGHTS ON JOINT STIFFNESS - Chen-Yi Song, Hsien-Te Peng, Thomas W. Kernozek, Yu-Han Wang
PS3	60	WHAT HAVE WE LEARNED FROM TEACHING CONFERENCES AND RESEARCH ON LEARNING IN BIOMECHANICS? - Duane Knudson
PS3	61	MOVEMENT ANALYSIS FOR JAVELIN THROWERS IN THE QATAR 2009 CHAMPIONSHIPS - Eman Mahmud
PS3	62	ADJUSTMENT OF THE LOWER LIMB MOTION AT DIFFERENT IMPACT HEIGHTS IN BASEBALL BATTING - Takahito Tago, Michiyoshi Ae, Daisuke Tsuchioka, Nobuko Ishii, Tadashi Wada
PS3	63	THE 3-D KINEMATIC ANALYSIS OF DIFFERENT TENNIS SERVES - Hui-Ting Lin, Jia-Hao Chang, Jia-rea Chang Chien, Ching-Sung Tseng
PS3	64	GROUND REACTION FORCES, KINEMATICS, AND MUSCLE ACTIVATIONS DURING THE SOFTBALL PITCH - Gretchen D. Oliver, Hillary Plummer
PS3	65	ELECTROMYOGRAPHIC FACTORS CORRELATED WITH SOFTBALL BATTING PERFORMANCE - Yi-Wen Chang, Shien-Ming Yang, Feng-Yin Chen, Hong-Wen Wu
PS3	66	INSIGHTS OF TAKE-OFF OF GROUND REACTIONS FORCE IN HIGH JUMP - Susana Martins, João Carvalho, Filipe Conceição
PS3	67	KINEMATICAL PARAMETERS CONTRIBUTION TO THE FLIGHT HEIGHT USING ONE-FOOT OR TWO-FOOT TAKE-OFF - Khalifa M. Jadidi, Hashem A. Kilani
PS3	68	RELIABILITY OF ACUTE STATIC STRETCH IMPACT ON VERTICAL JUMP HEIGHT - Michael Bird, Jennifer Hurst, Scott Strohmeyer, Jerry Mayhew
PS3	69	EFFECT OF VERBAL AND VISUAL FEEDBACK ON PEAK TORQUE DURING A KNEE JOINT ISOKINETIC TEST - Barbara L. Warren, Kevin Wright, Claire Ely
PS3	70	A KAYAK TRAINING SYSTEM FOR FORCE MEASUREMENT ON-WATER - Dennis Sturm, Khurram Yousaf, Martin Eriksson
PS3	71	THE INFLUENCE OF PRECEDING MOVEMENTS IN THE PERFORMANCE OF BALLET JUMPS - Filipa Sousa, Ana Sofia Dias, Leandro Machado
PS3	72	SAGITTAL PLANE RESISTANCE TORQUE IN ANKLE BRACES - Mike J. Smith, Joel L. Lanovaz
PS3	73	COORDINATION DURING INITIAL ACQUISITION OF THREE-BALL JUGGLING - Adam J. Strang, L. James Smart
PS3	74	QUANTIFICATION OF TIME TO STABILISATION USING THE SEQUENTIAL ESTIMATION TECHNIQUE - Michael Hanlon
PS3	75	BELAY TECHNIQUES ON STOP FALLING OF A CLIMBER - Reid Cross, ChengTu Hsieh, Scott Amick

PS3	76	RACE PATTERN OF 60-M HURDLES IN WORLD-CLASS SPRINT HURDLERS: A BIOMECHANICAL ANALYSIS OF WORLD INDOOR CHAMPIONSHIPS 2010 - Stephen Poon, Sami Kuitunen
PS3	77	EFFECTS OF AN ANGLED STARTING BLOCK ON SPRINT START KINEMATICS - Nathaniel Brown, Alfred Finch, Gideon Ariel
PS3	78	COMPARISON OF INSIDE CONTACT PHASE AND OUTSIDE CONTACT PHASE IN CURVED SPRINTING. - Kazuhiro Ishimura, Shinji Sakurai
PS3	79	TREKKING POLE FORCES DURING DOWNHILL WALKING - Michael Bohne, Greg Dixon, Julianne Abendroth
PS3	80	LONGITUDINAL KINEMATIC CHANGES WITH THE DIAGONAL STRIDE IN HIGH-SCHOOL GIRL CROSS-COUNTRY SKIERS - Morris Levy
PS3	81	TEMPORAL METHODS TO ESTIMATE THE DISPLACEMENT OF A CURLING ROCK: COMPARISON BETWEEN COMPETITIVE AND RECREATIONAL CURLERS - Derek Kivi, Tracy Auld

## Poster Session PS4 - Friday (09:45 – 10:45)

PS4	82	THE EFFECT OF DEPTH ON THE DRAG FORCE DURING UNDERWATER GLIDING: A CFD APPROACH - Leandro Machado, João Ribeiro, Lígia Costa, António Silva, Abel Rouboa, Narendra Mantripragada, Daniel Marinho, Ricardo Fernandes, João Paulo Vilas-Boas
PS4	83	KINEMATIC GAIT VARIABLES OF ELDERLY WOMEN WITH DIFFERENT LEVELS OF PHYSICAL ACTIVITY - Hans-Joachim Menzel, Camila Maria Castro Silveira, Renata Noce Kirkwood, Mauro Heleno Chagas
PS4	84	THE LEARNING PROCESS OF UNIFORMITY SKILLS FOR NOVICE ROWERS - Ami Ushizu, Shigeki Kawahara, Hiroh Yamamoto
PS4	85	TENSILE STRENGTH TESTING AND BREAKING MECHANISM INVESTIGATION OF USED ALUMINIUM CLIMBING CARABINERS - Arif Mithat Amca, Bora Balya
PS4	86	KINETIC EFFECT OF A FOUR-STEP AND STEP-CLOSE APPROACH IN A VOLLEYBALL SPIKE JUMP FOR FEMALE ATHLETES - ChengTu Hsieh, Sean M. Cascarina, Justin B. Pingatore
PS4	87	A METHOD TO ANALYZE SOCCER OFFENSIVE SEQUENCES - Fernando Santana Ziskind, Ana Lorena Marche, Milton Shoiti Misuta, Ricardo
PS4	88	FRONT FOOT SLIDE VARIABILITY AND ITS RELATION TO TENPIN BOWLING PERFORMANCE - Rizal Razman, Wan Abu Bakar Wan Abas, Noor Azuan Abu Othman
PS4	89	THE EFFECT OF UPPER EXTREMITY USAGE ON TRANSFER OF ANGULAR MOMENTUM DURING SOCCER INSTEP KICK MOTION - Woen-Sik Chae, Young-Tae Lim, Chang-Soo Yang, Gye-San Lee, Nyeon-Ju Kang, Dong-Soo Kim
PS4	90	EFFECT OF THE VELOCITY OF THE CENTER OF MASS IN PERFORMING THE BASKET WITH HALF TURN TO HANDSTAND ON PARALLEL BARS - Tetsu Yamada, Daisuke Nishikawa, Yusuke Sato, Maiko Sato
PS4	91	INFLUENTIAL LITERATURE IN APPLIED SPORTS BIOMECHANICS - Duane Knudson, John Ostarello
PS4	92	KINEMATIC AND KINETIC PATTERNS IN OLYMPIC WEIGHTLIFTING - Kristof Kipp, Josh Redden, Michelle Sabick, Chad Harris
PS4	93	LUNGE FORCES AND TECHNIQUE OF JUNIOR SQUASH PLAYERS - Benjamin Kane Williams, Sami Kuitunen
PS4	94	WITHIN SUBJECT VARIABILITY ANALYSIS REVEALS A TRANSITION POINT FOR THE LONGSWING ACROSS AGE GROUPS - Albert Busquets, Michel Marina, Alfredo Iruiria, Rosa Angulo-Barroso
PS4	95	CHARACTERISTICS OF JOINT MECHANICAL WORK IN MALE AND FEMALE ELDERLY DURING WALKING IN CONSIDERATION OF VELOCITY - Hidetaka Okada, Takashi Mori, Kazutoshi Kikkawa
PS4	96	DIFFERENCES IN RSI AND PEAK GROUND REACTION FORCE FOR DROP REBOUND JUMPS FROM A HANG AND BOX FOR FEMALE SUBJECTS - Brian J. McGowan, Randall L. Jensen, Erich J. Petushek
PS4	97	THE RELATIONSHIPS BETWEEN POSTURAL STABILITY AND FUNCTIONAL ACTIVITY IN OLDER ADULTS - Wei-Hsiu Lin, Jun-Dar Lin, Shu-Ching Wei, Yen-Ting Wang, Alex J.Y. Lee
PS4	98	THE USE OF UNI-AXIAL GYROSCOPE FOR MONITORING HEEL TILTING VELOCITY DURING SIMULATED ANKLE SUPINATION SPRAIN MOTIONS - Vikki Wing-Shan Chu, Yue-Yan Chan, Daniel Tik-Pui Fong, Patrick Shu-Hang Yung, Kai-Ming Chan
PS4	99	THE EFFECT OF BODY MARKERS ON GOLF DRIVING PERFORMANCE - Ian C. Kenny and Ross Anderson
PS4	100	VALIDATION OF AN ELECTRONIC JUMP MAT - Ainle Ó Cairealláin, Ian C. Kenny
PS4	101	CAN MUSCLE ACTIVATION BE INCREASED WHEN MODIFYING THE DUMBBELL CHEST PRESS? AN ELECTROMYOGRAPHIC COMPARISON - William Bray, Jason Lake, Kathleen Shorter

PS4	102	APPLICABILITY OF A FULL BODY INERTIAL MEASUREMENT SYSTEM FOR KINEMATIC ANALYSIS OF THE DISCUS THROW - Nico Ganter, Andreas Krüger, Marco Gohla, Kerstin Witte, Jürgen Edelmann-Nusser
PS4	103	FACTORS DETERMINING THE SPIN AXIS OF A PITCHED FASTBALL - Tsutomu Jinji, Shinji Sakurai, Yuichi Hirano
PS4	104	COMPARISON OF PELVIS KINEMATICS DURING THE BASEBALL PITCH: FATIGUED AND NON-FATIGUED CONDITIONS - David Keeley, Kasey Barber, Gretchen D. Oliver
PS4	105	CHANGES IN LOWER LIMB JOINT RANGE OF MOTION ON COUNTERMOVEMENT VERTICAL JUMPING - Adam Clansey, Adrian Lees
PS4	106	KINEMATIC ANALYSES IN TAEKWONDO POWER BREAKING MOVEMENT OF 360° JUMP BACK KICK - Chen-Lin Lee and Chenfu Huang
PS4	107	DESCRIPTIVE ANALYSIS OF sEMG DURING THE WINDMILL SOFTBALL PITCH: PRE-FATIGUE AND FATIGUED - Gretchen D. Oliver, Hillary Plummer

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