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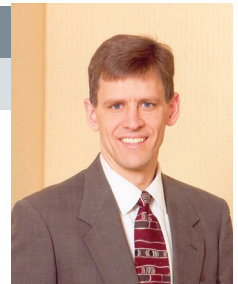
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# Newsletter

Volume: 28 - Number: 1, June 2015

## From the President

**Darryl Thelen**



The beginning of summer is always a time of excitement and high hopes: cold weather has ceased (finally), classes have ended, summer travel is planned and there looks to be an endless amount of time to focus on research. While I now recognize that not everything will really get done over the summer, the adventures and people along the way will continue to make the journey fun. Speaking of fun, plans for the upcoming [ASB conference in Columbus](#) are in full swing. Ajit Chaudhari and his crew at Ohio State have an incredible meeting planned that will be the most digitally connected ever. Our Program Chair, Rick Neptune, is combing through a record number of abstract submissions to create a diverse set of podium presentations, thematic poster sessions and symposia organized by ASB members. You can thus fully expect that this year's meeting will continue 'to encourage and foster the exchange of information and ideas among biomechanists working in different disciplines', as envisioned by the ASB founders in 1977. The year is significant because it means that our 40th annual meeting will be held next year in Raleigh, NC, the 'City of Oaks', providing a milestone opportunity to both recognize our past and envision the future for ASB.

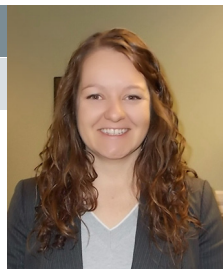
It is a great pleasure to see our membership approved the change in by-laws to establish a Diversity Chairperson to serve on the ASB board. The diversity initiative was launched by Past-President Richard Hughes, who recognized the enthusiasm for diversity activities that was building in the Society. Thanks to Kate Saul for chairing the diversity task force, which drafted the mission which includes efforts to 'support career development of all members' and 'promote sound science and research justice', while also 'promoting enhanced engagement in the Society of underrepresented groups'. Carrying through this mission will take a small army, such that I am sure our new Diversity Chair, Kristin Zhao, would be happy to engage you in this effort.

We will have a relatively large influx of energy and new ideas on the executive board this summer. Congratulations to the recently elected officers which include President-Elect Chris Hass, Program Chair-Elect Steve Piazza, Treasurer-Elect Tammy Reid Bush and Secretary/Membership Chair Stacie Ringleb. In addition, the executive board has selected Robert Catena to succeed Michelle Sabick as Communications Chair. A big thank you to Michelle who served on the executive board the last nine years, and did a great job in totally revamping our webpage and establishing an online repository for archiving Society materials. Going forward, there is substantial interest in expanding our online presence to facilitate sharing

Continued on page 3...

# Student's Corner

**Amy Lenz**



The summer solstice is around the corner and organizing for the [ASB annual meeting](#) is in full swing. This year the meeting will be held in Columbus, OH at The Ohio State University from August 5-8, 2015. Students will be pleasantly surprised with numerous student focused events, expansive space for the poster sessions and a variety of scientific podium sessions.

For those attending the annual conference, I encourage you to participate in the ASB one-on-one student mentoring program. This program is designed to allow students to network with more senior scientists, faculty and industry members. Students interested in being a mentee can be paired with a mentor on similar research interests or career paths. During the conference, mentors and mentees will find a time to meet over coffee, lunch or dinner that is convenient for both individuals. Mentor matches can discuss a variety of topics that are helpful for the students such as educational, career and professional objectives. I will be sending out reminders over the next month for those interested in participating to email me with information or questions.

During the conference another great opportunity for students is the Student Event entitled "How to Get the Most out of Your Time at ASB". This will be held on Wednesday August 5<sup>th</sup> at 5pm in the Ohio Union before the Opening Reception. I will be talking about helpful tips for students to professionally interact with senior researchers at their posters, learning the most from sessions, networking and making impressionable conversations. The next day, Thursday August 6<sup>th</sup>, there is another student event at 6pm, "Careers Round Table Discussions". This event will provide students with the opportunity to informally travel between career topic tables to talk with professionals regarding matters such as: post-doc experiences, clinical gait laboratory positions, faculty life in academia, a career in industry, work-life balance, and many more helpful topics.

On Thursday night of the conference, students can unwind with peers at the "Student Night Out". Bring your lab mates to relax with libations or come to meet students from other universities around the country. A short walk from the conference hotel, students can gather for the casual event at Brothers Bar and Grill from 7-11pm. Substantial appetizers will be provided in this fun setting with pool, darts and an outdoor patio.

Other events of interest for students include the diversity breakfast (Thursday August 6<sup>th</sup> at 7am) and the women in science breakfast (Friday August 7<sup>th</sup> at 7am). These events focus on increasing diversity in the ASB and creating open discussions amongst accomplished women scientists in biomechanics.

Lastly, I'd like to thank the members to the ASB student advisory committee (Doug Renshaw, Hunter Bennet, Anita Sinha, Jordan Grubaugh, Wu Pan, Josh Drost, Justin Waxman, Rachel Tatarski, Lauren Benson, Michael Connors and Tulika Nandi) for their feedback on student events. This committee facilitates communication between the ASB executive board and student members. Any suggestions for the student advisory committee or the annual meeting student events can be directed to me at [lenzamy@egr.msu.edu](mailto:lenzamy@egr.msu.edu). I look forward to seeing you in Columbus!



## Editorial Board

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## Advertising in the Newsletter

The Editorial Board invites businesses that have products or services of interest to members of the Society to advertise in the ASB Newsletter. Advertising space may also be purchased for job postings or other special announcements.

The current advertising rates are as follows:

1/4 page--\$100  
1/2 page--\$200  
full page--\$400  
back page--\$600

If you are interested in learning more about advertising in the ASB newsletter, please email Dan Gales:

[DGales@lhup.edu](mailto:DGales@lhup.edu)  
ASB Newsletter





## ASB Involvement

If you are interested in becoming more active in the Society (e.g., serving on a committee or chairing a conference session), contact [Andrew Karduna](#), Secretary/Membership Committee Chair, with your name, address, phone/fax number, email address, and your desired involvement. This information will be included in a database which is periodically updated and distributed to the Executive Board.

## Back Copies of the Newsletter

All previous ASB newsletters have been converted into pdf documents and are archived on the [ASB website](#).

# From the President (cont.)

**Darryl Thelen**

of teaching and outreach materials with our membership. This interest arises in part from the teaching symposia at our recent meetings, which have become very popular. This year, President-Elect Paul DeVita has moved the target to younger populations by organizing a symposium on outreach activities for middle school and high school students, which should be an exciting event to discuss how to bring biomechanics to the masses and engage the minds of younger students.

Please be sure to check out the upcoming special edition of the Journal of Biomechanics, which will feature a selection of papers generated from the ASB symposia at the 2014 World Congress of Biomechanics (WCB). Don Anderson and Brian Umberger went above and beyond on this one by overseeing thirteen papers through the review process, and drafting a preface that includes a brief ASB history and a nice set of photos of ASB members at WCB. The papers span a large range of research activities in our Society, including health and rehabilitation, sports and exercise, modeling, ergonomics and metabolic energy use in movement. Thanks to Don, Brian, the symposium organizers and the cooperation of the Journal of Biomechanics for making this happen.

I would like to close by thanking you for the opportunity to serve the ASB as your President. I have really enjoyed working with all of you and look forward to seeing you in Columbus.



There is no crying in baseball, but there is biomechanics! Beautiful Huntington Park, home of the Columbus Clippers, who are playing games during the ASB meeting.

# Education Committee

## Cécile Smeesters

This spring, each month had at least one **ASB regional conference**: the Midwest ASB Regional Meeting was held in February, the South Central ASB Regional Meeting took place in March, April saw both the Rocky Mountain ASB Regional Meeting and the Human Movement Science and Biomechanics Research Symposium (rescheduled due to the inclement weather in February), and May was for the Northwest Biomechanics Symposium. You can read about the resounding success of each one of these student centered conferences on [pages 28 to 32](#). The ASB wishes to thank the organizers of each of these regional conferences for their efforts and the various institutional and commercial sponsors that helped make them possible. If you are interested in hosting an ASB regional conference, [applications](#) for ASB support are due on September 30 each year. I would like to particularly encourage applications from the Northeast and Southwest regions, which have not had a regional conference since 2007 and 2008, respectively.



Spring is also the time for the Education Committee to get to work on reviewing the **ASB Graduate Student Grant-In-Aid (GIA)** proposals. There were eighteen proposals submitted this year and the competition was quite intense. Three of the eight members of the Education Committee were randomly assigned to review each proposal. After this initial screening, the top nine proposals were selected for further evaluation by all eight reviewers. While all of these were very good research proposals, we found the five proposals finally selected to be quite outstanding. Finally, the recommendation of the Education Committee was forwarded to the ASB executive board which approved our funding decision. So congratulations to the 2015 GIA recipients:

- **Richard A (Trey) Brindle**, Drexel University  
Advisor: Clare E Milner  
*Are Undesirable Lower Extremity Biomechanical Changes Due to Fatigue in Runners Proximally or Distally Driven?*
- **Charalambos C (Bobby) Charalambous**, Medical University of South Carolina  
Advisor: Jesse C Dean  
*The Associations between the Motor Cortical Control and the Task-Specific Biomechanics of the Paretic Soleus after a Stroke*
- **Jocelyn F Hafer**, University of Massachusetts Amherst  
Advisor: Katherine A Boyer  
*The Effect of Age and Physical Activity Status on Inter-Segment Coordination*
- **Tzu-Chieh (Jennifer) Liao**, University of Southern California  
Advisor: Christopher M Powers  
*Influence of Patellofemoral Joint Morphology and Lower Extremity Biomechanics on Patellofemoral Joint Stress*



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# Secretary/Membership

## Andrew Karduna



We'll start with the boring stuff.

As of today, we have 749 active members (12 Emeritus, 462 Regular, and 275 Student). That is the highest level since we started keeping track in 1999. OK, so maybe not so boring. If you have not renewed, please to go [www.asbmem.org](http://www.asbmem.org).

OK, now for the fun stuff.

This will be my last newsletter column as Secretary. After this summer, Bil will have to bug Stacie Ringleb, our newly elected Secretary. Welcome to the party Stacie. Here are some sage words of advice, handed down through the ages. The presidential mafia (president-elect, president, and past-president) will look to you for help. By all means help them. However, under no circumstances, tell them that it only takes a couple of minutes to look something up in the database, otherwise they will give you more work to do.

Although requiring applicants to provide two sponsors makes the application process a little more challenging for some, it has three distinct advantages. The first is that members are helping out with the review process, which allows for more ownership by the membership. The second is that it forces applicants who do not know anyone locally to reach out and make contacts (we help with that process if they have trouble finding someone). And finally, less work for the membership chair (see note above).

I've enjoyed my time serving on the executive board. I'd like to thank the membership committee for all of their help over the past 3 years - Tong-Ching (Tom) Wu, Chris Hass (now president-elect), and Young-Hui Chang. They have been very helpful in making less work for me (see the theme here).

I would like to close with the quote that my son selected to be read at his middle school graduation ceremony, because it means so much to me: "I'm not dead yet." Only kid with a Monty Python quote. If that is not a parenting success story, I don't know what is.



*"I'm not dead yet."*

- Andy's son

# Treasurer

**Karen Troy**



I am both delighted and a little sad that I will soon be starting my last year as Treasurer for ASB. Delighted because I know the Society will be in excellent hands when we transition the position to our new Treasurer-Elect, Tammy Bush next summer. Sad, because this is a wonderful Society and the executive board who runs it does an excellent job – it is truly a privilege to work with this group.

So, what have we been spending our money on and how are Society finances looking? Our long-term reserve investments, which include investments tied to the Hay Award, total around \$191,000 right now, up around \$4000 since December. This is not due to my savvy investing practices, but rather due to general upticks in the market. Our day-to-day expenses run through our checking account, which has around \$15,000 at the moment. Here are the “big ticket” items that we have recently spent Society dollars on: Grant-in-Aid Awards: \$10,000 was distributed to support 5 excellent student projects. Student Travel Awards: \$3250 will be distributed at the Annual Meeting to support 13 student travel awards. Mid-year Executive Board Meeting: Every year the executive board meets in person to work through Society business. This year the meeting was held in Columbus, OH in February. Our total meeting costs were \$8200, or \$369 per person. Despite increased transportation costs, we have managed to keep per-person costs fairly consistent over the past 5+ years.

During our mid-year Executive Board meeting, we voted to increase annual dues to \$80/year for regular members and \$20/year for student members. This \$20/year increase in dues will provide our Society an estimated additional ~\$8000 to work with each year. The vote followed a thoughtful discussion about the size of our reserve funds and financial risk, increasing costs of transportation and data security, and our ability as a Society to support new initiatives. In the context of financial risk, Past-President Richard Hughes has spent considerable effort over the last two years working with me to answer the question, “How much money should we have in long-term reserves?” His article in this newsletter details some of this process, and concludes that it would be wise for us to increase our reserves in proportion to our annual meeting expenses. In terms of new initiatives, I have been working with the Executive Board to develop a new small grant mechanism for members, which I hope to announce in detail later this year. As always, I thank you all for trusting me with the Society’s finances and look forward to handing out the award checks at our Annual Meeting!

*“The scientific man does not aim at an immediate result. He does not expect that his advanced ideas will be readily taken up. His work is like that of the planter - for the future. His duty is to lay the foundation for those who are to come, and point the way.”*

**- Nikola Tesla**



## ASB Executive Board 2014-15

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## Education Committee (cont.)

Cécile Smeesters

- **Justin P Waxman**, The University of North Carolina at Greensboro

Advisor: Sandra J Shultz

*The Relationship between Hamstring Musculo-Articular Stiffness and Anterior Cruciate Ligament Loading during Functional Unilateral and Bilateral Landing Tasks*

While we will have to wait until next year to hear the results of their research, you can read about the research results of the 2014 GIA recipients on [pages 24 to 27](#). Deadline for submission of ASB Graduate Student GIA [applications](#) is January 15 of each year.

The last spring task for the Education Committee is to evaluate suggestions for **tutorial topics and speakers** from the ASB membership for the annual meeting. For this year's ASB Annual Meeting we have selected for you the following two tutorials:

- **Tips for first time biomechanics teachers**

Cécile Smeesters, ASB Education Committee Chair

TBA, ASB Education Committee members

Wednesday, August 5 2015, 13:00-15:00PM

- **Writing effective journal article and responding to reviewers**

Jonathan B Dingwell, Associate editor for the Journal of Biomechanics

Wednesday, August 5 2015, 15:00-17:00PM

I'd like to take this opportunity to thank the members of my **Education Committee** for the considerable time and effort they dedicated to the ASB over the past year: Amy Lenz (Student Representative, Michigan State University), Kimberly Bigelow (University of Dayton), Zackary Domire (East Carolina University), Alena Grabowski (University of Colorado Boulder), Hyun Gu Kang (California State University San Marcos), Erika Nelson-Wong (Regis University), and Mike Pavol (Oregon State University). They helped me test out a new competency based scoring system for the GIAs which generated some interesting discussions. They reviewed each GIA application diligently and in a timely fashion. They provided brief comments about notable strengths or weaknesses of each GIA proposal to give applicants some feedback. They will all participate in preparing and/or giving the above teaching tutorial. They thus made my second year as Education Committee Chair a great experience.

Finally, 2015-2016 will be my third and final year as Education Committee Chair. It would be great to start training my replacement before I am done. So, if you have an interest in the position for 2016-2019, please contact me at [Cecile.Smeesters@USherbrooke.ca](mailto:Cecile.Smeesters@USherbrooke.ca).





# Past-President

## Richard Hughes



At the start of my term as President, I promised to work on two topics: (1) diversity and (2) financial risk. I am very gratified by the work done by many dedicated members on diversity the last few years. I especially want to thank Kate Saul and Kristin Zhao for heading the diversity task force, which will now morph into a committee. You can read about ASB diversity on [page 18](#).

Now for some thoughts on the less exciting topic of the Society's financial risk. The issue is whether the financial reserves of the Society are sufficient to manage our financial risk. The risk comes from our annual meeting. Should a meeting lose money, the Society stands behind the organizing committee. This must happen otherwise groups would not come forward to organize our annual meeting. While almost all meetings break even or return some funds to the Society, occasionally a meeting loses money. There is the chance – a small but nonzero one – that a catastrophic event could lead to a significant loss. Meeting organizers have to sign contracts with caterers and hotels far in advance of the meeting, and these contracts are based on specific participant projections. Should events occur that reduce meeting attendance and associated registration fees and hotel bookings, money would be lost. Years ago, when meetings were held on college campuses and the proceedings were in paper booklets (see how old I am?), this was a smaller concern and our financial reserves could easily cover a meeting that “crashed.” However, the (wonderful!) growth of our annual meeting has increased the financial exposure of the meeting organizers and Society.

Our reserves have not grown as fast as our meeting has, which has created the risk. To get a sense of this, ASB financial reserves are approximately \$206,000 and the budget of upcoming ASB meeting in Ohio is about \$254,000. At the time of maximum risk, we could lose 80% of the budget of an annual meeting. For the Ohio meeting, that would be \$203,200. I have gone back through ASB records to estimate the mean and variance of funds returned from meeting organizers and compared them to our financial reserves. I have talked to meeting organizers to understand what parts of their budgets create risk and what parts scale with registrations. I have looked into ways the risk could be mitigated by purchasing insurance against meeting losses. However, commercial meeting insurance does not cover some of the significant ways that a meeting could be disrupted. The end result is that I have come to the conclusion that we currently have sufficient reserves to cover a meeting that crashes, but sometime in the next five to ten years we may not. Consequently, my final act as Past-President of our Society is to humbly make a plea for increasing our financial reserves.

In addition, I would like to offer a final observation on our Society. When I called people asking them to consider running for ASB officers in the last few months, I found myself saying, “I have enjoyed every minute of service to ASB.” That was not a con job; I really meant it. ASB is composed of wonderful people, and I am grateful for the opportunity to have served with a very dedicated and congenial executive board. Thank you for the opportunity.

Lastly, one of the duties of the Past-President is to oversee the awards process and selection of the research travel grant awardee. I would like to thank all the people



## 2015 Award Summary

### Borelli Award

Rodger Kram,  
University of Colorado

### Jim Hay Memorial Award

Timothy E. Hewett,  
The Ohio State University



## 2015 Award Summary

### Young Scientist Pre-Doctoral

Rachel L. Lenhart,  
University of Wisconsin-Madison

### Young Scientist Post-Doctoral Award

Jason R. Franz,  
University of Wisconsin-Madison

### Clinical Biomechanics Award

Jarred Kaiser, et al.,  
University of Wisconsin-Madison

### Journal of Biomechanics Award

Justin C. Wager and John H. Challis,  
The Pennsylvania State University

### President's Award

TBA at the 2015 Meeting

### Research Travel Grant

Metin Yavuz,  
University of North Texas Health Science Center

## Past-President (cont.)

### Richard Hughes

who agreed to serve on the awards committee; the winners are described below.

#### Borelli Award: Rodger Kram

This is the most prestigious honor given by the ASB. It recognizes outstanding career accomplishment and is awarded annually to an investigator who has conducted exemplary research in any area of biomechanics. The awardee attends the annual meeting of the ASB to receive the award and to deliver the Borelli lecture. The award consists of an engraved plaque and a check for \$1,500. This year's winner is Rodger Kram, PhD, from the University of Colorado. He received his doctorate from Harvard University in Organismic and Evolutionary Biology following a BA in biology from Northwestern University and MS degree in biomechanics from The Pennsylvania State University. He has spent many years researching metabolic cost of locomotion in both human and nonhuman models. He has published studies of locomotor energetics in species ranging from penguins to giant tortoises. Dr. Kram served as President of the ASB and is an ASB fellow.



#### Jim Hay Memorial Award: Timothy E. Hewett

The Jim Hay Memorial Award for Research in Sports and Exercise Biomechanics was established in 2004 through the support of the Hay family and additional donors to recognize outstanding career accomplishment and is awarded annually to an investigator who has conducted exemplary research in the area of sports and exercise science biomechanics. The Hay Award selection is based on originality, quality and depth of the research and the relevance of this work to the field of sports and exercise biomechanics. The awardee attends the annual meeting of the ASB to receive the award and to deliver the Jim Hay Memorial lecture. The award consists of an engraved plaque and a check for \$1,000. The winner of this award is Timothy E. Hewett, PhD. Dr. Hewett received his BA in anthropology, BS in biology, and PhD in physiology and biophysics from the University of Cincinnati. He was a faculty member at the University of Cincinnati before moving to The Ohio State University in 2010. He will be moving to the Mayo Clinic soon. Dr. Hewett was been a substantial contributor to the area of anterior cruciate injury prevention, especially in young female athletes.



#### Young Scientist Pre-Doctoral Award: Rachel L. Lenhart

This award recognizes early achievements by a promising young scientist prior to receipt of their PhD. Selection is based upon the scientific quality of the submitted materials. The awardee attends the annual ASB meeting to present their work

## Past-President (cont.)

### Richard Hughes

in a special awards session. The award consists of an engraved plaque, a check for \$500, and a waiver of conference fee for the ASB meeting. The winner is Rachel L. Lenhart of the University of Wisconsin – Madison. She was an MD/PhD student at the time of the nomination working in the laboratory of Darryl Thelen. The abstract that Ms. Lenhart will present at the annual meeting is “Simulating the effects of crouch gait surgeries on knee mechanics.” Co-authors are Colin R. Smith, Michael H. Schwartz, Tom F. Novacheck, and Darryl G. Thelen.

#### **Young Scientist Post-Doctoral Award: Jason R. Franz**

This award recognizes early achievements by a promising young scientist within five years of receiving their PhD. Selection is based upon the scientific quality of the submitted materials. The awardee attends the annual ASB meeting to present their work in a special awards session. The award consists of an engraved plaque, a check for \$500, and a waiver of conference fee for the ASB meeting. The winner is Jason R. Franz, who was a post-doctoral fellow at the University of Wisconsin – Madison at the time of nomination. Dr. Franz’s PhD mentor was Rodger Kram and his Post-Doctoral mentor was Darryl Thelen. The abstract that Dr. Franz will present is titled “Achilles tendon deformations and the age-related reduction in plantarflexor performance during walking.”

#### **Clinical Biomechanics Award: Jarred Kaiser, et al.**

This award recognizes outstanding new biomechanics research targeting a contemporary clinical problem, and is sponsored by Elsevier Science, Ltd., publishers of Clinical Biomechanics. The awardee is expected to present their work at the ASB annual meeting, and submit their work for publication in Clinical Biomechanics. The winners of this award are Jarred Kaiser, Michael F. Vignos, Fang Liu, Richard Kijowski, and Darryl G. Thelen from the University of Wisconsin – Madison. The title of the abstract is, “MRI assessments of cartilage mechanics, morphology and composition following ACL-reconstructive surgery.”

#### **Journal of Biomechanics Award: Justin C. Wager and John H. Challis**

This award recognizes substantive and conceptually novel mechanics approaches explaining how biological systems function. It is sponsored by Elsevier Science, Ltd., publishers of the Journal of Biomechanics. The awardee is expected to present their work at the ASB meeting, and submit their work for publication in the Journal of Biomechanics. This year the winners are Justin C. Wager and John H. Challis of The Pennsylvania State University for their abstract titled “Assessment of the contributions of elastic energy in the human plantar aponeurosis.”

#### **Research Travel Grant: Metin Yavuz**

The research travel grant was awarded to Metin Yavuz of the Physical Therapy Department at the University of North Texas Health Science Center. This award, which is worth a maximum of \$1000, will be used to support travel to Akron, OH, to investigate a novel measurement device and collaborate with Brian Davis.

#### **Student Travel Awards: see right margin**

The student travel award is to help students attend the ASB annual meeting. To be eligible, one must be an ASB student member and must have authored an abstract for presentation at the annual meeting. The award comes with \$250. Win-



### 2015 Award Summary

#### **Student Travel Awards**

Derek Pamukoff, University of North Carolina at Chapel Hill

Peter Fino, Virginia Tech

Nicole Corbiere, Clarkson University

Yin Fang, Worcester Polytechnic Institute

Chun-Kai Huang, University of Nebraska Medical Center

Abbie Ferris, University of Northern Colorado

Eric Pisciotta, University of Nebraska at Omaha

Rebecca Krupenevich, University of Maryland

Mark Hedgeland, Clarkson University

Barbara Schornstein, University of Northern Colorado

Hunter Bennett, University of Tennessee

Ryan Wedge, University of Massachusetts, Amherst

Semih Bezci, University of California, Berkeley





## 2015 Award Summary

### ASB Fellows

John H. Challis, The Pennsylvania State University

## Past-President (cont.)

### Richard Hughes

ners of the award for this year are Derek Pamukoff (University of North Carolina at Chapel Hill), Peter Fino (Virginia Tech), Nicole Corbiere (Clarkson University), Yin Fang (Worcester Polytechnic Institute), Chun-Kai Huang (University of Nebraska Medical Center), Abbie Ferris (University of Northern Colorado), Eric Pisciotta (University of Nebraska at Omaha), Rebecca Krupenevich (University of Maryland), Mark Hedgeland (Clarkson University), Barbara Schornstein (University of Northern Colorado), Hunter Bennett (University of Tennessee), Ryan Wedge (University of Massachusetts, Amherst), and Semih Bezci (University of California, Berkeley).

### American Society of Biomechanics Fellows: John H. Challis

In 2011, ASB created the status of fellow to recognize professional achievement and service of the top members of the Society and to encourage continued service to the Society in a leadership role. This year there is one new fellow: John H. Challis. He received both his BSc (Hons) and PhD from Loughborough University of Technology, England. He then was a lecturer in Human Biomechanics at the University of Birmingham before moving to The Pennsylvania State University. He is Past-President of both the American Society of Biomechanics and the International Society of Biomechanics. He is a fellow of the National Academy of Kinesiology. His research focuses on the coordination and function of the musculo-skeletal system. Dr. Challis is a Professor at Penn State where he is the director of the Biomechanics Laboratory.

# novel



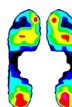
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# EXPERIENCE COLUMBUS

AUGUST 5-8, 2015

With a critically-acclaimed food and art scene, rich history, sports culture, and famous attractions, Ohio's capital city has a variety of activities to suit everyone's tastes. Visit [experiencecolumbus.com](http://experiencecolumbus.com) for a complete list of activities.

## THE OHIO STATE FAIR

July 29 – August 9

Check out one of the largest state fairs in the United States. Enjoy live music, sample one (or more) of 30 different types of food on a stick, and visit The MarketPlace or one of the 300 commercial exhibitors for some great summer shopping.

Ohio Expo Center

717 E. 17th Ave., Columbus, Ohio 43211

[ohiostatefair.com](http://ohiostatefair.com)



Photo: Randall Lee Schieber

## FOOD, DRINK + CITY TOURS

So many choices! Tour the Anthony Thomas chocolate factory, Brothers Drake Meadery, Middle West Spirits, Camelot Wine Cellars, or one of many Columbus breweries and distilleries. Don't like those options? Take an a la carte or guided food tour. You can also tour the city, Short North Arts District, and the famous Ohio Stadium on Ohio State's campus. [experiencecolumbus.com/explore](http://experiencecolumbus.com/explore)



Photo: Randall Lee Schieber

## THE NORTH MARKET + MAKERS MARKET

Saturdays

Explore one of many farmers markets in Columbus. One of the oldest and most popular is The Original Farmers' Market at the North Market, which also houses a year-round indoor market.

North Market

59 Spruce Street, Columbus, Ohio 43215

[northmarket.com](http://northmarket.com)



Photo: John Angelo

The 400 Farmers and Makers Market takes place August 8th and is one of the most unique markets in Central Ohio featuring local artists, entrepreneurs, and farmers. Or grab a drink and delicious dinner at Strongwater Food & Spirits also at 400 West Rich Arts Complex  
400 West Rich Street, Columbus, Ohio 43215  
[400westrich.com/the-market-at-400/](http://400westrich.com/the-market-at-400/)



Photo: 400westrich.com



It's so easy to get around the city with the bike & car share program, free Cbus Downtown circulator bus, and easy access to highways and suburbs. Check it out!

**CoGo:** [cogobikeshare.com](http://cogobikeshare.com)

**Car2Go:** [columbus.car2go.com](http://columbus.car2go.com)

**Cbus:** [cota.com/cbus.aspx](http://cota.com/cbus.aspx)



**AUGUST 5-8, 2015**

## COLUMBUS CLIPPERS BASEBALL

Home Games August 5-9th

See where Derek Jeter got his start and head down to the Arena District to catch a minor league baseball game at the new Huntington Park.

Huntington Park

330 Huntington Park Ln., Columbus, Ohio 43215

[clippersbaseball.com](http://clippersbaseball.com)



Photo: Randall Lee Schieber

## COLUMBUS ZOO AND AQUARIUM + WATERPARK

Take in a Jazz concert at the zoo on Friday, August 7th at 8pm, go on a safari at The Wilds, or spend some fun in the sun at the zoo's adjoining waterpark Zoombezi Bay. The Columbus Zoo and Aquarium has been ranked number one for a reason!

The Columbus Zoo and Aquarium

4850 W Powell Rd, Powell, Ohio 43065

[columbuszoo.org](http://columbuszoo.org)



Photo: Courtesy of the Columbus Zoo/Zoombezi Bay

## THE SHORT NORTH

Home to some of Central Ohio's most famous dining and shopping, Short North has a little bit of everything: great coffee, art galleries, amazing food— from small bites to bars to fine dining, boutique shops, and great nightlife.

Centered on the main strip of High Street, between campus and Downtown Columbus

[shortnorth.org](http://shortnorth.org)



Photo: Short North Business Association

## PARKS + GARDENS

Though Columbus is a bustling city, there are many great local parks and greenspaces. Visit Schiller Park in German Village, stroll the waterfront Scioto Mile downtown, see Topiary Park: a topiary interpretation of the painting *A Sunday Afternoon of the Isle of La Grande Jatte* by Georges Seurat, or head to the Franklin Park Conservatory to see plants of all species.

[experiencecolumbus.com/attractions?keyword=parks](http://experiencecolumbus.com/attractions?keyword=parks)



Photo: Randall Lee Schieber



# Communications Committee

**Michelle Sabick**



This month's column marks my last as Communications Committee Chair. As I look back over the past three years, I am struck by how many people have provided help and input with the website and its associated content, like the videos of the month, conference abstracts, grant writing tutorials, executive board document archives, and student resources. I definitely need to thank people like Jill McNitt-Gray, Zong-Ming Li, Jenna Yentes, Paul DeVita and Andy Karduna for their efforts both prior to, and during, my time in this role.

In addition, several people have helped through their service on the Communications Committee. Bil Ledoux has taken on some major archive projects and has provided great feedback on the website while serving as Newsletter Editor. Dan Gales has worked on the ads and event calendar for the newsletter. Tarang Jain has been very helpful in developing our social media outreach, and Jason Franz provided input on the website itself. Cara Lewis had students testing the graduate programs links to identify several that needed to be updated, and Richard Hughes has provided scanned abstracts from conferences for which we did not have online resources. Finally, many ASB members have sent me messages when they have found errors or omissions on the site. All of these contributions are greatly appreciated.

This summer we have begun the process of transitioning to the new Communications Committee Chair, Robert Catena. Robert brings a wealth of experience to the position, and has already taken an active role in the Communications Committee since his appointment this spring. I wish Robert the best of luck in the position, and expect that the website will continue to improve under his leadership.

I look forward to seeing you all in Columbus.

*"Scientific research involves going beyond the well-trodden and well-tested ideas and theories that form the core of scientific knowledge. During the time scientists are working things out, some results will be right, and others will be wrong. Over time, the right results will emerge."*

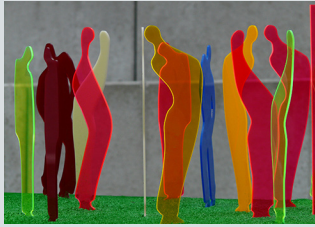
**- Lisa Randall**



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**Twitter: [@Am-SocBiomech](#)**



# Program Chair

**Rick Neptune**



ASB 2015 is fast approaching and we are excited about the upcoming conference and scientific program ([schedule](#) now available). We had over 700 abstract submissions, which was a 40% increase over our last meeting in 2013. We have invited two excellent Keynote Speakers who will highlight some of their leading-edge research and we hope will stimulate new ideas and lines of research:

**Dr. Allison M. Okamura** is an Associate Professor in the Department of Mechanical Engineering at Stanford University. Her research interests are in the areas of haptics, teleoperation, virtual environments and simulators, medical robotics, neuromechanics and rehabilitation, prosthetics and engineering education.

**Dr. Bill Marras** holds the Honda Chair in the Department of Integrated Systems Engineering at The Ohio State University. His research is focused on understanding multidimensional causal pathways for spine disorders through quantitative epidemiologic evaluations, laboratory biomechanics studies, personalized mathematical modeling, and clinical studies of the lumbar and cervical spine.

In addition to the Borelli, Hay, ASB Pre- and Post-Doctoral, Clinical Biomechanics, and Journal of Biomechanics award lectures, the Program Committee has organized a number of outstanding sessions including 6 symposia, and 13 podium and 14 thematic poster sessions as follows:

## Symposia:

- Changing the Landscape of Injury Prevention
- Grand Challenges in Upper Limb Biomechanics
- Fellows Symposium: Reflections and Advice
- Biomechanics of Pelvic Organs and Tissues
- Can Wearable Active and Passive Leg Prostheses Augment Performance?
- Let's Get Younger: 6th-12th Grade Educational Outreach in Biomechanics

## Podium Sessions:

- Knee Mechanics
- Muscle, Tendon, and Ligament Modeling
- Unique Insights Gained from Simulation Methods
- Tendon and Ligament Mechanics
- Upper Extremity Mechanics
- Lower Extremity Mechanics
- Biomechanics and Control of Amputee Movement
- Level Gait
- Non-level Gait
- Ergonomics: Design and Training
- Balance and Sensory Augmentation
- Imaging-Based Assessment of Joint Kinematics and Tissue Deformations
- Sport Biomechanics

## Thematic Poster Sessions:

- Prescription of Lower-Limb Orthoses and Exoskeletons
- Upper Extremity Rehabilitation
- Obesity and Falls

# Program Chair (cont.)

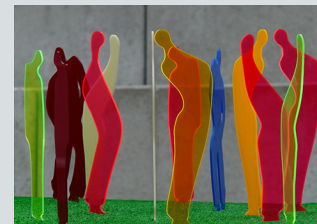
**Rick Neptune**

## **Thematic Poster Sessions (cont.):**

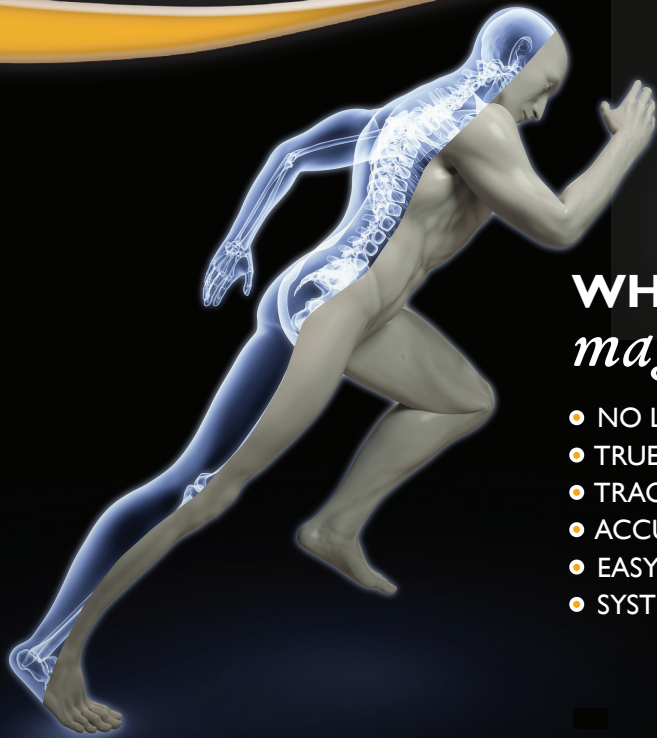
- Biofeedback Modalities for Gait Retraining
- Amputee Gait: Concise Talks and Extended Discussion
- Functional Muscle Mechanics
- Running - It's All in How You Land!
- Metabolic and Mechanical Energy in Locomotion
- Dual-Tasking and Functional Recovery Following Concussion
- Assessing and Interpreting Dynamic Balance
- Wide World of Gender Differences in Human Movement
- Putting Sensory Back into Sensori-Motor
- Aging and the Neuromuscular Control of Walking
- Biomechanics of Load Carriage

For this meeting, much of the scientific program was organized by members of the ASB community. The Program Committee consisted of leading scientists in their respective fields, with each member selecting abstracts focused on a specific theme to form their own podium, thematic poster or symposium sessions. I want to thank the following people for their incredible hard work and dedication to making this such an outstanding program: Steven D. Abramowitch (University of Pittsburgh), Donald D. Anderson, (University of Iowa), Silvia S. Blemker (University of Virginia), Jack P. Callaghan (University of Waterloo), Rakié Cham (University of Pittsburgh), Steven K. Charles (Brigham Young University), Ajit M. W. Chaudhari (The Ohio State University), Li-Shan Chou (University of Oregon), Steven H. Collins (Carnegie Mellon University), Irene S. Davis (Harvard Medical School), Paul DeVita (East Carolina University), Jonathan B. Dingwell (The University of Texas at Austin), Jason R. Franz (University of Wisconsin), Alena M. Grabowski (University of Colorado Boulder), Michael E. Hahn (University of Oregon), Walter Herzog (University of Calgary), Timothy E. Hewett (The Ohio State University), Elizabeth T. Hsiao-Wecksler (University of Illinois at Urbana-Champaign), Richard E. Hughes (University of Michigan), Andrew Karduna (University of Oregon), Rodger Kram (University of Colorado Boulder), Michael L. Madigan (Texas A&M University), Jill L. McNitt-Gray (University of Southern California), Ross H. Miller (University of Maryland), Wendy M. Murray (Northwestern University), Robin M. Queen (Virginia Tech), Anne K. Silverman (Colorado School of Mines), Robert A. Siston (The Ohio State University), Darryl G. Thelen (University of Wisconsin), Gregory S. Sawicki (North Carolina State University), Brian R. Umberger (University of Massachusetts Amherst), Francisco J. Valero-Cuevas (University of Southern California), Arian Vistamehr (Brooks Rehabilitation Hospital), and Raffaella De Vita (Virginia Tech).

I would also like to thank the 170+ reviewers who helped evaluate the scientific merit of the abstract submissions to help assure that the quality of the conference remains at a high level. Finally, I want to thank the amazing members of my research lab who have been a tremendous help in organizing the program and keeping track of all the daunting details: Nicole Harper, Ellyn Ranz, Courtney Shell and Jon Slowik. We are excited about the 2015 ASB Annual Meeting and look forward to seeing you in Columbus!







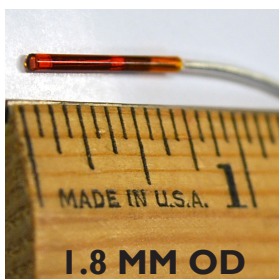
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# Diversity Committee

Kristin Zhao

In the latest ASB elections, the membership approved an amendment to the bylaws to promote and integrate diversity within the Society. As a result, the ASB now has an official diversity committee, and the chair of the diversity committee has a seat on the executive board. The Diversity Committee has begun work on a number of initiatives, including formation of subcommittees to develop affinity groups, promote inclusion of new members, establish a web presence, and plan upcoming mentoring events, all with the goal of supporting our diversity mission. Further, the Society obtained an NIH grant (PI Ajit Chaudhari, 2015 ASB Meeting Chair) to support a travel fellowship for underrepresented minorities, to attend the 2015 annual meeting in Columbus, OH. Given the strong response to the call for applications this year, we hope to continue this program in future years.



As we approach the annual meeting in August, the diversity committee wanted to share information about the benefits of diversity, as well as some challenges to start the conversations about how the Society should approach diversity, and how we as members can support diversity in our careers. Please note that since the literature on diversity in all fields ranging from education to business is exhaustive, we focused on only a few of those sources in this article.

The importance of promoting diversity in the ASB:

- More innovation happens when a group of people have heterogeneity in gender, sexual orientation, socioeconomic background and race/ethnicity.<sup>1</sup>
- Diversity has been shown to increase performance, productivity and profitability in business.<sup>1</sup>
- People who are discriminated against frequently have resilience, problem-solving skills and coping skills.<sup>1</sup>
- Students who took college classes that were focused on learning about diversity were found to have higher levels of academic self-confidence.<sup>2</sup>
- Students' critical thinking improved when they took college courses about diversity.<sup>2</sup>

Continued challenges:

- Having a diverse population alone does not improve students' understanding of, willingness to interact with, and exchange of ideas with people who are racially different. The value of diversity comes from increased engagement in diversity-related activities.<sup>3</sup>
- There are not enough women and minorities in the "mentoring pipeline." There is outreach to women and minorities in high school and as undergraduates, but there are not enough mentors when people reach medical residency programs and faculty positions.<sup>1</sup>
- While the pool of diverse STEM (science, technology, engineering and mathematics)-educated workers is increasing, they do not automatically flow into the workforce.<sup>1</sup>



## Diversity Committee (cont.)

Kristin Zhao

- There should be an awareness of implicit bias, “the bias in judgment and/or behavior that results from subtle cognitive processes (e.g., implicit attitudes and stereotypes) that often operate at a level below conscious awareness and without intentional control.”<sup>4</sup>

Some approaches to promoting diversity within the ASB:

- Recruiting a diverse population is not as effective as engaging people through mentoring and training on inclusion (i.e., “learning how to recognize and take advantage of the rich diversity”). This training can be engaging and allow people to ask questions that they typically feel uncomfortable asking.<sup>1</sup>
- Mentoring and promoting people with disabilities needs to be a part of the conversation about diversity. American Association for the Advancement of Science (AAAS) has started a summer internship program called Entry Point to provide internships to STEM majors with disabilities.<sup>1</sup>
- Childcare for travel to meetings is a concern for a more diverse population.<sup>1</sup> Some professional societies have childcare grants, and others identify childcare opportunities for meetings. NIH has family-friendly initiatives, including a requirement that conference grant proposals identify resources for childcare and other types of family care at the conference site.

**ASB Diversity Mission:** The American Society of Biomechanics is committed to building a professional community that respects and promotes diversity and inclusion. We strive to learn from the diverse perspectives of our membership as we seek common goals for the biomechanics community. As a Society, we seek to 1) support career development of all members to achieve their highest potential; 2) promote sound science and research Justice; 3) promote enhanced engagement in the Society of underrepresented groups through involvement in Society activities and dialogue with leadership; and 4) foster respect for diversity and inclusion in our community among our members and leadership.

Thank you to the ASB Diversity Committee newsletter subgroup, including Stacie Ringleb, Silvia Blemker, Matthew McCullough, and Katherine Saul, for contributing to this article.

### References

1. C. Tachibana, “Diversity: Promoting New Perspectives,” *Science Careers*, July 20, 2012.
2. T.F. Nelson Laird, “College Students’ Experience with Diversity and Their Effect on Academic Self-Confidence, Social Agency and Disposition toward Critical Thinking,” *Research in Higher Education*, 46(4), p 365-387, 2005.
3. M.J. Chang et al., “The Educational Benefits of Sustaining Cross-Racial Interaction among Undergraduates,” *The Journal of Higher Education*, 77(3), p 430-455, 2006.
4. “Helping Courts Address Implicit Bias, Frequently Asked Questions,” National Center for State Courts, [www.nscs.org/IBFAQs](http://www.nscs.org/IBFAQs) (accessed June 8, 2015).



# President-elect

**Paul DeVita**

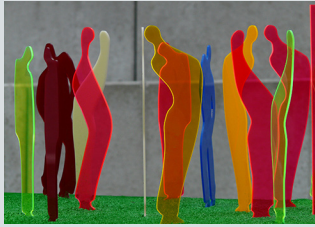
Biomechanics is healthy, vibrant, and ubiquitous...at least from the perspective of many biomechanists. But what is the perspective of non-biomechanists? I think their view might be one of some confusion, or mystery, or perhaps quizzical interest. My thesis is that while those within the field are well aware of the importance of our field and its contributions, biomechanics itself has yet to emerge as a widely known and fully appreciated scientific endeavor. We can see many examples of the limits of biomechanics including: the lack of an Institute For Biomechanics at NIH (no, not silly, futuristic), CIP (Classification of Instruction) codes for Athletic Trainer, Orthotist/Prosthetist, Rehabilitation Science but not Biomechanist or Biomechanics, and that the first biomechanics training most people receive, if any, is in a university but not a high school course.

Biomechanics is moving forward and reaching the general public more so than previously. This development is due at least partially to pop-culture phenomena such as the ESPN television show Sport Science and the use of motion capture to create video games. I am most excited to recently learn that biomechanics is making headway into high school curriculums, at least intermittently through the US. I found some efforts in Brooklyn, Chicago, and Minnetonka, MN, among other places. I suggest the growth of biomechanics instruction in high schools and even earlier grades can be the most influential development for biomechanics in the US. It will lead to more university students looking forward to taking, instead of getting past, biomechanics classes, more people considering biomechanics as a career, more biomechanics jobs, and overall a healthier and broader appreciation of biomechanics among the lay masses. Can you say, Institute For Biomechanics?

Several if not many ASB members have been contributing to the advancement of biomechanics by stepping backwards to younger and earlier school grades. Some of these educational programs are summer activities that bring school children into university biomechanics labs and others bring biomechanics demonstrations and experiments to middle and high schools. To promote the continued expansion of biomechanics education among school age children, we developed a symposium for the ASB annual meeting in Columbus titled, "Let's Get Younger: Educational Outreach In Biomechanics For 6th to 12th Grade Students." Jill McNitt-Gray, Brian Tracy, Janet Dufek, and Brian Davis will each demonstrate their educational programs designed to train youngsters in biomechanics, neuroscience, and rehabilitation medicine. Jill, three of her graduate students (Antonia Zaferiou, Travis Peterson, and Edward V. Wagner), Brian of the Davis variety, Julie Steele, and I will also participate in a similar session at ISB in Glasgow. These sessions will include discussions among the audience about other peoples' efforts to teach school children our craft. We hope you can attend at least one of these sessions and begin to think about expanding biomechanics to a younger crowd.

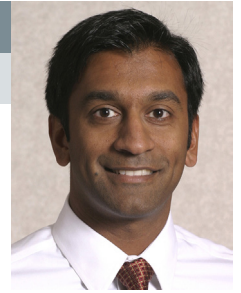
As a final note, I mention I am thinking about something called National Biomechanics Day. I am not sure of its form yet but the idea would be for all biomechanists to open their labs on one particular day and show high school students the super-cool things we do. Perhaps across the country we will have 1,000 high school students running across force plates at the same time? Hopefully we won't change the angular velocity of the planet.





# Meeting Chair

**Ajit Chaudhari**



ASB 2015 is less than two months away, and we are preparing to make it the biggest and best ASB yet! The conference will be held in downtown Columbus, Ohio, just steps away from restaurants, concert halls, Minor League baseball, and other great nightlife. We'll have the opening reception at the Archie Griffin Ballroom at the Ohio Union, where you'll have a chance to see Archie's Heisman trophies, meet up with old and new friends, have your picture taken with Bronze Brutus, and participate in an Amazing-Race-style scavenger hunt game.

At the conference, for the first time we'll have five (5) concurrent sessions, including symposia and thematic poster sessions in every time slot. We'll also be transitioning to a mobile app as our primary program in an effort to save paper and give you even more information to plan your conference ahead of time and get all the information you need right at your fingertips. You'll even be able to exchange messages and share photos from within the app itself. If any of you are wavering on whether to bring your Android tablet or iPad, we highly recommend it (iPhones, Android phones, and other mobile devices are supported as well).

We have many activities planned to help attendees network, learn about careers, and support diversity. The Diversity and Women In Science breakfasts are sold out—thanks to all of you who signed up to participate in those. If you are interested in taking advantage of one-on-one mentoring, or you'd like to help out by mentoring a junior member of ASB, please note that as you register for the meeting so we can match you up. We'll also have two events for students, one on how to get the most out of your ASB meeting and one on different careers in biomechanics.

We have more exhibitors than ever at ASB 2015, and a new "Selfie Challenge" to win valuable prizes and learn a lot about all the different equipment and people out there supporting our research. If you've got a selfie stick, you may want to bring it with you!

For those of you who remember ASB 1994, on Friday we'll be going back to COSI for our banquet. COSI is the #1 Children's Science Museum in America, and the great hands-on exhibits will be open for you to discover as you follow the map to all the different food stations hidden around the museum.

To register or find out anything you need to know about the meeting and visiting Columbus, go to the [meeting website](#).

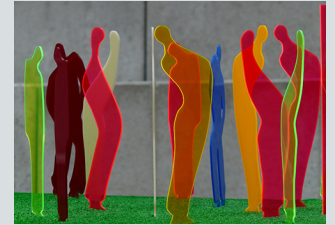


# Meeting Chair-Elect

**Katherine Saul, Gregory Sawicki**

We would like to invite the membership to join us for the [40<sup>th</sup> Annual Meeting](#) of the American Society of Biomechanics in Raleigh, NC, hosted by North Carolina State University (NCSU) August 2-5, 2016. While we are all currently looking forward to the upcoming 2015 Annual Meeting to be hosted in Columbus, OH, we are already planning a terrific scientific and social program for our 40<sup>th</sup> anniversary. NCSU is located in the Research Triangle, a research and industry region that also includes Duke University and UNC-Chapel Hill. The Raleigh Convention Center and the attached Marriott Raleigh City Center hotel will be our host, with a view of the Capitol Building. The conference site is located in the heart of downtown's vibrant entertainment district, featuring restaurants, bars, museums, and music. Our social program includes the opening reception at the Raleigh Convention Center grand lobby and outdoor plaza and the banquet at the NC Museum of Natural Sciences, located within a mile of the conference hotel. We expect an exciting meeting with excellent scientific content and Southern hospitality that will give you a taste of North Carolina.

In light of our 40<sup>th</sup> anniversary celebration, our meeting theme is "Building a dynamic future on the strength of our past". To honor our past, we would like to solicit contributions from the membership regarding memories of the founding of ASB, early years of the Society, and the impact that ASB has had in your lives. Stories, photos, and memorabilia are all welcome, and we plan to feature our history at the meeting in a variety of ways. Please watch the [conference website](#) for submission information or contact [asb2016ncsu@gmail.com](mailto:asb2016ncsu@gmail.com) with any memories you'd like to share. We'll also be at the 2015 meeting in Ohio and we look forward to seeing you there.



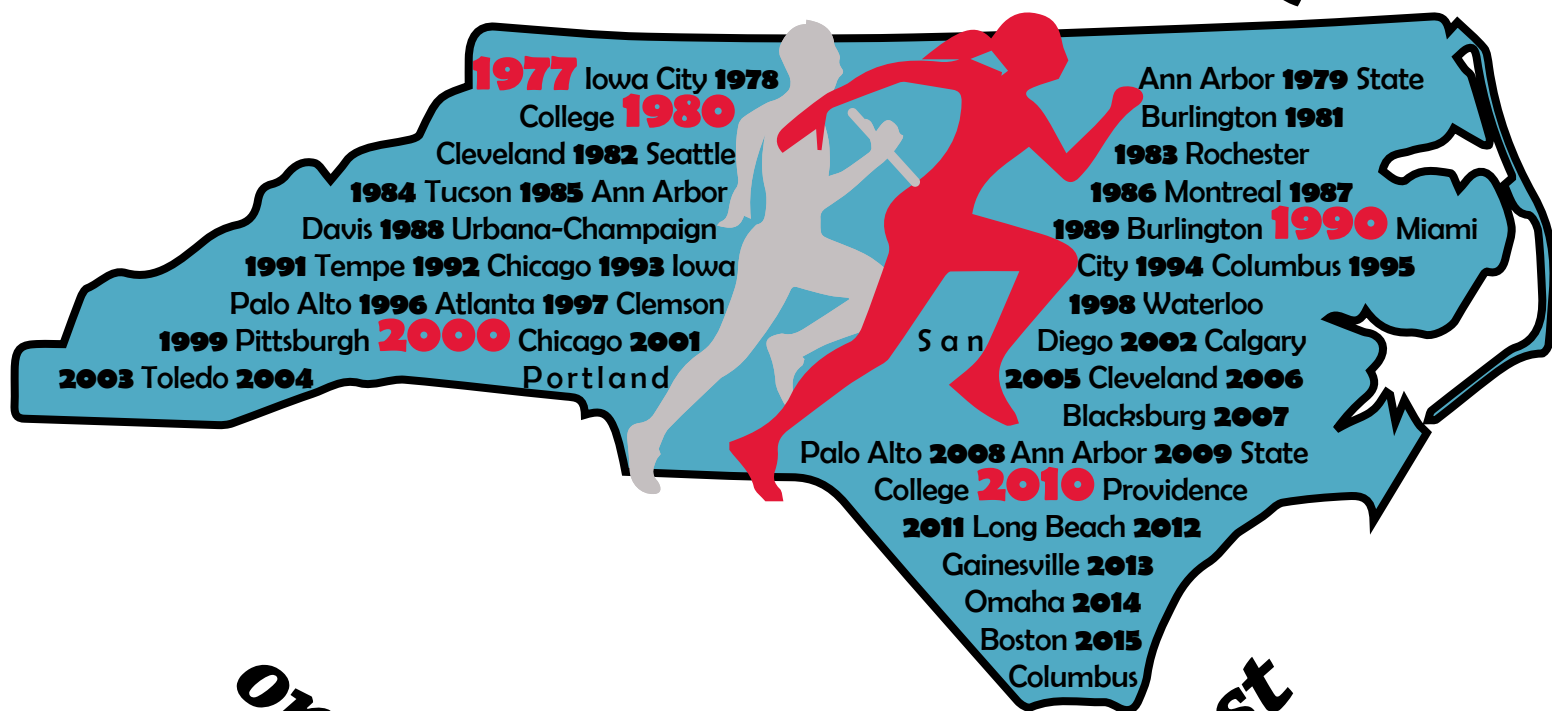
Hopefully Raleigh will have as vibrant a night life as Columbus!



# ASB4



*Building a dynamic future*



*on the strength of our past*

## 2016 Raleigh, NC

August 2-5, 2016

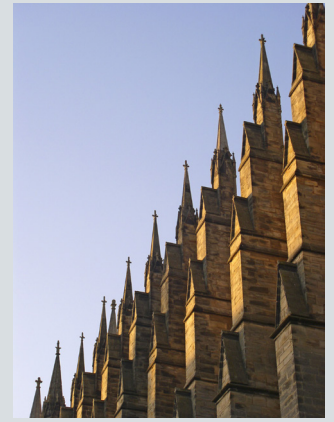
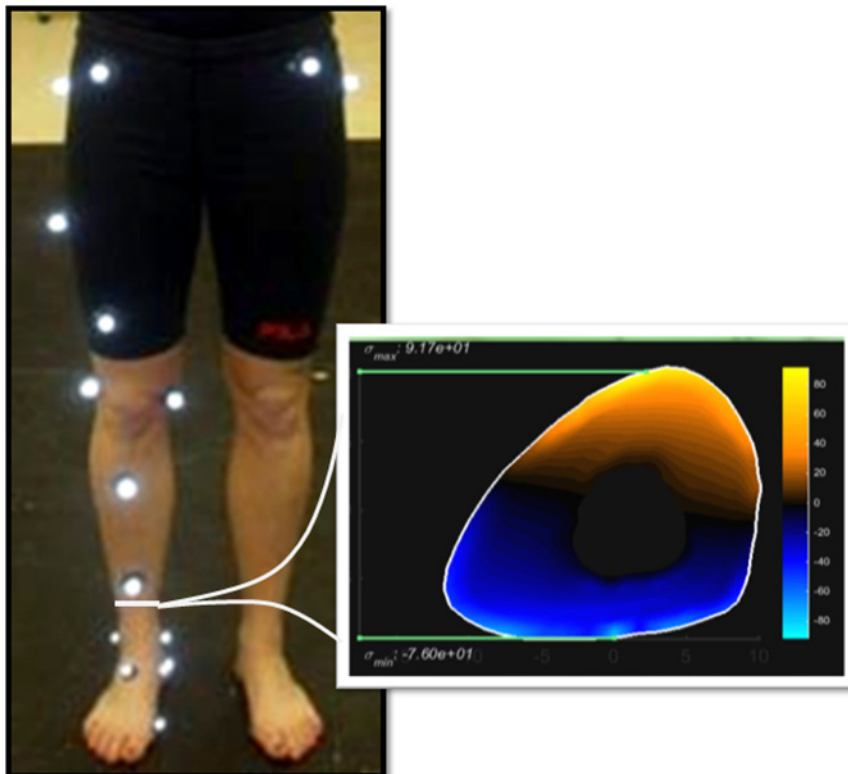
<http://asb2016.asbweb.org>

## 2014 ASB Grant-in-Aid

**Elizabeth Boyer:** “Subject-Specific Tibial Bone Stresses in Shod Rearfoot, Mid-foot/Forefoot, and Barefoot Running”

Receiving the GIA augmented my ability to pay for CT scans to complete my final dissertation study, which compared subject-specific tibial stresses during rearfoot strike, mid/forefoot strike, and barefoot running with normal and 8% shorter stride lengths. Without the support of ASB, we would have had to use a generic bone model. The plethora of data has the potential to be analyzed in so many ways. Thus far, we have compared differences in bone geometry and properties between habitual rearfoot strike runners to habitual mid/forefoot strike runners, and peak compressive, tensile, and shear stresses in the tibia when the two groups of runners ran with both foot strike styles and barefoot.

Based on the 17 runners who completed the study, there were no differences or only small effect size differences in bone geometry and properties between the two groups. Peak compressive, tensile, and shear stresses were larger during shod mid/forefoot strike than shod rearfoot strike or barefoot. Typically, stresses were smallest for rearfoot strike running. Only shear stress significantly decreased with a shorter stride length. We conclude that bones do not significantly differ between groups but tibial stresses do, being greatest during shod mid/forefoot strike running (regardless of group) and generally larger in habitual mid/forefoot strike runners across all conditions. An 8% shorter stride length does not seem sufficient to decrease tibial stresses. These findings have implications for running injury prevention.



**Iowa State  
University**

**Advisor: Timothy  
Derrick**



## East Carolina University

**Advisor: Zachary J. Domire**

# 2014 ASB Grant-in-Aid

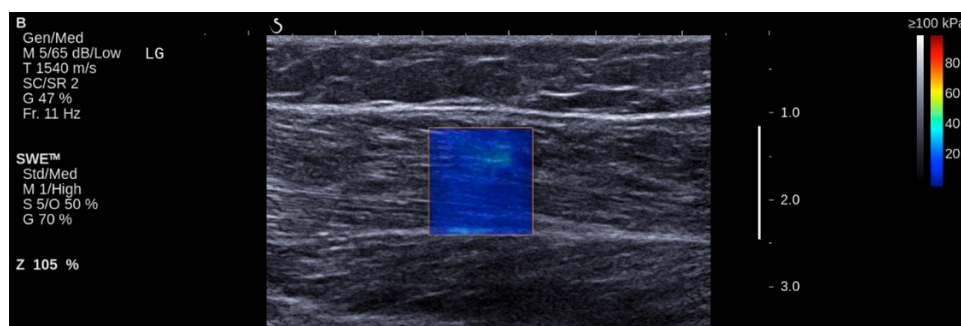
**Jamie E. Hibbert:** “Effects of a Long-Term Stretching Intervention on the Mechanical Properties of Muscle Tissue”

Muscle strength is a significant predictor of mortality [1]. Additionally, decreased muscle mass and strength, or sarcopenia, is also associated with decreased independence for older adults. It has also been shown that muscle mass is one of the risk factors strongly correlated with quality of life in older adults [2]. It is reasonable to recommend resistance training as a potential means of combating age-related muscle mass loss. However, there have been many studies that have found that older adults have a diminished response to exercise when compared to their younger counterparts. The observed decreased response to exercise seen in the aged population indicates that the hypertrophic response is impaired. The overarching hypothesis for this study is that the attenuated response to exercise seen in older adults is caused by an impaired ability to sense mechanical stimuli as a result of increased muscle stiffness.

The participants were three generally healthy women aged 70+ years with BMIs of less than 30 kg/m<sup>2</sup>. Ultrasound elastography was used to measure muscle stiffness of both heads of the gastrocnemius. The participants were taken through a series of contract-relax proprioceptive neuromuscular facilitation (PNF) stretches for the lower body. Subjects participated in this stretching routine 3 days a week for 8 weeks. Based on the data, it appears that each of the participants to this point has a slightly different response compared to the other two participants. The general trend of the data is a decrease in stiffness initially followed by an increase. Some of the variability may be explained by not controlling for ankle angle during the elastography measurements. Participants were instructed to position themselves in a relaxed prone position with their feet hanging off the edge of the table. It is likely that the relaxed position changed as a result of the stretching intervention. Ankle angle will be controlled using a splint in future testing. However, it does appear that there is an overall downward trend for muscle stiffness in the medial head of the gastrocnemius with the mean stiffness going from 18.1 kPa prior to beginning the stretching intervention to 15.8 kPa following 8 weeks of PNF stretching.

More participants are currently being recruited for participation in this study.

1. Rantanen T. Scand J Med Sci Sports. 13, 3-8, 2003.
2. Ozcan A, et al. BMC Public Health. 5, 90, 2005.



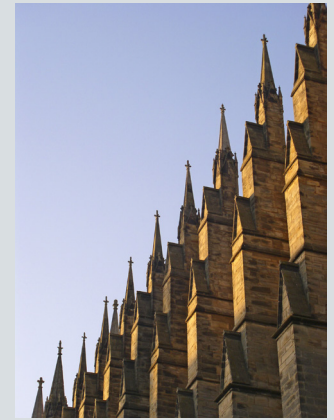
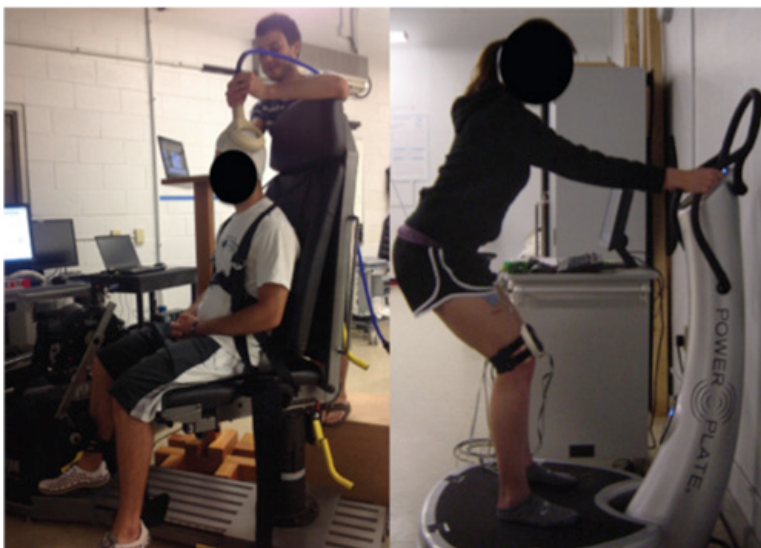


## 2014 ASB Grant-in-Aid

**Derek Pamukoff:** “The Effect of Vibratory Stimuli on Cortical and Spinal Neuron Excitability: Implications for Osteoarthritis Treatment and Prevention”

Knee osteoarthritis (OA) is a considerable burden on the US healthcare system and contributes to physical disability and comorbidities such as obesity and diabetes. Quadriceps dysfunction is ubiquitous in patients with knee pathologies due to alterations in central nervous system function, and is a major contributor to the development of OA. The quadriceps are responsible for absorbing impact forces during everyday tasks like walking and stair climbing, and also athletic tasks like running and jumping. Subtle increases in joint loading are amplified through repetitive activities like walking, and over time, greater loading contributes to a gradual breakdown of articular cartilage. Previous work in our laboratory indicates that muscle vibration provided directly (local muscle vibration – LMV) and indirectly (whole body vibration – WBV) may improve quadriceps function. However, what remains unclear is the mechanism by which these vibratory stimuli actually work to enhance muscle function. Therefore, the purpose of this study was to understand how both WBV and LMV influence characteristics of central nervous system function.

We recruited 60 healthy individuals for this study. Firstly, we measured various characteristics of quadriceps function (i.e., strength and activation), and also how the brain and spinal cord contribute to muscle contraction. Following baseline measurements, subjects were randomized to one of 3 groups (WBV, LMV, or control). Measurements of quadriceps and central nervous system function were repeated following the intervention. We found that both WBV and LMV acutely improved quadriceps function (strength and activation) relative to the control group, and that this improvement was likely due to greater cortical neuron excitability. In other words, muscle contraction can either be voluntary (the brain tells the muscle to contract) or involuntary (spinal reflex loops). Following WBV and LMV, brain activity was altered in such a way that it became easier for these subjects to activate and use their quadriceps muscles. As such, vibratory stimuli may be a suitable method to acutely enhance quadriceps function via improvements in cortical neuron excitability.



**The University of  
North Carolina  
at Chapel Hill**

**Advisor: Troy Black-  
burn**



## East Carolina University

Advisor: Paul DeVita

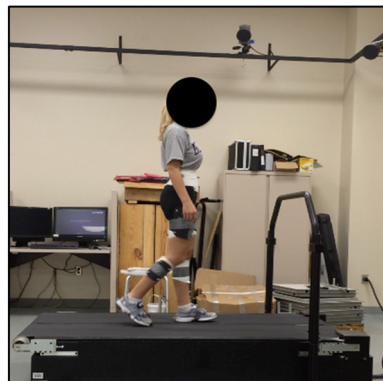
# 2014 ASB Grant-in-Aid

## Shane Rabideau: "Joint Torque and Power Redistribution during Accelerated Walking In Older Adults"

Age-induced physiological changes lead to the biomechanical locomotor adaptation of a distal to proximal shift in joint torques and powers during steady-state walking. While steady-state walking is a good indicator of health, it does not fully describe functional mobility. Daily walking behavior is comprised of positively and negatively accelerating gait phases along with constant-velocity steps. Positively accelerating steps require increased muscle force and torque with each step. This may be inherently more difficult and challenging (e.g., fall inducing) for older adults. Despite the prevalence of acceleration while walking, existing literature lacks biomechanical analyses of accelerated walking, particularly in older adults. We hypothesize that aging induces a distal to proximal shift in joint torques and powers during accelerated walking. The purpose of this study is to compare lower extremity joint torques and powers during acceleration while walking in young (18-25 years old) and old adults (70-85 years old). We expected that older adults would increase hip torque and power at a higher rate, and would increase ankle torques and powers at a lower rate than young adults while accelerating.

Preliminary results are based on 18 subjects (young = 10; old = 8). Using motion capture and a split-belt Bertec instrumented treadmill, participants were accelerated from 0.5 m/s to 2.0 m/s at two different rates ( $0.3 \text{ m/s}^2$  and  $0.6 \text{ m/s}^2$ ). Mean peak joint torques and powers for the hip, knee, and ankle during the acceleration phase were regressed onto step number. These results demonstrated a linear increase in magnitude of peak torques and powers at the hip, knee, and ankle joints in both young and old adults during accelerated walking. The calculated regression beta weights showed in both conditions that old adults increased their hip torque and power at a greater rate relative to young adults to accelerate while walking. Conversely, young adults increased their knee and ankle torques and powers to accelerate more than older adults. Thus far, the relative contributions of the three joints between the two groups does, in fact, indicate an age-induced distal to proximal shift in joint torques and powers during accelerated walking.

[Click](#) for a Visual3D video of hip, knee, and ankle joint torques in a young adult during the acceleration phase. Positive torques are extensor or plantar flexor.



# ASB Regional Conferences

## 2015 Midwest ASB Regional Meeting

The meeting was held at the Quaker Station building on The University of Akron campus. There were a total of 100 registered attendees, including presenters from 22 separate research institutions and 6 sponsoring organizations. Participants from 8 states from Massachusetts in the East to Illinois in the West were in attendance. The key focus of the meeting was on pelvic floor disorders – organized jointly with the Cleveland Clinic and the University of Pittsburgh. Graduate and undergraduate students delivered a total of 59 presentations. These students all registered for free – thanks largely to generous support from The American Society of Biomechanics and other sponsors.

The two-day meeting allowed attendees to learn about the research currently happening at universities and companies across the Midwest. Highlights of the meeting included keynotes by Dr. James Ashton-Miller on “Biomechanics of Pelvic Floor Disorders” and Dr. Yasin Dhaher on “Biomechanics in a Neuro/Rehabilitation Context”. The meeting led into the Biomedical Engineering Career Fair, and concluded with the ARCHAngels Network meeting, featuring a keynote by Dr. Brian Davis.

### Numbers Summary:

- Podium Presentations – 48
- Poster Presentations – 30
- Keynotes –
  - Dr. James Ashton-Miller (University of Michigan)
  - Dr. Yasin Dhaher (Northwestern University)
- Total Student Presenters – 59
  - Graduate Presenters – 41
  - Undergraduate Presenters – 18
- Event Sponsors –
  - The American Society of Biomechanics, Bertec, Kent State University, Great Lakes NeuroTechnologies, Novel GmbH, Simpleware
- Host – The University of Akron, Biomedical Engineering
- Student award winners –
  - Bradley Campbell (University of Pittsburgh), Best Podium/Graduate
  - Robert Paul (Allegheny College), Best Podium/Undergraduate
  - Stephanie Lemmo Ham (The University of Akron), Best Poster/Graduate
  - Melissa Boswell (The University of Akron), Best Poster/Undergraduate



(a) Dr. James Ashton-Miller; (b) Students at poster session; (c) Dr. Yasin Dhaher



## 2015 Midwest ASB Regional Meeting

University of Akron

February 17-18, 2015





## South Central American Society of Biomechan- ics Meeting

University of North  
Texas

March 6 - 7, 2015

# ASB Regional Conferences

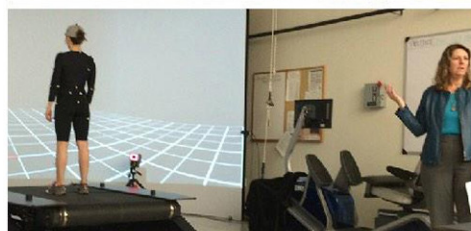
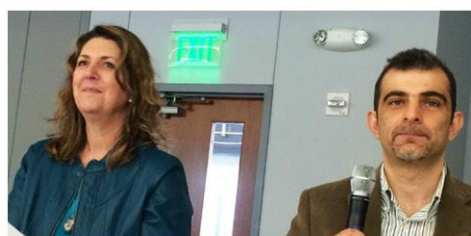
## 2015 South Central ASB Meeting

The 2015 South Central American Society of Biomechanics (SC ASB) Meeting was hosted this year by Drs. Metin Yavuz and Rita Patterson at the University of North Texas Health Science Center (UNTHSC) in Fort Worth, Texas. Linda Adams, research staff at UNTHSC, and other volunteers helped with the organization. It was a one and a half day event with presentations on Friday and Saturday morning, and a lab tour early Saturday afternoon. There were 68 attendees, including 28 students, from ten universities and institutions in the South Central area (including Texas, Louisiana and Arkansas). A total of 10 students presented, and awards (\$200, \$150 and \$100) were given to the top three presentations.

ASB was recognized as a major sponsor of the event with a thank you slide posted during interim periods. The 2015 ASB Meeting to be held in Columbus, OH was promoted with full color 8x10 handouts situated at all conference tables. Also, signs, posters and web pages created for the event indicated ASB as the primary sponsor. Other sponsors were Tekscan and Bertec Corporation.

A highlight of the event was keynote speaker Dr. Terence McCarthy, Medical Director of the Fort Worth Emergency Services Collaborative, a non-profit organization that provides medical training to professionals, education to community members and promotes a safe community through professional and community collaborative efforts. Tekscan and Bertec also provided vendor booths with hands-on demonstrations of their biomechanics products, and Tekscan gave an educational presentation on the use of pressure sensing insoles.

A UNTHSC lab tour was provided by Drs Patterson, Yavuz, and Papa with an overview of their research and demonstration of the state-of-the-art equipment.



# ASB Regional Conferences

## 2015 Rocky Mountain Regional Meeting of the ASB

The 2015 edition of the Rocky Mountain Regional Meeting of the ASB (RMASB) was held April 17-18 in Estes Park, CO. In true Colorado fashion we were greeted with a massive snowstorm the night before the event. Despite a winter storm warning and nearly two feet of snow, the majority of attendees were still able to attend making this the largest RMASB conference to date with 115 attendees and 64 presenters. The number of schools represented at RMASB has also continued to grow, with this year's conference attended by University of Colorado, University of Northern Colorado, Colorado State University, University of Denver, Colorado School of Mines, Regis University, Fort Lewis College, Brigham Young University, University of Wyoming, University of Nebraska, George Mason University, University of Utah, and Montana State University.

Since its inception the RMASB has focused on student research and this year's meeting continued that tradition. To help support students with their research efforts a number of awards were offered at this year's event. Due to generous corporate sponsorship and a donation from keynote speaker Dr. Gerald Smith, we were able to provide cash prizes for the following awards:

- Best Graduate Podium (\$200): Alison Pienciak-Siewert (Univ. of CO Boulder)
- Best Graduate Poster (\$200): Nathan Pickle (Colorado School of Mines)
- Best Undergraduate Podium (\$200): Keely Henninger (Univ. of CO Boulder)
- Best Undergraduate Poster (Tie \$100 each): Rima Baliga (Colorado School of Mines) and Asher Straw (University of Colorado Boulder)
- Dr. Gerald Smith Award, Graduate (\$100): Jana Jeffers (Univ. of CO Boulder)
- Dr. Gerald Smith Award, Undergraduate (\$100): Trey Hulbert (Colorado School of Mines)

This year's event would not have been possible without the generous grant provided by the ASB. The co-organizers for this year's meeting (Dr. Gary Heise, University of Northern Colorado, Dr. Matt Seeley, Brigham Young University and Dr. Missy Thompson, Fort Lewis College) would like to thank both the ASB, as well as the corporate sponsors (C-Motion, AMTI, Vicon, Motion Analysis, NDI, Simi, Noraxon and Delsys) that contributed to making this an outstanding event.



## 2015 Rocky Mountain Regional Meeting of the ASB

Estes Park, Colorado

April 17-18, 2015



## Human Movement Science and Biomechanics Research Symposium

University of North Carolina at Chapel Hill

April 17, 2015

# ASB Regional Conferences

## 2015 Human Movement Science and Biomechanics Research Symposium

After being rescheduled due to a snow storm across North Carolina, the 12<sup>th</sup> Human Movement Science and Biomechanics Research Symposium was finally held at the University of North Carolina at Chapel Hill on April 17<sup>th</sup>, 2015. Despite the rescheduling, this was one of the largest meeting to date with well over 125 attendees featuring 66 student and faculty presentations from universities across the southeastern states. While this meeting focused largely on biomechanics research, we also had presentations in exercise physiology, motor control, epidemiology, and nutrition. Our keynote speaker, Dr. Jimmy Onate of The Ohio State University, gave an interesting narrative of a successful career path in biomechanics. As an accomplished researcher in the field, Dr. Onate shared meaningful insights on various aspects of a career in academia, including starting and heading a research lab, fostering collaboration, and the endless and difficult pursuit of funding. We thank Dr. Onate for a truly unique and motivating talk that was well-received by students and faculty alike.

The highlight of the day, however, were the enthusiastic and engaged students presenting work during the three poster sessions. These sessions highlighted the interdisciplinary and multifaceted nature of research in human movement, ranging from athletic performance to pathology. Each poster was well-presented and ignited conversation between students from the many institutions represented.

The program co-chairs, Robert Lynall, Michael Clark, and Elizabeth Teel, would like to thank our sponsors: The American Society of Biomechanics, Tekscan, Donjoy, and the Departments of Physical Therapy and Exercise & Sport Science at the University of North Carolina at Chapel Hill for their continued support of this meeting. Without your generous support, this day would not be possible and accessible for students. We look forward to seeing you at next year's meeting!



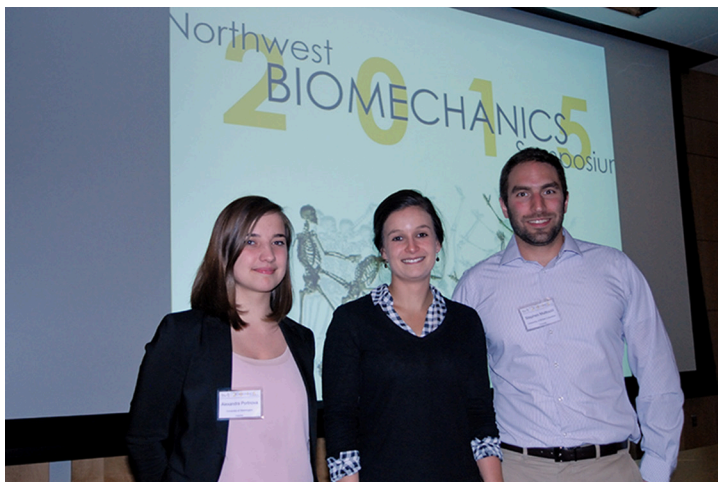


# ASB Regional Conferences

## 2015 Northwest Biomechanics Symposium

This year marked the eleventh regional meeting of biomechanicians in the Pacific Northwest as the [Northwest Biomechanics Symposium](#) (NWBS) was held in Seattle on May 1<sup>st</sup> and 2<sup>nd</sup>, 2015. The symposium focused on student learning, collaboration, and knowledge transfer and this year, it returned home to its roots at the University of Washington where it was previously held in 2005 and 2010. The NWBS featured 47 student presentations (25 podium and 22 poster) and six group discussions which celebrated the diverse biomechanical research from across our region. There were approximately 120 registrants from 22 different institutions. We were fortunate enough to have two excellent keynote speakers: B.J. Fregly spoke on “Design of optimal treatments for walking impairments using neuromusculoskeletal models” while Darryl Thelen’s talk was titled “Imaging of musculoskeletal dynamics: Applications, challenges and opportunities”. Our banquet was held at the UW student union/game room.

The NWBS co-chairs (Patrick Aubin, Randy Ching, Joseph Iaquinto, Bil Ledoux, Eric Rombokas, Becca Routson, Nate Sniadecki and Kat Steele) would like to acknowledge the generous support of our sponsors, without whom the conference would not have been possible. The gold level sponsors included: ASB, AMTI, Motion Lab Systems and the Mechanical Engineering Department at the University of Washington; silver level sponsors included: Kistler, Simpleware, Bertec, Tekscan and Bose; and bronze level sponsors included: Microsoft, novel, Sawbones, MEA Forensics and the VA RR&D Center of Excellence for Limb Loss Prevention and Prosthetic Engineering. Best podium presentations were awarded to Marita Rodriguez (PhD student, “Development of a pro-maturation culture environment for human stem cell derived cardiomyocytes”) and Andrea Willson (MS/BS student, “Towards a biarticular prosthesis: simulations of walking with a prosthetic gastrocnemius spring”), while best poster presentations were awarded to Stephen Mattucci (PhD student, “Identifying relative motion using high-speed x-ray imaging in a rodent dislocation spinal cord injury model”) and Alex Portnova (MS/BS student, “A 3D-printed wrist-driven orthosis for patients with spinal cord injury”). We would like to thank MEA Forensics for sponsoring the student awards once again and we look forward to next year’s meeting, which will be held at the University of British Columbia.



## 2015 Northwest Biomechanics Symposium

University of Washington

May 1-2, 2015



## 2014 ASB Research Travel Grant

Max Paquette

I would like to thank the ASB for awarding me the Research Travel Grant to help fund my travel to Montreal to collaborate with Dr. David Pearsall at McGill University last June. During my two weeks in Montreal, I was involved in pilot testing for a study on lower extremity skating biomechanics in the [Ice Hockey Science Research Group](#) laboratory. The purpose of the study was to describe the lower extremity joint kinematics of a forward skating task on artificial and actual ice surfaces. We tested different motion capture marker models specific to skating and hockey equipment and established a testing protocol for both off and on ice testing. Data for the study have been collected and will be analyzed in the coming weeks. A manuscript should be submitted for peer-review early this summer. Dr. Pearsall and I will continue collaborating on various projects related to hockey and skating biomechanics. I am very grateful to the ASB for giving me this opportunity to further my research program and develop new collaborators.



# Umbrellas are for Tourists

William Ledoux

I hope you are all enjoying the summer - one of the benefits of being the newsletter editor is that I get to write my article last, hence it is often the most up to date. By now, you've all finished your semester or spring quarter work, and, if you have any, the children are probably already home for summer break. Despite the name of my column, Seattle hasn't had much rain in a while and we are deep into the "how much do I need to water my lawn to keep it alive" season.



We've made some concrete steps on the ASB archives project. First, and most importantly, we have had discussions with the archivist from the library at the Pennsylvania State University about hosting the ASB archives. Having the archives at Penn State was something the ASB fellows recommended when I met with them last summer. As you may recall from ASB recent past-president John Challis' frequent postings in the International Society Biomechanics newsletters, Penn State also hosts the [ISB archives](#). If I am reading the table of contents correctly, this consists of 3 boxes of physical archives. Currently, and similarly, the ASB has 3 large file boxes of archival information, mostly from former Society secretaries. I have not sifted through all of them yet, but I have seen a lot of information from the files of Donald Chaffin, Bruce Martin, and Melissa Gross in the first box. Similar to what the ISB has, we hope to donate the files to Penn State. To quote from their guide: *"Archives are run by professionals whose first priorities are preserving historical materials and making them available for use. If your organization donates its records, the staff of that repository will be responsible for the care of the records and will continue to work with your organization as you use the records and periodically add to the collection."* It is my intention to send the physical archives that I have to Penn State later this year and I hope to add to these archives over time. So I will make my plea again - if you are moving offices or retiring or just looking to clean up and you have files that are related to the ASB - especially to our Society's early years - please contact me so that we can arrange for shipment.

A second aspect is the digital archives of the ASB; unlike the current ISB archives, which are just physical, we hope to also have a significant digital presence, including, someday in the future, scanned images of the physical archives. But in the short term, our goal is to include some of the current digital content. The Executive Board shares a Google drive that contains much of our mutual work in progress, but there is also a substantial amount of historical information (e.g., lists of past award winners, lists of past keynote lectures, etc.). Much of the older information was compiled by Melissa Gross (and I believe, Jill McNitt-Gray and James Ashton-Miller - apologies if I have missed someone who deserves credit) for the ASB's 25th anniversary. As we near our 40<sup>th</sup> meeting next year in Raleigh (more below), I am working closely with Robert Catena, the incoming Communication Committee chairperson, to organize and update our digital archives.

As detailed on page 22, Kate Saul and Greg Sawacki are already hard at work on the 2016 meeting. They'll be using some of archives we currently have collected, but also hope to solicit more content from senior members. As a taste, the oldest document we have on file is letter from Jim Hay to Don Chaffin dated November 11, 1975 - also included were Dick Brand, Gaynor Evans and Al Schultz. Very interesting to see how they were planning their first organizational meeting!







# Events Calendar

**Dan Gales**



## NOTE:

For other listings of international conferences, please visit either the ISB's [web-site](#) or [Biomch-L](#).

### **International Society of Biomechanics**

July 12-16, 2015

Glasgow, United Kingdom

Abstract deadline: past

[www.isbglasgow.com](http://www.isbglasgow.com)

### **2015 Summer Simulation Multi-Conference Incorporating Modeling and Simulation in Medicine**

July 26-29, 2015

Chicago, Illinois

Abstract deadline: past

[www.scs.org/summersim](http://www.scs.org/summersim)

### **International Conference and Expo on Biomechanics and Implant Design**

July 27-29, 2015

Orlando, Florida

Abstract deadline: past

[biomechanics-implantdesign.conferenceseries.com](http://biomechanics-implantdesign.conferenceseries.com)

### **American Society of Biomechanics**

August 5-8, 2015

Columbus, Ohio

Abstract deadline: past

[u.osu.edu/asb2015](http://u.osu.edu/asb2015)

### **IEEE Engineering in Medicine and Biology Society**

August 25-29, 2015

Milano, Italy

Abstract deadline: past

[embc.embs.org/2015](http://embc.embs.org/2015)

### **Computer Methods in Biomechanics and Biomedical Engineering 2015**

September 1-5, 2015

Montreal, Canada

Abstract deadline: July 24, 2015

[cmbbe2015.com](http://cmbbe2015.com)

### **European Society of Movement Analysis for Adults and Children**

September 7-12, 2015,

Heidelberg, Germany

Abstract deadline: past

[www.esmac.org](http://www.esmac.org)

### **Human Factors and Ergonomics Society International Annual Meeting**

October 26-30, 2015

Los Angeles, California

Abstract deadline: past

[www.hfes.org/Web/HFESMeetings/2015annualmeeting.html](http://www.hfes.org/Web/HFESMeetings/2015annualmeeting.html)

### **International Conference on Complex Systems Engineering**

November 9-11, 2015

Storrs, Connecticut

Abstract deadline: past

[iccse.uconn.edu](http://iccse.uconn.edu)

### **European College of Sport Science**

July 6-9, 2016

Vienna, Austria

Abstract deadline: February 15, 2016

[www.ecss-congress.eu/2016/16](http://www.ecss-congress.eu/2016/16)

### **Fourteenth International Symposium on the 3-D Analysis of Human Movement**

July 18-21, 2016

Taipei, Taiwan

Abstract deadline: TBA

[www.geocities.ws/3d-ahm](http://www.geocities.ws/3d-ahm)







The 39<sup>th</sup> Annual Meeting of the  
American Society of Biomechanics  
August 5-8, 2015 • Columbus, Ohio  
[u.osu.edu/asb2015](http://u.osu.edu/asb2015)



Columbia Gas  
of Ohio