



www.asbweb.org

In this issue

	page
From the President	1
Student's Corner	2
Secretary/Membership	4
Treasurer	5
Education Committee	6
Past-President	8
Things to do in Calgary	14
Communications	16
Program Chair	17
Nat. Biomechanics Day	18
President-elect	20
Diversity Committee	21
ASB Regional Conf.	22
ASB Research Travel	27
ASB Grant-in-Aid	28
Umbrellas are for Tourists	34
Events Calendar	35

Newsletter

Volume: 32 - Number: 1, June 2019

From the President

Brian Umberger



I hope the summer finds you well. During the winter and spring the ASB leadership has remained busy with our strategic planning initiative. Under the leadership of Past-President, Wendy Murray, we began last year by collecting data via a survey that many of you completed, we conducted an in-person session with the membership at the 2018 meeting, and we received informal feedback from many of our members. Together with President-Elect, Michelle Sabick, we used that information to identify priority areas and goals for the Society. As part of that process, we worked with a fantastic consultant who provided his services pro bono, and we received valuable input from former President Ken Kaufman, who spearheaded the first ASB strategic plan in 2007. Early drafts of the strategic plan were vetted by the Executive Board, representing diverse backgrounds and content expertise in many of the programs and initiatives supported by the ASB. Further feedback was obtained from small working groups representing members at all career stages, and a focus group run by the same center that conducted our survey last year. The entire membership will have the opportunity to provide feedback on a near-final draft of the strategic plan during an open comment period ahead of the annual meeting. While we are nearing the end of the planning phase, a strategic plan that sits on a (virtual) bookshelf is of little value—implementation is key. Our incoming President, Michelle Sabick, is a proponent of not only strategic planning, but also strategic doing. Thus, I am confident in our ability to achieve the collective goals we will establish for the future of the Society.

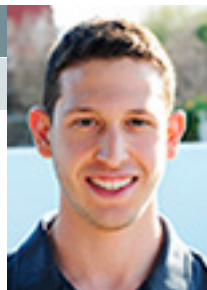
In addition to progress on the strategic plan, excitement is starting to build for our 43rd Annual Meeting being held in Calgary in conjunction with the XXVII Congress of the International Society of Biomechanics. The conference organizers report over 1900 submitted abstracts and they are expecting over 2000 attendees, placing the meeting this summer among the largest gatherings of biomechanists to date. In addition to providing the opportunity to interact with a large and diverse group of colleagues from around the globe, the robust numbers also mean you should make your travel arrangements now, if you have not already done so! While joint meetings naturally have a different feel than a traditional ASB conference, our program team, led by Program Chair Dan Ferris, has worked hard to ensure that many of the key ASB elements will be represented in the program.

Continued on page 3...

Student's Corner

Andrew Vigotsky

Now that Summer is upon us, the upcoming ISB/ASB meeting is undoubtedly on everyone's mind! Melissa Boswell—the ISB Student Representative—and I have planned several student events for this year's meeting, to which I'm looking forward.



To kick off this year's conference, there will be a Student Excursion on Wednesday, July 31 in Kananaskis Country, where students will be able to hike and experience the beautiful outdoors that Calgary has to offer. Transportation and a boxed lunch will be provided, and the students will be back in time to get ready for the Opening Ceremony.

As predicted, spots for this year's Student Mentoring Event filled up quickly. Because the meeting is joint with ISB, mentors and mentees from both ASB and ISB will be participating; I look forward to seeing greater diversity in the exchange of ideas and the relationships that develop as a result of the mentoring event. During these meetings, mentees are free and encouraged to discuss a variety of topics with their mentors, such as scholarly, research, and career objectives. We have distributed a survey to match students with their mentors based on several dimensions, including research interests, career paths, and leisurely interests.

Last but not least, there will be a Student Night Out joint with ISB. Transportation will be provided to and from Ranchman's Cookhouse and Dancehall, where live music and food will be supplied, in addition to one drink ticket. Of note, the drinking age in Canada is 18, not 21!

Finally, I am proud to say that the ASB student committee has been hard at work developing new resources and a new initiative. I would like to thank all of those on the student committee for assisting with these initiatives, and I look forward to describing them in more detail very soon.

See you all in Calgary!



ASB Involvement

If you are interested in VOLUNTEERING with ASB, contact the Communications Committee Chair ([Tarang Jain](#)) with the following information (1) NAME, (2) CONTACT INFORMATION, (3) ASB discipline, (4) research area and (5) how you would like to get involved (e.g., conference abstract review, awards committee, grant application review, student committee, another executive board committee, etc...).

"Science and technology revolutionize our lives, but memory, tradition and myth frame our response."

- Arthur M. Schlesinger



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.

Brian Umberger

Please see the Program Chair column in this issue for more details about the upcoming meeting in Calgary this summer.

The annual meeting is not only a celebration of biomechanics, but also a time of transition on the Executive Board. In Calgary, we will have the opportunity to thank several people for their substantial service to the Society, and we will be welcoming a new Treasurer (Jill Higginson), Program Chair-Elect (Alena Grabowski), Meeting Chair (Young-Hui Chang), Education Chair (Louis DiBerardino), and President-elect (Nick Stergiou). At our annual meeting in Calgary, I will transition to the role of Past-President, which includes a major focus on the awards offered by the ASB. Over the last year, our current Past-President, Wendy Murray, has put considerable effort into improving our awards selection processes, with an emphasis on fairness, consistency, and transparency. One of my goals as Past-President will be to build upon this considerable momentum to further improve our awards processes with a focus on increasing participation rates and representation among the nominees.

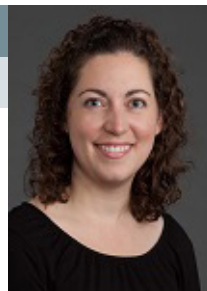
Regarding awards, I have one additional thought to share that is especially relevant for graduate students, postdoctoral fellows, and newly independent investigators. If you feel you are competitive for an award (from ASB, or another source) put your name in, or ask someone to nominate you, even if you do not think you will win. Many of us have a tendency to sell ourselves short—you may be more competitive than you think. Moreover, the awards committees usually include senior leaders in your field. Having those people become familiar with you and your work can pay dividends, even if you do not win the award. I have often been highly impressed with the applicants for our awards, well beyond the eventual winner, and that is how I first came to know of several promising new investigators in our field.

In closing, I hope you all get to enjoy some leisure time this summer, and I look forward to seeing many of you in Calgary.



Secretary/Membership

Katherine Saul



Thank you to the society membership for exploring the new [membership portal](#) and providing your feedback. As a reminder, in the portal, you can pay dues, buy journal subscriptions, donate to the award funds, and search the membership directory. All your member information can be found in the portal. I have recently updated the portal website to make some of these details easier for members to locate under the My Account dropdown. Your member number is located under My Member Details. Your current member status (student or regular membership and membership expiration date) can be found under My Member Status. These details are required if you are sponsoring new members or applying for awards. In addition, you can always update your email account for logging in to the portal, or add a second login (for example, if you have administrative support), by visiting Update my Login Information.

Potential new members can also apply online for membership via the portal. If you are sponsoring an applicant, please note that it can take up to 4-6 weeks to review applications, especially if application information is incomplete. Please encourage any applicants you are sponsoring to apply well in advance of important deadlines for award or grant-in-aid applications. Applications must be approved (not just submitted) prior to relevant deadlines. Finally, sponsors must be up to date on their dues; please check your member status when providing your member number for an application.

Another new feature in the portal is the Volunteer function. There are many opportunities to contribute to the society through committee service, participating at the annual meetings, and hosting events. We now offer the ability to indicate your interest in volunteering on the ASB membership portal. When you log in, visit the 2019 Volunteer form to select roles that interest you. Executive board members or committee chairs will use these lists to identify potential candidates to fill these roles, according to the requirements of the positions.

We have 950 members, of which 774 are currently up-to-date on their member status. Of these, 481 are regular members, 281 are student members, and 12 are emeritus. Remember to renew your membership if you have not yet done so for 2019. For primary disciplines, our membership breakdown is: 48 Biological Sciences, 341 Engineering and Applied Physics, 43 Ergonomics and Human Factors, 197 Exercise and Sports Science, 143 Health Sciences. To help our diversity initiatives, we collect demographic information regarding the society membership composition, reported only in aggregate. By sex: 468 Man, 290 Woman, 14 Don't wish to answer. By ethnicity: 44 Hispanic, 685 Not Hispanic or Latino, 42 Don't wish to answer. By race: 3 American Indian or Alaska Native, 11 Asian, 23 African American/black, 3 Native Hawaiian or Pacific Islander, 595 White, 15 Other, 37 Don't wish to answer. By disability status: 11 Yes, 731 No, 22 Don't wish to answer.

Please feel free to reach out if you have any feedback on the membership portal or if I can assist you in anyway. I look forward to seeing you in Calgary!



Editorial Board

Editor & Layout
William Ledoux
wrledoux@uw.edu

Calendar & Advertising
Dan Gales
DGales@lockhaven.edu

Editorial Assistant
Cara Lewis
lewisc@bu.edu

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

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

DGales@lockhaven.edu



ASB Executive Board 2018-19

President

Brian Umberger, PhD
University of Michigan,
Ann Arbor, MI 48105
(734) 763-8296
umberger@umich.edu

Past-President

Wendy Murray, PhD
Northwestern University
Evanston, IL 60208
(312) 238-6965
w-murray@northwestern.edu

President-Elect

Michelle Sabick, PhD
Saint Louis University,
St. Louis, MO 63103
(314) 977-8282
michelle.sabick@slu.edu

Treasurer

Tamara Reid Bush, PhD
Michigan State University
East Lansing, MI 48824
(517) 353-9544
reidtama@msu.edu

Secretary/ Membership Chair

Katherine Saul, PhD
North Carolina State
University, NC 27695
(919) 515-1273
ksaul@ncsu.edu

Treasurer

Tamara Bush



Hello from your Treasurer!

After our 2019 summer meeting, my term as ASB Treasurer will be coming to a close. These past four years have been wonderful! I have enjoyed my time serving as ASB Treasurer—the membership and executive board have been wonderful to work with, especially past-Treasurer, Karen Troy—Thank you all! I am also excited to work with Jill Higginson from the University of Delaware who will be the new ASB Treasurer. We will spend the next few months transitioning all of the accounts over to her management.

Now for a few financial updates. The Rochester Meeting yielded a profit for ASB of \$39,600. These funds are used for multiple ASB activities, such as the many awards ASB sponsors, including: \$10,000 in Grants-in-Aid, \$5,250 in Travel Awards, and \$2,750 in Diversity Travel Awards, as well \$10,000 for the various regional biomechanics meetings. At this year's annual meeting, we will also provide honoraria for the Hay, Borelli, Goel, Founder, Young Scientist, and Junior Faculty Research awards totaling \$9,500. Finally, Elsevier will sponsor two \$1,000 awards for Clinical Biomechanics and the Journal of Biomechanics. We return approximately \$40,000 to our members in the form of meeting support or awards. Congrats to all of our award winners!

The ASB Treasurer also manages the funds associated with National Biomechanics Day (NBD). Currently, that account has \$31,450 in it. These funds are used to support efforts associated with NBD, including student competitions for exceptional biomechanics content and significant impact of their NBD event.

The society also has regular expenses—these include software to manage our membership, accountant fees, processing fees for use of credit cards from membership purchases, and security monitoring for our website and purchase site. The executive board also holds a mid-year meeting at the conference site to work out all meeting details and view the conference space. (This year, being a combined ISB/ASB, the meeting was held in Michigan.) The cost for the mid-year meeting was \$7,030 which is in line with past mid-year meetings.

If you have any questions relating to ASB finances, feel free to contact me or Jill!

"Science may have found a cure for most evils; but it has found no remedy for the worst of them all - the apathy of human beings."

- Helen Keller

Education Committee

Kimberly Bigelow

It is hard to believe my time as ASB Education Chair is almost over. The opportunity to serve on the executive board has been a wonderful experience, and I would encourage anyone wanting to become more involved in our society to consider a position on the board in the future. Certain positions, such as the Education Chair, are appointed, so consideration starts by letting someone know you are interested. Most commonly, the appointment starts a step before that by first serving on the committee that you might want to chair. If you are interested in being a committee member, you should let the current chair or incoming chair know, or express your interest through the membership system. Thank you to all of the executive board members I have gotten to know and interact with during my term from 2016 – 2019. I am in awe at how professional, productive, and responsive to the membership needs the board members are. Our society is made up of some really amazing people!

Thank you also to the great members of the Education Committee. The committee generally serves a three-year term along with the Chair. We have had some changes in the committee make-up as professional and life changes have come up, and I appreciate that there was always someone there eager to jump in and help when another committee member was needed. Thank you to all who participated in the Education Committee at some point during my term: Louis DiBerardino, Erin Feser, Kim Fournier, Kaitlin Gallagher, Jessie Huisinga, Anne Martin, Scott Monfort, Erika Nelson-Wong, Patrick Rider, K. Alex Shorter, Missy Thompson, and Lieselle Trinidad. For many of them, this was their first step in becoming more involved with the Society, and it is clear based on their ideas, creativity, hard work, and follow through, that our society will be in good hands.

The Education Committee hopes that you are excited to join us for some education programming at ISB/ASB 2019 in Calgary. Traditionally, our committee is tasked with planning the conference tutorials but with this year's meeting being combined with ISB, we did not need to handle this task. We are excited to see some great tutorials chosen and with more offerings, we hope that our members will be able to attend at least one and learn something new. We will also be offering our annual Teaching Symposium. Incoming ASB President Michelle Sabick will serve as the keynote presenter of the panel discussing active learning techniques. She will be followed by several presentations featuring the abstracts chosen as being the highest quality of those submitted to the conference in the education category. Don't miss it, and be sure to check the program for other presentations involving educational and outreach research and activities.

The Education Committee stays busy year round and most recently we have completed the review of the proposals submitted to the American Society of Biomechanics Grant in Aid (GIA) program. The GIA program is a mechanism for our society to provide support to graduate students needing up to \$2,000 in funds to support research needs. Grant applications are due on January 15th of each year and application instructions are available on the ASB [website](#). This year we



ASB Executive Board 2018-19

Education Committee Chair

Kim Bigelow, PhD
University of Dayton
Dayton, OH 45469
(937) 229-2918
kimberly.bigelow@udayton.edu

Communication Committee Chair

Tarang Jain, PhD
Northern Arizona University
Flagstaff, AZ 86001
(928) 523-7305
Tarang.Jain@nau.edu

Newsletter Editor

William Ledoux, PhD
VA Puget Sound
Seattle, WA 98108
(206) 768-5347
wrlledoux@uw.edu

Program Chair

Daniel Ferris, PhD
University of Florida
Gainesville, FL 32611
(352) 294-1281
dferris@bmw.ufl.edu



ASB Executive Board 2018-19

Program Chair-Elect

Karen Troy, PhD
Worcester Polytechnic
Institute
Worcester, MA
(508) 831-6093
ktroy@wpi.edu

Meeting Chair

open

Diversity Chair

Robin Queen, PhD
Virginia Tech
Blacksburg, VA 24061
(540) 231-3134
rmqueen@vt.edu

Student Representative

Andrew Vigotsky
Northwestern University
Chicago, IL 60611
(914) 584-9750
vigotsky@u.northwestern.edu

Education Committee, cont.

Kimberly Bigelow

received 22 applications and were able to award five \$2,000 awards. Congratulations to our winners:

- Abigail Carpenter Schmitt, University of Florida, advisor: Chris Hass. *Determining the Impact of Osteoarthritis on Gait and Balance in Parkinson's Disease*
- Brian Diefenbach, East Carolina University, advisor: Zachary Domire. *Gene Expression in Response to Mechanical Loading on the Anterior Cruciate Ligament*
- Gabe Haberly, Oregon State University, advisor: Michael Pavol. *Influences of Lower Limb Strength and Rate of Torque Development on Recovery from a Backwards Balance Loss*
- Dovin Kiernan, University of California-Davis, advisor: David Hawkins. *Changes in Shock Attenuation across a Prolonged Run in Injured and Uninjured Runners*
- Jia Liu, Univ. of Southern California, advisor: Christopher Powers. *Sex Differences in Frontal Plane Hip and Knee Kinematics during Running: An Integrated Investigation of Hip Abductor Strength, Activation, and Pelvis & Femur Morphology*

A special thanks to Louis DiBerardino for his leadership in coordinating the 2019 GIA review. Be sure to check out the findings of our 2018 GIA winners, who will be presenting at the 2019 ISB/ASB conference (and who are highlighted in this newsletter). In preparation for being ready to submit applications for 2020, be sure that all student applicants—and their advisors—apply for, or renew their ASB memberships well before the January 15th grant deadline. To be considered eligible, both the student and advisor must be a current member with 2020 dues paid upon the submission deadline or the application will not be considered.

In this newsletter, you'll also see summaries of all of the ASB Regional Meetings that occurred from February to May 2019. The Education Committee oversees the review of the regional meeting proposals and supports up to \$2,000 to assist with meeting costs. Proposals to host a meeting are due by September 30th. Please consider hosting a regional meeting this year, or in the future. I hosted my first one this year and it was an excellent experience. I would be happy to share ideas and lessons learned with anyone considering hosting their own meeting.

And finally, as the new school year nears, be sure to check out the ASB Teaching Repository for ideas for new classroom project, labs, demos, and more—and to share your own. Our Teaching Repository continues to grow, but only because of contributions by people like you. Please consider uploading at least one “snippet” this year. The Teaching Repository can be accessed from the ASB [website](#).

With that I'll conclude my last column as Education Chair. I will forever be appreciative of the opportunities that ASB has provided me, starting during my first ASB meeting at Virginia Tech in 2006. I feel so fortunate to be a part of the society and have truly enjoyed this opportunity to serve the society in the Education Chair position these last three years.

Past-President

Wendy Murray

As Past-President, it has been my honor to serve as the Awards Chairperson for the 2018-2019 Academic Year. Each year, the ASB Past-President serves as a non-voting member of all awards committees. My duties revolved around processing each of the nominations and applications for our vast portfolio of awards, creating multiple committees, addressing conflicts of interest, tallying the review results, and informing the applicants and nominees of the results. The awards selections are an intensive process, with so many ASB members contributing in some way to its overall success. My deepest thanks to everyone who contributed this year.



Our 2019 Award Recipients are presented below:

Awards that honor an individual for their contributions to the field of biomechanics:

Borelli Award: Irene S. Davis; Harvard Medical School

Presentation: Friday, August 2nd, 14:00-14:45 pm

This is the most prestigious honor given by the ASB. The award recognizes outstanding career accomplishment and is awarded annually to an investigator who has conducted exemplary research in any area of biomechanics. This year's Borelli award winner, Irene S. Davis, PhD, is only the second woman to be selected by our society for this honor. Dr. Irene Davis is the founding Director of the Spaulding National Running Center, Department of Physical Medicine and Rehabilitation, Harvard Medical School. Dr. Davis received her Bachelor of Science in Exercise Science from the University of Massachusetts and in Physical Therapy from the University of Florida. She earned her Masters degree in Biomechanics from the University of Virginia, and her PhD in Biomechanics from Pennsylvania State University. She is a Professor Emeritus in Physical Therapy at the University of Delaware where she served on the faculty for over 20 years. Her research is focused on the relationship between lower extremity structure, mechanics and injury. Her research also extends to the development of interventions to alter faulty mechanics through gait retraining. She has been studying the use of wearable sensors in both the evaluation and treatment of injured runners. Her interests also include the effect of minimal footwear on mechanics and injury. Dr. Davis has received funding from the Department of Defense and National Institutes of Health to support her research. She has given over 350 lectures both nationally and internationally and authored 140 publications on the topic of lower extremity mechanics during walking and running gait. She was recently named one of the 50 Most Influential People in Running. She is a Fellow and Past President of the American Society of Biomechanics. She is also a Fellow, Vice President, and current Presidential nomi-



2019 Award Summary

Borelli Award

Irene Davis,
Harvard Medical School



2019 Award Summary

Jim Hay Memorial Award

Paavo Komi (in memoriam),
University of Jyväskylä,
Finland

Goel Award For Translational Re- search in Biome- chanics

Scot Delp,
Stanford University

Past-President, cont.

Wendy Murray

nee of the American College of Sports Medicine, and a Catherine Worthingham Fellow of the American Physical Therapy Association.

Jim Hay Memorial Award: Paavo Komi (in memoriam); University of Jyväskylä, Finland

Hay Symposium: Sunday, August 4th, 11:00 am-12:45 pm

The Jim Hay Memorial Award recognizes originality, quality, and depth of biomechanics research that address fundamental research questions relevant to extraordinary demands imposed in sport and exercise. In 2019, the Hay Committee has elected to award The Jim Hay Memorial Award for Research in Sports and Exercise Biomechanics posthumously to honor Paavo Komi, PhD. Dr. Komi was a renowned international researcher and scientific leader, a Professor Emeritus and former Head of the Department of Biology of Physical



Activity at the University of Jyväskylä, and a scientist who, in keeping with the spirit of the Jim Hay Award, dedicated his professional career of over 50 years to improving performance under the extreme demands of athletic competition. His fundamental approach to science was holistic by design, with a focus on the interdependent neuromuscular and musculoskeletal systems acting together as an integrated sensorimotor system in movement control.

Goel Award for Translational Research in Biomechanics: Scott Delp; Stanford University

Presentation: Friday, August 2nd, 8:00-8:45 am

The Goel Award, newly created in 2016, recognizes outstanding accomplishments in translational biomechanics research, entrepreneurship, and societal benefit. The award is named after Dr. Vijay Goel, the Borelli Award winner in 2014 and is given annually to an ASB member. The Award was initiated by Dr. Goel's loving and devoted family. The Goel Award selection is based on originality, quality and depth of the candidate's research, and the commercial and societal benefits emanating from this research.



The 2019 Goel Award Recipient, Scott L. Delp, PhD, is the James H. Clark Professor of Bioengineering and Mechanical Engineering at Stanford University. He is the Founding Chairman of the Department of Bioengineering at Stanford, Director of the National Center for Simulation in Rehabilitation Research, and Director of the Mobilize Center, an NIH National Center of Excellence focused on Big Data and Mobile Health. Scott is focused on developing technologies to advance movement science and rehabilitation. Software

Past-President, cont.

Wendy Murray

tools developed in his lab (OpenSim and Simtk.org) have become the basis of an international collaboration involving thousands of investigators who exchange biomechanical models, simulations, and data. Prior to joining the faculty at Stanford, Delp was on the faculty at Northwestern University and the Rehabilitation Institute of Chicago. He has co-founded six biomedical technology companies.

Founders' Award: Silvia Salinas Blemker; University of Virginia

Presentation: Sunday, August 4th, 8:00-8:45 am

Silvia Salinas Blemker, PhD, is a Professor of Biomedical Engineering, with joint appointments in Mechanical & Aerospace Engineering, Orthopaedic Surgery, and Ophthalmology at the University of Virginia in Charlottesville, VA. She obtained her BS and MS degrees in Biomedical Engineering from Northwestern University and her PhD degree in Mechanical Engineering from Stanford University. Before joining the faculty at UVA in 2006, Silvia worked as a post-doctoral Research Associate at Stanford University's National Center for Biomedical Computation. At UVA, she leads the Multi-scale Muscle Mechanophysiology Lab ("M3 Lab"). The M3 lab group develops advanced multi-scale computational and experimental techniques to study skeletal muscle biomechanics and physiology, and they are currently applying these techniques to a variety of areas, including muscle injury & regeneration, speech disorders, movement disorders, vision impairments, muscle atrophy, aging, and muscular dystrophies. While the work is grounded in biomechanics, it strongly draws from many other fields, including biology, muscle physiology, biomedical computation, continuum mechanics, imaging, and a variety of clinical fields. M3 lab aims to have an impact on research and society. The lab strives for excellence in scholarship through contributing high impact papers and being awarded competitive awards and grants. Additionally, teaching and mentorship of post-doctoral fellows, graduate students, and undergraduate students is a high priority, both in the lab and in the classroom. Lastly, the M3 lab is enthusiastic to take part in outreach activities, including having active participation of K-12 teachers in the lab. The M3 lab's research has been funded by several institutes at the National Institutes of Health (NIAMS, NIBIB, NIA, and NIDCD), NASA, the NSF, The Hartwell Foundation, and the UVA-Coulter Translational Research Partnership, in addition to industry partnerships. Dr. Blemker has multiple patents pending and co-founded Springbok, Inc, a company focused on image-based muscle analytics for a variety of applications from sports medicine to neuromuscular disorders.



2019 Award Summary

Founders' Award

Silvia Salinas Blemker,
University of Virginia

Young Scientist Pre-Doctoral

Erika Pliner,
University of Pittsburgh

Young Scientist Post-Doctoral Award

Wouter Hoogkamer,
University of Colorado

ASB Fellows

Chris Hass,
University of Florida

Li-Shan Chou,
Iowa State University



2019 Award Summary

Junior Faculty Research Award

Robert Catena,
Washington State University

Research Travel Grant

Jessica Goetz,
University of Iowa

Clinical Biomechanics Award

Winner:
Stephan Bodkin
University of Virginia

Top-scoring Finalists:
Michelle Hall
University of Melbourne
Sybele Williams
RWTH Aachen University

Journal of Biomechanics Award

Finalists:
Tsolmonbaatar Khurelbaatar,
Worcester Polytechnic Institute

Kevin R. Boldt,
University of Calgary

Olivia M.G. Aguiar,
Simon Fraser University

President's Award

TBD

Past-President, cont.

Wendy Murray

Young Scientist Pre-doctoral Award: Erika Pliner; University of Pittsburgh
ASB Young Investigator Awards Session: Sunday, August 4th, 9:00-10:00 am

Erika Pliner is a PhD Candidate in Bioengineering at the University of Pittsburgh. Her research is focused on determining individual, environmental and biomechanical factors that contribute to ladder fall risk. This knowledge is critical to guide safety interventions that reduce ladder fall injuries. She has also been active in outreach programs to improve diversity in biomechanics. Her dissertation work was funded by the NSF Graduate Research Fellowship Program and Whitaker International Program. She received her BS in Mechanical Engineering and MS in Engineering at the University of Wisconsin-Milwaukee.



Young Scientist Post-doctoral Award: Wouter Hoogkamer; University of Colorado

ASB Young Investigator Awards Session: Sunday, August 4th, 9:00-10:00 am

Wouter Hoogkamer, PhD, is a post-doctoral research associate in the Locomotion Laboratory at the University of Colorado, Boulder. He uses a comprehensive approach to study human locomotion, integrating neurophysiology, biomechanics, and energetics. Dr. Hoogkamer's work covers the full health spectrum, from the neuromechanics of split-belt walking in individuals with cerebellar damage to the biomechanics and energetics of elite marathon runners. After obtaining master's degrees in Civil Engineering and Human Movement Sciences in the Netherlands, he moved to Leuven, Belgium where he earned his PhD degree in Biomedical Sciences, before moving to Colorado in 2015. Dr. Hoogkamer is passionate about mentoring students and is an avid runner. He recently accepted a tenure-track position as assistant professor in the Department of Kinesiology at the University of Massachusetts, Amherst, where he will be starting in the fall of 2019.



ASB Fellows:

In 2011, ASB created the status of Fellow to recognize scientific achievement and service to the Society and to encourage continued service in leadership roles. The Society currently has 37 Fellows and we will induct two individuals as new Fellows in 2019 in Calgary. The 2019 Fellows are Chris Hass, PhD, from the University of Florida, and Li-Shan Chou, PhD, from Iowa State University. Chris and Li-Shan will be formally recognized at the ASB Business Meeting at lunch on Sunday, August 4th.

Past-President, cont.

Wendy Murray

Competitive Grant Programs:

Opportunities for Faculty Members

The **Junior Faculty Research Award** is a \$5,000 grant that can be used to generate pilot data and support early-career investigators. The 2019 JFRA recipient is **Robert Catena**, PhD, from Washington State University. Dr. Catena's application, "Obstacle avoidance during pregnancy: determining the role of strength and joint position sense", aims to determine (1) how obstacle crossing performance changes throughout pregnancy, and (2) how joint position sense and strength are related to obstacle crossing performance.

A **Research Travel Grant** is offered to foster collaborative research and interaction among scientists by helping to offset the cost of travel to a host institution. The 2019 recipient, **Jessica Goetz**, PhD, from University of Iowa, will use these travel funds to make a week-long trip to the University of Utah to spend an intensive, dedicated block of time working with Dr. Andrew Anderson and his team to develop collaborative opportunities within their shared research interest area of biomechanics of structural hip deformity and the mechanics of hip preservation treatments.

Opportunities for Student Members (note GIA and Diversity Travel were reported by the Education and Diversity committee chairs, respectively)

Student Travel Awards are offered 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. There were over 40 applications for this award. When first introduced, ASB funded only 8 Student Travel Awards annually. In recent years, the number of awards made by the society has increased each year, and 20 students were selected to receive awards in 2019. Factors considered in evaluation of applications include: current ASB student membership at the time of application, abstract accepted for presentation at the meeting, abstract score, merit and need of the applicant, and the applicant's previous history of receiving the award, with preference given to students who have not received an award for the previous two ASB meetings.

Awards that are judged based on abstract submissions for the annual meeting:

Clinical Biomechanics Award: "Knee Extensor Fatigue Resistance in Individuals Following ACL-Reconstruction", **Stephan G. Bodkin**, Joseph Hart
Session: ISB Awards Session I, Sunday, August 4th, 11:45 am-12:45 pm

This award recognizes outstanding new biomechanics research targeting a contemporary clinical problem, and is sponsored by Elsevier Science, Ltd., publishers of Clinical Biomechanics. Top scoring abstracts from the initial program review were first compiled into a list for further review. For the 2019 meeting, ISB Pro-



2019 Award Summary

Student Travel Awards

- Emma Baillargeon
Northwestern University
- Kaylyn Bell
Rensselaer Polytechnic Institute
- Matthew Berno
North Carolina State University
- Lynda Brady
University of Washington
- Katie Conway
University of North Carolina
- Paul Craig
Methodist University
- Danny Davis
Penn State University
- Evan Day
University of Oregon
- Sujata Khandare
Penn State University
- Dean Molinaro
Georgia Institute of Technology
- Constantine Nicolozakes
Northwestern University
- Kayla Pariser
University of Delaware
- Chase Rock
Georgia Institute of Technology
- Bryan Schlink
University of Florida
- Jordyn Schroeder
Georgia Institute of Technology
- Jan Stenum
University of Mass, Amherst
- James Tracy
University of Delaware



2019 Award Summary

Student Travel Awards

- Kyra Twohy
University of Dayton
- Katherine Wagner
Colorado School of Mines
- Ross Wilkinson
University of Queensland

ASB Diversity Travel Awards

- The Ohio State University
- University of California, Davis
- University of Michigan – 2 awards
- Georgia Institute of Technology – 2 awards
- University of Massachusetts, Amherst
- California State University Fullerton
- Virginia Tech – 2 Awards
- University of North Carolina at Chapel Hill and North Carolina State University
- North Carolina Agricultural and Technical State University

AMTI Diversity Travel Awards

- George Mason University
- The Ohio State University – 3 awards
- University of Wisconsin-Milwaukee

cesses were followed. A jury of 3 ISB Past-Presidents and 3 ASB Past-Presidents reviewed 7 full length manuscripts to determine the winner. In addition to the podium presentation by the Clinical Biomechanics Award Recipient, two top-scoring finalists (listed below) will be introduced at the ISB Awards Session.

“Kinematic variability according to pain and structural disease severity in people with hip osteoarthritis” **Michelle Hall**, Aaron Fox, Jason Bonacci, Ben Metcalf, Yong Hao Pua, Tim Wrigley, Kim Bennell

“Non-invasive assessment of single motor unit activity in relation to motor neuron level and lesion location in stroke and spinal muscular atrophy” **Sybele E. Williams**, Kathrin C. Koch, Catherine Disselhorst-Klug

Journal of Biomechanics Award:

Session: ASB Awards Session, Sunday, August 4th, 10:30-11:30 am

The Journal of Biomechanics 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. Top scoring abstracts from the initial program review were first compiled into a list for further review. A Journal of Biomechanics Award review committee was formed and asked to identify three finalists based on the significance and potential impact of the work, the potential for the work presented in abstract form to be expanded into a full-length journal article, and the innovation/creativity of the work. The winner of the award will be decided at the meeting. The finalist are:

“Tibial bone strain influences bone change following marathon training in novice marathon runners” **Tsolmonbaatar Khurelbaatar**, Rebecca Fellin, Jessica Ventura, Karen L. Troy

“Maximum Force and Velocity Properties of Cardiac Muscle Following Aerobic and Resistance Exercise Training in Rats” **Kevin R. Boldt**, Venus Joumaa, Walter Herzog

“Situational factors associated with the frequency and severity of head impacts in varsity ice hockey” **Olivia M.G. Aguiar**, Tim Chow, Brigitte M. Potvin, Stephen N. Robinovitch



Things to do in Calgary and Surrounding Area



Calgary Tower

The Calgary Tower, home of the world's highest 360-degree observation deck, offers an award-winning multimedia tour. Available in English, French, Mandarin, Korean, Japanese and German, the self-guided tour brings visitors on an exciting journey through Calgary's past and present. Gain a unique perspective on famous landmarks while enjoying sweeping panoramas of the city skyline and Canadian Rockies.

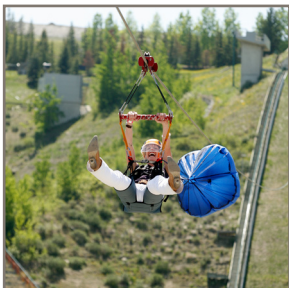
See more at calgarytower.com



Glenbow

Founded some 50 years ago by oilman Eric Harvie, the Glenbow Museum is located next to the Calgary TELUS Convention Centre in downtown Calgary. One of the largest museums in Canada, the Glenbow includes a museum, art gallery, library and archives and has more than one million artifacts and 28,000 works of art in its vast collections. Many of those pieces are linked to the people and history of Western Canada.

See more at glenbow.org



WinSport and Canada's Sports Hall of Fame

The site of the 1988 Winter Olympic Games has since become an attractive training destination for professional athletes and a thrilling attraction for leisure sports enthusiasts. Thrill-seekers can take a ride down the bobsleigh track at speeds up to 100 km/h or zipline from the iconic ski jump tower. For something less intense, try downhill karting on the Skyline Luge. While at WinSport take time to visit Canada's Sports Hall of Fame.

See more at winsport.ca and at sportshall.ca



Heritage Park

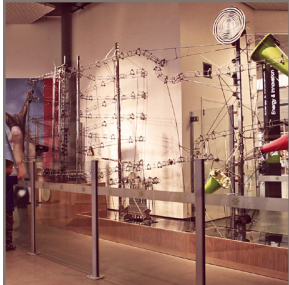
Heritage Park Historical Village first opened its gates on July 1, 1964. Since opening its doors, the Park has grown into one of Calgary's premier tourist attractions and Canada's largest living history museum. Throughout the year, guests have the opportunity to interact with nearly 100 years of history. Heritage Park's exhibits span the early 1860s fur trade to the petroleum and automobile-dominated 1950s. It is the Park's mission to preserve the history of the early West and to educate and entertain guests of all ages for many generations to come. See more at heritagepark.ca



The Calgary Zoo

Located just minutes east of the city's downtown core and accessible on the CTrain line, the Calgary Zoo is the second largest zoo in Canada and in 2012, was the nation's most visited zoo. In 2014, it was named by TripAdvisor as Canada's top zoo and has received international recognition in the world of conservation research. Admire the pandas while strolling through Panda Passage. Visit the Land of Lemurs; the captivating penguins in an Antarctic environment; majestic giraffes, bellowing hippos and colourful mandrills in Africa; the cool cats, tigers, lynx and snow leopards in Eurasia; or the stars of the Canadian Wilds – the bears, cougars and wolves. See more at calgaryzoo.com

Things to do in Calgary and Surrounding Area



TELUS Spark

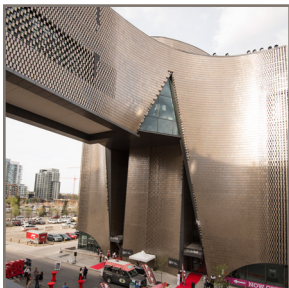
TELUS Spark is a place for people of all ages and abilities to let go and embrace the desire to explore and discover science, technology and art in a way that their normal day-to-day life doesn't allow for. With over 200 experiences, five galleries, and an outdoor park, it is a place to experiment and to play.

See more at sparkscience.ca



Fort Calgary

Fort Calgary is located on 40 acres of parkland on the eastern edge of downtown Calgary. This is the place where the modern city of Calgary began! Learn about the Indigenous history of the Traditional Treaty 7 land the fort was built on. Explore colourful stories of Calgary's past in the Interpretive Centre. Experience both sides of the law as you try on an authentic RCMP uniform or spend some time in their jail. Discover this National Historic Site and take a stroll around the RiverWalk to the confluence of the Bow and Elbow Rivers. See more at fortcalgary.com



Studio Bell - National Music Centre

Studio Bell, the National Music Centre, opened in downtown Calgary's East Village on July 1, 2016. The National Music Centre is home to the history of music in Canada, including the country's most impressive collection of musical instruments and sound equipment, the Canadian Music Hall of Fame, and the Canadian Country Music Hall of Fame Collection. It also includes event and performance spaces, recording studios, broadcast facilities, the Rolling Stones Mobile Studio, and artist-in-residence programs, as well as Calgary's famed King Eddy Hotel. See more at nmc.ca



Banff National Park

At the heart of Banff National Park is a charming and historic alpine town, surrounded by majestic lakes and tall peaks. Banff's historic town centre is alive with shops, galleries, cafes and restaurants. You can explore the iconic highlights and take in multiple views of the famous peaks, ride to the top of Sulphur Mountain on the incredible Banff Gondola and enjoy a relaxing boat ride on Lake Minnewanka.

See more at banfflakelouise.com



Drumheller and Canadian Badlands

The Canadian Badlands are located just an hour from Calgary. Stop at Horseshoe Canyon, walk among the Hoodoos, and enjoy an Underground Tunnel or Tipple Tour (a structure used to load product for transport) at the Atlas Coal Mine. Walk on the old Suspension Bridge that many a miner has crossed! And of course there are the dinosaurs. Enjoy the Royal Tyrrell Museum, Canada's only museum dedicated exclusively to the science of paleontology. See more at canadianbadlands.com

For more information visit ChooseCalgary.ca/ISB-ASB2019

Communications Committee

Tarang Jain



Greetings from Flagstaff, Arizona! Flagstaff is enjoying a fun and active summer with lot of tourists and adventurous activities abound. We will soon be meeting in Calgary for the 43rd Annual Meeting of the American Society of Biomechanics, held in conjunction with the XXVII Congress of the International Society of Biomechanics (ISB/ASB 2019). Similar to past conferences, we will be more active on our [webpage](#), [Facebook](#) page, and [Twitter](#) feed with meeting related information. You can stay up to date more easily if you stay connected with us through social media. We especially encourage students (and faculty with students) to check out our [Facebook](#) page as student related posts become more active at this time. Additionally, follow us at [@AmSocBiomech](#) so you can get live updates in Calgary this summer.

Continuing with our previous efforts to keep the website fresh, we are still soliciting interesting research related pictures from our members to post on the scrolling photo banner of the ASB webpage. So, if you are willing to share some research related pics and give your research some free press, let me know:

- An eye-catching biomechanics figure/picture.
- The pictures need to be 980 wide x 310 tall size to properly display in the ASB banner, so you can make it this size or we can crop the picture as long as the original meets the minimal dimensions of 980 wide x 310 tall.
- A 1-sentence caption of the picture, with the name of the author as well as the laboratory and/or school affiliation.
- See the current ASB homepage for examples.
- No previously published pictures.
- No recognizable faces.
- Make sure the PI has given consent to posting the picture.

Lastly, we have been hard at work updating a few parts of the ASB website:

- [ASB Awards and Competitive Grants page](#) is updated and reflects the updated information from 2019. [ASB Fellows page](#) is updated to honor the stalwards in the field of biomechanics. You can locate the list of 2019 ASB Election results and awards on this [page](#). Thanks to the tireless and excellent work of ASB Past-President Wendy Murray to get this accomplished.
- We are updating future [ASB conference locations](#) and dates as we become aware of them. This will allow you to better plan your future travel.
- We have an [ASB regional meetings](#) page that is updated when the meetings are announced in early spring. These are great opportunities for a student-focused conference. Please inform your students.
- A [Member Obituaries page](#) is on our website. If you become aware of an ASB members passing, please let us know so that we can honor them.
- We have updated our [Videos and Presentations page](#) to post past award and keynote presentations. We will be updating the keynote lectures from ISB/ASB2019 on the website as they become available. We also have spots of tutorial videos (science or career related) and if you want to contribute, please contact me so that we can discuss the possible contribution.

Thank you all for your support to ASB. As always, I am appreciative of people behind the scenes who have helped to run the things smoothly and look forward to work with all of you to make ASB further stronger.



Find us on Facebook or Follow us on Twitter

Facebook: [American_Society_of_Biomechanics](#)

Twitter: [@AmSocBiomech](#)



Daniel Ferris

The joint meeting of the XXVII Congress of the International Society of Biomechanics and the 43rd Annual Meeting of the American Society of Biomechanics is rapidly approaching (July 31–August 4, 2019)! Walter Herzog, Brent Edwards, Azim Jinha, Sandro Nigg, and the rest of the meeting committee have been hard at work setting up an incredible meeting for us. Detailed information about the program is available on the [website](#). There are 11 parallel oral sessions during the conference covering a wide range of biomechanics topics. Over 1,900 abstracts were submitted and we are expecting more than 2,000 attendees at the meeting. The program includes keynote lectures, invited speakers, research symposia, oral podium presentations, poster presentations, tutorials, and numerous social and networking events. We are hoping for strong turnouts at the Diversity Lunch, Advancing Women in Biomechanics Event, and ASB Business Meeting. There are also two student excursions: a hike on the first day (Wednesday) and a night out on Friday. Please make sure you sign up for all the events you want to attend through on the online registration site. We are very happy to have a return of the ASB undergraduate and graduate student rapid podium and poster contest sessions. We have 6 finalists in the undergraduate session and 12 finalists spread across two graduate sessions. Winners of each of the divisions (undergraduate and graduate) will receive a plaque and a monetary award. If you are interested in helping judge these student awards, please [email](#) me. Looking forward to seeing you in Calgary!



Data to Complete Your Gait Analysis



- Versatile & portable solutions
- Synchronization capabilities
- Unique exportable data

**Learn about unique insights
pressure & force measurement
can bring to your research!**

www.tekscan.com/complete-your-gait-analysis

eBook

National Biomechanics Day 2019

Paul DeVita



Hello Biomechanists and Everyone Else All Around The World,

National Biomechanics Day is completing its fourth season and its ever-growing popularity and success continue to expand the boundaries of Biomechanics. With more events to come this summer, we have had over 7,600 high school students and 220 teachers participating in NBD 2019 events around the world. As we move through our fourth NBD season, we are thrilled to report that we have excited over 28,000 young people about Biomechanics in its myriad forms and applications. While most NBD 2019 events occurred at universities, many private, commercial institutions also participated. Delsys in Massachusetts, Nike in Oregon, Zwift, Inc in Illinois, the Children's Hospital in Colorado, and the Mayo Clinic in Minnesota all celebrated NBD with uplifting events. Additionally, NBD expanded to several new countries in 2019 including India, South Africa, and Wales. We certainly thank all NBD participants for sharing our vision. As you know, NBD thrives on happy photos of happy people... so, let's see a few from Brazil, the US, and Malaysia...

2019 National Biomechanics Day website



Even more exciting though is that 2019 turned out to be the Year of the NBD Video. Many sites created inspirational, short videos displaying the wonderful nature of NBD. Please view a few (or all) of them at [Link-1](#). You will readily see the joy NBD is bringing to Biomechanists and Future Biomechanists around the world.

Through the generosity of Farsh Guilak and editor of the Journal of Biomechanics, the journal published this past Spring two new articles about NBD. Sarah Shultz, Felipe Carpes, Laura-Anne Furlong, Scott Landry, and I described the spread of NBD around the world in an article titled, "The Internationalization of National Biomechanics Day," [Link-2](#). We also provided guidelines and sugges-

National Biomechanics Day 2019

Paul DeVita

tions aimed to help others in the international community start their own NBDs. In a second article, Sarah Shultz, Robin Queen and colleagues described their process of combining NBD service with biomechanics science in a piece entitled, “Can research align with service? Lessons learned from the Big Experiment and National Biomechanics Day,” [Link-3](#).

NBD 2019 also had wonderful growth in its competitions, expanding from two to six individual contests. This year’s events included Art in Biomechanics (sponsored by Sanford Sports Science Institute), Two Minute Tweet (ISBS), Student Competition (ASB, Katie Knaus and Books of Discovery), Best Poster at BIGin-theHud meeting (BASES), Young Scientist Load Sol (Novel), and Force Platform Experiment (Bertec). We thank all the sponsors and congratulate all the award recipients. Three groups received awards for their Two Minute Tweets and you can view them at [Link-4](#). The winning entry for Art in Biomechanics submitted by Randall Manning and Marco Avalos at Texas Women’s University, an insightful view of the combination of bio and mechanics. All award recipients are listed on our website under the links NBD/NBD Competitions, [Link-5](#).

The phenomenal success of National Biomechanics Day is due to the generous contributions of so many individual people, institutes, societies, and enterprises. Please see all our sponsors and supporters here, [Link-6](#). All sponsor logos are linked to their websites so please visit some of these sites when you have a moment. Most importantly, NBD thanks with great sincerity and appreciation YOU, the biomechanists around the world creating National Biomechanics Day events in all their varied forms. Every participating biomechanist, student and faculty, academic and industrialist, researcher and applier generously donated your time and effort to unify our science and show it to young people and young people liked it. YOU are creating the Biomechanists of the future through your contributions to NBD.

We also enhanced our worldwide presence through social media. Please spend a few moments viewing, liking, forwarding, and retweeting The Global Phenomenon that is National Biomechanics Day: [Instagram](#), [Twitter](#), [Facebook](#), [Website](#).

You can search through these sites with #NBD2019, @BiomechanicsDay, #NationalBiomechanicsDay and variations on these themes to see NBD 2019 all over the world.

Please see the NBD poster (The Internationalization of National Biomechanics Day) and oral (Using Sport and Science to Promote Biomechanics) presentations at ISB/ASB.

Without doubt **NBD remains single greatest day in biomechanics: there are more smiles on more faces in more biomechanics labs than any other day.** Let’s all thank each other for contributing so successfully to our mission which is to increase the impact of Biomechanics onto society through introducing our science to high school students.

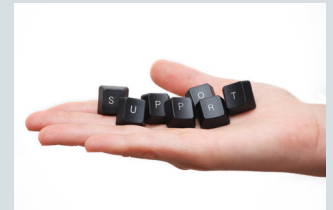
President-elect

Michelle Sabick



In the December newsletter, I promised to provide an update this month on my progress in working with the ASB Fellows to develop a bit more structure to their group. The number of Fellows grows each year, and there is currently no formal means of communication between the Fellows and the ASB Executive Board. The primary focus of the Fellow designation is to honor the research success and professional service of exemplary ASB members. However, the Fellows are an amazing resource of research expertise, societal historical knowledge, and administrative experience. Many of the current Fellows are very interested in continuing to advise the Society and remain involved in a more formal way. For that reason, at the Annual Meeting the Executive Board will host a Fellows Breakfast to discuss how best to formalize a structure, while continuing to allow lots of flexibility in the way Fellows choose to participate. Current Fellows should look for an email inviting them to the breakfast on Saturday, August 3 at 7:00 AM. Prior to the meeting, we will distribute materials for discussion, so please RSVP if you are interested in attending.

This year of serving as President-Elect has flown by. As I prepare to attend the combined ISB/ASB meeting this month, I cannot believe that the year is about to end. I am humbled to have the opportunity to serve as the next President of the American Society of Biomechanics starting at the ASB Business Meeting in Calgary. I look forward to seeing all of you and reconnecting in Calgary as I transition to this new chapter in my involvement with ASB.



ASB Corporate Sponsors 2018

Corporate sponsor levels are aimed at encouraging affiliation by commercial organizations that market products which are used by the biomechanics research community, or companies that are otherwise engaged in activities that fall within the Society's general interest areas. Companies wishing to become a Corporate Member are encouraged to contact [Tamara Reid](#), Treasurer.

The ASB Executive Board is pleased to recognize the following corporate sponsors:

Partner Member
Tekscan



ASB Newsletter



**FINITE ELEMENT ANALYSIS
FOR BIOMEDICAL
ENGINEERING APPLICATIONS**

Z. Yang



A new book, **Finite Element Analysis for Biomedical Engineering Applications**, is out in 2019 by CRC Press.

Preview:

<http://www.feabea.net/preview.pdf>

20% OFF

<http://www.feabea.net/bookflyer.pdf>



2019 Annual meeting [website](#)

Diversity Committee

Robin Queen



It has been a busy year for the Diversity Committee since the Annual meeting in Rochester. We have been working hard with our partners in the ISB to plan the diversity and inclusion events for the 2019 meeting in Calgary. One of these is the Advancing Women in Biomechanics (AWB) event. You can receive updates on the event by following the [AWB twitter feed](#). If you have questions, you can [email me](#) or [Kirsty McDonald](#). The Advancing Women in Biomechanics will have a similar format to previous years. We will again enjoy an interactive cocktail event with a focus on facilitating difficult conversations. We are honored to have Julie Steele and Chris Hass facilitating our conversation this year along with a number of dedicated volunteers who will serve as table leaders during the event. The Advancing Women in Biomechanics event has already sold out and will be held on August 3 from 7:30-9:00 pm. If you were unable to register for the event and would like to attend, please check in with the front desk in Calgary to determine if any spaces have opened up.

In addition the Advancing Women in Biomechanics event, the Diversity committee will also host the Diversity Lunch on August 2 from 1:00-2:00 pm and will focus on developing effective mentoring relationships in diverse and non-diverse work environments. Please make sure if you are attending the diversity lunch that you bring your boxed lunch with you. This event is also completely booked for the 2019 meeting so please check in with the registration desk to see if any spaces open up. In addition to these events which we traditionally host during the ASB annual meeting, there are some additional diversity and inclusion events for you to consider attending during the upcoming meeting. These include the Developing Countries Grant Competition in the afternoon of August 1 which should be a lot of fun to attend if you are able.

The Diversity Committee is thrilled to report that we were able to award 17 Diversity Travel awards for those from underrepresented groups to attend and present their work during the 2019 Annual Meeting. Twelve of the Diversity Travel grants were funded by the ASB and five were funded through the generosity of AMTI. Through the hard work of this committee, which includes [Matt McCullough](#), NC A&T University; [Joan Bechtold](#), University of Minnesota; [Susan Diekrager](#), Novel Electronics; [Becky Zifchock](#), United States Military Academy; and [Ajit Chaudhari](#), The Ohio State University, we have been able to plan for an exciting 2019 Annual Meeting. We hope that everyone will consider joining us for at least one of the Diversity events in Calgary.

Do note that this year we will not be hosting a diversity outreach event as we have in the past due to logistical challenges with setting up an event in Calgary. However, for those of you who are interested in diversity and outreach work please plan to join us the first day of the Atlanta 2020 meeting for the diversity outreach event. Please feel free to reach out to me or any member of the committee at any time with suggestions or concerns during the year as well as throughout the 2019 Annual Meeting.

ASB Regional Conferences

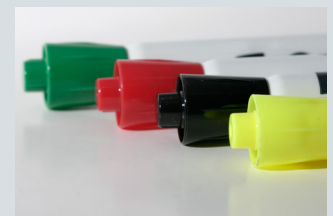
Mid-South Biomechanics Conference (MSBC)

The second annual Mid-South Biomechanics Conference (MSBC) was immensely successful. Hosted by the School of Health Studies at the University of Memphis on February 21st and 22nd, the 2019 MSBC included 130 attendees from 12 states while the program included 36 podium presentations, 10 digital poster presentations, one tutorial, three invited presenters and one keynote presenter. Further, the 2019 MSBC included social activities, a Women in Science Breakfast and student presentation awards. For information regarding the 2019 MSBC, please visit the conference [website](#). The third annual MSBC conference will be hosted at the University of Memphis in late February 2020 with final details for the conference announced in August or September. The organizing committee would like to thank all of the attendees, presenters, volunteers, invited presenters and sponsors including: The American Society of Biomechanics, iMeasureU, Novel, OptiTrack, Bertec, Qualisys, Tekscan, The FedEx Institute of Technology at the University of Memphis, The School of Health Studies at the University of Memphis.



2019 Midwest American Society of Biomechanics (ASB) Regional Meeting – University of Dayton

On February 28th and March 1st, the University of Dayton hosted the Midwest Regional American Society of Biomechanics Meeting in Dayton, Ohio. Approximately 110 students, faculty, and others came from 8 surrounding states: Illinois, Indiana, Michigan, Missouri, Ohio, Pennsylvania, Tennessee, and Wisconsin. Attendees came from 19 different institutions, with co-authors from another 11 institutions. Keynotes were given by Dr. Jim Schmiedeler from the University of Notre Dame (Robotist turned Biomechanist or Something in Between), the interdisciplinary University of Dayton team of Drs. Kim Bigelow, Kurt Jackson, Tim Reissman, Julie Walsh-Messinger (Working Across Disciplines to Maximize Impact- Addressing Rolling Walker Misuse) and Dr. Michelle Sabick, Dean at Saint Louis University (Academic Career Paths within Higher Education). Forty-nine podium presentations broken into concur-



Mid-South Biomechanics Conference (MSBC)

University of Memphis

Memphis, Tennessee
February 21 - 22, 2019

2019 Midwest American Society of Biomechanics (ASB) Regional Meeting

University of Dayton

Dayton, Ohio
February 28 - March 1, 2019



ASB Regional Conferences, cont.

2019 Human Movement Science and Biomechanics Research Symposium

The University of North Carolina

Chapel Hill, North Carolina

March 22, 2019

Rocky Mountain American Society of Biomechanics Regional Meeting

Universities of Colorado, Northern Colorado, and Wyoming

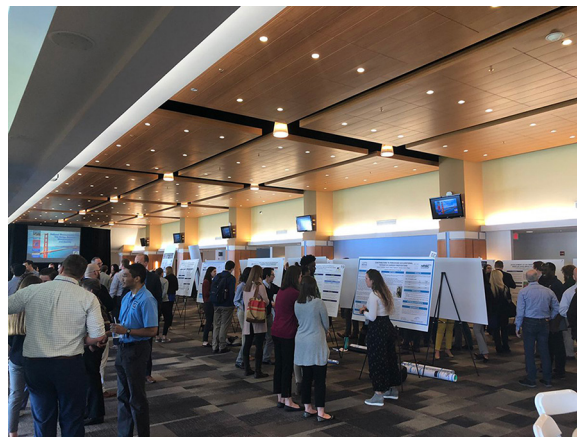
Estes Park, Colorado
April 5- 6, 2019

rent sessions were given, almost all by students. Additional meeting highlights included: a Mini Teaching Symposium, an Industry Spotlight Panel with meeting sponsor Bertec Corporation, a Networking Night, and a Panel Session on Success Strategies for the Next Step in Your Career. The student-centric meeting was a great way for students and faculty from area institutions to build relationships. Meeting host Dr. Kim Bigelow would like to thank ASB for the generous funding to help make the conference a success, as well as the University of Dayton and Bertec Corporation for their contributions.

2019 Human Movement Science and Biomechanics Research Symposium

For the past 16 years, students, faculty, researchers, and clinicians from regional institutions have attended the symposium to present and discuss current research in an open and friendly environment. In the past, over 50 student and faculty presentations were given each year, with a focus on student presentation. This year, we had 92 student presentations split up into three poster and three podium sessions. Further aims of the symposium are to encourage collaboration between researchers, and to provide vocational information to students. The formal interactions during the presentations and the informal discussions that took place during the luncheon and social are key to fostering continued collaborations.

This symposium was highlighted by a keynote address given by a respected and established researcher in the field of Human Movement Science, Dr. Anthony Beutler. Dr. Beutler is from the Uniformed Services University (USU), where he is a full professor in the Department of Family Medicine and the medical director of the USU Injury Research Prevention Laboratory. We graciously appreciate him accepting our invitation to be our featured speaker. The 2019 symposium was our largest and most successful symposium to date, and we look forward to continuing to grow and expand each year.



Rocky Mountain American Society of Biomechanics Regional Meeting

The 9th Annual Meeting of the Rocky Mountain Chapter of ASB was held at the YMCA of the Rockies in Estes Park, CO on April 5-6, 2019. Approximately 150 participants attended the meeting, including 24 faculty from ten different regional institutions. At the meeting, 26 podium presentations (regular and rapid) were distributed into five sessions and 49 poster presentations were displayed throughout the meeting. As a student-focused meeting, most of the presentations were delivered by undergraduate and graduate students. In addition, there were two 30-minute talks by local faculty (Brett Fling, Colorado State University and Brian Baum, Regis University) to share some details about their research programs.

ASB Regional Conferences, cont.

The meeting was organized by Boyi Dai (University of Wyoming), Sara Wings (University of Northern Colorado), Nathan Robey (University of Northern Colorado), and Roger Enoka (University of Colorado Boulder). Registration for the meeting was once again free for attendees staying at the YMCA, which was enabled by the generous support from the ASB, Bertec, C-Motion, BOA, Qualisys, Vicon, University of Wyoming, and Delsys.

The 24 faculty, distributed among three-member panels, selected the winners for the following categories:

Best Doctoral Student Podium Presentation:

Sutton Richmond, Colorado State University

Best Doctoral Student Poster Presentation:

Colin Korbisch, University of Colorado Boulder

Best Masters Student Podium Presentation:

Andrew Burns, University of Colorado Boulder

Best Masters Student Poster Presentation:

Lauren Sepp, Colorado School of Mines

Best Undergraduate Student Podium Presentation:

Katherine Wagner, Colorado School of Mines

Best Undergraduate Student Poster Presentation:

Helena Myers, University of Colorado Boulder

Most Amazing Podium Presentation:

Mohammad Homayounpour, University of Utah

Most Amazing Poster Presentation:

Nicole Sauls, University of Wyoming



More details can be found at the meeting [website](#).





South Central American Society of Biomechanics Regional Meeting

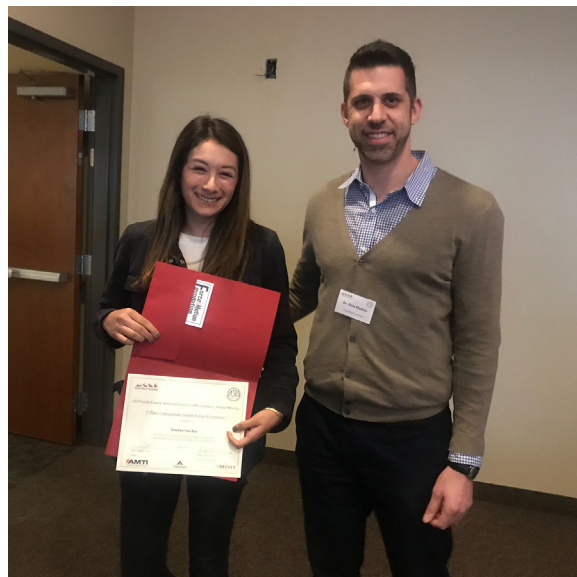
Texas Back Institute

Plano, Texas
April 12 - 13, 2019

ASB Regional Conferences, cont.

South Central American Society of Biomechanics Regional Meeting

The 9th Annual South Central ASB meeting was held at the Texas Back Institute in Plano, TX on April 12-13. We had one of the largest meetings in recent years, with 80 attendees from 11 different universities and 3 hospitals all over Texas and Arkansas. We had 22 undergraduate and graduate students present their work in 4 different sessions: Biomechanics of Gait; Biomechanics of Joints and Muscles; Biomechanics of Lower Limbs and Balance; and Biomechanics of Balance, Posture, and Control Strategies. Paulina Sanchez (Texas Back Institute) was awarded best undergraduate presentation, and Christian DeBuys (Texas A&M) and Yo-Rong Chen (Texas Tech University Health Sciences Center) were awarded best graduate presentation. We were able to have wonderful guest speakers as well who covered a variety of research interests: Dr. Nicholas Fey (Assistant Professor at University of Texas at Dallas) gave a presentation on "Rehabilitation Engineering & Robotics". On Saturday, Dr. Akwasi Boah (Neurosurgeon at Texas Back Institute) wrapped up the meeting with a discussion of gait and balance analyses for spinal pathology - Clinician's Perspectives. Special thanks to our sponsors: AMTI, Tekscan and Delsys Inc.



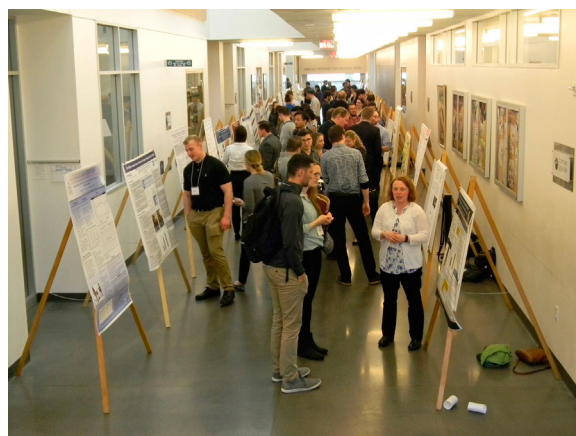
ASB East Coast Meeting 2019

Penn State Berks

Reading, Pennsylvania
April 12 - 13, 2019

ASB East Coast Meeting 2019

Penn State Berks hosted our second regional American Society of Biomechanics (ASB) conference on April 12-13, 2019. Over 50 undergraduate students, graduate students, and faculty presented posters and podium sessions at this year's two-day conference. Over 90 attendees came for workshops on Visual3D and Virtual Reality on the first day and presentations on the second. The conference featured Dr. Jonathan Dingwell as the keynote speaker and he presented on avoiding accidental bias in research studies. Seven student awards were given to best posters and podiums from undergraduate and graduate students. The conference was generously sponsored by the American Society of Biomechanics, C-Mo-



ASB Regional Conferences

tion, The Motion Monitor, AMTI, and Qualisys. These sponsors, and the support of Penn State Berks, allowed for a reduced cost for students to attend the conference and for the student awards. More information, including abstracts, is available on the conference [website](#). We hope to see you at the 2020 conference!

Northwest Biomechanics Symposium

Nearly 100 biomechanists traveled from the northwest United States and Canada to Bozeman, MT to attend the 2019 Northwest Biomechanics Symposium May 17-18, 2019. This student-centered regional conference of the American Society of Biomechanics (ASB) featured podium and poster presentations from over 60 students in Montana State's new Norm Asbjornson Hall (below left). The scientific tone of the meeting was highlighted by an exceptional keynote address by Dr. Paul DeVita, past-president of the ASB (below right).



15th Northwest Biomechanics Symposium May 17-18, 2019 Bozeman, MT

Gold-Level Sponsors



Norm Asbjornson College of Engineering
College of Education, Health, and Human Development
Dept. of Mechanical & Industrial Engineering
The Graduate School



Bronze-Level Sponsors



Northwest Biomechanics Symposium

Montana State University

Bozeman, Montana
May 17 - 18, 2019

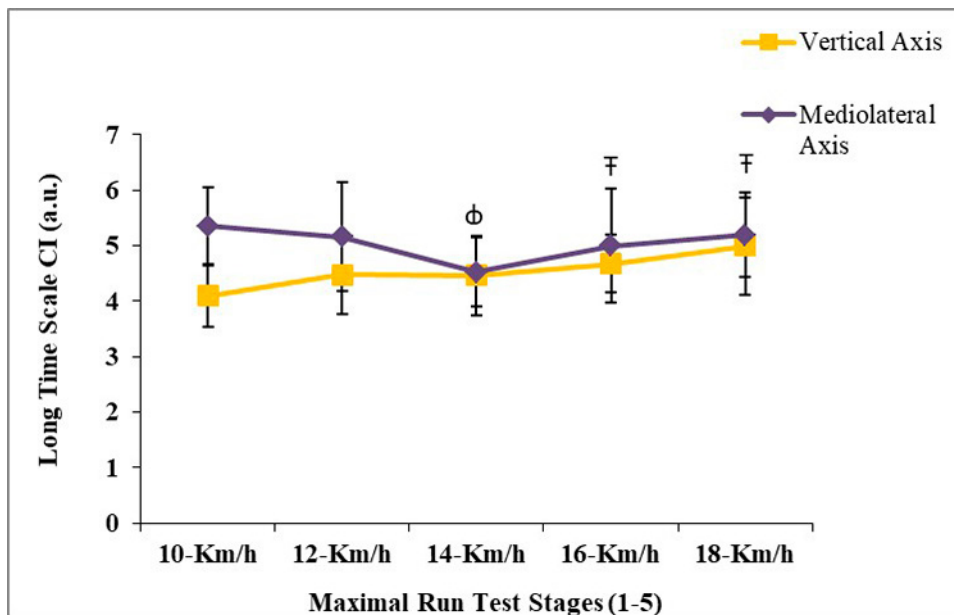


ASB 2018 Research Travel Grant

Jackie Morgan

In collaboration with the University of Memphis, a pilot study was conducted over a five-day period in August 2018. The primary objective of the pilot study was to quantify changes in system adaptability during and at the conclusion of a maximal running test, and to explore the effects an exhaustive running test might have on functional performance (single-leg hop test). A secondary aim was to explore the feasibility of testing several dynamic postural stability tests and correlate stability measures using force data and accelerometry. Overall, seven runners volunteered to participate in a single session study design. The design of the study included participants performing a series of dynamic postural stability tests (50% max vertical jump test, a forward and lateral single-leg hop test over a 12 inch hurdle, and a continuous 30-second single-leg hop test) prior to a maximal running test and a second single-leg hop test immediately after. The maximal running test included five 4-minute running stages at progressively faster speeds; 10-Km/h, 12-Km/h, 14-Km/h, 16-Km/h and 18-Km/h. The participants began the test with a two minute warm up at their preferred running pace and were instructed to complete as many stages as long as possible until they could no longer maintain speed. Ratings of perceived exertion (RPE) were verbalized and recorded to confirm a maximal effort was given.

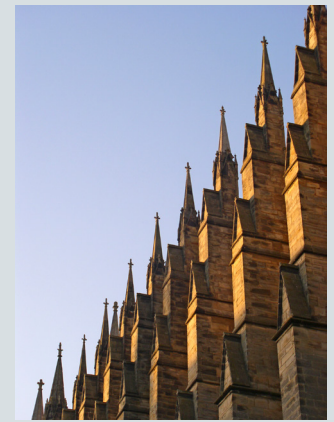
A tri-axial accelerometer was placed on the participant's sacrum during testing and filtered at a 10Hz cut-off frequency using a zero-lag Butterworth filter. Multiscale entropy analysis was applied to the filtered acceleration data and sample entropy was calculated at each time scale (1-10). Overall, vertical entropy measures and complexity indices at both long and short scale factors was noticeably lower during all stages for all participants compared to the mediolateral (ML) and anteroposterior (AP) directions. Lower complexity (reductions in adaptability of the nervous system) in the vertical direction during treadmill running may relate to one's desire to limit lateral sway (remain centered on the treadmill) and to negotiate a continuously moving belt (AP).



ASB 2018 Grant-in-Aid

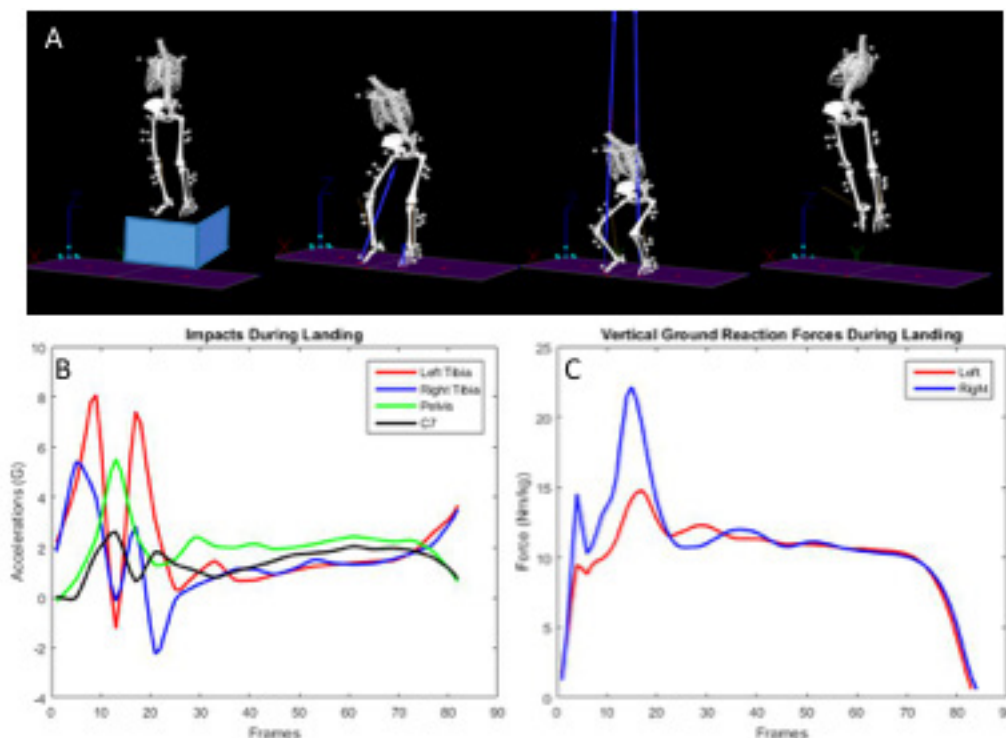
Alexa K. Johnson: Connecting the Pieces: How Low Back Pain Alters Lower Extremity Biomechanics and Shock Attenuation in Active Individuals

In the general population, more than 80% of individuals will experience an episode of low back pain (LBP) at some time during their lives, whereas in active populations, up to 37% of athletes suffer from LBP, and military populations report 70% higher prevalence than the general population. Those who experience LBP tend to adapt their movement patterns to compensate for pain. These compensations often become learned behaviors that results in lasting damage to the lower extremity joints. The purpose of this project is to determine how chronic LBP influences lower extremity biomechanics and shock attenuation in active individuals compared to healthy individuals. To date, 11 physically active individuals suffering from chronic low back pain and 11 physically active healthy matched controls participated. Preliminary analyses indicate that individuals who suffer from LBP recorded higher peak vertical ground reaction forces on both the dominant and the non-dominant limbs compared to the healthy control individuals. Additionally, while there were similar impacts on the dominant and non-dominant limbs across groups, there were uneven impacts sustained at the pelvis. The similar impacts at the tibia and the greater impacts at the pelvis in individuals suffering from LBP may indicate that an alteration in attenuation is happening in the lower extremities, before the force of the ground even reaches the back. The alteration in impacts and greater peak vertical ground reaction forces may indicate that compensation strategies are happening in the lower extremities during functional tasks, in terms of shock absorption and joint loading. Additionally, the increase in loading in individuals suffering from LBP may lead to reduced long-term musculoskeletal health outcomes, such as osteoarthritis.



**University of
Kentucky**

**Advisor: Joshua D.
Winters**





The Ohio State University

Advisor:
Stephanie Di Stasi

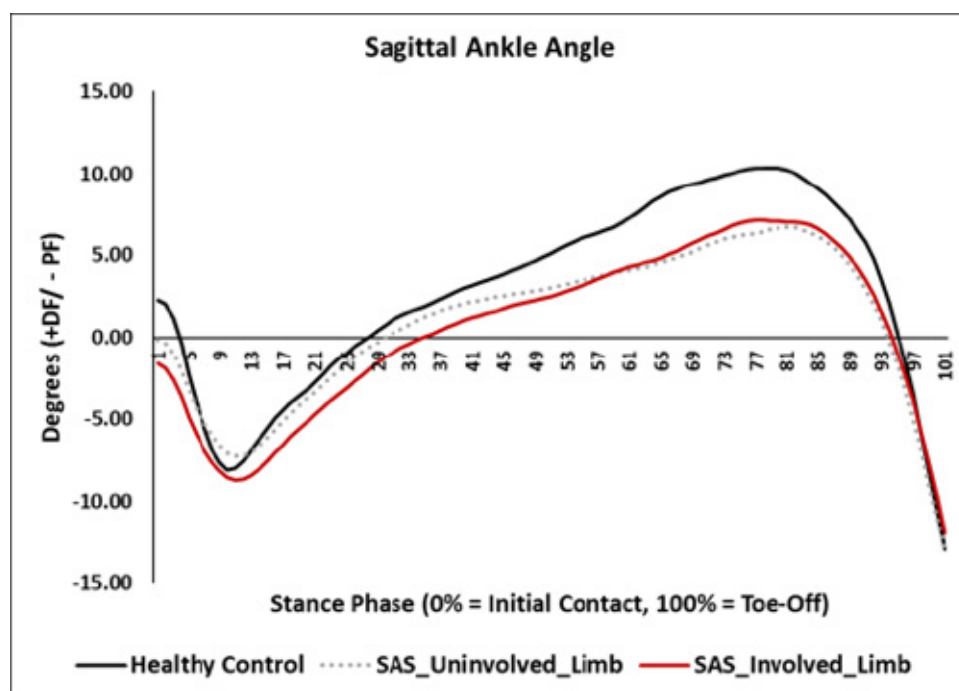
ASB 2018 Grant-in-Aid, cont.

Rachel Tatarski: Altered Ankle Mechanics as a Marker of Functional Disability in Individuals with a Syndesmotic Ankle Sprain

Syndesmotic ankle sprains (SAS), when not associated with fracture, are notoriously difficult to diagnose and are likely to result in a prolonged, and often incomplete recovery. SAS are commonly characterized by chronic pain, dysfunction, and long return-to-participation times; however, it is unclear what biomechanical deficits may exist in patients with SAS and how those deficits might be related to patient-reported function. Thus, the purpose of this study was to quantify the relationship between ankle biomechanics during gait and patient-reported function in patients with SAS. The overall hypotheses tested were that (1) subjects with SAS would walk with reduced peak ankle dorsiflexion and reduced peak external dorsiflexion moments compared to healthy controls, and (2) that poor patient-reported function would be associated with reduced ankle dorsiflexion and lower external dorsiflexion moments.

Thus far, two healthy control subjects (50% female, age: 31.9 ± 1.5 years, height: 1.73 ± 0.56 m, mass: 71.5 ± 3.6 kg) and five subjects with SAS have been tested (80% female, age: 26.0 ± 7.6 years, height: 1.69 ± 0.80 m, mass: 66.3 ± 10.9 kg). Subjects with SAS were, on average, 121 (± 82) days post-injury. All subjects underwent 3D motion analysis of self-selected walking. Inverse dynamics was used to calculate external ankle moments. Subjects with SAS completed the Foot and Ankle Outcome Score (FAOS) and the Foot and Ankle Disability Index (FADI) at the time of testing.

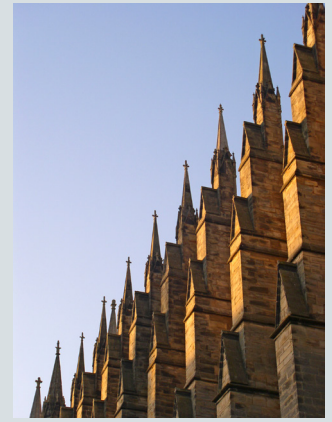
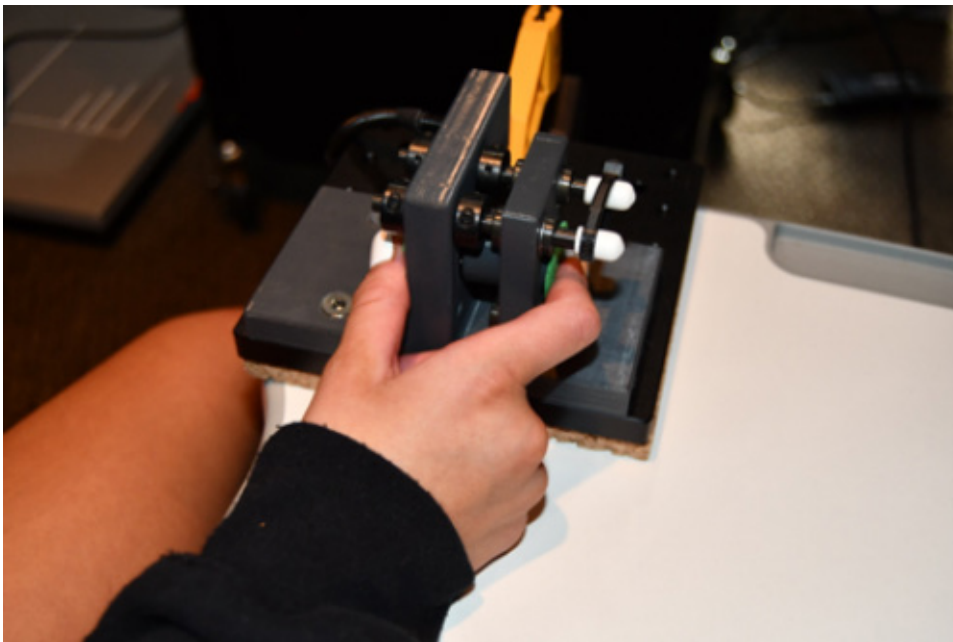
While subjects continue to be recruited and tested, the preliminary results suggest that there may be biomechanical deficits at the ankle that occur after SAS and that those deficits are associated with patient-reported function.



ASB 2018 Grant-in-Aid, cont.

Daniel Lidstone: Discovering Motor Phenotypes of Autism Spectrum Disorder: A Cross-Syndrome Study

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by persistent deficits in social communication and social interaction accompanied by restricted, repetitive patterns of behaviors, interests, or activities. Brain regions implicated in the behavioral phenotype of ASD include motor areas such as the cerebellum and basal ganglia making it possible to identify motor phenotypes specific to ASD. Identifying motor phenotypes of ASD using biomechanics techniques may improve clinical diagnostic practices and provide objective measures to evaluate the effectiveness of pharmaceutical and behavioral interventions. We are particularly interested in the potential to treat ASD using non-invasive brain stimulation techniques. Our research group is currently collaborating with the University of Nevada Las Vegas (UNLV) Medicine Ackerman Autism Center to collect biomechanics data on children with ASD and clinical controls without a diagnosis of ASD. Inclusion of clinical controls with Fetal Alcohol Spectrum Disorder and Attention-Deficit Hyperactivity Disorder will allow us to determine motor features specifically impaired in children with ASD. We are currently assessing postural control, grip-force visuomotor tracking of static and dynamic targets, and manual dexterity in a clinical setting. Our next step is to examine the effect of non-invasive brain stimulation on measures shown to be specifically impaired in children with ASD.



University of Nevada at Las Vegas

**Advisor:
Janet Dufek**



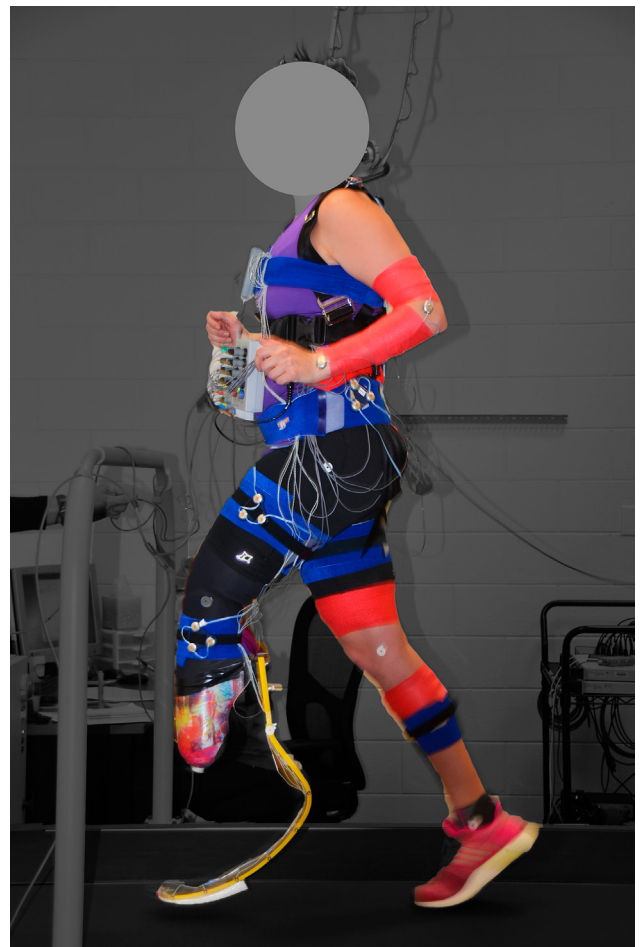
Colorado School of Mines

Advisor: Anne Silvermann

ASB 2018 Grant-in-Aid, cont.

Lauren Sepp: Running with a transtibial amputation using running-specific and daily-use prostheses

Running can be beneficial for people with a transtibial amputation, but some individuals may not have access to running-specific prostheses and therefore choose to run using their daily-use prosthesis. Unlike running-specific prostheses, daily-use prostheses are not designed for running and may result in biomechanical differences that affect running performance, neuromuscular control, and injury risk. My research focuses on determining the biomechanical implications of running using running-specific prostheses compared to daily-use prostheses. Through the support of the American Society of Biomechanics Graduate Student Grant-In-Aid, additional research participants were recruited for this study, allowing for better generalizability of the results. I collected whole-body kinematics, ground reaction forces and surface electromyography signals at a range of running speeds from people using their prescribed running-specific and daily-use prostheses. Analysis of ground reaction forces and lower-limb joint work suggest that running-specific prostheses are beneficial for achieving faster speeds by providing greater propulsion and reducing the magnitude of amputated leg hip joint work compared to daily-use prostheses. However, daily-use prostheses provide greater vertical support and medial/lateral force generation compared to running-specific prostheses. I have also quantified differences in timing and magnitude of muscle activity to further understand the neuromuscular control of using different types of prosthetic devices. Further, these data are being used to drive a musculoskeletal model within a simulation framework to quantify lower-limb joint contact forces, which are important to understanding long-term joint degeneration and injury risk in this population. I will present initial results from these analyses at ISB/ASB 2019. I thank the ASB Grant-in-Aid program for their generous support in enabling us to obtain additional consumable laboratory supplies and recruit additional participants to strengthen our study.

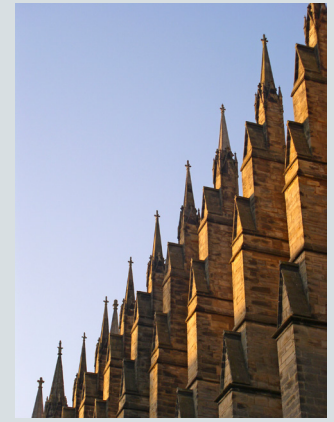


ASB 2018 Grant-in-Aid, cont.

Emily Gerstle: Transition step mechanics: How influential are age and fall history?

As age increases, so does the risk of falls and fall-related injuries, with older adult women falling twice as often as men. One of the most hazardous types of locomotion for older adults is step negotiation. Although continuous step mechanics have been studied, the transition step where 30% of falls occur has not been adequately examined. Therefore, the purpose of this study was to examine lower extremity (hip, knee, ankle) and distal foot (medial midfoot, lateral midfoot, medial forefoot, lateral forefoot) function during transition step negotiation across young women (YA), older women with a history of falling (OFH) and older women with no fall history (ONF). The aim of the study was to determine group differences in lead and trail limb minimum step clearance, foot placement and lower extremity kinematics during negotiation of a single transition step. It was hypothesized that the older groups would have lower vertical foot clearance, closer horizontal foot placement of the lead and trail limbs, and a more extended lower extremity at contact compared to the young adults. Further, it was anticipated the OFH group would have lower clearance, closer placement, and more extended lower extremity position compared to the ONF group.

The OFH group (n=15) was over 64 years old and experienced at least one fall within the last year. The ONF group (n=15) had no falls in the previous year and the participants were age and BMI matched to the OFH group. The YA group (n=15) was between the ages of 18-40 with no history of falls in the last year. With respect to the first aim, the older adult groups' lead limb placement was significantly closer to the step than the YA group. Additionally, at initial contact, the older adult groups' lead knee was significantly more flexed than the YA group. The closer placement and greater knee flexion at landing of the older adults may be an adaptation to decrease the time the trail limb is in single limb stance. Although the adaptations may decrease time in single limb stance, landing closer to the step may increase the risk of catching the heel on the step. Further, the knee in greater flexion at landing in the older adults may increase the required load on the quadriceps, which could put some older adults in danger of falling due to age-related strength decreases. Thank you to the ASB Grant-in-Aid award for providing funding for this study.



**University
of Wisconsin
Milwaukee**

**Advisor: Stephen C.
Cobb**



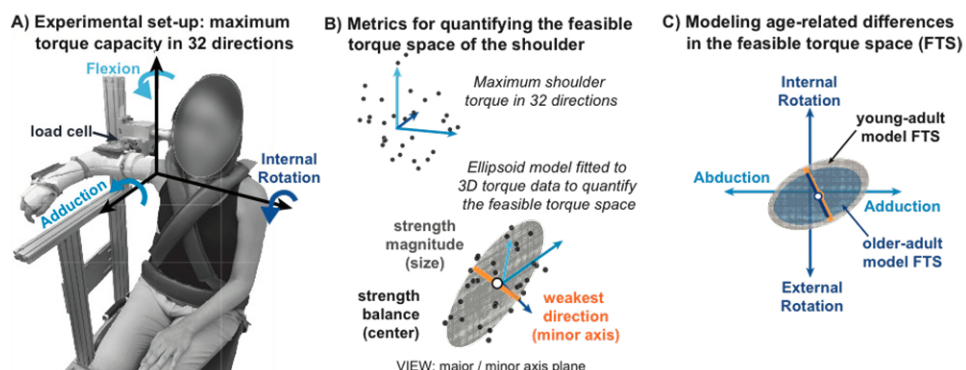
Northwestern University

Advisors: Eric Perreault and Ameer Seitz

ASB 2018 Grant-in-Aid

Emma Baillargeon: Quantifying age-related differences in shoulder muscle coordination in healthy adults.

Degenerative shoulder pathology, such as osteoarthritis or rotator cuff disease, is often associated with pain, functional limitations, and reduced independence in older adults. Although the prevalence of pathology increases with age, the underlying age-related disease mechanisms are not precisely known. Altered muscle strength and coordination have been hypothesized as contributing factors but have not been confirmed empirically. Therefore, the long-term goal of this project is to quantify the influence of age on shoulder muscle strength and coordination. Because three-dimensional (3D) shoulder torque production is important for daily tasks, but cannot be assessed by typical unidimensional strength measures, we first developed metrics to quantify shoulder strength in all directions. We measured maximal volitional shoulder torques in 32 unique directions in 16 young adults to establish each participant's feasible torque space (Figure 1A). We then fit an ellipsoid to each participant's torque data and used this model to quantify overall strength magnitude, strength balance, and the direction in which participants were weakest (Figure 1B). Strength magnitude varied across individuals and was significantly lower in women ($41.0 \pm 15 \text{ Nm}$) compared to men ($83.4 \pm 18 \text{ Nm}$, $p < 0.001$). In contrast, strength balance and the weakest direction were highly consistent across participants. Participants were $6.7 \pm 6\%$ stronger in adduction than abduction and $9.2 \pm 5\%$ stronger in flexion than extension but had nearly equal strength in internal and external rotation ($-0.07 \pm 3\%$). All participants were weakest when combining adduction, external rotation, and flexion. We then used musculoskeletal simulations to demonstrate that these feasible torque space metrics are able to distinguish between the anticipated changes in muscle strength in older adults (Figure 1C). We are currently collecting these data in older adults to quantify age-related differences in the feasible torque space experimentally. In addition, we are collecting electromyography to assess how muscle coordination is altered during sub-maximal and dynamic tasks. Together, these data will characterize shoulder strength and coordination across the lifespan, and inform future studies aimed at identifying early pathology, altering disease progression, and reducing the impact of age-related shoulder pathology in older adults.



Umbrellas are for Tourists

William Ledoux

Well, I have set a personal best for “latest newsletter distribution”, but I hope that at least some of you find a nugget or two in these pages before the annual meeting. On an unrelated note, one of my long standing goals as ASB newsletter editor was to organize the ASB archives, which consist of the hardcopy files of past ASB executive board members as well as annual meeting proceedings and abstracts. Most of the non-annual meeting information consists of records from previous ASB secretaries and presidents. The content had been sent to me as part of the preparation for the 40th annual meeting in Raleigh a few years ago. After residing in my office for the better part of three years, I was finally able to organize the boxes, generate a summary document, and ship them off to their new home at The Eberly Family Special Collections Library, at Pennsylvania State University, where the staff has begun to set up the official record of the archives. As the process proceeds, I’ll provide updates to the membership, but it is expected that a “Finding Aid” will be published electronically and that the records will be climate controlled and under our custodianship/ownership of the Penn State Library in perpetuity.

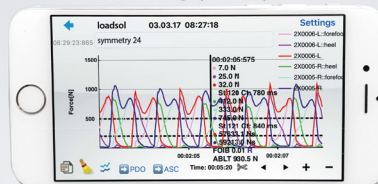


loadsol®

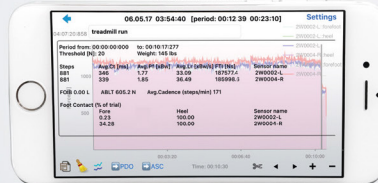


Wireless, smartphone device for accurate total plantar force measurement.

Walking symmetry



Trial Overview



Four sensor layouts are available with the loadsol®



loadsol loadsol HF loadsol HMF loadsol HMI

novel 

emed[®]

Barefoot pressure platforms
for both research and clinical
applications.

pedar[®]

In-shoe pressure measurement via wireless Bluetooth. Pressure, force, and gait parameters are available.

pliance®

Pressure sensors for a variety of applications including hand, prosthetics, seating, and more.

novel electronics inc.
www.novelusa.com
novelinc@novelusa.com
964 Grand Avenue
St. Paul, MN 55105



Events Calendar

Dan Gales



NOTE:

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

37th Annual International Society of Biomechanics in Sport

July 21-25, 2019

Oxford, Ohio

Abstract deadline: past

isbs.org/conferences/29-isbs2019

4th Rocky Mountain Muscle Symposium

July 27-29, 2019

Canmore, Alberta, Canada

Abstract Deadline: May 15, 2019

rmms-2019.com

14th biennial Footwear Biomechanics Symposium

July 28-30, 2019

Kananaskis, Alberta, Canada

Abstract Deadline: February 15, 2019

fbs2019.footwearbiomechanics.org

TGCS 17th International Symposium on Computer Simulation in Biomechanics

July 28-30, 2019

Canmore, Alberta, Canada

Abstract Deadline: past

isbweb.org/~tgcs/isb2019/canmore.html

XXVII Congress of the International Society of Biomechanics and American Society of Biomechanics 43rd Annual Conference

July 31-August 4, 2019,

Calgary, Canada

Abstract deadline: January 31, 2019

www.isb2019.com

16th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering

August 14-16, New York City,

New York, USA

Abstract dead-

line: closed

cmbbe2019.com

6th International Patellofemoral Research Retreat

October 1-3, 2019, Milwau-

kee, Wisconsin, USA

Abstract deadline: closed

ipfrn.org/conference2019/

6th International Conference on Movement and Computing

October 10-12, 2019

Tempe, Arizona

Abstract deadline: February 27, 2019

tinyurl.com/ybvuep99

Biomedical Engineering Society 2019 Annual Meeting

October 16-19, 2019

Philadelphia, Pennsylvania

Abstract Deadline: May 1, 2019

[www.bmes.org/content.](https://www.bmes.org/content.asp?contentid=528)

[asp?contentid=528](https://www.bmes.org/content.asp?contentid=528)

Human Factors and Ergonomics Society 63rd International Annual Meeting

October 28-November 1, 2019

Seattle, Washington

Abstract deadline: tba

www.hfes2019.org

International Foot and Ankle Biomechanics Meeting

April 5-8, 2020

Sao Paulo, Brazil

Abstract deadline: November 10, 2019

www.i-fab2020.com



ISB / ASB 2019

July 31 - August 4
Calgary, Canada

Telus Convention Centre



isb2019.com



UNIVERSITY OF
CALGARY

