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Newsletter

Volume: 30 - Number: 1, June 2017

From the President

Chris Hass



Neuroplastic, viscoelastic, and anisotropic are all biomechanical terms that, at a basic level, relate to the body's ability to adapt to demands placed upon it. Like the body, ASB must be able to respond effectively and efficiently to changing demands and alterations in research funding priorities, higher education policy, and our growth as "21st Century's break through science." We must not only be reactive; but we also must be forward-thinking and seek opportunities to grow our society and its impact on our membership and the field.

Let us not be content in staying small. Nelson Mandela writes, "there is no passion to be found playing small—in settling for a life that is less than the one you are capable of living." With our success and maturation, ASB is capable of more. Several new initiatives have been discussed amongst the Executive Board this year. These initiatives include: (1) the creation of a Leadership Development Program, whereby cohorts of members could participate in online and in person programing; (2) forming ASB University: support for the development and distribution of online lectures and laboratory exercises that can be used by our members and can serve as outreach to institutions with little exposure to or expertise within biomechanics; (3) increasing ASB leadership/participation in diversity programs such as NSF ADVANCE: Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers, Alliances for Graduate Education and the Professoriate (AGEP), Research Experiences for Undergraduates (REU) programs and/or tabling/recruiting at [Annual Biomedical Research Conference](#) for Minority Students; (4) an enhanced student awards program, including greater breadth of conference award competitions; and (5) a broad series of suggestions by the ASB Fellows concerning established diversity, equity, and inclusion initiatives (see the [Fellows Forum article](#)).

These are interesting initiatives about which we can be proud. However, as E. M. Forster stated, "one person with passion is better than forty people merely interested." The Executive Board is excited to partner with those passionate about these or other initiatives and to facilitate their development and long-term success. Please contact any of us on the Board or the Ministry of Big Ideas ([#ASBFellows,@KinesKing](#)) to indicate your interests and commitment to pursue them.

Speaking of big ideas, the Boulder meeting is full of them. We return to the con-

Continued on page 3...

Student's Corner

Katie Knaus

Hello from Virginia! This year the ASB annual meeting will be at the University of Colorado in Boulder, CO on August 8-11, 2017. For those attending, I encourage you to participate in the ASB one-on-one student mentoring program, which is designed to allow students to network with more senior scientists, faculty, and industry members. Students interested in being a mentee can be paired with a mentor on similar research interests or career paths; mentors and mentees find a convenient time to meet over coffee or a meal. Mentor matches can discuss a variety of topics that are helpful for the students such as educational, career, and professional objectives. Sign up during conference registration!



ASB Involvement

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

Start the conference by attending the Student Welcome on Tuesday (Aug 8) at 5pm in the North Dining Room. I will talk about the [student events](#) and give some tips for navigating the conference. It is a great time to meet and greet peers and establish some friendly faces. Then, as the Opening Reception wraps up at 8pm, head to the UMC Connection for the Student After-Reception. Join old and new friends to enjoy bowling, billiards, other games, and a cash bar. The next day (Aug 9), grab lunch and join us at 12:15pm for Student Networking where you'll have a chance to meet students from other labs and discuss career and research interests. Later that evening at 8pm, head to Fate Brewery for the Student Night Out to relax with dessert and drinks, including local Boulder beer! There will be shuttles running from campus to Fate and back throughout the event. On Thursday (Aug 10) at 6:30pm, there will be a Student Career Event with round table discussions on a variety of topics lead by biomechanics professionals including professors, engineers in industry, physical therapists, and consultants. Speakers will be at small tables to allow for personal discussion and feel free to switch between topic tables to learn about more opportunities. For many of these events, you will need to sign up during registration. If an event is full, don't be discouraged from attending as there are often last minute openings. Other events also include the Inclusivity Breakfast on Thursday (Aug 10) and the Women in Science Cocktail Hour on Wednesday (Aug 9), both of which focus on celebrating and promoting diversity in ASB and creating open discussions amongst biomechanists. Find details and updates on [student events](#) on the conference website!

I would also like to point out that there is a growing number of resources available on the [ASB website](#) that are especially helpful for students in every stage of their career. Further, we have made an effort to expand ASB's [Facebook](#) presence, and a lot has been thanks to the efforts of ASB students. Check out the Facebook Highlights later in the newsletter and be sure to like and follow ASB's page! Lastly, I'd like to thank the outstanding members of the ASB student advisory committee (Jana Jeffers, Amanda Stone, Simi Oludare, Ana Ebrahimi, Anthony Anderson, Andrew Vigotsky, Daniel Kuhman, Samuel Masters, Becky Krupenovich, Samuel Acuna, Ryan Wedge, Bhushan Thakkar, Kelley Virgilio, and Katie Pelland) for their hard work. Any suggestions for the student advisory committee or the annual meeting student events can be directed to me at ker4e@virginia.edu. I look forward to seeing you in Boulder!



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.

Chris Hass

lines of a college campus for the first time in several years. While our size and growing scientific program certainly represents a challenge, your Program and Meeting Chairs have deftly crafted an exceptional experience (please see their respective newsletter articles). While many traditional features of the conference have been maintained, there are a plethora of new approaches and exciting opportunities to take in all that the Boulder community has to offer. I look forward to seeing you there.

In other news, the Executive Board and ASB Fellows are pleased to announce a new path forward for the Jim Hay Memorial Award. 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. The awardee will deliver the Jim Hay Memorial Lecture highlighting how the study of biomechanical principles in the extraordinary context of sport can inform our understanding and directly impact performance or focusing on central questions related to selected physiological systems, e.g., the musculoskeletal system, nervous system, or cardiovascular system, that inform behavior at the extreme end of human performance. This award lecture will be the feature presentation within the Jim Hay Memorial Session. This session will have a central theme and the Hay Awardee will be complemented by a panel of invited speakers. This Board and Fellows believe this new approach

will generate meaningful discussion and seed areas of potential collaboration, and values investigation and conversations that intermingle the basic and applied sciences to maximize human abilities. Full details of the award, nomination process, and format of the award session can be found on the ASB awards page.



Secretary/Membership

Stacie Ringleb



During the past six months we switched our membership database management software from OpenWire to CVent. OpenWire served us well for many years, but we needed to pay for a system upgrade to improve security and functionality. Additionally, CVent is the software that we use for conference registration, so having the capability to link both was a deciding factor. We now have two different web sites in our system. The **first** site is where you can pay dues, purchase journal subscriptions, and make donations to our award funds. This is set up as a conference event and will have a different web site every year. The **second** site is our membership management tool where you can change the information in your membership profile. At the moment, you will also have to contact me if you have a change in name or email address, but we hope to have this fixed shortly. In the CVent system, we are charged based on the number of records in our database, therefore the board decided to keep only 5 years of members in the database. If your membership lapses for more than 5 years, you will have to contact the membership chair to import your information into the system.

We launched our new CVent system at the end of March. There were several bugs in the beginning, and I thank everyone for being patient as we worked them out. I would also like to thank the members who confirmed that things worked (or didn't) after we made a change. Without your help and patience, this conversion would have been a lot more painful. Since the new system was launched, we've had 153 membership applications submitted and 146 renewals. As of June 15th, there are 19 pending membership applications, which should all be reviewed before mid July. The last change with our membership database is how we'll be running the elections. This year, we're running the election for president-elect and the program chair for the 2019 annual meeting through SurveyMonkey. While the election was still open when this was written, it seems to be going well.

As of June 15th, we have 906 regular or student members. This is an increase of 76 over last June. 558 of our members are regular members and the remaining 348 are student members. Most have reported their primary discipline: we have 44 in the biological sciences, 383 in Engineering and Applied Physics, 51 in Ergonomics and Human Factors, 269 in Exercise and Sports Science, and 146 members in Health Sciences. To help our diversity committee understand the demographics of our society, at the end of 2015, we revised the demographic data we collect. If you haven't updated your demographic data, please take a few minutes to go to the [membership tool](#) to update this. The sex of our members are: 325 female members, 531 male members, and 3 who didn't wish to answer. There are 6 members who are American Indian/Alaska natives, 117 Asian members, 20 black/African American members, 36 members who selected "other" for race, and 665 white members. For our members who have reported their ethnicity, 117 are Hispanic or Latino, 523 who are not Hispanic or Latino and 49 who did not wish to answer. For disability, we have 843 members with no disability, 12 with a disability, and 45 people who didn't wish to answer.

Please feel free to find me in Boulder if you have any feedback to provide for our new system for the management of our membership and running our elections.



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Advertising in the Newsletter

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

The current advertising rates are as follows:

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

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

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ASB Newsletter



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Treasurer

Tamara Bush



Our society finances are in healthy shape. So far this year we have sponsored five regional meetings for a total of \$10,000 and we've provided five Grants-in-Aid to our members (\$10,000 total). For this year's meeting we plan to award 21 travel grants for a total of \$5,250. We will also be providing awards to our Hay, Borelli, Goel, Founder, Young Scientist, and Junior faculty winners for a total of \$10,500. Finally, Elsevier sponsors two \$1,000 awards for Clinical Biomechanics and the Journal of Biomechanics. In total, ASB will provide society members with nearly \$40,000 in awards and meeting support. The majority of these funds are derived from membership dues and our corporate sponsorships, however, we've also collected many donations for the Hay, Borelli, Goel and Founder awards. Thanks to all of you who support ASB!

Right now, our checking account has \$53,000 in it; however, the above meeting awards have not yet been paid out of that account. Additionally, the board agreed to set aside \$10,000 for the next meeting site to borrow. Each year, the host institution has to place down payments on the various venues in the fall, and each year institutions struggle to obtain these funds. Since we had a surplus from the last meeting, we are now able to provide "loans" to the host institutions, making it easier for them to plan the meeting. Additionally, our long term reserve fund is up from last year; we are at \$203,650. We do not spend these reserves; they are there in case we encounter issues with a meeting—such as a natural disaster, and the meeting is not held, yet we are past the point of obtaining deposits back.

The society has regular expenses as well; these include software to manage our membership, accountant fees, processing fees for use of credit cards for 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 in advance and view the conference space, as well as conduct a full day of society business face to face. This year, the cost for the mid-year meeting was \$8,000 with the majority of that cost being flights for our 13 board members. This is in line with what was spent in prior years.

Industries/Vendors: One common question asked is how can we obtain more publicity? Or, how can we reach ASB members directly? We offer corporate sponsorships, at the Supporter (\$1,000) and Partner (\$3,000) levels, which provides:

- One annual subscription to the Journal of Biomechanics.
- One annual ASB membership for a point of contact.
- Identification on the ASB Home Page and in ASB Biannual Newsletter as a Corporate Sponsor with a company logo and webpage link, and, for Partner Sponsors, a 20-word description under the logo.
- One time use of the email membership list per year (Partner Sponsors only).
- One half-page advertisement in the newsletter each year (Partner Sponsors are offered an additional half-page advertisement, which can be combined into a single full-page).

If you would like to see something else offered as part of the corporate membership, please let the executive board know; we want to provide our industrial partners with a program that is optimal for them!

Education Committee

Kimberly Bigelow

When I became the Education Chair, we decided to expand the education committee, creating smaller sub-committees for the various educational initiatives of the ASB. I cannot thank our Education Committee enough for all of their time, effort, and energy to see these initiatives through. Even with our larger committee, our members are staying busier than ever!

The Grant-in-Aid (GIA) sub-committee spent the late winter and spring reviewing a record number of ASB Graduate Student GIA applications. The purpose of this program is to support ASB student members pursuing biomechanics research by offering a source of research funding. We received 32 applications this year and were able to award five \$2,000 awards. Congratulations to our 2017 awardees; we look forward to learning more about the results of their projects when they present their completed work next year in Rochester, MN.

- Jonathan Goodwin, University of North Carolina at Chapel Hill, Advisor: Dr. Troy Blackburn. *Neuromechanical contributions to lower extremity stiffness during hopping and running*
- Daniel F. Feeney, University of Colorado – Boulder, Advisor: Dr. Roger Enoka. *Neuromuscular determinants of manual dexterity in old adults*
- Kyung-Mi (Jasmine) Park, University of Southern California, Advisor: Dr. Chris Powers. *The influence of lower extremity kinematics and patella position on patellar tendon stress and strain in persons with patellar tendinopathy*
- Andrew D. Vigotsky, Northwestern University, Advisor: Dr. Sabrina Lee. *In vivo relationship between shear-wave velocity and joint-based estimates of muscle stiffness*
- Ying Fang, Worcester Polytechnic Institute, Advisor: Dr. Karen Troy. *The Effect of Ergometer Setup and Rowing Technique on Joint Loading during FES Rowing among People with Spinal Cord Injury*

Looking forward, we would like to encourage all graduate student members in need to consider submitting a GIA application. GIA applications are always due on January 15th. You and your advisor must be ASB members in good standing at the time of application—so be sure to plan on renewing your membership as 2017 comes to a close. Graduate students wishing to become new ASB members should apply for membership in the fall to allow plenty of time for their membership application to be approved. As a committee, we also plan to explore options so that the number of GIAs can grow if we continue to have growing numbers of applications.

The Teaching Repository sub-committee also continues to be busy as the ASB repository grows. The Teaching Repository aims to be a resource for instructors to find ideas for lessons, labs, activities, and other educational needs. The suc-



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Education Committee, cont.

Kimberly Bigelow

cess of this effort depends on the contributions of our ASB members. The more contributions we have, the more likely members will continue to come to the repository, search for ideas, and find value in what is offered. Please think about the biomechanics courses you taught in 2016-2017 and use some “free time” this summer to add your most effective items to the repository. We are also working hard to make the Teaching Repository meet our members’ needs so expect to see changes coming—as we do this, please email suggestions, ideas, wishes, or bugs to [myself](#) and/or [Patrick Rider](#).

Our smallest sub-committee is made up of Kim Fournier and Erin Feser, who with myself are spearheading some new initiatives. They have worked very hard to create a Teaching Symposium for the 2017 conference that I am very excited about. The symposium is scheduled for Thursday morning and will include some great presentations on educational approaches adaptable to various types and levels of courses, a short presentation on the teaching repository, and then for the first time an introduction and deep-dive into the Scholarship of Teaching and Learning (SoTL) of biomechanics. This will be a great resource for anyone who might wish to take what they are trying in the classroom and go a little deeper to assess student learning and possibly publish, present, or pursue grants in this area. We have also organized a Teaching Roundtable event that will be held at the conference Thursday after the symposium, during lunchtime. This should be a great chance for newer teachers to ask questions, discuss concerns, get ideas, and network. It does seem we will need to limit this event to 50 people—please watch your emails as the conference approaches for details for more information.

If you have any ideas of how you would like our committee to better support the educational needs of our members, please [email](#) me to let me know. We hope to see a few other new initiatives through in the next two years of my term and your ideas on what these will be are certainly welcomed!

“A man who dares to waste one hour of time has not discovered the value of life.”

- Charles Darwin

ASB Fellows Forum

Joan Bechtold, JJ (Trey) Crisco, Robin Queen, Kristin Zhao

Biomechanics and National Biomechanics Day as Mechanisms to Support Diversity, Equity, and Inclusion

Eds. note: in this article, two ASB Fellows (Joan Bechtold and Trey Crisco), are joined by the incoming (Robin Queen) and outgoing (Kristin Zhao) Diversity Chairs



In this 2nd “ASB Fellows Forum” article, we are following up on James Ashton-Miller’s and Ron Zernicke’s inspiring 1st Fellows Forum article in the last ASB newsletter ([Volume 29, Issue 2](#)): specifically, that a significant focus for “high performing” organizations such as the ASB, should be namely: diversity, equity, and inclusion (DE&I).

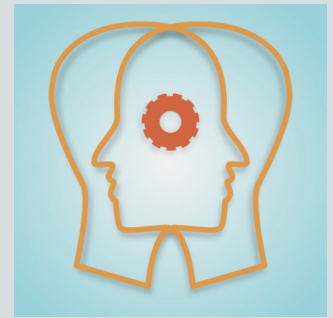
Let’s start by reminding ourselves of the Mission statement approved by the Executive Board in 2014: “The American Society of Biomechanics is committed to building a professional community that respects and promotes diversity, equity, and inclusion. We strive to learn from the diverse perspectives of our membership as we seek common goals for the biomechanics community.”

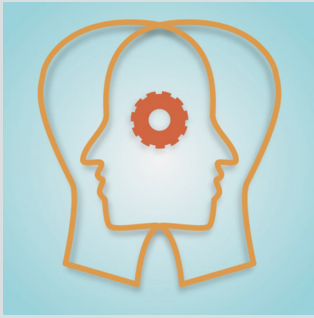
Furthermore, James Ashton-Miller and Ron Zernicke (A-M/Z) proposed three outstanding ideas for ASB members to consider, in order to “re-emphasize the vital importance for DE&I to enhance the creativity and the quality of science in ASB, and create a more diverse, equitable, and inclusive ASB”. We put forward opportunities here, in hopes of defining how we can best move forward in a meaningful manner.

1. A-M/Z Proposal: “Have ASB formally affiliate with universities with large enrollments of under-represented groups (e.g., Historically Black Colleges and Universities (HCBU), and Hispanic Serving Institutions (HSI)).”

Action: As a first (organic) step, there is tremendous opportunity for 1:1 Professor:Professor relationships to develop, leading to student interchange or institutional collaborations. If you have individual success stories or success strategies to share, please send them to [Robin Queen](#) (incoming Diversity Chair) so that your experiences and successes can be shared with the ASB membership. We would recommend that ASB consider a Diversity Committee HCBU/HSI subcommittee/task force, to formulate a longer-term, more strategic approach. If you see this as a particular niche or passion of yours, consider nominating yourself (contact [Robin Queen](#)) for such a subcommittee/task force.

2. A-M/Z Proposal: “Develop a NextMember workshop/seminar to precede an ASB annual meeting (or regional meetings) in which hosted early-career faculty, post-doctoral fellows and experienced PhD students from underrepresented mi-





ASB Fellows Forum, cont.

Joan Bechtold, JJ (Trey) Crisco, Robin Queen, Kristin Zhao

norities are invited to discuss careers and opportunities in biomechanics, across all areas of research and application.”

Action: We recommend the ASB Program and Meeting Committees evaluate and implement these sessions on an annual basis. Again, as a first step, a lead person could be designated within the Program and/or Meeting Committees, and have joint representation on the Diversity Committee.

3. A-M/Z Proposal: “As National Biomechanics Day (NBD) has begun to raise the profile of biomechanics among young people in schools and communities, and STEM Academies (Science, Technology, Engineering, and Mathematics) provide students with supportive and academically rich experiences during their critical transition from high school to college, we urge the ASB to pursue implementation of ASB-Pipeline Partnerships.” Note from Paul DeVita: NBD is inclusive: in the U.S. alone, with over 5,000 high schoolers, we had 51% female, 8% Asian, 18% Black-African American, 18% Hispanic/Latino, 5% Hawaiian/Pacific, & 51% White.

Action: We have three specific proposals for leveraging NBD to enhance the STEM pipeline, particularly for underrepresented minorities. The first two proposals (College Possible and Perry Initiative) are relatively straightforward to implement, and can be accomplished individually by ASB members. Implementation by ASB members should be coordinated by the Diversity Committee so that efforts are not duplicated, and importantly, they are documented and publicized by the society to further promote the activities. The third proposal (4th Family) will entail some risk in determining how to implement and whether it ultimately succeeds, but has tremendous potential and directly leverages ASB expertise, common goals and National Biomechanics Day outreach and goodwill.

a. ASB-Pipeline Partnership with College Possible or other college readiness organizations. Using randomized controlled trials, College Possible’s success shows the [potential of this program](#) with their [approach to preparing students](#) for college (20% increases in ACT scores, 100% admittance to colleges). Pertinent to ASB, they also have >90 partner colleges and universities, where you, as ASB members, could introduce and inundate them with the wonders of biomechanics as the best STEM field, while also being an additional resource in easing the transition to undergraduate life. (Disclosure: JB has familiarity with College Possible because it was founded and is active in the Twin Cities/Minnesota).

Action: Individuals can seek out whether their institution is a [Partner college](#). If so, you can approach College Possible representatives to individualize how an ASB member could be of most benefit to students on their campus. If not, College Possible may have distance mentoring opportunities, or you could advocate that your University partner with College Possible. Again, the ASB Diversity Committee can serve as a lead for organizational outreach if a more formal approach seems indicated.

b. ASB-Pipeline Partnership with the Perry Initiative. The Perry Initia-

ASB Fellows Forum, cont.

Joan Bechtold, JJ (Trey) Crisco, Robin Queen, Kristin Zhao

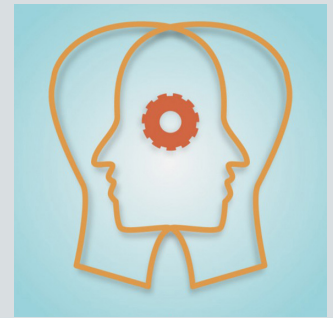
tive's mission is: "inspiring young women to be leaders in Orthopaedic Surgery and Engineering. We advance our mission principally by running hands-on outreach programs across the country for women students in high school, college, and medical school". The Perry Initiative high school and medical school outreach programs have recently been supplemented by OIA (Orthopaedics in Action), "designed specifically to bridge the gap between bioscience and engineering coursework and reinforce cross-cutting concepts in math and science." Several kits with materials for different curricula incorporating biomechanics principles can be purchased through [Sawbones](#) and implemented broadly to high schoolers.

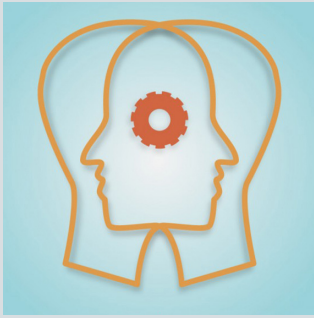
Action: ASB can annually sponsor an outreach program and/or provide biomechanics-focused OIA kits to local schools at the annual meeting site, and work with the Perry Initiative to specifically target schools with underrepresented minorities. Outreach sponsorship requires \$1k-\$4k per day-long session, which may require separate ASB fundraising or identification of local or national philanthropic partners. This program has been very successful in steering female students into engineering and medical students into orthopaedic residency programs, and is straightforward to implement (as long as the funding is available). Again, it would make sense for the ASB Diversity Committee to be the lead organizational contact for this activity.

c. ASB-Pipeline Partnership with 4th Family. Central to 4th Family, which provides urban students access to STEM, is use of biomechanical principles to understand and improve athletic performance of youth. "The 4th Family STEM program is centered on providing students access to the opportunities in the STEM disciplines. The focus of the program is to provide concrete, accessible STEM material through hands on seminars and mentoring programs. 4th Family places an emphasis on social justice within the context of STEM education and encourages peer to peer mentoring as part of the program."

Expanding upon 4th Family. John Drazan, PhD is a lecturer in Biomedical Engineering (BME) at Rensselaer Polytechnic Institute (RPI), and has succeeded in shaping the 4th Family program as STEM director. The 4th Family STEM program uses biomechanics and sports science to engage underserved youth in authentic STEM outreach through sports training. He has authored numerous publications analyzing and demonstrating effectiveness of using sports as a venue for STEM education for marginalized youth. Most recently, Dr. Drazan's programs won 1st Place in the Research Paper Competition for the MIT-Sloan Sports Analytics Conference, a.k.a., the "Super Bowl of Sports Analytics". This has led to an increased national profile for the program, including an opportunity to present his work to NBA executives at the 2017 NBA Summer League in Las Vegas. 4th Family will be running a series of sports-science programs this summer with popular figures such as the rapper Wale and Emmanuel Mudiay of the Denver Nuggets.

Dr. Drazan can best explain: "For all the limitations of the traditional STEM pipeline, it is very good at scaffolding scientific material within students' existing knowledge. Lego Mindstorms provides an age-appropriate introduction to robotics. The issue is that a lot of kids aren't that motivated to build robots dur-





ASB Fellows Forum, cont.

Joan Bechtold, JJ (Trey) Crisco, Robin Queen, Kristin Zhao

ing their free time. Many more kids love playing or watching sports. If we can similarly scaffold sports science/biomechanics and analytics as a tool for improvement within youth sports, we can authentically introduce STEM to a broad set of youth who are interested in sports at the outset rather than STEM. In this manner students without a preexisting interest in STEM can be engaged in STEM enrichment. Just as students in robotics clubs are motivated to learn STEM to build the best robot and win competitions, basketball players could be motivated to learn STEM to use sports science to become better athletes and get a scholarship. Youth players just need an accessible, authentic set of scientific and analytical tools that enables them to study their own games. The biomechanics research community is uniquely positioned to make this approach reality across our country.”

Action: As 4th Family continues to build on its solid success and broaden its program to motivate greater numbers of underrepresented youth to pursue STEM careers (and ideally with a biomechanics focus), growth will require that programs be facilitated by individuals other than the intensely devoted and energetic 4th Family founders. Given that ASB members are biomechanics experts, and work at universities across the country and in most urban centers, we propose that ASB initiate a step-wise strategy to partner with 4th Family to develop enthusiastic biomechanics-trained facilitators and leverage their institutional resources to create sustained community programs for youth presently excluded from the STEM pipeline. NBD is an ideal venue to provide focus, outreach, and publicity for an initial exposure of communities to the approach of youth engagement to biomechanics via sports.

Long-term strategy:

To train the ASB biomechanics/sport science facilitators, we would advocate that 4th Family hold regular training programs at the ASB annual meeting. This will introduce ASB members to the program, and also will help develop ongoing biomechanics outreach programs in the communities hosting each annual meeting.

We would advocate that the ASB Diversity Committee and Executive Board develop a 5-year implementation plan to partner with 4th Family for Annual Meeting training and National Biomechanics Day events, to support initiation of sustained community programs. This would include beta-tests, scientifically designed studies of effectiveness, academic and lay-publications and assessment of viability of the ASB-4th Family Partnership.

Short-term strategy:

Dr. Drazen would like to beta-test this approach when under his direct leadership, and suggests we have a National Biomechanics Day kick-off with “Science of the Slam” workshops during NBD 2018 and ASB’s 2018 Annual Meeting to be held in Rochester, MN. To prepare for this, in the interim, with support of Susan Diekrager and Novel Electronics, he would conduct an analogous trainer-focused workshop in the Twin Cities. This would be in collaboration with the Minneapolis Public Schools or YMCA/YWCA, with additional workshops as indicated, to hone the plan. He would design the effort as a case study to identify strengths and weaknesses, and work with ASB

ASB Fellows Forum, cont.

Joan Bechtold, JJ (Trey) Crisco, Robin Queen, Kristin Zhao

to develop a solid implementation plan to eventually provide for individuals to employ in their own communities.

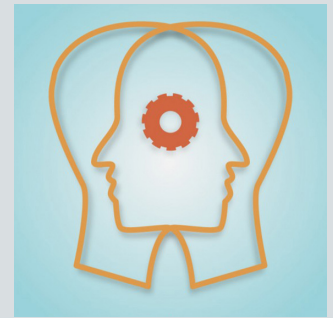
Here are two recent publications that highlight Dr. John Drazen's work:

Conf Proc IEEE Eng Med Biol Soc. 2015 Aug;2015:3691-4. doi: 10.1109/EMBC.2015.7319194. Experimental and credentialing capital: an adaptable framework for facilitating science outreach for underrepresented youth. Drazen JF, D'Amato AR, Winkelman MA, Littlejohn AJ, Johnson C, Ledet EH, Eglash R. Abstract: Increasing the numbers of black, latino and native youth in STEM careers is both an important way to reduce poverty in low income communities, and a contribution to the diversity of thought and experience that drives STEM research. But underrepresented youth are often alienated from STEM. Two new forms of social capital have been identified that can be combined to create a learning environment in which students and researchers can meet and explore an area of shared interest. Experimental capital refers to the intrinsic motivation that students can develop when they learn inquiry techniques for exploring topics that they feel ownership over. Credentialing capital denotes a shared interest and ability between all parties engaged in the experimental endeavor. These two forms of social capital form an adaptable framework for researchers to use to create effective outreach programs. In this case study sports biomechanics was utilized as the area of shared interest and understanding the slam dunk was used as experimental capital.

Conf Proc IEEE Eng Med Biol Soc. 2016 Aug;2016:3027-3030. doi: 10.1109/EMBC.2016.7591367. A case study for integrated STEM outreach in an urban setting using a do-it-yourself vertical jump measurement platform. Drazen JF, Danielsen H, Vercelletto M, Loya A, Davis J, Eglash R. Abstract: The purpose of this study was to develop and deploy a low cost vertical jump platform using readily available materials for Science, Technology, Engineering, and Mathematics (STEM) education and outreach in the inner city. The platform was used to measure the jumping ability of participants to introduce students to the collection and analysis of scientific data in an engaging, accessible manner. This system was designed and fabricated by a student team of engineers as part of a socially informed engineering and design class. The vertical jump platform has been utilized in 10 classroom lectures in physics and biology. The system was also used in an after school program in which high school volunteers prepared a basketball based STEM outreach program, and at a community outreach events with over 100 participants. At present, the same group of high school students are now building their own set of vertical jump platform under the mentorship of engineering undergraduates. The construction and usage of the vertical jump platform provides an accessible introduction to the STEM fields within the urban community.

As with many exciting ventures, this carries some risk. The ASB-4th Family partnership could help 4th Family to increase its capacity and impact from a founder-centric effort to one that can reach broader communities and incite biomechanics (and broadly, STEM) excitement in greater numbers of underrepresented youth. ASB can help fuel this growth, but we recognize at the end of the plan that ASB could also appropriately determine that alternate strategies may be more effective. The ASB Partnerships with College Possible and Perry Initiative carry less risk because the programs are more mature and can be more readily implemented.

In closing, we thank James Ashton-Miller and Ron Zernicke for focusing attention on the responsibility of ASB to foster DE&I in its activities. Here we extend this call to encourage the ASB Diversity Committee and Executive Board to evaluate the appropriateness of the ASB-Pipeline Partner and other suggestions outlined here as means to implement Paul DeVita and team's prescient development of NBD and his vision of "Biomechanics and National Biomechanics Day as Mechanisms to support Diversity, Equity, and Inclusion".





2016 Junior Faculty Research Award

Jeremy Crenshaw

Fall-recovery Training of Individuals with Chronic Stroke

Individuals living with chronic stroke have a fall risk that is twice that of age- and gender-matched controls. This increased risk results in fear of falling and limited balance confidence, in turn leading to activity avoidance. A third of all post-stroke falls are a result of a trip or a slip. Perturbation-based fall recovery training, often focusing on the stepping response necessary to recover from such falls, has effectively reduced falls in other populations. The benefits of such training on fall-recovery, balance confidence, and walking activity in individuals with chronic stroke are not known. Therefore, the purpose of this study is to evaluate the efficacy of fall-recovery training as a means to improve fall-recovery ability, increase balance confidence, and enable walking activity in the free-living environment.

To date we have enrolled nine individuals living with chronic to participate in our fall-recovery training. The fall-recovery training consists of six training sessions in which the participant is exposed to progressively challenging anterior and posterior simulated falls; practicing stepping with both their paretic and non-paretic limb. Using the funding provided by the ASB Junior Faculty Research Award, we were able to include step count monitoring for 3 months pre-training and 3 months post-training. To date, seven individuals living with chronic stroke have successfully completed our fall-recovery training with two of the seven individuals completing the six months of step count monitoring.

With training, we have observed promising improvements in forward fall-recovery kinematics when comparing the first and last training sessions. For example, five of the seven participants increased their initial recovery step length by 6 – 54% when stepping with the paretic limb (example in Figure 1). Although we have not observed similar improvements in posterior fall-recovery kinematics (example in Figure 2), we have identified a between-limb difference in recovery step placements. Initial posterior steps with the paretic limb were placed 44 – 347% wider relative to the CoM than non-paretic steps, a characteristic that directly limits the success of slip recovery.



This funding has allowed us to determine the feasibility of our methods and identify limitations in our planned approach. We are now recruiting participants with lower function and balance confidence, a group that is likely to benefit most from our training.



Past-President

Paul DeVita

As the Past-President of the Society it was my honor and duty to direct the awards process this past year. This work involved generating nominations for each award which of course was also substantially performed by the membership, creating and assisting the award committees, tallying their results and discussing these results with the committees, and...the best part...calling the award recipients with the good news. I must thank the membership for your generous and important contributions of serving on the award committees. Today I especially acknowledge the ASB Fellows nearly all of whom energetically volunteered and provided great leadership for the Society. We have two new awards this year, the Goel Award for Translational Research in Biomechanics and the Founders' Award, and we relied heavily on the Fellows to provide sound evaluations on these committees so that these awards are initiated as strongly as possible. The 2017 ASB Award recipients are:



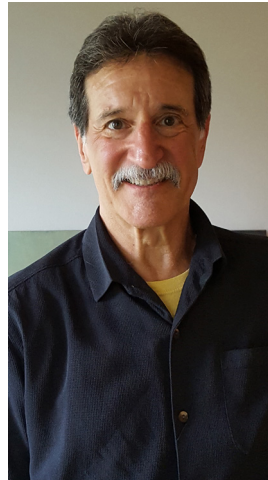
2017 Award Summary

Borelli Award

Mark Grabiner,
University of Illinois at
Chicago

Borelli Award: Mark Grabiner, University of Illinois at Chicago

The Borelli Award is the most prestigious honor given by the Society. The award recognizes outstanding career accomplishment and is awarded annually to an investigator who has conducted exemplary research in any area of biomechanics. The Borelli Award recipient for 2017 is Mark Grabiner, PhD, from the Department of Kinesiology and Nutrition at the University of Illinois at Chicago. Dr. Grabiner received his PhD from the University of Illinois in 1985 and has held primary positions at the Cleveland Clinic Foundation and at UIC since 1986. He has also held adjunct appointments at Cleveland State University, The Ohio State University, and Case Western Reserve University. In the words of one of Dr. Grabiner's promoters "Dr. Grabiner's work has made, and continues to make, a tangible impact on people's lives. Dr. Grabiner's area of expertise can be classified as neuromusculoskeletal rehabilitation science. He has made notable contributions in orthopedics, geriatrics, and rehabilitation. Among these contributions, most notable is his work on fall prevention in the elderly. These papers are focused on trip-related falls and collectively tell the story of a noteworthy and sustained effort to identify solutions to the clinically-, socially-, and economically significant problem of falls by the older adults, a problem that is growing in parallel with population demographics." Another wrote "Dr. Grabiner is a pioneer and leader in the research of the biomechanics of falls, and he has a sustained, impressive, and still-expanding body of high-quality work in this area." And still another, "Dr. Grabiner possesses many of the characteristics that I think Borelli Award winners exemplify—curiosity, innovation, creativity, and a broad biomechanics skillset that he has translated into years of impactful research." Dr. Grabiner is a Fellow of the ASB and has been a career-long supporter of our Society having served as Secretary-Treasurer, 1992-1995, President-Elect, President, and Past-President, 1996-1999, and in many other roles. Dr. Grabiner has also made substantial contributions to other Biomechanics societies and organizations. The Society is honored to recognize Dr. Grabiner as the 2017





2017 Award Summary

Jim Hay Memorial Award

Rick Lieber,
Shirley Ryan AbilityLab

Goel Award For Translational Research in Biomechanics

J.J. Trey Crisco,
Brown University

Past-President, cont.

Paul DeVita

Borelli Award winner and we are privileged to have him as a member, colleague, and friend. Dr. Grabiner will deliver the Borelli lecture at 9:00am on Thursday, August 10, at the annual meeting in Boulder.

Jim Hay Memorial Award: Rick Lieber, Shirley Ryan AbilityLab

The Jim Hay Memorial Award was established in 2004 through the support of the Hay family and additional donors to recognize outstanding contributions to the field of biomechanics. 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. This year's Hay Award Winner is Rick Lieber, PhD. Dr. Lieber is the Chief Scientific Officer & Senior VP at the Shirley Ryan AbilityLab (former Rehabilitation Institute of Chicago). He received his PhD from the University of California-Davis and his MBA from the University Of California-San Diego. His research focused on the design and plasticity of skeletal muscle leading to well over 250 articles in journals ranging from the very basic to those more applied. His focus on central questions related to the muscular system has significantly informed behavior not only in clinical populations but also at the extreme end of human performance. Dr. Leiber will give the Hay Memorial lecture at 1:30pm on Friday, August 11, at the annual meeting in Boulder.



Goel Award For Translational Research in Biomechanics: J.J. Trey Crisco, Brown University

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. This research is expected to have a biomechanical element. The winning candidate will have demonstrated the translational nature of his or her work from basic research to the enhancement of human health and well-being. The Goel Award recipient for 2017 is Trey Crisco, PhD, from the Department of Orthopaedics and School of Engineering, Brown University. Dr. Crisco received his PhD from



Past-President, cont.

Paul DeVita

Yale University in 1989 and has held academic appointments at Yale and Brown Universities and research appointments at Rhode Island Hospital. His basic and translation work has been supported by R21s, R01s, and SBIRs from the National Institutes of Health, resulting in over 200 peer-reviewed publications and 16 patents. Dr. Crisco's CV is extraordinary in its breadth of content including basic science of the skeletal system with emphasis on the articular mechanics of the spine and wrist and translation to wrist arthroplasty. In addition, Dr. Crisco has created basic and translational research in head impacts and concussions. Of his many contributions, we highlight his work in pediatric therapy for children with cerebral palsy. Dr. Crisco and colleagues developed a wrist rehabilitation device in the guise of a toy and game controller that solved several rehabilitation challenges in upper extremity disability in this population. It was a labor of love. Dr. Crisco is also a Fellow of the ASB and has been a career-long supporter of our Society having served as Program Chair 1998-1999, President-Elect, President, and Past-President, 2003-2006, Meeting Co-Chair 2010 and in many other roles. Dr. Crisco will deliver the Goel Award address as part of the Awards Session, Friday, August 11 at 10:30am at the annual meeting in Boulder.

Founders' Award: Rick Neptune, University of Texas at Austin

The Founders' Award was developed the past two years with substantial contributions from the Executive Board and is being awarded for the first time in 2017. The Founders' Award is named in honor of the Society's original members and is given to recognize "scientific accomplishment in biomechanics and excellence in mentoring and is open to investigators of all disciplines within ASB". While scientific accomplishment is part of all ASB awards, the mentoring component is part of the legacy of Jim Hay, one of the Society's original Founders and a pillar in the development of contemporary Biomechanics. The Award is focused on mid-career members whereas other Awards emphasize earlier and later career stages. The Founders' Award recipient for 2017 is Rick Neptune, PhD from the Department of Mechanical Engineering at the University of Texas at Austin. Dr. Neptune received his PhD,



from the University of California-Davis in 1996 and has held positions at the University of Calgary, Stanford University, the Rehabilitation R&D Center in Palo Alto, and has been at UT Austin since 2001. Dr. Neptune's promoter wrote "His research activities are...yielding valuable contributions to the biomechanics community by seeking to improve the quality of life for individuals with various movement disabilities. He is recognized as a leader in developing advanced computer modeling and simulation techniques..." and "He is collaborating with research groups around the world to assist clinicians and physical therapists in developing effective rehabilitation strategies for a number of patient populations..." As for his mentoring, "Rick is...dedicated to mentoring young biomechanists. For many years he has served in the ASB faculty mentor program...and he always



2017 Award Summary

Founders' Award

Rick Neptune,
University of Texas at
Austin



2017 Award Summary

Young Scientist Pre- Doctoral

Colin Smith,
University of Wisconsin-
Madison

Young Scientist Post-Doctoral Award

Karl Zelik,
Vanderbilt University

Past-President, cont.

Paul DeVita

goes out of his way to help young investigators... Seven of his recent graduate students have been awarded National Science Foundation Graduate Research Fellowships. There is no better testament... than the numerous prestigious awards his graduate students have won at regional and national conferences and the academic positions they now hold." We are so pleased to recognize such a truly well-rounded and outstanding individual for the initial Founders' Award. Dr. Neptune is a credit to his profession and to the ASB. He will give the Founders' award lecture as part of the Awards Session, Friday, August 11 at 11:00am at the annual meeting in Boulder.

Young Scientist Pre-Doctoral Award: Colin Smith, University of Wisconsin-Madison

This award recognizes early achievements by promising young scientists prior to the award of their PhD. Selection is based upon submitted materials including a letter of nomination, curriculum vitae, description of research interests, representative published papers, and an abstract submitted to the 2017 meeting. The Young Scientist Pre-Doctoral Award recipient for 2017 is Colin Smith from the University of Wisconsin-Madison. Mr. Smith works in the UW Neuromuscular Biomechanics Lab under the direction of Darryl Thelen, PhD. He completed his BS and MS training in the Departments of Mechanical Engineering at Clemson University. The title of the abstract submitted for this award is "Simulated ACL and menisci deficiency predicts altered knee mechanics during walking." His current doctoral research includes the development of a probabilistic musculoskeletal simulation framework to study cartilage loading and functional knee mechanics during movement. This framework enables prediction of muscle, ligament and cartilage loading using a multibody knee model and motion analysis data. Mr. Smith will present his current work as part of the Awards Session, Friday, August 11 at 11:30am at the annual meeting in Boulder.

Young Scientist Post-Doctoral Award: Karl Zelik, Vanderbilt University

This award recognizes early achievements by promising young scientists who are within five years of receiving their PhD. Selection is based upon the submitted materials including a letter of nomination, a description of the nominee's current research, a CV, up to five published papers, and an original ASB abstract for the 2017 annual meeting. The Young Scientist Post-Doctoral Award recipient for 2017 is Karl Zelik, PhD, from Vanderbilt University. Dr. Zelik completed his BS and MS training in the Department of Biomedical Engineering at Washington University and his PhD training in the Department of Mechanical Engineering at the University of Michigan under the direction of Art Kuo, PhD. Dr. Zelik was a post-doctoral researcher at the Laboratory of Neuromotor Physiology at IRCCS Santa Lucia Foundation in Rome, Italy and was funded as a Whitaker International Scholar. Dr. Zelik is currently the Director of the Biomechanics and Assistive Technology Laboratory at Vanderbilt. The title of his abstract is "Resolving the debate: ankle push-off during human walking contributes to accelerating both the swing leg and the center-of-mass." Dr. Zelik's work has "improved mechanistic understanding of the relationship between a biomechanical disability, its consequences for walking," and his "approach... is notable for starting with a mechanistic analysis or computational model and then testing it with

Past-President, cont.

Paul DeVita

rigorous human subject experiments.” His work is focused on “disabilities such as amputation, and devices to address those disabilities.” Dr. Zelik is a talented presenter, known to use poetry to explain his science. He will present his current work as part of the Awards Session, Friday, August 11 at 11:45am at the annual meeting in Boulder.

Junior Faculty Research Award: Jacqueline H. Cole, North Carolina State University and University of North Carolina-Chapel Hill

The Junior Faculty Research Award is a \$5,000 grant that can be used to generate pilot data and support early-career investigators. We had nine applications this year that were each reviewed based on the significance of the problem, the scientific approach, and the impact of the project on the candidate’s research program. The JFRA recipient for 2017 is Dr. Jacqueline Cole in the Joint Department of Biomedical Engineering at North Carolina State University and University of North Carolina-Chapel Hill. Dr. Cole’s award application is titled “Changes in the Osteovascular Niche Following Ischemic Stroke in Mice.” Her work “will expand our understanding of the functional, structural, and cellular changes in osteovasculature that occur following stroke and we will elucidate biomarkers associated with these changes.” Look for results at the 2018 meeting.

Research Travel Grant: Kaitlin Gallagher, University of Arkansas

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. Applications included a cover letter, CV, letter from host institution, a synopsis, and a budget. Dr. Gallagher’s research “focuses on the influence of prolonged neck flexion on the potential for injury in the head and neck region.” Dr. Gallagher will travel to the Department of Kinesiology at East Carolina University to collaborate with Dr. Zac Domire and will use ultrasound elastography to investigate neck flexion and muscle stiffness in the cervical extensor muscles. Dr. Gallagher aims to use these data as pilot data for external applications.

Clinical Biomechanics Award: Announced at the annual meeting

This award recognizes outstanding new biomechanics research targeting a contemporary clinical problem, and is sponsored by Elsevier Science, Ltd., publishers of Clinical Biomechanics. The award finalists were selected from submitted abstracts for the 2017 Annual Meeting. The finalists’ presentations will be in a podium session that will be held Wednesday, Aug. 9, from 5:30-6:30pm, with the winner announced at the closing ceremony. Here are the two finalists:

“Individuals with Lower Limb Trauma Prioritize Stability over Maneuverability when Navigating a Virtual Obstacle Course”

Riley C. Sheehan,^{1,2} Mitchell D. Ruble,¹ Jonathan B. Dingwell,² Jason M. Wilken^{1,3}

¹Center for the Intrepid, Brooke Army Medical Center, JBSA Ft. Sam Houston, TX, USA

²University of Texas at Austin, Austin, TX, USA

³Extremity Trauma and Amputation Center of Excellence, JBSA Ft. Sam Houston, TX, USA

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2017 Award Summary

Junior Faculty Research Award

Jacqueline H. Cole
North Carolina State University and University of North Carolina-Chapel Hill

President’s Award

TBD at annual meeting

Research Travel Grant

Kaitlin Gallagher
University of Arkansas

Clinical Biomechanics Award

TBD at annual meeting

Journal of Biomechanics Award

TBD at annual meeting

Student Travel Awards

Anthony Anderson,
University of Washington

Lindsey Brown, The
Ohio State University

Geoffrey Burns,
University of Michigan

Ming-Shen Chan, Univer-
sity of Southern California

Ying Fang, Worcester
Polytechnic Institute

Reed Gurchiek,
Appalachian State
University

ASB Newsletter



2017 Award Summary

Student Travel Awards

Jessica Hunter,
University of Maryland

Alexa Johnson,
University of Kentucky

Gu Eon Kang,
University of Michigan

Koran Gast,
Ben-Gurion University

Dan Kuhman, East
Carolina University

Josh Leonardis,
University of Michigan

Virginia Liang,
Georgia State University

April McPherson,
Mayo Clinic

Jamie Pigman,
University of Delaware

Laksh Punith, North
Carolina University &
North Carolina
State University

Amanda Ransom,
University of Kentucky

Paige Rice,
Appalachian State
University

Ian Russell, University
of Southern California

Annika Stoldt,
University of Michigan

Bhushan Thakkar,
Virginia Common-
wealth University

Past-President, cont.

Paul DeVita

“ACL Reconstruction Graft Geometry is Associated with Asymmetric In Vivo Cartilage Contact Patterns”

Michael F. Vignos,¹ Jarred Kaiser,^{1,2} Geoffrey S. Baer,¹ Richard Kijowski,¹ Darryl G. Thelen¹

¹University of Wisconsin-Madison, Madison, WI, USA

²Boston University, Boston, MA, USA

Journal of Biomechanics Award: Announced at the annual meeting

This award recognizes substantive and conceptually novel mechanics approaches explaining how biological systems function. It is sponsored by Elsevier Science, Ltd., publishers of the Journal of Biomechanics. The award finalists were selected from submitted abstracts for the 2017 Annual Meeting. The finalists' presentations will be in a podium session that will be held Wednesday, Aug. 9, from 5:30-6:30pm, with the winner announced at the closing ceremony. Here are the two finalists:

“High-Acceleration Training during Growth Increases Optimal Fiber Lengths in an Avian Bipedal Model”

Matthew Q. Salzano, Suzanne M. Cox, Stephen J. Piazza, Jonas Rubenson
Biomechanics Laboratory, The Pennsylvania State University, University Park, PA, USA

“In Vivo Determination of Optimal Muscle Fascicle Length and PCSA using Multi-Scale Measurements”

Evan Terrell, Shawn Russell, Joseph Hart, George Christ, David Weiss, Silvia Blemker
University of Virginia, Charlottesville, VA, USA

Student Travel Awards: 21 Recipients

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. Applications included a cover letter, CV, a letter from student's advisor, and an accepted abstract. We had over 60 applications this year and we are able to fund 21 of them. The Student Travel Award recipients for 2017 are: Anthony Anderson (University of Washington), Lindsey Brown (The Ohio State University), Geoffrey Burns (University of Michigan), Ming-Shen Chan (University of Southern California), Ying Fang (Worcester Polytechnic Institute), Reed Gurchiek (Appalachian State University), Jessica Hunter (University of Maryland), Alexa Johnson (University of Kentucky), Gu Eon Kang (University of Michigan), Koran Gast (Ben-Gurion University), Dan Kuhman (East Carolina University), Josh Leonardis (University of Michigan) Virginia Liang (Georgia State University), April McPherson (Mayo Clinic), Jamie Pigman (University of Delaware), Laksh Punith (North Carolina University & North Carolina State University), Amanda Ransom (University of Kentucky), Paige Rice (Appalachian State University), Ian Russell (University of Southern California), Annika Stoldt (University of Michigan), and Bhushan Thakkar (Virginia Commonwealth University). Please note: recipients attending identical universities have different advisors and work in different labs.

Past-President, cont.

Paul DeVita

Fellows of the ASB: Joe Hamill, Nick Stergiou, Darryl Thelen

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 31 Fellows and we will induct three individuals as new Fellows in 2017 at Boulder. The 2017 Fellows are Joe Hamill, PhD, from the University of Massachusetts at Amherst, Nick Stergiou, PhD, from the University of Nebraska at Omaha, and Darryl Thelen, PhD, from the University of Wisconsin-Madison. Special note: Vijay Goel, PhD, elected Fellow last year will also be inducted this year as he was unable to attend the meeting in 2016.

Congratulations to the ASB Award recipients and the new ASB Fellows for 2017.



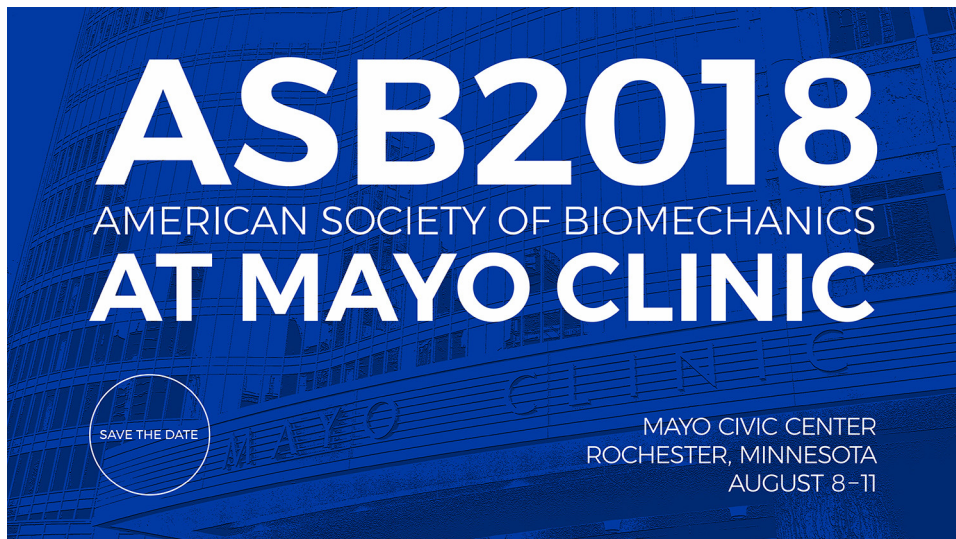
2017 Award Summary

ASB Fellows

Joe Hamill, University of Massachusetts at Amherst

Nick Stergiou, University of Nebraska at Omaha

Darryl Thelen, University of Wisconsin-Madison



“The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom.”

- Isaac Asimov

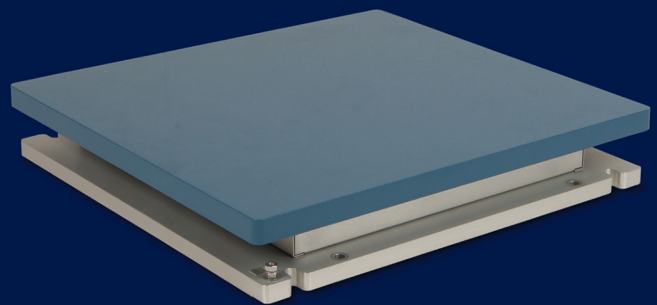


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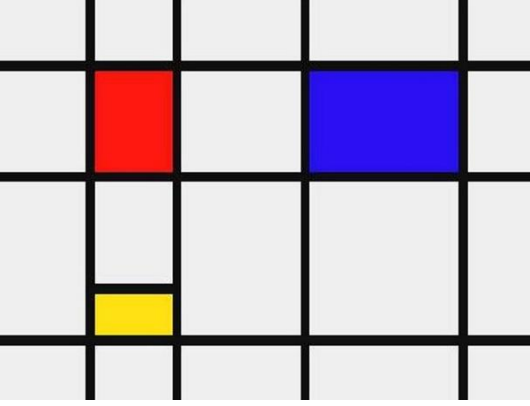
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Things to do in Boulder, Colorado

Boulder has the many cultural offerings of a college town combined with close-by opportunities for outdoor adventures.

University of Colorado Art Museum

The CU Art Museum is less than 100m from the University Memorial Center (UMC), which is ASB Conference Headquarters. In August, the Museum will be showing *Elemental Forms* which focuses on Minimalism, Conceptualism and geometric abstraction. No, Irene, the exhibit does not focus on minimal running shoes! The museum is free, quiet, relaxing and air-conditioned.

(www.colorado.edu/cuartmuseum/)



University of Colorado Museum of Natural History

The CU Museum of Natural History is right next door to the UMC. The museum has five exhibition galleries where visitors can explore natural and human history through engaging and interactive displays. Our youngest visitors enjoy The Discovery Corner where everything is hands-on. Visitors to the BioLounge can sip a beverage while experiencing exhibits that focus on biodiversity. Admission is free and the museum is open 9 AM – 5 PM.

(www.colorado.edu/cumuseum/)

University of Colorado Rec Center

The CU Rec Center on campus is the place to go to swim, sunbathe, play tennis, boulder/rock climb, play pickup basketball or have a refreshing ice skate in August. There is an outdoor pool shaped like our mascot, the American Bison or buffalo. (www.colorado.edu/recreation/)



Farmers Market

In the heart of downtown, the Boulder Farmers Market on Wednesday afternoon/evening is a great place to people watch, listen to free music and grab a burrito or falafel, drink a Kombucha or enjoy the outdoor beer garden. Be sure to wear your Birkenstock sandals and tie-dye shirt.

(www.bcfm.org/boulder-wednesday/)

Boulder Museum of Contemporary Art (BMoCA)

Adjacent to the Farmers Market is the BMoCA. Admission is only \$1, and it is open until 5 PM. (www.bmoca.org)



Boulder Dushanbe Teahouse

Also next to the Farmers Market is the Boulder Dushanbe Teahouse. Unless you've been to Tajikistan, you've probably never seen a teahouse like this one. Handcrafted by artisans in Boulder's sister city of Dushanbe, the structure was shipped piece-by-piece from the Tajikistan city and assembled in Boulder. It is an inviting and peaceful place to enjoy one of dozens of types of hot or iced teas, a snack or a full meal while taking in the vibrant carvings and paintings that cover every inch of the interior. The Teahouse is the favorite Boulder restaurant of both Rodger Kram and Alaa Ahmed.

(boulderteahouse.com)





Bicycle Paths

Boulder has many kilometers of bicycle paths and it is easy to rent a B-cycle and ride up the Boulder Canyon bike path. B-cycle is Boulder's bicycle sharing program. There are numerous stations all over town where you can pick up a bike or drop it off. You can rent a bike starting at just \$2! (boulder.bcycle.com) If you want to rent a speedier road or mountain bike for a longer ride, check out University Bikes (www.ubikes.com/rentals/). If you want to test the ultimate strength of your clavicles, the free, 40 acre Vailmont Bike park has jumps, berms and pump tracks (bouldercolorado.gov/parks-rec/valmont-bike-park).

Chautauqua Park

Chautauqua Park at the base of the Flatirons is a favorite place for hiking, trail running, rock climbing and dining on the veranda (bouldercolorado.gov/parks-rec/chautauqua-park). Thursday night there is an acoustic guitar concert featuring Colin Hay and Trace Bundy (www.chautauqua.com/portfolio/colin-hay/).

Pearl Street Pedestrian Mall

Boulder's Pearl Street Pedestrian Mall is the center of downtown and has many restaurants, bars, shops and street performers. A contortionist and the acrobats may be of particular interest to biomechanists. Wednesday evening there is a free outdoor concert featuring Chris Daniels & the Kings who play a mix of jump blues, blue-eyed soul and horn infused rock (www.boulderdowntown.com).

Many visitors are curious about Colorado's recreational marijuana shops. While it is indeed legal under certain conditions, it is not legal to smoke or possess on the CU campus or really anywhere in public or in hotel rooms. This handy guide should answer many questions you may have. Today's cannabis is much, much stronger than it was when the ASB Fellows were in college. Whatever you do, don't try to fly back home with a stash.

(www.coloradopotguide.com/marijuana-laws-in-colorado/)



Communications Committee

Robert Catena



Summer greetings from Pullman, Washington. Just a month before we meet in Boulder. As we get closer to our meeting, the [webpage](#), [Facebook page](#), and [Twitter feed](#) will become more active 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 have become more active over the last 6 months. Additionally, follow us at [@AmSocBiomech](#) so you can get live updates in Boulder this summer.

Another one of our efforts described in the last newsletter has been to collect interesting research related pictures from our members and post on the scrolling photo banner of the ASB homepage. Having new photos keeps our website fresh, and providing your photos gets your research some free press. It is a win-win. So, if you have some interesting photos and are willing to share, let me know. Here is exactly what we are looking for:

- Select 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 and lab/school affiliation.
- See the current ASB homepage for examples of pictures.
- Do not send previously published pictures or recognizable faces.
- Make sure the principal investigator has given consent to posting the picture on the ASB website.

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

- We were saddened to hear of the [passing of Dr. Norman Murphy from Tekscan](#). This led us to create a [Member Obituaries page](#) on our website. If you become aware of other ASB members passing, please let us know so that we can honor them on our website.
- We have updated the [Annual Conferences page](#) to include information on each of the past annual conferences, including all abstracts presented. However, we are missing information on the 1981 conference in Cleveland. If you have this information, we would greatly appreciate hearing from you. We have also started posting future ASB conference locations and dates as we become aware of them. This will allow you to better plan your future travels to conferences.
- We have created a new [ASB regional meetings page](#) that allows students to find a nearby student focused conference. Please inform your students.
- We have created a new [Videos and Presentations page](#) to post some excellent past presentations. Besides past award and keynote presentations, we also have spots of tutorial videos (science or career related). If you want to contribute, please [contact me](#) so that we can discuss the possible contribution.
- We have changed the “Student” tab to “[Education](#)”, knowing that we are all



Find us on Facebook or Follow us on Twitter

Facebook: [American_Society_of_Biomechanics](#)

Twitter: [@AmSocBiomech](#)



Communications Committee, cont.

Robert Catena

lifelong learners. Information on the [teaching repository](#), [graduate programs](#), the aforementioned [videos and presentations](#), and [grant and career information](#) is located here. Research Experiences for Undergraduates (REUs) and related experiences are now being posted in the latter. If you have a biomechanics related REU at your university, let me know. [Student membership](#) information has moved to the Members tab.

Thank you to everyone that has contributed to these efforts. Also, thanks goes out to all the people behind the scenes that keep everything running smoothly.

Biomechanics Conversations

Max R. Paquette and D.S. Blaise Williams III

The Use of Biomechanics in Clinic and in Performance: Practical Applications

The use of biomechanics in research is common and has provided important answers to clinical and applied performance questions over the last few decades. Drastic improvements in instrumentation quality has allowed in-depth analyses of human movement within academic or industry laboratory settings. Due to advances in technology, portable and less expensive instrumentation has made its way in clinical and performance or coaching environments. Yet, even portable equipment still provides biomechanical data that can be overwhelming for many clinicians and sport performance professionals. Recently, wearable technology and smartphones have somewhat simplified ‘in-field’ biomechanical analyses for both clinicians and coaches. However, some challenges and limitations still remain. In the following “casual” discussion, Drs. Max Paquette and Blaise Williams address some of these limitations and provide recommendations for biomechanical analyses performed in practical settings for both clinicians and sports performance professionals.

About the Speakers:

Dr. Paquette’s research interests are largely focused on the biomechanics of the lower limb for injury and musculoskeletal disease prevention. Specifically, he focuses on the effects of different footwear, fatigue, foot strike patterns and training interventions in runners on injury and performance related biomechanical and physiological variables. Dr. Paquette is a former collegiate middle distance runner and coaches high school, post-collegiate and professional middle distance runners.

Dr. D.S. Blaise Williams III treats athletes of all levels at the Virginia Commonwealth University (VCU) Sports Medicine Clinic. His research interests are in the areas of biomechanics and pathomechanics of running injuries, dynamic balance after injury and limb coordination during functional tasks. Dr. Williams also serves as a sports science and biomechanics consultant to VCU athletics teams.

Here is the [link](#) on youtube and the ASB website under the [Career Tutorials](#) tab.

National Biomechanics Day

Paul DeVita



7,000+ High School Students Celebrated Biomechanics on NBD 2017

Hello Fellow Members of ASB,

Please commence [Jumping For Joy!](#) We enlightened this vast amount of high school students in our synchronized, around-the-world celebration of Biomechanics. National Biomechanics Day (NBD) was a resounding success for the second consecutive year while remaining a giant fun-fest of Biomechanics, science, STEM, and STEAM as everyone reported smiles, thrills, and awe among all participants. You can see the celebration throughout social media and also through a few slides [here](#). We happily extend our mantra from last year: *NBD 2017 was the single greatest day in Biomechanics: there were more smiles on more faces in more biomechanics labs than ever before.* Let's all thank each other for contributing so successfully to our mission which is to bring Biomechanics into high school curricula around the world and thereby increase the impact of Biomechanics on society. Along this line we propose that Biomechanics will be the breakthrough science of the 21st century...and we mean it in a Big Way. I have written about this opportunity on Facebook and report it [here](#).

Please spend a few moments viewing, liking, forwarding, and retweeting The Global Phenomenon that is (Inter)National Biomechanics Day (yes, next year we'll figure out our new name):

[Instagram NBD](#) [Twitter NBD](#) [Facebook NBD](#) [NBD Website](#)

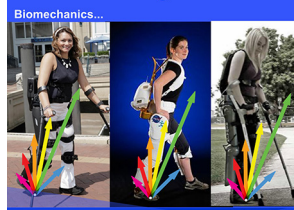
NBD was initiated in 2016 and it was energetically enacted by members of the American Society of Biomechanics. It also excited many biomechanists around the world and led to our around-the-globe expansion this year. We received support from many international organizations and commercial enterprises including the International and Brazilian Societies of Biomechanics, the Osteoarthritis Research Society International, AMTI, IMeasureU, and Nike, to name a few. But how can we succeed and even improve our event in 2018 and future years? The answer is:

We demonstrated our viability with 2,000+ high school students in 2016 and we fully established NBD with 6,800+ students this year. **It is now time for ALL BIOMECHANISTS TO JOIN THE MOVEMENT.** We can have 20,000, 30,000, even more high schoolers learning and enjoying Biomechanics in 2018. We will inspire even ourselves with this level of success and it will truly change the world from the simple level of more undergraduates anticipating and enjoying their Biomechanics courses to the beneficial level of more people doing



2017 National Biomechanics Day website

Celebrating the 21st century's breakthrough science



Biomechanics...
...helps people
National Biomechanics Day
April 6, 2017
<http://nationalbiomechanicsday.asbweb.org/>

Celebrating the 21st century's breakthrough science



Science meets art...
...on National Biomechanics Day
National Biomechanics Day
April 6, 2017
<http://nationalbiomechanicsday.asbweb.org/>

National Biomechanics Day, cont.

Paul DeVita

Biomechanics for their careers, to the exciting level of Biomechanics developing along lines not even envisioned today to the supreme level of Biomechanics having true meaning and importance to human society. People will consider, as truly typical and necessary the biomechanical perspective to address and improve the human condition. Biomechanics will no longer be that “...you know...cool sounding...but...wait, what is it?” science but an irresistible part of life. We can achieve this success. **Biomechanics can become the breakthrough science of the 21st century IF WE ALL UNIFORMLY AND IRRESISTIBLY PARTICIPATE in 2018.** NBD 2018 can be stunningly superb and awesome if the entire world participates. If you have not yet participated, you will be surprised at how our synchronized events are more than lab demonstrations. They are as I wrote above, a movement.

I respectfully ask all biomechanists to participate in International-National Biomechanics Day 2018 (whatever we call it). Please and Really. The outcome would be incredible and important. You and we will change the world. Please support NBD.

Please, give it a shot. Take a chance. Join the fun and let's see where we can go. Do not resist. Do not decline. Do not do not. Only do. And who are we talking to? You.



NBD can also change the face and nature of science. NBD 2017 was greatly inclusive with over 50% female students and 17% Black/African American, 15% Hispanic/Latino, and 7% Asian participants. Everyone is invited to the party.

Please also see the Fellows Forum article in this issue by Joanie Bechtold and colleagues in which they discuss the importance of NBD within Diversity, Equity, and Inclusivity initiatives the ASB can and should initiate.

Also, Derek Pamukoff and group identified the most appropriate NBD Eve dinner: Torque Pot Pie. Yum!

National Biomechanics Day gratefully acknowledges its many [sponsors](#).

NBD 2017 was BIG everywhere but it was MUSICAL in Brazil. Please view this first [NBD music video](#) from Felipe Carpes, President Brazilian Society of Biomechanics.

National Biomechanics Day, cont.

Paul DeVita

Thank you so much and we will begin NBD 2018 shortly,



Paul DeVita, PhD

PS. In the “This Just In” news category, Justus Ortega from Humboldt State University just now emailed his NBD numbers and demographics to me: 55 students with 18 males, 37 females. Make that 7,000++ high schoolers!

His summary: “It was awesome...and it is inspiring.” Thanks, Justus.

Finally, let’s ask this group of 300 Brazilian students to “raise your hand if you like NBD.”



Ok, that settles it!



2017 National Biomechanics Day website



NBD Student Competition

Hello Fellow Members of ASB,

NBD had a Student Competition this year to increase participation and enthusiasm (as if this needed enhancement) among our younger ranks. All NBD events that were mainly created and ran by students were eligible. We had two competitive categories, Exceptional Biomechanics Content and Significant Impact. The judging for Content was based on educational value and creativity and the judging for Impact was based on participation and advertisement/media coverage. A student committee was selected to judge the many entries and we chose to reward as many entries as we could so we selected three winners in each category. All the entries were excellent and identifying the winners was quite a challenge.

The three Content winners are:

NC State/UNC submitted by Stephanie Teeter
The Ohio State University submitted by Scott Monfort
Vanderbilt University submitted by Emily Matijeich

The three Impact winners are:

University of Wisconsin submitted by Samuel Acuna
Northwestern University submitted by Amy Adkins
University of Delaware submitted by Corey Koller

Each group will receive up to 10 NBD t-shirts and an NBD poster recognizing their success.

The competition was so strong we also want to acknowledge several honorable mentions. They are: Federal University of Pampa Uruguaiana submitted by Milena Aguiar, University of Washington St. Louis submitted by Ching-Ting Hwang, and Federal University of Amazonas submitted by Joao Otacilio Libardoni Dos Santos.

Thank you to all student participants in National Biomechanics Day 2017. We hope you are excited about NBD 2018 and are starting to plan more amazing events!

Katie Read Knaus, Student Representative and Paul DeVita, Past President



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American Sports Medicine Institute



International Society
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**National
Biomechanics
Day** APRIL 6, 2017

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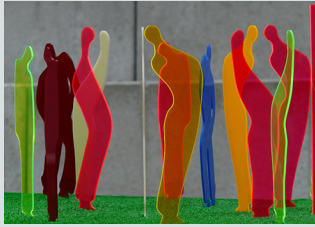
JOURNAL OF
biomechanics



Australian & New Zealand
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<http://nationalbiomechanicsday.asbweb.org/>



2017 Annual meeting website

Program Chair

Stephen Piazza



ASB2017 is just a few weeks away, and attendees can look forward to experiencing Boulder's incomparable natural beauty and vibrant cultural scene. Attendees will want to ignore all that beauty and culture during the day, however, when they will be indoors experiencing the fantastic scientific program we have assembled for this year's 41st Annual Meeting. Here's a brief summary of what's in store (more details available at the [conference website](#)).

Keynote Speakers: **Elizabeth Brainerd, PhD**, is a Professor of Biology at Brown University and Director of the Functional Morphology and Biomechanics Lab where she leads a team of biologists, engineers, and programmers developing X-ray Reconstruction of Moving Morphology (XROMM) technology for 3D X-ray imaging of animal bones and joints in motion.

Julie Steele, PhD, is a Senior Professor at the University of Wollongong and is founder and current Director of the Biomechanics Research Laboratory and Breast Research Australia (BRA). Her research has focused on lower limb structure and function, developing wearable technologies to enhance quality of life, and breast health biomechanics.

Plenary award sessions:

We will have a presentation by the Borelli Award winner, Mark Grabiner, PhD, of the University of Illinois at Chicago, and a separate session in which the winners of the Goel Award, Founders' Award, and the Pre- and Post-Doctoral Young Scientist Awards will present.

Symposia:

We have nine 90-minute symposia planned. There will be a new format for the Hay Award: the **Jim Hay Memorial Session** will feature a lecture by the Hay Award winner, Richard Lieber, PhD, of the Shirley Ryan AbilityLab, followed by three shorter invited talks. The theme of the Hay Session this year is "Muscle-Tendon-Unit Mechanics of the Lower Extremity: Lessons Learned from Sport".

A **Teaching Symposium**, entitled "Pedagogical Approaches in Undergraduate Biomechanics" has been organized by the ASB Education Committee.

This year we will have **joint symposia** cooperatively organized by members of ASB and members of other societies. These sessions will give attendees an introduction to societies of potential interest and a sampling of the programming at their meetings. These symposia are:

Gait and Clinical Movement Analysis Society

"ASB-GCMAS Joint Symposium: Technical Challenges in Clinical Motion Analysis: Finding Solutions"

Osteoarthritis Research Society International

"Osteoarthritis Examined from Full Human to Cellular Perspectives: ASB-OARSI Symposium Sympatico"

Society for Integrative and Comparative Biology

"ASB-SICB Joint Symposium: Insights from Animal Biomechanics"

Program Chair, cont.

Stephen Piazza

The conference will also feature **four competitively-selected symposia** proposed by members:

- “Principles of Energetic Optimization in Healthy and Pathological Movement”
- “Non-Academic Career Paths in Biomechanics”
- “Unanswered Questions in Biomechanics: Bases of Muscle Force Production”
- “Touch of Grey: The Aging Runner”

NEW! Rapid Podium Sessions: This format is new this year and is being tried on a limited basis. Each speaker is allotted only 10 minutes in the session, with 5-6 minutes for the presentation followed by 4-5 minutes of open discussion. Speakers are encouraged to fit their talks into the shorter time period omitting details—especially descriptions of standard data collection techniques—that do not add substantially to the audience’s understanding of the work.

2017 Topics: Lower Limb Loss • Running Wearable • Sensors

Regular Podium Sessions: Each speaker is allotted 15 minutes in the session, with 10-12 minutes for the presentation followed by 3-5 minutes of open discussion.

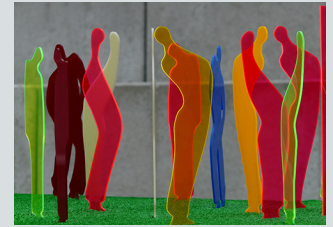
2017 Topics: Animal Models of Locomotor Biomechanics • Balance • Bone • Dynamic Stability of Walking and Running • Foot and Ankle • Human Performance • Joint Loading and Osteoarthritis • Journal Award Finalists • Knee Arthroplasty • Shoulder • Tissue Mechanics • Understanding Altered Hip Structure and Muscle Function

Thematic Poster Sessions: The first 30 minutes of each session are dedicated to viewing the posters for the session, followed by 10 minutes for each speaker, consisting of a 2 minute overview and 8 minutes for active discussion among all audience participants.

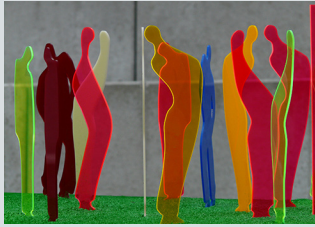
2017 Topics: Advances in Musculoskeletal Imaging Techniques • Anterior Cruciate Ligament • Energetics • Ergonomics • Footwear and Inserts • Low Back Pain • Lower Extremity Neurorehabilitation Biomechanics • Lower-Body Exoskeletons • Mechanics and Control of Walking • Mobility in Aging • Motor Control • Muscle • Post-Stroke Biomechanics • Practical Implications of Muscle Modeling and Musculoskeletal Simulation • Tendon Mechanics • Wheelchair Biomechanics

Regular Poster Sessions: This year we will have an unprecedented number of posters (well over 500) presented in two 2.5 hour sessions spread over two locations, one indoor and one outdoor.

2017 Topics: Aging • Anterior Cruciate Ligament • Balance • Bone and Soft Tissue Mechanics • Clinical Biomechanics • Ergonomics • Exoskeletal Devices • Experimental Methods and Tools • Footwear • Gait • Jumping and Landing • Knee Mechanics • Lower Extremity • Modeling and Simulation • Motor Control • Muscle and Tendon • Pathological Gait • Prosthetics • Rehabilitation • Running • Slips and Falls • Spine • Sport



**2017 Annual
meeting website**



2017 Annual meeting website

Program Chair

Stephen Piazza

and Exercise • Teaching • Upper Extremity • Wearable Sensors

I would like to thank all of those who helped with putting this year's program together, which was no small task with a record-setting **800 abstracts submitted**. The contributions of **224 volunteer reviewers** were invaluable for producing a program of the highest scientific quality. The **Program Committee** did yeoman's work, performing speedy adjudications when reviews differed and reviewing symposium proposals. This year's Program Committee members were: Alaa Ahmed, Don Anderson, Silvia Blemker, Li-Shan Chou, Deanna Gates, Ross Miller, Kristian O'Connor, Karen Troy, and Gregory Sawicki. Here at Penn State, I got a big hand from Lauren Hickox, Kirsty McDonald, and Frankie Wade as we attempted to sort hundreds of abstracts and avoid conflicts when assembling the sessions. Finally, I would like to thank the four **Meeting Co-Chairs** in Boulder (a.k.a., the "Meeting Couch"): Alaa Ahmed, Roger Enoka, Alena Grabowski, and Rodger Kram. I am grateful for their efforts to put science first as they made many difficult decisions about meeting logistics.

In closing, I would like to bring to the attention of the membership some questions related to the recent growth in the submission rate. Just a few years ago 400 to 500 submissions was the norm, but in 2015 and 2016 we had around 700 submissions and this year there were 800 abstracts submitted. If the number of submissions stays at this level or continues to rise, we may need to change how the meeting is organized. Faced with 1000 submissions sometime in the near future, the Society might have to choose from these options:

- Maintain the usual meeting schedule while finding more room for posters (essentially the path we have taken this year in Boulder, but one that is not always available). With more posters presented in the same amount of time, there may not be sufficient time for attendees to view the posters.
- Keep the schedule the same, but maintain the podium-to-poster ratio by adding more parallel sessions. This would be more expensive than finding more room for posters but would provide more opportunities for members to serve as session moderators and more room for symposia.
- Reject more abstracts while keeping the schedule essentially the same. The rejection rate at ASB has historically been low, 5% to 10%. Would a higher rejection rate of 25% to 50% be right for ASB?
- Change the schedule to make more poster sessions of longer duration while reducing the time devoted to podium and thematic poster presentations (similar to the annual meeting of the Society of Neuroscience).
- Lengthen the meeting by a day. Adding programming on a fifth day would provide more room for presentations, but would make the meeting more expensive to attend due to the added lodging costs.

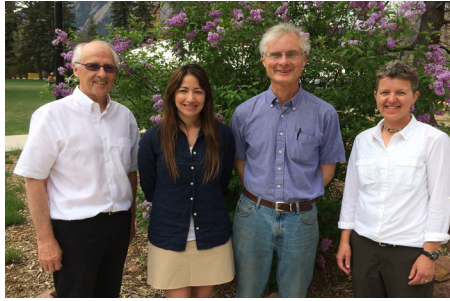
The ASB Executive Board welcomes comments from the membership on how to manage the growth of the annual meeting. To this end, on the day this newsletter appears I will be starting a thread on BIOMCH-L for comments and suggestions on this topic. Please consider adding your voice to this dialogue.

I am looking forward to a great meeting this year and to seeing you in Boulder!

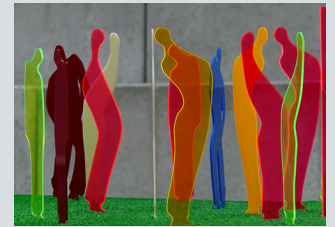
Meeting Chairs

Roger Enoka, Rodger Kram, Alaa Ahmed, Alena Grabowski

The ASB 2017 annual meeting will be held at the University of Colorado, Boulder on August 8-11. The meeting is being organized by an experienced group of faculty, including two former presidents of the Society, who are committed to ensuring a memorable experience for all. In collaboration with the Program Chair (Steve Piazza), we have prepared a program that includes the following:



- Approximately 1,000 participants.
- Reduced registration fees due to the venue being a university campus rather than a convention center.
- A program that is focused at the [University Memorial Center \(UMC\)](#) in the middle of campus with ample space for enjoying the moment.
- The availability of relatively inexpensive lodging at a Residence Hall ([Baker](#)) that is adjacent to the UMC.
- Lunch at the [Center for Community \(C4C\)](#), which offers buffet style all-you-can-eat choices of Asian Shi Pin, Black Coats, Desserts, Italian Cibo, Latin Comida, Persian Ghaza, Smoke 'n Grill, Sushi, and Wholesome Fields. Participants will be assigned one of two lunch times (meal cards will be color-coded) to minimize lines at C4C.
- To accommodate student participants (~50% of attendees), the ASB Student Representative (Katie Knaus) and a CU Graduate Student (Jana Jeffers) have organized several events exclusively for students:
 - + Student Welcome (Tuesday, 5 pm)
 - + Student After-Reception (Tuesday, 8 pm) at [The Connection](#)
 - + Student Networking Lunch (Wednesday) at [Alferd Packer Grill](#)
 - + Student Night Out (Wednesday, 8 pm) at [Fate Brewery](#)
 - + Student Career Event (Thursday, 6:30 pm)
- Instead of the traditional banquet, the organizers are offering a series of optional events on Thursday evening. A few spaces are available for the [Boulder Beer Tour](#), [Boulder Bike Tour](#), [Gateway Fun Park](#), [Rayback Collective](#), and [Spot Bouldering Gym](#). However, there are plenty of [other options](#) available in and around Boulder.
- The meeting program will be available on an App that will be released on July 17. In addition, an outline of the program will be provided to attendees in a Program At A Glance booklet.
- The App includes a conference game (Click) in the form a photo scavenger hunt. The challenges will encourage participants to engage other attendees, to learn about ASB, and to explore CU Boulder and its surroundings. The person with the most points at the time of the Closing Ceremony (Friday, 5 pm) will receive a prize of \$500.
- The most significant scientific findings will be presented in the Poster Sessions from 3-5:30 pm on Wednesday and Thursday in both the UMC Ballroom and the UMC Arcade. Attendees are encouraged to visit posters and learn at least five new findings that impact their research.
- Meeting attendees will be able to access the Student Recreation Center by



**2017 Annual
meeting website**



Meeting Chairs, cont.

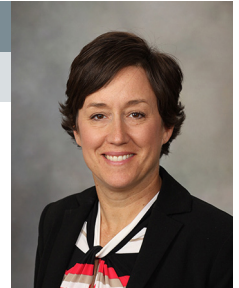
Roger Enoka, Rodger Kram, Alaa Ahmed, Alena Grabowski

- showing their meal cards and paying a modest fee (\$7/day or \$20/week).
- Two of our top athletes (Shalaya Kipp and Dan Feeney) have organized a 5k run beginning at the [Student Rec Center](#) at 6:30 am on Wednesday.
- Entry at events with registration limits (tutorials, student events, Inclusivity Breakfast, Women in Science Cocktail) will be strictly controlled.
- Attendees who are driving to CU Boulder should consult the [website](#) for information about parking.

If anyone has any complaints about the meeting, please direct them to [Paul DeVita](#). In contrast, the Meeting Chairs are willing accept any compliments, especially in the form of [Belgian beer](#).

Diversity Committee

Kristin Zhao



A Final Note... As my tenure as Diversity and Inclusion Chair for the American Society of Biomechanics comes to an end, I reflect on having been a part of the Diversity Task Force which stepped up behind the leadership of Kate Saul, PhD (NC State), with her clear vision for the future of our membership that ultimately resulted in the creation of the Diversity Chair position. Diversity of our membership has and will continue to make our Society stronger, supportive, inclusive, proactive, and complete. Students, post-doctoral fellows, and faculty at all levels benefit from the rich interactions at our annual conference. Our Society has prioritized funding for Diversity Travel Awards, encouraged self-organization of affinity groups, and has consciously guided equitable abstract submissions, among many other initiatives. We should be proud of the momentum we have generated and the awareness we have brought to the whole Society in the form of outreach and inclusivity (see the [ASB Fellows Forum](#)).

I am excited to pass the baton to our new Diversity Chair, Robin Queen, PhD. With her vast experience and passion for diversity, Dr. Queen is sure to lead the Society in new directions while preserving our past successes. Dr. Queen is director of the Kevin P. Granata Biomechanics Laboratory as an associate professor in biomedical engineering and mechanics. Her work with professional societies includes her roles as chair of the Orthopaedic Research Society's Women's Leadership Forum and as a member of the annual meeting and basic science committees. In addition, Dr. Queen serves on the Women's Health Issues Advisory Board at the American Academy of Orthopaedic Surgery and is as a member of the Medical and Scientific Advisory Board at Quest Diagnostics. She is a Fellow in the American College of Sports Medicine and a member of the Strategic Health Initiative on Youth Sports and Health. Dr. Queen is passionate about her diversity and inclusion efforts including her service to Virginia Tech as the co-chair of the Women's Alliance, chair of the Biomedical Engineering and Mechanics diversity committee as well as serving as an at-large member of the University's Commission on Equal Opportunity and Diversity. Please join Dr. Queen and stay involved, make inclusivity a habit, and lead by example in ASB and in your home institutions.



President-elect

Wendy Murray



The main event for the American Society of Biomechanics is our annual conference. A lot of the conversation that occurs in Executive Board meetings and conference calls center on the details of the meeting itself. Meeting chairs submit proposals—and program chairs are nominated and elected—so that all of the conference organizers “N+2” years from now can be a part of the Executive Board Meetings a full 2 years in advance. From experience, I can tell you that I spent my first year on the Executive Board as Program Chair-Elect for the 2011 meeting feeling a bit like a fly on the wall, trying to pay attention to exactly how the 2010 organizers actually pulled it all off. Then, suddenly, it’s the last day of the “N+1” conference, and it’s off to the races! In 2010, I remember instantly wishing I had taken better notes...

One of the first real tasks the program and meeting chairs for any ASB Annual Meeting are responsible for is reading the meeting evaluations from the just completed conference. I find this to be symbolic of a general view held by every member of an ASB Executive Board I’ve met: the meeting should serve its members. Of course, there are always a variety of opinions expressed about what makes a meeting great, what didn’t work, and what should be avoided “next year”. When—as an organizer—you turn to the Board to seek additional input, helpful responses abound but the unanimous take-home message is: “You should put the meeting together the way that you think is best; we’ll stand by your decision.” As a result, each annual meeting ends up with its own personality, the culmination of detailed thought, planning, decision-making, and—if we’re lucky (and we usually are)—a few unique twists. For every part of the meeting you experience as an attendee, someone, somewhere, made a decision about it over the past two years. (At least! Meeting chairs were working on their proposals well in advance of that!)

When I received the phone call asking me if I’d be willing to run for Program Chair (and again for President), the conversation about the society turned to the fact that the Executive Board is made up of volunteers. Most people who become deeply involved in leadership of ASB view that as an important strength of our society. After serving as Program Chair in 2011, I reminded myself to always keep that in mind. For the events associated with the Annual Meeting, in particular, the amount of volunteer work is impressive, swamping the individuals who originally agreed to volunteer, and swallowing up their lab members and generous department staff as well. I’m looking forward to our 41st meeting at Boulder, and I want to take this opportunity to thank Steve Piazza, Rodger Kram, Roger Enoka, Alaa Ahmed, and Alena Grabowski (and their lab members!) for all their hard work. (And give you a little nudge to do so as well!) See you in Colorado!



ASB Corporate Sponsors 2017

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

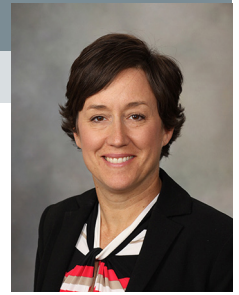


Supporting Member
Polhemus



ASB 2018, Mayo Clinic

Kristin Zhao



It is our pleasure to host the American Society of Biomechanics annual conference in Rochester, Minnesota, August 8-11, 2018. Rochester was the host city for the 7th annual ASB annual conference in 1983; hosting the event 35 years later is a privilege for the city and Mayo Clinic.

Mayo Clinic is represented by its logo, comprised of three shields, signifying clinical practice, research, and education, and the rich history of cooperation among the three. This integrated environment has resulted in high impact translational research teams who successfully solve clinical problems and make important discoveries in clinical and laboratory settings. Biomechanics and biomedical sciences are integral to the environment at Mayo. The scientists and clinicians at Mayo across the disciplines represented within the ASB are enthusiastic to participate in and contribute to making the conference a success, as well as welcoming you to our home.

We are excited to have Silvia Blemker, PhD, leading the scientific program; she has some innovative ideas for the program content. The conference will be held in our newly-renovated Mayo Civic Center that has large meeting rooms and plenty of vendor and poster space. The Mayo Civic Center was built around the first cornerstone laid by the Mayo brothers, who donated the land the convention center stands on. With Mayo Clinic a short distance away, laboratory and historical tours will be convenient and flexible.

With a population of approximately 110,000, Rochester's downtown is a perfect location for the conference and the weather in August is temperate and ideal (79F high, 59F low, on average). We plan to take advantage of the temperate climate and host the student night out on "Thursdays on First & 3rd" and an outdoor Banquet on the last evening.

The Mayo Clinic, Mayo Civic Center, hotels, and restaurants are all within walking distance, with easy access to bike/running trails along the Zumbro River. Transportation, lodging, and accessibility are integral parts of the "Med City". We look forward to welcoming you and the Society membership in 2018 to the Mayo Clinic and Rochester, Minnesota!



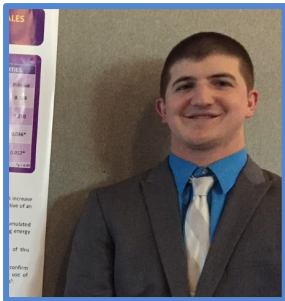
Time Into Pixels Photography

Highlights from the ASB Facebook page

There has been a lot happening on ASB social media in the past few months. Some of the highlights include:

Student Spotlight

Read ASB students' answers to questions about their school/research experience!



[Christopher Curran](#), MS student in Kinesiology at ECU advised by Patrick Rider, discusses his research on UCL properties and career plans in biomechanics academia



[Ryan Wedge](#), PhD student in Kinesiology at UMass Amherst advised by Dr. Brian Umberger, shares how he became interested in biomechanics and how his experience as a PT shapes his research



[Guarav Mukherjee](#), PhD student in Mechanical Engineering at UW Seattle advised by Dr. Kat Steele and Dr. Patrick Aubin, describes his academic background and offers advice to undergraduates

Who will be next?



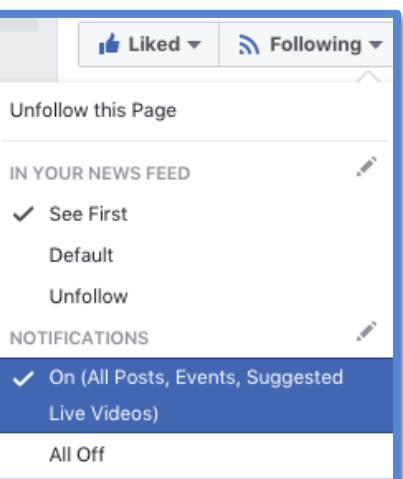
Let us know about ASB students we should spotlight!

Q&A Join the [conversation](#) or ask a new question!

What has been the largest and most important contribution of biomechanics to clinical practice (medical, rehabilitative, sport, etc.) within the past decade? How do you see biomechanics influencing clinical practice within the next decade?



Be sure to **like & follow** the [ASB page!](#)



Use your settings to be notified of new posts!

Interview with a Biomechanist

Check out the videos!

[Dr. Jeremy Crenshaw](#), Assistant Professor in Kinesiology and Applied Physiology at the University of Delaware and winner of the 1st ASB Junior Faculty Research Award in 2016, offers advice to students on networking and persevering in their careers



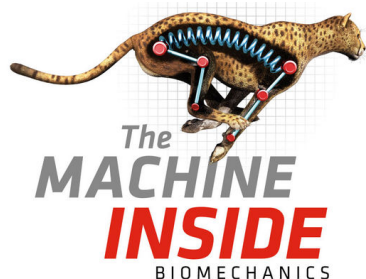
[Dr. Andrew Sawers](#), Assistant Professor in Kinesiology at University of Illinois at Chicago, discusses how the study of biomechanics and motor control can impact clinical practice and how the development of new technologies can advance motor rehabilitation

Tell us if you know someone we should interview or want to volunteer!

Featured Biomechanics

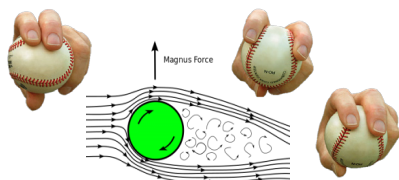
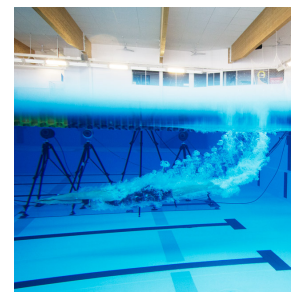
Learn about cool things happening in biomechanics!

Find out what [new tools](#) the Journal of Biomechanics has released to improve content innovation and data sharing



Read about a [traveling biomechanics exhibit](#) by the Field Museum...
Its next location is the Denver Museum of Science

Discover how motion capture is being used underwater to study [swimming biomechanics](#)



See how baseball pitchers take advantage of the [Magnus effect](#) by how they grip and throw a ball



Share something that you are excited about!

Want to contribute? Contact the [Student Representative](#)

Special thanks to the Student Committee for Biomechanics Advocacy for creating new Facebook content: **Simi Oludare, Ana Ebrahimi, Anthony Anderson, Andrew Vigotsky, Daniel Kuhman**

ASB Regional Conferences

2017 Midwest ASB Regional Meeting

The meeting was held at the Eberhard Center on Grand Valley State University downtown campus. There were total of 127 attendees, with representation from 21 different Midwest Universities, and 2 corporate sponsoring organizations. Participants came from as far west as University of Iowa, as far south as University of Kentucky, as far North as Northern Michigan University, and as far east as University of Mount Union.

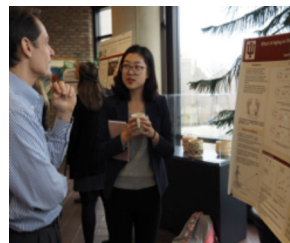
The two-day meeting allowed attendees to learn about the research currently happening across Midwest Universities and tour the GVSU Biomechanics & Motor Control Laboratory. Highlights of the meeting included Keynotes by Dr. Tamara Reid Bush from Michigan State University titled “Butts and Hands” and Dr. Kristian O Connor from University of Wisconsin-Milwaukee titled “Fatigue as a Paradigm for Understanding Athletic Injury Risk”.

Meeting Summary Numbers:

- 28 podium presentations: 15 graduate, 7 undergraduate, 6 professional
- 21 poster presentations: 11 graduate, 6 undergraduate, 4 professional
- 4 event sponsors: American Society of Biomechanics, AMTI, Tekscan, and Grand Valley State University (College of Liberal Arts & Sciences, Movement Science Department, College of Engineering, Graduate Studies, Center for Scholarly & Creative Excellence, and College of Health Sciences)

Four student award winners received a cash prize for their excellent presentation:

- Best undergraduate podium - Zachary Sadler, MSU
- Best graduate student podium - Joshua Drost, MSU
- Best undergraduate poster - Audrey Hoffmeister, Miami University
- Best graduate poster - Kelsey Loss, Miami University



For more pictures please visit www.gvsu.edu/midwestasb.

Thank-you to each presenter, moderator, attendee, and sponsor for a great Regional meeting!

7th South Central American Society of Biomechanics Regional Meeting

The 7th Annual South Central ASB regional meeting was held at the Texas Back Institute in Plano, TX on March 31st and April 1st. We had one of the largest meetings in recent years, with 75 attendees from all over Texas and Arkansas. For many, it was their first time attending the SCASB meeting! We had 11 undergraduate students and 18 graduate students present their work. Ethan Douglas (University of Arkansas) was awarded best undergraduate presentation, and Jessica Aviles (Texas A&M) was awarded best graduate presentation. We were



2017 Midwest ASB Regional Meeting

Grand Valley State University

Allendale, Michigan
February 23 - 24, 2017

7th Annual South Central American Society of Biomechanics Regional Meeting

Texas Back Institute

Plano, Texas
March 31 - April 1, 2017



ASB Regional Conferences, cont.

able to have wonderful guest speakers as well who covered a variety of research interests: Dr. Elizabeth Russell-Esposito (Center for the Intrepid at Brooke Army Medical Center) gave a presentation called “Raising the bar on expectations after lower limb trauma”. On Saturday, Dr. Isador Leiberman (Texas Back Institute) discussed gait analysis for spinal pathology, and Dr. Pilwon Hur (Texas A&M) wrapped up the meeting with a discussion of gait and balance rehabilitation. Special thanks to our sponsors: ASB, Tekscan, Delsys Inc, and the University of Arkansas Department of Health Human Performance and Recreation and Exercise Science Research Center.



2017 Human Movement Science and Biomechanics Research Symposium

The University of North Carolina

Chapel Hill, North Carolina
March 31, 2017

14th Annual Human Movement Science and Biomechanics Research Symposium

The fourteenth annual Human Movement Science and Biomechanics Research Symposium at the University of North Carolina at Chapel Hill took place on March 31, 2017. Students, faculty, researchers, and clinicians from nine regional institutions attended the symposium to present and discuss current research in an open and friendly environment. The goal of the symposium is to encourage collaboration between researchers, and to provide vocational information to students. Highlighted by a keynote address by Dr. Darcy Reisman from the University of Delaware who researches biomarkers of stroke recovery to develop individualized treatment interventions, the day featured 86 presentations on various topics within human movement.



ASB Regional Conferences, cont.

7th Annual Regional Meeting of the Rocky Mountain American Society of Biomechanics

The 7th Annual Regional Meeting of the Rocky Mountain American Society of Biomechanics (RMASB) was held at YMCA of the Rockies in Estes Park, CO on April 7-8. Over 100 registrants attended the meeting from Colorado, Nebraska, Wyoming and Utah. At the meeting, 20 podium and 43 poster presentations were delivered by graduate and undergraduate students, as well as post-docs. Dr. Sunil Agrawal from Columbia University delivered the keynote speech and provided an excellent overview of his research in rehabilitation robotics and exoskeletons for upper and lower extremities, and the spine, with clinical results through testing with patient populations.

Six students were selected by faculty votes for best presentation awards:

Best Graduate Student Podium Presentation Award (two-way tie):

Owen Beck - University of Colorado, Boulder

Benjamin Wheatley - Colorado State University

Best Graduate Student Poster Presentation Award:

Jason Actis - Colorado School of Mines

Best Undergraduate Student Podium Presentation Award:

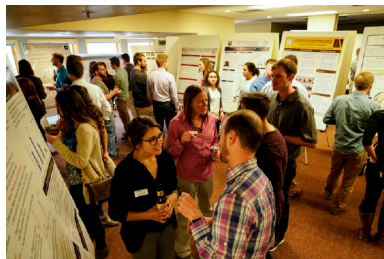
Elizabeth Bachman - University of Denver

Best Undergraduate Student Poster Presentation Award (two-way tie):

Barathwaj Murali - Colorado School of Mines

Mira Hopkins - University of Colorado, Boulder

The registration for the meeting was once again free for attendees staying at the YMCA, enabled by the generous support of the sponsors, which included the American Society of Biomechanics, Tekscan, Qualisys, Motion Lab Systems, ProtoKinetics, Bertec, VICON, Delsys, Noraxon, Colorado School of Mines and University of Northern Colorado.



7th Annual Regional Meeting of the Rocky Mountain American Society of Biomechanics

Colorado School of Mines and University of Northern Colorado

Estes Park, Colorado
April 7 - 8, 2017

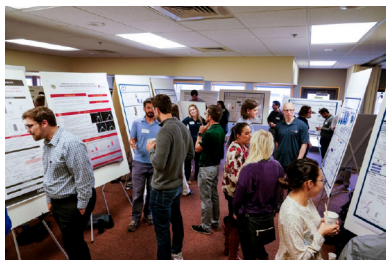


ASB Regional Conferences, cont.

13th Annual Northwest Biomechanics Symposium

University of Oregon

Eugene, Oregon
May 19 - 20, 2017



13th Annual Northwest Biomechanics Symposium

Can you name all of the Horcruxes in Harry Potter? How about all of the ASB presidents in the past decade? If so, then you might have done well in the trivia contest at the 13th Annual Northwest Biomechanics Symposium at the University of Oregon. It was a blast. Yeah, there was science going on as well. There were a total 118 attendees, including 68 presenters (23 podium, 40 posters and 5 thematic posters). Details from the meeting, including links to abstracts and our many sponsors, can be found [here](#). One of the highlights of the meeting was the keynote talk by Dr. Don Anderson, former ASB president (wearer of shorts and judge of a tie breaker in the trivia contest). There were two awards for graduate students, both from the University of Washington—Michael Rosenberg (PhD student) and Eric Thorhauer (MS student). Next year's meeting will be in Bellingham at Western Washington University. Hope to see you there.



ASB 2016 Grant-in-Aid

Jordan Craig: “Assessment of variability and coordination of upper and lower body segments during walking in healthy young adults and elderly fallers and non-fallers”

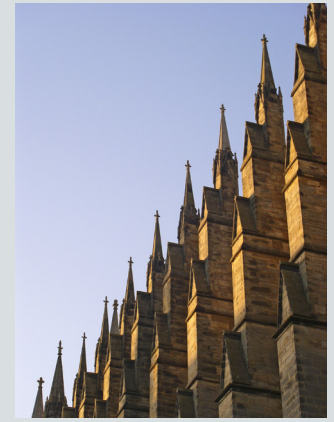
Falls are a major concern in aging populations, with fall related injuries resulting in billions of dollars in medical costs each year. Previous work has demonstrated that walking under challenging conditions, such as a non-preferred gait speed, alters the movement variability of the foot and the trunk in healthy young and elderly subjects. While it is known that movement variability of an individual segment changes relative to gait speed, it is not clear how relationships between segments are maintained under altered gait speed, and what role these relationships play in maintaining stability. For example, altered trunk movement could stabilize center of mass motion in order to compensate for altered foot movement, thus maintaining whole body stability even though motion of an individual segment is abnormal. Therefore, the purpose of the current study was to determine the effects of walking at non-preferred speeds on the relationship between foot and trunk acceleration variability in healthy young and healthy elderly adults. Identifying how these relationships between upper and lower body segments react to changing gait speed will assist in developing indices or measures of fall risk.

Twenty healthy young adults (mean age 23, range 20-30 yrs) and twenty healthy elderly adults (mean age 73, range 67-85 yrs) with no history of falls have participated in our study. Subjects walked for 3-minutes on a treadmill at five different speeds ranging from 80%-120% of their self-selected preferred walking speed while wireless sensors recorded accelerations at their trunk and right foot (Figure 1). Acceleration variability was measured using root mean square (RMS) and sample entropy (SaEn) from the resultant frontal plane acceleration time series. To directly examine the relationship between acceleration variability at the trunk and at the foot, a novel measure referred to as the segment variability ratio was calculated as the ratio of variability at the trunk divided by variability at the foot.

The segment variability ratio using RMS showed that healthy elderly subjects did not alter their segmental relationships in response to the changing gait speed, but healthy young subjects did demonstrate a significant effect of speed with their RMS segment variability ratio where the variability ratio increased with increasing speed (Figure 2). Using SaEn, healthy elderly adults demonstrated a higher segment variability ratio, indicating that healthy elderly adults show more irregular accelerations at the trunk relative to the feet, across speeds compared to healthy young adults. There was also an effect of speed where the variability ratio



Figure 1: Subject wearing trunk sensor and ankle sensor during data collection.



**University
of Kansas**

**Advisor: Jessie Huis-
inga**



decreased with increasing speed in both groups (Figure 2). These results indicate that when examining amount of variability (RMS), healthy young adults allow for increased variability ratio with increased walking speed, but healthy elderly adults maintain a consistent ratio of acceleration variability between the trunk and feet across speeds. However, when examining the structure of variability (SaEn), both groups adapt their trunk and foot variability to exhibit similar ratio changes in response to speed changes, though healthy elderly adults had a higher variability ratio compared to healthy young adults. It appears healthy elderly adults with no fall history may adapt their segmental relationships to task requirements differently compared to healthy young adults but this depends on the specific variability construct being evaluated. Elderly adults often have weakness and decreased range of motion of the legs which could contribute to altered segmental relationships and ultimately lead to a higher rate of falls. We are currently collecting data on elderly subjects with a history of falls to better understand how the relationship between trunk and foot motion may be related to fall risk. We greatly appreciate the support from the American Society of Biomechanics Grant-In-Aid, which allowed us to compensate our participants for their time and effort and allowed for purchasing various supplies necessary for data collections.

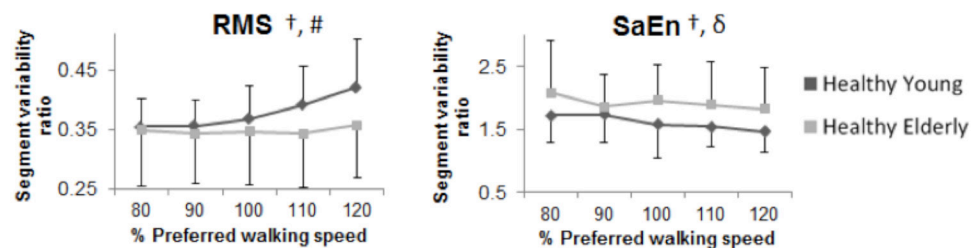


Figure 1: Means and standard deviations for segment variability ratio for root mean square (RMS) and sample entropy (SaEn) in the frontal plane, at 80%-120% preferred walking speed, in healthy young (dark grey) and healthy elderly (light grey) adults. Main effect of speed †; main effect of group δ , significant interaction #.

Washington University

Advisor: Linda Van Dillen

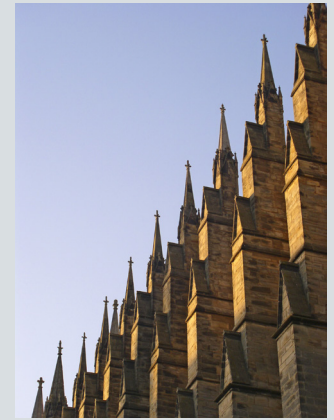
Ching-Ting Hwang: “Lumbar Alignment and the Development and Course of Low Back Pain in Prolonged Standing”

The prevalence of low back pain (LBP) is higher in people who engage in occupations that require prolonged standing than compared to the general population. However, the risk factors for the initial development of LBP with prolonged standing remains unclear. The purpose of our study was to evaluate the contribution of potential risk factors for the development and course of LBP intensity over time in prolonged standing. We examined risk factors in several domains including lumbar alignment in standing, anthropometrics, sensory processing, and psychosocial status.

Healthy participants without a history of LBP (n=71) filled out psychosocial questionnaires and completed quantitative sensory testing. Participants then performed simulated work tasks while standing for 2 hours. A Vicon motion capture

ASB 2016 Grant-in-Aid, cont.

system continuously tracked lumbar alignment. During standing, participants were asked to rate their current LBP every 15 minutes. There were no differences between participants that developed LBP and those who did not develop LBP for any measure. For the 33 participants that developed LBP during standing, we used 2-level hierarchical linear models to examine the variables (risk factors) that influenced the course of LBP intensity over time. We identified 3 variables that explained significant variance in the LBP intensities. Eighty percent of the variance was explained by time. As time spent standing increased, LBP within an individual also increased. Greater trunk to height ratios and greater Fear of Pain minor subscale scores resulted in a greater increase in LBP over time, together explaining 32% of the variance in rate of LBP increase over time. Our results suggest that time spent standing is the greatest risk factor for the development of LBP during standing. In addition, those with longer trunks should pay particular attention to time spent standing since a longer trunk resulted in a faster increase in LBP over time. In our model, higher Fear of Pain minor scores also predicted a faster increase in LBP intensity. While other studies have shown that education and cognitive training can reduce fear in people with chronic pain, further research is needed to demonstrate if a reduction in fear scores in healthy people also decreases the rate of LBP development with standing. Overall, we identified risk factors in different domains and their individual contribution to the course of LBP in standing. Such information can be used to prevent LBP development during standing in currently healthy individuals.



Daniel J Kuhman: “The Relationships Between Physical Capacity and Biomechanical Plasticity with Age During Level and Incline Walking”

Aging is associated with gait adaptations, some of which, such as decreased walking speed, have serious negative consequences for old adults. Lower limb joint-level biomechanics are also altered with age. Specifically, old compared to young adults exhibit increased mechanical output from muscles spanning the hip and decreased mechanical output from muscles spanning the ankle. This distal-to-proximal redistribution of joint torques and powers has been termed biomechanical plasticity and is now well-established as a gait adaptation made by healthy old adults. However, less is known about the impact of physical capacity—which varies greatly in this population—on this biomechanical phenomenon. For example, high capacity individuals (i.e., those with relatively fast walking speeds) might either retain a more youthful gait pattern (i.e., exhibit low magnitudes of plasticity) or increase the amount of distal-to-proximal redistribution of torques and powers (i.e., exhibit large magnitudes of plasticity). Previous discrete group comparisons of healthy versus impaired and strong versus weak old adults suggest the latter—that low capacity individuals exhibit larger magnitudes of biomechanical

**East Carolina
University**

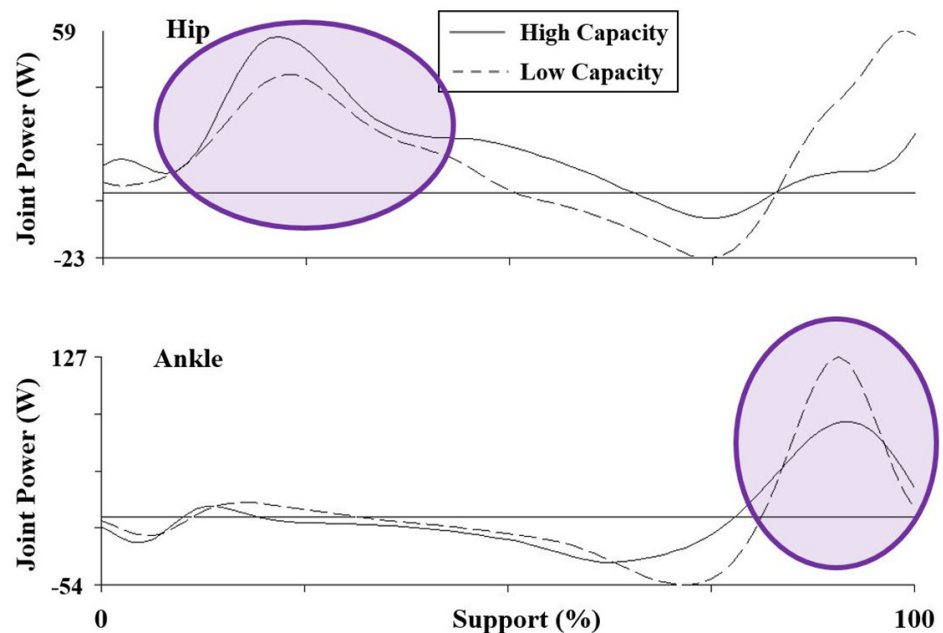
Advisor: Paul DeVita

ASB 2016 Grant-in-Aid, cont.



plasticity compared to high capacity individuals. With this project, we sought to expand the biomechanical plasticity phenomenon by precisely quantifying the relationships between physical capacity and biomechanical plasticity during level and incline walking. We hypothesized that as physical capacity decreased, biomechanical plasticity would increase in magnitude and that this inverse relationship would exist during both level and incline walking.

Young ($n = 10$, age = 20.3 ± 1.5 yrs) and old adults ($n = 32$, age = 74.7 ± 4.4 yrs) visited the ECU Biomechanics Laboratory on two separate occasions. During the initial visit, all participants completed the Short Form Health Survey (SF-36) and a 20-meter level walking test at self-selected, comfortable speeds. Results from these tests served as our measures of physical capacity. During the second visit, participants completed gait analyses, which included five level and five incline (10 degree) walking trials at self-selected, comfortable speeds. Biomechanical plasticity was defined by ratios of hip extensor to ankle plantarflexor peak torques, angular impulses, peak powers, and positive work during the support phase of gait. First, we compared joint kinetics and biomechanical plasticity ratios between young and old adults to confirm the existence of biomechanical plasticity in our old adult sample. We then conducted correlation analyses between physical capacity measures and biomechanical plasticity ratios strictly within our old adult sample.



Our comparisons of young and old adults confirmed the existence of biomechanical plasticity in our old adult sample and add further confirmation to the existing literature describing this biomechanical phenomenon. Contrary to our primary hypothesis, we observed positive relationships between physical capacity and biomechanical plasticity during both level and incline walking conditions. Additionally, positive relationships were observed between biomechanical plasticity ratios and in-trial self-selected walking speeds during level and incline conditions. Based on our results, we now suggest that biomechanical plasticity is

ASB 2016 Grant-in-Aid, cont.

a beneficial gait adaptation that serves to increase walking performance and thus, physical capacity in old adults. An inability to incorporate biomechanical plasticity might limit walking performance in some old adults and lead to decreased physical capacity.

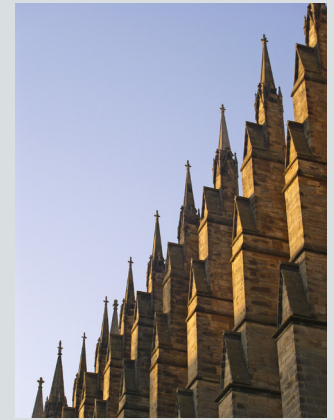
We thank the American Society of Biomechanics for funding this project.

Gu Eon Kang: “A Pilot Longitudinal Study of Motor Behavior in Bipolar Disorder”

Bipolar disorder is a mental illness characterized by two extreme mood phases—mania/hypomania and depression, with a relatively normal mood phase, euthymia. Both extreme mood phases can lead to severe problems for individuals with bipolar disorder, such as financial losses, illegal activities, and suicide. The Diagnostic and Statistical Manual of Mental Disorders published by the American Psychiatric Association emphasizes abnormalities in motor behavior as a core symptom for defining each mood phase: increased activity/energy for mania/hypomania, and having loss of energy for depression. An accurate diagnosis of bipolar disorder requires a clinician to identify an individual’s experiences with abnormal motor behavior for the two extreme mood phases and proper treatment depends on knowing the mood phase. Thus, information about mood phase is critical for managing bipolar disorder. Currently, evaluation of motor behavior in bipolar disorder is based on subjective and qualitative self-descriptions that have been reported to be biased in bipolar individuals, and lack biological validation with objective measurement. Quantitative information regarding motor behavior for bipolar individuals in each mood phase will be beneficial for more accurately diagnosing and better treating bipolar disorder. A major goal of my dissertation was to quantify movement behavior in individuals with bipolar disorder across mood phases to determine if biomechanical measures might serve as a biomarker for mood phase. In the study, gait and sit-to-walk biomechanics were evaluated in bipolar individuals across mood phases and in healthy controls at baseline and 6 month follow-up. Results from baseline testing will be presented at the 2017 ASB meeting at Boulder, CO, and the follow-up testing sessions are ongoing. Through the generous support of the American Society of Biomechanics Grant-in-Aid program, I was able to pay participant fees for this study.

Twenty-one bipolar individuals and 14 healthy controls recruited from the Prechter Longitudinal Study of Bipolar Disorder at the University of Michigan Depression Center completed the baseline testing. Two self-questionnaires were used to classify bipolar individuals by mood phase (4 hypomania, 7 euthymia and 10 depression). Participants performed five trials of gait and sit-to-walk at each of self-selected comfortable, slow and fast speeds. Motion data were collected using an optoelectronic motion capture system and ground reaction forces were collected using two force plates. Kinematic and kinetic variables related to clinical descriptions for the two extreme mood phases were examined.

Preliminary results indicated that movement characteristics differed for hypomanic individuals. For gait, gait velocity was greater for hypomanic individuals (1.55 ± 0.15 m/s) compared to the other individuals (1.21 ± 0.12 m/s for euthymic; 1.15 ± 0.28 m/s for depressed; 1.21 ± 0.12 m/s for healthy). Peak braking



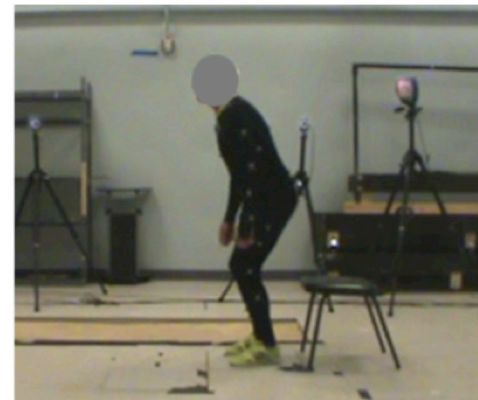
University of Michigan

Advisor: Melissa Gross

ASB 2016 Grant-in-Aid, cont.



force was greater for hypomanic individuals (0.27 ± 0.02 N/BW) compared to the other individuals (0.18 ± 0.03 N/BW for euthymic; 0.17 ± 0.05 N/BW for depressed; 0.18 ± 0.03 N/BW for healthy). Ankle power generation was greater for hypomanic individuals (5.29 ± 0.72 W/BW) compared to the other individuals (3.07 ± 0.54 W/BW for euthymic; 3.09 ± 1.27 W/BW for depressed; 3.43 ± 0.62 N/BW for healthy). For sit-to-walk, whole body center-of-mass displacement in the forward direction during sit-to-walk was greater for hypomanic individuals (0.97 ± 0.02 m) compared to the other individuals (0.82 ± 0.08 m for euthymic; 0.79 ± 0.09 m for depressed; 0.81 ± 0.08 m for healthy). Peak center-of-mass velocity in the forward direction was greater for hypomanic individuals (1.48 ± 0.15 m/s) compared to the other individuals (1.15 ± 0.20 m/s for euthymic; 1.13 ± 0.23 m/s for depressed; 1.14 ± 0.14 m/s for healthy). These results demonstrate clinical descriptions associated with hypomania in an objective and quantitative way, and suggest that biomechanical variables may be useful for identifying and characterizing mania/hypomania mood phase.



**University
of Southern
California**

**Advisor: Kornelia
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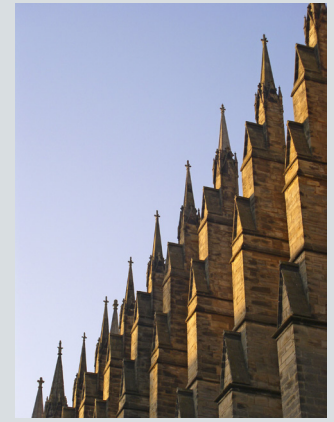
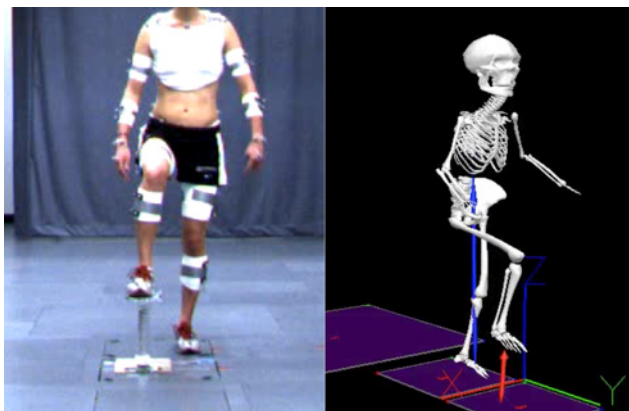
K. Michael Rowley: “Perturbation of Systems Contributing to the Neuromotor Control of Posture in Persons with Low Back Pain”

Funds from ASB’s Grant-In-Aid were used to investigate the effects of dual-task interference on trunk control during a dynamic unstable balance task in participants with and without recurrent low back pain (LBP). Associations between these effects and psychometric and motor control measures were tested in order to better our understanding of interactions between cognition, posture, and a history of pain. In six pain-free control participants, there was no uniform change in trunk coupling from single- to dual-task conditions—some participants became more tightly coupled in the trunk and some increased independent motion of the trunk segments (less coupling). The change in trunk coupling, however, trended toward a negative association with one’s tendency to invest conscious attention in movement, quantified using the Movement-Specific Reinvestment Scale. For example, a participant who pays conscious attention to his or her daily movement decreased trunk coupling when they were forced to think about a cognitive math task instead. A subset of three participants underwent electromyographic instrumentation of the paraspinal muscles. These data indicated that pain-free

ASB 2016 Grant-in-Aid, cont.

participants who consciously attend to movement (and therefore decreased their trunk coupling under dual-task interference) also increased the ratio of deep (multifidus) to superficial (erector spinae) muscle activation. This supports the hypothesis that a control strategy utilizing increased superficial musculature and decreased deep musculature is not robust to attentional interference as we see the opposite occur in conditions of dual-task interference. Further, four participants with recurrent LBP tested during symptom remission showed an association between the change in trunk coupling from single- to dual-task conditions and conscious motor processing trending in the same direction. While the direction was the same as the controls, the data were shifted upward such that all participants increased trunk coupling when the dual-task was added, indicating there is another mechanism at work.

These findings show that, in pain-free participants, there is no uniform change in trunk coupling during this dynamic unstable balance task when a cognitive dual-task is added. Importantly, however, the change in dynamic trunk stiffness measured in each individual may be related to his or her tendency to invest conscious attention in movement. In persons with recurrent LBP in symptom remission, however, all participants increased trunk coupling when the cognitive task was added. This is quite an important finding which informs rehabilitation given that dual-tasking is often prescribed during rehab to practice real-life situations. These findings indicate that dual-tasking should be prescribed with caution as it may increase trunk coupling in this patient group, potentially exacerbating problems in persons who already move with a stiff trunk. Findings from continued work on this study will help us learn more about interactions between attention, psychometric measures, and motor control measures in patients with recurrent LBP. Understanding these interactions will enhance multi-modal treatments, which up until now have been marginally successful. I am very grateful to ASB for helping to get this project off to a great start, and I look forward to learning more as I progress with this dissertation over the next year.



From the ASB Archives

Minutes of a Meeting to Consider the Founding of an American Society of Biomechanics held in Jyväskylä, Finland, on July 2, 1975

Present: Dr. Gideon Ariel, Dr. John Cooper, Dr. Albert Craig, Mr. Dan Daly, Dr. Jim Emory, Dr. Gladys Garrett, Dr. James Hay (Chairman), Dr. Robert Jensen, Dr. David Kaufmann, Dr. David Kelley, Dr. Menaheim Less, Dr. Doris Miller, Dr. Richard Nelson, Ms. Carol Putnam, Mr. Donald Riley, Dr. Jacques Samson, Dr. Gary Soderberg (Secretary), Dr. Juris Terauds, Dr. Barry Thompson, Dr. Erwin Tichauer, Dr. Ed Tucker, Mr. Barry Wilson.

Dr. Hay provided introductory remarks thanking all those present for their attendance. He explained that the calling of the meeting resulted from a series of informal discussions over several years that had culminated in a specific discussion at the Spring Meeting of the American College of Sports Medicine. At that time it was decided that there was a need for more broad discussion of the pros and cons of forming an American Society of Biomechanics. As a result, letters regarding this present meeting had been sent to all U.S. preregistrants for the Vth International Congress.

Dr. Hay then outlined what he considered to be some of the pros and cons of forming such an organization. He stated that although there was much biomechanics activity in many areas, there was relatively little contact among people in biomechanics. He expressed the view that there was a need for a common forum which, while not intended to replace any existing group or meeting, would provide for exchange across fields of application. He stated that he suspected that those who work in other areas would similarly not be enthused about another group which simply replicated what was already available. Among the cons, Dr. Hay noted that there were already numerous conferences and that much organizational work would be involved.

Dr. Hay then called for a reaction to the question of whether or not to initiate steps toward the formation of an association.

Dr. Tichauer responded very positively, citing the need for communications. He stated that there was no biomechanic's-biomechanics group per se, but rather a conglomeration of many different professional groups. He also felt a need for a newsletter or journal.

Dr. Cooper suggested the possibility of forming a North American group, or in other words combining with the recently founded Canadian Society. He also indicated that dollars would be needed and that we should perhaps consider formation within the American College of Sports Medicine and offer a simultaneous program.

In reply to Dr. Cooper, Dr. Hay stated that identification with the American College of Sports Medicine might seriously limit the scope of an American or North American Society of Biomechanics.

Dr. Kelley asked whether the proposed society would seek affiliation with the International Society of Biomechanics.

Dr. Hay said he would expect such a step to be taken eventually.

Dr. Jensen indicated that the Canadian group was applying for affiliate membership.

Dr. Kelley stated that he favors the formation of a society, that he sees no problem with redundancy and that the possibility of forming an American College of Biomechanics should be considered. He did not see that any other organization met the needs of this particular group.

Dr. Hay reported that he had received positive letters of response from the following six people:

Dr. David Barlow, Physical Education, University of Delaware
Dr. Barry Bates, Physical Education, University of Oregon
Dr. Pat Downie, Physical Education, Smith College
Dr. Erwin Tichauer, Ergonomics, New York University
Dr. Joseph Vorro, Dentistry, University of Maryland
Mr. James Walton, Applied Mechanics, Stanford University

Dr. Tichauer suggested that perhaps the National Science Foundation would have seed money for establishment of this organization.

Dr. Cooper too suggested that perhaps we should seek a modest beginning with attachment to some other group.

Dr. Kelley responded by citing that in his opinion numbers were available and that they would more likely favor a separate group.

Dr. Hay questioned whether a negative effect would be felt by being attached to another group.

Dr. Tichauer responded by saying that it would, and that he would therefore favor some kind of neutral ground.

Dr. Terauds moved to form a United States Society of Biomechanics, subject to name change, as per the suggestions of an organizational committee. Dr. Kelley seconded and the motion passed unanimously.

The meeting then proceeded to identify groups or agencies with which biomechanics people were active. The following were listed:

Alliance for Engineering in Medicine and Biology
American Alliance for Health, Physical Education and Recreation
American Association for Medical Instrumentation
American College of Sports Medicine
American Congress of Rehabilitation Medicine
American Industrial Hygiene Association
American Institute of Electrical Engineers

American Physical Therapy Association
American Society of Mechanical Engineers
International Society of Behavioral Kinesiology
International Society of Electrophysiological Kinesiology
Orthopedics Research Society

Discussion was then held on possible persons to participate in the formation of a working committee that would represent engineering, sport, and medicine. The following names were suggested:

Dr. John Basmajian (Medicine)
Dr. Bernacki (Clinical Medicine)
Dr. Don Chaffin (Engineering)
Dr. John Cooper (Physical Education)
Dr. James Hay (Physical Education)
Dr. Tom Kane (Engineering)
Dr. David Kaufmann (Physical Education)
Dr. Wasserman (Engineering)

Dr. Miller moved that Dr. Hay be elected as Chairman pro-tem, Dr. Kelley seconded, and the motion carried. Dr. Hay was instructed to proceed with the organization of a working committee, and after some discussion on procedure, Dr. Terauds moved to give responsibility for formulation to Dr. Hay with considerable leeway as to individuals that he might contact.

Following the appointment of Dr. Soderberg as interim secretary, the meeting was adjourned.

Respectfully submitted,

Gary Soderberg
Interim Secretary

Umbrellas are for Tourists

William Ledoux

Greetings ASB members! I hope you find this newsletter informative and in time to help improve your ASB annual meeting experience. I think we set a record for content with 56 pages for this edition (Vol 30, Iss 1). In addition to the excellent 'regular' articles (president, student representative, secretary/member-ship, treasure, education committee, past-president, communications committee, program chair, meeting chairs, diversity committee, president-elect, meeting chair-elect, and newsletter editor) we have come to know and expect from the ASB executive board, we have lots of bonus content, including the second ASB fellows forum titled "Biomechanics and National Biomechanics Day as Mechanisms to Support Diversity, Equity and Inclusion" and a summary of the work to date for the first Junior Faculty Research Award. Additionally, we had a summary of "Things to do in Boulder" and our first in a series of Biomechanics Conversations. Also, we had a detailed review of our second National Biomechanics Day and a summary of the ASB Facebook page. We had reports from the 5 ASB regional meetings that were held this spring and the 5 ASB Grant-in-Aid awards awarded in 2016. Wrapping it up, we have included from the ASB archives the minutes of the meeting held in Jyvaskyla, Finland that was held to "consider the founding of the an American Society of Biomechanics" and our Events Calendar. On the ASB archives project front, I am happy to report that Pennsylvania State University has agreed to house our physical archives and will cover all the shipping as well! Look forward to an detailed update this fall.



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Events Calendar

Dan Gales



NOTE:

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

13th Biennial Footwear Biomechanics Symposium

July 20-22, 2017
Gold Coast, Australia
Abstract deadline: past
footwearbiomechanics.org/fbs2017

International Society of Biomechanics 2017 Congress XXVI

July 23-27, 2017
Brisbane, Australia
Abstract deadline: past
www.biomech2017.com

Symposium of Hand and Wrist Biomechanics International

July 23-25, 2017
Brisbane, Australia
Abstract deadline: past
www.hwbi.org/2017

American Society of Biomechanics Annual Conference

August 8-11, 2017
Boulder, Colorado
Abstract deadline: past
asb2017.org

Human Factors and Ergonomics Society International Annual Meeting

October 9-13, 2017
Austin, Texas
Abstract deadline: past
www.hfes.org/web/HFESMeetings/2017annualmeeting.html

National Association for Kinesiology in Higher Education

January 3-6, 2018
Phoenix, Arizona
Abstract deadline: past
www.nakhe.org/conferences

Orthopaedic Research Society Annual Meeting

March 10-13, 2018
New Orleans, Louisiana
Abstract deadline: August 28, 2017
www.ors.org/2018annualmeeting/

Gait and Clinical Movement Analysis Society

May 21-26, 2018
Indianapolis, Indiana
Abstract deadline: TBA
www.gcmas.org/2018_annual_conference

Fifteenth International Symposium on the 3-D Analysis of Human Movement

July 3-6, 2018,
Salford, United Kingdom
Abstract deadline: TBA
www.geocities.ws/3d-abm/#2018

2018 World Congress of Biomechanics

July 8-12, 2018,
Dublin, Ireland
Abstract deadline: December 19, 2017
wcb2018.com

American College of Sports Medicine

May 29-June 2, 2018
Minneapolis, Minnesota
Abstract deadline: TBA
www.acsmannualmeeting.org

American Physical Therapy Association

NEXT Conference and Exposition
June 27-30, 2018
Orlando, Florida
Abstract deadline: September 29, 2017
www.apta.org/NEXT/FutureDates/



ASB2017 AMERICAN SOCIETY
OF BIOMECHANICS
UNIVERSITY OF COLORADO **BOULDER**

August 8-11, 2017

<http://asb2017.org>

