Conference Program
2015 Summer Biomechanics, Bioengineering and Biotransport Conference

SB3C
biomechanics.
bioengineering.
biotransport.

June 17-20, 2015
Snowbird Utah

The 2015 Summer Biomechanics, Bioengineering and Biotransport Conference (SB^3C) organizers gratefully acknowledge the support of the National Institutes of Health, National Institute of Biomedical Imaging and Bioengineering (R13EB020513) and the National Science Foundation (CBET/BMMB: 1540647).

Research reported in this publication was supported by the National Institute of Biomedical Imaging and Bioengineering of the National Institutes of Health under Award Number R13EB020513. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

ISBN: 978-0-692-43943-2

FOREWORD and ACKNOWLEDGEMENT

Welcome to beautiful Snowbird, Utah!

On behalf of the 2015 Summer Biomechanics, Bioengineering and Biotransport Conference (SB^{3}C) Organizing Committee, welcome to **SB^{3}C2015,** a new and exciting meeting with a fine pedigree. The SB^{3}C meeting is a great opportunity for us to come together to discuss outstanding research, catch up with old friends, and meet new friends and colleagues. Although our primary focus is scientific and technical exchange, the program incorporates relaxation as well. Come and dance to the awesome tunes of BEDRock at the free Friday night concert. And remember, we are located in a spectacular setting and have programmed free time so that everyone can enjoy the natural beauty of this amazing part of the world.

The theme of the SB^{3}C2105 meeting is "Synergy of Modeling and Experiments in Biomechanics, Bioengineering and Biotransport". In line with this theme we have selected Plenary Speakers, and will run Workshops and Challenge Sessions, to address research that covers the complex, messy and real-world intersection between modeling and measurement. We are particularly delighted to welcome Professors Margaret Gardel and Andrew McCulloch as our plenary speakers; they are both outstanding researchers and leaders in the areas of cellular and cardiac biomechanics, respectively.

We were delighted to receive a large number of excellent abstracts. This is a true testament to the vibrancy and dedication of members of the community, who work so hard to advance human knowledge in Biomechanics, Bioengineering and Biotransport. We had about 716 abstracts submitted and have programmed an "action-packed" meeting with outstanding contributed papers, posters, and workshops. First-time attendees, be sure to check out the student poster sessions and talks and encourage your favorite student competitors. We expect these sessions to to be a highlight of the conference. We will have 73 finalists presenting in the Bachelor, Masters, and Doctoral levels at SB^{3}C2015.

The SB^{3}C2015 meeting is delighted to welcome the participation of the Japanese Society of Mechanical Engineering, and notably their co-organization of a number of sessions. We are also grateful to the many Societies who have extended professional recognition to the meeting. We will pay tribute to the achievements of Avraham Shitzer through a special podium session in his honor. We are excited to include an Undergraduate Student Design Competition, several Challenge Competitions, and a number of workshops, ranging from "Taking the Guesswork out of the Interview Process" to "FEBIO Workshop and Discussion".

A plenary session will highlight the ASME H.R. Lissner medal winner and a special workshop session will highlight the ASME Van C. Mow and Y.C. Fung medal winners. This year we have the pleasure to acknowledge the accomplishments of James Ashton-Miller (University of Michigan) as the winner of the Lissner medal for his experimental and theoretical biomechanical contributions and inventions in the area of unintentional injuries. The winner of the Mow medal for accomplishments at the mid-career level is Dawn Elliott (University of Delaware) for seminal contributions to research in musculoskeletal biomechanics. Adam Engler (UCSD) is the winner of the Fung award for his work on how physical and chemical properties of the niche influence stem cell function. Please join us in congratulating each of the awardees.

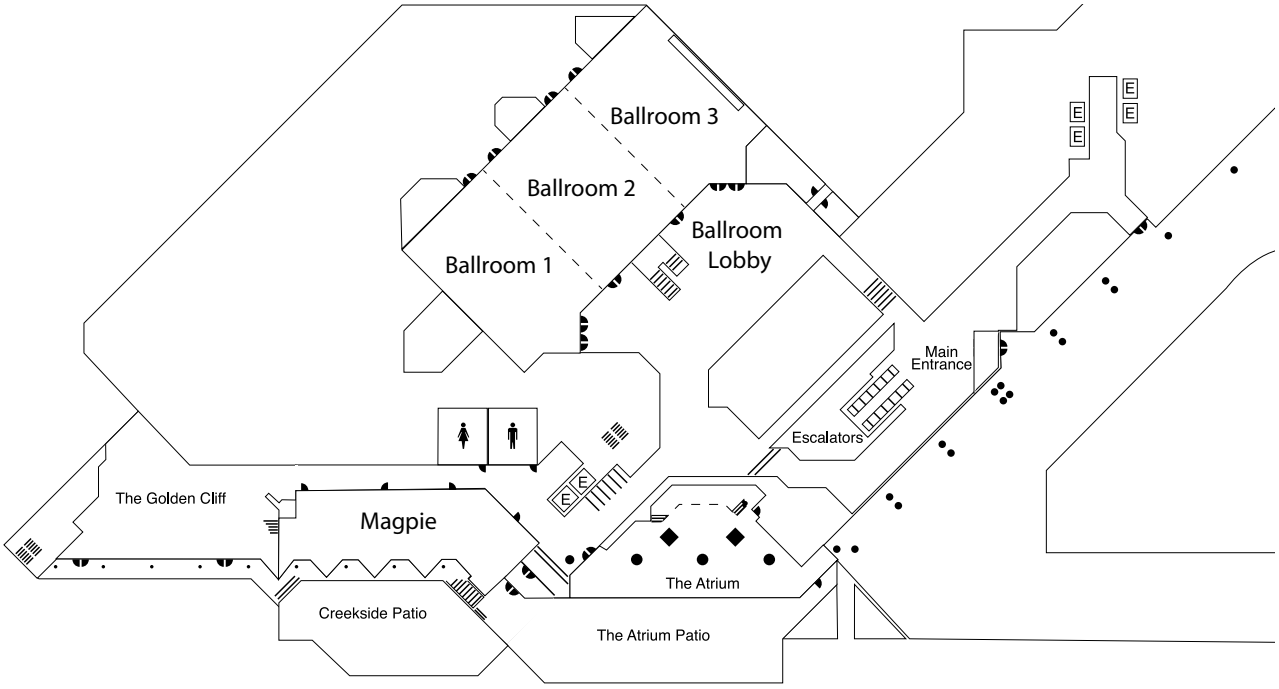
We would particularly like to thank and recognize the tremendous efforts of the members of the SB^{3}C2015 Organizing Committee, Program Committee, Local Arrangements Committee, session chairs, workshop organizers and the many reviewers who worked hard to bring us this high-quality program. We are fortunate to receive financial sponsorship from our industry sponsors listed in the program as well as the National Institutes of Health (NIBIB) and the National Science Foundation (CBET/GARDE).

C. Ross Ethier, Conference Chair
Georgia Institute of Technology/Emory

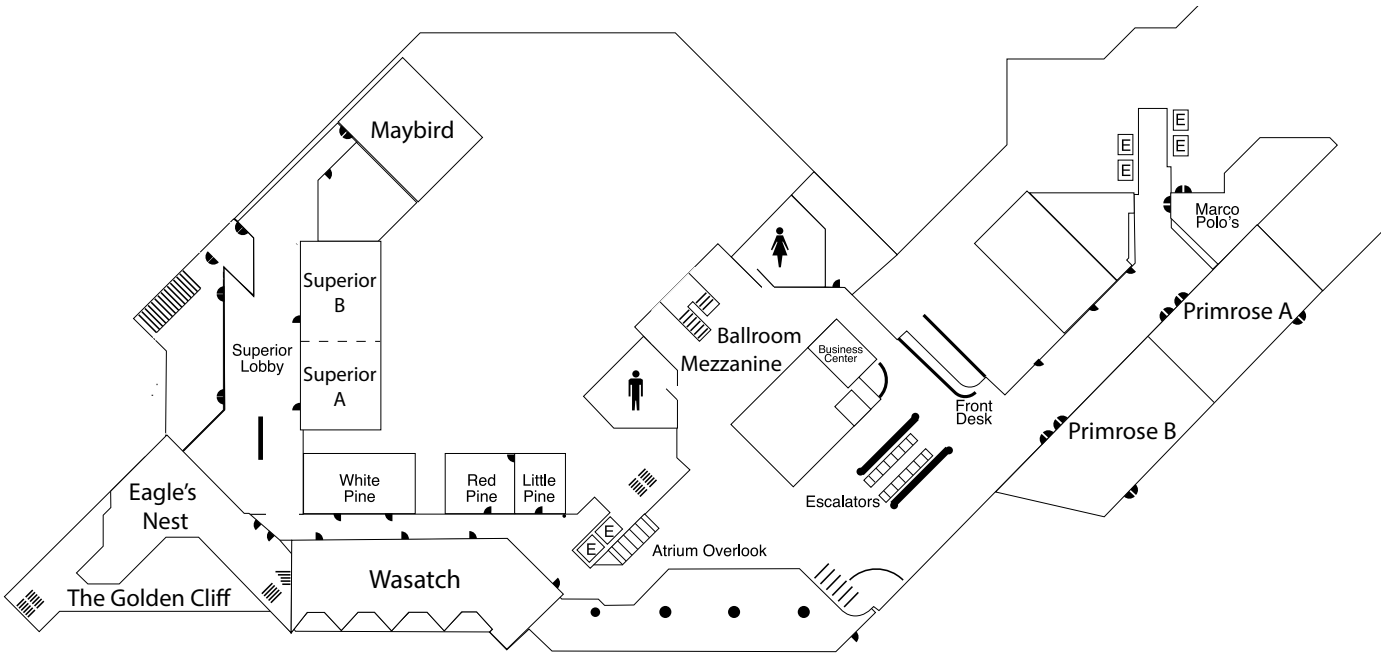
Jeff Weiss, Program Chair
University of Utah

Cliff Lodge/Conference Center: Registration & Podium Sessions
Event Tent: Posters and lunch

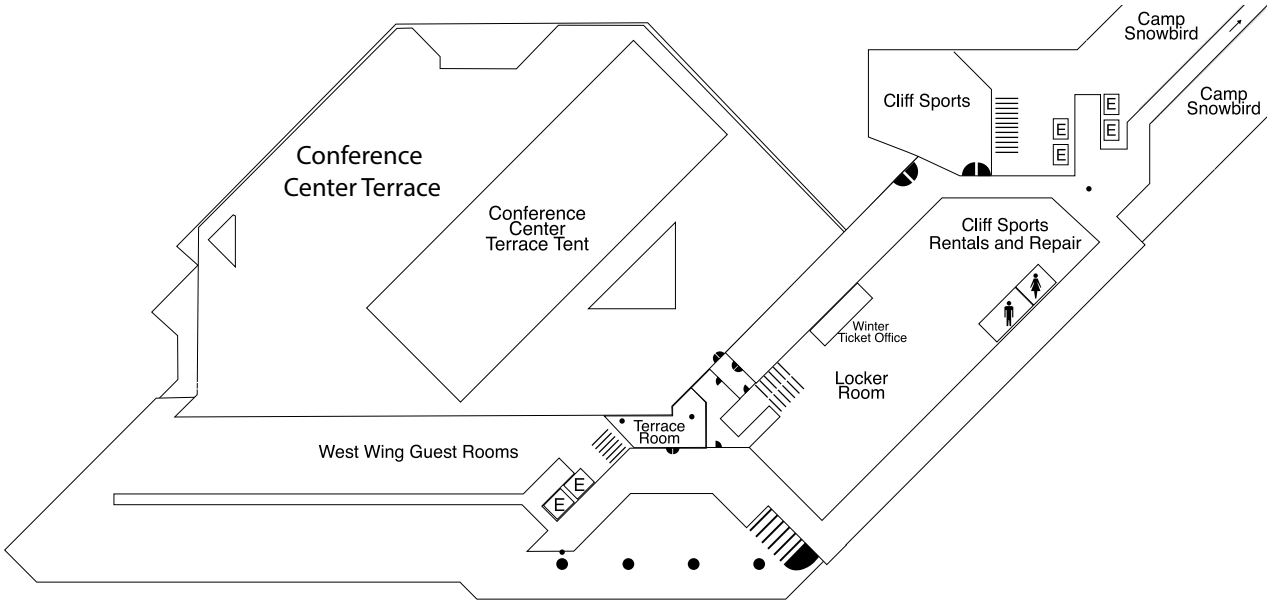
Cliff Lodge / Conference Center Level B



Level C



Cliff Lodge / Conference Center Level 1



Level 2

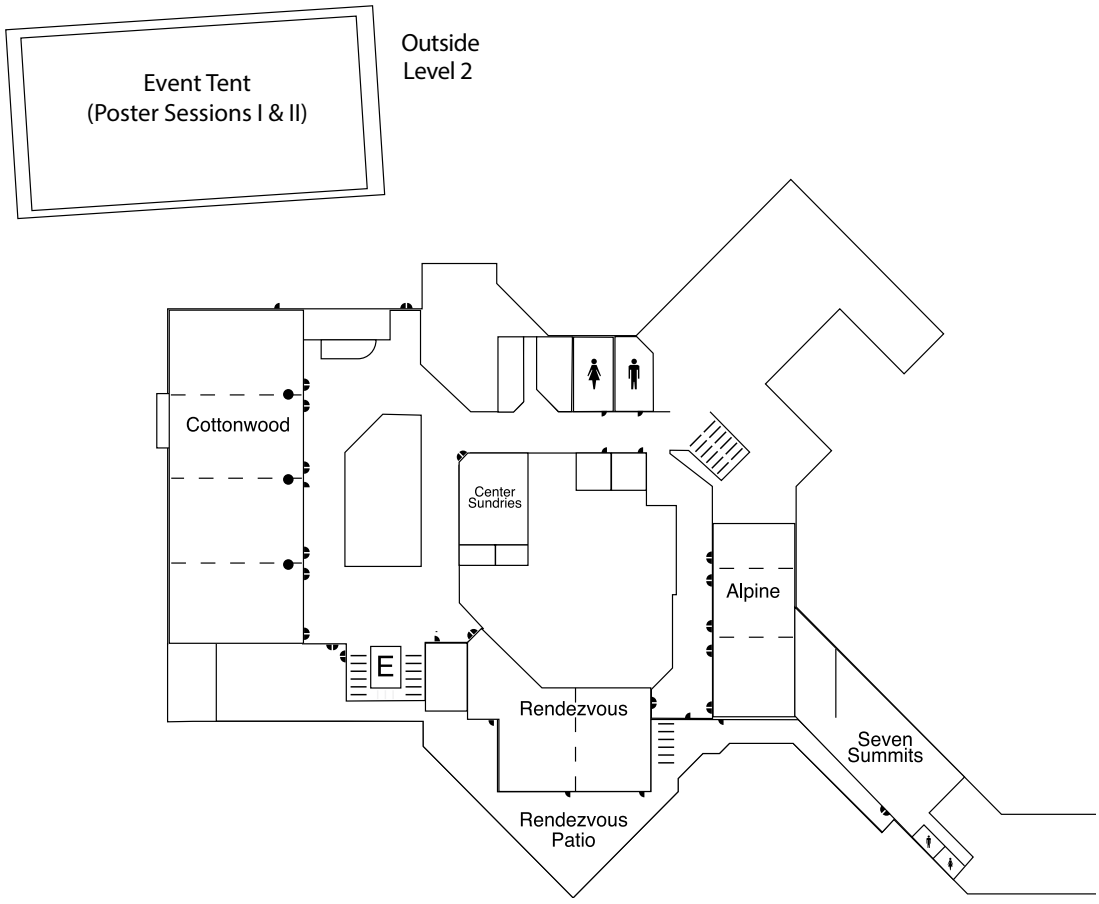


TABLE OF CONTENTS

SOCIAL PROGRAM

Wednesday, June 17, 2015		
Opening Reception	Conference Center Terrace*	7:00 pm – 9:00 pm
Thursday, June 18, 2015		
Breakfast	Ballroom Lobby and Mezzanine	7:00 am – 8:00 am
Poster Session Lunch	Event Tent	12:30 pm – 2:30 pm
Women's Networking Event	Cliff Lodge, Level 10	4:30 pm
Friday, June 19, 2015		
Breakfast	Ballroom Lobby and Mezzanine	7:00 am – 8:00 am
Poster Session Lunch	Event Center Tent	12:30 pm – 3:00 pm
BEDrock Concert	Plaza Deck**	8:00 pm – 11:00 pm
Saturday, June 20, 2015		
Lissner Reception	Ballroom Lobby and Mezzanine	6:00 pm – 7:00 pm
Banquet	Ballroom	7:00 pm – 10:00 pm

* Rain venue is Golden Cliff/Eagles Nest, Superior Lobby and Magpie
** Rain venue is the Ballroom

CONFERENCE REGISTRATION

Wednesday, June 17, 2015	Ballroom Lobby	11:00 am – 9:30 pm
Thursday, June 18, 2015	Ballroom Lobby	6:30 am – 3:00 pm
Friday, June 19, 2015	Ballroom Lobby	6:30 am – 2:30 pm
Saturday, June 20, 2015	Ballroom Lobby	11:00 am – 5:00 pm

POSTER DIRECTIONS AND SPEAKER READY ROOMS

The poster tent will be available to attendees from Wednesday - Saturday. Session I posters should be set up between 7 am-3:30 pm on Wed. June 17, and must be removed between 3-4 pm on Thurs. June 18. Session II posters should be set up between 5-7 pm on Thurs. June 18, and must be removed by 11 am on Sat. June 20. Students with posters in the competition should remain at their posters throughout designated times. Any poster remaining after the assigned take down period for a Poster Session will be removed by the organizers. Session rooms will be available outside of scheduled meeting times. Speakers are encouraged to test their presentations in the appropriate room prior to their presentation.

COMMITTEE MEETINGS

Unless denoted by an *, the committee meetings are *open to all*. Attending these meetings is a terrific way to get more involved with the Society! Please consider joining one or more of the meetings listed below.

Wednesday, June 17, 2015

BED Executive*	Ballroom 1	7:00 am – 9:30 am
SB^{3}C Organizing & Program (NOTE: 1)	Ballroom 1	9:30 am – 10:20 am
SB^{3}C Oversight* (NOTE: 2)	Ballroom 1	10:30 am – 11:20 am
Membership Development	Ballroom 2	10:30 am – 11:20 am
New Directions	Ballroom 3	10:30 am – 11:20 am
Education	Ballroom 1	11:30 am – 12:20 pm
Finance*	Ballroom 2	11:30 am – 12:20 pm
Cell & Tissue Engineering	Ballroom 1	12:30 pm – 1:20 pm
Industry Advisory	Ballroom 2	12:30 pm – 1:20 pm
Fluid Mechanics	Ballroom 1	1:30 pm – 2:20 pm
Design, Dynamics & Rehabilitation	Ballroom 2	1:30 pm – 2:20 pm
Honors*	Ballroom 3	1:30 pm – 2:20 pm
Solid Mechanics	Ballroom 2	2:30 pm – 3:20 pm
Biotransport	Ballroom 3	2:30 pm – 3:20 pm

Friday, June 19, 2015

JBME Editors (with lunch)*	Primrose A	12:30 pm – 2:30 pm
Open Executive Business Meeting	Primrose A	4:45 pm – 6:15 pm

Among other business, the future organization of SB^{3}C meetings and their relationship to ASME BED will be discussed at this meeting.

Saturday, June 20, 2015

Student Leadership Committee	Primrose A	10:30 am – 11:00 am

Open to all Students, Post-docs, and Faculty interested in Student Affairs.

NOTE 1: SB^{3}C Organizing committee meeting: members for three conference years (2015, 2016, 2017) should attend. SB^{3}C Program committee meeting: Program Chair (2016), Program Chair (2015), and Chairs of Technical Committees. Organizing Committee chaired by Conference Chair 2014; Program Committee chaired by Program Chair 2015.

NOTE 2: Conference Oversight Committee consists of the Conference Chairs from 2013-2017 and the Program Chairs from 2013-2017. Chaired by Conference Chair 2014.

PLENARY SESSIONS, WORKSHOPS, AND CHALLENGES

Thursday, June 18, 2015	8:00 AM – 9:00 AM	

Plenary Session: **HOW THE DYNAMIC ACTIN CYTOSKELETON REGULATES FORCE TRANSMISSION IN CELLS AND TISSUE** **Ballrooms 1-3**

Margaret Gardel, PhD
University of Chicago, Chicago, IL

The cytoskeleton of living cells is a quintessential example of active matter, in which internal molecular processes transduce chemical energy into local stresses that drive structural rearrangements and dominate its material response. The physical behaviors of such "living matter" engender cells with the ability to move, divide and build multi-cellular tissue. At the nano-meter (molecular) scale, mechanical stresses are generated by the translocation of myosin II motors along semi-flexible polymers of actin. However, how these molecular scale interactions guide the emergent self-organization and behaviors of contractile matter at micro-meter (cellular) to milli-meter (tissue) length scales is unknown. My lab has used approaches both in vitro and in vivo to determine the mechanisms of force transmission in cells and tissues. We have utilized high resolution imaging and force spectroscopy approaches to characterize the actomyosin networks formed in living cells as well as in contractile bundles and networks reconstituted from purified proteins. Our results identify the importance of the nonlinear elastic response of actin filaments as a robust means of symmetry breaking to generate robust contractility in diverse situations. We have then identified order parameters controlling force transmission in adherent cells and epithelial tissue, which then have led us to understand the important role of actin dynamics in controlling shape changes and force transmission in multicellular tissue.

Friday, June 19, 2015	8:00 AM – 9:30 AM	

MOW AND FUNG AWARD LECTURES: **DAWN ELLIOTT (MOW) AND ADAM ENGLER (FUNG)** **Primrose A&B**

Chairs: Lou Soslowsky (University of Pennsylvania) and Guy Genin (Washington University)

Two presentations will be made: The 2015 Van C. Mow Medal Awardee, Dawn Elliott (University of Delaware) will present "Taking Apart a Cat to See How It Works Gives You a Non-Working Cat… or Adventures in Fibrous Soft Tissues Biomechanics". The 2015 Y.C. Fung Medal Awardee, Adam Engler (University of California, San Diego) will present "Mechanical Signaling and its Role in Differentiation and Disease".

Workshop: **PROBLEM-BASED LEARNING IN BIOMECHANICS** **Superior**

Organizers: Alisa Morss Clyne (Drexel) and Kris Billiar (Worcester Polytechnic Institute)

Problem-based learning and flipped classrooms increase student interest and retention; however these effective learning techniques have yet to be widely implemented in biomechanics

Friday, June 19, 2015	8:00 AM – 9:30 AM	

education. The objective of this workshop is to provide a step-by-step guide for faculty at all levels, as well as graduate students and post-docs interested in academia, to implementing problem-based learning in biomechanics courses. Attendees will learn how to create effective problems, lead students towards their own solutions, and evaluate student performance through an interactive session led by faculty experienced in problem-based learning. In addition, attendees will receive successful biomechanics problems and flipped classroom techniques, along with implementation guidelines.

Challenge: **CFD CHALLENGE 2015** **Wasatch**

Organizers: Kenichi Kono (Wakayama Rosai Hospital, Japan) and Kristian Valen-Sendstad (University of Toronto)

Computational Fluid Dynamics (CFD) of intracranial flows has gained much interest over the past years and is arguably a useful tool for future clinical use. Drs. Steinman and Loth launched the "Aneurysm CFD Challenge 2012", and concluded that pressure drop was reasonably well predicted among the vast majority of the participants. Dr. Janiga followed up in 2013 and assessed whether CFD modellers could predict the ruptured aneurysm of two cases (Phase I in press). However, in both previous challenges, segmented surface geometries were provided along with other constraints, which may not reflect a normal collaboration between physicians and engineers.

We are therefore happy to announce the launch of the Aneurysm CFD Challenge 2015 that is designed to mirror a "real-world" collaboration starting from Digital Imaging and Communication in Medicine (DICOM) data. There are three questions we wish to answer in the current challenge: (i) what are the variabilities of image segmentation (ii) what are the differences in CFD results when surface and boundary conditions are not provided (iii) and is CFD really adding value with respect to rupture risk prediction? The latter will be answered through providing clinicians the "normal" clinical data as clinicians' challenge.

Workshop: **MENTEE-MENTOR MATCHING MIXER AND BEST PRACTICES IN MENTORING** **Magpie**

Organizers: Naomi Chesler (University of Wisconsin-Madison), Lakiesha Williams (Mississippi State University), and Victor Barocas (University of Minnesota)

A "chilly" climate at the departmental and institutional levels is often responsible for the loss of women from academic positions pre- and post-tenure. Isolation and the accumulated effects of micro-aggression are also key factors in the loss of underrepresented minorities (URM) from academic positions. Professional societies and associated conferences, such as SB^3C, can provide a venue for reducing isolation and increasing mentoring (including technical, informational, and psychosocial support) that help retain and promote women and URM in post-doctoral and faculty positions.

We are therefore happy to announce the launch of a mentor-mentee match mixer at SB^3C that is designed to develop mentoring relationships between junior and senior colleagues in biomechanics, bioengineering and biotransport. Interested participants should register in advance and fill out the match form here: http://bit.ly/1DOEMv0. The Diversity and Inclusion

Friday, June 19, 2015	8:00 AM – 9:30 AM	

Committee will use these forms to match mentees with mentors and will not share the information provided outside of the committee. The deadline for submitting match forms is May 25, 2015. Matches will be announced in advance of the workshop. At the workshop, best practices for mentor-mentee relationships will be discussed and the remainder of the time will be used for meeting, mixing and mentoring. Pre-registration is required to be matched with a mentor. Pre-registration is not required for attendance.

Workshop: **STRATEGIES FOR A SUCCESSFUL POST-DOCTORAL EXPERIENCE** **Maybird**

Organizers: ASME Bioengineering Division Student Leadership Committee (special thanks to Kathryn Drzewiecki, Samira Jamalian, Paola Jaramillo, and Samantha Schoell)

Today, the job market for PhDs is exceedingly competitive. While a post-doctoral fellowship is the most natural transition for most PhD graduates, the plight of a perpetual post-doc can seem bleak. This workshop will focus on how to make your post-doctoral experience successful! The session will begin with introductory remarks from an NIH Program Director regarding the importance and advantages of interdisciplinary training. This talk will be followed by a Q & A panel to answer questions regarding skills and experience that should be pursued during post-doctoral training opportunities to make you a desirable job candidate. The panelists' diverse expertise includes NIH and NSF Program Officers, tenured and tenure-track faculty members, and current post-doctoral fellows. After attending this workshop, you will have strategies for a successful post-doctoral experience that will make you a strong candidate for your desired career!

Friday, June 19, 2015	9:45 AM – 10:45 AM	

Plenary Session: **MULTI-SCALE MODELING OF THE FAILING HEART: FROM MOUSE TO HUMAN** **Ballrooms 1-3**

Andrew McCulloch, PhD

Distinguished Professor of Bioengineering and Medicine, UC San Diego

Heart failure is a complex syndrome that involves cellular defects in excitation-contraction coupling and contractile mechanisms, neurohormonal dysregulation, metabolic changes, ventricular structural remodeling, and circulatory alterations. We use multi-scale computational modeling, magnetic resonance imaging and biophysical studies in genetically engineered mice to investigate how cellular and molecular defects can give rise to heart failure at the organ and system scales. Recent experimental and computational studies have elucidated the distinct mechanisms by which gene defects in the contractile regulatory protein myosin regulatory light chain and the cytoskeletal protein vinculin can lead to dilated cardiomyopathy and heart failure. In both cases, we use experimental measurements in young mice before they develop ventricular dysfunction together with multi-scale models to show how specific molecular alterations have

distinct effects of myofilament and sarcomere function that manifest as alterations in ventricular wall mechanics that may trigger subsequent heart failure remodeling. To apply these multi-scale modeling strategies to clinical cardiology, we have also developed patient-specific models of dyssynchronous heart failure and used them to understand clinical responses to cardiac resynchronization therapy (CRT). Although CRT is one of the most cost-effective therapies for heart failure, in those patients who also have electrical conduction defects, the non-responder rate is 30-50%. Patient-specific models have identified new computational biomarkers of CRT response that may be significantly more predictive than currently available indices.

Saturday, June 20, 2015	**11:30 AM – 1:00 PM**	

Workshop: **CRITICAL STEPS IN COMPOSING A SUCCESSFUL MENTORSHIP PLAN** **Primrose A**

Organizers: Sara Wilson (University of Kansas) and Rouzbeh Amini (University of Akron)

More than 60% of the SB^{3}C attendees are graduate students and post-doctoral trainees who are interested in submitting fellowship grant proposals to the federal agencies. A key component of these proposals is a coherent and well-thought-out mentorship plan. The purpose of this workshop is to transfer first-hand knowledge from adroit participating members of SB^{3}C, who have been involved in the review process of such grants, and from representatives of agencies such as NIH and NSF to the participating trainees. The workshop will be held in two segments. The first segment includes two 20-minute seminars presented by the NIH and NSF representatives invited by the organizers. They will explain how critical components of a mentorship plan such as “grant writing skills”, “developing a new laboratory”, “teaching and mentoring graduate students”, “time management”, “forming new collaboration”, “training in responsible professional practices”, etc. should be addressed in the mentorship plan. For the remaining 25 minutes of the workshop, three experienced participating members of SB^{3}C will conduct a mock review session and will discuss the pros and cons of three sample mentorship plans, prepared by them before the workshop. The workshop participants, who will receive hard copies of these plans, will witness how strengths and weaknesses of each one are being discussed. Participants in this workshop will have an excellent opportunity to learn about critical elements of a mentorship plan necessary for a successful grant proposal.

Workshop: **TEACHING UNDERGRADUATE DESIGN** **Superior**

Organizers: Martin Tanaka (Western Carolina University) and Ken Fisher (University of Kansas)

The objective of this workshop is to teach the workshop participants best practices in conducting engineering design and how these practices can be taught to students taking senior design courses. The workshop is applicable to people teaching a senior design course, designing and building test devices or creating product for consumer use. The session will be divided into the following sections:

- Presentation by Martin Tanaka on the basics of engineering product design (~15 min). Martin has over 11 year of experience as a design engineer working for several different companies including Texas Instrument, Siemens VDO, and ABB. He has designed pressure switches for control of HVAC and refrigeration systems, an automotive cruise module for Volkswagen, and a mass spectrometer for ABB. The breadth of his

Saturday, June 20, 2015	11:30 AM – 1:00 PM	

experience includes work as a junior engineer, senior engineer, project manager, mechanical engineering supervisor and engineering manager.

- Presentation by Glen Livesay or Renee Rogge on Capstone Design (~15 min). Livesay and Rogge co-chaired the Capstone Design Conference at Columbus Ohio in 2014. The conference is intentionally designed to promote discussion and interaction across the capstone community. Both Glen Livesay and Renee Rogge are from the Rose-Hulman Institute of Technology.
- Small group discussion (~30 min). The workshop participants will be divided into small groups of 4-6 people. Each member will be instructed to share with the other members of the group things that you do well and areas that you would like to improve. We plan to "seed" each table with someone that has experience in engineering design or teaching capstone courses.
- Each group will briefly present the highlights of their discussion (~15 min). A representative for each table will be given the opportunity to tell the group about one item discussed in their 30 minute small group discussion. This can include best practices, alternate view points, concerns, etc. Highlighted points will be typed into a computer and projected onto a screen.
- Discussion by entire group on any of the highlighted points (~15 min). Finally, the workshop will conclude with a free form discussion of any of the highlighted topics for the entire group to discuss. Recall topics will be displayed on a screen. This will be moderated by the workshop co-chairs.

Workshop: SIMVASCULAR WORKSHOP AND NEW USER TRAINING Wasatch

Organizers: Alison Marsden, (UCSD), Shawn Shadden (UC Berkeley), and Nathan Wilson (Open Source Medical Software Corporation)

SimVascular is the only available open source software package that provides a complete pipeline from medical image data to cardiovascular blood flow simulation results and analysis (simvascular.org). It offers capabilities for image segmentation, unstructured adaptive meshing, physiologic boundary conditions and an efficient Navier-Stokes finite element solver with fluid structure interaction. An accompanying vascular model repository provides over 100 clinical data sets with simulation results from different parts of the vasculature to enable research. Extensive online documentation and tutorials with clinical examples are provided online. This workshop will introduce the newly released revitalized SimVascular project to the SB^3C community. We will interactively take new users through a step-by-step tutorial on the software. We will cover basic steps of model construction, meshing and flow simulations, as well as underlying theory, numerical methodology and best practices for high quality results. Following a series of interactive demonstrations, we will moderate a question and answer session for current and potential users.

Workshop: FEBIO WORKSHOP AND DISCUSSION Magpie

Organizers: Jeffrey A. Weiss (University of Utah), Gerard Ateshian (Columbia University), and Steve Maas (University of Utah)

FEBio is a nonlinear finite element solver that is specifically designed for biomechanical applications (www.febio.org). It offers modeling scenarios, constitutive models and boundary

Saturday, June 20, 2015	11:30 AM – 1:00 PM	

conditions that are relevant to many research areas in biomechanics. All features can be used together seamlessly, giving the user a powerful tool for solving 3D problems in computational biomechanics. This workshop will focus on FEBio capabilities that have been added through the new Plugin mechanism, including prestrain/residual strain, inverse mechanics, position dependent material properties and deformable image registration. Following the presentation/demonstrations, we will moderate an open question-and-answer period for users and potential users.

Workshop: **EXPERIMENTAL AND COMPUTATIONAL FRAMEWORKS FOR BIOTRANSPORT IN TUMORS** **Maybird**

Organizers: M. Nichole Rylander (University of Texas at Austin) and Malisa Sarntinoranont (University of Florida)

The biotransport characteristics of the tumor microenvironment are constantly evolving during tumor development and provide both opportunities and challenges for therapeutic intervention. In order to develop effective cancer treatments, a thorough understanding of the biotransport properties of tumors as a function of their growth and how these characteristics influence therapy outcome are critical. This workshop will describe innovative experimental platforms being utilized to understand how biotransport properties of tumors (e.g. fluid dynamics, heat transfer) influence tumor development. The use of three-dimensional *in vitro* microfluidic platforms and animal models for elucidating the impact of varying biotransport phenomena (e.g. hemodynamics, temperature) on transport and efficacy of therapeutics will be described. Modeling approaches for predicting biotransport phenomena associated with tumors and how these cues are modulated with hyperthermia and cryotherapy alone or in combination with nanomedicine will be discussed. Strategies for integration of experimental discovery and computational prediction related to biotransport for therapeutic development will be provided. Ultimately, this workshop will provide key insights which will be useful for controlling biotransport within the tumor microenvironment to maximize the effectiveness of cancer treatments.

Workshop: **TAKING THE GUESSWORK OUT OF THE INTERVIEW PROCESS** **Golden Cliff /Eagles Nest**

Organizers: ASME Bioengineering Division Student Leadership Committee (special thanks to Justine Garcia, Elizabeth Iffrig, and Corinne Riggin)

Knowing what an interviewer is looking for can be difficult. And while we can't provide you with a stellar resume, we can help you nail your interview. This workshop will feature a panel of representatives from academia and industry who have been a part of the hiring process both as interviewers and as interviewees. The session will include mock interviews influenced and guided by the experiences of our panelists. You will leave knowing what makes a candidate stand out in both a good way and a bad! Panelists will highlight what types of answers and behaviors make a candidate more attractive for specific job opportunities. Following the mock demonstrations we will regroup for a summary session and an open Q & A in which our panel will answer any lingering questions you may have. Attendees will leave this workshop feeling more confident in themselves and their answers at their next interviews!

Saturday, June 20, 2015	11:30 AM – 1:00 PM	

Workshop: **ROBOTIC TESTING SYSTEMS TO STUDY JOINT AND TISSUE FUNCTION** **Primrose B**

Organizers: Hiromichi Fujie (Tokyo Metropolitan University) and Rich Debski (University of Pittsburgh)

Robots are currently being used for a variety of tasks in different areas of Biomechanics, such as tissue and joint testing, the simulation and reproduction of motions and forces found in normal activities and the testing of biomechanical implants and sports related equipment. The number and variety of applications in musculoskeletal research is growing. This workshop will therefore be focused on the robot technologies employed and the experimental techniques that have been developed for biomechanical related research rather than robotic surgery. The objectives are to expose and discuss where improvements should be made in both robot competencies and usage, and to increase our abilities in this emerging field. Specific topics to be covered are: 1) Registration of geometry between test specimen and robot; 2) The level of accuracy required for motion reproduction (kinematics and forces); 3) Validation of robotic testing systems (e.g. superposition, *in vivo* loads); 4) Control algorithms and methodologies; and 5) Applications of robotic systems.

Saturday, June 20, 2015	5:00 PM – 6:00 PM	

Plenary Session: **LISSNER AWARD LECTURE** **Ballrooms 1-3**

Chair: Ellen Arruda (University of Michigan)

James A. Ashton-Miller, PhD
"On Injuries Related to Vaginal Birth and Their Sequelae"
Albert Schultz Collegiate Research Professor and Distinguished Research Scientist
University of Michigan

Each year 2.6 million vaginal deliveries occur in the United States. We shall begin by discussing the remarkable biomechanics of vaginal birth. Unfortunately, 10-15% of first time mothers are left with unseen injuries. Fortunately, over the past decade these injuries have become detectable on MRI and that has opened the door to learning more about how, when and why they occur, and whether they may be exacerbated by further deliveries. Meanwhile a series of anatomic, biomechanical, dynamic imaging, computer simulation and clinical studies have led to advances in understanding female pelvic floor structure and function. These have allowed one to use biomechanics to link the unseen injuries of vaginal birth to the development of genital prolapse, better known as a "fallen uterus". Often appearing decades later, this is one of the most common reasons why women undergo surgery for this embarrassing and uncomfortable condition in this country. We shall discuss the mechanics of two common types of genital prolapse and why these insights should lead to improvements in treatment for these conditions. This work stems from a serendipitous encounter with Dr. John O.L. Delancey which has resulted in a 25-year multidisciplinary collaboration between clinicians, engineers and others. If this collaboration has succeeded, then it is because of the energy and dedication of talented students and trainees, and the support of federal research funding. We shall reflect upon lessons learned from such collaborations.

SPECIAL TRIBUTE SESSION

Thursday, June 18, 2015	11:00 AM – 12:30 PM	

Special Session: **CRYOTHERAPY AND HYPERTHERMIA:** **Golden Cliff/ Eagles Nest**

Celebrating 70th+ Birthday of Professor Avraham Shitzer

Avraham Shitzer is the James H. Belfer Emeritus Professor of Mechanical Engineering at the Technion, Israel Institute of Technology. He graduated in Mechanical Engineering at the Technion and received his Ph.D. from the University of Illinois. He joined the ME faculty at the Technion and served as the Dean of the ME department, Technion Vice President for Research and as the founding head of the ME Department at the Azrieli College of Engineering in Jerusalem.

Dr. Shitzer was among the pioneers of the newly emerging field of bio-heat transfer. He has made seminal contributions to the permanent literature on bio-heat transfer, cryo-surgical applications, control of individual thermal comfort, assessment of wind chill effects and on the utilization of solar energy. He measured and documented the first regionally-controlled liquid-cooled garment for NASA's space explorations. The experiments with human subjects were augmented by a rigorous bio-heat transfer analysis of the fluid carrying tubes-skin interaction. He subsequently initiated, and co-edited the first comprehensive bio-heat transfer book entitled: "Heat transfer in Medicine and Biology: Analysis and Applications" which still forms a basic item in the toolbox of scientists involved in the field of bio-heat transfer. He developed fundamental understandings of the cryo-probe-tissue interactions during the non-linear phase change process. This work was highlighted with the development of the first ever cryo-probe that facilitated the control of the rate of temperature change at the freezing front. *In vivo* experiments in the hind thigh muscle of rabbits with this probe demonstrated the validity of this novel approach. Additional efforts were aimed at analyzing the interactions of multi-probes and the development of an algorithm for optimal insertion and operation for maximal tissue volume destruction.

Dr. Shitzer has been honored with prestigious awards, including a Fulbright-Hayes Grant, Hebrew Technical Institute Scholarships, the Ray and Miriam Klein Research Award, and the Best International Paper Award by the American Society of Heating, Refrigerating and Air Conditioning Engineers. He is a fellow of the ASME and of the ASHRAE.

2015 RICHARD SKALAK AWARD
ASME JOURNAL OF BIOMECHANICAL ENGINEERING

Each year the Editors-in-Chief and the editorial board members of the ASME Journal of Biomechanical Engineering select a paper that they believe is the most meritorious of all the papers published in the Journal in the previous calendar year. The authors of this paper are the recipients of the Richard Skalak Award, named after an early leader within the ASME Bioengineering community. The 2015 award winners will be announced at the conference banquet.

1977 Robert W. Mann
1978 Y.C. Fung
1979 Robert F. Rushmer
1980 F. Gaynor Evans
1981 Max Anliker
1982 R.M. Kenedi
1983 Henning E. von Gierke
1984 Perry L. Blackshear
1985 Richard Skalak
1986 Albert H. Burstein
1987 Van C. Mow
1988 Alf Louis Nachemson
1989 Robert M. Nerem
1990 Albert B. Schultz
1991 Savio Lau-Yuen Woo
1992 John C. Chato
1993 Don P. Giddens
1994 Sheldon Weinbaum
1995 Robert E. Mates
1996 Albert I. King
1997 Ajit P. Yoganathan
1998 Malcolm H. Pope
1999 Stephen C. Cowin
2000 Morton H. Friedman
2001 W. Michael Lai
2002 Kenneth R. Diller
2003 Vijay K. Goel
2004 John M. Tarbell
2005 Steven A. Goldstein
2006 Peter A. Torzilli
2007 Maury L. Hull
2008 Noshir A. Langrana
2009 Thomas P. Andriacchi
2010 Roger D. Kamm
2011 Jay D. Humphrey
2012 David Butler
2013 Mehmet Toner
2014 Kyriacos A. Athanasiou
2015 James A. Ashton-Miller

H.R. Lissner Medal

The H.R. Lissner Medal recognizes outstanding achievements in the field of bioengineering. These achievements may be in the form of (1) significant research contributions in bioengineering; (2) development of new methods of measuring in bioengineering; (3) design of new equipment and instrumentation in bioengineering; (4) educational impact in the training of bioengineers; and/or (5) service to the bioengineering community, in general, and to the Bioengineering Division of ASME, in particular. The Bioengineering Division of ASME established the H. R. Lissner Award as a divisional award in 1977. It was upgraded to a society award in 1987, made possible by a donation from Wayne State University and is named in honor of Professor H. R. Lissner of Wayne State University for his pioneering work in biomechanics that began in 1939.

2015
James A. Ashton-Miller, PhD

Dr. Ashton-Miller directs the Biomechanics Research Laboratory at the University of Michigan. He, his students and his colleagues use experimental and theoretical biomechanical approaches, advanced imaging, anatomic dissections and histology, clinical studies and inventions to better understand the mechanism of unintentional injuries. They have provided insights into why women are injured during childbirth, and why these injuries can cause life long pelvic floor problems such incontinence and prolapse; identified a special form of repetitive loading as a cause of ACL fatigue failure and rupture; identified risk factors that cause falls and, more importantly, fall-related injuries in the elderly; factors that cause back pain, factors that cause idiopathic scoliosis to progress, and even a flaw in the measurement of sprinter reaction times at the Olympics. Dr. Ashton-Miller serves on an NCAA panel concerned with baseball bat performance and safety, and an ASTM panel concerned with improving building skylight safety standards to prevent fall-throughs to serious injury or death. Dr. Ashton-Miller has published over 250 peer-reviewed papers and a dozen book chapters. His research is support by NIH as well as half a dozen Fortune 500 companies. He has served on two NIH study sections as a peer reviewer in geriatric and rehabilitation sciences. He has graduated over 30 doctoral students, and a series of NIH K-08,12 & 23 trainees. He is Chair-Elect of the Health Sciences section of the Gerontological Society of America. Dr. Ashton-Miller serves as an associate vice president for research at the University of Michigan with responsibilities for research policy and compliance, where he has worked since 1983.

2005 Kyriacos A. Athanasiou

2006 Robert Lie-Yuan Sah

2007 Lori A. Setton

2008 Scott L. Delp

2009 Michael Sacks

2010 Tony M. Keaveny

2011 David A. Vorp

2012 John Bischof

2013 Jeffrey Weiss

2014 Christopher R. Jacobs

2015 Dawn M. Elliott

Van C. Mow Medal

The Van C. Mow Medal is bestowed upon an individual who has made significant contributions to the field of bioengineering through research, education, professional development, leadership in the development of the profession, as a mentor to young bioengineers, and with service to the bioengineering community. The individual must have earned a PhD or equivalent degree between ten and twenty years prior to June 1 of the year of the award. The award was established by the Bioengineering Division in 2004.

2015
Dawn M. Elliott, PhD

Dawn Elliott is a professor and the founding chair of Biomedical Engineering at the University of Delaware. Prior to joining Delaware in 2011, she spent 12 years in the University of Pennsylvania's Departments of Orthopaedic Surgery and Bioengineering, where she was promoted to full professor. Dr. Elliott earned a doctoral degree in biomedical engineering from Duke University, a master's degree in engineering mechanics from the University of Cincinnati, and a bachelor's degree in mechanical engineering from the University of Michigan. Dr. Elliott is a leader in the field of musculoskeletal biomechanics. She investigates the changes that occur in load-bearing fibrous tissues, such as disc, meniscus, and tendon, during development, with degeneration and injury, and following therapeutic interventions. Her multi-scale approach, from the entire joint-level, to the tissue-scale, and to the micro-scale, integrates mechanical testing, mathematical modeling, and multi-modal imaging.

Dr. Elliott has been an outstanding teacher and mentor. In 2015 she was awarded the inaugural Outstanding Achievement in Mentoring Award from the Orthopaedic Research Society. Dr. Elliott is a Fellow of the American Institute for Medical and Biological Engineering (AIMBE) and the American Society of Mechanical Engineers (ASME). She currently serves on the executive boards of the International Society for the Study of Lumbar Spine (ISSLS), the Council of Chairs of Biomedical Engineering, the Biomedical Engineering Society (BMES), and on the board of directors of The Perry Initiative, a non-profit organization dedicated to increasing role of women in engineering and medicine. She has had leadership roles in a number of societies including: Bioengineering division of the American Society of Mechanical Engineers (ASME): Chair of Solid Mechanics Committee 2007-2010, Program Chair of Summer Bioengineering Conference 2009, Conference Chair of the Summer Bioengineering Conference 2012, and the Executive Committee 2009-2012; and the Orthopaedic Research Society (ORS): ex officio Board of Directors Information Technology Chair 2006-2009, Program Committee 2008, and Special Projects/Awards Committee 2010-2013. Dawn was a member of the NIH Study Section Musculoskeletal Tissue Engineering 2005-2008, and has served on numerous ad hoc NIH and other review panels. She lives in Landenberg Pennsylvania with her husband, Sam Console, and her son Matthew.

1986 Mark H. Holmes
1987 Steven A. Goldstein
1989 David N. Ku
1990 Jay D. Humphrey
1991 Michael Kwan
1992 Cheng Zhu
1993 John A. Frangos
1994 Mehmet Toner
1995 Cheng Dong
1996 Antony Keaveny
1997 Gerard A. Ateshian
1998 Louis J. Soslowsky
1999 Rebecca Richards-Kortum
2000 Farshid Guilak
2001 David F. Meaney
2002 Jeffrey A. Weiss
2003 Sangeeta N. Bhatia
2004 Richard E. Debski
2005 Jeffrey W. Holmes
2006 Beth A. Winkelstein
2007 Stavros Thomopoulos
2008 Gabriel A. Silva
2009 Robert Mauck
2010 Matthew J. Gounis
2011 Ali Khademhosseini
2012 Marissa Nichole Rylander
2013 Jonathan Vande Geest
2014 W. David Merryman
2015 Adam J. Engler

Y.C. Fung Young Investigator Award

The Y.C. Fung Young Investigator Award is given to a young investigator who is under the age of 36 on or before June 1 of the year of the nomination, and has received a PhD or equivalent bioengineering degree within seven years prior to their nomination. The individual must be committed to pursuing research in and have demonstrated significant potential to make substantial contributions to the field of bioengineering. Such accomplishments may take the form of, but are not limited to, design or development of new methods, equipment or instrumentation in bioengineering, and research publications in peer-reviewed journals. The award was established by the Bioengineering Division in 1985 and operated as a division award until 1998 when it was elevated to a Society award.

2015
Adam J. Engler, PhD

Adam J. Engler is an Associate Professor of Bioengineering at UC San Diego, where he has been on the faculty since 2008. He also is a resident scientist at the Sanford Consortium for Regenerative Medicine. Dr. Engler previously trained with Dr. Dennis Discher at the University of Pennsylvania, where he earned his PhD studying how ECM stiffness regulated stem cell fate. He also did a post doc with Dr. Jean Schwarzbauer at Princeton University's Department of Molecular Biology.

His current research focuses on how physical and chemical properties of the niche influence stem cell function and misregulate muscle function and heart performance during disease and aging. His lab makes natural and synthetic matrices with unique spatiotemporal properties to mimic niche conditions to improve stem cell behavior and commitment *in vitro* for their therapeutic use *in vivo*. His lab also studies these processes *in vivo* with rapidly aging model systems including *Drosophila*.

Dr. Engler was the 2008 recipient of the Rupert Timpl Award from the ISMB. He was also a recipient of an NIH Innovator Award, Rita Schaeffer Award from BMES, and was the inaugural recipient of the Renato Iozzo Award from ASMB in 2014.

THANKS TO ALL ABSTRACT REVIEWERS

Abramowitch, Steven
Aggarwal, Ankush
Akkus, Ozan
Alberto, Redaelli
Alford, Pat
Allen, Kyle
Almarza, Alejandro
Amanda, Buck
Amini, Rouzbeh
Amiriouch, Farid
Andarawis-Puri, Nelly
Andreas, Anayiotos
Andrews, Dennis
Arun, Mike
Ayyaswamy, Portonovo,
Baek, Seungik
Baish, James
Baker, Brendon
Balachandran, Kartik
Balachandran, Ram
Banerjee, Rupak
Barocas, Victor
Bergerson, Christie
Berry, Joel
Bevill, Scott
Bey, Michael
Bhattacharya, Sanghita
Bhattacharya, Shamik
Bigelow, Kimberly
Billiar, Kristen
Bischof, John
Black, Lauren D.B.
Bowles, Robby
Breigh, Roszelle
Brown, Fredericka
Buffinton, Christine
Calve, Sarah
Campbell, Ian
Carey, Stephanie
Carpenter, Dana
Cavanagh, Dan
Chakraborty, Nilay
Chao, Grace
Chen, Zi
Chesler, Naomi
Chesnutt, Jennifer
Chris, Haggerty
Christof, Karmonik
Chueh, Juyu R.
Coats, Brittany
Coger, Robin
Corcoran, Tim
Corr, David
Cortes, Daniel H.
Coudrillier, Baptiste
Dai, Guohao
Danny, Bluestein
Darvish, Kurosh
Dasi, Lakshmi P. D.
Davalos, Rafael
Davis, Frances
De Vita, Raffaella
Debski, Richard
DeFrate, Lou
Demetropoulos, Dean
Devireddy, Ram
Deymier-Black, Alix C.
Di Martino, Elena
DiAngelo, Denis
Diller, Kenneth
Dixon, Brandon
Donnelly, Eve
Downs, Crawford
Eberhardt, Alan
Elaheh, Rahbar
Elkin, Benjamin
Engler, Adam
Espinoza, Alejandro
Espinoza Orías, Alejandro
Estefania, Pena
Farsad, Mehdi
Fazio, Massimo
Ferguson, Virginia
Filas, Ben
Finol, Ender A.
Fisher, Matt
Fite, Kevin
Flamini, Vittoria
Fortier, Aleksandra
Fu, Jianping
Gao, Bo
Garcia, Paulo
Gardiner, John
Gaurav, Girdhar
Gayzik, Francis
Geist, Emily
George, Stephanie
Gijsen, Frank
Girard, Michael
Gleghorn, Jason
Goel, Vijay K.
Goergen, Craig
Gounis, Matt
Grande, Daniel
Grimm, Michele
Grosberg, Anna
Grytz, Rafael
Gu, Weiyong
Guess, Trent
Guo, Edward
Hallman, Jason
Han, Bumsoo
Han, Lin H.
Hariharan, Prasanna
Harley, Brendan
Hashemi, Nastaran
Hatami-Marbini, Hamed
Haudenschild, Dominik
Hayenga, Heather
Hayman, Danika
Hazelwood, Scott
He, Xiaoming
He, Zhaoming
Heise, Rebecca
Henninger, Heath
Herbertson, Luke
Hill, Michael
Holmes, Jeff
Hord, Erica
Hsiao-Wecksler, Elizabeth H.
Huang, Alice
Hur, Pilwon
Iaquinto, Joseph
Jacot, Jeff
Jamison, Steve
Jianping, Xiang
Jonkers, Ilse
Jun, Liao
June, Ron
Kamm, Roger
Kaunas, Roland
Keller, Brandis
Kelly, Brian
Kelly, Danny
Kemper, Andrew
Kennedy, Oran
Kersh, Mariana
Khoshnevis, Sepideh
Kieweg, Sarah
Killian, Megan
Kim, Sunghwan
Kim, Taeyoon
Kinney, Allison
Kishore, Vipuil
Kobayashi, Shunichi
Koo, Seungbum
Kresh, J. Yasha
Kuxhaus, Laurel
Kwon, Ronald
Ladisa, John
Lai, Victor
Lake, Spencer
Lee, Avione
Lee, Charles
Lee, Chung-Hao

Lee, Lik Chuan
Lee, Namheon
Leonid, Goubergrits
Lessner, Susan
Li, Guoan
Li, Wan-Ju
Li, Zhiyong
Liu, Baolin
Liu, Jun
Liu, X. Sherry
Liu, Yaling
Loerakker, Sandra
Lu, Xiao
Lujan, Trevor
Lundberg, Hannah
Ma, Ding
Madigan, Mike
Main, Russel
Manuchehrabadi, Navid
Mao, Haojie
Marsden, Alison
Martin, Bryn
Mauck, Robert
McCain, Megan
McGarry, Patrick
Mendias, Chris
Meng, Hui
Merchant, Fatima
Meyer, Clark
Michael, Keith Sharp
Michalek, Arthur
Miller, Gerald
Miller, Kristin
Miller, Mark
Mitra, Kunal
Monson, Ken
Moore, James
Morss, Alisa
Munn, Lance
Murfee, Lee
Myers, Kristin
Mynard, Jonathan
Nagatomi, Jiro
Nelson, Celeste
Neptune, Rick
Nerurkar, Nandan
Neu, Corey
Nguyen, Thao
Niebur, Glen
Nowlan, Niamh
O'Connell, Grace D.
Ohashi, Toshiro
Omori, Toshihiro
Oshinski, John
Overby, Darryl
Papaharilaou, Yannis
Pathak, Amit
Patrick, Segers
Patterson, Rita M.
Pearce, John
Pedrigi, Ryan
Pfeiffer, Ferris
Pierce, David M.
Pleog, Heidi-Lynn
Plesniak, Michael
Provenzano, Paolo
Qin, Zhenpeng
Raghavan, Raghu
Ragupathy, Ramesh
Ramaswamy, Sharan
Rao, Wei
Reilly, Matthew
Reiter, David
Ristori, Tommaso
Roccabianca, Sara
Roeder, Ryan K.
Ruberti, Jeffery
Rylander, Nichole
Sacks, Michael
Sander, Ed
Sarntinoranont, Malisa
Sastry, Sudeep
Saunders, Marnie
Schmid-Schoenbein, Geert W.
Shadden, Shawn
Shearn, Jason
Sherwood, Joseph M.
Siefert, Andrew
Sigal, Ian A.
Siggers, Jennifer H.
Simmons, Chelsey
Sinjae, Hyun
Smith, Joshua
Smith, Lachlan
Song, Jiahui
Sparks, Jessica
Steinman, David
Stern, Amber
Stitzel, Joel
Stylianou, Antonis
Sucosky, Philippe
Sun, Wei
Sundararaghavan, Harini G
Taber, Larry
Tai, Bruce
Tan, Wei
Tanaka, Martin
Tang, Dalin
Temenoff, Johnna
Thelen, Darryl
Thomas, Susan
Thomopoulos, Stavros
Tian, Lian
Timmins, Lucas H.
Todo, Mitsugu
Towles, Joseph
Troy, Karen
Tsubota, Ken-ichi
Umberto, Morbiducci
Untaroiu, Costin
Uquillas, Jorge
Vahdati, Ali
Valdez-Jasso, Daniela
Vande, Geest Jonathan
VandeVord, Pamela
VanToen, Carolyn
Varner, Victor
Veress, Alex
Vigmostad, Sarah C.
Voo, Liming
Voorhees, Andrew
Wagenseil, Jessica
Wagner, Diane
Wagoner Johnson, Amy
Walker, Michael
Wallace, Joseph
Walsh, Michael
Wan, Leo
Wang, James H.
Wang, Sihong
Wang, Vincent
Wang, Zhijie
Weinbaum, Justin
Weiss, Jeffrey A.
Wenk, Jonathan
Wilson, Sara E.
Wimmer, Markus
Wojcik, Laura
Wolchok, Jeff
Wright, Neil
Ye, Jingyong
Yiemeng, Hoi
Yoganandan, Narayan
Zhang, Aili
Zhang, Liying
Zhao, Gang
Zheng, Li
Zhu, Liang Z.
Zorlutuna, Pinar

SCIENTIFIC SESSIONS

WEDNESDAY, JUNE 17	3:45pm - 5:15pm

Ocular Biomechanics I — Primrose A

Session Chair: Rouzbeh Amini, *The University of Akron, Akron, OH, United States*
Session Co-Chair: Jun Liu, *Ohio State, Columbus, OH, United States*

3:45PM **Development Of A Platform For Studying Astrocyte Mechanobiology: Compression Of Astrocytes In 3D Alginate Gels** SB³C2015-655
John J. Mulvihill[1,2], Lisa A. Schildmeyer[1], Baptiste Coudrillier[1], Danny J. Kelly[2], C. Ross Ethier[1,3], *[1]Georgia Tech, Atlanta, GA, United States,[2]Trinity College Dublin, Dublin, Ireland,[3]Atlanta VA Medical Center, Atlanta, GA, United States*

4:00PM **Cellular Young's Modulus as a Novel Stemness Marker in the Corneal Limbus** SB³C2015-216
Tom Bongiorno[1], Jena Chojnowski[2], James D. Lauderdale[2], Todd Sulchek[1,3], *[1]Georgia Institute of Technology, Atlanta, GA, United States,[2]University of Georgia, Athens, GA, United States,[3]The Parker H. Petit Institute for Bioengineering and Bioscience, Atlanta, GA, United States*

4:15PM **Experimental Measurement Of Collagen Fiber Uncrimping And Recruitment With Increases In Intraocular Pressure** SB³C2015-417
Ian A. Sigal, Ning-Jiun Jan, Jonathan Grimm, Huong Tran, Hiroshi Ishikawa, Katherine A. Davoli, Larry Kagemann, Joel S. Schuman, Gadi Wollstein, Kira Lathrop, *University of Pittsburgh, Pittsburgh, PA, United States*

4:30PM **Phase-contrast Micro-tomography Measurements Of Intraocular Pressure-induced Deformation Of The Porcine Lamina Cribrosa** SB³C2015-147
Baptiste Coudrillier[1], Diogo M. Geraldes[2], Nghia Vo[3], Ian C. Campbell[1], Julie Albon[4], Richard L. Abel[2], C. Ross Ethier[1], *[1]Georgia Institute of Technology, Atlanta, GA, United States,[2]Imperial College, London, United Kingdom,[3]Diamond Light Source, Didcot, United Kingdom,[4]Cardiff University, Cardiff, United Kingdom*

4:45PM **Ocular Compliance in Mice** SB³C2015-111
Stephen A. S. Schwaner[1], Joseph M. Sherwood[2], Eric J. Snider[1], Eldon E. Geisert[3], Darryl R. Overby[4], C. Ross Ethier[1,3], *[1]Georgia Institute of Technology, Atlanta, GA, United States,[2]Imperial College London, London, United Kingdom,[3]Emory University, Atlanta, GA, United States,[4]Imperial College of London, London, United Kingdom*

5:00PM **Time And Pressure-Dependent Hydraulic Resistance Across Schlemm's Canal Endothelial Cell Layers** SB³C2015-1045
Alice Spenlehauer, Joseph M. Sherwood, Darryl R. Overby, *Imperial College London, London, United Kingdom*

WEDNESDAY, JUNE 17	3:45pm - 5:15pm

Design and Devices I - Vascular Disease and Therapeutic Intervention — Superior

Session Chair: James Moore, *Imperial College London, London, United Kingdom*
Session Co-Chair: Joao S. Soares, *University of Texas at Austin, Austin, TX, United States*

3:45PM **Corrosion Behavior of a Novel Biodegradable Metallic Stent** SB³C2015-240
Jennifer Frattolin[1,2], Luca Gottellini[1,3], Olivier F. Bertrand[1,4], Rosaire Mongrain[1,2], *[1]McGill University, Montreal, QC, Canada,[2]Montreal Heart Institute, Montreal, QC, Canada,[3]Politecnico di Milano, Milan, Italy,[4]Quebec Heart and Lung Institute, Laval University, Quebec City, QC, Canada*

4:00PM **Geometric Analysis of Iliac Artery Tortuosity: Comparison to Current Clinical Practice** SB³C2015-248
Matthew G. Doyle[1,2], Elrasheed Osman[2], Naomi Eisenberg[2], Cristina H. Amon[1], Leonard W. Tse[2], *[1]University of Toronto, Toronto, ON, Canada,[2]Toronto General Hospital, Toronto, ON, Canada*

4:15PM **In Vitro Coronary Artery Model for the Study of Atherosclerosis** SB³C2015-368
Elizabeth E. Antoine, Abdul I. Barakat, *Ecole Polytechnique, Palaiseau, France*

4:30PM **Quantification of Plaque Shift after Coronary Bifurcation Stenting** SB³C2015-465
Francesco Iannaccone[1,2], **Claudio Chiastra**[1,3], Francesco Migliavacca[3], Frank J. H. Gijsen[1], Patrick Segers[2], Evelyn Regar[4], Matthieu De Beule[2,5], Jolanda J. Wentzel[1], *[1]Thoraxcenter, Erasmus University Medical Center, Rotterdam, Netherlands,[2]Ghent University, Ghent, Belgium,[3]Politecnico di Milano, Milan, Italy,[4]Erasmus MC, Rotterdam, Netherlands,[5]FEops bvba, Ghent, Belgium*

4:45PM **Management of Distal Embolization during Interventional Treatment of Acute Ischemic Stroke in a Simulated Vascular Phantom** SB³C2015-589
Juyu Chueh, Olivia W. Brooks, Ajit S. Puri, Ajay K. Wakhloo, Matthew J. Gounis, *University of Massachusetts Medical School, Worcester, MA, United States*

5:00PM **Temperature Comparison Of Catheter Ablation Between Open Irrigation And Vibration** SB³C2015-159
Kaihong Yu[1], Tetsui Yamashita[2], Shigeaki Shingyochi[3], Kazuo Matsumoto[4], Makoto Ohta[5], *[1]Tohoku University, Sendai, Japan,[2]Cardiovascular Internal Medicine System Sec., JMS Co., Ltd., Tokyo, Japan,[3]Nidec Copal Electronics Corp., Tochigi, Japan,[4]Saitama Medical University, Hidaka, Japan,[5]Tohoku University, Sendai, Japan*

WEDNESDAY, JUNE 17 | 3:45pm - 5:15pm

Atherosclerosis — Wasatch

Session Chair: Michael Walsh, *University of Limerick, Ireland*
Session Co-Chair: Francis Loth, *University of Akron, OH, United States*

3:45PM **Human Coronary Plaque Morphological and Stress Vulnerability Indices Using IVUS-Based Fluid-Structure Interaction Models: A Multi-Patient Study** SB³C2015-33
Liang Wang[1], Jie Zheng[2], Akiko Maehara[3], Chun Yang[4], Richard Bach[2], David Muccigrosso[2], Gary Mintz[5], **Dalin Tang**[1,6], *[1]WPI, Worcester, MA, United States,[2]Washington University, St. Louis, St. Louis, MO, United States,[3]Columbia University, New York, NY, United States,[4]China United Network Communications Co., Ltd., Beijing, China,[5]Columbia University, The Cardiovascular Research Foundation, New York, NY, United States,[6]Southeast University, Nanjing, China*

4:00PM **The Effect of Head Rotation to the Geometry and Hemodynamics of Healthy Vertebral Arteries** SB³C2015-495
Nicolas Aristokleous[1], Ioannis Seimenis[2], Georgios C. Georgiou[3], Andreas S. Anayiotos[1], *[1]Cyprus University of Technology, Lemesos, Cyprus,[2]Democritus University of Thrace, Alexandroupoli, Greece,[3]University of Cyprus, Nicosia, Cyprus*

4:15PM **Development Of A Framework To Characterize The Role Of Wall Shear Stress In Atherosclerotic Plaque Transformation Through The Combined Use Of OCT And Vh-IVUS** SB³C2015-1064
David Molony[1], Lucas Timmins[1], Emad Rasoul-Arzrumly[2], Olivia Hung[2], Bill Gogas[2], Habib Samady[2], Don Giddens[1], *[1]Georgia Institute of Technology, Atlanta, GA, United States,[2]Emory University, Atlanta, GA, United States*

4:30PM **Phenotypic Differences in Coronary Artery Disease Progression in the Clinical Setting and Dependence on a Focal Oscillatory Hemodynamic Environment.** SB³C2015-426
Lucas H. Timmins[1,2], David S. Molony[1,2], Parham Eshtehardi[3], Michael C. McDaniel[2], John N. Oshinski[1,2], Habib Samady[2], Don P. Giddens[1,2], *[1]Georgia Institute of Technology, Atlanta, GA, United States,[2]Emory University School of Medicine, Atlanta, GA, United States,[3]Albert Einstein College of Medicine, Bronx, NY, United States*

4:45PM **Relationship among Disturbed Shear Descriptors, the Extent of Flow Recirculation and Helicity in Carotid Bifurcation** SB³C2015-547
Diego Gallo[1], David A. Steinman[2], Umberto Morbiducci[1], *[1]Politecnico di Torino, Turin, Italy,[2]University of Toronto, Toronto, ON, Canada*

5:00PM **Application of Gold Particle Enhanced CT for Vulnerable Plaque Detection and Quantification in Atherosclerotic Mouse Models** SB³C2015-366
David De Wilde[1], Bram Trachet[1,2], Carole Van der Donckt[3], Bert Vandeghinste[1], Benedicte Descamps[1], Christian Vanhove[1], Guido R. Y. De Meyer[3], Patrick Segers[1], *[1]Ghent University, Gent, Belgium,[2]Institute for Bioengineering Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland,[3]University of Antwerp, Wilrijk, Belgium*

WEDNESDAY, JUNE 17	3:45pm - 5:15pm

Nano, Micro and Multiscale Mechanics — Magpie

Session Chair: Raffaella De Vita, *Virginia Tech, Blacksburg, VA, United States*
Session Co-Chair: Steven Abramowitch, *University of Pittsburgh, Pittsburgh, PA, United States*

3:45PM **Direct Measurement of Energy Landscape of Biological Interactions** SB³C2015-1181
Ahmad Haider, Daniel Potter, Todd Sulchek, *Georgia Institute of Technology, Atlanta, GA, United States*

4:00PM **Constructing Rudimentary Limit Curves For Neuronal Phospholipid Bilayer Failure And Theoretical Calcium Penetration** SB³C2015-1025
M. A. Murphy[1], Sungkwang Mun[1], M. F. Horstemeyer[1], Steven R. Gwaltney[1], Tonya W. Stone[1], Michelle C. LaPlaca[2], Jun Liao[1], Lakiesha N. Williams[1], **R. Prabhu**[1], *[1]Mississippi State, MS, United States,[2]Georgia Institute of Technology, GA, United States*

4:15PM **Deterioration Of Trabecular And Cortical Microarchitecture And Reduced Bone Stiffness At Distal Radius And Tibia In Postmenopausal Women With Vertebral Fractures** SB³C2015-231
Ji Wang[1], Emily Stein[2], Bin Zhou[1], Kyle Nishiyama[2], Elizabeth Shane[2], X.Edward Guo[1], *[1]Columbia University, New York, NY, United States,[2]College of Physicians and Surgeons, Columbia University, New York, NY, United States*

4:30PM **Correlating Molecular Structure With The Mechanical Response Of Aquatic Caddisworm Silk** SB³C2015-325
Nicholas N. Ashton, Russell J. Stewart, *The University of Utah, Salt Lake City, UT, United States*

4:45PM **Numerical Modeling of Human Fibrous Cap Delamination** SB³C2015-181
Xiaochang Leng, Xiaomin Deng, Michael A. Sutton, Susan M. Lessner, *University of South Carolina, Columbia, SC, United States*

5:00PM **Nonlinear Viscoelastic Response of the Spinal Cord In Vivo** SB³C2015-150
Snehal S. Shetye[1], Femke Streijger[2], Christopher Strickland[1], Jae H. T. Lee[2], Brian K. Kwon[2], Peter Cripton[2], Patrick D. Shipman[1], Christian M. Puttlitz[1], *[1]Colorado State University, Fort Collins, CO, United States,[2]University of British Columbia, Vancouver, BC, Canada*

WEDNESDAY, JUNE 17	3:45pm - 5:15pm

Organs, Morphogenesis, and Collective Cell Behavior — Maybird

Session Chair: Nandan L. Nerurkar, *Harvard Medical School, Boston, MA, United States*
Session Co-Chair: Celeste Nelson, *Princeton University, Princeton, NJ, United States*

3:45PM **Fgf8 Establishes A Contractile Gradient To Drive Directed Cell Movements In The Developing Avian Gut** SB³C2015-143
Nandan L. Nerurkar, Cliff Tabin, *Harvard Medical School, Boston, MA, United States*

4:00PM **Mechanics of Early Eye Development: Interactions Between the Retina and Lens** SB³C2015-193
Alina Oltean[1], Jie Huang[2], David C. Beebe[2], Larry A. Taber[1], *[1]Washington University in St. Louis, St. Louis, MO, United States,[2]Washington University School of Medicine, St. Louis, MO, United States*

4:15PM **Magnetic Micropillar Array To Study Epithelial Microtissue Morphogenesis And Local Mechanics** SB³C2015-341
Mohammadnabi Asmani, Yan Li, Christopher Kotei, David Olsen, Zhaowei Chen, Fanjie Meng, **Ruogang Zhao**, *State University of New York at Buffalo, Buffalo, NY, United States*

4:30PM **Viscoelastic Folding Instability Controls Airway Branching Morphogenesis** SB³C2015-386
Victor D. Varner, Jason P. Gleghorn, Celeste M. Nelson, *Princeton University, Princeton, NJ, United States*

4:45PM **In Silico Predictions Of Angiogenic Growth Coupled To Matrix Mechanics Within Heterogeneous Extracellular Environments** SB³C2015-546
Lowell T. Edgar[1], James B. Hoying[2], Jeffrey A. Weiss[1], *[1]University of Utah, Salt Lake City, UT, United States,[2]University of Louisville, Louisville, KY, United States*

5:00PM **Biohybrid Swimming at Low Reynolds Number** SB³C2015-1183
Brian Williams[1], Sandeep Anand[1], Jagannathan Rajagopalan[2], M. Taher A. Saif[1], *[1]University of Illinois at Urbana-Champaign, Urbana, IL, United States,[2]Arizona State University, Tempe, AZ, United States*

WEDNESDAY, JUNE 17	3:45pm - 5:15pm

Multiscale Modeling in Biotransport (Special Session) — Golden Cliff / Eagle's Nest

Session Chair: Bumsoo Han, *Purdue University, West Lafayette, IN, United States*
Session Co-Chair: Ronghui Ma, *University of Maryland Baltimore County, Baltimore, MD, United States*

3:45PM **Energetics of Water Permeation across Stretched Phospholipid/Cholesterol Bilayer: Molecular Dynamics Simulation** SB³C2015-200
Taiki Shigematsu, Kenichiro Koshiyama, Ryotaro Kurumatani, Shigeo Wada, *Osaka University, Toyonaka, Osaka, Japan*

4:00PM **Numerical Modeling of Scalp Cooling Devices for the Prevention of Chemotherapy-Induced Alopecia** SB³C2015-635
Bradley Pliskow, Mehmet Kaya, Kunal Mitra, *Florida Institute of Technology, Indialantic, FL, United States*

4:15PM **Cross Capillary Mesangial Transport** SB³C2015-1066
Sarah E. Hunt, Yoav Segal, Kevin D. Dorfman, Victor H. Barocas, *University of Minnesota, Minneapolis, MN, United States*

4:30PM **Multiscale Simulation of Shear-Induced Platelet Activation: Correlating Numerical with Experimental Results** SB³C2015-302
Peng Zhang[1], Chao Gao[1], Na Zhang[1], Seetha Pothapragada[1], Marvin J. Slepian[1,2], Yuefan Deng[1], Danny Bluestein[1], *[1]Stony Brook University, Stony Brook, NY, United States,[2]University of Arizona, Tucson, AZ, United States*

4:45PM **Numerical Study Of A New Thermalplasty Treatment System For Atherosclerosis** SB³C2015-1110
Shiqing Zhao, **Aili Zhang**, Lisa X. Xu, *Shanghai Jiao Tong University, Shanghai, China*

5:00PM **An Approach to Include Pre-Stress in a Finite Element Model of Convection-Enhanced Delivery With Backflow** SB³C2015-383
Gustavo A. Orozco[1], Fabian A. Urrea[1], **Fernando Casanova**[1], Joshua H. Smith[2], Jose J. Garcia[1], *[1]Universidad del Valle, Cali, Colombia,[2]Lafayette College, Easton, PA, United States*

WEDNESDAY, JUNE 17	3:45pm - 5:15pm

Muscle and Joint Loading — Primrose B

Session Chair: Jun Liao, *Mississippi State, Mississippi State, MS, United States*
Session Co-Chair: Andrew Anderson, *University of Utah, Salt Lake City, UT, United States*

3:45PM **Medial and Lateral Contact Pressure Distribution Following the Implantation of a Novel Medial Meniscus Implant** SB³C2015-185
Maoz Shemesh[1], Noa Cohen[1], Eyal Zylberberg[1], Adaya Shefy-Peleg[1], Ron Arbel[2], Vincenzo Condello[3], Nogah Shabshin[4], Eran Linder-Ganz[1], **Jonathan J. Elsner**[5], *[1]Active Implants, Netanya, Israel,[2]Ichilov Medical Center, Tel Aviv, Israel,[3]Sacro Cuore Hospital, Verona, Italy,[4]Carmel Medical Center, Haifa, Israel,[5]Active Implants, Cambridge, MA, United States*

4:00PM **Effect of Meniscal Properties and Patient Variables on Knee Joint Contact Mechanics** SB³C2015-213
Hongqiang Guo[1], Thomas J. Santner[2], Po-Hsu Chen[2], Amy L. Lerner[3], Suzanne A. Maher[1], *[1]Hospital for Special Surgery, New York, NY, United States,[2]The Ohio State University, Columbus, OH, United States,[3]University of Rochester, Rochester, NY, United States*

4:15PM **Non-Invasive Method for Investigating the Relationship between Muscle Strain and Post-Exercise Blood Perfusion Using MRI** SB³C2015-1175
Amanda K. W. Buck, Christopher P. Elder, Bruce M. Damon, *Vanderbilt University, Nashville, TN, United States*

4:30PM **Numerical Modeling of Skeletal Muscle Under High Strain and Stress Relaxation Compression Conditions** SB³C2015-247
Benjamin B. Wheatley[1], Renee Pietsch[2], Tammy L. Haut Donahue[1], Lakiesha N. Williams[2], *[1]Colorado State University, Fort Collins, CO, United States,[2]Mississippi State University, Starkville, MS, United States*

4:45PM **Biomechanical Characterization of Porcine Skeletal Muscle Extracellular Matrix** SB³C2015-512
Bryn Brazile, Sourav S. Patnaik, Sallie Lin, Xiaodan Shi, Shengfa Liao, Raj Prabhu, Hongjoo Rhee, Lakiesha N. Williams, Jun Liao, *Mississippi State University, Mississippi State, MS, United States*

5:00PM **Predicting the Stress and Intramuscular Pressure Response of Whole Skeletal Muscle Through Optimized Finite Element Analysis** SB³C2015-249
Benjamin B. Wheatley[1], Duane A. Morrow[2], Gregory M. Odegard[3], Kenton R. Kaufman[2], Tammy L. Haut Donahue[1], *[1]Colorado State University, Fort Collins, CO, United States,[2]Mayo Clinic, Rochester, MN, United States,[3]Michigan Tech University, Houghton, MI, United States*

WEDNESDAY, JUNE 17 | 5:30pm - 7:00pm

Ocular Biomechanics II — Primrose A

Session Chair: Jun Liu, *Ohio State, Columbus, OH, United States*
Session Co-Chair: Ian A. Sigal, *University of Pittsburgh, Pittsburgh, PA, United States*

5:30PM **Equilibrium Shape of the Aqueous Humor-Vitreous Substitue Interface** SB³C2015-445
Krystyna Isakova, Rodolfo Repetto, Jan Oscar Pralits, *University of Genova, Genova, Italy*

5:45PM **A Computational Model To Explore The Role Of Experimentally Determined Scleral Microstructure On Lamina Cribrosa Deformation** SB³C2015-1087
Avinash Ayyalasomayajula, Forest L. Danford, Jonathan P. Vande Geest, *University of Arizona, Tucson, AZ, United States*

6:00PM **Effects Of Hydration And Riboflavin/uva Collagen Crosslinking On Bovine Corneal Tensile Properties** SB³C2015-1074
Hamed Hatami-Marbini, *Oklahoma State University, Stillwater, OK, United States*

6:15PM **Intraocular Pressure Increases In Patients With Intraocular Gas Bubbles Following A Descent And Subsequent Ascent** SB³C2015-394
Lucas A. Gsellman, Rouzbeh Amini, *The University of Akron, Akron, OH, United States*

6:30PM **The Effect Of Elevated Intraocular Pressure On Convective Flow In The Vitreous** SB³C2015-323
Julie E. Whitcomb[1], Mohammad R. Kazemi[2], Michael R. Robinson[1], Mayssa Attar[1], Anita Penkova[3], Sati Sadhal[3], Susan S. Lee[1], *[1]Allergan, Irvine, CA, United States,[2]Consultant, San Jose, CA, United States,[3]University of Southern California, Los Angeles, CA, United States*

6:45PM **A Parametrized Model Of The Lamina Cribrosa For Studying Oxygen Transport** SB³C2015-312
Fabian A. Bräu[1,2], Ian C. Campbell[1,3], Baptiste Coudrillier[1], **C. Ross Ethier**[1,3], *[1]Georgia Institute of Technology, Atlanta, GA, United States,[2]Technical University Munich, Munich, Germany,[3]Atlanta VA Medical Center, Decatur, GA, United States*

WEDNESDAY, JUNE 17 | 5:30pm - 7:00pm

Design and Devices II - Modeling and Simulation of Cardiovascular Therapies — Superior

Session Chair: Michael Moreno, *Texas A&M University, College Station, TX, United States*
Session Co-Chair: Lucas H. Timmins, *Georgia Institute of Technology, Atlanta, GA, United States*

5:30PM **Hemocompatibility Assessment Of Hyaluronan Enhanced Linear Low Density Polyethylene For Use In Aortic Heart Valve Leaflets** SB³C2015-1041
Rachael Simon-Walker, John Cavicchia, David Bark, Susan James, Lakshmi Prasad Dasi, Popat Ketul, *Colorado State University, Fort Collins, CO, United States*

5:45PM **Virtual Transplantation To Establish Donor Selection Criteria For Undersized And Complex Heart Recipients** SB³C2015-335

Justin Ryan[1], Randy Richardson[2], Erik Ellsworth[3], John J. Nigro[3], David Frakes[1], Stephen Pophal[3], *[1]Arizona State University, Tempe, AZ, United States,[2]St. Joseph's Hospital and Medical Center, Phoenix, AZ, United States,[3]Phoenix Children's Hospital, Phoenix, AZ, United States*

6:00PM **Physical Patient Specific Simulation For Ascending Aortic Aneurysms Surgery Pre-procedural Training** SB³C2015-338

Justine Garcia[1], ZhiLin Yang[1], Kevin Lachapelle[2], Rosaire Mongrain[1], Richard Leask[1], *[1]McGill University, Montreal, QC, Canada,[2]McGill University Health Network, Montreal, QC, Canada*

6:15PM **Computer Simulator of the Coil Insertion into Aneurysm: The Effect of Mechanical Property and Reference Configuration of the Coil** SB³C2015-343

Tomohiro Otani[1], Satoshi Ii[1], Tomoyoshi Shigematsu[2], Toshiyuki Fujinaka[2], Masayuki Hirata[2], Tomohiko Ozaki[2], Shigeo Wada[1], *[1]Graduate School of Engineering Science, Osaka University, Toyonaka, Japan,[2]Graduate School of Medicine, Osaka University, Suita, Japan*

6:30PM **Computational Hemodynamic Assessment of a Novel Modular Anastomotic Valve Device for Hemodialysis Vascular Access** SB³C2015-1069

Andrew McNally[1], Philippe Sucosky[1], A. George Akingba[2], *[1]University of Notre Dame, South Bend, IN, United States,[2]Indiana University School of Medicine, Indianapolis, IN, United States*

6:45PM **Computational Modeling Of A Percutaneous Transvenous Mitral Annuloplasty Device Deployment Into The Coronary Sinus Vessel For Treatment Of Mitral Regurgitation: Analysis Of Anchor Sizes** SB³C2015-1068

Thuy Pham[1], Fanwei Kong[1], Milton Deherrera[2], Wei Sun[1], *[1]Georgia Institute of Technology, Atlanta, GA, United States,[2]Edwards Lifesciences, Irvine, CA, United States*

WEDNESDAY, JUNE 17	**5:30pm - 7:00pm**

Cardiovascular Diagnostics and Imaging — Wasatch

Session Chair: David Steinman, *University of Toronto, Toronto, ON, Canada*
Session Co-Chair: Matt Gounis, *University of Massachusetts, Worcester, MA, United States*

5:30PM **Invasive Measurement of Pulse Wave Velocity in Anesthetized Mice: a Computational-Experimental Study** SB³C2015-600

Federica Cuomo[1], Jacopo Ferruzzi[2], Jay D. Humphrey[2], Carlos A. Figueroa[1], *[1]University of Michigan, Ann Arbor, MI, United States,[2]Yale University, New Haven, CT, United States*

5:45PM **Modeling Hemodynamic Effects Of Cerebral Vasospasm** SB³C2015-1049

Jaiyoung Ryu[1], Xiao Hu[2], Shawn C. Shadden[1], *[1]University of California, Berkeley, Berkeley, CA, United States,[2]University of California, San Francisco, San Francisco, CA, United States*

6:00PM **A Novel Approach to Calculating Isovolumic Pressure for Single-Beat Estimation of Right Ventricular End-Systolic Elastance** SB³C2015-544

Alessandro Bellofiore[1], Eric Dinges[2], Sanjiv J. Shah[3], Michael J. Cuttica[3], Ranya Sweis[3], Hamorabi Mkrdichian[3], Lauren Beussink-Nelson[3], Melissa Bailey[2], James R. Runo[2], Jon G. Keevil[2], Christopher J. Francois[2], Naomi C. Chesler[2], *[1]San Jose State University, San Jose, CA, United States,[2]University of Wisconsin-Madison, Madison, WI, United States,[3]Northwestern University, Chicago, IL, United States*

6:15PM **A Method for Rapid, Accurate Calculation of Wall Shear Stress from 2D Phase Contrast Magnetic Resonance Image Data** SB³C2015-562

Elizabeth Iffrig[1,2], William R. Taylor[1,2], John N. Oshinski[1,2], *[1]Emory University, Atlanta, GA, United States,[2]Georgia Institute of Technology, Atlanta, GA, United States*

6:30PM **Tracking Mass Transport Of A Drug Surrogate In Porcine Coronary Tissue Using Photoacoustic Imaging And Spectroscopy** SB³C2015-1083

Kenneth J. Furdella, Jonathan P. Vande Geest, Russell S. Witte, *University of Arizona, Tucson, AZ, United States*

6:45PM **Wave Intensity Analysis from Magnetic Resonance Imaging: Experimental Validation and New Insights into Single Ventricle Physiology** SB³C2015-459
Nikesh Arya[1], Silvia Schievano[1], Catriona Baker[1], Tain-Yen Hsia[2], Alessandro Giardini[2], Sachin Khambadkone[2], Andrew M. Taylor[1], **Giovanni Biglino**[1], *[1]University College London, London, United Kingdom,[2]Great Ormond Street Hospital for Children, London, United Kingdom*

WEDNESDAY, JUNE 17	**5:30pm - 7:00pm**

Multiscale Biomechanics - Coupling Muscuoskeletal, Joint, and Tissue Level Models (Special Session) — Magpie

Session Chair: Mariana Kersh, *University of Illinois, Urbana, IL, United States*
Session Co-Chair: Darryl Thelen, *University of Wisconsin-Madison, Madison, WI, United States*

5:30PM **Gait Simulation Using a Contact Force Feedback Controller** SB³C2015-416
Jonathan P. Walter, Marcus G. Pandy, *University of Melbourne, Parkville, Australia*

5:45PM **A Multi-scale Finite Element Framework for Modeling Natural Knee Mechanics** SB³C2015-314
Michael D. Harris, Ali Azhar, Alessandro Navacchia, Adam J. Cyr, Donald Hume, Clare K. Fitzpatrick, Paul J. Rullkoetter, Kevin B. Shelburne, *University of Denver, Denver, CO, United States*

6:00PM **Prediction Of Elbow Joint Contact Pressures In The Multibody Framework** SB³C2015-389
Munsur Rahman[1], Akin Cil[1,2], Antonis P. Stylianou[1], *[1]University of Missouri-Kansas City, Kansas City, MO, United States,[2]Truman Medical Centers, Kansas City, MO, United States*

6:15PM **Multi-scale Models of Skeletal Muscle Reveal the Complex Effects of Muscular Dystrophy on Tissue Mechanics and Damage Susceptibility.** SB³C2015-478
Kelley M. Virgilio, Kyle M. Martin, Shayn M. Peirce, Silvia S. Blemker, *University of Virginia, Charlottesville, VA, United States*

6:30PM **Multiscale Syntheses Of Articular Cartilage Stress In Post Aclr Model Under Physiological Loading** SB³C2015-605
Malek Adouni, Yasin Dhaher, *Rehabilitation Institute of Chicago/Biomedical Engineering, Northwestern University, Chicago, IL, United States*

6:45PM **Towards The Validation of a Multiscale Chemo-Electro-Mechanical Finite Element Model Using Electromyography** SB³C2015-475
Thomas Heidlauf, Mylena Mordhorst, **Sook-Yee Chong**, Oliver Röhrle, *University of Stuttgart, Stuttgart, Germany*

WEDNESDAY, JUNE 17	**5:30pm - 7:00pm**

Musculoskeletal Tissue Engineering - Molecular, Soluble, and Mechanical Regulation of Tissue Development — Maybird

Session Chair: Danny Kelly, *Trinity College, Dublin, Ireland*
Session Co-Chair: Pen-hsiu Grace Chao, *National Taiwan University, Taipei, Taiwan*

5:30PM **Osteocyte Sclerostin Expression Is Directed By Substrate Composition And Dimensionality In Addition To Fluid Flow** SB³C2015-241
Robert Thomas Brady[1], Andrew R. Cameron[1], David A. Hoey[2], Fergal J. O'Brien[1], *[1]Royal College of Surgeons in Ireland, Dublin, Ireland,[2]University of Limerick, Limerick, Ireland*

5:45PM **Investigating CRISPRi Cell-Engineering Methods For Treatment Of Intervertebral Disc Degeneration** SB³C2015-395
Niloofar Farhang[1], Jonathan M. Brunger[2], Joshua D. Stover[1], Pratishka I. Thakore[2], Brandon Lawrence[1], Farshid Guilak[2], Charles A. Gersbach[2], Lori A. Setton[2], Robby D. Bowles[1], *[1]University of Utah, Salt Lake City, UT, United States,[2]Duke University, Durham, NC, United States*

6:00PM **Label-Free Protein Profiling for Functional Characterization of Engineered Cartilage Following Inflammatory Cytokine Exposure** SB³C2015-450
Andrea R. Tan[1], Shujuan Tao[2], David Chen[2], Lewis Brown[2], Clark T. Hung[1], *[1]Columbia University, New York, NY, United States,[2]Comparative Proteomics Center, Columbia University, New York, NY, United States*

6:15PM **Bisphosphonate Gives Trauma Damaged Chondrocytes a New Life via Inhibition of Mevalonate Pathway** SB³C2015-570
Yilu Zhou, Miri Park, Liyun Wang, Enoch Cheung, X. Lucas Lu, *University of Delaware, Newark, DE, United States*

6:30PM **The Impact of Physical and Enzymatic Treatment on the Development of Tissue-Engineered Articular Cartilage Generated from Adult Human Chondrocytes** SB³C2015-1099
Brendan L. Roach[1], Terri-Ann N. Kelly[1], Michael K. Dermksian[1], Sonia Bansal[1], Paola A. Lopez[2], Aaron M. Stoker[3], James L. Cook[3], Gerard A. Ateshian[1], Clark T. Hung[1], *[1]Columbia University, New York, NY, United States,[2]University of Arizona, Tucson, AZ, United States,[3]University of Missouri at Columbia, Columbia, MO, United States*

6:45PM **Effects Of Structural Vs. Non-structural Scaffolds On Bmp-2- And Mechanical Load-mediated Bone Regeneration** SB³C2015-1180
Anna McDermott[1], Angela Lin[2], Robert Guldberg[2], **Joel D. Boerckel**[1], *[1]University of Notre Dame, Notre Dame, IN, United States,[2]Georgia Institute of Technology, Atlanta, GA, United States*

WEDNESDAY, JUNE 17	**5:30pm - 7:00pm**

Transport at the Nano- and Micro- scale — Golden Cliff / Eagle's Nest

Session Chair: Rubén Diaz-Rivera, *University of Puerto Rico at Mayagüez, PR, United States*
Session Co-Chair: Chris Rylander, *University of Texas at Austin, Austin, TX, United States*

5:30PM **Biophysical Fractionation Of Cells With Multiple Microfluidic Outlets** SB³C2015-294
Todd Sulchek, Gonghao Wang, Cory Turbyfield, Kaci Crawford, Alexander Alexeev, *Georgia Tech, Atlanta, GA, United States*

5:45PM **Pressure Drop Approach to Estimate the Apparent Slip Length in a PDMS Micro-channel** SB³C2015-633
Stephanie E. González Jiménez[1], Carlos R. Romero Peñaloza[1], Rubén E. Díaz-Rivera[1,2], *[1]University of Puerto Rico at Mayagüez, Mayagüez, PR, United States,[2]Purdue University, West Lafayette, IN, United States*

6:00PM **Mechano-activatable Microcapsules For Tunable Drug Delivery** SB³C2015-597
Bhavana Mohanraj, Fuquan Tu, Daeyeon Lee, George R. Dodge, Robert L. Mauck, *University of Pennsylvania, Philadelphia, PA, United States*

6:15PM **Rate of Transport of Circulating Macromolecules Into The Arterial Wall May Determine Atherosclerotic Plaque Stability** SB³C2015-358
Peter Weinberg, **Zahra Mohri**, *Imperial College London, London, United Kingdom*

6:30PM **Gold Nanoparticle Mediated Enhanced Gene Delivery With High Selectivity For Breast Cancer Treatment** SB³C2015-659
Binita Shrestha, Liang Tang, *University of Texas at San Antonio, San Antonio, TX, United States*

6:45PM **The Effect Of Particle Deformability On The Transport Of Soft Colloids Through Porous Media** SB³C2015-1148
Eduard Benet, Louis Foucard, Franck J. Vernerey, John Pellegrino, *University of Colorado at Boulder, Boulder, CO, United States*

WEDNESDAY, JUNE 17	**5:30pm - 7:00pm**

Ligament and Tendon — Primrose B

Session Chair: Spencer Lake, *Washington University, St. Louis, MO, United States*
Session Co-Chair: Ozan Akkus, *Case Western Reserve University, Cleveland, OH, United States*

5:30PM **Two Bundles of the Anterior Cruciate Ligament Exhibit Different Microstructural Properties and Mechanics During Stress-Relaxation** SB³C2015-484
Ryan Castile, Nathan Skelley, Robert Brophy, Spencer Lake, *Washington University, St. Louis, MO, United States*

5:45PM **Composition-dependent Mechanical Properties and Multiscale Strain Transfer in Tendon Subjected to Shear Loading** SB^{3}C2015-173
Fei Fang, Spencer P. Lake, *Washington University in St. Louis, St. Louis, MO, United States*

6:00PM **Evaluation of Tendon Injuries Using Shear Wave Elastography: Preliminary In-vivo Results in Human Achilles and Semitendinosus Tendons** SB^{3}C2015-160
Daniel H. Cortes, Stephen M. Suydam, Jennifer A. Zellers, Karin Gravare-Silbernagel, Thomas S. Buchanan, Dawn M. Elliott, *University of Delaware, Newark, DE, United States*

6:15PM **Modeling Ligament Mechanics Using Microstructural Parameters Measured from Confocal Images of Collagen Networks** SB^{3}C2015-223
Christina J. Stender, Evan Rust, Erica E. Morrill, Roshani Lamichhane, Raquel J. Brown, Trevor J. Lujan, *Boise State University, Boise, ID, United States*

6:30PM **A Transversely Isotropic Constitutive Model Describes And Predicts The Contribution Of Elastin To The Multiaxial Mechanics Of Ligament** SB^{3}C2015-441
Heath B. Henninger, Sara A. Scott, Benjamin J. Ellis, Jeffrey A. Weiss, *University of Utah, Salt Lake City, UT, United States*

6:45PM **Detection, Quantification, and Localization of Subfailure Damage in Tendon Fascicles using Collagen Mimetic Peptides** SB^{3}C2015-628
Jared L. Zitnay, Yang Li, Shawn P. Reese, Boi-Hoa San, S. Michael Yu, Jeffrey A. Weiss, *University of Utah, Salt Lake City, UT, United States*

THURSDAY, JUNE 18 | 8:00am - 9:00am

PLENARY SESSION I – Margaret Gardel — Ballrooms 1-3

THURSDAY, JUNE 18 | 9:15am - 10:45am

Brain Injury Biomechanics — Primrose A

Session Chair: Brittany Coats, *University of Utah, Salt Lake City, UT, United States*
Session Co-Chair: Francis Gayzik, *Wake Forest University School of Medicine, Winston-Salem, NC, United States*

9:15AM **The Effect of Facemasks on the Impact Performance of Helmets** SB^{3}C2015-1101
Steven Rowson, Evan Terrell, *Virginia Tech, Blacksburg, VA, United States*

9:30AM **Estimating Axonal Strain in White Matter Using Paranodal Proteins as Fiduciary Markers** SB^{3}C2015-468
Sagar Singh, Assimina A. Pelegri, David I. Shreiber, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

9:45AM **In Vivo Comparison Of Wearable Head Impact Sensors** SB^{3}C2015-1152
Lyndia C. Wu, Vaibhav Nangia, Kevin Bui, Bradley Hammoor, Calvin Kuo, Fidel Hernandez, David B. Camarillo, *Stanford University, Stanford, CA, United States*

10:00AM **Image-Based Dynamic Analysis of Brain Deformation on Porcine Brain Injury Model** SB^{3}C2015-1163
Arnold D. Gomez, Gregory G. Scott, Boston C. Terry, Brittany Coats, *University of Utah, Salt Lake City, UT, United States*

10:15AM **Preliminary Development and Validation of an Atlas-Based Finite Element Brain Model** SB^{3}C2015-1145
Logan Miller, Jillian Urban, Elizabeth Lillie, Joel Stitzel, *Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston-Salem, NC, United States*

10:30AM **Influence of Recent Head Impact History on Biomechanics of Concussion Sustained in College Football Athletes** SB^{3}C2015-289
Daniel J. Sjoquist, Brian D. Stemper, Alok S. Shah, James Murtha, John R. Humm, Ashley LaRoche, Adam Pfaller, Steven Broglio, Kevin Guskiewicz, Michael McCrea, *Medical College of Wisconsin, Milwaukee, WI, United States*

THURSDAY, JUNE 18	9:15am - 10:45am

Dynamics and Rehabilitation — Superior

Session Chair: Alan Eberhardt, *University of Alabama at Birmingham, Birmingham, AL, United States*
Session Co-Chair: Tammy Bush, *Michigan State University, East Lansing, MI, United States*

9:15AM **A Support Vector Machine Based On Vertical Ground Reaction Force To Supplement Observational Gait Evaluation** SB³C2015-568
Craig J. Simons[1], Cory L. Christiansen[2], Jennifer E. Stevens-Lapsley[2], Kevin B. Shelburne[1], Bradley S. Davidson[1], *[1]University of Denver, Denver, CO, United States,[2]University of Colorado Denver, Denver, CO, United States*

9:30AM **A Bootstrapping Method to Assess the Influence of Age, Obesity, and Gender on Probability of Tripping as a Function of Obstacle Height** SB³C2015-506
Christina M. R. Garman[1], Christopher T. Franck[1], Maury A. Nussbaum[1], Michael L. Madigan[2], *[1]Virginia Tech, Blacksburg, VA, United States,[2]Texas A & M University, College Station, TX, United States*

9:45AM **Metabolic Consumption Using Different Repetitive Lifting Strategies** SB³C2015-1039
Timothy D. Craig[1], Alice E. Riley[1], Sandra A. Billinger[2], Neena K. Sharma[2], **Sara E. Wilson**[1], *[1]University of Kansas, Lawrence, KS, United States,[2]University of Kansas, Kansas City, KS, United States*

10:00AM **Design, Calibration, and Validation of a Novel In Vitro Tibial Force Sensor** SB³C2015-29
Joshua D. Roth, Maury L. Hull, Stephen M. Howell, *University of California, Davis, Davis, CA, United States*

10:15AM **Oh Deer! Morphological and Biomechanical Evaluation of Cervine Femora** SB³C2015-415
Mark J. Hedgeland, Morgan A. Libruk, Nicole C. Corbiere, Mario J. Ciani, Laurel Kuxhaus, *Clarkson University, Potsdam, NY, United States*

10:30AM **The Effects of Low Intensity Vibration on Bone Mineral Density in the Intact Limb of Animals with a Percutaneously Attached Endoprosthesis.** SB³C2015-502
Kyle Bodnyk[1], Garrett Noble[1], Matthew Allen[2], Noel Fitzpatrick[3], Gabriel Pagnotti[4], Richard Hart[1], *[1]The Ohio State University, Columbus, OH, United States,[2]University of Cambridge, Cambridge, United Kingdom,[3]Fitzpatrick Referrals, Surrey, United Kingdom,[4]Stony Brook University, New York, NY, United States*

THURSDAY, JUNE 18	9:15am - 10:45am

Cerebral and Aortic Aneurysms — Wasatch

Session Chair: Ender A. Finol, *University of Texas at San Antonio, San Antonio, TX, United States*
Session Co-Chair: Naomi Chesler, *University of Wisconsin, Madison, WI, United States*

9:15AM **Effect of Branched and Fenestrated Stent-Grafts on Renal Blood Flow.** SB³C2015-107
Harkamaljot S. Kandail[1], Mohamad S. Hamady[2], Xiao Y. Xu[1], *[1]Imperial College London, London, United Kingdom,[2]Imperial College Healthcare NHS Trust, London, United Kingdom*

9:30AM **Hemodynamic Changes in Treated Cerebral Aneurysms and Correlations with Long-Term Outcomes** SB³C2015-557
Michael C. Barbour[1], Patrick M. McGah[1], Michael R. Levitt[2], Kurt Sansom[1], Ryan P. Morton[2], John D. Nevra[2], Pierre D. Mourad[2], Basavaraj V. Ghodke[3], Danial K. Hallam[3], Laligam N. Sekhar[2], Louis J. Kim[2], Alberto Aliseda[1], *[1]University of Washington, Seattle, WA, United States,[2]University of Washington, Neurological Surgery, Seattle, WA, United States,[3]Dept of Radiology, Harborview Medical Center, Seattle, WA, United States*

9:45AM **Anuerysm MRI Phantoms For Direct, Ex Vivo Fluid Dynamics** SB³C2015-283
Jeff R. Anderson[1], Orlando Diaz[2], Richard Klucznik[2], Yi J. Zhang[2], Gavin W. Britz[2], Robert G. Grossman[2], Christof Karmonik[1,2], *[1]Houston Methodist Research Institute, Houston, TX, United States,[2]Houston Methodist Hospital, Houston, TX, United States*

10:00AM **Endovascular Treatment of Intracranial Aneurysms: Finite Element Modeling of Various Intervention Strategies** SB³C2015-518
Robert Damiano, Ding Ma, Jianping Xiang, Adnan Siddiqui, Kenneth Snyder, Hui Meng, *University at Buffalo, State University of New York, Buffalo, NY, United States*

10:15AM **Experimental Evaluation of Hemodynamics in Patient-Specific Model of Type B Aortic Dissection** SB³C2015-608
Joav Birjiniuk[1], Jean M. Ruddy[2], Mark Young[3], Lucas H. Timmins[1], Ravi K. Veeraswamy[4], David N. Ku[5], *[1]Georgia Institute of Technology and Emory University School of Medicine, Atlanta, GA, United States,[2]Medical University of South Carolina, Charleston, SC, United States,[3]Medtronic, Inc., Santa Rosa, CA, United States,[4]Emory University School of Medicine, Atlanta, GA, United States,[5]Georgia Institute of Technology, Atlanta, GA, United States*

10:30AM **Assessment And Quantification Of Transitional Flow In Intracranial Aneurysms - Highly Resolved Simulations Below The Kolmogorov Scales** SB³C2015-588
Kartik Jain[1,2], Kristian Valen-Sendstad[2], Sabine Roller[1], Kent-Andre Mardal[2,3], *[1]University of Siegen, Siegen, Germany,[2]Simula Research Laboratory, Oslo, Norway,[3]University of Oslo, Oslo, Norway*

THURSDAY, JUNE 18	**9:15am - 10:45am**

Microstructure of Aneurysms — Magpie

Session Chair: Alison Marsden, *University of California San Diego, San Diego, CA, United States*
Session Co-Chair: Hai-Chao Han, *University of Texas at San Antonio, San Antonio, TX, United States*

9:15AM **Stiffer Arterial Wall Enhances Aortic Aneurysm Formation In A Mouse Model Via Elastase Infusion** SB³C2015-537
Zhijie Wang, Stephanie Morgan, Mark Golob, Zhenjie Liu, Bo Liu, Naomi C. Chesler, *University of Wisconsin - Madison, Madison, WI, United States*

9:30AM **Bayesian Calibration Of A Growth And Remodeling Computational Model Of Abdominal Aortic Aneurysms** SB³C2015-564
Seungik Baek, Liangliang Zhang, Sajjad SeyedSalehi, Jongeun Choi, Chae Young Lim, Tapabrata Maiti, *Michigan State University, East Lansing, MI, United States*

9:45AM **Role Of Aneurysm On Failure Properties Of "Radially-oriented" Collagen Fibers In Human Ascending Thoracic Aortic Media** SB³C2015-572
Siladitya Pal, Spandan Maiti, Alkiviadis Tsamis, Julie A. Phillippi, Thomas G. Gleason, David A. Vorp, *University of Pittsburgh, Pittsburgh, PA, United States*

10:00AM **Elastin Production Slows Aneurysm Enlargement in a Constrained Mixture Models of Aneurysm Growth and Remodelling** SB³C2015-404
Kory J. Blose, Justin S. Weinbaum, Anne M. Robertson, David A. Vorp, *University of Pittsburgh, Pittsburgh, PA, United States*

10:15AM **Novel Image-based Analysis Of Patient-specific Abdominal Aortic Aneurysm Wall Stress Using A Membrane Mechanics Model** SB³C2015-1043
Mirunalini Thirugnanasambandam[1], Prahlad G. Menon[1,2], Stéphane Avril[3], Ender A. Finol[1], *[1]University of Texas at San Antonio, San Antonio, TX, United States,[2]Sun Yat-sen University - Carnegie Mellon University Joint Institute of Engineering, Pittsburgh, PA, United States,[3]Ecole Nationale Supérieure des Mines, Saint-Etienne, France*

10:30AM **Heterogeneous Elastic Properties Of Ascending Thoracic Aneurysms** SB³C2015-122
Jia Lu[1], Yuanming Luo[1], Frances M. Davis[2], Stéphane Avril[2], *[1]The University of Iowa, Iowa City, IA, United States,[2]Ecole Nationale Suprieure des Mines de Saint-Etienne, St. Étienne, France*

THURSDAY, JUNE 18	**9:15am - 10:45am**

Musculoskeletal Tissue Engineering - Matrices and Interfaces — Maybird

Session Chair: Matt Fisher, *North Carolina State University, Raleigh, NC, United States*
Session Co-Chair: Mariana Kersh, *University of Illinois, Urbana, IL, United States*

9:15AM **Perfusion Decellularized Skeletal Muscle As A Scaffold For The Repair Of Volumetric Muscle Loss** SB³C2015-432
Ben Kasukonis, John Kim, Tyrone Washington, **Jeffrey C. Wolchok**, *University of Arkansas, Fayetteville, AR, United States*

9:30AM **Fabrication Of Dense Porous Aligned Collagen Scaffolds Using 2D Plastic Compression And Porogens** SB³C2015-1034
Shawn Reese, Jared Zitnay, Jeffrey Weiss, *University of Utah, Salt Lake City, UT, United States*

9:45AM **Wrinkled, Wavelength-Tunable Graphene-Based Surface Topographies for Directing Cell Alignment and Morphology** SB³C2015-295
Daniel F. Tonderys, Susan Leggett, Zhongying Wang, *Brown University, Providence, RI, United States*

10:00AM **Network Stiffening of Nanofiber Scaffolds by Mineral** SB³C2015-402
Justin H. Lipner[1], John J. Boyle[1], Victor Birman[2], Guy M. Genin[1], Stavros Thomopoulos[1], *[1]Washington University in St. Louis, Saint Louis, MO, United States,[2]Engineering Education Center, Missouri University of Science and Technology, Saint Louis, MO, United States*

10:15AM **Micrometer-scale Mechanical Properties Of The Tendon-to-bone Attachment** SB³C2015-594
Alix C. Deymier-Black[1], Yiran An[2], Andrea G. Schwartz[1], Guy M. Genin[1], Stavros Thomopoulos[1], Asa H. Barber[2], *[1]Washington University in St Louis, St Louis, MO, United States,[2]Queen Mary University of London, London, United Kingdom*

10:30AM **Local Microenvironment Response of Chondrocytes in Gradient Collagen Matrices** SB³C2015-639
Tyler Novak, Benjamin Seelbinder, Celina M. Twitchell, Sherry L. Voytik-Harbin, Corey P. Neu, *Purdue University, Lafayette, IN, United States*

THURSDAY, JUNE 18	**9:15am - 10:45am**

Transport in Tissue and Tumor Microenvironments — Golden Cliff / Eagle's Nest

Session Chair: John Pearce, *The University of Texas at Austin, Austin, TX, United States*
Session Co-Chair: Aili Zhang, *Shanghai Jiao Tong University, Shanghai, China*

9:15AM **Temperature Control of Hydrogel Delivered Through Endoscopic Needle as Potential Treatment for Pancreatic Cancer** SB³C2015-477
Tom M. Merrill[1], Jennifer Mitchell[2], Denise Merrill[2], Matthew Short[1], *[1]Rowan University, Glassboro, NJ, United States,[2]FocalCool, LLC, Mullica Hill, NJ, United States*

9:30AM **Shear Activated Nanoparticle Aggregate Delivery of Tissue Plasminogen Activator with Adjunctive Endovascular Bypass for Revascularization in Acute Ischemic Stroke** SB³C2015-303
Matthew J. Gounis[1], Netanel Korin[2], Miklos G. Marosfoi[1], Oktay Uzun[2], Erin T. Langan[1], Anne-Laure Papa[2], Olivia W. Brooks[1], Chris Johnson[2], Ajit S. Puri[1], Deen Bhatta[2], Ajay K. Wakhloo[1], Donald E. Ingber[2], *[1]University of Massachusetts Medical School, Worcester, MA, United States,[2]Wyss Institute for Biologically Inspired Engineering, Boston, MA, United States*

9:45AM **Characterization Of Endothelial Cell Permeability On A Biomimetic Blood Vessel Platform** SB³C2015-217
Yaling Liu, Antony Thomas, Christopher Uhl, *Lehigh University, Bethlehem, PA, United States*

10:00AM **Salmon Thrombin Inhibits Endothelial Barrier Disruption Through its Activation of Protein C** SB³C2015-273
Jenell Smith, Peter Galie, David Slochower, Paul Janmey, Beth Winkelstein, *University of Pennsylvania, Philadelphia, PA, United States*

10:15AM **An In Vitro Microfluidic Tumor Model to Mimic Ductal Carcinoma In Situ** SB³C2015-673
Victoria Noe-Kim, Altug Ozcelikkale, Bumsoo Han, *Purdue University, West Lafayette, IN, United States*

10:30AM **Novel 3D Co-culture Assay Reveals Cancer Cell Migration Driven By Matrix-dependent Autonomous Formation Of CXCL12 Gradients** SB³C2015-532
Christopher Moraes[1], Taisuke Kojima[2], Stephen P. Cavnar[2], Gary D. Luker[2], Shuichi Takayama[2], *[1]McGill University, Montreal, QC, Canada,[2]University of Michigan, Ann Arbor, MI, United States*

THURSDAY, JUNE 18	9:15am - 10:45am

Cartilage and Intervertebral Disc — Primrose B

Session Chair: Clark Hung, *Columbia University, New York, NY, United States*
Session Co-Chair: Corey Neu, *Purdue University, West Lafayette, IN, United States*

9:15AM **Quantitative Analysis Of Raman Spectra For Assessment Of Crosslink Concentrations Toward Diagnosing Early Osteoarthritis** SB^{3}C2015-452
Chao Wang, **Krista M. Durney**, Jonathan L. Kuo, Jack R. Norton, Gerard A. Ateshian, Sinisa Vukelic, *Columbia University, New York, NY, United States*

9:30AM **An In-situ Cartilage Characterization Method With Reduced Time And Computation Demands: Comparison Against Linear And Nonlinear Biphasic Theories** SB^{3}C2015-226
David L. Burris, Axel C. Moore, Xingyu Chen, Brandon K. Zimmerman, X. Lucas Lu, *University of Delaware, Newark, DE, United States*

9:45AM **Maintenance of F-Spondin (Spon1) Knockout Phenotype in 3D Cultured Murine Chondrocytes** SB^{3}C2015-1050
Eben G. Estell[1], Qing Yang[2], Andrea R. Tan[1], Mukundan Attur[2], Steven B. Abramson[2], Clark T. Hung[1], *[1]Columbia University, New York, NY, United States,[2]New York University School of Medicine and Langone Medical Center, New York, NY, United States*

10:00AM **Impact-induced Fissuring In Articular Cartilage: Bulk And Tissue-scale Mechanics** SB^{3}C2015-663
Corinne R. Henak, Lena R. Bartell, Itai Cohen, Lawrence J. Bonassar, *Cornell University, Ithaca, NY, United States*

10:15AM **Modeling The Intervertebral Discs Repair With Cellular Therapies** SB^{3}C2015-563
Qiaoqiao Zhu, Xin Gao, Weiyong Gu, *University of Miami, Coral Gables, FL, United States*

10:30AM **The Contribution of Collagen Fibers in Human Cartilage Endplate Mechanics** SB^{3}C2015-660
John DeLucca[1], Mary Boggs[1], Edward Vresilovic[2], Randall Duncan[1], Dawn Elliott[1], *[1]University of Delaware, Newark, DE, United States,[2]Pennsylvania State University, Hershey, PA, United States*

THURSDAY, JUNE 18	11:00am - 12:30pm

Biomechanics of Microcirculation: From Cells to Networks and Changes During Disease States (joint with JSME) — Primrose A

Session Chair: Ken-ichi Tsubota, *Chiba University, Chiba, Japan*
Session Co-Chair: Walter Lee Murfee, *Tulane University, New Orleans, LA, United States*

11:00AM **Molecular Dynamics Simulations of Lipid Bilayer Failure under Mechanical Stresses: Toward Understanding Mechanical Hemolysis** SB^{3}C2015-214
Kenichiro Koshiyama, *Osaka University, Toyonaka, Japan*

11:15AM **A Computational Study Of Red Blood Cells In Stokes Flow: From Single Cellular Mechanics To Suspension Rheology** SB^{3}C2015-256
Toshihiro Omori, Yohsuke Imai, Takami Yamaguchi, Takuji Ishikawa, *Tohoku University, Sendai, Japan*

11:30AM **Microsystems Engineering for Bridging Angiogenesis with Mechanopathology** SB^{3}C2015-28
Jonathan W. Song, *The Ohio State University, Columbus, OH, United States*

11:45AM **Autodigestion And Its Manifestations In The Microcirculation.** SB^{3}C2015-292
Geert W. Schmid-Schoenbein, Frank De Iano, Angelina Altshuler, Erik Kistler, Michael Richter, *University of California, San Diego, La Jolla, CA, United States*

12:00PM **Quantifying Hemodynamics And Wall Mechanics In Patient-specific Coronary Artery Bypass Grafts** SB^{3}C2015-1119
Abhay B. Ramachandra, Andrew Kahn, Alison L. Marsden, *University of California San Diego, La Jolla, CA, United States*

12:15PM **The Effects of Aging on Microvascular Network Resistance and Flow Heterogeneity in the Rat Mesentery** SB³C2015-644
David C. Sloas, Scott A. Stewart, Richard S. Sweat, Walter L. Murfee, *Tulane University, New Orleans, LA, United States*

THURSDAY, JUNE 18	11:00am - 12:30pm

Human Dynamics — Superior

Session Chair: Rita M. Patterson, *University of North Texas Health Science Center, Fort Worth, TX, United States*
Session Co-Chair: Tom Gardner, *Columbia University, New York, NY, United States*

11:00AM **Lumbar-pelvic Coordination Differences Between Novice And Experienced Lifters In Repetitive Lifting** SB³C2015-1029
Timothy D. Craig[1], Alice E. Riley[1], Sandra A. Billinger[2], Neena K. Sharma[2], **Sara E. Wilson**[1], *[1]University of Kansas, Lawrence, KS, United States,[2]University of Kansas, Kansas City, KS, United States*

11:15AM **Design and Simulation of an Ankle Foot Simulator** SB³C2015-1171
Jonathan J. Miller, *University of Utah, Salt Lake City, UT, United States*

11:30AM **Improved Detection Of Dynamic Balance Using Normalized COM-COP Inclination Angular Jerk During A Golf Swing** SB³C2015-23
Ahnryul Choi[1], Joung Hwan Mun[2], *[1]The University of Texas Health Science Center at Houston, Houston, TX, United States,[2]Sungkyunkwan University, Suwon, Korea*

11:45AM **Investigating the Effect of Ball Impact Location** SB³C2015-117
Ainhoa Iglesias-Díaz, **Martin L. Tanaka**, Paul M. Yanik, Aaron K. Ball, *Western Carolina University, Cullowhee, NC, United States*

12:00PM **Designing Biomechanical Models of the Ankle: How Many Degrees of Freedom are Necessary to Reflect In Vivo Joint Kinematics?** SB³C2015-237
Jennifer A. Nichols, Koren E. Roach, Charles L. Saltzman, Andrew E. Anderson, *University of Utah, Salt Lake City, UT, United States*

12:15PM **Obesity and Age Affect Trip Outcome and Severity Following a Laboratory-Induced Trip** SB³C2015-510
Christina M. R. Garman[1], Maury A. Nussbaum[1], Michael L. Madigan[2], *[1]Virginia Tech, Blacksburg, VA, United States,[2]Texas A & M University, College Station, TX, United States*

THURSDAY, JUNE 18	11:00am - 12:30pm

Thrombus Prediction — Wasatch

Session Co-Chair: Shawn Shadden, *UC Berkeley, Berkeley, CA, United States*
Session Co-Chair: Dalin Tang, *WPI, Worcester, MA, United States*

11:00AM **Activated Expression And Shedding Of Platelet Glycoprotein IIb/IIIa Under Non-physiological Shear Stress: A Paradoxical Effect** SB³C2015-280
Zengsheng Chen, Jun Ding, Zhongjun J Wu, *University of Louisville School of Medicine, Louisville, KY, United States*

11:15AM **Development of A Predictive Computational Model For Device-Induced Thrombosis** SB³C2015-243
Joshua O. Taylor[1,2], Richard S. Meyer[2], Steven Deutsch[2], **Keefe Manning**[1,3], *[1]The Pennsylvania State University, University Park, PA, United States,[2]Applied Research Laboratory, State College, PA, United States,[3]Penn State Hershey Medical Center, Hershey, PA, United States*

11:30AM **Thrombotic Risk Assessment Using Transluminal Attenuation Gradient and Computational Modelling in Kawasaki Disease Patients with Coronary Artery Aneurysms** SB³C2015-1082
Noelia Grande Gutierrez[1], Andrew M. Kahn[2], Olga Shirinsky[3], Nina V. Gagarina[3], Galina A. Lyskina[3], Ryuji Fukazawa[4], Shunichi Ogawa[4], Jane C. Burns[2], Alison L. Marsden[1], *[1]University of California San Diego, La Jolla, CA, United States,[2]School of Medicine, University of California San Diego, La Jolla, CA, United States,[3]Sechenov First Moscow State University, Moscow, Russian Federation,[4]Nippon Medical School Hospital, Tokyo, Japan*

11:45AM **Hemodynamic Prediction of Thrombus Prone Regions in Abdominal Aortic Aneurysms** SB³C2015-455
Konstantinos Tzirakis[1], **Eleni Metaxa**[1], Nikolaos Kontopodis[2], Christos V. Ioannou[2], Yannis Papaharilaou[1], *[1]Foundation of Research and Technology - Hellas, Heraklion, Greece,[2]University of Crete, Heraklion, Greece*

12:00PM **Thrombogenic Properties Of A Superhydrophobic Surface For Use As A Prosthetic Heart Valve Material** SB³C2015-652
David L. Bark, Jr., Sanli Movafaghi, Brandon L. Moore, Arun K. Kota, Ketul C. Popat, Lakshmi P. Dasi, *Colorado State University, Fort Collins, CO, United States*

12:15PM **The Impact of VAD Surgical Implantation Configurations on its Thrombogenic Potential** SB³C2015-548
Wei C. Chiu[1], Allison J. McLarty[1], Shmuel Einav[1], Marvin J. Slepian[2], Danny Bluestein[1], *[1]Stony Brook University, Stony Brook, NY, United States,[2]Sarver Heart Center, Tucson, AZ, United States*

THURSDAY, JUNE 18	**11:00am - 12:30pm**

Heart Valve Structure and Function — Magpie

Session Chair: Michael Sacks, *University of Texas, Austin, TX, United States*
Session Co-Chair: Shamik Bhattacharya, *St.Mary's University, San Antonio, TX, United States*

11:00AM **Age-dependent Changes In Stress And Strain In The Human Native Heart Valve And Their Relation With Collagen Remodeling** SB³C2015-523
Pim J. A. Oomen[1], Sandra Loerakker[1], Daphne van Geemen[1], Jan Neggers[1], Marie-José T. H. Goumans[2], Antoon J. van den Bogaerdt[3], Ad J. J. C. Bogers[3], Carlijn V. C. Bouten[1], Frank P. T. Baaijens[1], *[1]Eindhoven University of Technology, Eindhoven, Netherlands,[2]Leiden University Medical Center, Leiden, Netherlands,[3]Erasmus Medical Center, Rotterdam, Netherlands*

11:15AM **Effects Of Leaflet Microstructure And Constitutive Model On The Closing Behavior Of The Mitral Valve** SB³C2015-339
Chung-Hao Lee[1], Jean-Pierre Rabbah[2], Ajit P. Yoganathan[2], Robert C. Gorman[3], Joseph H. Gorman[3], Michael S. Sacks[1], *[1]The University of Texas at Austin, Austin, TX, United States,[2]Georgia Institute of Technology, Atlanta, GA, United States,[3]University of Pennsylvania, Philadelphia, PA, United States*

11:30AM **Capturing Detailed 3D Mitral Valve Geometry For Computational Valve Modeling** SB³C2015-462
Charles H. Bloodworth, Eric L. Pierce, Thomas F. Easley, Milan Toma, Morten O. Jensen, Ajit P. Yoganathan, *Wallace H Coulter Department of Biomedical Engineering, Georgia Tech and Emory University, Atlanta, GA, United States*

11:45AM **True 3D Stresses in Heart Valve Leaflets** SB³C2015-1032
Bruno V. Rego, Michael S. Sacks, *The University of Texas at Austin, Austin, TX, United States*

12:00PM **A Framework For Parameter Estimation Of Heart Valves Using Inverse-Modeling Approach** SB³C2015-603
Ankush Aggarwal, Michael S. Sacks, *University of Texas at Austin, Austin, TX, United States*

12:15PM **Immersogeometric Fluid-Structure Interaction Analysis of Bioprosthetic Heart Valves: Realistic Material Modeling and Experimental Validation** SB³C2015-1150
David Kamensky[1], Ming-Chen Hsu[2], Michael S. Sacks[1], Thomas J. R. Hughes[1], *[1]University of Texas at Austin, Austin, TX, United States,[2]Iowa State University, Ames, IA, United States*

THURSDAY, JUNE 18	**11:00am - 12:30pm**

Nano-, Micro-, and Multi-Scale Mechanics of Cells and Tissues — Maybird

Session Chair: Nadeen Chahine, *Feinstein Institute of Medical Research, Manhasset, NY, United States*
Session Co-Chair: Grace D. O'Connell, *University of California, Berkeley, Berkeley, CA, United States*

11:00AM **Micromechanical Heterogeneity And Anisotropy Of The Meniscus Extracellular Matrix** SB³C2015-128
Qing Li[1], Feini Qu[2,3], Biao Han[1], Robert L. Mauck[2,3], **Lin Han**[1], *[1]Drexel University, Philadelphia, PA, United States,[2]University of Pennsylvania, Philadelphia, PA, United States,[3]Philadelphia Veterans Administration Medical Center, Philadelphia, PA, United States*

11:15AM **A Micromechanical Viscoelastic Computational Model Incorporating Progressive Detachment Of The Tau Proteins Predicting Microtubule Breaking Following Axonal Injury.** SB³C2015-153
Hossein Ahmadzadeh[1], Douglas H. Smith[2], Vivek B. Shenoy[1], *[1]Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA, United States,[2]Penn Center for Brain Injury and Repair and Department of Neurosurgery, University of Pennsylvania, Philadelphia, PA, United States*

11:30AM **Layer-specific Mitral Valve Interstitial Cell Deformations Under Physiological Loading** SB³C2015-340
Chung-Hao Lee[1], Christopher A. Carruthers[2], Ayoub Salma[1], Robert C. Gorman[3], Joseph H. Gorman[3], Michael S. Sacks[1], *[1]The University of Texas at Austin, Austin, TX, United States,[2]Medtronic, Minneapolis, MN, United States,[3]University of Pennsylvania, Philadelphia, PA, United States*

11:45AM **Relaxation of Simulated Viscoelastic Fiber Networks** SB³C2015-377
Rohit Y. Dhume, Victor H. Barocas, *University of Minnesota, Minneapolis, MN, United States*

12:00PM **A Multi-Scale Approach in Analyzing Fluid/Solute Flow in Mechanically Loaded Bone** SB³C2015-499
Lixia Fan[1], Shaopeng Pei[2], Xiaohan Lai[2], Xin Lu[2], **Liyun Wang**[2], *[1]Nanjing University of Science and Technology, Nanjing, China,[2]University of Delaware, Newark, DE, United States*

12:15PM **Blocking Inflammation Protects Against Alterations In Cell Biomecahnics, Morphology And Cytoskeleton** SB³C2015-1155
Timothy Jacobsen, Paula Hernandez, Victoria Wei, Nadeen O. Chahine, *Feinstein Institute for Medical Research, Manhasset, NY, United States*

THURSDAY, JUNE 18	**11:00am - 12:30pm**

Cryotherapy and Hyperthermia: 70+ Birthday Celebration for Prof. Avraham Shitzer — Golden Cliff / Eagle's Nest

Session Chair: John Bischof, *University of Minnesota at Minneapolis, Minneapolis, MN, United States*
Session Co-Chair: Liang Z. Zhu, *University of Maryland Baltimore County, Baltimore, MD, United States*

11:00AM **A Novel Method For Positioning And Operating Cryo-surgical Probes In 2-D Convex Target Areas Based On Super-positioning Of Unit Circles** SB³C2015-25
Avraham Shitzer, *Technion, Isreal Inst. Tech., Haifa, Israel*

11:15AM **Meeting The Need For Improved Monitoring Of Cryotherapy In Thin Cardiovascular Tissues With A New Micro-thermal Sensor** SB³C2015-1137
Harishankar Natesan[1], Jeunghwan Choi[1], Wyatt Hodges[2], Sean Lubner[2], Chris Dames[2], John Bischof[1], *[1]University of Minnesota, Minneapolis, MN, United States,[2]University of California, Berkeley, CA, United States*

11:45AM **Determination of the Convective Heat Transfer Coefficients on the Outer Surfaces of the Cryovivals Plunged in Liquid Nitrogen and 37°C Water Bath** SB³C2015-433
Tao Wang, Gang Zhao, *University of Science and Technology of China, Hefei, China*

11:45AM **Correcting Arrhenius Models for Application to Cell Death Processes Involving Intrinsic Protein Cascades** SB³C2015-142
John Pearce, *The University of Texas at Austin, Austin, TX, United States*

12:00AM **Tumor Engineering to Elucidate the Effect of Mild Hyperthermia on the Transport of Single Walled Carbon Nanohorns in the Tumor Microenvironment** SB³C2015-586
Matthew R. DeWitt[1], M. Nichole Rylander[2], *[1]Virginia Tech, Blacksburg, VA, United States,[2]The University of Texas at Austin, Austin, TX, United States*

12:15AM **Strategies Of Injecting Ferrofluid Into Tumors To Achieve Repeatable Nanoparticle Deposition And Thermal Dosage In Mangetic Nanoparticle Hyperthermia** SB³C2015-286
Alexander LeBrun, Charles Bieberich, Ronghui Ma, Liang Zhu, *University of Maryland Baltimore County, Baltimore, MD, United States*

THURSDAY, JUNE 18	11:00am - 12:30pm

Cartilage Mechanics and Repair (joint with JSME) — Primrose B

Session Chair: Hiromichi Fujie, *Tokyo Metropolitan University, Tokyo, Japan*
Session Co-Chair: Jennifer Wayne, *Virginia Commonwealth University, Richmond, VA, United States*

11:00AM **Anisotropic Hydraulic Permeability In Articular Cartilage And Menisci: A Direct Measurement Using Biopsy Punches** SB^{3}C2015-420
Hiromichi Fujie, Ryosuke Nakamura, *Tokyo Metropolitan University, Tokyo, Japan*

11:15AM **The Influence of Cartilage Morphology and Elasticity on Tibiofemoral Contact Pressures During Walking** SB^{3}C2015-667
Colin R. Smith, Rachel L. Lenhart, Mike F. Vignos, Jarred Kaiser, Darryl G. Thelen, *University of Wisconsin-Madison, Madison, WI, United States*

11:30AM **The Effect of Impact and Genipin Crosslinking on the Friction and Wear of Articular Cartilage** SB^{3}C2015-24
Craig M. Bonitsky[1], Michael Selep[1], Megan E. McGann[1], Timothy C. Ovaert[1], Stephen B. Trippel[2], Diane R. Wagner[1], *[1]University of Notre Dame, Notre Dame, IN, United States,[2]Indiana University, Indianapolis, IN, United States*

11:45AM **Development Of Artificial Cartilage Using Two Phase Collagen/Scaffold With Mesenchymal Stem Cells** SB^{3}C2015-268
Mitsugu Todo[1], Yusuke Nakamuta[1], Takaaki Arahira[2], *[1]Kyushu University, Kasuga, Japan,[2]Fukuoka Dental College, Fukuoka, Japan*

12:00PM **Evaluation Of Friction And Wear Properties Of Poly(vinyl Alcohol) Hydrogels As Artificial Articular Cartilage** SB^{3}C2015-1078
Seido Yarimitsu[1], Ayumi Yoshida[1], Kazuhiro Nakashima[1], Teruo Murakami[1], Saori Sasaki[2], Atsushi Suzuki[2], *[1]Kyushu University, Fukuoka, Japan,[2]Yokohama National University, Yokohama, Japan*

12:15PM **Relationship Of Wear Particles Of Poly(vinyl Alcohol) Hydrogel And Immune Response Of Macrophage** SB^{3}C2015-1079
Seiji Omata, Yoshinori Sawae, Teruo Murakami, *Kyushu University, Fukuoka, Japan*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — BS Competition - Biofluid Mechanics — Event Center Tent

1 **Predicting Regions Of Low Wall Shear Stress In The Carotid Artery Bifurcation** SB^{3}C2015-419
Haley M. King, Emma J. Lichtenfels, Christian R. Fahrenbruck, Brandon Moore, Lakshmi P. Dasi, *Colorado State University, Fort Collins, CO, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — BS Competition - Biotransport — Event Center Tent

2 **Generating Tumor Models From MicroCT Scan Images For Simulating Temperature Elevation During Magnetic Nanoparticle Hyperthermia** SB^{3}C2015-300
Andrew S. Lee, Alexander LeBrun, Ronghui Ma, Liang Zhu, *University of Maryland Baltimore County, Baltimore, MD, United States*

3 **Evaluating Accuracy Of The Algorithm/formula Used In Store Brand Digital Thermometers To Predict Body Temperature Based On The First Few Seconds of The Temperature Measurements** SB^{3}C2015-507
Amirreza Saharkhiz[1], Oleg Vesnovsky[2], Jon P. Casamento[2], Laurence W. Grossman[2], L. D. Timmie Topoleski[1], Liang Zhu[1], *[1]University of Maryland Baltimore County, Baltimore, MD, United States,[2]U.S. Food and Drug Administration, Silver Spring, MD, United States*

4 **Development Of A Tissue Phantom To Mimic The Thermal Environment Of A Human Arm To Test Digital Thermometers** SB³C2015-501
Peter Dillon[1], Oleg Vesnovsky[2], L. D. Timmie Topoleski[1], Jon P. Casamento[2], Laurence W. Grossman[2], Liang Zhu[1], *[1]University of Maryland Baltimore County, Baltimore, MD, United States,[2]U.S. Food and Drug Administration, Silver Spring, MD, United States*

5 **Quantitative Visualization of Drug Response of Breast Cancer Cells Within a Three-Dimensional Extracellular Matrix** SB³C2015-234
Brett S. Klosterhoff[1], Kyeonggon Shin[1], J. Craig Dutton[2], Bumsoo Han[1], *[1]Purdue University, West Lafayette, IN, United States,[2]University of Illinois at Urbana-Champaign, Urbana, IL, United States*

THURSDAY, JUNE 18 | 12:30pm - 2:30pm

Poster Session I — BS Competition - Cellular and Tissue Engineering — Event Center Tent

6 **Fabrication and Evaluation of Biodegradable Tissue Scaffolds for Osteochondral Defect Repair** SB³C2015-1154
Carly R. Garrow, Andrew J. Polk, Ferris M. Pfeiffer, *University of Missouri - Columbia, Columbia, MO, United States*

THURSDAY, JUNE 18 | 12:30pm - 2:30pm

Poster Session I — BS Competition - Design and Devices — Event Center Tent

7 **Wear Simulator for Canine Total Hip Replacements** SB³C2015-1174
Kevin J. Warburton[1], Evan Rust[1], Jeff Brourman[2], Trevor J. Lujan[1], *[1]Boise State University, Boise, ID, United States,[2]Veterinary Surgeon WestVet Animal Emergency & Specialty Center, Garden City, ID, United States*

8 **Material Property Testing of Carboxymethylated Hyaluronic Acid Hydrogel Polymer** SB³C2015-1186
McKenna Drysdale[1], Hee-Kyoung Lee[1,2], Barbara Wirostko[2], Brittany Coats[1], *[1]University of Utah, Salt Lake City, UT, United States,[2]Jade Therapeutics, Salt Lake City, UT, United States*

9 **Design of a 3-D Bioreactor for Simulation of Cerebrospinal Fluid Flow in the Third Ventricle and Aqueduct of Sylvius** SB³C2015-1164
Michael J. Majcher, Matthew R. Dailey, David P. Lemmer, Joseph T. Havrilak, Nic Leipzig, Bryn A. Martin, *University of Akron, Akron, OH, United States*

11 **A New Method For Determining Cross-sectional Shape And Area Of Soft Tissues Using 3d Laser Scanning** SB³C2015-176
Yaniv Michaeli[1,2], Richard E. Debski[2], *[1]ORT Braude College, Nahariya, Israel,[2]University of Pittsburgh, Pittsburgh, PA, United States*

12 **Rapid Quantification Of Femoral Head Geometry From Magnetic Resonance Imaging Of Femoroacetabular Impingement** SB³C2015-643
Haley Ehlers[1], Michael Roberts[1], Garry Gold[2], Saikat Pal[1], *[1]California Polytechnic State University, San Luis Obispo, CA, United States,[2]Stanford University, Stanford, CA, United States*

13 **Design and Implementation of an Instrumented Pedal for Cycling Biomechanics Research** SB³C2015-1033
Luke I. Kraemer, Juan D. Gutierrez-Franco, Jake E. Deschamps, Karim C. Dudum, Eshan M. Dandekar, Scott J. Hazelwood, Hemanth V. Porumamilla, Stephen M. Klisch, *California Polytechnic State University, San Luis Obispo, CA, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I **BS Competition - Human Dynamics** **Event Center Tent**

14 **Can Measured Muscle Synergies Reconstruct Unmeasured Muscle Excitations?** SB³C2015-573
Nicholas A. Bianco, Carolynn Patten, Benjamin J. Fregly, *University of Florida, Gainesville, FL, United States*

15 **Using OpenSim to Predict Knee Joint Moments During Cycling** SB³C2015-1023
Karim C. Dudum, Jake E. Deschamps, Juan D. Gutierrez-Franco, Luke I. Kraemer, Alejandro M. Gonzalez-Smith, Eshan M. Dandekar, Scott J. Hazelwood, Stephen M. Klisch, *California Polytechnic State University, San Luis Obispo, CA, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I **BS Competition - Injury** **Event Center Tent**

16 **The Temporal Change in Protein Biomarkers of Vitreous Humor following Blast Trauma of the Visual System** SB³C2015-1098
Justin A. Jones, Daniel F. Shedd, Brittany Coats, *University of Utah, Salt Lake City, UT, United States*

17 **Effect of Sclerostin Antibody on Tendon-to-Bone Healing in a Rotator Cuff Animal Model** SB³C2015-1051
Shivam A. Shah[1], Ioannis Kormpakis[1], Necat Havlioglu[2], Michael S. Ominsky[3], Leesa M. Galatz[1], Stavros Thomopoulos[1], *[1]Washington University of St. Louis, Saint Louis, MO, United States,[2]John Cochran VA Medical Center, Saint Louis, MO, United States,[3]Amgen Inc., Thousand Oaks, CA, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I **BS Competition - Tissue Mechanics** **Event Center Tent**

18 **Comparison of Pulmonary Artery Material Properties between a Congenital Heart Disease Patient and a Normal Subject using Cardiac Magnetic Resonance: A Feasibility Study** SB³C2015-606
Rajit Banerjee[1], Gavin A. D'Souza[2], Namheon Lee[3], Michael D. Taylor[3], *[1]University of Toledo, Toledo, OH, United States,[2]University of Cincinnati, Cincinnati, OH, United States,[3]Cincinnati Children's Hospital Medical Center, Cincinnati, OH, United States*

19 **Finite Element Analysis of the Biomechanical Consequences of Schmorl's Nodes** SB³C2015-1018
Boston B. Barham, Anton E. Bowden, *Brigham Young University, Provo, UT, United States*

20 **A Mechanical Model For Cortical Folding During Brain Development** SB³C2015-575
Nithya Vijayakumar, Maria Holland, Ellen Kuhl, *Stanford University, Stanford, CA, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I **Multi-scale Modeling in Biotransport** **Event Center Tent**

21 **Comparison Of MRI-measured Tracer Transport In The Rat Brain With Computational Model Prediction** SB³C2015-1149
Wei Dai, Garrett W. Astary, Aditya K. Kasinadhuni, Paul R. Carney, Thomas H. Mareci, Malisa Sarntinoranont, *University of Florida, Gainesville, FL, United States*

22 **A Reduced-Dimensional Transport Model for Thrombogenic Species in Large Arteries** SB³C2015-195
Kirk B. Hansen, Shawn C. Shadden, *University of California, Berkeley, Berkeley, CA, United States*

23 **Low-Concentration Salmonella Detection Using Orbiting Magnetic Microbeads in a Continuous-Flow Microfluidic Device** SB³C2015-593
Matthew S. Ballard, Drew L. Owen, Zachary G. Mills, Srinivas K. G. Hanasoge, Peter J. Hesketh, Alexander Alexeev, *Georgia Institute of Technology, Atlanta, GA, United States*

24 **Computational Multiphysics Model of Clot Lysis in a Completely Occluded Stenotic Artery** SB³C2015-139
Andris Piebalgs, Xiao Y. Xu, *Imperial College London, London, United Kingdom*

25 **Effect of Intervertebral Disc Size on Nutrient Distributions: A Finite Element Analysis with Implications for In Vivo Models** SB³C2015-1077
Alicia R. Jackson, *University of Miami, Coral Gables, FL, United States*

26 **Reaction/Diffusion Modelling of AtzA Biocatalyst Encapsulated in a Silica Gel Matrix** SB³C2015-175
Baris Ragip Mutlu, *University of Minnesota, Minneapolis, MN, United States*

27 **Finite Element Model of Mixed Porohyperelastic Transport in an Axisymmetric Porcine Coronary Artery** SB³C2015-184
Michelle A. H. Armstrong, Bruce R. Simon, Jonathan P. Vande Geest, *University of Arizona, Tucson, AZ, United States*

THURSDAY, JUNE 18 | 12:30pm - 2:30pm

Poster Session I — Design, Dynamics and Rehab — Event Center Tent

28 **Mechanical Design of a Customizable Self-Expanding Endovascular Stent** SB³C2015-1189
Joel C. R. Scott, Clifton R. Johnston, Darrel A. Doman, *Dalhousie University, Halifax, NS, Canada*

29 **Which Of Four Commercially-Available Laser Scanner Systems Generates The Most Accurate Bone Model?** SB³C2015-152
Valentina Campanelli[1,2], Stephen M. Howell[1], Maury Hull[1], *[1]UC Davis, Davis, CA, United States,[2]University of Verona, Verona, Italy*

30 **Deformation and Flow of Arterial Stenosis Model Regarding the Change in Curvature of Coronary Artery for Percutaneous Transluminal Coronary Angioplasty** SB³C2015-1142
Shunichi Kobayashi, *Shinshu University, Ueda, Japan*

31 **Computational Modeling Of Mechanical Stresses In Stents: Implications For The Optimization Of Drug-eluting Stents** SB³C2015-458
Francois P. M. Cornat, Franz Bozsak, Abdul I. Barakat, *Ecole Polytechnique, Palaiseau cedex, France*

32 **Damage Analysis of Retrieved Oxidized Zirconium Femoral Components for TKA: Can Wear Breach the Oxide Layer?** SB³C2015-1135
Noah Bonnheim[1], Michael Ries[2], Sanjai Shukla[2], Lisa Pruitt[1], *[1]University of California, Berkeley, Berkeley, CA, United States,[2]Tahoe Fracture and Orthopaedic Clinic, Carson City, NV, United States*

33 **Design and Optimization of an In-Vitro Emboli Detector for Flow-Induced Thrombogenicity Evaluation** SB³C2015-344
Ram Shtoltz, *Tel Aviv University, Tel Aviv, Israel*

34 **Development of Micro-scale Ultrasound Imaging for Tissue Characterization.** SB³C2015-1165
Jeremy Stromer, Leila Ladani, *University of Connecticut, Storrs, CT, United States*

35 **Bearing Surface Damage Analysis Of Total Shoulder Replacement Retrievals Across Fixation Designs And UHMWPE Composition** SB³C2015-531
Louis G. Malito[1], Farzana Ansari[1], Lulu Li[1], Taylor Lee[1], Helen Park[1], Steve Gunther[2], Tom Norris[3], Mike Ries[4], Lisa Pruitt[1], *[1]University of California, Berkeley, Berkeley, CA, United States,[2]Martha Jefferson Hospital, Charlottesville, VA, United States,[3]San Francisco Shoulder, Elbow & Hand Clinic, San Francisco, CA, United States,[4]Tahoe Fracture and Orthopaedic Clinic, Carson City, NV, United States*

36 **Stress Angle Device: A Novel System For Reproducing The Mechanical Conditions Associated With Regions Most Susceptible To Vascular Disease** SB³C2015-406
Steve Zambrano, Michael J. Draper, Brendan L. Swain, Caleb A. Davis, Michael R. Moreno, *Texas A&M University, Bryan, TX, United States*

37 **On The Characterization Of Mitral Valve Geometry And Development Of A Population-averaged Model** SB³C2015-1022
Amir Khalighi[1], Andrew Drach[1], Fleur ter Huurne[2], Chung-Hao Lee[1], Charles Bloodworth[3], Eric Pierce[3], Morten Jensen[3], Ajit Yoganathan[3], Michael Sacks[1], *[1]University of Texas at Austin, Austin, TX, United States,[2]Eindhoven University, Eindhoven, Netherlands,[3]Georgia Institute of Technology, Atlanta, GA, United States*

38 **Modeling the Mechanical Behavior of Polymeric Bioresorbable Stents: a Finite Element Approach** SB³C2015-658
Nic Debusschere, Patrick Segers, Peter Dubruel, Benedict Verhegghe, Matthieu De Beule, *Ghent University, Ghent, Belgium*

THURSDAY, JUNE 18 | 12:30pm - 2:30pm

Poster Session I — Neuromuscular Control and Motion Analysis — Event Center Tent

39 **Artificial Neural Networks for the Optimization of Ligament Stiffnesses in a Computational Foot/Ankle Model** SB³C2015-438
Ruchi Chande, Norma Ortiz-Robinson, Jennifer Wayne, *Virginia Commonwealth University, Richmond, VA, United States*

40 **Movement Analysis Based on the Separation of Angular Momentum: Gait Progression and Segment Rotation in Patients with TKA** SB³C2015-382
Brecca M. Gaffney[1], Will M. Johnston[1], Cory L. Christiansen[2], Jennifer E. Stevens-Lapsley[2], Kevin B. Shelburne[1], Bradley S. Davidson[1], *[1]University of Denver, Denver, CO, United States,[2]University of Colorado Denver, Aurora, CO, United States*

41 **A Description of Segmental Angular Momentum Synergies using Independent Component Analysis During Gait** SB³C2015-543
Brecca M. Gaffney[1], Cory L. Christiansen[2], Kevin B. Shelburne[1], Bradley S. Davidson[1], *[1]University of Denver, Denver, CO, United States,[2]University of Colorado Denver, Aurora, CO, United States*

42 **Joint Angle and Muscle Activity during Hippotherapy: A Case Study Using Motion Capture Analysis and EMG** SB³C2015-632
Mary C. Baker, Stephen Wester, Timothy Monday, *Texas Tech University, Lubbock, TX, United States*

43 **Changes In The Range Of Motion Envelope Of The Lumbar Spine With Repetitive Lifting** SB³C2015-618
Muhammad I. Gul[1], Timothy D. Craig[1], Neena K. Sharma[2], **Sara E. Wilson**[1], *[1]University of Kansas, Lawrence, KS, United States,[2]University of Kansas, Kansas City, KS, United States*

THURSDAY, JUNE 18 | 12:30pm - 2:30pm

Poster Session I — Best Practices in Biomechanics, Bioengineering, and Biotransport Education — Event Center Tent

44 **Best Practices in Teaching Biomechanics: Integrating Reflective Learning Activities** SB³C2015-138
Laurel Kuxhaus, *Clarkson University, Potsdam, NY, United States*

45 **Assessment of a Bioengineering Innovation Program for Middle School Girls** SB³C2015-577
Kristen Billiar[1], Amanda Reidinger[1], Jeanne Hubelbank[2], Helen Vassallo[1], *[1]Worcester Polytechnic Institute, Worcester, MA, United States,[2]Independent Program Evaluation Consultant, Sudbury, MA, United States*

46 **Teaching Undergraduate Design: An Approach Based on Industrial Experience** SB³C2015-118
Martin L. Tanaka, *Western Carolina University, Cullowhee, NC, United States*

47 **A Progress Report From a Multi-disciplinary Capstone Experience Involving Engineering and Business Students** SB³C2015-110
Alan Eberhardt, Joel Dobbs, *University of Alabama at Birmingham, Birmingham, AL, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — Cardiovascular Devices and Imaging in Fluid Mechanics — Event Center Tent

48 **Retrospective Analysis of Echocardiography in Those Suspected of Pulmonary Hypertension with Comparison to Right Heart Catheterization** SB³C2015-439
Travis B. Eason[1], Melinda V. Pyler[1], Lavanya Alapati[1], Sanjay Mehra[2], John M. Cahill[1], Stephanie M. George[1], *[1]East Carolina University, Greenville, NC, United States,[2]Vidant Medical Center, Greenville, NC, United States*

49 **The Influence Of Sub-Optimal Acquisition Delay In A C-arm Cone-Beam CT Perfusion Study** SB³C2015-1067
Antonius M. de Korte, Kajo van der Marel, Juyu Chueh, Olivia W. Brooks, Ajit S. Puri, Ajay K. Wakhloo, Matthew J. Gounis, *New England Center for Stroke Research, University of Massachusetts Medical School, Worcester, MA, United States*

50 **The Relationship Of Wall Shear Stress With Clinically Relevant Metrics In Pulmonary Arterial Hypertension** SB³C2015-648
Alifer D. Bordones[1,2], Vitaly O. Kheyfets[3], Ender A. Finol[1], *[1]University of Texas at San Antonio, San Antonio, TX, United States,[2]University of Texas Health Science Center at San Antonio, San Antonio, TX, United States,[3]University of Colorado, Denver, CO, United States*

51 **Quantitative Coronary Angiography Based Reconstructions for Wall Shear Stress Calculations in Bifurcations** SB³C2015-545
Jelle T. C. Schrauwen[1], Antonios Karanasos[1], Nienke S. Ditzhuijzen[1], Jean-Paul Aben[2], Jolanda J. Wentzel[1], Antonius F. W. van der Steen[1,3], Frank J. H. Gijsen[1], *[1]Thoraxcenter, Erasmus Medical Center, Rotterdam, Netherlands,[2]Pie Medical Imaging, Maastricht, Netherlands,[3]Delft University of Technology, Netherlands*

52 **Swirling Flows in Arterial Hemodynamics** SB³C2015-1072
Kartik Bulusu[1], Christopher Elkins[2], John Eaton[2], **Michael Plesniak**[1], *[1]George Washington University, Washington, DC, United States,[2]Stanford University, Stanford, CA, United States*

53 **Integrating an Open Source Meshing Alternative into SimVascular 2.0** SB³C2015-1062
Adam R. Updegrove[1], Nathan M. Wilson[2], Shawn C. Shadden[1], *[1]University of California, Berkeley, Berkeley, CA, United States,[2]Open Source Medical Software Corporation, Santa Monica, CA, United States*

54 **Microbubble Void Imaging - A Novel Technique For Flow Visualisation and Quantitative Assessment of Intravascular Mixing in Larger Vessels Using Ultrasound** SB³C2015-388
Chee Hau Leow, **Francesco Iori**, Richard W. Corbett, Neill Duncan, Colin G. Caro, Peter E. Vincent, Mengxing Tang, *Imperial College London, London, United Kingdom*

55 **In-vivo Validation Of The In Silico Predicted Pressure Drop Across An Arteriovenous Fistula** SB³C2015-536
Leonard Browne[1], Khalid Bashar[2], Philip Griffin[1], Eamon Kavanagh[2], Michael Walsh[1], *[1]University of Limerick, Limerick, Ireland,[2]Univeristy Hospital Limerick, Limerick, Ireland*

56 **Triangulated Surface Boolean Operations for Combining 2-D and 3-D Image Segmentation for Patient-Specific Blood Flow Analysis** SB³C2015-1052
Adam R. Updegrove[1], Nathan M. Wilson[2], Shawn C. Shadden[1], *[1]University of California, Berkeley, Berkeley, CA, United States,[2]Open Source Medical Software Corporation, Santa Monica, CA, United States*

57 **Role of Wall Thickness and Tethering in the Assessment of Arterial Stiffness** SB³C2015-156
Simona Hodis[1], Mair Zamir[2], *[1]Texas A&M University - Kingsville, Kingsville, TX, United States,[2]University of Western Ontario, London, ON, Canada*

58 **SimVascular 2.0: an Open Source Pipeline for Cardiovascular Modeling and Simulation** SB³C2015-656
Hongzhi Lan[1], Nathan M. Wilson[2], Daniele Schiavazzi[1], Jameson Merkow[1], Adam Updegrove[3], Shawn C. Shadden[3], Alison L. Marsden[1], *[1]University of California - San Diego, La Jolla, CA, United States,[2]Open Source Medical Software Corporation, Los Angeles, CA, United States,[3]University of California - Berkeley, Berkeley, CA, United States*

59 **Nt-proBNP Expression Originating From The RV Myocardium In Pediatric Pulmonary Hypertension Patients Is Correlated With Both The Reactive And Resistive Components Of Vascular Impedance** SB³C2015-1130
Vitaly O. Kheyfets[1], Jamie Dunning[1], Uyen Truong[2], Kendall Hunter[1], Dunbar Ivy[2], Robin Shandas[1], *[1]University of Colorado, Aurora, CO, United States,[2]Children's Hospital Colorado, Aurora, CO, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — Embryonic, Pediatric Cardiology, and Other Fluid Mechanics — Event Center Tent

60 **Valveless Flow in a Thick Elastic Tube** SB³C2015-582
Pavel Kozlovsky[1], Moshe Rosenfeld[1], Ariel Jaffa[2], **David Elad**[1], *[1]Tel Aviv Univesity, Tel Aviv, Israel,[2]Tel Aviv Medical Center, Tel Aviv, Israel*

61 **Prediction of Downstream Velocity Waveforms for In Vitro Aortic Flow Experiments** SB³C2015-229
Rafeed A. Chaudhury, Justin R. Ryan, David H. Frakes, Ronald J. Adrian, *Arizona State University, Tempe, AZ, United States*

62 **In Vitro Optimization Of The Nozzle Used In Assisted Bidirectional Glenn Procedure For Single Ventricle Stage 1 Palliation** SB³C2015-626
Jian Zhou[1], Mahdi Esmaily-Moghadam[2], Timothy Conover[1], Tain-Yen Hsia[3], Alison Marsden[4], **Richard Figliola**[1], *[1]Clemson University, Clemson, SC, United States,[2]Stanford University, Palo Alto, CA, United States,[3]Great Ormond Street Hospital, London, United Kingdom,[4]University of California, San Diego, La Jolla, CA, United States*

63 **Mean Flow Umbilical Doppler Indices Perform Better Than Pulsatility Indices In Determining Small For Gestational Age Pregnancies** SB³C2015-201
Shier Nee Saw[1], Citra Nurfarah Zaini Mattar[2], Seow Heong Yeo[3], Shu-E Soh[4,5], Yap-Seng Chong[2,6], Peter David Gluckman[6,7], Keith Godfrey[8], Seang Mei Saw[5,9], Arijit Biswas[2], **Choon Hwai Yap**[1], *[1]National University of Singapore, Singapore,[2]Yong Loo Lin School of Medicine, NUS & NUHS, Singapore,[3]KK Women's and Children's Hospital, Singapore,[4]Yong Loo Lin School of Medicine, NUS, Singapore,[5]Saw Swee Hock School of Public Health, NUS, Singapore,[6]Singapore Institute for Clinical Sciences, A*STAR, Singapore,[7]Liggins Institute, University of Auckland, Auckland, New Zealand,[8]University of Southampton & University Hospital Southampton NHS Foundation Trust, Southampton, United Kingdom,[9]Singapore Eye Research Institute, Singapore*

64 **Accounting For Clinical Data Uncertainty In Multiscale Numerical Simulation Of Single Ventricle Palliation Surgery** SB³C2015-309
Daniele E. Schiavazzi[1], Tain-Yen Hsia[2], Alison L. Marsden[1], *[1]University of California at San Diego, San Diego, CA, United States,[2]Great Ormond Street Hospital for Children and UCL Institute of Cardiovascular Science, London, United Kingdom*

65 **Automated Tuning for Parameter Identification in Multi-scale Coronary Simulations** SB³C2015-541
Justin S. Tran, Daniele Schiavazzi, Abhay Ramachandra, Andrew Kahn, Alison Marsden, *University of California, San Diego, La Jolla, CA, United States*

66 **Investigating Environmental Causes of Congenital Heart Diseases: A Subject-Specific Computational Fluid Dynamics Study** SB³C2015-204
Venkat Keshav Chivukula[1], Sevan Goenezen[2], Sandra Rugonyi[1], *[1]Oregon Health and Sciences University, Portland, OR, United States,[2]Texas A&M University, College Station, TX, United States*

67 **Characterization of Transition to Turbulence for Blood in an S-Shaped Pipe Under Steady Flow Conditions** SB³C2015-1053
Dipankar Biswas[1], David M. Casey[1], Douglas C. Crowder[1], Kristian Valen-Sendstad[2], David A. Steinman[2], Yang H. Yun[1], Francis Loth[1], *[1]The University of Akron, Akron, OH, United States,[2]University of Toronto, Toronto, ON, Canada*

68 **Quantitative Analysis Of Heart Function In Embryonic Zebrafish: Retrograde Flow In The Atrioventricular Junction** SB³C2015-661
Alexander T. Bulk, David L. Bark Jr., Brennan Johnson, Deborah Gogarty, **Lakshmi P. D. Dasi**, *Colorado State University, Fort Collins, CO, United States*

69 **The Impact of Parameter Variation, Experimental Data and Uncertainty Quantification for Complex Biomechanical Problems Examplified for AAA** SB³C2015-364
Wolfgang A. Wall, Jonas Biehler, Michael W. Gee, *Technische Universität München, Garching b. München, Germany*

70 **Novel Method For 3D Reconstruction Of The Chick Embryo Cardiovascular Anatomy From Non-invasive Ultrasound Scans For Longitudinal Studies** SB³C2015-109
Germaine X. Y. Tan[1], Muhammad Jamil[1], Nicole G. Z. Tee[2], Liang Zhong[1,2], **Choon Hwai Yap**[1], *[1]National University of Singapore, Singapore,[2]National Heart Centre Singapore, Singapore*

71 **Investigating The Two-phase Nature Of Blood Flow** SB³C2015-1102
Joseph M. Sherwood[1], Xuejin Li[2], George Karniadakis[2], Stavroula Balabani[3], *[1]Imperial College London, London, United Kingdom,[2]Brown University, Providence, RI, United States,[3]University College London, London, United Kingdom*

72 **Tissue Hypoxia and Murray's Law of Minimum Work Control Neovascular Growth and Remodeling** SB³C2015-1176
Sean Moore, David Hoelzle, **Joel D. Boerckel**, *University of Notre Dame, Notre Dame, IN, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — MS Competition - Biofluid Mechanics — Event Center Tent

73 **Elevated Wall Shear Stress Predicts Branch Graft Failure Following Chimney Endovascular Aortic Aneurysm Repair** SB³C2015-443
Rosamaria Tricarico[1], He Yong[1,2], Adam Beck[1], Salvatore Scali[1,2], Roger Tran-Son-Tay[1], Scott Berceli[1,2], *[1]University of Florida, Gainesville, FL, United States,[2]North Florida/South Georgia Veterans Health System, Gainesville, FL, United States*

74 **Better Assessment Of Arteriovenous Fistula Patency Using Functional Diagnostic Endpoints** SB³C2015-442
Krishna Subramony Anantha, Ehsan Rajabi-Jaghargh, Rupak Banerjee, *University of Cincinnati, Cincinnati, OH, United States*

75 **Establishing In Vivo Hemodynamic Baseline In A Normotensive Rat Model** SB³C2015-1059
Daniela Velez-Rendon, Erica R. Pursell, Daniela Valdez-Jasso, *University of Illinois at Chicago, Chicago, IL, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — MS Competition - Biotransport — Event Center Tent

76 **Imaging Processing Algorithms For Detecting Subtle Morphological Changes In Mole Images Over Time** SB³C2015-235
Alireza Chamani[1], Neera Nathan[2], Thomas Hornyak[3], Liang Zhu[1], *[1]University of Maryland Baltimore County, Baltimore, MD, United States,[2]National Cancer Institute / NIH, Bethesda, MD, United States,[3]University of Maryland at Baltimore, Baltimore, MD, United States*

77 **Evaluating the Influence of Tissue Properties on the Core Temperature Using a 3D Whole Body Model** SB³C2015-1037
Robins T. Kalathil[1], Swarup Zachariah[1], Amit Bhattacharya[2], Rupak Banerjee[1], *[1]University of Cincinnati, Cincinnati, OH, United States,[2]University of Cincinnati College of Medicine, Cincinnati, OH, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — MS Competition - Cellular and Tissue Engineering — Event Center Tent

78 **Individual Cell-Based Morphological Analysis to Determine Chirality of Epithelial Morphogenesis** SB³C2015-371
Michael J. Raymond, Poulomi Ray, Leo Wan, *Rensselaer Polytechnic Institute, Troy, NY, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — MS Competition - Design and Devices — Event Center Tent

79 **Fetal Monitoring with Silicone Nanocomposite Strain Gauges** SB[3]C2015-334
Daniel Baradoy, Anton Bowden, David Fullwood, *Brigham Young University, Provo, UT, United States*

80 **Development of 3D Printed Patient Specific Ascending Aortic Training Models for Cardiac Surgery** SB[3]C2015-446
ZhiLin Yang[1], Justine Garcia[1], Kevin Lachapelle[2], Rosaire Mongrain[1], Richard L. Leask[1], *[1]McGill University, Montreal, QC, Canada,[2]Royal Victoria Hospital, Montreal, QC, Canada*

81 **Image-based 3D Morphometric Analysis of the Clavicle Intramedullary Canal in Male Population** SB[3]C2015-494
Jazmine Aira[1,2], Sergio Gutierrez[2], Brandon G. Santoni[1,2], Mark A. Frankle[1,3], Peter Simon[1,2], *[1]University of South Florida, Tampa, FL, United States,[2]Foundation for Orthopaedic Research and Education, Tampa, FL, United States,[3]Florida Orthopaedic Institute, Tampa, FL, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — MS Competition - Human Dynamics — Event Center Tent

82 **Pseudo-Rigid Body Method for Reducing Soft Tissue Artifact: Validation and Application to Gait** SB[3]C2015-1147
Jake Deschamps, Karim Dudum, Eshan Dandekar, Scott Hazelwood, Stephen Klisch, *California Polytechnic State University, San Luis Obispo, CA, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — MS Competition - Injury — Event Center Tent

83 **Assessing Head Impact Sensor Validity in the Laboratory** SB[3]C2015-631
Abigail M. Zadnik, Steven Rowson, Stefan M. Duma, *Virginia Tech, Blacksburg, VA, United States*

84 **Acute Failure Modes in Small Diameter Spinal Segments** SB[3]C2015-282
Aubrie L. Taylor, Cassandra Bell, Anton E. Bowden, *Brigham Young University, Provo, UT, United States*

85 **Human Knee Joint Finite Element Model Using a Two Bundle Anterior Cruciate Ligament: Validation and Gait Analysis** SB[3]C2015-610
Nicholas A. Czapla[1], Meghan K. Sylvia[1], Zachary F. Lerner[2], David J. Tuttle[3], Otto S. Schueckler[4], Scott J. Hazelwood[1], Stephen M. Klisch[1], *[1]California Polytechnic State University at San Luis Obispo, San Luis Obispos, CA, United States,[2]Colorado State University at Fort Collins, Fort Collins, CO, United States,[3]Radiology Associates, Inc., San Luis Obispos, CA, United States,[4]Central Coast Orthopedic Medical Group, San Luis Obispos, CA, United States*

86 **Quantifying Head Impact Exposure in Collegiate Women's Soccer** SB[3]C2015-555
Jaclyn Press, Steven Rowson, *Virginia Tech, Blacksburg, VA, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — MS Competition - Tissue Mechanics — Event Center Tent

87 **Development of a Human Knee Joint Finite Element Model to Investigate Cartilage Stress During Walking in Obese and Normal Weight Adults** SB³C2015-611
Meghan Sylvia[1], Nicholas Czapla[1], Zachary Lerner[2], David Tuttle[3], Otto Schueckler[4], Scott Hazelwood[1], Stephen Klisch[1], *[1]California Polytechnic State University, San Luis Obispo, San Luis Obispo, CA, United States,[2]Colorado State University, Fort Collins, Fort Collins, CO, United States,[3]Radiology Associates, Inc., San Luis Obispo, CA, United States,[4]Central Coast Orthopedic Medical Group, San Luis Obispo, CA, United States*

88 **Accurate Prediction of Collagen Fiber Distribution using FFT: A Validation Study** SB³C2015-431
Erica E. Morrill, Christina Stender, Roshani Lamichhane, Raquel Brown, Trevor Lujan, *Boise State University, Boise, ID, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — Joint and Spine Mechanics — Event Center Tent

89 **Influence of Bone Density and Insertion Angle on Fixation Strength of Pedicle Screws** SB³C2015-186
Giovanni Solitro, **Farid Amirouche**, Brenden Magnan, *University of Illinois at Chicago, Chicago, IL, United States*

90 **An Open-source Toolbox for Surrogate Modeling of Joint Contact Mechanics** SB³C2015-578
Ilan Eskinazi, Benjamin J. Fregly, *University of Florida, Gainesville, FL, United States*

91 **Effect Of Axial Compression Preload On Intervertebral Disc Torsional Mechanics** SB³C2015-127
Semih E. Bezci, **Grace D. O'Connell**, *University of California, Berkeley, Berkeley, CA, United States*

92 **Using Dynamic Community Detection to Map Collagen Fiber Network Reorganization During Tensile Loading of the Human Facet Capsular Ligament** SB³C2015-115
Sijia Zhang, Danielle Bassett, Beth Winkelstein, *University of Pennsylvania, Philadelphia, PA, United States*

93 **Application of a Novel Robotically Simulated Pivot Shift for Anterior Cruciate Ligament Reconstruction: Comparison of the All-Epiphyseal and Over-The-Top Techniques** SB³C2015-500
Robb Colbrunn, Tara Bonner, Joel Kolmodin, Paul Saluan, *Cleveland Clinic, Cleveland, OH, United States*

94 **Effect Of Sacroiliac Joint Fixation On Segmental Kinematics Of Lumbar Spine: A Finite Element Analysis** SB³C2015-1146
Ali Kiapour[1], Derek Lindsey[2], Scott Yerby[2], Vijay Goel[1], *[1]ECORE, Toledo, OH, United States,[2]Si-Bone Inc, San Jose, CA, United States*

95 **Effect of Variability in Anatomical Landmarks on Ankle Kinematic Descriptions** SB³C2015-513
Ednah G. Louie, Fallon G. Fitzwater, Matthew H. Dickinson, William M. Eboch, Bardiya Akhbari, Lorin P. Maletsky, *University of Kansas, Lawrence, KS, United States*

96 **Biomechanical Evaluation of Proximal Junctional Failure and Kyphosis in Lumbar Spinal Fusion Surgery** SB³C2015-155
Won Man Park[1], Kyungsoo Kim[1], Yongjung J. Kim[2], **Yoon Hyuk Kim**[1], *[1]Kyung Hee University, Yongin, Korea, Republic of,[2]Columbia University College of Physicians and Surgeons, New York, NY, United States*

97 **Biomechanical Comparison Between Facet Sparing Laminectomy and Laminectomy with Facetectomy in Lumbar Spine: A Finite Element Analysis** SB³C2015-653
Shady Elmasry[1], Shihab Asfour[1], Joseph Gjolaj[2], Loren Latta[2], Frank Eismont[2], **Francesco Travascio**[1], *[1]University of Miami, Coral Gables, FL, United States,[2]University of Miami, Miami, FL, United States*

98 **Open Knee(s): Comprehensive Tibiofemoral Joint Testing For Specimen-specific Next Generation Knee Models** SB³C2015-530
Tara F. Bonner, Robb W. Colbrunn, Snehal Chokhandre, Craig Bennetts, Ahmet Erdemir, *Cleveland Clinic, Cleveland, OH, United States*

99 **Applying Mean Soft Tissue Properties To A Subpopulation Of Knee Models Reveals Inability To Capture Variations In Knee Stability** SB³C2015-613
Kevin Schafer, Mohammad Kia, Daniel Green, Andrew Pearle, Thomas Wickiewicz, Timothy Wright, **Carl Imhauser**, *Hospital for Special Surgery, New York, NY, United States*

100 **2D/3D Registration To Find Host Bone Coverage Of Rsa Implants** SB³C2015-1156
Jonathan W. Keimel[1], Kristi L. Krebes[1], **Andres F. Cabezas**[1], Adam Lorenzetti[2], Brandon G. Santoni[3], Mark A. Frankle[2], Peter Simon[4], *[1]University of South Florida, Clearwater, FL, United States,[2]Florida Orthopaedic Institute, Tampa, FL, United States,[3]Foundation for Orthopaedic Research and Education, Clearwater, FL, United States,[4]Foundation for Orthopaedic Research and Education, Tampa, FL, United States*

101 **Do External Load Measures Predict Knee Contact Force Changes Due To Weight Loss?** SB³C2015-1158
Nathan R. Sauder[1], James C. Coburn[2], Melinda K. Harman[3], Heather K. Vincent[4], Darryl D. D'Lima[5], Benjamin J. Fregly[1], *[1]University of Florida, Gainesville, FL, United States,[2]Center for Devices and Radiological Health, Food and Drug Administration, Silver Spring, MD, United States,[3]Clemson University, Clemson, SC, United States,[4]University of Florida, Gainesville, FL, United States,[5]Shiley Center for Orthopaedic Research & Education, Scripps Clinic, La Jolla, CA, United States*

102 **Mechanical Characterization and a Computational Wear Model for Polycarbonate Urethane as a Bearing Material** SB³C2015-396
Hannah Gramling, Amrita Srinivasan, Lisa Pruitt, *University of California, Berkeley, Berkeley, CA, United States*

103 **Does the Cylindrical or Spherical Axis More Accurately Locate the Flexion-Extension Axis of the Tibia of the Natural Knee?** SB³C2015-349
Abheetinder S. Brar[1], Stephen M. Howell[1], Maury L. Hull[1], Mohamed R. Mahfouz[2], *[1]University of California, Davis, Davis, CA, United States,[2]University of Tennessee, Knoxville, TN, United States*

104 **Development Of A Finite Element Model Of The Pediatric Occipito-atlantoaxial Complex For Studying Osodontoideum And Atlanto-occipital Dislocation** SB³C2015-1070
Rinchen Phuntsok[1,2], Marcus D. Mazur[1,3], Vijay M. Ravindra[1,3], Douglas L. Brockmeyer[1,3], Benjamin J. Ellis[2,3], *[1]University of Utah, Salt Lake City, UT, United States,[2]Scientific Computing and Imaging, Salt Lake City, UT, United States,[3]Salt Lake City, UT, United States*

105 **A Hybrid Risk Model for Hip Fracture Prediction using Clinical and Stochastic Finite Element Data** SB³C2015-293
Peng Jiang, Samy Missoum, Zhao Chen, *University of Arizona, Tucson, AZ, United States*

106 **The Effect of Muscle Loading on Ankle Joint Complex Kinematics and Achilles Load: A Cadaveric Study** SB³C2015-525
Bardiya Akhbari, Matthew H. Dickinson, Ednah G. Louie, Sami Shalhoub, Lorin P. Maletsky, *University of Kansas, Lawrence, KS, United States*

107 **The Hip Joint Estimates from Skin-Marker-Based Methods Do Not Correspond with Measurements using Dual Fluoroscopy** SB³C2015-1094
Niccolo M. Fiorentino, Penny R. Atkins, Michael J. Kutschke, Ashley L. Kapron, K. Bo Foreman, Andrew E. Anderson, *University of Utah, Salt Lake City, UT, United States*

109 **Effect Of Interspinous Device On Lumbar Spine: A Finite Element Study** SB³C2015-1035
Deniz U. Erbulut, Iman Zafarparandeh, Chaudhry R. Hassan, Ismail Lazolu, Ali F. Ozer, *Koc University, Istanbul, Turkey*

110 **The Effects Of Axial Compressive Loading On The Intersegmental Rotation Of A Virtual Cervical Spine** SB³C2015-308
Ryan J. Moss, Kevin M. Bell, *Orthopaedic Robotics Laboratory, Pittsburgh, PA, United States*

111 **A Computational Method for Visualizing Femoral Range of Motion for Patients with Slipped Capital Femoral Epiphysis** SB³C2015-384
Ferris Pfeiffer, David Tager, Sumit Gupta, *University of Missouri, Columbia, MO, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — Tissue Mechanics - General — Event Center Tent

112 **Extracting Mechanical Properties Of The Corneoscleral Shell From Whole Eye Perfusions** SB³C2015-629
Joseph M. Sherwood[1], Ester Reina-Torres[1], Jacques Bertrand[1], C. Ross Ethier[2], Darryl Overby[1], *[1]Imperial College London, London, United Kingdom,[2]Georgia Institute of Technology/Emory, Atlanta, GA, United States*

113 **Strain Rate Dependency Of The Intracellular Calcium Ion Concentration During Neuronal Membrane Mechanoporation** SB³C2015-621
Amirhamed Bakhtiarydavijani[1], Anna E. Florence[1], Michael A. Murphy[1], Sungkwang Mun[1], Jun Liao[1], Lakiesha N. Williams[1], M. F. Horstemeyer[1], Michelle C. LaPlaca[2], Raj Prabhu[1], *[1]Mississipi State University, Starkville, MS, United States,[2]Georgia Institute of Technology, Atlanta, GA, United States*

114 **Quasilinear and Non-Quasilinear Viscoelastic Behavior of Collagen Gels During Stress Relaxation** SB³C2015-551
Christopher E. Korenczuk[1], Victor K. Lai[2], Victor H. Barocas[1], *[1]University of Minnesota, Minneapolis, MN, United States,[2]University of Minnesota Duluth, Duluth, MN, United States*

115 **Direct Estimation of Three-dimensional Deformation Gradient Tensors from Volumetric Ultrasound Data** SB³C2015-671
John J. Boyle[1], Roger Rowe[1], Frederick Damen[2], Arvin Soepriatna[2], Robert B. Pless[1], Craig Goergen[2], Stavros Thomopoulos[1], Guy M. Genin[1], *[1]Washington University in St Louis, Saint Louis, MO, United States,[2]Purdue University, West Lafayette, IN, United States*

116 **A Structural Constitutive Model for the Active and Passive Behavior of Biological Tissues** SB³C2015-330
Ting Tan, **Raffaella De Vita**, *Virginia Tech, Blacksburg, VA, United States*

117 **Computational Modeling Of Synthetic Mesh Materials: Simulation And Experimental Assesment Of Model Predictions** SB³C2015-511
William R. Barone[1], Katrina M. Knight[1], Pamela A. Moalli[2], Steven D. Abramowitch[1], *[1]University of Pittsburgh, Pittsburgh, PA, United States,[2]Magee-Womens Research Institute, University of Pittsburgh, Pittsburgh, PA, United States*

118 **Tough, Self-recovering Hydrogels Inspired By Caddisfly Silk** SB³C2015-337
Dwight D. Lane, G. Mahika Weerasekare, Sarbjit Kaur, Russell J. Stewart, *University of Utah, Salt Lake City, UT, United States*

119 **Determining The Compressive Modulus Of Mouse Trabecular Meshwork With Atomic Force Microscopy** SB³C2015-1047
Ke Wang, Todd Sulchek, C. Ross Ethier, *Georgia Institute of Technology, Atlanta, GA, United States*

120 **Development of Shoe Sole Design Using Material Natural Frequencies** SB³C2015-251
Brett D. Steineman[1], Ted Barber[2], Tammy L. Haut Donahue[1], *[1]Colorado State University, Fort Collins, CO, United States,[2]Pearl Izumi, Inc., Louisville, CO, United States*

121 **The Need for Validation in Soft Tissue Constitutive Models** SB³C2015-1058
Sandeep Madireddy, Kumar Vemaganti, *University of Cincinnati, Cincinnati, OH, United States*

122 **A Computational Study of A Simple, Transversely Isotropic Model of Soft Tissue, with Shear and Tensile Anisotropy, in Large Strain** SB³C2015-202
Yuan Feng[1], Ruth J. Okamoto[2], Guy M. Genin[2], Larry A. Taber[2], Philip V. Bayly[2], *[1]Soochow University, Suzhou, China,[2]Washington University in St. Louis, St. Louis, MO, United States*

123 **Development Of A Clinical Ultrasound Technique for Analysis of Protein Content Within Hydrogel** SB³C2015-1109
Jessica Stukel[1], Monika Goss[2], Agata Exner[2], Rebecca Willits[1], *[1]The University of Akron, Akron, OH, United States,[2]Case Western Reserve University, Cleveland, OH, United States*

124 **Validation Of High Rate Strip Biaxial Tension Deformations Of The Neuronal Phospholipid Bilayer Using Empirical Data** SB³C2015-1120
M. A. Murphy[1], M. F. Horstemeyer[1], Steven R. Gwaltney[1], Tonya W. Stone[1], Michelle C. LaPlaca[2], Jun Liao[1], Lakiesha N. Williams[1], **R. Prabhu**[1], *[1]Mississippi State, MS, United States,[2]Georgia Institute of Technology, Atlanta, GA, United States*

125 **Collective Chiral Rotation of Epithelial Microtissues Within a Three-Dimensional Matrigel System** SB³C2015-232
Amanda S. Chin, Kathryn E. Worley, Leo Q. Wan, *Rensselaer Polytechnic Institute, Troy, NY, United States*

126 **Finite Element Model of Cervical Pessary in Use: Evaluating Mechanical Interventions for Preterm Birth** SB³C2015-490
Michael J. Fernandez[1], Michael D. House[2], Noelia M. Zork[3], Joy S. Vink[3], Ronald J. Wapner[3], Sachin R. Jambawalikar[3], Kristin M. Myers[1], *[1]Columbia University, New York, NY, United States,[2]Tufts Medical Center, Boston, MA, United States,[3]Columbia University Medical Center, New York, NY, United States*

127 **Impact of Urinary Bladder Matrix on Vaginal Smooth Muscle Function and Structure in the Nonhuman Primate Model** SB³C2015-164
Katrina Knight[1], Zegbeh Jallah[1], Rui Liang[2], Stacy Palcsey[2], Pamela Moalli[1,2], Steven Abramowitch[1,2], *[1]Musculoskeletal Research Center, University of Pittsburgh, Pittsburgh, PA, United States,[2]Magee-Womens Research Institute, Magee-Womens Hospital, Pittsburgh, PA, United States*

128 **Biaxial Creep of Swine Cardinal and Uterosacral Ligaments** SB³C2015-299
Ting Tan, Nathan M. Cholewa, Scott W. Case, **Raffaella De Vita**, *Virginia Tech, Blacksburg, VA, United States*

129 **Characterization of Soft Tissue Microstructure via Transmural SALS** SB³C2015-1044
John G. Lesicko, Kristen R. Feaver, Michael S. Sacks, *University of Texas at Austin, Austin, TX, United States*

130 **Finite Element Modeling of the Posterior Eye in Microgravity** SB³C2015-348
Andrew Feola[1], Julia Raykin[1], Lealem Mulugeta[2], Rudolph Gleason[1], Jerry G. Myers[3], Emily S. Nelson[3], Brian Samuels[4], Ross Ethier[1], *[1]Georgia Institute of Technology, Atlanta, GA, United States,[2]Universities Space Research Association, Houston, TX, United States,[3]NASA Glenn Research Center, Cleveland, OH, United States,[4]University of Alabama at Birmingham, Birmingham, AL, United States*

131 **Posterior Scleral Stiffening: How is Scleral Canal Expansion Affected by the Size of Stiffening Region?** SB³C2015-1048
Ian C. Campbell[1,2], Baptiste Coudrillier[1], C. Ross Ethier[1,2], *[1]Georgia Institute of Technology/Emory University, Atlanta, GA, United States,[2]Atlanta VA Medical Center, Decatur, GA, United States*

132 **Biomechanical Behavior Of Cornea When Subjected To Tension And Compression Loads** SB³C2015-1076
Hamed Hatami-Marbini, *Oklahoma State University, Stillwater, OK, United States*

133 **Correlating Urethral Rupture with Distension of the Urethra during the Inflation of a Misplaced Transurethral Catheter Balloon** SB³C2015-370
Connor V. Cunnane, *University of Limerick, Limerick, Ireland*

134 **Tuning Silk Fibroin Hydrogels: Genipin Crosslinking Pre-gelation Decreases Time-dependent Properties** SB³C2015-1125
Winston H. Elliott[1], Walter Bonani[2,3], Devid Maniglio[2,3], Antonella Motta[2,3], Wei Tan[1], Claudio Migliaresi[2,3], *[1]University of Colorado- Boulder, Boulder, CO, United States,[2]University of Trento, Trento, Italy,[3]European Institute of Excellence on Tissue Engineering and Regenerative Medicine, and INSTM Trento Research Unit, Trento, Italy*

135 **Spherical Shell Mechanical Model of the Pacinian Corpuscle** SB³C2015-411
Julia C. Quindlen, Henryk K. Stolarski, Victor H. Barocas, *University of Minnesota, Minneapolis, MN, United States*

136 **Measuring Tortuosity Changes due to Central Retinal Vein Occlusion** SB³C2015-1182
Kendall McMillan[1], Shaun Evans[1], Gil Binenbaum[2], Brittany Coats[1], *[1]University of Utah, Salt Lake City, UT, United States,[2]The Children's Hospital of Philadelphia, Philadelphia, PA, United States*

138 **Mechanical Properties Of Human Placenta In Normal Pregnancies And During Intrauterine Growth Restriction** SB³C2015-206
Jeanette Shifen Lau, Shier Nee Saw, Martin Lindsay Buist, **Choon Hwai Yap**, *National University of Singapore, Singapore*

139 **Determination of the Mechanical Properties of the Iris Using Inverse Finite Element Modeling** SB³C2015-424
Anup D. Pant, Rouzbeh Amini, *The University of Akron, Akron, OH, United States*

140 **A Poroelastic High Fidelity Finite Element Model Of The Osteochondral Unit To Evaluate Changes In Permeability With Osteoarthritis** SB³C2015-144
Michael E. Stender, Richard A. Regueiro, Virginia L. Ferguson, *University of Colorado, Boulder, Boulder, CO, United States*

141 **The Effects Of Stress State On The Mechanical Response And Failure Of The Neuronal Phospholipid Bilayer: A Molecular Dynamics Study** SB³C2015-1132
M. A. Murphy[1], M. F. Horstemeyer[1], Steven R. Gwaltney[1], Tonya W. Stone[1], Michelle C. LaPlaca[2], Jun Liao[1], Lakiesha N. Williams[1], **R. Prabhu**[1], *[1]Mississippi State, MS, United States,[2]Georgia Institute of Technology, Atlanta, GA, United States*

142 **Racial Differences In The Load-dependent Area Of The Lamina Cribrosa** SB³C2015-1172
Stephen J. Howerton, Forest L. Danford, Jonathan P. Vande Geest, Avinash Ayyalasomayajula, *The University of Arizona, Tucson, AZ, United States*

143 **Optic Nerve Sheath Mechanics in VIIP Syndrome** SB³C2015-488
Julia Raykin[1], Andrew Feola[1], Rudy Gleason[1], Lealem Mulugeta[2], Jerry Myers[3], Emily Nelson[3], Brian Samuels[4], C. Ross Ethier[1], *[1]Georgia Institute of Technology, Atlanta, GA, United States,[2]Universities Space Research Association, Houston, TX, United States,[3]NASA Glenn Research Center, Cleveland, OH, United States,[4]University of Alabama at Birmingham, Birmingham, AL, United States*

144 **Modeling the Biaxial Mechanics of Brain White Matter** SB³C2015-177
Kevin M. Labus[1], José J. García[2], Christian M. Puttlitz[1], *[1]Colorado State University, Fort Collins, CO, United States,[2]Universidad del Valle, Cali, Colombia*

145 **An In Silico Biomechanical Analysis of the Stent-Esophagus Interaction.** SB³C2015-365
Mathias Peirlinck[1], Benedict Verhegghe[1,2], Patrick Segers[1], Matthieu De Beule[1,2], *[1]Ghent University, Ghent, Belgium,[2]FEops bvba, Ghent, Belgium*

THURSDAY, JUNE 18 | 12:30pm - 2:30pm

Poster Session I — Bone Biomechanics — Event Center Tent

146 **Fabrication And Characterization Of Artificial Bone-cartilage Tissue Construction Using Mesenchymal Stem Cells** SB³C2015-207
Takaaki Arahira, *Fukuoka Dental College, Fukuoka, Japan*

147 **Mechanical Analysis of Bone Tissue as Mineral and Organic Composite by Raman Spectroscopy** SB³C2015-447
Masahiro Todoh, Shigeru Tadano, *Hokkaido University, Sapporo, Japan*

148 **The Effect of Pore Size on Bone Strain in the Proximal Femur** SB³C2015-1167
Mariana Kersh[1], Afrodite Zendelli[2], Yohann Bala[2], Ali Ghasem-Zadeh[2], Ego Seeman[2], Roger Zebaze[2], *[1]University of Illinois, Urbana, IL, United States,[2]Austin Health, Heidelberg, Australia*

149 **Multimodal Assessment of Bone Quality of the Human Rib** SB³C2015-38
Lauren M. Mangano[1], Jean-Paul Roux[2], François Duboeuf[2], Delphine Farlay[2], David Mitton[3], Hélène Follet[2], *[1]Boston University, Brookline, MA, United States,[2]INSERM, Université Lyon 1, Lyon, France,[3]IFSTTAR, Université Lyon 1, Bron, France*

150 **The Characterization Of The Bone Marrow Mechanical Environment Using Poroelastic Finite Element Models** SB³C2015-1116
Joshua Gargac, Thomas Metzger, Tyler Kreipke, Hansel Weihs, Glen Niebur, *University of Notre Dame, South Bend, IN, United States*

151 **Spring Mediated Cranioplasty: a Patient Specific Numerical Model** SB³C2015-210
Alessandro Borghi[1], Silvia Schievano[1], William Rodgers[1], Freida Angullia[2], Allan Ponniah[2], David Dunaway[2], Owase Jeelani[2], *[1]University College London, London, United Kingdom,[2]Great Ormond Street Hospital, London, United Kingdom*

152 **Preliminary Finite Element Analysis of Subchondral Bone Cysts in the Stifle of the Horse** SB³C2015-393
Lance F. Frazer[1], Kenneth Fischer[1], Garrett Noble[2], Elizabeth Santschi[3], *[1]University of Kansas, Lawrence, KS, United States,[2]Ohio State University, Columbus, OH, United States,[3]Kansas State University, Manhattan, KS, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — Fabrication and Manipulation of the Cellular Microenvironment — Event Center Tent

153 **Mechanics of Interstitial Growth in Enzymatically Degradable Hydrogels: Characterization of Degradation Front** SB³C2015-1124
Umut Akalp, Stephanie J. Bryant, Stacey C. Skaalure, Franck J. Vernerey, *University of Colorado at Boulder, Boulder, CO, United States*

154 **Microgeometry and Microenvironment of Mitral Valve Interstitial Cells Under Physiological Loads** SB³C2015-287
Salma Ayoub, Chung-Hao Lee, Michael S. Sacks, *The University of Texas at Austin, Austin, TX, United States*

155 **Understanding and Optimizing Electrical Stimulation of Neurons for Improving Regeneration: A Finite Element Simulation with Experimental Verification** SB³C2015-520
Robert D. Adams[1], Rebecca K. Willits[2], Amy B. Harkins[1], *[1]Saint Louis University, Saint Louis, MO, United States,[2]University of Akron, Akron, OH, United States*

156 **Schwann Cell Proliferation in Scaffolds with Decoupled Mechanical and Biochemical Properties** SB³C2015-428
Jessica Stukel, Wenda Zhou, Rebecca Willits, *The University of Akron, Akron, OH, United States*

157 **Wrinkled, Wavelength-Tunable Graphene-Based Surface Topographies for Directing Cell Alignment and Morphology** SB³C2015-297
Daniel F. Tonderys, *Brown University, Providence, RI, United States*

158 **Biomimetic Ex Vivo Model for Tracking Stem Cells During Microvascular Network Growth** SB³C2015-1100
Mohammad S. Azimi, Amy L. Strong, Theresa B. Phamduy, Douglas B. Chrisey, Bruce A. Bunnell, Walter L. Murfee, *Tulane University, New Orleans, LA, United States*

THURSDAY, JUNE 18	12:30pm - 2:30pm

Poster Session I — Multi-Scale Mechanics in Cell and Tissue Engineering — Event Center Tent

159 **Optimization of Test Methods and Burst Property Characterization of Alginate Hydrogel Lung Sealants** SB³C2015-630
Patrick N. Charron, Spencer L. Fenn, Rachael A. Oldinski, *University of Vermont, Burlington, VT, United States*

160 **Numerical Simulations of Fibrous Biomaterial with Randomly Distributed Fiber Network** SB³C2015-130
Tao Jin, Ilinca Stanciulescu, *Rice University, Houston, TX, United States*

161 **Using Simulations with Realistic Fibrous Network Geometry to Find the Achievable Range of Mechanical Behaviors of Elastomeric Scaffolds** SB³C2015-535
James B. Carleton, Gregory J. Rodin, Michael S. Sacks, *University of Texas at Austin, Austin, TX, United States*

162 **A Strain Based Approach To Quantify Non-affine Behavior Of Three Dimensional Random Network** SB³C2015-1080
Hamed Hatami-Marbini, *Oklahoma State University, Stillwater, OK, United States*

163 **Empirically Determined Vascular Smooth Muscle Mechano-adaptation Laws** SB³C2015-275
Kerianne E. Steucke, Patrick W. Alford, *University of Minnesota, Minneapolis, MN, United States*

164 **Microstructure And Dynamics Of Crosslinked Collagen Gel** SB³C2015-397
Shengmao Lin[1], Linxia Gu[1,2], *[1]University of Nebraska-Lincoln, Lincoln, NE, United States,[2]Nebraska Center for Materials and Nanoscience, Lincoln, NE, United States*

165 **Probing Of A Complex Multi-layer Embryonic Tissue Through Novel 3D Bio-etching** SB³C2015-352
Melis Hazar[1], YongTae Kim[2], Philip R. LeDuc[1], William C. Messner[3], Lance A. Davidson[4], *[1]Carnegie Mellon University, Pittsburgh, PA, United States,[2]Georgia Institute of Technology, Atlanta, GA, United States,[3]Tufts University, Medford, MA, United States,[4]University of Pittsburgh, Pittsburgh, PA, United States*

166 **Numerical Simulation Of Effects Of Membrane Surface Viscosity On Tank-treading Motion Of Red Blood Cell** SB³C2015-203
Ken-ichi Tsubota, *Chiba University, Chiba, Japan*

167 **Wnt/beta-catenin Signaling Pathways Contributes To Dynamic Fluid Flow Loading Induced In Situ Osteocytic Calcium Oscillations In An Intact Mouse Femur** SB³C2015-1084
Minyi Hu, Guowei Tian, Yi-Xian Qin, *Stony Brook University, Stony Brook, NY, United States*

168 **Nonlinear Anisotropic Mechanical Properties of Vascular Smooth Muscle Cells** SB³C2015-650
Zaw Win, Patrick W. Alford, *University of Minnesota, Minneapolis, MN, United States*

169 **Dynamic Fluid Flow Loading Induced In Situ Osteocytic Calcium Oscillations In An Intact Mouse Femur** SB³C2015-1081
Minyi Hu, Guowei Tian, Yi-Xian Qin, *Stony Brook University, Stony Brook, NY, United States*

FRIDAY, JUNE 19	8:00am - 9:30am

Workshop: Mow and Fung Lectures - Dawn M. Elliott, Adam J. Engler — Primrose A/B

Session Chair: Louis Soslowsky, *University of Pennsylvania, Philadelphia, PA, United States*
Session Co-Chair: Guy Genin, *Washington University, St. Louis, MO, United States*

FRIDAY, JUNE 19	8:00am - 9:30am

Workshop: Problem-based Learning in Biomechanics — Superior

Session Chair: Alisa Morss Clyne, *Drexel University, Philadelphia, PA, United States*
Session Co-Chair: Kristen Billiar, *Worcester Polytechnic Institute, Worcester, MA, United States*

FRIDAY, JUNE 19	8:00am - 9:30am

Workshop: CFD Challenge 2015 — Wasatch

Session Chair: Kenichi Kono, *Wakayama Rosai Hospital, Japan*
Session Co-Chair: Kristian Valen-Sendstad, *University of Toronto, Toronto, ON, Canada*

FRIDAY, JUNE 19	8:00am - 9:30am

Workshop: Mentee-mentor Matching Mixer and Best Practices in Mentoring — Magpie

Session Chair: Naomi Chesler, *University of Wisconsin, Madison, WI, United States*
Session Co-Chair: Lakiesha Williams, *Mississippi State University, Mississippi State, MS, United States*
Session Co-Chair: Victor Barocas, *University of Minnesota, Minneapolis, MN, United States*

FRIDAY, JUNE 19	8:00am - 9:30am

Workshop: Strategies for a Successful Postdoctoral Experience — Maybird

Organizers: ASME Bioengineering Division Student Leadership Committee (special thanks to Kathryn Drzewiecki, Samira Jamalian, Paola Jaramillo, and Samantha Schoell)

FRIDAY, JUNE 19	9:45am - 10:45am

PLENARY SESSION II – Andrew McCulloch — Ballrooms 1-3

FRIDAY, JUNE 19	11:00am - 12:30pm

PhD Competition - Biofluid Mechanics — Primrose A

Session Chair: Stephanie George, *East Carolina University, Greenville, NC, United States*
Session Co-Chair: Brandon Dixon, *Georgia Institute of Technology, Atlanta, GA, United States*

11:00AM **Increased Red Blood Cell Stiffness Increases Pulmonary Vascular Resistance And Pulmonary Arterial Pressure** SB³C2015-587
David A. Schreier, Omid Forouzan, Timothy Hacker, John Sheehan, Naomi C. Chesler, *University of Wisconsin-Madison, Madison, WI, United States*

11:15AM **Effect of Bicuspid Aortic Valve Morphotype on Ascending Aorta Hemodynamics: a Computational Study** SB³C2015-304
Kai Cao, Philippe Sucosky, *University of Notre Dame, Notre Dame, IN, United States*

11:30AM **Hemodynamic Characterization of Different Basilar Tip Aneurysm Templates Using Computational Fluid Dynamics** SB³C2015-1114
Priya Nair[1], Brian W. Chong[2], David Frakes[1], *[1]Arizona State University, Tempe, AZ, United States,[2]Mayo Clinic Hospital, Phoenix, AZ, United States*

11:45AM **Modulation of Lymph Node Resistance during Inflammation: Experimental Measurement and Computational Modeling** SB³C2015-566
Mohammad Jafarnejad[1], Joshua P. Scallan[2], Joseph M. Sherwood[1], Darryl R. Overby[1], David C. Zawieja[3], Michael J. Davis[2], James E. Moore[1], *[1]Imperial College London, London, United Kingdom,[2]University of Missouri, Columbia, MO, United States,[3]Texas A&M Health Science Center, Temple, TX, United States*

12:00PM **Inlet Flow Rate Variation and Onset of Flow Instabilities in the Carotid Siphon** SB³C2015-276
Resmi KrishnankuttyRema[1], Kristian Valen-Sendstad[1,2], David Steinman[1], *[1]University of Toronto, Toronto, ON, Canada,[2]Simula Research Laboratory, Lysaker, Norway*

12:15PM **Suction Effect Produced by Active Contraction of Collecting Lymphatic Vessels Facilitates Lymphatic Filling** SB³C2015-539
Samira Jamalian[1], Mohammad Jafarnejad[1], Christopher D. Bertram[2], David C. Zawieja[3], J. Davis[4], James E. Moore[1], *[1]Imperial College London, London, United Kingdom,[2]University of Sydney, New South Wales, Australia,[3]Texas A&M Health Science Center, Temple, TX, United States,[4]University of Missouri School of Medicine, Columbia, MO, United States*

FRIDAY, JUNE 19	11:00am - 12:30pm

PhD Competition - Biotransport and Simulation — Superior

Session Chair: Victor Varner, *Princeton University, Princeton, NJ, United States*
Session Co-Chair: Alisa Morss, *Drexel University, Philadelphia, PA, United States*

11:00AM **Lymphatic Disease Phenotyping With Near-Infrared Imaging** SB³C2015-1104
Tyler S. Nelson[1], Michael J. Weiler[1], Ira L. Savetsky[2], Xiaolei Liu[3], Babak J. Mehrara[2], Hong Chen[4], J. Brandon Dixon[1], *[1]Georgia Institute of Technology, Atlanta, GA, United States,[2]Memorial Sloan Kettering Cancer Center, New York, NY, United States,[3]St. Jude Children's Research Hospital, Memphis, TN, United States,[4]Oklahoma Medical Research Foundation, Oklahoma City, OK, United States*

11:15AM **Red Blood Cell Dynamic Deformability and Adhesion in Microscale Flow Determine Cellular Heterogeneity in Sickle Cell Disease** SB³C2015-504

Yunus Alapan[1], Yumi Matsuyama[1], Jane Little[1,2], Umut A. Gurkan[1,3], *[1]Case Western Reserve University, Cleveland, OH, United States,[2]University Hospitals, Cleveland, OH, United States,[3]Louis Stokes Cleveland Veterans Affairs Medical Center, Cleveland, OH, United States*

11:30AM **Reduced Lymphatic Function Correlates With Disease Progression In a Novel Single Vessel Ligation Model of Lymphedema** SB³C2015-410

Michael J. Weiler, Tyler S. Nelson, J. Brandon Dixon, *Georgia Tech, Atlanta, GA, United States*

11:45AM **Finite Element Modeling Of Active Transmembrane Cell Transport** SB³C2015-356

Chieh Hou, Kelly Terlizzi, Gerard A. Ateshian, *Columbia University, New York, NY, United States*

12:00PM **Combined Experimental and Finite Element Analysis to Determine the Diffusion Coefficient Within and Between Human Skin Layers** SB³C2015-274

Anne M. Römgens[1], Dan L. Bader[1,2], Frank P. T. Baaijens[1], Cees W. J. Oomens[1], *[1]Eindhoven University of Technology, Eindhoven, Netherlands,[2]University of Southampton, Southampton, United Kingdom*

12:15PM **CFD Simulation of Transition to Turbulence for Newtonian vs. Non-Newtonian Flow Through a Stenosis** SB³C2015-363

M. Owais Khan[1], Kristian Valen-Sendstad[1,2], Dipankar Biswas[3], David M. Casey[3], Francis Loth[3], David Steinman[1], *[1]University of Toronto, Toronto, ON, Canada,[2]Simula Research Laboratory, Lysaker, Norway,[3]University of Akron, Akron, OH, United States*

FRIDAY, JUNE 19	**11:00am - 12:30pm**

PhD Competition - Cellular and Tissue Engineering — Wasatch

Session Chair: Victor Lai, *University of Minnesota, Duluth, MN, United States*
Session Co-Chair: Colleen Witzenburg, *University of Virginia, Charlottesville, VA, United States*

11:00AM **Interstitial Cell Migration in Dense Connective Tissues is Modulated by Matrix Microstructure and Micromechanics** SB³C2015-129

Feini Qu[1,2], Miltiadis H. Zgonis[1,2], Robert L. Mauck[1,2], *[1]University of Pennsylvania, Philadelphia, PA, United States,[2]Philadelphia VA Medical Center, Philadelphia, PA, United States*

11:15AM **Cells Alter Traction Force and Orientation in Response to Long-term Cyclic Stretch** SB³C2015-461

Heather A. Cirka, Qi Wen, Kristen L. Billiar, *Worcester Polytechnic Institute, Worcester, MA, United States*

11:30AM **Dedifferentiaton of Chondrocytes Influences Strain Transfer Measured by Deformable Image Registration** SB³C2015-561

Jonathan T. Henderson[1], Benjamin Seelbinder[1], Alexander Veress[2], Corey Neu[1], *[1]Purdue University, West Lafayette, IN, United States,[2]University of Washington, Seattle, WA, United States*

11:45AM **An Active Contraction Model Of Valvular Interstitial Cells** SB³C2015-614

Yusuke Sakamoto, Michael Sacks, *The University of Texas at Austin, Austin, TX, United States*

12:00PM **A Predictive 3D High-Content/High Throughput Screening Platform to Elucidate and Enhance Multilineage Stem Cell Differentiation** SB³C2015-601

Amit Paul, Bo Chen, Elise DeBruyn, Michael Cho, *University of Illinois at Chicago, Chicago, IL, United States*

12:15PM **In Vitro Growth Trajectory And In Vivo Implantation Of Cell-seeded Disc-like Angle Ply Structures For Total Disc Replacement** SB³C2015-131

John T. Martin[1,2], Dong Hwa Kim[1,2], Kensuke Ikuta[1,2], Christian G. Pfeifer[1,2], Lachlan J. Smith[1,2], Dawn M. Elliott[3], Harvey E. Smith[1,2], Robert L. Mauck[1,2], *[1]University of Pennsylvania, Philadelphia, PA, United States,[2]Philadelphia VA Medical Center, Philadelphia, PA, United States,[3]University of Delaware, Newark, DE, United States*

FRIDAY, JUNE 19	11:00am - 12:30pm

PhD Competition - Mechanics and Rehabilitation — Magpie

Session Chair: Bradley Davidson, *University of Denver, Denver, CO, United States*
Session Co-Chair: Darryl Thelen, *University of Wisconsin-Madison, Madison, WI, United States*

11:00AM **Blocking Blood-Spinal Cord Barrier Breakdown Prevents the Development of Pain Following Nerve Root Compression Injury** SB³C2015-319
Jenell Smith, Paul Janmey, Beth Winkelstein, *University of Pennsylvania, Philadelphia, PA, United States*

11:15AM **Defining Collagen Fiber Mechanics in Neuron-Collagen Constructs Under Stretch Using Integrated Experimental & Modeling Approaches** SB³C2015-281
Sijia Zhang, Xuan Cao, Vivek Shenoy, Beth Winkelstein, *University of Pennsylvania, Philadelphia, PA, United States*

11:30AM **Redistribution of Knee Loads Using Auditory Feedback from Pressure Detecting Shoe Insoles** SB³C2015-245
Christopher F. Ferrigno, Ina S. Stoller, Laura E. Thorp, Najia Shakoor, Markus M. Wimmer, *Rush University, Chicago, IL, United States*

11:45AM **Pre-Clinical Assesment of a Percutaneous Leaflet Resection Device for Treatment of Degenerative Mitral Valve Disease** SB³C2015-559
Steven Boronyak, Brett Byram, Joseph Fredi, Michael Young, W. David Merryman, *Vanderbilt University, Nashville, TN, United States*

12:00PM **Subject-specific Calibration Of Geometric Neuromusculoskeltal Models** SB³C2015-585
Andrew J. Meyer, Carolynn Patten, Benjamin J. Fregly, *University of Florida, Gainesville, FL, United States*

12:15PM **In-Vivo Dynamic Measurement of Tibiotalar and Subtalar Joint Kinematics Using Dual Fluoroscopy: A Framework for Studying OA.** SB³C2015-527
Koren E. Roach, Bibo Wang, Ashley L. Kapron, Niccolo M. Fiorentino, Charles L. Saltzman, Madeline Singer, Andrew E. Anderson, *University of Utah, Salt Lake City, UT, United States*

FRIDAY, JUNE 19	11:00am - 12:30pm

PhD Competition - Characterization of Tissue Mechanics — Maybird

Session Chair: Sarah Kieweg, *University of Kansas, Lawrence, KS, United States*
Session Co-Chair: Ian A. Sigal, *University of Pittsburgh, Pittsburgh, PA, United States*

11:00AM **Regional Contraction Shapes the Three-Dimensional Morphogenesis of the Embryonic Forebrain** SB³C2015-1030
Kara E. Garcia, Philip V. Bayly, Larry A. Taber, *Washington University in St. Louis, St. Louis, MO, United States*

11:15AM **The Dynamic Mechanical Response is Severely Altered in Collagen V Deficient Mouse Supraspinatus Tendons** SB³C2015-104
Brianne K. Connizzo[1], Mei Sun[2], David E. Birk[2], Louis J. Soslowsky[1], *[1]University of Pennsylvania, Philadelphia, PA, United States,[2]University of South Florida, Tampa, FL, United States*

11:30AM **Evidence that Interfibrillar Load Transfer in Tendon is Supported by a Network of Small Diameter Collagen Fibrils** SB³C2015-132
Spencer E. Szczesny[1], Kristen L. Fetchko[2], Jeffrey L. Caplan[3], Pal Pedersen[4], Dawn M. Elliott[2], *[1]University of Pennsylvania, Philadelphia, PA, United States,[2]University of Delaware, Newark, DE, United States,[3]Delaware Biotechnology Institute, Newark, DE, United States,[4]Carl Zeiss Microscopy, Thornwood, NY, United States*

11:45AM **3D Strains in Posterior Sclera Using Ultrasound Speckle Tracking** SB³C2015-515
Elias R. Pavlatos, Benjamin Cruz-Perez, Hugh J. Morris, Hong Chen, Richard T. Hart, Jun Liu, *The Ohio State University, Columbus, OH, United States*

12:00PM **The Collagen Directionality and Dispersion and Mechanical Indentation Response in Nonpregnant Human Cervical Tissue** SB³C2015-1090
Wang Yao[1], Yu Gan[1], Christine Hendon[1], Joy Vink[2], Ronald Wapner[2], Kristin Myers[1], *[1]Columbia University, New York, NY, United States,[2]Columbia University Medical Center, New York, NY, United States*

12:15PM **Tribological Rehydration: Maintaining and Rebuilding Interstitial Fluid Pressure in Cartilage** SB³C2015-133
Axel C. Moore, David L. Burris, *University of Delaware, Newark, DE, United States*

FRIDAY, JUNE 19 | 11:00am - 12:30pm

Undergraduate Design Competition — Golden Cliff / Eagle's Nest

Session Co-Chair: Martin L. Tanaka, *Western Carolina University, Cullowhee, NC, United States*
Session Co-Chair: Sara Roccabianca, *Michigan State University, East Lansing, MI, United States*

11:00AM **BioView: A Wearable Sensor Array For Rehabilitation Biofeedback** SB³C2015-1420
Tyler Maydew, Brett Donnermeyer, Kathryn Thompson, Alwyn Johnson, Bradley Davidson, *University of Denver, Denver, CO, United States*

11:15AM **The Tension Assisted Device: An Orthotic Alternative to High Tone Plantar Flexion** SB³C2015-298
Ron V. Perrone, Elizabeth Duncan, Cory Jeanes, Mike Martorano, Gary Bowlin, John Williams, Susan Anderson, *University of Memphis, Memphis, TN, United States*

11:30AM **DermaShift: Diagnostic Device For Pressure Ulcer Formation** SB³C2015-1421
Francisca Acosta[1], Hope Atina[1], Kim Le[1], Andrea Pinto[1], William Wilson[1], Erice Richardson[1], Catherine Ambrose[2], Lex Frieden[2], *[1]Rice University, Houston, TX, United States,[2]Texas Health Science Center, Houston, TX, United States*

11:45AM **Smartboot: An Instrumented Clinical Walking Boot for Partial Weight Bearing Training** SB³C2015-328
Dustyn Roberts, Tim West, Michael Schenk, David Schnall, Margaret O'Brien, Melissa Groome, Brian Knarr, Jill Higginson, Anita Singh, *University of Delaware, Newark, DE, United States*

12:00PM **Soft Ankle-foot Orthotic** SB³C2015-187
Adam Podolec, Megan Erhart, Noah Schadt, Geni Giannotti, Jared Green, Tyler Leichenberger, *Rochester Institute of Technology, Rochester, NY, United States*

12:15PM **Design of a Low-cost Haptic Assistive Handwriting Device** SB³C2015-225
Eamon Campolettano, Alexander Croft, Kevin Fasano, Stephen Hodge, Kevin Myers, Brian Pinkard, Jessica Ross, Allison Scoular, Thomas S. Todd, Alexander A. Brown, *Lafayette College, Easton, PA, United States*

FRIDAY, JUNE 19 | 11:00am - 12:30pm

PhD Competition - Mechanics of Injury and Repair — Primrose B

Session Chair: Ramesh Ragupathy, *Drexel University, Philadelphia, PA, United States*
Session Co-Chair: Corey Neu, *Purdue University, West Lafayette, IN, United States*

11:00AM **Thermoresponsive, Redox-crosslinked Cellulosic Hydrogels Undergo In Situ Gelation And Restore Nucleus Pulposus Biomechanical Properties Post Nucleotomy** SB³C2015-263
Devika M. Varma[1], Huizi A. Lin[1], Rose G. Long[2], Carine Rognon[3], Andrew C. Hecht[2], James C. Iatridis[2], Steven B. Nicoll[1], *[1]The City College of New York, CUNY, New York, NY, United States,[2]Icahn School of Medicine at Mount Sinai, New York, NY, United States,[3]Swiss Federal Institute of Technology of Zurich (ETHZ), Zurich, Switzerland*

11:15AM **A Multigenerational Collagen Damage Model Explains Engineered Cartilage Growth and Remodeling Phenomena** SB³C2015-642
Robert J. Nims, Alexander D. Cigan, Brian K. Jones, Krista M. Durney, Clark T. Hung, Gerard A. Ateshian, *Columbia University, New York, NY, United States*

11:30AM **Influence of Intracortical Porosity on the Fracture Susceptibility of Human Cortical Bone** SB³C2015-672
Andrew P. Baumann, Travis L. Turnbull, Glen L. Niebur, Ryan K. Roeder, *University of Notre Dame, Notre Dame, IN, United States*

11:45AM **Effective Remodeling in Cerebral Aneurysm: a Case Study** SB³C2015-1159
Xinjie Duan[1], Bong Jae Chung[2], Juan R. Cebral[2], Khaled Aziz[3], Anne M. Robertson[1], *[1]University of Pittsburgh, Pittsburgh, PA, United States,[2]George Mason University, Fairfax, VA, United States,[3]Allegheny General Hospital, Pittsburgh, PA, United States*

12:00PM **Cartilage Wear Initiated by Fatigue Damage Under Physiologic Loading when Fluid Load Support and Boundary Lubrication are Compromised** SB³C2015-1160
Krista M. Durney, Sevan R. Oungoulian, Brian K. Jones, Jason T. Suh, Clark T. Hung, Gerard A. Ateshian, *Columbia University, New York, NY, United States*

12:15PM **Cornea Damage Progression following Blast Exposure** SB³C2015-1169
Dan F. Shedd[1], Justin A. Jones[1], Brian Zaugg[2], Brittany Coats[1], *[1]University of Utah, Salt Lake City, UT, United States,[2]John A. Moran Eye Center, Salt Lake City, UT, United States*

FRIDAY, JUNE 19	12:30pm - 3:00pm

Poster Session II — Thermal Effects and Nanoparticles — Event Center Tent

170 **Determination of the Biophysical Parameters of HUVECs and Their Application in Optimization of the Addition and Removal of Cryoprotective Agents** SB³C2015-434
Yuntian Zhang, Dan Niu, Gang Zhao, *University of Science and Technology of China, Hefei, China*

171 **Nonlinear Derating of High-Intensity Focused Ultrasound using Hydrophone Measurements in Water** SB³C2015-542
Seyed Ahmad Reza Dibaji[1], Yunbo Liu[2], Joshua E. Soneson[2], Rupak K. Banerjee[1], Matthew R. Myers[2], *[1]University of Cincinnati, Cincinnati, OH, United States,[2]US Food and Drug Administration, Silver Spring, MD, United States*

172 **Effect of Hydroxyapatite Nanoparticles on Cryopreservation of HUVECs** SB³C2015-427
Yuanyuan Zheng, Jianye Wang, **Gang Zhao**, Tao Wang, *University of Science and Technology of China, Hefei, China*

173 **Feasibility of Utilizing Thermal Images for Melanoma Screening** SB³C2015-126
Alexander LeBrun, **Liang Zhu**, *University of Maryland Baltimore County, Baltimore, MD, United States*

174 **Application Of Mesoporous Silica Nanoparticle At Drug Delivery System** SB³C2015-1372
M. Titirinli, Sevil Yücel, B. Karakuzu, Y. Basarab, *Yildiz Technical University, Istanbul, Turkey*

FRIDAY, JUNE 19	12:30pm - 3:00pm

Poster Session II — Transport at the Cell and Tissue Level — Event Center Tent

176 **Cancer-Associated Fibroblasts Promote Vascularization in Collagen and Fibrin Matrices** SB³C2015-199
M.K. Sewell-Loftin, Samantha van Hove, Gregory Longmore, Steven George, *Washington University in St. Louis, St. Louis, MO, United States*

177 **Insights Into the Hemodynamic Factors Affecting Embolus Transport for Stroke** SB³C2015-584
Debanjan Mukherjee, Shawn C. Shadden, *U.C. Berkeley, Berkeley, CA, United States*

178 **A Peristaltic Mechanism For Clearance Of Solutes In Periarterial Basement Membranes** SB³C2015-391
M Keith Sharp[1], Alexandra Keith Diem[2], Roy O. Weller[2], Roxana O. Carare[3], *[1]University of Louisville, Louisville, KY, United States,[2]University of Southampton, Southampton, United Kingdom,[3]University of Southampton, Suthampton, United Kingdom*

179 **Trapping of Tumor Cells Using Rapid Electrokinetic Patterning (REP)** SB³C2015-163
Katherine N. Clayton, Seungman Park, Steven Wereley, Bumsoo Han, *Purdue University, West Lafayette, IN, United States*

180 **Visco-Hyperelastic and Biphasic Properties of a Brain Phantom Agarose Gel** SB³C2015-114
Gerson Cordoba[1], Gustavo Orozco[1], **Fernando Casanova**[1], Joshua H. Smith[2], Jose J. Garcia[1], *[1]Universidad del Valle, Cali, Colombia,[2]Lafayette College, Easton, PA, United States*

FRIDAY, JUNE 19	12:30pm - 3:00pm

Poster Session II — Design, Dynamics and Rehab — Event Center Tent

181 **The Effect Of Bone Defect Size And Position On Cementless Acetabular Cup Stability : A Finite Element Analysis** SB³C2015-1091
Mark H. Gonzalez, Farid Amirouche, Gianfranco Solitro, *University of Illinois at Chicago, Chicago, IL, United States*

182 **Simulation-Based Design of a Hip Actuator for Running a Mile Sprint** SB³C2015-641
John R. Rogers, Julie E. Dillon, Cameron I. McDonald, Gabriela C. Barrera-Gutierez, *United States Military Academy, West Point, NY, United States*

183 **Comparison of Human Walking Backward and Forward Using Optimization Method** SB³C2015-351
Yujiang Xiang[1], Hyun-Jung Kwon[2], *[1]University of Alaska Fairbanks, Fairbanks, AK, United States,[2]The Ohio State University, Columbus, OH, United States*

184 **Beginning Braille Learning Device** SB³C2015-252
Kelton Gubler, Jason Castillo, Adam Daly, Austin Eastman, Kay B. Freckleton, Andrew Silotti, *University of Utah, Salt Lake City, UT, United States*

185 **Ocular Bobbing Compensation System** SB³C2015-3803
Yucong Gu, Yuchen Yan, You Chen, Tai Kim, Ken Fischer, *University of Kansas, Lawrence, KS, United States*

186 **A Bioengineering Solution To Cure Spinal Cord Injury** SB³C2015-1161
Anita Singh[1], Jacklyn Witko[1], Brittany King[1], Alexender Herman[1], Andrea Vernengo[1], Babitha Tom[2], *[1]Rowan University, Glassboro, NJ, United States,[2]Widener University, Chester, PA, United States*

187 **High Performance Luxury 4WD (or All Terrain) Wheel Chair** SB³C2015-3731
Jason McCurry, Philip Stykes, Alex Wilfong, Martin Tanaka, *Western Carolina University, Cullowhee, NC, United States*

188 **Dynamic Balance Using The COM And COP Inclination Angle During A Golf Swing** SB³C2015-22
Ahnryul Choi[1], Joung Hwan Mun[2], *[1]The University of Texas Health Science Center at Houston, Houston, TX, United States,[2]Sungkyunkwan University, Suwon, Korea, Republic of*

FRIDAY, JUNE 19	12:30pm - 3:00pm

Poster Session II — Fluid Mechanics of Atherosclerosis and Aneurysms — Event Center Tent

189 **FSI Simulations for the Hemodynamic Assessment of the Carotid Bifurcation in an Atherosclerotic Mouse Model** SB³C2015-528
David De Wilde[1], Bram Trachet[1,2], Nic Debusschere[1], Francesco Iannaccone[1], Abigaïl Swillens[1], Joris Degroote[1], Jan Vierendeels[1], Guido R. Y. De Meyer[3], Patrick Segers[1], *[1]Ghent University, Gent, Belgium,[2]Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland,[3]University of Antwerp, Wilrijk, Belgium*

190 **Integrating Morphologic, Biomechanic, Biological And Clinical Risk Factors To Improve Decision Making In The Management Of Abdominal Aortic Aneurysm Disease** SB³C2015-454
Eleni Metaxa[1], Nikolaos Kontopodis[2], Christos V. Ioannou[2], Yannis Papaharilaou[1], *[1]FORTH, Heraklion, Greece,[2]University of Crete, Heraklion, Greece*

191 **Biomechanical Response And Fiber Microstructure Coupled With Localized Protease Activity And Inhibition In The Angiotensin Ii Infused Apoe-/- Mouse Model Of Aneurysm** SB³C2015-188
Darren G. Haskett[1], Tyler S. Smith[1], D. Catalina Ardilia[1], Tom C. Doetschman[1], Oliver J. McIntyre[2], Dominic V. McGrath[1], Urs Utzinger[1], Jonathan P. Vande Geest[1], *[1]University of Arizona, Tucson, AZ, United States,[2]Vanderbilt University, Nashville, TN, United States*

192 **Geometric and Hemodynamics Implications of Moyamoya Disease on Carotid Siphon** SB³C2015-264
Muhammad Jamil[1], Mehnaz Haq[1], Heidi Kang[2], Zhi Rui Lee[2], Phua Hwee Tang[3], **Choon Hwai Yap**[1], *[1]National University of Singapore, Singapore,[2]Hwa Chong Institution, Singapore,[3]KKH Women's and Children's Hospital, Singapore*

193 **Coherent Wall Shear Stress Structures Determine the Near Wall Transport in Aneurysms.** SB³C2015-423
Amirhossein Arzani[1], Guoning Chen[2], Alberto M. Gambaruto[3], Shawn C. Shadden[1], *[1]University of California, Berkeley, Berkeley, CA, United States,[2]University of Houston, Houston, TX, United States,[3]Barcelona Supercomputing Center, Barcelona, Spain*

194 **RhoA Mediated Effects of Statin Therapy on Endothelial Cells: A Comparison to Fasudil and Latrunculin A** SB³C2015-538
Melissa L. Dick[1,2], Katherine N. MacDonald[1], Jean-Claude Tardif[2], Richard L. Leask[1,2], *[1]McGill University, Montreal, QC, Canada,[2]Montreal Heart Institute, Montreal, QC, Canada*

195 **In Vitro And Computational Fluid Dynamics Comparison Of The Flow Diversion Efficacy Of Five Commercial Stents** SB³C2015-636
Ronak J. Dholakia[1], Andrew Pagano[1], Fotis Drakopoulos[2], Ari Kappel[1], Chander Sadasivan[1], Xiangmin Jiao[1], David J. Fiorella[1], Nikos Chrisochoides[2], Henry H. Woo[1], Baruch B. Lieber[1], *[1]Stony Brook University, Stony Brook, NY, United States,[2]Old Dominion University, Norfolk, VA, United States*

196 **Effect of Red Blood Cells on Endothelial Cell Shear Stress Studied Using Discrete-Nature Blood Flow Simulations** SB³C2015-1024
Brenna E. Hogan[1], Zaiyi Shen[2], Chaouqi Misbah[2], Abdul Barakat[1], *[1]Ecole Polytechnique, Palaiseau Cedex, France,[2]Universite Joseph Fourier, Grenoble, France*

197 **FRED versus Pipeline: An In-vitro Comparison of Cerebral Aneurysm Hemodynamics Using Particle Image Velocimetry** SB³C2015-1108
Priya Nair[1], Brian W. Chong[2], Haithem Babiker[1], Justin Ryan[1], L. Fernando Gonzalez[3], David Frakes[1], *[1]Arizona State University, Tempe, AZ, United States,[2]Mayo Clinic Hospital, Phoenix, AZ, United States,[3]Duke University School of Medicine, Durham, NC, United States*

198 **In Vitro Validation of Endovascular Doppler-derived Flow Rates in Cerebral Vessels** SB³C2015-526
Patrick McGah, John Nerva, Ryan Morton, Michael Barbour, Pierre Mourad, Michael Levitt, Louis Kim, Alberto Aliseda, *University of Washington, Seattle, WA, United States*

199 **The Role of the Glycocalyx in Leukocyte Adhesion to the Endothelium** SB³C2015-612
Karli K. McDonald, Scott E. Cooper, Richard L. Leask, *McGill University, Montreal, QC, Canada*

200 **Validation Of CFD Solver Of A Clinical Tool Using PIV On A Patient-Specific Intracranial Aneurysm.** SB³C2015-623
Nikhil Paliwal, Christopher Martensen, Nicole Varble, Robert Damiano, Adnan Siddiqui, Elad Levy, Jianping Xiang, Hui Meng, *University at Buffalo, State University of New York, Buffalo, NY, United States*

201 **The Quantification of Blood Flow Patterns Induced by Endovascular Stent Grafts Using a Non-Newtonian Blood Analog** SB³C2015-637
Amanda Colella Centazzo, Clifton R. Johnston, *Dalhousie University, Halifax, NS, Canada*

FRIDAY, JUNE 19 | 12:30pm - 3:00pm

Poster Session II — Heart Valves, Mechanical Circulatory Support, Thrombosis, and Hemolysis — Event Center Tent

202 **Modulation of Platelet Microtubule Function Alters Platelet Stiffness and Mechanotransductive Responsiveness to Shear Stress** SB³C2015-1036
Siu Ling Leung[1], Yi Lu[1], Danny Bluestein[2], Marvin J. Slepian[1,2], *[1]the University of Arizona, Tucson, AZ, United States,[2]Stony Brook University, Stony Brook, NY, United States*

203 **Convective Leakage Makes Heparin Locking of Central Venous Catheters Ineffective within Seconds: Experimental Measurements in an In Vitro Model of the Pediatric Superior Vena Cava** SB³C2015-1042
Alberto Aliseda[1], Michael Barbour[1], Patrick M. McGah[1], Kurt R. Sansom[1], Kenneth Gow[2], *[1]University of Washington, Seattle, WA, United States,[2]Seattle Children's Hospital, Seattle, WA, United States*

204 **Aortic Flow Waveform Shape Regulates Valvular Hemodynamics And Energy Losses** SB³C2015-1063
Brandon L. Moore, Lakshmi P. Dasi, *Colorado State University, Fort Collins, CO, United States*

205 **Analyzing The Effect Of Stent Geometry For Polymeric Aortic Valves** SB³C2015-1071
Atieh Yousefi Koupaei, Brandon L. Moore, David L. Bark Jr., David Prawel, Lakshmi P. Dasi, *Colorado State University, Fort Collins, CO, United States*

206 **Mathematical Modeling of Thrombus Formation in Idealized Models of Aortic Dissection** SB³C2015-170
Claudia Menichini, Xiao Y. Xu, *Imperial College London, London, United Kingdom*

207 **Characterizing The Inflammatory And Coagulation Response To Trauma And Resuscitation** SB³C2015-579
Elaheh Rahbar[1], Jessica C. Cardenas[2], Nena Matijevic[2], Deborah J. del Junco[2], Jeanette M. Podbielski[2], Mitchell J. Cohen[3], Bryan A. Cotton[2], John B. Holcomb[2], Charles E. Wade[2], *[1]Wake Forest University, Winston-Salem, NC, United States,[2]University of Texas Health Science Center, Houston, TX, United States,[3]University of California San Francisco, San Francisco, CA, United States*

208 **Valve Interstitial Cell Shape Regulates Cell Function And Phenotype.** SB³C2015-619
Atefeh Razavi, Rachel Reynolds, Kartik Balachandran, *University of Arkansas, Fayetteville, AR, United States*

209 **Aortic Valve Calcification: Geometric And Biomechanical Analysis** SB³C2015-1055
Banafsheh Zebhi[1], Brandon L. Moore[1], Gary Luckasen[2], Lakshmi P. Dasi[1], *[1]Colorado State University, Fort Collins, CO, United States,[2]Medical Center of Rockies, Loveland, CO, United States*

211 **Effect Of Assymetric Deployment On The Function And Leaflet Mechanics Of Bioprosthetic TAVI Valves** SB³C2015-524
Michael B. Gogarty[1], Pablo Maureira[2], Lakshmi P. Dasi[1], *[1]Colorado State University, Fort Collins, CO, United States,[2]Lorraine University Hospital of Nancy, Nancy, France*

212 **Vascular Compliance Effect On Endothelial-to-mesenchymal Transdifferentiation Under Highly Pulsatile Fluid Shear** SB³C2015-1111
Winston H. Elliott[1], Yan Tan[2], Nancy Tseng[2], Wei Tan[1,2], *[1]University of Colorado- Boulder, Boulder, CO, United States,[2]University of Colorado- Denver, Denver, CO, United States*

213 **Intimal Hyperplasia and its Implications in the Cephalic Arch: A Numerical Study of Non-Physiological Hemodynamics in Patients with Brachiocephalic Fistulae** SB³C2015-315
Seyed Mohammad Javid Mahmoudzadeh Akherat[1], Michael E. Boghosian[1], Kevin W. Cassel[1], Mary S. Hammes[2], *[1]Illinois Institute of Technology, Chicago, IL, United States,[2]University of Chicago, Chicago, IL, United States*

214 **In Vitro Pulsatile Flow Loop Using Human Blood To Mimic Physiological Flow Conditions** SB³C2015-664
Ryan W. Oba, David Bark, Ketul Popat, **Lakshmi P. D. Dasi**, *Colorado State University, Fort Collins, CO, United States*

FRIDAY, JUNE 19 | 12:30pm - 3:00pm

Poster Session II — Respiratory and Cerebrospinal Fluid Motion — Event Center Tent

215 **Effects of Inhalation Transience on Flow Structures During Numerical Simulation of Airflow Through a CT-based Airway Geometry** SB³C2015-649
Richard R. Gruetzemacher, *The University of Tennessee at Chattanooga, Chattanooga, TN, United States*

216 **Bariatric Surgery Improvements For OSA Patients** SB³C2015-151
Ahmed M. Al-Jumaily, *Auckland University of Technology, Auckland, New Zealand*

217 **Acoustic Detection of Respiratory Sounds in Silicone Lung Airway Model Using Microphone Array System** SB³C2015-360
Gabriel Pramudita Saputra[1], Kazunori Nozaki[2], Satoshi Ii[1], Chizu Habukawa[1,3], Shigeo Wada[1], *[1]Osaka University, Toyonaka, Osaka, Japan,[2]Osaka University Dental Hospital, Suita, Osaka, Japan,[3]Minami Wakayama Medical Center, Tanabe, Wakayama, Japan*

218 **Pressure Modulation Improves OSA Patient Therapy** SB³C2015-246
Ahmed M. Al-Jumaily, *Auckland University of Technology, Auckland, New Zealand*

219 **Multicenter Comparison Of 4D Phase Contrast MRI Measurement Of Cerebrospinal Fluid Dynamics In The Cervical Spine** SB³C2015-583
Suraj Thyagaraj[1], Daniel Giese[2], Francesco Santini[3], Eleonora Fornari[4], Alexander C. Bunck[2], Francis Loth[1], Bryn A. Martin[1], *[1]University of Akron, Akron, OH, United States,[2]University of Cologne, Cologne, Germany,[3]University of Basel, Basel, Switzerland,[4]Lausanne University Hospital, Lausanne, Switzerland*

220 **Integration Of A Spontaneous Respiratory Driver With Blood Gas Feedback Into Biogears, An Open-source, Whole-body Physiology Model** SB³C2015-327
Yeshitila Gebremichael, Rachel Clipp, Jeffrey Webb, Aaron Bray, Cameron Thames, Zack Swarm, Jennifer Carter, Jeremiah Heneghan, *Applied Research Associates, Inc., Raleigh, NC, United States*

221 **A Patient-Specific Computational Model to Characterize The Impact of Neural Tissue Motion on Cerebrospinal Fluid Dynamics at the Cervical-Medullary Junction** SB³C2015-166
Soroush Heidari Pahlavian[1,2], Francis Loth[1,2], Mark Luciano[3], Bryn Martin[1,2], *[1]The University of Akron, Akron, OH, United States,[2]Conquer Chiari Research Center, Akron, OH, United States,[3]Cleveland Clinic Foundation, Cleveland, OH, United States*

222 **Complexity Of The Cerebrospinal Fluid Flow In Patients Suffering From Chiari Malformation Type I - A Computational Study** SB³C2015-209
Kartik Jain[1,2], Kent-Andre Mardal[2,3], *[1]University of Siegen, Siegen, Germany,[2]Simula Research Laboratory, Oslo, Norway,[3]University of Oslo, Oslo, Norway*

223 **Peclet Number Of Ciliary Transport On The Surface Of The Tracheal Lumen** SB³C2015-157
Kouki Kiyota[1], Hironori Ueno[2], Keiko Numayama-Tsuruta[1], Yohsuke Imai[1], Takami Yamaguchi[1], **Takuji Ishikawa**[1], *[1]Tohoku University, Sendai, Japan,[2]Aichi University of Education, Aichi, Japan*

FRIDAY, JUNE 19 | 12:30pm - 3:00pm

Poster Session II — Musculoskeletal Soft Tissue Mechanics — Event Center Tent

224 **A Phenomenological Model to Describe The Viscoelastic Behavior in Multiple Loading** SB³C2015-440
Behzad R. Babaei, *Washington University in St. Louis, St. Louis, MO, United States*

225 **Effect of Osteoarthritis on the Mechanical Properties of Human Articular Cartilage** SB³C2015-509
Blair E. Larson, Kristine M. Fischenich, Kirk A. Kindsfater, Tammy L. Haut Donahue, *Colorado State University, Fort Collins, CO, United States*

226 **Conditioned Media from Degenerative Vertebral Discs Sensitizes Dorsal Root Ganglion Neurons to Heat Stimuli** SB³C2015-1040
Joshua D. Stover[1], Ibrahima Bah[2], Alexander Kotelsky[2], Mark R. Buckley[2], Brandon Lawrence[1], Robert Bowles[1], *[1]University of Utah, Salt Lake City, UT, United States,[2]University of Rochester, Rochester, NY, United States*

227 **Inter and Intra Variation in the Tensile Properties of the Porcine Temporomandibular Joint Disc** SB³C2015-498
Jesse Lowe[1], Alejandro Almarza[1,2], *[1]University of Pittsburgh, Pittsburgh, PA, United States,[2]McGowan Institute of Regenerative Medicine, Pittsburgh, PA, United States,[3]*

228 **A Quantitative Evaluation of the Role of Cell Senescence in Intervertebral Disc Degeneration** SB³C2015-640
Shady Elmasry, Shihab Asfour, Juan Pablo de Rivero Vaccari, **Francesco Travascio**, *University of Miami, Coral Gables, FL, United States*

229 **Characterizing the Change in Ankle Constraint Following Grade II and III Sprains** SB³C2015-392
Matthew H. Dickinson, Ednah G. Louie, Bardiya Akhbari, William M. Eboch, Sami Shalhoub, Lorin P. Maletsky, *University of Kansas, Lawrence, KS, United States*

230 **Three-dimentional Strain Distribution In The Anterior Cruciate Ligament During Anterior Translation Of The Knee** SB³C2015-444
Satoshi Yamakawa[1], Richard Debski[2], Hiromichi Fujie[1], *[1]Tokyo Metropolitan University, Hino, Japan,[2]University of Pittsburgh, Pittsburgh, PA, United States*

231 **A Finite Element Model to Evaluate the Role of the Medial Meniscotibial Attachment in Knee Biomechanics** SB³C2015-1153
Andrew J. Polk, Ferris M. Pfeiffer, James L. Cook, James P. Stannard, Patrick A. Smith, *University of Missouri, Columbia, MO, United States*

232 **Characterization of Fatigue Failure in Bovine Meniscus.** SB³C2015-1187
Jaremy J. Creechley[1], Trevor J. Lujan[2], *[1]Materials Science and Engineering, Boise State University, Boise, ID, United States,[2]Boise State University, Boise, ID, United States*

233 **Quantifying Skeletal Muscle Deformation in Three Dimensions** SB³C2015-666
Elisabeth Jensen, Kenton Kaufman, Duane Morrow, Joel Felmlee, *Mayo Clinic, Rochester, MN, United States*

234 **Treatment of Focal Cartilage Defects Using a Metal Implant: New Biomechanical Insights Using Finite Element Modeling** SB³C2015-361
Ashley Heuijerjans, Wouter Wilson, Keita Ito, Corrinus C. van Donkelaar, *Eindhoven University of Technology, Eindhoven, Netherlands*

235 **Progressive Changes In Cervical Spine Intervertebral Disc Properties During Cyclic Compressive Fatigue Loading** SB³C2015-665
Sagar Umale[1], Brian Stemper[1,2], Mingxin Zheng[3], Aidin Masoudi[3], Daniel Fama[1,2], Narayan Yoganandan[1,2], Brian Snyder[3,4,5], *[1]Medical College of Wisconsin, Milwaukee, WI, United States,[2]Clement J. Zablocki VA Medical Center, Milwaukee, WI, United States,[3]Beth Israel Deaconess Medical Centre, Boston, MA, United States,[4]Harvard Medical School, Boston, MA, United States,[5]Cerebral Palsy Clinic Children's Hospital, Boston, MA, United States*

236 **Structural Inhomogeneity Enhances Interstitial Fluid Pressurization in TMJ Condylar Cartilage** SB³C2015-1107
Brandon Zimmerman[1], Leonardo Ruggiero[1,2], Miri Park[1], Lin Han[3], Liyun Wang[1], David L. Burris[1], Xin L. Lu[1], *[1]University of Delaware, Newark, DE, United States,[2]Vrije Universiteit Brussel, Brussels, Belgium,[3]Drexel University, Philadelphia, PA, United States*

237 **A Model To Study Articular Cartilage Mechanical And Biological Responses To Rolling And Sliding Loads** SB³C2015-162
Oliver R. Schätti[1,2,3], Luigi M. Gallo[2], Peter A. Torzilli[1], *[1]Laboratory for Soft Tissue Research, Hospital for Special Surgery, New York City, NY, United States,[2]Center for Dental Medicine, University of Zürich, Zürich, Switzerland,[3]Institute for Biomechanics, Swiss Federal Institute of Technology, ETH, Zürich, Switzerland*

238 **Ibuprofen Does Not Adversely Affect Supraspinatus Tendon Mechanical Adaptations in a Rat Model of Exercise** SB³C2015-269
Sarah I. Rooney, Rachel Baskin, Andrew F. Kuntz, Louis J. Soslowsky, *University of Pennsylvania, Philadelphia, PA, United States*

239 **Toward Understanding the Mechanisms by Which Microparticles Induce Synovial Inflammation in Osteoarthritis** SB³C2015-374
Amy M. Silverstein[1], Robert M. Stefani[1], Sevan R. Oungoulian[1], Eric L. Tong[1], Mukundan G. Attur[2], Steven B. Abramson[2], Christopher S. Ahmad[1], James L. Cook[3], Gerard A. Ateshian[1], J. Chloe Bulinski[1], Clark T. Hung[1], *[1]Columbia University, New York, NY, United States,[2]New York University, New York, NY, United States,[3]University of Missouri, Columbia, MO, United States*

240 **Regional Mechanical Properties of the Long Head of the Biceps Tendon** SB³C2015-148
Christopher W. Kolz[1], Thomas Suter[1,2], Heath B. Henninger[1], *[1]University of Utah, Salt Lake City, UT, United States,[2]Clinic of Orthopaedic Surgery, Kantonsspital Baselland, Liestal, Switzerland*

241 **Biomechanical Effects of Menisco-Tibial Repair** SB³C2015-399
Ferris Pfeiffer[1], James Stannard[1], James Cook[1], Matthew Bollier[2], Patrick Smith[3], *[1]University of Missouri, Columbia, MO, United States,[2]University of Iowa, Iowa City, IA, United States,[3]Columbia Orthopaedic Group, Columbia, MO, United States*

242 **Mechanical And Adhesive Properties Of Hydrogels In Tension And Shear** SB³C2015-1097
Jennifer Kadlowec, Daniel Collins, Patrick Myers, Thomas Christiani, Jennifer Vernengo, *Rowan University, Glassboro, NJ, United States*

243 **Dynamic Viscoelastic Properties of Porcine Patellar Tendon Tissue: A Study of Regional Variation and Frequency Dependent Behaviour** SB³C2015-449
Sourav S. Patnaik[1,2], Taylor Szasz[1,2], **Raj Prabhu**[1,2], Hongjoo Rhee[2], Mark F. Horstemeyer[2], Jun Liao[1,2], Lakiesha Williams[1,2], *[1]Mississippi State University, Mississippi State, MS, United States,[2]Center for Advanced Vehicular Systems, Mississippi State, MS, United States*

244 **Targeting Collagen Strands by Triple Helix Hybridization** SB³C2015-194
Michael Yu, **Yang Li**, *University of Utah, Salt Lake City, UT, United States*

245 **Functional Tensile Properties of a Split Quadriceps Graft for Double-Bundle ACL Reconstruction** SB³C2015-180
Robert Matthew Miller, Amir Ata Rahnemai-Azar, Todd Jasinski, Fabio V. Arilla, Levent Surer, Freddie H. Fu, Richard E. Debski, Volker Musahl, *University of Pittsburgh, Pittsburgh, PA, United States*

246 **A New Method for Measuring Stress Concentrations in Finite Element Analysis of Fibrocartilage Predicts Greater Fracture Risk for Angled Center Cracks** SB³C2015-326
John M. Peloquin[1], Dawn M. Elliott[2], *[1]University of Pennsylvania, Philadelphia, PA, United States,[2]University of Delaware, Newark, DE, United States*

247 **The Effect of Anatomical Variability on Temporomandibular Joint Mechanics.** SB³C2015-403
Jessica Coogan[1], Travis Eliason[1], Mark Wong[2], **Daniel Nicolella**[1], *[1]Southwest Research Institute, San Antonio, TX, United States,[2]The University of Texas School of Dentistry at Houston, Houston, TX, United States*

FRIDAY, JUNE 19 | 12:30pm - 3:00pm

Poster Session II | Injury Mechanics | Event Center Tent

248 **Sensitivity Study of Head Impact Parameters on Intracranial Dynamics** SB³C2015-413
Yi Hua[1], Praveen Akula[1], Matthew Kelso[2], Linxia Gu[1,3], *[1]University of Nebraska-Lincoln, Lincoln, NE, United States,[2]University of Nebraska Medical Center, Omaha, NE, United States,[3]Nebraska Center for Materials and Nanoscience, Lincoln, NE, United States*

249 **Improving Brain-Skull Interface Through Application of Mesh Smoothing Algorithm** SB³C2015-1093
Mireille Kelley[1,2], Logan Miller[1,2], Jillian Urban[1,2], Joel Stitzel[1,2], *[1]Wake Forest University School of Medicine, Winston-Salem, NC, United States,[2]Virginia Tech - Wake Forest University, Winston-Salem, NC, United States*

250 **Mouse Model Of Blast Traumatic Brain Injury: An Imaging, Behavior And Pathological Assessment Study** SB³C2015-380
Sujith Sajja[1], Jiangyang Zhang[1], Jeff Bulte[1], Joseph Long[2], Robert Stevens[1], Piotr Walczak[1], Miroslaw Janowski[1,3], *[1]Johns Hopkins School of Medicine, Baltimore, MD, United States,[2]Walter Reed Army Institute of Reseatch, Silver Spring, MD, United States,[3]NeuroRepair Department, MMRC, PAS, Warsaw, Poland*

251 **The Effects of the Impact of a Soccer Ball on a Human Head** SB³C2015-517
Kimberly A. Brown, Aalaap Desai, Yuxiong Mao, Mark Horstemeyer, Jun Liao, Lakiesha Williams, Hongjoo Rhee, Raj Prabhu, *Mississippi State University, Mississippi State, MS, United States*

252 **Biomechanics of Human Tibia and Fibula Fracture Caused by a Mixed Martial Arts Kick** SB³C2015-436
Andrew Lamont[1,2], Robbin Bertucci[1,3], Youssef Hammi[2], Mark Horstemeyer[2], Jun Liao[1,2], Hongjoo Rhee[3], Lakiesha Williams[1,2], Rajkumar Prabhu[1,2], *[1]Agricultural and Biological Engineering, Mississippi State University, Starkville, MS, United States,[2]Center for Advanced Vehicular Systems, Starkville, MS, United States,[3]Center for Advanced Vehicular Systems, Mississippi State, MS, United States*

253 **Influence Of Sulci On Mechanical Response Of The Brain And Injury Prediction Under High-rate Impact** SB³C2015-473
Alan Leung[1], Nithyanand Kota[2], Amit Bagchi[3], **Siddiq Qidwai**[3], *[1]Advanced Technology & Research Corporation, Columbia, MD, United States,[2]Leidos Corporation, Arlington, VA, United States,[3]US Naval Research Laboratory, Washington, DC, United States*

254 **Finite Element Analysis of Lower Extremity Military Boot Protection at Blast Conditions** SB³C2015-1143
Robbin Bertucci, **R. Prabhu**, M. F. Horstemeyer, Jun Liao, Lakiesha N. Williams, *Mississippi State University, Starkville, MS, United States*

255 **Development of a Computationally Efficient Full Human Body Finite Element Model** SB³C2015-638
Doron Schwartz[1,2], Berkan Guleyupoglu[1,2], Bharath Koya[1,2], Joel D. Stitzel[1,2], F. Scott Gayzik[1,2], *[1]Wake Forest School of Medicine, Winston Salem, NC, United States,[2]Virginia Tech – Wake Forest University Center for Injury Biomechanics, Winston Salem, NC, United States*

256 **An Efficient and Reliable Biomechanical Testing Device to Perform Torsion Testing in Long Bones with Locking Compression Plates** SB³C2015-574
Joseph P. Loftus[1], **Anita Singh**[1], Lindsay Stoy[1], Douglas J. Patterson[2], *[1]Widener University, Chester, PA, United States,[2]Christiana Care, Newark, DE, United States*

257 **A Computational Model Of Blast Loading To The Eye: A Comparison With Field Tests** SB³C2015-481
Thao D. Nguyen[1], Rajneesh Bhardwaj[2], Shantanu Bailoor[2], *[1]Johns Hopkins University, Baltimore, MD, United States,[2]Indian Institute of Technology Bombay, Mumbai, India*

258 **Supine to Prone Thoraco-abdominal Deformation and Organ Migration in a Set of Healthy Young Adults** SB³C2015-1027
Berkan Guleyupoglu, Josh C. Tan, Craig A. Hamilton, F. Scott Gayzik, *Wake Forest University School of Medicine, Winston Salem, NC, United States*

259 **Design of a Novel Shock Tube System for Blast Induced Traumatic Brain Injury** SB³C2015-598
Andrew B. Robbins[1], Raoul Van Loon[2], Ashok K. Shetty[3], Michael R. Moreno[1], *[1]Texas A&M University, College Station, TX, United States,[2]Swansea University, Swansea, United Kingdom,[3]Texas A&M Health Science Center, Temple, TX, United States*

261 **A Computational Head Model Validated Against Pressure Responses Only May Not Be Used To Estimate Brain Strain Responses** SB³C2015-662
Wei Zhao, Songbai Ji, *Dartmouth College, Hanover, NH, United States*

262 **Head Impact Response Resulting from Forceful Impact with Toy Swords by Pediatric Males** SB³C2015-604
Stephanie M. Beeman, Steven Rowson, Stefan M. Duma, *Virginia Tech, Blacksburg, VA, United States*

263 **Behavioral And Inflammatory Consequences Of Cerebrovascual Dysfunction In Primary Blast Injury** SB³C2015-1188
Stewart Yeoh, Kenneth L. Monson, *University of Utah, Salt Lake City, UT, United States*

264 **Pelvic Response of a Total Human Body Finite Element (FE) Model During Simulated Under Body Blast (UBB) Impacts** SB³C2015-1028
Caitlin M. Weaver[1,2], Randolph S. Coates[2], Andrew S. Merkle[3], Joel D. Stitzel[1], *[1]Wake Forest University, Winston-Salem, NC, United States,[2]US Army Research Laboratory, Aberdeen Proving Ground, MD, United States,[3]Johns Hopkins Applied Physics Lab, Laurel, MD, United States*

265 **The Effect of Pre-Crash Velocity Reduction on Occupant Response Using a Finite Element Model** SB³C2015-301
Nicholas A. Vavalle[1,2], Berkan Guleyupoglu[1,2], Jeremy M. Schap[1,2], Kristofer D. Kusano[3,4], F. Scott Gayzik[1,2], *[1]Virginia Tech – Wake Forest Center for Injury Biomechanics, Winston-Salem, NC, United States,[2]Wake Forest School of Medicine, Winston-Salem, NC, United States,[3]Virginia Tech – Wake Forest Center for Injury Biomechanics, Blacksburg, VA, United States,[4]Virginia Tech, Blacksburg, VA, United States*

266 **Alteration And Failure Of Cerebral Artery Internal Elastic Lamina Following Axial Overstretch** SB³C2015-1140
Matthew I. Converse, Tessa Sommer, Kenneth L. Monson, *University of Utah, Salt Lake City, UT, United States*

268 **Prediction Of Extra-axial Injury Location From Real World Motor Vehicle Crash And Occupant Data** SB³C2015-1086
Jillian E. Urban[1], Sarah Lynch[1], Ervin Lowther[1,2], Christopher Whitlow[1,2,3], Joel Stitzel[1], *[1]Wake Forest University, Winston-Salem, NC, United States,[2]Wake Forest School of Medicine, Winston-Salem, NC, United States,[3]Translational Science Institute, Winston-Salem, NC, United States*

269 **Effect of Neck Cable Tension During Helmeted Head Impact** SB³C2015-1113
Bethany Rowson, Steven Rowson, Stefan M. Duma, *Virginia Tech, Blacksburg, VA, United States*

270 **Traumatic Brain Injury Resulted in Increased Aquaporin-4 Expression - Relevance to Post Injury Edema** SB³C2015-647
Nasya Sturdivant, Jeffrey Wolchok, Kartik Balachandran, *University of Arkansas, Fayetteville, AR, United States*

FRIDAY, JUNE 19	12:30pm - 3:00pm

Poster Session II — Mechanics of Growth, Remodeling and Repair — Event Center Tent

271 **Damage Accumulation Modeling and Rate Dependency of Spinal Dura Mater** SB³C2015-178
Nicole Ramo, Snehal S. Shetye, Christian M. Puttlitz, *Colorado State University, Fort Collins, CO, United States*

272 **Analytical Approximation for Predicting Stress Fiber Remodeling Due to Dynamic Mechanical Stimuli** SB³C2015-215
Tommaso Ristori[1,2], [1]*Eindhoven University of Technology, Eindhoven, Netherlands,*[2]*Institute for Complex Molecular Systems, Eindhoven, Netherlands*

273 **Multiscale Model of Strain-Dependent Glomerular Basement Membrane Remodeling** SB³C2015-624
Lazarina Gyoneva[1], Yoav Segal[1,2], Kevin D. Dorfman[1], Victor H. Barocas[1], [1]*University of Minnesota, Minneapolis, MN, United States,*[2]*VA Medical Center, Minneapolis, MN, United States*

274 **Quantification Of Transient Temperature And Thermal Damage In An Established Burn Model** SB³C2015-1166
Stephanie Lindow, **F. Scott Gayzik**, *Wake Forest University School of Medicine, Winston-Salem, NC, United States*

275 **Simulated Collagen Network Remodeling in Response to Stress.** SB³C2015-591
Carley B. Hovell, *University of Minnesota, Twin Cities, Minneapolis, MN, United States*

276 **Isolation of Subarachnoid Hemhorrage Factors on a Single Chip for Understanding Cerebral Vasospasm Progression** SB³C2015-514
Eric S. Hald, Kerianne E. Steucke, Connor Timm, Patrick W. Alford, *University of Minnesota, Minneapolis, MN, United States*

277 **A Finite Element Investigation of Fracture Healing Under Simulated Microgravity Loading Conditions** SB³C2015-422
Benjamin C. Gadomski, Zachary F. Lerner, Raymond C. Browning, Christian M. Puttlitz, *Colorado State University, Fort Collins, CO, United States*

FRIDAY, JUNE 19	12:30pm - 3:00pm

Poster Session II — Cardiovascular Tissue Mechanics — Event Center Tent

278 **Novel Technique for Assessment of Mechanical Properties of Carotid Arteries** SB³C2015-476
Stefan Sanders, Frans van de Vosse, Marcel Rutten, *Eindhoven University of Technology, Eindhoven, Netherlands*

279 **Morphological Characterization Of Collagen Fibers At The Crack Initiation Sites In Biaxially Stretched Porcine Thoracic Aortas Toward Clarification Of Aneurysm Rupture Mechanism** SB³C2015-425
Shukei Sugita, Takeo Matsumoto, *Nagoya Institute of Technology, Nagoya, Japan*

280 **Biaxial Mechanical Characterization of Non-Uniform Thermal Shrinkage Deformations to Guide Ablative Therapy** SB³C2015-565
Steven Boronyak, W. David Merryman, *Vanderbilt University, Nashville, TN, United States*

281 **Characterization of the Fatigue Life, Dynamic Creep and Modes of Damage Accumulation within Mitral Valve Chordae Tendineae** SB³C2015-533
Gillian M. Gunning, Bruce P. Murphy, *Trinity College Dublin, Dublin, Ireland*

282 **Finite Element Modeling Of Cardiac Muscle Contraction** SB³C2015-408
Xiaoyan Zhang, Kenneth S. Campbell, **Jonathan F. Wenk**, *University of Kentucky, Lexington, KY, United States*

283 **Novel Micro-Computed Tomography Technique for Soft Tissue Deformation Tracking - Application to the Mitral Valve** SB³C2015-182
Eric L. Pierce[1], **Charles H. Bloodworth**[2], Ajay Naran[2], Thomas F. Easley[2], Morten O. Jensen[1], Ajit P. Yoganathan[1], [1]*Georgia Institute of Technology and Emory University, Atlanta, GA, United States,*[2]*Georgia Institute of Technology, Atlanta, GA, United States*

284 **Identification and Quantification of Extracellular Matrix Proteins at the Plaque - Internal Elastic Lamina Interface in a Mouse Model of Atherosclerosis** SB³C2015-291
Lindsey Davis, Susan Lessner, *University of South Carolina, Columbia, SC, United States*

285 **The Number of Lesions Does Not Govern the Functionality of Coronary Bifurcation Lesions: A Study of the Effect of Relative Stenosis Severity** SB³C2015-224
Catherine Pagiatakis[1,2], Jean-Claude Tardif[2,3], Philippe L. L'Allier[2,3], **Jennifer Frattolin**[1], Rosaire Mongrain[1,2], *[1]McGill University, Montreal, QC, Canada,[2]Montreal Heart Institute, Montreal, QC, Canada,[3]University of Montreal, Montreal, QC, Canada*

286 **Force Required to Cinch the Tricuspid Annulus: An Ex Vivo Study** SB³C2015-137
Amy N. Adkins[1], Jesus Aleman[1], Edward Sako[2], Lori Boies[1], Shamik Bhattacharya[1], *[1]St.Mary's University, San Antonio, TX, United States,[2]University of Texas Health Science Center San Antonio, San Antonio, TX, United States*

287 **Infarcted Left Ventricles Have Stiffer Material Properties and Lower Stiffness Variation: 3D Echo-Based Modeling to Quantify In Vivo Ventricle Material Properties** SB³C2015-32
Longling Fan[1], Jing Yao[2], Chun Yang[3], Di Xu[2], **Dalin Tang**[1,4], *[1]Southeast University, Nanjing, China,[2]Nanjing Medical University, Nanjing, China,[3]China United Network Communications Co., Ltd., Beijing, China,[4]Worcester Polytechnic Institute, Worcester, MA, United States*

288 **Development Of An Estimation Method Of Blood Vessel Configuration At No Load State For FE Patient-specific Simulation** SB³C2015-1133
Ming Yu[1], Sota Yamamoto[1], Mrie Oshima[2], *[1]Shibaura Institute of technology, Tokyo, Japan,[2]The University of Tokyo, Tokyo, Japan*

289 **Post Endovascular Stent Repair Of Descending Aorta: Side Effects And Development Of Aneurysm In The Ascending Aorta** SB³C2015-1095
Giampaolo Martufi, **Manal Altamimi**, Raied Aburashed, Cyrus Fiori, Jehangir J. Appoo, Elena S. Di Martino, *University of Calgary, Calgary, AB, Canada*

290 **Bicuspid Aortic Valve Hemodynamics Induce Acute Asymmetric Remodeling Of Porcine Ascending Aortas: An Ex Vivo Study** SB³C2015-1112
Samantha K. Atkins, Philippe Sucosky, *University of Notre Dame, Notre Dame, IN, United States*

291 **The Effect of Vascular Curvature on Blood Flow and Oxygen Transport in Arterio-Venous Fistulae** SB³C2015-807
Francesco Iori, Lorenza Grechy, Richard W. Corbett, Wladyslaw Gedroyc, Neill Duncan, Colin G. Caro, **Peter E. Vincent**, *Imperial College London, London, United Kingdom*

292 **Measuring Vessel Wall Displacement and Circumferential Strain Using Displacement Encoded with Stimulated Echo (DENSE) MRI Sequence** SB³C2015-592
Elizabeth Iffrig[1,2], Xiaodong Zhong[1,3], William R. Taylor[1,2], John N. Oshinski[1,2], *[1]Emory University, Atlanta, GA, United States,[2]Georgia Institute of Technology, Atlanta, GA, United States,[3]Siemens Medical Solutions, Malvern, PA, United States*

293 **Computational Analysis Of The Effect Of Sequential Coiling On The Wall Stress Of Cerebral Aneurysms** SB³C2015-1190
Joseph E. Pichamuthu, Brian T. Jankowitz, David A. Vorp, *University of Pittsburgh, Philadelphia, PA, United States*

294 **Smooth Muscle Cell Elastin Generation Stimulated by Adipose-Derived Mesenchymal Stem Cells** SB³C2015-496
Aneesh Ramaswamy, Kory Blose, Justin Weinbaum, David Vorp, *University of Pittsburgh, Pittsburgh, PA, United States*

295 **Computational Modeling Of Passive Myocardium:A Comparison Between Two Constitutive Models** SB³C2015-347
Amir Nikou[1], Shauna M. Dorsey[2], Jeremy R. McGarvey[3], Joseph H. Gorman III[2], Jason A. Burdick[2], James J. Pilla[2], Robert C. Gorman[2], Jonathan F. Wenk[1], *[1]University of Kentucky, Lexington, KY, United States,[2]University of Pennsylvania, Philadelphia, PA, United States, [3]Gorman Cardiovascular Research Group, University of Pennsylvania, Philadelphia, PA, United States*

296 **Toward an Experimentally Validated Immersed Boundary Model of Left Ventricular Fluid Dynamics Using In Vitro Experiments** SB³C2015-1123
Boyce E. Griffith[1], Jae Ho Lee[1], Pritam Mekala[2], Arvind Santhanakrishnan[2], *[1]University of North Carolina at Chapel Hill, Chapel Hill, NC, United States,[2]Oklahoma State University, Stillwater, OK, United States*

297 **Role Of Cyclic Strain On Calcific Nodule Formation Among Aortic Heart Valve Cusps** SB³C2015-1085
Ying Lei, Zannatul Ferdous, *The University of Tennessee, Knoxville, TN, United States*

298 **Impact of Partial Intraluminal Thrombus Attachment on Peak Stresses on Abdominal Aortic Aneurysm Wall** SB³C2015-277
Juan S. Stockle, David A. Romero, Cristina H. Amon, *University of Toronto, Toronto, ON, Canada*

299 **Stability Analysis of the Continuum Constrained Mixture Model for Vascular Growth and Remodeling** SB³C2015-1096
Jiacheng Wu, Shawn C. Shadden, *University of California, Berkeley, Berkeley, CA, United States*

300 **Ultrasound Monitoring of Abdominal Aortic Aneurysm Progression in a Murine Model** SB³C2015-1046
Arvin H. Soepriatna[1], Gurneet S. Sangha[1], Amelia R. Adelsperger[1], Evan H. Phillips[1], Clifford M. Babbey[2], Michael P. Murphy[2], Pavlos P. Vlachos[1], Craig J. Goergen[1], *[1]Purdue University, West Lafayette, IN, United States,[2]Indiana University - Purdue University Indianapolis, Indianapolis, IN, United States*

301 **Aortic Peak Stress Induced By Antihypertensive Medications In Aortic Dissection Patients** SB³C2015-552
Vittoria Flamini, *New York University, Brooklyn, NY, United States*

302 **Mechanical Parameters Characterization of Embryonic Mouse Hearts for Studying Human Congenital Heart Disease** SB³C2015-492
Andres Rubiano, Kyle G. Rowe, W. Gregory Sawyer, Chelsey S. Simmons, *University of Florida, Gainesville, FL, United States*

303 **Machine Learning Based Structured Edge Detection for Cardiovascular Modeling** SB³C2015-1021
Jameson T. Merkow[1], Zhouwen Tu[1], David Kriegman[1], Nathan Wilson[2], Alison L. Marsden[1], *[1]University of California San Diego, San Diego, CA, United States,[2]Open Source Medical Software Corporation, San Diego, CA, United States*

304 **A Study On The Interplay Of Sex And Cyclic Stretch In Aortic Valve Calcification** SB³C2015-466
Shirin Masjedi, **Ying Lei**, Zannatul Ferdous, *University of Tennessee, Knoxville, TN, United States*

FRIDAY, JUNE 19	**12:30pm - 3:00pm**

Poster Session II — Tissue Engineering and Regenerative Medicine: Materials and Interfaces — Event Center Tent

306 **Genipin Cross-linking Silk Fibroin Post-gelation Increases Gel Mechanical Stiffness** SB³C2015-1134
Winston H. Elliott[1], Walter Bonani[2,3], Devid Maniglio[2,3], Antonella Motta[2,3], Wei Tan[1], Claudio Migliaresi[2,3], *[1]University of Colorado- Boulder, Boulder, CO, United States,[2]University of Trento, Trento, Italy,[3]European Institute of Excellence on Tissue Engineering and Regenerative Medicine, and INSTM Trento Research Unit, Trento, Italy*

307 **Silica-Collagen Hydrogel for Corneal Replacement** SB³C2015-259
Michael DiVito, *University of Minnesota, Minneapolis, MN, United States*

308 **In Situ Polymerization Of Thiol-acrylate Nanocomposite Foam For Bone Defects** SB³C2015-253
Anoosha Forghani, *Louisiana State University, Baton Rouge, LA, United States*

309 **Fabrication Of Scaffolds From Different Silica Based Bioactive Glass And Investigation Of Bioactivity And Biodegredation Behaviors** SB³C2015-1371
Sevil Yücel[1], A. C. Ozarslan[1], B. S. Oduncu[1], P. Terzioglu[2], *[1]Yildiz Technical University, Istanbul, Turkey,[2]Muğla Sıtkı Koçman University, Muğla, Turkey*

310 **Evaluation Of Two Formulations Of Polycaprolactone For Use In Tissue Scaffold Applications** SB³C2015-390
Jacob D. Harris, A. Sharif El-Gizawy, Ferris M. Pfeiffer, *University of Missouri, Columbia, MO, United States*

311 **Aqueous Biphasic Micro-printing Of Tumor Spheroids** SB³C2015-654
Stephanie Lemmo Ham, Ehsan Atefi, Hossein Tavana, *University of Akron, Akron, OH, United States*

312 **Using Finite Element Analysis to Study the Mechanical Advantages of a Turtle's Shell** SB³C2015-1105
John W. Wood, Rajkumar Prabhu, *Mississippi State University, Starkville, MS, United States*

313 **Characterization of a Thermoreversible Collagen for Free-Form Fabrication of Scaffolds** SB³C2015-474
Kathryn E. Drzewiecki, David I. Shreiber, *Rutgers University, Piscataway, NJ, United States*

314 **3D Printing Of B. Mori Silk Proteins For Implantable Devices** SB³C2015-320
Tom M. Merrill, Maria Torculas, Jethro Medina, Brenton Boszczuk, Kyle Meehan, Ian Miller, Xiao Hu, Wei Xue, *Rowan University, Glassboro, NJ, United States*

315 **Influence of Nano- and Micro-Scale Structure of Aligned Electrospun Scaffolds on Mechanical Properties and Cell Response** SB³C2015-141
Hannah M. Pauly[1], Ketul C. Popat[1], Daniel J. Kelly[2], Tammy L. Haut Donahue[1], *[1]Colorado State University, Fort Collins, CO, United States,[2]Trinity College Dublin, Dublin, Ireland*

316 **An Assessment of the Native Species in Articular Cartilage and Synovial Fluid as Potential Absorptive Barriers to UV-Initiated Scaffold Polymerization** SB³C2015-429
Anthony Finch, Patrick Donnelly, Peter Torzilli, *Hospital for Special Surgery, New York, NY, United States*

FRIDAY, JUNE 19	**12:30pm - 3:00pm**

Poster Session II — Tissue Engineering and Regenerative Medicine: Cells, Constructs, Culture Systems, and Regeneration — Event Center Tent

317 **Effects of Mechanical Constraints on Cell-Generated Stress and Collagen Remodeling in Statically Cultured Microtissues** SB³C2015-369
Mathieu A. J. van Kelle, Sandra Loerakker, Inge A. E. W. van Loosdregt, Carlijn V. C. Bouten, Frank P. T. Baaijens, *Eindhoven University of Technology, Eindhoven, Netherlands*

318 **Optimization of Parameters For Long-Term Storage of Tissue Engineered Articular Cartilage** SB³C2015-385
Adam B. Nover[1], Robert M. Stefani[1], Stephanie L. Lee[1], Rebecca A. Peyser[1], Daniel R. Howard[2], Gerard A. Ateshian[1], Aaron M. Stoker[3], James L. Cook[3], Clark T. Hung[1], *[1]Columbia University, New York, NY, United States,[2]Mount Sinai St. Luke's, New York, NY, United States,[3]University of Missouri, Columbia, MO, United States*

319 **Maturation Of Human Stem Cell-derived Cardiomyocytes In 3D Tissues Through Increasing Collagen Concentrations** SB³C2015-1131
Aric Q. Pahnke, *University of Toronto, Toronto, ON, Canada*

320 **Use Of Kartogenin To Augment The Tendon-bone Tunnel Healing** SB³C2015-310
Yiqin Zhou, Jianying Zhang, Guangyi Zhao, **James H-C. Wang**, *University of Pittsburgh, Pittsburgh, PA, United States*

321 **Modular Tissue Engineered Cartilage Surfaces** SB³C2015-324
Audrey C. Ford, Kayla Wolf, Aditya Nandy, Anne Y. Zeng, Grace D. O'Connell, *University of California Berkeley, Berkeley, CA, United States*

322 **Tensile Properties of Stem Cell-Based Self-Assembled Tissue (scSAT) Biosynthesized on Nanoperiodic Structured Substrate** SB³C2015-448
Kei Oya[1], Yuki Tani[2], Kota Koizumi[3], Norihiko Sugita[3], Kenji Suzuki[4], Norimasa Nakamura[3], Hiromichi Fujie[2], *[1]Tokai University, Hiratsuka, Kanagawa, Japan,[2]Tokyo Metropolitan University, Hino, Tokyo, Japan,[3]Osaka University, Suita, Osaka, Japan,[4]Kogakuin University, Hachioji, Tokyo, Japan*

323 **Ultrasound Assisted Human Mesenchymal Stem Cell Chondrogenesis: Engineering Large-scale Cartilage Grafts** SB³C2015-669
Anu Subramanian, Sanjukta Guha Thakurta, Neety Sahu, Abdul Qadir Chama, Hendrik J. Viljoen, *University of Nebraska, Lincoln, NE, United States*

324 **Osteogenic Induction Of Human Adipose Derived Stem Cells Cultured On Poly (l-lactic Acid) Scaffolds Prepared By Thermally Induced Phase Separation Method** SB³C2015-172
Harish Chinnasami, Ram Devireddy, Dan Hayes, *Louisiana State University, Baton Rouge, LA, United States*

325 **Investigating the Role of Osteoactivin in Muscle Regeneration** SB³C2015-625
Jinjin Ma[1], Bing Yu[2], Andrew Baker[1], Min-Ho Kim[2], Anthony Calabro[1], Fayez Safadi[3], Christopher Malcuit[2], Kathleen Derwin[1], *[1]Cleveland Clinic, Cleveland, OH, United States,[2]Kent State University, Kent, OH, United States,[3]Northeast Ohio Medical University, Rootstown, OH, United States*

326 **Effect Of Heat Shock On Cryopreservation Of Adipose Tissue Derived Stem Cells** SB³C2015-165
Mulla S. Shaik[1], Jeffrey M. Gimble[2], Ram Devireddy[1], *[1]Louisiana State University, Baton Rouge, LA, United States,[2]LaCell Incorporation, New Orleans, LA, United States*

327 **Evaluating the Consistency of Cardiomyocyte Self-assembly** SB³C2015-316
Nancy K. Drew, Danny B. Baldo, Jason Q. Core, Anna Grosberg, *University of California, Irvine, Irvine, CA, United States*

FRIDAY, JUNE 19	**12:30pm - 3:00pm**

Poster Session II Mechanotransduction and Sub-Cellular Biophysics Event Center Tent

328 **Comparison Between Nonlinear Material Models And Fiber Network Models Reveals Importance Of Fiber Interactions In Cell Mechanosensing On Fibrous Substrates** SB³C2015-609
Maziar Aghvami[1], Kristen L. Billiar[2], Edward A. Sander[1], *[1]University of Iowa, Iowa City, IA, United States,[2]Worcester Polytechnic Institute, Worcester, MA, United States*

329 **Role of SRC in Electric Field-Induced Directed Cell Migration** SB³C2015-469
Shun-Hao Tsao, Pen-Hsiu Grace Chao, *National Taiwan University, Taipei, Taiwan*

330 **Exploring the Response of Astrocytes to Traumatic Brain Injuries Using a Novel Bench Top Crash Tester** SB³C2015-435
Joe Wyatt, Addison Walker, Kartik Balachandran, **Jeff Wolchok**, *University of Arkansas, Fayetteville, AR, United States*

331 **Endoplasmic Reticulum Calcium Dynamics in Osteocyte Mechanobiology** SB³C2015-179
Genevieve N. Brown, Prajesh Desai, X. Edward Guo, *Columbia University, New York, NY, United States*

333 **Movement In Engineered Valvular Tissues In Relation To Regional Flow Physics And Nutrient Transport** SB³C2015-279
Manuel Salinas, *Florida International University, Davie, FL, United States*

334 **Cellular Cholesterol Content Modulates Monocyte Interaction With E-selectin** SB³C2015-412
Amit K. Saha, Anand K. Ramasubramanian, *University of Texas at San Antonio, San antonio, TX, United States*

335 **Time Evolution of Contractility in Fibroblasts as a Measure of Cell Photodamage** SB³C2015-1177
Samantha G. Knoll[1], Wylie W. Ahmed[2], Taher A. Saif[1], *[1]University of Illinois at Urbana-Champaign, Urbana, IL, United States,[2]Institut Curie, Paris, France*

336 **Topology of Prestin Expressed in the CHO Cell Membrane -Atomic Force Microscopy Study-** SB³C2015-221
Michio Murakoshi[1,2], Hiroshi Wada[3], *[1]Kagoshima University, Kagoshima, Japan,[2]JST, Kawaguchi, Japan,[3]Tohoku Bunka Gakuen University, Sendai, Japan*

337 **Role of Cell-Cell Interaction in Tensional Homeostasis** SB³C2015-1118
Alicia Zollinger[1], Elizabeth Canovic[2], Michael Smith[1], Dimitrije Stamenovic[1], *[1]Boston University, Boston, MA, United States,[2]Massachusetts Institute of Technology, Cambridge, MA, United States*

338 **Computational And Experimental Analysis Of Intracellular Motion, Forces, And Structure** SB³C2015-1184
Michael Mak[1], Taeyoon Kim[2], Muhammad H. Zaman[3], Roger D. Kamm[1], *[1]Massachusetts Institute of Technology, Cambridge, MA, United States,[2]Purdue University, West Lafayette, IN, United States,[3]Boston University, Boston, MA, United States*

339 **Epithelial to Mesenchymal Transition Alters Cellular Chiral Behavior** SB³C2015-238
Kathryn E. Worley, Andrew K. Watrobski, David Shieh, Leo Q. Wan, *Rensselaer Polytechnic Institute, Troy, NY, United States*

340 **Modeling Cellular Contraction on Biohybrid Devices Using Thermal Contraction Capabilities of Finite Element Analysis Tools** SB³C2015-400
Victoria A. Webster, Ozan Akkus, Hillel J. Chiel, Roger D. Quinn, *Case Western Reserve University, Cleveland, OH, United States*

FRIDAY, JUNE 19	3:00pm - 4:30pm

Bone Structure, Mechanics, and Function — Primrose A

Session Chair: Amy Wagoner Johnson, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*
Session Co-Chair: Shigeo Tanaka, *Kanazawa University, Kanazawa, Japan*

3:00PM **Collagen Bound Water Is A Strong Correlate Of Bone's Toughness** SB³C2015-262
Mustafa Unal, Ozan Akkus, *Case Western Reserve University, Cleveland, OH, United States*

3:15PM **Sequential Bisphosphonate and Parathyroid Hormone Treatment Decouples Bone Remodeling in Favor of Bone Formation** SB³C2015-521
Allison R. Altman, Carina Lott, Chantal M. de Bakker, Wei-Ju Tseng, Ling Qin, **X. Sherry Liu**, *University of Pennsylvania, Philadelphia, PA, United States*

3:30PM **Tissue Mineral Density Dependent Mechanical Properties of Individual Trabecula Plates and Rods Do Not Differ in Anatomic Directions but Individual Trabecular Directions** SB³C2015-242
Y. Eric Yu, Ji Wang, Bin Zhou, X. Edward Guo, *Columbia University, new york, NY, United States*

3:45PM **Post-yield Damage Denatures Bone's Collagen As Determined By A Novel Molecular Spectroscopic Biomarker** SB³C2015-261
Mustafa Unal, Hyungjin Jung, Ozan Akkus, *Case Western Reserve University, Cleveland, OH, United States*

4:00PM **Measurement of Bone Mineral Density in Motor Vehicle Crash Occupants and Correlation with Age and Fracture Incidence** SB³C2015-236
Ashley A. Weaver, Richarlette C. Hightower, Sarah K. Lynch, Kristen M. Beavers, Anna N. Miller, Joel D. Stitzel, *Wake Forest University, Winston-Salem, NC, United States*

4:15PM **Proximal Femoral Cortical Bone Thickness in Patients with Femoroacetabular Impingement and Normal Hips Analyzed using Statistical Shape Modeling** SB³C2015-1115
Penny R. Atkins, Prateep Mukherjee, Shireen Y. Elhabian, Sumedha Singla, Michael D. Harris, Jeffrey A. Weiss, Ross T. Whitaker, Andrew E. Anderson, *University of Utah, Salt Lake City, UT, United States*

FRIDAY, JUNE 19	3:00pm - 4:30pm

Joint Motion and Rehabilitation — Superior

Session Chair: Laurel Kuxhaus, *Clarkson University, Potsdam, NY, United States*
Session Co-Chair: Bradley Davidson, *University of Denver, Denver, CO, United States*

3:00PM **A Long-Term Simulated Degradation Study of a Synthetic Meniscus Implant: Material and Functional Properties** SB³C2015-191
Maoz Shemesh[1], Adaya Shefy-Peleg[1], Eyal Zylberberg[1], Eran Linder-Ganz[1], **Jonathan J. Elsner**[2], *[1]Active Implants, Netanya, Israel,[2]Active Implants, Cambridge, MA, United States*

3:15PM **A Robotic Knee Orthosis for Locomotive Assistance** SB³C2015-409
Saroj Thapa[1], Hao Zheng[1], Geza Kogler[2], Xiangrong Shen[1], *[1]University of Alabama, Tuscaloosa, AL, United States,[2]Georgia Institute of Georgia, Atlanta, GA, United States*

3:30PM **Towards Vertebral Compression Fracture Prevention: Simulating Physiologic Fracture During Small Movement ADLs.** SB³C2015-414
Nicole C. Corbiere, Stacey L. Zeigler, Kathleen A. Issen, Arthur J. Michalek, Laurel Kuxhaus, *Clarkson University, Potsdam, NY, United States*

3:45PM **Effect of Arm Posture on Voluntary Activation and Moments Generated by Individuals with Tendon Transfer and Quadriplegia** SB³C2015-1151
Carrie L. Peterson[1,2,3], Michael S. Bednar[4], Anne M. Bryden[5,6], Michael W. Keith[5,6], Eric J. Perreault[1,2], Wendy M. Murray[1,2,3], *[1]Rehabilitation Institute of Chicago, Chicago, IL, United States,[2]Northwestern University, Chicago, IL, United States,[3]Edward Hines Jr., VA Hospital, Hines, IL, United States,[4]Loyola University, Maywood, IL, United States,[5]MetroHealth Medical Center, Cleveland, OH, United States,[6]Case Western Reserve University, Cleveland, OH, United States*

4:00PM **Use of a Torque Range of Motion Device to Teach Evaluation of Joint Dysfunction** SB³C2015-296
Rita Patterson[1], Jeongsik Shin[2], Aditya Das[2], Vanneise Collins[1], Carol Kominski[1], Katelyn Rockenbach[1], Robert Longnecker[1], David Mason[1], *[1]University of North Texas Health Science Center, Fort Worth, TX, United States,[2]University of Texas at Arlington Research Institute, Fort Worth, TX, United States*

4:15PM **Development of Virtual Environment Navigation Options for Individuals Post-stroke or With Cerebral Palsy Using Kinect** SB³C2015-124
Alan Eberhardt[1], Sean Pool[1], Scott Bickel[1], Gerald McGwin[1], James Rimmer[1], Laurie Malone[2], *[1]University of Alabama Birmingham, Birmingham, AL, United States,[2]Lakeshore Foundation, Birmingham, AL, United States*

FRIDAY, JUNE 19	**3:00pm - 4:30pm**

Cardiovascular Imaging — Wasatch

Session Chair: Frank Gijsen, *University of Rotterdam, Netherlands*
Session Co-Chair: Christof Karmonik, *Houston Methodist Research Institute, Houston, TX, United States*

3:00PM **Differential Hemodynamic Changes And Lumen Remodeling In The Artery And Vein Of Porcine Arteriovenous Graft And Fistula** SB³C2015-123
Daniel B. Pike[1], Yong He[2], Christi M. Terry[1], Alfred K. Cheung[1,3], Yan-Ting Shiu[1], *[1]University of Utah, Salt Lake City, UT, United States,[2]University of Florida, Gainesville, FL, United States,[3]VA SLC Health Care System, Salt Lake City, UT, United States*

3:15PM **Does Aortic Open Distal and Hemi-arch Procedure Remove All Tissue Suspected for Progression of Bicuspid Valve Aortopathy?** SB³C2015-322
Alex J. Barker[1], Pim van Ooij[1], David Guzzardi[2], Emilie Bollache[1], S. Chris Malaisrie[1], Patrick M. McCarthy[1], James Carr[1], Jeremy Collins[1], Michael Markl[1], Paul W. M. Fedak[1,2], *[1]Northwestern University, Chicago, IL, United States,[2]University of Calgary, Calgary, AB, Canada*

3:30PM **Quantification of Helical Flow Patterns in Left Ventricles of Healthy Subjects and Patients with Dilated Cardiomyopathy** SB³C2015-471
Jonas Lantz, Carljohan Carlhäll, Tino Ebbers, *Linköping University, Linköping, Sweden*

3:45PM **Preparation of a Hydrogel Phantom of Human Athrosclerotic Plaque for Medical Simulation and Imaging** SB³C2015-622
Juyu Chueh[1], Tanya N. Turan[2], Truman R. Brown[2], Todd LeMatty[2], Hui Mao[3], Olivia W. Brooks[1], Matthew J. Gounis[1], *[1]University of Massachusetts Medical School, Worcester, MA, United States,[2]Medical University of South Carolina, Charleston, SC, United States,[3]Emory University School of Medicine, Atlanta, GA, United States*

4:00PM **Microcirculation-Induced MRI Signal Anisotropy in Organized Tissues: Finite Element Modeling and Validation on Perfused Hearts** SB³C2015-1162
Osama Abdullah[1], Arnold David Gomez[1], Adam Schmidt[1], Edward Hsu[2], *[1]University of Utah, Salt Lake City, UT, United States,[2]University of Utah, Salt Lake City, UT, United States*

4:15PM **Functional and Anatomical Measures for Outflow Boundary Conditions in Atherosclerotic Coronary Bifurcations** SB³C2015-549
Jelle Schrauwen[1], Adriaan Coenen[1], Akira Kurata[1], Jolanda J. Wentzel[1], Antonius F. W. van der Steen[1,2], Koen Nieman[1], Frank J. H. Gijsen[1], *[1]Thoraxcenter, Erasmus Medical Center, Rotterdam, Netherlands,[2]Delft University of Technology, Delft, Netherlands*

FRIDAY, JUNE 19	**3:00pm - 4:30pm**

Vascular Remodeling and Stented Flow — Magpie

Session Chair: Lucas H. Timmins, *Georgia Institute of Technology, Atlanta, GA, United States*
Session Co-Chair: Zhijie Wang, *University of Wisconsin - Madison, Madison, WI, United States*

3:00PM **Effects Of Estrogen On Pulmonary Wave Reflection And Energy Transmission In Pulmonary Arterial Hypertension** SB³C2015-627
Aiping Liu, Naomi Chesler, *University of Wisconsin-Madison, Madison, WI, United States*

3:15PM **Biomechanical Comparison of Glutaraldehyde-crosslinked Gelatin/Fibrinogen Electrospun Cylindrical Scaffolds to Porcine Native Vascular Tissue** SB³C2015-1128
Ehab Tamimi, Catalina D. Ardila, Darren G. Haskett, Thomas Doetschman, Jonathan P. Vande Geest, *University of Arizona, Tucson, AZ, United States*

3:30PM **Hemodynamics of Healthy Vs. Pathological Venous Valve - Fluid-Structure Interaction Computational Model** SB³C2015-212
Elina Soifer[1], Dar Weiss[1], Oren Rotman[1], Uri Zaretsky[1], Shmuel Einav[1,2], *[1]Tel Aviv University, Tel Aviv, Israel,[2]Stony Brook University, Stony Brook, NY, United States*

3:45PM **Patient-specific Treatment Of Intracranial Aneurysms: An Automatic CFD-based Flow-diverter Optimization Principle** SB³C2015-265
Philipp Berg[1], László Daróczy[1], Oliver Beuing[2], Gábor Janiga[1], *[1]University of Magdeburg, Magdeburg, Germany,[2]University Hospital Magdeburg, Magdeburg, Germany*

4:00PM **Vaso-CT for Quantitative Mapping of Vessel Wall Apposition in a Flow-Diverter Implant** SB³C2015-493
Kajo van der Marel, Ajay K. Wakhloo, Matthew J. Gounis, Ajit S. Puri, *University of Massachusetts Medical School, Worcester, MA, United States*

4:15PM **Biomechanical Testing to Improve Constitutive Models of the Two-Layered Carotid Artery Media** SB³C2015-453
Caleb Davis[1,2], Ashish Pandya[2], Stephen E. Greenwald[2], *[1]Texas A&M University, College Station, TX, United States,[2]Queen Mary University of London, London, United Kingdom*

FRIDAY, JUNE 19	**3:00pm - 4:30pm**

Cardiovascular Tissue Engineering — Maybird

Session Chair: Alisa Morss, *Drexel University, Philadelphia, PA, United States*
Session Co-Chair: Pat Alford, *University of Minnesota, Minneapolis, MN, United States*

3:00PM **Spatiotemporal Cell-matrix Interactions During En Masse Migration of Fibroblasts on Collagen Matrices** SB³C2015-491
Altug Ozcelikkale[1], Frederick Grinnell[2], Bumsoo Han[1], *[1]Purdue University, West Lafayette, IN, United States,[2]University of Texas Southwestern Medical Center, Dallas, TX, United States*

3:15PM **Modeling the Enhancement of Extracellular Matrix Quantity and Quality in Large-Deformation Mechanically-Conditioned Heart Valve Tissue Engineering** SB³C2015-169
Joao S. Soares[1], John A. Stella[2], Antonio D'Amore[2], Will Zhang[1], William R. Wagner[2], John E. Mayer[3], Michael S. Sacks[1], *[1]University of Texas at Austin, Austin, TX, United States,[2]University of Pittsburgh, Pittsburgh, PA, United States,[3]Harvard Medical School, Boston, MA, United States*

3:30PM **Tubular Pediatric Pulmonary Valves By Suturing Decellularized Engineered Tissue Tubes** SB³C2015-183
Jay Reimer, Zeeshan Syedain, Bee Haynie, **Robert Tranquillo**, *University of Minnesota, Minneapolis, MN, United States*

3:45PM **Adipose-Derived Stem Cells From Diabetic Donors Cause Thrombotic Failure of Autologous Tissue Engineered Blood Vessels** SB³C2015-407
Jeffrey T. Krawiec[1], Han T. Liao[1,2], Justin S. Weinbaum[1], Dominic J. Pezzone[1], Antonio D'Amore[1], J. P. Rubin[1], William R. Wagner[1], David A. Vorp[1], *[1]University of Pittsburgh, Pittsburgh, PA, United States,[2]Chang Gung University, Guishan District, Taiwan*

4:00PM **Biomechanical Characterizations of Scar ECM During the Acute to Chronic Stages of Myocardial Infarction** SB³C2015-503
Bryn Brazile[1], Ryan Butler[1], Sourav S. Patnaik[1], Yanyi Xu[2], Andrew Claude[1], Raj Prabhu[1], Lakiesha N. Williams[1], Jianjun Guan[2], Jun Liao[1], *[1]Mississippi State University, Mississippi State, MS, United States,[2]Ohio State University, Columbus, OH, United States*

4:15PM **Development of a Induced Pluripotent Stem Cell Derived Cardiomyocyte Seeded Fibrin Suture for Cardiac Regeneration** SB³C2015-599
Katrina J. Hansen[1], Michael A. Laflamme[2], Glenn R. Gaudette[1], *[1]Worcester Polytechnic Institute, Worcester, MA, United States,[2]University of Washington, Seattle, WA, United States*

FRIDAY, JUNE 19	3:00pm - 4:30pm

The Cellular Microenvironment (joint with JSME)

Golden Cliff / Eagle's Nest

Session Chair: Wei Tan, *University of Colorado, Boulder, CO, United States*
Session Co-Chair: Brendon Baker, *Boston University, Boston, MA, United States*

3:00PM **MicroRNAs and Related Tissue Remodeling Genes in Rotator Cuff With Delayed Repair in A Rat Model** SB³C2015-1089
Christopher T. Chen, Fuxin Wei, Erik Contreras, Lucas M. Chen, Zachary Shirley, William Shelton, Michael Khazzam, *UT Southwestern Medical Center, Dallas, TX, United States*

3:15PM **Soft 3-Dimensional Neotissue Microarrays as High-throughput Platforms for Interrogating Stem Cell Instructional Microenvironments** SB³C2015-1173
Michael Floren, Wei Tan, *University of Colorado, Boulder, CO, United States*

3:30PM **Long-range Communication Between Cells in Fibrous Matrices Enabled by Tension-driven Alignment of Fibers** SB³C2015-113
Hailong Wang[1], Abhilash Nair[1], Brendon M. Baker[2], Britta Trappmann[2], Christopher S. Chen[2], Rebecca G. Wells[1], Vivek B. Shenoy[1], *[1]University of Pennsylvania, Philadelphia, PA, United States,[2]Boston University, Boston, MA, United States*

3:45PM **Engineered Cardiac Model System Reveals Fibroblast Threshold for Synchronized Beating** SB³C2015-158
Ariane C. C. van Spreeuwel[1], Noortje A. M. Bax[1], Christopher S. Chen[2], Carlijn V. C. Bouten[1], *[1]Eindhoven University of Technology, Eindhoven, Netherlands,[2]Boston University, Boston, MA, United States*

4:00PM **Cadherin-Specific Extracellular Interactions Alter Stem Cell Sensation and Interpretation of Soft Tissue Microenvironments** SB³C2015-190
Brian D. Cosgrove[1,2], Kush D. Mehta[1], Tristan P. Driscoll[1,2], Jason A. Burdick[1,2], Robert L. Mauck[1,2], *[1]University of Pennsylvania, Philadelphia, PA, United States,[2]Philadelphia VA Medical Center, Philadelphia, PA, United States*

4:15PM **Microscopic Heterogeneity in the Aortic Wall: Correlation between Mechanical Environment and Protein Expression** SB³C2015-567
Takeo Matsumoto[1], Yohei Uno[1], Shintaro Iijima[1], Yoshitaka Moriyama[1], Shukei Sugita[1], Kazuaki Nagayama[1,2], Akio Matsumoto[3], *[1]Nagoya Institute of Technology, Nagoya, Japan,[2]Ibaraki University (present), Hitachi, Japan,[3]Chiba University, Chiba, Japan*

FRIDAY, JUNE 19	3:00pm - 4:30pm

Soft Tissue Mechanics

Primrose B

Session Chair: Heath Henninger, *University of Utah, Salt Lake City, UT, United States*
Session Co-Chair: Trevor Lujan, *Boise State University, Boise, ID, United States*

3:00PM **Computational Framework For Application Of Residual Stress When The Stress-free Configuration Is Unknown.** SB³C2015-1075
Steve Maas[1], Ahmet Erdemir[2], Jason P. Halloran[3], Jeffrey A. Weiss[1], *[1]University of Utah, Salt Lake City, UT, United States,[2]Cleveland Clinic, Cleveland, OH, United States,[3]Cleveland State University, Cleveland, OH, United States*

3:15PM **Using Slow and Fast Shear Waves to Estimate Shear and Tensile Moduli: Results from Simulations of Anisotropic Tissue.** SB³C2015-317
Dennis J. Tweten, John L. Schmidt, Ruth J. Okamoto, Philip V. Bayly, *Washington University, St. Louis, MO, United States*

3:30PM **Experimental Measurement of Shear and Tensile Moduli In Anisotropic Tissue Using Magnetic Resonance Elastography** SB³C2015-244
John L. Schmidt[1], Dennis J. Tweten[1], Maisie M. Mahoney[1], Tally Portnoi[2], Ruth J. Okamoto[1], Joel R. Garbow[1], Philip V. Bayly[1], *[1]Washington University, St. Louis, MO, United States,[2]Massachusetts Institute of Technology, Cambridge, MA, United States*

3:45PM **A Nonlinear Anisotropic Inverse Mechanics Method for Computational Dissection of Inhomogeneous Planar Soft Tissues** SB³C2015-171
Colleen M. Witzenburg[1], Victor H. Barocas[2], *[1]University of Virginia, Charlottesville, VA, United States,[2]University of Minnesota, Minneapolis, MN, United States*

4:00PM **Structural Properties of the Anterolateral Structures of the Knee** SB³C2015-284
Amir Ata Rahnemai-Azar, **R Matthew Miller**, Daniel Guenther, Freddie H. Fu, Bryson P. Lesniak, Volker Musahl, Richard E. Debski, *University of Pittsburgh, Pittsburgh, PA, United States*

4:15PM **Stiffness Characterization in Biological Materials Based on Deformation Imaging and Topology Optimization** SB³C2015-556
Luyao Cai[1], Claus Pedersen[2], Ross Mclendon[2], Manuel Biedermann[2], Gergana Dimitrova[2], Jiang Yao[2], Corey P. Neu[1], *[1]Purdue University, West Lafayette, IN, United States,[2]Dassault Systèmes, Johnston, RI, United States*

SATURDAY, JUNE 20	11:30am - 1:00pm

Workshop: Critical Steps in Composing a Successful Mentorship Plan — Primrose A

Session Chair: Sara E. Wilson, *University of Kansas, Lawrence, KS, United States*
Session Co-Chair: Rouzbeh Amini, *The University of Akron, Akron, OH, United States*

SATURDAY, JUNE 20	11:30am - 1:00pm

Workshop: Teaching Undergraduate Design — Superior

Session Chair: Martin Tanaka, *Western Carolina University, Cullowee, NC, United States*
Session Co-Chair: Ken Fischer, *University of Kansas, Lawrence, KS, United States*

SATURDAY, JUNE 20	11:30am - 1:00pm

Workshop: SimVascular Workshop and New User Training — Wasatch

Session Chair: Alison Marsden, *University of California, San Diego, CA, United States*
Session Co-Chair: Shawn Shadden, *UC Berkeley, Berkeley, CA, United States*
Session Co-Chair: Nathan Wilson, *Open Source Medical Software Corporation, CA, United States*

SATURDAY, JUNE 20	11:30am - 1:00pm

Workshop: FEBio Workshop and Discussion — Magpie

Session Chair: Jeffrey A. Weiss, *University of Utah, Salt Lake CIty, UT, United States*
Session Co-Chair: Gerard A. Ateshian, *Columbia University, New York, NY, United States*
Session Co-Chair: Steve Maas, *University of Utah, Salt Lake City, UT, United States*

SATURDAY, JUNE 20	11:30am - 1:00pm

Workshop: Experimental and Computational Frameworks for Biotransport in Tumors — Maybird

Session Chair: M. Nichole Rylander, *University of Texas at Austin, Austin, TX, United States*
Session Co-Chair: Malisa Sarntinoranont, *University of Florida, Gainesville, FL, United States*

SATURDAY, JUNE 20	11:30am - 1:00pm

Workshop: Taking the Guesswork out of the Interview Process — Golden Cliff / Eagle's Nest

Organizers: ASME Bioengineering Division Student Leadership Committee (special thanks to Justine Garcia, Elizabeth Iffrig, and Corinne Riggin)

SATURDAY, JUNE 20	11:30am - 1:00pm

Workshop: Robotic Testing Systems to Study Joint and Tissue Function — Primrose B

Session Chair: Hiromichi Fujie, *Tokyo Metropolitan University, Tokyo, Japan*
Session Chair: Richard Debski, *University of Pittsburgh, Pittsburgh, PA, United States*

SATURDAY, JUNE 20	1:30pm - 3:00pm

Heart Valves and Cardiovascular Devices — Primrose A

Session Chair: Sarah Vigmostad, *University of Iowa, Iowa City, IA, United States*
Session Co-Chair: Keefe Manning, *Pennsylvania State University, State College, PA, United States*

1:30PM **Fluid-Structure Interaction Analysis of Mitral Valve Forces using a Comprehensive Model with 3D Chordal Structure: Synergy of Modeling and Experiments** SB^{3}C2015-387
Milan Toma[1], **Morten O. Jensen**[1], Daniel R. Einstein[2], Ajit P. Yoganathan[1], Richard P. Cochran[3], Karyn S. Kunzelman[3], *[1]Georgia Institute of Technology, Atlanta, GA, United States,[2]Pacific Northwest National Laboratory, Richland, WA, United States,[3]University of Maine, Orono, ME, United States*

1:45PM **Transcatheter Aortic Valve Replacement Model: Crimping And Deploying In Patient-pathology Specific Roots** SB^{3}C2015-418
Matteo Bianchi[1], Ram P. Ghosh[1], Debapria Das[1], Gil Marom[1], Thomas Claiborne[1], Marvin Slepian[2], Danny Bluestein[1], *[1]Stony Brook University, Stony Brook, NY, United States,[2]Sarver Heart Center,University of Arizona, Tucson, AZ, United States*

2:00PM **Computational Assessment of Hemodynamics in Tricuspid and Bicuspid Aortic Valves** SB^{3}C2015-305
Kai Cao, Philippe Sucosky, *University of Notre Dame, Notre Dame, IN, United States*

2:15PM **Effects Of Coronary Flow On Sinus Hemodynamics In The Presence Of A Transcatheter Aortic Valve Implantation** SB^{3}C2015-1060
Brandon Moore[1], Pablo Maureira[2], **Lakshmi P. Dasi**[1], *[1]Colorado State University, Fort Collins, CO, United States,[2]Lorraine University Hospital of Nancy, Nancy, France*

2:30PM **Left Ventricle Assist Device Anastomosis Hemodynamic Analysis Using Direct Numerical Simulations (DNS) And Large Eddy Simulations (LES)** SB^{3}C2015-463
Ricardo J. Bonilla-Alicea, *Georgia Institute of Technology, Atlanta, GA, United States*

2:45PM **Microfluidic Facsimile Of Ventricular Assist Device Shear Stress Patterns: Towards Point-of-care Devices To Monitor Patient Thrombotic Risk** SB^{3}C2015-1126
Annalisa Dimasi[1], Filippo Consolo[1], Lorenzo Valerio[1], Marco Rasponi[1], Danny Bluestein[2], Gianfranco B. Fiore[1], Alberto Redaelli[1], Marvin Slepian[3], *[1]Politecnico di Milano, Milano, Italy,[2]Stony Brook University, Stony Brook, NY, United States,[3]University of Arizona, Tucson, AZ, United States*

SATURDAY, JUNE 20	1:30pm - 3:00pm

Growth, Remodeling and Repair — Superior

Session Chair: Kristin Miller, *Tulane University, New Orleans, LA, United States*
Session Co-Chair: C. Alberto Figueroa, *University of Michigan, Ann Arbor, MI, United States*

1:30PM **Cell-mediated Compaction and Collagen Remodeling in Tissue-engineered Heart Valves due to Dynamic Loading Conditions** SB³C2015-219
Sandra Loerakker, Tommaso Ristori, Frank P. T. Baaijens, *Eindhoven University of Technology, Eindhoven, Netherlands*

1:45PM **Non-Linear Optical Characterization of the Extracellular Matrix Changes Following Myocardial Infarction Predicts Alterations in Mechanical Properties** SB³C2015-1127
Kyle P. Quinn[1], Kelly E. Sullivan[1], Carlo A. Alonzo[1], Zachary Ballard[1], Irene Georgakoudi[1], **Lauren D. Black**[1,2], *[1]Tufts University, Medford, MA, United States,[2]Tufts University School of Medicine, Boston, MA, United States*

2:00PM **Tensile Equilibrium Material Response of Pregnant Mouse Cervical Tissue During Normal Remodeling** SB³C2015-372
Kyoko Yoshida[1], Mala Mahendroo[2], Joy Vink[3], Ronald Wapner[3], Kristin Myers[1], *[1]Columbia University, New York, NY, United States,[2]UT Southwestern Medical Center, Dallas, TX, United States,[3]Columbia University Medical Center, New York, NY, United States*

2:15PM **Strain-dependent Degradation as a Mechanism for the Paradoxical Effects of Mechanical Loading on Collagen Fiber Alignment in Healing Tendon** SB³C2015-467
William J. Richardson[1], Stavros Thomopoulos[2], Jeffrey W. Holmes[1], *[1]University of Virginia, Charlottesville, VA, United States,[2]Washington University, St. Louis, MO, United States*

2:30PM **A Computational Growth and Remodelling Approach to Study Adaptation and Tortuosity in a Buckled Artery** SB³C2015-580
Mehdi Farsad[1], Qin Liu[2], Hai-Chao Han[2], Seungik Baek[1], *[1]Michigan State University, East Lansing, MI, United States,[2]University of Texas at San Antonio, San Antonio, TX, United States*

2:45PM **Quantification Of Mechanical Properties Of Rat Thoracic Ducts For Long-term Prediction Of Mechanically-mediated Growth And Remodeling** SB³C2015-401
Alexander W. Caulk, Zhanna Nepiyushchikh, Ryan Shaw, J. Brandon Dixon, Rudolph L. Gleason, *Georgia Institute of Technology, Atlanta, GA, United States*

SATURDAY, JUNE 20	1:30pm - 3:00pm

Pediatric/Embryonic Hemodynamics — Wasatch

Session Chair: Morbiducci Umberto, *Politecnico di Torino, Turin, Italy*
Session Co-Chair: Anayiotos Andreas, *Cyprus University of Technology, Cyprus*

1:30PM **In Vitro Multi-scale Patient Specific Study of the Effects of Coarctation in the Norwood Circulation** SB³C2015-430
Tianqi Hang[1], Alessandro Giardini[2], Giovanni Biglino[3], **Richard Figliola**[1], *[1]Clemson University, Clemson, SC, United States,[2]Great Ormond Street Hospital for Children, London, United Kingdom,[3]Great Ormond Street Hospital, London, United Kingdom*

1:45PM **Improved Post-operative Flow Modeling For Complex Peripheral Pulmonary Artery Stenosis** SB³C2015-1103
Weiguang Yang[1], Jeffrey A. Feinstein[1], Alison L. Marsden[2], Frank L. Hanley[1], Frandics P. Chan[1], Lisa W. Faberowski[1], Irene E. Vignon-Clementel[3], *[1]Stanford University, Palo Alto, CA, United States,[2]University of California, San Diego, La Jolla, CA, United States,[3]INRIA Paris-Rocquencourt, Paris, France*

2:00PM **The Effect of Resolution on Viscous Dissipation Measured with 4D Flow MRI in Patients with Fontan Circulation: Evaluation Using Computational Fluid Dynamics** SB³C2015-421
Merih Cibis[1], Kelly Jarvis[2], Michael Markl[2], Michael Rose[2], Cynthia Rigsby[2], Alex Barker[2], Jolanda Wentzel[1], *[1]Erasmus MC, Rotterdam, Netherlands,[2]Northwestern University, Chicago, IL, United States*

2:15PM **Modeling Blood Flow in Embryo-Specific Geometry of the Zebrafish Heart** SB³C2015-266
Pavel Kozlovsky[1], Robert Bryson-Richardson[2], Moshe Rosenfeld[1], Ariel Jaffa[3], **David Elad**[1], *[1]Tel Aviv Univesity, Tel Aviv, Israel,[2]Monash University, Melbourne, Australia,[3]Tel Aviv Medical Center, Tel Aviv, Israel*

2:30PM **Biomechanical Role For Cardiac Jelly In Pumping Mechanics Of Developing Heart During Looping** SB³C2015-657
David L. Bark, Jr., Brennan M. Johnson, Bryce W. Schroder, Deborah M. Garrity, Diego Krapf, Lakshmi P. D. Dasi, *Colorado State University, Fort Collins, CO, United States*

2:45PM **Developmental Hemodynamics in the Embryonic Heart Outflow Tract** SB³C2015-205
Venkat Keshav Chivukula, Madeline Midgett, Sandra Rugonyi, *Oregon Health and Sciences University, Portland, OR, United States*

SATURDAY, JUNE 20	**1:30pm - 3:00pm**

Biomechanics in Treatment of Heart Disease — Magpie

Session Chair: Jonathan Wenk, *University of Kentucky, Lexington, KY, United States*
Session Co-Chair: Lik Chuan Lee, *Michigan State University, East Lansing, MI, United States*

1:30PM **Cardiac Reversible Growth & Remodeling Model: Predicting and Understanding the Chronic Effects of Bioinjection Therapy** SB³C2015-31
Lik Chuan Lee[1], Martin Genet[2], Jonathan Wenk[3], Joakim Sundnes[4], Samuel Wall[4], *[1]Michigan State University, East Lansing, MI, United States,[2]ETH Zurich, Zurich, Switzerland,[3]University of Kentucky, Lexington, KY, United States,[4]Simula Research Laboratory, Oslo, Norway*

1:45PM **The Effect Of Trabeculae Carnae On The Passive Compliance Of Left Ventricle** SB³C2015-516
Arnav Sanyal[1], David Halaney[2], Marc D. Feldman[2], Hai-Chao Han[1], *[1]University of Texas at San Antonio, San Antonio, TX, United States,[2]University of Texas Health Science Center at San Antonio, San Antonio, TX, United States*

2:00PM **Effect of Scar Compaction on Therapeutic Efficacy of Anisotropic Reinforcement Following Myocardial Infarction** SB³C2015-615
Samantha A. Clarke, Gorav Ailawadi, Jeffrey W. Holmes, *University of Virginia, Charlottesville, VA, United States*

2:15PM **Impaired Collagen Degradation Prevents Right Ventricular Hypertrophy And Dysfunction With Development Of Pulmonary Arterial Hypertension** SB³C2015-645
Mark Golob, Zhijie Wang, Anthony Prostrollo, Timothy Hacker, Gaoussou Diarra, Naomi Chesler, *University of Wisconsin-Madison, Madison, WI, United States*

2:30PM **The Degree Of Outflow Tract Banding Predicts Cardiac Remodeling In Chicken Embryos** SB³C2015-108
Madeline Midgett, Sandra Rugonyi, *Oregon Health & Science University, Portland, OR, United States*

2:45PM **Mechanical Decoupling of Nuclei from the Cytoskeleton Indicate Mechanosensitivity in a Myocardiocyte Pathology Model** SB³C2015-540
Benjamin Seelbinder, Sarah Calve, Corey P. Neu, *Purdue University, West Lafayette, IN, United States*

SATURDAY, JUNE 20	**1:30pm - 3:00pm**

Mechanotransduction I - Cellular and Sub-Cellular Biophysics (joint with JSME) — Maybird

Session Chair: Leo Wan, *Rensselaer Polytechnic Institute, Troy, NY, United States*
Session Co-Chair: James H. Wang, *University of Pittsburgh, Pittsburgh, PA, United States*

1:30PM **TGF-beta and BMP Signaling Pathways Regulate Chromatin Condensation in Mesenchymal Stem Cells in Response to Dynamic Loading** SB³C2015-398
Su-Jin Heo[1], Woojin M. Han[1,2], Tristan P. Driscoll[1], Dawn M. Elliott[2], Randall L. Duncan[2], Robert L. Mauck[1], *[1]University of Pennsylvania, Philadelphia, PA, United States,[2]University of Delaware, Newark, DE, United States*

1:45PM **Temperature Rise Causes Upregulation Of Tenocyte Catabolism And Enhances Gap Junctional Intercellular Communications** SB³C2015-342
Masataka Tashiro, Eijiro Maeda, **Toshiro Ohashi**, *Hokkaido University, Sapporo, Japan*

2:00PM **Changes In Mechanosensitivity Of Children Cells: An Approach To Investigate Bone Repair And Bone Developmental Disease** SB³C2015-553
Sara Barreto[1,2,3], Andrew R. Cameron[1,2,3], Dylan Murray[4], Fergal J. O'Brien[1,2,3], *[1]Tissue Engineering Research Group, Royal College of Surgeons in Ireland, Dublin, Ireland,[2]Trinity Centre for Bioengineering, Trinity College Dublin, Dublin, Ireland,[3]Advanced Materials and Bio-Engineering Research (AMBER) Centre, Ireland, Dublin, Ireland,[4]National Paediatric Craniofacial Center, Children's University Hospital, Temple Street, Dublin, Ireland*

2:15PM **Notch1 Mutation Leads to Valvular Calcification Through Enhanced Cadherin-11 Mechanotransduction** SB³C2015-651
Joseph Chen[1], Larisa Ryzhova[1], M.K. Sewell-Loftin[1], Christopher Brown[1], Stacey Huppert[2], H. Scott Baldwin[1], W. David Merryman[1], *[1]Vanderbilt University, Nashville, TN, United States,[2]Cincinnati Children's Hospital, Cincinnati, OH, United States*

2:30PM **Vinculin-network Mediated Cytoskeletal Remodeling Regulates Contractile Function In The Aging Heart** SB³C2015-1057
Gaurav Kaushik[1], Anthony Cammarato[2], **Adam J. Engler**[1], *[1]UC San Diego, La Jolla, CA, United States,[2]Johns Hopkins University, Baltimore, MD, United States*

2:45PM **Acto myosin Catch Bonds And Mechano-sensitivity In Non-muscle Cells** SB³C2015-1144
Franck J. Vernerey, Umut Akalp, *University of Colorado at Boulder, Boulder, CO, United States*

SATURDAY, JUNE 20 | 1:30pm - 3:00pm

Injury Biomechanics I: Spine, Military, Modeling — Golden Cliff / Eagle's Nest

Session Chair: Liming Voo, *Johns Hopkins University Applied Physics Laboratory, Laurel, MD, United States*
Session Co-Chair: Reuben H. Kraft, *The Pennsylvania State University, State College, PA, United States*

1:30PM **A Point-Wise Normalization Method for Development of Biofidelity Response Corridors** SB³C2015-497
Ian Marcus[1], Scott Gayzik[1], Kerry Danelson[1], Jonathan Rupp[2], Cameron Bass[3], Narayan Yoganandan[4], JiangYue Zhang[5], *[1]Wake Forest Univeristy, Winston Salem, NC, United States,[2]University of Michigan Transportation Research Institute, Ann Arbor, MI, United States,[3]Duke University, Durham, NC, United States,[4]Medical College of Wisconsin, Milwaukee, WI, United States,[5]Applied Physics Laboratory Johns Hopkins Univeristy, Laurel, MD, United States*

1:45PM **A Comparison Of Brain Injury Predictors Based On Four Benchmark Impact Studies** SB³C2015-479
Siddiq Qidwai, Nithyanand Kota, Amit Bagchi, *US Naval Research Laboratory, Washington, DC, United States*

2:00PM **Effect Of Geometric And Material Property Changes In The Thoracic Skeleton For An Older Occupant Finite Element Model** SB³C2015-125
Samantha Schoell[1,2], Ashley Weaver[1,2], Nicholas Vavalle[1,2], Joel Stitzel[1,2], *[1]Virginia Tech- Wake Forest University, Winston-Salem, NC, United States,[2]Wake Forest School of Medicine, Winston-Salem, NC, United States*

2:15PM **Collagen Mimetic Peptide as a Marker of Mechanical Damage in Lamb Middle Cerebral Arteries** SB³C2015-1020
Raymond G. Walther, Matthew I. Converse, Kenneth L. Monson, *University of Utah, Salt Lake City, UT, United States*

2:30PM **Injuries And Failure Biomechanical Responses Of Artificial Discs In The Cervical Spine: Potential Applications To Military Environments** SB³C2015-519
Narayan Yoganandan[1], Frank A. Pintar[1], Jamie L. Baisden[1], Joseph B. McEntire[2], Valeta Carol Chancey[2], *[1]Medical College of Wisconsin, Milwaukee, WI, United States,[2]U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL, United States*

2:45PM **Investigation Of Possible Correlation Between Brain Tissue Response And Head Kinematics For Blast-induced Brain Injury** SB³C2015-1136
Hesam Sarvghad-Moghaddam, Mariusz Ziejewski, Ghodrat Karami, *North Dakota State University, Fargo, ND, United States*

SATURDAY, JUNE 20	1:30pm - 3:00pm

Shoulder Mechanics — Primrose B

Session Chair: Richard Debski, *University of Pittsburgh, Pittsburgh, PA, United States*
Session Co-Chair: Antonis Stylianou, *University of Missouri-Kansas City, Kansas City, MO, United States*

1:30PM **The Effect Of Size And Location Of Tears In The Supraspinatus Tendon On Potential Tear Propagation** SB³C2015-486
James R. Thunes, Siladitya Pal, R. M. Miller, Richard E. Debski, Spandan Maiti, *University of Pittsburgh, Pittsburgh, PA, United States*

1:45PM **3D Quantification of Osteophyte Distribution on the Humeral Head** SB³C2015-576
Shea K. Taylor[1,2], Brandon G. Santoni[1,2], Mark A. Frankle[1,3], Peter Simon[1,2], *[1]University of South Florida, Tampa, FL, United States,[2]Foundation for Orthopaedic Research and Education, Tampa, FL, United States,[3]Florida Orthopaedic Institute, Tampa, FL, United States*

2:00PM **Surgical Accuracy of Traditional Humeral Head Osteotomy in Shoulder Arthroplasty** SB³C2015-146
Thomas Suter[1,2], **Christopher W. Kolz**[1], Sean T. Tagge[1], Robert Z. Tashjian[1], Ariane Gerber Popp[2], Heath B. Henninger[1], *[1]University of Utah, Salt Lake City, UT, United States,[2]Clinic of Orthopaedic Surgery, Kantonsspital Baselland, Liestal, Switzerland*

2:15PM **Validation of a Subject-Specific Computer Model of Glenohumeral Instability and Capsular Plication** SB³C2015-616
Charlie Yongpravat, David Kovacevic, T Sean Lynch, Charles M. Jobin, William N. Levine, Gerard A. Ateshian, Thomas R. Gardner, Christopher S. Ahmad, *Columbia University, New York, NY, United States*

2:30PM **Design Considerations for Glenoid Components: A Computational Stress Analysis of Translational Motion in Shoulder Replacements** SB³C2015-258
Christopher Berthelet[1], Farzana Ansari[1], Lisa Pruitt[1], Tom Norris[2], Steve Gunther[3], Michael Ries[4], *[1]University of California, Berkeley, Berkeley, CA, United States,[2]San Francisco Shoulder, Elbow & Hand Clinic, San Francisco, CA, United States,[3]Martha Jefferson Hospital, Charlottesville, VA, United States,[4]Tahoe Fracture and Orthopedic Clinic, Carson City, NV, United States*

2:45PM **Damage Analysis Of Metallic And Polymeric Bearings Used In Reverse Total Shoulder Arthroplasty** SB³C2015-192
Suzanne Chou[1], Isabel Yang[1], **Noah Bonnheim**[1], Farzana Ansari[1], Steve Gunther[2], Tom Norris[3], Michael Ries[4], Lisa Pruitt[1], *[1]University of California, Berkeley, Berkeley, CA, United States,[2]Martha Jefferson Hospital, Charlottesville, VA, United States,[3]San Francisco Shoulder, Elbow & Hand Clinic, San Francisco, CA, United States,[4]Tahoe Fracture and Orthopaedic Clinic, Carson City, NV, United States*

SATURDAY, JUNE 20	3:15pm - 4:45pm

Bone Tissue Engineering (joint with JSME) — Primrose A

Session Chair: Shigeo Tanaka, *Kanazawa University, Kanazawa, Japan*
Session Co-Chair: Ryan K. Roeder, *University of Notre Dame, Notre Dame, IN, United States*

3:15PM **Electromagnetic Field Stimulation Enhances Mechanical Properties Of Tissue-engineered Bone Constructed With Calcined Bovine Trabecular Bone Scaffold** SB³C2015-336
Shigeo Tanaka, Yuki Yamashita, *Kanazawa University, Kanazawa, Japan*

3:30PM **Development And Characterization Of Novel Bone Substitutes Using Composite Scaffolds With Mesenchymal Stem Cells** SB³C2015-267
Mitsugu Todo[1], Phanny Yos[2], *[1]Kyushu University, Kasuga, Japan,[2]Institute of Technology of Cambodia, Phnom Penh, Cambodia*

3:45PM **Hydroxyapatite Reinforced Collagen Scaffolds Designed for Improved Architecture, Mechanical Properties, and Tunable Growth Factor Delivery** SB³C2015-174
Ryan K. Roeder, Matthew J. Meagher, Holly E. Weiss-Bilka, Diane R. Wagner, Robert J. Kane, *University of Notre Dame, Notre Dame, IN, United States*

4:00PM **Microporosity Dominates Growth for Large and Small Macropores in BCP Scaffolds** SB³C2015-670
Amy Wagoner Johnson[1], Laurie Rustom[1], David Hoelzle[2], Mark Markel[3], Brett Nemke[3], Yan Lu[3], *[1]University of Illinois at Urbana-Champaign, Urbana, IL, United States,[2]University of Notre Dame, Notre Dame, IN, United States,[3]University of Wisconsin, Madison, WI, United States*

4:15PM **Fabrication Of Collagen Based 3-d Complex Constructs With Electrochemical Compaction Method** SB³C2015-154
Mousa Younesi[1], Vipuil Kishore[2], **Ozan Akkus**[1], *[1]Case Western Reserve University, Cleveland, OH, United States,[2]Florida institute of technology, Melborne, FL, United States*

SATURDAY, JUNE 20 | 3:15pm - 4:45pm

Spine Mechanics — Superior

Session Chair: Brian D. Stemper, *Medical College of Wisconsin, Milwaukee, WI, United States*
Session Co-Chair: Farid Amiriouch, *University of Illinois, Chicago, IL, United States*

3:15PM **SEM-based Multi-scale Mechanical Modeling of Lumbar Spine Facet Capsular Ligament During Biaxial Extension** SB³C2015-1054
Vahhab Zarei, Amy A. Claeson, Victor H. Barocas, *University of Minnesota, Minneapolis, MN, United States*

3:30PM **Simulation-Directed Design of Planar Biaxial Tests on the Lumbar Facet Capsular Ligament** SB³C2015-168
Amy A. Claeson, Victor H. Barocas, *University of Minnesota, Minneapolis, MN, United States*

3:45PM **Effect Of Implant Length And Orientation On Biomechanics Of Sacroiliac Joint Stabilization: A Finite Element Analysis** SB³C2015-1141
Ali Kiapour[1], Derek Lindsey[2], Scott Yerby[2], Vijay Goel[1], *[1]ECORE, Toledo, OH, United States,[2]Si-Bone Inc, San Jose, CA, United States*

4:00PM **Internal Disc Strain Template Highlights Regions of High Local Strain During Compression Loading and Validates a Finite Element Model** SB³C2015-1019
Brent L. Showalter[1], John F. DeLucca[2], John M. Peloquin[1], Daniel H. Cortes[2], Alexander C. Wright[1], James C. Gee[1], Edward J. Vresilovic[3], Dawn M. Elliott[2], *[1]University of Pennsylvania, Philadelphia, PA, United States,[2]University of Delaware, Newark, DE, United States,[3]Pennsylvania State University, Hershey, PA, United States*

4:15PM **Accuracy of QCT-Based Finite Element Predictions of Vertebral Fracture When Boundary Conditions are Based on Intradiscal Pressure Profiles** SB³C2015-313
Timothy Jackman, Alexander DelMonaco, Elise Morgan, *Boston University, Boston, MA, United States*

4:30PM **Differences In The Intradiscal Pressure In The L4-L5 And L5-S1 Lumbar Segments** SB³C2015-196
Hector E. Jaramillo[1], Christian M. Puttlitz[2], Jose J. Garcia[3], Kirk McGilvray[2], *[1]Universidad Autonoma de Occidente, Cali, Colombia,[2]Colorado State University, Fort Collins, CO, United States,[3]Universidad del Valle, Cali, Colombia*

SATURDAY, JUNE 20 | 3:15pm - 4:45pm

Biological Flows in the Interstitium and Lymphatics — Wasatch

Session Chair: Brandon Dixon, *Georgia Institute of Technology, Atlanta, GA, United States*
Session Co-Chair: Walter Lee Murfee, *Tulane University, New Orleans, LA,United States*

3:15PM **A Poroelastic Fluid/Structure-Interaction Model of the Spinal Cord and Surrounding Structures with a Cord Syrinx and Associated Stenosis of the Subarachnoid Space** SB³C2015-197
Christopher D. Bertram[1], Matthias Heil[2], *[1]University of Sydney, New South Wales, Australia,[2]University of Manchester, Manchester, United Kingdom*

3:30PM **Neural Tissue Deformation And Cerebrospinal Fluid Flow Impedance Are Positevely Correlated At The Craniocervical Junction** SB³C2015-634
Bryn A. Martin[1], Nicholas Shaffer[1], John N. Oshinski[2], Mark Luciano[3], Francis Loth[1], *[1]The University of Akron, Akron, OH, United States,[2]Emory University, Atlanta, GA, United States,[3]Cleveland Clinic Foundation, Cleveland, OH, United States*

3:45PM **In Silico and In Vitro Modelling of Flow Behaviour in Lymphatic Vessels.** SB³C2015-222
Sinéad T. Morley[1,2,3], David T. Newport[1,4], Michael T. Walsh[1,2,3], *[1]University of Limerick, Limerick, Ireland,[2]Centre for Applied Biomedical Engineering Research, Limerick, Ireland,[3]Materials and Surface Science Institute, Limerick, Ireland,[4]Stokes Institute, Limerick, Ireland*

4:00PM **Quantification of Lymphatic Valve Resistance to Forward Flow Using Computational Fluid and Solid Modeling** SB³C2015-560
John T. Wilson[1], Raoul van Loon[2], James E. Moore[1], *[1]Imperial College London, London, United Kingdom,[2]Swansea University, Swansea, United Kingdom*

4:15PM **A New Paradigm for the Contribution of Active Tension to the Constitutive Relation in Small Lymphatic Vessels** SB³C2015-198
Christopher D. Bertram[1], Charlie Macaskill[1], Michael J. Davis[2], James E. Moore[3], *[1]University of Sydney, New South Wales, Australia,[2]University of Missouri School of Medicine, Columbia, MO, United States,[3]Imperial College, London, United Kingdom*

4:30PM **Spatiotemporal Image Correlation Spectroscopy Techniques for Quantifying Fluid Flow in Microfluidic Channels and Porous Tissues** SB³C2015-472
Brian T. Graham, Christopher Price, *University of Delaware, Newark, DE, United States*

SATURDAY, JUNE 20	**3:15pm - 4:45pm**

Micromechanics of Atherosclerosis — Magpie

Session Chair: Dalin Tang, *Worcester Polytechnic Institute, Worcester, MA, United States*
Session Co-Chair: Susan Lessner, *University of South Carolina, Columbia, SC,United States*

3:15PM **On the Effect of Calcific Content on the Mechanical Behaviour of Carotid Plaque Tissue** SB³C2015-359
Hilary E. Barrett, *University of Limerick, Limerick, Ireland*

3:30PM **Intima Heterogeneity In Atherosclerotic Plaque Stress Calculations** SB³C2015-451
Lambert Speelman[1], Bas Van Velzen[2], Anton F. W. Van der Steen[1,2], Jolanda J. Wentzel[1], Frank J. H. Gijsen[1], *[1]Erasmus MC, Rotterdam, Netherlands,[2]Delft University of Technology, Delft, Netherlands*

3:45PM **Diet-induced Vascular Remodeling Produces a Shift in Collagen Fiber Angle Distribution in a Mouse Model of Atherosclerosis** SB³C2015-508
Shana R. Watson, Piaomu Liu, Edsel A. Pena, Michael A. Sutton, John F. Eberth, Susan M. Lessner, *University of South Carolina, Columbia, SC, United States*

4:00PM **Towards the Development of an Atherosclerotic Plaque Stratification Parameter to Predict Arterial Restenotic Response following Endovascular Treatment** SB³C2015-379
Eoghan M. Cunnane[1], Hilary E. Barrett[1], Eamon G. Kavanagh[2], Michael T. Walsh[1], *[1]University of Limerick, Limerick, Ireland,[2]University Hospital Limerick, Limerick, Ireland*

4:15PM **Reconstruction of Incomplete Lipid Pool Geometry for Stress Calculations in Atherosclerotic Arteries** SB³C2015-362
Annette M. Kok, Lambert Speelman, Frank J. H. Gijsen, Jolanda J. Wentzel, *Erasmus MC, Rotterdam, Netherlands*

4:30PM **MMP-2 Expression and the Tissue Mechanics of Human Ascending Thoracic Aortic Aneurysms** SB³C2015-405
Alexander A. Emmott[1,2], Nastaran Shahmansouri[1,2], Mohammed Alreshidan[3], Stefanie Pohlod[1], Rosaire Mongrain[1], Raymond Cartier[2], Kevin Lachapelle[3], Richard Leask[1,2], *[1]McGill University, Montreal, QC, Canada,[2]Montreal Heart Institute, Montreal, QC, Canada,[3]Royal Victoria Hospital, Montreal, QC, Canada*

SATURDAY, JUNE 20	3:15pm - 4:45pm

Mechanotransduction II - Interactions between Cells and Their Environment (joint with JSME)

Maybird

Session Chair: Toshiro Ohashi, *Hokkaido University, Sapporo, Japan*
Session Co-Chair: Chelsey Simmons, *University of Florida, Gainesville, FL, United States*

3:15PM **A Microtissue Array Device To Screen The Lung Fibrogenic Potential Of Carbon Nanotubes** SB³C2015-350
Zhaowei Chen, Qixin Wang, Mohammadnabi Asmani, Yan Li, Yun Wu, **Ruogang Zhao**, *State University of New York at Buffalo, Buffalo, NY, United States*

3:30PM **The Impact of Pre-stretch Induced Surface Anisotropy on Axonal Regeneration** SB³C2015-464
Chun Liu, Seungik Baek, **Christina Chan**, *Michigan State University, East Lansing, MI, United States*

3:45PM **Excessive Mechanical Loading Causes Aberrant Differentiation Of Tendon Stem Cells (TSCs) That Leads To The Development Of Degenerative Tendinopathy** SB³C2015-227
Jianying Zhang, **James H-C. Wang**, *University of Pittsburgh, Pittsburgh, PA, United States*

4:00PM **Both Nuclear And Extracellular Matrix Rigidity Determine The Stable Size Of Focal Adhesion Plaques** SB³C2015-228
Xuan Cao, Tristan P. Driscoll, Robert L. Mauck, Vivek B. Shenoy, *University of Pennsylvania, Philadelphia, PA, United States*

4:15PM **Role Of Cell Tension On Anisotropic Mechanosensing** SB³C2015-1106
Shin Min Wen, Pen Hsiu Grace Chao, *National Taiwan university, TAIPEI, Taiwan*

4:30PM **Osteocyte Mechanotransduction During Low Magnitude Mechanical Stimulation** SB³C2015-1121
Thomas R. Coughlin, Tyler C. Kreipke, Glen L. Niebur, *University of Notre Dame, Notre Dame, IN, United States*

SATURDAY, JUNE 20	3:15pm - 4:45pm

Injury Biomechanics II - Head to Foot, Modeling, Risk

Golden Cliff / Eagle's Nest

Session Chair: Steven Rowson, *Virginia Tech, Blacksburg, VA, United States*
Session Co-Chair: Ken Monson, *University of Utah, Salt Lake City, UT, United States*

3:15PM **The Effect of Grade II and Grade III Ankle Injury on the Ankle Joint Complex Kinematics and Achilles Load: A Cadaveric Study** SB³C2015-529
Bardiya Akhbari, Matthew H. Dickinson, Ednah G. Louie, Sami Shalhoub, Lorin P. Maletsky, *University of Kansas, Lawrence, KS, United States*

3:30PM **Driver Injury Risk Sensitivity in Finite Element Model Reconstructions of Real World Motor Vehicle Crashes** SB³C2015-602
James P. Gaewsky, Ashley A. Weaver, Bharath Koya, Joel D. Stitzel, *Wake Forest University, Winston-Salem, NC, United States*

3:45PM **Head-neck Relative Posture Affects Fracture Outcome of the Basilar Skull and Upper Cervical Spine under Helmeted Head Crown Impact** SB³C2015-571
Liming Voo, Kyle Ott, Christopher Dooley, Andrew Merkle, *Johns Hopkins University Applied Physics Laboratory, Laurel, MD, United States*

4:00PM **Investigation of Head Rotational Impulse Characteristics on Brain Strain Responses** SB³C2015-39
Wei Zhao, Songbai Ji, *Dartmouth College, Hanover, NH, United States*

4:15PM **Development of a 5th Percentile Female Finite Element Model Using a Multi-Modality Image Dataset** SB³C2015-1038
Matthew L. Davis, Bharath Koya, Jeremy M. Schap, F. Scott Gayzik, *Virginia Tech-Wake Forest University, Winston Salem, NC, United States*

4:30PM **Embedded Finite Elements For Modeling Traumatic Axonal Injury** SB³C2015-1117
Reuben H. Kraft, Harsha T. Garimella, *The Pennsylvania State University, University Park, PA, United States*

SATURDAY, JUNE 20	3:15pm - 4:45pm

Lower Extremity Mechanics — Primrose B

Session Chair: Lorin Maletsky, *University of Kansas, Lawrence, KS, United States*
Session Co-Chair: Ferris Pfeiffer, *University of Missouri, Columbia, MO, United States*

3:15PM **Understanding the Mechanics of Focal Chondral Defects in the Hip: a Framework to Advance Treatment Options** SB³C2015-596
Brenden J. Klennert, Benjamin J. Ellis, Travis G. Maak, Ashley Kapron, Tyler O. Kaiser, Jeffrey A. Weiss, *University of Utah, Salt Lake City, UT, United States*

3:30PM **Specimen-Specific Evaluation of a Multi-Body Model Predicts Instability and Increased Meniscal Load in the Anterior Cruciate Ligament-Deficient Knee** SB³C2015-375
Mohammad Kia, Kevin Schafer, Daniel Green, Andrew Pearle, Thomas Wickiewicz, Timothy Wright, Carl Imhauser, *Hospital for Special Surgery, New York, NY, United States*

3:45PM **In-Vivo Kinematics of the Asymptomatic Hip during Dynamic Pivoting: Foundations for the Evaluation of Femoroacetabular Impingement** SB³C2015-306
Penny R. Atkins, Niccolo M. Fiorentino, Michael J. Kutschke, Sara J. Fauver, Ashley L. Kapron, Christopher L. Peters, Stephen K. Aoki, Andrew E. Anderson, *University of Utah, Salt Lake City, UT, United States*

4:00PM **Open Knee(s): Magnetic Resonance Imaging for Specimen-specific Next Generation Knee Models** SB³C2015-581
Craig Bennetts[1], Snehal Chokhandre[1], Shannon Donnola[2], Chris Flask[2], Tara Bonner[1], Robb Colbrunn[1], Ahmet Erdemir[1], *[1]Cleveland Clinic, Cleveland, OH, United States,[2]Case Western Reserve University, Cleveland, OH, United States*

4:15PM **A New Joint Coordinate System for Robotic Testing of Cadaveric Knee Specimens** SB³C2015-554
Daniel Boguszewski, Nirav Joshi, Edward Cheung, Paul Yang, Keith Markolf, David McAllister, *UCLA, Los Angeles, CA, United States*

4:30PM **Do The Laxities Of The Normal Knee At 0° And 90° Of Flexion Support The Goal Of Gap-balancing A Total Knee Arthroplasty?** SB³C2015-30
Joshua D. Roth, Stephen M. Howell, Maury L. Hull, *University of California, Davis, Davis, CA, United States*

SATURDAY, JUNE 20	5:00pm - 6:00pm

LISSNER LECTURE – James A. Ashton-Miller — Ballrooms 1-3

AUTHOR INDEX

Author Index

Session Chair/Co-Chair Index

The Relationship of SB^{3}C to the ASME Bioengineering Division

The Summer Bioengineering Conference (SBC) series has a long history as a high-quality, multidisciplinary, biomedical engineering event organized by the Bioengineering Division (BED) of the American Society of Mechanical Engineers (ASME). A hallmark of these meetings has been the interaction and integration of engineering principles and contemporary biological concepts. The Summer Biomechanics, Bioengineering and Biotransport Conference (SB^{3}C) is a volunteer-initiated, new annual meeting that preserves the essence of what we have all come to love in our summer annual – high impact science delivered in a student-friendly, casual resort style venue designed to promote informal networking.

The biennial and successful SBC in its modern format was organized from 1993 through 2003 independent of ASME. Beginning in 2005, the BED moved away from holding its committee meetings at the IMECE and elected to make the SBC an annual conference with the sponsorship of our parent society. Boscov's Travel has managed every SBC since 1993 with the exception of only one year – when we combined with the World Congress of Biomechanics in 2014. This long history of mutual trust and respect has led to the SB^{3}C that was given life with the financial backing of Boscov's Travel. Special thanks to Pat Cinfici, Debbie Pasquale and the Boscov's Travel team for making the SB^{3}C a reality.

Since rejoining SBC with ASME in 2005, the relationship between the BED and ASME has been turbulent. In 2013, senior BED leaders met with ASME staff at Society headquarters in New York City in an effort to reconcile differences and chart a productive path for our future. However, ASME's response was to put in place a set of conference planning rules that would have 1) Resulted in increased conference registration fees; 2) Removed all authority of conference organizers and the BED in business decisions that include selection of the conference venue, timing and budget planning and allocation; and 3) Removed Boscov's Travel from conference planning, instead using ASME's in-house conference planning service. As a result, in 2014 the BED Executive Committee voted unanimously not to hold the SBC 2015, like many other ASME Technical Divisions. The 2015 SB^{3}C meeting has been organized independently by a group of dedicated volunteers, preserving the ethos, structure and features of our summer meetings.

That being said, many attendees at the SB^{3}C2015 meeting are also BED members, and the BED continues as a viable and dynamic entity. It is therefore sensible and appropriate to conduct BED-related business at SB^{3}C. For example, attendees, **including particularly student attendees**, are most welcome, and indeed encouraged, to attend the many open BED-related committee meetings during SB^{3}C; doing so is professionally valuable and, dare we say it, even somewhat enjoyable. Further, we as a community will honor and recognize outstanding members of the division, such as our ASME Award winners and new ASME Fellows.

2015 SB^{3}C CONFERENCE ORGANIZERS

C. Ross Ethier, Conference Chair
Georgia Institute of Technology/Emory

Jeff Weiss, Program Chair
University of Utah

Richard Leask (Information Chair), McGill University

Tammy Haut-Donahue (Local Arrangements Chair), Colorado State University

Malisa Sarntinoranont (Publications Chair), University of Florida

Steven Abramowitch (Student Paper Competition), University of Pittsburgh

Crawford Downs (Exhibits Chair), University of Alabama at Birmingham

Rita Patterson (Finance Chair), University of North Texas

Tamara Bush (Undergraduate Design Competition), Michigan State University

David Schreier (Student Leadership Committee) University of Wisconsin

Bryn Martin (Member-at-Large), Conquer Chiari Research Center at University of Akron

Joel Berry (Member-at-Large), University of Alabama at Birmingham

LOCAL ARRANGEMENTS COMMITTEE

Tammy Haut-Donahue (Chair), Colorado State University

Heath Henniger, University of Utah

Kristine Fischenich (Student), Colorado State University

PROGRAM COMMITTEE

Rupak Banerjee (Chair, Biotransport Technical Committee), University of Cincinnati

Marissa Rylander (Vice Chair, Biotransport Technical Committee), Virginia Tech

Rob Mauck (Chair, Cell & Tissue Engineering Technical Committee), University of Pennsylvania

Ed Guo (Vice Chair, Cell & Tissue Engineering Technical Committee), Columbia University

Martin Tanaka (Chair, Design, Dynamics & Rehabilitation Technical Committee), Western Carolina University

Tammy Bush (Vice Chair, Design, Dynamics & Rehabilitation Technical Committee), Michigan State University

Francis Loth (Chair, Fluid Mechanics Technical Committee), University of Akron

Keefe B. Manning (Vice Chair, Fluid Mechanics Technical Committee), Pennsylvania State University

Rich Debski (Chair, Solid Mechanics Technical Committee), University of Pittsburgh

Laurel Kuxhaus (Chair, Education Committee), Clarkson University

Sarah L. Kieweg (Vice Chair, Education Committee), University of Kansas

Steven Abramowitch (Chair, Student Paper Competition), University of Pittsburgh

Eric Kennedy (Chair, PhD-Level Student Paper Competition), Bucknell University

Spencer Lake (Chair, MS-Level Student Paper Competition), Washington University

Rouzbeh Amini (Chair, BS-Level Student Paper Competition), University of Akron

BIOENGINEERING DIVISION EXECUTIVE COMMITTEE

Matthew Gounis (Chair), University of Massachusetts Medical School

David A. Vorp (Past Chair), University of Pittsburgh

Sara E. Wilson (Secretary), University of Kansas

Charles Y. Lee (Secretary Elect), University of North Carolina Charlotte

Ross Ethier (Member in Charge of Technical Committees), Georgia Tech/Emory

Jeffrey Holmes (Member in Charge of Member Affairs), University of Virginia

Jeffrey E. Bischoff (Member in Charge of External Affairs), Zimmer, Inc.

Rita Patterson (Treasurer), University of North Texas

Kristen Billiar (Member in Charge of Student Affairs), Worcester Polytechnic Institute

Tammy Haut-Donahue (Member-at-Large), Colorado State University

Tim McGloughlin (International Member-at-Large), Khalifa University

Journal of Biomechanical Engineering

The *Journal of Biomechanical Engineering* reports research results involving the application of mechanical engineering knowledge, skills and principles to the conception, design, development, analysis, and operation of biomechanical systems, including: artificial organs and prostheses; bioinstrumentation and measurements; bioheat transfer; biomaterials; biomechanics; bioprocess engineering; cellular mechanics; design and control of biological systems; and physiological systems.

Website: http://www.asmedl.org/Biomechanical

Editors: Drs. Beth Winkelstein (University of Pennsylvania) and Victor Barocas (University of Minnesota)

Published: Monthly

Journal of Medical Devices

Focusing on applied research and the development of new medical devices or instrumentation, this journal presents papers on devices that improve diagnostic interventional and therapeutic treatments. It provides special coverage of novel devices that allow new surgical strategies, new methods of drug delivery, or possible reductions in the complexity, cost or adverse results of health care. The Design Innovation category features papers focusing on novel devices, including some with limited clinical or engineering results. The Medical Device News section provides coverage of advances, trends, and events.

Website: http://www.asmedl.org/MedicalDevices

Editors: Dr. Arthur G. Erdman (University of Minnesota) and Dr. Gerald E. Miller (Virginia Commonwealth University)

Published: Quarterly

Journal of Nanotechnology in Engineering and Medicine

The *ASME Journal of Nanotechnology in Engineering and Medicine* provides an interdisciplinary forum uniquely focused on conveying advancements in nanoscience and applications of nanostructures and nanomaterials to the creative conception, design, development, analysis, control and operation of devices and technologies in engineering, medical, and life science systems. High-quality contributions of three types are sought: original research reports addressing nanoscale phenomena, synthesis and analysis of nanomaterials and devices, and applications of these; reviews of emerging nanotechnology topics and research needs to impact engineering and medicine; and opinions/views on the developments and potential applications of nanoscience, engineering and technology.

Website: http://www.asmedl.org/Nanoengineeringmedical

Editor: Dr. Boris Khusid (New Jersey Institute of Technology)

Published: Quarterly

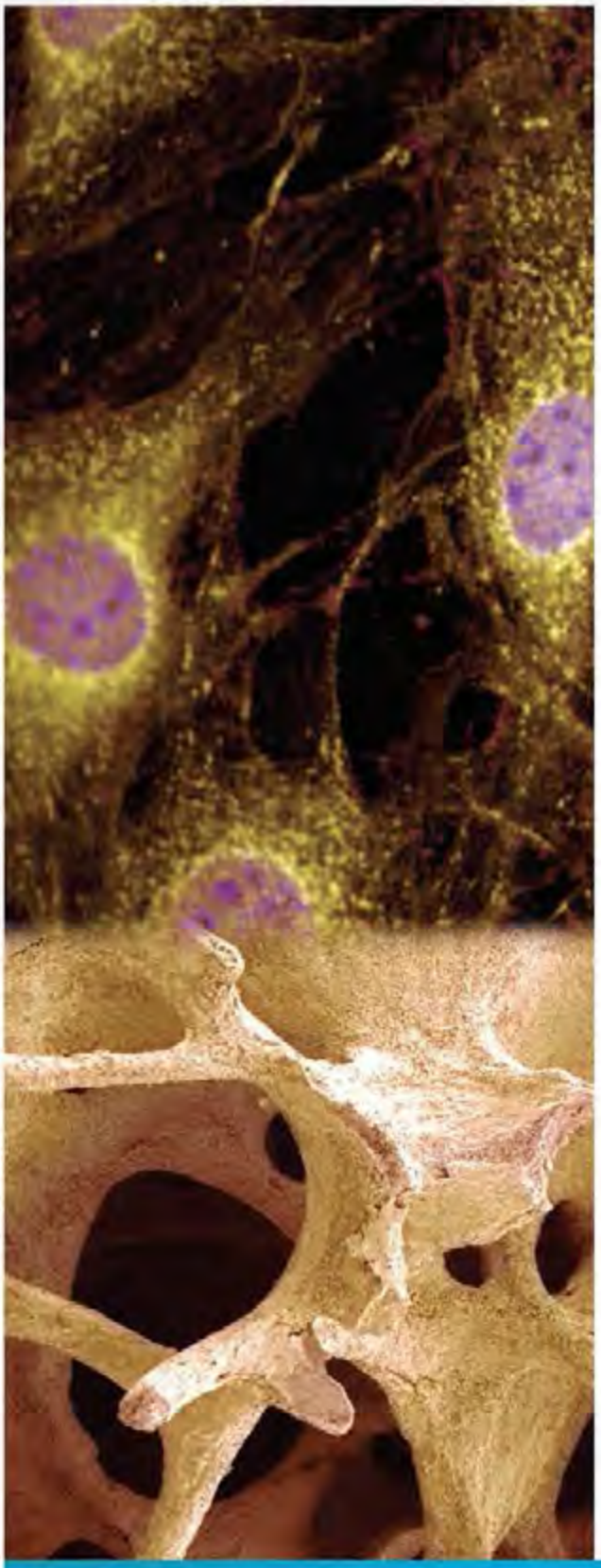
FOLLOW
THE FORCE

Biomechanics, Engineering, Science,… the World is fundamentally multi-axial. The complexity of these environments can only be accurately observed, measured and tested with multi-axis instruments.

AMTI innovative technology creates the most reliable and precise multi-axis force platorms and sensors. AMTI joint simulators provide true to life testing environments capble of simulating all joint motions and loads of the human body.

AMTI always surpasses the boundaries, so Follow the Force and visit us at our booth or at WWW.AMTI.BIZ

AMTI
FORCE AND MOTION



Your success. Our mission.™

Your research demands a customized approach.

And we deliver. With Bose® biomedical instruments, you can mimic virtually any *in vivo* conditions for native and engineered tissues – from pulsatile heartbeat loading to walking gait waveforms. We also know that your research requires more than just a great machine. That's why Bose provides **Above & Beyond™ support:** start-to-finish customer assistance from application specialists that goes further than anyone in the industry to make sure we're matching your needs every step of the way.

You can also count on industry-leading reliability. Our patented zero-friction **ElectroForce® technology** is virtually maintenance free and comes with the only 10-year warranty in the business. Which means you not only get a more complete solution – but one that will also stand the test of time.

Testing Solutions for
Biomaterials • Medical Devices • Engineered Materials

BOSE

bose-electroforce.com

simpleware

Software for 3D Image Visualization, Analysis and Model Generation

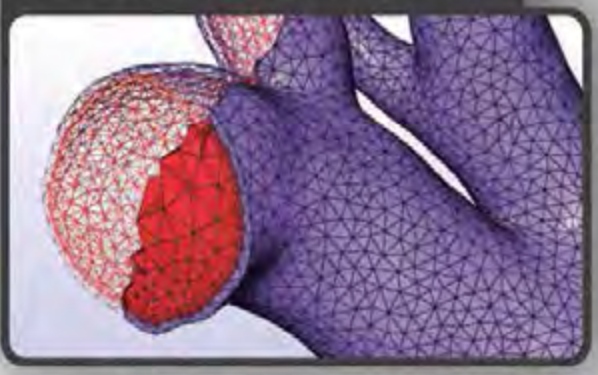
- Process data from a wide range of 3D imaging modalities
- Advanced segmentation and measurement tools
- Industry leading automated, robust and fast multi-part meshing
- Direct export to all leading FEA and CFD solvers
- Customizable with scripting and macros

Download Free Trial

Visualization & 3D Image Processing

Accurately reconstruct, process and quantify 3D image data

Model Generation for CAD and CAE



Generate watertight computational models for design and simulation

Integrate CAD and 3D Image Data

Position medical devices within anatomies

3D Printing

Create and optimize models for 3D printing

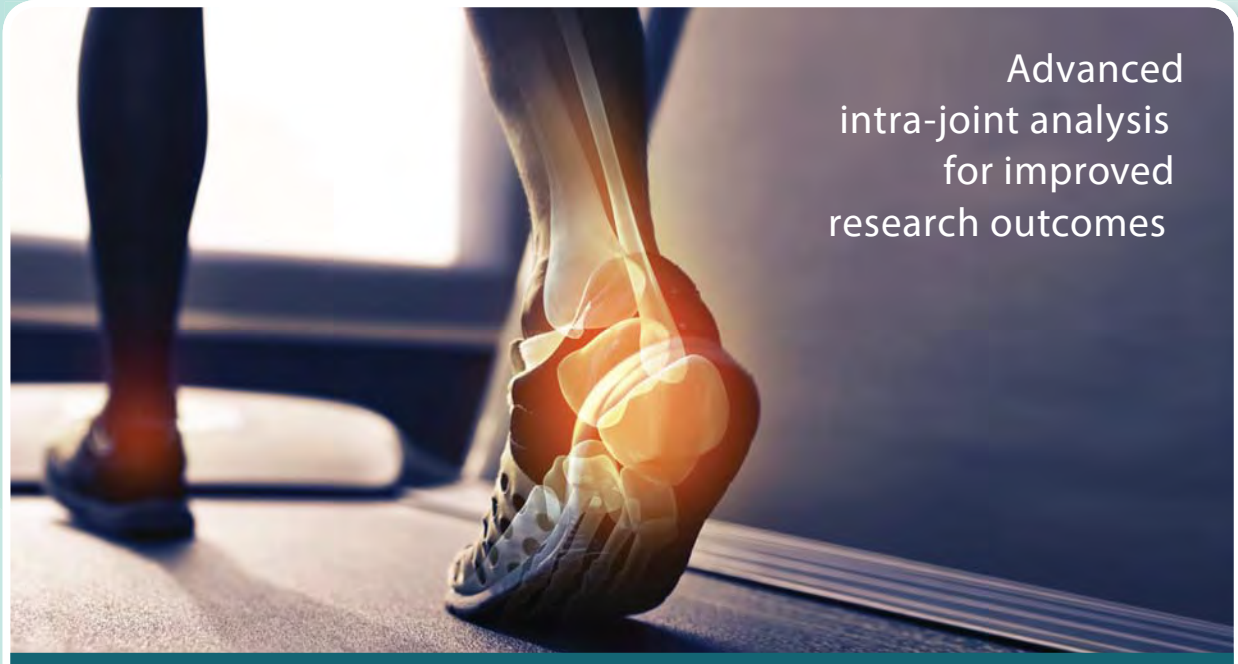
www.simpleware.com | info@simpleware.com |

Tekscan®

Ultra-thin sensors

Better Data.
Better Decisions.
Better Results.

- Accurate & reliable pressure data
- Peer accepted & research validated systems
- Synchronize with external systems



Objective plantar pressure data for enhanced gait analysis

> VISIT THE TEKSCAN BOOTH FOR A DEMONSTRATION

+1.617.464.4281 | 1.800.248.3669 | info@tekscan.com | www.tekscan.com/medical

Static and Dynamic Biomechanical Test Equipment

www.testresources.net

PRODUCT LINE

Our test machines have a unique modular design of interchangeable components. Modularity ensures affordable highly flexible systems that can be configured to serve a wide range of applications.

STATIC & DYNAMIC TEST MACHINES

Our electrodynamic test machines are the best of both worlds: delivering a broad speed range of .001 hz to 15 hz and forces from 50 grams to 100 Kn.

SERVO HYDRAULIC TEST MACHINES

TestResources also offers electromechanical and servo hydraulic machines to match your static and dynamic test applications. For test requirements of 25 to 100 kN, take a look at our 900 Series product line on our website.

Call our engineers today!

800.430.6536

www.testresources.net

830 Family Electrodynamic Axial Torsion Test Machine

- TestResources presents a modular product family of biomechanical test equipment made for flexibility and affordability
- Our turnkey design allows for ease of use and convenient service
- With a reputation as creative problem solvers, TestResources has delivered innovative solutions to over 2000 customers located in more than 25 countries - including top biomechanics research universities and major medical companies all over the world.

910 Family Servo Hydraulic Test Machine

SB3C biomechanics. bioengineering. biotransport.

Stop by our booth at SB3C! Our engineers want to help you with your biomechanical testing application.

574LE Family Electrodynamic Planar Biaxial Test Machine

Mechanical Stimulation

BioReactors allow you to stimulate your cells inside an incubator environment. CellScale has several systems to support your research goals.

Materials Testing

Biomaterials require test systems tailored to the task. Our systems help you mount, test, and analyse your tissues quickly and accurately.

Micro-Scale Testing

Test samples as small as 50µm and resolve forces as low as 10nN using piezoelectric micropositioning and realtime image feedback.

CellScale
biomaterials testing

BIOENGINEERING AT PITT

EXPERIENCES BEYOND THE CLASSROOM

The Department of Bioengineering at the University of Pittsburgh combines hands-on experience with fundamentals that students need to advance themselves in research, medicine, and industry. The department has a unique relationship with the University of Pittsburgh Medical Center as well as neighboring Carnegie Mellon University. Our faculty are able to offer our graduate and undergraduate students access to state-of-the-art facilities and an array of research opportunities.

Our department is growing rapidly, and increasing the diversity of our research. The Pittsburgh bioengineering community is a vibrant and stimulating alliance of diverse components for which our department forms an essential and central connection.

UNDERGRADUATE PROGRAM

The undergraduate bioengineering program seeks to prepare students to meet their postgraduate goals of industrial careers, graduate school, and professional school such as medical, dental, and law school.

To achieve this objective, students will be:

a. Provided with a broad knowledge of the technical and social principles of bioengineering as well as a focused education in one concentration area within bioengineering, and;

b. Prepared through educational experiences beyond the classroom that deepen their understanding of the technical and non-technical issues in bioengineering process and design.

The BS in Bioengineering program is accredited by the Engineering Accreditation Commission of ABET (www.abet.org).

GRADUATE PROGRAM

The Department of Bioengineering has an active, interdisciplinary graduate program in conjunction with faculty from other schools within the University, as well as the clinical staffs at the UPMC hospitals.

The scope of the program is broadly defined to incorporate the application of engineering principles, methods, and technology in two broad areas:

- Scientific inquiries into fundamental biological phenomena
- Development of instrumentation, materials, devices, and systems relative to application in the biological sciences and medicine

engineering.pitt.edu/bioengineering

University of Pittsburgh | Swanson School of Engineering | Department of Bioengineering
302 Benedum Hall | 3700 O'Hara Street | Pittsburgh, PA 15260
bioegradinfo@pitt.edu | **412-624-6445**

PITT | SWANSON ENGINEERING
BIOENGINEERING

VirginiaTech

Invent the Future®

Department of Biomedical Engineering and Mechanics

www.beam.vt.edu

ASME BED Student Leadership Comittee

SB3C biomechanics. bioengineering. biotransport.

sb3c.com

Student Leadership Committee Planned Events

- **Thursday June 18th: Group hike and social**

  Join your fellow grad students for either an easy hike around Snowbird center, or take the tram up to the top of Hidden Peak to explore the Wasatch Mountains.

  Time: 3pm-till
  Location: meet at Snowbird Center Level 3 Plaza Deck

- **Friday June 19th: Strategies for a successful post-doctoral experience**

  Attend this session for fantastic advice from current post-docs, professors, and NSF and NIH program officers regarding post-doctoral training experiences. A short presentation will be made by Dr. Zeynep Erim, NIH Program Officer in the Division of Interdisciplinary Training at NIBIB, with a Q&A panel session to follow.

  Time: 8-9:30 am
  Location: Primrose A

- **Saturday June 20th: Job interview workshop**

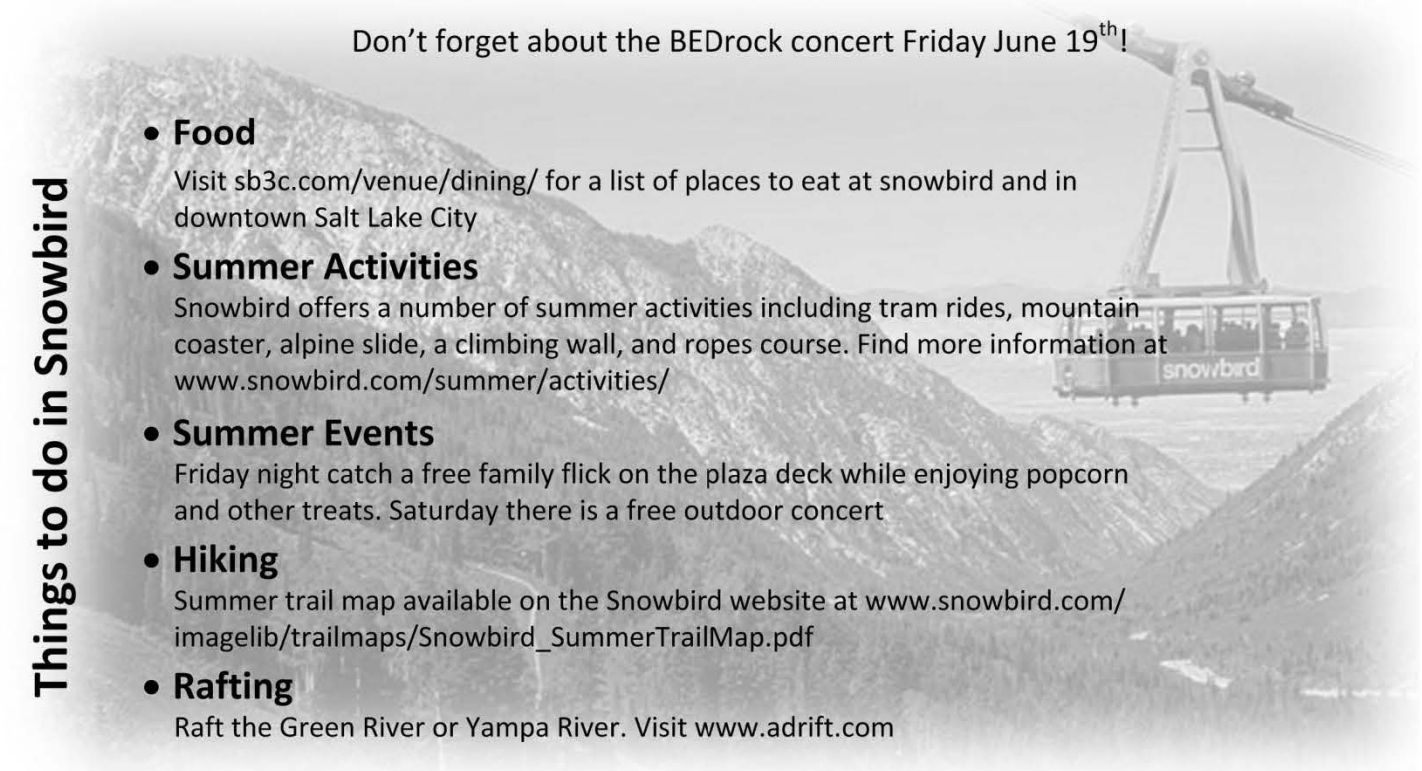
  Come join us for a workshop where professionals from academia, industry and government will provide valuable insight about the interview process and helpful interview preparation tips. This workshop will include both a mock interview demonstration as well as an open Q&A session.

  Time: 11:30-1pm
  Location: Golden Cliff Eagles Nest

For more information and live updates about the events follow us on Facebook (ASME Bioengineering Division) and on twitter (@asmebedstudents)

Don't forget about the BEDrock concert Friday June 19th!

Things to do in Snowbird



- **Food**
  Visit sb3c.com/venue/dining/ for a list of places to eat at snowbird and in downtown Salt Lake City
- **Summer Activities**
  Snowbird offers a number of summer activities including tram rides, mountain coaster, alpine slide, a climbing wall, and ropes course. Find more information at www.snowbird.com/summer/activities/
- **Summer Events**
  Friday night catch a free family flick on the plaza deck while enjoying popcorn and other treats. Saturday there is a free outdoor concert
- **Hiking**
  Summer trail map available on the Snowbird website at www.snowbird.com/imagelib/trailmaps/Snowbird_SummerTrailMap.pdf
- **Rafting**
  Raft the Green River or Yampa River. Visit www.adrift.com

Find more information at www.snowbird.com

The 2015 Summer Biomechanics, Bioengineering and Biotransport Conference (SB^{3}C) organizers gratefully acknowledge the support of our Industry and Academic Sponsors.

New for SB^{3}C 2015!! People's Choice Award for Best Posters!

We already know how awesome the Student Paper Competition is, and how prizes are awarded to the best MSc and BSc posters. But what about posters that are not part of the Student Paper Competition, e.g. given by PhD students, postdocs or PIs? Shouldn't they get some love too?

Yes, we agree. That's why we are running a new award for the best posters. Here are the rules:

1. At any time until noon (Mountain time) on Saturday June 20, each conference attendee can send SMS (text) messages to **(770) 203-1288** to vote for their favorite posters. Normal SMS message charges apply.
2. **Every presented poster is eligible.**
3. Attendees can vote for up to 6 posters in total: up to three from Thursday's session and up to three from Friday's session.
4. Your text message(s) can contain one or more poster numbers; if you want to include more than one poster number in a message, separate the poster numbers by spaces. For example, the SMS message "1 66 19" votes for posters 1, 66 and 19. Order does not matter.
5. You can send multiple text messages. However, only the first 6 unique votes received from a given phone number count.
6. The authors of the top posters, based on number of votes received, will receive significant cash prizes at the Conference Banquet on Saturday evening. Plus, winners get bragging rights. Lots of bragging rights…

So get out your cell phones and vote! (770) 203-1288

SB^{3}C 2015 - PROGRAM AT A GLANCE

Room	Primrose A	Superior	Wasatch	Magpie	Maybird	Golden Cliff/ Eagles Nest	Primrose B
WEDNESDAY, June 17, 2015							
7 am - 3:30 pm	**Committee Meetings (Ballroom 1, 2, or 3)**						
3:45 - 5:15 pm	Ocular Biomechanics I	Vascular Disease and Therapeutic Intervention	Atherosclerosis	Nano, Micro and Multiscale Mechanics	Organs, Morphogenesis, and Collective Cell Behavior	Multiscale Modeling in Biotransport	Muscle and Joint Loading
5:15 - 5:30 pm	**Break**						
5:30 - 7:00 pm	Ocular Biomechanics II	Modeling and Simulation of Cardiovascular Therapies	Cardiovascular Diagnostics and Imaging	Multiscale Biomechanics: Musculoskeletal, Joint and Tissue	Musculoskeletal Tissue Engr: Mol Soluble and Mech Reg of Tissue Dev	Transport at the Nano- and Microscale	Ligament and Tendon
7:00 - 9:00 pm	**Opening Reception (Conference Center Terrace)**						
THURSDAY, June 18, 2015							
7:00 - 8:00 am	**Breakfast (Ballroom Lobby and Mezzanine)**						
All Day	**Industry Exhibits (Ballroom Lobby and Mezzanine)**						
8:00 - 9:00 am	**PLENARY SESSION I – Margaret Gardel, University of Chicago (Ballrooms 1-3)**						
9:00 - 9:15 am	**Break**						
9:15 -10:45 am	Brain Injury Biomechanics	Dynamics and Rehabilitation	Cerebral and Aortic Aneurysms	Role of Microstructure of Aneurysms	Musculoskeletal Tissue Engineering: Matrix and Interfaces	Transport in Tissue and Tumor Microenvironments	Cartilage and Intervertebral Disc
10:45 - 11 am	**Break**						
11 - 12:30 pm	Biomechanics of Microcirculation*	Human Dynamics	Thrombus Prediction	Heart Valve Structure and Function	Nano, Micro and Multiscale Mech of Cells and Tissues	Cryotherapy and Hyperthermia: Celebration for Prof. A. Shitzer	Cartilage Mechanics and Repair*
12:30 -2:30 pm	**POSTER SESSION I --- Posters with Lunch Including BS & MS Student Paper Competitions** (Event Tent)**						
FRIDAY, June 19, 2015							
7:00 - 8:00 am	**Breakfast (Ballroom Lobby and Mezzanine)**						
All Day	**Industry Exhibits (Ballroom Lobby and Mezzanine)**						
8:00 - 9:30 am	Mow and Fung Lectures (Primrose A and B)	Workshop - Problem-based Learning in Biomechanics	CFD Challenge 2015	Workshop - Mentee-Mentor Matching Mixer & Best Practices	Workshop – Strategies for a Successful Postdoc Experience		Mow and Fung Lectures (Primrose A and B)
9:30 - 9:45 am	**Break**						
9:45 -10:45 am	**PLENARY SESSION II – Andrew McCulloch, University of California San Diego (Ballrooms 1-3)**						
10:45 - 11 am	**Break**						
11 - 12:30 pm	PhD Competition: Biofluid Mechanics	PhD Competition: Biotransport and Simulation	PhD Competition: Cellular and Tissue Engineering	PhD Competition: Mechanics and Rehabilitation	PhD Competition: Tissue Mechanics - Characterization	Undergraduate Design Competition	PhD Competition: Tissue Mechanics– Injury and Repair
12:30 -3:00 pm	**POSTER SESSION II --- Posters with Lunch ** (Event Tent)**						
3:00 - 4:30 pm	Bone Structure, Mechanics and Function	Joint Motion and Rehabilitation	Cardiovascular Imaging	Solid Mechanics: Vasc Remodeling and Stented Flow	Cardiovascular Tissue Engineering	The Cellular Microenvironment*	Soft Tissue Mechanics
8:00 -11:00 pm	**BEDROCK CONCERT (Plaza Deck)**						
SATURDAY, June 20, 2015							
Afternoon	**Industry Exhibits (Ballroom Lobby and Mezzanine)**						
11:30 am-1 pm	Workshop - Critical Steps in a Successful Mentorship Plan	Workshop - Teaching Undergraduate Design	SimVascular Workshop and New User Training	FEBio Workshop and Discussion	Workshop - Exp & Comp Frameworks for Biotransport in Tumors	Workshop – Taking the Guesswork out of the Interview Process	Workshop - Robotic Test Sys to Study Joint and Tissue Function
1:00-1:30 pm	**Break**						
1:30-3:00 pm	Heart Valves and Cardiovascular Devices	Growth, Remodeling and Repair	Pediatric and Embryonic Hemodynamics	Biomechanics in Treatment of Heart Disease	Mechano-transduction I: Cellular and Sub-Cell Biophysics*	Injury Biomechanics I: Spine, Military, Modeling	Shoulder Mechanics
3:00-3:15 pm	**Break**						
3:15-4:45 pm	Bone Tissue Engineering*	Spine Mechanics	Biological Flows in the Interstitium and Lymphatics	Micromechanics of Atherosclerosis	Mechano-transduction II: Cells and Their Environment*	Injury Biomechanics II - Head to Foot, Modeling, Risk	Lower Extremity Mechanics
4:45-5:00 pm	**Break**						
5:00-6:00 pm	**LISSNER LECTURE – James A. Ashton-Miller, University of Michigan (Ballrooms 1-3)**						
6:00-7:00 pm	**Lissner Reception (Ballroom Lobby and Mezzanine)**						
7:00-10:00 pm	**Banquet and Awards Ceremony (Ballroom)**						

* Joint session with Japanese Society of Mechanical Engineers

** **Important Note to Poster Presenters:** Session I – Posters set up is 7 AM – 3:30 PM on Wed. and take down is 3 - 4 PM on Thurs.
Session II – Poster set up is 5 - 7 pm Thurs. and take down is by 11 am on Sat.

ISBN: 978-0-692-43943-2