

Conference Program

2016 Summer Biomechanics, Bioengineering and Biotransport Conference



SB³C
biomechanics.
bioengineering.
biotransport.
SB3C.org

June 29 – July 2, 2016
National Harbor, Maryland

The 2016 Summer Biomechanics, Bioengineering and Biotransport Conference (SB³C) organizers gratefully acknowledge the support of the National Institutes of Health (National Institutes of Biomedical Imaging and Bioengineering, Eunice Kennedy Shriver National Institute of Child Health and Human Development, R13 EB023077) and the National Science Foundation (General & Age-Related Disabilities Engineering, Biomechanics and Mechanobiology, Biotechnology and Biochemical Engineering).



National Institute of Biomedical Imaging
and Bioengineering



Eunice Kennedy Shriver National Institute
of Child Health and Human Development

Health research throughout the lifespan



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FOREWORD and ACKNOWLEDGEMENT

Welcome to beautiful National Harbor!

It is with great pleasure that we welcome the attendees to the second Summer Biomechanics, Bioengineering & Biotransport Conference. SB³C streams from the lineage of Summer Bioengineering Conferences which date back to 1993. The SB³C has been organized successfully under a different sponsorship structure for the past two years. It is particularly important to emphasize that SB³C is organized as a new non-profit organization this year, thanks to the leadership and hard work of Dr. Matthew Gounis. The meeting format will continue past years' traditions and philosophy: student centered scientific program that is held in a resort-like environment to promote networking in a casual atmosphere.

This year's SB³C meeting will be a venue for many firsts. The meeting is held close to Washington D.C. for the first time, enabling the participation of colleagues from a broad range of government agencies such as NIH, NSF, FDA and VA. In association, workshops and town hall meetings will be held with program managers from these agencies to connect the attendees with the Federal Government. The participation of these agencies fits well with the 2016 theme, "Impact of Biomechanics on HealthCare". For the first time, the conference will be holding key events which are organized by the Student Leadership Committee (SLC), underlining the ongoing dedication of this meeting to training the next generation of scientists and researchers. Specifically, the SLC has organized a workshop and a professional networking event during the conference. We also have added a Diversity Chair, Dr. Victor Barocas, to the Organizing Committee and have planned a Diversity Mixer event.

Another first is the assignment of a plenary spot for our award winners. It is our hope and expectation that the recognition of awardees will take place more broadly in this format. We are pleased to announce that in addition to our long tradition of the Mow and Fung awards, we have an inaugural award this year in honor of Dr. Savio L-Y. Woo. The Woo Medal was established in June 2015 as a society-level award and recognizes a sustained level of meritorious contributions in translating bioengineering research to clinical application, to improve the quality of life. The inaugural winner of this award is Dr. Barry Lieber (Stony Brook) for his work on brain aneurysms and cerebrovascular disease. Dr. Roger C. Haut (Michigan State University) is the 2016 Lissner Medal award winner for his significant research contribution to biomechanics and bioengineering. Dr. Beth Winkelstein (University of Pennsylvania) is our Van C. Mow Medal recipient for her scientific contributions as well as professional development, mentoring and contribution to bioengineering education. Dr. Triantafyllos Stylianopoulos (University of Cyprus) has been named the 2016 Y.C. Fung Young investigator for his outstanding research contributions in his early career.

While this is a year of many firsts, we are carrying on the long standing tradition of the outstanding and highly competitive Student Paper Competition and Undergraduate Design Competition, and will offer a Women's Networking Event on Friday evening before the amazing and talented BEDROCK concert.

We are grateful for the conference support provided by Sponsors, NIH and the NSF that reduced student registration fees and enabled the organization of a number of outreach activities targeting to improve the diversity of the meeting. We are certain that the Gaylord meeting will be another terrific event that will provide the attendees with top caliber scientific exchange, a friendly networking atmosphere and simply a fun environment. We also hope that you will be taking advantage of the many museums and sites that our nation's capital has to offer. The last word is specifically dedicated to the conference organizers, technical committee chairs and reviewers who have volunteered selflessly to make this conference happen. We are indebted to their service and we encourage junior members of our community to volunteer in helping the organization of the future SB³C meetings.

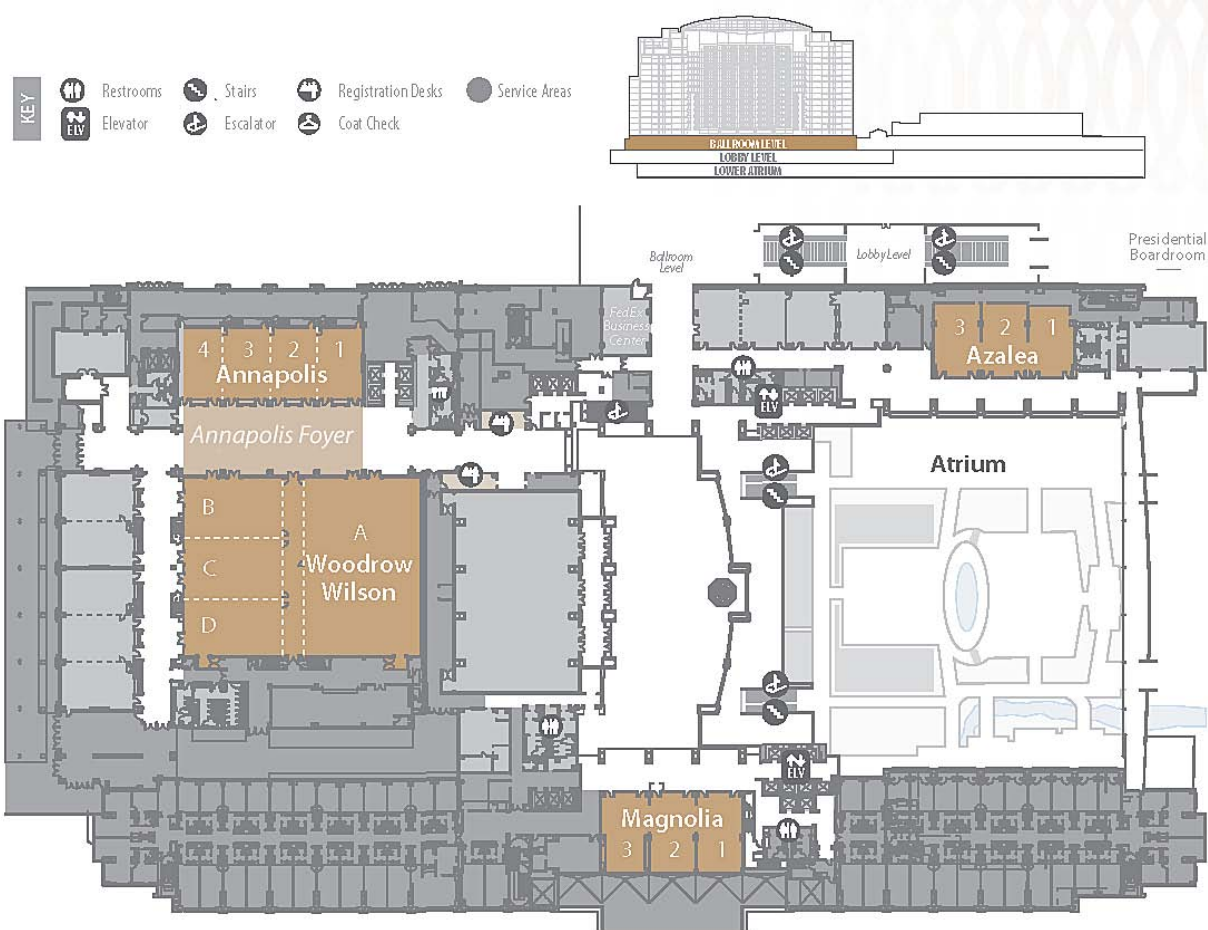
Ozan Akkus, Conference Chair
Case Western Reserve University

Tammy L. Haut Donahue, Program Chair
Colorado State University

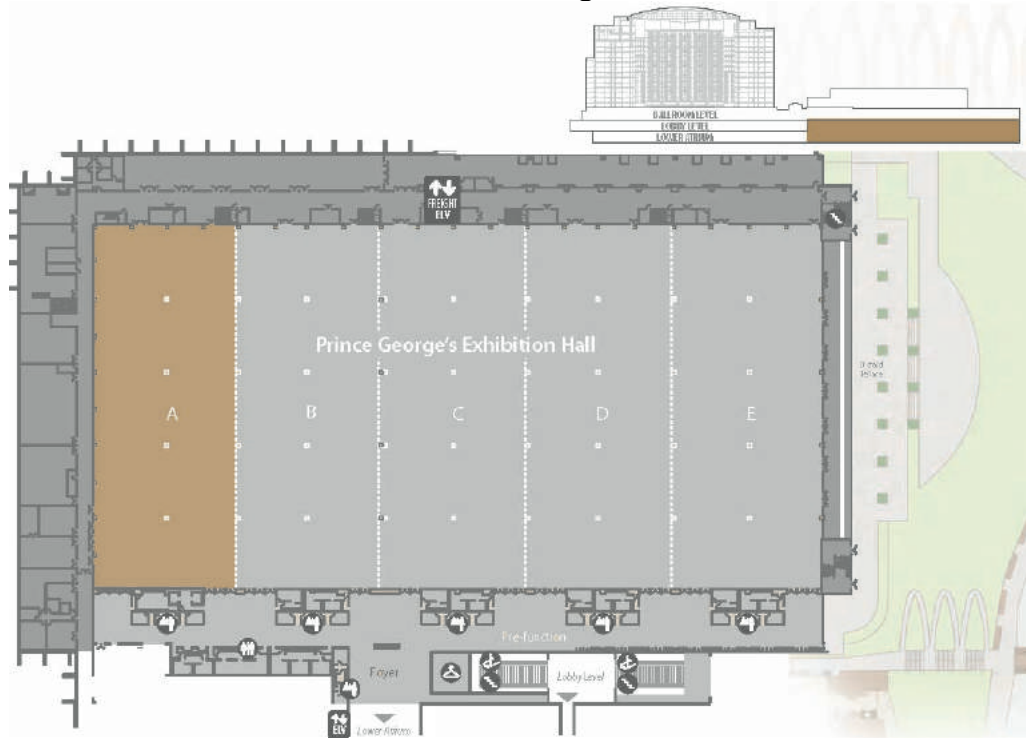
Gaylord National Resort & Convention Center Overview Map



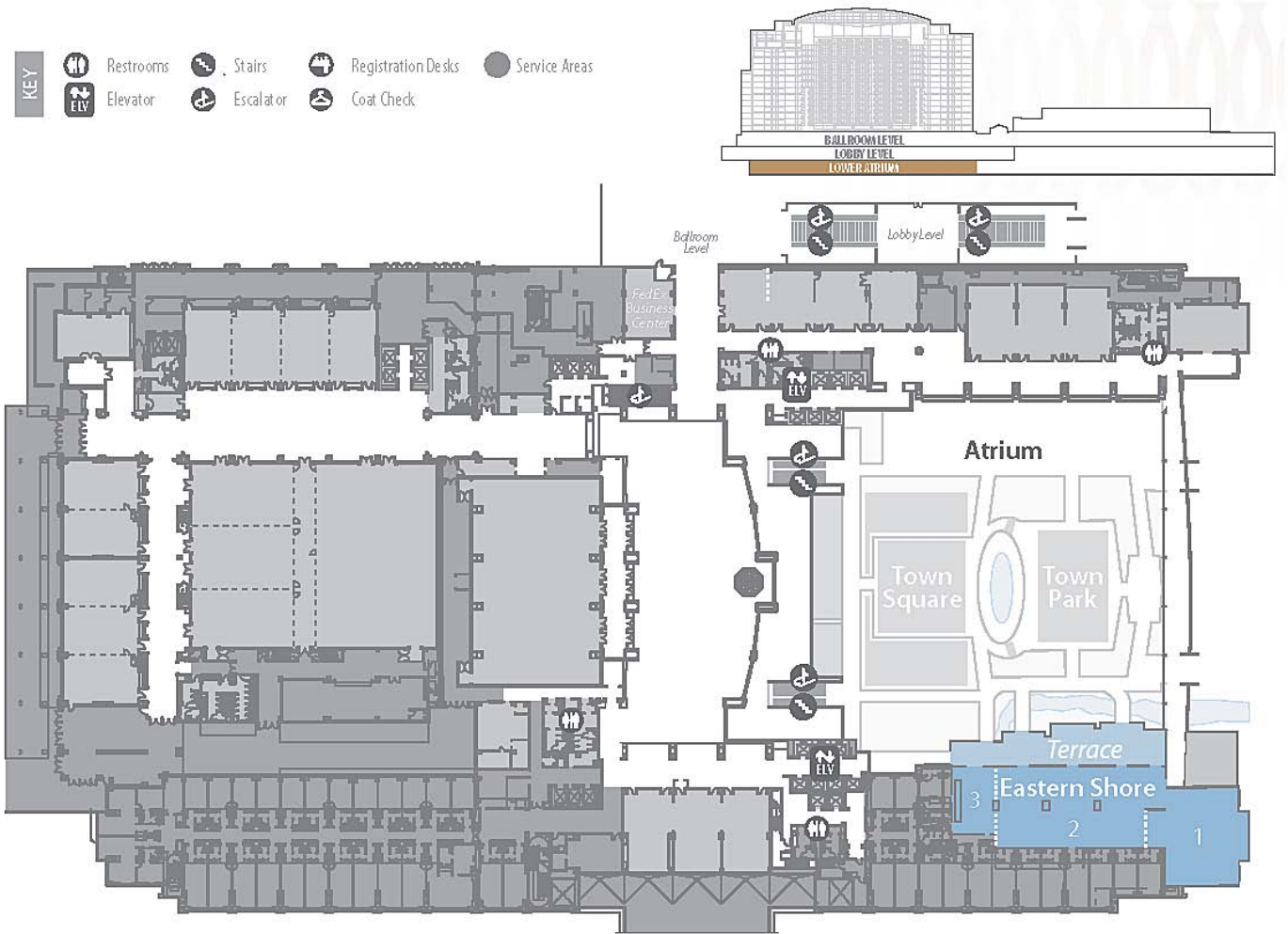
Meeting Spaces: Woodrow Wilson, Annapolis, Azalea, Magnolia (Ballroom Level)



Poster Sessions: Prince George's Exhibition Hall A



Event Spaces: Eastern Shore and Terrace (Lower Atrium)



Opening Reception: Orchard Terrace; BEDrock Concert: Marina Promenade



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SOCIAL PROGRAM

Wednesday, June 29

Opening Reception	Orchard Terrace	7:00 pm – 9:00 pm
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Thursday, June 30

Breakfast	Annapolis Foyer	7:00 am – 8:00 am
Poster Session Lunch	Exhibit Hall A	1:00 pm – 3:15 pm

Friday, July 1

Breakfast	Annapolis Foyer	7:00 am – 8:00 am
Poster Session Lunch	Exhibit Hall A	1:00 pm – 3:15 pm
Women's Networking Event	Eastern Shore I	6:00 pm – 7:00 pm
BEDrock Concert	Marina Promenade	7:30 pm – 11:00 pm

Saturday, July 2

Lissner Reception	Eastern Shore and Terrace	6:00 pm – 7:00 pm
Banquet and Awards	Wilson	7:00 pm – 10:00pm

KIDS & FAMILY / ACCESSIBILITY INFORMATION

The Gaylord National Resort & Convention Center, National Harbor Maryland, and Washington D.C. have many great activities for kids. On site, kids can explore the Potomac Playzone Arcade (video games and a pool table), swim in the junior-Olympic indoor pool with splash fountains, watch the water fountain show or free pool/outdoor movies, enjoy biking along the Potomac River, and climb National Harbor's Pirate Ship (a ropes course, rock climbing wall and zip line). The Gaylord National Resort also connects guests with an outside nanny service for in-room babysitting, which can be arranged through the Concierge Desk. Gaylord is fully ADA compliant. Entrances to all parts of the facility, including registration desks, meeting rooms, guest rooms, business center, restaurants, and the fitness center are fully accessible. Every level has access to elevators.

CONFERENCE REGISTRATION

Wednesday, June 29	Annapolis Foyer	11:00 am – 10:00 pm
Thursday, June 30	Annapolis Foyer	6:00 am – 2:00 pm
Friday, July 1	Annapolis Foyer	6:00 am – 2:00 pm
Saturday, July 2	Annapolis Foyer	11:30 am – 3:00 pm

POSTER DIRECTIONS AND SPEAKER READY ROOMS

The poster room will be available to attendees from Wednesday - Saturday. All posters should be put up between 5:00pm on Wednesday and 7:00am on Thursday, and removed before 4:00pm on Saturday. Session I posters will be highlighted on Thursday, June 30 in the 1:00-3:15pm Poster Session. Session II posters will be highlighted on Friday July 1st between 1:00-3:15pm. 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 29

BED Executive*	Magnolia 1	7:00 am – 9:30 am
SB ³ C Organizing & Program (NOTE: 1)	Magnolia 1	9:30 am – 10:20 am
SB ³ C Oversight* (NOTE: 2)	Magnolia 1	10:30 am – 11:20 am
Industry Interests Meeting	Magnolia 2	10:30 am – 11:20 am
New Directions	Magnolia 3	10:30 am – 11:20 am
Education	Magnolia 1	11:30 am – 12:20 pm
Cell & Tissue Engineering	Magnolia 2	11:30 am – 12:20 pm
Fluid Mechanics	Magnolia 3	11:30 am – 12:20 pm
Design, Dynamics & Rehabilitation	Magnolia 1	12:30 pm – 1:20 pm
Solid Mechanics	Magnolia 2	12:30 pm – 1:20 pm
Biotransport	Magnolia 3	12:30 pm – 1:20 pm
Open Executive Business Meeting	Magnolia 1	9:00 pm – 10:30 pm

Thursday, June 30

USNCB*	Eastern Shore I	1:00 pm – 2:00 pm
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Friday, July 1

JBME Editors (with lunch)*	Eastern Shore I	1:00 pm – 2:30 pm
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Saturday, July 2

Student Leadership Committee (closed)	Eastern Shore I	9:00 am – 10:00 am
Student Leadership Committee (open)	Eastern Shore I	10:00 am

NOTE 1: SB³C Organizing committee meeting: members for three conference years (2016, 2017, 2018) should attend. SB³C Program committee meeting: Program Chair (2017), Program Chair (2015), and Chairs of Technical Committees. Organizing Committee chaired by Conference Chair 2016; Program Committee chaired by Program Chair 2016.

NOTE 2: Conference Oversight Committee consists of the Conference Chairs from 2015-2018 and the Program Chairs from 2015-2018. Chaired by Conference Chair 2015.

SPECIAL SESSIONS, PLENARY SESSIONS & WORKSHOPS

WEDNESDAY, JUNE 29	2:00 PM – 3:30 PM	
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Special Session: **VETERANS AFFAIRS TOWNHALL** **Wilson B**

The Department of Veterans Affairs (VA) administers the largest integrated healthcare system in the United States with over 150 medical centers, ~ 1700 out-patient clinics, and a patient population of over 7 million Veterans. VA research is unique in that it is the only Federal program with a focus on advancing the health care needs of Veterans. VA research is an intramural program embedded in a hospital system with its own state-of-the-art electronic health records (EHR) and community of clinician scientists who are engaged to conduct pioneering research and provide rapid translation of discoveries from the bench to the bedside to meet the mission stated below:

- Support DoD in the treatment of combat Veterans;
- Provide treatment options to special populations including amputees and Veterans with spinal cord injuries and other disabilities;
- Provide treatments for service connected injuries and illnesses; and
- Contribute to the Nation's knowledge about disease and disability in connection with the provision of medical care and treatment of Veterans

Townhall meeting participants will learn about the spectrum of research funded by the VA and current capability gaps in the treatment of combat Veterans.

Speakers: Timothy Brindle, PhD, Scientific Program Manager
Rehabilitation Research and Development Service
Office of Research and Development, Department of Veterans Affairs

Kimberlee Potter, PhD, Scientific Program Manager
Biomedical Laboratory and Clinical Sciences Research and Development Services
Office of Research and Development, Department of Veterans Affairs

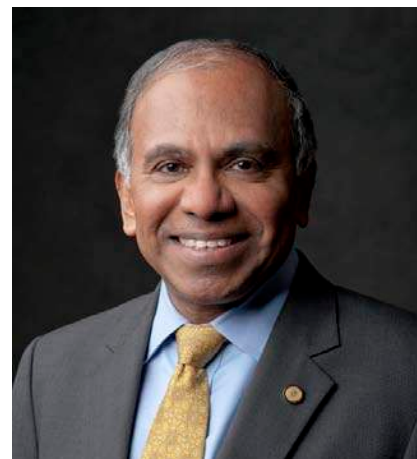
LTC Luis M. Alvarez, Ph.D.
Academy Professor & Director, Center for Molecular Science
Department of Chemistry & Life Science
United States Military Academy West Point, NY

Michael Davis, MD, FACS
Lt. Col, USAF, MC
Chief, Reconstructive Surgery and Regenerative Medicine
United States Army Institute of Surgical Research
Fort Sam Houston, Texas

WEDNESDAY, JUNE 29**5:30 PM – 6:30 PM****Opening Plenary
Session:****CELL BIOMECHANICS AND HUMAN DISEASES****Wilson A**

Subra Suresh, PhD
Carnegie Mellon University

This presentation will provide an overview of recent work on how the mechanics and physics of biological cells influence the onset and progression of different human diseases, and how pathological states of cells, in turn, modulate the mechanics and physics of cells. Results derived from experiments, analysis and computational simulations from a variety of disciplines spanning engineering, sciences and medicine, the presentation will focus on specific examples the role of cell mechanics in influencing hereditary blood disorders, infectious diseases and different types of cancer. These examples will also guide the discussion of pathways to gain new mechanistic insights into the pathogenic basis of the disease as well as to develop novel diagnostics, therapeutics and drug efficacy assays.

**THURSDAY, JUNE 30****11:30 AM – 1:00 PM****Workshop:**

**POINT-OF-CARE HEALTHCARE TECHNOLOGIES:
 CHALLENGES AND OPPORTUNITIES**

Wilson B

Organizers: Umut Gurkan (Case Western Reserve University) and John Bischof (University of Minnesota)

This workshop will facilitate presentations and discussions on recent technological advances, challenges, opportunities and global issues in implementation of Point-of-Care (POC) technologies. The POC can be the patient's home, a primary care office, an emergency room, or any other location, where care is needed. The POC challenges and opportunities for the developed world are different than for the developing world. In the developed world, POC technologies offer effective and feasible means of reducing healthcare costs and improving patient care. In the developing world, POC technologies are essential and urgently needed to address pressing healthcare needs with affordable and accessible solutions. Cost is generally an important metric for POC technologies, whereas an improvement in patient outcome and/or quality of life should be the main consideration. The following topics will be discussed in this workshop: outcome assessment, research and development, global health applications, and regulatory issues.

Speakers:

"Implementing Point-of-Care Testing to Improve Outcomes"

Kent Lewandrowski, MD, Director of Clinical Laboratories and Molecular Medicine, Director of Point of Care Testing, Massachusetts General Hospital, Harvard Medical School, Editor-in-Chief of "Point of Care: The Journal of Near-Patient Testing & Technology"

Elizabeth Lewandrowski, PhD, MPH, Co-Director, Clinical Laboratory Research Core, Massachusetts General Hospital, Assistant Professor of Pathology, Harvard Medical School

"Co-inventing the Future of POC Technologies"

Mary Rodgers, PT, PhD, FAPTA, FASB, FISB, Extramural Science Program, National Institute of Biomedical Imaging & Bioengineering, National Institutes of Health

THURSDAY, JUNE 30	11:30 AM – 1:00 PM	
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“Challenges and Opportunities for POC Technology for Global Health”

Miguel Ossandon, MS, Program Director, Cancer Diagnosis Program, Division of Cancer Treatment and Diagnosis, National Cancer Institute, National Institutes of Health

“FDA's Perspective on Regulatory Considerations of POC Technologies”

Irene Tebbs, Scientific Reviewer, Food and Drug Administration (FDA)

Workshop:

**NEW MEDICAL DEVICES: UNDERSTANDING THE FDA
APPROVAL PROCESS NEEDED TO PREPARE THEM FOR
COMMERCIAL RELEASE**

Wilson C

Organizers: Orlando Lopez (FDA), Martin L. Tanaka (Western Carolina University), Nadeen Chahine (Feinstein Institute for Medical Research), Nandini Duraiswamy (FDA), and Michael R. Moreno (Texas A&M University)

The Food and Drug Administration (FDA) is responsible for the approval of new medical devices before they can be sold publicly. A panel of experts from the FDA will describe how to take a new medical device through the regulatory process and prepare it for market release. The session will begin with an introduction that will provide an overview of the regulatory process. This will be followed by talks focused on Orthopaedic Devices, Cardiovascular Devices, and Biologics/Combination Products. Following the presentations there will be a panel discussion to provide session attendees with an opportunity to ask questions. In addition to the presenters, there will be other panelists from the FDA available to answer questions.

Speakers: Introduction - Regulatory considerations for medical device commercialization: Overview of regulatory process involved in taking a new device to market

Orlando Lopez, PhD, Biomedical Engineer / Regulatory Reviewer, Division of Cardiovascular Devices, Office of Device Evaluation, Center for Devices and Radiological Health (CDRH)

Orthopedic Devices - Considerations to streamline regulatory approval using Medical Device Development Tools (MDDT)

Tina Morrison, PhD, Biomedical Engineer / Acting Deputy Director, Division of Applied Mechanics, Office of Science and Engineering Laboratories, Center for Devices and Radiological Health (CDRH)

Cardiovascular Devices – Regulatory and technology framework for regulatory approval of an endovascular device and considerations for using tissue engineering constructs

Carmen Gacchina Johnson, PhD, Biomedical Engineer / Regulatory Reviewer, Division of Cardiovascular Devices, Office of Device Evaluation, Center for Devices and Radiological Health (CDRH)

Biologics/Combination Products - Regulatory pathways for classification, development and performance requirements of combination products

Carolyn Yong, PhD, Biomedical Engineer/Device & Combination Products Team Lead, Division of Cellular and Gene Therapies, Office of Cellular, Tissue, and Gene Therapies, Center for Biologics Evaluation and Research (CBER)

Additional CDRH Panelists:

John Karanian, PhD, Director of the Cardiovascular Therapeutics lab

William Pritchard, MD, PhD, Medical Officer, Cardiovascular Therapeutics lab

James Bertram, PhD, Product Jurisdiction Officer

THURSDAY, JUNE 30**11:30 AM – 1:00 PM****Workshop: ROBOTIC TESTING SYSTEMS TO STUDY JOINT AND
TISSUE FUNCTION****Wilson D**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 (eg: superposition, in vivo loads); 4) Control algorithms and methodologies; and 5) Applications of robotic systems in academic and industrial settings.

Speakers: Hiromichi Fujie, Tokyo Metropolitan University,
 Rich Debski, University of Pittsburgh
 Jason Shearn, University of Cincinnati
 Lorin Maletsky, University of Kansas
 Joseph Deck, Advanced Mechanical Technology, Inc.

Workshop: ACTIVE TEACHING AND LEARNING IN BIOENGINEERING**Annapolis 1**Organizers: Alisa Morss Clyne (Drexel University), Virginia Ferguson (University of Colorado Boulder), and Ferris Pfeiffer (University of Missouri)

In this workshop, participants will learn about an active learning approach that worked well in bioengineering and biomechanics related coursework. Speakers will present innovative tools that they used to enhance creative thinking and problem solving among senior bioengineering students developing capstone projects. The case study presented will include assessment of the effectiveness of the pedagogy. Finally, the speakers will demonstrate hands-on learning techniques using the audience as the “students”. Our goal is to develop an interactive workshop format in which speakers can actively demonstrate, in real time, the concepts that worked in their own classroom.

Speakers: Dr. Suzanne Burgoyne, PhD, and Rachel Bauer, Director, Center for Applied Theatre and
 Drama Research, University of Missouri

THURSDAY, JUNE 30**5:00 PM – 7:30 PM****SPECIAL SESSION: NETWORKING MIXER: CAREERS IN ENGINEERING****Eastern Shore 1**Organizers: ASME Bioengineering Division Student Leadership Committee (special thanks to Kathryn Drzewiecki, Kristine Fisichenich, Katrina Hansen, and Lizz Iffrig)

Today, the range of career opportunities for engineers is limitless: academia, science policy, consulting, science writing, venture capital, industry research – the list goes on and on. Come and join us in a networking event where you can interact with professionals in these areas to learn about the job, day-to-day activities, skillsets advantageous for these positions, and more! The event will take place in two parts: first, small

groups of students will rotate among professionals to learn about the diverse career possibilities for engineers; second, we will break the groups and have informal networking between all in attendance. Keep an eye out for updates on the ASME BED and SB³C Facebook pages and Twitter (@asmebedstudents) for updates on what groups are joining us. After attending this event, you will develop a new network of colleagues and professionals and have a new perception about your possible career path!

FRIDAY, JULY 1	8:00 AM – 9:30 AM	
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Workshop: **VERIFICATION, VALIDATION AND UNCERTAINTY
QUANTIFICATION IN CARDIOVASCULAR MODELING AND
DIAGNOSTICS** **Wilson B**

Organizers: Kristian Debus (Director Life Sciences, CD-adapco – A Siemens Business), Alison L. Marsden (Stanford University), Kristian Valen-Sendstad (Simula Research Laboratory)

In traditional engineering disciplines, geometries, boundary conditions, flow conditions, and fluid properties are well defined. However, such information is often not well defined in biomedical engineering. First, we often rely on medical image-based segmentation that often involves a significant amount of manual labor and may introduce noise. In addition, models typically require patient-specific boundary conditions such as flow rates, pressures, and material properties, which have some associated uncertainty. Verification & validation (V&V) and uncertainty quantification (UQ) is therefore especially important. Since the concepts of V&V and UQ are fairly broad, we will give an introduction to the ASME V&V40 Guidelines. We will briefly present an overview of the recent challenges held in the image-based CFD community and discuss the need for, and applicability of V&V and UQ. This will be exemplified by looking at results from the most recent challenge in the image-based CFD community and addressing application of the ASME V&V40 guidelines. We will show implementation of the V&V40 guidelines and demonstrate comparison of academic and commercial CFD codes.

Speakers: Sethuraman Sankaran (HeartFlow)
Tina Morrison (FDA)

Case Study 1: Discuss and develop best practices and guidelines for consistency in cerebral aneurysm modeling

- Uncertainty Quantification: Quantifying error in simulation predictions
- Overview of recent methodological advances for parameter estimation and uncertainty quantification
- Assimilation of clinical data into simulations

Case Study 2: Coronary artery modeling

- Discussion of industry translation of UQ methods and their use in the FDA approval process
- Overview of recent applications of UQ and parameter estimation to patient specific coronary models

Panel Discussion: speakers from academia, industry, and the FDA will discuss recent challenges and recommendations for VVUQ

Translational Perspectives: The role of the Medical Device Innovation Consortium for the future of clinical trials on virtual patients.

FRIDAY, JULY 1**8:00 AM – 9:30 AM****Workshop:****NON-CANONICAL MODELS FOR MECHANOBIOLOGY
INSIGHTS FROM PLANTS AND NON-MAMMALIAN SYSTEMS****Wilson C**

Organizers: Adam Engler (University of California, San Diego) and Guy Genin (Washington University in St. Louis)

Often biomechanics and mechanobiology focuses on mammalian systems, especially in cell culture. However mechanics and mechanotransduction are extremely important in shaping the organisms that live around us. The goal of this workshop would be to explore the diversity of mechanical problems present in non-mammalian model organisms as well as their connections to mammalian systems. Additionally, the symposium will include a discussion with attendees on the critical issues facing research in these model organisms and the open questions in the field.

Speakers: Adam Engler, University of California, San Diego
Lance Davidson, University of Pittsburgh

Workshop:**CONQUERING THE REMAINING CHALLENGES IN ORGAN
AND TISSUE BANKING****Wilson D**

Organizers: John Bischof (University of Minnesota) and Sebastian Giwa (CEO Organ Preservation Alliance)

This session will discuss the major challenges to organ banking and tissue preservation and new technologies that may address them. Combined across all organs, organ impairment causes more deaths each year than cancer. Solutions that can overcome this problem have the potential to save millions of lives in the coming years, and as a result momentum has been building within the scientific community for a coordinated effort to develop solutions to bank organs and other complex tissues. Recent events such as the first global Organ Banking Summit have convened leading scientists, federal science agencies, and other stakeholders at Stanford University, NASA Research Park, the White House, the U.S. Military Academy at West Point, and other locations, aimed at outlining the key barriers to the clinical banking of organs and other complex tissues. This workshop will discuss the findings from these meetings, defining the remaining challenges in organ banking research and describing ways that surrounding areas of science and technology can be leveraged to make rapid progress in this field.

Introduction (Lt Col Luis Alvarez, PhD, and Dr. Sebastian Giwa)

Limiting cryoprotectant toxicity (Gloria Elliott, University of North Carolina - Charlotte)

Controlling ice formation and limiting thermomechanical stress (John Bischof, University of Minnesota)

Preventing excessive chilling injury (Greg Fahy, 21st Century Medicine)

Minimizing ischemic injury and enabling revival/repair/functional assessment (Korkut Uygun, Harvard Medical School)

Conclusions, Panel/Audience Q&A (Lt Col Luis Alvarez, PhD, & Dr. Sebastian Giwa)

Workshop:**COMMUNICATING SCIENCE WORKSHOP****Annapolis 1**

Organizers: Jared Zitnay (University of Utah), Student Leadership Committee

Giving scientific presentations is a sometimes difficult but necessary component of our work as we try to disseminate our knowledge to scientific audiences and broader society. Importantly, there are distinctions between presenting to different types of audiences. This workshop will focus on good presentation and communication practices for speaking to different audiences, focusing on practices for communicating with

other researchers, students and trainees, and lay audiences. As scientists and engineers, these presentation and communication skills are important for discussing scientific problems with a colleague, potential employer, or even a friend!

Speakers: Victor Barocas, PhD, Professor, Department of Biomedical Engineering, University of Minnesota
Elise Morgan, PhD, Professor, Department of Mechanical Engineering, Boston University

FRIDAY, JULY 1	11:30 AM – 1:00 PM	
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**PLENARY SESSION II:
MOW, WOO, FUNG
AWARD LECTURES**

**BETH A. WILKENSTEIN (MOW)
B. BARRY LIEBER (WOO)
TRIANAFYLLOS STYLIANOPOULOS (FUNG)**

Wilson A

Chairs: Noshir A. Langrana (Rutgers University), Jeffrey W. Holmes (University of Virginia), and James Moore (Imperial College London)

2016 VAN C. MOW MEDAL AWARDEE

Beth A Winkelstein, PhD

“What a pain in the neck! Understanding biomechanics of injury & mechanotransduction of pain to bioengineer treatments & diagnostics”

University of Pennsylvania

Understanding and predicting pain remains a tremendous challenge and hinders the development of effective therapies. Many injury mechanisms are hypothesized in painful neck trauma, with complicated relationships between the biomechanics of the spine and loading of its tissues and physiological and molecular cascades throughout the musculoskeletal and nervous systems. Our work integrates biomechanics across the length-scales in model systems in vivo, in vitro and in silico to advance the mechanistic understanding of how pain can be initiated and maintained, even for subfailure loading of neural and ligamentous tissues in the neck. With that context, we develop and implement imaging and neurophysiological approaches to define how injury/loading mediates physiological function, dysfunction and tissue failure, as well as to re-define the meaning of “injury” in the context of pain. By defining the spatiotemporal neuroimmune responses from pain generators and the systems responsible for sensitization, mechanical thresholds for tissue tolerance, pain, and cellular dysfunction can be defined and related to the clinical presentations that are associated with pain and trauma. Collectively, this work is enabling clinical diagnostics for prediction of pain onset and/or those scenarios in which chronic pain will be developed, as well as leading to new pain therapies and interventions.

2016 SAVIO L-Y. WOO MEDAL AWARDEE

B. Barry Lieber

“Endovascular bypass of cerebral aneurysms by flow diverters - from concept to clinical implementation”

Stony Brook University Medical Center

One fourth of the deaths from cerebrovascular disease in the US arise from hemorrhagic stroke associated with rupture of intracranial aneurysms and it is estimated that ten to fifteen million Americans harbor intracranial aneurysms. Surgical treatment of aneurysms involve open head surgery and placement of a clip at the base of the aneurysm, yet not all aneurysms are accessible by surgery. Endovascular treatment for intracranial aneurysms has thus far focused on the intra-aneurysmal deposition of occlusive materials (such as coils) with little regard for the pathology of the disease. The concept of flow diversion involve stent like device that are deposited in the artery that harbor the aneurysm, straddling its neck, rather than intra-saccular deposition of occlusive materials. Such devices in addition to inducing flow stasis-mediated

FRIDAY, JULY 1	11:30 AM – 1:00 PM	
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thrombosis of aneurysms, and thus at times being referred to as flow diverters, these devices also reconstitute pathologic arterial segments to near-physiologic normalcy. The successful implementation of such an endoluminal scaffold for vascular reconstruction in the cerebral circulation requires careful consideration of various factors drawn from engineering, physics, and biological sciences. The permeability of the device is optimized such that it significantly reduces the blood flow in the aneurysm, while keeping small side branches of the artery open to supply critical brain tissue. The biocompatible device elicits a healthy scar-response from the body that lines the inner metal surface of the device with biological tissue, thus restoring the diseased arterial segment to its normal state. For brevity, only the most essential milestones of the long journey from concept to clinical implantation will be discussed.

2016 Y.C. FUNG MEDAL AWARDEE

Triantafyllos Stylianopoulos

“Stress-alleviation strategy to enhance cancer treatment”

University of Cyprus

A solid tumor is an aberrant tissue made of cancer cells and a variety of host cells – all embedded in an extracellular matrix – nourished by blood vessels and drained by lymphatic vessels. Rapid tumor growth in the confined space of the host tissue results in the accumulation of mechanical forces within structural components of the tumor, and between the tumor and the host. These forces, in turn, are able to compress blood and lymphatic vessels, reducing perfusion rates, creating hypoxia and elevating the interstitial fluid pressure of the tumor. Hypo-perfusion and hypoxia contribute to immune-evasion, promote malignant progression and metastasis, and reduce the efficacy of a number of therapies, including radiation. In parallel, hypo-perfusion and interstitial hypertension can reduce dramatically the delivery of blood-borne therapeutic agents, lowering the efficacy of chemo- and nano-therapies. The stress-alleviation strategy aims to alleviate mechanical forces in solid tumors in order to decompress tumor blood vessels and restore vessel functionality. Application of any therapeutic intervention to alleviate forces, however, requires identification of the components of a solid tumor that contribute to the generation of these forces as well as the investigation of safe and well tolerated pharmaceutical agents that reduce stress levels and may be added to cancer patients' treatment regimen. In my talk, I will present a simple technique to estimate the growth-induced, residual stress accumulated within animal and human tumors, and I will show that this stress can be reduced by depleting cancer cells, fibroblasts, collagen, and/or hyaluronan, resulting in improved tumor perfusion. Based on these observations, I suggest the repurposing of common antifibrotic drugs that can be used as stress-alleviating agents and I will present preclinical data that show how combined use of a drug that modifies the tumor micro-environment to alleviate stresses with chemotherapy improves the efficacy of the treatment.

FRIDAY, JULY 1	3:15 PM – 4:30 PM	
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SPECIAL SESSION

**MENTEE-MENTOR MATCHING MIXER (M⁴ AT SB³C)
AND BEST PRACTICES IN MENTORING**

**Eastern Shore
Room**

Organizers: Naomi Chesler (University of Wisconsin-Madison) 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 persons from underrepresented minority (URM) groups from academic positions. Professional societies and associated conferences, such as SB³C, can provide a venue for reducing isolation and increasing mentoring (including technical, informational, and psychosocial support) that help retain and promote women and members of URM groups at all stages of the academic career path.

The Diversity and Inclusion Committee is therefore happy to announce a mentor-mentee match mixer at SB³C, designed to develop mentoring relationships between junior and senior colleagues in biomechanics, bioengineering and biotransport. The mixer will include some initial remarks on the mentoring process and best practices in mentoring and in being mentored, after which a majority of the time will be devoted to one-on-one or one-on-two conversations between mentors and mentees, promoting conversation on specific matters of importance to the individual participants to complement the broader guidelines.

Pre-registration is required for mentor-mentee matching. Questions may be directed to Victor Barocas at baroc001@umn.edu

SATURDAY, JULY 2	5:00 PM – 6:00 PM	
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PLENARY SESSION:**LISSNER AWARD LECTURE****Wilson A**

Chairs: Maury Hull (University of California Davis) and Savio L-Y. Woo (University of Pittsburgh)

2016 H.R. LISSNER MEDAL

Roger C. Haut

“Biomechanical studies on patterns of pediatric bone fracture”

Michigan State University

Bone fractures are a common childhood trauma, occurring in 8-12% of all pediatric injuries. In infants and toddlers an abusive act is reported to cause 12-20% of these fractures. A recent study of abuse cases indicates long bone fractures the most common in 26% of cases, followed by cranial fractures at 24% with rib cage and clavicle fractures at 14% and 4.2%, respectively. While these skeletal fractures are strong indicators of child abuse, the same bones can be injured in childhood accidents. In cases of litigation the patterns of bone fracture are used by forensic anthropologists and engineers to help determine the mechanism of injury. This lecture will focus on recent joint studies by the Orthopaedic Biomechanics Laboratories and the Forensic Anthropology Laboratory at Michigan State University. Due to the limited availability of human pediatric tissue, basic science studies are being conducted on immature porcine bones to establish ground-truth data correlating load environment with patterns of bone fracture. Data from porcine skulls have been used in the development of a “Fracture-Printing Interface”, using machine-learning techniques, to determine the mechanism of input loading from the pattern of cranial fracture. This presentation will discuss early stages of its use to investigate human forensic case files. Additionally, the lecture will present recent biomechanical data on patterns of long bone fracture using this porcine model that may address recent forensic literature dealing with the clinical determination of abusive versus accidental human pediatric trauma. In summary, the presentation will discuss attempts to develop basic science data that may help forensic anthropologists and engineers determine “truth of testimony” in the litigation of cases involving the human pediatric victim of trauma.

SPECIAL TRIBUTE SESSION

SATURDAY, JULY 2

1:30 PM – 3:00 PM

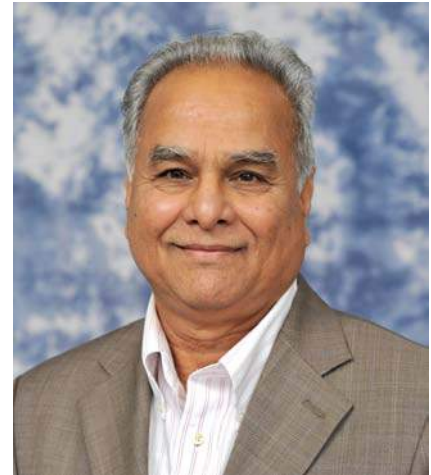
Special Session:

SPINE BIOMECHANICS

Wilson C

Celebrating 70th+ Birthday of Professor Vijay Goel

Vijay K. Goel, Ph.D. is the Distinguished University Professor, Endowed Chair & McMaster Gardner Professor, and Co-Director, Engineering Center for Orthopaedic Research Excellence (E-CORE) with a joint appointment in the departments of Bioengineering and Orthopaedic Surgery, at The University of Toledo. Professor Goel received his basic engineering education (B.S. and M.S. degrees) in India. He taught for almost 10 years in various engineering schools within India, including Indian Institute Technology, New Delhi. He started his career in the United States of America in 1979 as a Research Associate at Yale University after having earned his doctorate from the University of New South Wales, Sydney, Australia in 1978. He joined the Department of Biomedical Engineering at the University of Iowa in 1982 as an Assistant Professor. In 1990, he became the Chairman of the department for a period of five+ years. In December 2000, Prof. Goel moved to the University of Toledo, Toledo, OH, as Professor and Chairman of the Department of Bioengineering, College of Engineering for a period of 5+ years. As Chair, he was instrumental in developing the departmental curriculum and establishment of the Orthopedic Biomechanics sub tract. He served as Co-Director of the Spine Research Center, a joint undertaking of the colleges of Engineering and Medicine from 2001 to 2006. He was a member of the Ohio's Third Frontier on Biosciences Task Force.



As a researcher over the last 35+ years, Professor Goel has made noteworthy contributions in the area of spinal biomechanics. He has over 340 full-length peer-reviewed publications and over 600 conference presentations to his credit. Professor Goel has supervised research projects of over 100 engineering students, residents and fellows. Professor Goel has been recognized for his innovative and peer-reviewed research in the area of spinal implants by various professional societies, including the International Society for the Study of the Lumbar Spine (Volvo Award 3 times), North American Spine Society Research Award (3 times). Professor Goel received the 1996 distinguished Alumni Award, and Excellence Research Awards from the University of Iowa (2000) and the University of Toledo (2006), respectively. Prof. Goel has received lifetime achievement awards from four professional societies (the ASME-BED 2003 H. R. Lissner Award for the growth of the industry, and for his internationally renowned work on spinal implants using the finite element modeling and innovative experimental techniques; the North American Spine Society-NASS 2008 Harry Farfan Award, the International Society for the Study of the Lumbar Spine – ISSLS 2010, Leon Wiltse Lifetime Achievement Award; and the American Society of Biomechanics - ASB 2014 Borelli Award).

2016 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 2016 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
 2016 Roger C. Haut

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.

2016 Roger C. Haut, PhD

Dr. Roger C. Haut is a University Distinguished Professor in the Departments of Radiology and Mechanical Engineering at Michigan State University (MSU). He received his B. S. degree (cum laude) in Mechanical Engineering from MSU in 1967, his M. S. and Ph.D. degrees also from MSU in Engineering Mechanics in 1968 and 1971. After graduation he started a career in trauma biomechanics at the General Motors Research Laboratories. He was named the first Chairman of the Industrial Liaison Committee for the ASME Bioengineering Division and has served on the Honors and Y.C. Fung Young Investigator Committees. In 1986 Dr. Haut moved to MSU in the Department of Biomechanics in the College of Osteopathic Medicine. He founded and is currently the Director of the Orthopaedic Biomechanics Laboratories in the College. Dr. Haut has made it a priority during his academic career to train students in the basic principles of engineering science during their bioengineering research projects. He has mentored 80 Ph.D., M.S. and B.S. dissertations and theses over his career. Dr. Haut has published over 150 manuscripts in peer-reviewed, archival journals which have been cited more than 5000 times in the scientific literature.



He currently serves on the Editorial Advisory Board of the Journal of Biomechanics and as an associate editor of the International Journal of Vehicle Safety. His research in Sports Medicine has been honored with H. Ed Cabaud and O'Donahue Awards from the American Orthopaedic Society of Sports Medicine. He has also earned Innovation and Research Excellence awards from the MSU College of Osteopathic Medicine resulting in him also receiving a MSU Distinguished Faculty Award.



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

2016 Beth A. Winkelstein

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.

2016

Beth A. Winkelstein, PhD

Beth A. Winkelstein, Ph.D., received her BSE in Bioengineering from the University of Pennsylvania in 1993 and her doctorate in Biomedical Engineering from Duke University in 1999. After completing a Postdoctoral Fellowship at Dartmouth College, she joined the faculty at the University of Pennsylvania in 2002. She is Professor of Bioengineering and Neurosurgery and is Vice Provost for Education overseeing the academic portfolios of the four undergraduate schools and also the 12 graduate and professional schools. Winkelstein's research focuses on elucidating the mechanisms of subfailure spine and joint injuries and the cellular events surrounding the etiology of chronic pain. She takes a hierarchical approach to understand the underlying pathomechanisms at the joint, tissue, and cellular levels. Her work is multidisciplinary, melding engineering and biology to bridge the gaps between basic neuroscience, tissue biomechanics and clinical application. In support of her research, Winkelstein has been awarded grants from NIH, DoD, NSF, US Army, and private foundations and industry partners. She has been recognized by an NIH Career Award, a Whitaker Foundation Young Investigator Research Award, an NSF Career Award, and the ASME YC Fung Young Investigator Award. Recently, she was elected as Fellow of ASME and AIMBE. She has mentored more than 14 doctoral students in her own lab, and overseen research for over 75 additional fellows, graduate and undergraduate researchers. She edited a book on *Orthopaedic Biomechanics*, which was published in 2012. She has been active with ASME and its Bioengineering Division, serving on its Student Paper Competition Committee, the Education Committee, the Solid Mechanics Technical Committee, and most as Co-editor of the ASME Journal of Biomechanical Engineering. Since assuming this post, Winkelstein has been instrumental in working to reduce the review time and broadening the diversity of the Associate Editor Board.





2016 Baruch Barry Lieber



Savio L-Y. Woo Medal

The Savio L-Y. Woo Translational Biomechanics Medal was established in June 2015 as a society-level award and recognizes a sustained level of meritorious contributions in translating bioengineering research to clinical application, to improve the quality of life. This award is named in honor of Savio Lau-Yuen Woo, Ph.D., Distinguished University Professor of Bioengineering and the Founder and Director of the Musculoskeletal Research Center (MSRC), a diverse multidisciplinary research and educational center in the Department of Bioengineering at the University of Pittsburgh. Beyond pioneering and world-renowned scholarly contributions, Professor Woo has made an enormous impact in 40 years of translational research that has significantly contributed to the delivery of healthcare. Any member of ASME who has demonstrated a sustained level of outstanding achievement in translating bioengineering findings to the clinical community may be eligible for this medal.

2016

Baruch Barry Lieber, PhD

Baruch Barry Lieber is the inaugural recipient of the 2016 Savio L-Y. Woo Translational Biomechanics Medal. Translating research discovery to clinical utilization is precisely what Barry has done his entire career, and his work in flow diversion to treat brain aneurysms is a perfect example. Barry went beyond what is typically expected of a bioengineering Professor in terms of research, service and teaching. While performing all of his duties as a university Professor and serving our community, particularly the ASME BED (Chair of the Executive Committee 2009-2010, Conference Chair 2008 SBC, Associate Editor to JBME 2005-2010), he was also Chief Science Officer and Member of the Board of Surpass Medical. The devices he invented received regulatory approval in Europe and the US FDA trial was initiated when Surpass Medical LTD was purchased by medical device giant Stryker in 2013. Realizing that technology is only as good as the training and skills of the operating physician, he embarked to build a realistic model of the human circulatory system for training programs for neurointerventional fellows and attending physicians to hone their technical skills prior to using new technology in people. He is the Chief Science Officer of his latest start-up, Vascular Simulations, which sells to medical device companies and hospitals the Replicator that duplicates the cardiac cycle with a functional left atrium and ventricle with mechanical mitral and aortic valves. This Replicator is used by multiple companies to train physicians on new devices prior to enrolling into clinical trials. Barry's work has served to improve the lives of patients suffering from cerebrovascular disease. Flow diversion has been used to treat more than 50,000 aneurysms world-wide. The Replicator has become the standard for training endovascular neurosurgeons, and has provided incalculable benefit for patients.



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 age 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.

2016

Triantafyllos Stylianopoulos, PhD

Triantafyllos Stylianopoulos is an Assistant Professor of Mechanical Engineering and the Head of the Cancer Biophysics Laboratory at the University of Cyprus. He received a Diploma in Chemical Engineering from National Technical University of Athens, Greece (2003) and a PhD also in Chemical Engineering from the University of Minnesota (2008) working with Dr. Victor H. Barocas. Subsequently, he performed his post-doctoral training with Dr. Rakesh K. Jain at the Department of Radiation Oncology at Harvard Medical School and Massachusetts General Hospital (2008-2010). Dr. Stylianopoulos has co-authored 50 peer-reviewed articles in the fields of biomechanics, drug delivery, cancer nanomedicine and tumor microenvironment. He has secured more than \$2.4M for funding his research, including a highly selective \$1.6M Starting Grant from the European Research Council. Dr. Stylianopoulos' research focuses on the 1) development of therapeutic strategies to re-engineer solid tumors in order to improve cancer therapy, 2) mathematical modeling of the fluid and solid mechanics of cancer, 3) investigation of specific genes that are related to cancer metastasis in relation to tumor stiffness, 4) response of stromal cells to mechanical stimuli. His laboratory consists of 5 senior scientists and post-doctoral fellows, 4 PhD students and 2 Master students. Dr. Stylianopoulos is the recipient of the 2014 Young Investigator award by the Research Promotion Foundation of Cyprus and the 2013 Most Cited paper award of the Annals of Biomedical Engineering Journal by the Biomedical Engineering Society (BMES).

THANKS TO ALL ABSTRACT REVIEWERS

Abramowitch, Steven
 Akkus, Ozan
 Alberto, Gambaruto
 Alford, Pat
 Amini, Rouzbeh
 Anderson, Andrew
 Andrews, Dennis
 Arena, Christopher
 Azeloglu, Evren
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ABSTRACT REVIEWERS

Miller, Laura
 Miller, Mark
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 Zhang, Wujie
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NOTES

SCIENTIFIC SESSIONS

WEDNESDAY, JUNE 29**3:45pm - 5:15pm**

Nano, Micro, and Multi-Scale Mechanics in Cell and Tissue Engineering

Wilson B**Session Chair:** X. Sherry Liu, *University of Pennsylvania, PA, United States***Session Co-Chair:** Nadeen Chahine, *Feinstein Institute, NY, United States*

3:45PM A Chemo-mechanical Model for Extracellular Matrix and Nuclear Rigidity Regulated Size of Focal Adhesion Plaques SB³C2016-679

Xuan P. Cao¹, Yuan Lin², Tristan Driscoll³, Janusz Franco-Barraza⁴, Edna Cukierman⁴, Robert Mauck³, Vivek Shenoy⁵,
¹*Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA, United States*, ²*Department of Mechanical Engineering, The University of Hong Kong, Hong Kong, Hong Kong*, ³*Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, United States*, ⁴*Fox Chase Cancer Center, Philadelphia, PA, United States*, ⁵*Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA, United States*

4:00PM A Predictive Multiscale Model for Simulating Flow-Induced Platelet Activation: Correlating with In-Vitro Results SB³C2016-690

Peng Zhang¹, Chao Gao¹, Jawaad Sherif¹, Marvin J. Slepian^{1,2}, Yuefan Deng³, Danny Bluestein¹, ¹*Biomedical Engineering Department, Stony Brook University, Stony Brook, NY, United States*, ²*Departments of Medicine and Biomedical Engineering, University of Arizona, Tucson, AZ, United States*, ³*Applied Mathematics Department, Stony Brook University, Stony Brook, NY, United States*

4:15PM Cell Organization Dictates Stress Generation in Tissue Engineered Cell Sheets SB³C2016-665

Inge A. E. W. van Loosdregt¹, Patrick W. Alford², Cees W. J. Oomens¹, Sandra Loerakker¹, Carlijn V. C. Bouten¹,
¹*Biomedical Engineering, Eindhoven University of Technology, Eindhoven, Netherlands*, ²*Biomedical Engineering, University of Minnesota, Minneapolis, MN, United States*

4:30PM Impacts of Maturation on the Nanostructure and Nanomechanics of the Meniscus Extracellular Matrix SB³C2016-948

Qing Li¹, Feini Qu^{2,3}, Biao Han¹, Robert L. Mauck^{2,3}, Lin Han¹, ¹*School of Biomedical Engineering, Science and Health Systems, Drexel University, Philadelphia, PA, United States*, ²*McKay Orthopaedic Research Laboratory, University of Pennsylvania, Philadelphia, PA, United States*, ³*Translational Musculoskeletal Research Center, Philadelphia Veterans Administration Medical Center, Philadelphia, PA, United States*

4:45PM Linking Mitral Valve Interstitial Cell Deformation to Biosynthetic Response: Implications for Mitral Valve Repair SB³C2016-802

Salma Ayoub¹, Chung-Hao Lee¹, Connor T. Hughes¹, Giovanni Ferrari², Michael S. Sacks¹, ¹*The University of Texas at Austin, Austin, TX, United States*, ²*University of Pennsylvania, Philadelphia, PA, United States*

5:00PM Mechanical Effects of Dynamic Binding between Tau Proteins on Microtubules during Axonal Injury SB³C2016-111

Hossein Ahmadzadeh¹, Douglas Smith², Vivek Shenoy³, ¹*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*, ³*Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA, United States*

WEDNESDAY, JUNE 29**3:45pm - 5:15pm**

Modeling and Mechanosensitivity

Wilson C**Session Chair:** Clark Hung, *Columbia, NY, United States***Session Co-Chair:** Malisa Sarntinoranont, *University of Florida, FL, United States*

3:45PM Age-Related Differences in Human Dermal Fibroblast Mechanosensitivity to Hyaluronic Acid Dermal Filler SB³C2016-877

Aribet M. De Jesus¹, Sathivel Chinnathambi¹, Mariam El-Hattab¹, Douglas K. Henstrom², Edward A. Sander¹,
¹*Department of Biomedical Engineering, University of Iowa, Iowa City, IA, United States*, ²*Department of Otolaryngology - Head and Neck Surgery, University of Iowa, Iowa City, IA, United States*

- 4:00PM A Comparison of Phenomenological and Thermodynamically Consistent Approaches to the Modelling of Cells Subjected to Dynamic Loading** SB³C2016-1113
Patrick McGarry¹, Vikram S. Deshpande², ¹National University of Ireland Galway, Galway, Ireland, ²University of Cambridge, Cambridge, United Kingdom
- 4:15PM Modeling the Gas Foaming Process for Expanding Electrospun Nanofiber Membranes in the Third Dimension** SB³C2016-707
Zhuoran Li¹, Jingwei Xie², Linxia Gu¹, ¹Dept. of Mechanical & Materials Engineering, University of Nebraska-Lincoln, Lincoln, NE, United States, ²Department of Surgery-Transplant and Holland Regenerative Medicine Program, University of Nebraska Medical Center, Omaha, NE, United States
- 4:30PM A Model for Biological Fibers Derived From Implicit Elasticity** SB³C2016-48
Alan D. Freed, Mechanical Engineering, Texas A&M University, College Station, TX, United States
- 4:45PM Chemically Conjugated Growth Factors on Electrospun Biomimetic Scaffolds Enhance Cell Adhesion and Proliferation** SB³C2016-31
Hannah M. Pauly¹, Ketul C. Popat^{1,2}, Nicholas J. Dunne^{3,4}, Daniel J. Kelly⁵, Tammy L. Haut Donahue^{1,2}, ¹School of Biomedical Engineering, Colorado State University, Fort Collins, CO, United States, ²Mechanical Engineering, Colorado State University, Fort Collins, CO, United States, ³School of Mechanical and Aerospace Engineering, Queens University of Belfast, Belfast, United Kingdom, ⁴School of Mechanical and Manufacturing Engineering, Dublin City University, Dublin, Ireland, ⁵Trinity Centre for Bioengineering, Trinity College, Dublin, Ireland
- 5:00PM Finite Element Modeling of Cell pH and Ca²⁺ Regulations for Chondrocytes with Mixture Theory** SB³C2016-854
Chieh (Jay) Hou¹, Eben G. Estell², Clark T. Hung², Gerard A. Ateshian¹, ¹Mechanical Engineering, Columbia University, New York, NY, United States, ²Biomedical Engineering, Columbia University, New York, NY, United States

WEDNESDAY, JUNE 29**3:45pm - 5:15pm****Musculo-skeletal Soft Tissue Mechanics****Wilson D****Session Chair:** Richard Debski, University of Pittsburgh, PA, United States**Session Co-Chair:** Suzanne Maher, Hospital for Special Surgery, NY, United States

- 3:45PM Block Co-Polymer Based Hydrogels for Meniscal Replacement** SB³C2016-36
Kristine M. Fischenich¹, Jackson T. Lewis¹, Travis S. Bailey^{1,2}, Tammy L. Haut Donahue^{1,3}, ¹School of Biomedical Engineering, Colorado State University, Fort Collins, CO, United States, ²Chemical and Biological Engineering, Colorado State University, Fort Collins, CO, United States, ³Department of Mechanical Engineering, Colorado State University, Fort Collins, CO, United States
- 4:00PM Effects of Mechanical Load on Scaffold-Cartilage Integration: A Computationally Augmented Biological Model** SB³C2016-914
Supansa Yodmuang¹, Hongqiang Guo¹, Tony Chen¹, Caroline Brial¹, Peter A. Torzilli², Russell Warren², Suzanne Maher¹, ¹Biomechanics, Hospital for Special Surgery, New York, NY, United States, ²Tissue Engineering, Regeneration and Repair Program, Hospital for Special Surgery, New York, NY, United States
- 4:15PM Skeletal Muscle Permeability: Direct Experimental Evaluation and Modeling Implications** SB³C2016-103
Benjamin B. Wheatley¹, Gregory M. Odegard², Kenton R. Kaufman³, Tammy L. Haut Donahue¹, ¹Mechanical Engineering, Colorado State University, Fort Collins, CO, United States, ²Mechanical Engineering-Engineering Mechanics, Michigan Technological University, Fort Collins, CO, United States, ³Department of Orthopaedic Surgery, Mayo Clinic, Rochester, MN, United States
- 4:30PM Investigating Deep Pressure Induced Deep Tissue Injury Using MRI and 3D Finite Element Analysis** SB³C2016-122
Willeke A. Traa¹, Mark C. van Turnhout¹, Jules L. Nelissen¹, Gustav J. Strijkers², Klaas Nicolay¹, Dan L. Bader³, Cees W. J. Oomens¹, ¹Department of Biomedical Engineering, University of Technology Eindhoven, Eindhoven, Netherlands, ²Department of Biomedical Engineering and Physics, Amsterdam Medical Centre, Amsterdam, Netherlands, ³Department of Health Sciences, University of Southampton, Southampton, United Kingdom
- 4:45PM Effects of Meniscal Transplantation on Knee Joint Contact Mechanics and PostOperative Articular Cartilage Imaging** SB³C2016-815
Hongsheng Wang, Matthew Koff, Hollis Potter, Scott Rodeo, Suzanne A. Maher, Hospital for Special Surgery, New York City, NY, United States

- 5:00PM Site- and Force-dependent Strain Behavior in the Porcine Anterior Cruciate Ligament** SB³C2016-1040
Satoshi Yamakawa¹, Richard E. Debski², Hiromichi Fujie¹, ¹*Tokyo Metropolitan University, Hino, Japan*, ²*University of Pittsburgh, Pittsburgh, PA, United States*

WEDNESDAY, JUNE 29	3:45pm - 5:15pm
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Extracellular Matrix Mechanics in Aneurysms

Annapolis 1

Session Chair: Ken Monson, *University of Utah, UT, United States*

Session Co-Chair: Shamik Bhattacharya, *St.Mary's University, TX, United States*

- 3:45PM A Comparative Study of the Mechanical Response and Fiber Structure in an Elastase Induced Aneurysm Model in Rabbits and Human Cerebral Aneurysms** SB³C2016-1112
Chao Sang¹, Xinjie Duan¹, David F. Kallmes², Ram Kadirvel², Yonghong Ding², Daying Dai², Khaled M. Aziz³, Juan R. Cebra⁴, Anne M. Robertson¹, ¹*Mechanical Engineering and Materials Science, University of Pittsburgh, Pittsburgh, PA, United States*, ²*Department of Radiology, Mayo Clinic, Rochester, MN, United States*, ³*Department of Neurosurgery, Allegheny General Hospital, Pittsburgh, PA, United States*, ⁴*Department of Bioengineering, George Mason University, Fairfax, VA, United States*
- 4:00PM A Structural Finite Element Model for Lamellar Unit of Aortic Media Indicates Heterogeneous Stress Field After Collagen Recruitment** SB³C2016-676
James R. Thunes, Joseph Pichamuthu, Julie A. Phillippi, Thomas G. Gleason, David A. Vorp, Spandan Maiti, *Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*
- 4:15PM Development and Evaluation of an Image Analysis Approach for the Study of Recurrence in Coil Embolized Cerebral Aneurysms** SB³C2016-166
Anna Schumacher¹, Luca Antiga², Tatiana Correa¹, David Hasan³, Madhavan Raghavan¹, ¹*Biomedical Engineering, University of Iowa, Iowa City, IA, United States*, ²*Orobix Srl, Bergamo, Italy*, ³*Neurosurgery, University of Iowa, Iowa City, IA, United States*
- 4:30PM Effect of Penta-galloyl Glucose on Murine AAA: Material Parameter Optimization and Finite Element Implementation** SB³C2016-791
Mirunalini Thirugnanasambandam¹, Dan Simionescu², Eugene Sprague³, Beth Goins⁴, Geoffrey D. Clarke⁴, Hai-Chao Han⁵, Krysta Amezcua¹, Oluwaseun R. Adeyinka¹, Ender Finol¹, ¹*Department of Biomedical Engineering, University of Texas at San Antonio, San Antonio, TX, United States*, ²*Department of Bioengineering, Clemson University, Clemson, SC, United States*, ³*Department of Medicine, University of Texas Health Science Center at San Antonio, San Antonio, TX, United States*, ⁴*Department of Radiology, University of Texas Health Science Center at San Antonio, San Antonio, TX, United States*, ⁵*Department of Mechanical Engineering, University of Texas at San Antonio, San Antonio, TX, United States*
- 4:45PM Mechanical Behavior and Genetic Signaling in Aortic Aneurysms in Newborn Lysyl Oxidase Knockout Mice** SB³C2016-728
Marius C. Staiculescu¹, Robert Mecham², Jessica Wagenseil¹, ¹*Mechanical Engineering and Materials Science, Washington University, St. Louis, MO, United States*, ²*Cell Biology, Washington University, St. Louis, MO, United States*
- 5:00PM In Vitro Rupture Patterns of Ascending Thoracic Aortic Aneurysms** SB³C2016-607
Jia Lu¹, Yuanming Lu¹, Ambroise Duprey², Stéphane Avril², ¹*Mechanical and Industrial Engineering, The University of Iowa, Iowa City, IA, United States*, ²*Ecole Nationale Supérieure des Mines, St. Étienne, France*

WEDNESDAY, JUNE 29**3:45pm - 5:15pm****Atherosclerosis****Annapolis 2****Session Chair:** Frank Gijzen, *Erasmus University Rotterdam, Netherlands***Session Co-Chair:** David Vorp, *University of Pittsburgh, PA, United States*

- 3:45PM Assessment of Analysis Methods to Evaluate the Association Between Wall Shear Stress and Coronary Artery Disease in the Clinical Setting** SB³C2016-1036
Lucas H. Timmins^{1,2}, David S. Molony^{1,3}, Parham Eshtehardi³, Michael C. McDaniel³, John N. Oshinski^{1,2}, Habib Samady³, Don P. Giddens¹, ¹*Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA, United States*, ²*Radiology and Imaging Sciences, Emory University School of Medicine, Atlanta, GA, United States*, ³*Medicine (Cardiology), Emory University School of Medicine, Atlanta, GA, United States*
- 4:00PM Impact of Bi-Axial Shear on Atherogenic Gene Expression by Endothelial Cells** SB³C2016-87
 Amlan Chakraborty¹, Sutirtha Chakraborty², Venkatakrishna R. Jala², Jonathan Thomas², **M. Keith Sharp**², R Eric Berson², Haribabu Bodduluri², ¹*Entegris, Inc, Franklin, MA, United States*, ²*University of Louisville, Louisville, KY, United States*
- 4:15PM Cap Inflammation Leads to Large Plaque Cap Stress Decrease and Strain Increase: MRI-PET/CT-Based FSI Modeling** SB³C2016-28
Dalin Tang^{1,2}, Chun Yang^{1,3}, Sarayu Huang⁴, Venkatesh Mani⁴, Zahi A. Fayad⁴, ¹*WPI, Worcester, MA, United States*, ²*Southeast University, Nanjing, China*, ³*China Information Tech. Designing & Consulting Institute Co., Ltd., Beijing, China*, ⁴*Translational and molecular imaging institute, New York, NY, United States*
- 4:30PM MRI based Cap Thickness and Peak Cap Stress Prediction: Man Versus Machine** SB³C2016-782
Annette M. Kok¹, Aad van der Lugt², Antonius F. W. van der Steen¹, Jolanda J. Wentzel¹, Frank J. H. Gijzen¹, ¹*Biomedical Engineering, Erasmus MC, Rotterdam, Netherlands*, ²*Radiology, Erasmus MC, Rotterdam, Netherlands*
- 4:45PM The Relation Between Shear Stress Metrics and Atherosclerosis: a Follow-up Study in the Carotid Arteries of Atherosclerotic Mice** SB³C2016-39
 David De Wilde¹, Bram Trachet^{1,2}, Guido R. Y. De Meyer³, **Patrick Segers**¹, ¹*Ghent University, Ghent, Belgium*, ²*Institute for Bioengineering, EPFL, Lausanne, Switzerland*, ³*Division of Physiopharmacology, University of Antwerp, Antwerp, Belgium*
- 5:00PM Effect of Stent Oversizing on In-stent Restenosis in the Second Part of the Popliteal Artery** SB³C2016-1132
Azadeh Lotfi¹, Tracie Barber¹, Anne Simmons¹, Ramon Varcoe², ¹*Mechanical and manufacturing Engineering, University of new South Wales, Sydney, Australia*, ²*Department of Surgery, Prince of Wales Hospital, Sydney, Australia*

WEDNESDAY, JUNE 29**3:45pm - 5:15pm****Musculoskeletal System and Design****Azalea 2****Session Chair:** Michele Grimm, *Wayne State, MI, United States***Session Co-Chair:** Brett Steineman, *Colorado State University, CO, United States*

- 3:45PM Elucidating Mechanisms of Tendon Damage by Measuring Multiscale Unloaded Recovery following Tensile Loading** SB³C2016-800
Andrea H. Lee¹, Spencer E. Szczesny², Kristen L. Fetchko¹, Michael H. Santare³, Dawn M. Elliott¹, ¹*Department of Biomedical Engineering, University of Delaware, Newark, DE, United States*, ²*Department of Orthopaedic Surgery, University of Pennsylvania, Philadelphia, PA, United States*, ³*Department of Mechanical Engineering, University of Delaware, Newark, DE, United States*
- 4:00PM The Use of Individual Motion Units to Analyze In Vivo Total Thoracolumbar Motion in Healthy Older Adults** SB³C2016-717
Eileen S. Cadel¹, Sarah N. Galvis¹, William M. Eboch², Paul M. Arnold³, Sara E. Wilson², Elizabeth A. Friis², ¹*Bioengineering Graduate Program, University of Kansas, Lawrence, KS, United States*, ²*Mechanical Engineering, University of Kansas, Lawrence, KS, United States*, ³*Department of Neurology, University of Kansas Medical Center, Kansas City, KS, United States*

- 4:15PM Novel Instrumented Mouthguard Designs to Accurately Measure Head Kinematics for Traumatic Brain Injury** SB³C2016-696
Calvin Kuo¹, Lyndia C. Wu², David B. Camarillo^{1,2}, ¹*Mechanical Engineering, Stanford University, Stanford, CA, United States*, ²*Bioengineering, Stanford University, Stanford, CA, United States*
- 4:30PM Effective Stiffnesses for the Human Buttocks and Thigh Regions Obtained Through in vivo Methods: Applications to Medical Seating** SB³C2016-124
Wu Pan, Zac Sadler, Lindsay Nault, Tamara Reid Bush, *Mechanical Engineering, Michigan State University, East Lansing, MI, United States*
- 4:45PM Fatigue Testing of a Composite Meniscus Implant - What are the Limits?** SB³C2016-669
Jonathan J. Elsner¹, Maoz Shemesh², Adaya Shefy-Peleg², Eyal Zylberberg², Zahava Barkai³, Eran Linder-Ganz², ¹*Research and Development, Active Implants, Cambridge, MA, United States*, ²*Research and Development, Active Implants, Netanya, Israel*, ³*Wolfson Applied Materials Research Center, Tel-Aviv University, Tel-Aviv, Israel*
- 5:00PM Footwear Affects Muscle Activity during Ramp Walking** SB³C2016-685
Feng Wei, Andrew J. Crechiolo, Roger C. Haut, *Orthopaedic Biomechanics Laboratories, Michigan State University, East Lansing, MI, United States*

WEDNESDAY, JUNE 29**3:45pm - 5:15pm****Thermal Treatment and Hyperthermia****Azalea 3****Session Chair:** Aili Zhang, *Shanghai Jiao Tong University, China***Session Co-Chair:** Zhenpeng Qin, *University of Texas at Dallas, TX, United States*

- 3:45PM Development of a 3-D Whole Body Heat Transfer Model for Accurately Predicting Time of Death in Forensic Science** SB³C2016-149
Catherine Bartgis, Alexander LeBrun, Amirreza Saharkhiz, Ronghui Ma, **Liang Zhu**, *Mechanical Engineering, University of Maryland Baltimore County, Baltimore, MD, United States*
- 4:00PM A Counterexample of Entropy-Enthalpy Compensation in Collagen Denaturation** SB³C2016-900
Neil T. Wright, *Mechanical Engineering, Michigan State University, East Lansing, MI, United States*
- 4:15PM Contribution of Ultrasound Absorption in Nanoparticles for Hyperthermia Application** SB³C2016-765
Vishal Kumar¹, Surendra Devarakonda², Rupak K Banerjee², Ashok K Ganguli^{1,3}, **Chandan Bera**¹, ¹*Institute of Nano Science and Technology, Mohali, India*, ²*Mechanical and Materials Engineering Department, University of Cincinnati, Cincinnati, OH, United States*, ³*Department of Chemistry, Indian Institute of Technology, Delhi, New Delhi, India*
- 4:30PM Dynamic Bubble Formation in ADV Assisted HIFU with Preexisting Bubble Wall** SB³C2016-767
Ying Xin¹, **Aili Zhang**¹, Lisa X. Xu¹, Jeffery B. Fowlkes², ¹*Shanghai Jiao Tong University, Shanghai, China*, ²*University of Michigan, Ann Arbor, MI, United States*
- 4:45PM In Vitro and In Vivo Model for Assessing Irreversible Electroporation on Pancreatic Cancer** SB³C2016-770
Qi Shao¹, Connie Chung¹, Feng Liu¹, Kianna Elahi², Paolo Provenzano², Bruce Forsyth³, John C. Bischof¹, ¹*Mechanical Engineering, University of Minnesota, Minneapolis, MN, United States*, ²*Biomedical Engineering, University of Minnesota, Minneapolis, MN, United States*, ³*Boston Scientific, Marlborough, MA, United States*
- 5:00PM Nanosecond Protein Thermal Inactivation by Plasmonic Nanoparticle Laser Heating** SB³C2016-745
Peiyuan Kang, **Zhenpeng Qin**, *Mechanical Engineering, University of Texas at Dallas, Richardson, TX, United States*

THURSDAY, JUNE 30	8:00am - 9:30am
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Engineering Translation: Disease Models and Outcomes**Wilson B****Session Chair:** Sharan Ramaswamy, *Florida International University, FL, United States***Session Co-Chair:** Ozan Akkus, *Case Western Reserve University, OH, United States*

- 8:00AM 3D in vitro Platform to Isolate Dormancy Capable Cancer Cells** SB³C2016-740
Julian A. Preciado, Eduardo Retagui, Molly Lefebvre, Samira Azarin, Emil Lou, Alptekin Aksan, *Mechanical Engineering, University of Minnesota, Minneapolis, MN, United States*
- 8:15AM Biomechanical Regulation of Angiogenesis by Cancer-Associated Fibroblasts** SB³C2016-97
M.K. Sewell-Loftin¹, Elizabeth L. Crist¹, B. Taylor Hughes¹, Samantha van Hove², Gregory D. Longmore^{2,3}, Steven C. George¹, ¹*Department of Biomedical Engineering, Washington University in St. Louis, St. Louis, MO, United States*, ²*Department of Cell Biology and Physiology, Washington University in St. Louis, St. Louis, MO, United States*, ³*Department of Medicine, Oncology Division, Washington University in St. Louis, St. Louis, MO, United States*
- 8:30AM Chondro-protective Effect of Zoledronate on In Situ Chondrocytes Damaged by Interleukin-1** SB³C2016-999
Mengxi Lv, Yilu Zhou, Shongshan Fan, Olivia Smith, Liyun Wang, X.Lucas Lu, *University of Delaware, Newark, DE, United States*
- 8:45AM Photoclickable Peptide Microarrays for High Throughput Screening and Discovery in Regenerative Medicine and Disease Models** SB³C2016-1098
Michael L. Floren, *Department of Mechanical Engineering, University of Colorado Boulder, Boulder, CO, United States*
- 9:00AM Characterization of Glioblastoma Growth Using Five Different Mathematical Models** SB³C2016-986
Mitra Shabanisamghabady, Martin L. Tanaka, *Engineering and Technology, Western Carolina University, Cullowhee, NC, United States*
- 9:15AM Application of a Novel Biomechanical Fiber Model to Tissue Engineering for Improved Clinical Outcomes** SB³C2016-1055
Andrew B. Robbins¹, Silvia Minardi², Ennio Tasciotti², Alan D. Freed³, Michael R. Moreno³, ¹*Biomedical Engineering, Texas A&M University, College Station, TX, United States*, ²*Methodist Research Hospital, Houston, TX, United States*, ³*Mechanical Engineering, Texas A&M University, College Station, TX, United States*

THURSDAY, JUNE 30	8:00am - 9:30am
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Design and Optimization of Cardiovascular Devices**Wilson C****Session Chair:** Alan D. Freed, *Texas A&M University, TX, United States***Session Co-Chair:** Michael Moreno, *Texas A&M, TX, United States*

- 8:00AM A Computational Framework for Optimization of Transcatheter Aortic Valve Leaflets** SB³C2016-993
Kyle E. Murdock¹, Kewei Li², Caitlin Martin¹, Wei Sun¹, ¹*Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA, United States*, ²*Biomedical Engineering, Graz University of Technology, Graz, Austria*
- 8:15AM A Computational Investigation of the Positioning of Transcatheter Aortic Heart Valves to Enhance Long Term Performance** SB³C2016-773
Orla M. McGee, Paul S. Gunning, Laoise M. McNamara, *Biomedical Engineering, NUI Galway, Galway, Ireland*
- 8:30AM Computational Modeling of Optimization of Drug-Eluting Stents Under Multiple Mechanical Criteria** SB³C2016-882
Francois P. M. Cornat, Franz Bozsak, Abdul I. Barakat, *Laboratoire d'hydrodynamique LadHyX, Ecole Polytechnique, Palaiseau cedex, France*
- 8:45AM Development and Evaluation of an Arborizing Catheter for Convection Enhanced Delivery** SB³C2016-849
Egleide Y. Elenes¹, Christopher G. Rylander², ¹*Biomedical Engineering, The University of Texas at Austin, Austin, TX, United States*, ²*Mechanical Engineering, The University of Texas at Austin, Austin, TX, United States*

- 9:00AM A Virtual Coiling Algorithm to Simulate Endovascular Coil Deployment in Cerebral Aneurysm using Spring Based Geometric Constraint Model** SB³C2016-716
Rahul Sanal¹, Robert J. Damiano¹, Adnan H. Siddiqui², Jinhui Xu³, Hui Meng¹, ¹*Department of Mechanical and Aerospace Engineering, State University of New York at Buffalo, Buffalo, NY, United States*, ²*Department of Neurosurgery, State University of New York at Buffalo, Buffalo, NY, United States*, ³*Department of Computer Science and Engineering, State University of New York at Buffalo, Buffalo, NY, United States*
- 9:15AM Visco-Hyperelastic Modeling of the Penn State Pulsatile Pneumatic Pediatric VAD Membrane** SB³C2016-884
Bryan Good, Keefe Manning, *Bioengineering, The Pennsylvania State University, University Park, PA, United States*

THURSDAY, JUNE 30**8:00am - 9:30am****Injury: Brain I****Wilson D****Session Chair: Songbai Ji**, *Dartmouth College, NH, United States***Session Co-Chair: Reuben H. Kraft**, *The Pennsylvania State University, PA, United States*

- 8:00AM Modal Analysis of Human Brain Dynamics in Contact Sports** SB³C2016-1023
Mehmet Kurt, Kaveh Laksari, David B. Camarillo, *Bioengineering, Stanford University, Stanford, CA, United States*
- 8:15AM Characterization of White Matter Using Asymmetric Indentation and Inverse Modeling in Large Strain** SB³C2016-53
Yuan Feng¹, Chung-Hao Lee², Lining Sun¹, Shengjun Fu¹, ¹*Mechanical and Electronic Engineering, Soochow University, Suzhou, China*, ²*ICES, The University of Texas at Austin, Austin, TX, United States*
- 8:30AM White Matter Injury Susceptibility Using Whole-brain Tractography: Concept Illustration** SB³C2016-69
Wei Zhao¹, James C. Ford², Thomas W. McAllister³, Songbai Ji^{1,4}, ¹*Thayer School of Engineering, Dartmouth College, Hanover, NH, United States*, ²*Department of Psychiatry, Geisel School of Medicine, Dartmouth College, Hanover, NH, United States*, ³*Department of Psychiatry, Indiana University School of Medicine, Indiana University, Indianapolis, IN, United States*, ⁴*Department of Surgery and of Orthopaedic Surgery, Dartmouth College, Hanover, NH, United States*
- 8:45AM A Bayesian Approach to Model Selection and Surrogate Modeling: Application to Traumatic Brain Injury Simulations** SB³C2016-1039
Sandeep Madireddy, **Kumar Vemaganti**, *Mechanical & Materials Engineering, University of Cincinnati, Cincinnati, OH, United States*
- 9:00AM Subconcussive Head Impact Exposure for Concussed and Non-Concussed Division III College Football Athletes** SB³C2016-708
Alok S. Shah^{1,2}, Brian D. Stemper^{1,2}, James K. Murtha¹, Rachel A. Chiariello^{1,2}, John R. Humm^{1,2}, Ashley LaRoche¹, Michael McCrea^{1,2}, ¹*Department of Neurosurgery, Medical College of Wisconsin, Milwaukee, WI, United States*, ²*Neuroscience Research Center, Veterans Affairs Medical Center, Milwaukee, WI, United States*
- 9:15AM Heterogeneity of Viscoelastic Behavior of Rat Brain** SB³C2016-1043
Soroush Assari, Golriz Kermani, Ali Hemmasizadeh, Mary F. Barbe, Kurosh Darvish, *Temple University, Philadelphia, PA, United States*

THURSDAY, JUNE 30**8:00am - 9:30am****ATH Plaque Imaging and Mechanics****Annapolis 1****Session Chair: Dalin Tang**, *Worcester Polytechnic Institute, MA, United States***Session Co-Chair: Lucas H. Timmins**, *Georgia Institute of Technology, GA, United States*

- 8:00AM A CT Based Model of the Fracture of Calcified Atherosclerotic Plaques** SB³C2016-1019
Brían L. O'Reilly, Patrick McGarry, Peter E. McHugh, *Biomedical Engineering, National University of Ireland, Galway, Ireland*

- 8:15AM Characterization of Fracture Behavior of Human Atherosclerotic Fibrous Caps Using a Miniature Single Edge Notched Tensile Test** SB³C2016-610
Lindsey A. Davis¹, Samantha E. Stewart¹, Christopher G. Carsten², Bruce A. Snyder², Michael A. Sutton¹, Susan M. Lessner¹, ¹University of South Carolina, Columbia, SC, United States, ²Greenville Health System, Greenville, SC, United States
- 8:30AM Deployment and Degradation of a Bioresorbable Stent: a Coupled Computational Model Between Stent and Artery** SB³C2016-777
Johanne Mensah-Gourmel¹, François Cornat¹, Antoine Lafont², Abdul I. Barakat¹, ¹Hydrodynamics Laboratory - Ecole Polytechnique, Palaiseau, France, ²Georges Pompidou European Hospital - Cardiology department - APHP - Paris Descartes University, Paris, France
- 8:45AM Imaging and Quantifying the 3D Collagen Architecture in Atherosclerotic Plaques** SB³C2016-940
Ali C. Akyildiz¹, Lambert Speelman¹, Chen-Ket Chai², Cees Oomens², Gustav Strijkers³, Frank Gijssen¹, ¹Biomedical Engineering Department, Erasmus MC, Rotterdam, Netherlands, ²Department of Biomedical Engineering, Eindhoven University of Technology, Eindhoven, Netherlands, ³Department of Biomedical Engineering & Physics, University of Amsterdam, Amsterdam, Netherlands
- 9:00AM Loss of Elastic Fiber Integrity Due to Fibulin-5 Deficiency Alters Aortic Elasticity, Central Hemodynamics, and Cardiac Function** SB³C2016-167
Jacopo Ferruzzi^{1,2}, Paolo Di Achille², Pradyumn Agarwal³, Federica Cuomo³, C. Alberto Figueroa³, Jay D. Humphrey^{2,4}, ¹Boston University, Boston, MA, United States, ²Department of Biomedical Engineering, Yale University, New Haven, CT, United States, ³Department of Biomedical Engineering, University of Michigan, Ann Arbor, MI, United States, ⁴Vascular Biology & Therapeutics Program, Yale School of Medicine, New Haven, CT, United States
- 9:15AM Effects of Opening Angle, Axial Stretch and Circumferential Shrinkage on Blood Vessel Stress and Strain Calculations** SB³C2016-581
Liang Wang¹, Jian Zhu², Akiko Maehara³, Jie Zheng⁴, Chun Yang^{1,5}, David Muccigrosso⁴, Gary S. Mintz³, Dalin Tang^{1,6}, ¹Mathematical Department, Worcester Polytechnic Institute, Worcester, MA, United States, ²Department of Cardiology, Zhongda Hosiptial, Southeast University, Nanjing, China, ³The Cardiovascular Research Foundation, Columbia University, New York, NY, United States, ⁴Mallinckrodt Institute of Radiology, Washington University, St. Louis, MO, United States, ⁵Network Technology Research Institute, China United Network Comm. Co., Ltd., Beijing, China, ⁶Department of Mathemtics, Southeast University, Nanjing, China

THURSDAY, JUNE 30	8:00am - 9:30am
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Aneurysm Biomechanics

Annapolis 2

Session Chair: Ender A. Finol, University of Texas at San Antonio, TX, United States

Session Co-Chair: Jessica Shang, University of Rochester, NY, United States

- 8:00AM Prediction of Abdominal Aortic Aneurysm shape evolution using Gaussian Process Implicit Surfaces** SB³C2016-56
Huan N. Do¹, Jongeun Choi^{1,2}, Seungik Baek¹, ¹Mechanical Engineering, Michigan State University, East Lansing, MI, United States, ²Department of Electrical and Computer Engineering, Michigan State University, East Lansing, MI, United States
- 8:15AM A New Approach for Abdominal Aortic Aneurysm Local Growth Quantification** SB³C2016-783
Eleni Metaxa¹, Iordan Iordanov¹, Emmanuel Maravelakis², **Yannis Papaharilaou**¹, ¹Institute for Applied and Computational Mathematics, Foundation for Research and Technology - Hellas, Heraklion, Greece, ²(2)Department of Environmental and Natural Resources Engineering, Technological Educational Institute of Crete, Chania, Greece
- 8:30AM Novel Growth and Remodeling Mechanisms May Explain the Unique Expansion Patterns and Evolving Mechanical Behavior of Abdominal Aortic Aneurysms** SB³C2016-1052
John S. Wilson¹, Christian Cyron², Jay D. Humphrey³, ¹Radiology, Emory University, Atlanta, GA, United States, ²Mechanical Engineering, Technical University of Munich, Garching, Germany, ³Biomedical Engineering, Yale University, New Haven, CT, United States

- 8:45AM Intrasaccular Hemodynamics, Wall Inflammation and Degenerative Changes of Cerebral Aneurysm Wall**
SB³C2016-132
Juan Cebal¹, Eliisa Ollikainen², BongJae Chung¹, Fernando Mut¹, Visa Sippola², Behdam Jahromi², Riikka Tulamo², Juha Hernesniemi², Mika Niemela², Anne Robertson³, Juhana Frosen^{2,4}, ¹*Bioengineering, George Mason University, Fairfax, VA, United States*, ²*Neurosurgery, Biomedicum & Helsinki University Hospital, Helsinki, Finland*, ³*Mechanical and Material Science & Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*, ⁴*Neurocenter, Kuopio University Hospital, Kuopio, Finland*
- 9:00AM Fluid-structure Interaction of a Ruptured Intracranial Aneurysm: Does Patient-specific Wall Thickness Matter?**
SB³C2016-35
Philipp Berg¹, Samuel Voß¹, Sylvia Glaßer², Thomas Hoffmann³, Simon Weigand³, Gábor Janiga¹, ¹*Department of Fluid Dynamics and Technical Flows, University of Magdeburg, Magdeburg, Germany*, ²*Department of Simulation and Graphics, University of Magdeburg, Magdeburg, Germany*, ³*Department of Neuroradiology, University Hospital Magdeburg, Magdeburg, Germany*
- 9:15AM Intra Aneurysmal Angiographic Analysis in Patients Towards Determination of Flow Diversion Efficacy**
SB³C2016-1138
Ronak J. Dholakia, Chander Sadasivan, David J. Fiorella, Henry H. Woo, Baruch B. Lieber, *Neurological Surgery, Stony Brook University, Stony Brook, NY, United States*

THURSDAY, JUNE 30**8:00am - 9:30am****Computational Mechanics and Simulations****Azalea 2**

Session Chair: Jonathan Vande Geest, *University of Pittsburgh, PA, United States*
Session Co-Chair: Andrew Feola, *Georgia Institute of Technology, A, United States*

- 8:00AM Study of Two Arterial Wall Delamination Experiments** SB³C2016-635
Xiaochang Leng¹, Boran Zhou², Xiaomin Deng¹, Lindsey Davis^{2,3}, Susan Lessner^{2,3}, Michael Sutton^{1,2}, Tarek Shazly¹, ²*Department of Mechanical Engineering, University of South Carolina, Columbia, SC, United States*, ³*Biomedical Engineering Program, University of South Carolina, Columbia, SC, United States*, ⁴*Department of Cell Biology & Anatomy, University of South Carolina, Columbia, SC, United States*
- 8:15AM Individual-Specific Finite Element Model of the Rat Optic Nerve Head Under Elevated Intraocular Pressure Conditions** SB³C2016-107
Stephen A. Schwaner¹, Marta Pazos^{2,3}, Hongli Yang³, Elaine C. Johnson⁴, John C. Morrison⁴, Claude F. Burgoyne³, C. Ross Ethier^{1,5}, ¹*George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA, United States*, ²*Ophthalmology Department, Hospital de l'Esperanca-Parc de Salut Mar. Institute Mar d'Investigacions Mediques, Barcelona, Spain*, ³*Devers Eye Institute, Optic Nerve Head Research Laboratory, Portland, OR, United States*, ⁴*Casey Eye Institute, Oregon Health and Science University, Portland, OR, United States*, ⁵*Coulter Department of Biomedical Engineering, Georgia Institute of Technology/Emory University, Atlanta, GA, United States*
- 8:30AM Lamina Cribrosa Disinsertions as a Mechanoprotective Strategy** SB³C2016-786
Andrew P. Voorhees¹, Ning-Jiun Jan^{1,2}, John G. Flanagan³, Jeremy M. Sivak⁴, Ian A. Sigal^{1,2}, ¹*Ophthalmology, University of Pittsburgh, Pittsburgh, PA, United States*, ²*Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*, ³*Optometry and Vision Science, University of California Berkeley, Berkeley, CA, United States*, ⁴*Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada*
- 8:45AM Magnetic Resonance Elastography of White Matter Brain Tissue Ex Vivo** SB³C2016-687
John L. Schmidt¹, Dennis J. Tweten¹, Andrew A. Badachhappe², Ruth J. Okamoto¹, Joel R. Garbow³, Philip V. Bayly¹, ²*1Mechanical Engineering and Materials Science, Washington University, St. Louis, MO, United States*, ²*Biomedical Engineering, Washington University, St. Louis, MO, United States*, ³*Radiology, Washington University, St. Louis, MO, United States*
- 9:00AM Numerical Constraint for Tracking Tagged Magnetic Resonance Images in Biomechanical Simulations**
SB³C2016-1002
Arnold David Gomez¹, Deva Chan², Yuan-Chiao Lu², Dzung Pham², Philip Bayly³, Jerry Prince¹, ¹*Electrical and Computer Engineering Department, Johns Hopkins University, Baltimore, MD, United States*, ²*Center for Neuroscience and Regenerative Medicine, Henry Jackson Foundation, Bethesda, MD, United States*, ³*Mechanical Engineering Department, Washington University in St. Louis, St. Louis, MO, United States*

9:15AM A Parameterized Ultrasound-Based Finite Element Analysis of the Mechanical Environment of PregnancySB³C2016-927

Andrea R. Westervelt¹, Michael Fernandez¹, Joy Vink², Chia-Ling Nhan-Chang², Miaoying Fan², Ronald J. Wapner², Michael House³, Kristin M. Myers¹, ¹*Mechanical Engineering, Columbia University, New York, NY, United States*, ²*Obstetrics and Gynecology Division of Maternal Fetal Medicine, Columbia University, New York, NY, United States*, ³*Obstetrics and Gynecology Division of Maternal Fetal Medicine, Tufts Medical Center, Boston, MA, United States*

THURSDAY, JUNE 30**8:00am - 9:30am**

Imaging and Modeling Physiological Microflows; Lymphatics, CSF, and Eyes

Azalea 3**Session Chair: James Moore**, *Imperial College London, London, United Kingdom***Session Co-Chair: Ryan Pedrigi**, *University of Nebraska, NE, United States***8:00AM Contractile Activity in Branched Lymphatic Vessels** SB³C2016-1000

Samira Jamalain¹, Michael J. Davis², James E. Moore¹, ¹*Bioengineering, Imperial College London, London, United Kingdom*, ²*University of Missouri School of Medicine, Columbia, MO, United States*

8:15AM Investigation of the Pressure-length Relationship along a Lymphatic Chain with Modeling and ExperimentsSB³C2016-828

Mohammad S. Razavi¹, Tyler S. Nelson¹, Rudolph L. Gleason^{1,2}, **J. Brandon Dixon**^{1,2}, ¹*Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA, United States*, ²*Biomedical Engineering, Georgia Tech and Emory University, Atlanta, GA, United States*

8:30AM Assessment of 4D Flow Accuracy for Quantification of Cerebrospinal Fluid Dynamics in the Cervical Spine: Comparison of in vitro Measurements and Numerical Simulation SB³C2016-789

Soroush Heidari Pahlavian¹, Francis Loth¹, Suraj Thyagaraj¹, Alexander Bunck², Daniel Giese², Bryn Martin³, ¹*Department of Mechanical Engineering, The University of Akron, Akron, OH, United States*, ²*Department of Radiology, University Hospital of Cologne, Cologne, Germany*, ³*Department of Biological Engineering, The University of Idaho, Moscow, ID, United States*

8:45AM Quantifying Cerebrospinal Fluid Dynamics Using Real-Time Phase Contrast MRI SB³C2016-51

Selda Yildiz¹, John Oshinski², Karim G. Sabra¹, ¹*Woodruff School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA, United States*, ²*Radiology & Imaging Sciences and Biomedical Engineering, Emory University, Atlanta, GA, United States*

9:00AM Aqueous Humor Flow in the Posterior Chamber of the Eye with Iridotomy SB³C2016-129

Mariia Dvoriashyna¹, Rodolfo Repetto¹, Jennifer H. Tweedy², ¹*Department of Civil, Chemical and Environmental Engineering, University of Genoa, Genoa, Italy*, ²*Department of Bioengineering, Imperial College London, London, United Kingdom*

9:15AM Rheological Characterization of an Embryo Culture Liquid and Implications for Culture in Microfluidic DevicesSB³C2016-678

Irene Nepita¹, Alberto Lagazzo¹, Stefano Barone², Giovanni Besio¹, **Alessandro Stocchino**¹, Rodolfo Repetto¹, ¹*Department of Civil, Chemical and Environmental Engineering, University of Genoa, Genoa, Italy*, ²*Centro Procreazione Assistita, Ospedale della Versilia, Lido di Camaiore, Italy*

THURSDAY, JUNE 30**9:45am - 11:15am**

Cardiovascular Cell and Tissue Engineering

Wilson B**Session Chair: Alisa Morss Clyne**, *Drexel University, PA, United States***Session Co-Chair: Pat Alford**, *University of Minnesota, MN, United States***9:45AM Cardiac Contractility and Global Tissue Organization** SB³C2016-841

Meghan Knight, Nancy Drew, Linda McCarthy, **Anna Grosberg**, *UCIrvine, Irvine, CA, United States*

- 10:00AM Comparison of In Vitro Endothelial Wound Healing in Bare Metal vs. Drug-Eluting Stents** SB³C2016-89
Elizabeth Antoine, Abdul Barakat, *Mechanics, Ecole Polytechnique, Palaiseau, France*
- 10:15AM Direction-dependent Collagen Disruption in Overstretched Cerebral Arteries** SB³C2016-734
Matthew I. Converse¹, Justin T. Ingram², Raymond G. Walther¹, Kenneth L. Monson³, ¹*Mechanical Engineering, University of Utah, Salt Lake City, UT, United States*, ²*Bioengineering, University of Utah, Salt Lake City, UT, United States*, ³*Mechanical Engineering; Bioengineering, University of Utah, Salt Lake City, UT, United States*
- 10:30AM Shear Stress Maintains Endocardial Phenotype in Induced Pluripotent Stem Cell Derived Endocardial Cells** SB³C2016-758
Mark Vander Roest, Camryn Johnson, Scott Baldwin, W. David Merryman, *Vanderbilt University, Nashville, TN, United States*
- 10:45AM TGF-Beta 1 and Adipose-derived Mesenchymal Stem Cell Secreted Factors Aid in the Organization of Deposited Elastin Within 3D Fibroblast and Smooth Muscle Cell Constructs** SB³C2016-1022
Aneesh Ramaswamy, Justin Weinbaum, David Vorp, *Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*
- 11:00AM Valve Interstitial Cell Contractile Strength and Metabolic State are Dependent on its Shape** SB³C2016-686
Ngoc Lam, Timothy Muldoon, Narasimhan Rajaram, Kartik Balachandran, *University of Arkansas, Fayetteville, AR, United States*

THURSDAY, JUNE 30**9:45am - 11:15am****Safety and Biocompatibility in Medical Device Design****Wilson C****Session Chair:** Lucas H. Timmins, *Georgia Institute of Technology, GA, United States***Session Co-Chair:** Michael Moreno, *Texas A&M, TX, United States*

- 9:45AM Bearing Surface Damage Analysis of Anatomical and Reverse Total Shoulder Replacements: Retrieval Analysis Across Fixation Designs and UHMWPE Compositions** SB³C2016-1131
Louis G. Malito¹, Noah Bonnheim¹, Lulu Li¹, Taylor Lee¹, Steven Gunther², Tom Norris³, Mike Ries⁴, Lisa Pruitt¹, ¹*Mechanical Engineering, University of California, Berkeley, Berkeley, CA, United States*, ²*Orthopedic Surgery, 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*
- 10:00AM Wear Testing of an Innovative Design for Hip Resurfacing** SB³C2016-568
John B. Everingham, Jillian L. Helms, Kevin J. Warburton, Jeff Brouman, Steven Fox, Trevor J. Lujan, *Mechanical and Biomedical Engineering, Boise State University, Boise, ID, United States*
- 10:15AM Evaluation of Laser Bacterial Anti-Fouling of Transparent Nanocrystalline Yttria-Stabilized-Zirconia Cranial Implant** SB³C2016-976
David L. Halaney, Yasaman Damestani, Natalie De Howitt, Javier E. Garay, Guillermo Aguilar, *Mechanical Engineering, University of California, Riverside, Riverside, CA, United States*
- 10:30AM Polydopamine Based Insulating Coating for Shape Memory Alloy Biomedical Devices** SB³C2016-589
Mohammad Sahlabadi, Yao Zhao, Harold H Lee, Fei Ren, Parsaoran Hutapea, *Temple University, Philadelphia, PA, United States*
- 10:45AM Addressing Iatrogenic Injury due to Traumatic Urethral Catheterisation** SB³C2016-831
Eoghan M. Cunnane¹, Niall F. Francis², Connor V. Cunnane¹, Rory O'C Mooney¹, John A. Thornhill², Michael T. Walsh¹, ¹*Mechanical, Aeronautical and Biomedical Engineering, University of Limerick, Limerick, Ireland*, ²*Department of Urology, Tallaght Hospital, Dublin, Ireland*
- 11:00AM Investigating the In Vitro and In Vivo Biocompatibility of a Novel Biodegradable Fe-316L Stent** SB³C2016-147
Jennifer Frattolin^{1,2}, Richard Leask³, Stephen Yue⁴, Olivier F. Bertrand^{1,5}, Rosaire Mongrain^{1,2}, ¹*Department of Mechanical Engineering, McGill University, Montreal, QC, Canada*, ²*Montreal Heart Institute, Montreal, QC, Canada*, ³*Department of Chemical Engineering, McGill University, Montreal, QC, Canada*, ⁴*Department of Mining and Materials Engineering, McGill University, Montreal, QC, Canada*, ⁵*Interventional Cardiology Laboratories, Quebec Heart and Lung Institute, Laval University, Quebec City, QC, Canada*

THURSDAY, JUNE 30	9:45am - 11:15am
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Injury: Brain II**Wilson D****Session Chair: Brittany Coats**, *University of Utah, UT, United States***Session Co-Chair: JiangYue Zhang**, *Johns Hopkins, MD, United States*

- 9:45AM In Situ Estimation of Axonal Injury Strain Thresholds Following Tissue-level Tensile Stretch** SB³C2016-955
Sagar Singh¹, Assimina A. Pelegri², David I. Shreiber¹, ¹*Biomedical Engineering, Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, ²*Mechanical and Aerospace Engineering, Rutgers, The State University of New Jersey, Piscataway, NJ, United States*
- 10:00AM Simulated Blast-Induced Cavitation: An Invitro Study** SB³C2016-996
Saranya Canchi, Yu Hong, Karen Kelly, Michael A. King, Ghatu Subhash, Malisa Sarntinoranont, *University of Florida, Gainesville, FL, United States*
- 10:15AM Bandwidth Requirements for Wearable Head Impact Sensors** SB³C2016-602
Lyndia C. Wu, Kaveh Laksari, Calvin Kuo, David B. Camarillo, *Bioengineering, Stanford University, Stanford, CA, United States*
- 10:30AM In-Situ Head Acceleration Measurements for Playground Impacts Relative to Head Injury Metrics** SB³C2016-747
Eric A. Kennedy, Greg P. Danchik, Chris D. DiDomenico, *Biomedical Engineering, Bucknell University, Lewisburg, PA, United States*
- 10:45AM Development of Finite Element-Based Injury Metrics for Head Injury Prediction** SB³C2016-866
Derek A. Jones, Jillian E. Urban, Ashley A. Weaver, Joel D. Stitzel, *Biomedical Engineering, Wake Forest University School of Medicine, Winston-Salem, NC, United States*
- 11:00AM Sex Differences in the Dynamic Brain Response to a Mild Angular Head Acceleration** SB³C2016-743
Deva Chan¹, Andrew Knutsen², Yuan-Chiao Lu¹, Sarah Yang¹, Philip Bayly³, John Butman⁴, Dzung Pham¹, ¹*Center for Neuroscience and Regenerative Medicine, Henry M Jackson Foundation, Bethesda, MD, United States*, ²*Institute for Defense Analyses, Alexandria, VA, United States*, ³*Mechanical Engineering and Materials Science, Washington University of St. Louis, St. Louis, MO, United States*, ⁴*Radiology and Imaging Sciences, National Institutes of Health Clinical Center, Bethesda, MD, United States*

THURSDAY, JUNE 30	9:45am - 11:15am
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Mechanics of Heart Valves**Annapolis 1****Session Chair: Michael Sacks**, *The University of Texas at Austin, TX, United States***Session Chair: Lik Chuan Lee**, *Michigan State University, MI, United States*

- 9:45AM Age-Dependent Differences in Mechanical Properties of Chemically Treated Bovine Pericardium** SB³C2016-1115
Andres D. Caballero, Fatiesa Sulejmani, Wei Sun, *The Wallace H. Coulter Department of Biomedical Engineering, Georgia Institute of Technology and Emory University, Atlanta, GA, United States*
- 10:00AM Effects of Sagging Versus Stretched Leaflets on Bioprosthetic Heart Valve Durability** SB³C2016-620
Nandini Duraiswamy¹, Parinaz Fathi², Stephen M. Retta¹, Jason D. Weaver¹, ¹*Center for Devices and Radiological Health, Food and Drug Administration, Silver Spring, MD, United States*, ²*Oak Ridge Institute for Science & Education, Oak Ridge, TN, United States*
- 10:15AM Stress-Relaxation Behaviors of Diseased Heart Valve Tissues** SB³C2016-1093
Kaitlyn Barbour¹, Siyao Huang², **HY Shadow Huang**², ¹*Biomedical Eng., NC State, Raleigh, NC, United States*, ²*Mechanical and Aerospace Eng., NC State, Raleigh, NC, United States*

- 10:30AM Stress Fiber Contractile Behavior in Aortic Valve Interstitial Cells** SB³C2016-818
Yusuke Sakamoto¹, Rachel M. Buchanan², Johannah S. Adams³, Farshid Guilak⁴, Michael S. Sacks^{1,2}, ¹*The Institute for Computational Engineering and Sciences, The University of Texas at Austin, Austin, TX, United States*, ²*Department of Biomedical Engineering, The University of Texas at Austin, Austin, TX, United States*, ³*Departments of Orthopaedic Surgery and Biomedical Engineering, Duke University, Durham, NC, United States*, ⁴*Departments of Orthopaedic Surgery, Biomedical Engineering, and Developmental Biology, Washington University, St. Louis, St. Louis, MO, United States*
- 10:45AM Design of a Novel In Vitro Simulation of a Dynamically Contracting Mitral Valve Annulus** SB³C2016-702
Thomas F. Easley, Charlie H. Bloodworth, Ajit P. Yoganathan, *Georgia Institute of Technology, Atlanta, GA, United States*
- 11:00AM Novel Irreversible Chemistry Produces Structurally More Stable Tissue Based Biomaterials** SB³C2016-1049
Hobey Tam¹, Will Zhang², Daniel Infante¹, Nathaniel Parchment¹, Michael Sacks², Narendra Vyavahare¹, ¹*Bioengineering, Clemson University, Clemson, SC, United States*, ²*Biomedical Engineering, University of Texas, Austin, Austin, TX, United States*

THURSDAY, JUNE 30

9:45am - 11:15pm

Cerebral Aneurysm**Annapolis 2****Session Chair: Kristian Valen-Sendstad**, *Simula Research Laboratory, Lysaker, Norway***Session Co-Chair: David Steinman**, *University of Toronto, ON, Canada*

- 9:45AM A Simple and Rational Approach to Outflow Conditions in Cerebrovascular CFD Models.** SB³C2016-1026
Christophe Chnafa¹, Kristian Valen-Sendstad², Olivier Brina³, Vitor Mendes Pereira⁴, David Steinman¹, ¹*Mechanical & Industrial Engineering, University of Toronto, Toronto, ON, Canada*, ²*Simula Research Laboratory, Centre for Biomedical Computing, Lysaker, Norway*, ³*Department of Medical Imaging, Toronto Western Hospital, Toronto, ON, Canada*, ⁴*Toronto Western Hospital, Toronto, ON, Canada*
- 10:00AM Non-newtonian versus Numerical Rheology: Practical Impact of Shear-thinning on the Prediction of Stable and Unstable Flows in Intracranial Aneurysms** SB³C2016-579
Owais Khan¹, David A. Steinman¹, Kristian Valen-Sendstad², ¹*Mechanical and Industrial Engineering, University of Toronto, Toronto, ON, Canada*, ²*Simula Research Laboratory, Kristian Valen-Sendstad, Lysaker, Norway*
- 10:15AM Numerical Modeling of Post-surgical Flow in Basilar Artery Aneurysms** SB³C2016-609
Alireza Vali¹, Michael Lawton², David Saloner³, Vitaliy Rayz¹, ¹*Neurosurgery, Medical College of Wisconsin, Milwaukee, WI, United States*, ²*Neurological Surgery, University of California San Francisco, San Francisco, CA, United States*, ³*Radiology and Biomedical Imaging, University of California San Francisco, San Francisco, CA, United States*
- 10:30AM Comparison of Flow Conditions in Aneurysms at the Basilar Tip and Internal Carotid Artery Terminus** SB³C2016-110
Ravi Doddasomayajula¹, BongJae Chung¹, Farid Hamzei-Sichani², Christopher Putman³, Juan Cebra¹, ¹*George Mason University, Fairfax, VA, United States*, ²*Mt. Sinai Hospital, New York, NY, United States*, ³*Inova Fairfax Hospital, Falls Church, VA, United States*
- 10:45AM Hemodynamics in Developing Stages of Cerebral Aneurysms Using Spectral-Element Simulations and Comparison with PIV Experiments** SB³C2016-1008
Tanvi K. Kaushik¹, Yulia T. Peet¹, Priya Nair², David H. Frakes², ¹*School for Engineering of Matter, Transport and Energy, Arizona State University, Tempe, AZ, United States*, ²*School of Biological and Health Systems Engineering, Arizona State University, Tempe, AZ, United States*
- 11:00AM Aneurysmal Flow Modifications by Coils and Flow Diverters and Long-Term Treatment Outcome** SB³C2016-1081
Robert J. Damiano¹, Nicole Varble¹, Rahul Sanal¹, Jason M. Davies², Adnan H. Siddiqui², Hui Meng¹, ¹*Mechanical and Aerospace Engineering, University at Buffalo, Buffalo, NY, United States*, ²*Neurosurgery, University at Buffalo, Buffalo, NY, United States*

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Musculoskeletal Soft Tissue: Disc**Azalea 2****Session Chair:** Amy Claeson, *University of Delaware, DE, United States***Session Co-Chair:** Grace D. O'Connell, *University of California, Berkeley, CA, United States*

- 9:45AM Failure Properties of Annulus Fibrosus** SB³C2016-983
Noah Bonnheim, Benjamin Werbner, Grace O'Connell, *Mechanical Engineering, University of California, Berkeley, Berkeley, CA, United States*
- 10:00AM A Probabilistic Finite Element Analysis of the Annulus Fibrosus Elastic Properties Influence on the Behavior of the Human L4-L5 and L5-S1 Segments** SB³C2016-127
Héctor E. Jaramillo¹, José J. García², ¹*Departamento de Energética y Mecánica, Universidad Autonoma De Occidente, Cali, Colombia*, ²*Escuela de Ingeniería Civil y Geomática, Universidad Del Valle, Cali, Colombia*
- 10:15AM A High Throughput Nucleus Pulposus Explant Culture System Preserves Tissue Integrity** SB³C2016-962
Timothy Jacobsen, Nadeen Chahine, *The Feinstein Institute for Medical Research, Manhasset, NY, United States*
- 10:30AM Validation of a High Throughput Hydrostatic Pressure Bioreactor on the Nucleus Pulposus Biosynthesis** SB³C2016-1078
Bhranti Shah, Farzana Chowdhury, Nadeen Chahine, *Feinstein Institute for Medical Research, Manhasset, NY, United States*
- 10:45AM Nucleotomy Alters Internal Strain Distribution of the Human Lumbar Intervertebral Disc** SB³C2016-1082
Amy A. Claeson¹, Brent L. Showalter², Edward J. Vresilovic³, Alexander C. Wright⁴, James C. Gee⁴, Neil R. Malhotra⁴, Dawn M. Elliott¹, ¹*Department of Biomedical Engineering, University of Delaware, Newark, DE, United States*, ²*Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, United States*, ³*Department of Orthopaedics and Rehabilitation, Pennsylvania State University, Hershey, PA, United States*, ⁴*Department of Radiology, University of Pennsylvania, Philadelphia, PA, United States*
- 11:00AM Potential Involvement of Endplate Purinergic Signaling in Low Back Pain** SB³C2016-1117
Mary Boggs, John DeLuca, Dawn Elliot, Randall Duncan, *University of Delaware, Newark, DE, United States*

THURSDAY, JUNE 30	9:45am - 11:15am
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Cryopreservation and Cryotherapy**Azalea 3****Session Chair:** Nilay Chakraborty, *University of Michigan Dearborn, MI, United States***Session Co-Chair:** Sepideh Khoshnevis, *University of Texas at Austin, TX, United States*

- 9:45AM Nanowarming of Arteris** SB³C2016-1089
Navid Manuchehrabadi, *University of Minnesota, Minneapolis, MN, United States*
- 10:00AM Physiological Basis for Rational Cryotherapy Protocol Design** SB³C2016-737
Sepideh Khoshnevis¹, Robert M. Brothers², Kenneth R. Diller¹, ¹*University of Texas at Austin, Austin, TX, United States*, ²*University of Texas at Arlington, Arlington, TX, United States*
- 10:15AM Alginate Hydrogel Microencapsulation Inhibits Devitrification and Enables Large-volume Low-cpa Cell Vitrification** SB³C2016-582
Haishui Huang, *The Ohio State University, Columbus, OH, United States*
- 10:30AM Development of an Isothermal Vitrification Matrix and Method for the Room Temperature Stabilization of Proteinaceous Cancer Biomarkers in Archival Human Sera** SB³C2016-839
Morwena J. Solivio, Goeun Heo, Alptekin Aksan, *Mechanical Engineering, University of Minnesota, Minneapolis, MN, United States*
- 10:45AM Dynamic Vapor Sorption in Trehalose/salt Mixtures: Effect of Composition on Retention of the Amorphous State** SB³C2016-168
Gloria Elliott, Babak Bagheri, Lindong Weng, Matthew Van Vorst, *Department of Mechanical Engineering, UNC Charlotte, Charlotte, NC, United States*

- 11:00AM A Raman Microspectroscopic Technique to Quantify Residual Water in Desiccated Samples** SB³C2016-876
 Quinn Osgood, Jason Solocinski, **Nilay Chakraborty**, *Mechanical Engineering Department, University of Michigan Dearborn, Dearborn, MI, United States*

THURSDAY, JUNE 30	1:00pm - 3:15pm
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Poster Session I Biotransport Diagnostics and Therapeutics Exhibit Hall A

- 1 Probing the Interactions Between Mannobiose Molecules, Using Atomic Force Microscopy (afm).** SB³C2016-989
Komitige H. Perera, Saswati Basu, Preethii Chandran, *Biochemistry and Molecular Biology, Howard University, Washington, DC, United States*
- 2 Increased Capture of Magnetic Microbeads Due to Switching of Electroosmotic Flow** SB³C2016-1067
Samuel A. Miller¹, William R. Heineman², Rupak K. Banerjee¹, *¹Department of Mechanical and Materials Engineering, University of Cincinnati, Cincinnati, OH, United States, ²Department of Chemistry, University of Cincinnati, Cincinnati, OH, United States*
- 3 Evaluation of Sensitivity and Accuracy of Infrared Thermography for Melanoma Screening** SB³C2016-145
 Yiyong Li¹, Alexander M. LeBrun², L. D. Timmie Topoleski², **Liang Zhu**², *¹Mechanical Engineering, Beijing University of Aeronautics & Astronautics, Beijing, China, ²Mechanical Engineering, University of Maryland Baltimore County, Baltimore, MD, United States*
- 4 Validation of Image-assisted Modeling Approach to Design Heating Protocols in Magnetic Nanoparticle Hyperthermia** SB³C2016-24
 Alexander M. LeBrun¹, Tejashree Joglekar², Charles Bieberich², Ronghui Ma¹, **Liang Zhu**¹, *¹Mechanical Engineering, University of Maryland Baltimore County, Baltimore, MD, United States, ²Biology, University of Maryland Baltimore County, Baltimore, MD, United States*
- 5 Development and Characterization of Protein Nanoparticles Derived from Lung Extracellular Matrix** SB³C2016-682
 Patrick A. Link¹, Sirish K. Desai², Nan Zhou³, Da-Ren Chen³, **Rebecca L. Heise**¹, *¹Biomedical Engineering, VCU, Richmond, VA, United States, ²J.R. Tucker High School, Richmond, VA, United States, ³Mechanical and Nuclear Engineering, VCU, Richmond, VA, United States*
- 6 Stiffness-Independent on-Chip Extraction of Cell-Laden Hydrogel Microcapsules from Oil Emulsion Into Aqueous Solution Based on Dielectrophoresis** SB³C2016-721
Mingrui Sun¹, Haishui Huang², Xiaoming He¹, *¹Biomedical Engineering, The Ohio State University, Columbus, OH, United States, ²Mechanical Engineering, The Ohio State University, Columbus, OH, United States*
- 7 Point-of-Care Diagnosis by Nanoparticle Aggregation: Tuning the Sensitivity by Nanoparticle Size and Concentration** SB³C2016-1114
 Peiyuan Kang, **Zhenpeng Qin**, *Mechanical Engineering, University of Texas at Dallas, Richardson, TX, United States*

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Poster Session I Cancer and Tumor Microenvironments Exhibit Hall A

- 8 In vitro Testing of Hydrogel Delivery for Potential Treatment for Pancreatic Cancer Lesions** SB³C2016-1125
Thomas L. Merrill, *rowan university, Glassboro, NJ, United States*
- 9 Effect on Oligosaccharide Grafting on the Polyelectrolyte and Protonation Dynamics of Polyethylenimine** SB³C2016-1018
Saswati Basu, Danielle N. Miller, Stacy N. Apugo, Preethi L. Chandran, *Chemical Engineering, Howard University, Washington, DC, United States*
- 10 Enhanced Microwave Hyperthermia of Cancer Cells with Fullerene** SB³C2016-724
Mingrui Sun, Xiaoming He, *Biomedical Engineering, The Ohio State University, Columbus, OH, United States*

- 11 **Isolation of Rare Tumor Cells Using Adhesion Rolling in a Microfluidic Chip with Inclined Wavy Surfaces** SB³C2016-749
Shunqiang Wang¹, Roy Ghosh¹, Ran He¹, Jie Yang², Yaling Liu^{1,3}, ¹*Department of Mechanical Engineering & Mechanics, Lehigh University, Bethlehem, PA, United States*, ²*School of Mechanics and Engineering, Southwest Jiaotong University, Chengdu, China*, ³*Bioengineering Department, Lehigh University, Bethlehem, PA, United States*
- 12 **Analyzing Effects of Chemotherapeutic Drugs for the Prevention of Chemotherapy-Induced Alopecia** SB³C2016-1060
Likitha Somasekhar, Kunal Mitra, Carlos Martino, *Biomedical Engineering, Florida Institute of Technology, Melbourne, FL, United States*
- 13 **Relationship Between Mechanical Stiffness and Multiple Cancer Cell Proliferation and Morphology in 3D Encapsulated Gelatin Methacrylate Hydrogels** SB³C2016-605
Sean Hennigan¹, Susan A. Pomilla², Melissa A. DePrato¹, John R. Beliveau¹, **Jason W. Nichol**², ¹*Biology and Biotechnology, Endicott College, Beverly, MA, United States*, ²*Bioengineering, Endicott College, Beverly, MA, United States*
- 14 **A 3D Model of Breast Tumor- Endothelial Cell Interactions** SB³C2016-792
Swathi Swaminathan¹, Olivia Ngo², Alisa Morss Clyne³, ¹*Mechanical Engineering and Mechanics, Drexel University, Philadelphia, PA, United States*, ²*Biomedical Engineering, Science and Health Systems, Drexel University, Philadelphia, PA, United States*, ³*Mechanical Engineering and Mechanics/ Biomedical Engineering, Science and Health Systems, Drexel University, Philadelphia, PA, United States*

THURSDAY, JUNE 30

1:00pm - 3:15pm

Poster Session I

Bachelors Level Student Paper Competition I:
Physiology & Diseases - Cellular &
Tissue Mechanics - Biomaterial & Material
Characterization

Exhibit Hall A

- 34 **Off-axis Biaxial Analysis of Synthetic Scaffolds for Hernia Repair** SB³C2016-587
Savannah Est^{1,2}, Maddie Roen¹, Vivian Chi², Adrian Simien², Ryan Castile¹, Dominic Thompson², Corey R. Deeken³, Spencer P. Lake¹, ¹*Department of Mechanical Engineering & Materials Science, Washington University in St. Louis, St. Louis, MO, United States*, ²*Department of Surgery, Section Minimally Invasive Surgery, Washington University School of Medicine, St. Louis, MO, United States*, ³*Covalent Bio, LLC, St. Louis, MO, United States*
- 35 **The Characterization of the Bone Marrow Mechanical Environment Using Poroelastic Models with Material Properties Determined From Micro-finite Element Modeling** SB³C2016-1057
Jason A. Shar¹, Thomas A. Metzger², Tyler Kreipke², Glen Neibur², Joshua Gargac¹, ¹*Engineering, University of Mount Union, Alliance, OH, United States*, ²*AME, University of Notre Dame, Notre Dame, IN, United States*
- 36 **Anterolateral Capsule of the Knee Functions as a Sheet of Tissue based on Tissue Strain** SB³C2016-96
Stephanie L. Sexton¹, Daniel Guenther², Kevin Bell¹, Sebastian Irrarrazaval¹, Ata Rahnama-Azar¹, Freddie Fu¹, Volker Musahl¹, Richard Debski¹, ¹*University of Pittsburgh, Pittsburgh, PA, United States*, ²*Hannover Medical School, Hannover, Germany*
- 37 **Methodology to Reduce Dimensional Variability in Tensile Testing of Soft Fibrous Tissue** SB³C2016-604
Madison E. Krentz, Jeremy J. Creechley, Trevor J. Lujan, *Mechanical and Biomedical Engineering, Boise State University, Boise, ID, United States*
- 38 **Ultrasound Measurement of Shape Change During In Vitro Inflation of an Arterial Bifurcation** SB³C2016-864
John P. Carruth, Ryan R. Mahutga, Christopher E. Korenczuk, Victor H. Barocas, *Biomedical Engineering, University of Minnesota - Twin Cities, Saint Paul, MN, United States*
- 39 **Three-Element Windkessel Model to Describe Pulmonary Vasculature Changes in Hypertensive Rat** SB³C2016-1031
Jesse W. Geringer, Daniela Vélez-Rendon, Daniela Valdez-Jasso, *Bioengineering, University of Illinois at Chicago, Chicago, IL, United States*

- 40 **Analysis of the Effect of Saliva on the Degradation of Absorbable Sutures** SB³C2016-1075
Luke E. Riexinger¹, Jenna W. Briddell², Donna M. Ebenstein¹, ¹*Biomedical Engineering, Bucknell University, Lewisburg, PA, United States*, ²*Otolaryngology, Geisinger Medical Center, Danville, PA, United States*
- 41 **Viscoelastic Properties of Human Patellar Tendons Measured Using Continuous Shear Wave Elastography** SB³C2016-606
Courtney T. Cox¹, Jennifer A. Zellers¹, Karin G. Silbernagel¹, Daniel H. Cortes², ¹*University of Delaware, Newark, DE, United States*, ²*Penn State University, University Park, PA, United States*
- 42 **Determining Impedance in Pulmonary Vessels Using Four-Element Windkessel Models** SB³C2016-1133
Julie C. Wagner, Jesse W. Gerringer, Daniela Valdez-Jasso, *Bioengineering, University of Illinois - Chicago, Chicago, IL, United States*
- 43 **The Influence of Gel Stiffness on Growth Factor Gene Expression of Schwann Cells** SB³C2016-808
Carlisle R. DeJulius, Rebecca Kuntz Willits, *Department of Biomedical Engineering, The University of Akron, Akron, OH, United States*

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Poster Session I

Bachelors Level Student Paper Competition II:
Imaging - Devices - Human Dynamics & Injury -
Fluids & Microfluidics - Heat Transfer

Exhibit Hall A

- 44 **DTI Voxel-Wise Analysis of Mild TBI in Neonatal Pigs Following Non-Impact Head Rotation.** SB³C2016-941
Boston C. Terry¹, Gregory G. Scott², Osama Abdullah¹, Brittany Coats², ¹*Biomedical Engineering, University of Utah, Salt Lake City, UT, United States*, ²*Mechanical Engineering, University of Utah, Salt Lake City, UT, United States*
- 45 **Characterizing a Novel Ex-Vivo Animal Knee Model: ACL Rupture and Meniscus Compressive Strength** SB³C2016-585
Nicole L. Zaino, Mark J. Hedgeland, Laurel Kuxhaus, Arthur J. Michalek, *Mechanical & Aeronautical Engineering, Clarkson University, Potsdam, NY, United States*
- 46 **Characterization of Particulate and Vapor Phase Nicotine in Electronic Cigarettes** SB³C2016-106
Mark C. Daley¹, James W. Baish¹, Dabrina D. Dutcher², Timothy M. Raymond², ¹*Biomedical Engineering, Bucknell University, Lewisburg, PA, United States*, ²*Chemical Engineering, Bucknell University, Lewisburg, PA, United States*
- 47 **A Novel Imaging Technique to Quantify Surface Wear in Joint Replacement Devices** SB³C2016-583
Katherine Hollar¹, John Everingham¹, Jillian Helms¹, Daniel Ferguson², Trevor Lujan¹, ¹*Boise State University, Boise, ID, United States*, ²*Global Inspection Solutions, Boise, ID, United States*
- 48 **Additive Manufacturing of Localized Microneedle Drug-Delivery System** SB³C2016-985
Sofia Chinchilla¹, Yangfeng Lu¹, Corey J. Schurko¹, Douglas C. Crowder¹, Bum-Joon Park², Jae-Won Choi³, Yang H. Yun¹, ¹*Biomedical Engineering, University of Akron, Akron, OH, United States*, ²*Molecular Biology, Pusan National University, Busan, Korea, Republic of*, ³*Mechanical Engineering, University of Akron, Akron, OH, United States*
- 49 **Structural Interactions of the Vessel Wall and Stent Graft in Abdominal Aortic Aneurysm Treatment** SB³C2016-711
Ryan J. Pewowaruk, Victor H. Barocas, *Biomedical Engineering, University of Minnesota - Twin Cities, Minneapolis, MN, United States*
- 50 **A Flexible Method for Producing F.E.M. Analysis of Bone Using Open-Source Software** SB³C2016-967
Abhishektha Boppana¹, Ryan Sefcik², Jerry G. Myers³, ¹*Biomedical Engineering, Case Western Reserve University, Cleveland, OH, United States*, ²*Biochemistry, The Ohio State University, Columbus, OH, United States*, ³*NASA Glenn Research Center, Cleveland, OH, United States*
- 51 **Investigation of Superposition in Microchannel Geometry for Inertial Particle Separation** SB³C2016-969
Utku M. Sonmez, Samir Jaber, Levent Trabzon, *Mechanical Engineering, Istanbul Technical University, Istanbul, Turkey*

- 52 **A Fluid Dynamics Analysis of the Manifestation of Ebstein's Anomaly in the Right Ventricle** SB³C2016-1140
Alyssa L. Niquette¹, Shelly Lo¹, Adam Shore², Vittoria Flamini¹, Puneet Bhatla³, ¹*NYU Tandon School of Engineering, Brooklyn, NY, United States*, ²*NYU Langone Medical Center, New York, NY, United States*, ³*NYU Langone Medical Center, Brooklyn, NY, United States*
- 53 **Internal-External Rotation Axis Locates Laterally Outside of Stifle Joints in the Dog** SB³C2016-1017
Tetsuya Takagi¹, Nobuo Kanno², Masakazu Shimada², Yasushi Hara², Satoshi Yamakawa¹, Richard E. Debski³, Glen A. Livesay⁴, Hiromichi Fujie¹, ¹*Faculty of System Design, Tokyo Metropolitan University, Tokyo, Japan*, ²*Division of Veterinary Surgery Department of Veterinary Science Faculty of Veterinary Medicine, Nippon Veterinary and Life Science University, Tokyo, Japan*, ³*Bioengineering department Faculty of Engineering, University of Pittsburgh, Pittsburgh, PA, United States*, ⁴*Department of Biology & Biomedical Engineering, Rose-Hulman Institute of Technology, Terre Haute, IN, United States*

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Poster Session I

Mechanotransduction and Sub-Cellular Biophysics

Exhibit Hall A

- 54 **Effect of Compaction on Stretch Sensitivity in Fibroblast-Populated Collagen Gels** SB³C2016-837
Kellen Chen, Jeffrey W. Holmes, *University of Virginia, Charlottesville, VA, United States*
- 55 **Role of P2_U-er Ca²⁺ Signaling in Ca²⁺ Oscillations of In Situ Osteocytes in Response to Medium Intensity Focused Ultrasound** SB³C2016-1120
Minyi Hu, Jian Jiao, Daniel Gibbons, Yi-Xian Qin, *Stony Brook University, Stony Brook, NY, United States*
- 56 **Mechanical Trauma in Articular Cartilage Induces Rapid, Location-Dependent Chondrocyte Dysfunction** SB³C2016-819
Lena R. Bartell¹, Michelle M. Delco², Lawrence J. Bonassar³, Itai Cohen⁴, Lisa A. Fortier², ¹*School of Applied and Engineering Physics, Cornell University, Ithaca, NY, United States*, ²*Department of Clinical Sciences, Cornell University, Ithaca, NY, United States*, ³*Meinig School of Biomedical Engineering and Sibley School of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY, United States*, ⁴*Department of Physics, Cornell University, Ithaca, NY, United States*
- 57 **A Study for the Effects of the Mechanical Trapping of the Nucleus on Cellular Events Using a Micropillar Substrate** SB³C2016-569
Kazuaki Nagayama, *Department of Intelligent Systems Engineering, Ibaraki University, Hitachi, Japan*
- 58 **A Cell Migration Model Integrating the Mechanical Stress Generation and Sensing with Biochemical Signals** SB³C2016-639
hongyan yuan¹, Kevin K. Parker², ¹*University of Rhode Island, Kingston, RI, United States*, ²*Harvard University, Cambridge, MA, United States*
- 59 **Disturbed Cyclical Stretch of Endothelial Cells Promotes Nuclear Expression of the Pro-Atherogenic Transcription Factor NF- κ B** SB³C2016-677
Ryan M. Pedrigi, Konstantinos I. Papadimitriou, Avinash Kondiboyina, Sukhjinder Sidhu, James Chau, Emmanuel M. Drakakis, Rob Krams, *Bioengineering, Imperial College London, London, United Kingdom*
- 60 **ElectroMechanical Coupling Behavior of Endothelial Cells** SB³C2016-1077
Khashayar Teimoori¹, Richard Khalily², Ali M. Sadegh³, Marom Bikson², ¹*Mechanical Engineering Department, The City College of the City University of New York, New York, NY, United States*, ²*Biomedical Engineering Department, The City College of the City University of New York, New York, NY, United States*, ³*Mechanical Engineering, The City College of the City University of New York, New York, NY, United States*
- 61 **Thermodynamic Fluctuations Determine the Kinetics of Swell-burst Cycles of Giant Unilamellar Vesicles Under Osmotic Stress** SB³C2016-1118
Morgan Chabanon¹, James Ho², Atul Parikh³, **Padmini Rangamani**¹, ¹*UCSD, La Jolla, CA, United States*, ²*NTU, Singapore, Singapore*, ³*UC Davis, Davis, CA, United States*

- 62 **The Effect of Loading Frequency on Tenocyte Metabolism** SB³C2016-595
Chineye P. Udeze¹, Eleanor R. Jones², Graham P. Riley², Dylan Morrissey^{3,4}, Hazel R. C. Screen¹, ¹*School of Engineering and Material Science, Queen Mary University of London, Mile End, United Kingdom*, ²*University of East Anglia, Norwich, United Kingdom*, ³*Sport and Exercise Medicine, Queen Mary University of London, London, United Kingdom*, ⁴*Physiotherapy Department, Bart's Health NHS Trust, London, United Kingdom*
- 63 **Mild Traumatic Brain Injury Resulted in Increased Aquaporin-4 Expression - Relevance to Post-Injury Edema** SB³C2016-670
Nasya Sturdivant¹, Sean Smith¹, Syed Ali², Jeff Wolchok¹, Kartik Balachandran¹, ¹*University of Arkansas, Fayetteville, AR, United States*, ²*National Center for Toxicological Research, Jefferson, AR, United States*

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Poster Session I**Nano, Micro, and Multi-Scale Mechanics****Exhibit Hall A**

- 64 **A Mechanostatistical Model for the Rapid Assessment of Femoral Neck Cortical Fracture Risk** SB³C2016-164
Xiaoming Wang¹, Raj Das², Peter Hunter¹, Justin Fernandez^{1,3}, ¹*Auckland Bioengineering Institute, The University of Auckland, Auckland, New Zealand*, ²*Department of Mechanical Engineering, The University of Auckland, Auckland, New Zealand*, ³*Department of Engineering Science, The University of Auckland, Auckland, New Zealand*
- 65 **ElectroMechanical Coupling Behavior of Axon Microtubules** SB³C2016-720
Khashayar Teimoori¹, Ali M. Sadegh¹, Marom Bikson², ¹*Mechanical Engineering Department, The City College of the City University of New York, New York, NY, United States*, ²*Biomedical Engineering Department, The City College of the City University of New York, New York, NY, United States*
- 66 **On Mechanics and Structure of 3D Randomly Cross-linked Fibrous Networks** SB³C2016-779
Hamed Hatami-Marbini, *Mechanical & Industrial Engineering, University of Illinois at Chicago, Chicago, IL, United States*
- 67 **Detailed Finite Element Modeling of Fiber-reinforced Tissues** SB³C2016-755
Bo Yang, Minhao Zhou, Grace D. O'Connell, *Mechanical Engineering, University of California, Berkeley, CA, United States*
- 68 **Micro-Structurally Motivated Constitutive Model for Human Skin** SB³C2016-52
Sheng Chen¹, A. Ni Annaidh², Sara Roccabianca¹, ¹*Mechanical Engineering, Michigan State University, East Lansing, MI, United States*, ²*School of Mechanical & Materials Engineering, University College Dublin, Dublin, Ireland*
- 69 **Computational Modeling of the Arterial Wall Based on Layer-specific Histological Data** SB³C2016-58
Tao Jin, Ilinca Stanculescu, *Civil and Environmental Engineering, Rice University, Houston, TX, United States*
- 70 **Implications of Desiccation Induced Microheterogeneity on Protein Stability** SB³C2016-577
Sampreeti Jena¹, Raj Suryanarayanan², Alptekin Aksan¹, ¹*Mechanical Engineering, University of Minnesota, Minneapolis, MN, United States*, ²*Department of Pharmaceutics, University of Minnesota, Minneapolis, MN, United States*
- 71 **Multidomain Particle Dynamics Simulator Engine** SB³C2016-155
Vi Q. Ha, *Mechanical Engineering, University of Connecticut, Storrs, CT, United States*
- 72 **FiberFit: A Validated Software Application to Measure Fiber Organization in Soft Tissue** SB³C2016-863
Azamat Tulepbergenov, **Erica Morrill**, Christina Stender, Roshani Lamichhane, Raquel Brown, Trevor Lujan, *Boise State University, Boise, ID, United States*
- 73 **Nonlinear Bending Dynamics of a Semiflexible Filament in 3D Brownian Fluctuation** SB³C2016-958
Jyothirmai J. Simhadri, Preethi Chandran, *Chemical Engineering, Howard University, Washington, DC, United States*
- 74 **Strain Determination in the Osteocyte Lacunae Using Finite Element Analysis** SB³C2016-797
Ganesh Thiagarajan, *Civil and Mechanical Engineering, University of Missouri Kansas City, Kansas City, MO, United States*

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Poster Session I	Medical Devices	Exhibit Hall A
95	Using An Electroactive Polymer, Dielectric Elastomer, for Making Implantable Blood Pump SB ³ C2016-49 Sheldon Ho, Yoke Yin Foo, Hareesh Gobada, Phan Thien Nhan, Jian Zhu, Choon Hwai Yap, NUS, Singapore, Singapore	
96	A Novel Self-expandable Retractor for Neuroendoscopy. SB ³ C2016-719 Yang Xia ¹ , Zhong You ¹ , Puneet Plaha ² , Jingxian Yang ³ , ¹ Engineering Science, University of Oxford, OXFORD, United Kingdom, ² Department of Neurosurgery, John Radcliffe Hospital, OXFORD, United Kingdom, ³ Department of Pharmacy, Liaoning University of Traditional Medicine, Dalian, China	
97	Fold-and-Go Single Knee Scooter SB ³ C2016-830 Kevin Mozurkewich, Nicholas Colarossi, Muntha Issa, Lawrence Technological University, Livonia, MI, United States	
98	Customizable Surface-Coating Method for Bioprosthetic Valve Biocompatibility SB ³ C2016-870 Monica M. Fahrenholtz, K. Jane Grande-Allen, Bioengineering, Rice University, Houston, TX, United States	
99	Design Optimization of a Hyaluronan-based Drug-delivery Device to Improve Ocular Retention SB ³ C2016-879 Jourdan Colter ¹ , Nathaniel Cady ² , Hee-Kyoung Lee ³ , Brenda Mann ³ , Barbara Wirosko ³ , Brittany Coats ¹ , ¹ Mechanical Engineering, University of Utah, Salt Lake City, UT, United States, ² Colleges of Nanoscale Science and Engineering, SUNY Polytechnic Institute, Albany, NY, United States, ³ Jade Therapeutics Inc., Salt Lake City, UT, United States	
100	Hemodynamic Effects of Asynchronous Pumping of the Penn State Pulsatile Pneumatic Pediatric VAD SB ³ C2016-889 Bryan Good, Keefe Manning, Bioengineering, The Pennsylvania State University, University Park, PA, United States	
101	Performance Evaluation of a Developed Acoustic Impedance Device in Tumor Screening SB ³ C2016-890 Ali Mohammadabadi ¹ , Qimei Gu ¹ , Alexander LeBrun ¹ , Mohamed Younis ² , Liang Zhu ¹ , ¹ Mechanical Engineering, University of Maryland Baltimore County, Baltimore, MD, United States, ² Computer Science and Electrical Engineering, University of Maryland Baltimore County, Baltimore, MD, United States	
102	The Effect of Simulated Anatomical Constraints on Buckling Loads of Cardiac Leads SB ³ C2016-906 Donna Walsh ¹ , Ashok Williams ¹ , Nandini Duraiswamy ¹ , Oleg Vesnovsky ¹ , L.D. Timmie Topoleski ^{1,2} , ¹ Food and Drug Administration, Silver Spring, MD, United States, ² Department of Mechanical Engineering, University of Maryland, Baltimore County, Baltimore, MD, United States	
103	Clot Integration Factor for In Vitro Quantification of Stent-Retriever Deployment using Cone-Beam Computed Tomography SB ³ C2016-929 Kajo van der Marel ¹ , Olivia W. Brooks ¹ , Robert M. King ¹ , Ju-Yu Chueh ¹ , Miklos Marosfoi ¹ , Erin T. Langan ¹ , Sarena L. Carniato ² , Raul G. Nogueira ³ , Ajay K. Wakhloo ¹ , Matthew J. Gounis ¹ , Ajit S. Puri ¹ , ¹ Department of Radiology, University of Massachusetts Medical School, Worcester, MA, United States, ² PreClinical Science, Stryker Neurovascular, Fremont, CA, United States, ³ Department of Neurology, Emory University School of Medicine, Atlanta, GA, United States	
104	Design of a Cardiovascular Flow Mimicking Pump SB ³ C2016-1009 Chris F. Brake, Clifton R. Johnston, Mechanical Engineering, Dalhousie University, Halifax, NS, Canada	
105	Simulation of Centrifugal Pump Thrombosis In Vitro SB ³ C2016-1024 Susan Hastings ¹ , Shriprasad Deshpande ² , Scott Wagoner ² , Kevin Maher ² , David Ku ¹ , ¹ Mechanical Engineering, Georgia Institute of Technology, ATLANTA, GA, United States, ² Pediatrics, Emory University School of Medicine, ATLANTA, GA, United States	
106	Investigation of Forces and Moments During Minimally Invasive Total Hip Arthroplasty and the Likelihood of Intraoperative Fracture SB ³ C2016-1058 Pooyan Abbasi ¹ , Dustin Greenhill ² , Andrew Star ² , Kurosh Darvish ¹ , ¹ Temple University, Philadelphia, PA, United States, ² Temple University Hospital, Philadelphia, PA, United States	
107	Magnetically Levitated Shear Inducing Device for the Testing of Cell Fragility SB ³ C2016-1094 Oyuna Myagmar, Ramnath Raghunathan, Steven W. Day, Rochester Institute of Technology, Rochester, NY, United States	

- 108 **Patient-Specific Assessment of Pre-TPVR Angioplasty Coronary Compression Using the Finite Element Method** SB³C2016-1139
 Sara Amendola¹, Doff McElhinney², Puneet Bhatla³, **Vittoria Flamini¹**, ¹*Mechanical and Aerospace, NYU Tandon School of Engineering, Brooklyn, NY, United States*, ²*Medical Center, Stanford, Stanford, CA, United States*, ³*Pediatrics, NYU Langone Medical Center, Brooklyn, NY, United States*

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Poster Session I

Atherosclerosis & Aneurysms

Exhibit Hall A

- 129 **Modification of a Parallel Plate Flow Chamber for Analysis of Endothelial Response to Disturbed Flow** SB³C2016-944
Jason M. Sedlak¹, Alisa Morss Clyne², ¹*Biomedical Engineering, Drexel University, Philadelphia, PA, United States*, ²*Mechanical Engineering and Mechanics, Drexel University, Philadelphia, PA, United States*
- 130 **Wall Shear Stress and Combined VH-IVUS and OCT Analysis of Coronary Plaque Composition** SB³C2016-951
David Molony¹, Lucas Timmins¹, Udit Joshi¹, Yasir Bouchi¹, Bill Gogas¹, Habib Samady¹, Don Giddens², ¹*Emory University, Atlanta, GA, United States*, ²*Georgia Institute of Technology, Atlanta, GA, United States*
- 131 **An Explorative CFD Study on Stenosis-induced Flow Instabilities in the Carotid Artery** SB³C2016-668
Viviana Mancini¹, Jan Vierendeels², Daniela Tommasin¹, Simon Shaw³, Abigail Swillens¹, Awais Yousef⁴, Stephen E. Greenwald⁴, ¹*IBiTech-bioMMeda, Ghent University, Ghent, Belgium*, ²*Ghent University, Ghent, Belgium*, ³*Brunel University, London, United Kingdom*, ⁴*Queen Mary University of London, London, United Kingdom*
- 132 **Co-localizations and Correlations of Established and Emerging Indicators of Disturbed Wall Shear Stress at the Normal Carotid Bifurcation** SB³C2016-140
Diego Gallo¹, David A. Steinman², Morbiducci Umberto¹, ¹*Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Turin, Italy*, ²*Department of Mechanical & Industrial Engineering, University of Toronto, Toronto, ON, Canada*
- 133 **Longitudinal Study of Wall Shear Stress Over Atherosclerotic Plaques in Mice** SB³C2016-768
Ruoyu Xing, Astrid Moerman, Yanto Ridwan, Anton van der Steen, Frank Gijzen, Kim van der Heiden, *Erasmus MC, Rotterdam, Netherlands*
- 134 **Influence of Plaque Stiffness on Deformation and Flow of Arterial Stenosis Model for Percutaneous Transluminal Coronary Angioplasty** SB³C2016-658
Shunichi Kobayashi¹, Daiki Miyamoto², Hajime Kitami¹, ¹*Faculty of Textile Science and Technology, Shinshu University, Ueda, Japan*, ²*Graduate School of Science and Technology, Shinshu University, Ueda, Japan*
- 135 **Effect of Deformation on Cerebral Aneurysm in Middle Cerebral Artery** SB³C2016-763
Suguru O. Omachi, Gaku Tanaka, Hao Liu, Ryuhei Yamaguchi, *Chiba University, Chiba, Japan*
- 136 **Numerical Simulation of Mechanics of Rupture in Abdominal Aortic Aneurysms Using Fluid-structure Interaction Methods** SB³C2016-980
Tejas Canchi^{1,2}, Eddie Yin Kwee Ng³, Esley Chin Hock Pwee³, Dinesh Kumar Srinivasan⁴, Sriram Narayanan⁵, ¹*Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore, Singapore*, ²*Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore, Singapore*, ³*Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore, Singapore, Singapore*, ⁴*Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore, Singapore, Singapore*, ⁵*Department of General Surgery, Tan Tock Seng Hospital, Singapore, Singapore*
- 137 **How Sensitive are Hemodynamics in Intracranial Aneurysms to Different Blood Flow Waveforms?** SB³C2016-933
Michael J. Durka¹, Issac H. Wong¹, David F. Kallmes², Dario Pasalic², Juan R. Cebal³, Pablo J. Blanco⁴, Manoj Jagani², Anne M. Robertson¹, ¹*Department of Mechanical Engineering and Materials Science, University of Pittsburgh, Pittsburgh, PA, United States*, ²*Mayo Clinic, Rochester, MN, United States*, ³*Department of Bioengineering, George Mason University, Fairfax, VA, United States*, ⁴*Laboratorio Nacional de Computacao Cientifica, Petropolis, Brazil*

- 138 **PCOM Aneurysms: Angio-Architecture, Hemodynamics and Geometry** SB³C2016-136
BongJae Chung¹, Ravi Doddasomayajula¹, Fernando Mut¹, Farid Hamzei-Sichani², Christopher Putman³, Michael Pritz¹, Carlos Jimenez⁴, Juan Cebal¹, ¹Bioengineering & Krasnow Institute, George Mason University, Fairfax, VA, United States, ²Interventional Neuroradiology, Mt. Sinai Hospital, New York, NY, United States, ³Interventional Neuroradiology, Inova Fairfax Hospital, Falls Church, VA, United States, ⁴Neurosurgery, University of Antioquia, Medellin, Colombia
- 139 **Association of Hemodynamic Stresses with Thickness of Aneurysm Wall: A Case Study** SB³C2016-726
Hamidreza Rajabzadeh Oghaz¹, Jaco J. M. Zwanenburg², Hui Meng¹, ¹University at Buffalo, Buffalo, NY, United States, ²University Medical Center Utrecht, Utrecht, Netherlands
- 140 **Comparison of Cerebral Aneurysm Flow Fields Obtained From Cfd And Dsa** SB³C2016-126
Juan Cebal¹, BongJae Chung¹, Fernando Mut¹, Fred van Nijnatten², Danny Ruijters², ¹Bioengineering, George Mason University, Fairfax, VA, United States, ²IGT Innovation, Philips Healthcare, Best, Netherlands
- 141 **Objective Identification of the Yield Point from Tensile Testing of Aortic Tissues** SB³C2016-752
Madhavan L. Raghavan, Timothy K. Chung, Chaid D. Schwarz, *Biomedical Engineering, University of Iowa, Iowa City, IA, United States*
- 142 **Biomechanical Characterization of Six Murine Models of Thoracic Aortic Aneurysm and Dissection** SB³C2016-872
Chiara Bellini, Matthew R. Bersi, Jacopo Ferruzzi, Jay D. Humphrey, *Biomedical Engineering, Yale University, New Haven, CT, United States*
- 143 **A Novel Technique for Assessment of Mechanical Properties of Vascular Tissue** SB³C2016-662
Stefan Sanders, Frans van de Vosse, Marcel Rutten, *Eindhoven University of Technology, Eindhoven, Netherlands*
- 144 **Towards the Characterization of Carotid Plaque Tissue Toughness: Linking Mechanical Properties to Biological Content** SB³C2016-680
Hilary E. Barrett¹, Eoghan M. Cunnane¹, Eamon G. Kavanagh², Michael T. Walsh¹, ¹Centre for Applied Biomedical Engineering (CABER) and Health Research Institute (HRI), University of Limerick, Limerick, Ireland, ²Department of Vascular Surgery, University Hospital Limerick, Limerick, Ireland

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Poster Session I

Cardiovascular Diagnostics and Devices

Exhibit Hall A

- 145 **Bifurcation Angle and Fractional Flow Reserve: A Multiscale Numerical Study of Coronary Bifurcation Lesions** SB³C2016-148
Catherine Pagiatakis^{1,2}, Jean-Claude Tardif^{2,3}, Philippe L. L'Allier^{2,4}, **J. Frattolin**^{2,5}, Rosaire Mongrain^{1,2}, ¹Mechanical Engineering, McGill University, Montreal, QC, Canada, ²Montreal Heart Institute, Montreal, QC, Canada, ³Faculty of Medicine, Université de Montréal, Montreal, QC, Canada, ⁴Université de Montréal, Montreal, QC, Canada, ⁵McGill University, Montreal, QC, Canada
- 146 **Development of an Integrated Multi-Scale Simulation System with Multi-modal Data for Cerebral Circulation** SB³C2016-997
Marie Oshima¹, Zhao Zhang², Masaharu Kobayashi¹, Shigeki Yamada³, Fuyou Liang⁴, Shu Takagi², ¹Interfaculty Initiative in Information Studies, The University of Tokyo, Tokyo, Japan, ²Department of Mechanical Engineering, The University of Tokyo, Tokyo, Japan, ³Department of Neurosurgery, Rakuwakai Otowa Hospital, Kyoto, Japan, ⁴Department of Naval Architecture and Ocean Engineering, Shanghai Jiao Tong University, Shanghai, China
- 147 **Windkessel Approach for Blood Flow Responses: Application in Venous Ulcer Risk Assessment** SB³C2016-774
Wu Pan, Seungik Baek, Tamara Reid Bush, *Mechanical Engineering, Michigan State University, East Lansing, MI, United States*
- 148 **Patient-Specific CFD of Clinical Mitral Regurgitation as a Novel Method to Quantify Regurgitation Severity** SB³C2016-118
Muhammad Jamil¹, Kian Keong Poh², Choon Hwai Yap¹, ¹Department of Biomedical Engineering, National University of Singapore, Singapore, Singapore, ²Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore

- 149 **Assessing Hemodynamic Response to Exercise for Patient with Left Ventricular Hypertrophy by Integrating Cardiovascular and Autonomic Nervous Systems** SB³C2016-93
Weiwei Jin¹, Fuyou Liang², Hao Liu^{1,2}, ¹Chiba University, Chiba, Japan, ²Shanghai Jiao Tong University and Chiba University International Cooperative Research Center, Shanghai Jiao Tong University, Shanghai, China
- 150 **Translating 4d-flow MRI to Clinical Practice** SB³C2016-1137
Kurt R. Sansom¹, Haining Liu², chun yuan², Alberto Aliseda¹, Gador Canton², ¹Mechanical Engineering, University of Washington, WA, United States, ²Vascular Imaging Laboratory, University of Washington, WA, United States
- 151 **Patient-Specific Computational Fluid Dynamics Simulations of the Human Fetal Left Ventricle Based on 4D Clinical Ultrasound Imaging** SB³C2016-83
Changquan Lai¹, Guat Ling Lim², Muhammad Jamil³, Citra Nurfarah Zaini Mattar², Arijit Biswas², Choon Hwai Yap³, ¹Singapore MIT Alliance for Research and Technology, Singapore, Singapore, ²Obstetrics and Gynecology, National University Hospital Systems, Singapore, Singapore, Singapore, ³Biomedical Engineering, National University of Singapore, Singapore, Singapore
- 152 **Impact of Idealized Versus Measured Velocity Profiles in Computational Models of Mass Transport in the Human Aorta** SB³C2016-593
Giuseppe De Nisco¹, Peng Zhang², Gianpaolo Usala¹, Diego Gallo¹, Xiao Liu², Xiaoyan Deng², Giovanna Rizzo³, Umberto Morbiducci¹, ¹Mechanical and Aerospace Engineering, Politecnico di Torino, Turin, Italy, ²School of Biological Science and Medical Engineering, Beihang University, Beijing, China, ³Research National Council, IBFM, Milan, Italy
- 153 **Micro Matrix Encapsulation of Cell Aggregates for Injectable Delivery Augments Stem Cell Therapy of Myocardial Infarction** SB³C2016-731
Shuting zhao, Xiaoming He, Biomedical Engineering, The ohio state university, Columbus, OH, United States

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Poster Session I

Masters Level Student Paper Competition I:
Physiology & Diseases - Cellular &
Tissue Mechanics - Biomaterial & Material
Characterization

Exhibit Hall A

- 188 **Early Production of Phospholipase A₂ Accompanies Spinal Neuroinflammation and Pain Following Nerve Root Compression** SB³C2016-641
Sonia Kartha, Jenell Smith, Beth Winkelstein, University of Pennsylvania, Philadelphia, PA, United States
- 189 **Disorganized Layers within an Otherwise Aligned Fibrous Network Preserve Bulk Mechanics and Promote Strain Reconstitution in the Context of Radial Tears** SB³C2016-873
Sonia Bansal^{1,2,3}, Niobra M. Keah^{1,3}, Feini Qu^{1,3,4}, Spencer E. Szczesny^{1,3}, Alexander L. Neuwirth^{1,3}, Robert L. Mauck^{1,2,3}, Miltiadis H. Zgonis^{1,3}, ¹McKay Orthopaedic Research Laboratory, University of Pennsylvania, Philadelphia, PA, United States, ²Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, United States, ³Translational Musculoskeletal Research Center, Philadelphia VA Medical Center, Philadelphia, PA, United States, ⁴University of Pennsylvania, School of Veterinary Medicine, Philadelphia, PA, United States
- 190 **Long-term Exposure to Buffer Solution Alters Tendon Structure and Mechanics -Implications for Fatigue Studies** SB³C2016-1037
Babak N. Safa^{1,2}, Kyle D. Meadows², Spencer E. Szczesny³, Dawn M. Elliott², ¹Mechanical engineering, University of Delaware, Newark, DE, United States, ²Biomedical engineering, University of Delaware, Newark, DE, United States, ³Department of Orthopaedic Surgery, University of Pennsylvania, Philadelphia, PA, United States
- 191 **Effect of Ablation Pattern on Mechanical Function in the Atrium: A Finite-Element Study** SB³C2016-592
Thien-Khoi N. Phung, Patrick T. Norton, John D. Ferguson, Jeffrey W. Holmes, University of Virginia, Charlottesville, VA, United States
- 192 **Effects of Reproduction and Lactation on Maternal Bone Tissue Mechanical Properties at Different Length Scales** SB³C2016-885
Yihan Li¹, Peng Guo¹, Wei-Ju Tseng¹, Chantal M. J. de Bakker¹, Prashant Chandrasekaran², Yonghoon Jeong³, Do-Gyoon Kim³, Lin Han², X. Sherry Liu¹, ¹University of Pennsylvania, Philadelphia, PA, United States, ²Drexel University, Philadelphia, PA, United States, ³The Ohio State University, Columbus, OH, United States

- 193 **Methods to Determine Right Ventricular Performance in a Rat Animal Model of Pulmonary Arterial Hypertension** SB³C2016-1046
Daniela M. Velez Rendon, Jesse Gerringer, Gizzel Gomez, Erica Pursell, Daniela Valdez-Jasso, *Bioengineering, University of Illinois at Chicago, Chicago, IL, United States*
- 194 **Surface Modification of Electrospun gelatin/fibrinogen Scaffolds to Encourage Endothelial Cell Function** SB³C2016-162
Catalina Ardila¹, David Maestas², Victoria Lundine², Marvin Slepian^{3,4}, Jonathan Vande Geest⁵, ¹*Graduate Interdisciplinary Program of Biomedical Engineering, The University of Arizona, Tucson, AZ, United States*, ²*Biomedical Engineering, The University of Arizona, Tucson, AZ, United States*, ³*Sarver Heart Center, The University of Arizona, Tucson, AZ, United States*, ⁴*Interventional Cardiology, The University of Arizona, Tucson, AZ, United States*, ⁵*Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*
- 195 **Swelling of Collagen-Hyaluronic Acid Co-Gels: An In Vitro Residual Stress Model** SB³C2016-942
David S. Nedrelow¹, Victor K. Lai², Spencer P. Lake³, Bumjun Kim¹, Emily M. Weiss¹, Robert T. Tranquillo⁴, Victor H. Barocas¹, ¹*Biomedical Engineering, University of Minnesota, Minneapolis, MN, United States*, ²*Chemical Engineering, University of Minnesota, Duluth, MN, United States*, ³*Mechanical Engineering and Materials Science, Washington University, St. Louis, MO, United States*, ⁴*Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN, United States*
- 196 **Longitudinal Assessment of Mouse Bone Microstructure by In Vivo μ CT Imaging with Minimal Radiation Effects** SB³C2016-1035
Hongbo Zhao, Chih-Chiang Chang, Youwen Yang, Wei-Ju Tseng, Chantal M. J. de Bakker, X. Sherry Liu, *Department of Orthopaedic Surgery, University of Pennsylvania, Philadelphia, PA, United States*
- 197 **Pathological Engineering Study of Human Cerebral Aneurysms Three Dimensional Accumulation of Foam Cells Versus Hemodynamics** SB³C2016-1110
Kenta Suto¹, Takano Yagi^{1,2}, Yasutaka Tobe¹, Takuma Murayoshi¹, Kiyofumi Takanishi¹, Mitsuo Umezu¹, Hiroataka Yoshida³, Kazutoshi Nishitani³, Yoshifumi Okada³, Shigemi Kitahara³, ¹*Center for Advanced Biomedical science (TWIns), Waseda University, Tokyo, Japan*, ²*(2)EBM corporation Ohmoriminami, Ohtaku, Tokyo, 143-0013 Japan, Tokyo, Japan*, ³*Kitahara International Hospital Oowada-cho, Hachioji-shi, Tokyo Japan, Tokyo, Japan*
- 198 **Mathematical Modelling of Oxygen Transport in the Retina** SB³C2016-1007
Wouter J. Thijssen, Emilie Lunddahl, Andris Piebalgs, Xiao Y. Xu, *Chemical Engineering, Imperial College London, London, United Kingdom*
- 199 **Effect of Hydration on Intervertebral Disc Recovery** SB³C2016-754
Semih Bezci, Grace D. O'Connell, *Mechanical Engineering, University of California, Berkeley, Berkeley, CA, United States*
- 200 **The Role of IGF-1 in the Cytoskeletal Regulation of Gating of TRPV4 Channels in Articular Chondrocytes** SB³C2016-1101
Victor DeBarros¹, Joseph D. Gardinier², Lauren Hurd³, Mary E. Boggs¹, Randall Duncan⁴, ¹*Biological Sciences, University of Delaware, Newark, DE, United States*, ²*Orthopedics/Bone and Joint Center, Henry Ford Health System, Detroit, MI, United States*, ³*Molecular Diagnostics Laboratory, Nemours/Al duPont Hospital for Children, Wilmington, DE, United States*, ⁴*Biological Sciences and Biomedical Engineering, University of Delaware, Newark, DE, United States*
- 201 **Image-based Analysis for Inverse Estimation of Muscle Fiber Forces in the Tongue** SB³C2016-1004
Narihiko Koike¹, Tsukasa Yoshinaga¹, Kazunori Nozaki², Satoshi Ii¹, Shigeo Wada¹, ¹*Osaka University, Toyonaka, Japan*, ²*Osaka University Dental Hospital, Suita, Japan*
- 202 **Modeling the Viscoelastic Properties of Pulmonary Vessels in a Hypertensive Rat** SB³C2016-1020
Erica Pursell, Daniela Velez-Rendon, Daniela Valdez-Jasso, *University of Illinois at Chicago, Chicago, IL, United States*
- 203 **Biomechanical Consequences of Subchondral Bone Cysts - A Finite Element Analysis of the Equine Stifle Joint** SB³C2016-922
Lance F. Frazer¹, Kenneth Fischer², Elizabeth Santschi³, ¹*Bioengineering, University of Kansas, Lawrence, KS, United States*, ²*Mechanical Engineering, University of Kansas, Lawrence, KS, United States*, ³*Clinical Sciences, Kansas State University, Manhattan, KS, United States*

- 204 **Confined Compression of a Hydrogel Composite for Nucleus Pulposus Tissue Engineering** SB³C2016-932
Thomas R. Christiani¹, Rachel Adams², Erin Signor³, Alex Crudo⁴, Patrick Myers⁴, Dan Collins⁴, Kathryn Wrinn⁴, Michael Arigot⁴, Alexandra Guido⁴, Jennifer Vernengo², Jennifer Kadlowec⁴, ¹*Biomedical Engineering, Rowan University, Glassboro, NJ, United States*, ²*Chemical Engineering, Rowan University, Glassboro, NJ, United States*, ³*Civil Engineering, Rowan University, Glassboro, NJ, United States*, ⁴*Mechanical Engineering, Rowan University, Glassboro, NJ, United States*
- 205 **Flow Field Post-repair in Critical Aortic Valve Stenosis : Implications to Recurring Disease State** SB³C2016-909
Sana Nasim¹, Glenda Castellanos¹, Angie Estrada¹, Denise Medina¹, Makensley Lordeus¹, Lilliam Valdes-Cruz², Steven Bibevski², Frank Scholl², Benjamin Bosel¹, Arvind Agarwal¹, Sharan Ramaswamy¹, ¹*Florida International University, Miami, FL, United States*, ²*Joe DiMaggio's Children's Hospital, Hollywood, FL, United States*

THURSDAY, JUNE 30

1:00pm - 3:15pm

Poster Session I Masters Level Student Paper Competition II: Exhibit Hall A
Imaging - Devices - Human Dynamics & Injury -
Fluids & Microfluidics - Heat Transfer

- 206 **Comprehensive Hemodynamics of Living Donor Liver Transplant** SB³C2016-101
David R. Rutkowski^{1,2}, Scott B. Reeder^{2,3,4}, Luis A. Fernandez⁵, Alejandro Roldán-Alzate^{1,2}, ¹*Mechanical Engineering, University of Wisconsin-Madison, Madison, WI, United States*, ²*Radiology, University of Wisconsin-Madison, Madison, WI, United States*, ³*Medical Physics, University of Wisconsin-Madison, Madison, WI, United States*, ⁴*Biomedical Engineering, University of Wisconsin-Madison, Madison, WI, United States*, ⁵*Surgery, UW Hospital and Clinincs, Madison, WI, United States*
- 207 **Patient Specific Computational Models to Optimize Surgical Correction for Flatfoot Deformity** SB³C2016-923
Brian A. Smith, Robert Adelaar, Jennifer Wayne, *Biomedical Engineering, Virginia Commonwealth University, Richmond, VA, United States*
- 208 **Determination of HIFU Induced Temperature Rise at Focal Location Using Numerical Approach** SB³C2016-1066
Sai Sameer Paruchuri¹, Surendra B. Devarakonda¹, Seyed Ahmad Reza Dibaji¹, Matthew R. Myers², Rupak K. Banerjee¹, ¹*Department of Mechanical Engineering, University of Cincinnati, Cincinnati, OH, United States*, ²*Division of Applied Mechanics, Center for Devices and Radiological Health, US Food and Drug Administration, Cincinnati, OH, United States*
- 209 **Reproducibility of Mouse Trabecular Bone Microstructure at Multiple Skeletal Sites by In Vivo Micro Computed Tomography Imaging** SB³C2016-655
Chih-Chiang Chang¹, Hongbo Zhao², Youwen Yang¹, Chantal M. J. de Bakker¹, Wei-Ju Tseng², X. Sherry Liu¹, ¹*Bioengineering, University of Pennsylvania, Philadelphia, PA, United States*, ²*University of Pennsylvania, Philadelphia, PA, United States*
- 210 **Patient Specific In Vitro Models for Hemodynamic Analysis of Congenital Heart Disease - Additive Manufacturing Approach** SB³C2016-757
Rafael Medero^{1,2}, Sylvana García-Rodríguez², Christopher J. François², Alejandro Roldán-Alzate^{1,2}, Petros V. Anagnostopoulos³, ¹*Mechanical Engineering, University of Wisconsin-Madison, Madison, WI, United States*, ²*Radiology, University of Wisconsin-Madison, Madison, WI, United States*, ³*Pediatric Cardiothoracic Surgery, University of Wisconsin-Madison, Madison, WI, United States*
- 211 **Drill-Specific Head Impact Exposure in Youth Football Practice** SB³C2016-814
Eamon Campolettano, Steve Rowson, Stefan Duma, *Virginia Tech, Blacksburg, VA, United States*
- 212 **The Food and Drug Administration's Nozzle Benchmark: In Theory, There is No Difference Between Theory and Practise. But, in Practice, There is.** SB³C2016-580
Aslak Bergersen¹, Mikael Mortensen², Kristian Valen-Sendstad¹, ¹*Simula Research Laboratory, Lysaker, Norway*, ²*Department of Mathematics, University of Oslo, Oslo, Norway*
- 213 **Laboratory Evaluation of Wearable Head Impact Sensors** SB³C2016-887
Abigail M. Tyson, Steven Rowson, Stefan M. Duma, *Biomedical Engineering and Mechanics, Virginia Tech, Blacksburg, VA, United States*

- 214 **Biomechanical Comparison of Youth and Adult Football Helmets: Standards Testing** SB³C2016-80
David W. Sproule, Steven Rowson, *Biomedical Engineering and Mechanics, Virginia Tech, Blacksburg, VA, United States*
- 215 **Investigation of Flow Instability with Vascular Geometry at the Bifurcation of Middle Cerebral Arteries From Healthy Volunteers** SB³C2016-1106
Takuma Murayoshi¹, Takanobu Yagi^{1,2}, Yasutaka Tobe¹, Kenta Suto¹, Kiyofumi Alex Takanishi¹, Mitsuo Umezu¹, Hirotaka Yoshida³, Kazutoshi Nishitani³, Yoshifumi Okada³, Shigemi Kitahara³, ¹*Center for Advanced Biomedical science (TWIns), Waseda University, Tokyo, Japan*, ²*EBM corporation, Tokyo, Japan*, ³*Kitahara International Hospital, Tokyo, Japan*
- 216 **Performance of Three Variable-length Intramedullary Nails: The Effect of the Length-adjustment Mechanism** SB³C2016-627
Mark Hedgeland¹, Alexander Martin Clark², Laurel Kuxhaus¹, ¹*Clarkson University, Potsdam, NY, United States*, ²*Canton-Potsdam Hospital, Potsdam, NY, United States*
- 217 **A Phenomenological Model of Damage and Recovery in the Intervertebral Disc of the Cervical Spine due to Cyclic Loading** SB³C2016-928
Shruti Motiwale¹, Xianlin Zhou², Reuben H. Kraft¹, ¹*Department of Mechanical and Nuclear Engineering, The Pennsylvania State University, University Park, PA, United States*, ²*CFD Research Corporation, Huntsville, AL, United States*
- 218 **Study of the Consistency of Wall Shear Stress in Healthy Major Human Cerebral Arteries** SB³C2016-1034
Kiyofumi A. Takanishi¹, Takanobu Yagi¹, Takuma Murayoshi¹, Kenta Suto¹, Mitsuo Umezu¹, Hiroki Yoshida², Kazutoshi Nishitani², Yoshifumi Okada², Yoshimi Kitahara², Akihide Yamamoto³, Hidehiro Iida³, Hiroharu Kataoka³, ¹*Center for Advanced Biomedical Science (TWIns), Waseda University, Tokyo, Japan*, ²*Kitahara International Hospital, Tokyo, Japan*, ³*National cerebral and cardiovascular centre, Osaka, Japan*
- 219 **A Finite Element Analysis of Augmented Glenoid Components** SB³C2016-15
Nikolas K. Knowles, G. Daniel G. Langohr, Louis M. Ferreira, George S. Athwal, *Biomedical Engineering, The University of Western Ontario, London, ON, Canada*
- 220 **Development of a Novel Fistula Occlusion Device** SB³C2016-584
Alyssa K. Rollando¹, Sara E. Wilson², Stephen C. Waller³, Richard Gilroy⁴, James M. Stiles⁵, ¹*Bioengineering Graduate Program, University of Kansas, Lawrence, KS, United States*, ²*Department of Mechanical Engineering, University of Kansas, Lawrence, KS, United States*, ³*Department of Internal Medicine, University of Kansas Medical Center, Kansas City, KS, United States*, ⁴*Department of Gastroenterology, Hepatology and Motility, University of Kansas Medical Center, Kansas City, KS, United States*, ⁵*Department of Electrical Engineering and Computer Science, University of Kansas, Lawrence, KS, United States*

THURSDAY, JUNE 30	1:00pm - 3:15pm
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|-------------------------|--|-----------------------|
| Poster Session I | Cardiovascular Tissue Mechanics | Exhibit Hall A |
|-------------------------|--|-----------------------|
- 227 **The Effect of Electropotential on Nitinol Fatigue Life** SB³C2016-626
Shiril Sivan^{1,2}, Matthew A. Di Prima¹, Jason D. Weaver¹, ¹*CDRH OSEL DAM, FDA, Silver Spring, MD, United States*, ²*Oak Ridge Institute of Science and Education, Oak Ridge, TN, United States*
- 228 **Right Ventricular Adaptation to Pressure Overload Conditions in Mice** SB³C2016-652
Tik Chee Cheng¹, Diana Tabima¹, Zhijie Wang¹, Tim Hacker², Naomi Chesler^{1,2}, ¹*Biomedical Engineering, University of Wisconsin-Madison, Madison, WI, United States*, ²*Medicine, University of Wisconsin-Madison, Madison, WI, United States*
- 229 **Measurement of Aortic Stent Graft Coefficients of Friction** SB³C2016-60
Matthew G. Doyle^{1,2}, Michael Lancaster¹, Leonard W. Tse², Thomas L. Forbes², Cristina H. Amon^{1,3}, ¹*Department of Mechanical and Industrial Engineering, University of Toronto, Toronto, ON, Canada*, ²*Division of Vascular Surgery, University of Toronto, Toronto, ON, Canada*, ³*Institute of Biomaterials and Biomedical Engineering, University of Toronto, Toronto, ON, Canada*

- 230 **Effect of Sodium Hypochlorite on the Fatigue Performance and Corrosion Resistance of Nitinol Wires** SB³C2016-622
Erick J. Gutierrez^{1,2}, Srinidhi Nagaraja¹, Shiril Sivan^{1,2}, Jason D. Weaver¹, Matthew Di Prima¹, ¹*Center for Devices and Radiological Health, U.S. Food and Drug Administration, Silver Spring, MD, United States*, ²*Oak Ridge Institute for Science and Education, Oak Ridge, TN, United States*
- 231 **Integration of Opencascade and Improved Global Surface Interpolation Methods into Simvascular 2.0** SB³C2016-924
Adam R. Updegrove¹, Nathan M. Wilson², Shawn C. Shadden¹, ¹*Mechanical Engineering, University of California, Berkeley, Berkeley, CA, United States*, ²*Open Source Medical Software Corporation, Santa Monica, CA, United States*
- 232 **Modelling the Evolution of Smooth Muscle Cell Stress Fibres following Stent Deployment in an Artery** SB³C2016-1065
Catherine A. O'Connor, Noel H. Reynolds, Patrick McGarry, *Biomedical Engineering, National University of Ireland, Galway, Galway, Ireland*
- 233 **Evaluating Left Ventricular Function Using Cardiac and Respiratory-Gated Volumetric Murine Ultrasound** SB³C2016-776
Arvin H. Soepriatna¹, Frederick W. Damen^{1,2}, Pavlos P. Vlachos^{1,3}, Craig J. Goergen¹, ¹*Weldon School of Biomedical Engineering, Purdue University, West Lafayette, IN, United States*, ²*School of Medicine, Indiana University, Indianapolis, IN, United States*, ³*Department of Mechanical Engineering, Purdue University, West Lafayette, IN, United States*
- 234 **Computational Analysis of Right-ventricular Fiber Distribution as a Compensatory Mechanism During Pressure Overload** SB³C2016-995
Arnold David Gomez¹, Huashan Zou¹, Osama M. Abdullah¹, Megan E. Bowen², Xiaoqing Liu², David A. Bull², Edward W. Hsu¹, Stephen H. McKellar², ¹*Bioengineering, University of Utah, Salt Lake City, UT, United States*, ²*Division of Cardiothoracic Surgery, University of Utah, Salt Lake City, UT, United States*
- 235 **Image-Based Computational Modeling of the Ventricular Mechanics in Patients with Pulmonary Hypertension** SB³C2016-27
Ce Xi¹, Xiaodan Zhao², Liang Zhong², Martin Genet³, Lik Chuan Lee¹, ¹*Michigan State University, East Lansing, MI, United States*, ²*National Heart Center, Singapore, Singapore*, ³*École Polytechnique, Paris, France*
- 236 **Comparison of Material Properties between the Main and Left Pulmonary Arteries of Congenital Heart Disease Subjects Using Cardiac Magnetic Resonance: A Feasibility Study** SB³C2016-990
Gavin A. D'Souza¹, Michael D. Taylor², Namheon Lee², Rupak K. Banerjee¹, ¹*Department of Mechanical and Materials Engineering, University of Cincinnati, Cincinnati, OH, United States*, ²*The Heart Institute, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, United States*
- 237 **Decreased Wall Shear Stress in Isolated Regions of the Pulmonary Endothelium Could Impact Pulmonary Vascular Dysfunction on a Global and Cellular Level in Pulmonary Hypertension** SB³C2016-875
Vitaly O. Kheifets¹, Michal Schafer¹, Joyce D. Schroeder¹, Jamie Dunning¹, Chris Podgorski², James Browning³, Jean Hertzberg³, Kendall Hunter¹, Kern Buckner², Robin Shandas¹, Brett Fenster², ¹*Bioengineering/Medicine, University of Colorado Denver|Anschutz Medical Campus, Denver, CO, United States*, ²*Cardiology, National Jewish Health, Denver, CO, United States*, ³*Mechanical Engineering, University of Colorado Boulder, Boulder, CO, United States*
- 238 **In Vitro Studies on Native to Engineered Heart Valve Tissue Integration** SB³C2016-938
Kristin Comella, Danique Stewart, Sasmita Rath, Sharan Ramaswamy, *Biomedical Engineering, Florida International University, Miami, FL, United States*
- 239 **Mathematical Modeling of Fluid-Structure Interaction in Bioprosthetic Heart Valves: Numerical Approximation and Experimental Validation** SB³C2016-1069
David Kamensky¹, Ming-Chen Hsu², John G. Lesicko¹, Mitchell A. Katona¹, Jordan L. Graves¹, Samuel J. Petter¹, Thomas J. R. Hughes¹, Michael S. Sacks¹, ¹*Institute for Computational Engineering and Sciences, University of Texas at Austin, Austin, TX, United States*, ²*Mechanical Engineering, Iowa State University, Ames, IA, United States*
- 240 **In-vivo Analysis and Residual Strains in Semilunar Heart Valves** SB³C2016-905
Ankush Aggarwal^{1,2}, Alison Pouch³, Eric Lai³, John Lesicko², Joseph H. Gorman³, Robert C. Gorman³, Michael S. Sacks², ¹*Swansea University, Swansea, United Kingdom*, ²*University of Texas at Austin, Austin, TX, United States*, ³*University of Pennsylvania, Philadelphia, PA, United States*

- 241 **Multi-resolution Models of the Mitral Valve Leaflets for High Fidelity Biomechanical Simulations** SB³C2016-921
Amir H. Khalighi¹, Andrew Drach², Charles Bloodworth³, Eric L. Pierce³, Ajit P. Yoganathan³, Robert C. Gorman⁴, Joseph H. Gorman⁴, Michael S. Sacks⁵, ¹*Mechanical Engineering, University of Texas at Austin, Austin, TX, United States*, ²*Institute for Computational Engineering and Sciences, University of Texas at Austin, Austin, TX, United States*, ³*Georgia Institute of Technology, Atlanta, GA, United States*, ⁴*Gorman Cardiovascular Research Group, University of Pennsylvania, Philadelphia, PA, United States*, ⁵*Biomedical Engineering, University of Texas at Austin, Austin, TX, United States*
- 242 **Determination of the Tensile Mechanical Properties of the Segmented Tricuspid Valve Annulus** SB³C2016-759
Fatima Al-Quaiti¹, Evelia Salinas¹, Lori Boies¹, Edward Sako², Shamik Bhattacharya¹, ¹*Engineering, St. Mary's University, San Antonio, TX, United States*, ²*University of Texas Health Science Center at San Antonio, San Antonio, TX, United States*
- 243 **Inverse Modeling Based Estimation of In-vivo Stresses and Their Relation to Simulated Layer-specific Interstitial Cell Deformations in the Mitral Valve** SB³C2016-114
Chung-Hao Lee¹, Kristen Feaver¹, Will Zhang¹, Robert C. Gorman², Joseph H. Gorman², Michael S. Sacks¹, ¹*Institute for Computational Engineering and Sciences, Department of Biomedical Engineering, The University of Texas at Austin, Austin, TX, United States*, ²*Gorman Cardiovascular Research Group, University of Pennsylvania, Philadelphia, PA, United States*
- 244 **Mitral Valve Leaflet Remodeling During Pregnancy: Implications for Modeling Valvular Adaptation** SB³C2016-803
Bruno V. Rego¹, Sarah M. Wells², Michael S. Sacks¹, ¹*Biomedical Engineering, The University of Texas at Austin, Austin, TX, United States*, ²*Biomedical Engineering, Dalhousie University, Halifax, NS, Canada*

THURSDAY, JUNE 30

1:00pm - 3:15pm

Poster Session I

Injury

Exhibit Hall A

- 258 **Cervical Spine Forces and Disc Herniation Risk During Standardized Rear-End Impact Testing** SB³C2016-930
Keith Button, Stephanie Rossman, Brian Weaver, Steve Rundell, *Explico Engineering Company, Novi, MI, United States*
- 259 **Changes of Total Finger Forces Due to Emulating Finger Amputations Using a Cylinder Handle Device** SB³C2016-1085
Diego F. Villegas¹, Jorge H. Escobar¹, Ricardo A. Quiros¹, Edna R. Buitrago², Ivan D. Quintero², ¹*Mechanical Engineering Department, Universidad Industrial De Santander, Bucaramanga, Colombia*, ²*School of Medicine, Universidad Industrial De Santander, Bucaramanga, Colombia*
- 260 **Biomechanical Properties of the Neonatal Brachial Plexus** SB³C2016-827
Anita Singh¹, Shania Shaji¹, Maria Delivoria², Malaeb Shadi², ¹*Biomedical Engineering, Widener, Chester, PA, United States*, ²*Pediatrics, Obstet. & Gynecol., Drexel College of Medicine, Philadelphia, PA, United States*
- 261 **Pulmonary Contusion Modeling in Reconstructions of Frontal Motor Vehicle Collisions** SB³C2016-858
James P. Gaewsky, Derek A. Jones, Ashley A. Weaver, Joel D. Stitzel, *Center for Injury Biomechanics, Wake Forest University, Winston-Salem, NC, United States*
- 262 **Sensitive Injury Detection in the Cervical Spine Using Acoustic Emission** SB³C2016-1027
Jay K. Shridharani, Brian R. Bigler, Courtney A. Cox, Maria A. Ortiz-Paparoni, **Anna E. Knight**, Cameron R. 'Dale' Bass, *Biomedical Engineering, Duke University, Durham, NC, United States*
- 263 **Comparison of Computed Tomography Imaging Measurements to Created Injuries Under UBB Loading Conditions** SB³C2016-586
Nathanael P. Kuo, Christopher J. Dooley, Constantine K. Demetropoulos, Kyle A. Ott, Andrew C. Merkle, *Research and Exploratory Development Department, Johns Hopkins University Applied Physics Laboratory, Laurel, MD, United States*
- 264 **An Investigations of Human Long Bone Fracture Patterns During Traumatic Amputations From Moving Railroad Equipment** SB³C2016-1092
Brian T. Weaver^{1,2}, Mark Davison², Steve Rundell², Eric Meyer³, ¹*Orthopedics Biomechanics Laboratories, Michigan State University, East Lansing, MI, United States*, ²*Explico Engineering Co., Novi, MI, United States*, ³*Biomedical Engineering, Lawrence Technological University, East Lansing, MI, United States*

- 265 **Development of a Combat Helmet Suspension System Computational Model: Implications for Pad Design and Injury Outcome** SB³C2016-978
Connor Bradfield, Quang Luong, Brian DeVincents, John Clark, Adam Golman, Catherine Carneal, *Johns Hopkins Applied Physics Lab, Laurel, MD, United States*
- 266 **Development and Parametric Study of a 3-year-old Child Abdominal Finite Element Model** SB³C2016-1014
Haiyan Li¹, Ruirui Lu¹, Shijie Ruan¹, Shihai Cui¹, Chunxiang Wang², ¹*Tianjin University of Science and Technology, Tianjin, China*, ²*Tianjin Children's Hospital, Tianjin, China*
- 267 **Dynamic Bending Response of the Unrestrained Femur in Underbody Blast Loading** SB³C2016-1102
Joshua G. Chen, Gwansik Park, Edward M. Spratley, Robert S. Salzar, *Mechanical and Aerospace Engineering, University of Virginia, Charlottesville, VA, United States*
- 268 **Scaling between Human and Porcine Models for Traumatic Brain Injury** SB³C2016-154
Siddiq Qidwai¹, Robert Saunders², ¹*Multifunctional Materials Branch, Code 6350, US Naval Research Laboratory, Washington, DC, United States*, ²*Leidos Corporation, Arlington, VA, United States*
- 269 **Validation of a Porcine Head and Upper Torso Model** SB³C2016-156
Robert Saunders¹, Siddiq Qidwai², ¹*Leidos Corporation, Arlington, VA, United States*, ²*U.S. Naval Research Lab, Washington, DC, United States*
- 270 **The Effect of Limited Fractional Anisotropy Representation on Brain Injury Predictions** SB³C2016-157
Shankarjee Krishnamoorthi¹, **Siddiq Qidwai**², ¹*NRL/ASEE Postdoctoral Fellowship, US Naval Research Laboratory, Washington, DC, United States*, ²*Multifunctional Materials Branch, US Naval Research Laboratory, Washington, DC, United States*
- 271 **Simple Geometric Scaling to Transform Cervical Spine Injury Criteria From Males to Females Adequate?** SB³C2016-907
Narayan Yoganandan¹, Frank Pintar¹, Cameron-Dale Bass², Maria Ortiz², Hattie Cutcliffe², Jonathan Rupp³, Amanda Agnew⁴, Ashley Weaver⁵, Scott Gayzik⁵, Liming Voo⁶, ¹*Neurosurgery, Medical College of Wisconsin, Milwaukee, WI, United States*, ²*Duke University, Durham, NC, United States*, ³*University of Michigan, Ann Arbor, MI, United States*, ⁴*Ohio State University, Columbus, OH, United States*, ⁵*Wake Forest University School of Medicine, Winston-Salem, NC, United States*, ⁶*John Hopkins University, Laurel, MD, United States*
- 272 **A Study on the Mechanical Response of the Human Head during Single-Collision Car Crashes using Finite Element Analysis** SB³C2016-979
Parker Berthelson, *Mississippi State University, Mississippi State, MS, United States*
- 273 **Computational Fluid Dynamics Predictions of Pressure Loading on the Human Head in a Laboratory-Based Blast Test Methodology** SB³C2016-1041
Rubbel Kumar¹, Catherine Carneal¹, Ashish Nedungadi¹, Marina Carboni², Jonathan Cyganik², Michael Maffeo², ¹*JHU/APL, Laurel, MD, United States*, ²*NSRDEC, Natick, MA, United States*
- 274 **A Computational Model of the Eye for Primary Blast Injury** SB³C2016-709
Bahram Notghi¹, Rajneesh Bhardwaj², Thao D. Nguyen¹, ¹*Mechanical Engineering, John Hopkins University, Baltimore, MD, United States*, ²*Department of Mechanical Engineering, Indian Institute of Technology Bombay, Powai, Mumbai, India*
- 275 **Sustained Presentation of Neurotrophic Cues Following Traumatic Brain Injury Through Matrix Immobilized BDNF Fragment Peptides** SB³C2016-738
Christopher J. Lowe, David I. Shreiber, *Biomedical Engineering, Rutgers, the State University of New Jersey, Piscataway, NJ, United States*
- 276 **Comparison of Validation Data for Finite Element Models of the Human Head** SB³C2016-1103
Logan E. Miller, *Biomedical Engineering, Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston-Salem, NC, United States*
- 277 **Uncertainty and Similarity in Brain Strains Resulting From Shape Variation in Head Rotational Velocity Profile** SB³C2016-68
Wei Zhao¹, Songbai Ji^{1,2}, ¹*Thayer School of Engineering, Dartmouth College, Hanover, NH, United States*, ²*Department of Surgery and of Orthopaedic Surgery, Dartmouth College, Hanover, NH, United States*
- 278 **Registration, Regional Identification and Transfer of Data From Mri Scans to Finite Element Models** SB³C2016-590
Shankarjee Krishnamoorthi, Siddiq Qidwai, *US Naval Research Laboratory, Washington, DC, United States*

THURSDAY, JUNE 30	3:15pm - 4:45pm
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Musculoskeletal Tissue Engineering: Micro to Macro**Wilson B****Session Chair:** Matt Fisher, *North Carolina State University, NC, United States***Session Co-Chair:** Mariana Kersh, *University of Illinois, Urbana, IL, United States*

- 3:15PM Anchorage-Independent Priming Increases Chondrogenic Potential of Human Mesenchymal Stem Cells** SB³C2016-1005
Andrea R. Tan¹, Daniel S. Donovan², Gerard A. Ateshian¹, J. Chloe Bulinski³, Clark T. Hung¹, ¹*Biomedical Engineering, Columbia University, New York, NY, United States*, ²*Orthopedic Surgery, Mt. Sinai-Roosevelt, New York, NY, United States*, ³*Biological Sciences, Columbia University, New York, NY, United States*
- 3:30PM Mechanical Control of Endochondral Bone Regeneration by Engineered Chondrogenic Mesenchymal Condensates** SB³C2016-151
 Anna M. McDermott¹, Samuel Herberg², Hope B. Pearson¹, Devon E. Mason¹, Eben Alsberg², **Joel B. Boerckel**¹, ¹*Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, IN, United States*, ²*Biomedical Engineering, Case Western Reserve University, Cleveland, OH, United States*
- 3:45PM Tissue Engineering Platform for Molecular Manipulation of Tenogenesis** SB³C2016-612
 Chun Chien¹, Brian Pryce², Sara F. Tufa², Douglas R. Keene², **Alice H. Huang**¹, ¹*Orthopaedics, Icahn School of Medicine at Mount Sinai, New York, NY, United States*, ²*Shriners Hospital, Portland, OR, United States*
- 4:00PM The Effect of Cell Density on Prestress Development in Engineered Microtissues** SB³C2016-120
Mathieu A. J. van Kelle, Sandra Loerakker, Carlijn V. C. Bouten, *Biomedical Engineering, Eindhoven University of Technology, Eindhoven, Netherlands*
- 4:15PM Microfluidic-fabrication of Bundled Cellular Scaffolds by Phaseseparated Polymer Solution** SB³C2016-1032
Yukiko T. Matsunaga, *Institute of Industrial Science, The University of Tokyo, Tokyo, Japan*
- 4:30PM Variations in the Relative Size of the Cruciate Ligaments and Menisci in the Porcine Stifle Joint throughout Skeletal Growth** SB³C2016-694
Stephanie G. Cone¹, Hope E. Piercy¹, Lynn A. Fordham², Jorge A. Piedrahita³, Jeffrey T. Spang⁴, Matthew B. Fisher¹, ¹*Department of Biomedical Engineering, North Carolina State University and University of North Carolina - Chapel Hill, Raleigh, NC, United States*, ²*Department of Radiology, University of North Carolina - Chapel Hill, Chapel Hill, NC, United States*, ³*College of Veterinary Medicine, North Carolina State University, Raleigh, NC, United States*, ⁴*Department of Orthopaedics, University of North Carolina - Chapel Hill, Chapel Hill, NC, United States*

THURSDAY, JUNE 30	3:15pm - 4:45pm
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Reproductive Biomechanics**Wilson C****Session Chair:** Kristin Myers, *Columbia University, NY, United States***Session Co-Chair:** Kristin Miller, *Tulane University, LA, United States*

- 3:15PM Mechanical Properties of Pregnant Cervix from Mouse Models of Infection-Mediated and Hormone-Mediated Preterm Birth** SB³C2016-1011
Kyoko Yoshida¹, Alexandra Willcockson², Shanmugasundaram Nallasamy², Mala Mahendroo², Kristin Myers¹, ¹*Mechanical Engineering, Columbia University, New York, NY, United States*, ²*Obstetrics and Gynecology, UT Southwestern Medical Center, Dallas, TX, United States*
- 3:30PM Nonlinear Creep Behavior of Uterosacral and Cardinal Ligaments** SB³C2016-855
Adwoa Baah-Dwomoh, Ting Tan, Raffaella De Vita, *Virginia Tech, Blacksburg, VA, United States*
- 3:45PM Exploring Differences in the Tensile Response of the Pregnant and Non-pregnant Mouse Cervix** SB³C2016-902
Carrie E. Barnum¹, Jennifer L. Fey¹, Brianne K. Connizzo^{1,2}, Snehal S. Shetye¹, Michal A. Elovitz³, Louis J. Soslowsky¹, ¹*McKay Orthopaedic Research Laboratory, University of Pennsylvania, Philadelphia, PA, United States*, ²*Department of Biological Engineering, Massachusetts Institute of Technology, Boston, MA, United States*, ³*Maternal and Child Health Research Program, Department OBGYN, University of Pennsylvania, Philadelphia, PA, United States*

- 4:00PM Effect of Elastin Digestion on the Biaxial Mechanical Response of the Murine Vagina** SB³C2016-703
Katy M. Robison, Derek J. Bivona, Kristin S. Miller, *Biomedical Engineering, Tulane University, New Orleans, LA, United States*
- 4:15PM How much Additional Maternal Spatial Capacity do Forceps Require When Delivering the Fetal Head During Vaginal Birth?** SB³C2016-775
Paige V. Tracy¹, John O. L. DeLancey², James A. Ashton-Miller³, *¹Biomedical Engineering, University of Michigan, Ann Arbor, MI, United States, ²Obstetrics and Gynecology, University of Michigan, Ann Arbor, MI, United States, ³Mechanical Engineering, Biomedical Engineering, University of Michigan, Ann Arbor, MI, United States*
- 4:30PM Use Inverse Finite Element Method to Determine the Impairments in Pelvic Floor Support Structure in Women with Pelvic Organ Prolapse** SB³C2016-847
Mark T. Gordon¹, James A. Ashton-Miller², John O. L. DeLancey³, Luyun L. Chen², *¹Bioengineering and Mechanical Engineering, California Baptist University, Riverside, CA, United States, ²Biomedical Engineering Department, University of Michigan, Ann Arbor, MI, United States, ³Obstetrics and Gynecology Department, University of Michigan, Ann Arbor, MI, United States*

THURSDAY, JUNE 30**3:15pm - 4:45pm****Solid Mechanics: Growth and Remodeling****Wilson D****Session Chair:** Sara Roccabianca, *Michigan State University, MI, United States***Session Co-Chair:** Lik Chuan Lee, *Michigan State University, MI, United States*

- 3:15PM Adventitial Remodeling in Hypertension Leads to Aortic Maladaptation and Loss of Function** SB³C2016-840
Matthew R. Bersi¹, Chiara Bellini¹, Jing Wu², Kim R. C. Montaniel², David G. Harrison², Jay D. Humphrey¹, *¹Biomedical Engineering, Yale University, New Haven, CT, United States, ²Medicine and Pharmacology, Vanderbilt University, Nashville, TN, United States*
- 3:30PM Effects of Hemodynamic Changes on the Developing Dorsal Aorta of the Chick Embryo** SB³C2016-99
 Gabriela Espinosa, Larry Taber, **Jessica Wagenseil**, *Washington University in St. Louis, St. Louis, MO, United States*
- 3:45PM Flow-Rate-Controlled Remodeling of Glomerular Capillaries** SB³C2016-829
 Lazarina Gyoneva¹, **Daniel Goodman**¹, Yoav Segal^{1,2}, Kevin D. Dorfman¹, Victor H. Barocas¹, *¹University of Minnesota, Minneapolis, MN, United States, ²VA Medical Center, Minneapolis, MN, United States*
- 4:00PM A Comparison of Phenomenologic Growth Laws for Myocardial Hypertrophy** SB³C2016-161
Colleen M. Witzenburg, Jeffrey W. Holmes, *Biomedical Engineering, University of Virginia, Charlottesville, VA, United States*
- 4:15PM Experimental Investigation of Functional Forms Required for Modeling Degrading Acellular Tissue Engineered Vascular Grafts in a Predictive Growth and Remodeling Framework** SB³C2016-780
Piyusha S. Gade¹, Keewon Lee¹, Blaise N. Pfaff², Yadong Wang³, Anne M. Robertson⁴, *¹Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States, ²Department of Chemical Engineering, Pennsylvania State University, Philadelphia, PA, United States, ³Department of Bioengineering, Chemical and Petroleum Engineering, Surgery, University of Pittsburgh, Pittsburgh, PA, United States, ⁴Department of Mechanical Engineering and Materials Science, Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*
- 4:30PM Histological and Biomechanical analyses of Human Abdominal Aortic Aneurysms** SB³C2016-1044
Mirunalini Thirugnanasambandam¹, Karthik Mikkineni², Satish Muluk², Oluwaseun R. Adeyinka¹, Ender Finol¹, *¹Department of Biomedical Engineering, University of Texas at San Antonio, San Antonio, TX, United States, ²Division of Vascular Surgery, Allegheny Health Network, Pittsburgh, PA, United States*

THURSDAY, JUNE 30	3:15pm - 4:45pm
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Characterization of Cardiovascular Tissues**Annapolis 1****Session Co-Chair: Jonathan Wenk**, *University of Kentucky, KY, United States***Session Co-Chair: Hai-Chao Han**, *UTSA, San Antonio, TX, United States*

- 3:15PM A Multi-Scale Mechanical and Cellular Argument for the Differential Performance of Coronary Artery Bypass Grafts** SB³C2016-937
David A. Prim¹, Boran Zhou¹, Laurel Carter², Vinal Menon³, Jay Potts³, Tarek Shazly¹, John F. Eberth³, ¹*Biomedical Engineering, University of South Carolina, Columbia, SC, United States*, ²*University of South Carolina School of Medicine, Columbia, SC, United States*, ³*Cell Biology and Anatomy, University of South Carolina School of Medicine, Columbia, SC, United States*
- 3:30PM Is There a Critical Time Point for Antihypertensive Treatment? Embryonic Antihypertensive Treatment Alters Arterial Stiffness in Elastin Haploinsufficient Mice** SB³C2016-982
Jungsil Kim¹, Victoria Le², Robert Mecham³, Jessica Wagenseil¹, ¹*Mechanical Engineering & Materials Science, Washington University in St. Louis, St. Louis, MO, United States*, ²*Biomedical Engineering, University of Texas, Austin, TX, United States*, ³*Cell Biology & Physiology, Washington University in St. Louis, St. Louis, MO, United States*
- 3:45PM Anatomically-driven Multiscale Model of Ascending Thoracic Aorta, with Application to Multidirectional Experiments** SB³C2016-917
Rohit Y. Dhume¹, Christopher E. Korenczuk², Victor H. Barocas², ¹*Department of Mechanical Engineering, University of Minnesota, Minneapolis, MN, United States*, ²*Department of Biomedical Engineering, University of Minnesota, Minneapolis, MN, United States*
- 4:00PM The Mitral Valve Chordae Tendineae: A Topological And Geometric Analysis** SB³C2016-852
Amir H. Khalighi¹, Andrew Drach², Charles Bloodworth³, Eric L. Pierce³, Ajit Yoganathan³, Robert C. Gorman⁴, Joseph H. Gorman⁴, Michael S. Sacks², ¹*Mechanical Engineering, University of Texas at Austin, Austin, TX, United States*, ²*University of Texas at Austin, Austin, TX, United States*, ³*Georgia Institute of Technology, Atlanta, GA, United States*, ⁴*University of Pennsylvania, Philadelphia, PA, United States*
- 4:15PM Quantification of Biventricular Myocardial Strains from Cine Magnetic Resonance Images of Pulmonary Hypertensive Patients Using Hyperelastic Warping** SB³C2016-25
Ce Xi¹, Xiaodan Zhao², Liang Zhong², Martin Genet³, Lik Chuan Lee⁴, ¹*Michigan State University, East Lansing, MI, United States*, ²*National Heart Center, Singapore, Singapore*, ³*École Polytechnique, Paris, France*, ⁴*Michigan State University, East Lansing, MI, United States*
- 4:30PM A Novel Numerical-Experimental Inverse Modeling Approach to Investigate the Time-Evolving Three-Dimensional Mechanical Properties of Infarcted Myocardium** SB³C2016-735
David S. Li¹, João S. Soares¹, John G. Lesicko¹, Reza Avazmohammadi¹, Joseph H. Gorman², Robert C. Gorman², Michael S. Sacks¹, ¹*Biomedical Engineering, The University of Texas at Austin, Austin, TX, United States*, ²*Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, United States*

THURSDAY, JUNE 30	3:15pm - 4:45pm
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Physiological Valves**Annapolis 2****Session Chair: Michael Sacks**, *University of Texas, Austin, TX, United States***Session Co-Chair: Lakshmi P. D. Dasi**, *Ohio State University, OH, United States*

- 3:15PM Developing Computational Fluid-Structure Models for the Lymphatic Valve** SB³C2016-881
John T. Wilson¹, Lowell T. Edgar¹, Raoul van Loon², James E. Moore¹, ¹*Bioengineering, Imperial College London, London, United Kingdom*, ²*Swansea University, Swansea, United Kingdom*
- 3:30PM Blood Clotting Potential and Hemodynamic Analysis of a Superhydrophobic Bileaflet Mechanical Heart Valve** SB³C2016-901
David Bark¹, Hamed Vahabi¹, Hieu Bui², Sanli Movafaghi¹, Arun Kota¹, Ketul Popat¹, Lakshmi Prasad Dasi¹, ¹*Mechanical Engineering, Colorado State University, Fort Collins, CO, United States*, ²*Biomedical Engineering, Colorado State University, Fort Collins, CO, United States*

- 3:45PM FSI Simulation of Intraventricular Flow in a Patient-Specific Left Ventricular Model with both Mitral and Aortic Valves** SB³C2016-1121
Andres D. Caballero, Wenbin Mao, Wei Sun, *The Wallace H. Coulter Department of Biomedical Engineering, Georgia Institute of Technology and Emory University, Atlanta, GA, United States*
- 4:00PM A Robust Framework for Building Attribute-Rich FE Models of Mitral Valve from Medical Images** SB³C2016-1003
Andrew Drach¹, Amir H. Khalighi², Robert C. Gorman³, Joseph H. Gorman³, Ajit P. Yoganathan⁴, Michael S. Sacks⁵,
¹*Institute for Computational Engineering and Sciences, The University of Texas at Austin, Austin, TX, United States*,
²*Mechanical Engineering, The University of Texas at Austin, Austin, TX, United States*, ³*Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, United States*, ⁴*Cardiovascular Fluid Mechanics Laboratory, Georgia Institute of Technology, Atlanta, GA, United States*, ⁵*Biomedical Engineering, The University of Texas at Austin, Austin, TX, United States*
- 4:15PM Computational Assessment of Hemodynamic Parameters of Bicuspid Aortic Valve Aortopathy** SB³C2016-57
Kai Cao¹, **Philippe Sucosky**², ¹*Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, IN, United States*, ²*Department of Mechanical and Materials Engineering, Wright State University, Dayton, OH, United States*
- 4:30PM Importance of Including Papillary Muscles and Trabeculae in Cardiac Flow Simulations** SB³C2016-86
Jonas Lantz, Lilian Henriksson, Anders Persson, Matts Karlsson, Tino Ebbens, *Linköping university, Linköping, Sweden*

THURSDAY, JUNE 30

3:15pm - 4:45pm

Trends, Tips, and Tricks in Biomechanical Engineering Education

Azalea 2

Session Chair: Sarah Kieweg, *University of Kansas, KS, United States*

Session Co-Chair: Kristen Billiar, *Worcester Polytechnic Institute, MA, United States*

- 3:15PM Student Learning of Biomechanics Topics by Embedding “Quantified Self” Motivated Problem Based Learning Modules in Biomedical Engineering Courses** SB³C2016-1116
Eric G. Meyer, Mansoor Nasir, *Biomedical Engineering, Lawrence Technological University, Southfield, MI, United States*
- 3:30PM Introduction to Finite Element Modeling in a Guided Project-based Approach to Biomechanics Research** SB³C2016-992
Alexander Kotelsky, Amy L. Lerner, *Biomedical Engineering, University of Rochester, Rochester, NY, United States*
- 3:45PM A New Educational Approach to Teaching Science and Engineering for K-12 Students** SB³C2016-860
Kritsakorn Chaumpanich¹, Michelle Johnson², Yingcai Xiao¹, Philip A. Allen³, **Yang H. Yun**⁴, ¹*Computer Science, University of Akron, Akron, OH, United States*, ²*PLTW Biomedical Science, North High School, Akron, OH, United States*, ³*Psychology, University of Akron, Akron, OH, United States*, ⁴*Biomedical Engineering, University of Akron, Akron, OH, United States*
- 4:00PM A Course in Maker Activities for a Master of Engineering in Design and Commercialization** SB³C2016-688
Brandon Kirkland, Ophelia Johnson, **Alan Eberhardt**, *UAB, Birmingham, AL, United States*
- 4:15PM Best Practices in teaching biomechanics: Connecting Biomechanics Beyond the Classroom** SB³C2016-575
Laurel Kuxhaus, *Clarkson University, Potsdam, NY, United States*
- 4:30PM When Theatre comes to Capstone Design: Oh How Creative They can Be...** SB³C2016-805
Ferris Pfeiffer¹, Suzanne Burgoyne², Rachel E. Bauer², ¹*Bioengineering/Orthopaedic Surgery, University of Missouri, Columbia, MO, United States*, ²*Theatre, University of Missouri, Columbia, MO, United States*

THURSDAY, JUNE 30	3:15pm - 4:45pm
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Cancer and Tumor Microenvironment**Azalea 3****Session Chair:** Sihong Wang, *City College of New York, NY, United States***Session Co-Chair:** Hai Wang, *The Ohio State University, OH, United States*

- 3:15PM Investigation of Biotransport in a Tumor with Non-Homogeneous Permeability Using a Non-Intrusive Polynomial Chaos Approach** SB³C2016-785
Miao Lu¹, Liang Zhu¹, Ronghui Ma¹, Maher Salloum², Meilin Yu¹, ¹*Mechanical Engineering, University of Maryland, Baltimore County, Baltimore, MD, United States*, ²*Sandia National Labs, Livermore, CA, United States*
- 3:30PM Adhesion and Invasion of Circulating Cancer Cells on Inflamed Endothelium** SB³C2016-848
Taylor J. Thompson, Bumsoo Han, *Mechanical Engineering, Purdue University, West Lafayette, IN, United States*
- 3:45PM A Near Infrared Laser-activated “Nanobomb” for Breaking the Barriers to MicroRNA Delivery** SB³C2016-133
Hai Wang, Xiaoming He, *Biomedical Engineering, The Ohio State University, Columbus, OH, United States*
- 4:00PM Conformal Nanoencapsulation of Allogeneic T Cells Mitigate Graft-versus-Host Disease but Retain Graft-versus-Leukemia Activity** SB³C2016-718
Shuting zhao, Xiaoming He, *Biomedical Engineering, The Ohio State University, Columbus, OH, United States*
- 4:15PM Monitoring Tumor Response to Therapeutic TR4 Fusion Protein via in vivo Imaging** SB³C2016-67
Marianna Prokopi¹, Costas Pitsillides², Mahendra Deonarain³, Konstantinos Kapnisis², Spyros Stylianou⁴, George Kousparos⁵, Christina Kousparou¹, **Andreas Anayiotos²**, Agamemnon Epenetos¹, ¹*Trojanter Ltd, Nicosia, Cyprus*, ²*Mechanical and Materials Science and Engineering, Cyprus University of Technology, Limassol, Cyprus*, ³*ShyDen Biotechnology Ltd, Stevenage, Herts, United Kingdom*, ⁴*Translational Genetics Team, The Cyprus Institute of Neurology & Genetics, Nicosia, Cyprus*, ⁵*Frimley Park Hospital, NHS Foundation Trust, Surrey, United Kingdom*
- 4:30PM Development of a Tissue Engineered 3D Microfluidic Tumor Platform to Study Nanoparticle Transport** SB³C2016-1100
Manasa Gadde¹, Matthew R. DeWitt², Marissa N. Rylander³, ¹*Biomedical Engineering, University of Texas at Austin, Austin, TX, United States*, ²*Virginia Tech-Wake Forest SBES, Virginia Tech, Blacksburg, VA, United States*, ³*Mechanical Engineering, University of Texas at Austin, Austin, TX, United States*

FRIDAY, JULY 1	9:45am - 11:15am
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PhD Competition: Signaling & Remodeling**Wilson B****Session Chair:** Triantafyllos Stylianopoulos, *University of Cyprus, Cyprus***Session Co-Chair:** Trevor Lujan, *Boise State, ID, United States*

- 9:45AM Reproduction Induces Adaptation of the Maternal Skeleton and Alters Patterns of Postmenopausal Bone Loss** SB³C2016-138
Chantal M. J. de Bakker, Allison R. Altman-Singles, Wei-Ju Tseng, Laurel Leavitt, Connie Li, X. Sherry Liu, *Department of Orthopaedic Surgery, University of Pennsylvania, Philadelphia, PA, United States*
- 10:00AM Local Changes to the Growth Plate in Response to Injury** SB³C2016-691
Lauren M. Mangano¹, Meghan E. Kupratis¹, Katie Li¹, Eric Rapp², Louis C. Gerstenfeld³, Elise F. Morgan^{1,2,3}, ¹*Biomedical Engineering, Boston University, Boston, MA, United States*, ²*Mechanical Engineering, Boston University, Boston, MA, United States*, ³*Orthopaedic Surgery, Boston University, Boston, MA, United States*
- 10:15AM Vascular Smooth Muscle Cell Mechano-Adaptation Laws** SB³C2016-159
Kerianne E. Steucke, Zaw Win, Emily E. Walsh, Taylor R. Stemler, Patrick W. Alford, *Biomedical Engineering, University of Minnesota, Minneapolis, MN, United States*
- 10:30AM Cadherin-11 Exacerbates Maladaptive Remodeling After Myocardial Infarction** SB³C2016-1080
Alison Schroer, W. David Merryman, *Vanderbilt University, Nashville, TN, United States*

- 10:45AM Positive and Negative Cues for Modulating Neurite Dynamics and Receptor Expression to Improve Peripheral Nerve Regeneration** SB³C2016-611
Melissa R. Wrobel, Harini G. Sundararaghavan, *Biomedical Engineering, Wayne State University, Detroit, MI, United States*
- 11:00AM The RhoA/ROCK Pathway Mediates Nociceptive Signaling After Painful Ligament Loading** SB³C2016-32
Sijia Zhang, Beth Winkelstein, *University of Pennsylvania, Philadelphia, PA, United States*

FRIDAY, JULY 1**9:45am - 11:15am****PhD Competition: Mechanosensing & Mechanics****Wilson C****Session Chair: Corinne Henak**, *Wisconsin, WI, United States***Session Co-Chair: Andrew Kemper**, *Virginia Tech, VA, United States*

- 9:45AM Chondrocyte Death and Mitochondrial Dysfunction are Mediated by Cartilage Friction and Shear Strain** SB³C2016-807
Edward D. Bonnevie¹, Michelle L. Delco², Naveen Jasty¹, Lena R. Bartell³, Lisa A. Fortier², Itai Cohen³, Lawrence J. Bonassar^{1,4}, ¹*Mechanical Engineering, Cornell University, Ithaca, NY, United States*, ²*Comparative Biomedical Sciences, Cornell University, Ithaca, NY, United States*, ³*Applied Engineering Physics, Cornell University, Ithaca, NY, United States*, ⁴*Biomedical Engineering, Cornell University, Ithaca, NY, United States*
- 10:00AM Direct Osmotic Pressure Measurements in Articular Cartilage Demonstrate Non-Ideal and Concentration-Dependent Phenomena** SB³C2016-1010
Brandon K. Zimmerman¹, Robert J. Nims², Clark T. Hung², Gerard A. Ateshian^{1,2}, ¹*Mechanical Engineering, Columbia University, New York, NY, United States*, ²*Biomedical Engineering, Columbia University, New York, NY, United States*
- 10:15AM N-Cadherin Adhesive Interactions Modulate ECM Mechanosensing and Fate Commitment in Mesenchymal Stem Cells** SB³C2016-640
Brian D. Cosgrove^{1,2,3}, Keeley L. Mui⁴, Tristan P. Driscoll^{1,2}, Steven R. Caliar^{1,3}, Richard K. Assoian⁴, Jason A. Burdick^{1,3}, Robert L. Mauck^{1,2,3}, ¹*Bioengineering, University of Pennsylvania, Philadelphia, PA, United States*, ²*Orthopedic Surgery, University of Pennsylvania, Philadelphia, PA, United States*, ³*Translational Musculoskeletal Research Center, Philadelphia VA Medical Center, Philadelphia, PA, United States*, ⁴*Pharmacology, University of Pennsylvania, Philadelphia, PA, United States*
- 10:30AM A Multiphysics Model of the Pacinian Corpuscle** SB³C2016-95
Julia C. Quindlen¹, Henryk K. Stolarski², Martha Flanders³, Victor H. Barocas¹, ¹*Biomedical Engineering, University of Minnesota, Minneapolis, MN, United States*, ²*Civil Engineering, University of Minnesota, Minneapolis, MN, United States*, ³*Neuroscience, University of Minnesota, Minneapolis, MN, United States*
- 10:45AM Molecular Level Detection and Quantification of Collagen Mechanical Damage Using Collagen Hybridizing Peptides** SB³C2016-809
Jared L. Zitnay^{1,2}, Yang Li¹, Zhao Qin³, Baptiste Depalle³, Shawn P. Reese^{1,2}, Markus J. Buehler³, S. Michael Yu¹, Jeffrey A. Weiss^{1,2,4}, ¹*Bioengineering, University of Utah, Salt Lake City, UT, United States*, ²*Scientific Computing and Imaging Institute, University of Utah, Salt Lake City, UT, United States*, ³*Civil and Environmental Engineering, Massachusetts Institute of Technology, Cambridge, MA, United States*, ⁴*Orthopaedics, University of Utah, Salt Lake City, UT, United States*
- 11:00AM Collagen Degradation Alters Failure Properties & Matrix Reorganization During Tensile Loading** SB³C2016-92
Meagan Ita, Beth Winkelstein, *University of Pennsylvania, Philadelphia, PA, United States*

FRIDAY, JULY 1	9:45am - 11:15am
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PhD Competition: Tissue Mechanics & Modeling**Wilson D****Session Chair:** Roger Haut, *Michigan State University, MI, United States***Session Co-Chair:** Megan Killian, *University of Delaware, DE, United States*

- 9:45AM Multiscale Mechanics of Human Supraspinatus Tendon in Shear after Proteoglycan Depletion** SB³C2016-72
Fei Fang¹, Spencer P. Lake^{1,2,3}, ¹*Mechanical Engineering & Materials Science, Washington University in St. Louis, St. Louis, MO, United States*, ²*Department of Biomedical Engineering, Washington University in St. Louis, St. Louis, MO, United States*, ³*Department of Orthopaedic Surgery, Washington University in St. Louis, St. Louis, MO, United States*
- 10:00AM Subject-specific vs. Averaged Structural Models of the Collagen Network in the Lumbar Facet Capsular Ligament** SB³C2016-918
Vahhab Zarei¹, Amy A. Claeson², Chao Liu², Taner Akkin², Victor H. Barocas², ¹*Mechanical Engineering, University of Minnesota, Minneapolis, MN, United States*, ²*Biomedical Engineering, University of Minnesota, Minneapolis, MN, United States*
- 10:15AM Dynamic Imaging of Tendon Tissue Stress** SB³C2016-1042
Jack A. Martin¹, Alexander C. Ehlers², James R. Hermus², Matthew S. Allen³, Daniel J. Segalman³, Darryl G. Thelen⁴, ¹*Materials Science Program, University of Wisconsin-Madison, Madison, WI, United States*, ²*Department of Biomedical Engineering, University of Wisconsin-Madison, Madison, WI, United States*, ³*Department of Engineering Physics, University of Wisconsin-Madison, Madison, WI, United States*, ⁴*Department of Mechanical Engineering, University of Wisconsin-Madison, Madison, WI, United States*
- 10:30AM Tsai-Hill Maximum-Work Theory as a Failure Criterion for Fibrous Biological Tissues** SB³C2016-689
Christopher E. Korenczuk, Victor H. Barocas, *Department of Biomedical Engineering, University of Minnesota, Minneapolis, MN, United States*
- 10:45AM Remodeling by Fibroblasts Alters the Rate-dependent Mechanical Properties of Collagen** SB³C2016-894
Behzad Babaei¹, Ali Davarian², Kenneth M. Pryse², William B. McConnaughey², Elliot L. Elson², Guy M. Genin¹, ¹*Department of Mechanical Engineering & Materials Science, Washington University in St. Louis, St. Louis, MO, United States*, ²*Department of Biochemistry & Molecular Biophysics, Washington University in St. Louis, St. Louis, MO, United States*
- 11:00AM A Permanent Set Constitutive Model for Exogenously Cross-linked Collagenous Tissues** SB³C2016-954
Will Zhang¹, Hobe Tam², Wei Sun³, Naren Vyavahare², Michael S. Sacks¹, ¹*Department of Biomedical Engineering, Institute for Computational Engineering and Sciences, The University of Texas at Austin, Austin, TX, United States*, ²*Department of Bioengineering, Clemson University, Clemson, SC, United States*, ³*Department of Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA, United States*

FRIDAY, JULY 1	9:45am - 11:15am
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PhD Competition: Biomechanics of Injury**Annapolis 1****Session Chair:** Brittany Coats, *University of Utah, UT, United States***Session Co-Chair:** Lakiesha Williams, *Mississippi State, MS, United States*

- 9:45AM Coronal Head Rotation and Rapid Corpus Callosum Tract Strain in Sports-Related Mild Traumatic Brain Injury** SB³C2016-971
Fidel Hernandez¹, Chiara Giordano², Svein Kleiven², David Camarillo^{1,3}, ¹*Department of Mechanical Engineering, Stanford University, Stanford, CA, United States*, ²*Department of Neuronic Engineering, KTH Royal Institute of Technology, Stockholm, Sweden*, ³*Department of Bioengineering, Stanford University, Stanford, CA, United States*
- 10:00AM Differences in the Ability of Bicycle Helmets to Reduce Risk of Head Injury** SB³C2016-1090
Megan L. Bland, Steven Rowson, *Virginia Tech, Blacksburg, VA, United States*
- 10:15AM Spatio-Temporal Quantification of Cartilage Structural Changes in a Murine Model of Post-Traumatic Osteoarthritis** SB³C2016-966
Michael A. David, Avery T. White, Rachael Pilachowski, Ryan C. Locke, Melanie K. Smith, Christopher Price, *Biomedical Engineering, University of Delaware, Newark, DE, United States*

- 10:30AM Principal Component Analysis of Friction Force Hysteresis Curves for Detecting Fatigue Failure and Generating Frictional S-N Curves for Articular Cartilage** SB³C2016-1071
Krista M. Durney¹, Robert J. Nims¹, James F. Boorman-Padgett², Jason T. Suh¹, Hyeon Jin Koo¹, Polina V. Smirnova¹, Gregory T. Salamone¹, Brian K. Jones², Sevan R. Oungoulian², Clark T. Hung¹, Gerard A. Ateshian^{1,2}, ¹*Biomedical Engineering, Columbia University, New York, NY, United States*, ²*Mechanical Engineering, Columbia University, New York, NY, United States*
- 10:45AM Experimental Biomechanics of the Anterior Cruciate Ligament: Hyperelasticity and Viscoelasticity** SB³C2016-1063
Kaitlyn Mallett¹, Ellen M. Arruda², ¹*Mechanical Engineering, University of Michigan, Ann Arbor, MI, United States*, ²*Mechanical Engineering, Biomedical Engineering, Program in Macromolecular Science and Engineering, University of Michigan, Ann Arbor, MI, United States*
- 11:00AM Alterations in the Anterior Capsule Correlate with Impaired Joint Mechanics in a Rat Elbow Model of Post-Traumatic Joint Stiffness** SB³C2016-618
Chelsey Dunham¹, Ryan Castile¹, Leesa Galatz², Spencer Lake¹, ¹*Washington University in St. Louis, St. Louis, MO, United States*, ²*Mount Sinai, New York, NY, United States*

FRIDAY, JULY 1**9:45am - 11:15am****PhD Competition: Cardiac & Vascular****Annapolis 2****Session Chair: Daniela Valdez-Jasso, UI Chicago, IL, United States****Session Co-Chair: Will Richardson, Clemson, SC, United States**

- 9:45AM Cellular Architecture Dictates Anisotropic Mechanical Properties of Vascular Smooth Muscle Cells** SB³C2016-629
Zaw Win, Justin M. Buksa, Patrick W. Alford, *Biomedical Engineering, University of Minnesota, Minneapolis, MN, United States*
- 10:00AM Analysis of Chromatin Mechanics During Cardiomyocyte Contraction Using Nuclear Spatial Strain Maps Reveals New Protective Mechanism** SB³C2016-751
Benjamin Seelbinder¹, Soham Ghosh¹, Sarah Calve², Corey P. Neu^{1,2}, ¹*Mechanical Engineering, University of Colorado Boulder, Boulder, CO, United States*, ²*Biomedical Engineering, Purdue University, West Lafayette, IN, United States*
- 10:15AM Acute Effects of Cell Free Hemoglobin and Sickled Red Blood Cells on Pulmonary Vascular Impedance in Otherwise Healthy Mice** SB³C2016-772
David A. Schreier¹, Timothy Hacker², Diana Tabima¹, Naomi C. Chesler¹, ¹*Biomedical Engineering, University of Wisconsin-Madison, Madison, WI, United States*, ²*Medicine, University of Wisconsin-Madison, Madison, WI, United States*
- 10:30AM Virtual Evaluation of Surgical Revascularization Techniques in Coronary Artery Bypass Surgery** SB³C2016-904
Abhay B. Ramachandra^{1,2}, Christopher Jensen³, Andrew B. Goldstone³, Joseph Y. Woo³, Jack H. Boyd³, Andrew Kahn⁴, Alison Marsden², ¹*Department of Mechanical and Aerospace Engineering, University of California San Diego, La Jolla, CA, United States*, ²*Institute for Computational and Mathematical Engineering, Department of Pediatric Cardiology, Stanford University, Stanford, CA, United States*, ³*Department of Cardiothoracic Surgery, Stanford University, Stanford, CA, United States*, ⁴*Department of Medicine, University of California San Diego, La Jolla, CA, United States*
- 10:45AM Computation Investigation of Hydrogel Injection Characteristics for Myocardial Support** SB³C2016-94
Hua Wang¹, Christopher Rodell², Mandonna Lee³, Neville Dusaj⁴, Jason Burdick², Robert Gorman³, Jonathan Wenk^{1,5}, ¹*Department of Mechanical Engineering, University of Kentucky, Lexington, KY, United States*, ²*Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, United States*, ³*Gorman Cardiovascular Research Group, University of Pennsylvania, Philadelphia, PA, United States*, ⁴*Department of Chemistry and Physics, University of Pennsylvania, Philadelphia, PA, United States*, ⁵*Department of Surgery, University of Kentucky, Lexington, KY, United States*

11:00AM Contribution of Glycosaminoglycans to Extracellular Matrix Fiber Recruitment and Arterial Wall Mechanics
SB³C2016-104

Jeffrey Mattson¹, Raphaël Turcotte^{2,3}, Yanhang Zhang^{1,2}, ¹*Mechanical Engineering, Boston University, Boston, MA, United States*, ²*Biomedical Engineering, Boston University, Boston, MA, United States*, ³*Center for Systems Biology, Advanced Microscopy Program, Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard Medical School, Boston, MA, United States*

FRIDAY, JULY 1

9:45am - 11:15am

**Undergraduate Design Competition -
Rehabilitation & Assistive Devices**

Azalea 2

Session Chair: Tamara Bush, *Michigan State University, MI, United States*

Session Co-Chair: Nicole Corbiere, *Clarkson University, NY, United States*

9:45AM Substitute Voice Production via a Mechanically-Driven Artificial Larynx SB³C2016-130

Michael R. Baldwin¹, Kateri A. Kaminski¹, Janet A. Hrdina¹, Evan T. Cody², Erik A. Gillespie¹, Tyler T. Tuttle¹, **Byron D. E. Erath**¹, ¹*Mechanical and Aeronautical Engineering, Clarkson University, Potsdam, NY, United States*, ²*School of Business, Clarkson University, Potsdam, NY, United States*

10:00AM Wireless Instrumented Cane SB³C2016-1095

Me'Lanae Garrett¹, Binod Shilpakar¹, Joel A. Whitney¹, Jon T. E. Williams¹, Radhakrishnan Srinivasan², Lakiesha Williams², ¹*Agricultural and Biological Engineering, Mississippi State University, Starkville, MS, United States*, ²*Agricultural and Biological Engineering, Mississippi State University, Mississippi State, MS, United States*

10:15AM Intrahospital Assistive Transportation Device for Mechanically Ventilated Pediatric Patients SB³C2016-1047

Allison Fetz, Elysia Masters, Ravi Patel, Ameen Ozrail, John Williams, Gary Bowlin, Maris Brown, *Biomedical Engineering, University of Memphis, Memphis, TN, United States*

10:30AM Adaptable, Affordable, and Reusable Interim Prosthetic Leg Solution in Response to Recent Medicare Coverage Changes SB³C2016-615

Jason A. Shar, Andrew M. Milhoan, Nathan F. Levengood, Joshua Gargac, Matthew Volansky, *Mechanical Engineering, University of Mount Union, Alliance, OH, United States*

10:45AM Improved Ankle Foot Orthosis for Clubfoot Treatment SB³C2016-574

Angela Guardia¹, Alissa Adams¹, Brianna Bruni-Bossio¹, Alberto Palomino¹, Rex Wu¹, Kajsa Duke², ¹*Mechanical Engineering, University of Alberta, Edmonton, AB, Canada*, ²*Mechanical Engineering - Biomedical Option, University of Alberta, Edmonton, AB, Canada*

11:00AM Reaching Aid for Spinal Fusion Recipients SB³C2016-834

Bijal Patel, **Casey K. Schiner**, Celia M. Staniak, Maryssa Mercer, Michele Grimm, Brian Mundo, *Wayne State University, Detroit, MI, United States*

FRIDAY, JULY 1

9:45am - 11:15am

PhD Competition: Devices, Microfluidics and Sensing

Azalea 3

Session Chair: James Baish, *Bucknell University, PA, United States*

Session Co-Chair: Luke Herbertson, *FDA, DC, United States*

9:45AM Programming 'On-Demand' Delivery From Mechanically-Activated Microcapsules SB³C2016-134

Bhavana Mohanraj, Miju Kim, Daeyeon Lee, George R. Dodge, Robert L. Mauck, *University of Pennsylvania, Philadelphia, PA, United States*

10:00AM Analysis of Cell Spreading on Micropatterned Substrates using a Thermodynamically Consistent Non-Local Active Formulation SB³C2016-1015

Eoin McEvoy¹, Tommaso Ristori², Sandra Loerakker², Vikram S. Deshpande³, Patrick McGarry¹, ¹*Biomedical Engineering, National University of Ireland Galway, Galway, Ireland*, ²*Biomedical Engineering, Eindhoven University of Technology, Eindhoven, Netherlands*, ³*Engineering, University of Cambridge, Cambridge, United Kingdom*

- 10:15AM An Experimental Canine Patent Ductus Arteriosus Occluder Based on Shape Memory Polymer Foam in a Nitinol Cage** SB³C2016-21
Mark A. Wierzbicki, Bradley H. Due, Landon D. Nash, Brandis Keller, Sonya G. Gordon, Matthew W. Miller, Duncan J. Maitland, *Texas A&M University, College Station, TX, United States*
- 10:30AM Microfluidics for the Study of Oxygen Gradients at the Maternal Fetal Interface** SB³C2016-794
Yassen Abbas^{1,2}, Carolin Oefner^{2,3}, Graham J. Burton^{2,4}, Ashley Moffett^{2,3}, Michelle L. Oyen^{1,2}, ¹*Engineering, University of Cambridge, Cambridge, United Kingdom*, ²*Centre for Trophoblast Research, University of Cambridge, Cambridge, United Kingdom*, ³*Pathology, University of Cambridge, Cambridge, United Kingdom*, ⁴*Department of Physiology, Development and Neuroscience, University of Cambridge, Cambridge, United Kingdom*
- 10:45AM Thermal Contrast Amplification (TCA) Readers Improve the Limit of Detection for Influenza and Malaria Lateral Flow Assays** SB³C2016-1056
Yiru Wang¹, Zhenpeng Qin^{1,2}, David Boulware³, Iveth J. González⁴, David Bell^{3,5}, Warren Chan⁶, Peter Chiodini⁷, Roxanne Rees-Channer⁷, John C. Bischof¹, ¹*Department of Mechanical Engineering, University of Minnesota - Twin Cities, Minneapolis, MN, United States*, ²*University of Texas at Dallas, Richardson, TX, United States*, ³*Department of Medicine Infectious Diseases and International Medicine, University of Minnesota - Twin Cities, Minneapolis, MN, United States*, ⁴*Foundation for New Innovative Diagnosis, Geneva, Switzerland*, ⁵*Global Good Fund, Bellevue, WA, United States*, ⁶*Department of Chemistry, University of Toronto, Toronto, ON, Canada*, ⁷*Hospital for Tropical Disease, University College London, London, United Kingdom*
- 11:00AM Error and Uncertainty Quantification of a Commercial CFD Solver in an Intracranial Aneurysm** SB³C2016-1074
Nicole Varble^{1,2}, Nikhil Paliwal^{1,2}, Jianping Xiang^{2,3}, Kristian Debus⁴, Hui Meng^{1,2,5}, ¹*Mechanical and Aerospace Engineering, SUNY University at Buffalo, Buffalo, NY, United States*, ²*Toshiba Stroke and Vascular Research Center, Buffalo, NY, United States*, ³*Neurosurgery, SUNY University at Buffalo, Buffalo, NY, United States*, ⁴*CD-adapco, Melville, NY, United States*, ⁵*Biomedical Engineering, SUNY University at Buffalo, Buffalo, NY, United States*

FRIDAY, JULY 1	1:00pm - 3:15pm
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Poster Session II**Thermal Treatment and Cryotherapy****Exhibit Hall A**

- 15 Blood Cooling Using Cryogenic Nitrogen** SB³C2016-638
Joseph Licwinko, Brian Dixon, *Mechanical Engineering, Rowan University, Glassboro, NJ, United States*
- 16 Can We Use Apparent Thermal Conductivity to Include the Effect of Blood Perfusion? An Attempt to Predict Frozen Region During Cryosurgery** SB³C2016-766
Mohammed M. H. Shurrab, Haidong Wang, Takanobu Fukunaga, Kosaku Kurata, Hiroshi Takamatsu, *Mechanical Engineering, Kyushu University, Fukuoka, Japan*
- 17 Development and Validation of a Brain Phantom for Therapeutic Cooling Devices** SB³C2016-1012
Ryan Packett¹, Philip Brown¹, Gautam Popli², Scott Gayzik¹, ¹*Biomedical Engineering, Wake Forest University, Winston Salem, NC, United States*, ²*Neurosurgery, Wake Forest University, Winston Salem, NC, United States*
- 18 Modulation of Ice Formation Characteristics Due to Addition of Trehalose in Cryoprotectant** SB³C2016-891
Jason Solocinski, Mian Wang, Quinn Osgood, **Nilay Chakraborty**, *Mechanical Engineering Department, University of Michigan Dearborn, Dearborn, MI, United States*
- 19 A Novel Cryopreservation Approach Without Penetrating Cryoprotectants** SB³C2016-725
Haishui H. Huang, *The Ohio State University, Columbus, OH, United States*
- 20 Enhancement of Cryopreservation outcome of Adipose Tissue Derived Stem Cells by Thermal Stress** SB³C2016-651
Mulla Shahensha Shaik, *Mechanical Engineering, Louisiana State University, Baton Rouge, LA, United States*
- 21 Proliferation of Human Adipose Derived Stem Cells Cultured on Porous Poly (l-lactic Acid) Scaffolds Prepared by Thermally Controlled Methods** SB³C2016-43
Harish Chinnasami, Ram Devireddy, *Mechanical Engineering Department, Louisiana State University, Baton Rouge, LA, United States*

FRIDAY, JULY 1**1:00pm - 3:15pm****Poster Session II****Ocular and Optofluidics****Exhibit Hall A**

- 22 **Study of Ganciclovir Permeability Through Bovine, Rabbit & Human Alzheimair Ex-vivo Ocular Tissues** SB³C2016-1099
Anita Penkova^{1,2}, Komsan Rattanakijstorn¹, Satwindar Sadhal^{1,2}, ¹University of Southern California, Los Angeles, CA, United States, ²Saban Research Institute, Children's hospital Los Angeles, Los Angeles, CA, United States
- 23 **Intraocular Pressure Measurement Through the Laser Induced Cavitation Bubbles Dynamics** SB³C2016-761
Luis F. Devia-Cruz, Santiago Camacho-López, Optics, CICESE, Ensenada, Mexico
- 24 **Fluid Displacement During Droplet Formation at Microfluidic Flow-focusing Junction at Microfluidic Flow-focusing Junction** SB³C2016-722
Haishui H. Huang, The Ohio State University, Columbus, OH, United States
- 25 **Role of Intracranial Pressure in Optic Nerve Head Biomechanics** SB³C2016-713
Yi Hua, Dept. of Mechanical & Materials Engineering, University of Nebraska-Lincoln, Lincoln, NE, United States
- 26 **Finite Element Model of Ocular Accommodation Mechanism Based on Lens Pre-Tensioning and Ciliary Muscle Contraction** SB³C2016-572
Katherine R. Knaus¹, AnnMarie Hipsley², Silvia S. Blemker¹, ¹University of Virginia, Charlottesville, VA, United States, ²Ace Vision Group Inc., Akron, OH, United States
- 27 **Riboflavin/uvva Collagen Cross-linking Effects on Tensile and Compressive Properties of the Cornea** SB³C2016-799
Hamed Hatami-Marbini, Mechanical & Industrial Engineering, University of Illinois at Chicago, Chicago, IL, United States
- 28 **Regional Variations in the Mechanical Strains of the Human Optic Nerve Head** SB³C2016-804
Dan Midgett¹, Mohak Patel², Mary Pease³, Christian Franck², Harry Quigley³, Vicky Nguyen¹, ¹Mechanical Engineering, Johns Hopkins University, Baltimore, MD, United States, ²Engineering, Brown University, Providence, RI, United States, ³Ophthalmology, Johns Hopkins University, Baltimore, MD, United States
- 29 **An Image-Based Inverse Finite Element Method to Determine the Mechanical Properties of Human Trabecular Meshwork** SB³C2016-984
Anup D. Pant¹, Lawrence Kagemann², Ian Sigal², Joel Schuman², Rouzbeh Amini¹, ¹Biomedical Engineering, The University of Akron, Akron, OH, United States, ²Department of Bioengineering, Department of Ophthalmology, University of Pittsburgh, Pittsburgh, PA, United States
- 30 **3D Characterization of Corneal Deformation Using Ultrasound Speckle Tracking** SB³C2016-936
Keyton Clayson, Elias Pavlatos, Jun Liu, The Ohio State University, Columbus, OH, United States
- 31 **The Impact of Ocular Pressures, Material Properties and Geometry on Optic Nerve Head Deformation** SB³C2016-637
Andrew Feola¹, Jerry G. Myers², Julia Raykin¹, Emily S. Nelson², Brian Samuels³, C. Ross Ethier¹, ¹Department of Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA, United States, ²NASA Glenn Research Center, Cleveland, OH, United States, ³Department of Ophthalmology, University of Alabama at Birmingham, Birmingham, AL, United States
- 32 **Development of a Platform for Studying Astrocyte Mechanobiology: Compression of Astrocytes in 3D Collagen Gels** SB³C2016-868
John J. E. Mulvihill^{1,2}, Lisa A. Schildmeyer¹, Julia Raykin¹, Eric J. Snider¹, Kavita Chinoy¹, Danny J. Kelly², C. Ross Ethier^{1,3}, ¹Wallace H. Coulter Dept. of Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA, United States, ²Mechanical and Manufacturing Engineering, Trinity College Dublin, Dublin, Ireland, ³Atlanta VA Medical Center, Decatur, GA, United States
- 33 **Characterization of the Mechanical Behavior of the Optic Nerve Sheath** SB³C2016-1054
Julia Raykin, Roy Wang, Taylor E. Forte, Andrew Feola, Brian Samuels, Jerry G. Myers, Emily S. Nelson, Rudy L. Gleason, C. Ross Ethier, Georgia Institute of Technology, Atlanta, GA, United States

FRIDAY, JULY 1

1:00pm - 3:15pm

Poster Session II

Cardiovascular Tissue Engineering

Exhibit Hall A

- 75 **Connexin 43 Stability and Gap Junction Channel Functionality: the Role of Heparan Sulphate** SB³C2016-642
Solomon Mensah, Homa Homayoni, Ming Cheng, Brian Plouffe, Eno E. Ebong, *Bioengineering, Northeastern University, Boston, MA, United States*
- 76 **Phenotypic Changes of Stromal Vascular Fraction Cells for Use in a Tissue Engineered Vascular Graft** SB³C2016-861
Darren G. Haskett, *Department of Surgery, University of Pittsburgh, Pittsburgh, PA, United States*
- 77 **Influence of Subarachnoid Hemorrhage Factors on Vascular Smooth Muscle Cell Functional Phenotype in the Development of Cerebral Vasospasm** SB³C2016-865
Eric S. Hald, Zaw Win, Justin Buksa, Connor Timm, Patrick W. Alford, *Biomedical Engineering, University of Minnesota, Minneapolis, MN, United States*
- 78 **Biomechanical Evaluation of Gelatin/Fibrinogen Electrospun Cylindrical Scaffolds Seeded with 3T3 Mouse Fibroblasts and Porcine Smooth Muscle Cells** SB³C2016-1064
Ehab Tamimi¹, Jamie L. Hernandez², Corina MacIsaac², Catalina Ardila¹, Jonathan P. Vande Geest³, ¹Graduate Interdisciplinary Program of Biomedical Engineering, University of Arizona, Tucson, AZ, United States, ²Biomedical Engineering, University of Arizona, Tucson, AZ, United States, ³Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States
- 79 **Quantify Patient-specific Coronary Vessel Material Property and Its Impact on Plaque Stress/strain Calculations Using Cine Ivus and 3D Fsi Models** SB³C2016-644
Xiaoya Guo¹, Jian Zhu², Liang Wang³, Akiko Maehara⁴, Jie Zheng⁵, Chun Yang⁶, David Muccigrosso⁵, Gary S. Mintz⁴, Dalin Tang³, ¹Southeast University, Nanjing, China, ²Zhongda Hospital, Southeast University, Nanjing, China, ³Worcester Polytechnic Institute, Worcester, MA, United States, ⁴Columbia University, New York, NY, United States, ⁵Washington University, St. Louis, MO, United States, ⁶China United Network Comm. Co. Ltd., Beijing, China
- 80 **Modeling Active Contraction of Left Ventricle Using Different Zero-load Diastole and Systole Geometries** SB³C2016-54
Longling Fan¹, Jing Yao², Chun Yang³, Di Xu², Dalin Tang⁴, ¹Southeast University, Nanjing, China, ²First Affiliated Hospital of Nanjing Medical University, Nanjing, China, ³China Information Tech. Designing & Consulting Institute Co., Ltd., Beijing, China, ⁴Math Sciences Department Worcester Polytechnic Institute, Worcester, MA, United States
- 81 **A Model to Determine the Effect of Axial Stretch on Lumen Collapse of Arteries** SB³C2016-857
Fateme Far, Hai Chao Han, *Mechanical Engineering, University of Texas at San Antonio, San Antonio, TX, United States*
- 82 **Inhomogeneity of the Material Properties of Thoracic Aorta in Three Dimensions** SB³C2016-1033
Golriz Kermani, Ali Hemmasizadeh, Soroush Assari, Michael Autieri, Kurosh Darvish, *Temple University, Philadelphia, PA, United States*
- 83 **Mechanics of Heart Tube Formation in Chick Embryo** SB³C2016-65
Hadi S. Hosseini¹, Larry A. Taber², ¹BME/Physics, Washington University in Saint Louis, Saint Louis, MO, United States, ²BME, Washington University in Saint Louis, Saint Louis, MO, United States
- 84 **Myocardial Wall Stiffening in a Mouse Model of Persistent Truncus Arteriosus** SB³C2016-1061
Christine Miller Buffinton¹, Kerra R. Mercon¹, Alyssa K. Benjamin², Asena Abay³, Elise M. Buffinton⁴, Roberta K. Blaho³, Ashley N. Firment⁵, Anne M. Moon⁵, ¹Mechanical Engineering, Bucknell University, Lewisburg, PA, United States, ²Biology, Bucknell University, Lewisburg, PA, United States, ³Biomedical Engineering, Bucknell University, Lewisburg, PA, United States, ⁴Civil and Environmental Engineering, Cornell University, Ithaca, NY, United States, ⁵Weis Center for Research, Geisinger Medical Center, Danville, PA, United States
- 85 **Using Patient-Specific MRI-Based Right Ventricle Models with Different Zero-Load Diastole and Systole Geometries for Better Stress and Strain Calculations and Post-Surgery Outcome Prediction** SB³C2016-29
Dalin Tang^{1,2}, Pedro del Nido³, Chun Yang^{1,4}, Heng Zuo¹, Xueying Huang^{1,5}, Rahul H. Rathod³, Alexander Tang³, Zheyang Wu¹, Kristen L. Billiar¹, Tal Geva³, ¹WPI, Worcester, MA, United States, ²Southeast University, Nanjing, China, ³Harvard Medical School, Boston, MA, United States, ⁴China Information Tech. Designing & Consulting Institute Co., Ltd, Beijing, China, ⁵Xiamen University, Xiamen, China

FRIDAY, JULY 1	1:00pm - 3:15pm
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Poster Session II**Tissue and Cellular Microenvironment****Exhibit Hall A**

- 86 **Study on the Biosolubility of Calcined Bovine Bone Scaffold for Bone Tissue Engineering** SB³C2016-1141
Shigeo Tanaka¹, Naoki Hirooka², ¹*Institute of Science and Engineering, Kanazawa University, Kanazawa, Japan,*
²*Graduate School of Natural Science and Technology, Kanazawa University, Kanazawa, Japan*
- 87 **Molecular Spectroscopic Identification of the Water Compartments in Cartilage** SB³C2016-78
Mustafa Unal, Ozan Akkus, *Case Western Reserve University, Cleveland, OH, United States*
- 88 **Modeling Calcium Transients in Human Pluripotent Stem Cell-Derived Cardiomyocytes** SB³C2016-1108
Kevin Beussman, Marita Rodriguez, Adam Rakla, Ashley Emery, Nathan Sniadecki, *Mechanical Engineering, University of Washington, Seattle, WA, United States*
- 89 **Polycaprolactone Fibrous Scaffolds to Navigate Neural Stem Cells** SB³C2016-880
Nastaran Hashemi, *Iowa State University, Ames, IA, United States*
- 90 **Effect of Shear Stress on Glucose Metabolism in Pulmonary Arterial Hypertension** SB³C2016-810
Sarah Basehore, Alisa Morss Clyne, *Biomedical Engineering, Drexel University, Philadelphia, PA, United States*
- 91 **Impact of Membrane Cholesterol in the Monocyte Adhesion Cascade** SB³C2016-714
Amit K. Saha¹, Pawel Osmulski², Anand K. Ramasubramanian¹, ¹*Biomedical Engineering, University of Texas at San Antonio, San Antonio, TX, United States,* ²*Molecular Medicine, University of Texas Health Science Center at San Antonio, San Antonio, TX, United States*
- 92 **Endothelial Cell Glycocalyx Modulates Shear-induced Tubule Formation** SB³C2016-119
Ping Zhao, Xiao Liu, Xiaoyan Deng, *School of Biological Science and Medical Engineering, Beihang University, Beijing, China*
- 93 **Decellularized Extracellular Matrix Electrospun Scaffold for a Novel Airway Smooth Muscle Model** SB³C2016-824
Bethany M. Young¹, Bryan A. Blakeney², Gretchen E. Schreyak¹, Robert A. Pouliot¹, Rebecca L. Heise¹, ¹*Biomedical Engineering, VCU, Richmond, VA, United States,* ²*Physiology and Biophysics, VCU, Richmond, VA, United States*
- 94 **Numerical Investigation of Cell Migration** SB³C2016-1126
Xiaowei Zeng, Liqiang Lin, *Mechanical Engineering, University of Texas at San Antonio, San Antonio, TX, United States*

FRIDAY, JULY 1	1:00pm - 3:15pm
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Poster Session II**Human Dynamics and Rehabilitation****Exhibit Hall A**

- 109 **Biomechanical Analysis of Kicks in Soccer and Kicks in Football** SB³C2016-617
Allison M. Gerren, Tori Breitenbach, Jacob Forstat, Jonathan Fox, Mohamed Samir Hefzy, *The University of Toledo, Toledo, OH, United States*
- 110 **Assessing Kinematics and Kinetics of FES-rowing** SB³C2016-897
Adina Draghici¹, Glen Picard², J. Andrew Taylor^{2,3}, Sandra Shefelbine^{1,4}, ¹*Bioengineering, Northeastern University, Boston, MA, United States,* ²*Cardiovascular Research Laboratory, Spaulding Rehabilitation Hospital, Boston, MA, United States,* ³*Physical Medicine and Rehabilitation, Harvard Medical School, Boston, MA, United States,* ⁴*Mechanical and Industrial Engineering, Northeastern University, Boston, MA, United States*
- 111 **Utilizing Bandwidth to Quantify Human Torso Motor Control Capability** SB³C2016-915
Shahab Karimi¹, Martin L. Tanaka¹, N. Peter Reeves², Sudhir Kaul¹, ¹*Engineering and Technology, Western Carolina University, Cullowhee, NC, United States,* ²*Osteopathic Surgical Specialty, Michigan State University, East Lansing, MI, United States*
- 112 **Building a Better Quarterback: Using Biomechanics to Optimize Throwing Mechanics** SB³C2016-1127
Hunter Storaci¹, Andrew Robbins¹, Michael R. Moreno^{1,2}, ¹*Biomedical Engineering, Texas A&M University, College Station, TX, United States,* ²*Mechanical Engineering, Texas A&M University, College Station, TX, United States*

- 113 **Design of an Affordable Outdoor Add-on to a Manual Wheelchair for Developing Countries** SB³C2016-645
Swostik Dash, Vivek Sarda, Ashish Sharma, **S. Sujatha**, *Mechanical Engineering, Indian Institute of Technology Madras, Chennai, India*
- 114 **Relationship Between Force Applied & Velocity of Contraction of Air Muscles.** SB³C2016-1122
Aniruddha Phatak, *Rochester Institute of Technology, Rochester, NY, United States*
- 115 **Comparison of Humeral Head Osteotomy using Anatomic and Guide-Assisted Cuts** SB³C2016-1070
Emily A. West^{1,2,3}, Nikolas K. Knowles^{1,2,3}, Louis M. Ferreira^{1,2,3}, George S. Athwal², *¹Biomedical Engineering, Western University, London, ON, Canada, ²Roth|McFarlane Hand and Upper Limb Center, London, ON, Canada, ³Lawson Health Research Institute, London, ON, Canada*
- 116 **A Testing Protocol for Evaluating and Classifying Spinal Orthoses** SB³C2016-76
Denis J. DiAngelo, John C. Simmons, Daniel M. Wido, *Orthopaedic Surgery and Biomedical Engineering, The University of Tennessee Health Science Center, Memphis, TN, United States*
- 117 **A Novel Distractive and Mobility-Enabling Lumbar Spinal Orthosis** SB³C2016-733
Daniel C. Hillyard, **Denis J. DiAngelo**, *Department of Orthopaedic Surgery and Biomedical Engineering, The University of Tennessee Health Science Center, Memphis, TN, United States*
- 118 **The Biomechanical Effects of Strap Options on Scoliosis Bracing Mechanics** SB³C2016-965
Chloe L. Chung¹, Derek M. Kelly², Jack R. Steele³, **Denis J. DiAngelo**¹, *¹The Department of Orthopaedic Surgery and Biomedical Engineering, The University of Tennessee Health Science Center, Memphis, TN, United States, ²The Department of Orthopaedics, Campbell Clinic Orthopaedics and Le Bonheur Children's Hospital, Memphis, TN, United States, ³Center for Orthotics and Prosthetics, Inc., Memphis, TN, United States*
- 119 **A.R.K. Brace: and Active Rehabilitation Knee Brace** SB³C2016-859
Jarrel Bobb¹, Kelly Chickering², **Patrick Donohue**², Mac Gallagher³, Shannon Hartzell⁴, Cole Lipman², M. Jake Miorin², Kailan Ottaway², Alexander A. Brown², *¹Biology, Lafayette College, Easton, PA, United States, ²Mechanical Engineering, Lafayette College, Easton, PA, United States, ³Economics, Lafayette College, Easton, PA, United States, ⁴Neuroscience, Lafayette College, Easton, PA, United States*
- 120 **Cable Actuated 3D Printed Exoskeleton: for Restoration of Hand Motor Function in Stroke Affected Patients** SB³C2016-616
Aaron J. Brice¹, Muxi Li¹, Stéphane Magnan¹, Jin Wang¹, Tyler Friesen¹, Yongsheng Ma², Ahmed Qureshi², Jonathon Schofield², *¹Mechanical Engineering, University of Alberta, Edmonton, AB, Canada, ²Mechanical Engineering, University of Alberta, Spruce Grove, AB, Canada*

FRIDAY, JULY 1**1:00pm - 3:15pm****Poster Session II****Best Practices in Contemporary Biomechanical Engineering Education****Exhibit Hall A**

- 121 **Enhancing Biomechanical Engineering Education Through Problem Based Learning** SB³C2016-1104
Alisa Morss Clyne, *Drexel University, Philadelphia, PA, United States*
- 122 **Project-based Biomechanics Laboratories: Theory and Practice** SB³C2016-1038
Kristen L. Billiar, Glenn R. Gaudette, *Biomedical Engineering, Worcester Polytechnic Institute, Worcester, MA, United States*
- 123 **Utilizing Problem-Based Learning to Teach Biomedical Engineering as a Chemical Engineering Elective** SB³C2016-684
Victor Lai, *Chemical Engineering, University of Minnesota - Duluth, Duluth, MN, United States*
- 124 **A Master of Engineering in Design and Commercialization** SB³C2016-673
Alan Eberhardt, Brandon Kirkland, Ophelia Johnson, Joel Dobbs, Lee Moradi, *UAB, Birmingham, AL, United States*
- 125 **"Contemporary Issues in ... Bioengineering": A New Required Course Addressing Several Curricular Concerns** SB³C2016-826
Steven W. Day, Robert J. Stevens, *Rochester Institute of Technology, Rochester, NY, United States*

SCIENTIFIC SESSIONS

- 126 **Recruiting and Supporting Transfer students to Mechanical Engineering Program at UMBC** SB³C2016-23
Liang Zhu¹, Dwayne Arola², Anne Spence¹, Carlos Romero-Talamas¹, Charles Eggleton¹, ¹*Mechanical Engineering, University of Maryland Baltimore County, Baltimore, MD, United States*, ²*Materials Science and Engineering, University of Washington, Seattle, WA, United States*
- 127 **Experiences with Introducing STEM Clubs to K-12 Students: Perils, Pitfalls, and Pearls of Wisdom?** SB³C2016-821
Ferris Pfeiffer, *Bioengineering/Orthopaedic Surgery, University of Missouri, Columbia, MO, United States*
- 128 **Audio Response System for Active Learning in a Large Lecture Class** SB³C2016-61
Craig J. Goergen, *Biomedical Engineering, Purdue University, West Lafayette, IN, United States*

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- Poster Session II** **Cardiovascular Fluid Mechanics** **Exhibit Hall A**
- 154 **Hemodynamic Modifications and its Association with Outcome in Intracranial Aneurysms Treated using Flow Diverters** SB³C2016-798
Nikhil Paliwal¹, Jason Davies², Adnan H. Siddiqui², Hui Meng¹, ¹*Mechanical and Aerospace Engineering, University at Buffalo, the State University of New York, Buffalo, NY, United States*, ²*Neurosurgery, University at Buffalo, the State University of New York, Buffalo, NY, United States*
- 155 **Flow Diverting Characteristics of Endoluminal and Intracardiac Devices: A Comparison** SB³C2016-143
Fernando Mut¹, Pedro Lylyk², David Kallmes³, Juan Cebal¹, ¹*Bioengineering, George Mason University, Fairfax, VA, United States*, ²*Interventional Neuroradiology, Instituto Clinico ENERI, Buenos Aires, Argentina*, ³*Radiology, Mayo Clinic, Rochester, MN, United States*
- 156 **Computational Modeling of Coiled Cerebral Aneurysms: Comparing Homogeneous Porous Medium Against Micro-CT Reconstructed Coil Volume in Aneurysmal Sac Hemodynamics** SB³C2016-1029
Michael C. Barbour¹, Patrick McGah¹, Christian Geindreau², Sabine Rolland du Roscoat², Kurt Sansom¹, Venkat Keshav Chivukula¹, Ryan P. Morton³, John D. Nerva³, Basavaraj V. Ghodke⁴, Laligam N. Sekhar³, Michael R. Levitt³, Louis J. Kim³, Alberto Aliseda¹, ¹*Mechanical Engineering, University of Washington, Seattle, WA, United States*, ²*SR Universite Grenoble Alps, Grenoble, France*, ³*Neurological Surgery, University of Washington, Seattle, WA, United States*, ⁴*Radiology, Harborview Medical Center, Seattle, WA, United States*
- 157 **Numerical Modeling of Flow Diverter Stent in Giant Cerebral Aneurysm** SB³C2016-771
Augusto F. Sanches, Eva Gutheil, *University of Heidelberg, Heidelberg, Germany*
- 158 **The Quantification of Blood Flow Patterns Induced by Endovascular Stent Grafts: An Experimental Investigation of The Effects of Oversizing and Compliance** SB³C2016-867
Amanda Colella Centazzo, *Mechanical Engineering, Dalhousie University, Halifax, NS, Canada*
- 159 **The Quantification of Blood Flow Patterns Induced by Endovascular Stent Grafts: An Experimental Investigation of the Effects of Oversizing and Compliance** SB³C2016-1013
Amanda Colella-Centazzo, **Clifton R. Johnston**, *Mechanical Engineering, Dalhousie University, Halifax, NS, Canada*
- 160 **A Preliminary Study to Determine If Arteriovenous Fistula Configuration Generates Helical Flow and If Helical Flow is A Surrogate Marker of Exposure to Disturbed Shear** SB³C2016-871
Connor V. Cunnane¹, Leonard D. Browne¹, Stephen P. Broderick¹, Craig Dunlop², Graeme J. Houston³, Michael T. Walsh¹, ¹*Mechanical Aeronautical and Biomedical Engineering Department, University of Limerick, Limerick, Ireland*, ²*Vascular Flow Technologies, Dundee, United Kingdom*, ³*Cardiovascular and Diabetes Medicine, University of Dundee, Dundee, United Kingdom*
- 161 **A Real-Time Programmable Pulsatile Flow Pump for In-Vitro Cardiovascular Experimentation** SB³C2016-998
Rahul Raj Mechoor, Tyler M. Schmidt, Ethan O. Kung, *Mechanical Engineering, Clemson University, Clemson, SC, United States*

- 162 **Evaluation of Pulsatile and Continuous Flow Ventricular Assist Device Implementation in the Single-Ventricle Circulation: A Lumped-Parameter Modeling Study** SB³C2016-672
Tyler M. Schmidt¹, David N. Rosenthal², Olaf Reinhartz², Alison L. Marsden³, Ethan O. Kung¹, The Modeling of Congenital Hearts Alliance (MOCHA) Investigators⁴, ¹*Department of Mechanical Engineering, Clemson University, Clemson, SC, United States*, ²*School of Medicine, Stanford University, Stanford, CA, United States*, ³*Department of Pediatrics, Stanford University, Stanford, CA, United States*, ⁴*Institute of Cardiovascular Sciences, University College London, London, United Kingdom*
- 163 **Apical Inflow Cannula Angle and Left Ventricular Size Impact LVAD Thrombosis Risk** SB³C2016-836
Venkat Keshav Chivukula¹, Patrick McGah¹, Anthony R. Prisco², Jennifer A. Beckman³, Guilherme J. M. Garcia², Claudius Mahr³, Alberto Aliseda¹, ¹*Mechanical Engineering, University of Washington, Seattle, WA, United States*, ²*Biotechnology and Bioengineering Center, Medical College of Wisconsin, Milwaukee, WI, United States*, ³*Division of Cardiology, University of Washington, Seattle, WA, United States*
- 164 **Native Cardiac Output and Surgical Implantation Configuration May Influence LVAD Thrombosis Risk** SB³C2016-838
Venkat Keshav Chivukula¹, Patrick McGah¹, Anthony Prisco², Jennifer Beckman³, Guilherme Garcia², Claudius Mahr³, Alberto Aliseda¹, ¹*Mechanical Engineering, University of Washington, Seattle, WA, United States*, ²*Biotechnology and Bioengineering Center, Medical College of Wisconsin, Milwaukee, WI, United States*, ³*Division of Cardiology, University of Washington, Seattle, WA, United States*

FRIDAY, JULY 1

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Poster Session II

Respiratory

Exhibit Hall A

- 165 **Acoustic Visualisation of Flow-Sound in the Respiratory Airway** SB³C2016-1001
Gabriel Pramudita Saputra¹, Kazunori Nozaki², Satoshi Ii¹, Chizu Habukawa³, Shigeo Wada¹, ¹*Department of Biomechanical Science and Engineering, Graduate School of Engineering Science Osaka University, Osaka, Japan*, ²*Division of Dental Informatics, Osaka University Dental Hospital, Osaka, Japan*, ³*Department of Pediatrics, Minami Wakayama Medical Center, Wakayama, Japan*
- 168 **Influence of Standardization of Airway Geometry on Airflow and Particle Transport** SB³C2016-169
Toshihiro Sera¹, Hiroaki Kuninaga², Kazuaki Fukasaku³, Hideo Yokota³, Masao Tanaka², ¹*Kyushu Univ., Fukuoka, Japan*, ²*Osaka Univ., Toyonaka, Japan*, ³*RIKEN, Wako, Japan*
- 169 **Investigating Force Transfer During Parturition Using Experimental and Computational Methods** SB³C2016-599
Alexa Baumer¹, Roseanna Pealatore², Lisa J. Fauci², Megan C. Leftwich¹, ¹*The George Washington University, Washington, DC, United States*, ²*Tulane University, New Orleans, LA, United States*
- 170 **A Mathematical Model of Vitreoschisis** SB³C2016-692
Krystyna Isakova¹, Jan Oscar Pralits², Outi-Leena Tammisola¹, Rodolfo Repetto², ¹*Faculty of Engineering, University of Nottingham, Nottingham, United Kingdom*, ²*Department of Civil, Chemical and Environmental Engineering, University of Genoa, Genoa, Italy*
- 171 **Digital Manufacturing and In Silico Modeling for Rational Design of Drug Delivery to the Central Nervous System** SB³C2016-953
Kevin Tangen¹, Ted Gabor², Lu Lu², Yayue Pan², Narasimhan Sriram¹, Andreas Linninger^{1,3}, ¹*Bioengineering, University of Illinois at Chicago, Chicago, IL, United States*, ²*Mechanical Engineering, University of Illinois at Chicago, Chicago, IL, United States*, ³*Neurosurgery, University of Illinois at Chicago, Chicago, IL, United States*
- 172 **Integration of a Baroreflex Model into a Whole Body Physiology Engine** SB³C2016-888
Rachel B. Clipp, M. Cameron Thames, Jeffrey B. Webb, Rodney Metoyer, Zachary M. Swarm, Aaron M. Bray, *Applied Research Associates, Inc, Raleigh, NC, United States*

FRIDAY, JULY 1**1:00pm - 3:15pm****Poster Session II****Respiratory and Others Fluid Mechanics****Exhibit Hall A**

- 173 **Aortic Regurgitation on Left Ventricular Diastolic Flow** SB³C2016-643
Ikechukwu (Ikay) Okafor¹, Vrishank Raghav¹, Gautam Kumar², Ajit Yoganathan¹, ¹Georgia Institute of Technology, Atlanta, GA, United States, ²Emory University, Atlanta, GA, United States
- 174 **Computational Fluid Flow Modeling of a Pulmonary Vascular Phantom with Experimental Validation** SB³C2016-66
Alifer D. Bordonas^{1,2}, Matthew Leroux^{1,2}, Vitaly O. Kheyfets³, Ender A. Finol¹, ¹Biomedical Engineering, University of Texas at San Antonio, San Antonio, TX, United States, ²Graduate Program in Biomedical Engineering, University of Texas Health Science Center at San Antonio, San Antonio, TX, United States, ³Bioengineering, University of Colorado Denver, Denver, CO, United States
- 175 **Similarities and Differences Between Flow Mode of a Leukocyte and Circulating Tumor Cell in Microvessels** SB³C2016-742
Naoki Takeishi¹, Yohsuke Imai², Takami Yamaguchi¹, Takuji Ishikawa², ¹Graduate School of Biomedical Engineering, Tohoku University, Sendai, Japan, ²Division of Mechanical Engineering, Tohoku University, Sendai, Japan
- 176 **Subject Specific Simulation of Entire Cerebral Arterial Tree: Implementation of Automatic Parametric Mesh Generation.** SB³C2016-171
Mahsa Ghaffari¹, Ben C. Schneller¹, Ali Alaraj², Andreas A. Linninger¹, ¹Bioengineering, University of Illinois at Chicago, Chicago, IL, United States, ²Department of Neurosurgery, University of Illinois at Chicago, Chicago, IL, United States
- 177 **Hemodynamic Analysis on Correlations between Bicuspid Aortic Valve and Aneurysm Progression with an Integrated Model of Left Ventricle and Aorta** SB³C2016-1021
Takashi Fujiwara¹, Fuyou Liang², Koichi Sugimoto³, Hao Liu¹, ¹Graduate School of Engineering, Chiba University, Chiba, Japan, ²School of Naval Architecture, Ocean & Civil Engineering, Shanghai Jiao Tong University, Shanghai, China, ³Cardiovascular Surgery, Kitazato University Hospital, Kanagawa, Japan
- 178 **Porcine Small Intestinal Submucosal Valve Dynamics in the Aortic Position** SB³C2016-856
Omkar V. Mankame¹, Makensley Lordeus¹, Lilliam Valdes-Cruz², Steven Bibevski², Frank Scholl², Sarah M. Bell², Ivan Baez², Sharan Ramaswamy¹, ¹Biomedical Engineering, Florida International University, Miami, FL, United States, ²Joe DiMaggio Children's Hospital, Memorial Regional Hospital, Hollywood, FL, United States
- 179 **Comparison of Pediatric and Adult Blood Viscoelasticity** SB³C2016-88
M Keith Sharp¹, Mary E. Gregg¹, Guy Brock², George M. Pantalos¹, ¹University of Louisville, Louisville, KY, United States, ²Ohio State University, Columbus, OH, United States
- 180 **Understanding the Fluid Mechanics of Aortic Regurgitation** SB³C2016-650
Samantha Houser¹, Ikechukwu Okafor², Vrishank Raghav¹, Ajit Yoganathan¹, ¹Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA, United States, ²School of Chemical and Biomolecular Engineering, Georgia Institute of Technology, Atlanta, GA, United States
- 181 **Abnormal Characteristics of Blood Flow in Human Left Atrium with Prior History of Embolic Stroke: Computational Fluid Dynamics Study** SB³C2016-659
Tomohiro Otani¹, Shigeo Wada¹, Hiroshi Ashikaga², ¹Mechanical Science & Bioengineering, Osaka University, Toyonaka, Japan, ²School of Medicine, Johns Hopkins University, Baltimore, MD, United States
- 182 **Computational Modeling of Embolus Migration in the Human Inferior Vena Cava** SB³C2016-55
Kenneth I. Aycock¹, Robert L. Campbell², Brent A. Craven³, Keefe B. Manning¹, ¹Biomedical Engineering, The Pennsylvania State University, State College, PA, United States, ²Mechanical and Nuclear Engineering, The Pennsylvania State University, State College, PA, United States, ³Center for Devices and Radiological Health, U.S. Food and Drug Administration, State College, PA, United States
- 183 **Shear Dependent Sickle Red Blood Cell Adhesion in Shear Gradient Hele Shaw Flow** SB³C2016-647
Erdem Kucukal, Umut A. Gurkan, Mechanical and Aerospace Engineering, Case Western Reserve University, Cleveland, OH, United States
- 184 **Velocity-Dilatation Formulation for Computational Fluid Dynamics in FEBio** SB³C2016-788
Gerard A. Ateshian¹, Jay J. Shim¹, Steve Maas², Jeffrey A. Weiss², ¹Mechanical Engineering, Columbia University, New York, NY, United States, ²Bioengineering, University of Utah, Salt Lake City, UT, United States

- 185 **Production of Monodisperse Silica Gel Microspheres for Bioencapsulation by Extrusion Into An Oil Crossflow** SB³C2016-653
Joey Benson¹, Lawrence Wackett^{2,3}, Alptekin Aksan^{1,3}, ¹*Department of Mechanical Engineering, University of Minnesota, Minneapolis, MN, United States*, ²*Department of Biochemistry, Molecular Biology and Biophysics, University of Minnesota, Minneapolis, MN, United States*, ³*BioTechnology Institute, University of Minnesota, St Paul, MN, United States*
- 186 **Bacterial Growth Inside Reversible Ca-alginate Beads Encapsulated in a Thin Silica Film** SB³C2016-853
Goeun Heo¹, Jonathan K. Sakkos¹, Sujin Yeom², Lawrence P. Wackett^{2,3}, Alptekin Aksan^{1,3}, ¹*Mechanical Engineering, University of Minnesota, Minneapolis, MN, United States*, ²*Biochemistry, Molecular Biology, and Biophysics, University of Minnesota, Minneapolis, MN, United States*, ³*Biotechnology Institute, St Paul, MN, United States*
- 187 **Microbial Regeneration of Adsorbent Silica Gel for Sustainable Treatment of Environmental Pollutants** SB³C2016-608
Jonathan Sakkos¹, Lawrence P. Wackett², Alptekin Aksan¹, ¹*Mechanical Engineering, University of Minnesota, Minneapolis, MN, United States*, ²*Biochemistry, Molecular Biology, and Biophysics, University of Minnesota, Minneapolis, MN, United States*

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Poster Session II**Bone Mechanics****Exhibit Hall A**

- 221 **Evaluation of BioDent Reference Point Indentation (RPI) Platform to Measure the Elastic Modulus in Mouse Bones** SB³C2016-795
Ganesh Thiagarajan, *Civil and Mechanical Engineering, University of Missouri Kansas City, Kansas City, MO, United States*
- 222 **Effects of Body Weight Supported Treadmill Training on Bone and Muscle Following Spinal Cord Injury** SB³C2016-910
Anita Singh¹, Bridgette Saverine¹, Gabrielle Gehron¹, Brittany King², Shania Shaji¹, Jennifer Kadlowec², ¹*Widener University, Chester, PA, United States*, ²*Rowan University, Glassboro, NJ, United States*
- 223 **Orientation Dependent Strain Characterization of the Ultrastructure In Bone** SB³C2016-1136
Jitin S. Samuel, Xiaodu Wang, *University of Texas at San Antonio, San Antonio, TX, United States*
- 224 **A Coupled Reaction-Diffusion-Strain Model for Bone Growth in the Cranial Vault** SB³C2016-931
Chanyoung Lee, Reuben H. Kraft, *Department of Mechanical and Nuclear Engineering, Pennsylvania State University, University Park, PA, United States*
- 225 **Modeling Bone Formation with a Lab-on-a-Chip Platform** SB³C2016-63
Marnie M. Saunders, Spencer L. York, Estee L. George, Erica L. Grutkowski, Jennifer L. Smith, *Biomedical Engineering, The University of Akron, Akron, OH, United States*
- 226 **A Cellular Automata Model Verifying Osteoblastic Bone Formation In Vitro** SB³C2016-42
Estee L. George¹, Flora F. Opoku Asantewaa², Gabrielle K. Van Scoy², Alicia Prieto-Langarica², Marnie M. Saunders¹, ¹*The University of Akron, Akron, OH, United States*, ²*Youngstown State University, Youngstown, OH, United States*

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Poster Session II**Growth, Remodeling and Repair****Exhibit Hall A**

- 245 **Acceleration of Critical Bone Defect Healing by Ultrasound Radiation Force in a Rat Tibial Model** SB³C2016-949
Yi-Xian Qin, Jingbo Liu, Tony Zhang, Xiaofei Li, *Biomedical Engineering, Stony Brook University, Stony Brook, NY, United States*

- 246 **A Novel Structural Constitutive Model for Passive Right Ventricular Myocardium: Toward An Understanding of Remodeling During Pulmonary Hypertension** SB³C2016-137
Reza Avazmohammadi, Michael S. Sacks, *Institute for Computational Engineering and Sciences, The University of Texas at Austin, Austin, TX, United States*
- 247 **Experimental Validation of a Subject-Specific Anisotropic Model of the Rotator Cuff to Predict Tear Propagation** SB³C2016-820
R. Matthew Miller¹, James Thunes¹, Volker Musahl², Spandan Maiti¹, Richard E. Debski¹, *¹Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States, ²Orthopaedic Surgery, University of Pittsburgh, Pittsburgh, PA, United States*
- 248 **Kinematic Evidence of Ring Apophysis Fracture During Cyclic Loading Typical of ADLs** SB³C2016-623
Nicole C. Corbiere¹, Stacey L. Zeigler², Kathleen A. Issen¹, Arthur J. Michalek¹, Laurel Kuxhaus¹, *¹Mechanical and Aeronautical Engineering, Clarkson University, Potsdam, NY, United States, ²Physical Therapy, Clarkson University, Potsdam, NY, United States*
- 249 **Effective Remodeling of Wall Content in Cerebral Aneurysms** SB³C2016-1028
Xinjie Duan, *Mechanical Engineering and Material Science, University of Pittsburgh, Pittsburgh, PA, United States*
- 250 **Modeling Soft Tissue Damage and Failure Using a Hybrid Particle/Continuum Approach** SB³C2016-71
Manuel K. Rausch¹, George E. Karniadakis², Jay D. Humphrey¹, *¹Biomedical Engineering, Yale University, New Haven, CT, United States, ²Applied Mathematics, Brown University, Providence, RI, United States*
- 251 **Temporal Healing Response of Achilles Tendons in Rodents Following Injury Depends on Surgical Treatment and Return to Activity Time** SB³C2016-84
Benjamin R. Freedman, Tyler R. Morris, Nabeel S. Salka, Joshua A. Gordon, Adam M. Pardes, Corinne N. Riggan, Courtney A. Nuss, Jennica J. Tucker, Pankti R. Bhatt, George W. Fryhofer, Daniel C. Farber, Louis J. Soslowsky, *McKay Orthopaedic Research Laboratory, University of Pennsylvania, Philadelphia, PA, United States*
- 252 **A Theoretical Evaluation of Potential Strategies for Enhancing Cellular Anabolism in the Extracellular Matrix of the Intervertebral Disc** SB³C2016-98
Shihab Asfour¹, Juan Pablo de Rivero Vaccari², **Francesco Travascio**¹, *¹Industrial Engineering, University of Miami, Coral Gables, FL, United States, ²Neurosurgery, University of Miami, Miami, FL, United States*
- 253 **In-Vitro Model of Healing Ligament** SB³C2016-727
Stephanie M. F. Tuft, Julia T. Oxford, Erica E. Morrill, Raquel J. Brown, Trevor J. Lujan, *Biology, and Mechanical and Biomedical Engineering, Boise State University, Boise, ID, United States*
- 254 **Adipose-derived Mesenchymal Stem Cells Stimulate Elastin Production by Adult Human Smooth Muscle Cells in a 3D Fibrin Scaffold** SB³C2016-1119
Kory Blose, Justin Weinbaum, David Vorp, *Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*
- 255 **Effect of Three Dimensional Spheroid Culture on Bipotent Murine Liver Progenitor Cells** SB³C2016-165
Kenichiro Nishii, Erik Brodin, Taylor Renshaw, Rachael Weesner, **Jessica L. Sparks**, *Miami University, Oxford, OH, United States*
- 256 **Does Tissue Architecture Matter to Bulk Mechanics? Scrambled Embryos Suggest Not.** SB³C2016-862
Joseph H. Shawky, Lance A. Davidson, *Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*
- 257 **Urinary Bladder Structure Remodeling Study with Multiphoton Imaging** SB³C2016-1030
Fangzhou Cheng¹, Jack Hornsby², Donna Daly³, Florenta Kullmann¹, Lori Birder¹, Anne Robertson¹, Mark Thompson², Paul Watton³, *¹University of Pittsburgh, Pittsburgh, PA, United States, ²University of Oxford, Oxford, United Kingdom, ³University of Sheffield, Sheffield, United Kingdom*

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Poster Session II

Musculoskeletal Soft Tissue Mechanics

Exhibit Hall A

- 279 **The Contribution of Articular Cartilage Focal Defect Size and Location on Whole Knee Computational Models** SB³C2016-64
Benjamin C. Marchi, Rhima Coleman, Ellen M. Arruda, *Mechanical Engineering, University of Michigan, Ann Arbor, MI, United States*
- 280 **Determining the Relationship Between the Biomechanical and Biochemical Properties of Articular Cartilage Utilizing An Artificial Neural Network** SB³C2016-903
Joe T. Rexwinkle¹, Ferris Pfeiffer², Nikki Werner³, Aaron M. Stoker³, ¹*Mechanical Engineering, University of Missouri, Columbia, MO, United States*, ²*Bioengineering/Orthopaedic Surgery, University of Missouri, Columbia, MO, United States*, ³*Veterinary Medicine, University of Missouri, Columbia, MO, United States*
- 281 **Mechanical Properties of the Growth Plate in a Rat Model of Obesity** SB³C2016-926
Patrick Estep¹, Moriah Smoot², Shawn Gilbert¹, Alan Eberhardt¹, ¹*UAB, Birmingham, AL, United States*, ²*University of Alabama, Tuscaloosa, AL, United States*
- 282 **The Dynamics of Proteoglycan Loss in Articular Cartilage Following Mechanical Perturbation** SB³C2016-667
Lorenza Henao Murillo, Keita Ito, Corrinus C. van Donkelaar, *Biomedical Engineering, Eindhoven University of Technology, Eindhoven, Netherlands*
- 283 **Tribological Rehydration 2: Insights into the Mechanics of Cartilage Recovery** SB³C2016-163
David L. Burris¹, Axel Moore², ¹*Mechanical Engineering, University of Delaware, Newark, DE, United States*, ²*Biomedical Engineering, University of Delaware, Newark, DE, United States*
- 284 **Smoking and Smoking Cessation: Implications on the Degeneration of the Intervertebral Disc** SB³C2016-741
Shady Elmasry¹, Shihab Asfour¹, Juan Pablo de Rivero Vaccari², Francesco Travascio¹, ¹*Industrial Engineering, University of Miami, Coral Gables, FL, United States*, ²*Neurological Surgery, University of Miami, Miami, FL, United States*
- 285 **Biomechanics of Muscle Tendon Junction and Tendon Bone Insertions** SB³C2016-1073
Sandhya Chandrasekaran, Ashley Saltzman, HY Shadow Huang, *NC State, Raleigh, NC, United States*
- 286 **The Effect of Ligament Stiffness on Shoulder Cartilage Pressure and Kinematics** SB³C2016-844
Hafizur Rahman, Mariana E. Kersh, *Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, United States*
- 287 **Anterior Cruciate Ligament Femoral Enthesal Shape and Insertion Angle are Risk Factors for Injury** SB³C2016-160
Callan M. L. Luetkemeyer, Ellen M. Arruda, *Mechanical Engineering, University of Michigan, Ann Arbor, MI, United States*
- 288 **Uninjured Supraspinatus Tendons in Rodents Do Not Exhibit Different Material Properties Across Sex** SB³C2016-674
Kelsey A. Robinson, Adam M. Pardes, Benjamin R. Freedman, Louis J. Soslowsky, *Department of Orthopaedics, University of Pennsylvania, Philadelphia, PA, United States*
- 289 **Simvastatin Does Not Adversely Affect the Mechanical and Histological Properties of the Achilles Tendon in a Diet Induced Hypercholesterolemia Rat Model** SB³C2016-778
Daniel S. Choi, Jennica J. Tucker, Louis J. Soslowsky, *University of Pennsylvania, Philadelphia, PA, United States*
- 290 **The Response to Stress Deprivation Differs Between the Interfascicular and Fascicular Matrix of Tendon** SB³C2016-664
Daniel T. Rowson, Martin M. Knight, Hazel R. C. Screen, *School of Engineering and Materials Science, Institute of Bioengineering, London, United Kingdom*
- 291 **Overlap Between Anterior Cruciate Ligament and the Anterolateral Meniscal Root Insertions: A Scanning Microscopy Study** SB³C2016-105
Brett D. Steineman¹, Samuel G. Moulton², Tammy L. Haut Donahue³, Chase S. Dean², Robert F. LaPrade^{2,4}, ¹*School of Biomedical Engineering, Colorado State University, Fort Collins, CO, United States*, ²*Steadman Philippon Research Institute, Vail, CO, United States*, ³*Mechanical Engineering, Colorado State University, Fort Collins, CO, United States*, ⁴*The Steadman Clinic, Vail, CO, United States*

- 292 **Correlation of Supraspinatus Tendon Degeneration and Quantitative Ultrasound Measures** SB³C2016-710
Gerald A. Ferrer¹, R. Matthew Miller¹, Masahito Yoshida², Amir A. Rahnamai-Azar², Volker Musahl^{1,2}, Richard E. Debski^{1,2}, ¹*Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*, ²*Department of Orthopaedic Surgery, University of Pittsburgh, Pittsburgh, PA, United States*
- 293 **Energy Storing and Positional Human Tendons: Mechanics and Changes with Ageing** SB³C2016-81
Dharmesh Patel¹, Ewa M. Spiesz¹, Chavaunne T. Thorpe¹, Helen L. Birch², Graham P. Riley³, Peter D. Clegg⁴, Hazel R. C. Screen¹, ¹*School of Engineering and Materials Science, Queen Mary University of London, London, United Kingdom*, ²*Institute of Orthopaedics and Musculoskeletal Science, University College London, London, United Kingdom*, ³*School of Biological Sciences, University of East Anglia, Norwich, United Kingdom*, ⁴*Department of Musculoskeletal Biology, University of Liverpool, Liverpool, United Kingdom*
- 294 **Effect of Collagen Fibril Alignment on Viscoelastic Mechanical Properties of Ligament** SB³C2016-109
Erica E. Morrill¹, Christina J. Stender¹, Raquel J. Brown², Trevor J. Lujan¹, ¹*Mechanical and Biomedical Engineering, Boise State University, Boise, ID, United States*, ²*Biomolecular Research Center, Boise State University, Boise, ID, United States*
- 295 **Sex Differences in Achilles Tendon Properties Three Weeks After Injury in Rats** SB³C2016-144
George W. Fryhofer, Benjamin R. Freedman, Adam M. Pardes, Cody D. Hillin, Louis J. Soslowsky, *McKay Orthopaedic Research Laboratory, University of Pennsylvania, Philadelphia, PA, United States*
- 296 **Differences Between the Mechanical and Microstructural Properties of the Human ACL and PCL** SB³C2016-628
Ryan Castile¹, Nathan Skelley², Jon Wright³, Robert Brophy², Spencer Lake¹, ¹*Mechanical Engineering, Washington University in St. Louis, St. Louis, MO, United States*, ²*Washington University in St. Louis, St. Louis, MO, United States*, ³*Beaumont Health, Royal Oak, MI, United States*
- 297 **Consequences of Meniscus Cracks in Uniaxial Tension** SB³C2016-911
John M. Peloquin¹, Julia Pezick², Pranita Muralidhar², Michael H. Santare³, Dawn M. Elliott², ¹*Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, United States*, ²*Department of Biomedical Engineering, University of Delaware, Newark, DE, United States*, ³*Department of Mechanical Engineering, University of Delaware, Newark, DE, United States*
- 298 **Effect of Age on the Mechanical Properties of the Porcine Temporomandibular Joint Disc** SB³C2016-152
Jesse Lowe, Alejandro Almarza, *Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*
- 299 **In Situ Measurements of Hydraulic Permeability in Skeletal Muscles** SB³C2016-960
Michael Schenk, Lijian Peng, Xingyu Chen, **Shaopeng Pei**, X. Lucas Lu, Liyun Wang, *University of Delaware, Newark, DE, United States*
- 300 **Muscle Volume Prediction using Anthropometric Measurements and Population Derived Statistical Models** SB³C2016-117
Shasha Yeung, Justin Fernandez, Geoffery Handsfield, Cameron Walker, Thor Besier, Ju Zhang, *Auckland Bioengineering Institute, Auckland, New Zealand*
- 301 **Probing the Transition From Compaction to Fatigue in Human Articular Cartilage Under Cyclic Loading** SB³C2016-671
Jonathan T. Kaplan^{1,2}, M. Hicham Drissi³, Corey P. Neu⁴, **David M. Pierce**¹, ¹*Mechanical Engineering/Biomedical Engineering/Mathematics, University of Connecticut, Storrs, CT, United States*, ²*Biomechanics Research and Engineering, Natick Soldier RD&E Center, Natick, MA, United States*, ³*Orthopaedic Surgery, University of Connecticut Health Center, Farmington, CT, United States*, ⁴*Mechanical Engineering, University of Colorado, Boulder, CO, United States*

FRIDAY, JULY 1

1:00pm - 3:15pm

Poster Session II

Joint and Spine Biomechanics

Exhibit Hall A

- 302 **Post-Operative Complications of Computer Assisted Total Knee Arthroplasty in Osteoporotic Femurs and Tibias: A Finite Element Study** SB³C2016-1129
Ruth Solomon¹, Andrew Sori¹, Shihab Asfour¹, Loren Latta², Ali Alhandi², Francesco Travaschio¹, ¹*Industrial Engineering, University of Miami, Coral Gables, FL, United States*, ²*Max Biedermann Institute for Biomechanics, Miami Beach, FL, United States*

- 303 **Computational Analysis on Post-Fusion Effects of Hardware Preservation of Removal on Osteoporotic Proximal Tibia Cartilage and Subchondral Bone** SB³C2016-812
Andrew Sori¹, Ruth Solomon¹, Shihab Asfour¹, Ronald Lindsey², Ali Alhandi³, Loren Latta³, Francesco Travascio¹,
¹Industrial Engineering, University of Miami, Coral Gables, FL, United States, ²Orthopaedic Surgery, University of Texas Medical Branch, Galveston, TX, United States, ³Max Biedermann Institute for Biomechanics, Miami Beach, FL, United States
- 304 **Effects of Tibiofemoral Compression on ACL Forces and Knee Kinematics Under Combined Knee Loads** SB³C2016-630
Kent T. Yamaguchi, Daniel Boguszewski, Justin Mathew, Keith Markolf, David McAllister, *Orthopedic Surgery, University of California Los Angeles, Los Angeles, CA, United States*
- 305 **Development of Clinically Relevant Constraint Measurement Using Modified Total Knee Replacement Implants** SB³C2016-956
Scott N. Anderson¹, Peter S. Walker², Ryan T. Willing¹, ¹Mechanical Engineering, Binghamton University, Binghamton, NY, United States, ²Langone Medical Center, New York University, New York, NY, United States
- 306 **Nonlinear Multifactorial Influence of Ligament Properties on Rotatory Knee Stability: Novel Application of Bayesian Sensitivity Analysis** SB³C2016-1128
 Mohammad Kia¹, Po-Hsu Chen², Thomas L. Wickiewicz³, Andrew D. Pearle³, Thomas Santner², **Carl W. Imhauser**¹,
¹Biomechanics, Hospital for Special Surgery, New York, NY, United States, ²Statistics, The Ohio State University, Columbus, OH, United States, ³Orthopaedic Surgery, Hospital for Special Surgery, New York, NY, United States
- 307 **Generating a Subject-specific Musculoskeletal Model of the Knee Using Motion Capture Data and Medical Imaging** SB³C2016-576
Mousa Kazemi, *ABI, Auckland, New Zealand*
- 308 **Evaluation of a Displacement-Driven Model for Assessing Patellofemoral Joint Contact Mechanics** SB³C2016-46
Jonathan A. Gustafson, Kyle A. Berkow, Richard E. Debski, Shawn Farrokhi, *Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*
- 309 **Toward Patient-specific Computational Model of the Knee Joint** SB³C2016-90
Hongqiang Guo¹, Thomas Santner², Amy Lerner³, Suzanne Maher¹, ¹Hospital for Special Surgery, New York, NY, United States, ²The Ohio State University, Columbus, OH, United States, ³University of Rochester, Rochester, NY, United States
- 310 **A Population Derived Mechanostatistical Model of the Human and Sheep Spine to Evaluate Spinal Fusion Implants** SB³C2016-654
Alex Swee, Vickie Shim, Justin Fernandez, *Auckland Bioengineering Institute, University of Auckland, Auckland City, New Zealand*
- 311 **Changes in Cervical Spine Intervertebral Disc Properties with Repetitive Axial Loading** SB³C2016-123
Brian D. Stemper^{1,2}, Alok S. Shah^{1,2}, Narayan Yoganandan^{1,2}, Mingxin Zheng^{3,4}, Brian Snyder^{3,4}, ¹Neurosurgery, Medical College of Wisconsin, Milwaukee, WI, United States, ²Research Service, Zablocki VA Medical Center, Milwaukee, WI, United States, ³Beth Israel Deaconess Medical Center, Boston, MA, United States, ⁴Harvard Medical School, Boston, MA, United States
- 312 **Treatment of Thoracolumbar Burst Fracture: A Biomechanical Analysis of Three Different Fixation Constructs** SB³C2016-746
Shady Elmasry¹, Shihab Asfour¹, Joseph Gjolaj², Loren Latta³, Frank Eismont², Francesco Travascio¹, ¹Industrial Engineering, University of Miami, Coral Gables, FL, United States, ²Orthopaedic Surgery, University of Miami, Miami, FL, United States, ³Max Biedermann Institute for Biomechanics, Miami Beach, FL, United States
- 313 **Detecting Osteoporotic Vertebral Compression Fractures: BMD vs. Acoustic Emission Technique** SB³C2016-908
Jihui Li¹, Thomas Mazahery¹, Ronald Childs¹, Mark Theiss¹, Melanie Pham², ¹Orthopaedics, Fairfax hospital, Falls Church, VA, United States, ²Surgery, Eastern Virginia Medical School, Norfolk, VA, United States
- 314 **Computer Simulation of Lumbar Flexion Shows In-Plane and Through-Plane Shear of the Facet Capsular Ligament** SB³C2016-22
Amy A. Claeson, Victor H. Barocas, *Biomedical Engineering, University of Minnesota, Minneapolis, MN, United States*
- 315 **Shape Optimization of Lumbar Intervertebral Cages Featuring Different Cross-Section Shapes** SB³C2016-634
Chaochao Zhou¹, Khalid Sethi², Ryan Willing¹, ¹Department of Mechanical Engineering, Binghamton University, Binghamton, NY, United States, ²Senecka Spine, Binghamton, NY, United States

- 316 **A Comparison of Normal and Osteoarthritic Humeral Head Size and Morphology** SB³C2016-17
Nikolas K. Knowles¹, Michael J. Carroll², Louis M. Ferreira¹, Jay D. Keener³, George S. Athwal², ¹*Biomedical Engineering, The University of Western Ontario, London, ON, Canada*, ²*The University of Western Ontario, London, ON, Canada*, ³*Washington University, St. Louis, MO, United States*

FRIDAY, JULY 1

1:00pm - 3:15pm

Poster Session II

Other Solid, Tissue, Cellular and Molecular
Biomechanics

Exhibit Hall A

- 317 **Evaluation of Polymeric Scaffolds Using a Vertical Layered Coextrusion for Topical Drug Delivery Applications and Comparison with Electrostatic Spinning** SB³C2016-621
Mohammad Mofidfar, Eric Baer, Gary E. Wnek, *Macromolecular Science and Engineering, CWRU, Cleveland, OH, United States*
- 318 **Synthesis and Characterization of Mesopore Forsterite Powder for Biomedical Application** SB³C2016-1053
Seyed Mehdi Mirhadi¹, **Fariborz Tavangarian**², ¹*Shahreza Branch, Islamic Azad University, Isfahan, Iran, Islamic Republic of*, ²*Morehead State University, Morehead, KY, United States*
- 319 **PLA/ PLGA-coated Chitosan Micro-implants for Sustained Release of Methotrexate to Treat Vitreo-retinal Diseases** SB³C2016-172
Soumyarwit Manna¹, Marwan F. Al-Rjoub¹, Anna Donnell², Necati Kaval², James J. Augsburger³, Zelia M. Correa³, Rupak Banerjee¹, ¹*Mechanical and Materials Engineering, University of Cincinnati, Cincinnati, OH, United States*, ²*Chemistry, University of Cincinnati, Cincinnati, OH, United States*, ³*Ophthalmology, University of Cincinnati, Cincinnati, OH, United States*
- 320 **Investigating Collagen Methacrylamide, a Photocrosslinkable, Thermoreversible, Collagen-Based Hydrogel, for Regenerative Medicine** SB³C2016-946
Kathryn E. Drzewiecki, Juilee N. Malavade, David I. Shreiber, *Biomedical Engineering, Rutgers, The State University of New Jersey, Piscataway, NJ, United States*
- 321 **Detection of SK Channels on Neuronal Axons of Skchannels on Neuronal Axons** SB³C2016-33
Krithika Abiraman, Anastasios V. Tzingounis, George Lykotrafitis, *University of Connecticut, Storrs, CT, United States*
- 322 **Emulation of Muscular Thin Film Deflection Using Thermal Contraction: Comparison of Constitutive Models** SB³C2016-813
Victoria A. Webster¹, Santiago G. Nieto², Anna Grosberg³, Ozan Akkus¹, Hillel J. Chiel⁴, Roger D. Quinn¹, ¹*Mechanical Engineering, Case Western Reserve University, Cleveland, OH, United States*, ²*Biomedical Engineering, Case Western Reserve University, Cleveland, OH, United States*, ³*Biomedical Engineering, University of California, Irvine, Irvine, CA, United States*, ⁴*Biology, Case Western Reserve University, Cleveland, OH, United States*
- 323 **Simulation of Strain Induced Damage During Delivery** SB³C2016-633
Olivier Mayeur^{1,2}, Estelle JeanDitGautier³, Pauline Lecomte^{1,2}, Jean-François Witz⁴, Chrystele Rubod^{2,3}, Michel Cosson^{2,5}, **Mathias J. Brieu**^{1,2}, ¹*MSO, Centrale Lille, Villeneuve D'Ascq, France*, ²*Lml - fre 3723, CNRS, Villeneuve d'Ascq, France*, ³*Hopital Jeanne de Flandre, CHR Lille, Lille, France*, ⁴*LML - FRE 3723, CNRS, Villeneuve D'Ascq, France*, ⁵*Hopital Jeanne de Flandre, CHR Lille, Villeneuve D'Ascq, France*
- 324 **Elastin Fiber Network in Porince Epicardium: 3D Visualzation and Quantification** SB³C2016-823
Xiaodan Shi, Bryn Brazile, David Lee, Sourav Patnaik, Jim Cooley, Raj Prabhu, Lakiesha Williams, Song Zhang, Jun Liao, *Mississippi State University, Mississippi State, MS, United States*
- 325 **Determining the Effect of Elastin Digestion on the Regional Biaxial Mechanical Properties of the Murine Cervix** SB³C2016-695
Victoria Morris, **Cassandra Conway**, Kristin Miller, *Biomedical Engineering, Tulane University, New Orleans, LA, United States*
- 326 **Viscosity is a Necessary Component of Mechanical Characterization of Biological Tissue** SB³C2016-935
Andres Rubiano¹, Daniel Delitto², Song Han¹, Steven Hughes², Chelsey S. Simmons^{1,3,4}, ¹*Mechanical and Aerospace Engineering, University of Florida, Gainesville, FL, United States*, ²*Department of Surgery, University of Florida, Gainesville, FL, United States*, ³*Biomedical Engineering, University of Florida, Gainesville, FL, United States*, ⁴*Division of Cardiovascular Medicine, University of Florida, Gainesville, FL, United States*

- 327 **Quantification and Comparison of Mechanical Properties of the Urinary Bladder Wall** SB³C2016-934
Antonella Massafra, **Sara Roccabianca**, *Mechanical Engineering, Michigan State University, East Lansing, MI, United States*
- 328 **A Mechanical Analysis of Compressible Collagen Hydrogels** SB³C2016-1135
Brooks Lane¹, Tarek Shazly^{1,2}, John Eberth^{1,3}, ¹*Biomedical Engineering, University of South Carolina, Columbia, SC, United States*, ²*Mechanical Engineering, University of South Carolina, Columbia, SC, United States*, ³*Cell Biology and Anatomy, University of South Carolina, Columbia, SC, United States*
- 329 **Stochastic Head Morphology Description for Uncertainty Quantification of TBI Prediction** SB³C2016-591
Kirubel Teferra¹, Siddiq M. Qidwai¹, Shankarjee Krishnamoorthi², ¹*Multifunctional materials branch, Code 6353, Naval Research Laboratory, Washington DC, DC, United States*, ²*NRL/ASEE Postdoctoral fellowship, Naval Research Laboratory, Washington DC, DC, United States*
- 330 **Characterization of the Failure Responses of Skin: Comparison of Uniaxial and Equibiaxial Planar Mechanics** SB³C2016-649
Samantha Schumm, Meagan Ita, Beth Winkelstein, *University of Pennsylvania, Philadelphia, PA, United States*

SATURDAY, JULY 2**11:45am - 1:15pm****Engineering the Cellular Microenvironment****Wilson B****Session Chair: Brendon Baker**, *University of Michigan, MI, United States***Session Co-Chair: Alice Huang**, *Mount Sinai School of Medicine, NY, United States*

- 11:45AM A Biomimetic Core-Shell Platform for Miniaturized 3D Cell and Tissue Engineering** SB³C2016-943
Pranay Agarwal, Jung K. Choi, Xiaoming He, *Biomedical Engineering, The Ohio State University, Columbus, OH, United States*
- 12:00PM Differentiating Stem Cells Exhibit Molecular and Microenvironmental Heterogeneity at the Single Cell Level** SB³C2016-793
Claire M. McLeod^{1,2,3}, Allison J. Cote¹, Arjun Raj¹, Robert L. Mauck^{1,2,3}, ¹*Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, United States*, ²*Translational Musculoskeletal Research Center, Philadelphia VA Medical Center, Philadelphia, PA, United States*, ³*Department of Orthopaedic Surgery, University of Pennsylvania, Philadelphia, PA, United States*
- 12:15PM Anisotropically Stiff Micropillar Substrate for Controlling Cellular Alignment and Elongation** SB³C2016-750
Yunus Alapan¹, Mousa Younesi¹, Ozan Akkus^{1,2,3}, Umut A. Gurkan^{1,2,3}, ¹*Mechanical and Aerospace Engineering Department, Case Western Reserve University, Cleveland, OH, United States*, ²*Biomedical Engineering Department, Case Western Reserve University, Cleveland, OH, United States*, ³*Orthopaedics Department, Case Western Reserve University, Cleveland, OH, United States*
- 12:30PM Non-swelling Micromolded Hydrogels Reveal That Matrix Degradability Controls Multicellularity of 3D Cell Invasion** SB³C2016-973
Brendon M. Baker¹, Britta Trappmann¹, Jason A. Burdick², Christopher S. Chen¹, ¹*Biomedical Engineering, Boston University, Boston, MA, United States*, ²*Bioengineering, University of Pennsylvania, Philadelphia, PA, United States*
- 12:45PM Schwann Cells Promote Penetration and Myelination of Regenerated Axons into Patterned Channels** SB³C2016-45
Chun Liu, **Christina Chan**, *Chemical Engineering and Materials Science, Michigan State University, East Lansing, MI, United States*
- 1:00PM Tunable and Selective Nanofiber Degradation Regulates 3D Cell Migration** SB³C2016-631
Feini Qu^{1,2}, Julianne L. Holloway^{1,2}, Jason A. Burdick^{1,2}, Robert Mauck^{1,2}, ¹*University of Pennsylvania, Philadelphia, PA, United States*, ²*Philadelphia VA Medical Center, Philadelphia, PA, United States*

SATURDAY, JULY 2**11:45am - 1:15pm****Upper and Lower Extremity Joint Mechanics****Wilson C****Session Chair:** Ken Fischer, *University of Kansas, KS, United States***Session Co-Chair:** Justin Fernandez, *The University of Auckland, New Zealand*

- 11:45AM Fibrin Glue Increases the Strength of Conduit-Assisted Digital Nerve Repairs** SB³C2016-912
Patrick J. Schimoler^{1,2}, Jessica Childe², Steven Regal², Alexander Kharlamov², Peter Tang², Mark Carl Miller^{1,2},
¹*Mechanical Engineering and Materials Science, University of Pittsburgh, Pittsburgh, PA, United States*, ²*Orthopaedic Surgery, Allegheny General Hospital, Pittsburgh, PA, United States*
- 12:00PM The Effect of Lateralizing Joint Center of Rotation of Reverse Total Shoulder Arthroplasty on Adduction Range of Motion and Initial Implant Fixation: A Finite Element Study** SB³C2016-988
Josie Elwell¹, Joseph Choi², Ryan Willing¹, ¹*Binghamton University, Binghamton, NY, United States*, ²*Guthrie Clinic, Sayre, PA, United States*
- 12:15PM Premorbid Retroversion is Significantly Greater in Type B2 Glenoids** SB³C2016-16
Nikolas K. Knowles¹, Louis M. Ferreira¹, George S. Athwal², ¹*Biomedical Engineering, The University of Western Ontario, London, ON, Canada*, ²*Surgery, The University of Western Ontario, London, ON, Canada*
- 12:30PM Novel Method for Characterizing Loading Patterns of Knee Stabilizers Yields New Insight into the Function of the Anterolateral Ligament** SB³C2016-974
Robert N. Kent¹, Thomas L. Wickiewicz², Andrew D. Pearle², Carl W. Imhauser¹, ¹*Department of Biomechanics, Hospital for Special Surgery, New York, NY, United States*, ²*Department of Orthopedic Surgery, Hospital for Special Surgery, New York, NY, United States*
- 12:45PM Effects of Proximal Tibia Anterior Closing Wedge Osteotomy on ACL Force and Knee Kinematics** SB³C2016-75
Kent T. Yamaguchi¹, Daniel V. Boguszewski¹, Edward Cheung¹, Justin Mathew², Keith Markolf¹, David McAllister¹, Frank Petrigliano¹, ¹*Orthopedic Surgery, University of California Los Angeles, Los Angeles, CA, United States*, ²*David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA, United States*
- 1:00PM Virtual Design of Modular 3D Printed Ankle Foot Orthoses** SB³C2016-661
Alessio Ielapi¹, Benedict Verheghe¹, Miguel Vermandel², Jan Patrick Deckers², Malcolm Forward³, Egle Vasiliauskaite³, Matthieu De Beule¹, ¹*IBiTech-bioMMeda, Gent University, Gent, Belgium*, ²*V!GO N.V. / S.A., Wetteren, Belgium*, ³*Gait & Movement Analysis Laboratory, University Hospital Ghent, Gent, Belgium*

SATURDAY, JULY 2**11:45am - 1:15pm****Musculoskeletal Soft Tissue: Cartilage****Wilson D****Session Chair:** Jennifer Wayne, *Virginia Commonwealth University, VA, United States***Session Co-Chair:** David M. Pierce, *University of Connecticut, CT, United States*

- 11:45AM Indispensable Roles of Decorin and Biglycan in Cartilage Mechanical Function During Maturation** SB³C2016-964
Basak Doyran¹, Qingmei Yao², Samuel J. Rozans¹, Qing Li¹, Marian F. Young³, Renato V. Iozzo⁴, David Birk², Lin Han¹, ¹*School of Biomedical Engineering, Science and Health Systems, Drexel University, Philadelphia, PA, United States*, ²*Department of Molecular Pharmacology and Physiology, University of South Florida, Tampa, FL, United States*, ³*Molecular Biology of Bones and Teeth Section, National Institutes of Health, Bethesda, MD, United States*, ⁴*Department of Pathology, Anatomy and Cell Biology, Thomas Jefferson University, Philadelphia, PA, United States*
- 12:00PM An Alternative Method to Characterize the Quasi-Static Material Properties of Murine Articular Cartilage** SB³C2016-744
Alexander Kotelsky, Chandler Woo, Mark R. Buckley, *Biomedical Engineering, University of Rochester, Rochester, NY, United States*
- 12:15PM Bisphosphonate can Rescue the Damaged Articular Cartilage in vitro** SB³C2016-70
Yilu Zhou, Mengxi Lv, Marisa Bisram, Joshua Blotnick, Liyun Wang, X. Lucas Lu, *University of Delaware, Newark, DE, United States*

- 12:30PM Tribological Rehydration I: A New Mechanism of Interstitial Fluid Recovery** SB³C2016-74
Axel Moore¹, David Burris², ¹*Biomedical Engineering, University of Delaware, Newark, DE, United States*, ²*Mechanical Engineering, University of Delaware, Newark, DE, United States*
- 12:45PM Mechanostatistical Cartilage Pellet Model to Evaluate Cartilage Growth in Scaffolds** SB³C2016-573
Christopher Miller, *Auckland Bioengineering institute, University of Auckland, Auckland, New Zealand*
- 1:00PM Shear Testing of Human Articular Cartilage: Anisotropy Apparent at Large But Not Small Shear Strains** SB³C2016-712
Franz S. Maier¹, M. Hicham Drissi², David M. Pierce¹, ¹*Mechanical Engineering/Biomedical Engineering/Mathematics, University of Connecticut, Storrs, CT, United States*, ²*Orthopaedic Surgery, University of Connecticut Health Center, Farmington, CT, United States*

SATURDAY, JULY 2**11:45am - 1:15pm****Morphogenesis, Remodeling and Repair****Annapolis 1****Session Chair:** Nandan L. Nerurkar, *Harvard Medical School, MA, United States***Session Co-Chair:** Lance Davidson, *University of Pittsburgh, PA, United States*

- 11:45AM Mechanical Regulation of Cell Behaviors During Convergent Extension of the *Xenopus laevis* Neural Plate** SB³C2016-1105
Deepthi S. Vijayraghavan, Emily E. Kieffer, Joseph H. Shawky, Lance A. Davidson, *Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*
- 12:00PM Meso-Scale Reorganization of Metabolic Brain Networks is Associated with Persistent Pain** SB³C2016-59
Megan Sperry, Sonia Kartha, Eric Granquist, Beth Winkelstein, *University of Pennsylvania, Philadelphia, PA, United States*
- 12:15PM Molecular Control of Differential Growth During Looping of the Embryonic Small Intestine** SB³C2016-832
Nandan L. Nerurkar, Cliff Tabin, *Genetics, Harvard Medical School, Boston, MA, United States*
- 12:30PM Optimization of In Vitro Endothelial Cell Self-Assembly for Millimeter Scale Vasculogenesis** SB³C2016-878
Joshua T. Morgan, Jasmine Shirazi, Erica M. Comber, Peter A. Sariano, Jason P. Gleghorn, *Biomedical Engineering, University of Delaware, Newark, DE, United States*
- 12:45PM Structural Analysis of Early Embryonic Aortic Arch Morphogenesis** SB³C2016-895
Seyedehsamaneh Lashkarinia, Senol Piskin, Selda Goktas, **Kerem Pekkan**, *Koc University, Istanbul, Turkey*
- 1:00PM The Effect of Dynamic Stimulation on Joint Morphogenesis of the Embryonic Chick Knee Joint** SB³C2016-14
Vikesh V. Chandaria, Niamh C. Nowlan, *Bioengineering, Imperial College London, London, United Kingdom*

SATURDAY, JULY 2**11:45am - 1:15pm****Pediatric Cardiology and Embryology****Annapolis 2****Session Chair:** Alison Marsden, *UC San Diego, CA, United States***Session Co-Chair:** Ethan Kung, *Clemson University, SC, United States*

- 11:45AM Quantifying Circumferential and Wall Shear Stress in a Developing Embryonic Heart Using Non-invasive Techniques** SB³C2016-893
David Bark¹, Deborah Garrity², Lakshmi Prasad Dasi¹, ¹*Mechanical Engineering, Colorado State University, Fort Collins, CO, United States*, ²*Biology, Colorado State University, Fort Collins, CO, United States*
- 12:00PM Buckling Configurations of the Extracardiac Total Cavopulmonary Conduit** SB³C2016-883
Gokce Nur Oguz¹, Senol Piskin¹, Erhan Ermek¹, Naz Altekin¹, Ahmet Arnaz², Kerem Pekkan¹, ¹*Mechanical Engineering, Koc University, Istanbul, Turkey*, ²*Cardiovascular Surgery, Acibadem Bakirköy Hospital, Istanbul, Turkey*

- 12:15PM In Vivo Measurements of Wall Shear Stress Environment in Fetus Umbilical Arteries and Veins** SB³C2016-34
Shier Nee Saw¹, Dawn Chia², Citra Nurfarah Zaini Mattar², Arijit Biswas², Choon Hwai Yap¹, ¹*Department of Biomedical Engineering, National University of Singapore, Singapore, Singapore*, ²*Department of Obstetrics and Gynecology, National University of Singapore & National University Health Systems, Singapore, Singapore*
- 12:30PM Coronary Circulation in an In Vitro Multi-scale Model of Norwood Circulation** SB³C2016-91
Lauren E. Carter, Tim Conover, Tian-qi Hang, Richard Figliola, *Mechanical Engineering, Clemson University, Clemson, SC, United States*
- 12:45PM Implementation of the Assisted Bidirectional Glenn in an Idealized Single Ventricle Model** SB³C2016-1091
Jessica K. Shang¹, Mahdi Esmaily-Moghadam², Tigran Khalapyan³, Richard Figliola⁴, Olaf Reinhartz³, Tain-Yen Hsia⁵, Alison L. Marsden¹, ¹*Pediatrics, Stanford University, Stanford, CA, United States*, ²*Center for Turbulence Research, Stanford University, Stanford, CA, United States*, ³*Cardiothoracic Surgery, Stanford University, Stanford, CA, United States*, ⁴*Mechanical Engineering, Clemson University, Clemson, SC, United States*, ⁵*Cardiothoracic Surgery, Great Ormond Street Hospital, London, United Kingdom*
- 1:00PM Computational Fluid Dynamics of Fetal Right Ventricle Based on Patient-specific Ultrasound Images** SB³C2016-85
Hadi Wiputra¹, Changquan Lai¹, R. Nivetha¹, Khong Chun Chua¹, Joel Heng¹, Guo Lan¹, Guat Ling Lim², Citra Nurfarah Zaini Mattar², Biswas Arijit², Hwa Liang Leo¹, Choon Hwai Yap¹, ¹*National University of Singapore, Singapore, Singapore*, ²*Department of Obstetrics and Gynecology, National University Hospital Systems, Singapore, Singapore*

SATURDAY, JULY 2**11:45am - 1:15pm****Rehabilitation Devices, Modeling, and Control****Azalea 2****Session Chair:** Ted Conway, *Florida Institute of Technology, FL, United States***Session Co-Chair:** Laurel Kuxhaus, *Clarkson University, NY, United States*

- 11:45AM The Synergistic Use of Haptic Feedback with an EMG Controlled Transfemoral Powered-Knee Prosthesis** SB³C2016-596
J. Miles Canino, Kevin B. Fite, *Mechanical and Aeronautical Engineering, Clarkson University, Potsdam, NY, United States*
- 12:00PM Functional Evaluation of Exoskeleton Control Strategies for Treating Crouch Gait in Cerebral Palsy** SB³C2016-816
Zachary F. Lerner, Diane L. Damiano, Thomas C. Bulea, *Rehabilitation Medicine Department, National Institutes of Health, Bethesda, MD, United States*
- 12:15PM A Methodology for the Quantification of Upper Limb Prosthetic Socket Interface Mechanics** SB³C2016-37
Jonathon S. Schofield¹, Jason P. Carey¹, Paul D. Marasco², Jacqueline S. Hebert³, ¹*Mechanical Engineering, University of Alberta, Edmonton, AB, Canada*, ²*Biomedical Engineering, Cleveland Clinic, Cleveland, OH, United States*, ³*Faculty of Medicine and Dentistry, University of Alberta, Edmonton, AB, Canada*
- 12:30PM A Mechanical Analog Model of Adolescent Idiopathic Scoliosis** SB³C2016-963
Chloe L. Chung¹, Derek M. Kelly², Jack R. Steele³, **Denis J. DiAngelo¹**, ¹*The Department of Orthopaedic Surgery and Biomedical Engineering, The University of Tennessee Health Science Center, Memphis, TN, United States*, ²*The Department of Orthopaedics, Campbell Clinic Orthopaedics and Le Bonheur Children's Hospital, Memphis, TN, United States*, ³*The Center for Orthotics and Prosthetics, Inc., Memphis, TN, United States*
- 12:45PM Mapping Hand Dysfunction: A Model for Use in Rehabilitation** SB³C2016-843
Joshua P. Drost¹, Hyokyoung Hong², Tamara Reid Bush¹, ¹*Mechanical Engineering, Michigan State University, East Lansing, MI, United States*, ²*Statistics and Probability, Michigan State University, East Lansing, MI, United States*
- 1:00PM Kinematic Evaluation of a Wearable Soft Robotic System for Continuous Passive Motion in Post Stroke Hand Rehabilitation** SB³C2016-833
Rita M. Patterson¹, Nicoleta Bugnariu², Timothy Niaccaris³, Mahdi Haghshenas-Jaryani⁴, Carrigan Wei⁴, Caleb Nothnagle⁴, Muthu Wijesundara⁵, ¹*Family Medicine and Osteopathic Manipulative Medicine, University of North Texas Health Science Center, Fort Worth, TX, United States*, ²*Physical Therapy, University of North Texas Health Science Center, Fort Worth, TX, United States*, ³*Orthopaedic Surgery, University of North Texas Health Science Center, Fort Worth, TX, United States*, ⁴*Research Institute, University of Texas At Arlington, Arlington, TX, United States*, ⁵*Osteopathic Manipulative Medicine, University of North Texas Health Science Center, Fort Worth, TX, United States*

SATURDAY, JULY 2**11:45am - 1:15pm****Hemodynamic Flows and Devices****Azalea 3****Session Chair:** Richard Figliola, *Clemson University, SC, United States***Session Co-Chair:** Brandon Dixon, *Georgia Tech, GA, United States*

- 11:45AM Computational Assessment of the Effect of Arteriovenous Graft Flow Rate on Vascular Access Hemodynamics in a Novel Modular Anastomotic Valve Device** SB³C2016-597
Andrew McNally¹, A. George Akingba², Philippe Sucosky³, ¹*University of Notre Dame, South Bend, IN, United States*, ²*Indiana University - Purdue University of Indiana, Indianapolis, IN, United States*, ³*Wright State University, Dayton, OH, United States*
- 12:00PM Effect of Transcatheter Aortic Valve Positioning on Paravalvular Leakage: A Patient-Specific Numerical Model** SB³C2016-753
Matteo Bianchi, Ram P. Ghosh, Gil Marom, Danny Bluestein, *Biomedical Engineering, Stony Brook University, Stony Brook, NY, United States*
- 12:15PM Image-Based Simulations Show Significant Flow Fluctuations in a Normal Left Ventricle.** SB³C2016-131
Christophe Chnafa¹, Simon Mendez², Franck Nicoud², ¹*Mechanical & Industrial Engineering, University of Toronto, Toronto, ON, Canada*, ²*IMAG, University of Montpellier, Montpellier, France*
- 12:30PM Hemodynamic Regulation of Tie1 in Aortic Valve Endothelial Cells** SB³C2016-756
Camryn Johnson, W. David Merryman, *Vanderbilt University, Nashville, TN, United States*
- 12:45PM Patient-Specific CFD Simulations of Intraventricular Haemodynamics Based on 3D Ultrasound Imaging.** SB³C2016-121
Alessandra M. Bavo¹, Alison M. Pouch², Joris Degroote³, Jan Vierendeels³, Joseph H. Gorman², Robert C. Gorman², Patrick Segers¹, ¹*ELIS department, Ibitech bioMMeda, Ghent University, Gent, Belgium*, ²*Gorman Cardiovascular Research Group, University of Pennsylvania, Philadelphia, PA, United States*, ³*Department of Flow, Heat and Combustion Mechanics, Ghent University, Gent, Belgium*
- 1:00PM Flap Motion and Flow Reversal Vary with Number of Tears in an In Vitro Model of Descending Thoracic Aortic Dissection** SB³C2016-683
Joav Birjiniuk¹, Lucas H. Timmins^{1,2}, Mark Young³, John N. Oshinski^{1,2}, Ravi K. Veeraswamy⁴, David N. Ku⁵, ¹*Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA, United States*, ²*Radiology, Emory University School of Medicine, Atlanta, GA, United States*, ³*Cardiac and Vascular Group, Medtronic, Inc., Santa Rosa, CA, United States*, ⁴*Division of Vascular Surgery, Department of Surgery, Emory University School of Medicine, Atlanta, GA, United States*, ⁵*Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA, United States*

SATURDAY, JULY 2**1:30pm - 3:00pm****Mechanotransduction and Sub-Cellular Biophysics****Wilson B****Session Chair:** Toshiro Ohashi, *Hokkaido University, Sapporo, Japan***Session Co-Chair:** Joel B. Boerckel, *University of Notre Dame, IN, United States*

- 1:30PM Changes in Nuclear Stiffness of Nesprin-1 Depleted Fibroblasts Exposed to Cyclic Stretching** SB³C2016-760
Naoya Sakamoto¹, Kiyomi Sadamoto², Mai Ogawa², Masaki Takeuchi², Noriyuki Kataoka³, ¹*Department of Intelligent Mechanical Systems, Tokyo Metropolitan University, Tokyo, Japan*, ²*Department of Medical Engineering, Kawasaki University of Medical Welfare, Okayama, Japan*, ³*Department of Mechanical Engineering, Nihon University, Fukushima, Japan*
- 1:45PM Deletion of Cadherin-11 Increases Smooth Muscle Actin Expression But Prevents Contraction in Valve Fibroblasts** SB³C2016-1088
Meghan Bowler, W. David Merryman, *Vanderbilt University, Nashville, TN, United States*

- 2:00PM Matrix Stiffness Enhances Vasculogenesis Through Cytoskeletal Activation of YAP and TAZ Mediated Gene Expression** SB³C2016-822
Devon E. Mason¹, Sherry L. Voytik-Harbin², Mervin C. Yoder³, Joel D. Boerckel¹, ¹*Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, IN, United States*, ²*Weldon School of Biomedical Engineering and Dept. of Basic Medical Sciences, Purdue University, West Lafayette, IN, United States*, ³*Herman B Wells Center for Pediatric Research, Indiana University School of Medicine, Indianapolis, IN, United States*
- 2:15PM Regulation of Valve Interstitial Cell Contractility and Metabolism by Mesoscale Architecture** SB³C2016-920
Ishita Tandon, Atefeh Razavi, Timothy Muldoon, Narasimhan Rajaram, Kartik Balachandran, *University of Arkansas, Fayetteville, AR, United States*
- 2:30PM Strain-rate Dependent Mechanical Responses of the Aortic Valve Interstitial Cells** SB³C2016-950
Yusuke Sakamoto¹, Rachel M. Buchanan², Johannah S. Adams³, Farshid Guilak⁴, Michael S. Sacks^{1,2}, ¹*The Institute for Computational Engineering and Sciences, The University of Texas at Austin, Austin, TX, United States*, ²*Department of Biomedical Engineering, The University of Texas at Austin, Austin, TX, United States*, ³*(2) Departments of Orthopaedic Surgery and Biomedical Engineering, Duke University, Durham, NC, United States*, ⁴*Departments of Orthopaedic Surgery, Biomedical Engineering, and Developmental Biology, Washington University, St. Louis, St. Louis, MO, United States*
- 2:45PM Myosin II Mediated Cortical Contractility Regulates Nucleus Pulposus Cell Osmotic Properties and Morphology** SB³C2016-959
Timothy Jacobsen, Paula Hernandez, Nadeen Chahine, *The Feinstein Institute for Medical Research, Manhasset, NY, United States*

SATURDAY, JULY 2**1:30pm - 3:00pm****Celebration for Vijay Goel: Spine Biomechanics****Wilson C****Session Chair: Denis DiAngelo**, *University of Tennessee, TN, United States***Session Co-Chair: Francesco Travascio**, *University of Miami, FL, United States*

- 1:30PM The Effect of Degeneration on the Six Degree of Freedom Mechanical Properties of Human Spine Segments** SB³C2016-646
John J. Costi¹, Dhara Amin¹, Dana Sommerfeld², Isaac Lawless¹, Richard Stanley¹, Boyin Ding³, ¹*School of Computer Science, Engineering and Mathematics, Flinders University, Adelaide, Australia*, ²*Institute of Biomechanics, TUHH Hamburg University, Hamburg, Germany*, ³*School of Mechanical Engineering, The University of Adelaide, Adelaide, Australia*
- 1:45PM The Resonance of the Thoracic Spine Under Whole Body Vibration is Non-Linear & Depends on Acceleration: An in Vivo Study Using a Rat Model** SB³C2016-82
Timothy Holsgrove, Martha Zeeman, William Welch, Beth Winkelstein, *University of Pennsylvania, Philadelphia, PA, United States*
- 2:00PM MRI Quantification of Human Spine Cartilage Endplate Geometry** SB³C2016-704
John DeLucca¹, John Peloquin², Lachlan Smith², Nichol Reisher¹, Alexander Wright², Edward Vresilovic³, Dawn Elliott¹, ¹*University of Delaware, Newark, DE, United States*, ²*University of Pennsylvania, Philadelphia, PA, United States*, ³*Pennsylvania State University, Hershey, PA, United States*
- 2:15PM Cervical Spinal Cord Stress: A Comprehensive Finite Element Model of the Cervical Spinal Cord** SB³C2016-698
Kirsten E. Stoner¹, Kingsely O. Abode-Iyamah², Douglas C. Fredericks³, Matthew A. Howard², Nicole M. Grosland¹, ¹*Biomedical Engineering, University of Iowa, Iowa City, IA, United States*, ²*Neurosurgery, University of Iowa, Iowa City, IA, United States*, ³*Orthopaedics, University of Iowa, Iowa City, IA, United States*
- 2:30PM Mechanisms of Cervical Spine Disc Injury Under Cyclic Loading: Experiments and Finite Element Analysis** SB³C2016-835
Sagar Umale¹, Narayan Yoganandan¹, Mike Arun¹, Brian Stemper¹, Brian Snyder², ¹*Neuroscience Research, Medical College of Wisconsin, Milwaukee, WI, United States*, ²*Harvard Medical School, Beth Israel Deaconess Medical Center, Boston, MA, United States*

- 2:45PM A Finite Element Analysis of the Occipitoatlantal Capsular Ligaments as the Primary Stabilizers of the Adult and Pediatric Craniocervical Junction** SB³C2016-62
Rinchen Phuntsok¹, Benjamin Ellis¹, Douglas Brockmeyer², ¹*Department of Bioengineering, University of Utah, Salt Lake City, UT, United States*, ²*School of Medicine, Pediatric Neurosurgery, University of Utah, Salt Lake City, UT, United States*

SATURDAY, JULY 2**1:30pm - 3:00pm****Bone Biomechanics****Wilson D****Session Chair:** Mariana Kersh, *University of Illinois, Urbana, IL, United States***Session Co-Chair:** Eric Kennedy, *Bucknell University, PA, United States*

- 1:30PM The Development of a “Fuzzy” Yield Envelope for Trabecular Porcine Skull Bone Using Numerical Simulations** SB³C2016-1050
Allison N. Ranslow, Reuben H. Kraft, *Mechanical and Nuclear Engineering, Penn State University, University Park, PA, United States*
- 1:45PM Design of Fatigue Test for Ex-Vivo Mouse Vertebra** SB³C2016-1025
Megan M. Pendleton¹, Joshua S. Alwood², Grace D. O’Connell¹, Tony M. Keaveny¹, ¹*Mechanical Engineering, UC Berkeley, Berkeley, CA, United States*, ²*Space Biosciences Division, NASA Ames Research Center, Moffett Field, CA, United States*
- 2:00PM Electric Properties of Cortical Bone are Strong Predictors of Bone Mechanical Properties** SB³C2016-77
Mustafa Unal¹, Fatih Cingoz², Cevat Bagcioglu², Yilmaz Sozer², Ozan Akkus¹, ¹*Case Western Reserve University, Cleveland, OH, United States*, ²*The University of Akron, Akron, OH, United States*
- 2:15PM Diagnostic Potential of Kirschner (K-) Wire and Reference Probe Indentation for the Prediction of Bone Mineral Density (BMD)** SB³C2016-1076
Eric A. Kennedy¹, Sarah C. Denning¹, Donna M. Ebenstein¹, Thomas R. Bowen², ¹*Biomedical Engineering, Bucknell University, Lewisburg, PA, United States*, ²*Orthopaedic Surgery, Geisinger Health System, Danville, PA, United States*
- 2:30PM Bioinspired Simulation of Polycrystalline Materials** SB³C2016-1096
Liqiang Lin, Xiaodu Wang, xiaowei Zeng, *Mechanical Engineering, University of Texas at San Antonio, San Antonio, TX, United States*
- 2:45PM Characteristic X-ray Diffraction Method for Mechanical Analysis of Mineral and Collagen Phases in Bone Tissue** SB³C2016-781
Masahiro Todoh, Shigeru Tadano, *Faculty of Engineering, Hokkaido University, Sapporo, Japan*

SATURDAY, JULY 2**1:30pm - 3:00pm****Solid Mechanics: Biomechanics of Injury****Annapolis 1****Session Chair:** Ian A. Sigal, *University of Pittsburgh, PA, United States***Session Co-Chair:** Timothy P. Holsgrove, *University of Pennsylvania, PA, United States*

- 1:30PM Quantitative Comparison of Human Body and ATD Occupant Models in US-NCAP Test Simulations** SB³C2016-975
Berkant Guleyupoglu, Bharath Koya, Matt Davis, Scott Gayzik, *Biomedical Engineering, Wake Forest University School of Medicine, Winston Salem, NC, United States*
- 1:45PM Upper Cervical Spine Loading Simulating Low-Speed Collisions Significantly Increases Facet Strains Compared to Equivalent Quasistatic Loading** SB³C2016-115
Timothy Holsgrove, Nicolas Jaumard, Nina Zhu, Nicholas Stiansen, William Welch, Beth Winkelstein, *University of Pennsylvania, Philadelphia, PA, United States*

SCIENTIFIC SESSIONS

- 2:00PM Injury-Based Advanced Automatic Crash Notification Algorithm Improves Motor Vehicle Crash Occupant Triage** SB³C2016-102
Samantha Schoell¹, Ashley Weaver¹, Jennifer Talton², Ryan Barnard², R. Shayn Martin¹, J. Wayne Meredith¹, Joel Stitzel¹, ¹Wake Forest School of Medicine, Winston-Salem, NC, United States, ²Division of Public Health Sciences, Wake Forest School of Medicine, Winston-Salem, NC, United States
- 2:15PM Damage Modeling of a Human Tibia and Fibula Fracture Caused by a Mixed Martial Arts Kick** SB³C2016-825
 Andrew Lamont¹, **Vina L. Nguyen**^{1,2}, Robbin Bertucci¹, Youssef Hammi¹, Mark F. Horstemeyer¹, Jun Liao^{1,2}, Hongjoo Rhee¹, Lakiesha Williams^{1,2}, Rajkumar Prabhu^{1,2}, ¹Center of Advanced Vehicular Systems, Mississippi State University, Starkville, MS, United States, ²Department of Agricultural and Biological Engineering, Mississippi State University, Mississippi State, MS, United States
- 2:30PM Assessing the Ability of Hockey Helmets to Reduce Concussion Risk** SB³C2016-952
Bethany Rowson, Steven Rowson, Stefan M. Duma, *Biomedical Engineering and Mechanics, Virginia Tech, Blacksburg, VA, United States*
- 2:45PM Foul Tip Attenuation of Baseball Catcher Masks Using Head Impact Metrics** SB³C2016-625
Christopher Eckersley, Hattie Cutcliffe, Jay Shridharani, Cameron 'Dale' Bass, Terrance White, *Biomedical Engineering, Duke University, Durham, NC, United States*

SATURDAY, JULY 2	1:30pm - 3:00pm
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Thrombosis and Cardiac Flows

Annapolis 2

Session Chair: Keefe Manning, *Pennsylvania State University, PA, United States*

Session Co-Chair: Shawn Shadden, *UC Berkeley, CA, United States*

- 1:30PM Coagulation Cascade Model Reduction Using a Genetic Algorithm** SB³C2016-113
Kirk B. Hansen, Shawn C. Shadden, *Mechanical Engineering, University of California, Berkeley, Berkeley, CA, United States*
- 1:45PM Macroscopic Predictions of Thrombus Growth in a Three-Dimensional Backward-Facing Step** SB³C2016-108
 Joshua O. Taylor, Steven Deutsch, **Keefe B. Manning**, *Biomedical Engineering, The Pennsylvania State University, University Park, PA, United States*
- 2:00PM Distal Emboli Following Cover Assisted Thrombectomy** SB³C2016-892
Juyu Chueh, Ajit S. Puri, Matthew J. Gounis, *Radiology, University of Massachusetts Medical School, Worcester, MA, United States*
- 2:15PM Towards Non-invasive, Computational Modeling of the Transport of Thrombo-emboli and Athero-emboli along Arteries** SB³C2016-970
Debanjan Mukherjee, Shawn C. Shadden, *U.C. Berkeley, Berkeley, CA, United States*
- 2:30PM A Shape Optimization Approach Applied to Intraluminal Thrombus Deposition in Abdominal Aortic Aneurysms** SB³C2016-939
Paolo DiAchile¹, George Tellides², Jay D. Humphrey¹, ¹Department of Biomedical Engineering, Yale University, New Haven, CT, United States, ²Surgery, Yale School of Medicine, New Haven, CT, United States
- 2:45PM Predicting False Lumen Thrombosis in 3D Patient-Specific Models of Type B Aortic Dissection** SB³C2016-636
Claudia Menichini¹, Zhuo Cheng¹, Richard G. J. Gibbs², Xiao Y. Xu¹, ¹Department of Chemical Engineering, Imperial College London, London, United Kingdom, ²Department of Surgery and Cancer, St. Mary's Hospital, Imperial College NHS Trust, London, United Kingdom

SATURDAY, JULY 2**1:30pm - 3:00pm****Human Dynamics of the Torso and Lower Extremities****Azalea 2****Session Chair:** Joseph Iaquinto, *VA, Puget Sound, WA, United States***Session Co-Chair:** Tom Gardner, *Columbia University, NY, United States*

- 1:30PM Muscle Activation in Cyclic Lifting with Trained Lumbar-Pelvic Coordination** SB³C2016-1086
Timothy D. Craig, Alice E. Riley, Neena K. Sharma, **Sara E. Wilson**, *Mechanical Engineering, University of Kansas, Lawrence, KS, United States*
- 1:45PM The Determination of Free Torque on Athletic Turf Surfaces Using Insole Pressure Data** SB³C2016-1079
Brian T. Weaver^{1,2}, Jerrod E. Braman¹, Roger C. Haut¹, *¹Orthopedics Biomechanics Laboratories, Michigan State University, East Lansing, MI, United States, ²Explico Engineering Co., Novi, MI, United States*
- 2:00PM Knee and Ankle Biomechanics During Squatting with Heels On and Off the Ground, with and without Body Weight Shifting** SB³C2016-624
Jonathan Fox, Mohamed Samir Hefzy, Charles Armstrong, *The University of Toledo, Toledo, OH, United States*
- 2:15PM A Method for Predicting Complete Ground Reaction Forces with Plantar Pressure Insoles during Level and Angled Walking** SB³C2016-851
Andrew J. Crechiolo, Feng Wei, Roger C. Haut, *Orthopaedic Biomechanics Laboratories, Michigan State University, East Lansing, MI, United States*
- 2:30PM Knee Medial Tibial Cartilage Stress One and Five Years After Anterior Cruciate Ligament Reconstruction** SB³C2016-916
Ashutosh Khandha¹, Kurt Manal², Lynn Snyder-Mackler³, Thomas S. Buchanan⁴, *¹Biomedical Engineering, University of Delaware, Newark, DE, United States, ²Mechanical Engineering, University of Delaware, Newark, DE, United States, ³Physical Therapy, University of Delaware, Newark, DE, United States, ⁴Biomedical Engineering, Mechanical Engineering, University of Delaware, Newark, DE, United States*
- 2:45PM The Effect of Soft Tissue Artifact on Kinematic Measurement - an Evaluation of Optical Marker Motion using Biplane Fluoroscopy.** SB³C2016-1097
Joseph M. Iaquinto¹, Matthew W. Kindig¹, David R. Haynor², William R. Ledoux¹, *¹VA Puget Sound, Seattle, WA, United States, ²University of Washington Medical Center, Seattle, WA, United States*

SATURDAY, JULY 2**1:30pm - 3:00pm****Hemodynamics, Lymphatics and Lung Therapy****Azalea 3****Session Chair:** Nastaran Hashemi, *Iowa State University, IA, United States***Session Co-Chair:** Joshua Smith, *Lafayette College, LA, United States*

- 1:30PM Cerebral Blood Flow Simulation for the Whole Mouse Brain** SB³C2016-1062
ben schneller¹, Mahsa Ghaffari¹, Sahar Ghanavati², John Sled², Andreas Linninger¹, *¹University of Illinois at Chicago, Chicago, IL, United States, ²University of Toronto, Toronto, ON, Canada*
- 1:45PM Directing Angiogenesis with Fluid Mechanics at Vessel Bifurcations** SB³C2016-1123
Ehsan Akbari, *Department of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, OH, United States*
- 2:00PM In Silico and In Vitro Modelling of Flow Behaviour in Lymphatic Vessels** SB³C2016-787
Sinéad T. Morley, David T. Newport, Michael T. Walsh, *MABE, University of Limerick, Limerick, Ireland*
- 2:15PM Placenta-on-a-chip: A Novel Platform in Drug Testing and Toxicology Applications** SB³C2016-919
Nastaran Hashemi, *Iowa State University, Ames, IA, United States*
- 2:30PM Preventing Upper Airway Collapse Using CPAP with and without Pressure Oscillations** SB³C2016-19
Ahmed M. Al-Jumaily, Sherif Ashaat, Loulin Huang, *Institute of Biomedical Technologies, Auckland University of Technology, Auckland, New Zealand*

2:45PM Upper Airway Dynamic Characteristics in Healthy Subjects and OSA Patients SB³C2016-50

Sherif Ashaat, **Ahmed M. Al-Jumaily**, Loulin Huang, *Institute of Biomedical Technologies, Auckland University of Technology, Auckland, New Zealand*

SATURDAY, JULY 2**3:15pm - 4:45pm****Measuring and Modeling Cellular Phenomena****Wilson B**

Session Chair: Lin H. Han, *Drexel University, PA, United States*

Session Co-Chair: Edward Guo, *Columbia University, NY, United States*

3:15PM A Chemo-mechanical Free-energy-based Approach to Model Durotaxis and Extracellular Stiffness Dependent Contraction and Polarization of Cells SB³C2016-570

Vivek Shenoy, Hailong Wang, Xiao Wang, *Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA, United States*

3:30PM Disorder as a Biomechanical Pattern Forming Mechanism that Guides Symmetric Vertebrate Body Elongation SB³C2016-158

Dipjyoti Das¹, Thierry Emonet², **Scott Holley**¹, ¹*Molecular, Cellular and Developmental Biology, Yale University, New Haven, CT, United States*, ²*Molecular, Cellular and Developmental Biology and Physics, Yale University, New Haven, CT, United States*

3:45PM Real-time Monitoring of the Mechanical Properties of Engineered Tissues During Growth and Remodeling. SB³C2016-578

Pim J. A. Oomen^{1,2}, Cees W. J. Oomens¹, Carlijn V. C. Bouten^{1,2}, Sandra Loerakker^{1,2}, ¹*Department of Biomedical Engineering, Eindhoven University of Technology, Eindhoven, Netherlands*, ²*Institute for Complex Molecular Systems, Eindhoven University of Technology, Eindhoven, Netherlands*

4:00PM Modulation of ICAM-4 Adhesion Receptors on SS-RBCs Revealed by Atomic Force Microscopy SB³C2016-73

Jing Zhang¹, Biree Andemariam², George Lykotrafitis³, ¹*Mechanical Engineering, University of Connecticut, Storrs, CT, United States*, ²*Adult Sickle Cell Center, University of Connecticut Health Center, Farmington, CT, United States*, ³*Mechanical Engineering/biomedical Engineering, University of Connecticut, Storrs, CT, United States*

4:15PM Surface Protrusion of Human Endothelial Cells: Experiment and Model SB³C2016-699

Jin-Yu Shao, Jin Hao, Yong Chen, *Washington University in St. Louis, Saint Louis, MO, United States*

4:30PM Traction Force Measurement of Migrating Cells in Multichannel Micropillar Device SB³C2016-801

Toshiro Ohashi¹, Akito Sugawara², ¹*Faculty of Engineering, Hokkaido University, Sapporo, Japan*, ²*Graduate School of Engineering, Hokkaido University, Sapporo, Japan*

SATURDAY, JULY 2**3:15pm - 4:45pm****Ocular Biomechanics****Wilson C**

Session Chair: Ross Ethier, *Georgia Institute of Technology, GA, United States*

Session Co-Chair: Matthew Reilly, *Ohio State University, OH, United States*

3:15PM Quantification of Scleral Stiffening in Rat Eyes as a Function of Glyceraldehyde Concentration and Age SB³C2016-736

Ian C. Campbell^{1,2}, Bailey G. Hannon³, A. Thomas Read², Joseph M. Sherwood⁴, Pedro Gonzalez⁵, C. Ross Ethier^{1,2,3}, ¹*Rehabilitation Research and Development, Atlanta VA Medical Center, Decatur, GA, United States*, ²*Biomedical Engineering, Georgia Institute of Technology and Emory University, Atlanta, GA, United States*, ³*Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA, United States*, ⁴*Bioengineering, Imperial College London, London, United Kingdom*, ⁵*Ophthalmology, Duke University, Durham, NC, United States*

3:30PM Measuring In-Vivo the Interplay Between Intraocular and Intracranial Pressure Effects on the Optic Nerve Head SB³C2016-701

Ian A. Sigal¹, Huong Tran¹, Alexandra Judisch¹, Bo Wang¹, Matthew A. Smith¹, Andrew Voorhees¹, Joel Schuman^{1,2}, Gadi Wollstein¹, ¹*University of Pittsburgh, Pittsburgh, PA, United States*, ²*New York University, New York, NY, United States*

- 3:45PM An Innovative Method for Measuring Adhesion at the Vitreoretinal Interface** SB³C2016-1111
Christopher J. Creveling, *University of Utah, Salt Lake City, UT, United States*
- 4:00PM IOP-Induced Strains in the Optic Nerve Head Using Ultrasound Speckle Tracking** SB³C2016-796
Elias Pavlatos¹, Xueliang Pan^{1,2}, Richard T. Hart¹, Paul A. Weber³, Jun Liu^{1,3}, ¹*Department of Biomedical Engineering, The Ohio State University, Columbus, OH, United States*, ²*Center for Biostatistics, The Ohio State University, Columbus, OH, United States*, ³*Department of Ophthalmology, The Ohio State University, Columbus, OH, United States*
- 4:15PM A Mathematical Model of Posterior Vitreous Detachment and Generation of Vitreoretinal Traction** SB³C2016-663
Federica Di Michele¹, Rodolfo Repetto², Amabile Tatone¹, ¹*Department of Information Engineering, Computer Science and Mathematics, University of L'Aquila, L'Aquila, Italy*, ²*Department of Civil, Chemical and Environmental Engineering, University of Genoa, Genoa, Italy*
- 4:30PM Modelling Corneal Mechanical Behavior with a Biphasictransversely Isotropic Poroviscoelastic Constitutive Model** SB³C2016-619
Hamed Hatami-Marbini, *Mechanical & Industrial Engineering, University of Illinois at Chicago, Chicago, IL, United States*

SATURDAY, JULY 2**3:15pm - 4:45pm**

Musculo-Skeletal Soft Tissue Mechanics: Ligament and Tendon

Wilson DSession Chair: Spencer Lake, *Washington University, St. Louis, MO, United States*Session Co-Chair: Victor Barocas, *University of Minnesota, MN, United States*

- 3:15PM A Reactive Viscoelastic Continuum Damage Model for Tendon** SB³C2016-1107
Babak N. Safa^{1,2}, Andrea H. Lee², Michael H. Santare¹, Dawn M. Elliott², ¹*Mechanical engineering, University of Delaware, Newark, DE, United States*, ²*Biomedical engineering, University of Delaware, Newark, DE, United States*
- 3:30PM Multiscale Regression Modeling in Mouse Supraspinatus Tendons Reveals Regional Contribution of Dynamic Processes to Structure-Function Relationships** SB³C2016-30
Brienne K. Connizzo¹, Sheila M. Adams², Thomas H. Adams², Abbas F. Jawad³, David E. Birk², Louis J. Soslowsky¹, ¹*McKay Orthopaedic Research Laboratory, University of Pennsylvania, Philadelphia, PA, United States*, ²*Department of Molecular Pharmacology & Physiology, University of South Florida, Tampa, FL, United States*, ³*Department of Pediatrics, Perelman School of Medicine, University of Pennsylvania and Children's Hospital of Philadelphia, Philadelphia, PA, United States*
- 3:45PM Localized Histological Differences in Tendon Degeneration Between Torn and Intact Supraspinatus Tendon** SB³C2016-817
R. Matthew Miller¹, Gerald A. Ferrer¹, Masahito Yoshida², Leanna Sullivan¹, James H-C Wang², Volker Musahl², Richard E. Debski¹, ¹*Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States*, ²*Orthopaedic Surgery, University of Pittsburgh, Pittsburgh, PA, United States*
- 4:00PM Recovery of Functional Properties During Neonatal Tendon Regeneration** SB³C2016-112
Kristen Howell¹, Rebecca Bell², Sara F. Tufa³, Douglas R. Keene³, Nelly Andarawis-Puri², Alice H. Huang¹, ¹*Orthopaedics, Icahn School of Medicine at Mount Sinai, New York, NY, United States*, ²*Cornell University, Ithaca, NY, United States*, ³*Shriners Hospital, Portland, OR, United States*
- 4:15PM Altered Mechanics of Supraspinatus Tendons from Elastin-Deficient Genetically-Modified Mice** SB³C2016-128
Fei Fang¹, Gabriela Espinosa², Lindsey Kahan², Robert P. Mecham³, Spencer P. Lake^{1,2,4}, ¹*Mechanical Engineering & Materials Science, Washington University in St. Louis, St. Louis, MO, United States*, ²*Department of Biomedical Engineering, Washington University in St. Louis, St. Louis, MO, United States*, ³*Department of Cell Biology & Physiology, Washington University in St. Louis, St. Louis, MO, United States*, ⁴*Department of Orthopaedic Surgery, Washington University in St. Louis, St. Louis, MO, United States*

- 4:30PM Fascicles and the Interfascicular Matrix show Superior Fatigue Resistance in Energy Storing Tendons** SB³C2016-20
Chavaunne T. Thorpe¹, Graham P. Riley², Helen L. Birch³, Peter D. Clegg⁴, Hazel R. C. Screen¹, ¹*Institute of Bioengineering, Queen Mary University of London, London, United Kingdom*, ²*School of Biological Sciences, University of East Anglia, Norwich, United Kingdom*, ³*Institute of Orthopaedics and Musculoskeletal Science, University College London, London, United Kingdom*, ⁴*Institute of Ageing and Chronic Disease, University of Liverpool, Liverpool, United Kingdom*

SATURDAY, JULY 2**3:15pm - 4:45pm****Military Injury****Annapolis 1**

Session Chair: Liming Voo, *Johns Hopkins University Applied Physics Laboratory, MD, United States*
Session Co-Chair: Ali Sadegh, *City College of New York, NY, United States*

- 3:15PM A Robust and Generalized Procedure for Generating Human Injury Probability Curves** SB³C2016-898
Narayan Yoganandan^{1,2}, Scott Gayzik³, Anjishnu Banerjee⁴, Fang-Chi Hsu³, Frank Pintar¹, Cameron-Dale Bass⁵, Hattie Cutcliffe⁵, Jonathan Rupp⁶, Francesco Tenore⁷, JiangYue Zhang⁸, Liming Voo⁹, ¹*Neurosurgery, Medical College of Wisconsin, Milwaukee, WI, United States*, ²*Medical College of Wisconsin, Milwaukee, WI, United States*, ³*Wake Forest University School of Medicine, Winston-Salem, NC, United States*, ⁴*Biostatistics, Medical College of Wisconsin, Milwaukee, WI, United States*, ⁵*Duke University, Durham, NC, United States*, ⁶*University of Michigan, Ann Arbor, MI, United States*, ⁷*Neurosurgery, John Hopkins University, Laurel, MD, United States*, ⁸*Johns Hopkins University, Laurel, MD, United States*, ⁹*John Hopkins University, Laurel, MD, United States*
- 3:30PM Similitude Assessment Method for Comparing PMHS Response Data from Impact Loading Across Multiple Test Devices** SB³C2016-846
Christopher J. Dooley¹, Francesco V. Tenore¹, Scott Gayzik², Andrew C. Merkle¹, ¹*Biomechanics and Injury Mitigation Systems, Johns Hopkins University Applied Physics Lab, Laurel, MD, United States*, ²*School of Medicine, Wake Forest University, Winston-Salem, NC, United States*
- 3:45PM Forces Applied to the Foot and Pelvis in High Rate Vertical Accelerative Loading** SB³C2016-896
Jonathan D. Rupp, Carl Miller, Lauren Zaseck, Nichole Ritchie, Anne Bonifas, Laura Slykhouse, Matthew P. Reed, *University of Michigan Transportation Research Institute, Ann Arbor, MI, United States*
- 4:00PM Modeling and Sensitivity Analysis of the WIAMan ATD Head and Neck: A Finite Element Study** SB³C2016-748
Matthew L. Davis¹, Jeremy M. Schap¹, Michael P. Boyle², Robert S. Armiger², Mostafiz Chowdhury³, F. Scott Gayzik¹, ¹*Biomedical Engineering, Wake Forest University School of Medicine, Winston Salem, NC, United States*, ²*Johns Hopkins Applied Physics Laboratory, Laurel, MD, United States*, ³*U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, United States*
- 4:15PM Effects of Seated Soldier Posture on Pelvic Force Transmissibility** SB³C2016-1006
Brandon J. Perry¹, Kyvory A. Henderson¹, Edward M. Spratley¹, JiangYue Zhang², Andrew C. Merkle², Robert S. Salzar¹, ¹*Mechanical and Aerospace Engineering, University of Virginia, Charlottesville, VA, United States*, ²*Applied Physics Laboratory, Johns Hopkins University, Baltimore, MD, United States*
- 4:30PM The Effect of Variability in Warfighter Population on Injury: A Modeling Study** SB³C2016-588
Shankarjee Krishnamoorthi, Amit Bagchi, Siddiq Qidwai, *US Naval Research Laboratory, Washington, DC, United States*

SATURDAY, JULY 2**3:15pm - 4:45pm****Cardiovascular Diagnostics and Imaging****Annapolis 2**

Session Chair: Craig Goergen, *Purdue, IN, United States*
Session Co-Chair: Matt Gounis, *University of Massachusetts Medical Center, MA, United States*

- 3:15PM Near-wall Stagnation in Large Arteries: Is Wall Shear Stress Magnitude Sufficient?** SB³C2016-739
Amirhossein Arzani¹, Alberto M. Gambaruto², Guoning Chen³, Shawn C. Shadden¹, ¹*Mechanical Engineering, University of California, Berkeley, Berkeley, CA, United States*, ²*Mechanical Engineering, University of Bristol, Bristol, United Kingdom*, ³*Computer Science, University of Houston, Houston, TX, United States*

- 3:30PM A Computational Study of the Effects of Age-Associated Regional Changes in Artery Mechanics on Systemic Hemodynamics** SB³C2016-972
Federica Cuomo¹, Sara Roccabianca², Desmond Dillon-Murphy³, Nan Xiao³, Jay D. Humphrey⁴, C. Alberto Figueroa⁵,
¹Biomedical Engineering, University of Michigan, Ann Arbor, MI, United States, ²Mechanical Engineering, Michigan State University, East Lansing, MI, United States, ³King's College London, London, United Kingdom, ⁴Yale University, New Haven, CT, United States, ⁵University of Michigan, Ann Arbor, MI, United States
- 3:45PM Differences in Pelvic Blood Flow Mediate Differences in Abdominal Wall Shear Stress Between Men and Women** SB³C2016-1068
Elizabeth Iffrig, John N. Oshinski, William R. Taylor, *Emory University, Atlanta, GA, United States*
- 4:00PM Automated Optimization Framework for Cardiovascular Flow Simulations** SB³C2016-977
Aekaansh Verma¹, Alison Marsden², ¹Mechanical Engineering, Stanford University, Stanford, CA, United States, ²Department of Pediatrics, Stanford University, Stanford, CA, United States
- 4:15PM Quantification of Distal Cerebral Vascular Bed Collateral Resistances Using 1D Hemodynamic Model and CT Perfusion** SB³C2016-991
Jeffrey Pyne¹, Jaiyoung Ryu¹, Jared Narvid², Shawn Shadden¹, ¹University of California Berkeley, Berkeley, CA, United States, ²University of San Francisco, San Francisco, CA, United States
- 4:30PM Validation and Uncertainty Analysis of a Clinical CFD Tool—AView—for Intracranial Aneurysm Flow Simulation** SB³C2016-1016
Xiang Jianping^{1,2,3}, Nikhil Paliwal^{1,3}, Nicole Varble^{1,3}, Adnan H. Siddiqui^{2,3}, Hui Meng^{1,2,3}, ¹Department of Aerospace and Mechanical Engineering, SUNY-BUFFALO, BUFFALO, NY, United States, ²Department of Neurosurgery, SUNY-BUFFALO, Buffalo, NY, United States, ³Toshiba Stroke and Vascular Research Center, SUNY-BUFFALO, Buffalo, NY, United States

SATURDAY, JULY 2**3:15pm - 4:45pm****Biotransport at Multiple Scales****Azalea 2****Session Chair:** Sati Sadhal, *University of Southern California, CA, United States***Session Co-Chair:** Anita Penkova, *University of Southern California, CA, United States*

- 3:15PM Modeling and Optimization of Silica Gel Encapsulated Synergistic Bacteria** SB³C2016-150
Baris Ragip Mutlu, Jonathan Sakkos, Sujin Yeom, Lawrence Wackett, Alptekin Aksan, *University of Minnesota, Minneapolis, MN, United States*
- 3:30PM Continuous on-Chip Human Cell Separation Based on Conductivity-Induced Dielectrophoresis with Self-Assembled Ionic Liquid Electrodes** SB³C2016-715
Mingrui Sun, Xiaoming He, *Biomedical Engineering, The Ohio State University, Columbus, OH, United States*
- 3:45PM Microchip Electrophoresis Platform for Point-of-Care Diagnosis of Sickle Cell Disease** SB³C2016-603
Ryan Ung¹, Yunus Alapan², Muhammad N. Hasan², Megan Romelfanger¹, Tolulope Rosanwo³, Asya Akkus², Mehmet Cakar⁴, Kutay Icoz⁴, Connie Piccone³, Jane Little³, **Umut A. Gurkan**^{1,2,3}, ¹Biomedical Engineering Department, Case Western Reserve University, Cleveland, OH, United States, ²Mechanical and Aerospace Engineering Department, Case Western Reserve University, Cleveland, OH, United States, ³School of Medicine, Case Western Reserve University, Cleveland, OH, United States, ⁴Abdullah Gul University, Kayseri, Turkey
- 4:00PM Direct Quantification of Solute Diffusivity in Porous, Viscoelastic Materials Using Correlation Spectroscopy** SB³C2016-1051
Janty Shoga, Christopher Price, *University of Delaware, Newark, DE, United States*
- 4:15PM Quantitative Assessment of Intracellular Delivery of Membrane-Impermeable Macromolecules Using Cell Deformation** SB³C2016-660
Kosaku Kurata¹, Atsushi Kurogawa², Takanobu Fukunaga¹, Haidong Wang¹, Hiroshi Takamatsu¹, ¹Department of Mechanical Engineering, Kyushu University, Fukuoka, Japan, ²Graduate School of Engineering, Kyushu University, Fukuoka, Japan
- 4:30PM Study Vascular Permeability in a Microfluidic Device** SB³C2016-47
Yaling Liu, Chris Uhl, Salman Sohrab, *Lehigh University, Bethlehem, PA, United States*

SATURDAY, JULY 2**3:15pm - 4:45pm****Respiratory Fluid Mechanics****Azalea 3****Session Chair:** Jessica Oakes, *Berkley, CA, United States***Session Co-Chair:** Barry Lieber, *Stonybrook, NY, United States***3:15PM Age Dependent Susceptibility to Inhaled Particles SB³C2016-968**

Jessica M. Oakes^{1,2,3}, Irene E. Vignon-Clementel^{2,3}, Céline Grandmont^{2,3}, Shawn C. Shadden¹, ¹*Mechanical Engineering, University of California Berkeley, Berkeley, CA, United States*, ²*INRIA de Paris, Paris, France*, ³*Laboratoire Jacques-Louis Lions, UPMC Université Paris 6, Paris, France*

3:30PM Effect of Inflow Boundary Condition on Nasal Transitional Flow SB³C2016-657

Shun Shimizu¹, **Takashi Sakamoto**¹, Shinya Kimura¹, Gaku Tanaka¹, Toshihiro Sera², Hideo Yokota³, Kenji Ono⁴, ¹*Graduate School of Engineering, Chiba University, Chiba, Japan*, ²*Engineering, Kyushu University, Fukuoka, Japan*, ³*Image Processing Research Team, RIKEN, Kobe, Japan*, ⁴*Advanced Visualization Research Team, RIKEN, Kobe, Japan*

3:45PM Morphological Measurement and the Oxygen Diffusion Analysis in Mouse Acinar Cluster Obtained From Micro-ct SB³C2016-769

Luosha Xiao¹, Toshihiro Sera², Kenichiro Koshiyama¹, **Shigeo Wada**¹, ¹*Osaka University, Osaka, Japan*, ²*Kyushu University, Fukuoka, Japan*

4:00PM Simulation of Airflow in Realistic Model Pulmonary Acinus SB³C2016-762

Yuri Inagaki¹, Keisuke Yamanaka¹, Gaku Tanaka¹, Toshihiro Sera², ¹*Mechanical Engineering, Chiba University, Chiba, Japan*, ²*Mechanical Engineering, Kyushu University, Fukuoka, Japan*

4:15PM In Vitro Characterization of Tracheal Pressures for Infant Nasal Airway Replicas Receiving High-flow Nasal Cannula Therapy SB³C2016-142

Douglas E. A. Rebstock¹, **Andrew R. Martin**¹, Georges Callibotte², Warren H. Finlay¹, Michelle L. Noga³, Ira M. Katz⁴, ¹*Mechanical Engineering, University of Alberta, Edmonton, AB, Canada*, ²*Medical R&D, Air Liquide Santé International, Paris-Saclay Research Center, Les Loges-en-Josas, France*, ³*Radiology and Diagnostic Imaging, University of Alberta, Edmonton, AB, Canada*, ⁴*Medical R&D, Air Liquide Santé International, Paris-Saclay Research Center, Edmonton, AB, Canada*

4:30PM Evaluation of Design Parameters for a Novel Personal Air Purification Method to Mitigate Particle Aspiration SB³C2016-1087

Christopher Idelson, Christopher Rylander, *Mechanical Engineering, The University of Texas at Austin, Austin, TX, United States*

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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

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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: Drs. Rupak K. Banerjee (University of Cincinnati) and William K. Durfee (University of Minnesota)

Published: Quarterly

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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

Poster Walking Tours; Meet at sign at entrance to Exhibit Hall A

This year we will highlight a number of posters in various technical areas. We will have tour guides to bring you around to these highlighted posters during the regularly scheduled poster session. Tours have limited space, so sign up early. If space is available, sign-ups will be permitted onsite.

Please email Tammy.Donahue@ColoState.edu to sign up for a tour listed below; please indicate your TOUR preference and your name and email contact.

TOUR #1 Thursday June 30th, 2pm, Cardiovascular Tissue and Fluid Mechanics:

Poster #132, Poster #133, Poster #231, Poster #232, Poster #237

TOUR #2 Thursday June 30th, 2pm, Devices:

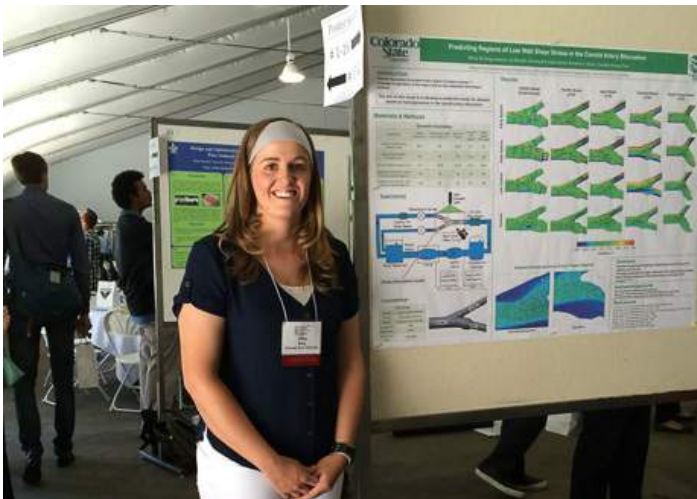
Poster #153, Poster #103, Poster #102, Poster #99

TOUR #3 Friday July 1st, 2pm, Ocular and Optofluidics:

Poster #22, Poster #24, Poster #32, Poster #33

TOUR #4 Friday July 1st, 2pm, Soft Tissues and Joints:

Poster #293, Poster #294, Poster #295, Poster #296, Poster #306, Poster #309





We'd like to welcome posters that were also presented at the 2016 Frontiers in Medical Devices conference, May 25-27th

Poster #331 **CDRH's Medical Device Development Tools Program**, CDRH MDDT Working Group

Poster #332 **Assessing Credibility of Computational Modeling and Simulation Results through Verification and Validation: Application to Medical Devices**, The ASME V&V40 Subcommittee on Verification and Validation of Computational Modeling for Medical Devices

Poster #333 **A Bridge for the 'Leap of Faith' with Computational Models**, Pras Pathmanathan, PhD, Richard Gray, PhD, Leonardo Angelone, PhD and Tina Morrison, PhD

➤ **Thursday, June 30th, 2016: Career Networking Mixer**

Join us in a networking event where you can interact with engineering professionals from a range of careers from academia to government to industry.

Time: 5:00 - 7:30 pm
Location: Eastern Shore 1

➤ **Friday, July 1st, 2016: Communicating Science Workshop**

How do I talk to non-engineers/non-scientists about my research? Attend this workshop and communicate science like a pro.

Time: 8:00 am
Location: Annapolis

➤ **Friday, July 1st, 2016: Water taxi to Alexandria!**

Join your fellow students for a water taxi ride on the Potomac and a night exploring Alexandria! Meet at the South Dock of the Gaylord National Hotel at 4:20 pm for a departure at 4:35 p.m. To return, buddy up and take a taxi back to the Gaylord from Alexandria.

Time: 4:20 pm
Location: Gaylord South Dock

➤ **Saturday, July 2nd, 2016: Open meeting**

Attend this open meeting to provide feedback on the events hosted at the conference, suggestions for future work, and to meet the student leadership committee.

Time: 10:00 am
Location: Eastern Shore 1

For more information on things to do and live updates about events follow us on Facebook (ASME Bioengineering Division) and on Twitter (@asmebedstudents)

Don't Forget about the BEDrock concert on Friday, July 1st!

➤ **Food**

Visit sb3c.org/the-venue/dining/ for a list of places to eat surrounding the hotel, or check out Alexandria's many restaurants!

➤ **Activities**

Gaylord National Resort & Convention Center is located minutes away from National Harbor Maryland, which has the Capitol Ferris Wheel, a carousel, walking and biking trails, outdoor movies, outlet shopping, and a marina complete with sightseeing tours and water taxis as well as kayak, paddleboard, and pedal boat rentals. Find more information at sb3c.org/the-venue/activities/ and www.nationalharbor.com

➤ **Events**

Check out www.nationalharbor.com/events/2016-06/ to see what's going on in the Harbor.

➤ **Other**

In addition, Washington D.C.'s monuments, museums, and attractions (White House, National Zoo, Smithsonian, Washington Monument), Old Town Alexandria, Mt. Vernon, and Six Flags Amusement Park are just a short ride away. Ask at the front desk for info on transportation.

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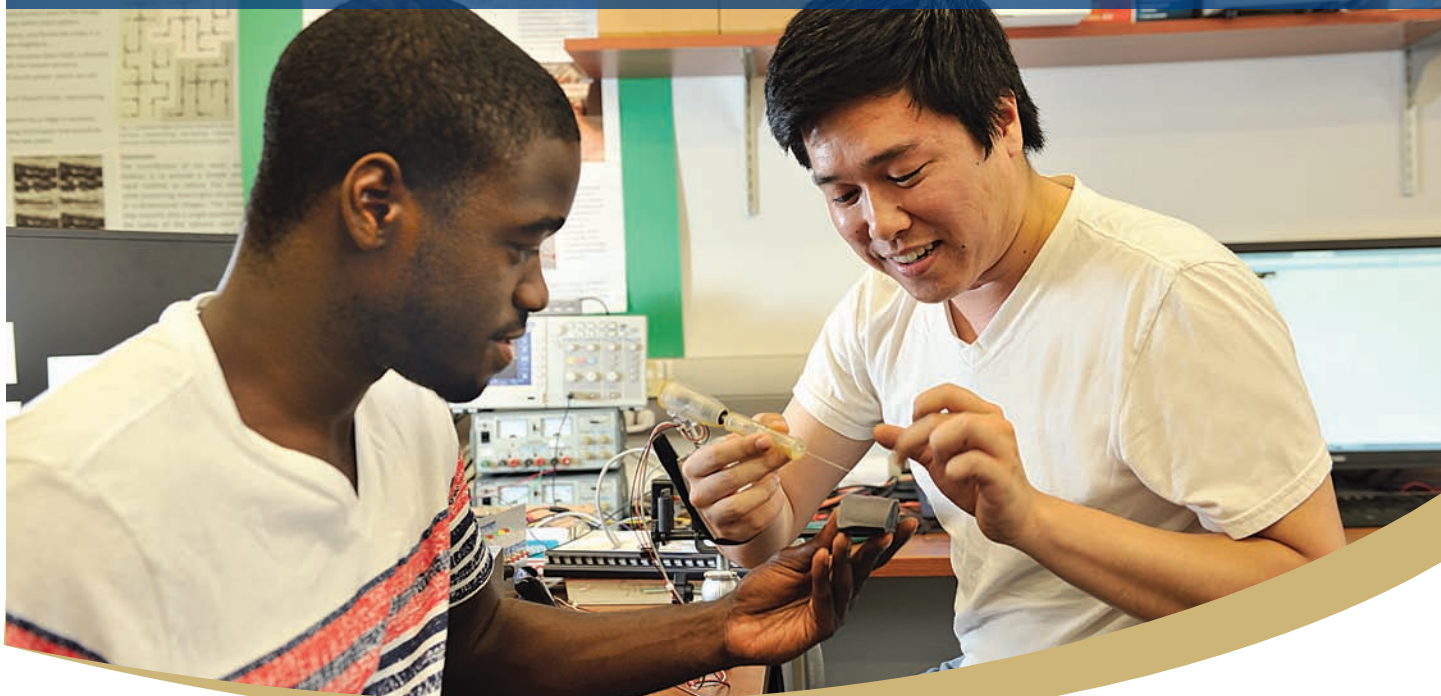


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BIOENGINEERING AT PITT

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:

- 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;
- 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:

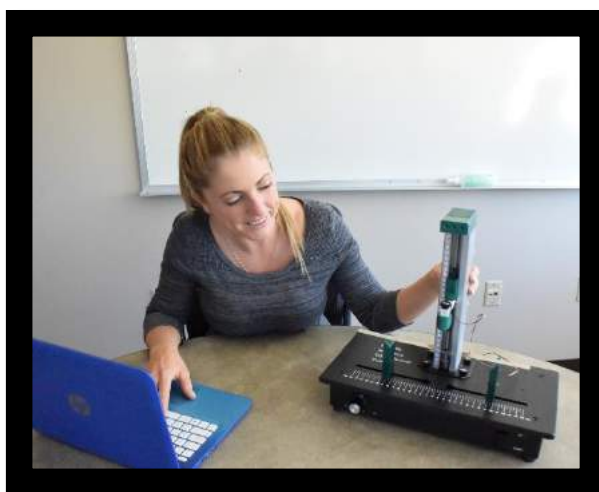
- Scientific inquiries into fundamental biological phenomena
- Development of instrumentation, materials, devices, and systems relative to application in the biological sciences and medicine

engineering.pitt.edu/bioengineering

MENTIS SCIENCES ENGINEERING TOOLKIT

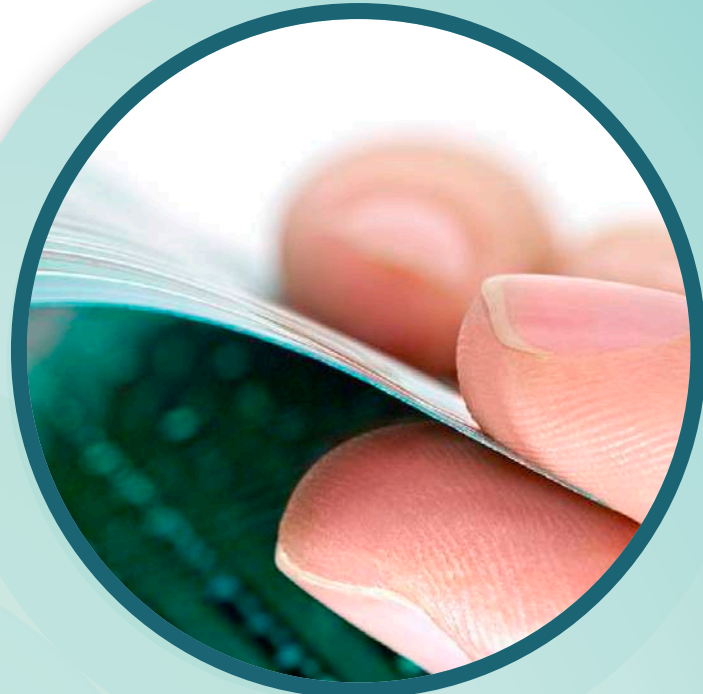
Mentis Sciences Inc. is an engineering firm located in the historic downtown district of Manchester, NH. The work performed by the team at Mentis Sciences is specialized and diverse, centering mostly around advanced composite research for the United States Government. Over the course of the past two years, Mentis has taken knowledge derived from the company's 20 years of engineering practice and applied it to the creation of an innovative tool to help improve the education of the next generation of scientists and engineers.

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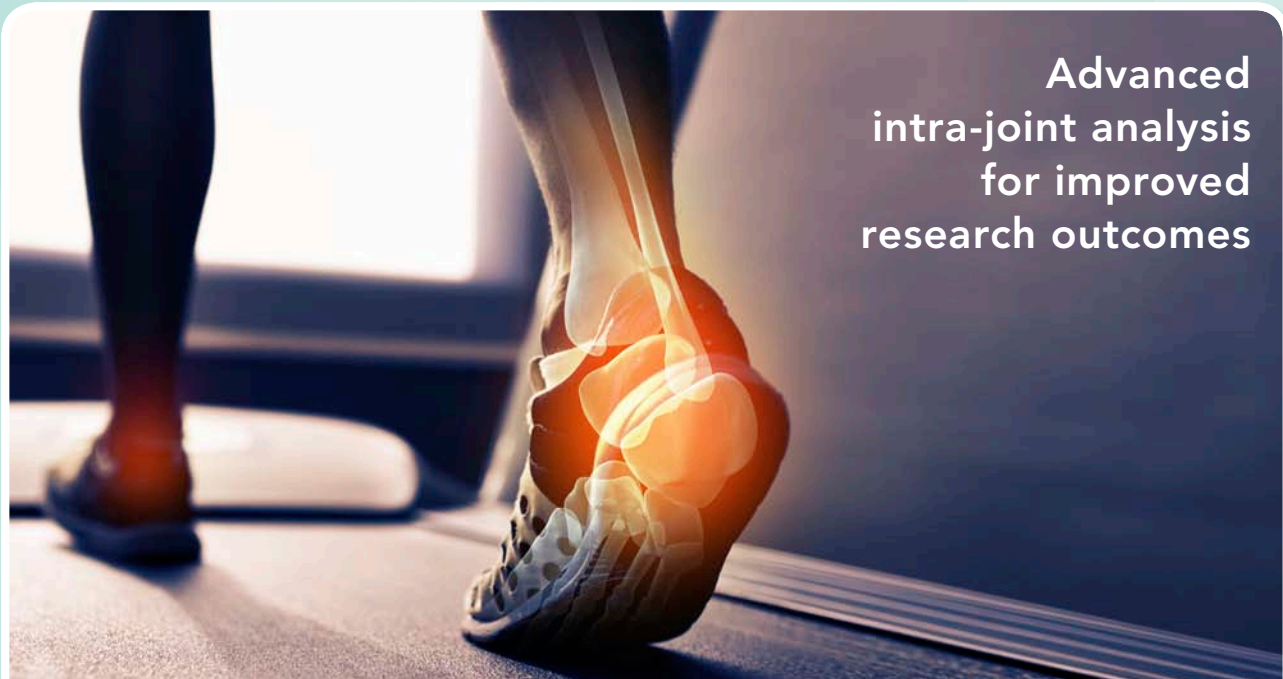


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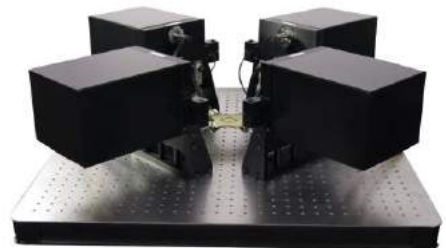


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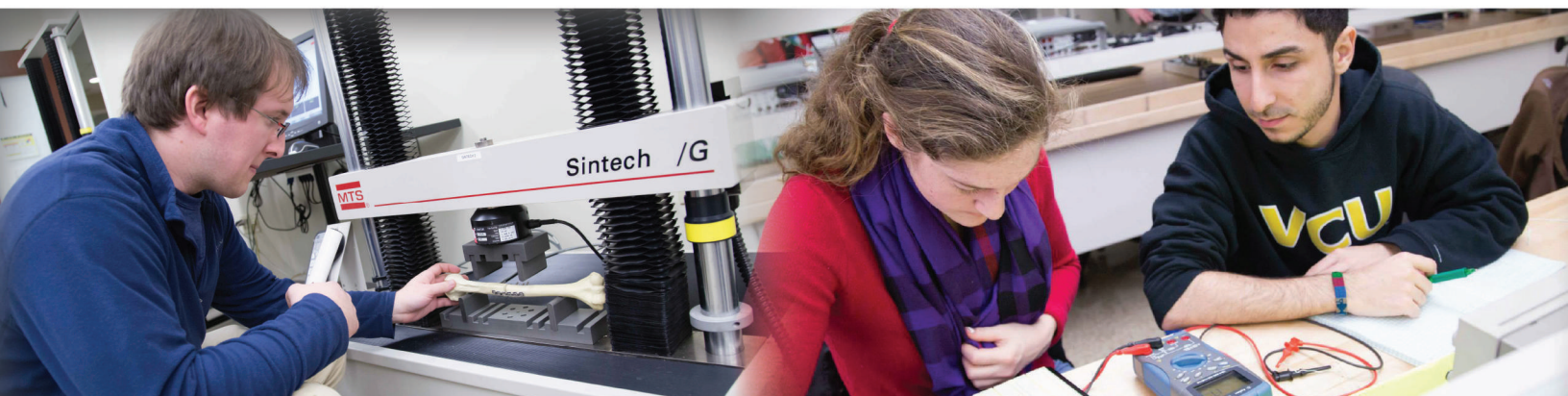


BIOMEDICAL ENGINEERING



The **VCU Department of Biomedical Engineering**, located in the dynamic capital of Richmond, offers B.S., M.S., and Ph.D. degrees in Biomedical Engineering as well as a combined M.D./Ph.D. program. The graduate program was founded in 1984, making it one of the first biomedical engineering programs in Virginia.

We maintain a close collaborative relationship with VCU Health, one of the country's leading academic medical centers where students receive personalized attention as they work on groundbreaking research areas. Graduate students are afforded the ability to specialize in a variety of areas including mechanobiology and regenerative medicine, rehabilitation engineering, human-computer interfaces, biomechanics, biomaterials, imaging, and cardiovascular devices.



For more information about our programs, contact undergraduate director **Paul Wetzel** (pawetzel@vcu.edu) or graduate director **Jennifer Wayne** (jwayne@vcu.edu)

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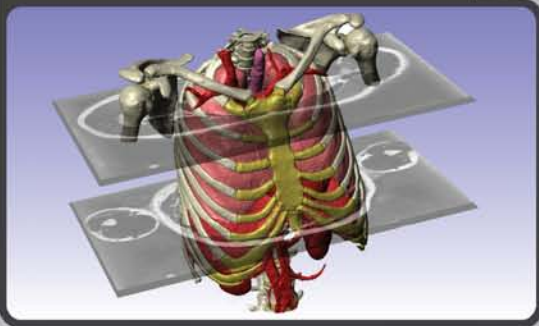
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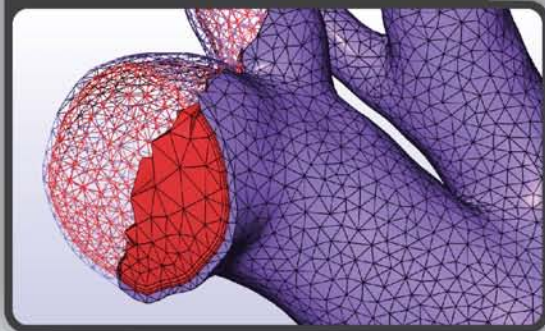
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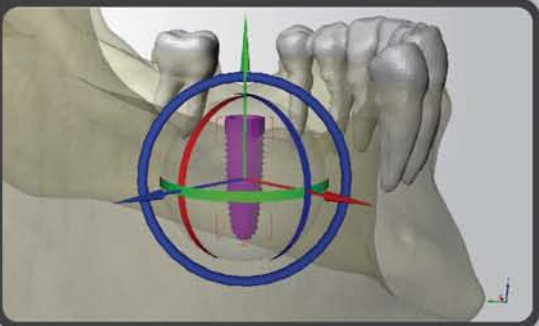
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RESEARCH FOCUS

Research areas include biomaterials, nanotechnology, regenerative medicine & tissue engineering, signal processing, bone biomechanics and mechanobiology, soft tissue mechanics, and device development and bioinstrumentation. Faculty are active participants in the Institute for Biomedical Engineering Research.

The department also conducts a number of research initiatives focused on connecting basic science and engineering research with clinical applications. These efforts are bolstered by the department's partnerships with local area hospitals and other biomedical institutes in Northeast Ohio.

Departmental assistantships are available to incoming students to allow exploration of research areas prior to selecting an advisor.



CONTACT

Email: bmegrad@uakron.edu

Phone: 330-972-6650

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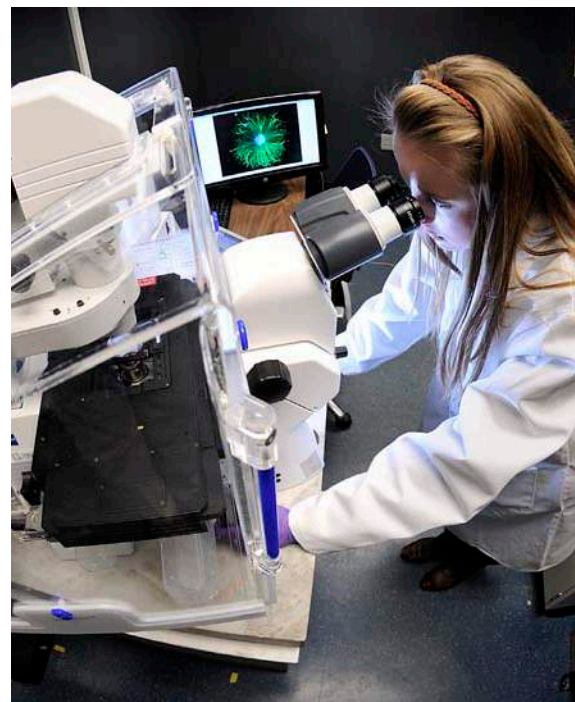
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ABOUT THE COLLEGE

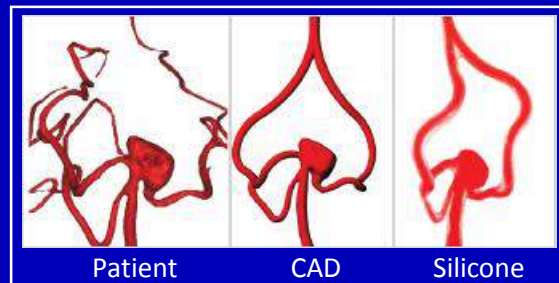
Founded in 1914, the University of Akron College of Engineering is committed to excellence in graduate education. The College of Engineering is the fastest growing college in Ohio and one of the fastest growing colleges in nation.



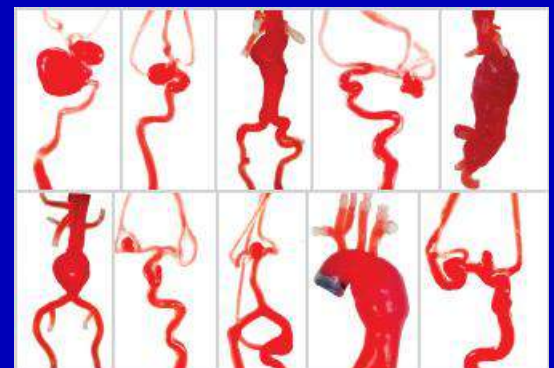


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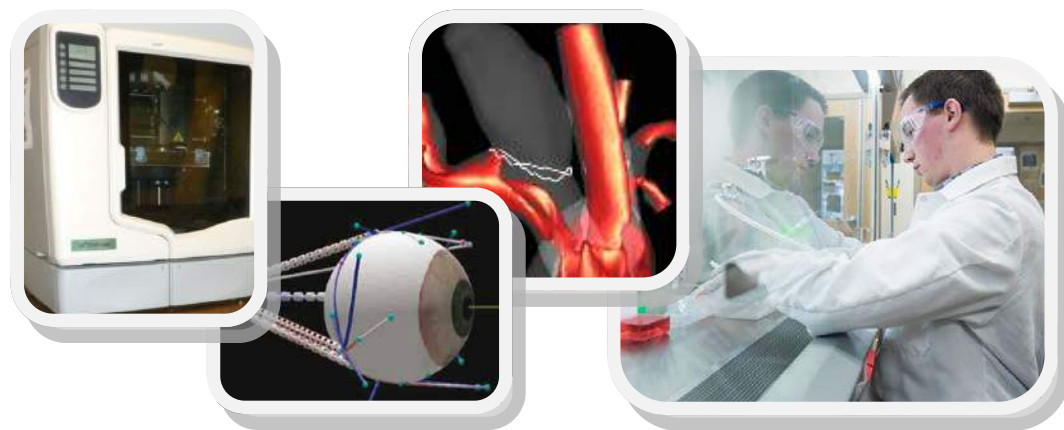
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BIOENGINEERING AT MASON



PROGRAM OVERVIEW

Located in the Washington DC metropolitan area, George Mason University's Department of Bioengineering offers a unique research and educational experience including collaborative opportunities with nearby national laboratories, institutes, and clinical facilities. The BS program earned accreditation from ABET in 2012 and currently offers three concentrations: Biomedical Signals & Systems, Bioengineering Healthcare Informatics, and Bioengineering Prehealth. The Bioengineering PhD program is currently accepting applications from outstanding prospective students and provides tuition and stipend support for qualified students. The MS program is pending SCHEV approval for launching in Spring 2017. The department has 13 primary faculty members with over \$9M of active research in the areas of biomedical imaging, nanotechnology, neural engineering, and data-driven biomechanics.

HIGHLIGHTS

- Over 200 undergraduate students
- Over 25% undergraduate students are in the Honors College
- Three university scholars
- Studying abroad in Guatemala and Spain
- PhD program taking off with 10 graduate students
- MS program launching in Spring 2017
- New collaboration with INOVA Fairfax hospital



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Northeastern University Engineering Graduate Studies in Bioengineering

An Interdisciplinary Concept for Cutting-edge Research



The Doctor of Philosophy in Bioengineering program is designed to take advantage of Northeastern's considerable strength in multiple areas of both traditional and bio-engineering. Located in the heart of Boston, directly adjacent to the world renowned Longwood Medical Area, Northeastern provides an excellent opportunity for students to combine engineering, medicine and biology. Students work with one of more than 90 faculty affiliated with the program toward a degree tailored to suit their interests or take advantage of one of our seven "strength" tracks.

Tracking Concept

Seven strength tracks reflect unique areas of expertise at Northeastern which demonstrate a particularly high level of scholarly activity as indicated by numerous faculty with vigorous research programs in line with the strength of the track, ample representation by available courses, and international recognition. The strength tracks available include:

- Track 1: Bioimaging and Signal Processing
- Track 2: Biomechanics and Mechanobiology
- Track 3: BioMEMs and BioNanotechnology
- Track 4: Biochemical and Bioenvironmental Engineering
- Track 5: Motor Control
- Track 6: Biocomputing
- Track 7: Cell and Tissue Engineering

In addition to the available strength tracks, students are permitted to design their own depth curriculum under the strong guidance of the BioE curriculum committee.

Course Requirements

Students accepted into the Bioengineering program will complete a rigorous core curriculum (24 SH) in basic bioengineering science followed by completion of the chosen immersion track curriculum (24 SH). The core emphasizes the breadth of topics that our graduates must appreciate as internationally competitive bioengineers. It utilizes existing courses within the College of Engineering as well as introducing new/external courses that are necessary and will be developed. The strength track curriculum permits students to closely affiliate with a group of faculty whose research is clustered around a particular bioengineering research area. To qualify to continue in the Ph.D. program, students must pass the Bioengineering Comprehensive Qualifying Examination, an Area Exam, and satisfactorily complete and defend a thesis dissertation, describing original research in bioengineering.

"The best part about Northeastern's Bioengineering program is its interdisciplinary nature. I am able to work together with physical therapists, mechanical engineers, as well as other medical professionals on the same projects. In addition to this, the coursework in the program provides a wide breadth of knowledge from engineering mathematics, to the mechanics of cells and tissues, to signal processing and to nanomedicine courses. The program has allowed me to bridge the gap between various types of life sciences and engineering. While research is the main priority in a Ph.D. program, the benefits I have gained from the Bioengineering coursework have exceeded my expectations."

Alexander Orsi, 3rd year Ph.D. Student

CONTACT

Program Director

Dr. Jeffrey Ruberti

Professor of
Bioengineering

Program Information and Admissions

617-373-2711

grad-eng@coe.neu.edu

FACULTY

Track 1: Biomedical Imaging and Signal Processing (BISP)

Dr. Dana Brooks

Dr. Deniz Erdogmus

Track 2: Biomechanics and Mechanobiology

Dr. Sinan Muftu

Dr. Jeffrey Ruberti

Track 3: BioMEMs/ BioNano

Dr. Nick McGruer

Dr. Shashi Murthi

Track 4: Biochemical Engineering and Bioenvironmental Engineering (BEBE)

Dr. Rebecca Carrier

Dr. April Gu

Track 5: Motor Control

Dr. Rifat Sipahi

Dr. Dagmar Sternad

Track 6: Biocomputing

Dr. Stefano Basagni

Dr. Miriam Leeser

Track 7: Cell and Tissue Engineering

Dr. Anand Asthagiri

Dr. Erin Cram

Northeastern University
College of Engineering

For more information about this program: www.coe.neu.edu/gse/programs/BioE

ABEMIS LLC

Advanced Bio-Engineering and Micro-Imaging Systems

MEZOSCOPE V.3+



"Astonishing!"

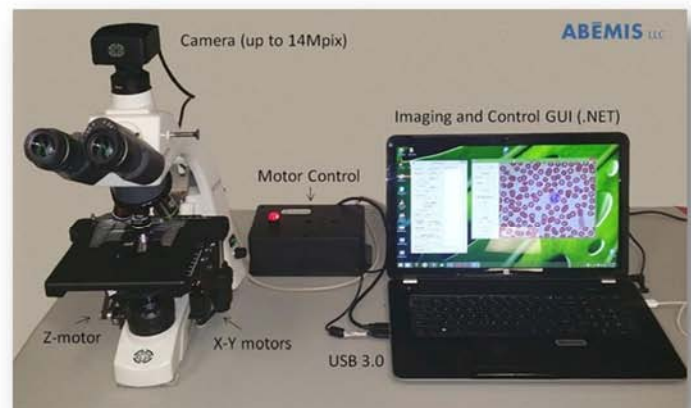
K.Meyer, Meyer
Instruments Inc.

Custom software includes novel (patent pending) fast focusing and 3-D Z-stepping algorithms. Our imaging and control GUI enables automated tiling (e.g. 2+3-D mosaics) to achieve whole-slide scans in minutes. Work is in progress for 'thick' specimen adaptive focusing methods, AI guided software-assisted diagnostics, live specimen feature-tracking, web interface for tele-medicine applications, and cloud solutions for image database storage/processing.

- Very fast stepper-motor control with simultaneous manual and automated modes
- Customizable software and easy-to-use 'base' GUI. Novel GUIs and tasks can be easily programmed.
- 3-D printed gantries for large specimens and novel applications (e.g. multiple slide imaging, circuit inspection, metrology, live specimen imaging for biology, field archeology, many more!)
- **AFFORDABLE. Fully motorized systems start at under \$20k including computer, camera, and controller.**
- **Integral micro-testing systems with uniaxial, biaxial and new tri-axial frames are available.**
- Phase contrast, DIC, multi-polarization, and fluorescent imaging are available as options, with fast, quantitative (statistic) Z-deconvolution. AI-assisted microscopy calibration and target *ident* (deep learning, recursive NN) are of particular interest, and in development. Compatible with all advanced Olympus objectives.

ABEMIS LLC develops novel, motorized microscopy and micro-testing systems for both standard imaging and *challenging* custom imaging/testing tasks.

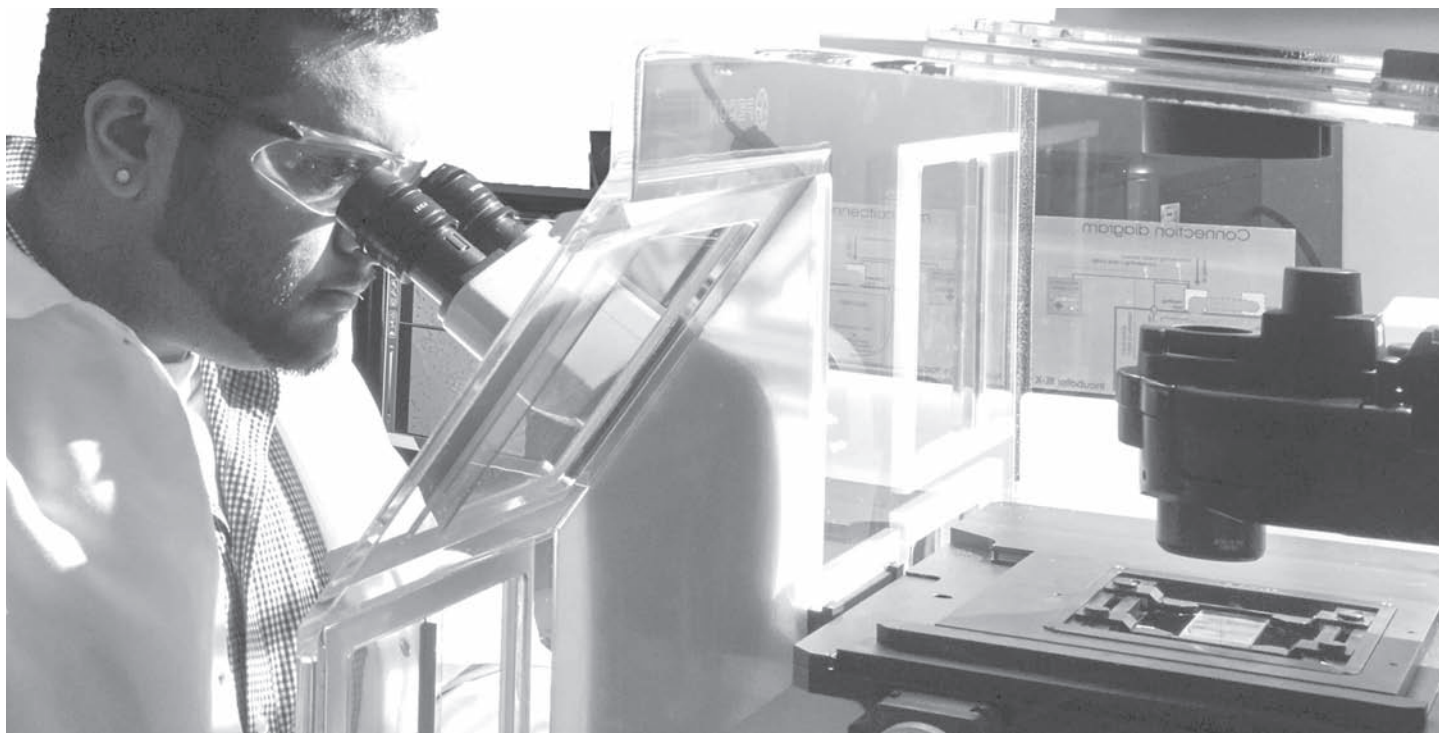
The ABEMIS MezoScope™ enables **full X-Y-Z motor control**, rapid imaging and custom gantries/software -- all developed (and customizable) **in-house**. We can address micro-testing and imaging problems (e.g. collagen fiber, large specimens) with innovative designs using our USB3.0 stepper-control hardware and software (.NET C#, GPU enabled imaging, OpenCV). We have designed the system with a simple button that turns on/off the motors, allowing *instant free manual control*. With the push of a single button the user can immediately perform fully automated imaging tasks (such as auto-focus and 3-D mosaic imaging).



Motorized, fully customizable micro-imaging.
Integral micro-testing systems (uniaxial, biaxial) available.

Contact Todd Doehring tcd@abemis.com and/or William (Bill) Nelson bn415@abemis.com for more information.

Visit: **Abemis.com**

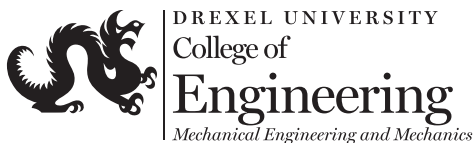


THE MECHANICAL ENGINEERING & MECHANICS DEPARTMENT OF DREXEL UNIVERSITY IS COMMITTED TO THE EDUCATION AND DEVELOPMENT OF THE NEXT GENERATION OF MECHANICAL ENGINEERS.

Discover the tools and unique environment that Drexel has to offer to foster scientific exploration, professional development and personal growth:

- Offering BS, MS and PhD degree programs as well as several accelerated degree program options such as BS/MS and MS/PhD
- Over 1,200 undergraduate and graduate students mentored by over 30 staff and tenured faculty members
- 16 state of the art research laboratories, including the A.J. Drexel Plasma Institute
- Grad students are actively conducting research in:
 - Biofluidics
 - Bio-inspired robotics
 - Joint and tissue biomechanics
 - Advanced biomanufacturing
 - Plasma medicine
 - Microfluidic devices as 3D tissue models
 - Smart composite materials design and analysis

LEARN MORE AT DREXEL.EDU/MEM

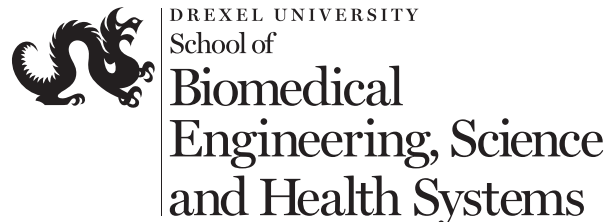


DREXEL UNIVERSITY'S SCHOOL OF BIOMEDICAL ENGINEERING, SCIENCE AND HEALTH SYSTEMS IS FOCUSED ON ACHIEVING CLINICAL AND INDUSTRIAL RELEVANCE THROUGH TEACHING AND TRANSLATIONAL RESEARCH.

Explore the way Drexel prepares students for emerging biomedical challenges:

- Offering BS, MS and PhD degrees in Biomedical Engineering and MS and PhD degrees in Applied Biomedical Science
- 850+ grad and undergrad students mentored by 36 core faculty and over 50 affiliated faculty from partner academic units
- Academic thrust areas in Biomaterials and Tissue Engineering, Neuroengineering and Integrated Bioinformatics
- Grad students are actively conducting research in:
 - Bioinformatics and Computational Bioengineering
 - Biomaterials and Tissue Engineering
 - Biomechanics
 - Cardiovascular Engineering
 - Drug Delivery
 - Neuroengineering

LEARN MORE AT DREXEL.EDU/BIOMED

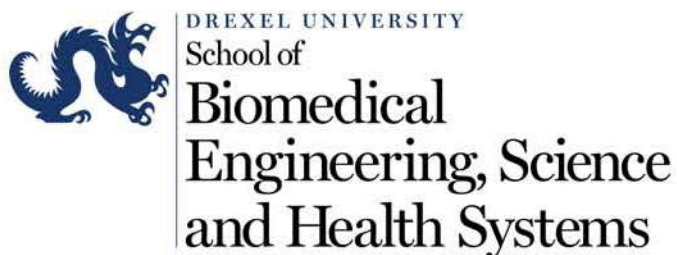


The 2016 Summer Biomechanics, Bioengineering and Biotransport Conference (SB³C) organizers gratefully acknowledge the support of our Academic and Industry Sponsors.



School of Engineering | Biomedical Engineering

Department of Biomedical Engineering and Mechanics



DEPARTMENT OF Bioengineering



SB³C 2016 - PROGRAM AT A GLANCE

Room	Wilson B	Wilson C	Wilson D	Annapolis 1	Annapolis 2	Azalea 2	Azalea 3
WEDNESDAY, June 29, 2016							
7 am – 1:30 pm	Committee Meetings (Magnolia 1, 2, 3)						
2:00-3:30 pm	Veterans Affairs Townhall						
3:45-5:15 pm	Nano, Micro, and Multi-Scale Mechanics in Cell/ Tissue Engineering	Modeling and Mechanosensitivity	Musculo-skeletal Soft Tissue Mechanics	Extracellular Mechanics in Aneurysm	Atherosclerosis	Musculoskeletal System and Design	Thermal Treatment and Hyperthermia
5:15-5:30 pm	Break						
5:30-6:30 pm	OPENING PLENARY – Dr. Subra Suresh (Wilson A)						
7:00-9:00 pm	Opening Reception (Orchard Terrace)						

THURSDAY, June 30, 2016							
7:00-8:00 am	Breakfast (Annapolis Foyer)						
All Day	Industry Exhibits (Annapolis Foyer)						
8:00-9:30 am	Engineering Translation: Disease Models and Outcomes	Design and Optimization of Cardiovascular Devices	Injury: Brain I	ATH Plaque Imaging and Mechanics	Aneurysm Biomechanics	Computational Mechanics and Simulations	Imaging and Modeling Physiologic Microflows
9:30-9:45 am	Coffee Break (Annapolis Foyer)						
9:45-11:15am	Cardiovascular Cell and Tissue Engineering	Safety and Biocompatibility in Medical Device Design	Injury: Brain II	Mechanics of Heart Valves	Cerebral Aneurysms	Musculoskeletal Soft Tissue: Disc	Cryopreservation and Cryotherapy
11:15-11:30am	Coffee Break (Annapolis Foyer)						
11:30am– 1:00pm	Point-of-Care Healthcare Technologies	New Medical Devices: FDA Approval Process	Robotic Testing Systems to Study Joint and Tissue Function	Active Teaching and Learning in Bioengineering			
1:00-3:15 pm	POSTER SESSION I --- Posters (Exhibit Hall A) with Lunch Including BS & MS Student Paper Competitions						
3:15-4:45 pm	Musculoskeletal Tissue Engineering: Micro to Macro	Reproductive Biomechanics	Solids Mechanics- Growth and Remodeling	Characterization of Cardiovascular Tissues	Physiological Valves	Trends, Tips, and Tricks in Biomechanical Enging Education	Cancer and Tumor Microenvironment
5:00-7:30 pm	Student Leadership Committee- Career Networking Mixer (Eastern Shore I)						

FRIDAY, July 1, 2016							
7:00-8:00 am	Breakfast (Annapolis Foyer)						
All Day	Industry Exhibits (Annapolis Foyer)						
8:00-9:30 am	V & V Uncertainty Quantification in Cardiovascular Modeling and Diagnostics	Non-canonical Models for Mechanobiology	Conquering the Remaining Challenges in Organ and Tissue Banking	Communicating Science Workshop			
9:30-9:45 am	Coffee Break (Annapolis Foyer)						
9:45-11:15am	PhD Competition: Signaling & Remodeling	PhD Competition: Mechanosensing & Mechanics	PhD Competition: Tissue Mechanics & Modeling	PhD Competition: Biomechanics of Injury	PhD Competition: Cardiac & Vascular	Undergraduate Design Competition	PhD Competition: Devices & Microfluidics
11:15-11:30am	Coffee Break (Annapolis Foyer)						
11:30am- 1:00pm	PLENARY SESSION II – Mow, Fung and Woo (Wilson A)						
1:00-3:15 pm	POSTER SESSION II --- Posters (Exhibit Hall A) with Lunch						
3:15-4:30pm	Mentee-Mentor Matching Mixer (Eastern Shore I)						
6:00-7:00 pm	Women's Networking Event (Eastern Shore I)						
7:30-10:00pm	BEDROCK CONCERT (Marina Promenade)						

SATURDAY, July 2, 2016							
11:45am-5pm	Industry Exhibits (Annapolis Foyer)						
11:45am- 1:15pm	Engineering the Cellular Microenvironment	Upper and Lower Extremity Joint Mechanics	Musculoskeletal Soft Tissue: Cartilage	Morphogenesis, Remodeling and Repair	Pediatric Cardiology and Embryology	Rehabilitation Devices, Modeling, and Control	Hemodynamic Flows and Devices
1:15-1:30pm	Coffee Break (Annapolis Foyer)						
1:30-3:00 pm	Mechanotransduction and Sub-Cellular Biophysics	Celebration for Vijay Goel: Spine Biomechanics	Bone Biomechanics	Solid Mechanics: Biomechanics of Injury	Thrombosis and Cardiac Flows	Human Dynamics of the Torso and Lower Extremities	Hemodynamics, Lymphatics and lung Therapy
3:00-3:15pm	Coffee Break (Annapolis Foyer)						
3:15-4:45 pm	Measuring and Modeling Cellular Phenomena	Ocular Biomechanics	Musculoskeletal Mechanics: Ligament and Tendon	Military Injury	Cardiovascular Diagnostics and Imaging	Biotransport at Multiple Scales	Respiratory Fluid Mechanics
4:45-5:00 pm	Break						
5:00-6:00 pm	LISSNER AWARD LECTURE – (Wilson A)						
6:00-7:00 pm	Lissner Reception (Eastern Shore and Terrace)						
7:00-10:00 pm	Banquet and Awards Ceremony (Wilson)						