PROGRAM BOOK

SB³C

biomechanics.
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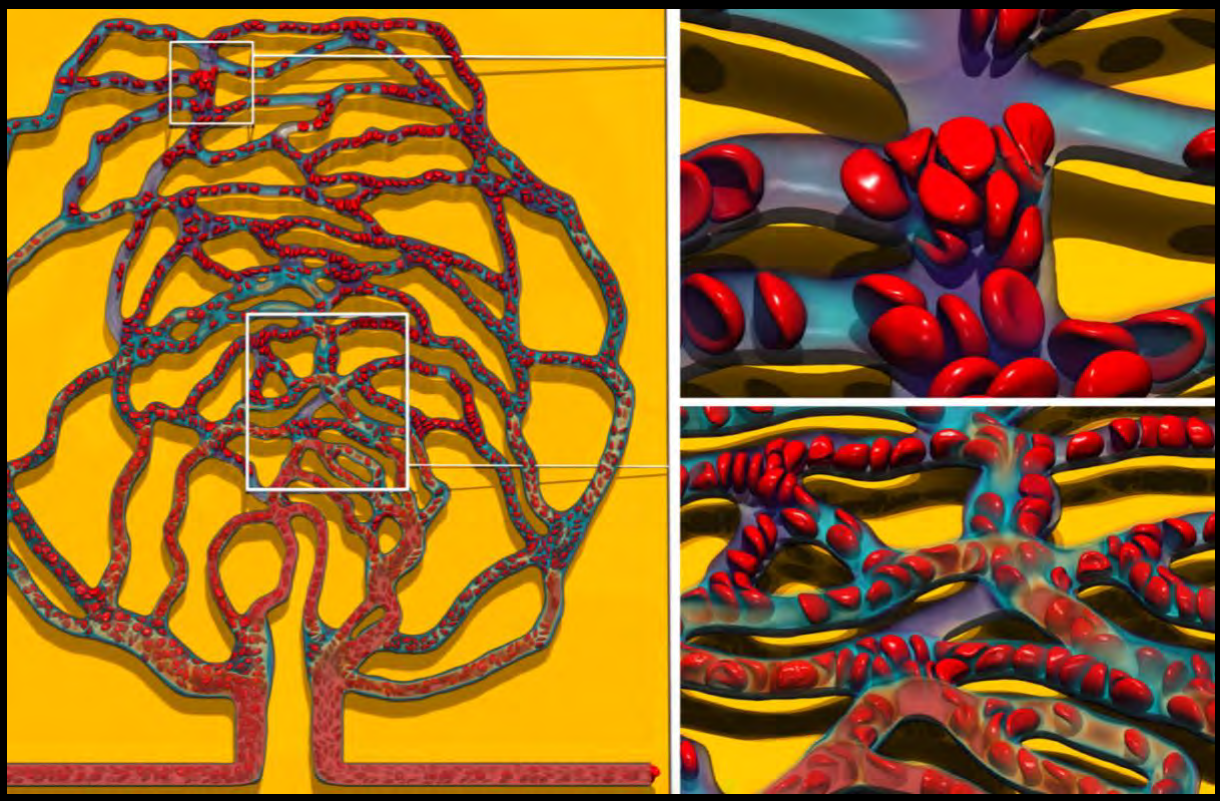
2023 Summer Biomechanics, Bioengineering, and Biotransport Conference

June 4th – 8th, 2023

Vail, Colorado



Building Interfaces Across Tissues, Disciplines, and Communities

Funding for this conference was made possible (in part) by the National Science Foundation and the National Institutes of Health. The views expressed in written conference materials or publications and by speakers and moderators do not necessarily reflect the official policies of the Department of Health and Human Services; nor does mention of trade names, commercial practices, or organizations imply endorsement by the U.S. Government. The 2023 Summer Biomechanics, Bioengineering, and Biotransport Conference (SB^3C) organizers gratefully acknowledge the support of the National Science Foundation and the National Institutes of Health.

Congratulations to the 2022 Cover Art Contest Winner:

Kacper Ostalowski, Joseph A. Insley, and Jifu Tan, Northern Illinois University.
Title: Direct Numerical Simulation of Blood Flow with Cells in Retina Vascular Network

Description: The photo depicts the transport of red blood cells through a patient-specific retina vascular network. The velocity magnitude is indicated by the background color in the tubes. The top inset illustrates the accumulation of cells in a T-branch vessel, while the bottom inset provides an enlarged view of cells in complicated vessels with branches and loops.

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1 Forward and Acknowledgement

Dear SB^{3}C Community,

On behalf of the entire Organizing Committee and the SB^{3}C Foundation, we welcome you to Vail for the 2023 Summer Bioengineering, Biomechanics and Biotransport Conference (SB^{3}C). This year's conference theme is "Building Interfaces Across Tissues, Disciplines, and Communities". This theme highlights three critical issues that face our community: (i) interfacing across basic research and translation, including biomechanics, bioengineering, and biotransport; (ii) interfacing across large research institutions and institutions with fewer research opportunities, including many minority-serving institutions; and (iii) developing emerging fields with high translational potential, including biomechanics and biotransport at tissue interfaces and focus areas such as women's health. Our plenary speaker, Dr. Amy Wagoner-Johnson, exemplifies this theme, with work that bridges fields such as biomaterials and biomechanics with understudied areas such as women's reproductive health. We hope that attendees will look for the theme of building interfaces throughout the conference and be inspired to apply these approaches to their own research.

At SB^{3}C 2023, we will honor several ASME medal winners through award lectures. The H.R. Lissner Medal winner, Dr. Boris Rubinsky, is honored for the invention of numerous medical technology devices used to treat tens of thousands of patients worldwide, including imaging-monitored multiprobe cryosurgery, among others. Dr. Alison Marsden will receive the Van C. Mow Medal for her scholarly work in pediatric cardiology, advancements in surgical care of children with heart defects, and exemplary leadership in ASME and women in STEM. Dr. Jessica Oakes will receive the Y.C. Fung Early Career Medal for outstanding work in respiratory mechanics that has significantly advanced the understanding of asthma, smoking, and inhalable drug delivery, and for strong advocacy in diversity, equity, and inclusion efforts. Dr. Tamara Bush will be honored as the winner of the Savio L-Y. Woo Translational Biomechanics Medal for innovative work in several biomechanical areas, including thumb biomechanics, that have direct clinical application in improving patient outcomes. Dr. Victor Barocas will receive the Robert M. Nerem Education and Mentorship Medal for exceptional commitment to undergraduate and graduate education as a teacher, mentor, administrator, editor, and advocate for community and diversity in bioengineering. We congratulate the awardees and encourage you to attend their plenary talks.

A highlight of our conference is the Student Paper Competition (SPC), which awards top students at the BS, MS, and PhD levels. The SB^{3}C Foundation will support awards for all winners and travel for 36 PhD finalists. Additional funding from the NSF will support travel for the top SPC BS and MS finalists. If you're a student, be sure to attend the professional development and social activities planned by the ASME-BED Student Leadership Committee (SLC), including an axe-throwing melee in the Zen Patio (we're not kidding).

Finally, with support from the NIH, NSF, and our diversity sponsors, we will celebrate the diversity of our community throughout SB^{3}C 2023. Diversity travel awards will support 49 students to attend the conference, many for the first time. We will also enjoy a Diversity Mentorship event, LGBTQ+ Networking, and a Women's Networking events. Please take advantage of these opportunities to learn how to support ALL bioengineers.

We hope you take time to relax, reconnect with colleagues you have known for years, and meet new colleagues who will become lifelong friends and collaborators. Enjoy the beautiful activities in and around Vail. We thank the entire SB^{3}C Organizing Committee, the ASME-BED Technical Committees and SLC, Boscov's Travel, the SB^{3}C Foundation, and all the abstract reviewers and SPC judges who are essential to the success of our conference.

Enjoy the conference, and please join us again in 2024!

Stavros Thomopoulos, Conference Chair
Columbia University

Guy Genin, Program Chair
Washington University at St. Louis

1.1 Conference Code of Conduct

Conference organizers expect all participants to ensure a safe environment. The SB^{3}C Foundation and the conference organizers are dedicated to providing a harassment-free experience for everyone, regardless of gender, gender identity and expression, age, sexual orientation, disability, physical appearance, body size, race, ethnicity, religion (or lack thereof), or technology choices. We do not tolerate harassment of conference participants in any form, including bullying, discrimination, inappropriate physical contact, and intimidation. Sexual language and imagery are appropriate only within the context of conference content relating specifically to reproductive health, and are not appropriate for any other conference venue, including talks, workshops, parties, Twitter and other online media. By attending the SB^{3}C, you agree to follow this Code of Conduct. We thank you for helping us continue to make the SB^{3}C a respectful and welcoming event for all participants.

If you experience or witness harassment or any other behavior that violates this code of conduct, please report it immediately to the Conference Chair (chair@sb3c.org). We take all reports of harassment seriously and will respond promptly to investigate and address the situation. All communications will be kept confidential. Individuals who have questions, concerns or complaints related to harassment are also encouraged to contact the HHS Office for Civil Rights (OCR). Information about how to file a complaint with HHS OCR can be found on the OCR's webpage. Filing a complaint with the Conference Chair is not required before filing a complaint of discrimination with HHS OCR, and seeking assistance from the Conference Chair in no way prohibits filing complaints with HHS OCR. Furthermore, individuals can also notify the NIH about concerns of harassment, including sexual harassment, discrimination, and other forms of inappropriate conduct at NIH-supported conferences.

After de-identifying the individual who made the complaint, the conference chair will discuss the complaint with the Program Chair and the Diversity Chair and offer the accused individual or individuals the opportunity to defend themselves against the complaint. Conference participants violating these rules may be sanctioned or expelled from the conference without a refund at the discretion of the conference organizers. All allegations will be reported to the HHS Office for Civil Rights for further investigation. Sanctions may additionally include reporting to the violator's home institution for further investigation and/or disallowing registration and participation in future SB^{3}C meetings.

1.2 Conference COVID Policy

The health and safety of our attendees and guests at SB^{3}C 2023 is paramount. As such, we encourage all attendees to self-administer a COVID test no more than one day prior to arrival at the conference site. There is no need to log or report negative test results.

If your test is positive, please stay home and email info@sb3c.org immediately. If you are already onsite and feel unwell at any point or test positive, please self-quarantine in your guest room and contact info@sb3c.org immediately. Free test kits are also available from the U.S. federal government for U.S. residents, and we highly recommend bringing some to the meeting. For our international guests, if your country requires testing for re-entry, our SB^{3}C registration desk will have recommended testing sites for your convenience.

All attendees and hotel staff are encouraged to wear masks when indoors, except when presenting, eating, or drinking. We will provide as many opportunities as possible to eat and drink outdoors.

We appreciate your partnership in ensuring the health and safety of all of our guests. We will continue to monitor the situation and adjust these policies as needed.

2 General Information

All times below are in MT.

2.1 Registration Hours

The registration desk will be open during the following hours:

Sunday, June 4	12pm – 7:30pm
Monday, June 5	7:30am – 1:30pm
Tuesday, June 6	8am – 1:30pm
Wednesday, June 7	12:30pm – 4:30pm
Thursday, June 8	1pm – 3pm

2.2 Networking Events

Sunday, June 4, 2023, 5:30 - 7:00 PM, Cascade ABC
Industry/Exhibitor Networking Event
We invite you to join us for a special networking mixer following our Translational Technology Pitch Competition. Network with the competition finalists, Industry panelists, and our Exhibitors. This is also a great opportunity for current and future Junior Faculty who are looking to purchase equipment for their labs to talk to our Exhibitors!

Monday, June 5, 2023, 3:15 - 4:15 PM, Cascade ABC
LGBTQ+ Networking Event
This is a great opportunity to meet your fellow LGBTQ+ and ally colleagues at SB3C. The event will include icebreaker games and a special trivia game focusing on the history of the Pride month. Snacks will be served. We hope to see you there!

Monday, June 5, 2023, 6:30 - 8:30 PM, Alpine Hall
Welcome Reception

Tuesday, June 6, 2023, 1:00 - 2:30 PM, Outdoor Tent
Prospective Junior Faculty Poster Session
During this poster session, senior graduate students and postdocs will network with faculty members attending SB3C, for the purpose of presenting a vision for their future faculty careers. Participants are encouraged to practice their presentation of a cohesive research record and compelling research plans for the future, while also highlighting their experiences and plans in the areas of funding, teaching, and service. The goal of this event is to foster, within the supportive community of SB3C, the development of young and diverse researchers in biomechanics, bioengineering, and biotransport.

Tuesday, June 6, 2023, 4:00 - 5:00 PM, Cascade ABC
Women's Networking Event
The purpose of the ASME BED Women's Group is to provide mentoring, networking and communication for women involved in biomedical engineering to help further their careers and facilitate award nominations.

Tuesday, June 6, 2023, 7:00 - 9:00 PM, Zen Garden
ASME BED Student Networking Event and Axe-Throwing Melee
Join us for the SB3C 2023 Student Networking Event hosted by the ASME BED Student Leadership Committee (SLC)! All students attending the conference are invited to unwind and connect with one another outdoors. Students will be introduced to the current SLC members, learn more about our mission to support the bioengineering student community, and hear about opportunities to contribute. Afterward, students can network over outdoor games such as axe throwing.

Wednesday, June 7, 2023, 7:00 - 10:00 PM, Zen Garden
20th Anniversary BEDRock Concert
The SB^3C conference date and venue each year coincide with the annual concert of BEDrock, the world's most influential unknown band. This year, the band will gather at the SB^3C for its 20th year anniversary! (Many of you will recall their Miami debut in 2003). Come dance to the band as it takes us through a history of the BEDrock repertoire. Come see if this is the year we lose a percussionist to spontaneous human combustion! There is never a cover charge and all are invited.

Thursday, June 8, 2023, 7:00 - 10:30 PM, Alpine Hall
Banquet and Awards Ceremony
Be sure to plan your travel to enable you to stay through the banquet that closes the conference! In addition to a final gathering with all your friends and a dining experience designed by Corey Neu, the winners of the student competitions will be announced. The ASME Medals and awards will be presented at the banquet. You won't want to miss it.

2.3 Committee Meetings

The committee meetings listed below are open to all except the ASME BED Executive meeting, SB^{3}C Board meeting, and the JBME Editors meeting. Attending these meetings is a terrific way to get more involved with the Bioengineering Division of the ASME! Please consider joining one or more of the meetings listed below.

Monday, June 5

ASME Bioengineering Division (BED) Executive Meeting	Valhalla	2:15 - 3:45 PM

Wednesday, June 7

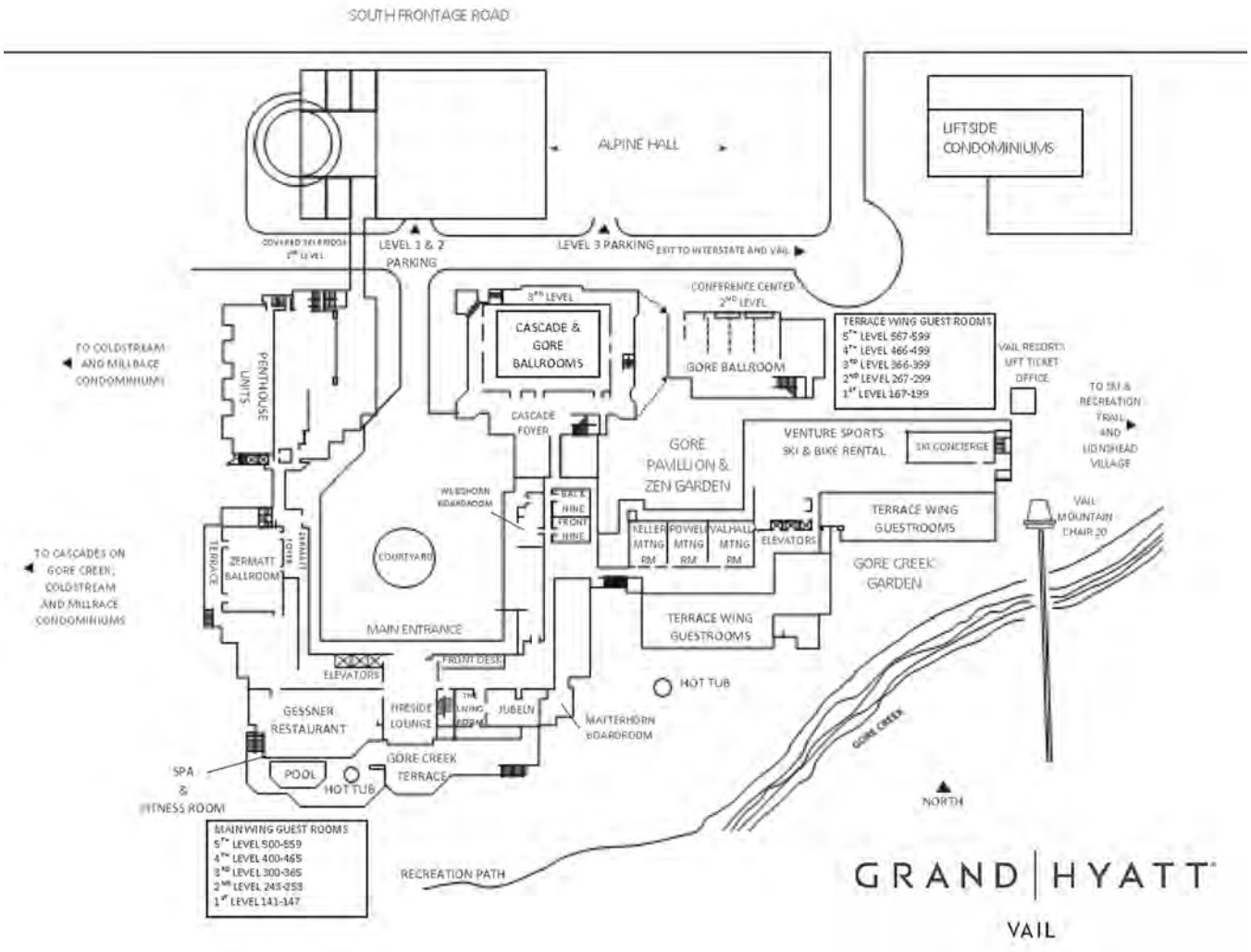
SB^{3}C Board Meeting	Valhalla	7:30 - 8:30 AM
Industry Meeting	Cascade ABC	8:30 - 9:20 AM
Fluid Mechanics Meeting	Cascade D	8:30 - 9:20 AM
Education Meeting	Gore AB	8:30 - 9:20 AM
Tissue and Cellular Engineering Meeting	Gore CD	8:30 - 9:20 AM
Biotransport Meeting	Cascade ABC	9:30 - 10:20 AM
Design, Dynamics, and Rehabilitation Meeting	Cascade D	9:30 - 10:20 AM
Solid Mechanics Meeting	Gore CD	9:30 - 10:20 AM
ASME BED Open Business Meeting	Gore CD	10:30 - 11:30 AM
Journal of Biomechanical Engineering Editors Meeting	Valhalla	11:30 AM - 1:30 PM
ASME BED Student Leadership	Zermatt	5:00 - 6:00 PM

2.4 Instructions for Poster Presenters

The poster exhibit tent is located near the Zen Garden and will be available to attendees starting on Monday morning. Poster boards will be identified by a number corresponding to the abstract number of the poster listed in the Program Book (P1, P2, etc.). Please hang your poster at the corresponding number. Posters for Poster Session I should be set up before 12:30pm and must be removed by 5:30 pm on Monday, June 5. Posters for Poster Session II should be set up before 12:30 pm and must be removed by 5:30 pm on Tuesday, June 6.

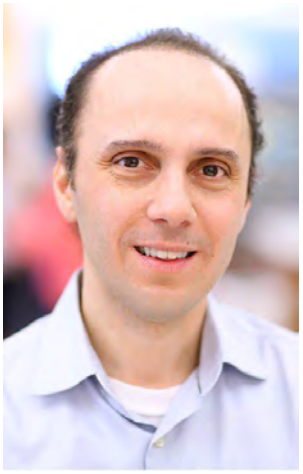
Poster Session I will be held on Monday, June 5th, 2022 from 1:00pm – 2:30pm. Poster Session II will be held on Tuesday, June 6th, 12:45pm – 2:15pm. Authors should stand next to their poster during the assigned session. Authors may also stand at their posters at any time, such as during scheduled breaks.

2.5 Conference Site Map



3 Conference Organizing Committees

3.1 Organizing Committee



Stavros Thomopoulos, Conference Chair
Columbia University

Guy Genin, Program Chair
Washington University at St. Louis

Diversity Chair
Mona Eskandari
UC Riverside

Exhibits Co-Chair
Craig Goergen
Purdue U

Exhibits Co-Chair
Kyoko Yoshida
U of Minnesota

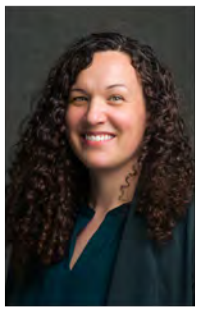
Finance Chair
Vicky Nguyen
Johns Hopkins U

Info/Online Chair
Brianne Connizzo
Boston U

Local Arrangements
Corey Neu
U of Colorado

Publications Chair
Grace O'Connell
UC Berkeley

Social Media Chair
Colleen Witzenburg
U of Wisconsin



Student Paper Comp.
Kristin Miller
UT Dallas

3.2 ASME-BED Technical Committee Chairs

Bumsoo Han, Biotransport Committee Chair, Purdue University
Sihong Wang, Biotransport Committee Co-Chair, City College of New York
Anita Singh, Design, Dynamics, & Rehabilitation Committee Chair, Temple University
Antonia Zaferiou, Design, Dynamics, & Rehabilitation Committee Co-Chair, Stevens Institute
Alejandro Roldan-Alzate, Fluids Committee Chair, University of Wisconsin-Madison
Lucas Timmins, Fluids Committee Co-Chair, University of Utah
Victor Lai, Education Committee Chair, University of Minnesota
Zhongping Huang, Education Committee Co-Chair, West Chester University
Chiara Bellini, Education Committee Co-Chair, Northeastern University
Ethan Kung, Industry Committee Chair, Clemson University
Lin Li, Industry Committee Co-Chair, Eli Lilly
Kristin Myers, Solid Mechanics Committee Chair, Columbia University
David Pierce, Solid Mechanics Committee Co-Chair, University of Connecticut
David Corr, Tissue & Cellular Engineering Committee Chair, Rensselaer Polytechnic Institute
Alix Deymier, Tissue & Cellular Engineering Committee Co-Chair, Rensselaer Polytechnic Institute

3.3 Student Paper Competition Committee

Kristin Miller, Chair, University of Texas, Dallas
Megan Killian, Ph.D. Level, University of Michigan
Mariana Kersh, M.S. Level, University of Illinois at Urbana-Champaign
Mary Kathryn Sewell-Loftin, B.S. Level, University of Alabama at Birmingham
Anita Singh, Undergraduate Student Design Competition, Temple University

Thank you to all committee members!

4 Special Sessions, Plenary Speakers, and Workshops

Sunday, June 4	Time 4:00 - 5:30 PM

Translational Technology Pitch Competition **Zermatt**

Translational Technology Pitch Competition" at this year's SB3C Conference in Vail, Colorado will highlight the excellent translational work within our research community. This will be a presentation-style session wherein a screened set of finalists will give brief pitches to a panel of academic and industry experts.

Submitted abstracts were reviewed based on product concept impact, clarity of development path, and overall mission. Selected abstracts get an opportunity to present in front of a panel consisting of industry and academic experts. The panel will cross-examine each team in a fast-paced series of questions before providing feedback on the technology, regulatory and business path forward. A networking mixer will follow in Cascade ABC from 5:30-7:00pm.

Sunday, June 4	Time 5:30 - 7:00 PM

Industry and Exhibitor Networking Event **Cascade ABC**

We invite you to join us for a special networking mixer following our Translational Technology Pitch Competition. Network with the competition finalists, Industry panelists, and our Exhibitors. This is also a great opportunity for current and future Junior Faculty who are looking to purchase equipment for their labs to talk to our Exhibitors!

Sunday, June 4	Time 5:30 - 7:00 PM

Effective Experimental and Computational Workflows with Applications to Biological Tissues **Gore AB**

Organizers: Luke Mattar, University of Pittsburgh, Caleb Berggren, University of Utah, Rouzbeh Amini, Northeastern University

Developing and fine-tuning workflows to answer important research questions can be challenging for students at all career stages. Thus, the goal of the workshop is to expose trainees to various workflows commonly used to conduct computational and experimental studies involving biological tissues. The workshop will be approximately 75 minutes long and feature 3 diverse panel members who will demonstrate their workflows live and allow for direct dialogue between all attendees (including QA). The workshop will also provide trainees an opportunity to network and learn from leaders in the community while bridging the gap between different disciplines. Furthermore, the workshop will provide a crucial opportunity for individuals to learn how they can become involved in the ASME-BED Student Leadership Committee to assist the future generation of students attending the annual SB3C conference.

Monday, June 5	Time 4:15 - 6:15 PM

Promoting Research Self-Efficacy to Facilitate Inclusion and Diversity in Mentoring Relationships **Gore AB**

Program Directors: The event will be led by guest speaker Dr. Diana Azurdia, the Director for the Graduate Programs in Biosciences at UCLA

Self-efficacy is the perceived confidence people have in their ability to perform a specific task or skill. This often stems from our diverse life experiences. This interactive workshop is designed to help students and faculty thrive in the mentoring relationship, as well as, offer a forum for participants to share experiences with one another and build community. The event will be led by Dr. Diana Azurdia, the Director for the Graduate Programs in Biosciences at UCLA where she leads a strategic plan to enhance diversity in the biomedical graduate student population. Dr. Azurdia is Guatemalan-American and the first in her family to attend college. She received her B.S. from CSULA and her Ph.D. in Biochemistry and Molecular Biology from UCLA. A major area of focus includes cultivating a strong inclusive graduate training culture through program development in the areas of personal well-being, professional development, mentorship, and leadership. Dr. Azurdia's research examines the doctoral training years to identify disparities in academic outcomes, with the goal of developing effective programmatic interventions. Additionally, she uses her platform as a Center for the Improvement of Mentored Experience in Research (CIMER) Principal Facilitator to promote inclusive mentoring practices nationally.

Tuesday, June 6	Time 8:00 - 9:15 AM

Blurring interfaces across engineering + X: a brief look across several projects with a deeper dive into the mechanical and structural microenvironment of cervix **Alpine Hall**

***Plenary**: Amy Wagoner Johnson, Carle Illinois College of Medicine*

Here, I will briefly describe my experience in blurring interfaces in research and education/administration, including engineering materials for coral restoration and as a faculty member and leader in the first engineering-based college of medicine. I will then focus on research related to the mechanics of the cervical microenvironment with applications to preterm birth (PTB). PTB birth affects millions of families annually and the rate of PTB is increasing, despite advances in care. The cervix helps maintain pregnancy; it is firm early and softens, or remodels, and changes shape as pregnancy progresses, allowing the fetus to pass during birth. Early changes to the cervical microstructure and/or shape

of the proximal end, called cervical funneling, correlate with PTB.
Our recent work shows the heterogeneity of cervical remodeling with pregnancy and how heterogeneity can lead to funneling. We further used indentation as a tool to probe heterogeneous and anisotropic microscale response of cervix and showed that cross-linking of collagen fibrils and glycosaminoglycans-facilitated deformation contribute to time-dependent and shear-regulated constituent interactions. These interactions lead to a stiffer response with longitudinal fiber deformation. Understanding the evolution of microstructural and compositional changes and the associated deformation mechanisms may lead to early detection and treatment, thus decreasing risk for PTB.

Tuesday, June 6	**Time 2:15 - 3:45 PM**

Integration of Uncertainty Quantification into Experimental and Computational Biofluid Mechanics — **Cascade E**

***Organizers**: Alejandro Roldán-Alzate, University of Wisconsin - Madison, Lucas Timmins, University of Utah*

Advances in experimental and computational biofluid mechanics have yielded a remarkable understanding of the complex flow features across the physiologic domain. As a result, these data are advancing knowledge on the role of biofluid mechanics across the molecular, cellular, tissue, and organ levels. Furthermore, data are increasingly being integrated into clinical decision-making, medical device design, and FDA production evaluation. Unfortunately, experimental and computational studies are marred by uncertainties that limit confidence in experimental analysis and model predictions. While not always acknowledged, uncertainties exist in, for example, velocity measurements, image noise, boundary conditions, segmented anatomy, and tissue material properties that propagate to variability in output measures. This workshop aims to introduce advances in uncertainty quantification (UQ) and discuss their direct application across research domains in biofluid mechanics. We anticipate this workshop will appeal to colleagues in both experimental and computational biofluid mechanics and offer an opportunity to engage with colleagues in biosolid mechanics, where UQ has immediate application.

Tuesday, June 6	**Time 2:15 - 3:45 PM**

Bridging Length Scales in Tissue Mechanics with Image Based Mechanics — **Powell**

***Organizers**: Ottman Tertuliano, University of Pennsylvania, Callan Leutkemeyer, University of Illinois, Corey Neu, University of Colorado*

Understanding the deformation and failure mechanics of tissues in a context that spans fundamental and clinical applications has been challenging. This is in part due to the imaging disparity between smaller scale laboratory tissue characterization and lower resolution clinical, diagnostic capabilities. Constructing a holistic understanding of tissue deformation via experiments and computations across length scales would help bridge this divide. I.e., what can one tissue length scale tell us about another? The goal of this workshop is to promote cross-fertilization of ideas and collaborative experimental and computational methods that can advance our understanding of deformation in tissues across length scales by coupling image-based techniques with mechanics. Image references: Kakaletsis et al. BMMB (2022), Sieverts et al. Commun. Mater (2022), McGhee et

al Exp. Mech. (2022), Bayat et al. Ultrasound Med. Bio. (2020) , Tertuliano et. al. Bioinsp Biomim. (2021), Luetkemeyer et al. JMPS (2021).

Wednesday, June 7	**Time 9:30 AM - 12:30 PM**

Force Based Manipulative Therapy for Spine Treatment: What is it and how can engineers help? **Cascade E**

Organizers: *Beth Winkelstein, University of Pennsylvania, Victor Barocas, University of Minnesota, Arin Ellingson, University of Minnesota*

This workshop will provide an overview SPINEWORK, an-NIH funded initiative to build a network of researchers and projects dedicated to understanding mechanisms by which force-based manipulations (FBMs) may alleviate spine pain. Force-based manipulations, such as those used by chiropractors and massage therapists, offer great promise as non-drug-based therapeutic approaches for neck and low back pain, but how and why they help is not well-understood, nor is the variability in their effectiveness across individuals and/or patient populations understood. An additional challenge with FBM research is that as an alternative therapy, FBM lacks a history of connection between the practitioners and relevant engineering and physiology research communities. The goal of this workshop is to begin to do that – by educating engineers and trainees about relevant issues of (1) FBM methods, (2) spinal pain, and (3) possible opportunities for research. Attendees will interact with practitioners, and build connections across disciplines and beyond engineering.

Wednesday, June 7	**Time 9:30 AM - 1:30 PM**

SimVascular Workshop **Zermatt**

Organizers: *Alison Marsden, Stanford University, David Parker, Stanford University, Shawn Shadden, UC Berkeley, Vijay Vedula, Columbia University, Nathan Wilson, Open Source Medical Software Corporation*

SimVascular is a fully open-source software package providing a complete pipeline from medical image data to cardiovascular blood flow simulation results and analysis. It offers capabilities for image segmentation, unstructured adaptive meshing, physiologic boundary conditions, and multi-physics simulations. The svFSI finite element solver incorporates fluid structure interaction capabilities, including large deformation motion with an Arbitrary Lagrangian Eulerian (ALE) formulation, electrophysiology, and cardiac mechanics solvers. An accompanying vascular model repository (VMR) provides over 150 freely available clinical data sets with image data and simulation results from different parts of the vascular anatomy. The VMR supports research in machine learning, medical devices, and reduced order modeling. Extensive online documentation and video tutorials with clinical examples are provided online.

In this workshop, we will offer focused sessions tailored to new and experienced users. New users will be guided through step-by-step tutorials, covering basic steps of model construction, meshing, flow simulations, and best practices (and pitfalls to avoid) for high quality results. For experienced users, we will cover advanced topics such as cardiac mechanics and electrophysiology, reduced order modeling, interactive surgical planning, and automated scripting via the Python interface. Users will have the opportunity to discuss current challenges from their research with the SimVascular developers and thus

participants are encouraged to bring their own models and questions to the workshop.

Wednesday, June 7	**Time 9:30 AM - 11:30 AM**

Reimagining Scientific Visualization with Augmented Reality **Gore AB**

***Organizers**: Manuel Rausch & Mrudang Mather, University of Texas - Austin*
Augmented reality (AR) is a next-generation visualization paradigm that boasts many advantages over existing data visualization tools such as images, videos, and scientific visualization software. Specifically, AR visualizations can represent the complete spatiotemporal aspects of data, are interactive in nature, and are easily accessible via smartphones. However, they've found limited adoption in the scientific community to date. This is, in part, due to the domain-specific expertise and proprietary software and hardware previously required to create AR models. To help overcome these challenges, in this workshop we will introduce the fundamentals of computer graphics and 3D modeling required to create AR visualizations and open-source tools to create, host, and share AR models of scientific results. Specifically, we will help attendees create and share AR models of their very own scientific results. Furthermore, attendees will leave this workshop with the requisite knowledge and skills to integrate AR within their own teaching, research, and outreach activities.

Wednesday, June 7	**Time 11:30 AM - 1:30 PM**

Machine Learning in Biomechanics and Imaging **Powell**

***Organizers**: Stephanie Cone, University of Delaware, Daniel Cortes, Penn State University*
The Machine Learning in Biomechanics and Imaging workshop will provide an introductory overview of Machine Learning (ML) fundamentals, and then will highlight current ML applications in biomechanics and imaging research. ML is a tool that can be used in virtually all areas in biomechanics to increase data throughput and enhance the reliability of analyses. ML is speeding up and revolutionizing paradigms in healthcare, precision medicine and wearable sensing among other fields of interest to SB3C attendees.

Thursday, June 8	**Time 9:00 AM - 1:00 PM**

CRIMSON Workshop **Cascade ABC**

***Organizers**: Alberto Figueroa Alverez, Abhilash Malipeddi & Elizabeth Livingston, University of Michigan*
This workshop will demonstrate the CRIMSON (CardiovasculaR Integrated Modelling and SimulatiON) software environment. CRIMSON is a powerful, user-friendly system for computational hemodynamics studies. The package encompasses segmentation of vascular structures from medical images, construction of arterial geometric models, finite element mesh generation, designing and applying boundary conditions, running incompressible Navier-Stokes simulations, and post-processing and visualizing output fields such as velocity, pressure and wall shear stress.

CRIMSON leverages open-source standards such as MITK, VMTK, OpenCascade, and Verdandi, and provides state-of-the art 1D and 3D fluid-structure interaction solvers. It is easily customizable.

The workshop will include an overview of the workflow and basic features of the software, including the Python interface. The workshop will also include demonstrations. Participants are encouraged to download the software prior to the meeting and install it on their laptops. The Windows version is preferred, although a Linux version is available as well. Participants are also encouraged to review the software documentation available on the CRIMSON website prior to the meeting. Participants are encouraged to contact the workshop organizers prior to meeting if they are interested in developing their own Python-based scripts for material or boundary condition specification.

Thursday, June 8	**Time 9:00 AM - 1:00 PM**

FEBio Workshop **Cascade D**

Organizers*: Jeffrey Weiss, University of Utah, Gerard Ateshian, Columbia University*
The FEBio workshop will offer beginning and intermediate users of FEBio a full-day course on how to setup FEBio models, run, and analyze them. All demos will be given using FEBioStudio, the new, fully integrated software environment for FEBio.The workshop will be divided in several focused, hands-on sessions, with topics including importing geometry, creating surface and volume meshing, doing solid mechanics and biphasic analyses, handling material anisotropy, setting up contact models, performing parameter optimizations, and more. Participants will also learn proven techniques for debugging their models, avoiding common pitfalls, and improving runtime performance. There will also be opportunities for discussing specific modeling challenges with the FEBio developers, so participants are encouraged to bring their own models and questions to the workshop.

Thursday, June 8	**Time 9:00 AM - 1:00 PM**

Stem Cell Bioengineering for Modeling Development and Disease **Core AB**

Organizers*: Jianping Fu, University of Michigan, Xioming He, University of Maryland*
In the past decade, stem cell-derived embryo and organ models (embryoids and organoids) have been developed to recapitulate different aspects of mammalian development. However, these embryoids and organoids only recapitulate limited aspects of the multiscale orders manifested during mammalian development. Their limited biological fidelity, with restricted developmental potential or tissue- or organ-level phenotypes and functions, hinders both mechanistic studies of mammalian development as well as translational applications. Through integrating bioengineering technologies, there is a recent emerging trend in the development of embryoids and organoids to reconstruct higher-order developmental events, including long-range tissue patterning and morphodynamics, tissue-tissue interactions, as well as organism-level organizations and functions. Thus, the aspiration for this workshop is to bring together stem cell bioengineers, theoretical physicists, and biomaterial scientists, who share common interests in studying mammalian development, to tackle emerging open questions in the field of embryoids and organoids. In this workshop, we will put together a theme and discussion framework useful for developing high-fidelity embryoids and organoids that display hierarchies in multiscale orders. Under this framework, we will invite renowned researchers to discuss their recent work in the development of embryoids and organoids that acquire higher-level orders through diverse bioengineering approaches.

Thursday, June 8	Time 9:00 AM - 1:00 PM

Demystifying the Review and Editing Process **Powell**

***Organizers**: Darryl Dickerson, Florida International University*

This workshop is designed to provide current and potential reviewers/editors of the Journal of Biomechanical Engineering with an opportunity to discuss their practices and to generate practical advice for reviewing and editing manuscripts in the biomechanical engineering field. All participants will be introduced to the Journal of Biomechanical Engineering and its review and editing processes. Participants will be placed in small groups with varying levels of reviewing and editing experience in each group. Groups will engage in discussion to discuss various aspects of reviewing and conduct a mock review of a journal paper. Based on this experience, groups will generate and report out on their "Advice for Authors" and "Advice for Reviewers". Groups will generate and report on their Advice for Editing. The Journal of Biomechanical Engineering editorial board will then serve as a panel to answer questions from participants generated by the activities. The facilitators will synthesize the discussion and provide resources to help participants apply their new skills in reviewing and editing in their own scholarship. Participants will be asked to sign up for reviewing and potential guest editor opportunities in the Journal of Biomechanical Engineering.

5 Awards

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
2017 Gerard A. Ateshian
2018 Louis J. Soslowsky
2019 Jennifer S. Wayne
2020 Larry A. Taber
2021 C. Ross Ethier
2022 Lori Setton
2023 Boris Rubinsky

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.

2023 Boris Rubinsky, Ph.D.

Prof. Rubinsky Boris received his BSc and MSc from the Technion in Israel and the Ph.D. from MIT. In 1980 he joined the Mechanical Engineering Department at UC Berkeley and later the UC Berkeley Bioengineering Department, of which he was one of the founders. At UC Berkeley he was the Chancellor's Professor and the Silverman Distinguished Professor of Bioengineering till 2008 and is now a Professor of the Graduate School. From 2007 to 2009, he took a leave of absence, to found the Department of Bioengineering and the Center for Bioengineering in the Service of Humanity and Society at the Hebrew University that brought together Israeli and Palestinian students. PhD graduates from that program are now Professors at top Israeli and Palestinian Universities. Rubinsky's research spans numerous areas, from plasma arc welding in space to Weierstrass- Mandelbrot modeling of turbulence. He contributed to various fields of bioengineering, pioneering several leading medical technologies, which he led from pioneering the concept to developing the clinical practice and commercialization. Noteworthy are the technology of imaging monitored cryosurgery which is now the clinical standard of the field, the technology of non-thermal irreversible, which is now clinical and at the forefront of minimally invasive surgery, the technology of non-invasive electromagnetic detection of internal bleeding which is in clinical trials, MEMS technology for single cell analysis which is now ubiquitous and many others.

Robert M. Nerem Education and Mentorship Medal

The Robert M. Nerem Education and Mentorship Medal is given to an individual who has demonstrated a sustained level of outstanding achievement in education and mentoring of trainees. Examples of meritorious activities include leadership within the nominee's institution, mentoring activities that are above and beyond those expected from others employed in similar positions, mentoring activities tailored to meet the needs of the trainees, and innovative mentoring activities.

2018 Roger D. Kamm
2019 Kenneth R. Diller
2020 Dawn M. Elliott
2021 Maury L. Hull
2022 Michele Grimm
2023 Victor Barocas

2023 Victor Barocas, Ph.D.

Victor Barocas received his B.S. and M.S. in Chemical Engineering from MIT and his Ph.D. in Chemical Engineering from the University of Minnesota. Despite receiving all of his degrees in Chemical Engineering, he found a welcoming and supportive home in BED almost 30 years ago, including – like everyone, it seems – being treated kindly by Bob Nerem. He worked briefly as an Assistant Professor of Chemical Engineering at the University of Colorado before returning to the University of Minnesota, where he is now a Professor of Biomedical Engineering as well as a Fellow of ASME and BMES. His research focuses on bridging scales with the intent of understanding how tissue level driving forces lead to microscale events, and how those events, collectively, lead back to tissue-level changes. His interest in novel computational and experimental biomechanical techniques has led him to study a wide range of topics and systems over his career, including aortic wall mechanics, vibrotactile sensing in the fingers, ocular mechanics, ligament mechanics in the spine, and cell-matrix interactions. He served as the co-Editor-in-Chief of the ASME Journal of Biomechanical Engineering from 2012-2021.

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 Ph.D. 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.

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
2017 Richard R. Neptune
2018 Jeffrey W. Holmes
2019 Tony Jun Huangm
2020 Stavros Thomopoulos
2021 Rafael V. Davalos
2022 Robert L. Mauck
2023 Alison Marsden

2023 Alison Marsden, Ph.D.

Alison Marsden is the Douglass M. and Nola Leishman Professor of Cardiovascular Disease in the Departments of Pediatrics, Bioengineering, and, by courtesy, Mechanical Engineering at Stanford University. Her research focuses on the development of numerical methods for cardiovascular biomechanics, including finite element methods for biofluids problems, uncertainty quantification, and optimization. Her team applies engineering methods for patient specific modeling and treatment planning to impact patient care in cardiovascular surgery and congenital heart disease. She graduated with a BSE degree in Mechanical Engineering from Princeton University in 1998, and a PhD in Mechanical Engineering from Stanford in 2005. She was a postdoctoral fellow at Stanford University in Bioengineering from 2005-07. From 2007-2015 she was a faculty member in Mechanical and Aerospace Engineering at UCSD. Her work has been recognized for contributions to the field with a Burroughs Wellcome Fund Career Award at the Scientific Interface in 2007, an NSF CAREER award in 2011, and the Van C. Mow medal from the ASME Bioengineering Division in 2023. She has been elected fellow of several scientific societies including the American Institute for Medical and Biological Engineering (2018), the Society for Industrial and Applied Mathematics (2018), the American Physical Society (2020) and the Biomedical Engineering Society (2021). She has published over 160 journal articles and serves on the editorial boards of leading journals in biomechanics and computational science. She holds leadership roles in the ASME Bioengineering Division and the American Physical Society. She participates in numerous activities to support diversity equity and inclusion as the DEI chair for Stanford's Institute for Computational and Mathematical Engineering and as an IDEAL faculty leader at Stanford. She leads two major open science efforts, the SimVascular open-source project and the Vascular Model Repository, in the biomechanics community.

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
2016 Triantafyllos Stylianopoulos
2017 Kristin Myers
2018 Spencer P. Lake
2019 Grace D. O'Connell
2020 Matthew B. Fisher
2021 Kristin S. Miller
2022 Zhenpeng Qin
2023 Jessica Oakes

Y.C. Fung Early Career Medal

The Y.C. Fung Early Career Award is given to young investigators who are committed to pursuing research in the field of Bioengineering 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.

2023 Jessica Oakes, Ph.D.

Jessica Oakes joined the Department of Bioengineering as a tenure-track Assistant Professor at Northeastern University in 2016. Following completion of her PhD in 2013 (UC San Diego), she continued research in aerosol medicine as a postdoc fellow at INRIA Paris, France and at UC Berkeley, supported by a Whitaker Fellowship, a UC Presidential Postdoc Fellowship, and an American Lung Association Fellowship. Now, her research group focuses on combining experimental and numerical techniques to predict, quantify, and optimize aerosol dosimetry, and the corresponding structure/function response, in the lung. Dr. Oakes's is the recipient of the Outstanding New Environmental Scientist award from NIH/NIEHS, where she is focusing on modeling pulmonary health consequences of fire smoke originating from the wildland urban interface regions. Her research is also generously supported by the FEMA/DHS Assistance to Firefighters grant program, NIH NHLBI, and the Bill
Melinda Gates Foundation.

Savio L-Y. Woo Translational Biomechanics 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
2017 Arthur Erdman
2018 Kyriacos A. Athanasiou
2019 Rita M. Patterson
2020 Mehmet Toner
2021 Daniel Bluestein
2022 Zong-Ming Li
2023 Tamara Bush

2023 Tamara Bush, Ph.D.

Dr. Bush is an accomplished Professor in Mechanical Engineering and Bioengineering, as well as an Associate Dean for Inclusion and Diversity at Michigan State University (MSU). Her research in biomechanics has had a significant impact on engineering mechanics, material science, modeling, medicine, and diversity in STEM.

She has received funding for her research from NSF, NIH, and various industries. Recently, she was awarded an NSF Partnership for Innovation award to develop and commercialize a wheelchair system for persons with disabilities. She and her students collaborate with Spectrum Health and a team of five hand surgeons to used biomechanics to better understand the effects of surgery on thumb function. Additionally, she is exploring ways to make autonomous vehicles accessible to people with mobility impairments. Dr. Bush has given numerous keynotes and invited talks. She has mentored over 60 undergraduate and 44 graduate students from diverse backgrounds. She has received several accolades for her contributions to the field, including the Founders' Award from the American Society of Biomechanics, the rank of Fellow of the American Society of Mechanical Engineers, and Fellow of the American Institute for Medical and Biological Engineering (AIMBE). She has also received the MSU Inspirational Woman Award for Professional Achievement and has twice been awarded the MSU College of Engineering Withrow Teaching Award.

Edward Grood Interdisciplinary Team Science Medal in Bioengineering

The Edward Grood Interdisciplinary Team Science Medal in Bioengineering seeks to recognize a team of scientists and engineers who have collaboratively carried out impactful interdisciplinary science and engineering research in the bioengineering field.

2023 The Spine Research Interdisciplinary Team, led by Dawn Elliott and Robert Mauck

2023 The Spine Research Interdisciplinary Team

Dawn Elliott is the Blue and Gold Distinguished Professor of Biomedical Engineering at the University of Delaware. She is the PI and founding Director of the NIH-funded Delaware Center for Musculoskeletal Research. Dr. Elliott was the founding chair of the BME department at Delaware from 2011-2020. Prior to joining Delaware, she spent 12 years as faculty in Orthopaedic Surgery at the University of Pennsylvania, where she was promoted to full professor. Her multi-scale approach integrates mechanical testing, mathematical modeling, and multi-modal imaging, spanning from the entire joint, to the tissue-level, and to the micro-scale. **Robert Mauck** is the Mary Black Ralston Professor of Orthopaedic Surgery and Professor of Bioengineering and Director of the McKay Orthopaedic Research Laboratory at the University of Pennsylvania. He is also a Research Career Scientist and Co-Director of the Translational Musculoskeletal Research Center at the CMC VA Medical Center in Philadelphia. Dr. Mauck's research program is focused on the engineering and mechanobiology of musculoskeletal tissues, with a particular interest in restoring articular cartilage, the knee meniscus, and the intervertebral disc. **The Spine Research Interdisciplinary Team** - Dawn Elliott and Robert Mauck have collaborated for over 17 years and published over 44 papers that include dozens of co-authors, 11 of whom are part of the Spine Research Interdisciplinary Team. The Team includes three spine surgeons (**Edward Vresilovic, Harvey Smith, Neil Malhotra**), one large animal surgical veterinarian (**Thomas Schaer**), three former trainees who have been promoted to professional team members (**Lachlan Smith, Sarah Gullbrand, John Peloquin**), and four former trainees who are now independent faculty at other institutions (**Nandan Nerukar, Grace O'Connell, Daniel Cortes, John Martin**). The Team has a sustained record of pioneering research and innovative technology development in three convergent areas: 1) Structure-Function and Degeneration, 2) Tissue-Engineered Replacements, and 3) Injectable Therapies.

Award Lecture Abstracts

Sunday, June 4, 2023, 3:00 - 3:45 PM EDT, Alpine Hall

Boris Rubinsky, *H. R. Lissner Medal*

Title: Bioengineering Technologies – From Pioneering Concepts to Clinical Practice

My research spans numerous areas from numerical analysis to fundamental science to engineering design, from plasma arc welding in space to inverse algorithms to Weierstrass- Mandelbrot modeling of turbulence. This presentation is a very brief survey of a few selected areas from my body of research, that may be of interest to a bioengineering audience. First, I will describe the pioneering work on imaging monitored cryosurgery and the commercialization of this technology, which is now used by everyone in the field of cryosurgery. Following is description of the patented directional solidification cryomicroscopy and the insight in cryobiology it has enabled. The discovery of the cryoprotective properties of antifreeze proteins has led to the formation of two companies I co-founded, "A/F Protein" and "Aqua Bounty Technologies". For the latter, which is the first company to produce a genetically engineered animal for food (a salmon) with FDA approval, I have developed a genetic algorithm to evaluate the possible environmental danger of the technology. I will also describe advances in medical imaging technology that we pioneered including the patented technology for imaging through the internet and cells phones with a focus on electrical impedance tomography. This has led to a patented, clinical minimally invasive electromagnetic technology for detection bleeding in the brain which is now commercialized with FDA and EU approval by "Cerebrotech". The first patented MEMS chip with a live cell (now ubiquitous) and its uses for genetic engineering and viability detection will be described. The concept of non-thermal irreversible electroporation which we pioneered and brought from concept to clinical practice and commercialization will be introduced and the numerous clinical applications in which it is now used will be described. The fundamental thermodynamics of isochoric cryobiology will be introduced, and the range of applications described. I will describe the concept of Temperature Controlled 3D Cryoprinting. Last, I will introduce my current research on regenerative medicine which led to successful implantation of pancreatic islets in an extracellular matrix formed in the liver with non-thermal irreversible electroporation.

Monday, June 5, 2023, 8:00 - 9:00 AM MT, Alpine Hall

Victor Barocas, *Robert M. Nerem Education and Mentorship Medal*

Title: 10 Important Things People Have Said to Me

When a friend of mine found out that I had won the Nerem Medal, he suggested that I come up with a set of "Rules of Life" a la Bob Nerem's famous list ("There are no such things as mistakes, only lessons,"...). It was a nice idea, but Bob Nerem already did it better than I ever could, and it wouldn't feel right. Instead, I made a list of 10 things that people have said to me over the years that helped shape the person, scientist, and educator that I am. Some were meaningful right away. Others meant little at the time but have grown in importance as I reflect on them. Some will be important to some people but not to others. Some may seem redundant with each other. Most will not have a significant effect on most people's lives. It's kind of a hodgepodge. I hope, though, that the talk will encourage people to think more about what has helped inform and change their own lives. In case you read this and skip the talk, thank you to every member of BED for all that it has given me over the years.

Alison Marsden, *Van C. Mow Medal*

Title: Computational model-driven design in pediatric cardiac surgery: playing in the sandbox

Congenital heart disease (CHD) affects 1 in 100 babies and is the leading cause of infant mortality in the US. Among the most severe forms of CHD is single ventricle physiology, in which the heart develops with only one functional pumping chamber. These patients typically undergo three open chest surgeries, culminating in the Fontan procedure. Multiscale models, combining hemodynamics with lumped parameter models of physiology, have been used extensively to propose and evaluate novel surgical methods for single ventricle palliation. In this talk, we will present recent work that goes beyond traditional computational fluid dynamics to model mechanobiology and cardiac function. In particular, we will discuss recent progress to develop a finite element framework for fluid solid growth simulations, demonstrated for the design and simulation of tissue engineered vascular grafts. We will then present recent work on multi-physics simulations of cardiac function, coupling fluid mechanics, electrophysiology and active contraction of the heart. We illustrate the application of these models to guide the design of a 3D bioprinted pulsatile conduit as a secondary power source for patients with Fontan physiology. We will discuss the importance of open-source software and data repositories in the field of biomechanics. Finally, we highlight the need for computational modeling to provide a "sandbox" to drive treatment innovation for high-risk patients.

Jessica Oakes, *Y. C. Fung Early Career Award*

Title: Lung Biomechanics with Aerosol Exposure

The lung is a beautiful organ with airway passages that span several orders of magnitude in size. The primary function of the lung is to participate in gas exchange and to protect the body from inhaled toxins. Once inhaled, particles can deposit on the vast surface area of the lung, causing local and systemic inflammation. Lung structure and function can significantly deteriorate depending on the deposition extent of toxic particles (e.g., those originating from wildland fires, cigarettes/e-cigarettes). This talk will explore the utilization of physiologically based computational models to determine deposited dose. Utilization of these models to design relevant animal exposure experiments will be highlighted. We will discuss how inhalation of toxic particles originating from wildland fire smoke and e-cigarettes impacts lung biomechanics and explore the biological underpinnings of lung remodeling.

Thursday, June 8, 2023, 6:00 - 7:00 PM MT, Cascade A-F

The Spine Research Interdisciplinary Team, Leads: Dawn Elliott Robert Mauck, *Edward Grood Interdisciplinary Team Science Medal in Bioengineering*

Title: The Power of Collaborative Science

Dawn and Rob could not agree on an abstract topic for the Collaborative Science lecture. Dawn wanted to share her thoughts on the Dobbs decision, gun control, the environment, and the crisis of democracy. Rob wanted to talk about unicorns (RIP Stacee). Moreover, they did not get input or approval from their co-authors on the theme of this talk. Therefore, it is unclear what they will talk about during the meeting, and it may come to blows on the podium. You should come see the spectacle. While Drs. Elliott and Mauck have already failed spectacularly in their leadership role in putting together this abstract, and do not yet have a set theme for their talk, this should in no way reflect on the transdisciplinary spine research team. Each member of this team, at various times over the course of nearly two decades, has made amazing contributions, advanced the science of spine structure function and developed novel tissue engineering and regenerative medicine approaches to address spine disease. This team deserves the credit for the publications, patents, and impact of these projects. During the talk, in

addition to taking pot shots at one another, Drs. Elliott and Mauck will surely recognize these outstanding individuals, discuss how teams form and grow, how the work moves forward in fits and starts (but inexorably), and how to sustain a productive collaboration over time.

Tamara Bush, *Savio L-Y. Woo Medal*

Title: Using Biomechanics to Impact Lives and Clinical Care

As members of the SB3C community, we are all uniquely trained in areas of Biomechanics, Bioengineering and Biotransport and because of this, we have the ability to use our training and experiences to touch the lives of people. In this talk, I will share a few ways my lab has impacted the health, function and overall well-being of people through the use of biomechanics. This influence occurs in many forms - including assessment, evaluation and device development. My team and I are privileged to work with partners and communities – including individuals with disabilities and teams of hand surgeons- who collaborate with us and share the common goal of improving peoples' lives.

6 Scientific Sessions

SB³C 2023 Meeting Pitch Competition

Sunday, June 4	4:00PM – 5:30PM MT

Translational Technologies Pitch Competition Finals

Zermatt

Session Chairs: Ethan Kung, *Clemson University of Utah*
Lyle Hood, *University of Texas at San Antonio*

4:00PM **On-Demand, Volumetric Liquid Biopsy From Solid Tumors** SB³C2023-PC01
Y. Kimura[1], MC. Sheehan[2], NR. Raghuraman[2], D. Downing[2], G. Srimathveeravalli[2]
[1]Osaka University Graduate School of Medicine, [2]University of Massachusetts, Amherst

4:20PM **Improving Clinical CT Image Data To Develop Better Fracture Risk Algorithms And Patient Outcomes** SB³C2023-PC02
Lance L. Frazer[1], Nathan Louis[1,2], Kal L. Clark[3], Daniel P. Nicolella[1]
[1]Southwest Research Institute, [2]University of Michigan, [3]University of Texas Health Science Center at San Antonio

4:40PM **SLIC-VAD: A Wirelessly Powered LVAD With Magnetic Levitation Bearings** SB³C2023-PC03
Shweta Karnik[1], Huang Chen[1], Simon Kiang[4], Arun Kumar Kota[2], Yaxin Wang[3], Joseph Cavallaro[4], Oscar H Frazier[3], Lakshmi Prasad Dasi[1]
[1]Georgia Institute of Technology and Emory University, [2]North Carolina State University, [3]Texas Heart Institute, [4]Rice University

5:00PM **I-KinCor: Revolutionizing Pediatric Duct–Dependent Surgeries** SB³C2023-PC04
Luis René Mata Quiñonez[1], Shweta Karnik[1], Srujana S. Joshi[1], Leon Cheng[1], Holly Bauser-Heaton, MD[1,2], Lakshmi Prasad Dasi[1]
[1]Georgia Institute of Technology and Emory University, [2]Children's Healthcare of Atlanta

Sunday, June 4	5:30PM – 6:15PM MT

Poster Session: Translational Technologies

Cascade ABC

P1 **Solving the Problem of Bicycle Helmet Fit** SB³C2023-PC05
William J. Makowski, Thomas L. Martin, William A. Schaudt
Virginia Tech

P2 **Faciliflow: An Implantable Device to Prevent the Onset of Breast Cancer-Related Lymphedema** SB³C2023-PC06
A. Swarup[1], A. Vella[1], K. Rowley[2], J. Frattolin[1], J. Moore Jr.[1]
[1]Imperial College, [2]Lympha Motus, Ltd.

P3 **Predicting Fracture Healing by Measuring Compliance Via Direct Electromagnetic Coupling** SB³C2023-PC07
Kevin M. Labus[1], Kirk C. McGilvray[1], Branislav Notaros[1], Milan Ilic[2], Julie Dunn[3], Christian M. Puttlitz[1]
[1]Colorado State University, [2]University of Belgrade, [3]University of Colorado Health North

P4 **Tackling Antimalarial Drug Resistance in Africa Using Novel Drug Repurposing and Nanotechnology Strategies** SB³C2023-PC08
Samuel W. Uzondu, Petra O. Nnamani, Anthony A. Attama
University of Nigeria

P5 **Tapping into Ligament Tension with Our Ligament Tensiometer to Enhance Outcomes Following Orthopedic Procedures** SB³C2023-PC09
Lesley R. Arant, Kai M. Heineman, Josh D. Roth
University of Wisconsin-Madison

P6 **Orthopedic Cast Saw** SB³C2023-PC10
Ryan A. DeJesus, Nicholas J. Graham, Evan M. Lunney, Jaedan D. Morton
The Pennsylvania State University

P7 **Artificial Multi-Organ Replacement (AMOR) System** SB³C2023-PC11
Nanye Du, Suhail Ahmad, Shaohang Hao, Ziyuan Wang, Ye Jin, Alexander Novokhodko, Dayong Gao
University of Washington

P8 **A Novel Hardware and Software Device to Non-Invasively Predict Post Thrombotic Syndrome** SB³C2023-PC12
Cyrus J. Darvish, Pete H. Gueldner, Rabih A. Chaer, David A. Vorp, and Timothy K. Chung
University of Pittsburgh

P9 **Polymeric Transcatheter Aortic Valve Replacement (TAVR) for Treating Aortic Stenosis** SB³C2023-PC13
B. Kovarovic[1], O.M. Rotman[1], M. Slepian[2], D. Bluestein[1]
[1]Stony Brook University, [2]University of Arizona

P10 **Automatically Perfusable Human Vessel Chip Platform for Preclinical Research in Hazardous Containment Environments and Space** SB³C2023-PC14
J. Eades[1], A. Kumar[1], A. Jain[1,2]
[1]Texas A&M University, [2]Houston Methodist Hospital

SB³C 2023 Meeting Scientific Podium Sessions

Monday, June 5	9:45AM – 11:15AM MT

Machine Learning in Biofluids

Cascade ABC

Session Chairs: Amir Arzani, *University of Utah*
Fanwei Kong, *University of California, Berkeley*

9:45AM **A Deep Learning Approach For Cardiac Model Construction For Congenital Heart Disease Patients** SB³C2023-402
Fenwei Kong, Alison L. Marsden
Stanford University

10:00AM **Enhancing Corrupt Cardiovascular Flow Data With Machine Learning** SB³C2023-026
Hunor Csala, Amirhossein Arzani
University of Utah

10:15AM **Automatic Model Construction For Patient-Specific Aortic Flow Simulations Using Geometric Deep Learning** SB³C2023-273
Pan Du, Delin An, Chaoli Wang, Jian-Xun Wang
University of Notre Dame

10:30AM **Physics-informed Neural Networks with Fourier-based Activation Function To Model Complex Cardiovascular Flows** SB³C2023-015
Arman Aghaee, M. Owais Khan
Toronto Metropolitan University

10:45AM **Data-Enhanced Personalized Models For Coronary Hemodynamics And Myocardial Perfusion** SB³C2023-014
Karthik Menon[1], Zachary Sexton[1], Owais Khan[2], Daniele Schiavazzi[3], Koen Nieman[1], Alison Marden[1]
[1]Stanford University of Texas Dallas, [2]Toronto Metropolitan University, [3]University of Notre Dame

11:00AM **Machine Learning-Based Reduced Order Modelling For The Simulation Of Braided Stent Deployment.** SB³C2023-303
Beatrice Bisighini[1,2,3], Miquel Aguirre[1,4,5], Baptiste Pierrat[1], David Perrin[2], Stéphane Avril[1]
[1]University of Lyon, [2]Predisurge, [3]University Tor Vergata, [4]Universitat Politècnica de Catalunya, [5]Gran Capità

Monday, June 5	9:45AM – 11:15AM MT

Soft Tissue Mechanics

Cascade D

Session Chairs: Kyoko Yoshida, *Univ of Minnesota*
Colleen Witzenburg, *Univ of Wisconsin*

9:45AM **A Clot Composition Dependent Hyperelastic Model In The Simulation Of Direct Aspiration Thrombectomy** SB³C2023-362
K. Bein Snee[1], R. McCarthy[2], P.E. McHugh[1], B. Fereidoonnezhad[3], J.P. McGarry[1]
[1]University of Galway, [2]Cerenovus, [3]TU Delft

10:00AM **Using Bayes' Optimization For Inverse Finite Element Analysis Of The Tricuspid Valve In Hypoplastic Left Heart Syndrome** SB³C2023-338
Colton J. Ross[1], Jaden Norman[1], Arshid Mir[1], Harold M. Burkhart[1], Ming-Chen Hsu[2], Chung-Hao Lee[1]
[1]University of Oklahoma, [2]Iowa State University

10:15AM **Calcified Plaque Has A Local Effect On The Dissection Behavior Of Human Aortas** SB³C2023-563
Carly L. Donahue, Ruturaj Badal, Victor H. Barocas
University of Minnesota

10:30AM **Influence Of Material Parameter Variability On The Predicted Coronary Artery Biomechanical Environment Via Uncertainty Quantification** SB³C2023-413
David Jiang, Caleb C. Berggren, Y.F. Jack Wang, Jake A. Bergquist, Lindsay C. Rupp, Zexin Liu, Rob S. MacLeod, Akil Narayan, Lucas H. Timmins
University of Utah

10:45AM **Spatial Configurations Of 3D Extracellular Matrix Density And Anisotropy Simultaneously Guide Angiogenesis** SB³C2023-084
Steven A. LaBelle[1], Steve A. Maas[1], Adam Rauff[1], Gerard A. Ateshian[2], Jeffery A. Weiss[1]
[1]*University of Utah,* [2]Columbia University

11:00AM **Spatiotemporal Evolution Of Collagen Micro-Mechanics Under Breast Cancer Cell Driven Remodeling** SB³C2023-125
Adil Khan, Jacopo Ferruzzi
University of Texas at Dallas

Monday, June 5	9:45AM – 11:15AM MT

Ocular and Lower Abdomen Biomechanics

Cascade E

Session Chairs: Jake Hermann, *University of Iowa*
Katrina Knight, *University of Pittsburgh*

9:45AM **Lamina Cribrosa Beam Insertions. The Humble Heroes Of The Lamina-Sclera Interplay** SB³C2023-513
Fengting Ji, Hua Yi, Ian A. Sigal
University of Pittsburgh

10:00AM **Mechanical Properties of Porcine Iris Stroma Using Micro-Indentation: The Effect Of Temperature And Hydration** SB³C2023-495
F. Sebastian[1], G. Bailey[1], V. Kondiboyina[1], S. Dorairaj[2], R. Amini[1]
[1]Northeastern University, [2]Mayo Clinic

10:15AM **Structural And Functional Heterogeneity Of The Uterosacral Ligaments In The Rat** SB³C2023-243
Joseph G. Thomas, Kandace Donaldson, Yizheng Zhu, Clara Gimenez, Raffaella De Vita
Virginia Tech

10:30AM **Biaxial Mechanics Of The Murine Vagina During Postpartum Healing Before And After Elastic Fiber Disruption** SB³C2023-272
Shelby E. White[1], Lily M. Buchanan[2], Niyousha Karbasion[3], Matthew R. Bersi[3], Maria Florian-Rodriguez[4], Kristin S. Miller[2,4]
[1]Tulane University, [2]University of Texas, Dallas, [3]Washington University in St. Louis, [4]University of Texas, Southwestern

10:45AM **Passive Mechanics Of Deep And Superficial Human Female Pelvic Floor Muscles** SB³C2023-455
Megan R. Routzong[1,3], Justin Dubik[2], Raffaella De Vita[2], Marianna Alperin[3], Pamela A. Moalli[1], Steven D. Abramowitch[1]
[1]University of Pittsburgh, [2]Virginia Tech, [3]University of California, San Diego

11:00AM **Bladder Wall Stress Is Lower In Female Compared To Male In A Murine Model Of Ex-Vivo Filling** SB³C2023-422
Eli Broemer, Pragya Saxena, Nathan R. Tykocki, Sara Roccabianca
Michigan State University

Monday, June 5	9:45AM – 11:15AM MT

Biotransport in Therapeutic Design and Analysis

Cascade F

Session Chairs: Chris Rylander, *University of Texas at Austin*
R. Lyle Hood, *University of Texas at San Antonio*

9:45AM **A Biphasic Fluid-Structure Interaction Model Of Backflow During Infusion Into Agarose Gel** SB³C2023-090
Arthur D. Ayers, Joshua H. Smith
Lafayette College

10:00AM **Thermodynamics Of Phase Transformation Of Water: Theory And Experiments** SB³C2023-301
Raphael J. Kepecs, Gerard A. Ateshian
Columbia University

10:15AM **Model For Heat Conduction In Vaporizable Endoskeletal Droplet In Response To X-Ray Photon Absorption** SB³C2023-578
William N. Frantz, David H. Thomas, Mark A. Borden
University of Colorado

10:30AM **Computational Modeling Of Machine Perfusion Of The Human Liver Vasculature** SB³C2023-585
Daniel Emerson, Yoed Rabin, Levent Burak Kara
Carnegie Mellon University

10:45AM **Conformal Ablation Of Atherosclerotic Plaque Based On Multi- Electrodes And NSGA II** SB³C2023-590
Hongying Wang, Ruizhe Hou, Shiqing Zhao, Aili Zhang
Shanghai Jiao Tong University

11:00AM **N-Acetyl Cysteine Rescues Chondrocytes From Oxidative Stress And Increases Their Metabolic Activity** SB³C2023-275
Austin C. Jenk[1,2], Elisabeth A. Lemmon[1,2], Sarah E. Gullbrand[1,2], Robert L. Mauck[1,2]
1University of Pennsylvania, 2Veterans Affairs Medical Center

Monday, June 5	9:45AM – 11:15AM MT

Engineered *In Vitro* Models

Gore AB

Session Chairs: Nathaniel Dyment, *University of Pennsylvania*
Kristan Worthington, *University of Iowa*

9:45AM **Modeling Cardiac Fibrosis: Understanding the Effects of Exogenous Extracellular Matrix on 3D Cardiac Tissues** SB³C2023-229
Natalie Weiss-Pachter, Kristen Allen, Tracy Hookway
Binghamton University

10:00AM **Engineered Composite Fibrous Hydrogels that Mimic Dynamic Developmental Signals during Fibrous Tissue Development** SB³C2023-376
Karen L. Xu[1], Jason A. Burdick[1,2], Robert L. Mauck[1]
[1]University of Pennsylvania, [2]University of Colorado

10:15AM **An explant-in-a-chip perfusion model for ex vivo preservation of tissue viability and function with applications for personalised medicine in cancer** SB³C2023-419
Evangelia E. Zeringa, Foivos Chatzidimitriou, Ester Reina-Torres, Larry O'Connell, Beatrce-Cristina Bezdadea, Alexandria Mitchell, Paula Cunnea, Christina Fotopoulou, Olivier Pardo, Joseph van Batenburg-Sherwood, Iain A. McNeish, Darryl R. Overby
Imperial College London

10:30AM **Prolonged Subculture and Progerin Expression Sensitize VSMCs to Three Dimensional Fiber Structures** SB³C2023-374
Yu-Yu Hsueh, Pen-hsiu Grace Chao
National Taiwan University

10:45AM **The Role Of Monocyte And Macrophages In The Development Of Aortic Valve Calcification In A 3D Tri-Culture In Vitro Model** SB³C2023-121
Fatemeh Salemizadehparizi, Peter Huang, Mei-Hsiu Chen, Gretchen J. Mahler
Binghamton University

11:00AM **Development of a Schlemm's canal "inner wall on a chip" for high content biomechanical screening** SB³C2023-417
Seyed Mohammad Siadat[1], Jacques A. Bertrand[2], Babak N. Safa[1], Darryl R. Overby[2], W. Daniel Stamer[3], C. Ross Ethier[1]
[1]Georgia Institute of Technology, [2]Imperial College of London, [3]Duke University

Monday, June 5	9:45AM – 11:15AM MT

Cartilage: Composition and Lubrication

Gore CD

Session Chairs: Jennifer Puetzer, *Virginia Commonwealth University*
Phoebe Szarek, *University of Connecticut*

9:45AM **Mechanical Weakening Precedes Cartilage Loss During Osteoarthritis Progression Across the Human Tapezium** SB³C2023-196
Brendan D. Stoeckl[1,2], Kendall M. Masada[1,2], Lorielle G. Laforest[1], Michael W. Hast[1], David R. Steinberg[1,2], Robert L. Mauck[1,2]
[1]University of Pennsylvania, [2]Corporal Michael J. Crescenz VA Medical Center

10:00AM **Quantitative Raman Measurement Of Cartilage Composition Via Tissue Phantom Calibration** SB³C2023-461
Erik Ersland[1], Dev Mehrotra[1], Mark W. Grinstaff[1], Brian D. Snyder[2], Mads S. Bergholt[3], Michael B. Albro[1]
[1]Boston University, [2]Beth Israel Deaconess Medical Center, [3]King's College London

10:15AM **Decorin Maintains Cartilage Surface Integrity And Chondrocyte Mechanotransduction During Aging** SB³C2023-159
M. Fan[1], B. Kwok[1], P. Singh[1], J. Xiang[1], L. Qin[2], D.E. Birk[3], R.V. Iozzo[4], R.L. Mauck[2], L. Han[1]
[1]Drexel University, [2]University of Pennsylvania, [3]University of South Florida, [4]Thomas Jefferson University

10:30AM **A chemo-mechano-biological model of cartilage in FEBio: Studies of pathological loading, homeostatic adaptation and bio-chemical treatments** SB³C2023-486
Muhammed M. Rahman[1], Paul N. Watton[2], Corey P. Neu[3], David M. Pierce[1]
[1]University of Connecticut, [2]University of Sheffield, [3]University of Colorado

10:45AM **Synovial Fluid Provides A Protective Effect In Articular Cartilage Fatigue Failure** SB³C2023-215
C.V. Sise, C.A. Petersen, J.X. Dewing, B.K. Zimmerman, J. Yun, R.J. Kepecs, C.T. Hung, G.A. Ateshian
Columbia University

11:00AM **The Role of Hyaluronic Acid in the Synergistic Lubrication of Articular Cartilage** SB³C2023-082
Emily P. Lambeth, David L. Burris, Christopher Price
University of Delaware

Monday, June 5	9:45AM – 11:15AM MT

Translational Bioengineering

Powell

Session Chairs: Lin Li, *Eli Lilly*
Elizabeth Shih, *University of Minnesota*

9:45AM **Shifting The Endovascular Paradigm: Patient-Specific Treatment Of Intracranial Aneurysms Using Shape Memory Polymers And Additive Manufacturing** SB³C2023-124
Sergio A. Pineda-Castillo[1], Tanner Cabaniss[1], Bradley N. Bohnstedt[2], Chung-Hao Lee[1]
[1]University of Oklahoma, [2]Indiana University

10:00AM **Impacts Of Type V Collagen Insufficiency On Cutaneous Wound Healing And Scar Formation** SB³C2023-153
Y. Liu[1], C. Wang[1], D.C. Stewart[2], E.M. O'Brien[1], B.K. Brisson[2], D.E. Birk[3], K.L. Spiller[1], S.W. Volk[2], L. Han[1]
[1]Drexel University, [2]University of Pennsylvania, [3]University of South Florida

10:15AM **Understanding Impacts Of Collagen Organization In An Infected Diabetic Wound Model Treated With A Novel Oxygenating And Antibacterial Hydrogel** SB³C2023-168
Hannah A. Durr[1], Samuel D. Salinas[2], Rouzbeh Amini[2], Nic D. Leipzig[1]
[1]University of Akron, [2]Northeastern University

10:30AM **Development And Utilization Of A Vascularized In Vitro Physiologically Representative Skin Tissue Platform For Burn Injury Investigation** SB³C2023-257
S. Brocklehurst, N. Ghousafim, K. Zuniga, D. Stolley, M.N. Rylander
University of Texas

10:45AM **Proteomic Characterization And Metabolic Labeling Of A Fibrin-Based In Vitro Wound Healing Model** SB³C2023-418
Dalton Miles[1], Tyler Tuttle[1], Julian Jimenez[2], Yifan Guo[2], Adrian Buganza-Tepole[2], Sarah Calve[1,2]
[1]University of Colorado, [2]Purdue University

11:00AM **Experimental And Computational Analysis Of The Injection- Induced Mechanical Changes In The Skin Microenvironment During Subcutaneous Injection Of Biologics** SB³C2023-518
Yingnan Shen, Sameep R. Shah, Kejie Zhao, Bumsoo Han
Purdue University

Monday, June 5	9:45AM – 11:15AM MT

Cardiovascular Mechanobiology

Zermatt

Session Chairs: Bryan Good, *University of Tennessee*
Friederike Schäfer, *Norwegian University of Science and Technology*

9:45AM **Effect of aging, sex, and gene (fibulin-5) on the arterial stiffness of mouse: 20 weeks adult mice with fibulin-5 knockout are older than 100 weeks wild-type mice** SB³C2023-341
H. Dong[1], J. Ferruzzi[2], M. Liu[1], L. Brewster[3], R. Gleason[1]
[1]Georgia Institute of Technology, [2]University of Texas, Dallas, [3]Emory University

10:00AM **Functional Differences in Human Aortic Valve Interstitial Cells from Patients with Varying Calcific Aortic Valve Disease** SB³C2023-458
R. Tuscher[1], A. Khang[1], T. West[1], G. Ferrari[2], M. Sacks[1]
[1]University of Texas, Austin, [2]Columbia University

10:15AM **Reduced Vascular Smooth Muscle Cell Mechanoadaptation in an in vitro Model of Cerebral Amyloid Angiopathy** SB³C2023-279
Samuel F. Boland, Patrick W. Alford
University of Minnesota

10:30AM **Constitutive Modeling Of Mouse Arteries Suggests Changes In Directional Coupling And Extracellular Matrix Remodeling That Depends On Artery Type, Age, Sex And Elastin Amounts** SB³C2023-300
Keshav A. Kailash, Jie Z. Hawes, Austin J. Cocciolone, Robert P. Mecham, Jessica E. Wagenseil
Washington University in St. Louis

10:45AM **Determining How VEGFR-2 Inhibition Affects Phosphorylation And Function In The Presence Of Mechanical Strain** SB³C2023-320
Bronte Miller, Michael Heim, Bryan Mortimer, M.K. Sewell-Loftin
University of Alabama at Birmingham

11:00AM **A Testable Mechanism for Force Generation and Maintenance in the Tonic Smooth Muscle** SB³C2023-606
Suzzane E. Stasiak, Dhanajay T. Tambe, Harikrishnan Parameswaran
Northeastern University

Monday, June 5	11:30AM – 1:00PM MT

Thrombosis and Hemolysis

Cascade ABC

Session Chairs: Debanjan Mukherjee, *University of Colorado Boulder*
Bryan Good, *University of Tennessee*

11:30AM **Numerical Predictions Of Flow-Induced Hemolysis: Can The Accuracy Of The Power Law Model Be Improved Using Calibrated Coefficients?** SB³C2023-371
Alberto Mantegazza[1], Nicolas Tobin[2], Keefe B. Manning[2], Brent A. Craven[3]
[1]Polytechnic University of Bari, [2]Pennsylvania State University, [3]US FDA

11:45AM **An In Vitro Assessment of Emboli Trajectories Within a Patient Specific Model: Investigation into the Influence of Thrombus Size, Mechanical Properties, and Cerebral Blood Pressure** SB³C2023-308
A. Glynn[1,2], A. Consoli[3], B. Murphy[1,4], R. McCarthy[2], C. Lally[1,4]
[1]Trinity College Dublin,[2]Cerenovus,[3]Hôpital Foch, [4]RCSI & TCD

12:00PM **Hematocrit Is A Potent Driver Of Platelet Adhesion At Supraphysiological Shear Rates** SB³C2023-126
C. Watson[1], K. Manning[1,2]
[1]Pennsylvania State University, [2]Penn State Hershey Medical Center

12:15PM **Computational Simulation Of Patient-Specific Blood Coagulation In Stent Thrombosis** SB³C2023-404
Janneke M.H. Cruts[1], Mohammad Rezeimoghaddam[2], Frans N. van de Vosse[2], Frank J.H. Gijsen[1,3]
[1]Erasmus Medical Center, [2]Eindhoven University of Technology, [3]Delft University of Technology

12:30PM **Image driven simulation of hemodynamics around a dynamic clot in vivo** SB³C2023-566
Chayut Teeraratkul[1], Timothy J. Stalker[2], Maurizio Tomaiuolo[3], Debanjan Mukherjee[1]
[1]University of Colorado, [2]Thomas Jefferson University, [3]Wills Eye Hospital

12:45AM **Multiscale, Cell-Resolved Simulations of Red Blood Cells in Macroscale Flows for Hemolysis Prediction** SB³C2023-105
Grant J. Rydquist, Mahdi Esmaily
Cornell University

Monday, June 5	11:30AM – 1:00PM MT

Vascular Pathology and Fluid Flow

Cascade D

Session Chairs: Grant Rydquist, *Cornell University*
Alejandro Roldán-Alzate, *University of Wisconsin - Madison*

11:30AM **Computational Fluid Dynamics Study To Investigate The Impact Of Sudden Physiological Actions On Cerebrospinal Fluid Pressure And Flow** SB³C2023-311
Sarah Vandenbulcke[1], Paul Condron[2,3], Haribalan Kumar[2,3,4], Soroush Safaei[3], Samantha Holdsworth[2,3], Joris Degroote[1], Patrick Segers[1]
[1]Ghent University, [2]Tairāwhiti-Gisborne, [3]University of Auckland, [4]GE Healthcare

11:45AM **Blood Flow Energy Profiles in Coronary Arteries Predict Myocardial Infarction** SB³C2023-309
M. Lodi Rizzini[1], A. Candreva[1,2], V. Mazzi[1], C. Chiastra[1], B. De Bruyne[3], C. Collet[3], D. Gallo[1], U. Morbiducci[1]
[1]Politechnico di Torino, [2]Zurich University Hospital, [3]OLV-Clinic

12:00PM **Evolution Of The Hemodynamic Properties And Arterial Wall Remodeling In Pulmonary Arterial Hypertension** SB³C2023-154
H. Mu, D. Valdez-Jasso
University of California, San Diego

12:15PM **Hemodynamics Of Coarctation Of The Aorta - Comparison Of A Distributed Lumped Parameter Model And 4D Flow MRI** SB³C2023-128
Labib A. Shahid[1], Matthew A. Culver[1], James P. Rice[1], Haben Berhane[2], Cynthia K. Rigsby[3], Joshua D. Robinson[3], Lindsay M. Griffin[3], Michael Markl[2], Colleen M. Witzenburg[1], Alejandro Roldán-Alzate[1]
[1]University of Wisconsin-Madison, [2]Northwestern University, [3]Lurie Children's Hospital of Chicago

12:30PM **Mitigating Post-TAVR Thrombogenic Risk: Design And Optimization of Novel Trileaflet and Bicuspid Aortic Valve Devices** SB³C2023-109
Kyle J. Baylous[1], Brandon J. Kovarovic[1], Salwa B. Anam[1], Ryan T. Helbock[1], Marvin J. Slepian[2], Danny Bluestein[1]
[1]Stony Brook University, [2]University of Arizona

12:45AM **A Computational Assessment of Stroke Predictors After Transcatheter Aortic Valve Replacement** SB³C2023-491
B. Vogl[1], Z. Wang[2], A. Chavez Ponce[3], A. El Shaer[3], M. Alkhouli[3], H. Hatoum[1]
[1]Michigan Technological University, [2]The Ohio State University, [3]Mayo Clinic

Monday, June 5	11:30AM – 1:00PM MT

Ocular and Lung Biomechanics

Cascade E

Session Chairs: Yi Hua, *University of Mississippi*
Arina Korneva, *Virginia Tech*

11:30AM **Eye-Specific Modeling Of Effects Of Intraocular Pressure On Optic Nerve Head Oxygenation** SB³C2023-297
Yuankai Lu, Yi Hua, Bingrui Wang, Fuqiang Zhong, Andrew Theophanous, Shaharoz Tahir, Po-Yi Lee, Ian A. Sigal
University of Pittsburgh

11:45AM **Effects of Glaucoma and Optic Nerve Crush on the Biomechanical Behavior Of Mouse Astrocytic Lamina Cribrosa** SB³C2023-510
A Korneva, E. Kimball, T.V. Johnson, S. Quillen, M.E. Pease, T.D. Nguyen, H.A. Quigley
Johns Hopkins University

12:00PM **Quantifying the Remodeling Strain in the Lamina Cribrosa Years After Pressure Lowering Surgery** SB³C2023-208
Cameron A. Czerpak, Harry A. Quigley, Thao D. Nguyen
Johns Hopkins University

12:15PM **The Influence Of Recruitment Maneuvers On Localized Murine Lung Strains Assessed With Digital Image Correlation** SB³C2023-123
M. Shankel, T.M. Nelson, K.A.M. Quiros, T. Biddle, G.O. Ramirez, C.A. Mariano, J. Bebawy, D.D. Lo, M. Eskandari
University of California, Riverside

12:30PM **Quantifying Temporal Dynamics Of Alveolar Recruitment During Mechanical Ventilation** SB³C2023-236
Daniel S. Meggo, Edward A. Sander, Jacob Herrmann
University of Iowa

12:45AM **Probing Lung Function At High Spatiotemporal Resolution Via Crystal Ribcage** SB³C2023-434
Rohin Banerji, Gabrielle N. Grifno, Linzheng Shi, Dylan Smolen, Rob LeBourdais, Johnathan Muhvich, Cate Eberman, Bradley Hiller, Jisu Lee, Kathryn Regan, Siyi Zheng, Sue S. Zhang, John Jiang, Riley Pihl, Katrina Traber, Giovanni Ligresti, Joseph P. Mizgerd, Bela Suki, Hadi T. Nia
Boston University

Monday, June 5	11:30AM – 1:00PM MT

Sex, Age, and Disease in Brain and Head Injury

Cascade F

Session Chairs: Kaveh Laksari, *University of Arizona*
Ken Monson, *University of Utah*

11:30AM **Sex Difference In Axon Dynamic Behavior Under Axial Loading And Unloading** SB³C2023-324
C. Zhang, S. Ji
Worcester Polytechnic Institute

11:45AM **Evolution Of Human Cortical Thickness And Morphology Throughout Growth And Development** SB³C2023-041
Nagehan Demirci, Maria A. Holland
University of Notre Dame

12:00PM **Age- And Sex-Based Skull Thickness Distribution For Predicting Skull Fracture Patterns** SB³C2023-428
Yousef Alsanea, Timothy Dixon, Tagrid Ruiz-Maldonado, Brittany Coats
University of Utah

12:15PM **Spatial Gradient in Brain Mechanical Properties Changes Through Development But Is Consistent During Adulthood** SB³C2023-239
Kyra E. Twohy[1], Grace McIlvain[1,2], Jeffrey M. Spielberg[1], Curtis L. Johnson[1]
[1]University of Delaware, [2]Georgia Institute of Technology

12:30PM **High Resolution MR Elastography of the Human Brain: Technical Development and Applications in Aging and Alzheimer's Disease** SB³C2023-132
E. Triolo[1], O. Khegai[2], A. Alipour[2], T. Hedden[2], P. Balchandani[2], M. Kurt[1,2]
[1]University of Washington, [2]Mount Sinai

12:45AM **The Relationship Between Imbalance Symptom And Cardiac Pulsation Induced Mechanical Strain In The Brainstem And Cerebellum For Chiari Malformation Type I** SB³C2023-471
Mohamad Motaz F. Al Samman[1], Alaaddin Ibrahimy[2], Blaise Simplice Talla Nwotchouang[3], John N. Oshinski[4], Daniel L. Barrow[4], Philip A. Allen[3], Rouzbeh Amini[1], Rafeeque A. Bhadelia[5], Francis Loth[1]
[1]Northeastern University, [2]Yale University, [3]University of Akron, [4]Emory University, [5]Harvard

Monday, June 5	11:30AM – 1:00PM MT

Bioprinting and Emerging Technology in TCE

Gore AB

Session Chairs: Deva Chan, *Purdue University*
Edward Sander, *University of Iowa*

11:30AM **Particulated ECM Biomaterial Inks Enable 3D Bioprinting of Osteochondral In Vitro Models With Multi-Scale Architecture** SB³C2023-535
Juliet O. Heye, Shannon A. Blanco, Jeanne E. Barthold, Emily Y. Miller, Corey P. Neu
University of Colorado

11:45AM **Novel Metabolic Labeling Demonstrates A Critical Role Of Decorin In The Assembly And Turnover Of Cartilage Matrix** SB³C2023-399
T. Li[1], M. Fan[1], A. Porter[2], B. Kwok[1], C. Wang[1], D.E. Birk[3], R.V. Iozzo[4], X.L. Lu[2], R.L. Mauck[5], L. Han[1]
[1]Drexel University, [2]University of Delaware, [3]University of South Florida, [4]Thomas Jefferson University, [5]University of Pennsylvania

12:00PM **Modeling Human Sex-Specific Fibrotic Activation In 3D-Bioprinted Pulmonary Artery Adventitia** SB³C2023-039
Duncan J. Davis-Hall, Chelsea M. Magin
University of Colorado

12:15PM **A Thermodynamic Framework For The Evolution Of Sarcomeres In Cardiomyocytes Subjected To Dynamic Loading** SB³C2023-522
Ryan J. Coleman[1], Vikram S. Deshpande[2], Patrick McGarry[1]
[1]University of Galway, [2]University of Cambridge

12:30PM **Effects of Conditional SV40-T Immortalization on Human Retinal Progenitor Cell Differentiation** SB³C2023-593
Qi Wang, Jessica A. Cooke, Budd A. Tucker, Kristan S. Worthington
University of Iowa

12:45AM **Sub-Millimeter Stiffness Gradients Within 3d Printed Composite Scaffolds For Osteochondral Tissue Engineering** SB³C2023-517
Kevin N. Eckstein, A. Camila Uzcategui, John E. Hergert, Sarah A. Schoonraad, Stephanie J. Bryant, Robert R. McLeod, Virginia L. Ferguson
University of Colorado

Monday, June 5	11:30AM – 1:00PM MT

Cartilage: Imaging and Degeneration

Gore CD

Session Chairs: Jill Middendorf, *Johns Hopkins University*
David Pierce, *University of Connecticut*

11:30AM **Enzymatic Digestion Does Not Compromise Sliding-Mediated Cartilage Lubrication** SB³C2023-182
Meghan E. Kupratis, Atia Rahman, David L. Burris, Elise A. Corbin, Christopher Price
University of Delaware

11:45AM **Raman Probe Predicts Cartilage Functional Mechanical Properties Better Than ORSI Score And MRI T2* Mapping** SB³C2023-547
Masumeh Kazemi[1], Chenhao Yu[1], Farida Korna[1],Dev Mehrotra[1], Erik Ersland[1], Juncheng Zhang[1], Thomas P. Schaer[2], Julie B. Engiles[2], Mark W. Grinstaff[1], Brian D. Snyder[3], Mads S. Bergholt[4], Michael B. Albro[1]
[1]Boston University, [2]University of Pennsylvania, [3]Beth Israel Deaconess Medical Center, [4]King's College London,

12:00PM **Cartilage Strain And T1rho MRI Mapping In Response To Load In An Initial ACL-Reconstructed Patient Cohort** SB³C2023-169
Emily Y. Miller, Hongtian Zhu, Woowon Lee, Corey P. Neu
University of Colorado

12:15PM **Cartilage Contact Pressures During Walking are Related to T2 Relaxation Times in Patients with Knee Osteoarthritis** SB³C2023-479
Benjamin D. Bernarding, Austin J. Carcia, Adam J. Bradshaw, Johnny Huard, Scott Tashman, Lauren E. Watkins, Colin R. Smilth
Steadman Philippon Research Institute

12:30PM **In Vivo Assessment Of Passive And Active Articular Cartilage Strain Recovery** SB³C2023-283
Shu-Jin Kust, Dana Voinier, Kyle D. Meadows, Dawn M. Elliott, Daniel K. White, Axel C. Moore
University of Delaware

12:45AM **Sensitivity Of Finite Element Models To Relationship Between T2 Relaxation And Modulus In Articular Cartilage** SB³C2023-483
Alexander A. Donabedian, Deva D. Chan
Purdue University

Monday, June 5	11:30AM – 1:00PM MT

Bioengineering Design I

Powell

Session Chairs: Ria Mazumder, *Widener University*
Sriram Balasubramanian, *Drexel University*

11:30AM **Photo-Curing Extracellular Matrix Sealant For Stopping Vascular Hemorrage** SB³C2023-199
Luke E. Schepers[1], Brooke L. Martindale[2], Alycia G. Berman[2], Hannah L. Cebull[1], William Van Alstine[3], Sydney E. Hollingshead[2], Tyler Novak[2], Craig J. Goergen[1]
[1]Purdue University, [2]Cook Biotech Inc., [3]Cook Research Inc.

11:45AM **Evaluating The Effects Of Coordinate System Selection on Thumb Carpometacarpal Joint Angles** SB³C2023-387
Adam J. Chrzan[1], Nicole D. Arnold[1], Kevin Chan[2], Tamara Reid Bush[1]
[1]Michigan State University, [2]Spectrum Health

12:00PM **Development and Validation of a Smart Screwdriver (SSD) for Spine Surgery** SB³C2023-436
Allison M. Tanner, Daniel Jacobson, Alexander W. Hooke, James S. Fitzsimmons, Chunfeng Zhao, Brett A. Freedman
Mayo Clinic

12:15PM **Development of an Artificial Temporomandibular Joint Disc Replacement and Surgical Strategy** SB³C2023-584
Jason Kuiper, Ryan Dobbs, Jeremiah Easley, Christian Puttlitz, Kevin Labus
Colorado State University

12:30PM **Regenerative Rehabilitation Of Muscle Deffect Under Mechanical Stimulation: An Organ Culture Study** SB³C2023-381
D. Jacho, E. Yildirim-Ayan
University of Toledo

12:45AM **Optimization Of A Bioprinted Pulsatile Fontan Conduit Using A Multiphysics Simulation Framework** SB³C2023-066
Zinan Hu[1], Jessica E. Herrmann[1], Mark A. Skylar-Scott[1], Tain-Yen Hsia[2], Alison L. Marsden[1]
[1]Stanford University, [2]University of Central Florida

Monday, June 5	11:30AM – 1:00PM MT

Multiscale Models, Cardiovascular System

Zermatt

Session Chairs: Arianna Forneris, *University of Calgary*
Lei Fan, *Marquette University*

11:30AM **Multiscale Model Predictions Of Heart Growth During Hypertensive Rat Pregnancies** SB³C2023-147
Molly S. Kaissar, Kyoko Yoshida
University of Minnesota

11:45AM **A Computational Model of Coarctation of the Aorta in Rabbits** SB³C2023-235
Ashley A. Hiebing[1], Matthew A. Culver[1], John F. LaDisa Jr.[2], Colleen W. Witzenburg[1]
[1]University of Wisconsin, [2]Medical College of Wisconsin

12:00PM **Numerical and Computational Analysis of Artery Stresses Considering Active Contractility** SB³C2023-609
N. Goulbourne, Y. Li
University of Michigan

12:15PM **Multiscale Modeling of Baroreflex Feedback Loop in Response to Acute Myocardial Infarction** SB³C2023-092
Hossein Sharifi, Kenneth S. Campbell, Jonathan F. Wenk
University of Kentucky

12:30PM **Toward a biomechanical model of aortic development** SB³C2023-393
Bruno V. Rego, Sae-Il Murtada, Guangxin Li, George Tellides, Jay D. Humphrey
Yale University

12:45AM **A 1D Model Characterizing The Role Of Spatiotemporal Contraction Distributions On Lymph Transport** SB³C2023-155
Farbod Sedaghati, J. Brandon Dixon, Rudolph L. Gleason
Georgia Institute of Technology

Tuesday, June 6	9:30AM – 11:00AM MT

PhD-Level Student Paper Competition Session I: Multiscale Biomechanics and Fluid Dynamics/Transport

Cascade ABC

Session Chairs: Debanjan Mukherjee, *University of Colorado*
Lucas Timmins, *University of Utah*

9:30AM **Characterizing Headform Friction Coefficient For Helmet Testing** SB³C2023-142
Nicole E-P. Stark, Steve Rowson
Virginia Tech

9:45AM **Tuning Of The Mechanical Boundary Conditions Parameters For A Patient-Specific Thoracic Aorta Model** SB³C2023-192
Leonardo Geronzi[1], Antonio Martinez[1,2], Aline Bel-Brunon[3], Michel Rochette[2], Marco Sensale[2], Pier Paolo Valentini[1], Marco E. Biancolini[1]
[1]University of Rome Tor Vergata, [2]Ansys, [3]INSA Lyon

10:00AM **Toward Generalizable Brain Deformation Estimators For Head Impacts With Unsupervised Domain Adaptation And Deep Learning** SB³C2023-030
Xianghao Zhan, Jiawei Sun, Yuzhe Liu, Nicholas Cecchi, Enora Le Flao, Olivier Gevaert, Michael Zeineh, David Camarillo
Stanford University

10:15AM **Learning Diffeomorphic Deformations for Whole Heart Mesh Generation** SB³C2023-113
Arjun Narayanan, Fanwei Kong, Shawn C. Shadden
University of California, Berkeley

10:30AM **Correlations Between Mass Transport, Elastic Fiber Fragmentation, And Thoracic Aortic Aneurysm Severity** SB³C2023-111
Christie L. Crandall, Carmen M. Halabi, Jessica E. Wagenseil
Washington University in St. Louis

10:45AM **Successful transplant of cryopreserved kidneys enabled by engineering-based protocol optimization** SB³C2023-110
Zonghu Han, Joseph S. Rao, Lakshya Gangwar, Bat-Erdene Namsrai, Jacqueline Pasek-Allen, Srivasupradha Ramesh, Michael L. Etheridge, Erik B. Finger, John C. Bischof
University of Minnesota

Tuesday, June 6	9:30AM – 11:00AM MDT

PhD-Level Student Paper Competition Session II: Cardiovascular Mechanics and Remodeling

Cascade D

Session Chairs: Joao Soares, *Virginia Commonwealth University*
Joseph van Batenburg-Sherwood, *Imperial College London*

9:30AM **Contribution Of Microtubule Network To The Passive Anisotropic Viscoelasticity Of Healthy Right Ventricle** SB³C2023-050
Kristen LeBar, Kellan Roth, Wenqiang Liu, Erith Evans, Jassia Pang, Adam Chicco, Zhijie Wang
Colorado State University

9:45AM **Suppressing Leaflet Thickening and Stiffening May Restore Tricuspid Valve Function** SB³C2023-150
Mrudang Mathur[1], Marcin Malinowski[2,3], Tomasz A. Timek[3], Manuel K. Rausch[1]
[1]University of Texas, Austin, [2]Medical University of Silesia, [3]Spectrum Health

10:00AM **Sex Differences in Right Ventricular Chamber Elastance and Stiffness in an Animal Model of Pulmonary Arterial Hypertension** SB³C2023-177
Ethan D Kwan, Tsui Min Wang, Hao Mu, Becky A Hardie, Daniela Valdez-Jasso
University of California, San Diego

10:15AM **Multiscale Model Translates Microscale Vascular Smooth Muscle Cell Mechanics to Tissue-Scale Aortic Contraction** SB³C2023-148
Shannon M. Flanary, Seokwon Jo, Emilyn U. Alejandro, Victor H. Barocas
University of Minnesota

10:30AM **Heterogeneity Of Red Cell Mechanical Properties Drives Pathophysiology In Sickle Cell Disease** SB³C2023-064
Dillon C. Williams, David K. Wood
University of Minnesota

10:45AM **Restored Normal Blood Flow Plus Atorvastatin Promotes Atherosclerosis Regression** SB³C2023-108
Morgan A. Schake, Ian McCue, Samuel Harvey, Evan Curtis, Forrest Kievit, Ryan M. Pedrigi
University of Nebraska-Lincoln

Tuesday, June 6	9:30AM – 11:00AM MT

Undergraduate Design Competition

Gore AB

Session Chairs: Antonia Zaferiou, *Stevens Institute of Technology*

9:30AM **The History And Goals Of The Undergraduate Design Competition**
Anita Singh
Temple University

9:45AM **Pulse Oximeter For Simulation Mannequin** SB³C2023-624
Marina Walsh, Benjamin Aon, Hatice S. Emanet, Cheyenne M. Miller, Chiamaka G. Oduah, Ria Mazumder
Widener University

10:00AM **3D Printed Mouth Guard For Temporomandibular Joint Dysfunction** SB³C2023-635
Christopher N. Barnes, Jorge M. Pumachagua, Elias P. Saliba
Embry-Riddle Aeronautical University

10:15AM **Design Of A Prophylactic Knee Brace To Prevent ACL Injuries In Female Athletes** SB³C2023-637
J. DiVanna, E. LoVerde, M. Taibi
Manhattan College

10:30AM **Elert: A Haptic Emergency Alert System For The Auditorily Impaired** SB³C2023-643
Emily Bartling, Ruth Hammon, Deven Cobb, Jerritt Gutierrez
Rose-Hulman Institute of Technology

10:45AM **A Digital Incentive Spirometer for Aiding Lung Recovery Post-Surgery** SB³C2023-647
Isabella T. Mirro, Yi-An Hsieh, Jackson C. Dooley, Parth K. Mody, Josh Freedman
University of Pennsylvania

Tuesday, June 6	9:30AM – 11:00AM MT

PhD-Level Student Paper Competition Session III: Morphogenesis, Maternal/Abdominal Health

Zermatt

Session Chairs: Sihong Wang, *The City College of New York*
Alix Deymier, *University of Connecticut*

9:30AM **Vascular remodeling during late-gestation pregnancy: an in-vitro assessment of the murine thoracic aorta** SB³C2023-247
Ana I. Vargas, Samar Tarraf, Chiara Bellini, Rouzbeh Amini
Northeastern University

9:45AM **Maternal Anatomy Drives Mechanical Loading in the Proximal Cervix During Pregnancy** SB³C2023-186
Erin Louwagie, Jada Hinds, Lindsey Carlson, Timothy Hall, Helen Feltovich, Kristin Myers
Columbia University

10:00AM **Mechanical Changes of the Pregnant Murine Uterus** SB³C2023-207
Emily A. Hoffmann, Shanmugasundaram Nallasamy, Kyoko Yoshida
University of Minnesota

10:15AM **Towards Enhanced Non-Invasive Assessment Of Bladder Urodynamics - Validation Of Dynamic 3D MRI In A Patient-Specific In Vitro Model Of The Bladder** SB³C2023-254
Jeams Rice, Jack Gwertzman, Alejandro Roldán-Alzate
University of Wisconsin - Madison

10:30AM **Using Microinjected Fluid Droplets To Locally Perturb Epithelial Mechanics And Branching Morphogenesis In Cultured Embryonic Organs** SB³C2023-213
Shelby R. Mohr-Allen, Victor D. Varner
University of Texas

10:45AM **Ectopic Changes in Tissue Stiffness Disrupt Epithelial Buckling and FGF-10-Induced Budding Morphogenesis in Cultured Embryonic Lungs** SB³C2023-234
Kara E. Peak, Victor D. Varner
University of Texas

Tuesday, June 6	11:15AM – 12:45AM MT

PhD-Level Student Paper Competition Session IV: Musculoskeletal and Mechanobiology/Tissue Engineering

Cascade ABC

Session Chairs: Jacopo Ferruzzi, *University of Texas at Dallas*
Stephanie Cone, *University of Delaware*

11:15AM **Stiffness Of Direct-Write, Near-Field Electrospun Gelatin Fibers Generates Differences In Tenocyte Gene Expression** SB³C2023-240
Zachary G. Davis[1], Drew W. Koch[1], Grant M. Scull[1], Ashley C. Brown[1], Lauren V. Schnabel[1], Matthew B. Fisher[1,2]
[1]North Carolina State University, [2]University of North Carolina at Chapel Hill

11:30AM **Role Of Sex And Sex Hormones In Pulmonary Artery Adventitial Fibroblast Mechanosignaling** SB³C2023-120
Yufan Lin, Daniela Valdez-Jasso
University of California, San Diego

11:45AM **Type V Collagen Plays An Essential Role In The Development Of Knee Articular Cartilage And Meniscus** SB³C2023-152
Bryan Kwok[1], Mingyue Fan[1], Prerana Singh[1], David Birk[2], Robert L. Mauck[3], Nathaniel A. Dyment[3], Eiki Koyama[4], Lin Han[1]
[1]Drexel University, [2]University of South Florida, [3]University of Pennsylvania, [4]Children's Hospital of Philadelphia

12:00PM **Focal Adhesion Kinase Regulates Mechanosensitive Gene Transcription And Tendon Maturation** SB³C2023-230
Thomas P. Leahy, Srish S. Chenna, Louis J. Soslowsky, Nathaniel A. Dyment
University of Pennsylvania

12:15PM **Mechanical Models Of Collagen Networks For Understanding Changes In The Failure Properties Of Aging Mouse Skin** SB³C2023-259
Nathan J. Witt[1], Alan E. Woessner[2], Jacob Herrmann[1], Kyle P. Quinn[2], Edward A. Sander[1]
[1]University of Iowa, [2]University of Arkansas

12:30PM **Moderated TGF-Beta Delivery Via Latent TGF-Beta Conjugated Scaffolds For Improving Engineered Articular Cartilage** SB³C2023-214
Tiabai Wang[1], Zhonghao Dai[1], Celina C. Maldonado[1], Prem Nelesh[1], Junhan Liao[1], Sung Yeon Kim[1], Andrew Martin[1], Joanne E. Murphy-Ullrich[2], Mark W. Grinstaff[1], Michael B. Albro[1],
[1]Boston University, [2]University of Alabama

Tuesday, June 6	11:15AM – 12:45PM MT

PhD-Level Student Paper Competition Session V: Musculoskeletal Biomechanics

Cascade D

Session Chairs: Deva Chan, *Purdue University*
Spence Lake, *Washington University at St. Louis*

11:15AM **A Novel Laser Ablation Model For Studying Local Microdamage Repair In Live Tendon Explants** SB³C2023-067
Anthony N. Aggouras, Matthew T. Lim, Jeroen Eyckmans, Brianne K. Connizzo
Boston University

11:30AM **Collagen Crosslinking Dramatically Impairs the Frictional Performance of Articular Cartilage** SB³C2023-037
Meghan E. Kupratis, Uriel Gonzalez, Atia Rahman, David L. Burris, Elise A. Corbin, Christopher Price
University of Delaware

11:45AM **Overexpression Of Enhanced Yellow Fluorescent Protein Fused With Channelrhodopsin Causes Contractile Dysfunction In Skeletal Muscle** SB³C2023-065
Syeda N. Lamia[1], Carol S. Davis[1], Peter C.D. Macpherson[1], T. Bradley Willingham[2], Yingfan Zhang[2], Chengyu Liu[2], Susan V. Brooks[1], Brian Glancy[2], Megan L. Killian[1]
[1]University of Michigan, [2]National Institutes of Health

12:00PM **Temporal and spatial dynamics of new bone formation in cyclic treatment regimens of parathyroid hormone-related peptide (PTHrP)** SB³C2023-114
Tala Azar, Kruti Desai, Justin Leggin, Yuanhang Li, Wenzheng Wang, Arie Jones, Wei-Ju Tseng, Nathaniel Dyment, X. Sherry Liu
University of Pennsylvania

12:15PM **Shear Strain Stiffening In Ligaments Arises From Unaligned Fibers And Is Amplified By Axial Strain** SB³C2023-095
Jonathan L. Blank, Darryl G. Thelen, Joshua D. Roth
University of Wisconsin-Madison

12:30PM **Development Of An In Vitro Model To Explore Collagen Fiber Regeneration With Aged Human Mensical Cells** SB³C2023-231
Austin G. Gouldin, Jennifer L. Puetzer
Virginia Commonwealth University

Tuesday, June 6	11:15AM – 12:45PM MT

PhD-Level Student Paper Competition Session VI: Emerging Tissue Mechanobiology & Biomechanics II

Zermatt

Session Chairs: Erin Berlew, *University of Pennsylvania*
Jill Middendorf, *Johns Hopkins University*

11:15AM **Damkohler Number Analysis For Predicting Biomolecule Gradients In Engineered Tissues** SB³C2023-187
Sedat Dogru, Matthew Simkulet, Halide Z. Haciguzeller, Michael B. Albro
Boston University

11:30AM **Multiaxial Loading Attenuates Fibroblast Activation In An In Vitro Model Of Fibrosis** SB³C2023-181
Ghiska Ramahdita[1], Xiangjun Peng[1], Mohammad Jafari[2], David Schuftan[1], Guy M. Genin[1], Farid Alisafaei[2], Nathaniel Huebsch[1]
[1]Washington University in St. Louis, [2]New Jersey Institute of Technology

11:45AM **Deep Learning Enables Accurate Estimation Of Tissue Deformation In Vivo** SB³C2023-163
Reece D. Huff[1], Frederick C. Houghton[1], Conner C. Earl[2], Elnaz Ghajar-Rahimi[2], Ishan Dogra[1], Andrew J. Darling[2], Frederick W. Damen[2], Guoyang Zhou[2], Denny Yu[2], Craig J. Goergen[2], Carisa Harris-Adamson[1,3], Grace D. O'Connell[1,3]
[1]University of California – Berkeley, [2]Purdue University, [3]University of California- San Francisco

12:00PM **Time And Strain Dependent Properties Of The Extracellular Collagen Matrix Regulate Cellular Mechanical Memory And Activation Level Of Fibroblast Cells** SB³C2023-209
Yuan Hong[1], Xiangjun Peng[1], Haomin Yu[1], Mohammad Jafari[2], Delaram Shakiba[1], Jacob Sandler[1], Kenneth M. Pryse[1], Justin M. Sacks[1], Elliot L. Elson[1], Guy M. Genin[1], Farid Alisafaei[1,2]
[1]Washington University in St. Louis, [2]New Jersey Institute of Technology

12:15PM **Nuclear Export Inhibition Jumbles Epithelial-Mesenchymal States and Gives Rise to Migratory Disorder in Healthy Epithelia** SB³C2023-134
Carly M. Krull, Haiyi Li, Amit Pathak
Washington University in St. Louis

12:30PM **Collective Autologous Chemotaxis In Cancer Cells** SB³C2023-087
Louis González, Andrew J. Mugler
University of Pittsburgh

Wednesday, June 7	1:45PM – 3:15PM MT

Patient Specific Flow and Physiology

Cascade ABC

Session Chairs: Alejandro Roldán-Alzate, *University of Wisconsin -Madison*
Lucas Timmins, *University of Utah*

1:45PM **Association of hedomodynamic forces with patterns of coronary artery disease and atherosclerotic plaque phenotypes** SB³C2023-370
Diego Gallo[1], Alessandro Candreva[1], Maurizio Lodi Rizzini[1], Valentina Mazzi[1], Daniel Munhoz[2], Jean Paul Aben[3], Bernard De Bruyne[2], Claudio Chiastra[1], Carlos Collet[2], Umberto Morbiducci[1]
[1]Politecnico di Torino, [2]OLV-Clinic, [3]Pie Medical Imaging BV

2:00PM **Patient-Specific Flap Motion, False Lumen Flow, and Aortic Stiffness in Acute Uncomplicated Type B Aortic Dissections Using 4D Flow MRI and 2D PC MRI: A Preliminary Study** SB³C2023-391
H. Cebull[1], S. Hashemi[2], K. Porte[1], J. Oshinski[1,3], B.G. Leshnower[1], M. Piccinelli[1]
[1]Emory University, [2]Children's Healthcare of Atlanta, [3]Georgia Institute of Technology

2:15PM **Predicting Hemodynamic Outcomes In Patients With Borderline Left Ventricles Under Uncertainty** SB³C2023-156
Yurui Chen[1], Isao A. Anzai[1], Justin S. Tran[2], David M. Kalfa[1], Vijay Vedula[1]
[1]Columbia University, [2]California State University

2:30PM **Non-Invasive Estimation of Pressure Drop Across Aortic Coarctation** SB³C2023-149
Priya J. Nair[1], Martin R. Pfaller[1], Seraina A. Dual[2], Doff B. McElhinney[1], Daniel B. Ennis[1], Alison L. Marsden[1]
[1]Stanford University, [2]KTH Royal Institute of Technology

2:45PM **Association Between Resistance To Cerebrospinal Fluid Flow And Cardiac-Induced Brain Tissue Motion For Chiari Malformation Type1** SB³C2023-475
Saeed Mohsenian[1], Alaaddin Ibrahimy[2], John N. Oshinski[3], Blaise Simplice Talla Nwotchuang[4], Rafeeque A. Bhadelia[5], Daniel L. Barrow[3], Rouzbeh Amini[1], Francis Loth[1]
[1]Northeastern University, [2]Yale University, [3]Emory University, [4]University of Akron, [5]Harvard Medical School

3:00PM **High-Fidelity Fluid-Structure-Interaction Modelling Explains Flow-induced Bruits and Murmurs in Cerebral Aneurysms** SB³C2023-205
David A. Bruneau[1], Kristian Valen-Sendstad[2], David A. Steinman[1]
[1]University of Toronto, [2]Simula Research Laboratory

Wednesday, June 7	1:45PM – 3:15PM MT

Fluid Velocity Mapping and Flow Characterization

Cascade D

Session Chairs: Jessica Oakes, *Northeastern University*
Ryan Pedrigi, *University of Nebraska*

1:45PM **Towards High Spatiotemporal Resolution Blood Flow Velocity Field Mapping For Mice: A Validation Study** SB³C2023-583
Mingyi Tang[1,2], David A. Steinman1, Craig A. Simmons[1,2]
[1]University of Toronto, [2]Ted Rogers Centre for Heart Research

2:00PM **The Generation of Synthetic Geometric Datasets for Flow Characterization in the Carotid Bifurcation** SB³C2023-440
Retta El Sayed[1,2], Paul Klein[2], John N. Oshinski[1], Tiziano Passerini[2]
[1]Georgia Institute of Technology, [2]Siemens Healthineers

2:15PM **Surrogate Models For Pressure Gradients In Coronary Artery Stenoses** SB³C2023-527
Elizabeth R. Livingston, Siddhartha Srivastava, Krishna Garikipati, C. Alberto Figueroa
University of Michigan

2:30PM **Impact of wall distensibility on emerging features of carotid bifurcation hemodynamics** SB³C2023-130
Sara Zambon[1], Marachiara Arminio[1], David A. Steinman[2], Claudio Chiastra[1], Umberto Morbiducci[1], Diego Gallo[1]
[1]Politecnico di Torino, [2]University of Toronto

2:45PM **Quantification Of Embolus Transport To The Brain From Carotid Stenosis Sites** SB³C2023-497
Ricardo Roopnarinesingh[1], Neel Jani[2], Michelle Leppert[1], Debanjan Mukherjee[1]
[1]University of Colorado, [2]University of Wisconsin-Madison

3:00PM **Subject-Specific One-Dimensional Fluid Dynamics Model Of Chronic Thromboembolic Pulmonary Hypertension** SB³C2023-165
Amirreza Kachabi, Mitchel J. Colebank, Naomi C. Chesler
University of California, Irvine

Wednesday, June 7	1:45PM – 3:15PM MT

Reproductive Biomechanics and Pregnancy

Cascade E

Session Chairs: Megan Routzong, *University of California, San Diego*
Callan Luetkemeyer, *University of Illinois*

1:45PM **Material Parametric Analysis Of Polypropylene During A Contact Sensitive Simulation Of A Ball Burst Test Of A Prolapse Mesh** SB³C2023-476
Madeline Hackett[1], Teseo Schneider[2], Zachary Ferguson[3], Daniele Panozzo[3], Denis Zorin[3], Pamela Moalli[1], Steven Abramowitch[1]
[1]University of Pittsburgh, [2]University of Victoria, [3]New York University

2:00PM **Modelling Of The Uterosacral Ligament Suggests Changes In Microarchitecture During Pregnancy** SB³C2023-179
Lea M. Savard[1], Catalina S. Bastías[1], Kathleen Connell[1], Sarah Calve[1], Callan M. Luetkemeyer[2], Virginia L. Ferguson[1]
[1]University of Colorado, [2]University of Illinois

2:15PM **Biaxial Contractility Of The Murine Cervix With Elastic Fiber Deficiency** SB³C2023-512
Mari J.E. Domingo[1], Avery G. Franques[1], Qinhan Zhou[2], Kristin S. Miller[2]
[1]Tulane University, [2]University of Texas

2:30PM **Time-Dependent Material Properties Of Nonhuman Primate Uterine Layers Through Gestation** SB³C2023-529
Daniella M. Fodera[1], Echo Z. Xu[1], Shuyang Fang[1], Ivan Rosado-Mendez[2], Timothy Hall[2], Helen Feltovich[2,3], Michelle L. Oyen[4], Kristin M. Myers[1]
[1]Columbia University, [2]University of Wisconsin-Madison, [3]Mount Sinai, [4]Washington University in St. Louis

2:45PM **A Longitudinal Study Of The Anatomical Changes Of The Pregnant Murine Vagina Using Magnetic Resonance Imaging** SB³C2023-217
Aileen C. Suarez[1], Clara J. Gimenez[1], Jennifer M. Munson[1], Kristin S. Miller[2], Kristin M. Myers[3], Steven D. Abramowitch[4], Raffaella De Vita[1]
[1]Virginia Tech, [2]University of Texas, [3]Columbia University, [4]University of Pittsburgh

3:00PM **Diffusion MRI Characterizes Microstructural Changes Of The Cervix During Pregnancy** SB³C2023-592
Noel Naughton[1], Amir Ostadi Moghaddam[1], Mariana Kersh[1], Sanmi Koyejo[2], Amy Wagoner Johnson[1], Bruce Damon[1,3]
[1]University of Illinois, [2]Stanford University, [3]Carle Health

Wednesday, June 7	1:45PM – 3:15PM MT

Biotransport in Drug Delivery

Cascade F

Session Chairs: Govind Srimathveeravalli, *UMass Amherst*
Nichole Rylander, *University of Texas at Austin*

1:45PM **Lymph Node Conduit Modelling Offers Insight Into The Role Of Fluid Flow In Antigen Deposition** SB³C2023-457
Daniel J. Watson[1], Willy V. Bonneuil[1], James Marshall[1], Peter Xie[1], Thomas Adam[1], Jennifer Frattolin[1], Matthew J. Russell[2], Francesca Fasanella Masci[3], Angela E. Goode[1], Shafa Balaram[1], Alexandra E. Porter[1], Anil A. Bharath[1], Bindi S. Brook[2], Robert J.B. Nibbs[3], James E. Moore Jr[1]
[1]Imperial College London, [2]Nottingham University, [3]Glasgow University

2:00PM **CD44 Mechanosignaling May Regulate Drug Resistance In Ovarian Cancer** SB³C2023-195
Maranda E. Kramer, Allison Criswell, Mary Kathryn Sewell-Loftin
University of Alabama at Birmingham

2:15PM **Functionalized Particulate Carriers Targeting Abdominal Aortic Aneurysms Under Flow** SB³C2023-349
Moran Levi[1], Yevgeniy Kreinin[1], Ido Rachbuch[1], Perla Namour[1], Josué Sznitman[1], Meinrad Gawaz[2], Netanel Korin[1]
[1]Technion – IIT, [2]Univesrity of Tuebingen

2:30PM **Investigation Of Bioeffects From Microbubble And Focused Ultrasound Assisted Blood Brain Barrier Disruption** SB³C2023-423
Jane J. Song, Payton J. Martinez, Kang-ho Song, Jenna Steiner, Adam Green, Natalie Serkova, Mark A. Borden
University of Colorado

2:45PM **Development Of A TGFβ2 Eluting Tissue Engineered Vascular Graft With Tunable Delayed Release** SB³C2023-369
Katarina M. Martinet, Tracey Moyston, Stephen C. Balmert, Steven R. Little, Jonathan P. Vande Geest
University of Pittsburgh

3:00PM **A Lattice-Boltzmann Fluid-Structure Interaction Framework For The Inertial Transport Of Bioparticles In Microfluidic Devices** SB³C2023-469
Alberto Mantegazza, Dario De Marinis, Marco D. de Tullio
Polytechnic University of Bari

Wednesday, June 7	1:45PM – 3:15PM MT

Engineering Tissue Regeneration

Gore AB

Session Chairs: Jennifer Puetzer, *Virginia Commonwealth University*
Alejandro Almarza, *University of Pittsburgh*

1:45PM **Optimization Of Lipid Nanoparticles For Localized mRNA Delivery In Fracture Repair** SB³C2023-498
Anna Laura Nelson[1,2], Chiara Mancino[3], Josh Choe[4], Gianluca Fontana[4], Johnny Huard[1], William Murphy[4], Francesca Taraballi[3], Nicole Ehrhart[2], Chelsea Bahney[1,2,5]
[1]Steadman Philippon Research Institute, [2]Colorado State University, [3]Houston Methodist, [4]University of Wisconsin-Madison, [5]University of California, San Francisco

2:00PM **Acellular ECM Powder Provides Lateral Integration And Structural And Cellular Signaling In A 12-Month Goat Implant** SB³C2023-539
Jeanne E. Barthold1, Juliet Heye1, Kaitlin McCreery1, Katie Bizzaza2, Jeremiah Easley2, Ben Gadomski2, Corey P. Neu1
[1]University of Colorado, [2]Colorado State University

2:15PM **Stem Cell-Derived Exosomes Promote Cell Homing and Angiogenic Differentiation For Dental Pulp Regeneration** SB³C2023-444
Venkateswaran Ganesh, Piedad C. Gomez-Contreras, Henry L. Keen, Kyungsup Shin, James A. Martin, Dongrim Seol
University of Iowa

2:30PM **Superficial Meniscus Cells And Highly Proliferative And Migratory And Generate Functional Tissue Despite A Lower Cellular Mechanosensitivity** SB³C2023-112
Sereen SF. Assi[1], Elizabeth Bernstein[1], Edward D. Bonnevie[1,2], Emily E. Sharp[1], Ryan C. Locke[1,2], Robert L. Mauck[1,2]
[1]University of Pennsylvania, [2]Crescenz VA Medical Center

2:45PM **Viscoelasticity and Micro-phase Separation Mediate Meniscal Cell Migration through Hyaluronic Acid Hydrogels** SB³C2023-138
Karen L. Xu[1], Hooman Fallahi[2], Lin Han[2], Robert L. Mauck[1], Jason A. Burdick[1,3]
[1]University of Pennsylvania, [2]Drexel University, [3]Univesrity of Colorado

3:00PM **Sustained-release losartan from peptide nanofibers promotes chondrogenesis** SB³C2023-485
Kohei Yamaura[1], Nicholas A. Sather[2], Anna Metlushko[2], Haruki Nishimura[1], Radoslav Z. Pavlović[2], Sealy Hambright[1], Sudheer K. Ravuri[1], Marc J. Philippon[1,3], Samuel I. Stupp[2], Chelsea S. Bahney[1,4], Johnny Huard[1]
[1]Steadman Philippon Research Institute, [2]Northwestern University, [3]Steadman Clinic, [4]University of California, San Francisco

Wednesday, June 7	1:45PM – 3:15PM MT

Predictive Models in Cardiovascular Biomechanics

Gore CD

Session Chairs: Lucas Timmins, *University of Utah*
Jonathan Wenk, *University of Kentucky*

1:45PM **Towards Real-Time Predictive Models of Transcatheter Aortic Valve Replacement Procedures via Reduced Order Modeling** SB³C2023-328
I Shah[1, 3], F. Ballarin[2], A. Veneziani[3], L. Dasi[1]
[1]Georgia Institute of Technology, [2]Università Cattolica del Sacro Cuore, [3]Emory University

2:00PM **Predicting Long-term Patient-Specific Outcome Of Cardiac Resynchronization Therapy Using A Fast Computational Model** SB³C2023-249
Clara E. Jones[1], Derek J. Bivona[2], Kenneth C. Bilchick[2], Pim J.A. Oomen[1]
[1]University of California, Irvine, [2]University of Arizona

2:15PM **Aortic Wall Stress Concentration As A Predictor Of Type A Aortic Dissection** SB³C2023-351
Christina Sun[1], Tongran Qin[1], Asanish Kalyanasundaram[2], Wei Sun[1], John Elefteriades[2], Liang Liang[3]
[1]Lake Forest, [2]Yale University, [3]University of Miami

2:30PM **A Modular Framework For Strong 3D/0D Coupling In Cardiac Mechanics Simulations** SB³C2023-032
Aaron L. Brown, Zinan Hu, Alison L. Marsden
Stanford University

2:45PM **A Neural Network Finite Element Approach For High-Speed Cardiac Pressure-Volume Simulations** SB³C2023-459
Shruti Motiwale, Wenbo Zhang, Michael S. Sacks
University of Texas at Austin

3:00PM **No Strings Attached: Predicting Tricuspid Valve Coaptation Without In Vivo Chordal Geometry** SB³C2023-473
Mrudang Mathur, Vijay Dubey, Manuel K. Rausch
University of Texas at Austin

Wednesday, June 7	1:45PM – 3:15PM MT

Bioengineering Design II

Powell

Session Chairs: Zhongping Huang, *West Chester University*
Anita Singh, *Temple University*

1:45PM **Mixed Approaches to Noninvasive Ventilation Mask Design: Triphasic Mixture Theory Material Model Calibration and Global Finite Element Analysis** SB³C2023-290
Anne D. Zakrajsek[1], Marty O. Visscher[1], Vivek Narendran[1,2], Eric A. Nauman[1]
[1]University of Cincinnati, [2]Cincinnati Children's Hospital

2:00PM **Retropubic Trocar Temporal Characteristics Between Expert and Novice Surgeons** SB³C2023-438
Md A. Arif, Austin Bachar, Gregory W. King, Gary Sutkin, Antonis P. Stylianou
University of Missouri

2:15PM **Continuous inter-limb gait coordination and stability in veterans and service members with transtibial limb loss: influences of prosthetic ankle-foot devices** SB³C2023-221
Alexis Sidiropoulos[1], Brad D. Hendershot[2], Jonathan Gladish[2], David Herlihy[1,3], Jason Maikos[1]
[1]New York Harbor Healthcare System, [2]Extremity Trauma and Amputation Center of Excellence, [3]Narrows Institute of Biomedical Research and Education

2:30PM **Analysis of a New Socket Based Reference Frame for Ankle Rollover Shape for Transtibial Prostheses** SB³C2023-451
David Herlihy[1], John Chomack[2], Jason Maikos[2]
[1]Narrows Institute of Biomedical Research and Education, [2]New York Harbor Healthcare System

2:45PM **Development Of A Novel Hand Worn Sensor For Objective Assessment Of Hand Dexterity In Neurodegenerative Conditions** SB³C2023-035
Conor D. Hayden[1], Deirdre Murray[1,2], Dara Meldrum[1], Dermot Geraghty[1], Orla Hardiman[1,2], Bruce P. Murphy[1]
1Trinity College Dublin, 2Beaumont Hospital

3:00PM **The Impact Of Regulating The Plantarflexion And Dorsiflexion Resistance Of An Articulated Ankle Foot- Orthosis On Lower Limb Kinematics And Kinetics Of Stroke Survivors During Ambulation** SB³C2023-406
Oluwaseye P. Odanye[1], Emily E. Steffensen[1], Christopher J. Burcal[1], Aaron D. Likens[1], Elisa S. Arch[2], Brian A. Knarr[1]
[1]University of Nebraska, [2]University of Delaware

Wednesday, June 7	1:45PM – 3:15PM MT

Cardiovascular Tissue Structure and Mechanics

Zermatt

Session Chairs: Jonathan Vande Geest, *University of Pittsburgh*
Lakshmi Dasi, *Georgia Institute of Technology*

1:45PM **Right Ventricular Myocardium Remodeling in Pulmonary Arterial Hypertension is Sex Dependent** SB³C2023-265
Becky A. Hardie, Jessica Huberts, Daniela Valdez-Jasso
University of California, San Diego

2:00PM **Cyclic Stretch Results in Directionally Dependent Recellularization Aligned with Cellular Stress Avoidance Reorientation** SB³C2023-267
Adam W.Y. Ley, Eric Slaughter, Victor H. Barocas, Robert T. Tranquillo
University of Minnesota

2:15PM **Evaluation Of Hypertension And Intraluminal Vascular Injury On The Biomechanics Of The Murine Femoral Artery** SB³C2023-508
J. Caleb Snider[1], Zachary Tentor[2], Yujun Xu[1], Matthew R. Bersi[1]
[1]Washington University in St. Louis, [2]University of Virginia

2:30PM **Impact of local collagen architecture on rupture behavior of tissue-engineered atherosclerotic plaque caps** SB³C2023-012
Hanneke Crielaard[1], Tamar B. Wissing[1,2], Su Guvenir Torun[1], Pablo de Miguel[1,3], Gert-Jan Kremers[1], Frank J.H. Gijsen[1,3], Ali C. Akyildiz[1,3], Kim van der Heiden[1,2]
[1]Erasmus Medical Center, [2]Eindhoven University of Technology, [3]Delft University of Technology

2:45PM **An Optimized Method For Constitutive Model Fitting Of Soft Tissues Bi-Directional Mechanical Stress-Stretch Data** SB³C2023-119
Sayed Ahmadreza Razian, Alexey Kamenskiy, Majid Jadidi
University of Nebraska at Omaha

3:00PM **Mechanical Characterization of Porcine Tricuspid Valve Anterior Leaflets Over Time: Applications to Ex-vivo Studies** SB³C2023-582
Julia Clarin, Dominique Dang, Lucas Santos, Rouzbeh Amini
Northeastern University

Wednesday, June 7	3:30PM – 5:00PM MT

Heart Valve Fluid Mechanics

Cascade ABC

Session Chairs: Hoda Hatoum, *Michigan Tech*
Lucas Timmins, *University of Utah*

3:30PM **Impact of Blood Pressure on Coronary and Sinus Flow Dynamics After Aortic Valve Replacement** SB³C2023-562
B. Vogl[1], S. Lilly[2], V. Thourani[3], M. Alkhouli[4], B. Lindman[5], H. Hatoum[1]
[1]Michigan Technological University, [2]The Ohio State University, [3]Piedmont Heart Institute, [4]Mayo Clinic, [5]Vanderbilt University

3:45PM **Biomechanical Analysis Of A Fetal Pulmonary Heart Valve Replacement** SB³C2023-388
Sanchita S. Bhat, Katelynne Berland, Anna Farnan, Katherine Vietmeyer, Lakshmi Prasad Dasi
Georgia Institute of Technology

4:00PM **On The Closure Kinematics Of Aortic Mechanical Heart Valves Versus Bioprosthetic Heart Valves** SB³C2023-044
Syed Samar Abbas, Iman Borazjani
Texas A&M University

4:15PM **Bio-Inspired Polymeric TAVR To Improve Durability Outcomes** SB³C2023-204
Nipa Khair[1], Sanchita Bhat[2], Katie Vinterella[2], Satheesh Kumar Harikrishnan[2], Lakshmi Prasad Dasi[2], Susan James[1]
[1]Colorado State University, [2]Georgia Institute of Technology

4:30PM **Experimental Study of Flow-Mediated Fibrin Clot Accumulation in Prosthetic Heart Valves** SB³C2023-367
Yevgeniy Kreinin, Moran Levi, Yahel Talmon, Josué Sznitman, Netanel Korin
Technion - IIT

4:45PM **Effect Of Sinotubular Junction Size In TAVR Leaflet Thrombosis And The Potential Of TAV-in-TAV Procedure: A Fluid Structure Interaction Based Thrombogenic Risk Assessment Analysis** SB³C2023-299
Symon Reza[1], David Oks[2], Brandon Kovarovic[1], Mariano Vázquez[2], Danny Bluestein[1]
[1]Stony Brook University, [2]Computer Applications in Science and Engineering

Wednesday, June 7	3:30PM – 5:00PM MT

Emerging Areas in Thrombosis and Vascular Modeling

Cascade D

Session Chairs: Diego Gallo, *Politecnico di Torino*
Hannah Cebull, *Emory University*

3:30PM **Shear-Mediated Platelet Adhesion Dynamics And Multi-Platelet Aggregation: In Vitro Validated Multiscale Simulations Using Coarse-Grained Molecular Dynamics And Dissipative Particle Dynamics** SB³C2023-288
Peineng Wang, Yicong Zhu, Jawaad Sheriff, Peng Zhang, Yuefan Deng, Danny Bluestein
Stony Brook University

3:45PM **Investigating Changes in Hematological and Hemorheological Parameters in a Mouse Stent Implantation Model** SB³C2023-274
D. Kokkinidou, E. Kaliviotis, C. Shammas, A. Anayiotos, K. Kapnisis
University of Technology

4:00PM **Usability Of Low-cost 3D Visualization Sharing Interfaces For Cardiovascular Blood Flow Dynamics Data** SB³C2023-509
Zainab Husain[1], Noah Egnatis[1], Karol Calò[2], Diego Gallo[2], Umberto Morbiducci[2], Peter Coppin[3], David A. Steinman[1]
[1]University of Toronto, [2]Politecnico di Torino, [3]Ontario College of Art and Design University

4:15PM **Excessive Shear Rate, not Shear Stress, is Responsible for Cell Mechanolysis in Small Bore Needle Injections** SB³C2023-368
George Morgan, Lamis Elsawah, Alejandro Esclamado-Cadenas, Amelie Daudet, Jennifer Frattolin, Daniel Watson, Qian Xu, Nicola Negrini, Adam Celiz, James E. Moore Jr.
Imperial College London

4:30PM **Real-Time Optimization of the Total Cavopulmonary Connection via Reduced Order Modeling** SB³C2023-331
I Shah[1,2], F. Ballarin[3], T. Iliescu[4], O. San[5], L. Dasi[1], A. Wei[6], A. Veneziani[2]
[1]Georgia Institute of Technology, [2]Emory University, [3]Università Cattolica del Sacro Cuore, [4]Virginia Tech, [5]Oklahoma State University, [6]University of Massachusetts

4:45PM **Validation Of The Coupled Momentum Method Against A Compliant Aortic Phantom In A Hybrid Mock Circulatory Loop** SB³C2023-358
Francesco Bardi[1,2,3], Emanuele Gasparotti[1], Emanuele Vignali[1], Miquel Aguirre[2], Stéphane Avril[2], Simona Celi[1]
[1]BioCardioLab, [2]INSERM, [3]PrediSurge

Wednesday, June 7	3:30PM – 5:00PM MT

Multiscale Biomechanics

Cascade E

Session Chairs: Pim Oomen, *University of California – Irvine*
Chung-Hao Lee, *University of Oklahoma*

3:30PM **Anisotropic Stiffness Measured Using A Toroidal Probe In Meso Level And Cell Level** SB³C2023-251
J. Li, T. Paradis, M. Vandadi, N. Rahbar, K.L. Billiar
Worcester Polytechnic Institute

3:45PM **A Validated Data-Driven, Constitutive Model Of Type II Collagen Including Failure** SB³C2023-228
Phoebe Szarek, David M. Pierce
University of Connecticut

4:00PM **Active Microtissue Arrays For Probing Tissue Response To Dynamic Conditioning** SB³C2023-366
William P. Cortes, Kalyn R. Younger, Thao D. Nguyen, Daniel H. Reich
Johns Hopkins University

4:15PM **The Non-Affine Network Solver Plugin: A Generalized Fiber Network Material Model From Volume Averaging Theory** SB³C2023-287
Ryan R. Mahutga, Victor H. Barocas, Patrick W. Alford
University of Minnesota

4:30PM **A Non-Contact Microfluidic Approach To Distinguish Large Extracellular Vesicles From Idh1-Mutated Glioblastoma Cells Based On Stiffness** SB³C2023-342
Mi Ho Jeong, Hyungsoon Im, Joanna B. Dahl
Massachusetts General Hospital

4:45PM **Augmented Reality Visualization Of Biomechanical Wall Stresses On Abdominal Aortic Aneurysms Using Artificial Intelligence** SB³C2023-511
Timothy K. Chung, Nathan L. Liang, David A. Vorp
University of Pittsburgh

Wednesday, June 7	3:30PM – 5:00PM MT

Experimental Head and Injury Mechanics

Cascade F

Session Chairs: Brittany Coats, *University of Utah*
Mehmet Kurt, *University of Washington*

3:30PM **Head Kinematics in Stock Car Racing: Quantifying Differences Between Tracks** SB³C2023-514
Sophia R. Zoch[1,2], Logan E. Miller[1,2], Cole M. Binder[2], Destiny R. Mason[1,2], John P. Patalak[3], Matthew G. Harper[3], Jillian E. Urban[1,2], Joel D. Stitzel[1,2]
[1]Virginia Tech-Wake Forest, [2]Wake Forest School of Medicine, [3]National Association for Stock Car Auto Racing

3:45PM **Late Triggering of Tagged MRI for Measurement of In Vivo Brain Deformation during Head Rotation** SB³C2023-551
Yuan-Chiao Lu[1], Andy Knutsen[1], Ahmed Alshareef[1], Wen-Tung Wang[2], Joy Mojumder2, Jerry L. Prince[3], Philip Bayly[4], John A. Butman[2], Dzung L. Pham[2,5]
[1]Henry M Jackson Foundation for the Advancement of Military Medicine, [2]National Institutes of Health, [3]Johns Hopkins University, [4]Washington University at St. Louis, [5]Uniformed Services University

4:00PM **Non-Concussive Head Impact Kinematics And Brain Strain Distribution In Collegiate Football** SB³C2023-344
Enora Le Flao[1], Xianghao Zhan[1], Nicholas J. Cecchi[1], Yuzhe Liu[1], Ashlyn A. Callan[1], Landon P. Watson[1], Collin Pang[1], Gerald A. Grant[1,2], Michael M. Zeineh[1], David B. Camarillo[1]
[1]Stanford University, [2]Duke University

4:15PM **Behavioral Impairments In Repetitive Mild Traumatic Brain Injury** SB³C2023-262
S. Vafadar, H. Li, S. Assari, S.J. Ward, R.F. Tuma, K. Darvish
Temple University

4:30PM **Influence of Fragment Impact Attributes in Cutaneous Injury** SB³C2023-086
O. Elsafty, R. Dauskardt
Stanford University

4:45PM **A Methodology to Obtain Injury and Biomechanical Data from Live Swine Experimentation for Behind Armor Blunt Trauma** SB³C2023-302
Alok S. Shah[1], Narayan Yoganandan[1], Mary F. Otterson[1], Brian D. Stemper[1], Joost Op't Eynde[2], Cameron D. Bass[2], Justin McMahon[3], Robert S. Salzar[3], B. Joseph McEntire[4]
[1]Medical College of Wisconsin, [2]Duke University, [3]University of Virginia, [4]US Army Aeromedical Research Laboratory

Wednesday, June 7	3:30PM – 5:00PM MT

Biophysical Effects on Cells and Tissues

Gore AB

Session Chairs: Sarah Calve, *University of Colorado*
Victor Varner, *University of Texas at Dallas*

3:30PM **Effect of the Physical Environment on Embryonic Kidney Progenitor and Explant Culture** SB³C2023-174
Aria (Zheyuan) Huang, Alex J. Hughes
University of Pennsylvania

3:45PM **Elastic Fibers Confer Tensile Stiffness To The Dorsal Mesentery, Driving Buckling Morphogenesis Of The Small Intestine** SB³C2023-425
Elise A. Loffet, John F. Durel, Hyunjee Lim, Richard Kam, Nandan L. Nerurkar
Columbia University

4:00PM **A Thermodynamic Framework For Sarcomere Formation In Cardiomyocytes Spread On Micro-Patterned Substrates** SB³C2023-253
Ryan J. Coleman[1], Vikram S. Deshpande[2], Patrick McGarry[1]
[1]University of Galway, [2]University of Cambridge

4:15PM **Cyclic Stretch Inhibits Cell Invasion And Migration In 3D Scaffolds** SB³C2023-017
Rozanne W. Mungai, Kevin Piskorowski, Grace Jolin, Ying Lei, Kristen L. Billiar
Worcester Polytechnic Institute

4:30PM **Connecting Cyclic Stress To Nephron Induction In Kidney Organoids and 3D Co-Culture Models** SB³C2023-178
John M. Viola, Alex J. Hughes
University of Pennsylvania

4:45PM **Delineating Effects of Substrate Stiffness, Chemistry, and Cyclical Strain on Lung Fibroblasts Gene Expression** SB³C2023-258
Qi Wang, Kristan S. Worthington, Edward A. Sander
University of Iowa

Wednesday, June 7	3:30PM – 5:00PM MT

Structure and Function in Biomechanics

Gore CD

Session Chairs: Stephanie Cone, *University of Delaware*
Kara Peak, *University of Texas - Dallas*

3:30PM **Cell-Scale Measurements Of Tissue Viscoelasticity Using Thermoresponsive Mechanosensors In Engineered Tumor Models** SB³C2023-489
Benjamin E. Campbell, Stephanie Mok, Christina-Marie Boghdady, Nikita Kalashnikov, Luke McCaffrey, Christopher Moraes
McGill University

3:45PM **Finite Elements Of Multiscale Mixtures (Fe2M): Theory, Numerical Implementation, And Analyses Of Size Effects** SB³C2023-389
Ashkan Almasi[1], Tim Ricken[2], David M. Pierce[1]
[1]University of Connecticut, [2]University of Stuttgart

4:00PM **Surgical Augmentation And Preservation Of Remnant ACL Tissue Best Restores Knee Function After Partial ACL Injury** SB³C2023-023
S. Cone[1,2], R. Salbego[1], J. Roth[1], P. Lang[1]
[1]University of Wisconsin, [2]University of Delaware

4:15PM **Characterizing The Biaxial Properties Of Skeletal Muscles Of The Mouse Hindlimb** SB³C2023-599
Katherine R. Knaus, Rebecca Hardie, Jessica Huberts, Daniela Valdez-Jasso
University of California, San Diego

4:30PM **Cyclic Strain Induces Matrix Turnover To Better Maintain Tendon Composition In Explant Culture** SB³C2023-069
Anthony N. Aggouras, Brianne K. Connizzo
Boston University

4:45PM **Microstructure-Based Estimation Of The Effective Stiffness Of Crosslinked, Embedded Fiber Networks** SB³C2023-330
Sotirios Kakaletsis[1], Emma Lejeun[2], Manuel Rausch[1]
[1]University of Texas at Austin, [2]Boston University

Wednesday, June 7	3:30PM – 5:00PM MT

Growth and Remodeling I

Powell

Session Chairs: Colleen Witzenburg, *University of Wisconsin - Madison*
Jacopo Ferruzzi, *University of Texas - Dallas*

3:30PM **Multiscale Model Predicts the Effect of Beta Blockers on Ventricular Remodeling in Dogs with Experimental Mitral Valve Regurgitation** SB³C2023-315
J. Bracamonte[1], L. Watkins[2], J. Saucerman[2], J. Holmes[1]
[1]University of Alabama at Birmingham, [2]University of Virginia

3:45PM **Computational Modeling Of Arterial Growth And Remodeling Including Mechanosensitive Notch Signaling** SB³C2023-420
Jordy van Asten[1], Marcos Latorre[3], Cansu Karakaya[1], Frank Baaijens[1], Cecilia[1,3], Tommaso Ristori[1], Jay Humphrey[4], Sandra Loerakker[1]
[1]Eindhoven University of Technology, [2]Universitat Politècnica de València, [3]Åbo Akademi, [4]Yale University

4:00PM **Growth And Remodeling Of The Pulmonary Arterial Tree For Evolution Of Pulmonary Arterial Hypertension** SB³C2023-546
Jason M. Szafron, Weiguang Yang, Jeffrey A. Feinstein, Marlene Rabinovitch, Alison L. Marsden
Stanford University

4:15PM **Multiscale Computational Modeling Of TGFbr1/2 Knock-Out In Adult Mouse Aortas** SB³C2023-575
Ana C. Estrada, Linda Irons, Jay D. Humphrey
Yale University

4:30PM **Semi-Automatic Quantification of Early Structural Remodeling Following Myocardial Infarction** SB³C2023-089
Catherine C. Eberman, Colleen M. Witzenburg
University of Wisconsin

4:45PM **Mechanical Characterization of Sheep Lymphatic Growth and Remodeling** SB³C2023-106
Sophia M. Mavris, Zhanna V. Nepiyushchikh, J. Brandon Dixon, Rudolph L. Gleason
Georgia Institute of Technology

Wednesday, June 7	3:30PM – 5:00PM MT

Modeling in the Cardiovascular System

Zermatt

Session Chairs: Manuel Rausch, *University of Texas - Austin*
Beatrice Bisighini, *Mines Saint-Etienne*

3:30PM **Classification-based super-resolution reconstruction in CMR to quantify four-dimensional myocardial strains in mice** SB³C2023-545
Tanmay Mukherjee[1], Sakthivel Sadayappan[2], Reza Avazmohammadi[1,3]
[1]Texas A&M, [2]University of Cincinnati, [3]Houston Methodist Academic Institute

3:45PM **A Novel Image-based Computational Framework to Evaluate the Material Properties of Arterial Tissue from High-resolution Magnetic Resonance Image Data** SB³C2023-505
Y.F. Jack Wang, Samer S. Merchant, Edward W. Hsu, Lucas H. Timmins
University of Utah

4:00PM **Novel Automated Aortic Root Echocardiography Feature Tracking Algorithm For Pediatric Aortopathy** SB³C2023-176
Elnaz Ghajar-Rahimi[1], Frederick W. Damen[1,2], Benjamin J. Landis[2], Craig J. Goergen[1,2]
[1]Prudue University, [2]Indiana University

4:15PM **3D Passive Strain Mapping of the Embryonic Zebrafish heart** SB³C2023-587
Alex L. Gendernalik[1,2], David Bark[1,2]
[1]Colorado State University, [2]Washington University

4:30PM **Computational modeling study of the effects of pulmonary hypertension on right heart perfusion** SB³C2023-024
Lei Fan[1], Jenny S. Choy[2], Ghassan S. Kassab[2], Lik Chuan Lee[1]
[1]Michigan State University, [2]California Medical Innovations Institute

4:45PM **Imaging And Mechanical Characterization Of Human Blood Clot Analogues With Different Compositions And Degrees Of Contraction** SB³C2023-395
Rachel Cahalane[1], Janneke M.H. Cruts[1], Ahlam Rachid[2], Kim van Gaalen[1], Heleen M.M. van Beusekom[1], Moniek de Maat[1], Marcel L. Kijkshoorn[1], Nikki Boodt[1], Aad van der Lugt[1], Frank Gijsen[1,3]
[1]Erasmus Medical Center, [2]Eindhoven University of Technology, [3]Delft University of Technology

Thursday, June 8	1:45PM – 3:15PM MT

Cardiovascular Devices and Design

Cascade ABC

Session Chairs: Zahra Keshavarz-Motamed, *McMaster University*
Ethan Kung, *Clemson University*

1:45PM **Analyzing The Impact Of TAVR Device Orientation On Post-TAVR Paravalvular Leakage Severity And Thrombogenicity In Bicuspid Aortic Valve Patients** SB³C2023-076
S. Anam[1], B. Kovarovic[1], A. Hamdan[2], R. Haj-Ali[3], D. Bluestein[1]
[1]Stony Brook University, [2]Rabin Medical Center, [3]Tel-Aviv University

2:00PM **In Silico Investigation on Stroke Risks from Left Ventricular Assist Device** SB³C2023-538
Sreeparna Majee[1], Akshita Sahni[1], Erin E. McIntyre[1], Jay D. Pal[2], Debanjan Mukherjee[1]
[1]University of Colorado, [2]University of Washington

2:15PM **Hemodynamic Performance Of Dual Lumen VV ECMO Cannulas** SB³C2023-284
Louis P. Parker[1], Anders Svensson Marcial[2], Torkel B. Brismar[2], Lars Mikael Broman[2,3], Lisa Prohl Wittberg[1]
[1]Royal Institute of Technology, [2]Karolinska Institute, [3]Karolinska University Hospital

2:30PM **A Preliminary In Silico Study On The Fluid Dynamic Changes With Central Venous Catheter Insertion** SB³C2023-414
B. Su, H. Palahnuk, T. Harbaugh, E. Rizk, S.W. Hazard, K.B. Manning
Penn State University

2:45PM **Predicting Device Related Thrombosis After Left Atrial Appendage Occlusion Using Computational Fluid Dynamics** SB³C2023-151
B. Vogl[1], A. Chavez Ponce[2], A. El Shaer[2], A. Bavo[3], M. De Buele[3], M. Alkhouli[2], H. Hatoum[1]
[1]Michigan Technological University, [2]Mayo Clinic, [3]FEops

3:00PM **Development Of A Novel Polymeric TAVR Valve: Design Optimization And Addressing TAVR Clinical Complications** SB³C2023-408
B. Kovarovic[1], R. Helbock[1], O.M. Rotman[1], K. Baylous[1], M. Slepian[2], D. Bluestein[1]
[1]Stony Brook University, [2]University of Arizona

Thursday, June 8	1:45PM – 3:15PM MT

Savio Woo Session I: Joint, Ligament, and Muscle

Cascade D

Session Chairs: Daniel Cortes, *Pennsylvania State University*
Beth Winkelstein, *University of Pennsylvania*

1:45PM **Strain Thresholds for Neuronal Activation During High-Rate Tensile Loading to Failure: Implications for Pain and Trauma** SB³C2023-078
Daniel Du, Sittinon Nuethong, Prabesh Ghimire, Beth A. Winkelstein
University of Pennsylvania

2:00PM **Estimating Soleus Muscle Volume By Anthropometric And Ultrasound-Measurable Parameters** SB³C2023-372
Shabnam Rahimnezhad[1], Karin G. Silbernagel[2], Daniel H. Cortes[1]
[1]Pennsylvania State University, [2]University of Delaware

2:15PM **Quantifying The Effect Of Femoral Component Internal Rotation On Ligament Forces For Total Knee Arthroplasty With Varus Tibial Alignment** SB³C2023-448
Jonathan Glenday, Jonathan Vigdorchik, Peter Sculco, Cynthia Kahlenberg, David Mayman, Eytan Debbi, Joseph Lipman, Timothy Wright, Fernando Quevedo Gonzalez
Hospital for Special Surgery

2:30PM **The Role of Posterior Cruciate Ligament on Femoral Rollback in Medial Congruent Total Knee Arthoplasty: A Computational Study** SB³C2023-525
Reza Pourmodheji, Jacob M. Hirth, Brian P. Chalmers, Cynthia A. Kahlenberg, William J. Long, Geoffrey H. Westrich, David J. Mayman, Peter K. Sculco, Timothy M. Wright, Carl W. Imhauser
Hospital for Special Surgery

2:45PM **Blebbistatin As A Method To Improve Outcomes Following Joint Capsule Release Surgery In An In Vivo Rat Elbow Model** SB³C2023-083
Austin J. Scholp, Timothy P. Fowler, Emily Petersen, Douglas Fredericks, James A. Martin, Aliasger K. Salem, Edward A. Sander
University of Iowa

3:00PM **Obesity Affects The Biomechanics Of The Posterior Kinetic Chain During Manual Lifting** SB³C2023-456
Sergio A. Lemus[1], Mallory Volz[1], Francisco Beron-Vera[1], Mitchell Hurtado[1], Eduard Tiozzo[1], Arlette Perry[1], Thomas M. Best[1,2], Francesco Travascio[1,3]
[1]University of Miami, [2]UHealth Sports Medicine, [3]Mount Sinai

Thursday, June 8	1:45PM – 3:15PM MT

Emerging Mechanobiology and Biomechanics I

Cascade E

Session Chairs: Soham Ghosh, *Colorado State University*
Ian Sigal, *University of Pittsburgh*

1:45PM **Nuclear Deformation Of The Tricuspid Valve Interstitial Cells: The Effects Of Nuclear Orientation And Extracellular Matrix Structure** SB³C2023-222
Mina Pakzadmanesh, Samuel D. Salinas, Vineet S. Thomas, Rouzbeh Amini
Northeastern University

2:00PM **Ultrasoft Edge-Labelled Hydrogel Sensors Reveal Internal Tissue Stress Patterns In Invasive Engineered Tumors** SB³C2023-223
C.M. Boghdady, W. Lee, V. Lelarge, R.L. Leask, L. McCaffrey, C. Moraes
McGill University

2:15PM **Deep Learning Enhances Micro-Computed Tomography Image Resolution Of Murine Femurs** SB³C2023-604
Michael A. David[1], Tillman James[2], Douglas J. Adams[1]
[1]University of Colorado, [2]Washington University at St. Louis

2:30PM **The Role Of Skin Biomechanics In Tactile Perception Of Anti-Aging Formulations** SB³C2023-206
S. Hendrickx-Rodriguez, O. Elsafty, R. Dauskardt
Stanford University

2:45PM **Constitutive Modeling Of The Airway Tree Informed By Experimental Biaxial Mechanical Behavior** SB³C2023-019
S. Sattari[1], CA. Mariano[1], T. Sigaeva[2], M. Eskandari[1]
[1]University of California, Riverside, [2]University of Waterloo

3:00PM **Integrated Right Ventricular-Pulmonary Artery Biomechanics In Pulmonary Hypertension** SB³C2023-197
Sunder Neelakantan[1], Peng Zhang[2,3], Gaurav Choudhary[2,3], Reza Avazmohammadi[1]
[1]Texas A&M University, [2]Providence VA Med Center, [3]Brown University

Thursday, June 8	1:45PM – 3:15PM MT

Biotransport in Directed Cell Migration

Cascade F

Session Chairs: Netanel Korin, *Technion*
Joanna Dahl*, University of Massachusetts*

1:45PM **A Microfluidic Platform To Investigate Transport Phenomena In Chemokine Gradient Establishment** SB³C2023-380
J. Frattolin[1], D.J. Watson[1], W.V. Bonneuil[1], F. Fasanella Masci[2], M. Russell[3], B.S. Brook[3], R.J.B. Nibbs[2], J.E. Moore Jr[1]
[1]Imperial College London, [2]University of Glasgow, [3]University of Nottingham

2:00PM **Quantitative Assessment Of The Role Of Chromatin Mechanics And Architecture In Monolayer Cell Migration** SB³C2023-397
Jack Forman, Brady Hine, Eric Havenhill, Samantha Kaonis, Soham Ghosh
Colorado State University

2:15PM **The Mechanics And Morphodynamics Of 3D Migrating Cancer Cells** SB³C2023-432
Bo Sun
Oregon State University

2:30PM **Interstitial Chemokine Gradients And Dendritic Cell Migration During Inflammation** SB³C2023-464
Matthew J. Russell[1], Francesca Fasanella Masci[2], Willy V. Bonneuil[3], Daniel J. Watson[4], Jennifer Frattolin[4], James E. Moore Jr. [4], Robert J.B. Nibbs[2], Bindi S. Brook[1]
[1]University of Nottingham, [2]University of Glasgow, [3]KTH Royal Institute of Technology, [4]Imperial College London

2:45PM **Mechanoregulation Of Cadherin Expression In A 3D Co-Culture** SB³C2023-431
Vaishali Bala, Faith Muriuki, M.K. Sewell-Loftin
University of Alabama at Birmingham

3:00PM **Cellular Signal Processing Machinery During Directed Migration Of Cancer Cells** SB³C2023-359
Andrew Mugler, Bumsoo Han
[1]University of Pittsburgh, [2]Purdue University

Thursday, June 8	1:45PM – 3:15PM MT

Mechanobiology in Cancer, Inflammation, and Motility

Gore AB

Session Chairs: Jacopo Ferruzzi, *University of Texas at Dallas*
Alix Deymier, *University of Connecticut*

1:45PM **Macrophage Signaling Alters Fibroblast Responses to Mechanical Loading** SB³C2023-519
McKenzie E. Sup, Min Kyu M. Kim, Lee Song, Beth Ashinsky, Jieon J. Kim, Stavros Thomopoulos
Columbia University

2:00PM **Stromal Cells Modulate Chemo-Mechanical Factors In The Tumor Microenvironment Required For Leader Cell Driven Collective Migration** SB³C2023-141
Jessanne Y. Lichtenberg[1], Trey P. Redman[1], Ella Ramamurthy[1,2], Christopher A. Lemmon[1], Priscilla Y. Hwang[1]
[1]Virginia Commonwealth University, [2]University of California, Berkeley

2:15PM **Mechanosensitivity of Naïve and Pro-inflammatory Macrophage Polarization upon Extravasation in 3D Musculoskeletal-like Tissue** SB³C2023-560
P. Babaniamansour, D. Jacho, A. Rabino, R. Garcia-Mata, E. Yildirim-Ayan
University of Toledo

2:30PM **Mechanically Primed Cells Transfer Memory To Fibrous Matrices For Invasion Across Environments Of Distinct Stiffness and Dimensionality** SB³C2023-185
José Almeida, Jairaj Mathur, Ye Lim Lee, Bapi Sarker, Amit Pathak
Washington University in St. Louis

2:45PM **Impact of Type V Collagen Deficiency on Fibroblast Mechanosensing Under Inflammatory Stimulation** SB³C2023-384
N. Patel[1], T. Li[1], J. Duggan[1], S.M. Kallish[2], K.L. Spiller[1], R.J. Petrie[1], L. Han[1]
1Drexel University, 2University of Pennsylvania

3:00PM **Mechanical Stiffening of Extracellular Matrix by Neutrophil Extracellular Traps Promotes Breast Cancer Progression** SB³C2023-405
C.-M.Boghdady, N. Wong, A. Shen, E. Solymoss, M. de Meo, A. Chandrasekaran, R. Rayes, Y. Chen, A. Ghagre, A. Ehrlicher, L. McCaffrey, J. Spicer, P. Siegel, C. Moraes
McGill University

Thursday, June 8	1:45PM – 3:15PM MT

Fibrocartilage: Intervertebral Disc, Meniscus, TMJ

Gore CD

Session Chairs: Alejandro Almarza, *University of Pittsburgh*
Sonia Bansal, *University of Delaware*

1:45PM **Non-enzymatic Glycation Strengthens Annulus Fibrosus Through Crosslinks Aligned With Primary Collagen Fibers** SB³C2023-031
Minhao Zhou, Erin Archibeck, Yarah Feteih, Yousuf Abubakr, Grace D. O'Connell
University of California

2:00PM **Multiscale Biomechanics Across Scales: Micromechanics and Nonlinear Viscoelasticity of the Nucleus Pulposus in Inflammation** SB³C2023-573
Timothy D. Jacobson, Gerard A. Ateshian, Nadeen O. Chahine
Columbia University

2:15PM **Influence of Multidirectional Loading On Meniscus Wear Behavior** SB³C2023-435
Kate J. Benfield, Katherine J. Fors, Trevor J. Lujan
Boise State University

2:30PM **Identifiability of Poroelastic Model Parameters Using Uniaxial Tension Data: Role of 3D Strain and Unloading** SB³C2023-504
John M. Peloquin, Dawn M. Elliott
University of Delaware

2:45PM **Comparison Of Mechanical Response of TMJ and Knee Cartilage Under Dynamic Loading** SB³C2023-143
Annie Porter[1], Michael Santare[1], Lin Han[2], John Peloquin[1], X. Lucas Lu[1]
[1]University of Delaware, [2]Drexel University

3:00PM **Tribological Assessment of PVA Hydrogels as Interpositional Implant Materials in the Temporomandibular Joint** SB³C2023-353
Kevin M. Labus, Jason P. Kuiper, Christian M. Puttlitz
Colorado State University

Thursday, June 8	1:45PM – 3:15PM MT

Educational Education: Challenges and Innovations

Powell

Session Chairs: Chiara Bellini, *Northeastern University*
Zhongping Huang, *West Chester University*

1:45PM **Computation For Bioengineering And Mechanical Engineering Students: An Experiential Learning Opportunity In Norway** SB³C2023-318
Samuel D. Salinas[1], Ana I. Vargas[1], Turner Jennings[1], Sean Harington[1], Mohammad J. Sadeghinia[2], Mojgan Y. Jacobsen[3], Trine Eide[3], Cecilie Udberg-Helle[3], Torill Andersen Eidsvaag[4], Torjer A. Olsen[5], Jonathan Crossen[5], Victorien Prot[2], Bjørn H. Skallerud[2], Rouzbeh Amini[1]
[1]Northeastern University, [2]Norwegian University of Science and Technology, [3]Kinn Education and Resource Centre, [4]Univesrity of Bergen, [5]UiT The Arctic University of Norway

2:00PM **Integration Of FEBio As An Instructional Tool For Undergraduate Biomechanics** SB³C2023-412
David Jiang, Jeffrey A. Weiss, Lucas H. Timmins
University of Utah

2:15PM **ChatGPT And The Future Of Education In Biomedical And Mechanical Engineering** SB³C2023-588
Sara E. Wilson
University of Kansas

2:30PM **Mega Data Analysis of Sex Distribution of Study Samples Reported in Summer Biomechanics, Bioengineering, & Biotransport Annual Meeting Abstracts** SB³C2023-093
F. Sebastian, A. Hurgoi, M. Schaenen, H. Shah, V. Rivera, K. Le, D. Ng, R. Amini
Northeastern University

2:45PM **Bringing Discussions of Accessibility to Engineering Classrooms** SB³C2023-378
N. Rich[1], S. Johnson[1], C. Bellini[2]
[1]Tatum Robotics, [2]Northeastern University

3:00PM **It Takes a Village: Catalyzing Clinically-driven Undergraduate Design Projects at the Nexus of Engineering, Medicine and Business** SB³C2023-337
Byron D. Erath, Laurel Kuxhaus
Clarkson University

Thursday, June 8	1:45PM – 3:15PM MT

Biomechanical Considerations in Cardio. Biomechanics

Zermatt

Session Chairs: Kyoko Yoshida, *University of Minnesota*
Matthew R. Bersi, *Washington University in St. Louis*

1:45PM **The Effects Of Strain History On Aortic Valve Interstitial Cell Activation In A 3D Hydrogel Environment** SB³C2023-071
Toni M. West, Daniel P. Howsmon, Miles W. Massidda, Helen N. Vo, Athena A. Janobas, Aaron B. Baker, Michael S. Sacks
University of Texas at Austin

2:00PM **Improving Anti-Thrombogenic Potential Of A Porohyperelastic Bilayered Vascular Graft Using Luminal Reversal Flow** SB³C2023-164
Ali Behrangzade[1], Sang-Ho Ye[1,2], William R. Wagner[1,2], Jonathan P. Vande Geest[1,2,3]
[1]University of Pittsburgh, [2]McGowan Institute for Regenerative Medicine, [3]Vascular Medicine Institute

2:15PM **Measurement of clot attachment forces to biomaterials and comparison to a hyperelastic simulation** SB³C2023-317
Jose L. Monclova, Sara E. Almasy, Nicolas Tobin, Vikas Kannojiya, Francesco Costanzo, Scott Simon, Keefe B. Manning
Penn State

2:30PM **Biomechanical Effects Of Annuloplasty Ring Sizing For Functional Mitral Regurgitation Repair** SB³C2023-140
Gediminas Gaidulis, Muralidhar Padala
Emory University

2:45PM **Investigating Elastin Fiber Kinematics In Porcine Epicardial Layer With Laser Scanning Confocal Microscopy** SB³C2023-345
Sara R. McMahan[1], Alan Taylor[1], Duc Khang Chung[1], Jiazhu Xu[1], Matthias Peltz[2], Pietro Bajona[1,2], Yi Hong[1], Jun Liao[1]
[1]University of Texas, [2]Drexel University

3:00PM **Comparison of some novel 1D implementations of hyperelastic arterial models with 3D approaches for a cylindrical test case** SB³C2023-453
Jacob Sturdy[1], Friederike Schäfer[1], Aleksander Sinek[1,2], Mateusz Mesek[1,2], Marek Rojczyk[2], Wojciech P. Adamczyk[2], Bartłomiej Melka[2], Ziemowit Ostrowski[2], Ryszard Białecki[2]
[1]Norwegian University of Science and Technology, [2]Silesiean University of Technology

Thursday, June 8	3:30PM – 5:00PM MT

Emerging Areas in Biofluids

Cascade ABC

Session Chairs: Joseph van Batenburg-Sherwood, *Imperial College London*
Ellie Rahbar, *Wake Forest University*

3:30PM **Effects of Wildland Fire Smoke Exposure on Airflow and Particle Deposition in the Mouse Respiratory Tract** SB³C2023-443
Matthew J. Eden, Jacqueline Matz, Chiara Bellini, Jessica M. Oakes
Northeastern University

3:45PM **The Effects of Cerebrospinal Fluid and Hyperelastic Model on Aneurysm Wall Vibration Using High-fidelity Fluid-structure Interaction Simulations** SB³C2023-379
Kei Yamamoto[1], David Bruneau[2], David Steinman[2], Kristian Valen-Sendstad[1]
[1]Simula Research Laboratory, [2]University of Toronto

4:00PM **Dynamic Response Characterization Of Sheep Lymphatic Pumping During Growth And Remodeling** SB³C2023-541
Young Jae Ryu, Sophia Mavris, Zhanna Nepiyushchikh, Rudolph L. Gleason, J. Brandon Dixon
Georgia Institute of Technology

4:15PM **Improved In Vivo Measurements Of Outflow Facility In Mice By Accounting For The Time-Varying Effects Of Anesthesia** SB³C2023-480
Michael Madekurozwa[1], Nicholas Tolman[2], Simon W. John[2], Darryl R. Overby[2], Joseph van Batenburg-Sherwood[1]
[1]Imperial College London, [2]Columbia University

4:30PM **Left Renal Vein Stenosis Alters Renal Venous Impedance During Murine Pregnancy** SB³C2023-200
Jennifer L. Anderson[1], Riley L. Holloway[1], Paula A. Torres Loza[1,2], David G. Reuter[3], Craig J. Goergen[1]
[1]Purdue University, [2]National University of Colombia, [3]Seattle Children's Hospital

4:45PM **Dynamics Of Shear Stress In Embryonic Chick Heart Anatomies Reconstructed From Light Sheet Fluorescence Microscopy** SB³C2023-219
K. Giesbrecht, S. Rossi, M. Bressan, B. Griffith
University of North Carolina at Chapel Hill

Thursday, June 8	3:30PM – 5:00PM MT

Savio Woo Session II: Ligament & Tendon Growth & Loading

Cascade D

Session Chairs: Jeffrey Weiss, *University of Utah*
Stephanie Cone, *University of Delaware*

3:30PM **ACL Injury And Joint Instability Leads To Meniscal Hypertrophy In A Skeletally Immature Porcine Model** SB³C2023-536
Jacob D. Thompson, Margaret E. Easson, Danielle Howe, Lauren V. Schnabel, Jeffrey T. Spang, Brian G. Pietrosimone, Matthew B. Fisher
North Carolina State University

3:45PM **Mechanical and Multiscale Structural Changes Due to Repetitive Fatigue Loading in an In Vivo Rat Overuse Model** SB³C2023-218
Pooja Chainani[1,2], Maria Buzo Mena[1], Diana Yeritsyan[1], Daniela Caro[1], Kaveh Momenzadeh[1], Joseph P. DeAngelis[2], Arun J. Ramappa[2], Ara Nazarian[1,2]
[1]Harvard Medical School, [2]Boston University

4:00PM **Changes in Viscoelastic Mechanical Properties and Gene Expression in Rat Achilles Tendon Due to Treadmill Running Depend on Exercise Intensity and Duration** SB³C2023-532
Margaret K. Tamburro, Kelsey A. Bonilla, Snehal S. Shetye, Thomas P. Leahy, Jeremy D. Eekhoff, Daniel C. Farber, Louis J. Soslowsky
University of Pennsylvania

4:15PM **Reduced Postnatal Loading After Sciatic Nerve Resection Impairs Achilles Tendon Growth And Maturation** SB³C2023-454
Talayah A. Johnson[1], Natalie Fogarty[1], Alisia Lin[1], Tonia K. Tsinman[1], Xi Jiang[1], Eiki Koyama[2], Lin Han[3], Josh R. Baxter[1], Robert L. Mauck[1], Nathaniel A. Dyment[1]
[1]University of Pennsylvania, [2]Children's Hospital of Pennsylvania, [3]Drexel University

4:30PM **Tendon Overload Using A Rodent Model Of Synergist Ablation Leads To Mechanical Degeneration** SB³C2023-494
Lily M. Lin, Ellen T. Bloom, John M. Peloquin, Michael H. Santare, Justin Parreno, Karin G. Silbernagel, Dawn M. Elliott
University of Delaware

4:45PM **Cellular Senescence Suppresses ECM Synthesis In Response To Mechanical Unloading in Tendon Explants** SB³C2023-047
Emma J. Stowe, Brianne K. Connizzo
Boston University

Thursday, June 8	3:30PM – 5:00PM MT

Emerging Mechanobiology and Biomechanics II

Cascade E

Session Chairs: Hannah Cebull, *Purdue University*
Chiara Bellini, *Northeastern University*

3:30PM **Plasticity And Avalanche Failure In Computational Models Of Pulmonary Collagen-Elastin Fiber Networks** SB³C2023-598
Jacob Herrmann[1], Yuqing Deng[2], Béla Suki[2]
[1]University of Iowa, [2]Boston University

3:45PM **Determining Strains From Intact Airway Inflation Tests As Compared To Isolated Uniaxial And Biaxial Tensile Tissue Testing** SB³C2023-166
Crystal A. Mariano[1], Stanislav Polzer[2], Mona Eskandari[1]
[1]University of California, Riverside, [2]VSB-Technical University of Ostrava

4:00PM **PolyFEM: Finite Element Solver For Complex Biomechanics Problems** SB³C2023-441
Pranav Jain[1], Liam Martin[2], Zachary Ferguson[1], Torkan Gholamalizadeh[3], Faezeh Moshfeghifar[4], Kenny Erleben[4], Steven Abramowitch[2], Daniele Panozzo[1], Teseo Schneider[5]
[1]New York University, [2]University of Pittsburgh, [3]3Shape ApS, [4]University of Copenhagen, [5]University of Victoria

4:15PM **Spatial Mapping The Material And Structural Properties Of The Uterine Fibroid-Myometrium Boundary** SB³C2023-298
Daniella M. Fodera1, Johanna L. Lund-Jackson1, Shuyang Fang1, Arnold Advincula1, Michelle L. Oyen2, Kristin M. Myers1
[1]Columbia University, [2]Washington University in St. Louis

4:30PM **Design And Evaluation Of A Floating Platform System For Mechanical Testing Of Mesoscale Gels And Tissues** SB³C2023-403
Tyler G. Tuttle, Sarah Calve
University of Colorado Boulder

4:45PM **Modeling Ultrasound-Derived Acoustic Radiation Forces In Hydrogels Using 3D Force Microscopy** SB³C2023-096
Kevin P. Grassie, Fei Wang, Bryan D. Huey, Yusuf M. Khan
University of Connecticut

Thursday, June 8	3:30PM – 5:00PM MT

Innovative Brain Mechanics Characterization

Cascade F

Session Chairs: Maria Holland, *University of Notre Dame*
Reuben Kraft, *Pennsylvania State University*

3:30PM **ElastUNet: Three-Dimensional Discovery of Elastic Material Parameters Using Deep Learning** SB³C2023-057
Ali Kamali, Kaveh Laksari
University of Arizona

3:45PM **Inverse Finite Element Modeling Captures Wave Propagation in High-Rate Oscillatory Shear Tests on Porcine Brain Tissue** SB³C2023-172
Gregory M. Boiczyk, Noah R. Pearson, Kenneth L. Monson
University of Utah

4:00PM **Identifying Commonalities of Harmonic Brain Deformation Induced by Magnetic Resonance Elastography in Vivo** SB³C2023-180
J.D. Escarcega[1], A.A. Alshareef[2], A.K. Knutsen[2], R.J. Okamoto[1], P.V. Bayly[1]
[1]Washington University, [2]Henry M. Jackson Foundation for the Advancement of Military Medicine

4:15PM **Investigating the Frequency-Dependent Skull-Brain Motion Transmissibility through MR Elastography** SB³C2023-600
F. Rezayaraghi[1], E. Triolo[2], C. Neher[1], M. Kurt[1,2]
[1]University of Washington, [2]Mount Sinai

4:30PM **Novel Magnetic Resonance Imaging Phantoms For Investigating Skull-Brain Mechanics** SB³C2023-576
Joy Mojumder[1], Suhas Vidhate[2], Yuan-Chiao Lu[1,3], Ahmed Alshareef[3,4], Curtis L. Johnson[5], Dzung L. Pham[1,6], John A. Butman[1]
[1]National Institutes of Health, [2]Intuitive Surgical, Inc., [3]Henry M. Jackson Foundation, [4]Universityof South Carolina, [5]University of Delaware, [6]Uniformed Services University

4:45PM **Post-mortem Changes in Anisotropic Mechanical Properties of Brain Tissue Measured by MR Elastography** SB³C2023-033
Shuaihu Wang[1], Charlotte A. Guertler[1], Ruth J. Okamoto[1], Curtis L. Johnson[2], Matthew D.J. McGarry[3], Philip V. Bayly[1]
[1]Washington University in St. Louis, [2]Delaware University, [3]Dartmouth College

Thursday, June 8	3:30PM – 5:00PM MT

Mechanobiology in Tissue and Cellular Engineering

Gore AB

Session Chairs: Spencer Szczesny, *Pennsylvania State University*
Virginia Ferguson, *University of Colorado*

3:30PM **Prestress On Nascent Desmosomes Regulates Electrophysiology Of Stem Cell-Derived Heart Muscle** SB³C2023-346
Daniel W. Simmons, David R. Schuftan, Jingxuan Guo, Kasoorelope Oguntuyo, Ghiska Ramahdita, Mary Munsell, Brennan Kandalaft, Missy Pear, Nathaniel Huebsch
Washington University in St. Louis

3:45PM **Epigenetic Treatments Restore Nuclear Architecture in Cardiomyocyte Cultures** SB³C2023-556
Stephanie E. Schneider, Adrienne K. Scott, Corey P. Neu
University of Colorado

4:00PM **Synaptopodin Enables Focal Adhesions To Resist Perpendicular Force** SB³C2023-224
Chengqing Qu[1], Shumeng Jiang[1], Farid Alisafaei[2], Jeffrey H Miner[1], Hani Y. Suleiman[1], Guy M. Genin[1]
[1]Washington University in St. Louis, [2]New Jersey Institute of Technology

4:15PM **Multiscale Mechanobiologically Optimized Scaffold Designs For Bone Tissue Engineering** SB³C2023-054
Timothy O. Josephson, Elise F. Morgan
Boston University

4:30PM **In-Situ Viscoelasticity Measurement Of Cell Monolayer By Strain Sensing Of Elastohydrodynamic Force In Microfluidic Channel** SB³C2023-216
Tianzheng Guo, Xiaoyu Zou, Shalini Sundar, Xinqiao Jia, Charles Dhong
University of Delaware

4:45PM **Development Of An Activating And Inactivating Optogenetic Toolbox For Perturbation Of Rhoa-Yap Mechanotransductive Feedback** SB³C2023-173
Erin E. Berlew, Annapurna Pranatharthi-Haran, Brian Y. Chow, Joel D. Boerckel
University of Pennsylvania

Thursday, June 8	3:30PM – 5:00PM MT

Spine and Shoulder Mechanics

Gore CD

Session Chairs: Arin Ellingson, *University of Minnesota*
Grace O'Connell, *University of California, Berkeley*

3:30PM **Examination of the Coupled Motion of the Lumbar Functional Unit During Dynamic Motion** SB³C2023-558
Matthew R. MacEwen, Rebecca E. Abbot, Victor H. Barocas, Arin M. Ellingson
University of Minnesota-Twin Cities

3:45PM **Risk Of Vertebral Endplate Failure During Vertebral Fracture** SB³C2023-060
Neilesh R. Frings, Elise F. Morgan
Boston University

4:00PM **Cyclic Loading Comparison Between Standard Ultra-High Molecular Weight Polyethylene Blocks And Biofidelic Solid Rigid Polyurethane Blocks For ASTM Pedicle Screw Testing** SB³C2023-333
Jeremy G. Loss[1], Robb W. Colbrunn[1], Kevin J. Lawson[2]
[1]Cleveland Clinic, [2]Ascension Medical Group

4:15PM **Bulk Properties of the Murine Spine are Maintained During 30-Days of Microgravity on the International Space Station** SB³C2023-088
Shiyin Lim[1], Joanna E. Veres[1], Eduardo A.C. Almeida[2], Grace D. O'Connell[1]
[1]University of California – Berkeley, [2]NASA Ames Research Center

4:30PM **Adaptive Changes In The Bat's Shoulder Anatomy Allow For Repetitive Overhead Motions** SB³C2023-528
Iden Kurtaliaj[1], Jennifer Kunes[1], K. Michael Rowley[2,3], Lynn Ann Forrester[1], Mikhail Golman[1], Guy M. Genin[4], Sharon M. Swarz[2], Stavros Thomopoulos[1]
[1]Columbia University, [2]Brown University, [3]California State University East Bay, [4]Washington University at St. Louis

4:45PM **Evaluating The Effect Of Soft Tissue Forces On The Fixation Mechanics Of Reverse Shoulder Arthroplasty: A Finite Element Analysis Driven By Musculoskeletal Simulations** SB³C2023-400
Jonathan Glenday[1], Benjamin Johnston[2], Fernando Quevedo Gonzalez[1], *Lawrence Gulotta[1], Andreas Kontaxis[1]*
[1]Hospital for Special Surgery, [2]Cornell University

Thursday, June 8	3:30PM – 5:00PM MT

Growth and Remodeling II

Powell

Session Chairs: Kyoko Yoshida, *University of Minnesota*
Adrian Buganza Tepole, *Purdue University*

3:30PM **The mTOR Inhibitor Rapamycin Decreases Subchondral Thickness And Affects Variability In The Tibial Plateau Of Common Marmosets** SB³C2023-336
Michael D.K. Focht[1], Dennis M. Minton[2,3], Adam B. Salmon[4,5], Adam R. Konopka[2,3], Mariana E. Kersh[1]
[1]University of Illinois, [2]University of Wisconsin-Madison, [3]William S. Middleton Memorial Veterans Hospital, [4]University of Texas, [5]Audie L. Murphy Hospital

3:45PM **Growth And Remodeling In Sparse And Semi-Sparse Tissues: Bridging The Gap Between The Constrained Mixture Model And Eshelby's Inclusion** SB³C2023-446
Ryan R. Mahutga, Elizabeth D. Shih, Patrick W. Alford
University of Minnesota

4:00PM **Personalized Finite Element Model Of Pediatric Tissue Expansion** SB³C2023-135
Tianhong Han[1], Kaleem Ahmed[2], Arun Gosain[2], Taeksang Lee[3], Adrian Buganza Tepole[1]
[1]Purdue University, [2]Northwestern University, [3]Myongji University

4:15PM **Telocollagen Injectable Significantly Improves Supraspinatus Tendon Mechanical Strength After Full-Tendon Tear in Rats** SB³C2023-553
Alexandrea A. Silverman[1], Nicolo Rossi[2], Jeffrey A. Paten[1], Mark A. Randolph[2], Luke S. Oh[2,3], Jeffrey W. Ruberti[1]
[1]Northeastern University, [2]Massachusetts General Hospital, [3]Rothman Orthopaedics

4:30PM **Computational Analysis of Heart Valve Growth and Remodeling in Pulmonary Autografts after the Ross Procedure** SB³C2023-292
Elmer Middendorp[1], Fabian Bräu[2,3], Frank P.T. Baaijens[1], Jay D. Humphrey[4], Christian J. Cyron[5,6], Sandra Loerakker[1]
[1]Eindhoven University of Technology, [2]Singapore National Eye Center, [3]Singapore-MIT Alliance for Research and Technology, [4]Yale University, [5]Hamburg University of Technology, [6]Helmholtz-Zentrum

4:45PM **Identifying Contributors to Aneurysmal Progression in the Marfan Aorta Using a Constrained Mixture Model** SB³C2023-295
David S. Li[1], Cristina Cavinato[2], Marcos Latorre[3], Jay D. Humphrey[1]
[1]Yale University, [2]Univerity of Montpellier, [3]Valencia Polytechnic University

Thursday, June 8	3:30PM – 5:00PM MT

Noninvasive Metrics for Cardio. Biomechanics

Zermatt

Session Chairs: Jun Liao, *University of Texas*

3:30PM **Pre-Operative Functional Characterization Of Aortic Neck In Abdominal Aortic Aneurysms And Its Association With Type I Endoleak Following EVAR Procedure** SB³C2023-482
A Forneris[1,2], A. Satriano[2], R.A. Beddoes[2], R.D. Moore[1], E.S. Di Martino[1,2]
[1]University of Calgary, [2]ViTAA Medical Solutions

3:45PM **4D Ultrasound-Based Strain Can Characterize Early Progression of Myocardial Infarction in Mice and Rats** SB³C2023-048
Conner C. Earl[1,2], Ana C.M. Omoto[3], Karthik Annamalai[1], Alyssa Richards[1], Samuel X. Zhang[1], Adalyn M. Meeks[1], Alexandre A. de Silva[3], Craig J. Goergen[1,2]
1Purdue University, 2Indiana University, 3University of Mississippi

4:00PM **Comparison Between Material Properties Obtained from Ultrasound Image Based Inverse FE Method Against Ex-Vivo Inflation Test** SB³C2023-385
Hadi Wiputra[1], Sydney Q. Clark[2], Craig J. Goergen[2], Matthew R. Bersi[3], Victor H. Barocas[1]
[1]University of Minnesota, [2]Purdue University, [3]Washington University in St. Louis

4:15PM **Procedural Strategy Impact On Outcomes Of Transcatheter Aortic Valve Replacement For Bicuspid Aortic Valves** SB³C2023-131
Breandan Yeats[1], Sri Krishna Sivakumar[1], Milad Samaee[1], Pradeep Yadav[2], Venkateshwar Polsani[2], Vinod Thourani[2], Stephanie Sellers[3], Janarthanan Sathananthan[3], Lakshmi Dasi[1]
[1]Georgia Tech & Emory University, [2]Piedmont Heart Institute, [3]University of British Columbia

4:30PM **A New Approach To Characterize Trabeculae Carneae Structures Using High-Resolution Human Heart Images** SB³C2023-567
Yasamin Seddighi1, Keith Bartels2, Hai-Chao Han1
[1]University of Texas at San Antonio, [2]Southwest Research Institute

4:45PM **Evaluating the use of Elastic Registration for Determining Atrioventricular Valve Annulus Mechanics** SB³C2023-390
Devin W. Laurence[1], Christian Herz[1], Silvani Amin[1], Ana Sulentic[1], Patricia Sabin[1], Andras Lasso[2], Matthew A. Jolley[1]
[1]Children's Hospital of Philadelphia, [2]Queen's University

Poster Sessions

Posters will be presented in two sessions as listed below. Please see the "Instructions for Poster Presenters' on Page 8. The poster viewing area is located in the **Gore Pavilion** and will be open throughout the conference.

Poster Session I	**Monday, June 5, 1:00PM – 2:30PM MT**
Poster Session II	**Tuesday, June 6, 12:45PM – 2:15PM MT**

Poster Session I

Biotransport

P1 **Molecular dynamics studies of sugar solutions for controlling water rotational relaxation time** SB³C2023-098
Kang Hu, Ryo Shirakashi
University of Tokyo

P2 **Repeatability And Backlash Distances Of Microneedles Displaced Using A Novel Actuation Block** SB³C2023-241
Brianna E. Morales, Christopher G. Rylander
University of Texas at Austin

P3 **Non-Invasive Stroke Work As A Predictor Of Myocardial Contractility In Duchenne Muscular Dystrophy** SB³C2023-238
Israel O. Ajiboye[1], Navaneeth Chandran[1], Michael D. Taylor[2], Rupak K. Banerjee[1]
[1]University of Cincinnati, [2]Cincinnati Children's Hospital Medical Center

P4 **MRI Guided Focused Ultrasound Drug Delivery to DIPG Tumors in a Mouse Model** SB³C2023-025
Payton J. Martinez, Genna Nault, Jenna Steiner, Natalie Serkova, Adam Green, Mark Borden
University of Colorado

P5 **A Cost Function Approach Applied to Muscle Cryopreservation** SB³C2023-013
Casey J. Kraft, Weston J. Upchurch, Michael L. Etheridge, Paul A. Iaizzo, John C. Bischof
University of Minnesota

P6 **Enabling Cryopreservation Through Vitrification And Rewarming At The Scale Of A Human Organ** SB³C2023-171
Lakshya Gangwar[1], Zonghu Han[1], Mikaela Hintz[1], Jacqueline L. Pasek-Allen[1], Robert C. Goldstein[2], Michael L. Etheridge[1], John C. Bischof[1]
[1]University of Minnesota, [2]AMF Life Systems LLC

P7 **Frequency Optimization of a Novel Skin Blood Flow Transducer** SB³C2023-501
Georgia E. Robles, Christopher M. Francis, Saeed I. Latif, David A. Nelson
University of South Alabama

P8 **Characterization Of Cellular Response To Endovascular Ablative Therapies In 2D And 3D** SB³C2023-270
S. Brocklehurst, Amin Sabaghan, D. Stolley, N. Ghousifam, E. Cressman, D. Fuentes, M.N. Rylander
University of Texas at Austin

Design, Dynamics, & Rehabilitation

P9 **Joint Space Of The First Carpometacarpal Joint: Correlation Between Computed Tomographic And Simulated X-Ray Measurement** SB³C2023-063
David Jordan, C. Kent Kwoh, Zong-Ming
University of Arizona

P10 **Changes In Thumb Force Due To Osteoarthritis** SB³C2023-427
Nicole D. Arnold[1], Adam J. Chrzan[1], Kevin Chan[2], Tamara Reid Bush[1]
[1]Michigan State University, [2]Spectrum Health

Fluid Mechanics

P11 **Poroelastic Model Of Trabecular Structures In The Developing Heart** SB³C2023-305
Christine Miller Buffinton, James W. Bush
Bucknell University

P12 **A self-powered pump for patients with a single ventricle heart** SB³C2023-296
Mahdi Esmaily, Dongjie Jia
Cornell University

P13 **A Comparative Study on the Difference in Arteriovenous Fistula CFD Simulations Based on Geometry Length** SB³C2023-503
Kaitlin M. Southern, Fatemeh Bahmani, Veeranna Maddipati, Stephanie M. George
East Carolina University

P14 **Patient-Specific Pulmonary Hypertension Simulations in Sickle Cell Disease Patients, a Viscosity Model Study** SB³C2023-549
Fatemah Bahmani, Alex Vahdati, Veeranna Maddipati, Stephanie M. George
East Carolina University

P15 **Sensitivity of Platelet Activation in an ECMO Pump due to Different Modelling Approaches** SB³C2023-357
Francesco Fiusco[1], Lars Mikael Broman[2,3], Lisa Prahl Wittberg[1]
[1]KTH Royal Institute of Technology, [2]Astrid Lindgren's Children's Hospital, [3]Karolinska Institutet

P16 **Post-MitraClip Mitral Valve Gradient with MitraClip G4** SB³C2023-326
Shelley C. Gooden[1], Mani A. Vannan[2], Konstantinos D. Boudoulas[3], Vinod H. Thourani[2], Pradeep K. Yadav[2], Lakshmi P. Dasi[1]
[1]Georgia Institute of Technology, [2]Piedmont Heart Institute, [3]Wexner Medical Center

P17 **Fluid-Structure Interaction Simulation In An Idealised Model Of The Dissected Aorta: Relation Between False Lumen Pressure And Outflow Via Side Branches** SB³C2023-383
Amith Balasubramanya[1], Lise Gheysen[1], Nele Famaey[2], Joris Degroote[1], Patrick Segers[1]
[1]Ghent University, [2]KU Leuven

P18 **A Computational Model For The Roughness Of Coronary And Cerebral Artery Stenosis And Treatment For Diabetes Mellitus Disease** SB³C2023-433
S. Piskin
Istinye University

P19 **Effect of Aortic Curvature on Bioprosthetic Aortic Valve Performance** SB³C2023-490
B. Vogl[1], R. Gadhave[1], Z. Wang[2], A. Chavez Ponce[3], A. El Shaer[3], M. Alkhouli[3], H. Hatoum[1]
[1]Michigan Technological University, [2]The Ohio State, [3]Mayo Clinic

P20 **Vorticity Transport In Aneurysms Of The Abdominal Aorta** SB³C2023-356
Valentina Mazzi[1], Karol Calò[1], Maurizio Lodi Rizzini[1], Ludovica Saccaro[2,3], Diego Gallo[1], Angelo Iollo[2, 3], Umberto Morbiducci[1]
[1]Politecnico di Torino, [2]Université de Bordeaux, [3]Inria-Bordeaux Sud-Ouest

P21 **Investigating The Role Of Eccentric Inlet Conditions On Hemodynamic Results At Different Stages Of Aneurysm Growth** SB³C2023-601
Federica Galbiati[1,2], Emanuele Vignali[3], Katia Capellini[3], Claire Morin[2], Stéphane Avril[2], Emiliano Costa[1], Simona Celi[3]
[1]RINA Consulting SpA, [2]INSERM, [3]BioCardioLab

P22 **A Fluid-Solid-Growth Framework For Simulating Patient-Specific Vascular Growth And Remodeling Using Constrained Mixture Theory** SB³C2023-268
Erica L. Schwarz[1], Martin R. Pfaller[1], Jason Szafron[1], Christopher Breuer[2], Jay D. Humphrey[3], Alison L. Marsden[1]
[1]Stanford University, [2]Nationwide Children's Hospital, [3]Yale University

P23 **Towards Modeling Acute Ischemic Stroke: In Vitro Experiments and Simulations of Blood Flow and Mean Arterial Pressure in an Artificially Clotted Cerebrovascular Model** SB³C2023-447
Saurabh Bhardwaj[1], Brent A. Craven[2], Jacob E. Sever[1], Francesco Costanzo[1], Scott D. Simon[1], Keefe B. Manning[1]
[1]Pennsylvania State University, [2]US FDA

P24 **The Influence Of Hemodiluted Blood Viscosity On Patient Hemodynamics During Cardiopulmonary Bypass** SB³C2023-162
Nafis M. Arefin, Allison R. Cripps, Bryan C. Good
University of Tennessee

P25 **Validating Multi-scale Coronary Simulation Pipeline Against Coronary Intravascular Velocity and Pressure Measurements** SB³C2023-016
Anahita A. Seresti[1], Alison L. Marsden[2], Andrew M. Kahn[3], M. Owais Khan[1]
[1]Toronto Metropolitan University, [2]Stanford University, 3University of California – San Diego

P26 **Multi-Omic Analysis Of Resected Thrombi Identifies Complex Traits Associated With Ischemic Stroke Etiology** SB³C2023-191
Briana A. Santo, Kerry E. Poppenberg, Andre Monteiro, Adnan H. Siddiqui
University of Buffalo

P27 **Laser Ablation: A New Leaflet Modification Strategy To Prevent Coronary Obstruction In Redo Tavr** SB³C2023-100
John T. Briansky, Masod Sadipour, Ali Azadani
University of Denver

P28 **Verification Errors In Eulerian Power-Law Hemolysis Model Predictions In Simple Flows** SB³C2023-280
Mohammad M. Faghih[1], Brent A. Craven[1], M. Keith Sharp[2]
[1]US FDA, [2]University of Louisville

P29 **Endothelial Nuclear Morphology is Incrementally Sensitive to Shear Stress Magnitude and Directionality** SB³C2023-515
Jaideep Sahni[1], Mehwish Arshad[2], Peter D. Weinberg[2], Ryan M. Pedrigi[1]
[1]University of Nebraska-Lincoln, [2]Imperial College London

P30 **Computational Study of Role of Ultra Large Von Willebrand Factor in COVID-19 Related Thrombosis** SB³C2023-350
Nahid Rahmati, Nima Maftoon
University of Waterloo

P31 **Rotational Impact-Induced Brain Injury, a Biomimetic Study** SB³C2023-232
Q. Wang[1], J. Lang[2], R. Nathan[3], Q. Wu[1]
[1]Villanova University, [2]Southeast University, [3]Pennsylvania State University

Solid Mechanics: Cardiovascular

P32 **High-Throughput Automated Mechanical Analysis of Human Induced Pluripotent Stem Cell Derived Cardiac Microtissue** SB³C2023-022
H. Kobeissi, E. Lejeune
Boston University

P33 **Changes In Right Ventricle Anisotropic Viscoelastic Behavior With Pulmonary Hypertension Development** SB³C2023-058
K. LeBar, K. Roth, W. Liu, B. Garcia, J. Pang, A. Chicco, Z. Wang
Colorado State University

P34 **A Three-node Rotation-free Kirchhoff-love Shell Formulation For Cardiovascular Applications** SB³C2023-570
L. Shi, Y. Chen, V. Vedula
Columbia University

P35 **Establishment Of A Validated Finite Element Framework To Predict The 3D, Patient-Specific Arterial Mechanical Environment** SB³C2023-597
Caleb C. Berggren, Y.F. Jack Wang, Lucas H. Timmins
University of Utah

P36 Anisotropic Material Property and Local Strength Characterization of Human Carotid Plaques: A Bayesian Optimization Based Inverse Finite Element Modeling SB³C2023-091
S. Guvenir Torun[1], B. Kaaij[1,2], P. de Miguel Munoz[1,2], H. Crielaard[1], H.J.M. Verhagen[1], G.J. Kremers[1], A.F.W. van der Steen[1], A.C. Akyildiz[1,2]
[1]Erasmus Medical Center, [2]Delft University of Technology

P37 Changes in Myocardial Deformation Induces Abnormalities in Valvular Dynamics Causing Mitral Valve Regurgitation SB³C2023-294
Tawfik M. Hussein[1,2], Gediminas Gaidulis[2,3], Michael Silverman[3], John N. Oshinski[1,3], Muralidhar Padala[2,3]
[1]Georgia Institute of Technology,[2]Carlyle Fraser Heart Center, [3]Emory University

P38 Computational Assessment of Elastin in a Hybrid Modelling Approach of Arterial Biomechanics SB³C2023-321
Yousof MA. Abdel-Raouf[1], Mathias Peirlinck[2], Nele Famaey[3], Patrick Sips[1], Patrick Segers1
[1]Ghent University, [2]Delft University of Technology, [3]KU Leven

P39 Pattern Of Aortic Valve Leaflet Calcification In As Patients: In-Vivo Geometric Description Of Calcific Progression SB³C2023-006
Mohamed Abdelkhalek, Zahra Keshavarz-Motamed
McMaster University

P40 An Inverse FE Method To Quantify The Relationship Between Mechanical Properties And Residual Stresses In The Myocardium SB³C2023-478
Manoj Ghosh, Marissa Grobbel, Lik Chuan Lee, Sara Roccabianca
Michigan State University

P41 Effects Of Chordae Rupture On Tricuspid Valve Septal Leaflet Strains: An Ex-Vivo Study On Porcine Hearts SB³C2023-227
Julia Clarin[1], Keyvan Amini Khoiy[2], Samuel D. Salinas[1], Dipankar Biswas[2], Kourosh T. Asgarian[3], Francis Loth[1], Rouzbeh Amini[1]
[1]Northeastern University, [2]The University of Akron, [3]Jersey Shore University

P42 Right Ventricular Global Longitudinal Strain And Ventricular Dynamics In Patients With Pulmonary Hypertension SB³C2023-521
Alexandra M. Janowski, Scott Visovatti, Raymond L. Benza, Rebecca R. Vanderpool
The Ohio State

P43 Viscoelastic and Fracture Properties of Clot from Human and Bovine Blood SB³C2023-104
Gabriella P. Sugerman, Sapun H. Parekh, Berkin Dortdivanlioglu, Manuel K. Rausch
University of Texas at Austin

P44 Biomechanical Characterization Of Neonatal Aortic Coarctation Tissue Informs The Need To Design Bespoke Patient Therapies For Neonatal Coarctation Of The Aorta SB³C2023-094
Niall Linnane[1,2,3], Robert Johnston[1], Damien P. Kenny[2,3], Caitriona Lally[1]
[1]Trinity College Dublin, [2]Royal College of Surgeons, [3]Children's Health Ireland

P45 Ultrasound Imaging To Characterize Inflated Atherosclerotic Plaques SB³C2023-327
Yasmine Guendouz[1], Brooke Tronifoglio[1], Sherif Sultan[2,3], Niamh Hynes[2,3], Cleona Gray[4], Caitriona Lally[1]
[1]Trinity College Dublin, [2]University Hospital Galway,[3]Galway Clinic, [4]Mater Misericordiae University Hospital

P46 Design, Computational And Experimental Evaluation, And 3D Printing Of Patient Specific Stents For Treatment Of Paediatric Aortic Coarctation SB³C2023-286
Robert D. Johnston[1], Niall Linnane[1,2,3], Samuel Geraghty[1], Conor O'Keeffe[1], Shirsha Bose[1], Damien Kenny[3], Caitriona Lally[1]
[1]Trinity College Dublin, [2]Royal College of Surgeons,[3]Children's Health Ireland at Crumlin

P47 Using A Three-Dimensional Biventricular Mathematical Model To Help Understand Sex Differences In The Onset And Progression Of Pulmonary Arterial Hypertension SB³C2023-211
Kristen M. Garcia, Becky A. Hardie, Jennifer Stowe, Daniela Valdez-Jasso
University of California – San Diego

P48 Multiscale Modeling of Myofiber Disarray In The Left Ventricle Using A Stress-Based Reorientation Law SB³C2023-118
Mohammad Mehri, Charles K. Mann, Hossein Sharifi, Kenneth S. Campbell, Jonathan F. Wenk
University of Kentucky

P49 Method Of Applying Twist To Complex Femoropopliteal Artery Deformations In A Finite Element Study SB³C2023-565
Ali Ahmadi, Anastasia Desyatova
University of Nebraska-Omaha

P50 Implementation Of Experimentally Acquired Tricuspid Valve Leaflet Pre-Strains To An In-Silico Finite Element Model SB³C2023-137
Colton J. Ross[1], Arshid Mir[1], Harold M. Burkhart[1], Ming-Chen Hsu[2], Devin W. Laurence[3], Chung-Hao Lee[1]
[1]University of Oklahoma, [2]Iowa State University, 3Children's Hospital of Philadelphia

P51 Patient-Specific Predictive Simulation of Transcatheter Edge-to-Edge Repair in Humans with Mitral Regurgitation SB³C2023-452
Natalie T. Simonian[1], Sneha Vakamudi[2], Mark J. Pirwitz[2], Alison M. Pouch[3], Joseph H. Gormann, III[3], Robert C. Gorman[3], Michael S. Sacks[1]
[1]University of Texas at Austin, [2]Ascension Texas Cardiovascular, [3]University of Pennsylvania

P52 Comparing The Elastic And Fracture Properties Between Fibrin And Whole Blood SB³C2023-407
Grace N. Bechtel[1], Gabrielle P. Sugerman[1], Sapun H. Parekh[1], Manuel K. Rausch[1,2]
[1]University of Texas at Austin, [2]Oden Institute for Computational Engineering and Sciences

Solid Mechanics: Injury & Brain

P53 Effect Of Muscle Activation on Head-Neck Response in Simulated Frontal Impact Compared To A Unique Military Data Set SB³C2023-072
Jesse W. Gerringer[1,2], Karthik Somasundaram[1,2], Frank Pintar[1,2]
[1]Medical College of Wisconsin and Marquette University of Tennessee, [2]VA Medical Center

P54 Development of Three - Dimensional Finite Element Model of the Neonatal Brachial Plexus SB³C2023-027
Sarah J. Wright, Michele J. Grimm
Michigan State University

P55 Measurement Error Associated With Decoupling Of Instrumented Mouthguards SB³C2023-245
Ryan A. Gellner, Mark T. Begonia, Matthew Wood, Lewis Rockwell, Taylor Geiman, Caitlyn Jung, Steve Rowson
Virginia Tech

P56 Effect Of Excitation Direction And Frequency On Regional Dynamic Deformation Of The Human Brain SB³C2023-561
Ruth J. Okamoto[1], Jordan D. Escarcega[1], Ahmed Alshareef[2], Curtis Johnson[3], Philip V. Bayly[1]
[1]Washington University, [2]Henry M. Jackson Foundation for the Advancement of Military Medicine, [3]University of Delaware

Solid Mechanics: Musculoskeletal

P57 Raman Specroscopic Probe Predicts The Composition And Functional Mechanical Properties Of The Intervertebral Disc SB³C2023-550
Chenhao Yu[1], Masumeh Kazemi[1], Farida Korna[1], Erik E. Ersland[1], Mark W. Grinstaff[1], Thomas P. Schaer[2], Mads S. Bergholt[3], Edward J. Vresilovic[4], Brian D. Snyder[5], Michael B. Albro[1]
[1]Boston University, [2]University of Pennsylvania, [3]King's College London, [4]University of Delaware, [5]Beth Israel Deaconess Medical Center

P58 The Effectiveness of Custom ACL Bracing in Adolescent Populations: A Finite Element Analysis SB³C2023-009
Alexandria D. Mallinos[1], Brian L. Davis[1], Kerwyn C. Jones[2]
[1]*Cleveland State University,* [1]*Akron Children's Hospital*

P59 Bendable Osteochondral Allografts for Improved Congruence: Comparison of Computational and Cadaveric Models SB³C2023-194
Katherine A. Spack[1], Courtney A. Petersen[1], Peter T. Shyu[1], Edward Guo[1], James T. Cook[2], Melvin P. Rosenwasser[1], Clark T. Hung[1], Gerard A. Ateshian[1]
[1]Columbia University, [2]University of Missouri

P60 Mechanical Failure Properties Of Porcine Annulus Fibrosus: An I-PREDICT Study SB³C2023-382
J. Seifert[1,2], A. Shah[1,2], L.L. Frazer[4], N. Yoganandan[1,2], B.S. Shender[3], J.B. Sheehy[3], G. Paskoff[3], T. Bentley[5], D.P. Nicolella[4], B.D. Stemper[1,2]

[1]*Medical College of Wisconsin,* [2]*Zablocki VA Medical Center,* [3]*Naval Air Warfare Center,* [4]*Southwest Research Institute,* [5]*Office of Naval Research*

P61 Calcium Signaling In In-Situ Chondrocytes Under Dynamic Compressive Loading SB³C2023-319
Vineel Kondiboyina, Timothy Boyer, Sandra J. Shefelbine
Northeastern University

P62 Partial Meniscectomy Of The Meniscal Inner Part Increases The Meniscal Deformation And Extrusion SB³C2023-343
Satoshi Yamakawa, Tomoki Ohori, Issei Ogasawara, Akira Tsujii, Shoji Konda, Seira Sato, Takashi Kanamoto, Ken Nakata
Osaka University

P63 Effects Of External Bathing Solution Osmolarity On Tribological Rehydration And Cartilage Lubrication SB³C2023-074
Shamimur R. Akanda, David L. Burris, Chris Price
University of Delaware

P64 Slick Yet Stuck: Elucidating The Underlying Adhesive Mechanisms In Articular Cartilage SB³C2023-250
Jamie M. Benson, David L., Burris
University of Delaware

P65 Partial Meniscus Transplant To Treat Horizontal Cleavage Tear Restores Contact Areas Similar to Partial Meniscectomy SB³C2023-145
Farid Amirouche[1,2], Eric Chang[1], Asher Lichtig[1], Jason Koh[2]
[1]*University of Illinois,* [2]*NorthShore University Health System*

Solid Mechanics: Other

P66 Multiscale Characterization of Human Tooth with Combination of SEM, AFM, and FEM SB³C2023-170
Y. Zhai[1], J. Wang[1], Z. Shi[1], T. Premaraj[2], S. Premaraj[2], T. Karpova[1], P. Dong[1], L. Gu[1]
[1]*Florida Institute of Technology,* [2]*Nova Southeastern University*

P67 Depth Map Image Based Inflation Test For Mechanical Characterization Of Soft Matter SB³C2023-468
Rahul L. Maurya[1], Yash K. Shrivastava[2], Samarth S. Raut[1]
[1]*Indian Institute of Technology,* [2]*Manipal University Jaipur*

P68 Micromechanical Model Of Mechanosensitive Collagen Tissues SB³C2023-437
Kalyn G. Younger, William Cortes, Daniel H. Reich, Thao D. Nguyen
Johns Hopkins University

P69 A Mesoscale Model Of Skin To Investigate The Role Of The Dermis-Epidermis Interface On The Tissue Biomechanics SB³C2023-161
O. Moreno Flores[1], M. Rausch[2], A. Buganza Tepole[1]
[1]*Purdue University,* [2]*University of Texas at Austin*

P70 **Deep Learning Framework For Stress Strain Analysis Over Point Cloud** SB³C2023-429
Jia Lu, Nishant Sundaravaradan
University of Iowa

P71 **An Inexpensive, Shared Biaxial Device To Study The Multiscale Mechanics Of Soft Materials** SB³C2023-332
Alberto Madariaga, Chien-Yu Lin, Mrudang Mathur, Manuel K. Rausch
University of Texas at Austin

P72 **Negative-Pressure Lung Mechanics Of Fibrotic And Emphysematous Mouse Lungs** SB³C2023-021
K.A.M. Quiros[1], T.M. Nelson[1], A. Ulu[1], E.C. Dominguez[1], T.M. Nordgren[1,2], M. Eskandari[1]
[1]University of California - Riverside, [2]Colorado State University

P73 **The Material Properties of Healthy Versus Diseased Mouse Lung Parenchyma** SB³C2023-049
T.M. Nelson, K.A.M. Quiros, C.A. Mariano, S. Sattari, M. Eskandari
University of California – Riverside

P74 **Histopathology of Capsule and Cartilage Predict Elbow Biomechanics via Machine Learning** SB³C2023-605
Michael A. David[1], Spencer P. Lake[2]
[1]University of Colorado, [2]Washington University in St. Louis

P75 **Understanding mechanotransduction of the distal colon and rectum by multiscale and multimodal computational modeling** SB³C2023-516
Amirhossein Shokrani, Ashkan Almasi, Bin Feng, David M. Pierce
University of Connecticut

P76 **Effects Of GAGs On Microstructure Of Corneal Extracellular Matrix** SB³C2023-116
M.E. Emu, H. Hatami-Marbini
University of Illinois at Chicago

P77 **Effect Of GAGs On Tensile Properties Of Porcine Cornea** SB³C2023-363
H. Hatami-Marbini
University of Illinois at Chicago

P78 **Fibrous Finite Element Modeling Of Posterior Sclera** SB³C2023-278
Mohammad R. Islam, Fengting Ji, Manik Bansal, Yi Hua, Ian A. Sigal
University of Pittsburgh

P79 **Comparing Five Methods To Identify Fracture Toughness Of Soft Tissues** SB³C2023-540
Matthew J. Lohr, Manuel K. Rausch
University of Texas at Austin

P80 **Extracting Inhomogeneous Orientation Distribution Functions From 3d Image Data Of Fibrous Tissues For Finite Element Simulations** SB³C2023-242
Adam Rauff, Michael R. Herron, Steve A. Maas, Jeffrey A. Weiss
University of Utah

P81 **Understanding Ciliary Waveforms Through Optimization** SB³C2023-533
Louis G. Woodhams, Philip V. Bayly
Washington University in St. Louis

Tissue & Cellular Engineering

P82 **Targeting the Chromatin Remodeling in Mesenchymal Stromal Cells Under Hyper Oxidative Stress for Maintaining Cell Phenotype and Viability** SB³C2023-335
Lauren A. Monroe, Samantha Kaonis, Neda Kabi, Abigail Fennell, Jack Forman, Soham Ghosh
Colorado State University

P83 **Mechanical Regulation of Lumen Growth** SB³C2023-557
Wenhui Tang[1], Anqi Chen[2], Jessie Huang[3], Darrell N. Kotton[3], Shengqiang Cai[4], Ming Guo[1]
[1]MIT, [2]Harvard University, [3]Boston University, [4]University of California – San Diego

P84 **Fabrication And Mechanical Characterization Of Direct Ink Write 3D Printed Methacrylated Hyaluronic Cerium Oxide Scaffolds** SB³C2023-472
Aritra Chatterjee[1], Jordan Turner[2], Jonathan Banks[2], Joan Adebowale[2], Deva D. Chan[1], Juana Mendenhall[2]
[1]Purdue University, [2]Morehouse College

P85 **Functionalized Nanowires Successfully Load And Sustain Release Of NGF** SB³C2023-594
Molly E. Czachor[1], Joel A. Finbloom[2], Nafisa A. Elghazali[2], Darnell L. Cuylear[2], Kevin O. Rivera[2], Tejal A. Desai[3], Chelsea S. Bahney[1,2]
[1]The Steadman Philippon Research Institute, [2]University of California – Riverside, [3]Brown University

P86 **The Association Between Clot Presentation On Ct, Biological Composition, And Material Properties: Implications For Pre-Treatment Imaging Biomarkers** SB³C2023-421
TaJania D. Jenkins[1,2], Briana A. Santo[1,2], Shiau-Sing K. Ciecierska[1], Tatsat R. Patel[1,2], Debanjan Mukherjee[3], Adnan H. Siddiqui[1,2], Vincent M. Tutino[1,2]
[1]Canon Stroke and Vascular Research Center, [2]University at Buffalo, [3]University of Colorado

P87 **A Vascularized Tissue Model To Investigate Human Synoviocyte - Endothelial Cell Crosstalk In Joint Health and Disease** SB³C2023-410
Hannah M. Zlotnick[1], Abhishek P. Dhand[1,2], Matthew D. Davidson[1], Gabriel J. Rodriguez-Rivera[1], Christopher J. Calo[1], Hannah K. Weppner[1], Laurel E. Hind[1], Jason A. Burdick[1]
[1]University of Colorado, [2]University of Pennsylvania

P88 **Quantifying Alignment in Engineered Tissue Constructs Using Raman Spectroscopy and Computational Modeling** SB³C2023-193
Maedeh Lotfi, Hui Zhou, Janny Piñeiro Llanes, Ghatu Subhash, Chelsey S. Simmons, Malisa Sarntinoranont
University of Florida

P89 **Amobarbital Prevents Intervertebral Disc Degeneration By Inhibiting Oxidative Stress** SB³C2023-146
Venkateswaran Ganesh[1], Deborah A. Vacek[1], Douglas C. Fredericks[1], Emily B. Petersen[1], Youssef W. Naguib[1,2], Anupam Tiwari[1], Yochana Kancheria[3], Mitchell C. Coleman[1], James A. Martin[1], Aliasger K. Salem[1], Tae-Hong Lim[1], Dongrim Seol[1]
[1]University of Iowa, [2]Deraya University, [3]Des Moines University

P90 **Gelatin Hydrogel Poly-Caprolactone 3D Printed Composite Biomaterial Characterization For Meniscal Tissue Engineering** SB³C2023-531
Anthony J. El Kommos, Gabi Schwartz, Andy J. Morejon
University of Miami

P91 **Multi-physics Modeling of Neural Dendrite Growth With Electrical Polarization** SB³C2023-079
Shuolun Wang, Xincheng Wang, Maria A. Holland
University of Notre Dame

P92 **Highly Parallel Production of Designer Organoids by Mosaic Patterning of Progenitors** SB³C2023-202
Catherine M. Porter, Alex J. Hughes
University of Pennsylvania

P93 **Epithelial Monolayers Develop Density and Effective Temperature Differentials to Migrate across Confined Matrices** SB³C2023-225
W.J. Lin, A. Pathak
Washington University

Undergraduate Research and Design

P94 **3D Printed Patient-Specific Lower Extremity Model For Assessing Developmental Dysplasia Of The Hip** SB³C2023-638
E. Fontz[1], O. Burkowski[1], J. Palmer[1], E. Scott[1], C. Price[2,3], V. Huayamave[1]
[1]Embry-Riddle Aeronautical University, [2]International Hip Dysplasia Institute, [3]Orlando Health

P95 **Numerical Modeling For Infants With Ductal-Dependent Pulmonary Flow** SB³C2023-641
S. Mulla, M.H. Alzaeim, W.S. Basha, K.B. Kose
Istanbul Medipol University

P96 **Development of a Novel Animal Model for Osteochondritis Dissecans: A Radiofrequency Ablation Approach** SB³C2023-644
Kosisochukwu Ogbonna-ukuku, Boyuan Liu, Kristine Fischenich, Virginia L. Ferguson
University of Colorado

P97 **Significance of Vasa Vasorum Oxygen Supply in the Nourishment of the Aneurysmal Wall** SB³C2023-617
Manoela Neves, Alexis Throop, Rana Zakerzadeh
Duquesne University

P98 Biomechanical Follow-Up And Evaluation Of Aneurysm Growth SB³C2023-608
F.A.M. Garbou, O.O.M. Elnamla, W.A.K.A. Saber, K.B. Kose
Istanbul Medipol University

P99 Heart Rate Impact On Plaque Deposition At The Carotid Artery Bifurcation SB³C2023-571
Ramita Sajankila, Esha Navaneethakrishnan, Elvan Dogan, Amir K. Miri
New Jersey Institute of Technology

Bachelor's Level Research

P100 The Effects Of Progeria On Central Vascular Tissue, Blood Flow, And Blood Pressure SB³C2023-646
L. Roukoz[1], T. Hopper[1], S. Murtada[2], J. Humphrey[2], C.A. Figueroa[1]
[1]University of Michigan, [2]Yale University

P101 Computational Modeling Of Hemodynamics In Aortic Root Enlargement SB³C2023-642
Surya Sanjay[1], Mia Bonini[1], Alexander Makkinejad[1], Maximilian Balmus[2], Marc Hirschvogel[2], Nicholas Burris[1], Bo Yang[1], David Nordsletten[1]
[1]University of Michigan, [2]King's College London

P102 High Aortic Diameter Variation Is Associated With Turbulent-Like Flow Conditions In Post-Norwood Patients SB³C2023-611
Vivian Tan[1], Ankavipar Saprungruang[2], Brandon Peel[2], Christopher K. Macgowan[2], David J. Barron[2], Shi J. Yoo[2], M. Owais Khan[1]
[1]Toronto Metropolitan University, [2]University of Toronto

P103 Development and Assessment of a New Web Application to Measure the Orientation and Alignment of Fibrous Tissue SB³C2023-652
Katherine J. Fors, Kyle Shannon, Kate J. Benfield, Trevor J. Lujan
Boise State University

P104 Computational Modeling of Fluid Perfusion in a Biphasic Vocal Folds Tissue During Phonation: Potential Role of Permeability SB³C2023-616
Isabella McCollum, Alexis Throop, Durwash Badr, Rana Zakerzadeh
Duquesne University

P105 Failure in Articular Cartilage: Finite Element Predictions of Stress, Strain, and Pressure Under Micro-Indentation Inducted Fracture SB³C2023-630
Brandon P. Chelstrom, Dipul Chawla, Corinne R. Henak
University of Wisconsin-Madison

P106 Comparison Of Left Ventricular Function Estimated From Inverse Finite Element Modeling Using 3D Echocardiographic And Magnetic Resonance Images SB³C2023-607
Chenghan Cai[1], Lei Fan[1], Jenny S. Choy[2], Ghassan S. Kassab[2], Lik Chuan Lee[1]
[1]Michigan State University, [2]California Medical Innovations Institute

P107 A New Method For Generating Virtual Bone Scans For The Purpose Of Investigating The Effects Of Cortical Microstructure SB³C2023-614
Zachary B. Toth, Joshua Gargac
Ohio Northern University

P108 Nintendo LABO For Serious Gaming SB³C2023-621
Amanda M. Wells, Logan M. Suiter, Jacob G. Colwell, Joshua A. Gargac
Ohio Northern University

P109 Fracture Risk Prediction Using Finite Element Modeling in a Canine Model of Osteosarcoma SB³C2023-613
Chloe R. Brekhus[1], Kevin M. Labus[1], Bernard Seguin[2], Christian M. Puttlitz[1], Benjamin C. Gadomski[1]
[1]Colorado State University, [2]VCA Central Victoria Veterinary Hospital

P110 A Bioreactor towards Mechanically Stimulating Stem Cell Differentiation in Bioprinted Orthopedic Tissue Constructs SB³C2023-658
Shreya Garg, Isadora S. Dos Passos, Hossein Vahid Alizadeh, Carolyn Kim, Jiannan Li, Yunzhi Peter Yang
Stanford University

P111 Fisetin Treated Human Bone Marrow Aspirate Concentrate Rapidly Reduces Senescence Signatures SB³C2023-466
Jacob B. Singer, Haruki Nishimura, Yoichi Murata, Sealy Hambright, Chelsea S. Bahney, Sudheer Ravuri, Johnny Huard, Marc J. Philippon
Steadman Philippon Research Institute

P112 Evaluating The Understandability Of Real-Time Sonified Biofeedback Prototypes For Balance Training SB³C2023-639
Vibha R. Iyer[1,2], Mitchel A. Tillman[1], Antonia M. Zaferiou[1]
[1]Stevens Institute of Technology, [2]Georgia Institute of Technology

P113 Analysis of Frictional Forces During Blood Clot Removal in Experimental Models of Acute Ischemic Stroke SB³C2023-627
Omar N. Elkhayyat, Bryan C. Good
University of Tennessee

P114 Micro-Computed Tomography For The Determination Of The Dentin-Enamel Junction Density Gradient Width SB³C2023-650
Bradley S. Rosenberg, Michael Truhlar, Sobhan Katebifar, Alix C. Deymier
University of Connecticut Health

P115 Directional Migration of Ovarian Cancer Cells in a 3D Microtissue Model SB³C2023-625
Peyton E. Clark, Asha Kumari, Karthikeyan Mythreye, M.K. Sewell-Loftin
University of Alabama at Birmingham

P116 Investigating sport-specific parameters of impacts in ice hockey SB³C2023-618
D. Bondi, A. Clansey, K. Oxland, D. Luke, A. Rauscher, P. van Donkelaar, L. Wu
University of British Columba

P117 Normal Variation in Frequency- and Time-Domain Resting State EEG Metrics SB³C2023-619
Eric Liu[1,2], Cidnee Luu[1], Lyndia Wu[1]
[1]University of British Columba, [2]University of Toronto

P118 Optimization Of Mounting Methods For Tension-Compression Testing Of Murine Intervertebral Disc Joints SB³C2023-622
J. Veres, S. Lim, G.D. O'Connell
University of California, Berkeley

P119 Pregnancy And Age Differentially Affect Mechanically-Induced Collagen Damage in Murine Uterosacral Ligaments SB³C2023-628
Catalina S. Bastías[1], Lea M. Savard[1], Kathleen Connell[1], Kathryn Jacobson[1], Sarah Calve[1], Virginia L. Ferguson[1], Callan M. Luetkemeyer[1,2]
[1]University of Colorado, Boulder, [2]University of Illinois Urbana-Champaign

P120 Simultaneous Measurements of Temperature and Blood Perfusion Rate During Surface Cooling to Evaluate Cooling Penetration in Human Shoulder Region SB³C2023-612
Jacob Lombardo, Md Jawad Naseem, Liang Zhu
University of Maryland, Baltimore County

P121 The Impact Of Lactation On Pregnancy-Induced Cardiac Hypertrophy During Postpartum In Mice SB³C2023-634
Gracine H. Sime, Arden C. Shen, Molly S. Kaissar, Jennifer L. Anderson, Craig J. Goergen, Kyoko Yoshida
[1]University of Minnesota, [2]Purdue University

P122 Application of 3D Printing in Shape Memory Polymer-Based Endovascular Embolization for Preventing Intracranial Aneurysm Rupture SB³C2023-631
Tanner Cabaniss[1], Sergio A. Pineda-Castillo[1], Bradley N. Bohnstedt[2], Chung-Hao Lee[1]
[1]University of Oklahoma, [2]Indiana University

P123 Modulating The Axial Displacement Of Two Photon Polymerized Human Lamina Cribrosa Models SB³C2023-620
Brock J. Pemberton, Remi J. Shittu, Jonathan P. Vande Geest
University of Pittsburgh

P124 Eye-specific 3D Models Of Lamina Cribrosa Hemodynamics Show Shared Trends In Blood Flow, Oxygenation And Sensitivity To Vessel Diameter SB³C2023-629
Andrew Theophanous[1], Shaharoz Tahir[1], Yuankai Lu[1], Yi Hua[1,2], Ian A. Sigal[1]
[1]University of Pittsburgh, [2]University of Mississippi

P125 Characterization Of A Polymeric Device For Localized And Controlled Drug Delivery To Cervical Cancer SB³C2023-657
P. Phillips, M. Elbjorn, J. Provencio, D. Di Rocco, R.L. Hood
University of Texas at San Antonio

P126 Investigating Anthropomorphic Hand Movement Patterns To Sign American Sign Language (ASL) Accurately And Repeatedly SB³C2023-655
Lillie Bukzin[1], Sophi Schneider[1], Julia Zelevinsky[1], Ethan Danahy[1], Samantha Johnson[2]
[1]Tufts University, [2]Tatum Robotics

P127 Quantitative Polarized Light Imaging of Porcine Pulmonary Valve Leaflets SB³C2023-626
Shreya Sreedhar, Connor Link, Daniel P. Pearce, Colleen M. Witzenburg
University of Wisconsin-Madison

P128 Handheld shear wave tensiometer measurements are sensitive to regional loading in phantom collateral ligaments SB³C2023-653
Mary E. Laudon, Lesley R. Arant, Joshua D. Roth
University of Wisconsin-Madison

P129 A Mechanical Model Of Glenohumeral Stability Across Species SB³C2023-656
S. Li[1], I. Kurtaliaj[2], S. Swartz[3], S. Thomopoulos[2], G.M. Genin[1]
[1]Washington University, [2]Columbia University, [3]Brown University

P130 Automating Collagen Gel Image Segmentation Using Detectron2: An Application of Modern Computer Vision Techniques SB³C2023-648
Michael I. Cafiero[1], Spencer P. Lake[1], Michael A. David[2]
[1]Washington University, [2]University of Colorado

P131 Clinical Immersion of Undergraduate Biomedical Engineering Students: Best Practices for Short-Term Programs SB³C2023-373
Emily L. Lothamer[1,2], Katherine R. Moravec[1,2], Amy Hoene[1], P. Mike Wagoner[1], Daniel J. Beckman[1], Craig J. Goergen[1,2]
[1]Indiana University, [2]Purdue University

MS-Level Research

P132 Tracking The Response Of A Sustained Dynamic Compression Device In An Ovine Tarsal Fusion Model SB³C2023-465
Erin E. Estrada[1], Jeremiah T. Easley[1], David L. Safranski[2], Dave Latt[3], Naohiro Shibuya[4], Christian M. Puttlitz[1], Ben C. Gadomski[1]
[1]Colorado State University, [2]Enovis Foot & Ankle, [3]University of Arizona, [4]Veterans Memorial Hospital

P133 Fluid-Structure Interaction Simulation And Experimental Validation Of Bioprosthetic Heart Valves SB³C2023-175
Masod Sadipour, Ali Azadani
University of Denver

P134 A Novel Self-Sealing Dialysis Port SB³C2023-493
Jacob M. Wright[1], Alan I. Benvenisty[2], Kenneth R. Nakazawa[2], Marina de Cos[1], Kirk N. Campbell[1], Eric G. Lima[2], Evren U. Azeloglu[1]
[1]Ichan School of Medicine, [2]Cooper Union

P135 An Anthropomorphic, Actuated Wrist for Achieving Biomimetic Motion of a Robotic Hand SB³C2023-462
Jonathan M. Rooney[1], Samantha T. Johnson[2], Chiara Bellini[1]
[1]Northeastern University, [2]Tatum Robotics

P136 Multi-Modal Analysis Of Intracranial Aneurysms To Explore The Relationship Between Wall Enhancement, Phenotype, Internal Stress, And Intrasaccular Hemodynamics SB³C2023-460
Jay P. Shah, Sricharan S. Veeturi, Nandor Pinter, Ammad A. Baig, Munjal Shah, Tatsat R. Patel, Adnan H. Siddiqui, Vincent M. Tutino
University of Buffalo

P137 A Multi Center Ilias Registry Based Diagnostic Cutoff For Pressure Drop Coefficient In Relation To The Current Pressure And Flow Endpoints In Patients With Coronary Artery Dysfunction SB³C2023-304
Shreyash M Manegaonkar[1], Mohamed A Effat[1], Tim P van de Hoef[2], Rupak K Banerjee[1]
[1]University of Cincinnati, [2]Amsterdam UMC

P138 Reaction Kinetics In Electroosmotic Flow Driven Microfluidic Device For Detection Of Antigen SB³C2023-603
Israel O. Ajiboye, Rupak K. Banerjee
University of Cincinnati

P139 Quantification Of Tumor Biophysical Heterogeneity Through Mechanical And Ultrastructural Analysis SB³C2023-537
Bradley J. Mahaffey, Zachary P. Fowler, Zoe Lung, Viven Dang, Neha Anil, Marco Munoz, Joseph Chen
University of Louisville

P140 Studying The Mechanical Reference Domain Of The Heart For Cardiovascular Biomechanics SB³C2023-502
John Sayut[1], Javiera Jilberto Vallejos[1], Sandra Hager[1], Mia Bonini[1], Marc Hirschvogel[1], David A. Nordsletten[1,2]
[1]University of Michigan, [2]King's College London

P141 Assessing Transmural Myocardial Perfusion In Healthy And Diseased Pigs Using Multi-Scale Computational Modeling SB³C2023-507
Victoria E. Sturgess[1], Alyssa Taylor-LaPole[2], Cooper M. Warne[3], Hamidreza Gharahi[1], Elaleh Rahbar[4], Jonathan D. Tune[3], Daniel Beard[1], C. Alberto Figueroa[1]
[1]University of Michigan, [2]NC State University, 3University of North Texas, [4]Wake Forest

P142 Bulk Material Density is Associated with Mechanical Response of Polydimethylsiloxane and Porcine Thoracic Aortic Tissue SB³C2023-411
Pete H. Gueldner, Alexandria Trevino, Ronald Fortunato, Cyrus J. Darvish, Emma E. Ahlgren, Isabelle K.M. Chickanosky, Timothy K. Chung, Keshava Rajagopal, Kumbakonam R. Rajagopal, Spandan Maiti, Chandler C. Benjamin, David A. Vorp
University of Pittsburgh

P143 Visualizing the Orifice of Visceral Arteries for In Situ Fenestration of AAA Endovascular Stent Grafts SB³C2023-415
Cyrus J. Darvish, Nicholas P. Lagerman, Oldrich Virag, Mohammad H. Eslami, David A. Vorp, Timothy K. Chung
University of Pittsburgh

P144 The Role Of Annuloplasty Ring Shape And Size On Tricuspid Valve Repair SB³C2023-329
Collin E. Haese, Mrudang Mathur, Manuel K. Rausch
University of Texas at Austin

P145 Coculture and Conditioned Media Enhance Mechanical Function of iPSC-Derived Cardiomyocytes on a 2D Micropatterned Substrate SB³C2023-028
Mitchell Josvai, Alana Stempien, Jacob Notbohm, Jianhua Zhang, Timothy J. Kamp, Wendy C. Crone
University of Wisconsin-Madison

P146 Bladder Biomechanics - Filling And Voiding SB³C2023-543
Juan Pablo Gonzalez-Pereira, Cody J. Johnson, Wade A. Bushman, Shane A. Wells, Alejandro Roland-Alzate
University of Wisconsin-Madison

Poster Session II

Biotransport

P1 Focused-Ultrasound Mediated Gene Delivery To Brain Without Blood-Brain Barrier Opening SB³C2023-246
Hanwen Fan, Mohammadaref Ghaderi, Qi Cai, Shashank Sirsi, Zhenpeng Qin
University of Texas

P2 Effect of Acoustic Radiation Force and Microbubble Size Parameters on AvB_3 Integrins - Targeting In Microvessel Phantoms SB³C2023-544
Jair I. Castillo[1], J. Angel Navarro-Becerra[1], Federico Di Ruzza[2], Mark Borden[1]
[1]University of Colorado, [2]University of Rome

P3 DMSO-free Cryopreservation Of Mammalian Cells Using Agarose Hydrogel Encapsulation SB3C2023-077
M Wang, A Mahajan, A Aksan
University of Minnesota

P4 Altered Oxygen Transport In Intracranial Aneurysms In Sickle Cell Disease SB3C2023-198
Marisa S. Bazzi, Hadi Wiputra, David K. Wood, Victor H. Barocas
University of Minnesota

P5 Toward Multiplexed Single-Cell Western Blotting Using DNA-Barcoded Readout SB3C2023-056
Mariia Alibekova Long, William KJ Benman, Lukasz J Bugaj, Alex J Hughes
University of Pennsylvania

P6 Technology For Rapid Rewarming Of Refrigerated Breast Milk SB3C2023-261
Melika Mehrabi Dehdezi, Marissa N. Rylander, Christopher G. Rylander
University of Texas at Austin

P7 Regulating Nanoscale Heat Transfer With Janus Nanoparticles SB3C2023-226
C. Xie, B. Wilson, Z. Qin
University of Texas at Dallas

P8 A Slim, Pulse-Driven Microfluidic Device for Insulin Delivery SB³C2023-255
Shuyu Zhang[1,2], Rafael V. Davalos[1,2], Anne E. Staples[1,2]
1Wake Forest, 2Virginia Tech

P9 Quantification Of Cationic Solute Diffusion And Fixed Charge Density In Human Synovium SB³C2023-101
Alexandra L. Davis, Ashish Vaidyanathan, Milad Rohanifar, Lori A. Setton
Washington University in St. Louis

Design, Dynamics & Rehabilitation

P10 **A Parabolic Modeling Of Carpal Arch Area Expansion** SB³C2023-062
David Jordan, Hui Zhang, Zong-Ming Li
University of Arizona

P11 **Understanding Fabric Friction to Reduce the Risk of Pressure Injuries in Wheelchair Users** SB³C2023-325
Archana Lamsal, Tamara R. Bush
Michigan State University

P12 **Kinematic Decomposition Of A Living Octopus: Application To Soft Robotic Assistive Devices** SB³C2023-365
Garrett S. Weidig, Brittany Bush, Fermin Jimenez, Galit Pelled, Tamara Reid Bush
Michigan State University

P13 **Fixation Analysis of Bone-Prosthesis Interface Micromotion of a Cementless Talar Component** SB³C2023-075
Irwan S.M. Moideen, Jun Wei Lee, Yu Shen Ong, Chin Tat Lim, Desmond Y.R. Chong
Singapore Institute of Technology, National University Hospital

P14 **Biomechanical Improvements In Gait With Carbon-Fiber Orthotic Insole For Post-Operative Tibiotalar Arthrodesis Patients** SB³C2023-424
Adam J. Bradshaw, Austin J. Carcia, Colin R. Smith, Thomas O. Clanton, Scott Tashman
Steadman Philippon Research Institute

P15 **Reduced Sensor Set For Assessment Of Hand Posture** SB³C2023-559
Ranjith Madhana-Gopal, Sara E. Wilson
University of Kansas

P16 **Individuals With Rotator Cuff Tears Requiring Surgery After Exercise Therapy Have Less Inferiorly Directed Muscle Forces Post-Exercise Therapy** SB³C2023-167
Luke T. Matter, Arash B. Mahboobin, Adam J. Popchak, William J. Anderst, Volker Musahl, James J. Irrgang, Richard E. Debski
University of Pittsburgh

P17 **Developing and Testing a Novel Device for Detecting Peripheral Artery Disease Using Radio Frequency Energy** SB³C2023-615
J Nelson, C Cobb, J Keller, D Nelson, M Francis
University of South Alabama

P18 **Performance comparison of portable suction devices** SB³C2023-264
Saketh R. Peri, Forhad Akhter, Robert A. De Lorenzo, R. Lyle Hood
University of Texas

P19 **Testing the Validity of Various Viscosity Values for a Versatile Oxygenating Perfusion System** SB³C2023-623
A Fasci, S Salazar, J Oseghale, M Garcia, A Khalil, B Wearden, L Muenchow, J Gonzalez, C Villareal, D Portillo
University of Texas at San Antonio

P20 **Multifiber Computational Modeling of Hollow-Fiber Hemodialyzers** SB³C2023-256
Ruhit Sinha, Anne E. Staples
Virginia Tech

P21 **An Intravascular Catheter With Switchable Flexural Rigidity** SB³C2023-269
D.G. Rucker, J.W. Osbun, M.A. Zayed, G.M. Genin
Washington University

P22 **Tissue Diffusion and Two Component Computational Model to Predict Leaching from Medical Devices** SB³C2023-068
Martin L. Tanka[1], David M. Saylor[2], Robert M. Elder[2]
[1]Western Carolina University, [2]US FDA

Education

P23 **Building Entrepreneurial Mindset: Motivating Curiosity, Connections, and Creating Value in an Assistive-Device Design Project** SB³C2023-316
Joshua A. Gargac
Ohio Northern University

P24 **Scaffolded And Iterative Course Design In a Biomechanics Laboratory Course** SB³C2023-352
S Bansal, J Benson, S Sullivan, E Corbin
University of Delaware

P25 **Effect Of Standards-Based Grading On The Course Grade Distribution In A Biomechanics Course** SB³C2023-488
Kenneth J Fischer, Christopher J Fischer
University of Kansas

Fluid Mechanics

P26 **Investigating the impact of aortic root geometry on TAVI implantation using 3D reconstructions and FSI** SB³C2023-053
K Bates, K Lachapelle, G Martucci, RL Leask
McGill University

P27 **Advance In Hybrid Cardiovascular Modeling: Coupling Volumetrically Dynamic In-Vitro Experiments To Numerical Physiology Simulation** SB³C2023-103
Abraham E. Umo, Ethan O. Kung
Clemson University

P28 **Toward Real-Time Simulation of Cardiovascular Flows by Introducing a Stabilized Time-Spectral Finite Element Method** SB³C2023-085
Dongjie Jia, Mahdi Esmaily
Cornell University

P29 **Computational Modeling Of Coronary Venous Retroperfusion Treatments For Ischemia** SB³C2023-052
Haifeng Wang, Lei Fan, Jenny S. Choy, Ghassan S. Kassab, Lik Chuan Lee
[1]Michigan State University, [2]California Medical Innovation Institute

P30 **Impact of the Coronary Stent Footprint on Wall Shear Stress in Patient-Specific Arteries - Analysis from the Shear-Stent Trial** SB³C2023-322
I Shah[1,2], D Molony[3], K. Crawford[2,3], A. Lefieux[2], A. Veneziani[2], H. Samady[2,3]
[1]Georgia Institute of Technology, [2]Emory University, [3]Northeast Georgia Medical Center

P31 **A 3D Particle Tracking Study on the Blood Residence Time in a Cerebral Aneurysm under Different Inflow Conditions** SB³C2023-552
Huang Chen, Roya Kamali, Thangam Natarajan, Satheesh Kumar Harikrishnan, Lakshmi Dasi
Georgia Institute of Technology

P32 **Biomechanical Follow-Up and Evaluation of Aneurysm Growth** SB³C2023-323
F.A.M Garbou, O.O.M. Elnamla, W.A.K.A. Saber, K.B. Kose
Istanbul Medipol University

P33 **The Impact Of Transcatheter Aortic Valve Replacement Deployment Parameters On Coronary Artery Hemodynamics** SB³C2023-007
Seyedvahid Khodaei, Zahra Keshavarz-Motamed
McMaster University

P34 **Developing a Perfusion Optimization Framework For Synthetic Vasculature In Biofabrication Applications** SB³C2023-564
Zachary A. Sexton, Karthik Menon, Lazaros Papamanolis, Alison Marsden
Stanford University

P35 **Quantitative comparison of flow parameters in rigid vs compliant aneurysm models using 4D particle image velocimetry (PIV)** SB³C2023-157
Nikhil S. Shirdade, Sandy Karam, Baha T. ElKhader, Ephraim W. Church, Guha Manogharan, Melissa C. Brindise
Penn State

P36 **Tomographic X-ray Particle Tracking Velocimetry And Possible Applications In Biological Fluid Dynamics** SB³C2023-496
Jason T. Parker, Simo A. Mäkiharju
University of California - Berkeley

P37 **Vascular Cross-Section Morphometrics Can Predict First Pass Outcome Of Mechanical Thrombectomy For Ischemic Stroke** SB³C2023-188
Briana A. Santo, S.M.M. Janbeh Sarayi, Muhammad Waqas, Andre Monteiro, Adnan H. Siddiqui, Vincent M. Tutinio
University at Buffalo

P38 **Bovine Pericardium Density Measurement And Its Implications On Leaflet Stress Distribution In Bioprosthetic Heart Valves** SB³C2023-107
Masod Sadipour, Ali Azadani
University of Denver

P39 **A Novel Electrochemical Catheter For Cardiac Output Monitoring** SB³C2023-055
Marco A. Nino, Abdulsattar H. Ghanim, Syed Mubeen, Suresh M.L. Raghavan
University of Iowa

P40 **Computational Fluid Dynamics Simulations Of Aortic Dissection Using Immersed Boundary Method** SB³C2023-117
Gokul G. Anugrah, Sam Tyagi, Mary B. Sheppard, Christoph Brehm, Jonathan F. Wenk
University of Kentucky

P41 **Peristaltsis Alone Is Inconsistent With Measured Flow In The Paravascular Space** SB³C2023-281
M. Keith Sharp
University of Louisville

P42 **An Euler-Lagrange Approach For Modeling Particle-Laden Flows In Biological Applications** SB³C2023-401
Abhilash Reddy Malipeddi, Jesse Capecelatro, C. Alberto Figueroa
University of Michigan

P43 **Pulse Wave Velocity Increases With Extending The Length Of Vascular Stent-Grafts** SB³C2023-189
Ramin Shahbad, Anastasia Desyatova
University of Nebraska Omaha

P44 **Design and characterization of a silicone venous valve model** SB³C2023-306
Matthew S. Ballard, Dallin Brimhall, Sarah Dayley, Andrew Rasmussen
Utah Valley University

Solid Mechanics: Cardiovascular

P45 **Comparing Approaches to Estimate Failure Strength of Sutured Patches Used in Pediatric Cardiac Surgery** SB³C2023-580
Shannen B. Kizilski[1,2], Dominic P. Recco[1,2], Lauren E. Marshall[1], Nicholas E. Kneier[1], Patrick D. Earley[1], Peter E. Hammer[1,2], David M. Hoganson[1,2]
[1]Boston Children's Hospital, [2]Harvard College

P46 **Simulation of a Repair on a Dynamic Patient-Specific Left Atrioventricular Valve Model** SB³C2023-520
Stephen Ching[1], Christopher Zelonis[1], Christian Herz[1], Patricia Sabin[1], Muhammad Nuri[1], Yan Wang[1], Andras Lasso[2], John Moore[3], Terry Peters[4], Matthew A. Jolley[1]
[1]Children's Hospital of Philadelphia, [2]Queen's University, [3]Archetype Medical Inc., [4]Western University

P47 **4D Ultrasound-Based Regional Mechanical Characterization Of Abdominal Aortic Aneurysms Using Virtual Fields Method** SB³C2023-360
Mirunalini Thirugnanansambandam[1,2], Esther J Maas[1,2], Arjet HM Nievergeld[1,2], Marc RHM van Sambeek[1,2], Stephane Avril[3], Richard Lopata[1]
[1]Eindhoven University of Technology, [2]Catharina Hospital Eindhoven, [3]Ecole des MINES Saint-Etienne

P48 **Influence of Wall Shear and Mechanical Stress on Atherosclerotic Artery Disease in Human Coronaries** SB³C2023-293
Aikaterini Tziotziou[1], Eline Hartman[1], Suze-Anne Korteland[1], Antonius F.W. van der Steen[1], Joost Daemen[2], Jolanda Wentzel[1], Ali C. Akyildiz[1,3]
[1]Erasmus Medical Center, [2]Delft University of Technology

P49 **Development of a System for Measuring Aortic Valve Deformation Using Digital Image Correlation** SB³C2023-442
Alexander W Hooke, Christopher Noble, David Morse, Melissa Young, Amir Lerman
Mayo Clinic

P50 **Personalized Intervention Cardiology For Transcatheter Aortic Valve Replacement With A Doppler-Exclusive Diagnostic Framework** SB³C2023-008
Nikrouz Bahadormanesh, Zahra Keshavarz-Motamed
McMaster University

P51 **Mechanical Properties Of Cardiac Tissue Surrogates And How They Compare To Human Cadaveric Cardiac Tissue** SB³C2023-122
Emily A. Bermel, Kevin O'Brien
Therapy Delivery Systems

P52 **Anatomical Location-Specific Quantification of Tissue Composition of Perivascular Adipose Tissue** SB³C2023-334
D. McClintock, E. Flood, S.W. Watts, W. Jackson, S. Roccabianca
Michigan State University

P53 **Altering Metabolic Cost Function Of Pulmonary Arteries To Understand Hemodynamic Response To Pah** SB³C2023-542
Haritha N. Mullagura, C. Alberto Figueroa, Seungik Baek
University of Michigan

P54 **Do Age And Sex Matter In A 1D Simulation Study Targeting Arterial Stiffness?** SB³C2023-276
Friederike Schäfer, Jacob Sturdy, Leif Rune Hellevik
Norwegian University of Technology

P55 **A Machine Learning Approach To Estimate Size And Location Of Myocardial Infarction** SB³C2023-252
RR Mehdi, EA Mendiola, R Avazmohammadi
Texas A&M University

P56 **Effective Strain Sharply Captures the Rupture Point of Aneurysm Tissues** SB³C2023-038
Ali Kamali, Kaveh Laksari
University of Arizona

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[1]Trinity College London, [2]Boston Scientific Corporation

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[1]University of Pennsylvania, [2]Crescenz VA Medical Center, [3]University of Colorado

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UNIVERSITY of CALIFORNIA · IRVINE
Department of Biomedical Engineering

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Northeastern University
College of Engineering
Bioengineering

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JOURNAL OF BIOMECHANICAL ENGINEERING

COLLEGE OF ENGINEERING
BIOMEDICAL ENGINEERING AND MECHANICS
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BIOMOMENTUM

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Biomedical Engineering

at the University of Colorado Boulder

A degree in biomedical engineering prepares students to use engineering principals to analyze and solve problems in biology and medicine.

- Biomechanics and mechanobiology
- Medical devices
- Imaging and diagnostics
- Therapeutics
- Neuroengineering

#11
Public graduate engineering program
U.S. News & World Report, 2023

90+
Hiring biomedical companies in Colorado
LinkedIn Jobs, 2020

38
Program faculty
CU Boulder BME

Partnerships
Anschutz Medical School, National Labs (NIST)
Colorado Front Range

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"BME is a growing program at CU, this has allowed me to interact with different faculty and students from across the college. My experience in the program has been amazing, granting me the possibility to explore all of my interests and find my true passion."

Catalina Bastias (BS Biomedical Engr '23)

"Our BME program is extraordinary, not only because of the diversity in expertise within campus, but the vast opportunities that come from having a top medical institution and ever expanding biotech community right around the corner."

Payton Martinez (PhD Biomedical Engr '24)

Biomedical Engineering
UNIVERSITY OF COLORADO **BOULDER**

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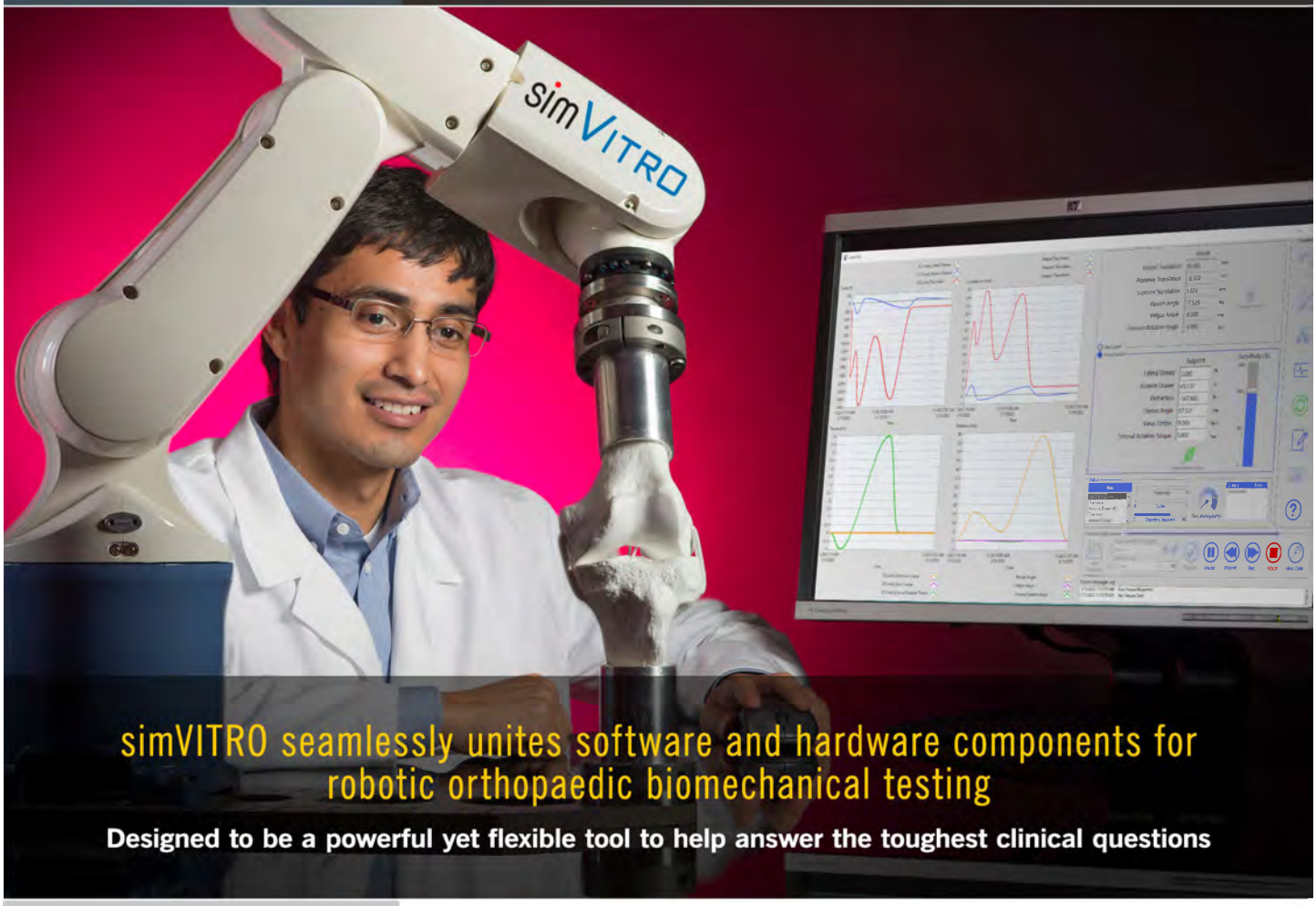
4/2023

bioRobotics

simVITRO®



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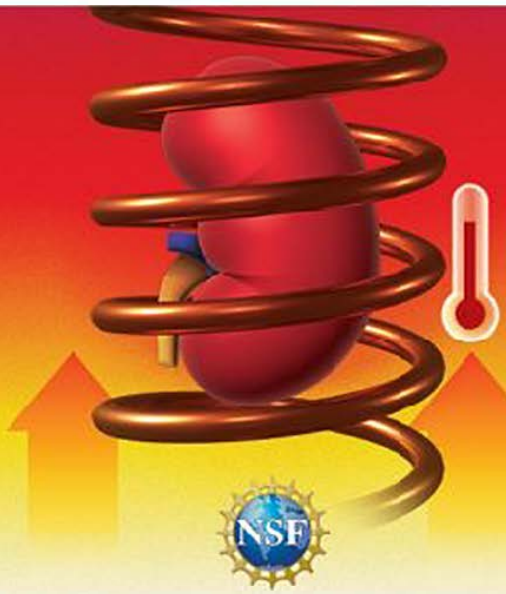

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Micro-Physiological Systems

Organisms

Organs

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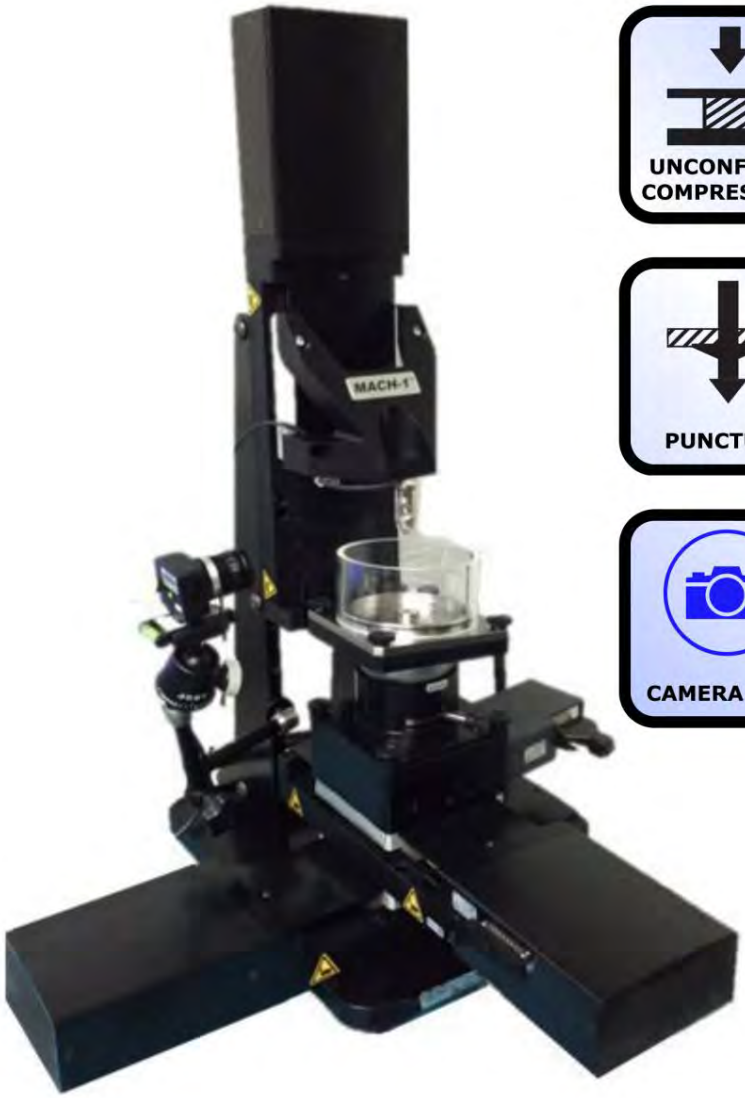

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About Us

Exponent is a leading engineering and scientific consulting firm that brings together more than 90 different disciplines to solve the most pressing and complicated challenges facing stakeholders today. Our vision is to engage the brightest scientists and engineers to empower clients with solutions for a safe, healthy, sustainable and technologically complex world. We leverage over 50 years of experience in analyzing accidents and failures to advise clients as they innovate their technologically complex products and processes, ensure the safety and health of their users, and address the challenges of sustainability. Learn about Our Impact here.

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AT THE INTERFACE OF ENGINEERING AND MEDICINE

Northeastern University's Bioengineering Program provides a broad-based, interdisciplinary engineering curriculum that offers a rigorous yet flexible education. The Department of Bioengineering has a robust Bachelors, Masters and PhD Program. The goal of the curriculum in Bioengineering is to provide students with a broad understanding of the quantitative analysis of biological systems and a deep expertise in an area of engineering of their choice.

Bioengineering students will have unique opportunities in the classroom, research labs, and experiential learning. The projects that they may be able to contribute to include bio-bandages that monitor bacterial growth or that help damaged ligaments heal faster; sheets of cells folded like origami to form a working kidney; and new materials that—like a leaf in the sun— automatically sense and adapt to changes in the environment.

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@Department of Bioengineering at Northeastern University

@NUBioE1

CONCENTRATIONS:

Biomechanics, Biotransport, and Mechanobiology

Biomedical Devices and Bioimaging

Molecular, Cell, and Tissue Engineering

Systems, Synthetic, and Computational Bioengineering

Visit us at www.bioe.northeastern.edu or contact Esther Cohen at e.cohen@northeastern.edu for more department information.

SCANCO MEDICAL

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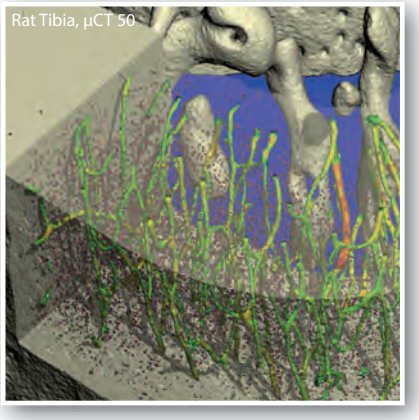

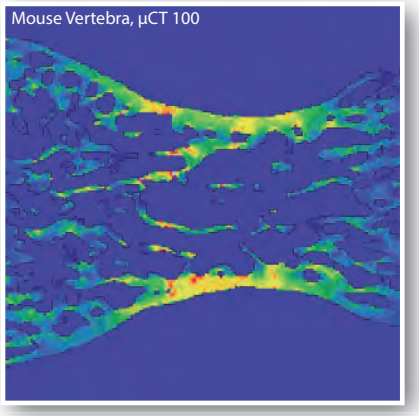

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UCI Samueli School of Engineering | Department of Biomedical Engineering

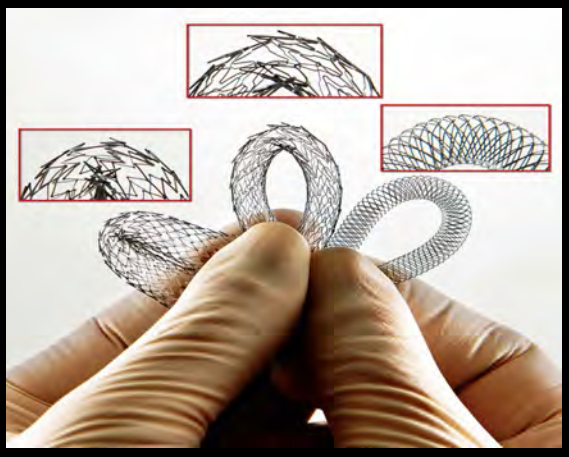
The UCI Department of Biomedical Engineering's mission is to inspire engineering minds for the advancement of human health.

Established in 2002, the growth of biomedical engineering in the UCI Samueli School has been rapid. The department merges UCI's strengths in medicine, biological sciences and engineering. BME faculty are competitive in garnering extramural grants, with expenditures topping $30M on an annual basis. Strong ties with many of Orange county's more than 300 biomedical device and biotech companies provide students and faculty with distinct opportunities to solve contemporary medical challenges.

The UCI BME Department offers two undergraduate degree programs, an M.S. degree program, a Professional Masters of Engineering degree, a Ph.D. degree, and a combined M.D./Ph.D. degree in conjunction with the UCI School of Medicine. There are currently 30 full-time faculty and 58 affiliated faculty. Research areas include micro/nano medicine, biophotonics, biocomputation and tissue engineering, with clinical emphases in neuroengineering, cardiovascular diseases, cancer and ophthalmology. Included in these opportunities are major campus research centers at the Beckman Laser Institute (biophotonics), UCI Edwards Lifesciences Foundation Cardiovascular Innovation and Research Center (CIRC), the Chao Family Comprehensive Cancer Center, the Integrated Nanosystems Research Facility, the Laboratory of Fluorescence Dynamics, and the Micro/nano Fluidics Fundamentals Focus Center. Because of its interdisciplinary nature, biomedical engineering attracts students with a variety of backgrounds.

Department website: http://www.bme.uci.edu
Scan the QR Code to sign-up to receive more information about programs and positions in BME at UCI.

| BIOMECHANICS



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- Biomechanics
- Translational Cancer Research
- Biomedical Imaging
- Transportation Research
- Neuroengineering
- Cardiovacular Engineering
- Biomaterials/Tissue Engineering/Regen Med

Learn more about our Biomedical Engineering programs and research at beam.vt.edu

Washington University in St. Louis

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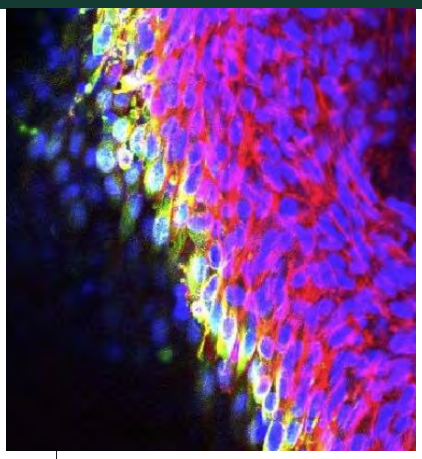
McKelvey School of Engineering



Graduate programs in Biomedical Engineering and Mechanical Engineering & Materials Science

PhD programs:

- Aerospace Engineering
- Biomedical Engineering
- Imaging Science *
- Materials Science & Engineering *
- Mechanical Engineering

Master's programs:

- Aerospace Engineering
- Biomedical Engineering
- Imaging Science *
- Materials Science & Engineering
- Mechanical Engineering

** interdisciplinary programs*

Highlighted research areas

- Advanced Materials
- Biomechanics & Mechanobiology
- Biomedical & Biological Imaging
- Cardiovascular Engineering
- Cell & Molecular Bioengineering
- Neural Engineering
- Orthopedic Engineering
- Regenerative Engineering in Medicine
- Thermal-Fluids in Energy, Aerospace and Biomedicine
- Women's Health Technologies

Engineer your way. Engineer at WashU.

Washington University in St. Louis is among the world's leaders in teaching, research and patient care, with 3,800 faculty and more than 15,000 full-time students. In the McKelvey School of Engineering, graduate students have the opportunity to work across the university's top programs including access to a world-class medical school. Researchers and students easily make interdisciplinary connections to take part in cutting-edge research.

#13
Biomedical engineering graduate program ranking in U.S. News

#38
Top rising materials science institutions worldwide (Nature Index)

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SB^{3}C 2023 • PROGRAM AT-A-GLANCE

Room:	Cascade ABC	Cascade D	Cascade E	Cascade F	Gore AB	Gore CD	Powell	Zermatt
SUNDAY, June 4, 2023								
3:00 – 3:45 pm	**Lissner ASME Medal: Boris Rubinsky**							
4:00 – 5:30 pm	**Translational technology pitch competition**							
5:30 – 7:00 pm	**Industry/exhibitor networking event** (SB3C Industry Committee)				**Effective Experimental and Computational Workflows with Applications to Biological Tissues** (ASME Student Leadership Committee)			
MONDAY, June 5, 2023								
All Day	**Exhibits**							
8:00 – 9:30 am	**Nerem ASME Medal: Victor Barocas | Mow ASME Medal: Alison Marsden | Fung ASME Medal: Jessica Oakes**							
9:45 – 11:15 am	Machine Learning in Biofluids	Soft Tissue Mechanics	Ocular and Lower Abdomen Biomechanics	Biotransport in Therapeutic Design and Analysis	Engineered *In Vitro* Models	Cartilage: Composition and Lubrication	Translational Bioengineering	Cardiovascular Mechanobiology
11:15 – 11:30 am	**Coffee Break**							
11:30 – 1:00 pm	Thrombosis and Hemolysis	Vascular Pathology and Fluid Flow	Ocular and Lung Biomechanics	Sex, Age, and Disease in Brain and Head Injury	Bioprinting and Emerging Technology in TCE	Cartilage: Imaging and Degeneration	Bioengineering Design I	Multiscale Models, Cardiovascular System
1:00 – 2:30 pm	**POSTER SESSION I with Lunch, Including BS & MS Student Paper Competitions (outdoor tent)**							
3:15 – 4:15 pm	**LGBTQ+ Networking Event**							
4:15 – 6:15 pm	**Workshop: Promoting Research Self-Efficacy to Facilitate Inclusion and Diversity in Mentoring Relationships**							
6:30 – 8:30 pm	**Welcome Reception**							
TUESDAY, June 6, 2023								
All Day	**Exhibits**							
8:15 – 9:15 am	**PLENARY: Amy Wagoner-Johnson**							
9:30 – 11:00 am	PhD I: Multiscale Mechanics and Transport	PhD II: Cardio. Mechanics and Remodeling			Undergraduate Design Competition			PhD III: Morphogenesis, Maternal/ Abdominal Health
11:00 – 11:15 am	**Coffee Break**							
11:15 – 12:45 pm	PhD IV: Musculoskeletal and Skin Tissue Eng.	PhD V: Musculoskeletal Biomechanics						PhD VI: Emerging Tissue Engineering and Mechanics
12:45 – 2:15 pm	**POSTER SESSION II with Lunch, including BS & MS Student Paper Competitions (outdoor tent)**							
2:15 – 3:45 pm	**Prospective Junior Faculty Poster Session (outdoor tent)**							
2:15 – 3:45 pm			**Uncertainty Quantification Workshop**				**Image-Based Mechanics Workshop**	
4:00 – 5:00 pm	**Women's Faculty and Post-Doc Networking Event**							
7:00 – 9:00 pm	**Student Networking Event and Axe-Throwing Melee (Location: Zen Garden. No, seriously!)**							
WEDNESDAY, June 7, 2023								
All Day	**Exhibits**							
9:30 – 12:30 pm	**Committee Meetings**							
9:30 – 12:30 pm			**Force-Based Manipulative Spine Therapy**		**Augmented Reality Workshop**			**SimVascular Workshop**
11:30 – 1:30 pm							**Machine Learning Workshop**	
12:45 – 1:45 pm	**Snacks & Coffee Break**							
1:45 – 3:15 pm	Patient Specific Flow and Physiology	Fluid Velocity Mapping and Flow	Reproductive Biomechanics and Pregnancy	Biotransport in Drug Delivery	Engineering Tissue Regeneration	Predictive Models in Cardiovascular Biomechanics	Bioengineering Design II	Cardiovascular Tissue Structure and Mechanics
3:30 – 5:00 pm	Heart Valve Fluid Mechanics	Thrombosis and Vascular Modeling	Multiscale Biomechanics	Experimental Head and Injury Mechanics	Biophysical Effects on Cells and Tissues	Structure and Function in Biomechanics	Growth and Remodeling I	Modeling in the Cardiovascular System
5:00 – 6:00 pm	**ASME BED Student Leadership Committee Meeting (Location: Zermatt)**							
7:00 – 10:00 pm	**20TH ANNIVERSARY BEDROCK CONCERT SPECTACULAR (Location: Not-So-Zen-Anymore Garden)**							
THURSDAY, June 8, 2023								
All Day	**Exhibits**							
9:00 – 1:00 pm	**CRIMSON Workshop**	**FEBio Workshop**			**Stem Cell Bioengineering Workshop**		**Demystifying the Review and Editing Process**	
1:15 – 1:45 pm	**Coffee Break**							
1:45 – 3:15 pm	Cardiovascular Devices and Design	Woo I: Joint, Ligament, and Muscle	Emerging Mechanobio and Biomech I	Biotransport in Directed Cell Migration	Mechanobiology in Cancer, Inflammation, and Motility	Fibrocartilage: Intervertebral Disc, Meniscus, TMJ	Engineering Education: Challenges and Innovations	Biomechanical Considerations in Cardio. Biomech.
3:30 – 5:00 pm	Emerging Topics in Biofluids	Woo II: Ligament & Tendon: Growth & Loading	Emerging Mechanobio and Biomech II	Innovative Brain Mechanics Characterization	Mechanobiology in Tissue and Cellular Engineering	Spine and Shoulder Mechanics	Growth and Remodeling II	Noninvasive Metrics for Cardio. Biomech.
6:00 – 7:00 pm	**Grood ASME Medal: Dawn Elliott and Rob Mauck | Woo ASME Medal: Tamara Bush**							
7:00 – 7:30 pm	**Banquet Reception**							
7:30 – 10:00 pm	**Banquet and Awards Ceremony**							