

PROGRAM BOOK

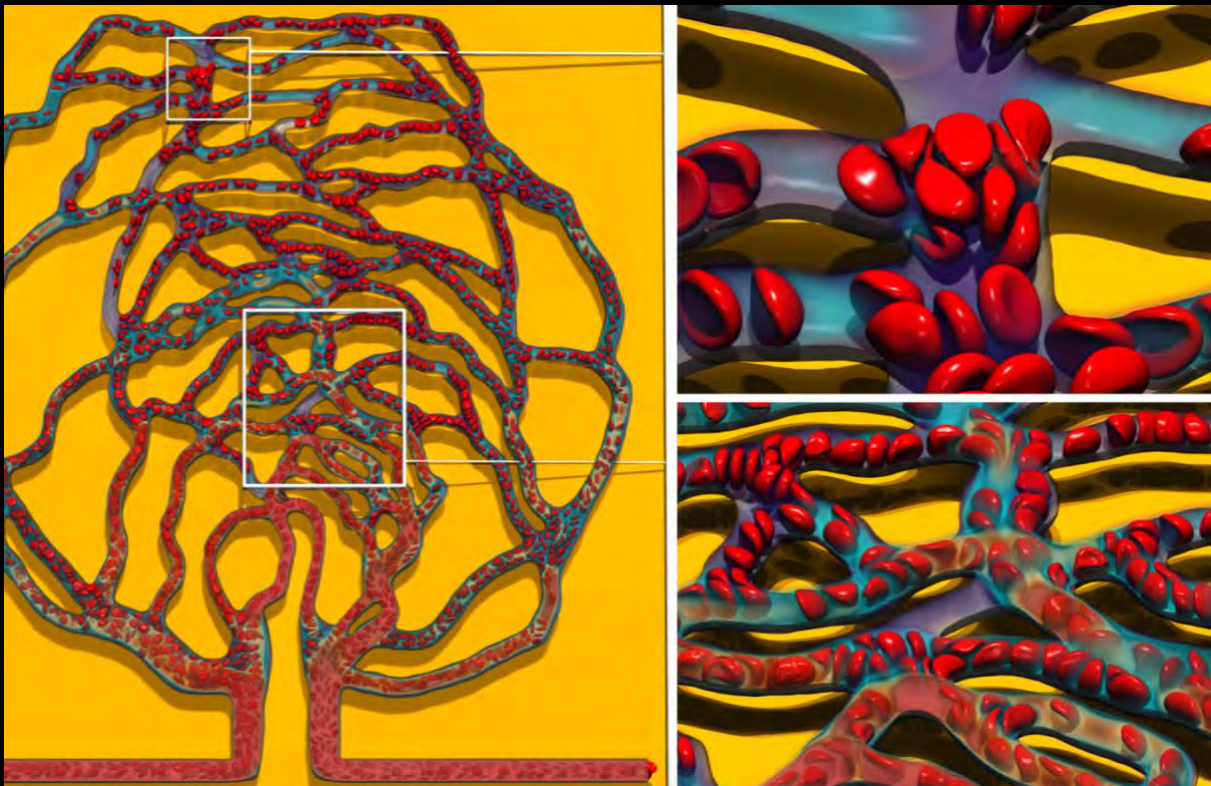
SB³C

biomechanics.
bioengineering.
biotransport.

*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 (SB³C) 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 SB³C Community,

On behalf of the entire Organizing Committee and the SB³C Foundation, we welcome you to Vail for the 2023 Summer Bioengineering, Biomechanics and Biotransport Conference (SB³C). 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 SB³C 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 SB³C 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 SB³C 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 SB³C Organizing Committee, the ASME-BED Technical Committees and SLC, Boscov's Travel, the SB³C 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 SB³C 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 SB³C, you agree to follow this Code of Conduct. We thank you for helping us continue to make the SB³C 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 SB³C meetings.

1.2 Conference COVID Policy

The health and safety of our attendees and guests at SB³C 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 on-site 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 SB³C 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 SB³C 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 SB³C 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, 6:30 - 7:30 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 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, SB³C 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
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Wednesday, June 7

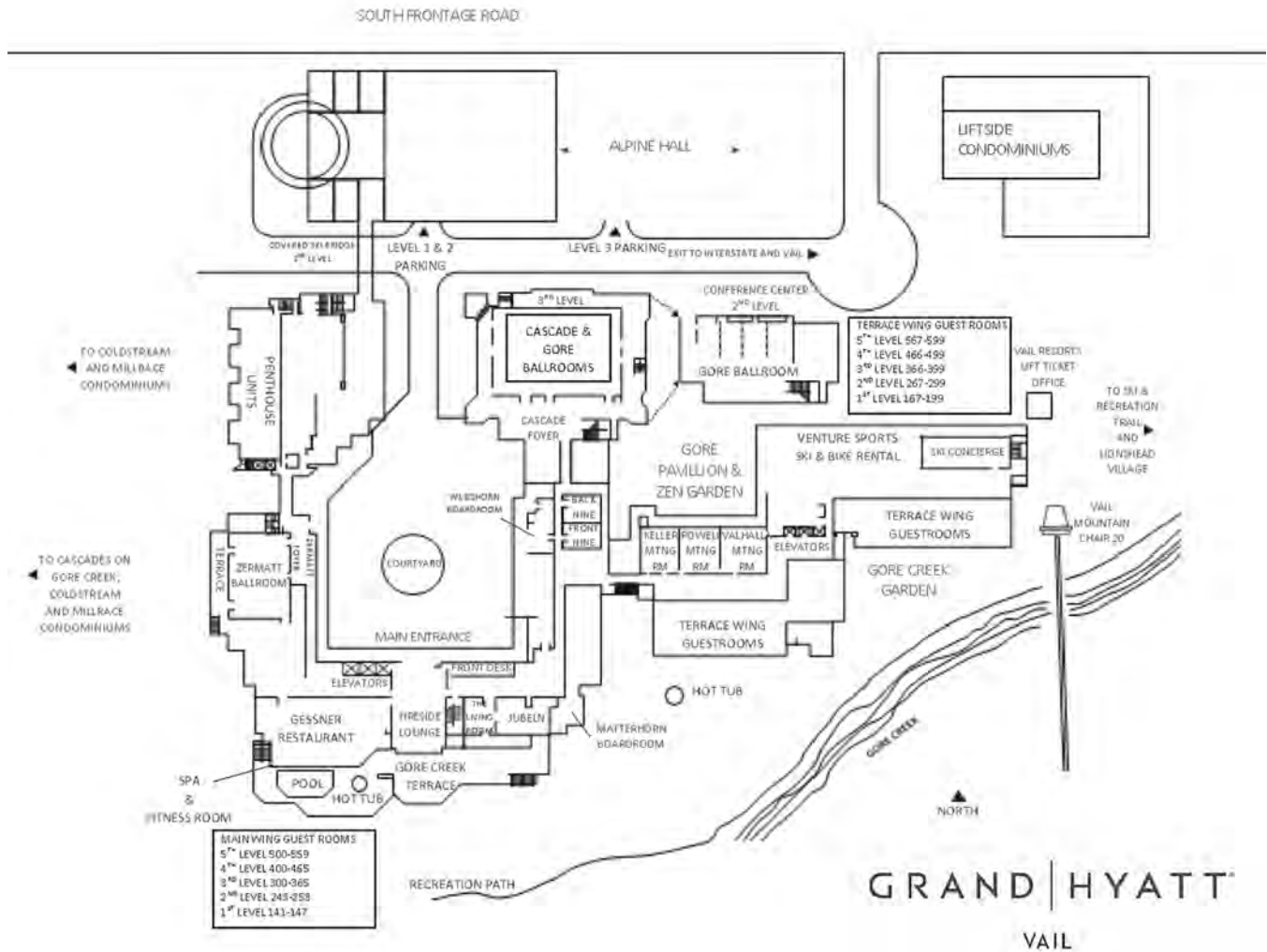
SB ³ C Board Meeting	Valhalla	7:30 - 8:30 AM
Industry Meeting	Cascade ABC	8:30 - 9:20 AM
Fluid Mechanics Meeting	Cascade D	8:30 - 9:20 AM
Education Meeting	Gore AB	8:30 - 9:20 AM
Tissue and Cellular Engineering Meeting	Gore CD	8:30 - 9:20 AM
Biotransport Meeting	Cascade ABC	9:30 - 10:20 AM
Design, Dynamics, 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.

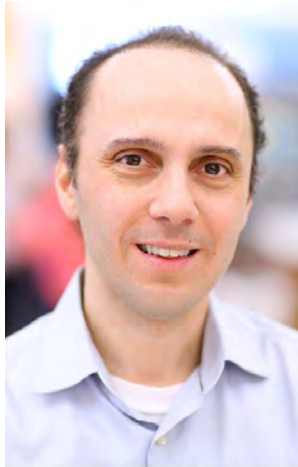
Poster Session I will be held on Monday, June 5th, 2022 from 1:00pm – 2:30pm. Poster Session II will be held on Tuesday, June 6th, 12:45pm – 2:15pm. Authors should stand next to their poster during the assigned session. Authors may also stand at their posters at any time, such as during scheduled breaks.

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-Loffin, 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
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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
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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
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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. Participants will gain strategies for bolstering their research confidence and minimizing self-doubt and imposter fears. 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.

During this session, participants will:

- Define what self-efficacy is and explore four sources for self-efficacy.
- Articulate the mentor and mentee's role in fostering research self-efficacy.
- Identify signs of self-efficacy in relation to research-related tasks.
- Learn about strategies for building self-efficacy in research.

The event will be led by guest speaker **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. Dr. Azurdia believes that initiatives that promote access to STEM degrees are important for equal representation of all identities in science, the creation of innovations that serve all communities, and income equity. Additionally, she attributes her ability to navigate her academic career to key mentors, and therefore a major focus of her work centers on the propagation of effective mentoring of underrepresented individuals in STEM.



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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
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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
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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
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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
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SimVascular Workshop

Cascade F

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
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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
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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
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CRIMSON Workshop**Cascade E****Organizers:** *Alberto Figueroa Alvarez, 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
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FEBio Workshop

Cascade F

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
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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.

Thursday, June 8**Time 5:15 PM - 6:00 PM****The Power of Collaborative Science****Cascade A-F****Plenary:** *Dawn Elliott, University of Delaware & Robert Mauck, University of Pennsylvania*

Dr. Dawn Elliott and Dr. Robert Mauck have jointly led a spine research interdisciplinary team since 2005. They have been (productively) bickering ever since. Dawn and Rob have been honored to be awarded prior ASME medals. Dawn talked about the Me Too movement and being a women in engineering when she was awarded the Mow Medal in 2015. She talked about Structural Racism and what academics can do after the murder of George Floyd when she was awarded the Nerem Medal in 2022. Rob talked about Silk Purses and Sow's Ears when he was awarded the YC Fung Medal in 2009. He talked about Dolly Parton and drag shows when he was awarded the Mow medal in 2023.

Drs. Elliott and Mauck remain in disagreement over the theme and content of this upcoming talk.

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.

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.

2023 Victor Barocas, Ph.D.



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

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 micro-scale 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.

2023 Alison Marsden, Ph.D.



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 Huang
 2020 Stavros Thomopoulos
 2021 Rafael V. Davalos
 2022 Robert L. Mauck
 2023 Alison Marsden

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 use 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.



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 - 6:30 PM MT, Cascade A-F

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. Kimura¹, MC. Sheehan², NR. Raghuraman², D. Downing², G. Srimathveeravalli²
¹Osaka University Graduate School of Medicine, ²University of Massachusetts, Amherst
- 4:20PM** **Improving Clinical CT Image Data To Develop Better Fracture Risk Algorithms And Patient Outcomes** SB³C2023-PC02
Lance L. Frazer¹, Nathan Louis^{1,2}, Kal L. Clark³, Daniel P. Nicolella¹
¹Southwest Research Institute, ²University of Michigan, ³University of Texas Health Science Center at San Antonio
- 4:40PM** **SLIC-VAD: A Wirelessly Powered LVAD With Magnetic Levitation Bearings**
SB³C2023-PC03
Shweta Karnik¹, Huang Chen¹, Simon Kiang⁴, Arun Kumar Kota², Yaxin Wang³, Joseph Cavallaro⁴, Oscar H Frazier³, Lakshmi Prasad Dasi¹
¹Georgia Institute of Technology and Emory University, ²North Carolina State University, ³Texas Heart Institute, ⁴Rice University
- 5:00PM** **I-KinCor: Revolutionizing Pediatric Duct-Dependent Surgeries** SB³C2023-PC04
Luis René Mata Quiñonez¹, Shweta Karnik¹, Srujana S. Joshi¹, Leon Cheng¹, Holly Bauser-Heaton, MD^{1,2}, Lakshmi Prasad Dasi¹
¹Georgia Institute of Technology and Emory University, ²Children's Healthcare of Atlanta

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. Swarup¹, A. Vella¹, K. Rowley², J. Frattolin¹, J. Moore Jr.¹
¹Imperial College, ²Lympha Motus, Ltd.
- P3 Predicting Fracture Healing by Measuring Compliance Via Direct Electromagnetic Coupling** SB³C2023-PC07
Kevin M. Labus¹, Kirk C. McGilvray¹, Branislav Notaros¹, Milan Ilic², Julie Dunn³, Christian M. Puttlitz¹
¹Colorado State University, ²University of Belgrade, ³University of Colorado Health North
- P4 Tackling Antimalarial Drug Resistance in Africa Using Novel Drug Repurposing and Nanotechnology Strategies** SB³C2023-PC08
Samuel W. Uzundu, 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. Kovarovic¹, O.M. Rotman¹, M. Slepian², D. Bluestein¹
¹Stony Brook University, ²University of Arizona
- P10 Automatically perfusable human vessel chip platform for preclinical research in hazardous containment environments and space** SB³C2023-PC14
J. Eades¹, A. Kumar¹, A. Jain^{1,2}
¹Texas A&M University, ²Houston 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 Menon¹, Zachary Sexton¹, Owais Khan², Daniele Schiavazzi³, Koen Nieman¹, Alison Marden¹
¹Stanford University of Texas Dallas, ²Toronto Metropolitan University, ³University 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 Pierrat¹, David Perrin², Stéphane Avril¹
¹University of Lyon, ²Predisurge, ³University Tor Vergata, ⁴Universitat Politècnica de Catalunya, ⁵Gran Capità

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 Snee¹, R. McCarthy², P.E. McHugh¹, B. Fereidoonzhad³, J.P. McGarry¹
¹University of Galway, ²Cerenovus, ³TU Delft
- 10:00AM** **Using Bayes' Optimization For Inverse Finite Element Analysis Of The Tricuspid Valve In Hypoplastic Left Heart Syndrome** SB³C2023-338
Colton J. Ross¹, Jaden Norman¹, Arshid Mir¹, Harold M. Burkhart¹, Ming-Chen Hsu², Chung-Hao Lee¹
¹University of Oklahoma, ²Iowa State University
- 10:15AM** **Calcified Plaque Has A Local Effect On The Dissection Behavior Of Human Aortas** SB³C2023-563
Carly L. Donahue, Raturaj 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. LaBelle¹, Steve A. Maas¹, Adam Rauff¹, Gerard A. Ateshian², Jeffery A. Weiss¹
¹University of Utah, ²Columbia 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

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. Sebastian¹, G. Bailey¹, V. Kondiboyina¹, S. Dorairaj², R. Amini¹
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. White¹, Lily M. Buchanan², Niyousha Karbasian³, Matthew R. Bersi³, Maria Florian-Rodriguez⁴, 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 Dubik², Raffaella De Vita², Marianna Alperin³, Pamela A. Moalli¹, Steven D. Abramowitch¹
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

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

Engineered *In Vitro* Models

Gore AB

Session Chairs: Nathaniel Dymnt, *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. Xu¹, Jason A. Burdick^{1,2}, Robert L. Mauck¹
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, Beatrice-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 Saleemizadehparizi, 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 Siadat¹, Jacques A. Bertrand², Babak N. Safa¹, Darryl R. Overby², W. Daniel Stamer³, C. Ross Ethier¹
¹*Georgia Institute of Technology*, ²*Imperial College of London*, ³*Duke University*

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. Laforest¹, Michael W. Hast¹, David R. Steinberg^{1,2}, Robert L. Mauck^{1,2}
¹University of Pennsylvania, ²Corporal Michael J. Crescenz VA Medical Center
- 10:00AM** **Quantitative Raman Measurement Of Cartilage Composition Via Tissue Phantom Calibration** SB³C2023-461
Erik Erslund¹, Dev Mehrotra¹, Mark W. Grinstaff¹, Brian D. Snyder², Mads S. Bergholt³, Michael B. Albro¹
¹Boston University, ²Beth Israel Deaconess Medical Center, ³King's College London
- 10:15AM** **Decorin Maintains Cartilage Surface Integrity And Chondrocyte Mechanotransduction During Aging** SB³C2023-159
M. Fan¹, B. Kwok¹, P. Singh¹, J. Xiang¹, L. Qin², D.E. Birk³, R.V. Iozzo⁴, R.L. Mauck², L. Han¹
¹Drexel University, ²University of Pennsylvania, ³University of South Florida, ⁴Thomas 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. Rahman¹, Paul N. Watton², Corey P. Neu³, David M. Pierce¹
¹University of Connecticut, ²University of Sheffield, ³University 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

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-Castillo¹, Tanner Cabaniss¹, Bradley N. Bohnstedt², Chung-Hao Lee¹
¹University of Oklahoma, ²Indiana University
- 10:00AM** **Impacts Of Type V Collagen Insufficiency On Cutaneous Wound Healing And Scar Formation** SB³C2023-153
 Y. Liu¹, C. Wang¹, D.C. Stewart², E.M. O'Brien¹, B.K. Brisson², D.E. Birk³, K.L. Spiller¹, S.W. Volk², L. Han¹
¹Drexel University, ²University of Pennsylvania, ³University 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. Durr¹, Samuel D. Salinas², Rouzbeh Amini², Nic D. Leipzig¹
¹University of Akron, ²Northeastern 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 Miles¹, Tyler Tuttle¹, Julian Jimenez², Yifan Guo², Adrian Buganza-Tepole², Sarah Calve^{1,2}
¹University of Colorado, ²Purdue 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

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. Dong¹, J. Ferruzzi², M. Liu¹, L. Brewster³, R. Gleason¹
¹Georgia Institute of Technology, ²University of Texas, Dallas, ³Emory University
- 10:00AM** **Functional Differences in Human Aortic Valve Interstitial Cells from Patients with Varying Calcific Aortic Valve Disease** SB³C2023-458
R. Tuscher¹, A. Khang¹, T. West¹, G. Ferrari², M. Sacks¹
¹University of Texas, Austin, ²Columbia 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

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 Mantegazza¹, Nicolas Tobin², Keefe B. Manning², Brent A. Craven³
¹Polytechnic University of Bari, ²Pennsylvania State University, ³US 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. Consoli³, B. Murphy^{1,4}, R. McCarthy², C. Lally^{1,4}
¹Trinity College Dublin, ²Cerenovus, ³Hôpital Foch, ⁴RCSI & TCD
- 12:00PM Hematocrit Is A Potent Driver Of Platelet Adhesion At Supraphysiological Shear Rates** SB³C2023-126
C. Watson¹, K. Manning^{1,2}
¹Pennsylvania State University, ²Penn State Hershey Medical Center
- 12:15PM Computational Simulation Of Patient-Specific Blood Coagulation In Stent Thrombosis** SB³C2023-404
Janneke M.H. Cruts¹, Mohammad Rezeimoghaddam², Frans N. van de Vosse², Frank J.H. Gijssen^{1,3}
¹Erasmus Medical Center, ²Eindhoven University of Technology, ³Delft University of Technology
- 12:30PM Image driven simulation of hemodynamics around a dynamic clot in vivo** SB³C2023-566
Chayut Teeraratkul¹, Timothy J. Stalker², Maurizio Tomaiuolo³, Debanjan Mukherjee¹
¹University of Colorado, ²Thomas Jefferson University, ³Wills 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

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 Vandenbulcke¹, Paul Condron^{2,3}, Haribalan Kumar^{2,3,4}, Soroush Safaei³, Samantha Holdsworth^{2,3}, Joris Degroote¹, Patrick Segers¹
¹Ghent University, ²Tairāwhiti-Gisborne, ³University of Auckland, ⁴GE Healthcare
- 11:45AM** **Blood Flow Energy Profiles in Coronary Arteries Predict Myocardial Infarction** SB³C2023-309
M. Lodi Rizzini¹, A. Candreva^{1,2}, V. Mazzi¹, C. Chiastra¹, B. De Bruyne³, C. Collet³, D. Gallo¹, U. Morbiducci¹
¹Politecnico di Torino, ²Zurich University Hospital, ³OLV-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. Shahid¹, Matthew A. Culver¹, James P. Rice¹, Haben Berhane², Cynthia K. Rigsby³, Joshua D. Robinson³, Lindsay M. Griffin³, Michael Markl², Colleen M. Witzenburg¹, Alejandro Roldán-Alzate¹
¹University of Wisconsin-Madison, ²Northwestern University, ³Lurie 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. Baylous¹, Brandon J. Kovarovic¹, Salwa B. Anam¹, Ryan T. Helbock¹, Marvin J. Slepian², Danny Bluestein¹
¹Stony Brook University, ²University of Arizona
- 12:45AM** **A Computational Assessment of Stroke Predictors After Transcatheter Aortic Valve Replacement** SB³C2023-491
B. Vogl¹, Z. Wang², A. Chavez Ponce³, A. El Shaer³, M. Alkhouli³, H. Hatoum¹
¹Michigan Technological University, ²The Ohio State University, ³Mayo Clinic

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

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. Twohy¹, Grace McIlvain^{1,2}, Jeffrey M. Spielberg¹, Curtis L. Johnson¹
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. Triolo¹, O. Khagai², A. Alipour², T. Hedden², P. Balchandani², 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 Samman¹, Alaaddin Ibrahimy², Blaise Simplicie Talla Nwotchouang³, John N. Oshinski⁴, Daniel L. Barrow⁴, Philip A. Allen³, Rouzbeh Amini¹, Rafeeqe A. Bhadelia⁵, Francis Loth¹
¹*Northeastern University*, ²*Yale University*, ³*University of Akron*, ⁴*Emory University*, ⁵*Harvard*

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. Li¹, M. Fan¹, A. Porter², B. Kwok¹, C. Wang¹, D.E. Birk³, R.V. Iozzo⁴, X.L. Lu², R.L. Mauck⁵, L. Han¹
¹Drexel University, ²University of Delaware, ³University of South Florida, ⁴Thomas Jefferson University, ⁵University 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. Coleman¹, Vikram S. Deshpande², Patrick McGarry¹
¹University of Galway, ²University 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

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 Kazemi¹, Chenhao Yu¹, Farida Korna¹, Dev Mehrotra¹, Erik Ersland¹, Juncheng Zhang¹, Thomas P. Schaefer², Julie B. Engiles², Mark W. Grinstaff¹, Brian D. Snyder³, Mads S. Bergholt⁴, Michael B. Albro¹
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

Bioengineering Design I

Powell

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

- 11:30AM Photo-Curing Extracellular Matrix Sealant For Stopping Vascular Hemorrhage**
 SB³C2023-199
 Luke E. Schepers¹, Brooke L. Martindale², Alycia G. Berman², Hannah L. Cebull¹,
 William Van Alstine³, Sydney E. Hollingshead², Tyler Novak², Craig J. Goergen¹
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. Chrzan¹, Nicole D. Arnold¹, Kevin Chan², Tamara Reid Bush¹
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 Hu¹, Jessica E. Herrmann¹, Mark A. Skylar-Scott¹, Tain-Yen Hsia², Alison L.
 Marsden¹
¹*Stanford University*, ²*University of Central Florida*

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. Hiebing¹, Matthew A. Culver¹, John F. LaDisa Jr.², Colleen W. Witzenburg¹
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

**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 Geronzi¹, Antonio Martinez^{1,2}, Aline Bel-Brunon³, Michel Rochette², Marco Sensale², Pier Paolo Valentini¹, Marco E. Biancolini¹
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

**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 Mathur¹, Marcin Malinowski^{2,3}, Tomasz A. Timek³, Manuel K. Rausch¹
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

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

**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

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. Davis¹, Drew W. Koch¹, Grant M. Scull¹, Ashley C. Brown¹, Lauren V. Schnabel¹, Matthew B. Fisher^{1,2}
¹North Carolina State University, ²University 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 Kwok¹, Mingyue Fan¹, Prerana Singh¹, David Birk², Robert L. Mauck³, Nathaniel A. Dymant³, Eiki Koyama⁴, Lin Han¹
¹Drexel University, ²University of South Florida, ³University of Pennsylvania, ⁴Children'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. Dymant
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. Witt¹, Alan E. Woessner², Jacob Herrmann¹, Kyle P. Quinn², Edward A. Sander¹
¹University of Iowa, ²University of Arkansas
- 12:30PM** **Moderated TGF-Beta Delivery Via Latent TGF-Beta Conjugated Scaffolds For Improving Engineered Articular Cartilage** SB³C2023-214
Tiabai Wang¹, Zhonghao Dai¹, Celina C. Maldonado¹, Prem Nelesh¹, Junhan Liao¹, Sung Yeon Kim¹, Andrew Martin¹, Joanne E. Murphy-Ullrich², Mark W. Grinstaff¹, Michael B. Albro¹,
¹Boston University, ²University of Alabama

**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. Lamia¹, Carol S. Davis¹, Peter C.D. Macpherson¹, T. Bradley Willingham², Yingfan Zhang², Chengyu Liu², Susan V. Brooks¹, Brian Glancy², Megan L. Killian¹
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 Dymant, 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

**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 Ramahdita¹, Xiangjun Peng¹, Mohammad Jafari², David Schuftan¹, Guy M. Genin¹, Farid Alisafaei², Nathaniel Huebsch¹
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. Huff¹, Frederick C. Houghton¹, Conner C. Earl², Elnaz Ghajar-Rahimi², Ishan Dogra¹, Andrew J. Darling², Frederick W. Damen², Guoyang Zhou², Denny Yu², Craig J. Goergen², 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 Hong¹, Xiangjun Peng¹, Haomin Yu¹, Mohammad Jafari², Delaram Shakiba¹, Jacob Sandler¹, Kenneth M. Pryse¹, Justin M. Sacks¹, Elliot L. Elson¹, Guy M. Genin¹, 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

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 hemodynamic forces with patterns of coronary artery disease and atherosclerotic plaque phenotypes SB³C2023-370**
Diego Gallo¹, Alessandro Candreva¹, Maurizio Lodi Rizzini¹, Valentina Mazzi¹, Daniel Munhoz², Jean Paul Aben³, Bernard De Bruyne², Claudio Chiastra¹, Carlos Collet², Umberto Morbiducci¹
¹Politecnico di Torino, ²OLV-Clinic, ³Pie 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. Cebull¹, S. Hashemi², K. Porte¹, J. Oshinski^{1,3}, B.G. Leshnower¹, M. Piccinelli¹
¹Emory University, ²Children's Healthcare of Atlanta, ³Georgia Institute of Technology
- 2:15PM Predicting Hemodynamic Outcomes In Patients With Borderline Left Ventricles Under Uncertainty SB³C2023-156**
Yurui Chen¹, Isao A. Anzai¹, Justin S. Tran², David M. Kalfa¹, Vijay Vedula¹
¹Columbia University, ²California State University
- 2:30PM Non-Invasive Estimation of Pressure Drop Across Aortic Coarctation SB³C2023-149**
Priya J. Nair¹, Martin R. Pfaller¹, Seraina A. Dual², Doff B. McElhinney¹, Daniel B. Ennis¹, Alison L. Marsden¹
¹Stanford University, ²KTH 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 Mohsenian¹, Alaaddin Ibrahimy², John N. Oshinski³, Blaise Simplicie Talla Nwotchuang⁴, Rafeeqe A. Bhadelia⁵, Daniel L. Barrow³, Rouzbeh Amini¹, Francis Loth¹
¹Northeastern University, ²Yale University, ³Emory University, ⁴University of Akron, ⁵Harvard Medical School
- 3:00PM High-Fidelity Fluid-Structure-Interaction Modelling Explains Flow-induced Bruits and Murmurs in Cerebral Aneurysms SB³C2023-205**
David A. Bruneau¹, Kristian Valen-Sendstad², David A. Steinman¹
¹University of Toronto, ²Simula Research Laboratory

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}
¹University of Toronto, ²Ted 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 Klein², John N. Oshinski¹, Tiziano Passerini²
¹Georgia Institute of Technology, ²Siemens 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 Zambon¹, Marachiara Arminio¹, David A. Steinman², Claudio Chiastra¹, Umberto Morbiducci¹, Diego Gallo¹
¹Politecnico di Torino, ²University of Toronto
- 2:45PM** **Quantification Of Embolus Transport To The Brain From Carotid Stenosis Sites** SB³C2023-497
Ricardo Roopnarinesingh¹, Neel Jani², Michelle Leppert¹, Debanjan Mukherjee¹
¹University of Colorado, ²University 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

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 Hackett¹, Teseo Schneider², Zachary Ferguson³, Daniele Panozzo³, Denis Zorin³, Pamela Moalli¹, Steven Abramowitch¹
¹University of Pittsburgh, ²University of Victoria, ³New York University
- 2:00PM** **Modelling Of The Uterosacral Ligament Suggests Changes In Microarchitecture During Pregnancy** SB³C2023-179
 Lea M. Savard¹, Catalina S. Bastías¹, Kathleen Connell¹, Sarah Calve¹, Callan M. Luetkemeyer², Virginia L. Ferguson¹, Bruce Simon², William Wagner¹, Jonathan Vande Geest¹
¹University of Colorado, ²University of Illinois
- 2:15PM** **Biaxial Contractility Of The Murine Cervix With Elastic Fiber Deficiency** SB³C2023-512
 Mari J.E. Domingo¹, Avery G. Franques¹, Qinhan Zhou², Kristin S. Miller²
¹Tulane University, ²University of Texas
- 2:30PM** **Time-Dependent Material Properties Of Nonhuman Primate Uterine Layers Through Gestation** SB³C2023-529
 Daniella M. Fodera¹, Echo Z. Xu¹, Shuyang Fang¹, Ivan Rosado-Mendez², Timothy Hall², Helen Feltovich^{2,3}, Michelle L. Oyen⁴, Kristin M. Myers¹
¹Columbia University, ²University of Wisconsin-Madison, ³Mount Sinai, ⁴Washington 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. Suarez¹, Clara J. Gimenez¹, Jennifer M. Munson¹, Kristin S. Miller², Kristin M. Myers³, Steven D. Abramowitch⁴, Raffaella De Vita¹
¹Virginia Tech, ²University of Texas, ³Columbia University, ⁴University of Pittsburgh
- 3:00PM** **Diffusion MRI Characterizes Microstructural Changes Of The Cervix During Pregnancy** SB³C2023-592
 Noel Naughton¹, Amir Ostadi Moghaddam¹, Mariana Kersh¹, Sanmi Koyejo², Amy Wagoner Johnson¹, Bruce Damon^{1,3}
¹University of Illinois, ²Stanford University, ³Carle Health

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. Watson¹, Willy V. Bonneuil¹, James Marshall¹, Peter Xie¹, Thomas Adam¹, Jennifer Frattolin¹, Matthew J. Russell², Francesca Fasanella Masci³, Angela E. Goode¹, Shafa Balaram¹, Alexandra E. Porter¹, Anil A. Bharath¹, Bindi S. Brook², Robert J.B. Nibbs³, James E. Moore Jr¹
¹Imperial College London, ²Nottingham University, ³Glasgow 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 Levi¹, Yevgeniy Kreinin¹, Ido Rachbuch¹, Perla Namour¹, Josué Sznitman¹, Meinrad Gawaz², Netanel Korin¹
¹Technion – IIT, ²Univesrity 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

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 Mancino³, Josh Choe⁴, Gianluca Fontana⁴, Johnny Huard¹, William Murphy⁴, Francesca Taraballi³, Nicole Ehrhart², Chelsea Bahney^{1,2,5}
¹Steadman Philippon Research Institute, ²Colorado State University, ³Houston Methodist, ⁴University of Wisconsin-Madison, ⁵University 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
¹University of Colorado, ²Colorado 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. Assi¹, Elizabeth Bernstein¹, Edward D. Bonnevie^{1,2}, Emily E. Sharp¹, Ryan C. Locke^{1,2}, Robert L. Mauck^{1,2}
¹University of Pennsylvania, ²Crescenz VA Medical Center
- 2:45PM Viscoelasticity and Micro-phase Separation Mediate Meniscal Cell Migration through Hyaluronic Acid Hydrogels** SB³C2023-138
Karen L. Xu¹, Hooman Fallahi², Lin Han², Robert L. Mauck¹, Jason A. Burdick^{1,3}
¹University of Pennsylvania, ²Drexel University, ³Univesrity of Colorado
- 3:00PM Sustained-release losartan from peptide nanofibers promotes chondrogenesis** SB³C2023-485
Kohei Yamaura¹, Nicholas A. Sather², Anna Metlushko², Haruki Nishimura¹, Radoslav Z. Pavlović², Sealy Hambricht¹, Sudheer K. Ravuri¹, Marc J. Philippon^{1,3}, Samuel I. Stupp², Chelsea S. Bahney^{1,4}, Johnny Huard¹
¹Steadman Philippon Research Institute, ²Northwestern University, ³Steadman Clinic, ⁴University of California, San Francisco

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. Ballarin², A. Veneziani³, L. Dasi¹
¹Georgia Institute of Technology, ²Università Cattolica del Sacro Cuore, ³Emory University
- 2:00PM** **Predicting Long-term Patient-Specific Outcome Of Cardiac Resynchronization Therapy Using A Fast Computational Model** SB³C2023-249
Clara E. Jones¹, Derek J. Bivona², Kenneth C. Bilchick², Pim J.A. Oomen¹
¹University of California, Irvine, ²University of Arizona
- 2:15PM** **Aortic Wall Stress Concentration As A Predictor Of Type A Aortic Dissection** SB³C2023-351
Christina Sun¹, Tongran Qin¹, Asanish Kalyanasundaram², Wei Sun¹, John Elefteriades², Liang Liang³
¹Lake Forest, ²Yale University, ³University 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

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. Zakrajsek¹, Marty O. Visscher¹, Vivek Narendran^{1,2}, Eric A. Nauman¹
¹University of Cincinnati, ²Cincinnati 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 Sidiropoulos¹, Brad D. Hendershot², Jonathan Gladish², David Herlihy^{1,3}, Jason Maikos¹
¹New York Harbor Healthcare System, ²Extremity Trauma and Amputation Center of Excellence, ³Narrows 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 Herlihy¹, John Chomack², Jason Maikos²
¹Narrows Institute of Biomedical Research and Education, ²New 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. Hayden¹, Deirdre Murray^{1,2}, Dara Meldrum¹, Dermot Geraghty¹, Orla Hardiman^{1,2}, Bruce P. Murphy¹
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. Odanye¹, Emily E. Steffensen¹, Christopher J. Burcal¹, Aaron D. Likens¹, Elisa S. Arch², Brian A. Knarr¹
¹University of Nebraska, ²University of Delaware

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 Snider¹, Zachary Tentor², Yujun Xu¹, Matthew R. Bersi¹
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 Crielaard¹, Tamar B. Wissing^{1,2}, Su Guvenir Torun¹, Pablo de Miguel^{1,3}, Gert-Jan Kremers¹, Frank J.H. Gijssen^{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

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. Vogl¹, S. Lilly², V. Thourani³, M. Alkhouli⁴, B. Lindman⁵, H. Hatoum¹
¹Michigan Technological University, ²The Ohio State University, ³Piedmont Heart Institute, ⁴Mayo Clinic, ⁵Vanderbilt 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 Khair¹, Sanchita Bhat², Katie Vinterella², Satheesh Kumar Harikrishnan², Lakshmi Prasad Dasi², Susan James¹
¹Colorado State University, ²Georgia 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 Reza¹, David Oks², Brandon Kovarovic¹, Mariano Vázquez², Danny Bluestein¹
¹Stony Brook University, ²Computer Applications in Science and Engineering

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. Shammass, 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 Husain¹, Noah Egnatis¹, Karol Calò², Diego Gallo², Umberto Morbiducci², Peter Coppin³, David A. Steinman¹
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 Elsayah, 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. Ballarin³, T. Iliescu⁴, O. San⁵, L. Dasi¹, A. Wei⁶, A. Veneziani²
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 Gasparotti¹, Emanuele Vignali¹, Miquel Aguirre², Stéphane Avril², Simona Celi¹
¹*BioCardioLab*, ²*INSERM*, ³*PrediSurge*

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

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. Binder², Destiny R. Mason^{1,2}, John P. Patalak³, Matthew G. Harper³, Jillian E. Urban^{1,2}, Joel D. Stitzel^{1,2}
¹Virginia Tech-Wake Forest, ²Wake Forest School of Medicine, ³National 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 Lu¹, Andy Knutsen¹, Ahmed Alshareef¹, Wen-Tung Wang², Joy Mojumder², Jerry L. Prince³, Philip Bayly⁴, John A. Butman², Dzung L. Pham^{2,5}
¹Henry M Jackson Foundation for the Advancement of Military Medicine, ²National Institutes of Health, ³Johns Hopkins University, ⁴Washington University at St. Louis, ⁵Uniformed Services University
- 4:00PM Non-Concussive Head Impact Kinematics And Brain Strain Distribution In Collegiate Football** SB³C2023-344
Enora Le Flao¹, Xianghao Zhan¹, Nicholas J. Cecchi¹, Yuzhe Liu¹, Ashlyn A. Callan¹, Landon P. Watson¹, Collin Pang¹, Gerald A. Grant^{1,2}, Michael M. Zeineh¹, David B. Camarillo¹
¹Stanford University, ²Duke 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. Shah¹, Narayan Yoganandan¹, Mary F. Otterson¹, Brian D. Stemper¹, Joost Op't Eynde², Cameron D. Bass², Justin McMahan³, Robert S. Salzar³, B. Joseph McEntire⁴
¹Medical College of Wisconsin, ²Duke University, ³University of Virginia, ⁴US Army Aeromedical Research Laboratory

Biophysical Effects on Cells and Tissues

Gore AB

Session Chairs: Sarah Calve, *University of Colorado*
Victor Varnier, *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. Coleman¹, Vikram S. Deshpande², Patrick McGarry¹
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

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 Almasi¹, Tim Ricken², David M. Pierce¹
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. Salbego¹, J. Roth¹, P. Lang¹
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 Kakaletsis¹, Emma Lejeun², Manuel Rausch¹
¹*University of Texas at Austin*, ²*Boston University*

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. Bracamonte¹, L. Watkins², J. Saucerman², J. Holmes¹
¹University of Alabama at Birmingham, ²University of Virginia
- 3:45PM** **Computational Modeling Of Arterial Growth And Remodeling Including Mechanosensitive Notch Signaling** SB³C2023-420
Jordy van Asten¹, Marcos Latorre³, Cansu Karakaya¹, Frank Baaijens¹, Cecilia^{1,3}, Tommaso Ristori¹, Jay Humphrey⁴, Sandra Loerakker¹
¹Eindhoven University of Technology, ²Universitat Politècnica de València, ³Åbo Akademi, ⁴Yale 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

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 Mukherjee¹, Sakthivel Sadayappan², Reza Avazmohammadi^{1,3}
¹Texas A&M, ²University of Cincinnati, ³Houston 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-Rahimi¹, Frederick W. Damen^{1,2}, Benjamin J. Landis², Craig J. Goergen^{1,2}
¹Prudue University, ²Indiana University
- 4:15PM** **3D Passive Strain Mapping of the Embryonic Zebrafish heart** SB³C2023-587
Alex L. Gendernalik^{1,2}, David Bark^{1,2}
¹Colorado State University, ²Washington University
- 4:30PM** **Computational modeling study of the effects of pulmonary hypertension on right heart perfusion** SB³C2023-024
Lei Fan¹, Jenny S. Choy², Ghassan S. Kassab², Lik Chuan Lee¹
¹Michigan State University, ²California Medical Innovations Institute
- 4:45PM** **Imaging And Mechanical Characterization Of Human Blood Clot Analogues With Different Compositions And Degrees Of Contraction** SB³C2023-395
Rachel Cahalane¹, Janneke M.H. Cruts¹, Ahlam Rachid², Kim van Gaalen¹, Heleen M.M. van Beusekom¹, Moniek de Maat¹, Marcel L. Kijkshoorn¹, Nikki Boodt¹, Aad van der Lugt¹, Frank Gijsen^{1,3}
¹Erasmus Medical Center, ²Eindhoven University of Technology, ³Delft University of Technology

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. Anam¹, B. Kovarovic¹, A. Hamdan², R. Haj-Ali³, D. Bluestein¹
¹Stony Brook University, ²Rabin Medical Center, ³Tel-Aviv University
- 2:00PM In Silico Investigation on Stroke Risks from Left Ventricular Assist Device**
SB³C2023-538
Sreeparna Majee¹, Akshita Sahni¹, Erin E. McIntyre¹, Jay D. Pal², Debanjan Mukherjee¹
¹University of Colorado, ²University of Washington
- 2:15PM Hemodynamic Performance Of Dual Lumen VV ECMO Cannulas** SB³C2023-284
Louis P. Parker¹, Anders Svensson Marcial², Torkel B. Brismar², Lars Mikael Broman^{2,3}, Lisa Prohl Wittberg¹
¹Royal Institute of Technology, ²Karolinska Institute, ³Karolinska 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. Vogl¹, A. Chavez Ponce², A. El Shaer², A. Bavo³, M. De Buele³, M. Alkhouli², H. Hatoum¹
¹Michigan Technological University, ²Mayo Clinic, ³FEops
- 3:00PM Development Of A Novel Polymeric TAVR Valve: Design Optimization And Addressing TAVR Clinical Complications** SB³C2023-408
B. Kovarovic¹, R. Helbock¹, O.M. Rotman¹, K. Baylous¹, M. Slepian², D. Bluestein¹
¹Stony Brook University, ²University of Arizona

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 Rahimnezhad¹, Karin G. Silbernagel², Daniel H. Cortes¹
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 Vigdorichik, 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 Arthroplasty: 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. Lemus¹, Mallory Volz¹, Francisco Beron-Vera¹, Mitchell Hurtado¹, Eduard Tiozzo¹, Arlette Perry¹, Thomas M. Best^{1,2}, Francesco Travascio^{1,3}
¹*University of Miami*, ²*UHealth Sports Medicine*, ³*Mount Sinai*

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. David¹, Tillman James², Douglas J. Adams¹
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. Sattari¹, CA. Mariano¹, T. Sigaeva², M. Eskandari¹
¹*University of California, Riverside*, ²*University of Waterloo*
- 3:00PM Integrated Right Ventricular-Pulmonary Artery Biomechanics In Pulmonary Hypertension** SB³C2023-197
Sunder Neelakantan¹, Peng Zhang^{2,3}, Gaurav Choudhary^{2,3}, Reza Avazmohammadi¹
¹*Texas A&M University*, ²*Providence VA Med Center*, ³*Brown University*

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. Frattolin¹, D.J. Watson¹, W.V. Bonneuil¹, F. Fasanella Masci², M. Russell³, B.S. Brook³, R.J.B. Nibbs², J.E. Moore Jr¹
¹Imperial College London, ²University of Glasgow, ³University 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. Russell¹, Francesca Fasanella Masci², Willy V. Bonneuil³, Daniel J. Watson⁴, Jennifer Frattolin⁴, James E. Moore Jr.⁴, Robert J.B. Nibbs², Bindi S. Brook¹
¹University of Nottingham, ²University of Glasgow, ³KTH Royal Institute of Technology, ⁴Imperial 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
¹University of Pittsburgh, ²Purdue University

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. Lichtenberg¹, Trey P. Redman¹, Ella Ramamurthy^{1,2}, Christopher A. Lemmon¹, Priscilla Y. Hwang¹
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. Patel¹, T. Li¹, J. Duggan¹, S.M. Kallish², K.L. Spiller¹, R.J. Petrie¹, L. Han¹
¹*Drexel University*, ²*University 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

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 Porter¹, Michael Santare¹, Lin Han², John Peloquin¹, X. Lucas Lu¹
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

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. Salinas¹, Ana I. Vargas¹, Turner Jennings¹, Sean Harington¹, Mohammad J. Sadeghinia², Mojgan Y. Jacobsen³, Trine Eide³, Cecilie Udberg-Helle³, Torill Andersen Eidsvaag⁴, Torjer A. Olsen⁵, Jonathan Crossen⁵, Victorien Prot², Bjørn H. Skallerud², Rouzbeh Amini¹
¹Northeastern University, ²Norwegian University of Science and Technology, ³Kinn Education and Resource Centre, ⁴Univesrity of Bergen, ⁵UiT 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. Rich¹, S. Johnson¹, C. Bellini²
¹Tatum Robotics, ²Northeastern 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

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 Behrangzade¹, Sang-Ho Ye^{1,2}, William R. Wagner^{1,2}, Jonathan P. Vande Geest^{1,2,3}
¹University of Pittsburgh, ²McGowan Institute for Regenerative Medicine, ³Vascular 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. McMahan¹, Alan Taylor¹, Duc Khang Chung¹, Jiazhu Xu¹, Matthias Peltz², Pietro Bajona^{1,2}, Yi Hong¹, Jun Liao¹
¹University of Texas, ²Drexel University
- 3:00PM** **Comparison of some novel 1D implementations of hyperelastic arterial models with 3D approaches for a cylindrical test case** SB³C2023-453
 Jacob Sturdy¹, Friederike Schäfer¹, Aleksander Sinek^{1,2}, Mateusz Mesek^{1,2}, Marek Rojczyk², Wojciech P. Adamczyk², Bartłomiej Melka², Ziemowit Ostrowski², Ryszard Bialecki²
¹Norwegian University of Science and Technology, ²Silesian University of Technology

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 Yamamoto¹, David Bruneau², David Steinman², Kristian Valen-Sendstad¹
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 Madekurozwa¹, Nicholas Tolman², Simon W. John², Darryl R. Overby², Joseph van Batenburg-Sherwood¹
¹*Imperial College London*, ²*Columbia University*
- 4:30PM** **Left Renal Vein Stenosis Alters Renal Venous Impedance During Murine Pregnancy** SB³C2023-200
Jennifer L. Anderson¹, Riley L. Holloway¹, Paula A. Torres Loza^{1,2}, David G. Reuter³, Craig J. Goergen¹
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

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 Mena¹, Diana Yeritsyan¹, Daniela Caro¹, Kaveh Momenzadeh¹, Joseph P. DeAngelis², Arun J. Ramappa², 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. Johnson¹, Natalie Fogarty¹, Alisia Lin¹, Tonia K. Tsinman¹, Xi Jiang¹, Eiki Koyama², Lin Han³, Josh R. Baxter¹, Robert L. Mauck¹, Nathaniel A. Dymant¹
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

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 Herrmann¹, Yuqing Deng², Béla Suki²
¹University of Iowa, ²Boston University
- 3:45PM** **Determining Strains From Intact Airway Inflation Tests As Compared To Isolated Uniaxial And Biaxial Tensile Tissue Testing** SB³C2023-166
Crystal A. Mariano¹, Stanislav Polzer², Mona Eskandari¹
¹University of California, Riverside, ²VSB-Technical University of Ostrava
- 4:00PM** **PolyFEM: Finite Element Solver For Complex Biomechanics Problems** SB³C2023-441
Pranav Jain¹, Liam Martin², Zachary Ferguson¹, Torkan Gholamalizadeh³, Faezeh Moshfeghifar⁴, Kenny Erleben⁴, Steven Abramowitch², Daniele Panozzo¹, Teseo Schneider⁵
¹New York University, ²University of Pittsburgh, ³Shape ApS, ⁴University of Copenhagen, ⁵University 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
¹Columbia University, ²Washington 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

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. Boiczuk, 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. Escarcega¹, A.A. Alshareef², A.K. Knutsen², R.J. Okamoto¹, P.V. Bayly¹
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. Rezarayaghi¹, E. Triolo², C. Neher¹, 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 Mojumder¹, Suhas Vidhate², Yuan-Chiao Lu^{1,3}, Ahmed Alshareef^{3,4}, Curtis L. Johnson⁵, Dzung L. Pham^{1,6}, John A. Butman¹
¹*National Institutes of Health*, ²*Intuitive Surgical, Inc.*, ³*Henry M. Jackson Foundation*, ⁴*University of 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 Wang¹, Charlotte A. Guertler¹, Ruth J. Okamoto¹, Curtis L. Johnson², Matthew D.J. McGarry³, Philip V. Bayly¹
¹*Washington University in St. Louis*, ²*Delaware University*, ³*Dartmouth College*

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 Kandalaf, 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 Qu¹, Shumeng Jiang¹, Farid Alisafaei², Jeffrey H Miner¹, Hani Y. Suleiman¹, Guy M. Genin¹
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

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. Loss¹, Robb W. Colbrunn¹, Kevin J. Lawson²
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 Lim¹, Joanna E. Veres¹, Eduardo A.C. Almeida², Grace D. O'Connell¹
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 Kurtaliaj¹, Jennifer Kunes¹, K. Michael Rowley^{2,3}, Lynn Ann Forrester¹, Mikhail Golman¹, Guy M. Genin⁴, Sharon M. Swarz², Stavros Thomopoulos¹
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 Glenday¹, Benjamin Johnston², Fernando Quevedo Gonzalez¹, Lawrence Gulotta¹, Andreas Kontaxis¹
¹*Hospital for Special Surgery*, ²*Cornell University*

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. Focht¹, Dennis M. Minton^{2,3}, Adam B. Salmon^{4,5}, Adam R. Konopka^{2,3}, Mariana E. Kersh¹
¹University of Illinois, ²University of Wisconsin-Madison, ³William S. Middleton Memorial Veterans Hospital, ⁴University of Texas, ⁵Audie 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 Han¹, Kaleem Ahmed², Arun Gosain², Taeksang Lee³, Adrian Buganza Tepole¹
¹Purdue University, ²Northwestern University, ³Myongji University
- 4:15PM** **Telocollagen Injectable Significantly Improves Supraspinatus Tendon Mechanical Strength After Full-Tendon Tear in Rats** SB³C2023-553
 Alexandra A. Silverman¹, Nicolo Rossi², Jeffrey A. Paten¹, Mark A. Randolph², Luke S. Oh^{2,3}, Jeffrey W. Ruberti¹
¹Northeastern University, ²Massachusetts General Hospital, ³Rothman Orthopaedics
- 4:30PM** **Computational Analysis of Heart Valve Growth and Remodeling in Pulmonary Autografts after the Ross Procedure** SB³C2023-292
 Elmer Middendorp¹, Fabian Bräu^{2,3}, Frank P.T. Baaijens¹, Jay D. Humphrey⁴, Christian J. Cyron^{5,6}, Sandra Loerakker¹
¹Eindhoven University of Technology, ²Singapore National Eye Center, ³Singapore-MIT Alliance for Research and Technology, ⁴Yale University, ⁵Hamburg University of Technology, ⁶Helmholtz-Zentrum
- 4:45PM** **Identifying Contributors to Aneurysmal Progression in the Marfan Aorta Using a Constrained Mixture Model** SB³C2023-295
 David S. Li¹, Cristina Cavinato², Marcos Latorre³, Jay D. Humphrey¹
¹Yale University, ²Univerity of Montpellier, ³Valencia Polytechnic University

Noninvasive Metrics for Cardio. Biomechanics

Zermatt

Session Chairs: Aaron Brown, *Stanford University*
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. Satriano², R.A. Beddoes², R.D. Moore¹, E.S. Di Martino^{1,2}
¹University of Calgary, ²ViTAA 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. Omoto³, Karthik Annamalai¹, Alyssa Richards¹, Samuel X. Zhang¹, Adalyn M. Meeks¹, Alexandre A. de Silva³, 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 Wiputra¹, Sydney Q. Clark², Craig J. Goergen², Matthew R. Bersi³, Victor H. Barocas¹
¹University of Minnesota, ²Purdue University, ³Washington University in St. Louis
- 4:15PM Procedural Strategy Impact On Outcomes Of Transcatheter Aortic Valve Replacement For Bicuspid Aortic Valves** SB³C2023-131
Breandan Yeats¹, Sri Krishna Sivakumar¹, Milad Samaee¹, Pradeep Yadav², Venkateshwar Polsani², Vinod Thourani², Stephanie Sellers³, Janarthanan Sathananthan³, Lakshmi Dasi¹
¹Georgia Tech & Emory University, ²Piedmont Heart Institute, ³University 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
¹University of Texas at San Antonio, ²Southwest Research Institute
- 4:45PM Evaluating the use of Elastic Registration for Determining Atrioventricular Valve Annulus Mechanics** SB³C2023-390
Devin W. Laurence¹, Christian Herz¹, Silvani Amin¹, Ana Sulentic¹, Patricia Sabin¹, Andras Lasso², Matthew A. Jolley¹
¹Children's Hospital of Philadelphia, ²Queen'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. Ajiboye¹, Navaneeth Chandran¹, Michael D. Taylor², Rupak K. Banerjee¹
¹University of Cincinnati, ²Cincinnati 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 Gangwar¹, Zonghu Han¹, Mikaela Hintz¹, Jacqueline L. Pasek-Allen¹, Robert C. Goldstein², Michael L. Etheridge¹, John C. Bischof¹
¹University of Minnesota, ²AMF 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. Arnold¹, Adam J. Chrzan¹, Kevin Chan², Tamara Reid Bush¹
¹Michigan State University, ²Spectrum 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 Fiusco¹, Lars Mikael Broman^{2,3}, Lisa Prahli Wittberg¹
¹KTH Royal Institute of Technology, ²Astrid Lindgren's Children's Hospital, ³Karolinska Institutet
- P16 Post-MitraClip Mitral Valve Gradient with MitraClip G4** SB³C2023-326
Shelley C. Gooden¹, Mani A. Vannan², Konstantinos D. Boudoulas³, Vinod H. Thourani², Pradeep K. Yadav², Lakshmi P. Dasi¹
¹Georgia Institute of Technology, ²Piedmont Heart Institute, ³Wexner 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 Balasubramanya¹, Lise Gheysen¹, Nele Famaey², Joris Degroote¹, Patrick Segers¹
¹Ghent University, ²KU 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. Vogl¹, R. Gadhav¹, Z. Wang², A. Chavez Ponce³, A. El Shaer³, M. Alkhouli³, H. Hatoum¹
¹Michigan Technological University, ²The Ohio State, ³Mayo Clinic
- P20 Vorticity Transport In Aneurysms Of The Abdominal Aorta** SB³C2023-356
Valentina Mazzi¹, Karol Calò¹, Maurizio Lodi Rizzini¹, Ludovica Saccaro^{2,3}, Diego Gallo¹, Angelo Iollo^{2,3}, Umberto Morbiducci¹
¹Politecnico di Torino, ²Université de Bordeaux, ³Inria-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 Vignali³, Katia Capellini³, Claire Morin², Stéphane Avril², Emiliano Costa¹, Simona Celi³
¹RINA Consulting SpA, ²INSERM, ³BioCardioLab
- P22 A Fluid-Solid-Growth Framework For Simulating Patient-Specific Vascular Growth And Remodeling Using Constrained Mixture Theory** SB³C2023-268
Erica L. Schwarz¹, Martin R. Pfaller¹, Jason Szafron¹, Christopher Breuer², Jay D. Humphrey³, Alison L. Marsden¹
¹Stanford University, ²Nationwide Children's Hospital, ³Yale 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 Bhardwaj¹, Brent A. Craven², Jacob E. Sever¹, Francesco Costanzo¹, Scott D. Simon¹, Keefe B. Manning¹
¹Pennsylvania State University, ²US 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. Seresti¹, Alison L. Marsden², Andrew M. Kahn³, M. Owais Khan¹
¹Toronto Metropolitan University, ²Stanford 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. Faghih¹, Brent A. Craven¹, M. Keith Sharp²
¹US FDA, ²University of Louisville
- P29 Endothelial Nuclear Morphology is Incrementally Sensitive to Shear Stress Magnitude and Directionality** SB³C2023-515
Jaideep Sahni¹, Mehwish Arshad², Peter D. Weinberg², Ryan M. Pedrighi¹
¹University of Nebraska-Lincoln, ²Imperial 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. Wang¹, J. Lang², R. Nathan³, Q. Wu¹
¹Villanova University, ²Southeast University, ³Pennsylvania State University

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- 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 Torun¹, B. Kaaij^{1,2}, P. de Miguel Munoz^{1,2}, H. Crielaard¹, H.J.M. Verhagen¹, G.J. Kremers¹, A.F.W. van der Steen¹, A.C. Akyildiz^{1,2}
¹Erasmus Medical Center, ²Delft 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 Silverman³, John N. Oshinski^{1,3}, Muralidhar Padala^{2,3}
¹Georgia Institute of Technology, ²Carlyle Fraser Heart Center, ³Emory University
- P38 Computational Assessment of Elastin in a Hybrid Modelling Approach of Arterial Biomechanics** SB³C2023-321
Yousof MA. Abdel-Raouf¹, Mathias Peirlinck², Nele Famaey³, Patrick Sips¹, Patrick Segers¹
¹Ghent University, ²Delft University of Technology, ³KU 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 Clarin¹, Keyvan Amini Khoiy², Samuel D. Salinas¹, Dipankar Biswas², Kourosh T. Asgarian³, Francis Loth¹, Rouzbeh Amini¹
¹Northeastern University, ²The University of Akron, ³Jersey 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 Johnston¹, Damien P. Kenny^{2,3}, Caitriona Lally¹
¹Trinity College Dublin, ²Royal College of Surgeons, ³Children's Health Ireland

- P45 Ultrasound Imaging To Characterize Inflated Atherosclerotic Plaques** SB³C2023-327
 Yasmine Guendouz¹, Brooke Tronifoglio¹, Sherif Sultan^{2,3}, Niamh Hynes^{2,3}, Cleona Gray⁴,
 Caitriona Lally¹
*¹Trinity College Dublin, ²University Hospital Galway, ³Galway Clinic, ⁴Mater Misericordiae
 University Hospital*
- P46 Design, Computational And Experimental Evaluation, And 3D Printing Of Patient Specific
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 Robert D. Johnston¹, Niall Linnane^{1,2,3}, Samuel Geraghty¹, Conor O’Keeffe¹, Shirsha Bose¹,
 Damien Kenny³, Caitriona Lally¹
¹Trinity College Dublin, ²Royal College of Surgeons, ³Children’s Health Ireland at Crumlin
- P47 Using A Three-Dimensional Biventricular Mathematical Model To Help Understand Sex
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 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. Ross¹, Arshid Mir¹, Harold M. Burkhart¹, Ming-Chen Hsu², Devin W. Laurence³,
 Chung-Hao Lee¹
¹University of Oklahoma, ²Iowa State University, ³Children’s Hospital of Philadelphia
- P51 Patient-Specific Predictive Simulation of Transcatheter Edge-to-Edge Repair in Humans
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 Natalie T. Simonian¹, Sneha Vakamudi², Mark J. Pirwitz², Alison M. Pouch³, Joseph H.
 Gormann, III³, Robert C. Gorman³, Michael S. Sacks¹
¹University of Texas at Austin, ²Ascension Texas Cardiovascular, ³University of Pennsylvania
- P52 Comparing The Elastic And Fracture Properties Between Fibrin And Whole Blood**
 SB³C2023-407
 Grace N. Bechtel¹, Gabrielle P. Sugerman¹, Sapun H. Parekh¹, Manuel K. Rausch^{1,2}
¹University of Texas at Austin, ²Oden Institute for Computational Engineering and Sciences

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- P53 Effect Of Muscle Activation on Head-Neck Response in Simulated Frontal Impact Compared To A Unique Military Data Set** SB³C2023-072
Jesse W. Gerring^{1,2}, Karthik Somasundaram^{1,2}, Frank Pintar^{1,2}
¹Medical College of Wisconsin and Marquette University of Tennessee, ²VA 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. Okamoto¹, Jordan D. Escarcega¹, Ahmed Alshareef², Curtis Johnson³, Philip V. Bayly¹
¹Washington University, ²Henry M. Jackson Foundation for the Advancement of Military Medicine, ³University of Delaware

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- P57 Raman Specroscopic Probe Predicts The Composition And Functional Mechanical Properties Of The Intervertebral Disc** SB³C2023-550
Chenhao Yu¹, Masumeh Kazemi¹, Farida Korna¹, Erik E. Erslund¹, Mark W. Grinstaff¹, Thomas P. Schaer², Mads S. Bergholt³, Edward J. Vresilovic⁴, Brian D. Snyder⁵, Michael B. Albro¹
¹Boston University, ²University of Pennsylvania, ³King's College London, ⁴University of Delaware, ⁵Beth Israel Deaconess Medical Center
- P58 The Effectiveness of Custom ACL Bracing in Adolescent Populations: A Finite Element Analysis** SB³C2023-009
Alexandria D. Mallinos¹, Brian L. Davis¹, Kerwyn C. Jones²
¹Cleveland State University, ¹Akron Children's Hospital
- P59 Bendable Osteochondral Allografts for Improved Congruence: Comparison of Computational and Cadaveric Models** SB³C2023-194
Katherine A. Spack¹, Courtney A. Petersen¹, Peter T. Shyu¹, Edward Guo¹, James T. Cook², Melvin P. Rosenwasser¹, Clark T. Hung¹, Gerard A. Ateshian¹
¹Columbia University, ²University 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. Frazer⁴, N. Yoganandan^{1,2}, B.S. Shender³, J.B. Sheehy³, G. Paskoff³, T. Bentley⁵, D.P. Nicoletta⁴, B.D. Stemper^{1,2}

¹Medical College of Wisconsin, ²Zablocki VA Medical Center, ³Naval Air Warfare Center, ⁴Southwest Research Institute, ⁵Office 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**
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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 Chang¹, Asher Lichtig¹, Jason Koh²
¹University of Illinois, ²NorthShore University Health System

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- P66 Multiscale Characterization of Human Tooth with Combination of SEM, AFM, and FEM**
SB³C2023-170
Y. Zhai¹, J. Wang¹, Z. Shi¹, T. Premaraj², S. Premaraj², T. Karpova¹, P. Dong¹, L. Gu¹
¹Florida Institute of Technology, ²Nova Southeastern University
- P67 Depth Map Image Based Inflation Test For Mechanical Characterization Of Soft Matter**
SB³C2023-468
Rahul L. Maurya¹, Yash K. Shrivastava², Samarth S. Raut¹
¹Indian Institute of Technology, ²Manipal 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 Flores¹, M. Rausch², A. Buganza Tepole¹
¹Purdue University, ²University 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. Quiros¹, T.M. Nelson¹, A. Ulu¹, E.C. Dominguez¹, T.M. Nordgren^{1,2}, M. Eskandari¹
¹University of California - Riverside, ²Colorado 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. David¹, Spencer P. Lake²
¹University of Colorado, ²Washington 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 Tang¹, Anqi Chen², Jessie Huang³, Darrell N. Kotton³, Shengqiang Cai⁴, Ming Guo¹
¹MIT, ²Harvard University, ³Boston University, ⁴University of California – San Diego
- P84 Fabrication And Mechanical Characterization Of Direct Ink Write 3D Printed Methacrylated Hyaluronic Cerium Oxide Scaffolds** SB³C2023-472
Aritra Chatterjee¹, Jordan Turner², Jonathan Banks², Joan Adebowale², Deva D. Chan¹, Juana Mendenhall²
¹Purdue University, ²Morehouse College
- P85 Functionalized Nanowires Successfully Load And Sustain Release Of NGF** SB³C2023-594
Molly E. Czachor¹, Joel A. Finbloom², Nafisa A. Elghazali², Darnell L. Cuylear², Kevin O. Rivera², Tejal A. Desai³, Chelsea S. Bahney^{1,2}
¹The Steadman Philippon Research Institute, ²University of California – Riverside, ³Brown 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. Ciecierska¹, Tatsat R. Patel^{1,2}, Debanjan Mukherjee³, Adnan H. Siddiqui^{1,2}, Vincent M. Tutino^{1,2}
¹Canon Stroke and Vascular Research Center, ²University at Buffalo, ³University of Colorado
- P87 A Vascularized Tissue Model To Investigate Human Synoviocyte - Endothelial Cell Crosstalk In Joint Health and Disease** SB³C2023-410
Hannah M. Zlotnick¹, Abhishek P. Dhand^{1,2}, Matthew D. Davidson¹, Gabriel J. Rodriguez-Rivera¹, Christopher J. Calo¹, Hannah K. Weppner¹, Laurel E. Hind¹, Jason A. Burdick¹
¹University of Colorado, ²University 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 Ganesh¹, Deborah A. Vacek¹, Douglas C. Fredericks¹, Emily B. Petersen¹, Youssef W. Naguib^{1,2}, Anupam Tiwari¹, Yochana Kancheria³, Mitchell C. Coleman¹, James A. Martin¹, Aliasger K. Salem¹, Tae-Hong Lim¹, Dongrim Seol¹
¹University of Iowa, ²Deraya University, ³Des 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. Fontz¹, O. Burkowski¹, J. Palmer¹, E. Scott¹, C. Price^{2,3}, V. Huayamave¹
¹Embry-Riddle Aeronautical University, ²International Hip Dysplasia Institute, ³Orlando 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. Roukoz¹, T. Hopper¹, S. Murtada², J. Humphrey², C.A. Figueroa¹
¹University of Michigan, ²Yale University
- P101 Computational Modeling Of Hemodynamics In Aortic Root Enlargement** SB³C2023-642
Surya Sanjay¹, Mia Bonini¹, Alexander Makkinejad¹, Maximilian Balmus², Marc Hirschvogel², Nicholas Burris¹, Bo Yang¹, David Nordsletten¹
¹University of Michigan, ²King's College London
- P102 High Aortic Diameter Variation Is Associated With Turbulent-Like Flow Conditions In Post-Norwood Patients** SB³C2023-611
Vivian Tan¹, Ankavipar Saprungruang², Brandon Peel², Christopher K. Macgowan², David J. Barron², Shi J. Yoo², M. Owais Khan¹
¹Toronto Metropolitan University, ²University 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 Cai¹, Lei Fan¹, Jenny S. Choy², Ghassan S. Kassab², Lik Chuan Lee¹
¹Michigan State University, ²California 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. Brekhus¹, Kevin M. Labus¹, Bernard Seguin², Christian M. Puttlitz¹, Benjamin C. Gadowski¹
¹Colorado State University, ²VCA 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. Tillman¹, Antonia M. Zaferiou¹
¹Stevens Institute of Technology, ²Georgia Institute of Technology
- P113 Analysis of Frictional Forces During Blood Clot Removal in Experimental Models of Acute Ischemic Stroke** SB³C2023-627
Omar N. Elkhayat, 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 Columbia
- P117 Normal Variation in Frequency- and Time-Domain Resting State EEG Metrics** SB³C2023-619
Eric Liu^{1,2}, Cidnee Luu¹, Lyndia Wu¹
¹University of British Columbia, ²University 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. Bastías¹, Lea M. Savard¹, Kathleen Connell¹, Kathryn Jacobson¹, Sarah Calve¹, Virginia L. Ferguson¹, Callan M. Luetkemeyer^{1,2}
¹University of Colorado, Boulder, ²University 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
¹University of Minnesota, ²Purdue University
- P122 Application of 3D Printing in Shape Memory Polymer-Based Endovascular Embolization for Preventing Intracranial Aneurysm Rupture SB³C2023-631**
Tanner Cabaniss¹, Sergio A. Pineda-Castillo¹, Bradley N. Bohnstedt², Chung-Hao Lee¹
¹University of Oklahoma, ²Indiana 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 Theophanous¹, Shaharoz Tahir¹, Yuankai Lu¹, Yi Hua^{1,2}, Ian A. Sigal¹
¹University of Pittsburgh, ²University 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 Bukzin¹, Sophi Schneider¹, Julia Zelevinsky¹, Ethan Danahy¹, Samantha Johnson²
¹Tufts University, ²Tatum 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. Li¹, I. Kurtaliaj², S. Swartz³, S. Thomopoulos², G.M. Genin¹
¹Washington University, ²Columbia University, ³Brown University
- P130 Automating Collagen Gel Image Segmentation Using Detectron2: An Application of Modern Computer Vision Techniques** SB³C2023-648
Michael I. Cafiero¹, Spencer P. Lake¹, Michael A. David²
¹Washington University, ²University 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 Hoene¹, P. Mike Wagoner¹, Daniel J. Beckman¹, Craig J. Goergen^{1,2}
¹Indiana University, ²Purdue University

MS-Level Research

- P132 Tracking The Response Of A Sustained Dynamic Compression Device In An Ovine Tarsal Fusion Model** SB³C2023-465
Erin E. Estrada¹, Jeremiah T. Easley¹, David L. Safranski², Dave Latt³, Naohiro Shibuya⁴, Christian M. Puttlitz¹, Ben C. Gadowski¹
¹Colorado State University, ²Enovis Foot & Ankle, ³University of Arizona, ⁴Veterans 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. Wright¹, Alan I. Benvenisty², Kenneth R. Nakazawa², Marina de Cos¹, Kirk N. Campbell¹, Eric G. Lima², Evren U. Azeloglu¹
¹Ichan School of Medicine, ²Cooper Union
- P135 An Anthropomorphic, Actuated Wrist for Achieving Biomimetic Motion of a Robotic Hand** SB³C2023-462
Jonathan M. Rooney¹, Samantha T. Johnson², Chiara Bellini¹
¹Northeastern University, ²Tatum 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 Manegaonkar¹, Mohamed A Effat¹, Tim P van de Hoef², Rupak K Banerjee¹
¹University of Cincinnati, ²Amsterdam 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 Sayut¹, Javiera Jilberto Vallejos¹, Sandra Hager¹, Mia Bonini¹, Marc Hirschvogel¹, David A. Nordsletten^{1,2}
¹University of Michigan, ²King's College London
- P141 Assessing Transmural Myocardial Perfusion In Healthy And Diseased Pigs Using Multi-Scale Computational Modeling** SB³C2023-507
Victoria E. Sturgess¹, Alyssa Taylor-LaPole², Cooper M. Warne³, Hamidreza Gharahi¹, Elaleh Rahbar⁴, Jonathan D. Tune³, Daniel Beard¹, C. Alberto Figueroa¹
¹University of Michigan, ²NC State University, ³University of North Texas, ⁴Wake 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

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- 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 AvB₃ Integrins - Targeting In Microvessel Phantoms** SB³C2023-544
Jair I. Castillo¹, J. Angel Navarro-Becerra¹, Federico Di Ruzza², Mark Borden¹
¹University of Colorado, ²University 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
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- 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

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- 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. Garcia, 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. Tanka¹, David M. Saylor², Robert M. Elder²
¹*Western Carolina University*, ²*US FDA*

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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

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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
¹Michigan State University, ²California 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 Molony³, K. Crawford^{2,3}, A. Lefieux², A. Veneziani², H. Samady^{2,3}
¹Georgia Institute of Technology, ²Emory University, ³Northeast 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 Peristalsis Alone Is Inconsistent With Measured Flow In The Paravascular Space**
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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

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- 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. Marshall¹, Nicholas E. Kneier¹, Patrick D. Earley¹, Peter E. Hammer^{1,2}, David M. Hoganson^{1,2}
¹Boston Children's Hospital, ²Harvard College
- P46 Simulation of a Repair on a Dynamic Patient-Specific Left Atrioventricular Valve Model**
 SB³C2023-520
 Stephen Ching¹, Christopher Zelonis¹, Christian Herz¹, Patricia Sabin¹, Muhammad Nuri¹, Yan Wang¹, Andras Lasso², John Moore³, Terry Peters⁴, Matthew A. Jolley¹
¹Children's Hospital of Philadelphia, ²Queen's University, ³Archetype Medical Inc., ⁴Western 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 Avril³, Richard Lopata¹
¹Eindhoven University of Technology, ²Catharina Hospital Eindhoven, ³Ecole des MINES Saint-Etienne

- P48 Influence of Wall Shear and Mechanical Stress on Atherosclerotic Artery Disease in Human Coronaries** SB³C2023-293
Aikaterini Tziotziou¹, Eline Hartman¹, Suze-Anne Korteland¹, Antonius F.W. van der Steen¹, Joost Daemen², Jolanda Wentzel¹, Ali C. Akyildiz^{1,3}
¹Erasmus Medical Center, ²Delft 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
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- 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
- P57 Elucidating The Longitudinal Impact Of Solid Mechanics On Atherosclerotic Plaque In Patient-Specific Coronary Arteries** SB³C2023-426
Jeremy L Warren, Clark A Meyer, Heather N Hayenga
University of Texas at Dallas

- P58 Optimization and Implementation of a Carotid Quantitative Susceptibility Mapping Sequence for Atherosclerotic Plaque Vulnerability Assessment** SB³C2023-313
Brooke Tornifoglio¹, Sarah McElroy², Alan J Stone³, Karin Shmueli⁴, Catriona Lally¹
¹Trinity College London, ²Siemens Healthcare, ³St. Vincent's University Hospital, ⁴University College London
- P59 Development of Melt Electrowriting Based Polymer Heart Valve Leaflets Informed Through Finite Element Modelling** SB³C2023-285
Celia Hughes^{1,2}, Robert D Johnston¹, Alix Whelan¹, David O'Reilly², Evelyn Campbell², Caitriona Lally¹
¹Trinity College London, ²Boston Scientific Corporation
- P60 Changes In Elastin Structure And Extensibility Induced By Hypercalcemia And Hyperglycemia** SB³C2023-439
C. Yang¹, A.S. Weiss², A Tarakanova¹
¹University of Connecticut, ²The University of Sydney
- P61 Development Of A Representative Artery Model For Stent Fatigue Testing** SB³C2023-220
Jude M Hussain, Ankush Aggarwal, Andrew McBride, Robbie Brodie, Craig MacLean
University of Glasgow
- P62 Integration Of Deep Neural Networks And Finite Element Method For Biomechanical Analysis Of The Aorta** SB³C2023-499
Liang Liang¹, Minliang Liu², Wei Sun³
¹University of Miami, ²Georgia Institute of Technology, ³Sutra Medical Inc
- P63 Effect Of Aortic Root Motion On Aortic Wall Stresses In Thoracic Aortic Aneurysms** SB³C2023-201
T Kim, N Tjahjadi, X He, H Patel, N Burris, CA Figueroa
University of Michigan
- P64 Regional Heterogeneity In The Biomechanics Of Human Aorta** SB³C2023-307
M Kazim, S Razian, D Varandani, M Jadidi
University of Nebraska-Omaha
- P65 Investigation Into Clot And Stent Retriever Parameters Affecting Removal Forces In An Experimental Model Of Acute Ischemic Stroke** SB³C2023-158
Demitria A Pouls¹, Jordis E Blackburn¹, Michael T Froehler², Bryan C Good¹
¹University of Tennessee, ²Vanderbilt University Medical Center
- P66 Viscoelastic And Shear Mechanical Properties Of Human Hypertrophied Septum** SB³C2023-347
Katherine M Copeland¹, Uday Chintapula¹, Alan M Taylor¹, Duc Khang Chung¹, Yi Hong¹, Kytai T Nguyen¹, Zhi-Ping Liu¹, Matthias Peltz¹, Pietro Bajona^{1,2}, Jun Liao¹
¹University of Texas, ²Drexel University
- P67 Phase-field Modeling of Deep Vein Thrombus Embolization** SB³C2023-011
Osman Gültekin, Matthew J Lohr, Sapun H Parekh, Manuel K Rausch
University of Texas at Austin

- P68 A Neural Network-Finite Element Approach For Multibody Contact in Soft Biological Materials** SB³C2023-487
Christian L Goodbrake, Michael S Sacks
University of Texas at Austin
- P69 On The Association Of Rupture Potential Index With Abdominal Aortic Aneurysm Geometric Measures In Patients Under Surveillance** SB³C2023-394
Juan C Restrepo-Perez¹, Pratik Mitra¹, Satish C Muluk², Mark K Eskandari³, Ender A Fino¹
¹University of Texas at San Antonio, ²Allegheny Health Network, ³Northwestern University
- P70 A Computational Framework For Surgical Planning Of Pulmonary Artery Stenosis Repair In Tetralogy Of Fallot Patients** SB³C2023-474
Alessia De Nardo, Leslie Louvelle, David A. Romero, Matthew Doyle, Thomas L Forbes, Cristina H Amon
University of Toronto
- P71 A Constitutive Model That Incorporates A Microstructural Mechanism Of Homogenizing Transmural Stress Distributions In Arteries** SB³C2023-450
Taisiya Sigaeva¹, Yanhang Zhang²
¹University of Waterloo, ²Boston University
- P72 A Complete Physics-Based Model For The Full Flow Mediated Dilation (FMD) Response** SB³C2023-291
B Sidnawi¹, B Zhou¹, S Santhanam¹, Z Chen², C Sehgal², P Kaufmann³, Q Wu¹
¹Villanova University, ²University of Pennsylvania, ³University of Nevada
- P73 A Tale Of Two Mice - Hypertension, Inflammation, And Insights From Immuno-Mechanical Modeling** SB³C2023-289
Jay D Humphrey¹, Marcos Latorre², Bart Spronck³
¹Yale University, ²Universitat Politecnica de Valencia, ³Maastricht University

Solid Mechanics: Growth and Remodeling

- P74 In Vivo Multiscale Measurements Of Solid Stresses In Primary And Metastatic Tumors** SB³C2023-555
Sue Zhang¹, Rachel Passaro¹, Kathryn Regan¹, Muhamed Hadzipasic^{1,2}, Gabrielle Grifno¹, Siyi Zheng¹, Logan O'Connor¹, Vinson Chu¹, Sung Yeon Kim¹, Jiarui Yang¹, Rohin Banerji¹, Kavon Karrobi¹, Darren Roblyer¹, Mark Grinstaff^{1,2}, Hadi T. Nia¹
¹Boston University, ²Massachusetts General Hospital
- P75 Pin Loosening In External Fixation: A Finite Element Analysis To Develop An Ovine Bone Transport Model** SB³C2023-579
Michael J Poland, Yunzhi Peter Yang, Jeremiah T Easley, Jeffrey Young, Holly L Stewart, Chloe Brekhus, Christian M Puttlitz, Benjamin C Gadowski
¹Colorado State University, ²Stanford University
- P76 Validation Of A Strain-Based Lower-Limb Fracture Healing Algorithm** SB³C2023-036
George Morgan¹, Lucas Low¹, Arul Ramasamy^{1,2}, Spyros Masouros¹
¹Imperial College London, ²Royal Centre for Defence Medicine

- P77 Modeling the fracture mechanical properties of load-bearing soft biological tissues**
 SB³C2023-409
 Christopher Miller¹, T Christian Gasser^{1,2}
¹KTH Royal Institute of Technology, ²University of Southern Denmark
- P78 FSGe: A Computational Model for Equilibrated Cardiovascular Fluid-Solid-Growth Interaction** SB³C2023-586
 Martin R Pfaller¹, Marcos Latorre², Erica L Schwarz¹, Fannie M Gerosa¹, Jason M Szafron¹, Jay D Humphrey³, Alison L Marsden¹
¹Stanford University, ²Universitat Politècnica, ³Yale University
- P79 Predictive Growth Analysis of Abdominal Aortic Aneurysms Under Surveillance Using Geometric Measures** SB³C2023-602
 Pratik Mitra¹, Juan C Restrepo-Perez¹, Satish C Muluk², Mark K Eskandari³, Ender A Finol¹
¹University of Texas at San Antonio, ²Allegheny Health Network, ³Northwestern University
- P80 Vascular Smooth Muscle Cells Retain Their Material Properties in Mechanically Variant Microenvironments** SB³C2023-043
 Elizabeth D Shih, Ryan R Mahutga, Katriel S Ng, Patrick W Alford
University of Minnesota
- P81 Determining The Geometrical Properties of Urinary Bladder Wall During Passive Filling**
 SB³C2023-314
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University of Pittsburgh
- P82 Tropocollagen Denaturation Is Not Responsible For Sub-Yield Softening** SB³C2023-160
 Noah R Pearson, Gregory M Boiczyk, William J Anderl, S Michael Yu, Kenneth L Monson
University of Utah
- P83 Contact Mechanics Based Formulation To Examine The Role Of Cellular Adhesion In Epithelial Mechanics** SB³C2023-595
 M Talukder, S Kale
Virginia Tech
- P84 A Predictive Model For The Coverage Of Wounds By Skin Grafts** SB³C2023-572
 Haomin Yu¹, Mohammad Jafari², Yuan Hong¹, Jacob Sandler¹, Guy M Genin¹, Farid Alisafaei^{1,2}
¹Washington University, ²New Jersey Institute of Technology

Solid Mechanics: Injury & Brain

- P85 Mathematical Dynamic Modeling (MADYMO) of the Maternal Pelvis and Neonate for Simulating Shoulder Dystocia and Delivery Maneuvers** SB³C2023-248
 J Iaconainni¹, B Gonik², M Grimm³, S Balasubramanian¹, Anita Singh⁴
¹Drexel University, ²Wayne State University, ³University at Albany, ⁴Temple University
- P86 Validation of Steering Wheel Forces And Upper Extremity Loading During Rear-End Collisions Using MADYMO** SB³C2023-133
 Dominic R Demma, Stephanie M Rossman, Nicole A Johns, Steven A Rundell
Explico Inc.

- P87 Rate Effects and Material Characterization of Skin During Puncture** SB³C2023-190
Joseph S LeSueur, Frank A Pintar
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- P88 Impact Forces of Division 1 Collegiate Offensive and Defensive American Football Players Using Practice Sled** SB³C2023-445
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¹National Institutes of Health, ²Henry M Jackson Foundation
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¹University of Colorado, ²Army Research Laboratory
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¹Trinity College Dublin, ²Royal College of Surgeons, ³Boston Scientific Corp,
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¹University of Pennsylvania, ²Crescenz VA Medical Center, ³University of Colorado
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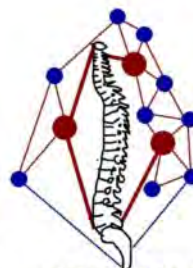


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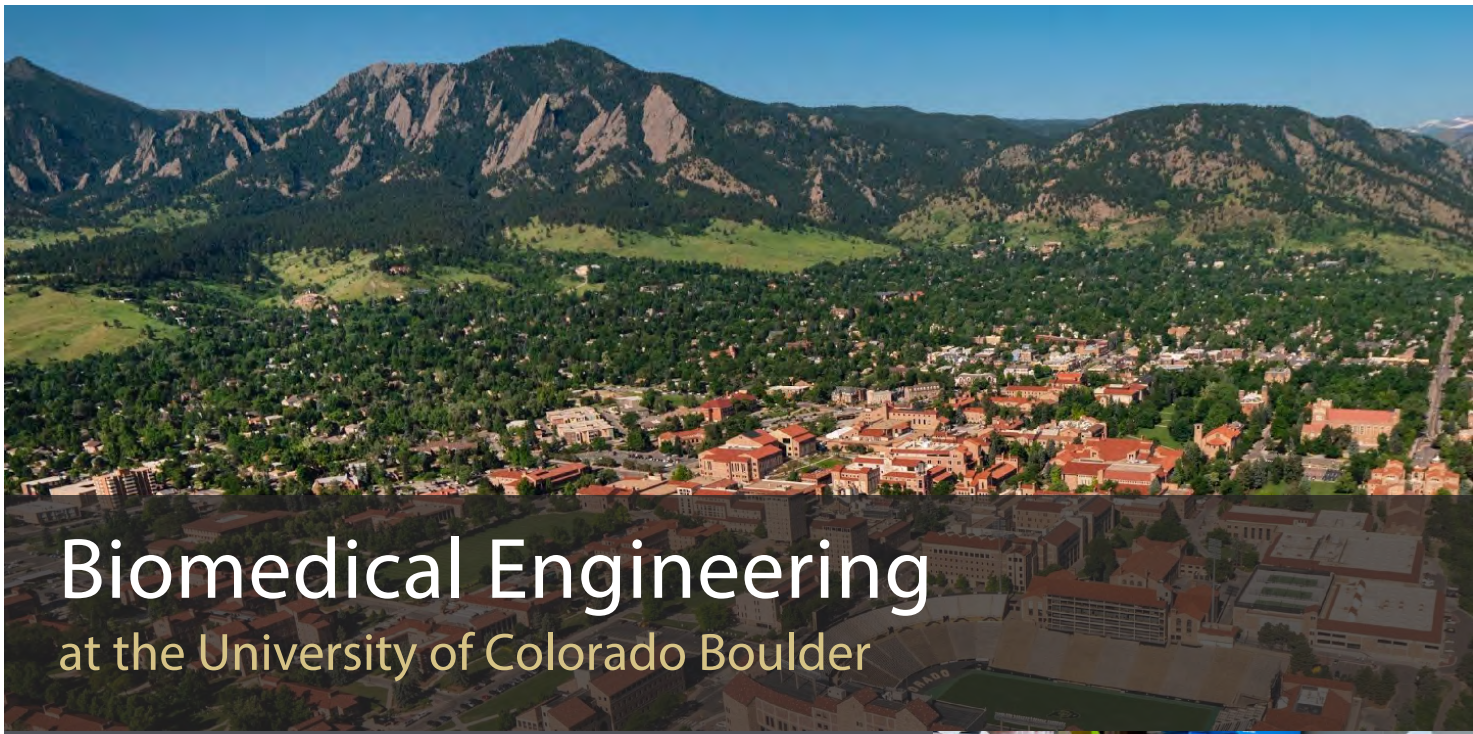
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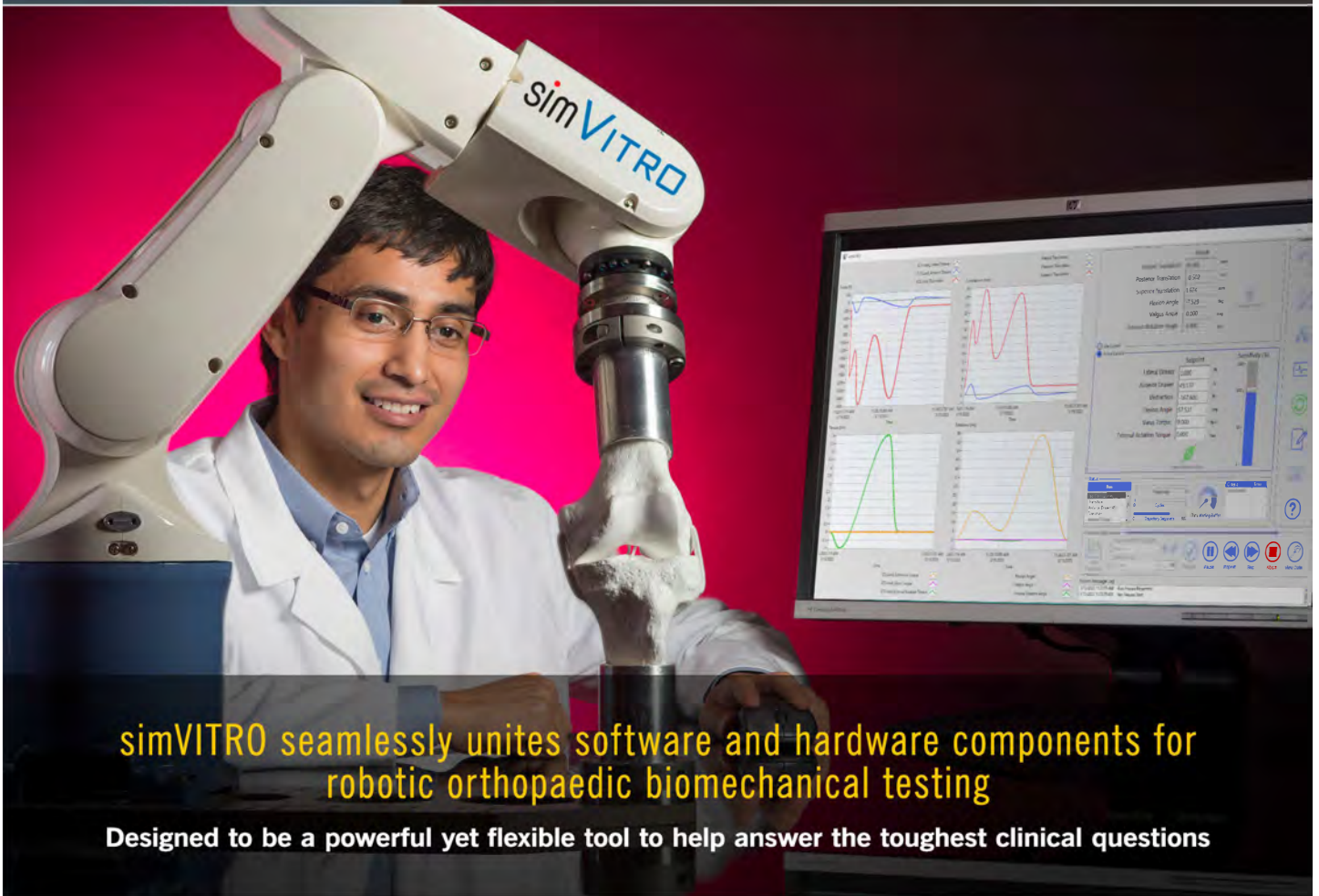


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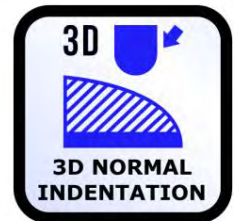
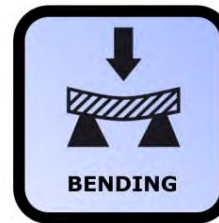
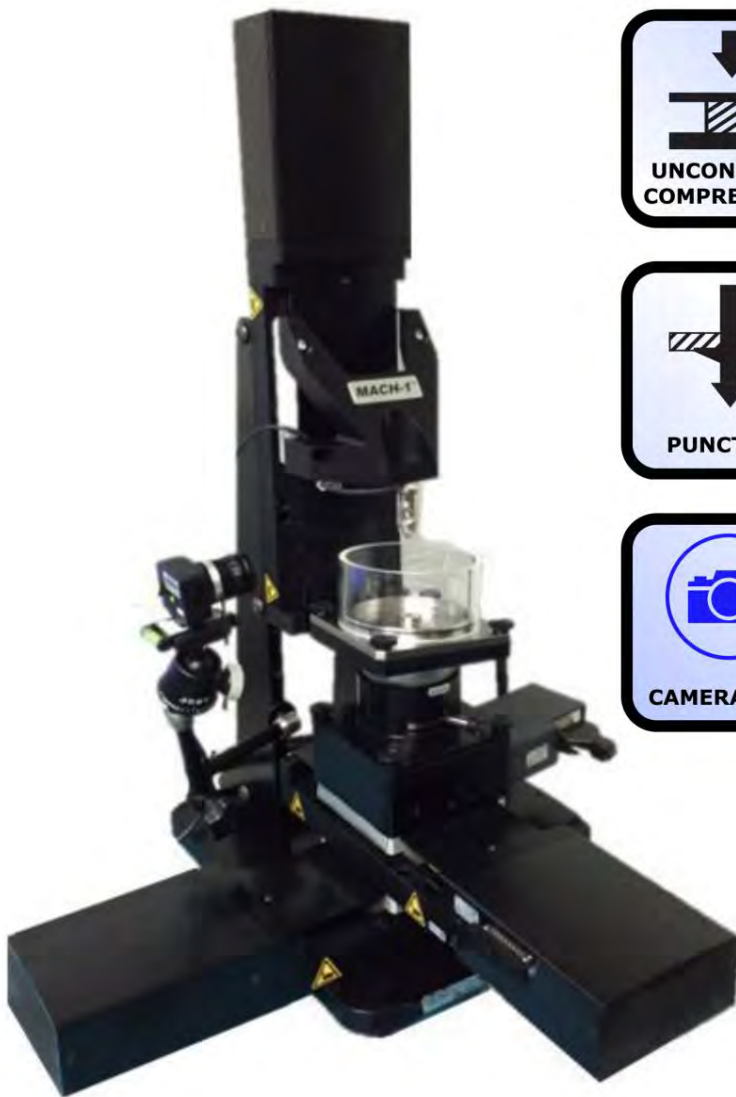
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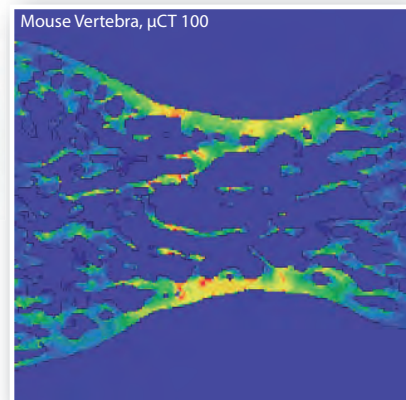
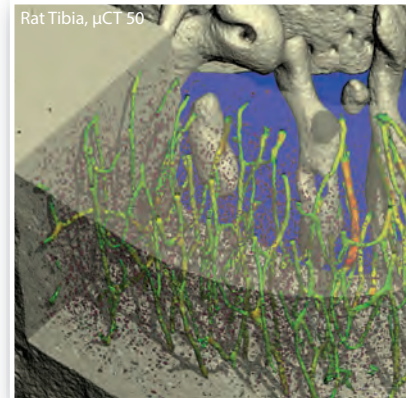
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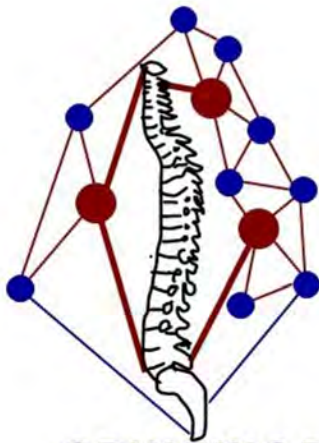
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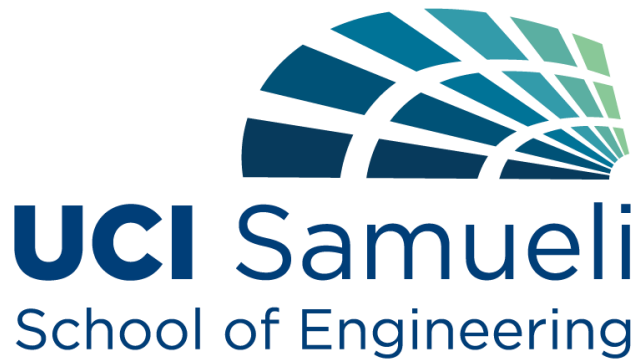
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Department of Biomedical Engineering

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

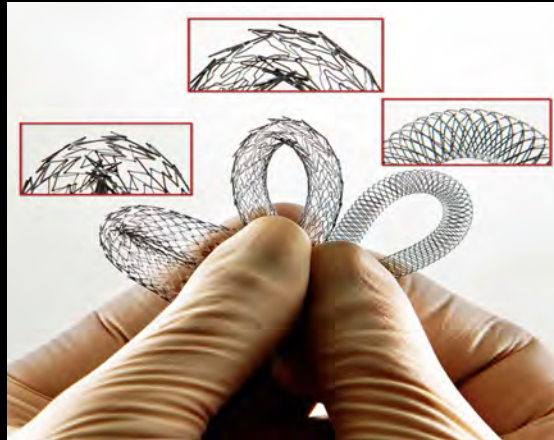
Established in 2002, the growth of biomedical engineering in the UCI Samueli School has been rapid. The department merges UCI's strengths in medicine, biological sciences and engineering. BME faculty are competitive in garnering extramural grants, with expenditures topping \$30M on an annual basis. Strong 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>

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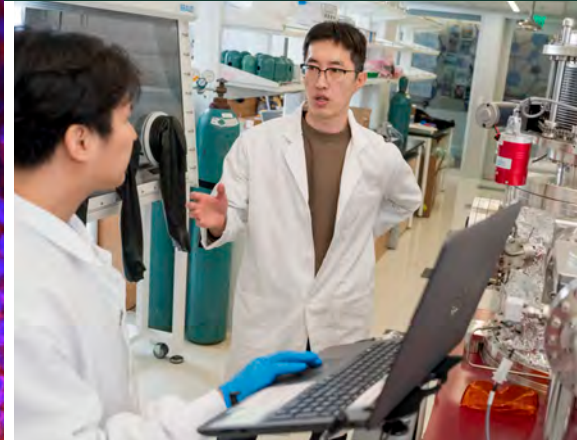
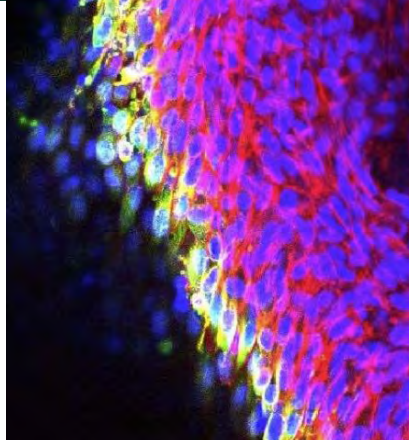
- Biomechanics
- Translational Cancer Research
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- Cardiovascular Engineering
- Biomaterials/Tissue Engineering/Regen Med



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#13

Biomedical engineering graduate program ranking in U.S. News

#38

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SB³C 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	Bitransport in Therapeutic Design and Analysis	Engineered <i>In Vitro</i> 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 (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	Tour: Steadman Philippon Research Institute
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	SimVascular Workshop	Augmented Reality 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	Bitransport 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	Bitransport 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.
5:15 – 6:00 pm	PLENARY: The Power of Collaborative Science – Dawn Elliott and Rob Mauck							
6:00 – 6:30 pm	Woo ASME Medal: Tamara Bush							
6:30 – 7:30 pm	Banquet Reception							
7:30 – 10:30 pm	Banquet and Awards Ceremony							