SB³C

biomechanics.
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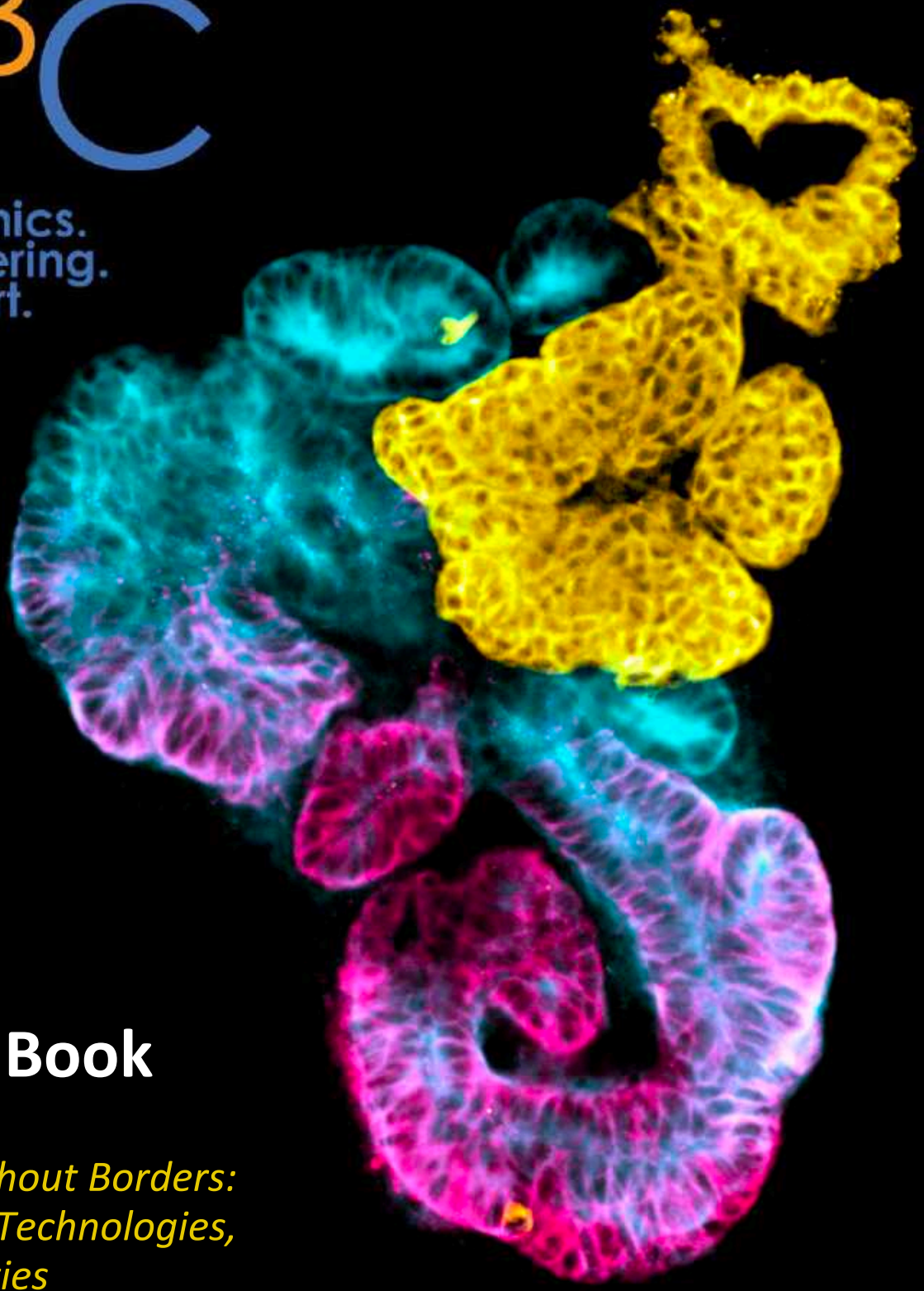

Program Book

Innovation without Borders:
Uniting Ideas, Technologies,
and Communities

2024 Summer Biomechanics, Bioengineering, and Biotransport Conference

June 11–14, Lake Geneva, Wisconsin

This conference was supported by the National Science Foundation's Civil, Mechanical, and Manufacturing Innovation Division (Biomechanics and Mechanobiology) under award number 2413182, and by award number R13EB033191A from the National Institute of Biomedical Imaging and Bioengineering. The views expressed in written conference materials or publications and by speakers and moderators do not necessarily reflect the official policies of National Science Foundation nor those 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.

Congratulations to the 2023 Cover Art Contest Winner:

Catherine M. Porter and Alex J. Hughes, University of Pennsylvania
Title: Highly Parallel Production of Designer Organoids by Mosaic Patterning of Progenitors

Description: Proximal-to-distal segmentation in an immunostained human kidney organoid. The midplane from a confocal z-stack of an induced pluripotent stem cell-derived kidney organoid shows nephron segmentation. Nephrin (yellow) marks the boundaries of podocytes, the cells in glomeruli that initially filter blood in vivo. Lotus tetragonolobus lectin (cyan) delineates proximal tubule cells, and membranous E-cadherin (bright pink) outlines distal tubule cells. This kidney organoid was grown in suspension using a novel culture device, which integrates transient 2D cell patterning technology with microwell arrays.

ISBN 978-1-7351808-7-8

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1 Forward and Acknowledgement

Dear SB^{3}C Community,

Welcome to SB^{3}C 2024! We are delighted to see so many colleagues and friends at the beautiful Grand Geneva Resort in Lake Geneva, Wisconsin. This year's conference will include 50 stellar scientific sessions, 5 special sessions, and 10 workshops centered around our theme **Innovation without Borders: Uniting Ideas, Technologies, and Communities**. This theme highlights how innovation and progress can be accelerated by crossing scientific domains to learn new methods, converging ideas, and broadening the impact of technology across the globe. Our plenary speaker, Dr. Umut Gurkan, Wilbert J. Austin Professor of Engineering at Case Western University, will feature this theme perfectly. His inspirational presentation will highlight the development of affordable point-of-care diagnostics, microfluidic systems, and more, all toward improving equitable global access to diagnostics and personalized medicine.

In addition to this themed content, we are delighted that 6 ASME medal awardees will give feature presentations at the conference. These awardees and their outstanding accomplishments are highlighted in pages 22-27 of the program book. In addition, a special symposium will honor Dr. Kenneth Diller, and his work in thermal regulation, injury, and treatment. We are immensely grateful to have the opportunity to recognize each of these speaker's successes and celebrate their achievements with them. Don't miss out on these presentations that are sure to be filled with inspirational messages, remarkable science, and humorous anecdotes.

Along with these key presentations, many of your favorite programs from last year are returning including the Translational Technology Pitch competition, the Future Faculty Poster Session, the Diversity Mentoring Workshop, and BEDRock. And, of course, let's not forget about our outstanding student community. We are delighted that the tradition of strong student participation continues. We had a record number of student competition submissions this year, resulting in 6 parallel sessions for the PhD student competition, 2 MS and 3 BS student poster sessions, and a highly competitive undergraduate design competition. Make sure to attend these events to support our students. Many thanks to the Student Leadership Committee for complementing these presentations with student activities including a student social/networking event (June 13 @ 5pm) and a graduate student panel (June 11 @ 1pm).

We are delighted to announce the inaugural SB^{3}C Kids Camp that parallels conference programming and allows attendees to bring their families. This is a big step to making this conference family-friendly. Please extend a big SB^{3}C community welcome to the families you may see in the hallways and recognize their contribution and support of our scientific endeavors.

Finally, all of the 2024 SB^{3}C programming is thanks to the tireless efforts of the 2024 SB^{3}C Organizing Committee, the ASME Bioengineering Division Technical and Student Leadership Committees, Debbie and Francesca from Boscov's Travel, Kirby and Andrea from Practical Pro, the SB^{3}C Foundation Board, and the record-breaking generous contributions of 20+ sponsors, exhibitors, and advertisers. We are extremely grateful and humbled by the continued support from this community.

Now sit back, relax, and let the conference begin!

Brittany Coats, Conference Chair
University of Utah

Spencer Lake, Program Chair
Washington University in St. Louis

1.1 Conference Code of Conduct

The SB^{3}C Foundation and conference organizers are dedicated to providing everyone with a respectful and inclusive conference experience. Conference participants and attendees are expected to interact with others respectfully and courteously, regardless of age, race, ethnicity, national origin, gender, sexual orientation, gender identity, gender presentation, physical appearance, religious affiliation, creed, medical condition, personal characteristics, technology choices, or any other differentiating factors.

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 the peer-reviewed scientific abstract accepted for presentation at the conference. It is not appropriate outside of this context, including other presentations, workshops, conference-related events, and online media. By attending the SB3C, you agree to follow this Code of Conduct.

If you experience or witness harassment or any other behavior that violates this code of conduct, please report it immediately to the Conference Chair (brittany.coats@utah.edu). We take all reports seriously and will respond promptly to investigate and address the situation. All communications will be kept confidential. Individuals with questions, concerns or complaints about harassment are also encouraged to contact the HHS Office for Civil Rights (OCR) via their complaint portal. Filing a complaint with the Conference Chair is nots 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.

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 the Code of Conduct may be sanctioned or expelled from the conference without a refund at the discretion of the conference organizers. All allegations will be reported to the HHS Office for Civil Rights for further investigation. Sanctions may additionally include reporting to the violator's home institution for further investigation and/or disallowing registration and participation in future SB^{3}C meetings.

1.2 Whova App for the SB^{3}C 2024 Conference

SB^{3}C 2024 conference information, including the program and schedule, is available on the Whova app, which has additional features including a personal conference agenda, and more. The QR code for the Whova app is below.

For more information on using Whova, the user guide is available online.

2 General Information

All times below are in CDT.

2.1 Registration Hours

The registration desk will be open during the following hours:

Tuesday, June 11	1:00 pm – 9:00 pm
Wednesday, June 12	7:30 am – 1:30 pm
Thursday, June 13	7:30 am – 1:30 pm
Friday, June 8	8:30 am – 1:00 pm

2.2 Networking Events

Tuesday, June 11, 2024, 7:15 - 9:00 PM, Forum
Welcome Reception
Please join us for our annual opening reception! The SB^{3}C prides itself on being an open and welcoming community. Be a part of it by attending this event, and don't forget to introduce yourself to someone new.

Wednesday, June 12, 2024, 2:30 - 3:45 PM, Chalet
LGBTQ+ Networking Event
This is a great opportunity to meet your fellow LGBTQ+ and ally colleagues at SB^{3}C while networking. The event will include disc golf, icebreaker games, and other networking opportunities. It will be held at the Disc Golf Facility at Chalet. It is a 20 minute walk from the main resort. Alternatively, you can meet us at the entrance hall of Forum at 2:15 PM to take a shuttle together. We hope to see you there!

Wednesday, June 12, 2024, 5:15 - 6:15 PM, Embers Terrace
Industry/Exhibitor Networking Event
We invite you to join us for a networking mixer following our Translational Technology Pitch Competition. Network with the competition finalists, industry panelists, as well as poster presenters of additional selected submissions, and our exhibitors. Join us to make valuable connections and further conversations about medical technology translation. 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.

Wednesday, June 12, 2024, 7:30 - 8:30 PM, Maple Lawn A
Iranian-American Society of Bioengineers Networking Event
The goal of this event is to utilize unique and shared experiences within the Iranian-American community to create opportunities for career development, peer mentoring, and networking. The event will kick off with 10-min presentations by five Iranian-American Bioengineers who will share their career paths, research experiences, and challenges they have faced as Iranian-Americans. The panel presentations will be followed by a $\sim$30 minute Q&A/discussion.

Thursday, June 13, 2024, 5:00 - 6:00 PM, Maple Lawn AB
Women's Faculty and Post-Doc Networking Event
The Women's Networking Group provides a rich environment that brings together women faculty and industry leaders at the SB^{3}C to strategically promote a diverse and inclusive environment. This group has been meeting since 2007 with the purpose to provide mentoring, networking and communication for women involved in the biomechanics field to help further their careers. It also seeks to promote the careers of women by identifying those that are eligible and deserving of awards and fellow status within ASME as well as other professional societies. In June 2021, the Women's Networking Group was named the 2021 recipient of the Johnson & Johnson Consumer Companies, Inc., Medal from ASME. The award recognizes outstanding contribution by the group toward developing and implementing practices, processes, and programs that value and strategically manage diversity and inclusiveness. The award was established by the ASME Board on Diversity and Outreach in 2004 through the generous contributions of individual ASME members and Johnson & Johnson Consumer Companies, Inc.

At each Summer Biomechanics, Bioengineering and Biotransport Conference, the group brings women faculty and post-doctoral associates together in a social event. What began as an event with 17 participants in 2007 grew to over 100 in 2023. We are very excited to get together again this summer in Lake Geneva!

Thursday, June 13, 2024, 5:00 - 6:00 PM, Indoor Pool
Student Networking Event
Join us for the SB^{3}C 2024 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 for an exciting boat race.

Thursday, June 13, 2024, 7:00 - 10:00 PM, Pavilion
BEDRock Concert
The SB^{3}C conference date and venue each year coincides with the annual concert of BEDrock, the world's most influential unknown band. 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.

Are you a musician with time to rehearse and be part of the band? Please contact Alan Eberhardt at aeberhar@uab.edu.

Friday, June 14, 2024, 7:00 - 7:30 PM, Forum
Banquet Reception

Friday, June 14, 2024, 7:30 - 10:00 PM, Forum
Banquet and Awards Ceremony
Be sure to stay through the banquet that closes the conference! In addition to a final gathering with all your colleagues and friends, 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, the SB^{3}C Foundation Board Meeting, and the JBME Editorial Board Meeting. Attending the open meetings is a terrific way to get more involved with the Bioengineering Division of the ASME.

Tuesday, June 11

ASME BED Executive Meeting	Galewood CD	10:00 - 11:30 AM
ASME BED Open Business Meeting	Maple Lawn C	12:00 - 12:50 PM
Graduate Student Panel	Linwood	1:00 - 1:50 PM
Education Open Meeting	Maple Lawn A	1:00 - 1:50 PM
Fluid Mechanics Open Meeting	Maple Lawn C	1:00 - 1:50 PM
Industry Open Meeting	Maple Lawn B	1:00 - 1:50 PM
Biotransport Open Meeting	Maple Lawn A	2:00 - 2:50 PM
Design, Dynamics, Rehabilitation and Regulation Open Meeting	Maple Lawn B	2:00 - 2:50 PM
Tissue and Cellular Engineering Open Meeting	Maple Cawn A	2:00 - 2:50 PM
Solid Mechanics Open Meeting	Maple Lawn C	3:00 - 3:50 PM

Wednesday, June 12

JBME Editorial Board Meeting	Geneva Bay Boardroom	1:00 - 2:00 PM
SB^{3}C Open Meeting	Maple Lawn C	6:15 - 7:15 PM

Friday, June 14

SB^{3}C Foundation Board Meeting	Galewood A	8:30 - 10:00 AM

2.4 Instructions for Poster Presenters

General Session Posters
Poster Session I & BS SPC Posters: 1:00 - 2:30 PM, Wednesday, June 12, Forum
Poster Session II & MS SPC Posters: 12:30 - 2:00 PM, Thursday, June 13, Forum

Prospective Faculty Poster Session
Wednesday, June 12, 5:15 – 6:15 PM, Forum

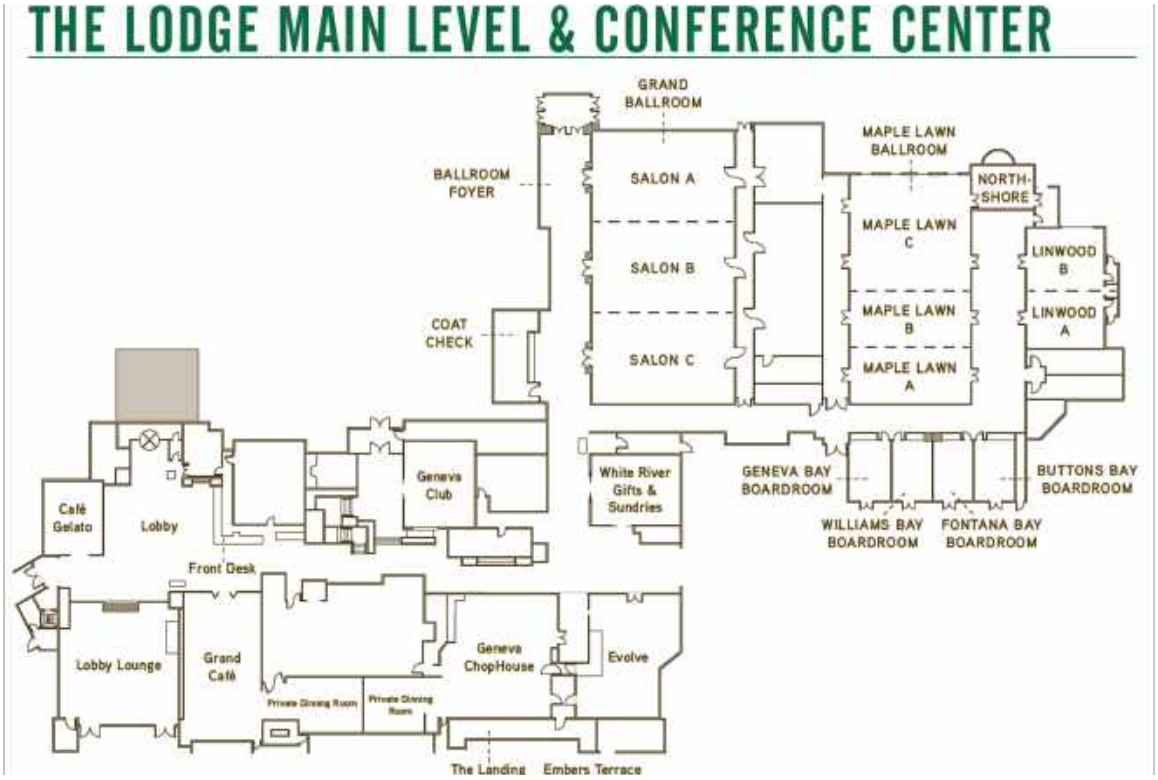
The poster exhibition hall (Forum) opens at 8:00 AM. Please hang your poster on the board with the number that corresponds to your poster number (P1, P2, etc.), which is listed in the Program Book and the Whova app. Authors should stand next to their poster during their assigned session, and may also stand at their posters at other times.

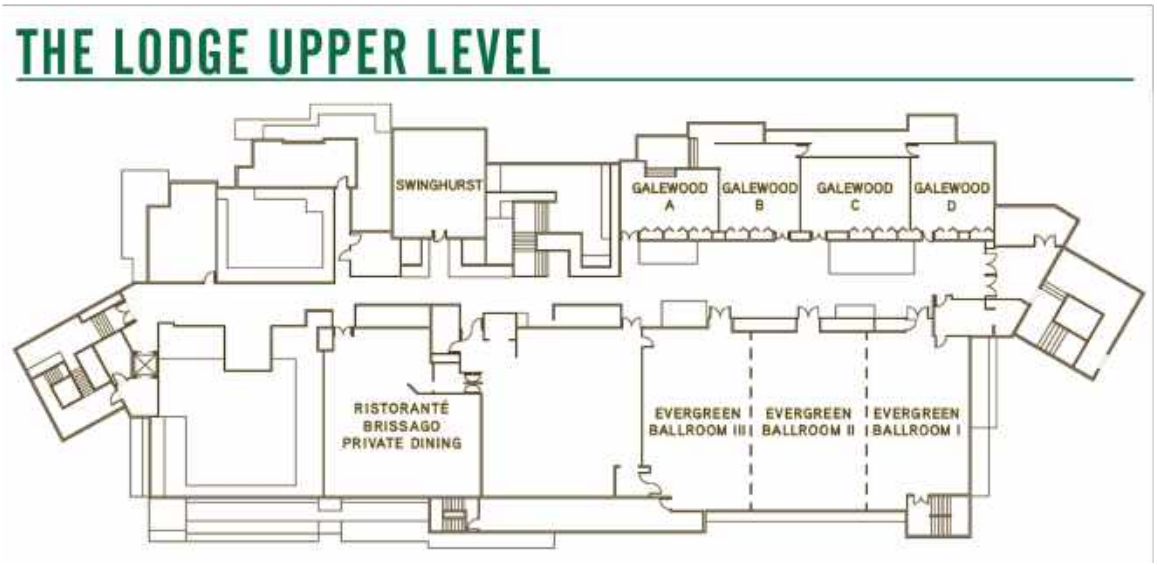
Posters for Poster Session I should be set up before 10:00 AM on Wednesday, June 12 and must be removed by 4:00 PM the same day. Posters for Poster Session II should be set up before 10:00 AM on Thursday, June 13 and must be removed by 4:00 PM the same day. Posters that are part of the BS or MS Student Paper Competition (SPC) may stay up throughout both days of poster presentations, from 10:00 AM on Wednesday, June 12 through 4:00 PM on Thursday, June 13.

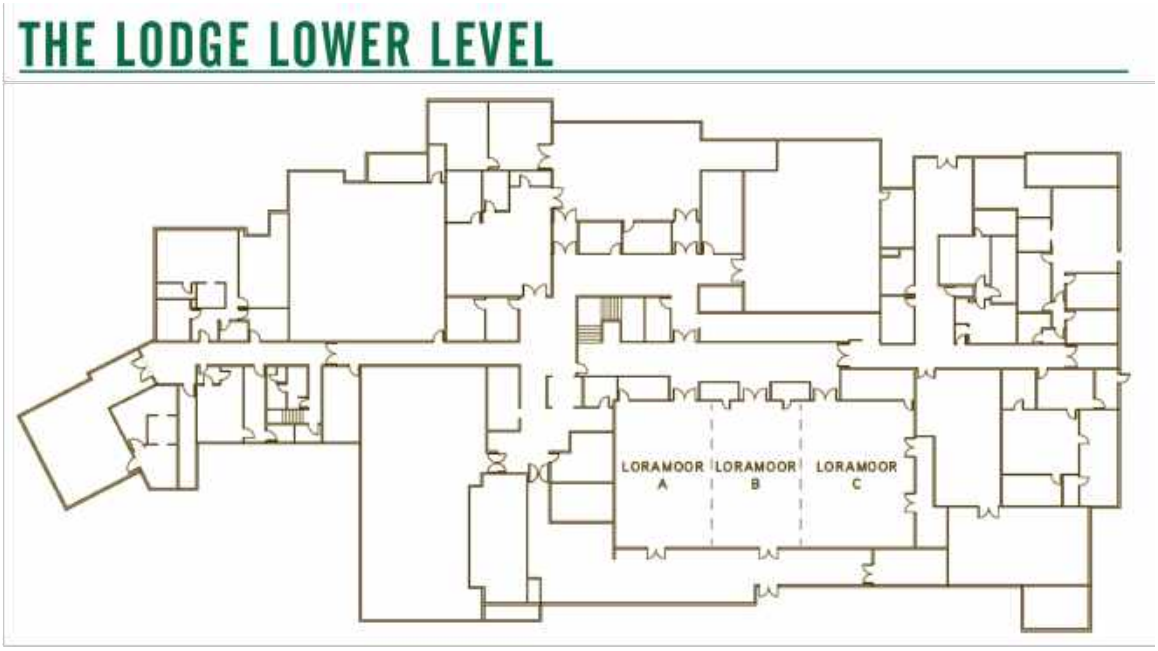
Posters for the Prospective Faculty Poster Session should be set up before 10:00 AM on Wednesday, June 12 and must be removed by 8:00 PM on the same day.

For more information about poster presentations, and for instructions for podium presentations, see the Information for Presenters page on the conference website.

2.5 Conference Site Map




THE LODGE UPPER LEVEL
SWINGHURST
GALEWOOD A
GALEWOOD B
GALEWOOD C
GALEWOOD D
RISTORANTE BRISSAGO PRIVATE DINING
EVERGREEN BALLROOM III
EVERGREEN BALLROOM II
EVERGREEN BALLROOM I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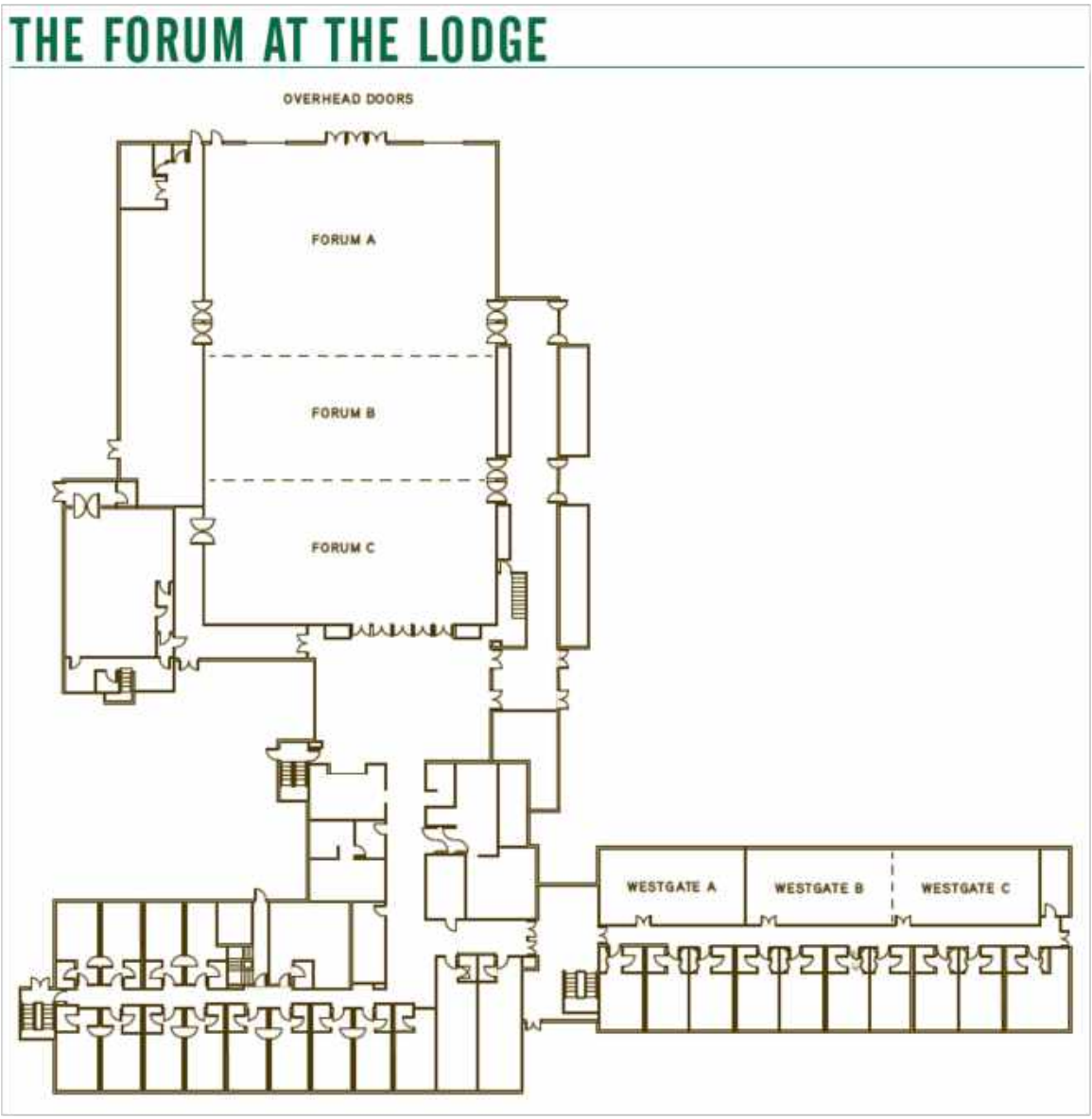


Mother's Room
A lactation room is located in Building 5 on the first floor. Follow the signs once you arrive in Building 5.

3 Conference Organizing Committees

3.1 Organizing Committee

Brittany Coats, Conference Chair
University of Utah

Spencer Lake, Program Chair
Washington University at St. Louis

3.2 ASME-BED Technical Committee Chairs

Sihong Wang, Biotransport Committee Chair, City College of New York
Chris Rylander, Biotransport Committee Co-Chair, The University of Texas at Austin
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

Megan Killian, Chair, University of Michigan
Mariana Kersh, PhD Level, University of Illinois at Urbana-Champaign
M. K. Sewell-Loftin, MS Level, University of Alabama at Birmingham
Matthew Bersi, BS Level, Washington University in St. Louis
Anita Singh, Undergraduate Student Design Competition, Temple University

Thank you to all committee members!

4 Special Sessions, Plenary Speaker, and Workshops

Tuesday, June 11	**Time 3:00 - 4:00 PM**

Transitioning Between Academia & Industry **Linwood**

Lance Frazer, *Southwest Research Institute*
Manoj Myneni, *W.L. Gore & Associates*

Unsure of what a job outside of academia looks like? Unsure of how you could fit into the workforce with an advanced degree? It may seem difficult to navigate the transition between academia and industry, but it doesn't have to be. With a little bit of information and perspective from those that have gone on to industry after graduating with an advanced degree, you'll be ready and encouraged to look for opportunities beyond graduation. This workshop is designed to give students insight into industry jobs. What skills from academia are important, what lessons we've learned, what we wish we would've known, and what you can start doing today to better prepare yourself for the job search. The session will include two brief talks followed by a Q&A panel of several industry leaders. Come join us and learn what the next steps of your career could look like!

Tuesday, June 11	**Time 6:00 - 7:10 PM**

***Plenary Lecture*: Innovation without Borders: Uniting Ideas, Technologies, and Communities** **Grand Ballroom**

Umut A. Gurkan, *Case Western Reserve University*

Biography: Professor Gurkan is the Director of the Case Biomanufacturing and Microfabrication Laboratory at Case Western Reserve University. He received his PhD in biomedical engineering from Purdue University in 2010 and completed his postdoctoral training in the Harvard-MIT Program in Health Sciences and Technology in 2012. Dr. Gurkan's research focuses on vascular biology, microcirculation, and the development of point-of-care diagnostics with a focus on global equitable access. He has authored over 100 peer-reviewed journal articles and holds 15 US Patents. Professor Gurkan's honors include the NSF CAREER Award, the Biomedical Engineering Society Rising Star Award, and the MIT Technology Review Innovator under 35 Award. Professor Gurkan is a Senior Member of the National Academy of Inventors (NAI), a member of the New Voices in Science, Engineering, and Medicine Program by the National Academies of Sciences, Engineering, and Medicine (NASEM), and a fellow of the American Institute for Medical and Biological Engineering (AIMBE).

Wednesday, June 12	**Time 3:45 - 5:15 PM**

Acknowledging and Addressing Bias in the Peer Review Process **Linwood**

Spencer Szczesny, *Pennsylvania State University*
Darryl Dickerson, *Florida International University*
NiCole Buchanan, *Michigan State University*

It is well established that all individuals harbor implicit biases/prejudices that influence our perspectives, opinions, and decisions. In many cases, these biases are innocuous heuristics that are necessary to navigate the numerous choices we make on a daily basis (e.g., choosing a name-brand medication over a generic). However, often these biases influence larger decisions and behaviors that negatively impact others and reinforce existing social inequalities. A particularly relevant example in science is the peer review process, which is the standard for determining what research gets funded and which papers get published. While many reviewers and editors may attempt to be as objective as possible, there is clear evidence that peer review is an inherently subjective determination influenced by many forms of bias. Therefore, the goal of this workshop organized by the ASME *Journal of Biomechanical Engineering* (JBME) is to broaden awareness of bias at all levels within the peer review process and inform attendees of the best practices for mitigating its impact on publication decisions. Participants will learn about efforts being implemented within JBME to minimize bias in paper publication. Additionally, they will hear from Dr. NiCole Buchanan, Professor of Psychology at Michigan State University, about the ways peer review can contribute to racial and global exclusion in science and evidence-based strategies to mitigate this effect. This workshop will help dismantle the invisible obstacles created by implicit biases in identifying the best ideas to fund and the best science to disseminate. Additionally, it will help create a scientific community that is more educated about the effects of bias on the peer review process and the best steps to mitigate its negative impact. Finally, attendees will be better equipped to identify whether a journal properly addresses bias in the peer review process so that their work is fairly assessed.

Tuesday, June 11	**Time 3:45 - 5:15 PM**

Translational Technology Pitch Competition **Maple Lawn C**

Organizer: Lyle Hood, *Pennsylvania State University*

The Translational Technology Pitch Competition at SB3C2024 will highlight the excellent translational work within our research community. This year, we will have TWO presentation-style sessions where student- and faculty-level 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 on Embers Terrace from 5:15-6:15 PM.

Thursday, June 13	Time 2:00 - 3:30 PM

Application of Generative AI in Teaching Research **Maple Lawn A**

Corinne Henak, *University of Wisconsin-Madison*
Sara Wilson, *University of Kansas*
Katie Knaus, *Colorado School of Mines*
Jacob Merson, *Rensselaer Polytechnic Institute*

The goal of this workshop is to provide participants with knowledge, hands-on experience, and discussion about using generative artificial intelligence (AI) in education and research. This workshop builds from a series of virtual ASME BED workshops held in fall 2023, which had the topics of Overview and Ethics, Applications in Education, and Applications in Research. The workshop will begin with a recap of themes brought up in the virtual workshops, along with updates in the rapidly changing landscape from fall 2023 to summer 2024. The majority of the workshop will be spent in hands-on exploration of the power and limitations of generative AI, using the tools to work on topics including: teaching or debugging code for introductory classes; writing a syllabus; writing a portion of a research paper; and writing a teaching statement for a faculty application. At the end of the session, groups will write white papers and debrief on their findings.

Thursday, June 13	Time 2:00 - 3:30 PM

Biomechanics, Bionengineering, & Biotransport (B3): Clinical Perspective **Linwood**

Alejandro Roldán-Alzate, *University of Wisconsin-Madison*
Corinne Henak, *University of Wisconsin-Madison*
Colleen Witzenburg, *University of Wisconsin-Madison*
Josh Roth, *University of Wisconsin-Madison*
Stephanie Cone, *University of Delaware*

Solution to biomechanics, bioengineering, and biotransport problems require a multidisciplinary approach. A very important aspect is the actual "user" of the solutions proposed by the engineering team which are the clinical doctors. In this workshop we will hear from clinicians from different areas including fluid dynamics and solid mechanics who will tell us about ways in which engineering has been useful for them in the clinic.

Thursday, June 13	Time 2:00 - 3:30 PM

Data-Driven Constitutive Modeling of Soft Tissue **Maple Lawn C**

Adrian Buganza Tepole, *Purdue University*
Manuel K. Rausch, *The University of Texas at Austin*

Machine learning (ML) has permeated into all areas of engineering and tissue modeling is no exception. However, alongside the democratization of ML tools through open source packages (e.g., Pytorch) and cloud computing (e.g., Google Colab), there is a

need for educational materials, including demos and benchmarks. This workshop fills that need. The goal of this workshop is to give an overview of data-driven methods to model soft tissues that might be of interest to the biomechanics community attending SB3C, and to give hands-on examples using Python Jupyter notebooks on the Google Colab with synthetic and experimental data. The workshop will start with an overview of current methods in the literature as well as the type of experimental data needed to train data-driven methods. Then, hands-on examples will show how to train the models on the available data and how to evaluate the model for stress prediction for a given deformation. Application into finite element software will also be discussed. The methods that will be presented can be used for a variety of materials (skin, rubber, blood clots, myocardium, brain) and for a variety of phenomena (hyperelasticity, viscoelasticity, damage). Particular attention will be given to methods that guarantee physics constraints a priori, just as the most common models for soft tissues do, thus allowing for flexibility while retaining physical behavior.

Thursday, June 13	**Time 2:00 - 3:30 PM**

Design Strategies to Promote Health Equity **Maple Lawn B**

Anita Singh, *Temple University*

This workshop will focus on raising awareness and informing the audience of FDA strategies that serve to promote and protect the health of diverse populations through research and communication of science that addresses healthcare disparities. Additional topics will include details of how to design a new medical device and get it approved for sale. Brief presentations on product design and development processes used in the development of medical devices, getting FDA approval for the device, and where to get help will also be offered. Additionally, the finalists of the NSF-funded Undergraduate Design Competition held at SB^{3}C will have a hands-on component aimed at improving upon their design ideas while accounting for issues related to healthcare disparity such as expanding the stakeholder community, understanding diverse patient perspectives, preferences, and unmet needs, and how to design a killer experiment that accounts for enrollment of underrepresented populations etc.

Thursday, June 13	**Time 3:30 - 5:00 PM**

Mentoring at the Margins: Best Practices for Showing up Fully for Students' Full Range of Identities **Evergreen Ballroom**

Dr. Meag-gan O'Reilly, *Inherent Value Psychology, Inc.*

You may be familiar with the wise African proverb that says: "If you want to go fast, go alone. If you want to go far, go together."

Everyone entering a mentorship relationship intuitively understands this universal truth. Mentors have wisdom that can help mentees go further than they thought. Mentees have the will to succeed and need direction. The question becomes, how do I best

give and receive in a mentoring relationship when the two people can be worlds and experiences apart?

For mentors, this workshop will lift the veil on what is required to be an emotionally intelligent mentor to mentees of diverse backgrounds and underrepresented identities. There are interpersonal dynamics that, once you are aware of them, can allow you to increase your ability to attend to and understand your mentee.

For mentees, this workshop will provide you with the encouragement and empowerment to own the constellation of who you are and where you come from. To be confident, wholehearted, and assertive in the kinds of supportive relationships you need to foster your unique growth.

Themes include:

- How to attend to a student's narrative, and foster resilience that does not continue to tie their self-worth to achievement and success?
- How to not stereotype your mentee as the one that "made it" or force them to carve a path that looks like yours?
- How to talk about marginalized identities and hardships in your life in authentic ways that do not induce hiding or shame?
- How to access your own needs for guidance and articulate your needs with interpersonal effectiveness?

As a psychologist and masterful facilitator of group spaces, Dr. Meag-gan will provide an exploratory, engaging and healing space. Mentors and mentees will be guided in hearing from each other in new and enlightening ways. Each will leave inspired to be their full selves in a deeply transformative relationship with one another.

Friday, June 14	**Time 8:30 - 11:30 AM**

CRIMSON Workshop **Loramoor A**

Alberto Figueroa Alverez, *University of Michigan*
Abhilash Malipeddi, *University of Michigan*
Elizabeth Livingston, *University of Michigan*

In biofluids, the digital twin paradigm relies on leveraging medical images and pressure and flow data to perform customized, subject-specific predictions. Flows in blood vessels and lymphatic systems include complex structured fluids, composed of a liquid phase (plasma) and a disperse phase, which includes cells and other particles such as thrombus of vastly different sizes and biophysical properties, and interactions between particles, fluid, and vessel boundaries. The development of robust and scalable schemes to study these complex interactions is a challenging task.

We recently developed a volume-filtered Eulerian-Lagrangian strategy that uses a finite element method (FEM) to solve for the fluid phase coupled with a discrete element method (DEM) for the particle phase.

In this workshop, we will demonstrate this FEM-DEM formulation for performing efficient and scalable particle-laden flow simulations for digital twinning in biofluids, implemented in the open-source framework CRIMSON.

Friday, June 14	**Time 8:30 - 11:30 AM**

FEBio Workshop **Evergreen I**

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.

Friday, June 14	**Time 8:30 - 11:30 AM**

ShapeWorks: An Integrated Open-Source Software for Characterization of Tissue Morphometrics **Loramoor B**

Andrew Anderson, *University of Utah*
Bergen Braun, *University of Utah*

Researchers in biology, engineering, and medicine commonly use form (i.e., shape) to understand function. In these fields, it is understood that abnormal morphology of the underlying anatomy often leads to impaired function – this is certainly true of the musculoskeletal system. While analysis of tissue shape from medical imaging is central in diagnosis and treatment planning, clinical observations of shape are often qualitative since quantitative description of shape requires the application of mathematics, statistics, and computing to parse the shape into a numerical representation. ShapeWorks is an open-source software that quantifies population-level shape representation derived from 3D tissue reconstructions from imaging data. ShapeWorks is integrative, user-friendly, and scalable, and its utility has been demonstrated across a range of biomedical engineering applications. This workshop aims to introduce ShapeWorks to the SB3C Community through a description of the core algorithms and a presentation of published shape models of human tissues. More advanced functionality, including multidomain modeling and statistical parametric mapping of features that accompany shape will be discussed by live demo. Ongoing research and development efforts will also be introduced, including measures we are taking to increase efficiency and broaden the application of shape analyses through the use of machine learning.

Friday, June 14	**Time 8:30 - 11:30 AM**

SimVascular Workshop **Loramoor C**

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

SimVascular (www.simvascular.org) 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 svFSIplus finite element solver incorporates fluid structure interaction capabilities, including large deformation motion with an arbitrary Lagrangian Eulerian (ALE) formulation, electrophysiology, and cardiac mechanics solvers. The solver has recently been released with a new C++ codebase. An accompanying vascular model repository provides over 250 freely available clinical data sets with image data and simulation results from different parts of the vascular anatomy (VMR, www.vascularmodel.com). 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.

Friday, June 14	**Time 8:30 - 11:30 AM**

SimVITRO Workshop **Maple Lawn C**

Robb Colbrunn, *Cleveland Clinic*
Stephanie Cone, *University of Delaware*
Josh Roth, *University of Wisconsin*
Lesley Arant, *University of Wisconsin*
Emma Coltoff, *Wake Forest Baptist Health*
Tara Nagle, *Cleveland Clinic*
Elizabeth Pace, *Cleveland Clinic*
Jeremy Loss, *Cleveland Clinic*
Callan Gillespie, *Cleveland Clinic*

Many in vitro joint biomechanics researchers, and their in vivo and in silico collaborators, attend the SB3C conference but only participate in sessions regarding their specific

joint or clinical problem of interest. Best practices, novel methodologies, and unique analysis techniques are not necessarily joint or clinical question specific. Researchers using simVITRO systems have expressed a desire for a workshop to collaborate and discuss these technical challenges and solutions with the greater biomechanical engineering community.

At this workshop we aim to present an overview of robot-based orthopedic biomechanics research to newcomers in the field; explaining the What, Why and How of 6 degree of freedom robotic in vitro joint testing, and to present more advanced topics relevant to seasoned researchers. We also want to provide in vitro, in silico, and in vivo joint biomechanics researchers the ability to network and discuss technical challenges and solutions for collecting in vitro joint biomechanics data. The workshop will include presentations by researchers working on novel solutions in this field, hands-on experience through robotic demonstrations, and break-out sessions for learning how to get the most out of your biomechanical testing system.

5 Awards

2018 Roger D. Kamm
2019 Kenneth R. Diller
2020 Dawn M. Elliott
2021 Maury L. Hull
2022 Michele Grimm
2023 Victor Barocas
2024 James E. Moore

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.

2024 James E. Moore, PhD

Jimmy Moore joined Imperial College in January 2013 as the Bagrit Chair in Medical Device Design in the Department of Bioengineering. His research interests include cardiovascular biomechanics, lymphatic biomechanics and medical device entrepreneurship. His research on lymphatic system biomechanics has provided unprecedented insight into the pumping characteristics of the system and the transport of nitric oxide, antigens, and chemokines in lymphatic tissues. Jimmy is currently developing two technologies for preventing and resolving secondary lymphoedema, which typically forms subsequent to cancer surgery. Along with his funding from government, charity, and industry sources, he has received 13 patents for medical devices and testing equipment. Jimmy has also co-founded four startup companies, and produced reports on the growth of the UK MedTech sector. He has developed two novel educational programs at Imperial College in medical device entrepreneurship: a masters program that has produced 10 startups, and a bachelor of science program in biotech venture management. Throughout these experiences, Jimmy has amassed a long list of mistakes.

Van C. Mow Medal

2005 Kyriacos A. Athanasiou
2006 Robert Lie-Yuan Sah
2007 Lori A. Setton
2008 Scott L. Delp
2009 Michael Sacks
2010 Tony M. Keaveny
2011 David A. Vorp
2012 John Bischof
2013 Jeffrey Weiss
2014 Christopher R. Jacobs
2015 Dawn M. Elliott
2016 Beth A. Winkelstein
2017 Richard R. Neptune
2018 Jeffrey W. Holmes
2019 Tony Jun Huangm
2020 Stavros Thomopoulos
2021 Rafael V. Davalos
2022 Robert L. Mauck
2023 Alison Marsden
2024 Thao D. Nguyen

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.

2024 Thao Nguyen, Ph.D.

Thao (Vicky) Nguyen is the Marlin U. Zimmerman Faculty Scholar and Professor in the Department of Mechanical Engineering at Johns Hopkins University. She also holds secondary appointments in Materials Science and Ophthalmology. She received her S.B. in 1998 from MIT, her M.S. in 2001, and her Ph.D. in 2004 from Stanford University, all in mechanical engineering. Her research focuses on the biomechanics of soft tissues, active polymers, and biomaterials. Dr. Nguyen has received numerous awards and honors for her work, including the 2008 Presidential Early Career Award for Scientists and Engineers (PECASE) and NNSA Office of Defense Programs Early Career Science and Engineer Award for her work on modeling the thermomechanical behavior of shape memory polymers. In 2013, she received the NSF Career Award for studying the micromechanisms of growth and remodeling of collagenous tissues, the Eshelby Mechanics Award for Young Faculty, and the Sia Nemat-Nasser Early Career Award from the ASME Materials Division. In 2015 She received the T.J.R. Hughes Young Investigator Award from the ASME Applied Mechanics Division. Dr. Nguyen was elected Fellow of ASME in 2022 and Fellow of the American Institute for Medical and Biological Engineering (AIMBE) in 2023. She served as a member of the Board of Directors of the Society of Engineering Science (SES) from 2017-2021 and was elected the President of SES for 2020. She has also held many leadership positions in ASME, including Chair of the Mechanics of Soft Materials TCOM of the Applied Mech Division, the Nanomaterials for Medicine and Biology TCOM of the Materials Division, and the Solid Mechanics TCOM of the Bioengineering Division. She was Associate Editor for the ASME journals Applied Mechanics Reviews and Journal of Biomechanical Engineering. She is currently a (co)Editor-in-Chief of the Journal of Biomechanical Engineering.

Y.C. Fung Early Career Medal

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
2024 Adrian Buganza Tepole

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.

2024 Adrian Buganza Tepole, PhD

Dr. Buganza Tepole is an Associate Professor of Mechanical Engineering and Biomedical Engineering (courtesy) at Purdue University. He obtained his Ph.D. in Mechanical Engineering from Stanford University in 2015 and was a postdoctoral fellow at Harvard University before joining Purdue as a faculty member in 2016. He was also a Miller Visiting Professor at UC Berkeley during Spring 2022. His group studies the interplay between mechanics and mechanobiology of soft tissue, with skin as a model system. Using computational simulation, machine learning, and experimentation, his group seeks to characterize the multi-scale mechanics of skin to understand the fundamental mechanisms of tissue's mechano-adaptation in order to improve clinical diagnostics and interventional tools.

H.R. Lissner Medal

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
2024 Marjolein C. H. van der Meulen

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.

2024 Marjolein C. H. van der Meulen, PhD

Marjolein C. H. van der Meulen is the James M. & Marsha McCormick Director of Biomedical Engineering and Swanson Professor of Biomedical Engineering in the Nancy E. and Peter C. Meinig School of Biomedical Engineering and the Sibley School of Mechanical and Aerospace Engineering at Cornell University. She also is a Senior Scientist at the Hospital for Special Surgery. Marjolein received her S.B. from MIT (1987), and MS (1989) and PhD (1993) from Stanford University, all in Mechanical Engineering. Before joining the faculty at Cornell, she worked as a biomedical engineer at the Rehabilitation R&D Center of the Department of Veterans Affairs, in Palo Alto, CA (1993-96). Marjolein has received an NIH FIRST Award (1995) and an NSF Faculty Early Career Development Award (1999). In 2018 she received the Adele L. Boskey Award from the American Society of Bone & Mineral Research (ASBMR), and in 2015 the Women's Leadership Award from the Orthopaedic Research Society (ORS). She has been recognized with both college and departmental teaching awards, including most recently from the COE in 2011. She also has received the COE Diversity Award (2006) and the Ronay & Richard Menschel Provost's Award for Distinguished Scholarship (2003). Marjolein is a fellow of the American Association for the Advancement of Science, American Institute of Medical and Biological Engineering, ASBMR, ASME, Biomedical Engineering Society (BMES) and ORS. Marjolein is the treasurer of the World Council of Biomechanics. Major prior roles include: President, ORS (2022-23); charter member, NIH Skeletal Biology Structure and Regeneration study section (2010-14); and, member-at-large, BMES Board of Directors (2015-19).

Edward Grood Interdisciplinary Team Science Medal

2023 Dawn Elliot & Robert Mauck 2024 DASI Simulation Team

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

2024 DASI Simulation Team

Lakshmi Prasad Dasi, PhD, is an established researcher in the field of prosthetic heart valves, cardiovascular biomechanics, biomaterials, and devices. He is currently Professor of Biomedical Engineering, at Georgia Institute of Technology while holding the Rozelle Vanda Wesley Endowed Professorship. He is also Co-Founder and Chief Technology Officer of DASI Simulations LLC and YoungHeartValve Inc. He has held positions at The Ohio State University, and Colorado State University previously. He is a Fellow of the American College of Cardiology (FACC) as well as Fellow of the American Institute for Medical and Biological Engineering (FAIMBE). Prof. Dasi earned his Ph.D. from Georgia Institute of Technology in 2004 with a focus in fluid dynamics and turbulence. Dr. Dasi's research corpus includes over 200 peer reviewed articles, over 300 conference presentations, 9 awarded patents, and has garnered over $15M in funding from NIH, NSF, AHA, and private foundations. He has mentored over 20 graduate students, 10 postdocs and innumerable undergraduate students during his career. He is an active supporter of diversity and outreach initiatives such as the NSF funded AGEP and REU programs; serves on multiple editorial boards and federal grant review panels; and has organized many symposiums/sessions on heart valve engineering at national and international meetings such as SB3C, HVS and the U.S. National Congress for Theoretical and Applied Mechanics.

Prof. Dasi Co-Founder DASI Simulations LLC a startup in 2020 which has fundraised over $7M and translated technology developed in his lab into the clinic. As part of his commercialization efforts, he has led two software-as-medical device (SAMD) products, PrecisionTAVI and DASI Dimensions, through FDA clearance and reimbursement from Centers of Medicare and Medicaid Services (CMS). More than 100 US Hospitals have utilized these products to date with PrecisionTAVI utilized in over 1100 patients to date.

The DASI Simulation Team includes Dr. Dasi and his collaborators and former and current trainees. Clinical collaborators include: Dr. Vinod Thourani, Dr. Pradeep Yadav, Dr. Venkat Polsani, and Dr. Mani Vannan (Piedmont Hospital, Atlanta GA), and Dr. Scott Lilly (Ohio State University).

Current Collaborators include: Dr. Alessandro Veneziani (Associate Professor, Emory University).

Former trainees include: Dr. Hoda Hatoum (Assistant Professor, Michigan Technology University), Dr. Huang Chen (Assistant Professor, University of Nevada), Dr. Fateme Esmailie (Assistant Professor, University of North Texas), Dr. Milad Samaee (Senior R&D Engineer, Medtronic), and Beom Jun Lee (Data Science Engineer, Dasi Simulations), Dr. Breandan Yeats (Product Development Engineer, Dasi Simulations), Dr. Sri Krishna Sivakumar (Product Development Engineer, Dasi Simulations), Dr. Shelley Gooden (Product Development Engineer, Dasi Simulations).

Current trainees include: Taylor Nicole Sirset-Becker (Doctoral Candidate, Biomedical Sciences, Ohio State University) and Imran Shah, Aniket Venkatesh, and Courtney Ream (Doctoral Candidates, Biomedical Engineering, Georgia Tech/Emory University).

Savio L-Y. Woo Translational Biomechanics 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
2024 Guy M. Genin

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.

2024 Guy M. Genin, PhD

Guy M. Genin applies fundamental concepts from engineering to control and probe living systems. His work advances surgical techniques, molecular detection, and therapies for inflammation, wound healing, and fibrosis. Genin serves as the Harold and Kathleen Faught Professor of Mechanical Engineering at Washington University, with appointments in Biomedical Engineering and Neurological Surgery. Genin co-directs the NSF Science and Technology Center for Engineering Mechanobiology and serves on the U.S. Interagency Modeling and Analysis Group's steering committee and the Society of Engineering Science Board of Directors. A fellow of ASME, AIMBE, IAMBE, and the U.S. National Academy of Inventors, Genin is chief engineer of Caeli Vascular, Inc., and CTO of Inflexion Vascular, LLC. At Xi'an Jiaotong University, he serves as Thousand Talents Plan Professor of Life Sciences, and at Tsinghua University he is Distinguished Visiting Professor. Additional disclosures are available upon request. He is currently an associate editor of Biophysical Journal. Genin is the recipient of awards including a Research Career Award from the NIH; the Changjiang Scholar Award from the Chinese Ministry of Education; the Eads Medal from the St. Louis Academy of Science; the Skalak Award from the ASME; and, if the ASME riot police are able to hold the ASME SB3C crowd at bay long enough, the ASME Woo Medal. He earned bachelor's and master's degrees from Case Western Reserve University and master's and doctoral degrees from Harvard, and completed postdoctoral training at Cambridge and Brown.

Award Lecture Abstracts

Wednesday, June 12, 2024, 9:45 - 11:15 AM, Grand Ballroom

James Moore, *Robert M. Nerem Education and Mentorship Medal*

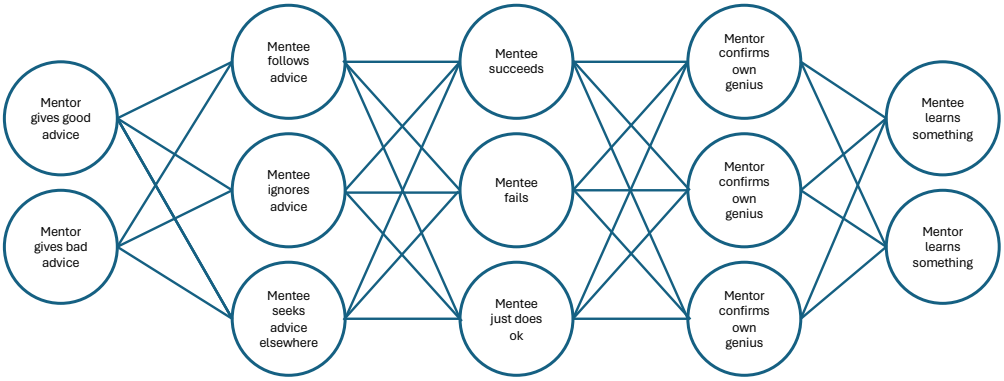
Title: Failure-Based Mentoring: Shallow Learning?

In Homer's Odyssey, Mentor was an inept old man whose advice only became useful when Athena assumed his form.

In 1995, a well-respected book on business management described one of the jobs of a mentor as "giving initially unclear or unacceptable advice that has value in a given situation."

Some say:

- Free advice is often worth what you paid for it.
- Failures are sometimes costly but they provide infinite learning value.
- If we are observant and lucky, we find exquisite mentoring in different forms.



And in the end, the mentoring we take is equal to the mentoring we make.

Vicky Nguyen, *Van C. Mow Medal*

Title: The Biomechanical Behavior of the Optic Nerve Head in Glaucoma

The optic nerve head is a small region in the posterior eyewall, where the axons of the retinal ganglion cells gather to exit the eye and form the optic nerve. The lamina cribrosa is a connective tissue structure in the optic nerve head composed of a stack of perforated plates that resemble a collagen beam network structure when viewed en face. The collagen beams support resident astrocytes and axons of the retinal ganglion cells as they exit the eye. Variations in the mechanical properties of the lamina cribrosa may contribute to the susceptibility and progression of glaucoma. Mouse models of glaucoma have been used to study the biomechanical effects of glaucomatous axon damage. The mouse optic nerve head does not have a connective tissue lamina cribrosa. It contains instead a network of astrocytes with long processes organized into structures that are evocative of the collagen beam structure of the human lamina cribrosa. In this presentation, I will describe our efforts to understand the structure-properties relationship of the optic nerve head tissues of human and mouse eyes. We developed a method using spectral domain optical coherence tomography (SD-OCT) and digital volume correlation (DVC) to measure in vivo the strain response of the optic nerve head tissues to changes in the intraocular pressure (IOP) in glaucoma patients by surgery or glaucoma medication. We recently adapted the method to measure the remodeling strain of the tissues years after IOP lowering. For mouse eyes, we developed ex-vivo inflation tests with confocal microscopy and DVC to measure the mechanical behavior of the astrocytic lamina under physiological conditions. We also developed methods to quantitatively characterize the beam/pore network microstructure of the lamina cribrosa and astrocytic lamina. This has led to a greater understanding of how the lamina structures remodel with glaucoma.

Adrian Buganza Tepole, *Y. C. Fung Early Career Award*

Title: Data-driven modeling of skin biophysics

Skin is the largest organ in our body and it serves essential roles including protection against outside harm, thermoregulation, and hosting the sense of touch. Skin, like most living tissue, adapts to mechanical cues, for example after wound healing, reconstructive surgery, or in the technique known as tissue expansion. We have created computational models that combine mechanics and mechanobiology to describe the deformation, growth, and remodeling of skin, and applied these models to clinically relevant scenarios. This talk will showcase computational models that leverage the recent explosion in machine learning (ML) and artificial intelligence (AI) algorithms. One application of interest is skin growth in tissue expansion, a popular reconstructive surgery technique that grows new skin in response to sustained supra-physiological loading. We have created computational models that combine mechanics and mechanobiology to describe the deformation and growth of expanded skin. Together with experiments on a porcine model, and leveraging ML tools such as multi-fidelity Gaussian processes, we have performed Bayesian inference to learn mechanistically how skin grows in response to stretch. A similar approach has allowed us to capture the coupled mechanobiology processes leading to scar formation in wound healing. One central aspect in creating these multi-scale multi-field computational models is the consideration of uncertainty in mechanics and biology of tissues, which we accomplish with novel data-driven methods. Accounting for the different sources of uncertainty can enable trustworthy results and further advance the use of computational models in clinical settings.

Thursday, June 13, 2024, 9:45 - 10:45 AM, Grand Ballroom

Marjolein van der Meulen, *H. R. Lissner Medal*

Title: Reflections on My Path Through Orthopaedic Biomechanics

The musculoskeletal system is the load-bearing and locomotor structure for all vertebrates. The skeleton bears high loads and has developed to uniquely fulfill its function. Many biological structures actively and continuously adapt to their functions in response to mechanical, biochemical and metabolic environments, and the adult organ is the product of these adaptive influences throughout growth and development. This principle is particularly true in the skeleton in which biophysical stimuli are a major determinant of bone tissue quantity and microstructure. My career has focused on understanding these processes and tissues. My successes are being recognized through the ASME Lissner Medal, which provides an opportunity to reflect. In many ways my life and career trajectories reflect adaptation similar to those in the orthopaedic tissues to which I have dedicated my research efforts. In this lecture, I hope to share the "environmental influences" on my path including family, mentors, role models, protegés and colleagues and how they have shaped my science, career and community.

Friday, June 14, 2024, 6:00 - 7:00 PM, Grand Ballrooom

DASI Simulation Team, *Edward Grood Medal*

Title: Changing the Clinical Paradigm in Structural Heart with Predictive Modeling: Teamwork Makes The Dream Work

Heart diseases remains the number one killer where most pathologies impact the structure and function of the heart necessitating surgical or interventional treatment. Trans-catheter interventions such as trans-catheter aortic valve replacement (TAVR) is one such example that has revolutionized the treatment for patients with aortic stenosis. However, the quality of treatment outcomes widely varies with respect to operator experience level as well as the complexity of the structural pathology itself. Not just limited to TAVR, these variations in outcomes plague interventional and surgical therapies resulting in thousands of preventable deaths and billions of additional health care costs in the United States each year. Furthermore, beyond acute clinical outcomes there is also a major impact on long term outcomes ranging from early degeneration of the implant or viability of further treatments. The DASI Simulations team not only uncovered new knowledge to understand the variability in TAVR complications but also developed new technologies

to apply the knowledge into predictive models that can be deployed in the clinic. In this talk we will present new artificial intelligence and predictive modeling frame works that are tailored to change the clinical paradigm with new decision support software-as-a-medical device products. The origin of these models from experimental work and the development of AI and predictive models will be discussed. We will also discuss the importance of teamwork as it pertains to translating technology towards changing clinical paradigm. Here the challenges from the perspective of a startup company navigating the complex playing field with established industry, regulatory and reimbursement bodies will also be discussed.

Guy Genin, *Savio L-Y. Woo Medal*

Title: Navigating Vascular Challenges in Stroke Treatment: Insights from Plant Mechanobiology

In the treatment of ischemic stroke, prompt surgical restoration of blood flow is crucial for favorable patient outcomes. However, navigating surgical tools through the vasculature to reach the blockage site can be challenging, with delays of mere minutes leading to poorer long-term prognoses. One critical class of navigation failures, known as "herniation," can unexpectedly delay surgery by tens of minutes. Herniation occurs when a an intravascular catheter suddenly drops down around a bend in the vascular access, causing the surgeon to lose control of the distal end and often requiring the removal and replacement of the entire catheter set. We demonstrate that these navigation failures can be predicted by treating herniation as a mechanical bifurcation. Drawing inspiration from mechanobiological mechanisms present in epidermal cells of plant shoots and roots, we present novel design adaptations for catheters that can reduce the likelihood of these bifurcations. By understanding and addressing the challenges of vascular navigation, we aim to improve the efficiency and success of stroke treatment procedures.

6 Scientific Sessions

SB^{3}C 2024 Meeting Scientific Podium Sessions

Tuesday, June 11	4:15PM–5:45PM CDT

AI & Machine Learning in Biofluids

Session Chairs: **Amir Arzani**, *University of Utah*
Hoda Hatoum, *Michigan Technological University*

Loramoor C

4:15PM **Generative Modeling of Congenital Heart Defect Anatomies for Surrogate Cardiac Flow Simulations**
Fanwei Kong, Alison Marsden
Stanford University

4:30PM **Towards 3D-3C Velocity Maps From Single Camera 2D-2C PTV Using Physics-Informed Neural Networks**
Amin Pashai Kalajahi, Zayeed Bin Mamun, Forouzan Naderi, Sangeeta Yadav, Roshan D'Souza
University of Wisconsin-Milwaukee

4:45PM **Modeling Pharyngeal Airway Pressure Distributions With Neural Networks**
Jun Tao Cui[1], Kok Ren Choy[1], Sanghun Sin[2], Mark E. Wagshul[3], Jayaram K. Udupa[4], Raanan Arens[2], David M. Wootton[1]
[1]Cooper Union, [2]Children's Hospital at Montefiore, [3]Albert Einstein College of Medicine, [4]University of Pennsylvania

5:00PM **Automated Bladder Segmentation of 3D Dynamic MRI for Urodynamic Analysis Using Deep Learning**
Labib Shahid, Juan Pablo Gonzalez-Pereira, Jennifer Franck, Alejandro Roldán-Alzate
University of Wisconsin-Madison

5:15PM **Synthesizing Multi-Branch Aortic Vessels Using Diffusion Model**
Pan Du, Xiaozhi Zhu, Jian-xun Wang
University of Notre Dame

5:30PM **Accuracy of Physics-Informed Neural Networks Under Laminar and Turbulent-Like Aortic Flow Conditions**
Arman Aghaee, M. Owais Khan
Toronto Metropolitan University

Tuesday, June 11	4:15PM–5:45PM CDT

Cartilage Structure, Lubrication & Mechanics

Session Chairs: **Corinne Henak**, *University of Wisconsin-Madison*
Matthew Fisher, *NC State and UNC Chapel Hill*

Maple Lawn B

4:15PM **Distinct Molecular and Structural Traits of Permanent Versus Transient Cartilage in Early Development**
Jiaqi Xiang[1], Bryan Kwok[1], Mingyue Fan[1], Meghan Kupratis[2], Sara Tufa[3], Douglas Keene[3], Robert Mauck[2], Nathaniel Dyment[2], Eiki Koyama[4], Lin Han[1]
[1]Drexel University, [2]University of Pennsylvania, [3]Shriners Hospital for Children, [4]Children's Hospital of Philadelphia

4:30PM **Sustained Structural and Functional Deficits in the Porcine Knee Six Months Following Meniscus Destabilization**
Brendan Stoeckl[1,2], Stephen Ching[1], Veridiana Nadruz[1], Kyle Meadows[3], John Peloquin[3], Owen McGroary[1], Madeline Boyes[1], Lorielle Laforest[1,2], Tim Teinturier[1], Miltiadis Zgonis[1,2], Dawn Elliott[3], Robert Mauck[1,2], Michael Hast[1], Thomas Schaer[1], David Steinberg[1,2]
[1]University of Pennsylvania, [2]CMC VA Medical Center, [3]University of Delaware

4:45PM **Impact of Lubricant Properties on the Synergistic Lubrication of Articular Cartilage**
Emily Lambeth, Brooklyn Tyndall, Sean Farrington, David Burris, Norman Wagner, Christopher Price
University of Delaware

5:00PM **The Protective Effect of Synovial Fluid Against Cartilage Fatigue Wear Is Concentration Dependent**
C.V. Sise, Courtney Petersen, Anna Ashford, Sinisa Vukelic, Clark Hung, Gerard Ateshian
Columbia University

5:15PM **Cartilage Strain Predicts Patient-Reported Outcomes Six Months Post-ACL Reconstruction**
Emily Miller[1], Timothy Lowe[1], Hongtian Zhu[1], Woowon Lee[1], Daniel Stokes[2], Rachel Frank[2], Jonathan Bravman[2], Eric McCarty[2], Nancy Emery[1], Corey Neu[1]
[1]University of Colorado, Boulder, [2]University of Colorado, Anschutz

5:30PM **Influence of Labrum Size and Material Parameters on Cartilage Mechanics in Hips With Cam FAIS**
Luke Hudson[1,2], Travis Maak[1], Andrew Anderson[1,2], Gerard Ateshian[3], Jeffrey Weiss[1,2]
[1]University of Utah, [2]Scientific Computing and Imaging Institute, [3]Columbia University

Tuesday, June 11	4:15PM–5:45PM CDT

Fiber Mechanics Symposium

Session Chairs: Ian Sigal, *University of Pittsburgh* **Maple Lawn C**
Jason Hua, *University of Mississippi*

4:15PM **Displacement Propagation in Prestressed Two-Dimensional Fibrous Networks**
Ashutosh Mishra, Hamed Hatami-Marbini
University of Illinois at Chicago

4:30PM **A Continuum Model May Artefactually Homogenize Local Strains While Also Artefactually Disrupting Long Distance Strain Transmission**
Xuehuan He[1], Mohammad Islam[2], Bingrui Wang[1], Ian Sigal[1]
[1]University of Pittsburgh, [2]University of Texas Rio at Grande Valley

4:45PM **Effect of Collagen Fiber Tortuosity Distribution on the Mechanical Response of Arterial Tissue**
Yamnesh Agrawal, Ronald N Fortunato, Alireza Asadbeygi, Mehdi Ramezanpour, Michael R Hill, Anne M. Robertson, Spandan Maiti
University of Pittsburgh

5:00PM **Physics Based Machine Learned Constitutive Models for Fibrous Materials**
Jacob Merson, Nishan Parvez
Rensselaer Polytechnic Institute

5:15PM **An Interpenetrating-Network Theory of the Cytoskeletal Networks in Living Cells**
Haiqian Yang, Ming Guo
Massachusetts Institute of Technology

5:30PM **Fiber Alignment and Tortuosity Influence the Load-Carrying Performance of the Lamina Cribrosa Collagen Beams**
Yi Hua[1], Lindee Wilson[1], Ian Sigal[2]
[1]University of Mississippi, [2]University of Pittsburgh

Tuesday, June 11	4:15PM–5:45PM CDT

Mechanobiology in Cancer

Session Chairs: **Alisa Morss Clyne**, *University of Maryland*
M. K. Sewell-Loftin, *University of Alabama at Birmingham*

Maple Lawn A

4:15PM **YAP/TAZ Activity Regulates a Mechano-Metabolic Crosstalk During 3D Breast Cancer Invasion**
Haider Ali[1], Hrishika Rai[1], Adil Khan[1], Jacopo Ferruzzi[1,2]
[1]University of Texas at Dallas, [2]University of Texas Southwestern Medical Center

4:30PM **Mechanical Stimulation and Hyaluronic Acid Alter Ovarian Cancer Cell Behaviors**
Maranda Kramer, Allyson Criswell, Kamari Marzette, M.K. Sewell-Loftin
University of Alabama at Birmingham

4:45PM **A Cell-Based and AI-Accelerated Computational Framework for the Prediction of Mechanosensitive Tumour Growth**
Irish Senthilkumar, Enda Howley, Eoin McEvoy
University of Galway

5:00PM **Decoding the Quantitative Relationship Between Mechanical Forces on Cell Nucleus and YAP Protein Translocation**
Miao Huang[1,2], Maedeh Lotfi[1], Kevin Connell[1], Malisa Sarntinoranont[1], Xin Tang[1,2]
[1]University of Florida, [2]UF Health Cancer Center

5:15PM **Intratumoral Compression Promotes Proneural to Mesenchymal Transitions in Glioblastoma**
Allison McKenzie Johnson, Lylah Cox, Joseph Chen
University of Louisville

Tuesday, June 11	4:15PM–5:45PM CDT

Modeling Cardiac and Coronary Artery Flow and Physiology

Session Chairs: Hannah Cebull, *Emory University*
Vitaliy Rayz, *Purdue University*

Loramoor A

4:15PM **Synthesis of Coronary Arterial Networks From Myocardial Blood Volume Maps**
Mostafa Mahmoudi[1,2], Amirhossein Arzani[3,4], Kim-Lien Nguyen[1,2]
[1]University of California, Los Angeles, [2]VA Greater Los Angeles Healthcare System, [3]University of Utah, [4]Scientific Computing and Imaging Institute

4:30PM **Hemodynamic Assessment of Coronary Atherosclerotic Lesions in Elderly Patients With Myocardial Infarction: a Longitudinal Study**
Diego Gallo[1], Maurizio Lodi Rizzini[1], Alessandro Candreva[1,2], Jean Paul Aben[3], Claudio Chiastra[1], Barbara Stähli[2], Simone Biscaglia[4], Gianluca Campo[4], Umberto Morbiducci[1]
[1]Politecnico di Torino, [2]University Hospital Zurich, [3]Pie Medical Imaging, [4]University of Ferrara

4:45PM **A Multi-Physics Model of Contrast Injection in the Coronary Arteries to Assess Index of Microcirculatory Resistance**
Haizhou Yang[1], Jiyang Zhang[2], Ismael Assi[3], Brahmajee Nallamothu[1], Krishna Garikipati[4], C. Alberto Figueroa[1]
[1]University of Michigan, [2]Sichuan University, [3]University of Cincinnati, [4]University of Southern California

5:00PM **Personalized and Uncertainty-Aware Virtual Planning for Coronary Artery Bypass Graft Surgery Informed by CT Myocardial Perfusion Imaging**
Karthik Menon[1], Zachary Sexton[1], Owais Khan[2], Daniele Schiavazzi[3], Koen Nieman[1], Alison Marsden[1]
[1]Stanford University, [2]Toronto Metropolitan University, [3]University of Notre Dame

5:15PM **The Importance of the Left Atrial Appendage on the Flow in the Atrium**
Ahmad Bshennaty[1], Brennan Vogl[1], Alessandra Bravo[2], Agata Sularz[3], Anders Kramer[4], Jens Nielsen-Kudsk[4], Yuheng Jia[5], Ole De Backer[5], Matthieu De Beule[2], Mohamad Alkhouli[3], Hoda Hatoum[1]
[1]Michigan Technological University, [2]FEops, [3]Mayo Clinic, [4]Aarhus University Hospital, [5]Copenhagen University Hospital

5:30PM **Evaluation of Flow Dynamics in the Left Atrium After Hybrid Ablation for Atrial Fibrillation**
Brennan Vogl[1], Grace Hoeppner[1], Hailey LaBonte[1], Emily Vitale[1], Agata Sularz[2], Alejandra Chavez-Ponce[2], Ammar Killu[2], Mohamad Alkhouli[2], Hoda Hatoum[1]
[1]Michigan Technological University, [2]Mayo Clinic

Spine & Disc

Session Chairs: **Deva Chan**, *Purdue University*
Daniel Cortes, *Pennsylvania State University*

Linwood

4:15PM **Low Back Pain Treatment Options Based on Statistical Shape Models: Spinal Decompression Surgery Versus Non-Operative**
Mary Foltz, Alexandra Seidenstein, Amit Jain, Jill Middendorf
Johns Hopkins University

4:30PM **A Novel Approach to Create the Mean Lumbar Spine Model Using Statistical Shape Modeling for Finite Element Analysis**
Faris Almalki[1,2], Daniel Cortes[2]
[1]University of Jeddah, [2]Penn State University

4:45PM **Correlation of Pain Symptoms in Military Fighter Pilots With Spinal Morphology Obtained Using Supine and Upright MRI Scans**
Rachel Cutlan[1], Vaibhav Porwal[2], Riley McCarty[2], Cory Everts[2,3], Alok Shah[2], Amy Nader[2], Keeley Hamill[2], Narayan Yoganandan[2,4], Keri Hainsworth[2], L. Tugan Muftuler[2], Timothy Meier[2], Hershel Raff[2], Peter Le[5], Chris Dooley[5], Benjamin Gerds[3], Brian Stemper[1,2,4]
[1]Marquette University and Medical College of Wisconsin, [2]Medical College of Wisconsin, [3]115th Fighter Wing, Wisconsin Air National Guard, [4]Zablocki Veterans Affairs Medical Center, [5]Air Force Research Laboratory

5:00PM **In Vivo Lumbar Intervertebral Disc Strain in Flexion, Extension, and Diurnal Motions: Variation With Age in Healthy Adults**
John Peloquin, Harrah Newman, Edward Vresilovic, Dawn Elliott
University of Delaware

5:15PM **Mechanical and Structural Changes to the Annulus Fibrosus in Response to Cyclic Loading: an I-PREDICT Study**
Jack Seifert[1,2,3], Lance Frazer[4], Dennis Maiman[2], Alok Shah[2,3], Narayan Yoganandan[2,3], Keith King[5], James Sheehy[5], Glenn Paskoff[5], Timothy Bentley[6], Daniel Nicolella[4], Brian Stemper[1,2,3]
[1]Marquette University, [2]Medical College of Wisconsin, [3]Zablocki Veterans Affairs Medical Center, [4]Southwest Research Institute, [5]Naval Air Warfare Center, [6]Office of Naval Research

5:30PM **Biomechanicnal Comparison of Commonly Used Three Different Material Composition Used in Cervical Disc Arthroplasty**
Yuvaraj Purushothaman[1], Resetar Ethan[2], Hoon Choi[1], Abdulbaki Kozan[1], Narayan Yoganandan[3]
[1]Cleveland Clinic Florida, [2]University Of Michigan, [3]Medical College Of Wisconsin

Tuesday, June 11	4:15PM–5:45PM CDT

Valvular Biomechanics

Session Chairs: **Rana Zakerzadeh**, *Duquesne University*
Rouzbeh Amini, *Northeastern University*

Loramoor B

4:15PM **Patient-Specific Long-Term Prediction of Transcatheter Edge-to-Edge Mitral Valve Repair**
Natalie Simonian[1], Sneha Vakamudi[2], Mark Pirwitz[2], Michael Sacks[1]
[1]University of Texas at Austin, [2]Ascension Texas Cardiovascular

4:30PM **The Impact of Sex and Hormone-Differences on Heart Valve Disease**
Colton Kostelnik[1], Chien-Yu Lin[1], Magda Piekarska[2], Gaweda Boguslaw[2], Austin Goodyke[2], Tomasz Timek[2], Manuel Rausch[1]
[1]University of Texas at Austin, [2]Corewell Health

4:45PM **Device Deployment and the Onset of Structural Valve Degeneration: Simulation of Transcatheter Aortic Valve Implantation In Vitro**
Sam Boxwell[1], Dylan Armfield[2], William Hickey[3], Scott Cook[3], Patricia Kelly[3], Philip Cardiff[2], Laoise McNamara[1]
[1]University of Galway, [2]University College Dublin, [3]Boston Scientific Corporation

5:00PM **A Parametric Analysis of Chordae Tendineae Density and Branching in Finite Element Simulations of Mitral Valve Closure**
Nicolas Mangine[1], Patricia Sabin[1], Devin Laurance[1], Wensi Wu[1], Christian Herz[1], Christopher Zelonis[1], Csaba Pinter[2], Andras Lasso[3], Stephen Ching[1], Steve Maas[4], Jeff Weiss[4], Metthew Joley[1]
[1]Children's Hospital of Philadelphia, [2]EBATINCA, [3]Queens University, [4]University of Utah

5:15PM **Biomechanical Impact of Neochordoplasty and Leaflet Resection for Mitral Valve Prolapse Repair**
Gediminas Gaidulis[1], Muralidhar Padala[2], Lakshmi Dasi[1]
[1]Georgia Institute of Technology, [2]Nyra Medical Inc.

5:30PM **A Neural-Network Finite-Element Approach to Modeling of Multibody Contact of Trileaflet Heart Valves**
Kenneth Meyer, Christian Goodbrake, Shruti Motiwale, Michael Sacks
Oden Institute for Computational Engineering and Sciences

Biomedical Devices and Materials for Global Health Solutions

Session Chairs: **Byron D. Erath**, *Clarkson University*
Mahsa Dabagh, *University of Wisconsin-Milwaukee*

Maple Lawn C

8:00AM **A Soft 3D Microarchitected Pressure Sensor for Urethral Monitoring**
Nakhiah Goulbourne
University of Michigan

8:15AM **Development and In-Vitro Validation of a Simple 1D Mechanical Model for Pediatric Vascular Patch Planning**
Shannen Kizilski[1,2], Dominic Recco[1,2], Jocelyn Davee[1], Patrick Earley[1], Nicholas Kneier[1], Lauren Marshall[1], Peter Hammer[1,2], David Hoganson[1,2]
[1]Boston Children's Hospital, [2]Harvard Medical School

8:30AM **Machining Living Osteochondral Allografts for Joint ResurfacingIn A Canine Patellofemoral Joint Model**
Katherine Spack[1], Chantelle Bozynski[2], Courtney Petersen[1], Joseph Viola[1], Peter Shyu[1], Edward Guo[1], Clark Hung[1], James Cook[2], Gerard Ateshian[1]
[1]Columbia University, [2]University of Missouri

8:45AM **Detecting Cardiac States With Photoplethysmography Wearables: Implications for Out-of-Hospital Cardiac Arrest Detection**
Mahsa Khalili, Saud Lingawi, Jacob Hutton, Babak Shadgan, Jim Christenson, Brian Grunau, Calvin Kuo
University of British Columbia

9:00AM **Refined Endovascular Solutions: Leveraging 3D Printing in Shape Memory Polymer-Based Embolization for Intracranial Aneurysm Rupture Prevention**
Tanner Cabaniss[1], Yingtao Liu[1], Bradley Bohnstedt[2], Chung-Hao Lee[3]
[1]University of Oklahoma, [2]Indiana University School of Medicine, [3]University of California, Riverside

9:15AM **Assessment of Clot Adhesion Strength on Endothelial Cells and Biocompatible Materials**
Vikas Kannojiya[1], Sara Almasy[1], Ian Goetz[1], Jose Monclova[1], Francesco Costanzo[1], Keefe Manning[1,2]
[1]Pennsylvania State University, [2]Penn State Hershey Medical Center

Wednesday, June 12	8:00AM–9:30AM CDT

Cancer Mechanics I

Session Chairs: **Meenal Datta**, *University of Notre Dame*
Jacopo Ferruzzi, *University of Texas at Dallas*

Loramoor A

8:00AM **Towards Cancer Mechano-Therapy: YAP as an Emerging Mechanical Target to Eradicate Tumors**
Miao Huang[1,2], Mu Yu[1,2], Chase Stallings[1], HeYang Wang[3], Lu Li[1], Conner Traugot[1], Mingyi Xie[1,2], Youhua Tan[4], Franziska Haderk[5], Juan Guan[6], Lizi Wu[1,2], Xin Tang[1,2]
[1]University of Florida, [2]UF Health Cancer Center (UFHCC), [3]Northwestern University, [4]Hong Kong Polytechnic University, [5]University of California, San Francisco, [6]University of Texas at Austin

8:15AM **Multiscale Mechanoimmunology: From Molecular Mechanisms to Precision Therapies**
Kolade Adebowale
Harvard University

8:30AM **Reverse-Engineering Cancer Mechanics: Piezo Regulates Epithelial Topology and Promotes Precision in Organ Size Control**
Nilay Kumar, Mayesha Mim, Megan Levis, Maria Unger, Gabriel Miranda, Trent Robinett, Jeremiah Zartman
University of Notre Dame

8:45AM **Development of a High-Throughput Drug Screening Platform Via Pipetting Gel Droplet Micro-Organoids Models**
Daniel Montes Pinzon, Angela Taglione, Fei Fan, Liao Chen, Xin Lu, Sharon Stack, Donny Hanjaya-Putra, Hsueh-Chia Chang
University of Notre Dame

9:00AM **A 3D Model for the Study of Macrophage-Induced Solid Stress**
Alice Burchett, Saeed Siri, Meenal Datta
University of Notre Dame

9:15AM **Chronic Off-Target Cardiotoxicity of Doxorubicin Is Mediated by Pathological Changes in Paracrine Signaling and miRNA Prevalence**
George Ronan[1], Frank Ketchum[1], Nicole Kowalczyk[1], Noor Behnam[1], Lara Çelebi[1], Pinar Zorlutuna[1,2]
[1]University of Notre Dame, [2]Harper Cancer Research Institute

Wednesday, June 12	8:00AM–9:30AM CDT

Cardiovascular Devices and Design

Session Chairs: **Noelia Grande Gutiérrez**, *Carnegie Mellon University*
David Bark, *Washington University in St. Louis*

Loramoor C

8:00AM **Digital Twin Development and Fatigue Optimization of Novel Polymeric TAVR Devices Tailored for Patient-Specific Needs**
Brandon Kovarovic[1], Kyle Baylous[1], Ryan Helbock[1], Oren Rotman[1], Marvin Slepian[2], Danny Bluestein[1]
[1]Stony Brook University, [2]University of Arizona

8:15AM **Stent Retriever Removal Forces in an Experimental Stroke Model With Porcine Carotid Arteries**
Demitria Poulos[1], Michael Froehler[2], Bryan Good[1]
[1]University of Tennessee, [2]Vanderbilt University Medical Center

8:30AM **TomoPINNs: Computed Tomography Enriched Physics-Informed Neural Networks for Hemodynamic Descriptors**
Sangeeta Yadav[1,2], Forouzan Naderi[1], Amin Pashaei Kalajahi[1], Zayeed Bin Mamun[1], Roshan M. Dsouza[1]
[1]University of Wisconsin, [2]Indian Institute of Science

8:45AM **Efficient Shape Optimization of the Total Cavopulmonary Connection Via Hyper-Reduced Order Models and Free Form Deformation**
Imran Shah[1,2], Francesco Ballarin[3], Lakshmi Dasi[1], Alessandro Veneziani[2]
[1]Georgia Institute of Technology, [2]Emory University, [3]Università Cattolica del Sacro Cuore

9:00AM **Impacts of Tears Size and Location on Blood Flow Dynamics in Type-B Aortic Dissection**
Khalil Khanafer, Shaun Scofield, Yasser Aboelkassem
University of Michigan

9:15AM **Dynamic Patient-Specific Computer Simulation of Transcatheter Aortic Valve Replacement Using the Evolut R and SApien3**
Masod Sadipour[1], Jordan Brown[2,3], David Wells[2], Boyce Eugene Griffith[1,2]
[1]University of North Carolina, [2]University of North Carolina, Chapel Hill, University of North Carolina, [3]College of Sciences and Mathematics, Belmont University

Wednesday, June 12	8:00AM–9:30AM CDT

Emerging Topics in Biomechanics and Mechanobiology

Session Chairs: **Arina Korneva**, *Virginia Tech*
Lei Shi, *Kennesaw State University*

Maple Lawn A

8:00AM **Human Airway Tissue Biaxial Tensile Mechanics**
Crystal Mariano, Mona Eskandari
University of California, Riverside

8:15AM ***WITHDRAWN*** **Non-Injurious Impact Loading to Explanted Cartilage Results in DNA Damage Within Chondrocytes**
Katie Gallagher[1], Stephanie Schnieder[1], David Pierce[2], Corey Neu[1]
[1]University of Colorado, Boulder, [2]University of Connecticut

8:30AM **Investigating the Range of Cell Cluster Biomechanical Behavior With Cluster Size**
Sara Ghanbarpour Mamaghani, Ethan Wagner, Jonathan P. Celli, Joanna B. Dahl
University of Massachusetts Boston

8:45AM **Dietary Cholesterol Stiffens the Steatotic Liver**
David Li, Abigail Loneker, Paul Janmey, Rebecca Wells
University of Pennsylvania

9:00AM **The Role of Early Life (Psychological) Stress on Central Artery Aging and Remodeling**
Brooks Lane[1], Nazli Gharraee[1], Gabrielle Lohrenz[1], Abigail Polter[2], Paul Marvar[2], John Eberth[1]
[1]Drexel University, [2]George Washington University, Pharmacology and Physiology

9:15AM **Stiffening or Softening? Deciphering the Role of Multiple Contracting Inclusions in Modulating the Stiffness of a Fibrous Matrix**
Mainak Sarkar, Brian M. Burkel, Suzanne M. Ponik, Jacob Notbohm
University of Wisconsin-Madison

Wednesday, June 12	8:00AM–9:30AM CDT

Engineered In Vitro Models

Session Chairs: **Spencer Szczesny**, *Pennsylvania State University*
Yubing Sun, *University of Massachusetts Amherst*

Loramoor B

8:00AM **Development and Analysis of Scaffold-Free Adipose Spheroids**
Jesse Liszewski, Riley Behan-Bush, Michael Schrodt, Aloysius Klingelhutz, Ed Sander, James Ankrum
University of Iowa

8:15AM **A Bioreactor Platform Designed to Estimate Cell Generated Stresses Within Uniaxially Constrained Tissue Equivalents**
Andrew V. Glick[1], Daniel Paukner[2], Christian J. Cyron[2], Jacopo Ferruzzi[1,3]
[1]University of Texas at Dallas, [2]Institute for Continuum and Material Mechanics, Hamburg University of Technology, [3]University of Texas Southwestern Medical Center

8:30AM **Development of Engineered Tendon Tissue Micro-Gauges (TENTUGS) for Investigating Tendon Organization and Mechanobiology**
Stephanie Steltzer, Seung-Ho Bae, Nicole Migotsky, Henry Yu, Charlie Mentzer, Syeda Lamia, Brendon Baker, Megan Killian, Adam Abraham
University of Michigan

8:45AM **A Novel Millifluidic Dual-Flow Bioreactor for Recapitulating Shear Stress In Vitro**
Fariha Ahmad, Katrina Cao, Jane Grande-Allen
Rice University

9:00AM **A 3D In-Vitro Neuro-Vascular Human Brain Model With Meningeal Lymphatics for Studying Alzheimer's Disease**
Xun Wang[1], Seunggyu Kim[1], Maria Proestaki[1], Shun Zhang[1], Georgios Pavlou[1], Se Hoon Choi[2,3], Rudolph Tanzi[2,3], Roger Kamm[1]
[1]Massachusetts Institute of Technology, [2]Massachusetts General Hospital, [3]Harvard Medical School

9:15AM **Strain, Stiffness, and Composition Effects on Lung Fibroblasts and Their Implications in Pulmonary Fibrosis**
Qi Wang, Kristan Worthington, Ed Sander
University of Iowa

Ligament & Tendon Mechanics & Imaging

Session Chairs: **Stephanie Cone**, *University of Delaware* **Linwood**
Zachary G. Davis, *DoD-VA Extremity Trauma and Amputation Center of Excellence*

8:00AM **Connexin-43 Positive Cell Ratio Is Not Modulated by Severity of Damage or Change in Cycle Number in Tendon Fatigue Injury Model**
Benjamin Johnston[1], Nelly Andarawis-Puri[1,2]
[1]Cornell University, [2]Hospital for Special Surgery

8:15AM **Elastin Alters Fatigue Mechanics of Functionally Distinct Tendon Fascicles in Murine Model of Elastin Knockdown**
Shawn Pavey, Nathan Xu, Spencer Lake
Washington University in St. Louis

8:30AM **Tendon Impingement Produces Differential Regional Profiles of Intact and Fragmented Aggrecan**
Brian Wise, Whasil Lee, Mark Buckley
University of Rochester

8:45AM **Aged Tendons Have a Higher Strain Threshold for Stimulation From Dynamic Compression Than Young Tendons**
Samuel Mlawer, Brianne Connizzo
Boston University

9:00AM **Estrogen Receptor Expression Is Greater Than Progesterone Receptor Expression in the Porcine Anterior Cruciate Ligament and Varies Across Age and Animal**
Jacob D. Thompson[1], Matthew B. Fisher[1,2]
[1]North Carolina State University and University of North Carolina at Chapel Hill, [2]University of North Carolina at Chapel Hill

9:15AM **Effects of Soaking Solution on Anterior Cruciate Ligament Hydration, Mechanics, and Magnetic Resonance Imaging**
Charlotte Andreasen[1], Peter Kuetzing[1], Hassan Siddiqui[2], Audrey McManus[1], Ulrich Scheven[1], Ellen Arruda[1]
[1]University of Michigan, [2]Pennsylvania State University

Wednesday, June 12	8:00AM–9:30AM CDT

Nano, Micro, Tissue & Multiscale Mechanics

Session Chairs: **Camilo Duarte Cordon**, *Columbia University*
Kristin Myers, *Columbia University*

Maple Lawn B

8:00AM **Does Tissue Composition Alter Strain-Based or Stress-Based Susceptibility to Injury?**
Callan Luetkemeyer
University of Illinois Urbana-Champaign

8:15AM **Anisotropic Mechanical Properties in Scaled Lattice Composites Estimated by Magnetic Resonance Elastography**
Kevin Eckstein[1], Daniel Yoon[1], Margrethe Ruding[1], Ramin Balouchzadeh[1], Aaliyah Thompson-Mazzeo[1], Ruth Okamoto[1], Curtis Johnson[2], Matthew McGarry[3], Philip Bayly[1]
[1]Washington University in St. Louis, [2]University of Delaware, [3]Dartmouth College

8:30AM **Influence of Glenohumeral Joint Angle on in Situ Supraspinatus Strain Behavior**
Aaron Hellem, John Liffrig, Allison Rao, Matthew MacEwen, Victor Barocas, Paula Ludewig, Arin Ellingson
University of Minnesota

8:45AM **A Tale of Two Tissues: Effects of Collagen III Dysyfunction on Determinants of Mechanical Properties in Tendon and Cervix**
Amir Moghaddam[1], Matthew Confer[2], Roberto Pineda Guzman[3], Kelechi Uhegbu[4], Rohit Bhargava[2], Bruce Damon[3,2], Sanmi Koyejo[4], Christina Laukaitis[3,2], Amy Wagoner Johnson[2], Mariana Kersh[2]
[1]University of Nebraska-Lincoln, [2]University of Illinois at Urbana-Champaign, [3]Carle Health, [4]Stanford University

9:00AM **Flexible Carbon Nanotubes (CNT)-Polydimethylsiloxane (PDMS) Force Sensors for the Rate-Dependent Characterization of Compliant Biomaterials** Sinan Candan, Vanessa Barton, Joseph Andrewas, Jacob Notbohm, Christian Franck
University of Wisconsin-Madison

9:15AM **Evaluating Adaptation of Amputee Skin Due to Prosthesis Use**
Jack Hayes[1], Jennifer Andrews[2], Tomas Andriuskevicius[1], Omar Abdelwahab[3], Ralph Gordon[3], Tom Briggs[1], Peter Worsley[3], Claire Higgins[1], Marc Masen[1]
[1]Imperial College London, [2]University of Salford, [3]University of Southampton

Wednesday, June 12	11:30AM–1:00PM CDT

Cancer Mechanics II

Session Chairs: **Meenal Datta**, *University of Notre Dame*
Jacopo Ferruzzi, *University of Texas at Dallas*

Loramoor A

11:30AM **Structural and Biomechanical Hallmarks of Early-Onset Colorectal Cancer**
Nicole Huning[1], Munir Buhaya[2], Adil Khan[1], Haider Ali[1], Sara Roccabianca[3], Emina Huang[2], Jacopo Ferruzzi[1,2]
[1]University of Texas at Dallas, [2]University of Texas Southwestern Medical Center, [3]Michigan State University

11:45AM **Interplay Between Interstitial Flow and Extracellular Matrix Physical Properties in the Initiation and Control of Angiogenesis and Lymphangiogenesis**
Jonathan W. Song, Jacob C. Holter, Shashwat S. Agarwal, Joseph W Tinapple, Marcos G. Cortes-Medina, Travis H. Jones, Joseph Barlage
Ohio State University

12:00PM **Quantifying Enzymatic Small Extracellular Vesicles (SEVs) for Cancer Companion Diagnostics Using Magnetic Nanoporous Membrane (MNM)-Based Activity Assay**
Tiger Shi[1], Chenguang Zhang[1], Youwen Zhang[1], Xuemin Lu[1], Gaeun Kim[1], Sonu Kumar[1], Ceming Wang[2], Nan Su[2], Yichun Wang[1], Xin Lu[1], Satyajyoti Senapati[1], Hsueh-Chia Chang[1,2]
[1]University of Notre Dame, [2]Aopia Biosciences, Inc.

12:15PM **Investigating the Paracrine Effects of Breast Cancer Cells on Osteoblast Differentiation, Proliferation, and Mineral Deposition**
Sarah Nano[1], Laurie Littlepage[1], Laoise McNamara[2], Glen Niebur[1]
[1]University of Notre Dame, [2]University of Galway

12:30PM **Investigating the Effects of an Increased Adipocyte Density on A 3D Human Breast Tumor Spheroid Model**
Jensen Amens, Gokhan Bacecioglu, Pinar Zorlutuna
University of Notre Dame

12:45PM **Oscillatory Shear Stress Modulates Lymphatic Progenitor Cells Maturation Into Lymphatic Vessels With Anti-Cancer Phenotypes**
Nancy Keilany Lightsey, Eva Hall, Sanjoy Saha, Donghyun Paul Jeong, Donny Hanjaya-Putra
University of Notre Dame

Wednesday, June 12	11:30AM–1:00PM CDT

Cardiovascular Patient-Specific Modeling in the Setting of Disease

Session Chairs: **Stephanie George**, *East Carolina University*
Noelia Grande Gutiérrez, *Carnegie Mellon University*

Loramoor C

11:30AM **Computational Modeling of a Human Placentone**
Armita Najmi, Noelia Grande Gutiérrez
Carnegie Mellon University

11:45AM **A Mechanistic In Vivo Study on the Relationship Between the Pathophysiology of the Ascending Aorta and the Coherence of Large Scale Blood Flow**
Karol Calò[1], Andrea Guala[2], Valentina Mazzi[1], Maurizio Lodi Rizzini[1], Lydia Dux-Santoy[2], Jose Rodriguez-Palomares[2], Stefania Scarsoglio[1], Luca Ridolfi[1], Diego Gallo[1], Umberto Morbiducci[1]
[1]Politecnico di Torino, [2]Vall d'Hebron Institut de recerca

12:00PM **Wall Shear Stress in Intracranial Aneurysms Computed From CFD and 4D Flow MRI Augmented With Flow Physics Principles**
Farshid Goudarzian, Mohammadreza Balouchestani Asl, Neal Patel, Abhishek Singh, Jiacheng Zhang, Pavlos Vlachos, Vitaliy Rayz
Purdue University

12:15PM **Analysis of Regional Hemodynamic Changes in Type A Aortic Dissection Repair Using 4D Flow MRI**
Hannah Cebull[1], Hai Dong[2], Minliang Liu[2], Rudy Gleason[2], John Elefteriades[3], John Oshinski[1,2], Marina Piccinelli[1], Bradley Leshnower[1]
[1]Emory University, [2]Georgia Institute of Technology, [3]Yale University

12:30PM **A Case Study: Computational Modeling of Hemodynamics in a Patient With End Stage Renal Disease Under Hemodialysis Via Arteriovenous Fistula With Pulmonary Hypertension**
Fatemeh Bahmani, Kaitlin Southern, Alex Vadati, Veeranna Maddipati, Stephanie George
East Carolina University

12:45PM **Patient-Specific Modeling of Hemodynamics During Splenic Artery Embolization**
Younes Tatari[1], Tyler Andrew Smith[1], Jingjie Hu[2], Amirhossein Arzani[1]
[1]University of Utah, [2]North Carolina State University

Digital Health and Computational Modeling to Improve Health Outcomes

Session Chairs: **Antonis P. Stylianou**, *University of Missouri-Kansas City*
Lyndia C. Wu, *University of British Columbia*

Maple Lawn C

11:30AM **Real-Time Segmentation, Virtual Image Modification, Surgical Intervention Modeling and 3D Printing (REVISIT-3D): A Treatment Planning Workflow for Congenital Heart Disease**
Robert McCarthy[1], Kasey Chaszczewski[2,3], John LaDisa[1,2,3,4]
[1]Marquette University and the Medical College of Wisconsin, [2]Pediatric Cardiology, Medical College of Wisconsin, [3]Herma Heart Institute, Children's Wisconsin, [4]Cardiovascular Medicine

11:45AM **Vascular Model Generation With the Space Colonization Algorithm**
Daniel Emerson, Yoed Rabin, Levent Burak Kara
Carnegie Mellon University

12:00PM **Optimal Lattice Geometry for Implementation in Scoliotic Braces**
Robert Rizza[1], Xue-Cheng Liu[2], Vince Anewenter[1]
[1]Milwaukee School of Engineering, [2]Medical College of Wisconsin

12:15PM **Virtual Prostate Cancer Biopsies Using Adc Targeted Lesions Shows Superior Performance Than T2 and Non-Mr Guided Surgical Sampling**
Savannah Duenweg[1], Samuel Bobholz[1], Allison Lowman[1], Aleksandra Winiarz[1], Biprojit Nath[1], Kenneth Iczkowski[2], Kenneth Jacobsohn[1], Peter LaViolette[1]
[1]Medical College of Wisconsin, [2]University of California, Davis

12:30PM **Perfusion Optimization in Engineered Microvessel Network Design**
Elbert Heng, Lazaros Papamanolis, Alyssa Garrison, Daniel Alnasir, Weiguang Yang, Zachary Sexton, Aravind Krishnan, Alison Marsden, John MacArthur
Stanford University

12:45PM **Comparison of Computational Models for Predicting Leaching From Implanted Medical Devices**
Martin L. Tanaka[1], David M. Saylor[2], Robert M. Elder[2]
[1]Western Carolina University, [2]US Food and Drug Administration

Wednesday, June 12	11:30AM–1:00PM CDT

Emerging Topics in Soft Tissue Mechanics

Session Chairs: **Sara Roccabianca**, *Michigan State University*
Mona Eskandari, *University of California*

Maple Lawn B

11:30AM **High-Speed Cardiac Pressure Volume Simulations Using A Novel Neural Network Finite Element Approach**
Shruti Motiwale, Michael Sacks
University of Texas at Austin

11:45AM **Mouse Lung Emphysematous Mechanical Strains Under Positive Versus Negative Pressure Ventilation**
Talyah Nelson[1], Kathrine Quiros[1], Mona Eskandari[1]
[1]University of California, Riverside

12:00PM **Artificial Intelligence Assisted Multiscale Lung Modeling to Predict Alveolar Septal Wall Stress**
Sunder Neelakantan[1], Raza Mehdi[1], Bradford Smith[2], Kyle Myers[1], Rahim Rizi[3], Reza Avazmohmammadi[1]
[1]Texas A&M University, [2]University of Colorado Denver, [3]University of Pennsylvania

12:15PM **Concentric Contraction During Unloading Prevents Strain Softening in the Mouse Urinary Bladder**
Tyler Tuttle[1], Daniel Deuel[1], Sara Roccabianca[2], Sarah Calve[1]
[1]University of Colorado, [2]Michigan State University

12:30PM **Employing Micro-Computed Tomography to Elucidate Hypoxanthine-Induced Alterations in Bladder Wall Geometry**
Fatemeh Azari[1], Lori Ann Birder[2], Amanda Sue Wolf-Johnston[2], Ricardo Cardozo[1], Anne M. Robertson[1]
[1]University of Pittsburgh, [2]University of Pittsburgh,

12:45PM **Infants Sucking Patterns Identification Using Machine Learning**
Abdullahi Olapojoye, Fatemeh Hassanipour, Abishek Pratap Singh
University of Texas at Dallas

Wednesday, June 12	11:30AM–1:00PM CDT

Emerging Topics in Tissue & Cellular Engineering

Session Chairs: **Victor Varner**, *University of Texas at Dallas*
Soham Ghosh, *Colorado State University*

Loramoor B

11:30AM **Characterization of Biomaterial Interfaces for Cranial Phantoms to Investigate Traumatic Brain Injury**
Anthony Baker[1], Natalie Smith[2], Suhas Vidhate[3], Ricardo Mejia-Alvarez[3], Zane Lybrand[2], Tony Yuan[4], Adam Willis[3,5], Michaelann Tartis[1]
[1]New Mexico Institute of Mining and Technology, [2]Texas Woman's University, [3]Michigan State University, [4]Uniformed Services University of Health Sciences, [5]59th Medical Wing

11:45AM **Assessment of DNA Motility Within Local Nuclear Area Through Telomere Motion Analysis**
Masashi Yamazaki[1,2], Bansei Andoshiro[2], Hiromi Miyoshi[1,2], Satoshi Ii[1,2], Naoya Sakamoto[1,2]
[1]Faculty of Systems Design, Tokyo Metropolitan University, [2]Tokyo Metropolitan University

12:00PM **Characteristics of Resolvable Polymers Used for Developing in Utero Fetal Valve Replacements**
Sanchita Bhat, Julia Toma, Lakshmi Prasad Dasi
Georgia Institute of Technology

12:15PM **Lympho-Vascularized Breast-Skin Platform for Modeling Lymphovascular Space Invasion in Advanced Breast Cancer**
Melika Mehrabi Dehdezi, Marissa Nichole Rylander
University of Texas at Austin

12:30PM **Profibrotic and Myofibroblast Activation Gene Expression in Right Ventricular Cardiac Fibroblasts in Pulmonary Arterial Hypertension**
Giuditta Monti, Yufan Lin, Daniela Valdez-Jasso
University of California San Diego

12:45PM **Incubation in Physiologically Relevant Oxygen Conditions Changes Lymphatic Endothelial Cell Gene Expression and Vessel Morphology**
Ellie Johandes, Donny Hanjaya-Putra
University of Notre Dame

Wednesday, June 12	11:30AM–1:00PM CDT

Growth, Remodeling, and Repair

Session Chairs: **Pat Alford**, *University of Minnesota*
Adrian Buganza Tepole, *Purdue University*

Maple Lawn A

11:30AM **Multiscale Model Predicts Modulation of Cardiac Remodeling by Intrinsic Ventricular Contractility Before and After Mitral Valve Repair**
Johane Bracamonte[1], Lamario Williams[1], Brett Cooke[1], Rongbing Xie[1], Panayotis Vardas[1], Betty Pat[1], Louis Dell'Italia[1], Lionel Watkins[2], Jeffrey Saucerman[2], Jeffrey Holmes[1]
[1]University of Alabama at Birmingham, [2]University of Virginia

11:45AM **Biomechanical and Compositional Changes in the Murine Uterus With Age**
Mari Domingo[1], Triniti Vanoven[1,2], Raffaella De Vita[3], Maria Florian-Rodriguez[2], Isaac Pence[1,2], Kristin Miller[1,2]
[1]University of Texas at Dallas, [2]University of Texas Southwestern Medical Center, [3]Virginia Tech

12:00PM **Micromechanics and Mechanoresponsivity of the Developing Porcine Meniscus**
Meghan E. Kupratis[1], Yuqi Zhang[1], Jiaqi Xiang[2], Byan Kwok[1], Elisabeth A. Lemmon[1], Karen Xu[1], Nathaniel A. Dyment[1], Lin Han[2], Eiki Koyama[3], Robert L. Mauck[1]
[1]University of Pennsylvania, [2]Drexel University, [3]Children's Hospital of Philadelphia

12:15PM **Localized Growth Rate Analysis on a Global Ensemble Averaging of Abdominal Aortic Aneurysm Growth**
Pratik Mitra[1], Juan C. Restrepo[1], Merjulah Roby[1], Satish C. Muluk[2], Mark K. Eskandari[3], Seungik Baek[4], Ender A. Finol[1]
[1]University of Texas at San Antonio, [2]Allegheny Health Network, [3]Northwestern University School of Medicine, [4]Michigan State University

12:30PM **Coupling Systems Biology and Kinematic Growth in Open-Source Finite Element Software**
Steven LaBelle[1], Mohammadreza Sadrabadi[2], Seungik Baek[3], Mohammad Mofrad[4,5], Jeffrey Weiss[1], Amirhossein Arzani[1]
[1]University of Utah, [2]Northern Arizona University, [3]Michigan State University, [4]University of California, Berkley, [5]University of California, Riverside

12:45PM **Influence of In-Vitro Tissue Culturing Conditions on the Properties of Tissue-Engineered Heart Valves - A Computational Analysis**
Elmer Middendorp[1], Justina Ghebryal[1], Valery Visser[2], Polina Zaytseva[2], Sarah Motta[2], Simon Hoerstrup[2,3], Max Emmert[2,3,4], Frank Baaijens[1], Sandra Loerakker[1]
[1]Eindhoven University, [2]Institute for Regenerative Medicine (IREM), University of Zurich, [3]ETH Zurich, [4]German Heart Center Berlin

Wednesday, June 12	11:30AM–1:00PM CDT

Novel Approaches to Bioengineering Education and Outreach

Session Chairs: **Alan Eberhardt**, *University of Alabama at Birmingham*
Jifu Tan, *Northern Illinois University*

Linwood

11:30AM **Students' Perceptions on Using Generative Artificial Intelligence (GAI) in Engineering Courses**
Victor Lai
University of Minnesota - Duluth

11:45AM **Increasing Students' Exposure to Research Via Applied Homework Problems Integrated in Research Manuscripts**
Sean Harrington, Turner Jennings, Ana Vargas, Frederick Sebastian, Rouzbeh Amini
Northeastern University

12:00PM **Fostering STEM Engagement: Building a Collaborative Partnership Between a Research University and Local High School**
Ryan Castile[1], Jamie Jobe[2], Leanne Iannucci[1], Rebecca Reals[1], Shawn Pavey[1], Jon Fitzgerald[2], Spencer Lake[1]
[1]Washington University, [2]Pattonville High School

12:15PM **Immersion, Innovation, Design & Development (I2D2): A 9-Week Summer Experience in Biomedical Bngineering**
Alan Eberhardt
University of Alabama at Birmingham

12:30PM **A 'Dinner Party' Themed Approach to Constructing Equitable and Exciting Literature Reviews**
Daniel Pearce, Corinne Henak
University of Wisconsin-Madison

12:45PM **Establishing a Comprehensive Collection of Ethics Resources for BMES at the Online Ethics Center: Assessing and Structuring Mentoring Resources**
Anjelyka Fasci[1], Sanjana Prashanth[2], Andrew Brightman[2], Lyle Hood[1]
[1]University of Texas at San Antonio, [2]Purdue University

Wednesday, June 12	3:45PM–5:00PM CDT

Translational Technology Pitch Competition

Session Chair: Lyle Hood, *University of Texas, San Antonio* **Maple Lawn C**

3:45PM **A Rapid Novel Assay for Measuring Hemoglobin-Oxygen Affinity**
Rucha Natu[1], Zoe Sekyonda[1], Yuxuan Du[1], John Hinshaw[2], Peter Galen[2], Umut Gurkan[1,2]
[1]Case Western Reserve University, [2]Hemex Health Inc

4:00PM **From Light to Relief: Revolutionizing Pain Management With Optical Blood-Spinal Cord Barrier Modulation**
Harsh Dave[1], Tiffany Leong[1], Eric David[1], Theodore Price[1], Zhenpeng Qin[1]
[1]University of Texas at Dallas

4:15PM **YoungHeartValve - Next Generation Heart Valve Technology**
Lakshmi Dasi[1], Srujana Joshi[1], Justin Gangwish[2], Nipa Khair[2], Susan James[2]
[1]Georgia Institute of Technology, [2]Colorado State University

4:30PM **Pulse Electric Field Treatment Induced Angiogenesis as a Promising Therapy for Diabetic Foot Ulcers**
Neeraj Raghuraman Rajagopalan, Govindarajan Srimathveeravalli
University of Massachusetts Amherst

4:45PM **Tapping Into Ligament Tension With Our Ligament Tensiometer to Enhance Outcomes Following Total Knee Arthroplasty**
Lesley Arant, Josh Roth
University of Wisconsin-Madison

Thursday, June 13	8:00AM–9:15AM CDT

Emerging Topics in Computational Modeling and Imaging in Soft Tissue Mechanics

Session Chairs: **Maria Holland**, *University of Notre Dame* **Linwood**
Emma Lejeune, *Boston University*

8:00AM **The Mechanical Loading of the Murine Uterus and Cervix in Early Pregnancy**
Abigail Laughlin[1], Joy Vink[2], Steven Abramowitch[3], Kristin Miller[4], Raffaella De Vita[5], Kristin Myers[1]
[1]Columbia University, [2]University of Hawaii, [3]University of Pittsburgh, [4]University of Texas Dallas, [5]Virginia Tech

8:15AM **Automated Full-Field Mechanical Analysis of Cardiac Microbundles**
Hiba Kobeissi, Emma Lejeune
Boston University

8:30AM **Low-Energy Impact Induced Damage in Cartilage: A Multiscale Modeling Study Using FE2M**
Kosar Safari, Ashkan Almasi[1], Phoebe Szarek[1], David M. Pierce[1]
[1]University of Connecticut

8:45AM **Lamina Cribrosa Vascular Network Analysis: Associations Between Structural and Functional Parameters**
Yuankai Lu[1], Hua Yi[2], Ruhani Gill[1], Andrew Theophanous[1], Po-Yi Lee[1], Ian Sigal[1]
[1]University of Pittsburgh, [2]University of Mississippi

9:00AM **Image-Based Patient-Specific Modeling of Human Stomach Electromechanics**
Lei Shi[1], Qi Zhao[2], Yurui Chen[3]
[1]Kennesaw State University, [2]Shandong Provincial Hospital, [3]Columbia University

Thursday, June 13	8:00AM–9:30AM CDT

Joint Biomechanics

Session Chairs: **Brianne Connizzo**, *Boston University*
Ken Fischer, *University of Kansas*

Maple Lawn B

8:00AM **Functional-Aggregate Method for Objective Determination of Vertebral Coordinate Systems**
Tara Nagle, Jeremy Loss, Rob Colbrunn
Cleveland Clinic Foundation

8:15AM **Sensor Fusion Algorithm to Improve Accuracy of Robotic Superposition Testing Using a 6-DOF Position Sensor**
Callan Gillespie[1], Lesley Arant[2], Tara Nagle[1], Joshua Roth[2], Robb Colbrunn[1]
[1]Cleveland Clinic, [2]University of Wisconsin-Madison

8:30AM **Characterization of the Mechanical and Compositional Effects of MMP-9 Exposure on Neuron-Collagen Constructs: Implications for Joint Degeneration**
Chang Wang, Michelle Meyers, Prabesh Ghimire, Mistica Lozano Perez, Beth Winkelstein
University of Pennsylvania

8:45AM **A Biomechanical Evaluation of Two Internal Fixation Methods With Different Screw Directions for Capitellum Fractures**
Hui Zhang, Justin Hellwinkel, Kiran Agarwal-Harding, Thomas Gardner, Susanne Roberts
Columbia University

9:00AM **Biomechanical Analysis of Dual Mobility Intraprosthetic Dissociation**
Joshua Bland, Alexander Hooke, Allison Tanner, Katherine Mallett, Sergio Gaurin-Perez, James Fitzsimmons, Chunfeng Zhao, Michael Taunton, Rafael Sierra
Mayo Clinic

9:15AM **In Situ Robotic Mechanical Testing of Rat Tibiofemoral Joints**
Olivia Dyer, Stephanie Cone
University of Delaware

Machine Learning: Computational Modeling & Predicting Patient Outcomes

Session Chairs: **Luke Mattar**, *University of Pittsburgh*
Jeremy Warren, *University of Texas at Dallas*

Maple Lawn C

8:00AM **Machine Learning Mediated Prognosis of Major Adverse Cardiac Event (MACE) for Patients With Coronary Artery Dysfunction Using Pressure Drop Coefficient**
Israel Ajiboye, Rao Marepalli, Rupak Banerjee
University of Cincinnati

8:15AM **A Novel Diffusion Tensor Myocardial Material Model Using Neural Networks for Form Determination**
Benjamin Thomas, Christian Goodbrake, Michael Sacks
Oden Institute for Computational Engineering and Sciences

8:30AM **Advancing 3D Organ Geometric Reconstruction From MRI: A Hybird Framework With Deep Learning and Iterative Optimization**
Hui Wang[1,2], Xiaowei Li[3], Chenxin Zhang[1,2], Jianwei Zuo[1,2], Xiuli Sun[3], Jianliu Wang[3], Jiajia Luo[1,2]
[1]Peking University Health Science Center, [2]Peking University, [3]Peking University People's Hospital

8:45AM **Computational Modeling and Machine Learning Methods to Predict Patient-Specific Healing Following Breast-Conserving Surgery**
Zachary Harbin[1], Alexander Argyros[1], Carla Fisher[2], Sherry Voytik-Harbin[1], Adrian Buganza Tepole[1]
[1]Purdue University, [2]Indiana University

9:00AM **Role of Physics-Informed Constraints in Real-Time Assessment of 3D Vascular Fluid Dynamics Via Multi-Case Deep Learning Neural Network**
Wei Xuan Chan, Wenhao Ding, Binghuan Li, Hong Shen Wong, Choon Hwai Yap
Imperial College London

9:15AM **Super-Resolving and Denoising 4D Flow MRI of CSF Using a Physics-Guided Temporally Coherent Neural Network**
Neal Patel, Sriram Baireddy, A.J. Schwichtenberg, Edward Delp, Vitaliy Rayz
Purdue University

Thursday, June 13	8:00AM–9:30AM CDT

Mechanobiology and Engineering of Musculoskeletal Soft Tissues

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

Maple Lawn A

8:00AM **Effects of Spontaneous Calcium Signaling on Cartilage Anabolic Activities**
Ying Peng, Annie Porter, Steven DiStefano, X. Lucas Lu
University of Delaware

8:15AM **Female Anterior Cruciate Ligaments Exhibit A Minimal Mechanobiological Response to Mechanical Loading**
Lauren Paschall[1], Maxwell Konnaris[1], Aman Dhawan[1], Erdem Tabdanov[1], Ilias Georgakopoulos-Soares[1], Spencer Szczesny[1]
[1]Pennsylvania State University

8:30AM **In Vitro Assessment of Metformin Treatments for Cartilage Injury**
Hessam Noori-Dokht[1,2], Taylor Williams[1], Sogol Younesi[2], Diane Wagner[1]
[1]Indiana University, [2]Purdue University

8:45AM **The Effect of Hyaluronic Acid and Proteoglycan on the Centrifugally Compressed Cell-Collagen Combined Construct (C6)**
Kazuki Moribe, Xu Ye, Masashi Yamazaki, Hiromichi Fujie
Tokyo Metropolitan University

9:00AM **An Engineered In VitroModel of the Human Myotendinous Junction**
Mitchell Josvai, Erzsebet Polyak, Meghana Kalluri, Samantha Robertson, Wendy Crone, Masatoshi Suzuki
University of Wisconsin-Madison

9:15AM **Neocartilage Cellular Morphology and Strain Profiles Are Improved by Physiologic TGF-β Doses**
Yifan Peng, Tianbai Wang, Sedat Dogru, Celina Maldonado, Michael Albro
Boston University

Thursday, June 13	8:00AM–9:30AM CDT

Mechanobiology and Fluid Mechanics in the Setting of Disease

Session Chairs: **Ruihang (Rita) Zhang**, *University of Minnesota*
Colleen Witzenburg, *University of Wisconsin-Madison*

Loramoor C

8:00AM **Uniform Growth Laws Recapitulate Some Aspects of Ascending Aortic Aneurysm Progression in the FbInSMKO Mouse**
Marisa Bazzi, Hadi Wiputra, Victor Barocas
University of Minnesota

8:15AM **Morphological and Hemodynamic Changes to the Right Ventricular Microvascular Network in Response to Chronic Pressure Overload**
Ilham Essafri[1], Kenzo Ichimura[2], Kurt Stenmark[1], Edda Spiekerkoetter[2], Vitaly Kheyfets[1]
[1]University of Colorado, Anschutz Medical Campus, [2]Stanford University

8:30AM **Co-Mapping of Smooth Muscle Cell Actin and Hemodynamics in Intact Human Intracranial Aneurysm**
Yasutaka Tobe[1], Anne Robertson[1], Mehdi Ramezanpour[1], Juan Cebral[2], Simon Watkins[1], Fady Charbel[3], Sepideh Amin-Hanjani[4], Alexander Yu[5], Boyle Cheng[6], Henry Woo[7]
[1]University of Pittsburgh, [2]George Mason University, [3]University of Illinois at Chicago, [4]University Hospital Cleveland Medical Center, [5]Allegheny Health Network, [6]Director of Translational Research, Neuroscience and Orthopedic Institutes, Allegheny Health Network, [7]Donald and Barbara Zucker School of Medicine at Hofstra Northwell

8:45AM **Elevated VWF Levels Drive Thrombus Instability**
Ava Obenaus[1], Dang Truong[1], Derek Macatangay[1], Annie Ke[1], Junmei Chen[2], José López[2], Nathan Sniadecki[1]
[1]University of Washington, [2]Bloodworks Northwest Research Institute

9:00AM **Presence of Red Blood Cells Promotes Stretching and Cleavage of Von Willebrand Factor in Whole Blood Under High Shear**
Rukiye Tuna[1], Alice Liu[2], David Bark[2], Z. Leonardo Liu[1]
[1]FAMU-FSU College of Engineering, [2]Washington University School of Medicine

9:15AM **Coronary Height and Peak Systolic Velocity as Main Predictors of Post-TAVR Thrombosis**
Fateme Esmailie[1], Aniket Venkatesh[2], Hoda Hatoum[3], Huang Chen[4], Breandan Yeats[2], BeomJun Lee[2], Philipp Ruile[5], Franz-Josef Neumann[5], Lakshmi Prasad Dasi[2]
[1]University of North Texas, Denton, [2]Georgia Institute of Technology, [3]Michigan Technological University, [4]University of Nevada, [5]Medical Center - University of Freiburg

Thursday, June 13	8:00AM–9:30AM CDT

Mineralized & Soft Tissue Mechanics & Modeling

Session Chairs: **Jacqueline Cole**, *NC State and UNC Chapel Hill*
Megan Killian, *University of Michigan*

Loramoor A

8:00AM **Probable Relation Between Structure & Composition of the Dentin-Enamel Junction (DEJ) & Dentinogenesis Imperfecta (DGI)**
Sobhan Katebifar[1,1], Kai Clark[1], Bradley Rosenberg[1], Michael Truhlar[1], Alix Deymier[1,1]
[1]UConn Health

8:15AM **Ovine Fracture Healing Is Robust to High Gap Strain: A Virtual Mechanical Testing and Image Colocalization Analysis**
Maham Tanveer, Hannah Dailey
Lehigh University

8:30AM **Cam Morphology and Sex-Based Differences in the Proximal Femur Anatomy of Collegiate Athletes Without Hip Pain: A Three-Dimensional Statistical Shape Modeling Analysis**
Bergen Braun, Andrew Anderson
University of Utah

8:45AM **Medial Iliofemoral Ligament Strain and Orientation Following THA Implantation Correlate With Its Ability to Contribute to Hip Stability**
Clarisse Zigan, Jennifer Bido, Kathleen Meyers, Jose Rodriguez, Timothy Wright, Fernando Quevedo Gonazalez
Hospital for Special Surgery

9:00AM **Physeal-Sparing ACL Reconstruction Provides Better Initial Joint Stability and Function Than Complete Transphyseal ACL Reconstruction in an Early Adolescent Porcine Model**
Yukun Zhang[1], Kaan Gurbuz[2], Jeffrey Spang[3], Matthew Fisher[1,3]
[1]North Carolina State University and University of North Carolina at Chapel Hill, [2]Kayseri State Education & Research Hospital, [3]University of North Carolina at Chapel Hill

9:15AM **Investigating Nonlinear Intrinsic Viscoelasticity of Collagen Type II in Immature Bovine Articular Cartilage**
Kimberly Kroupa[1], Jeffrey Weiss[2], Gerard Ateshian[1]
[1]Columbia University, [2]University of Utah

Thursday, June 13	8:00AM–9:30AM CDT

Thrombosis, Hemolysis & Mechanical Circulatory Support

Session Chairs: **Bryan Good**, *University of Tennessee* **Loramoor B**
John LaDisa, *Marquette University and the Medical College of Wisconsin*

8:00AM **In Vitro Fluid Mechanics and Blood Study to Evaluate Catheter-Related Thrombosis**
Hannah Palahnuk[1], Boyang Su[1], Thaddeus Harbaugh[2], Elias Rizk[2], Sprague Hazard[2], Jonathan Bernstein[3], Keefe Manning[1,2]
[1]Pennsyıvania State University, [2]Penn State Hershey Medical Center, [3]Penn State Hershey Children's Hospital

8:15AM **Micro-Channels Maintain Endothelial Cell Adhesion Under Physiologic Wall Shear Stress**
Alexander Armstrong[1], Patrick McCarthy[1,2], Alexander Raskin[1], John LaDisa[1,2,3], Brandon Tefft[1]
[1]Medical College of Wisconsin, [2]Marquette University, [3]Herma Heart Institute, Children's Wisconsin

8:30AM **Plaque Length and Stenosis Influence Instantaneous Wave-Free Ratio and Wall Shear Stress**
Arnav Garcha, Noelia Grande Gutiérrez
Carnegie Mellon University

8:45AM **The Balance of Von Willebrand Factor and Platelet Activation in Causing Bleeding in an Aortic Stenosis**
Alice Liu, Katrina Ashworth, Nina Lasky, Yi Qiao, Kimsey Platten, Jorge Di Paola, David Bark
Washington University in St. Louis

9:00AM **Post-TAVR Thrombogenic Risk Comparisons for Bicuspid Aortic Valve Patients Using Novel Fluid-Structure Interaction Approach**
Kyle Baylous[1], Brandon Kovarovic[1], Salwa Anam[1], Ryan Helbock[1], Marvin Slepian[2], Danny Bluestein[1]
[1]Stony Brook University, [2]University of Arizona

9:15AM **Flow and Turbulence Quantification Using 4D Flow Magnetic Resonance Imaging in a Pulsatile Total Artificial Heart**
Twan Bakker[1], Azad Najar[1,2], Thomas Finocchiaro[3], Ina Laura Perkins[3], Jonas Lantz[1], Tino Ebbers[1]
[1]Linköping University, [2]Scandinavian Real Heart AB, [3]Scandinavian Realheart AB

Thursday, June 13	11:00AM–12:30PM CDT

PhD SPC: Biotransport, Human Motion, Reproductive, and Other Emerging Topics

Session Chairs: **Ottman Teruliano**, *University of Pennsylvania*
Alix Deymier, *UConn Health*

Loramoor A

11:00AM **Enzyme- and Compartment-Free Single Protein Detection by Digital Plasmonic Nanobubble**
Tingting Zhang[1], Ye Gao[1], Yaning Liu[1], Zhenpeng Qin[2]
[1]University of Texas at Dallas, [2]University of Texas at Southwestern Medical Center

11:15AM **The Fate of Ultrasmall Fluorescent Silica Nanoparticles as Drug Delivery Vehicles in Cartilage Explants: Differential Retention Kinetics Between Matrix and Chondrocytes**
Aiyana Fortin, Antonio Garces, Ulrich Wiesner, Lawrence Bonassar
Cornell University

11:30AM **Generic Versus Personalized Foot-Ground Contact Models- Is Personalization Worth the Effort?**
Spencer Williams, Kayla Pariser, Claire Hammond, Benjamin Fregly
Rice University

11:45AM **Ex Vivo Minoxidil Treatment Increases Elastic Fiber Deposition in the Murine Vaginal Wall**
Niyousha Karbasion[1], John Caleb Snider[1], Savannah Chatman[1], Kristin Miller[2], Matthew Bersi[1]
[1]Washington University in St. Louis, [2]University of Texas at Dallas

12:00PM **Mechanistic Model of Biochemical-Biomechanical Crosstalk in Vascular Endothelial Cell Alignment**
Shannon Flanary, Victor Barocas
University of Minnesota

12:15PM **Deep Learning-Based Biomechanical Characterization of Infarcted Myocardium From Strain Imaging**
Rana Raza Mehdi, Tanmay Mukherjee, Emilio Agustin Mendiola, Sunder Neelakantan, Reza Avazmohammadi
Texas A&M University

PhD SPC: Heart Valves, Devices, and Computational Fluid Mechanics

Session Chairs: **Alejandro Roldán-Alzate**, *University of Wisconsin-Madison*
Marisa Bazzi, *University of Minnesota*
Loramoor C

11:00AM **Changes in Gene Spatial Expression, Structure, and Function in Response to Altered Mechanical Stress in a Murine Model of Bicuspid Aortic Valve**
Hail Kazik, Julie Kessler, Carol Mattern, Joy Lincoln, John LaDisa
Medical College of Wisconsin

11:15AM **Feasibility and Post-Procedural Risk Analysis of Redo-Transcatheter Aortic Valve Replacement: A Patient-Specific Fluid-Structure Interaction Based Study**
Symon Reza, Brandon Kovarovic, Danny Bluestein
Stony Brook University

11:30AM **Assessment of Aortic Valve Stenosis Using a Novel Functional Index: a Pilot Prospective Study for Trans-Catheter Aortic Valve Replacement Patients**
Shreyash M. Manegaonkar[1], Mohamed A. Effat[1], Marepalli Rao[2], Rishi Sukhija[1], Rupak K. Banerjee[3]
[1]University of Cincinnati, [2]Environmental & Public Health Sciences, University of Cincinnati, [3]University of Cincinnati, Veterans Affairs Medical Center

11:45AM **Parametric Investigation of a Bioprinted Pulsatile Fontan Conduit**
Zinan Hu[1], Jessica Herrmann[1], Erica Schwarz[2], Fannie Gerosa[1], Nir Emuna[2], Jay Humphrey[2], Tain-Yen Hsia[3], Mark Skylar-Scott[1], Alison Marsden[1]
[1]Stanford University, [2]Yale University, [3]Arnold Palmer Hospital for Children

12:00PM **Prediction of Pressure Drop Across Aortic Coarctation During Exercise Using a Hybrid Mock Circulatory Loop**
Priya Nair[1], Emanuele Perra[2], Doff McElhinney[1], Alison Marsden[1], Daniel Ennis[1], Seraina Dual[2]
[1]Stanford University, [2]KTH Royal Institute of Technology

12:15PM **Enhancing 4D-Flow MRI With Input-Parametrized Physics-Informed Neural Network (IP-PINN)**
Amin Pashaei Kalajahi[1], Omid Amili[2], Amirhossein Arzani[3], Roshan D'Souza[1]
[1]University of Wisconsin-Milwaukee, [2]University of Toledo, [3]University of Utah

PhD SPC: Musculoskeletal, Joint, and Spine Solid Mechanics

Session Chairs: **Daniel Cortes**, *Penn State University*
Caitlyn Collins, *Virginia Tech*

Maple Lawn B

11:00AM **Benefits of Using Functional Joint Coordinate Systems in In Vitro Knee Testing**
Tara Nagle[1,2], Jeremy Loss[1], Callan Gillespie[1,2], Robb Colbrunn[1,2]
[1]Cleveland Clinic Foundation, [2]Cleveland State University

11:15AM **Direct Quantification of Errors in Bone Positions and Ligament Tensions Using the Superposition Technique With a Robotic Testing System**
Lesley Arant, Joshua Roth
University of Wisconsin - Madison

11:30AM **Raman Arthrotomy for IN Vivo Quantitative Monitoring of Cartilage Defect Repair in Equine Stifle Joint**
Erik Ersland[1], Madeline Boyes[2], Keming Yan[1], Li-Hsin Han[3], J. Todd Lawrence[4], Thomas Schaer[2], Mark Grinstaff[1], Brian Snyder[5], Mads Bergholt[6], Michael Albro[1]
[1]Boston University, [2]University of Pennsylvania, [3]Drexel University, [4]Children's Hospital of Philadelphia, [5]Beth Israel Deaconess Medical Center, [6]King's College London

11:45AM **Immobilization and Soft Tissue Injury Are Necessary to Cause Persistent Disability in a Rat Model of Elbow Contracture**
Rebecca Reals[1], Alex Reiter[1,2], Ryan Castile[1], Sophia Miller[1], Spencer Lake[1]
[1]Washington University in St. Louis, [2]Saint Louis University

12:00PM **Loss of Decorin Accelerates Cartilage Surface Damage and Aberrant Fibrous Remodeling During Aging**
Mingyue Fan[1], Bryan Kwok[1], Aanya Mohan[2], Michael Newton[2], Jiaqi Xiang[1], Yuchen Liu[1], Ling Qin[3], David Birk[4], Renato Iozzo[5], Tristan Maerz[2], Robert Mauck[3], Lin Han[1]
[1]Drexel University, [2]University of Michigan, [3]University of Pennsylvania, [4]University of South Florida, [5]Thomas Jefferson University

12:15PM **Influence of Sex and Sex Hormones on Skeletal Responses to Intermittent Parathyroid Hormone (PTH) Treatment and Discontinuation**
Y. Vincent Jin, Wonsae Lee, Tala Azar, Xiaoyu Xu, Kruti Desai, Wei-Ju Tseng, X. Sherry Liu
University of Pennsylvania

Thursday, June 13	11:00AM–12:30PM CDT

PhD SPC: Platelets and Cardiovascular Biomechanics

Session Chairs: **Noelia Gutierrez**, *Carnegie Mellon University*
Bryan Good, *University of Tennessee*

Loramoor B

11:00AM **Shear-Induced Platelet Aggregation Is Mediated by vWF-Binding Receptors in A Stenotic Model**
Connor Watson[1], Christopher Siedlecki[1,2], Keefe Manning[1,2]
[1]Pennsylvania State University, [2]Penn State Hershey Medical Center

11:15AM **A Micromechanics Based Multiscale Model for Platelet-Driven Clot Contraction**
Chayut Teeraratkul, Debanjan Mukherjee
University of Colorado, Boulder

11:30AM **The Biomechanics of Radiation-Induced Cardiotoxicity in Mice**
Tanmay Mukherjee[1], Sarah Elliott[2], Prasanna Alluri[2], Reza Avazmohammadi[1]
[1]Texas A&M University, [2]University of Texas Southwestern Medical Center

11:45AM **Investigating the Influence of Lactation on Murine Heart Growth Through Ultrasound and Computational Analysis**
Molly Kaissar[1], Arden Shen[2], Jennifer Anderson[2,3], Elnaz Ghajar-Rahimi[2], Adalyn Meeks[2], Craig Goergen[2], Kyoko Yoshida[1]
[1]University of Minnesota, [2]Purdue University, [3]University of Vermont

12:00PM **Dynamic Imaging of the Collagenous Myocardial Extracellular Matrix During Post-Infarction Inflammation**
Daniel Pearce, Colleen Witzenburg
University of Wisconsin-Madison

12:15PM **Microstructural Alterations in the Murine Thoracic Aorta: Unveiling a Mechanism for Biomechanical Remodeling in Late-Gestation Pregnancy**
Ana Vargas, Turner Jennings, Rouzbeh Amini, Chiara Bellini
Northeastern University

PhD SPC: Tissue Engineering, Development, Mechanobiology, and Other Emerging Topics

Session Chairs: **Meghan Kupratis**, *University of Pennsylvania*
Jason Szafron, *Carnegie Mellon University*

Linwood

11:00AM **Rhythmic Nephron Progenitor Renewal and Differentiation Informs Kidney Tissue Engineering Strategies**
Samuel Grindel, Sachin Davis, John Viola, Grace Liu, Jiageng Liu, Grace Qian, Catherine Porter, Alex Hughes
University of Pennsylvania

11:15AM **Tailored Delivery of A Small Molecule Agonist for Hedgehog Signaling Activation in Tendon-to-Bone Integration**
Jonathan Marcelin, Rashad Madi, Timur Kamalitdinov, Xi Jiang, Dong Hwa Kim, Robert Mauck, Andrew Kuntz, Nathaniel Dyment
University of Pennsylvania

11:30AM **Scleraxis-Targeted Deletion of Non-Muscle Myosin Leads to Tendon Degeneration**
Mary Kate Evans[1], Ellie Bernstein[1], Tonia Tsinman[1], Ellie Ferguson[1], Xi Jiang[1], Joel Boerckel[1], Lin Han[2], Eiki Koyama[3], Robert Mauck[1], Nathaniel Dyment[1]
[1]University of Pennsylvania, [2]Drexel University, [3] Orthopaedic Biomedical Research, Children's Hospital of Philadelphia

11:45AM **Reduced Loading After Sciatic Nerve Resection Impairs Hindlimb Growth and Maturation**
Talayah Johnson[1], Natalie Fogarty[1], Alisia Lin[1], Xi Jiang[1], Eiki Koyama[2], Lin Han[3], Josh Baxter[1], Joel Boerckel[1], Robert Mauck[1], Nathaniel Dyment[1]
[1]University of Pennsylvania, [2]Children Hospital of Philadelphia, [3]Drexel University

12:00PM **Cell-Extracellular Matrix Feedback Results in Spontaneous Cellular Orientation and Contact Guidance Behavior in 3D Discrete Fiber Models of Cell Compaction**
Adam Ley, Lauren Bersie-Larson, Ryan Collanton, Sabin Adhikari, Robert Tranquillo, Kevin Dorfman, Victor Barocas
University of Minnesota, Twin Cities

12:15PM **Logic-Based Cell Signaling Model for Predicting Vascular Smooth Muscle Cell Contractility During Pregnancy**
Paige Nielsen, Yusheng Wu, Kyoko Yoshida
University of Minnesota

PhD SPC: Neural, Lung, and Developmental Solid Mechanics

Session Chairs: **Sara Moshage**, *University of Illinois at Urbana-Champaign*
Ryan Pedrigi, *University of Nebraska-Lincoln*

Maple Lawn A

11:00AM **Cross-Correlation of Biomechanical, Connectomic, and Pathologic Markers in Neurodegeneration at 7T MRI**
Em Triolo[1], Mackenzie Langan[2], Oleksandr Khegai[2], Sarah Binder[2], Trey Hedden[2], Priti Balchandani[2], Mehmet Kurt[1,2]
[1]University of Washington, [2]Icahn School of Medicine at Mount Sinai

11:15AM **Comparison of Head Impact Biomechanics Across Multiple Sports**
Zaryan Masood, David Luke, Rebecca Kenny, Daniel Bondi, Adam Clansey, Lyndia Wu
University of British Columbia

11:30AM **Associations Between Cerebrovascular Remodeling and Neuropathological Changes in the Brain During Alzheimer's Disease Progression**
Samuel Halvorsen[1], Raymond Nicks[2], Thor Stein[2,3], Katherine Zhang[1]
[1]Boston University, [2]Boston University School of Medicine, [3]US Department of Veterans Affairs

11:45AM **Surfactant Depleted Rat Lungs: A Global to Local Study of the Impact of Positive Versus Negative Pressure Ventilation**
Matthew Shankel, Mona Eskandari
University of California, Riverside

12:00PM **Towards Improved Surgical Sealants by Investigating Human Visceral Pleura Mechanics**
Gustavo Ramirez, Mona Eskandari
University of California, Riverside

12:15PM **Lung Lobar Sliding Reduces Parenchymal Distortion in the Left and Right Lungs**
Adam Galloy, Joseph Reinhardt, Suresh M. L. Raghavan
University of Iowa

Friday, June 14	10:00AM–11:30AM CDT

Undergraduate Design Competition

Session Chair: Anita Singh, *Temple University* **Maple Lawn B**

10:00AM **Soft Robotics for Progressive Vertebrae Rehabilitation**
Rachel Yu, Charmaine Tan, Michelle Haung, Thomas Ho, Jesse Kimie-Brylka, Nathan Ou, Amber Kashay, Ian Morales, Allison Cheng, Sina Ghadimi, Carissa Ott, Evan Zhao
University of California, Los Angeles

10:15AM **Preventing and Detecting Nasogastric Tube Dislodgement in Infant Patients**
Jeffrey Huang, Katherine Han, Stephanie Yoon, Dahin Song
University of Pennsylvania

10:30AM **Reinforcing Safe Walker Use: A Universal 2-Wheel Walker Monitoring Device**
Ashwin Gadiraju, Pradnesh Kolluru, Cecelia Rodriguez, Nick Tsintolas
Duke University

10:45AM **LAPPI: Lip and Palate Prosthetic Interface**
Camilla Whitesel, Serena Carson, Andrea Urdaneta, Ryan Lim, Ravikiran Ramjee
University of Pennsylvania

11:00AM **Sistance: A Two-Way Base Communication System for Deaf-Blind Students**
Mackenzie Hunt, Maxim Hansen, Souleymane Cissokho, Timothy Johnson
Rose-Hulman Institute of Technology

11:15AM **Adaptive Sport Solutions: Assistive Kayak Mount Device for Mobility Impaired Users**
Alex Britton, Megan Parker, Douglas Wingert, Christine Walck
Embry-Riddle Aeronautical University

Friday, June 14	12:45PM–2:15PM CDT

Cardiac Biomechanics

Session Chairs: Lei Fan, *Marquette University*
Colleen Witzenburg, *University of Wisconsin-Madison*

Evergreen I

12:45PM **Right Ventricular Myocardium Remodeling in Pulmonary Arterial Hypertension Is Sex-Specific and Ovarian-Hormone Dependent**
Becky Hardie, Jessica Huberts, Daniela Valdez-Jasso
University of California San Diego

1:00PM **Estrogen, Testosterone, and Mechanics : Modeling Sex-Specific Left Ventricular Remodeling in Heart Failure**
Adhithi Lakshmikanthan[1], Minnie Kay[1], Kenneth Bilchick[2], Anya Grosberg[1], Pim Oomen[1]
[1]University of California, Irvine, [2]University of Virginia

1:15PM **Identifying the Role of the Septum Wall in Right Ventricular Remodeling**
Kristen Garcia, Becky Hardie, Jessica Huberts, Daniela Valdez-Jasso
University of California San Diego

1:30PM **Comparative Analysis of Myocardial Wall Thickness: Insights From MRI-Derived Models and Biomechanical Simulations Across the Cardiac Cycle**
Mohsen Darayi[1], Mary Robakowski[1,2], Yiling Fan[3], Danielle Kara[1], Ojas Potdar[4], Christopher Nguyen[1], Debkalpa Goswami[1]
[1]Cleveland Clinic, [2]Cleveland State University, [3]Massachusetts Institute of Technology, [4]Case Western Reserve University

1:45PM **Patient-Specific Modeling of Left Atrial Electromechanics**
Lei Shi[1], Aaron Brown[2], Fanwei Kong[2], Chen Zhang[3], Hannah Haider[3], Vijay Vedula[3]
[1]Kennesaw State University, [2]Stanford University, [3]Columbia University

2:00PM **A Personalized Multiscale Model of Biventricular Cardiac Electromechanics**
Aaron Brown[1,2], Lei Shi[3], Matteo Salvador[1,2], Fanwei Kong[1,2], Vijay Vedula[4], Alison Marsden[1,2]
[1]Stanford University, [2]Stanford Cardiovascular Institute, [3]Kennesaw State University, [4]Columbia University

Friday, June 14	12:45PM–2:15PM CDT

Emerging In Vitro, Experimental, and Computational Methods in Fluid Mechanics I

Session Chairs: **Grace McIlvain**, *Emory University* **Maple Lawn A**
Melissa Brindise, *Pennsylvania State University*

12:45PM **Eulerian-Lagrangian Framework for Simulations of Particle-Laden Biological Flows in Complex Geometries**
Abhilash Reddy Malipeddi, Jesse Capecelatro, C. Alberto Figueroa
University of Michigan

1:00PM **Computational Analysis of the Effect of Type B Aortic Dissection on Pulse Wave Velocity and Pulse Waveform Shape**
Marisa Bazzi[1], Hadi Wiputra[2], Rumi Faizer[3], Victor Barocas[2]
[1], University of Minnesota, [2]University of Minnesota, [3]UP Medical

1:15PM **Experimental Validation of 3D Dynamic MRI Using an Ex-Vivo Porcine Model of the Bladder**
James Rice, Michael Stellon, Wade Bushman, Alejandro Roldán-Alzate
University of Wisconsin-Madison

1:30PM **Biphasic Modeling of 9L Glioma: Radiation Treated Versus Untreated**
Isabel Rivera Santiago[1], Malisa Sarntinoranont[1], James R. Ewing[2,3,4,5], Prabhu Acharya[2,4], Glauber Cabral[2], Tavarekere N. Nagaraja[2,3], Stephen L. Brown[3,2]
[1]University of Florida, [2]Henry Ford Hospital, [3]Michigan State University, [4]Oakland University, [5]Wayne State University

1:45PM **Experimental and Computational Modeling of Brain Shunt Performance**
Bryan Good, Ashley Handy, Alyson Matushek, Stephanie TerMaath
University of Tennessee

2:00PM **Spatiotemporal Variations in Blood Velocity and Hematocrit in A Microfluidic Capillary Network**
Solomon Oshabaheebwa, Christopher Delianides, Michael Suster, Pedram Mohseni, Umut Gurkan
Case Western Reserve University

Friday, June 14	12:45PM–2:15PM CDT

Head & Injury Mechanics I

Session Chairs: **Maria Holland**, *University of Notre Dame*
Ken Monson, *University of Utah*

Loramoor C

12:45PM **Strain-Based Cellular Injury Thresholds in a 3D In Vitro Model of Traumatic Brain Injury**
Jessica Park, Annalise Daul, Jing Zhang, Christian Franck
UW-Madison

1:00PM **A Human Organoid Model of Traumatic Brain Injury**
Shahrzad Shiravi[1], Alexandra Yufa[2], Maria Jose Quezada Valladares[3], Colin Franz[3], John Finan[2]
[1]Chicago, [2]University of Illinois at Chicago, [3]Northwestern University

1:15PM **Bridging Gaps in Traumatic Brain Injury Modeling: A Multiscale Approach to Unifying Global and Axonal Injury Models**
Chaokai Zhang[1], Lara Bartels[2], Adam Clansey[2], Julian Kloiber[2], Daniel Bondi[2], Paul van Donkelaar[2], Lyndia Wu[2], Alexander Rauscher[2], Songbai Ji[1]
[1]Worcester Polytechnic Institute, [2]University of British Columbia

1:30PM **Mapping Nonlinear Mechanical Properties of Ex VivoBrain Tissue Using MR Elastography With Applied Pre-Strain**
Olivia Bailey, Alexa Diano, Ali Lateef, Elise Corbin, Curtis Johnson
University of Delaware

1:45PM **Improving Glioma Segmentation Fairness in Low-Resolution Domains With Transfer Learning**
Juampablo Heras Rivera[1], Tianyi Ren[1], Ethan Honey[1], Harshitha Rebala[2], Abhishek Sharma[1], Mehmet Kurt[1]
[1]University of Washington, [2]Computer Science- University of Washington

2:00PM **Exploring the Potential Role of Sex-Based Brain Structural Variations in Susceptibility to Traumatic Brain Injury From a Biomechanics Perspective**
Bahram Jafari, Marzieh Memar
University of Texas at San Antonio

Friday, June 14	12:45PM–2:15PM CDT

Knee Biomechanics

Session Chairs: **Jacob Merson**, *Rensselaer Polytechnic Institute*
Tara Nagle, *Cleveland Clinic Foundation*

Maple Lawn C

12:45PM **Study of the Structures That Limit Combined Abnormal Hyperextension and Abnormal Varus of the Knee**
Rebekah Deardurff[1,2,3], Edward Grood[1,2], Frank Noyes[2,3,4]
[1]University of Cincinnati, [2]Cincinnati SportsMedicine Research and Education Foundation, [3]Cincinnati Sports Medicine and Orthopedic Research, The Jewish Hospital, Mercy Health, [4]Noyes Knee Institute

1:00PM **Towards Validation of Knee-Specific Finite Element Models in A Loaded MRI Condition**
Sean Letendre[1], Kalle Chastain[1], Joshua Leadem[2], Manuela Montes de Oca[2], Lila Pender[2], Madison Lang[2], Erin Leatherman[3], Thomas Santner[4], Kate Lindsey[2], Erin Argentieri[1], Amanda Wach[1], Ashley Pekmezian[1], Sara Sacher[1], Matthew Koff[1], Amy Lerner[2], Scott Rodeo[1], Suzanne Maher[1], Brett Steineman[1]
[1]Hospital for Special Surgery, [2]University of Rochester, [3]Kenyon College, [4]Ohio State University

1:15PM **Longitudinal MRI Analysis of Intratissue Cartilage Strain and Relaxometry in the ACL Reconstructed Knee: A Case Study**
Hongtian Zhu[1], Emily Miller[2], Woowon Lee[1], Timothy Lowe[1], Corey Neu[1,2]
[1]Paul M. Rady University of Colorado, Boulder, [2]University of Colorado, Boulder

1:30PM **Tibial Slope Affects ACL Force and Coupled Internal Tibial Rotation Under A Simulated Clinical Pivot Shift Exam: A Computational Study**
Reza Pourmodheji[1], Mitchell Wheatley[1], Julien Lulec[2], Jacob Hirth[1], Mark Amirtharaj[1], Thomas Wickiewicz[1], Matthieu Olivier[2], Andrew Pearle[1], Danyal Nawabi[1], Carl Imhauser[1]
[1]Hospital for Special Surgery, [2]Aix-Marseille University

1:45PM **Higher Percent Load Through the Intact Meniscus Results in Higher Reduction in Meniscal Loading After Partial Meniscectomy at Heel Strike in Simulated Gait**
Kalle Chastain, Sean Letendre, Heath Gould, Ian Hutchinson, Joshua Wright-Chisem, Arden Wach, Anil Ranawat, Scott Rodeo, Suzanne Maher
Hospital for Special Surgery

2:00PM **Biomechanical Consequences of Ligament Releases During Total Knee Arthroplasty**
Matthew Blomquist, Dylan Schmitz, Joshua Roth
University of Wisconsin-Madison

Friday, June 14	12:45PM–2:15PM CDT

Mechanobiology in Tissue & Cellular Engineering

Session Chairs: **Eno Ebong**, *Northeastern University*
Daniela Valdez-Jasso, *University of California, San Diego*

Maple Lawn B

12:45PM **An Optogenetic Platform for Controlled Release of Nucleocytoplasmic Shuttling Proteins**
Erin Berlew, Paula Camacho Sierra, Joel Boerckel
University of Pennsylvania

1:00PM **TRPV4 Integrates Matrix Mechanosensing to Modulate Calcium Signaling and Mechanobiology in Schlemm'S Canal Cells**
Haiyan Li[1], Seyed Siadat[2], Kristin Perkumas[3], Jacques Bertrand[4], Darryl Overby[4], Todd Sulchek[5], W. Daniel Stamer[3], C.Ross Ethier[1]
[1]Georgia Institute of Technology/Emory University, [2]Northeastern University, [3]Duke University, [4]Imperial College London, [5]Georgia Institute of Technology

1:15PM **Functional Expression of Mechanosensitive Ion Channels in Regenerating Axolotl Limbs**
Vineel Kondiboyina, Melissa Miller, James Monaghan, Sandra Shefelbine
Northeastern University

1:30PM **Pharmaceutical Interrogation of Podocyte Biomechanics Through Kinome Screening**
Jonathan Haydak[1], Anika Hudson[1], Stefanie DeFronzo[2], Yibang Chen[1], Nanditha Anandakrishnan[1], Alan Stern[1], Evren Azeloglu[1]
[1]Icahn School of Medicine at Mount Sinai, [2]Northeastern University

1:45PM **Interaction With Endothelial Cells Induces Vascular Smooth Muscle Cell Orientation Under Wall Shear Stress Condition**
Kaoru Sawasaki[1], Masanori Nakamura[2], Naoyuki Kimura[3], Koji Kawahito[3], Masashi Yamazaki[1], Hiromichi Fujie[1], Naoya Sakamoto[1]
[1]Tokyo Metropolitan University, [2]Nagoya Institute of Technology, [3]Jichi Medical University

2:00PM **Collagen Type-Dependent Extracellular Defect Sensing Driven by Actin Protrusions and Membrane Tension**
Hannah Zmuda, Christopher Walter, Amit Pathak
Washington University in St. Louis

Friday, June 14	12:45PM–2:15PM CDT

Special Session Honoring Ken Diller

Session Chairs: **Sihong Wang**, *City College of New York*
Chris Rylander, *University of Texas at Austin*

Loramoor A

12:45PM **Thermal Control of Circadian Function for Enhanced Sleep Onset and Blood Pressure Modulation**
Kenneth Diller, Laura Namisnak, Sepideh Khoshnevis
University of Texas

1:00PM **Professor Ken Diller's Impact in Cryobiology and Biomedical Engineering**
Mehmet Toner
Massachusetts General Hospital

1:15PM **Ken Diller and Bioheat Transfer**
John Bischof
University of Minnesota

1:30PM **In Vitro Platforms to Assess the Spatial Response to Burn Injury and Thermoembolization**
S. Brocklehurst, A. Sabaghan, M.N. Rylander
University of Texas, Austin

1:45PM **Rapid Thermal Control of Liquids (RealCooL): Development of a Four-Compartment Transient Heat Transfer Model**
Nadia Hannon, Marissa Rylander, Chris Rylander
University of Texas at Austin

2:00PM **Synergistic Effects of Periodically Mild Hyperthermia and Ultrasound Treatment on Osteogenesis in Aged Human Mesenchymal Stem Cells**
D. Dawkins, Sihong Wong
City College of New York

Friday, June 14	12:45PM–2:15PM CDT

Speech Biomechanics

Session Chairs: **Rana Zakerzadeh**, *Duquesne University*
Byron Erath, *Clarkson University*

Loramoor B

12:45PM **The Influence of Blunt Force Laryngeal Trauma on Phonation: Aerodynamic, Kinematic, and Acoustic Effects**
Md Roknujjaman, Molly E. Stewart, Byron D. Erath
Clarkson University

1:00PM **Insights Into Curved and Incomplete Glottal Closure Patterns: an Euler-Bernoulli Approach**
Mohamed Serry[1], Gabriel Alzamendi[2], Matias Zanartu[3], Sean Peterson[1]
[1]University of Waterloo, [2]CONICET-UNER, [3]Universidad Tecnica Federico Santa Maria

1:15PM **Effect of Type I Thyroplasty Implant Location and Stiffness on Voice Production**
Weili Jiang[1], Mahdi Sangbori[1], Liran Oren[2], Charles de Luzan[2], Ephraim Gutmark[2], Xudong Zheng[1], Qian Xue[1]
[1]Rochester Institute of Technology, [2]University of Cincinnati

1:30PM **Building a Numerical Framework for Energy Budget Analysis of Phonation**
Lucy Zhang
National Science Foundataion

1:45PM **Effects of Semi-Occluded Vocal Tract Exercise on Vocal Fold Biomechanics as Observed During High-Speed Videoendoscopy**
David Ford[1], Dimitar Deliyski[2]
[1]Duquesne University, [2]Michigan State University

2:00PM **Multiphysics Simulation of Flow and Oxygen Transport in a Poroelastic Vocal Fold Model**
Isabella McCollum, Manoela Neves, Rana Zakerzadeh
Duquesne University

Friday, June 14	2:30PM–4:00PM CDT

Biotech and Drug Delivery

Session Chairs: **Marissa Rylander**, *University of Texas at Austin*
Lyle Hood, *University of Texas at San Antonio*

Loramoor A

2:30PM **Evaluation of the Effects of PFAS on Pancreatic Cancer Using A Microfluidic Pancreas Model**
Tarun Singh[1], Sae Choi[1], Barbara Hocevar[2], Lisa Kamendulis[2], Bumsoo Han[1]
[1]Purdue University, [2]Indiana University

2:45PM **Compensating for the Simulated Foreign Body Response to Medical Implants Using Local Fluid Flow**
Lesley Trask[1], Niamh A. Ward[1], Ruth Tarpey[1], Rachel Beatty[1,2], Eimear Wallace[1], Joanne O'Dwyer[1], William Ronan[1], Garry P. Duffy[1,2], Eimear B. Dolan[1]
[1]University of Galway, [2]Trinity College Dublin

3:00PM **A Multiphasic Model for Determination of Mouse Ascending Thoracic Aorta Mass Transport Properties With and Without Aneurysms**
Keshav Kailash, Jessica Wagenseil
Washington University in St. Louis

3:15PM **Pulse-Driven Microfluidic Infusion Pumps With Constant and Heart Rate-Sensitive Flow Rates**
Shuyu Zhang[1], Rafael Davalos[2], Anne Staples[1]
[1]Virginia Tech, [2]Georgia Institute of Technology

3:30PM **Sex Differences in Placenta Villous Structure in Low- and High-Risk Pregnancies**
Adrienne Scott, Patrick Yang, Abigail Arter, Caroline Fosher, Ulugbek Kamilov, Anthony Odibo, Michelle Oyen
Washington University in St. Louis

3:45PM **Characterization of a Polymeric Device for Localized and Controlled Drug Delivery to Cervical Cancer**
Jacob Provencio[1], Monica Elbjorn[1], Paige Phillips[1], David Di Rocco[1], Lyle Hood[1,2]
[1]University of Texas at San Antonio, [2]University of Texas Health Science Center at San Antonio

Friday, June 14	2:30PM–4:00PM CDT

Bone and Cartilage Mechanobiology & Tissue Engineering

Session Chairs: **Alejandro Almarza**, *University of Pittsburgh*
Arun Nair, *University of Arkansas*

Loramoor B

2:30PM **Wnt-11 and SOST Are Regulated by Different Mechanical Stimuli in Loaded Bone**
Meghana Machireddy, Sara Cole, Lucas DeBiase, Jun Li, Glen Niebur
University of Notre Dame

2:45PM **Dynamic Micromechanical Characterization of 3D Printed Bone In Vitro Models Manufactured Via Vat Photopolymerization**
Elizabeth Hunt, Sera Choi, Edward Shangin, Emma Nguyen, Abby Whittington, Caitlyn Collins
Virginia Tech

3:00PM **Magnetic Actuation of Piezo1 Functionalized Superparamagnetic Iron Oxide-Gold Nanoparticles: A Novel Dual Acting Osteogenesis and Anti-Osteopenia Nanomedicine**
Elias Georgas[1], Muzhaozi Yuan[2], Ya Wang[2], Yi-Xian Qin[1]
[1]Stony Brook University, [2]Texas A&M University

3:15PM **Bone Formation Dependance on Microsphere Size in 3D Printed PLGA Microsphere Scaffolds**
Roland Klar, James Cox, Naren Raja, Stefan Lohfeld
University of Missouri-Kansas City

3:30PM **Raman Monitoring of Engineered Cartilage Development Across Different Hydrogel Scaffolds**
Dev Mehrotra[1], Carolina Cordova[1], Erik Ersland[1], Thomas Schaer[2], Mark Grinstaff[1], Brian Snyder[3], Mads Bergholt[4], Michael Albro[1]
[1]Boston University, [2]New Bolton Center, [3]Beth Israel Deaconess Medical Center, [4]King's College London

3:45PM **Investigating Dynamic Loading-Induced Fluid Effects on Bone Cells in 3D**
Kailin Chen[1], Alessandro Maggi[2], Alexander Bolanos-Campos[1], Mistica Perez[1], Michael Abrams[2], Julia Greer[2], Ottman Tertuliano[1]
[1]University of Pennsylvania, [2]California Institute of Technology

Friday, June 14	2:30PM–4:00PM CDT

Emerging In Vitro, Experimental, and Computational Methods in Fluid Mechanics II

Session Chairs: **Anne Staples**, *Virginia Tech* **Maple Lawn A**
Alejandro Roldán-Alzate, *University of Wisconsin-Madison*

2:30PM **Development and Implementation of Novel Framework for Thermofluid Analyses in FEBio**
Raphael Kepecs[1], Steve Maas[2], Jeffrey Weiss[2], Gerard Ateshian[1]
[1]Columbia University, [2]University of Utah

2:45PM **SeqSeg: Automatic Image-Based Vascular Model Construction Using Sequential Segmentations**
Numi Sveinsson Cepero, Shawn C. Shadden
University of California Berkeley

3:00PM **Pre-Surgical Assessments of CSF Flow and Brain Motion Are Indicative of Improved Cerebral Dynamics Following Surgery in Chiari Malformation I**
Grace McIlvain[1], Saeed Mohsenian[2], Mohamad Motaz Al Samman[2], Brice Williams[1], Daniel Barrow[1], Francis Loth[2], John Oshinski[1]
[1]Emory University, [2]Northeastern University

3:15PM **Negative Effort Dependence in Obstructive Sleep Apnea: Insights From a Mathematical Model**
Guilherme Garcia[1,2], B. Tucker Woodson[1]
[1]Medical College of Wisconsin, [2]Marquette University

3:30PM **Temperature Effect on In-Vitro Sinus Flow After Aortic Valve Replacement**
Ahmad Bshennaty[1], Brennan Vogl[1], Agata Sularz[2], Mohamad Alkhouli[2], Hoda Hatoum[1,1]
[1]Michigan Technological University, [2]Mayo Clinic

3:45PM **In Vitro Flow Study of the Penn State Pediatric Total Artificial Heart**
Cody Kubicki[1], Emma Raich[1], Peter Selinsky[1], Sailahari Ponnaluri[1], Steven Deutsch[1], William Weiss[2], Keefe Manning[1,2]
[1]Penn State University, [2]Penn State College of Medicine

Friday, June 14	2:30PM–4:00PM CDT

Emerging Tools for Cell Mechanics

Session Chairs: **Guy Genin**, *Washington University in St. Louis*
Ming Guo, *Massachusetts Institute of Technology*

Maple Lawn C

2:30PM **Myosin-Free Molecular Clutch Model Predicting Myosin-Independent Stiffness Sensing**
Sangyoon Han, Nikhil Mittal
Michigan Technological University

2:45PM **Optimal Design of Experiments for Nuclear Membrane Stiffness Estimation**
Emilio Mendiola[1], Rana Raza Mehdi[1], Jacques Ohayon[2,3], Roderic Pettigrew[1,3], Reza Avazmohammadi[1,3]
[1]Texas A&M University, [2]Savoie Mont-Blanc University, [3]Houston Methodist Research Institute

3:00PM **FRET Measurement of Cellular Tension in Tissues Using Conventional Confocal Microscopy in Newly Established Transgenic Mice Expressing Actinin Tension Sensor**
Takeo Matsumoto[1], Junfeng Wang[1], Eijiro Maeda[1], Yuki Tsujimura[2], Takaya Abe[3], Hiroshi Kiyonari[3], Hideo Yokota[2], Tetsuya Kitaguchi[4]
[1]Nagoya University, [2]RIKEN Center for Advanced Photonics, [3]RIKEN Center for Biosystems Dynamics Research, [4]Tokyo Institute of Technology

3:15PM ***WITHDRAWN*** **Uncovering Electro-Mechano-Physiological Rules of Life: A New 2D/3D All-Optical Interrogation Technology**
Chenyu Liang[1], Erica Hengartner[2], Abygale Cochrane[3], Bruna Balbino de Paula[4], Basak Ayaz[4], Robert Caudle[5], Allison Campbell[6], Eleana Manousiouthakis[6], Christine Schmidt[6], Tian He[7], Christopher Werley[8], Xin Tang[1,6,9]
[1]Mechanical and Aerospace Engineering, University of Florida, [2]Biochemistry, University of Florida, [3]Physics, University of Florida, [4]Neuroscience, University of Florida, [5]Dentistry, University of Florida, [6]University of Florida, [7]BioNTech SE, [8]Vertex Pharmaceuticals, [9]UF Health Cancer Center

3:30PM **Non-Contact Biomechanical Imaging of Cell and Tissue Using Optical Brillouin Microscopy**
Jitao Zhang
Wayne State University

3:45PM **Controlling Cellular Rearrangements in an Epithelial Monolayer Through Micropatterning Techniques**
Molly McCord, Jacob Notbohm
University of Wisconsin - Madison

Friday, June 14	2:30PM–4:00PM CDT

Head & Injury Mechanics II

Session Chairs: **Lyndia Wu**, *University of British Columbia*
Mehmet Kurt, *University of Washington*

Loramoor C

2:30PM **Population-Specific Biomechanical Response of the Brain by Age and Sex**
Ahmed A. Alshareef[1], Aaron Carass[2], Yuan-Chiao Lu[3], Joy Mojumder[4], Ruth J. Okamoto[5], Alexa M. Diano[6], Curtis L. Johnson[6], Dzung L. Pham[3,7], Jerry L. Prince[2], Philip V. Bayly[5]
[1]University of South Carolina, [2]Johns Hopkins University, [3]Henry M. Jackson Foundation, [4]National Institutes of Health (NIH), [5]Washington University in St. Louis, [6]University of Delaware, [7]Uniformed Services University

2:45PM **Sex-Related Variations in Head Impact Kinematics During Controlled Soccer Heading**
Alireza Abbasi Ghiri, Morteza Seidi, Kelly Cheever, Marzieh Memar
University of Texas at San Antonio

3:00PM **A Computational Modeling Approach for the Forensic Analysis of Infant Short Height Falls**
Keith Button, Yun Cai, Luis Nolasco, Brian Weaver
Explico

3:15PM **Detection of Intracranial Cavitation in Polyacrylamide Brain Phantoms Under Blunt Impacts Using Shadowgraph and Acoustic Plane Wave Imaging**
Eric Galindo[1], Ricardo Mejia-Alvarez[2], Michaelann Tartis[1], Adam Willis[2,3]
[1]New Mexico Institute of Mining and Technology, [2]Michigan State University, [3](3) 59th Medical Wing, Office of the Chief Scientist, Lackland AFB

3:30PM **Liver Injuries in Porcine Due to Behind Armor Blunt Trauma**
Parker Berthelson[1], Justin McMahon[1], Alexander Stotka[1], Barney McEntire[2], Robert Salzar[1]
[1]University of Virginia, [2]U.S. Army Aeromedical Laboratory

3:45PM **The Structural and Mechanical Behavior of Skin During Puncture for Different Impactor Sizes and Loading Rates**
Joseph LeSueur[1,2], Carolyn Hampton[3], Jared Koser[1], William Dzwierzynski[1], Michael Kleinberger[3], Frank Pintar[1,2]
[1]Medical College of Wisconsin, [2]Marquette University, [3]Army Research Laboratory

Friday, June 14	2:30PM–4:00PM CDT

Reproductive Biomechanics

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

Evergreen I

2:30PM **Impact of Novel Elastomeric Membrane on Vaginal Smooth Muscle Structure and Function**
Sophya Breedlove[1], Gabrielle King[2], Pamela Moalli[1,2] , Katrina Knight[1]
[1]University of Pittsburgh, [2]Magee-Womens Research Institute

2:45PM **Evaluating Mechanical Properties and Extracellular Matrix Composition of Anterior and Posterior Murine Vaginal Walls**
Qinhan Zhou[1], Triniti Vanoven[2,3], Maria Florian-Rodriguez[3], Isaac Pence[3,2], Kristin Miller[2,3]
[1]Univerity of Texas at Dallas, [2]University of Texas at Dallas, [3]University of Texas Southwestern Medical Center

3:00PM **Finite Deformations of the Entire Murine Reproductive Tract Under Inflation**
Aileen Suarez[1], Steven Abramowitch[2], Kristin Myers[3], Kristin Miller[4], Raffaella De Vita[1]
[1]Virginia Tech, [2]University of Pittsburgh, [3]Columbia University, [4]University of Texas Dallas

3:15PM **Three-Dimensional Shape Analysis of the Pelvic Floor: Identifying Defects in Cystocele Development**
Liam Martin[1], Alireza Hadizadeh[2], Henry Chill[2], Ghazaleh Rostaminia[2], Steven Abramowitch[1]
[1]University of Pittsburgh, [2]University of Chicago

3:30PM **The Effects of Growth and Remodeling on the Contractile Function of the Pregnant Murine Uterus**
Emily Hoffmann, Kyoko Yoshida
University of Minnesota

3:45PM **A Reactive Viscoelastic Model of the Macaque Rhesus Cervix to Quantify Cervical Remodeling**
Camilo Duarte-Cordon[1], Shuyang Fang[2], Ivan Rosado-Mendez[3], Timothy Hall[3], Helen Feltovich[4], Kristin Myers[2]
[1]New York, [2]Columbia University, [3]University of Wisconsin-Madison, [4]Mount Sinai

Friday, June 14	2:30PM–4:00PM CDT

Vascular Biomechanics & Pathology I

Session Chairs: **Jacopo Ferruzzi**, *University of Texas at Dallas*
Rebecca Vanderpool, *University of Arizona*

Maple Lawn B

2:30PM **Numerical Analysis of Pulmonary Artery Behavior: Investigating the Effects of Wall Complexity, Model Parameters, and Prestrain**
Seda Aslan[1], Tianyi Xu[1], Enze Chen[1], Miya Mese-Jones[2], Xiaolong Liu[3], Bryan Gonzalez[4], Ryan O'Hara[4], Yue-Hin Loke[4], Narutoshi Hibino[5], Laura Olivieri[6], Axel Krieger[1], Thao Nguyen[1]
[1]Johns Hopkins University, [2]Baltimore Polytechnic Institute, [3]Texas Tech University, [4]Children's National Hospital, [5]University of Chicago, [6]University of Pittsburgh Medical Center

2:45PM **Comparing Regional Variations in Radiodensity With Stiffness in an Atherosclerotic Human Aorta**
Carly Donahue, Victor Barocas
University of Minnesota

3:00PM **Alterations of the Mechanical and Failure Properties of Aging Human Descending Thoracic Aorta With Type-II Diabetes**
Ruizhi Wang, Katherine Zhang
Boston University

3:15PM **A Sex-Based Biomechanical Analysis and Normalization for Improved Prediction of Abdominal Aortic Aneurysm Rupture**
Katherine Kerr[1], Pete Gueldner[1], Indrani Sen[2], Tiziano Tallarita[2], Joseph Wildenberg[2], Nathan Liang[3], David Vorp[1], Timothy Chung[1]
[1]University of Pittsburgh, [2]Mayo Clinic Health Systems, [3]University of Pittsburgh Medical Center

3:30PM **Impact of Elastin Fragmentation on the Mechanical Dissection Properties of the Human Descending Thoracic Aorta**
Ramin Shahbad, Majid Jadidi, Sayed Ahmadreza Razian, Anastasia Desyatova
University of Nebraska Omaha

3:45PM **The Stiffness of False Lumen Wall Increased in Chronic Type B Aortic Dissection Vs. Normal Tissue Based on the Unified-Fiber-Distribution (UFD) Model**
Hai Dong[1,2], Minliang Liu[3,2], Hannah Cebull[1], Marina Piccinelli[1], John Oshinski[1], John Elefteriades[4], Rudolph Gleason[2], Bradley Leshnower[1]
[1]Emory University, [2]Georgia Institute of Technology, [3]Texas Tech University, [4]Yale University

Friday, June 14	4:15PM–5:45PM CDT

Cell-Microstructure Interactions in Cardiovascular Mechanics

Session Chairs: **Chiara Bellini**, *Northeastern University*
Matthew Bersi, *Washington University in St. Louis*

Evergreen I

4:15PM **Cellular Micro-Biaxial Stretching for Characterizing Stress-Strain Relations for Single Cardiomyocytes Exposed to Complex Deformations**
Taylor Rothermel[1], Anna Grosberg[2], Patrick Alford[1]
[1]University of Minnesota, [2]University of California, Irvine

4:30PM **Mechanical Characterization of Calcified Clot Analogs**
Jose Jose Monclova[1], Daniel Walsh[1], Vikas Kannojiya[1], Scott Simon[2], Francesco Costanzo[1,1], Keefe Manning[1,2]
[1]Pennsylvania State University, [2]Penn State Hershey Medical Center

4:45PM **Adipose-Driven Hypertension Impacts 3rd Order Mesenteric Artery Contractile Behavior in a Sex-Dependent Manner**
Dillon McClintock, Osvaldo Vega Rodríguez, Nathan Tykocki, Sara Roccabianca
Michigan State University

5:00PM **Mechanical Heterogeneity in Human Cerebral Aneurysms: Exploring the Role of Tissue Microstructure and Inflammation**
Sergio A. Pineda-Castillo, Elizabeth D. Shih, Andrew W. Grande, Patrick W. Alford
University of Minnesota

5:15PM **Effects of Mechanical Dyssynchrony on Myocardial Contractility**
Lei Fan[1], Jenny Choy[2], Chenghan Cai[1], Ghassan Kassab[2], Lik Chuan Lee[3]
[1]Marquette University and Medical College of Wisconsin, [2]California Medical Innovations Institute, [3]Michigan State University

5:30PM **Smooth Muscle Cell Mechanoadaptation Is Chronically Disrupted by High-Velocity Stretching**
Samuel Boland, Patrick Alford
University of Minnesota

Friday, June 14	4:15PM–5:45PM CDT

Emerging Topics in Extracellular Matrix Adaption, Alterations, and Therapy in Soft Tissue Mechanics

Session Chairs: **Michelle Oyen**, *Washington University in St. Louis*
Xun Wang, *Massachusetts Institute of Technology*

Maple Lawn C

4:15PM ***WITHDRAWN***

Evidence of Highly Localized Mechanical Adaptation in the Lamina Cribrosa: Within Beam Regional Variations in Collagen Crimp and Stretch-Induced Uncrimping

Qi Tian, Po-Yi Lee, Juana Yang, Ian Sigal
University of Pittsburgh

4:30PM

Differentiating Between the Effect of Damage to Tenocytes and Extracellular Matrix Using Precise Laser Ablation

Diane Stonestreet[1], Robert Hawkins[1], Nozomi Nishimura[1], Nelly Andarawis-Puri[1,2]
[1]Cornell University, [2]Hospital for Special Surgery

4:45PM

Photosensitizer-Mediated Low-Level Light Exposure Alters the Stiffness of Nonpregnant and Pregnant Human Cervix Tissue

Daniella Fodera[1], Jiashuai Fan[1], Aidan Therien[1], Serena Russell[1], Christine Hendon[1], Joy Vink[2], Kristin Myers[1]
[1]Columbia University, [2]University of Hawaii

5:00PM

Impact of GAGs Removal and CXL Therapy on Corneal Stromal Properties

Hamed Hatami-Marbini, M.E Emu
University of Illinois Chicago

5:15PM

Exploring the Possible Relationship Between Lost Elastin Integrity and Glycosaminoglycan Buildup in Elastic Arteries Using Computational Modelling

Yousof Abdel-Raouf[1], Lauranne Maes[2], Mathias Peirlinck[3], Nele Famaey[2], Patrick Sips[1], Julie De Backer[1,4], Patrick Segers[1], Jay Humphrey[5,6]
[1]Ghent University, [2]KU Leuven, [3]Delft University of Technology, [4]Ghent University Hospital, [5]Yale University, [6]Yale School of Medicine

5:30PM

The Influence of Pectinate Ligaments on the Patency of the Murine Aqueous Humor Outflow Pathway: a Finite Element Study

Babak N. Safa[1,2], Nina Sara Fraticelli Guzmán[1,2], Guorong Li[3], W. Daniel Stamer[3], Andrew J. Feola[1,2,4], C. Ross Ethier[1,2]
[1]Georgia Institute of Technology, [2]Emory University, [3]Duke University, [4]Atlanta VA Center for Visual and Noncognitive Rehabilitation

Friday, June 14	4:15PM–5:45PM CDT

Engineering Tissue Regeneration and Wound Healing

Session Chairs: **Kristan Worthington**, *University of Iowa*
Kyoko Yoshida, *University of Minnesota*

Loramoor B

4:15PM **The Effects of Preeclamptic Milieu on Cord Blood Derived Endothelial Colony-Forming Cells**
Eva Hall[1], Laura Alderfer[1], Sanjoy Saha[1], Ellie Johandes[1], Laura Haneline[2], Donny Hanjaya-Putra[1]
[1]University of Notre Dame, [2]Indiana University School of Medicine

4:30PM **Injectable Synthetic Platelet-Based Therapy Enhances Clot Formation in Synovial Fluid Joint Injury Model**
Melika Osareh, Grant Scull, Jacob D. Thompson, Ashley C. Brown, Matthew B. Fisher
North Carolina State University and University of North Carolina at Chapel Hill

4:45PM **Can Pattern Recognition Receptor Agonists Modulate Tendon Healing In Vitro?**
Sam Winston, Amelia Stoner, Jade Kurihara, Lyndah Chow, Lynn Pezzanite, Steven Dow, Kirk McGilvray
Colorado State University

5:00PM **IL-1β Increases Mitochondrial Transfer From Mesenchymal Stromal Cells to Annulus Fibrosus Cells**
Ashley Cardenas, Lawrence Bonassar
Cornell University

5:15PM **Optimization of iPSC Differentiation to Lymphatic Endothelial Cells Through Metabolites and Machine Learning**
Donghyun Jeong, Sanjoy Saha, Maksym Zarodniuk, Donny Hanjaya-Putra
University of Notre Dame

5:30PM **Fibroblast-Adipocyte Interactions Alter Extracellular Matrix Production**
Ed Sander[1], Mariam El-Hattab[1], Kathryn Jacobson[2]
[1]University of Iowa, [2]University of Colorado

Friday, June 14	4:15PM–5:45PM CDT

Head & Injury Mechanics III

Session Chairs: John Finan, *University of Illinois at Chicago* **Loramoor C**
Corinne Henak, *University of Wisconsin-Madison*

4:15PM **Mechanical Covariance Networks of the Cortex Regions as Identified by Magnetic Resonance Elastography**
Kyra Twohy, Alexa Diano, Olivia Bailey, Mary Kramer, Curtis Johnson
University of Delaware

4:30PM **Effect of Cortical Folds on Head Acceleration-Induced Brain Deformation: A Computational Study**
Anu Tripathi[1], Jose Gonzalez[2], Peter Ferrazzano[2], Christian Franck[2], Rika Carlsen[1]
[1]Robert Morris University, [2]University of Wisconsin Madison

4:45PM **Regional Correlation of Stiffness and Perfusion in the Human Brain at 7T MRI Through MR Elastography and Arterial Spin Labeling Techniques**
Caitlin Neher, Em Triolo, Mehmet Kurt
University of Washington

5:00PM **Incremental Overstretch Increases Failure Values of Cerebral Blood Vessels**
Farshid Shojaeianforoud, Brittany Coats, Ken Monson
University of Utah

5:15PM **Microstructural Damage Progression in the Pia-Arachnoid Complex**
Leonardo Marin, Tim Dixon, Brittany Coats
University of Utah

5:30PM **Novel MRI Phantoms for Investigating Skull-Brain Mechanics Using Magnetic Resonance Elastography**
Joy Mojumder[1], Suhas Vidhate[2], Yuan-Chiao Lu[1,3], Alexa Diano[4], Ahmed Alshareef[5], Curtis Johnson[4], Michaelann Tartis[6], John Butman[1], Dzung Pham[1,7]
[1]National Institutes of Health, [2]Intuitive Surgical Inc, [3]The Henry M. Jackson Foundation, [4]University of Delaware, [5]University of South Carolina, [6]New Mexico Institute of Mining and Technology, [7]Uniformed Services University

Friday, June 14	4:15PM–5:45PM CDT

Heart Valve and Ventricular Fluid Mechanics

Session Chairs: Hoda Hatoum, *Michigan Technological University* **Maple Lawn A**
John LaDisa, *Marquette University and the Medical College of Wisconsin*

4:15PM **Post-Transcatheter Edge-to-Edge Repair Pressure Gradient Prediction After Mitraclip in Functional Mitral Regurgitation Patients**
Shelley Gooden[1], Mani Vannan[2], Konstantinos Boudoulas[3], Vinod Thourani[2], Pradeep Yadav[2], Lakshmi Dasi[1]
[1]Georgia Institute of Technology, [2]Piedmont Heart Institute, [3]Wexner Medical Center

4:30PM **Computational Construction and Optimization of A Novel Tri-Tube Heart Valve Design**
Jirong Li, Yijiang Yu, Robert Tranquillo
University of Minnesota, Twin Cities

4:45PM **Patient-Specific Fluid-Structure Interaction Simulations of Young Bicuspid Aortic Valve Patients**
Hail Kazik[1,2], Harkamaljot Kandail[3], Joy Lincoln[1,4], John LaDisa[1,2,4]
[1]Medical College of Wisconsin, [2]Marquette University, [3]Medtronic Neurovascular, [4]Children's Wisconsin

5:00PM **Intraventricular Fluid Dynamics Study Using an In VitroModel of Mitral Valve Regurgitation and Edge-to-Edge Therapy**
Cody Kubicki[1], Michael Sacks[2], Keefe Manning[1,3]
[1]Pennsylvania State University, [2]University of Texas, [3]Penn State College of Medicine

5:15PM **Analysis of Energy and Pressure in the Sinus Under Different Blood Pressures After Aortic Valve Replacement**
Brennan Vogl[1], Agata Sularz[2], Scott Lilly[3], Vinod Thourani[4], Mohamad Alkhouli[2], Hoda Hatoum[1]
[1]Michigan Technological University, [2]Mayo Clinic, [3]Ohio State University, [4]Piedmont Heart Institute

5:30PM **Effect of Patient-Specific Ascending Aortic Curvature on Flow in the Vicinity of TAVR**
Jae Hyun Kim[1], Vahid Sadri[1], Huang Chen[1], Sanchita Bhat[1], Keshav Kohli[1], Raj Makkar[2], Vasilis Babaliaros[3], Rahul Sharma[4], Ajit Yoganathan[1]
[1]Georgia Institute of Technology, [2]Smidt Heart Institute, [3]Emory University Hospital, [4]Stanford University

Friday, June 14	4:15PM–5:45PM CDT

Nanotechnology and Microfluidics

Session Chairs: **Jing Fan**, *City College of New York*
Khalil Khanafer, *University of Michigan*

Loramoor A

4:15PM **On the Margination of White Blood Cells**
Tam Nguyen, Trung Le
North Dakota State University

4:30PM **Development of a Microfluidic Dual-Gel Cell Culture Model**
Malgorzata Dwulat, Sihong Wang, Jing Fan
City College of New York

4:45PM **Design of a µ-Fluidic Chip for in Situ Quantification of Traumatic Brain Injury Biomarker Release**
Mauricio Araiza Canizales[1], Alexander McGhee[2], Rafael González-Cruz[3], Diane Hoffman-Kim[3], Christian Franck[1]
[1]University of Wisconsin-Madison, [2]University of Arizona, [3]Brown University

5:00PM **Prototyping of a Microfluidic Mechanochemical Gradient Chip by 3D Printed Molding for In Vitro Drug Testing**
Milad Fathi, Ali Mehrasa, Altuğ Özçelikkale
Middle East Technical University

5:15PM **Enhancing the Target Efficacy of Endothelial Colony Forming Cells for Renal Regeneration Via Kidney-Targeted Liposomal Nanoparticles**
Brenda Cruz Gonzalez[1], Fei Fan[2], Eva Hall[1], Sanjoy Saha[1]
[1]University of Notre Dame, [2]Michigan State University

5:30PM **Radiofrequency Ablation Facilitated by Microchannel Jetting**
Bo Cao, Hongying Wang, Ruizhe Hou, Shiqing Zhao, Aili Zhang
Shanghai Jiao Tong University

Friday, June 14	4:15PM–5:45PM CDT

Vascular Biomechanics & Pathology II

Session Chairs: **Abhay Ramachandra**, *Iowa State University*
Luke Timmins, *Texas A&M University*

Maple Lawn B

4:15PM **Relation Between Cyclic Convection Fluid Filtration (CCFF) and Atherosclerosis**
Bruce Simon[1], Paul Rigby[2], Paul Howard[3], Jonathan Vande Geest[4]
[1]University of Arizona, [2]Raytheon Technologies, [3]Midwest Cardiovascular Specialists Indiana University, [4]University of Pittsburgh

4:30PM **Differential Effects of Hypertension on the Morphological, Mechanical, and Physiologic Characteristics of Male and Female Human Femoropopliteal Arteries**
Sayed Ahmadreza Razian, Majid Jadidi, Alexey Kamenskiy
University of Nebraska at Omaha

4:45PM **Effects of the Loading Rate on the Mechanical Behavior of Proximal Superficial Femoral Artery**
Ali Zolfaghari Sichani, Majid Jadidi
University of Nebraska at Omaha

5:00PM **Age and Sex Specific Biomechanics and Extracellular Matrix Remodeling of the Ascending Aorta in A Mouse Model of Marfan Syndrome**
Krashn Dwivedi, Jacob Rother, Jessica E. Wagenseil
Washington University in St. Louis

5:15PM **Effect of Collagen Accumulation on Right Ventricular Passive Viscoelasticity With Pulmonary Hypertension Development**
Yuecheng Wang, Kristen LeBar, Zhijie Wang
Colorado State University

5:30PM **Accelerated Stent Deployment Simulations Via Model Order Reduction for Predictive Modeling of Transcatheter Aortic Valve Replacement**
Imran Shah[1,2], Sri Krishna Sivakumar[1], Francesco Ballarin[3], Vinod Thourani[4], Alessandro Veneziani[2], Lakshmi Dasi[1]
[1]Georgia Institute of Technology, [2]Emory University, [3]Università Cattolica del Sacro Cuore, [4]Piedmont Heart Institute

Poster Sessions

Posters will be presented in two sessions as listed below. See the Instructions for Poster Presenters section on page 8 for additional information. All poster sessions will take place in the **Forum** exhibition hall.

Poster Session I	**Wednesday, June 12, 1:00 - 2:30 PM CDT**
Poster Session II	**Thursday, June 13, 12:30 - 2:00 PM CDT**

Poster Session I

BS SPC: Experimental Methods in Biomechanics and Mechanobiology

P1 **Building ASGR1-Overexpressed Fluorescent Reporter Cell Model for Optimization of CRISPR Delivery**
Yun-I Sang, Morgan Clay, Chun-Wei Chi, Yeh-Hsing Lao
University at Buffalo

P2 **Impact of a Cognitive Dual Task on Older Adult Motor Performance and Strategies**
Erin Kreis, Mitchell Tillman, Jun Liu, Zahava Hirsch, Antonia Zaferiou
Stevens Institute of Technology

P3 **Measuring Limb Loads Using A Novel Prosthetic Pylon Force Sensor**
Hanna Armstrong, Kaleb Burch, Amit Chaudhari, Sagar Doshi, Erik Thostenson, Jill Higginson
University of Delaware

P4 **Comprehensive Assessment of Community Mobility and Participation of Wheelchair Users Using Wearables.**
Madisyn R. Adelman[1], Maja Goršič[1,2], Grace Fasipe[1], Jacob R. Rammer[1]
[1]University of Wisconsin-Milwaukee, [2]Marquette University

P5 **Collaborative Pathways: Empowering Pregnant and Parenting Teens Through STEM Engagement**
Oluwatomisin Ajayi[1], Emily Hoffmann[1], Paige Nielsen[1], Lauren Tolbert[2], Kyoko Yoshida[1]
[1]University of Minnesota, [2]Longfellow Alternative High School

P6 **Development of a Benchtop Model for Cerebral Collateral Circulation**
Argudit Chauhan, Alena Tucker, Debanjan Mukherjee
University of Colorado Boulder

P7 **Full-Field Comparison of Porcine Pulmonary and Aortic Valve Leaflet Collagenous Architecture Using Quantitative Polarized Light Imaging**
Shreya Sreedhar, Daniel Pearce, Connor Link, Colleen Witzenburg
University of Wisconsin-Madison

P8 **Mechanical and Damage Properties of Preterm and Adult Sheep Middle Cerebral Arteries Following Mechanical Damage**
Kerrigan Denham, Joseph Bail, Andrew Rebentisch, Kurt Albertine, Kenneth Monson
University of Utah

P9 **In Vitro Stretch Injury Affects Mitochondrial Membrane Potential, Calcium Concentration, and Nuclear Morphology in Rat Astrocytes**
Citlally Santacruz, Shahrzad Shiravi, Alexandra Yufa, John Finan
University of Illinois Chicago

P10 **Design and Optimization of a 3D-Printed Testing Platform for Evaluating the Effects of Voluntary Wheel Running on the Biomechanical Properties of Murine Achilles Tendons**
Elsa Lecaj, Samantha Muscat, Nolan Sparks, Mark Buckley, Anne Nichols
University of Rochester

P11 **Regional Mechanical Properties on the Macroscale and Microscale Are Not Associated for the Equine Superficial Digital Flexor Tendon**
Samantha Watson[1], Zachary Davis[1,2], Shannon Connard[2], Lauren Schnabel[2], Matthew Fisher[1,2,3]
[1]NC State and UNC Chapel Hill, [2]North Carolina State University, [3]University of North Carolina - Chapel Hill

P12 **Effect of Intermolecular Crosslinking on the Multiscale Mechanical Behavior of Tendons**
Madeline Wagner[1], Rachel Klink[1], Steven Eppell[2], Allen Lin[3], Jeffrey Weiss[1]
[1]University of Utah, [2]Case Western Reserve University, [3]Revvity

P13 **Mechanical Response to Compression of the Pig Optic Nerve**
Katherine Metrey, Arina Korneva
Virginia Tech

P14 **Combined Effects of Proteoglycan and Collagen on the Lubrication Properties of a Polyvinyl Alcohol Hydrogel**
Monika Maeda, Heitaro Chiba, Hiromichi Fujie
Tokyo Metropolitan University

P15 **Controlling Neural Culture Density and Orientation for Enhanced Analysis of Traumatic Brain Injury Electrophysiology**
Griffin Radtke, Jamie Sergay, Jessica Park, Jing Zhang, Christian Franck
University of Wisconsin-Madison

P16 **Investigating the Effects of Surface Stiffness and Viscoelasticity on Human Mesenchymal Stem Cell Immunomodulation**
Sara Olsen, Rose Leader, Bethany Almeida
Clarkson University

P17 **Effects of Detrusor Contraction on Urinary Bladder Extracellular Matrix Organization**
Daniel Deuel[1,2], Tyler Tuttle[3], Sara Roccabianca[4], Sarah Calve[3]
[1]University of Colorado, Boulder, [2]University of Colorado Boulder, [3]Paul M. Rady University of Colorado Boulder, [4]Michigan State University

P18 Biomedical Applications of Novel Magnetostrictive Composite
Aaron Brandner[1], Chui Law[2], Rani Elhajjar[2], Priyatha Premnath[2]
[1]University of Wisconsin-Madison, [2]University of Wisconsin-Milwaukee

P19 Compliance Matching A Polyurethane and PLCL Biohybrid Tissue Engineered Vascular Graft
Trin Murphy[1,2], David Maestas[1,2], Katarina Martinet[1,2], William Wagner[1,2], Sang-Ho Ye[1,2], Jonathan Vande Geest[1,2,3]
[1]University of Pittsburgh, [2]McGowan Institute for Regenerative Medicine, [3]Vascular Medicine Insitute

BS SPC: Image-Based Measurement, Analysis, and Modeling

P20 Kinematic Sensitivity Study of Total Knee Replacement FEA Model to Ligament Attachment Site
Elizabeth Wynn[1,2], Takayuki Koya[1,3], Markus Wimmer[1], Hannah Lundberg[1], Steven Mell[1]
[1]Rush University, [2]University of Illinois at Chicago, [3]Showa University Koto Toyosu Hospital

P21 VIGOR4D: Vascular Idealized Geometry Open-Source Repository for 4D Flow MRI Denoising and Super-Resolution
Moses Hamm, Neal Patel, Vitaliy Rayz
Purdue University

P22 A Machine Learning Approach to Mining Hemodynamics Data From Pulmonary Arterial Hypertension Rats
Jingwen Hui, Ethan Kwan, Daniela Valdez-Jasso
University of California, San Diego

P23 4D Flow MRI Reveals That Carotid Artery Bifurcation Geometry Impacts Hemodynamics Associated With Atherosclerosis
Carissa Lucas[1], Brennen Anderson[2], Retta El Sayed[1,3], Jason Allen[3,4], John Oshinski[1,3]
[1]Georgia Institute of Technology, [2]Augusta University, [3]Emory University, [4]Indiana University

P24 Advancing Cardiac Metrics: Computational CMR Methods for Ejection Fraction Evaluation
Ella Lyon[1,2], Ilham Essafri[2], Mengqian Zhang[2], Melissa Lucero[2], Kenzo Ichimura[3], Kurt Stenmark[2], Edda Spiekerkoetter[3], Vitaly Kheyfets[2]
[1]Colorado School of Mines, [2]University of Colorado Anschutz Medical Campus, [3]Stanford University

P25 Comparative Study of Image-Based Modeling Using a Novel Medical-Image-to-Reduced-Order-Simulation Framework
Boyang Gan, Numi Sveinsson, Shawn Shadden
University of California, Berkeley

P26 **Multimodal Study of Ischemic Cardiac Remodeling: Murine 4D Ultrasound and Mass Spectrometry Imaging**

WITHDRAWN

Amelya Fox[1], Luke Schepers[2], Conner Earl[2], Craig Goergen[2], Colleen Crouch[1]
[1]University of Tennessee, Knoxville, [2]Purdue University

P27 **MRI-Based Measurements of Strain in the Aorta: Does Cardiac Disease Impact Aortic Deformation?**

Petra Alsahwi, Alice Guest, Rylan Marianchuk, Dina Labib, James White, Elena Di Martino
University of Calgary

P28 **Personalized Finite Element Models of Tissue Expansion for Breast Reconstruction After Mastectomy**

Joel Laudo[1], Tianhong Han[1], Ariel Figueroa Baker[2], Arun Gosain[2], Taeksang Lee[3], Adrian Buganza Tepole[1]
[1]Purdue University, [2]Northwestern University, [3]Myongji University

P29 **Development of Tailored Finite Element Head Models for Free Vibrational Analysis Across Subject Specific Geometry**

Diego Acosta, Turner Jennings, Sinan Müftü, Rouzbeh Amini
Northeastern University

P30 **Optimization of Objective Measurements for Evaluating Sagittal Synostosis Detection and Treatment Efficacy**

Tim Dixon[1], Jason Ramsey[2], Philip Stevens[2], Brittany Coats[1]
[1]University of Utah, [2]Hanger Clinic

P31 **Toward the Detection of Cerebral Vessel Softening Using Magnetic Resonance Elastography**

Lucas Bolster, Henrik Odeen, Allison Payne, Ken Monson
University of Utah

P32 **A Framework for Slice-Wise Motion Correction in Magnetic Resonance Elastography of the Human Brain**

Tyson Lam, Emily Triolo, Mehmet Kurt
University of Washington

P33 **Sensitivity of Contact Mechanics to FE Model Generation Decisions Compared to Variations Between Knees and Due to Partial Meniscectomy**

Joshua Leadem
University of Rochester

P34 **3D Geometric Reconstruction of Electrospun Fibers**

Evan He, Shruti Motiwale, Elizabeth Cosgriff-Hernandez, Michael Sacks
University of Texas at Austin

P35 Sex Differences in Iris Stiffness With a History of Angle-Closure Glaucoma: An In-Vivo Image-Based Inverse Modeling Analysis
Hayden DelCiello[1], Frederick Sebastian[2], Anup Pant[3], Vanita Pathak-Ray[4], Syril Dorairaj[5], Rouzbeh Amini[2,2]
[1]Khoury Northeastern University, [2]Northeastern University, [3]University of Akron, [4]LV Prasad Eye Institute, [5]Mayo Clinic

P36 In-Silico Models of In-Vivo Cervical Stiffness Measurements for Improving Preterm Birth Prediction
Adriana Delagarza[1], Erin Louwagie[1], Abigail Laughlin[1], Jacqueline Hairston[1], Mirella Mourad[1], Michael House[2], Kristin Myers[1]
[1]Columbia University, [2]Tufts University

P37 Development of In-Silico Model of Cancerous Tissue
Nathanael Sovitzky
University of Wisconsin-Milwaukee

P38 Assessment of a Tumor's Malignancy Using In Silico Model of Breast Tumor Tissue
Hannah Vincent[1], Morgan Connaughton[1], Kianoush Falahkheirkhah[2], Erik Robert Hansen[1], Rohit Bhargava[2], Mahsa Dabagh[1]
[1]University of Wisconsin Milwaukee, [2]University of Illinois at Urbana-Champaign

Design, Dynamics, Rehabilitation, and Regulations

P80 Exploration of the Full-Field Biomechanics of the Human Spine
Emma C. Coltoff, Benjamin S. Hezrony, Philip J. Brown
Wake Forest School of Medicine

P81 Comparison of OpenSim and AnyBody Modeling System Predictions in Biomechanical Modeling of Upper Extremities
kamal Gautam, Mohamed Samir Hefzy, Abdul A Mustapha, Behrens Kyle
University of Toledo

P82 Stability of the C2-C3/C3-C4 Level During C4-C6 Laminoplasty With and Without C3 Laminectomy in Cadaveric Biomechanical Models
John Francis[1], Jeremy Loss[2], Derrick Obiri-Yeboah[3], Orlando Martinez[1], Bilal Butt[2], Michael Steinmetz[2]
[1]Case Western Reserve University School of Medicine, [2]Cleveland Clinic Foundation, [3]Cleveland Clinic Lerner College of Medicine

P83 Evaluating the Performance of Extended Kalman Filter Vs. Unscented Kalman Filter for Displacement Estimation
Nafiseh Mohammadianaftah[1], Sara Wilson[1], Neena Sharma[2]
[1]University of Kansas, [2]University of Kansas Medical Center

P84 Novel Stent Design and Prototyping Method
Kaitlyn Elmer[1], Barry Uretsky[2], Adib Chaus[3], Morten Jensen[1]
[1]University of Arkansas, [2]University of Arkansas for Medical Sciences, [3]Lutheran General Hospital

P85 In Vitro Clot Trapping Efficiency of the FDA Generic Inferior Vena Cava Filter in the Supine Position
Ian Goetz[1], Ryan Frasca[1], Garrett Campbell[1], Terrell Barraclough[1], Kenneth Aycock[2], Brent Craven[2], Keefe Manning[1,3]
[1]Pennsylvania State University, [2]US Food and Drug Administration, [3]Penn State College of Medicine

P86 Bubbler System Design for Removal of Oxygen From Media in an Open Testing Environment
Margaret Capalbo[1], Spencer Szczesny[1]
[1]Pennsylvania State University

P87 Uncovering Electro-Mechano-Physiological Rules of Life: A New 2D/3D All-Optical Interrogation Technology
Chenyu Liang[1], Erica Hengartner[1], Abygale Cochrane[1], Bruna Balbino de Paula[1], Basak Ayaz[1], Robert Caudle[1], Allison Campbell[1], Eleana Manousiouthakis[1], Christine Schmidt[1], Tian He[2], Christopher Werley[3], Xin Tang[1]
[1]University of Florida, [2]Harvard University, [3]Q-State Biosciences

P88 Ocular Hypothermia, In-Vitro Validation of A Novel Therapeutic Apparatus Using Non Perfused Porcine Eye Model
Luigi Mecacci, Yukinari Nakamura, John R. Hetling
University of Illinois at Chicago

P89 The Pomelo Peel as Impact Protection From Fall-Related Femur Fracture: Mechanical and Biological Property Investigation
Stacey Zeigler, Benjamin Ellis, Daniel Fuller, Laurel Kuxhaus
Clarkson University

P90 Validation of FEA Models for Design of Engineered Foam for Scoliotic Braces
Robert Rizza[1], Xue-Cheng Liu[2], Vince Anewenter[1]
[1]Milwaukee School of Engineering, [2]medical College of Wisconsin

Fluid Mechanics

P91 Geometry and Physics-Informed Neural Network Modeling of Flows Inside Y-Shaped Bifurcated Ducts
Abdullahi Olapojoye, Fatemeh Hassanipour
University of Texas at Dallas

P92 Enhancing Predictive Accuracy in Cerebral Aneurysm Hemodynamics: Insights From Machine-Learning Evaluation and Parameter Influence Analysis
Narges Kamaei Asl[1], Mahkame Sharbatdar[2]
[1]University of Tehran, [2]K. N. Toosi University of Technology

P93 Automatic Segmentation of Abdominal Aortic Aneurysm From Computed Tomography Angiography Using A Patch-Based Dilated U-Net Model
Merjulah Roby[1], Juan Restrepo[1], Haehwan Park[1], Satish Muluk[2], Mark Eskandari[3], Ender Finol[1]
[1]University of Texas at San Antonio, [2]Allegheny Health Network, [3]Northwestern University School of Medicine

P94 Experimental Evaluation of the 'Plunger Technique' for Manual Cyclic Aspiration Treatment of Acute Ischemic Stroke
Demitria Poulos[1], James Keith[1], Michael Froehler[2], Bryan Good[1]
[1]University of Tennessee, [2]Vanderbilt University Medical Center

P95 Impact of Particle Seeding on the Rheological Characteristics of Blood Analog Fluid Used in Laser Doppler Velocimetry
Shreyash M Manegaonkar[1], Israel Ajiboye[1], Gavin A. D'Souza[2], Rupak K Banerjee[1]
[1]University of Cincinnati, [2]US Food and Drug Administration

P96 Clinical Validation of the PSCOPE Hybrid Framework for Cardiovascular Predictive Modeling
Abraham Umo[1], Brett Welch[2], Armand Kilic[2], Ethan Kung[1]
[1]Clemson University, [2]Medical University of South Carolina

P97 A 3D Tissue Model of the Endothelial Glycocalyx Post-Pneumonectomy
Camden Holm, Jacob Elliot, Mia Long, Solomon Mensah
Worcester Polytechnic Institute

P98 A Computational Model to Simulate the Roughness of Narrowed Coronary and Cerebral Arteries in Diabetes Mellitus Patients and to Design Effective Treatment Strategies
Senol Piskin
Istinye University

P99 A Simple Model of Angiotensin Converting Enzyme Hub Capacity on Peptide Flux and Renin Influence
Brian Westwood, Mark Chappell
Wake Forest School of Medicine

P100 Comparison of Lumped, Distributive and 1D Navier-Stokes Model of Coronary Blood Flow
Chenghan Cai[1], Lik Chuan Lee[2], Lei Fan[3]
[1]Medical College of Wisconsin, [2]Michigan State University, [3]Marquette University

P101 Development and Application of On-Site Velocity Boundary
Reza Bozorgpour, Mahsa Dabaghmeshin
University of Wisconsin-Milwaukee

P102 Numerical Simulation of Multi-Frequency Ventilation Within the Central Airways of a Porcine Lung
Bing Han[1,2], Emmanuel A. Akor[3], Mingchao Cai[4], David W. Kaczka[2,3,2]
[1]University of North Carolina, Chapel Hill and Morgan State University, [2]University of Iowa, [3]Roy J. Carver University of Iowa, [4]University of North Carolina, Chapel Hill, Morgan State University

P103 Modeling Heat Sink Effects of Cerebrospinal Fluid (CSF) During Thermal Therapies for Treatment of Glioblastoma (GBM)
Yash Lad, Omar Abdulqader, Shreeniket Pawar, Anilchandra Attaluri
Pennsylvania State University

P104 Proportional Integral Derivative (PID) Controller Applied to Magnetic Nanoparticle Hyperthermia Therapy (MNHT)
Nageshwar Arepally, Yash Lad, Shreeniket Pawar, Ma'Moun Abu-Ayyad, Anilchandra Attaluri
Pennsylvania State University

P105 Heat Sink Effects of Large Blood Vessel During Thermal Therapies
Shreeniket Pawar, Naveen Kondreddy, Yash Lad, Anilchandra Attaluri
Pennsylvania State University Harrisburg

P106 Computational Analysis of Stroke Risk During Cardiopulmonary Bypass in Adult and Pediatric Anatomies
Nafis Arefin, Bryan Good
University of Tennessee

P107 Flow Dynamic Factors Correlated With Device-Related Thrombosis After Left Atrial Appendage Occlusion
Brennan Vogl[1], Agata Sularz[2], Alessandra Bavo[3], Matthieu De Beule[3], Jens Erik Nielsen-Kudsk[4], Ole De Backer[5], Mohamad Alkhouli[2], Hoda Hatoum[1]
[1]Michigan Technological University, [2]Mayo Clinic, [3]FEops, [4]Aarhus University Hospital, [5]Copenhagen Univerrsity Hospital

P108 Computational Modeling of Carotid Artery Stenosis and Fibromuscular Dysplasia for Prediction of Biomechanical Platelet Activation
J. Scott Malloy[1], Suman Guntupalli[2], Scott Cameron[2], Vitaliy Rayz[1]
[1]Purdue University, [2]Cleveland Clinic

P109 Flexible Rotor Blades in LVADs: Investigating Implications for Hemocompatibility
Shweta Karnik, Shobana Santhanam, Charles Federico, Huang Chen, Lakshmi Prasad Dasi
Georgia Institute of Technology

P110 Simulation of the Viscoelasticity of Clots Considering Red Blood Cells and Fibrin Network
Ryan Mueller, Jifu Tan
Northern Illinois University

P111 Hemodynamic Evaluation of the Sensitivity of Graft Morphology on Direct Vascular Surgery for Moyamoya Disease: An In Vitro and In Silico Study
Cheng Peng[1], Ephraim Church[2], Melissa Brindise[1]
[1]Pennsylvania State University, [2]Hershey Medical Center

P112 The Influence of Echocardiographic and Computed Tomography Phases on the Resulting Flow Dynamics in the Left Atrium
Ahmad Bshennaty[1], Brennan Vogl[1], Agata Sularz[2], Mohamad Alkhouli[2], Hoda Hatoum[1]
[1]Michigan Technological University, [2]Mayo Clinic

Solid Mechanics

P127 Anisotropic Porous Hydroxyapatite/Gelatin Implants for Trabecular Structure Reconstruction
Anton Pavlov, Jimmy Johnson, Ben Gadomski
Colorado State University

P128 Radiation Induces Fibrosis in Skin, but This Injury Is Mitigated in Expanded Skin
Laura Nunez[1], Joanna Ledwon[2], Vahid Tac[1], Arun Gosain[2], Adrian Buganza[1]
[1]Purdue University, [2]Northwestern University

P129 Creation of a Multi-Scale Model of Skin Growth to Understand the Effect of Microstructure and Tissue Heterogeneities on Skin Mechanobiology
Omar Moreno Flores[1], Maria Holland[2], Adrian Buganza Tepole[1]
[1]Purdue University, [2]University of Notre Dame

P130 Selection of Loading Conditions for Reliable Virtual Mechanical Testing of Bone Fracture Healing in Sheep and Humans
Mehran Bahrami, Kylie Frew, Hannah Dailey
Mechanical Engineering & Mechanics, Lehigh University

P131 Automatic Boundary Detection and Meshing for Virtual Mechanical Testing of Tibial Fracture Healing
Alireza Ariyanfar, Mehran Bahrami, Hannah Dailey
Lehigh University

P132 Modelling Vascularization in the Healing Callus After Fracture
Joseph Soldenwagner, Priyatha Premnath, Mahsa Dabagh
University of Wisconsin Milwaukee

P133 Adaptation of a Multiscale Model of Heart Growth in Pregnancy for Use in Canines
Tiffany Corlin, Molly Kaissar, Kyoko Yoshida
University of Minnesota

P134 Measurement of the Population Distribution of Helmet-to-Head Contact Forces
Turner Jennings, Aidan Tillman, D'Mitra Mukasa, Michael Marchev, Rouzbeh Amini, Sinan Müftü
Northeastern University

P135 Is Synthetic Clear Gelatin a Validated Surrogate for Biological Tissue in Low-Velocity Penetrating Impacts?
Joseph LeSueur[1,2], Jared Koser[1], Stephen Hargarten[1], Frank Pintar[1,2]
[1]Medical College of Wisconsin, [2]Marquette University

P136 Infant Skull Anatomical Standards for Use in Head Trauma Modeling
Yousef Alsanea, Tagrid Ruiz-Maldonado, Brittany Coats
University of Utah

P137 A Numerical Study on the Effect of Cortical Diffusivity on Brain Tissue Gyrification
Karan Taneja, Maria Holland
University of Notre Dame

P138 Effect of Impact Magnitude and Direction on the Injury Risk of Neural Cells
Raisa Akhtaruzzaman, Arthur Koster, Kamal Awad, Venu Varanasi, Marco Brotto, Ashfaq Adnan
University of Texas at Arlington

P139 Method for Extracting Intact Skull-Brain Samples for Ex-Vivo Mechanical Testing
Brandon Chelstrom, Corinne Henak
University of Wisconsin-Madison

P140 Numerical Modelling of Low-Level Blast Scenarios to Quantify Likelihood of Cavitation-Induced Traumatic Brain Injury
Manik Bansal[1], Baudouin Fonkwa[2], Eric Johnsen[2], Christian Franck[3], Rika Carlsen[1]
[1]Robert Morris University, [2]University of Michigan, [3]University of Wisconsin-Madison

P141 Modification of Polyacrylamide Using Dextran and Linear Acrylamide Chains to Mimic Human Brain Tissue
James Angelos[1], Adam Willis[2,3], Michaelann Tartis[1]
[1]New Mexico Institute of Mining and Technology, [2]Michigan State University, [3]59th Medical Wing

P142 Re-DiffiNet: Modeling Discrepancy in Tumor Segmentation Using Diffusion Models
Tianyi Ren, Abhishek Sharma, Juampablo Heras Rivera, Harshitha Rebala, Agamdeep Chopra, Ethan Honey, Mehmet Kurt
University of Washington

P143 Estimating Severe Injury Risk to Human Cervical Spine Using Scaled Head Kinematic Response From Non-Human Primate
Jesse Gerringer, Karthik Somasundaram, Frank Pintar
Medical College of Wisconsin and Marquette University

P144 Effect of Rear Impact on the Instrumented Spine: A Finite Element Study
Balaji Harinathan[1,2], Karthik Devaraj[3], Aditya Vedantam[3], Narayan Yoganandan[3]
[1]Medical College of Wisconsin, [2]Vellore Institute of Technology, [3]Medical College Wisconsin

P145 Cervical Neck Muscle Morphology Under Load-Bearing Conditions and Its Impact on Spinal Alignment: An Upright Magnetic Resonance Imaging Study
Mahmudur Rahman[1], Ali Warraich[2], Vicky Varghese[3], Aditya Vedantam[1], Narayan Yoganandan[1]
[1]Medical College of Wisconsin, [2]University of Chicago, [3]American International University

P146 Neck Strength and Endurance After 1-Hour Exposure to Vertical Whole-Body Vibration
Ana I. Lorente, Robert S. Salzar
University of Virginia

P147 Quantitative Analysis of the Compressive Force Applied to the ACL Tibial Enthesis
Daichi Ishii, Shiho Sato, Hiromichi Fujie
Tokyo Metropolitan University

P148 The Effect of Cam Morphology of the Hip on Sacroiliac Motion During Functional Hip Biomechanics
Alexander Hooke, Mason Uvodich, Joshua Bland, Allison Tanner, Zachary Braig, Micah Nieboer, Evan Dugdale, William Cross, Chunfeng Zhao, Aaron Krych, Mario Hevesi
Mayo Clinic

P149 The Importance of the Meniscus Inner Segment on the Mechanical Function of the Meniscus
Satoshi Yamakawa, Toshitaka Tsunematsu, Issei Ogasawara, Tomoki Ohori, Akira Tsujii, Shoji Kondo, Seira Sato, Takashi Kanamoto, Ken Nakata
Osaka University

P150 Compression Stability of Three Fixation Modes for Intraoperative Femoral Condyle Fractures During Knee Replacement
Timothy Eastep[1], Brady Killham[1], Yi Hong[1], Cheng-Jen Chuong[1], Dane Wukich[2], Jun Liao[1], Senthil Sambandam[3]
[1]University of Texas at Arlington, [2]University of Texas Southwestern Medical Center, [3]Dallas VA Medical Center

P151 Biomechanical Variability in Composite Lumbar Spine Surrogates During Multi-Laboratory Collaborative Testing
Emma Coltoff[1], Jeremy Loss[2], Siril Dukkipati[3], Jenna Wahbeh[4], Kalle Chastain[5], Matthew Pelletier[6], Tian Wang[6], Philip Brown[1], Mark Driscoll[7], Sophia Sangiorgio[4], Edward Ebramzadeh[4], Kathleen Meyers[5], William Walsh[6], Bryan Cornwall[6,8], Brian Kelly[9], Robb Colbrunn[2]
[1]Wake Forest School of Medicine, [2]Cleveland Clinic, [3]McGill University, [4]University of California, Los Angeles, [5]Hospital for Special Surgery, [6]University of New South Wales, [7]McGill University,, [8]University of San Diego, [9]Barrow Neurological Institute

P152 Temporal Variability in Composite Lumbar Spine Surrogates During Multi-Laboratory Collaborative Testing
Emma Coltoff[1], Jeremy Loss[2], Siril Dukkipati[3], Jenna Wahbeh[4], Kalle Chastain[5], Matthew Pelletier[6], Tian Wang[6], Philip Brown[1], Mark Driscoll[3], Sophia Sangiorgio[4], Edward Ebramzadeh[4], Kathleen Meyers[5], William Walsh[6], Bryan Cornwall[6,7], Brian Kelly[8], Robb Colbrunn[2]
[1]Wake Forest School of Medicine, [2]Cleveland Clinic, [3]McGill University, [4]University of California, Los Angeles, [5]Hospital for Special Surgery, [6]University of New South Wales, [7]University of San Diego, [8]Barrow Neurological Institute

P153 Walking Recovers Cartilage Strain: An Analysis of Measurement Repeatability
JiYeon Hong[1], Tejus Surendran[1], Shu-Jin Kust[2], Dana Voinier[3], Kyle Meadows[3], Dawn Elliott[3], Daniel White[3], Axel Moore[1]
[1]Carnegie Mellon University, [2]Temple University, [3]University of Delaware

P154 Rotary Pivot Shift: A New Loading Profile for Quantifying Rotational Stability in the Knee
Elizabeth Pace, Robb Colbrunn, Vincent Lizzio, Paul Saluan, Tara Nagle
Cleveland Clinic Foundation

P155 Evaluation of Spine Biomechanics Using Micro-Computed Tomography
Hutomo Tanoto, Yuxiao Zhou
Texas A&M University

P156 Extent of Vascular Damage at Varying Degrees of Stretch in Hypoxic Neonatal Brachial Plexus
Sanjna Srinivasan[1], Virginia Orozco[1], Smriti Nair[2], Mitali Sahni[3], Sriram Balasubramanian[1], Anita Singh[2]
[1]Drexel University, [2]Temple University, [3]Sunrise Children's Hospital

P157 Collagen Denaturation Quantification in Bone Using Collagen Hybridizing Peptide.
William Woolley[1], Katy Martin[2], Seungju Yu[2], Claire Acevedo[1,2]
[1]University of California, San Diego, [2]University of Utah

P158 Resolving Nanoscale Deformations of Mineralized Collagen Fibrils in 3D
Riti Sharma, Luc Capaldi, Kailin Chen, Ottman A. Tertuliano
University of Pennsylvania

P159 Investigating the Effect of Co and Cr Substitutions on Biomimetic Apatite Maturation
Kennedy Drake[1], Julianna DeSantis-Raymond[2], Stephanie Wong[1], Alix Deymier[1]
[1]University of Connecticut Health Center, [2]University of Connecticut

P160 Osteotomy Has Variable Effects on Construct Stiffness of Cadaveric Tibiae: Implications for Functional Evaluations
Luke Mattar[1], M. Enes Kayaalp[2], Tianyu Chen[1], Ron Curelaru[1], Volker Musahl[1], Richard Debski[1]
[1]University of Pittsburgh, [2]Istanbul Kartal Dr. Lutfi Kirdar Training and Research Hospital

P161 Mechanics of Cobalt Substitution in Biommetic Apatites
Abigail Eaton[1], Stephanie Wong[2], Kennedy Drake[2], Arun Nair[1]
[1]University of Arkansas, [2]University of Connecticut

P162 Correlation Between Loading-Induced Changes in Optical Redox Metrics and Mitochondrial Depolarization Varies by Strain Rate and Cartilage Zone
Jingyi Wang, Greta Scheidt, Corinne Henak
University of Wisconsin-Madison

P163 Quantifying Soleus Muscle Structure Through Diffuse Tensor Imaging (DTI) in Individuals With Achilles Tendon Rupture
Shabnam Rahimnezhad Baghche Jooghi[1], Xiaoxiao Bai[1], Tanzil Arefin[1], Thomas Neuberger[1], Morgan Voulo[2], daniel cortes[1]
[1]Pennsylvania State University, [2]Milton Hershey Medical Center

P164 Investigating the Mechanisms of Patella Osteochondral Allograft Transplant Failure Using Finite Element Methods
Michael Hernández Lamberty, John Grant, Rhima Coleman, Ellen Arruda
University of Michigan

P165 Postural Stability in Helicopter Aircrew With and Without Neck and Back Pain: the Medical College of Wisconsin Military Aircrew Neck and Back Pain Study
Rachel Cutlan[1], Cory Everts[2,3], Alok Shah[2], Amy Nader[2], Keeley Hamill[2], Narayan Yoganandan[2,4], Lance Frazer[5], Barry Shender[6], James Sheehy[6], Glenn Paskoff[6], Daniel Nicolella[5], Timothy Bentley[7], Brian Stemper[1,2,4]
[1]Marquette University and Medical College of Wisconsin, [2]Medical College of Wisconsin, [3]115th Fighter Wing, Wisconsin Air National Guard, [4]Zablocki Veterans Affairs Medical Center, [5]Southwest Research Institute, [6]Naval Air Warfare Center Aircraft Division, [7]Office of Naval Research

P166 Multiscale Correlations Between, Joint and Tissue Biomechanics and Morphology in Ovine Stifles
Aritra Chatterjee[1,2], Zachary Davis[2], Timothy Lescun[2], Deva Chan[2]
[1]Birla Institute of Science and Technology, [2]Purdue University

P167 Selective Bundle ACL Reconstruction Does Not Initially Restore the Normal ACL Force Distribution in an Adolescent Porcine Model: Implications for Treatment of Partial ACL Injuries
Yukun Zhang[1], Kaan Gurbuz[2], Jeffrey Spang[3], Matthew Fisher[1,3]
[1]NC State and UNC Chapel Hill, [2]Kayseri State Education & Research Hospital, [3]University of North Carolina at Chapel Hill

P168 Tackling Heterogeneity in Canine Osteosarcoma- A Biomechanical Analysis of Histotripsy-Treated and Untreated Bone
Preeya Achari[1], Elliana Vickers[1], Lauren Ruger[1], Eli Vslaisavljevich[1], Joanne Tuohy[2], Caitlyn Collins[1]
[1]Virginia Tech, [2]Virginia-Maryland College of Veterinary Medicine

P169 Growth Plate and Its Role in Pediatric ACL Injuries
Isaac Woodward, Antonis Stylianou
University of Missouri-Kansas City

Special Session: Cancer Mechanics

P66 Single Cell Mechanical Analysis Reveals Viscoelastic Similarities Between Astrocytes and Glioblastoma Cells
Julian Najera, Killian Onwudiwe, Luke Holen, Alice Burchett, Dorielis Rodriguez, Maksym Zarodniuk, Saeed Siri, Meenal Datta
University of Notre Dame

P67 Long-Distance Symphony Among Human Cancer Cells: an Underappreciated Mechano-Regulated Process in Tumor Progression
Chenyu Liang[1,2], Mai Tanaka[2], Dietmar Siemann[2], Bo Zeng[3], Xin Tang[1,2]
[1]University of Florida, [2]UF Health Cancer Center, [3]Southwest Medical University

P68 Perivascular CNS Fibroblasts Are Associated With Increased Tumor Stiffness and Poor Immunotherapy Response in Glioblastoma Patients
Maksym Zarodniuk, Megna Panchbhavi, Alexander Steele, Xin Lu, Jun Li, Meenal Datta
University of Notre Dame

P69 Simulating the Impact of Tumor Mechanical Forces on Glymphatic Networks in the Brain Parenchyma
Saeed Siri, Alice Burchett, Meenal Datta
University of Notre Dame

P70 Biophysical Characterization of Increased Prostate Cancer Cell Survival in Muscle Tissue
Jonah Spencer[1], Anne Cress[2], Jacob Notbohm[1]
[1]University of Wisconsin-Madison, [2]University of Arizona

P71 Direct Quantification of Cancer-Associated Exosomes in Plasma Enables Rapid Identification of Cancer Using Rotational Diffusometry of Janus Particles
John Sinclair[1], Sonu Kumar[1], Tiger Shi[1], Satyajyoti Senapati[1], Han-Sheng Chuang[2], Chia Chang[1]
[1]Notre Dame, [2]National Cheng Kung University

P72 Towards the Estimation of Tumor Stiffness Using B-Mode Ultrasound Imaging
Tanmay Mukherjee, Adarsh Shree, Reza Avazmohammadi
Texas A&M University

Special Session: Emerging Tools for Cell Mechanics

P73 A Novel Method for Studying Mechanotransduction: Complex Force Frequency Application Using Magnetic Vortex Microdiscs
Matthew Holler[1], Elena Rozhkova[2], Valentine Novosad[2], Scott Wood[1]
[1]South Dakota School of Mines, [2]Argonne National Laboratory

P74 Building Homemade Optical Tweezers to Study the Mechanical Forces of the Chondrocyte Cytoskeleton in the Context of Osteoarthritis
Samantha Smith, Scott Wood
South Dakota School of Mines

Special Session: Fiber Mechanics

P75 3D Printing Patient-Specific Left-Heart Models for Surgical Planning
Jakari Harris, Scott Hollister, Lakshmi Dasi
Georgia Institute of Technology

P76 Assessing the Impact of Hyaluronic Acid on the Rheological Properties of Collagen Hydrogels
Nicholas Gigliotti, Vivian Su, Mitra Taheri
Johns Hopkins University

P77 Femtosecond Laser Generated Micro-Cuts in Partially Recruited Collagen Fibers Show Micro-Forces Relevant on the Microscale
Miriam Bohlmann Kunz, Hannah Schilpp, Po-Yi Lee, Ian Sigal
University of Pittsburgh

P78 Using Fiber Modeling to Understand the Effects of Modulating Tissue Mechanical Properties as A Preventative Treatment for Glaucoma
Yingzhe Han, Bingrui Wang, Xuehuan He, Yuankai Lu, Ian Sigal
University of Pittsburgh

P79 Low Strain Rate Cyclic Loading and Recovery Effect on the Fatigue Properties of the Anterior Cruciate Ligament
Peter Kuetzing, Ulrich Scheven, Ellen Arruda
University of Michigan

Tissue & Cellular Engineering

P113 Developing a Scaffold With Gradient Mechanical Properties for Rotator Cuff Repair: A Parametric Finite Element Study
Sam Winston[1], Lynn Pezzanite[1], Ted Schlegel[2], Anthony Romeo[3], Steven Dow[1], Kirk McGilvray[1]
[1]Colorado State University, [2]University of Colorado School of Medicine, [3]Rothman Orthopedic Institute

P114 Role of Obese-Like Adipocytes in the Pathophysiology of Atrial Fibrillation Using 3D Bioprinted Models
Lara Celebi, Pinar Zorlutuna
University of Notre Dame

P115 Shining Light on Calcium-Mediated Morphogenesis: Forward Engineering Organ Development With Optogenetics and Mechanosensation
David Gazzo, Mayesha Sahir Mim, Nilay Kumar, Megan Levis, Maria Unger, Gabriel Miranda, Jeremiah Zartman
University of Notre Dame

P116 In Vitro Regionalization of Early Midbrain and Hindbrain Tissues Derived From Micropatterned Human Pluripotent Stem Cells
Tianfa Xie, Han Jiang, Lauren Brown, ChangHui Pak, Yubing Sun
University of Massachusetts Amherst

P117 Balancing Competing Effects of Epithelial Tissue Growth and Cytoskeletal Regulation During Organogenesis
Nilay Kumar[1], Jennifer Ambriz[2], Kevin Tsai[2], Mayesha Mim[1], Marycruz Flores-Flores[1], Weitao Chen[2], Mark Alber[2], Jeremiah Zartman[1]
[1]University of Notre Dame, [2]University of California

P118 Spatiotemporal Analysis for Hypertrophic Chondrocyte Differentiation in Spheroid Culture
Jeonghyun Kim[1], Kosei Tomida[1], Eijiro Maeda[1], Taiji Adachi[2], Takeo Matsumoto[1]
[1]Nagoya University, [2]Kyoto University

P119 Developing Mouse-Tumor Model for High Intensity Foucsed Ultrasound (HIFU) Ablation Procedures
Nabin Khanal[1], Victoria Summey[2], Jeffrey Bailey[2], Xin Duan[2], Rupak K. Banerjee[1]
[1]University of Cincinnati, [2]Cincinnati Children's Hospital Medical Center

P120 A Click Chemistry Method to Evaluate Glycosaminoglycan Composition and Metabolism in Articular Cartilage
Annie Porter, Steven DiStefano, Emily Newcomb, Michael Axe, X. Lucas Lu
University of Delaware

P121 Polychlorinated Biphenyls Alter Macrophage Polarization and Plasticity
Riley Behan-Bush, Jesse Liszewski, Michael Schrodt, Aloysius Klingelhutz, James Ankrum
University of Iowa

P122 A Novel Explant-in-A-Chip Perfusion Platform for Ex Vivo Preservation of Tissue Viability Applied to Both Healthy and Cancerous Tissues
WITHDRAWN
Eva Zeringa[1], Saverio Charalambous[1,2], Kinga Suba[3], Avirup Chowdhury[1,2], Ester Reina-Torres[1], Larry O'Connell[1], Foivos Chatzidimitriou[1], Joseph van Batenburg-Sherwood[1], Olivier Pardo[1], Alan Melcher[1,2], Paul Huang[2], Darryl Overby[1]
[1]Imperial College, [2]Institute of Cancer Research, [3]Imperial

P123 p21 Suppression to Improve Osteogenic Capacity of MSCs
Sina Jafari, Aaron Brandner, Julie Sandria, Priyatha Premnath
University of Wisconsin Milwaukee

P124 Assessing Pattern Recognition Receptor Agonist Loaded Hydrogels as A Potential Rotator Cuff Repair Augment
Sam Winston, Devin von Stade, Cody Plaisance, Renata Impastato, Lynn Pezzanite, Steven Dow, Kirk McGilvray
Colorado State University

P125 The Effect of Tissue Engineered Heart Valve Design on Remodeling: Optimizing Valve Functionality and Collagen Organization
Valery Visser[1], Sarah Motta[1], Simon Hoerstrup[1,2], Frank Baaijens[3,4], Sandra Loerakker[3,4], Maximilian Emmert[1,2,5,6]
[1]Institute for Regenerative Medicine, [2]Wyss Translational Center, [3]Eindhoven University of Technology, [4]Institute for Complex Molecular Systems, [5]German Heart Center, [6]Charité Universitätsmedizin

P126 Synthetic Hyaluronic Acid Coating Preserves the Phenotypes of Lymphatic Endothelial Cells
Sanjoy Saha, Fei Fan, Laura Alderfer, Francine Graham, Eva Hall, Donny Hanjaya-Putra
University of Notre Dame

Translational Technology Pitch Competition

P64 Integrating Autopsy-Based Radio-Pathomic Maps of Tumor Probability for Guiding Surgical Biopsies in Glioblastoma
Samuel Bobholz, Allison Lowman, Aleksandra Winiarz, Savannah Duenweg, Michael Flatley, Biprojit Nath, Jennifer Connelly, Dylan Coss, Max Krucoff, Anjishnu Banerjee, Peter LaViolette
Medical College of Wisconsin

P65 Delta Cuff
Cyrus Darvish[1], Pete Gueldner[1], Rabih Chaer[2], David Vorp[1], Timothy Chung[1]
[1]University of Pittsburgh, [2]University of Pittsburgh Medical Center

Poster Session II

Biotransport

P64 Hydrogel Wound Healing in Palliative Care
Tre Welch, Jamie Wright, Vanini Pimpalwar, Kelley Newcomer, Matteo Ligorio
University of Texas Southwestern Medical Center of Dallas

P65 Characterization of Microstructural Changes on Biglycan/Decorin Induced Mouse Bone by Low-Field NMR
Qingwen Ni
Texas A&M International University

P66 Comparative Liquid Flow Analysis in Battery-Powered Suction Devices for Advanced Airway Management
Maria J. Londono[1], Saketh R. Peri[1,2], Zach Fallon[1], David DiRocco[1], David Restrepo[1], Robert A. De Lorenzo[2,1], R. Lyle Hood[1,2]
[1]University of Texas at San Antonio, [2]University of Texas Health Science Center at San Antonio

P67 **Significantly Amplified Photoacoustic Effect for Silica-Coated Gold Nanoparticles by Interface Heat Transfer Mechanisms**
Chen Xie[1], Peiyuan Kang[1], Jonghae Youn[1], Blake Wilson[1], Lokesh Basavarajappa[1], Qingxiao Wang[1,2], Moon Kim[1], Kenneth Hoyt[1], Zhenpeng Qin[1,3]
[1]University of Texas at Dallas, [2]King Abdullah University of Science and Technology, [3]University of Texas at Southwestern Medical Center

P68 **Development of a Non-Invasive Imaging Approach for Assessing Radiation-Induced Changes in Intestinal Barrier Function**
Austen Nissen, Christopher Hansen, Guru Sharma, Brian Fish, Dana Veley, Amit Joshi, Heather Himburg
Medical College of Wisconsin

P69 **Effect of Breathing Technique for Targeted Laryngopharyngeal Drug Delivery**
Shamudra Dey[1], Guilherme J.M. Garcia[1,2]
[1]Marquette University and Medical College of Wisconsin, [2]Medical College of Wisconsin

P70 **A New Strategy to Enhance Radiofrequency Ablation Within the Low Electrical Conductivity Region of Atherosclerotic Plaque: A Mathematical Modeling**
Ruizhe Hou, Hongying Wang, Shiqing Zhao, Aili Zhang
Shanghai JiaoTong University

P71 **Enhancing Fluid Infusion via Introduction and Enlargement of Microcracks in Tumors – Theoretical Simulations**
Md Jawed Naseem, Ronghui Ma, Liang Zhu
University of Maryland Baltimore County

P72 **Accelerating Hydrodynamic Fabrication of Microstructure Using Deep Neural Networks**
WITHDRAWN
Nicholus Clinkinbeard, Reza Montazami, Nicole Hashemi
Iowa State University

P73 **Measuring Flow Resistivity in Microfluidic-Based Medical Devices**
Ali Bozorgnezhad, Luke Herbertson, Suvajyoti Guha
US Food and Drug Administration

P74 **Computational Analysis of the Contribution of Paracrine Chemotaxis to Spatial Distribution of Leukocytes in Cerebral Aneurysms**
Ruskin Shi, Hadi Wiputra, Victor Barocas
University of Minnesota-Twin Cities

Fluid Mechanics

P75 **The Hemodynamics of Mechanical Heart Valves: A Comparison of Numerical Simulations Against Experimental Measurements**
Syed Samar Abbas[1], Lorenzo Ferrari[2], Dominik Obrist[2], Iman Borazjani[1]
[1]Texas A&M University, [2]University of Bern

P76 A Parametric Model of the Mitral Valve From Multimodal Imaging Data
André Da Luz Moreira, Anders Persson, Farkas Vanky, Matts Karlsson, Jonas Lantz, Tino Ebbers
Linköping University

P77 Non-Newtonian Effects on Sinus Flow After Aortic Valve Replacement
Ahmad Bshennaty[1], Brennan Vogl[1], Zhongtian Zhang[1], Agata Sularz[2], Bruce Lee[1], Mohamad Alkhouli[2], Hoda Hatoum[1,1]
[1]Michigan Technological University, [2]Mayo Clinic

P78 Image-Based 3D Reconstruction Analysis of Regional Thrombosis After Transcatheter Aortic Valve Replacement
Katelynne Berland[1], Breandan Yeats[1], Taylor Becker[2], Marco Moscarelli[3], Khalil Fattouch[3], Lakshmi Dasi[1]
[1]Georgia Institute of Technology, [2]Ohio State University, [3]Maria Eleonora Hospital

P79 Transcatheter Aortic Valve Hemodynamics in HALT Positive and Negative Patient Cohorts: An FSI Study
Thangam Natarajan[1], Aniket Venkatesh[1], Stephanie Sellers[2], Janarthanan Sathananthan[2], Lakshmi Dasi[1]
[1]Georgia Institute of Technology, [2]University of British Columbia

P80 Virtual Stenting of Patient-Specific Vascular Stenoses
Jonathan Pham, Fanwei Kong, Doug James, Jeffrey Feinstein, Alison Marsden
Stanford University

P81 Impact of Boundary Conditions and Blood Rheology on Indices of Wall Shear Stress From IVUS-Based Patient-Specific Stented Coronary Artery Simulations
Robert McCarthy[1], Peter Mason[2], David Marks[3], John LaDisa[1,3,4,5]
[1]Marquette University and the Medical College of Wisconsin, [2]Medical College of Wisconsin, [3]Cardiovascular Medicine, Medical College of Wisconsin, [4]Pediatric Cardiology, Medical College of Wisconsin, [5]Children's Wisconsin

P82 Fluid-Structure Interaction Model of the Human Heart With a Closed-Loop Model of the Circulation
Masod Sadipour[1], Marshall Davey[2], David Wells[3], Charles Puelz[4], Boyce Griffith[1,5]
[1]University of North Carolina, [2]Curriculum in Bioinformatics and Computational Biology,University of North Carolina, [3]University of North Carolina at Chapel Hill, [4]Baylor College of Medicine and Texas Children's Hospital, [5]University of North Carolina, Chapel Hill

P83 Cardiac-Induced Brain Tissue Motion in Chiari Malformation Type 1 and Its Relationship to: Surgery, Crowding, and Symptomatology
Mahsa Karamzadeh[1], Mohamad Motaz Al Samman[1], Christopher Maclellan[2,3], Rafeeque Bhadelia[2,3], Amir Ebrahimzadeh[2,3], John Oshinski[4], Francis Loth[1]
[1]Northeastern University, [2]Beth Israel Deaconess Medical Center, [3]Harvard Medical School, [4]Emory University School of Medicine

P84 Characterization of Failure in Cerebral Aneurysm Stenting

Reza Bozorgpour[1], Pilhwan Kim[1], Peter Tze Man Kan[2], Mahsa Dabaghmeshin[1]
[1]University of Wisconsin-Milwaukee, [2]University of Texas Medical Branch

P85 Using CFD to Assess Tracheal Work of Breathing in Neonates With Tracheoesophageal Defects Pre and Post Surgical Repair

Christopher Boles[1,2], Chamindu Gunatilaka[1], Qiwei Xiao[1], Jason Woods[1], Paul Kingma[1], Alister Bates[1,2]
[1]Cincinnati Children's Hospital Medical Center, [2]University of Cincinnati

P86 Multiscale Modeling of Blood Flow in Aortic Root Aneurysm

Yurui Chen[1], Hannah Zhai[1], Hiroo Takayama[2], Vijay Vedula[1]
[1]Columbia University, [2]Columbia University Irving Medical Center

P87 Bladder Biomechanics and Shape Characterization: Comparison Study of Healthy vs BPH Using Uro-Dynamic MRI

Juan P. Gonzalez-Pereira, Shane Wells, Matthew Grimes, Wade Bushman, Alejandro Roldan-Alzate
University of Wisconsin-Madison

P88 Extension of Murray's Law to Three Dimensions With Multiple Daughter Vessels

Seth Street[1], David Dierker[1], Mark Johnson[1], Samer Hoz[2], James Castiglione[3], Charles Prestigiacomo[1]
[1]University of Cincinnati College of Medicine, [2]University of Pittsburgh, [3]Thomas Jefferson University

P89 Comparison Between Vessel Wall Models to Estimate Hemodynamics in Coronary Artery Bypass Graft Patients

Nhien Tran-Nguyen[1], Andrew Yan[1,2], Stephen Fremes[1,3,4], Laura Jimenez-Juan[1,2,4], Piero Triverio[1]
[1]University of Toronto, [2]St. Michael's Hospital, [3]Sunnybrook Health Sciences Centre, [4]Sunnybrook Research Institute

P90 Longitudinal Changes in Mechanical Properties of Aorta From Angiotensin-II Infused Mice Obtained by an Inverse Finite Element Method

Hadi Wiputra[1], Sydney Clark[2], Craig Goergen[2], Victor Barocas[1], Matthew Bersi[3]
[1]University of Minnesota, [2]Purdue University, [3]Washington University in St. Louis

P91 Differences in Flow Dynamics Between Coronary Artery Aneurysms and Ectasia

Brennan Vogl[1], Emily Vitale[1], Simon Lee[2], John Kovalchin[3], Hoda Hatoum[1]
[1]Michigan Technological University, [2]Lurie Children's Hospital of Chicago, [3]Nationwide Children's Hospital

P92 Medical Imaging Based Patient-Specific Blood Flow Modelling of Cerebrovasculature

Amar Shrivastava[1], Ashish Suri[2], Sitikantha Roy[1]
[1]Indian Institute of Technology Delhi, [2]AIIMS New Delhi

P93 Revisiting Murray's Law Pulmonary Arteries: Exploring Branching Patterns and Principles
Sofia Altieri Correa, Amirreza Kachabi, Mitchel J. Colebank, Naomi C. Chesler
University of California, Irvine

P94 Hemodynamic Analysis of Sinotubular Junction Plication Techniques During Ascending Aortic Replacement
Hannah Zhai[1], Yurui Chen[1], Yu Hohri[2], Hiroo Takayama[2], Vijay Vedula[1]
[1]Columbia University, [2]Columbia University Medical Center

P95 A Thermodynamics-Based Approach for Estimating Ventricular Efficiency: Application in Patients With Single Ventricle Physiology
Sanjib Gurung, Arutyun Pogosyan, Gregory S. Perens, Kim-Lien Nguyen, John Paul Finn
University of California, Los Angeles

MS SPC: Cardiovascular

P39 Development of Coarctation of the Aorta Software to Combat Hypertension
Shahd Sawalhi[1], Arash Ghorbannia[1,2,3], Andrew Spearman[2], Robert Cooper[1], John LaDisa[1,2,4]
[1]Marquette University and the Medical College of Wisconsin, [2]Children's Wisconsin and the Medical College of Wisconsin, [3]Duke University, [4]Medical College of Wisconsin

P40 Computational Study on the Hemodynamics of Bioprosthetic Pulmonary Valves in Patients With Repaired Tetralogy of Fallot
Kwang-Bem Ko[1], Jung-Hee Seo[1], Ashish Doshi[2], Danielle Gottlieb-Sen[2], Rajat Mittal[1]
[1]Johns Hopkins University, [2]Johns Hopkins Medicine

P41 Estimation of Flow Rates From Clinical Pressure Measurements for Individualized CFD of Cerebral Venous Stenotic Disease
Gurnish Sidora[1], Anna Haley[1], Nicole Cancelliere[2], Vitor Pereirav[2,1], David Steinman[1]
[1]University of Toronto, [2]St. Michael's Hospital

P42 The Impact of Natural Estrogen and Progesterone Cycling on Cardiac Function in Mice
Thaotho Nguyen, Cassandra Conway-O'Donnell, Naomi Chesler
University of California, Irvine

P43 Computational Modeling of Left Ventricular Flow Using MRI-Derived Four-Dimensional Wall Motion
Seyed Babak Peighambari[1], Tanmay Mukherjee[1], Amr Darwish[2], Roderic Pettigrew[1,3], Dipan Shah[2], Reza Avazmohammadi[1,3]
[1]Texas A&M University, [2]Houston Methodist DeBakey Heart & Vascular Center, [3]School of Engineering Medicine

P44 Marginal Chordae Force Data in a Physiological In Vitro Mitral Valve Setup
Mads Ancker[1], Sam Stephens[1], Neil Ingels[1], Jonathan Wenk[2], Morten Jensen[1]
[1]University of Arkansas, [2]University of Kentucky

P45 Structural and Mechanical Analysis of Treated and Untreated Aortic Coarctation
Matt Culver, Colleen Witzenburg, Alejandro Roldan-Alzate, Luke Lamers, Michael Stellon, Leah Gober
University of Wisconsin-Madison

P46 Porcine Thoracic Aortic Tissue Failure Strength Is Associated With Bulk Density Which May Be Detectable From Diffusion Tensor Imaging
Pete Gueldner[1], Cyrus Darvish[1], Timothy Chung[1], Chandler Benjamin[2], Keshava Rajagopal[3], Kevin Hitchens[1], Spandan Maiti[1], Kumbakonam Rajagopal[2], David Vorp[1]
[1]University of Pittsburgh, [2]Texas A&M University, [3]Thomas Jefferson University

MS SPC: Solid Mechanics

P47 The Mechanicalization of Locomotor Training for Gait Rehabilitation Due to Damage Caused by Partial Spinal Injuries: Defing Parameter of Knee Jerk Relex Stimulation Device.
Hannah Khelfa, Mohammed Sbai, Sanford Meek
University of Utah

P48 A Finite Element Model for Simulating Closed-Head Impact Injury in a Mouse Model: Implications for Tau Pathology in Traumatic Brain Injury
Ruiyuan Chi, Patrick Alford
University of Minnesota Twin Cities

P49 The Material Tuning of Annealing PVA Hydrogels for the Application of TMJ Disc Replacement
Hassan Mahmoud, Christian Puttlitz, Kevin Labus
Colorado State University

P50 3D Assessment of Rat Knee Joint Anatomy Using High Field MRI
Olivia Dyer, Mackenzie Conner, Stephanie Cone
University of Delaware

P51 Microscale Shear Wave Tensiometry Tracks Axial Stress in Tendon Fascicles
Shreya Kotha[1], Samantha Kahr[1], Darryl Thelen[1], Jonathon Blank[2], Alex Reiter[3]
[1]University of Wisconsin-Madison, [2]University of Pennsylvania, [3]St. Louis University

P52 A Systematic Analysis Confirmed That Mechanical and Structural Anisotropies Do Not Concur in 37 percent of Equatorial Sclera Samples
Bangquan Liao[1], Yi Hua[2], Fengting Ji[1], Frederick Sebastian[3], Rouzbeh Amini[3], Ian Sigal[1]
[1]University of Pittsburgh, [2]University of Mississippi, [3]Northeastern University

P53 Development and Validation of a Vehicle Front Profile Finite Element Model to Evaluate Pedestrian Impacts
James Wolf, Karthik Somasundaram, Frank Pintar
Marquette University and Medical College of Wisconsin

P54 Pregnancy and Age Differentially Affect Stiffness, Collagen Microdamage Susceptibility, and Composition of Uterosacral Ligaments
Catalina Bastias[1,2], Lea Savard[2], Kathleen Connell[3], Kathryn Jacobson[2], Sarah Calve[2], Virginia Ferguson[2], Callan Luetkemeyer[1]
[1]University of Illinois Urbana-Champaign, [2]University of Colorado Boulder, [3]University of Colorado Anschutz

P55 Uniaxial Biomechanical Response of Murine Uterine Tissue After Surgery-Induced Scarring
Savannah Chatman, Niyousha Karbasion, Abigail Fisk, Matthew Bersi, Perry Ann Brody
Washington University in St. Louis

MS SPC: Tissue Engineering, Biotransport, Mechanobiology

P56 Functionalized Nanoparticles Mediated High Intensity Focused Ultrasound (HIFU) Ablation in Mice
Nabin Khanal[1], Michael Marciniak[2], Marie-Christine Daniel[2], Liang Zhu[2], Matthew Lanier[3], Charles Dumoulin[3,1], Rupak K. Banerjee[1]
[1]University of Cincinnati, [2]University of Maryland Baltimore County, [3]Cincinnati Children's Hospital Medical Center

P57 Mechanical Characterization of Human Mesenchymal Stem Cell-Derived Osteocytic Spheroids by Uniaxial Compression Testing
Takashi Inagaki, Jeonghyun Kim, Eijiro Maeda, Takeo Matsumoto
Nagoya University

P58 Pressure Overload During Murine Pregnancy and Its Effects on Acute Cardiac Remodeling
Adalyn Meeks[1], Elnaz Ghajar-Rahimi[1], Molly Kaissar[2], Kyoko Yoshida[2], Craig Goergen[1]
[1]Purdue University, [2]University of Minnesota

P59 Evaluating the Biomechanical Response of 3D Printed Synthetic Tissue-Mimicking Materials for Cardiovascular Applications.
Vivian Tan[1], Daniella Eliathamby[2], Craig Simmons[2], Jennifer Chung[3], M. Owais Khan[1]
[1]Toronto Metropolitan University, [2]University of Toronto, [3]University Health Network

P60 Induced Pluripotent Stem-Cell Derived Cardiomyocyte Aged Tissue Model
Hatice Emanet, Frances Dipietro, Sneha Philip, Aylin Acun
Widener University

P61 The Impacts of Estrogen and Progesterone on Extracellular Matrix Remodeling in Female Mice Are Strain-Dependent
Allison Sander, Brianne Connizzo
Boston University

P62 A Pre-Chondrogenic Stem Cell Niche Facilitating Articular Cartilage Formation via Improving Chondrogenic Phenotype via Changing Stiffness and Cell Seeding Density
Yuqian Yang[1], Ruxin Yang[1], Kiera Downey[1], Samuel Oh[1], Erika Noel[2], Cheri Deng[1], Rhima Coleman[1]
[1]University of Michigan, [2]Florida International University

P63 Modulating In Vivo Compliance and Remodeling of a Polyurethane Based, Antithrombogenic Tissue Engineered Vascular Graft via Gelatin Incorporation
Katarina Martinet[1], David Maestas[1], Keishi Kohyama[1], William Wagner[1,2], Jonathan Vande Geest[1,2,3]
[1]University of Pittsburgh, [2]McGowan Institute of Regenerative Medicine, [3]Vascular Medicine Institute

Solid Mechanics

P112 Rapid Estimation of Left Ventricular Contractility With a Physics-Informed Neural Network Inverse Modeling Approach
Ehsan Naghavi[1], Haifeng Wang[1], Lei Fan[2,3], Jenny S. Choy[4], Ghassan Kassab[4], Seungik Baek[1], Lik-Chuan Lee[1]
[1]Michigan State University, [2]Marquette University, [3]Medical College of Wisconsin, [4]California Medical Innovations Institute

P113 iPSC-Derived Endothelial Multi-Cell Networks Synergistically Modify Their Basal Contractility and Extracellular Matrix in 3D
Toni West, Jiwan Han, Gabriel Peery, Robin Tuscher, Janet Zoldan, Michael Sacks
University of Texas

P114 Unravelling the Structural Mechanisms Underlying Aging-Augmented Risk of Aortic Dissection
Ruizhi Wang, Xunjie Yu, Bela Suki, Katherine Zhang
Boston University

P115 Deciphering Cardiac Allograft Vasculopathy: A Multiscale Computational Approach to Improve Heart Transplant Outcomes
Elisa Serafini[1,2], Anna Corti[3], Enrico Sangiorgio[4], Maddalena Bovetti[4], Diego Gallo[4], Carly S. Filgueira[1], Xian C. Li[1,5], Claudio Chiastra[4], Stefano Casarin[1,2,5]
[1]Houston Methodist Research Institute, [2]La Rochelle University, [3]Politecnico di Milano, [4]Politecnico di Torino, [5]Houston Methodist Hospital

P116 Mechanism of the Developed Pressure – Preload Relationship in Ex-Vivo Beating Heart
Lei Fan[1], Vahid Ziaei-Rad[2], Jason Bazil[2], Lik Chuan Lee[2]
[1]Marquette University and Medical College of Wisconsin, [2]Michigan State University

P117 Mechanical Stress in Atherosclerotic Coronary Arteries Are Associated With Plaque Growth
Jeremy Warren, Clark Meyer, Heather Hayenga
University of Texas at Dallas

P118 AI-Based Quantification of Vascular Calcifications for Enhanced Risk Evaluation
Mehdi Ramezanpour[1], Anne M. Robertson[1], Xiaowei Jia[1], Juan R. Cebral[2]
[1]University of Pittsburgh, [2]George Mason University

P119 Biomechanics Parameter Predicts Outcome of Fetal Heart Intervention Better Than Clinical Scan Parameters
Laura Green[1], Wei Xuan Chan[1], Andreas Tulzer[2], Gerald Tulzer[2], Choon Hwai Yap[1]
[1]Imperial College London, [2]Children's Heart Center Linz

P120 Multiscale Cardiac Modeling of Preterm Neonates
Salla Kim[1], Mitchel Colebank[1], Filip Jezek[2], Kara Goss[3], Pim Oomen[1], Dan Beard[2], Naomi Chesler[1]
[1]University of California, Irvine, [2]University of Michigan, [3]University of Texas Southwestern Medical Center

P121 A Random Forest Classification Method to Estimate Rupture Risk of Abdominal Aortic Aneurysms Based on Biomechanical and Geometric Surrogates
Juan C. Restrepo[1], Merjulah Roby[1], Pratik Mitra[1], Satish C. Muluk[2], Mark Eskandari[3], Ender A. Finol[1]
[1]University of Texas at San Antonio, [2]Allegheny Health Network, [3]Northwestern University School of Medicine

P122 Computational Insights on the Correlation of Myofiber Contractility With the Developed Pressure-Preload Dynamics in Ex-Vivo Beating Hearts
Vahid Ziaei-Rad[1], Lei Fan[2], Jason Bazil[1], Lik Chuan Lee[1]
[1]Michigan State University, [2]Marquette University and Medical College of Wisconsin

P123 Computational Modeling of the Aorta in a Mouse Model of Marfan Syndrome to Determine Temporal Changes in Geometric Biomarkers and Wall Shear Stress
Yufan Wu, Krashn Dwivedi, Jessica Wagenseil
Washington University in St. Louis

P124 Investigating the Role of Wall Stress in Aortic Growth of Acute Uncomplicated Type B Aortic Dissection Using Fluid-Structure Interaction Analysis
Minliang Liu[1], Yuxuan Wu[2], Adam Mazlout[2], Yuhang Du[1], Rishika Agarwal[2], Hannah Cebull[3], Marina Piccinelli[3], John Elefteriades[4], Rudolph Gleason[2], Bradley Leshnower[3]
[1]Texas Tech University, [2]Georgia Institute of Technology, [3]Emory University, [4]Yale University

P125 Microstructural Abnormalities in Human Hypertrophic Septal Tissues
Duc Khang Chung[1], Milad Almasian[2], Houjia Chen[1], Katherine Copeland[1], Kytai Nguyen[1], Matthias Peltz[3], Pietro Bajona[3], Yi Hong[1], Yichen Ding[2], Jun Liao[1]
[1]University of Texas at Arlington, [2]University of Texas at Dallas, [3]University of Texas Southwestern Medical Center

P126 Finite Element Simulations of Heart Valve Function With Shape Enforcement in FEBio
Devin Laurence[1], Patricia Sabin[1], Steve Maas[2], Jeffrey Weiss[2], Matthew Jolley[1]
[1]Children's Hospital of Philadelphia, [2]University of Utah

P127 The Impact of Right Ventricular Fiber Re-Orientation on Left Ventricular Contraction: A Numerical Studay
Mengqian Zhang[1], Kenzo Ichimura[2], Kurt Stenmark[1], Edda Spiekerkoetter[2], Vitaly Kheyfets[1]
[1]University of Colorado Anschutz Medical Campus, [2]Stanford University

P128 Novel Computational Model for Planning Patent Ductus Arteriosus Stenting Procedure
Luis René Mata Quiñonez[1,2], Srujana Joshi[1,2], Shweta Karnik[1,2], Leon Cheng[1,2], Andrew Marini[1,2], Shobana Santhanam[1,2], Rahav Kothuri[1], Charles Federico[1,2], Suhaas Bonkur[1,2], Lakshmi Dasi[1,2], Holly Bauser-Heaton[1,2,3]
[1]Georgia Institute of Technology, [2]Emory University, [3]Children's Healthcare of Atlanta

P129 Structure and Function of the Murine Greater Thoracic Vessels
Abhay Ramachandra[1], Cristina Cavinato[2], Jay Humphrey[3]
[1]Iowa State University, [2]Université Montpellier, [3]Yale University

P130 Evaluation of Transcatheter Edge-to-Edge Repair Clip Selection via an Open-Source Finite Element Simulation Framework
Patricia Sabin[1], Devin Laurence[1], Wensi Wu[1], Christian Herz[1], Steve Maas[2], Jeffrey Weiss[2], Matthew Jolley[1]
[1]Children's Hospital of Philadelphia, [2]University of Utah

P131 Fiber Shortening and Laminar Thickening Strain Attributes Reveal Greater Transmural Heterogeneity in Myocardial Deformation than Green Strains via DENSE MRI
Tawfik Hussein, John Oshinski
Georgia Institute of Technology

P132 Effects of Residual Stress on the Buckling and Twisting Behavior of Arteries
Qin Liu[1,2], Alejandro Cisneros[1], Hai-Chao Han[1]
[1]University of Texas at San Antonio, [2]New York Institute of Technology

P133 Simulated TAVR Lifetime Management to Assess Coronary Obstruction Risk for Varied Deployments of Balloon-Expandable and Self-Expanding Valves
Courtney Ream[1], Taylor Becker[2], Venkateshwar Polsani[3], Pradeep Yadav[3], Vinod Thourani[3], Lakshmi Dasi[1]
[1]Georgia Institute of Technology, [2]Ohio State University, [3]Piedmont Hospital

P134 Simulation of Self-Expanding Transcatheter Pulmonary Valve Deployment in the Right Ventricular Outflow Tract
Christopher Zelonis[1], Nicolas Mangine[1], Kyle Sunderland[2], Steve Maas[3], Stephen Ching[1], Yuval Barak-Corren[1], Devin Laurence[1], Wensi Wu[1], Patricia Sabin[1], Andras Lasso[2], Matthew Gillespie[1], Jeff Weiss[3], Matthew Jolley[1]
[1]Children's Hospital of Philadelphia, [2]Queen's University, [3]University of Utah

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Justin McMahon[1], Parker Berthelson[1], Alexander Stotka[1], Barney McEntire[2], Robert Salzar[1]
[1]University of Virginia, [2]US Army Aeromedical Laboratory

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Kathrine Quiros[1], Talyah Nelson[1], Mona Eskandari[2,1]
[1]University of California, [2]University of California, Riverside

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Carla Nathaly Villacis Nunez[1], Ulrich Scheven[1], Asheesh Bedi[2], Ellen Arruda[1]
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[1]University of Wisconsin-Madison, [2]Brown University

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[1]University of Rochester, [2]University of Rochester Medical Center, [3]Emory University School of Medicine

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[1]Vellore Institute of Technology, [2]Medical College of Wisconsin

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[1]Boston University, [2]Massachusetts General Hospital, [3]Peking University, [4]Harvard University

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Cyrus Darvish[1], Peter Jacobs[2], Elias Mignonga[2], Yuqi Cai[2], Pete Gueldner[2], David Vorp[2], Timothy Chung[2]
[1]Univeristy of Pittsburgh, [2]University of Pittsburgh

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Samyuktha Kolluru[1], Adrienne Scott[2], Patrick Yang[2], Michelle Oyen[1,2]
[1]Washington University in St. Louis, [2]Washington University in St Louis

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Kara Peak, Sarah Wernimont, Victor Barocas
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[1]Columbia University, [2]University of Texas Southwestern Medical Center

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Megan Routzong[1], Francesca Sesillo[1], John Rudell[1], Marianna Alperin[1,2]
[1]University of California, San Diego, [2]Sanford Consortium for Regenerative Medicine

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Echo Xu[1], Camilo Duarte-Cordon[1], Daniella Fodera[1], Shuyang Fang[1], Ivan Rosado-Mendez[2], Timothy Hall[2], Helen Feltovich[3], Kristin Myers[1]
[1]Columbia University, [2]University of Wisconsin-Madison, [3]Mount Sinai

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Jun Yang, Gokhan Bahcecioglu, Aktar Ali, Brian Blagg, Pinar Zorlutuna
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Michael Potter[1], Samuel Coeyman[1], Jonathan Heywood[1], William Richardson[2]
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[1]University of Nevada, Las Vegas, [2]Johns Hopkins University

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[1]University of Pennsylvania, [2]Georgia Institute of Technology, [3]University of Colorado Boulder, [4]Washington University in St. Louis

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[1]Icahn School of Medicine at Mount Sinai, [2]Cooper Union

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Amin Sabaghan, Neda Ghousifam, Mahboobeh Rezaeeyazdi, Christopher Riley, Dwight Romanovicz, Marissa Nichole Rylander, Matthew Uden
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Undergraduate Design Competition

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Rohan Chhaya, Carly Flynn, Elena Grajales, Priya Shah, Dori Xu
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Alexandra Dumas, Angela Song, Samir Maarouf, Daphne Nie, Georgia Georgostathi
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P168 Region Adjustable Prosthetic Socket
Camilo Rodriguez Rozas, Kristin Bindas, Katie LeClaire, Maddi Viteri, Savannah Waymer
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Jamie Moni, Gautham Nair, Ajit Saran, Pavan Raghupathy
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Victoria Moore, Miles Yoshinobu, Mirabella Herrera, Tanveer Ahmed, Rachel Porter
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Connor Beck[1], Noah Kibler[2], Sheryl Korah[1], Osman Sayginer[1]
[1]Temple University, [2]Drexel University

P177 CARDIOFORECASTER - An AI-Driven Cardiovascular Disease Forecasting Platform
Valerie Balas, Krysta Bernold, Mathieu Colon, James Evangelisto III, Kylie Herbert, Daniel Roozbahani, Ria Mazumder
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Nicolette Cilenti, Matthew Jester, Skylar Ford, Elle Ferguson
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Jishnu Basu, Samarth Kabbur, Arnav Nair, Deeya Kaneria, Ryan Virkar, Reshmitha Muppala
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Srish Chenna, Kira Lu, Sylvia Mihailescu, Karan Shah, Kalen Truong
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Ali Eldeiry, Sing-Wan Wong
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Alexa Warren, Anna Sasse, Joshua Perry, Bailey Erickson, Marvin Aguilera, Christopher Luliucci, Erik Brewer
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Jimin Jung, Nigel Newby, Spencer Tuohy, Tyler McGoldrick
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Estefania Enciso Pelayo, Jonathan Balsano, Michael Fong
University of California, San Diego

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Emanuel Guzman, Wade Coons, Brady Killham
University of Texas at Arlington

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Vikas Addanki, Caeley Shorr, Madison Plone, Erik Brewer
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Nova Meng, Haley Morgenstern, Anthony Saldutti, Sharon Zheng
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Christopher Clark, Sofia Gandarilla, Briana Marquez, Minh-Huy Tran, Alexis Valencia
University of Riverside, California

P190 The Future of Intravenous Therapy Insertions by Using Vein Finder Technology in Emergency Scenarios to Improve Patient Safety

Ugochukwu Akpati, Ramiro Flores, Thai Pham, Baohong Yuan
University of Texas at Arlington

P191 A Benchtop Study of Physiological Response for the Novel Self-Powered Fontan Circulation

Clayton Purdy[1], Anthony Damon[1], Levi Blumer[1], Keyu Vadaliya[1], Martin Cinelli[1], Megan Parker[1], Dr. Ray Prather[1,2], Dr. Arka Das[1], Dr. Eduardo Divo[1], Dr. Alain Kassab[2], Dr. William DeCampli[3]
[1]Embry-Riddle Aeronautical University, [2]University of Central Florida, [3]Orlando Health Arnold Palmer Hospital for Children

P192 Development of an Automated Bone Transport Device for Use in Distraction Osteogenesis

Chloe Brekhus, Ben Gadomski, Christian Puttlitz
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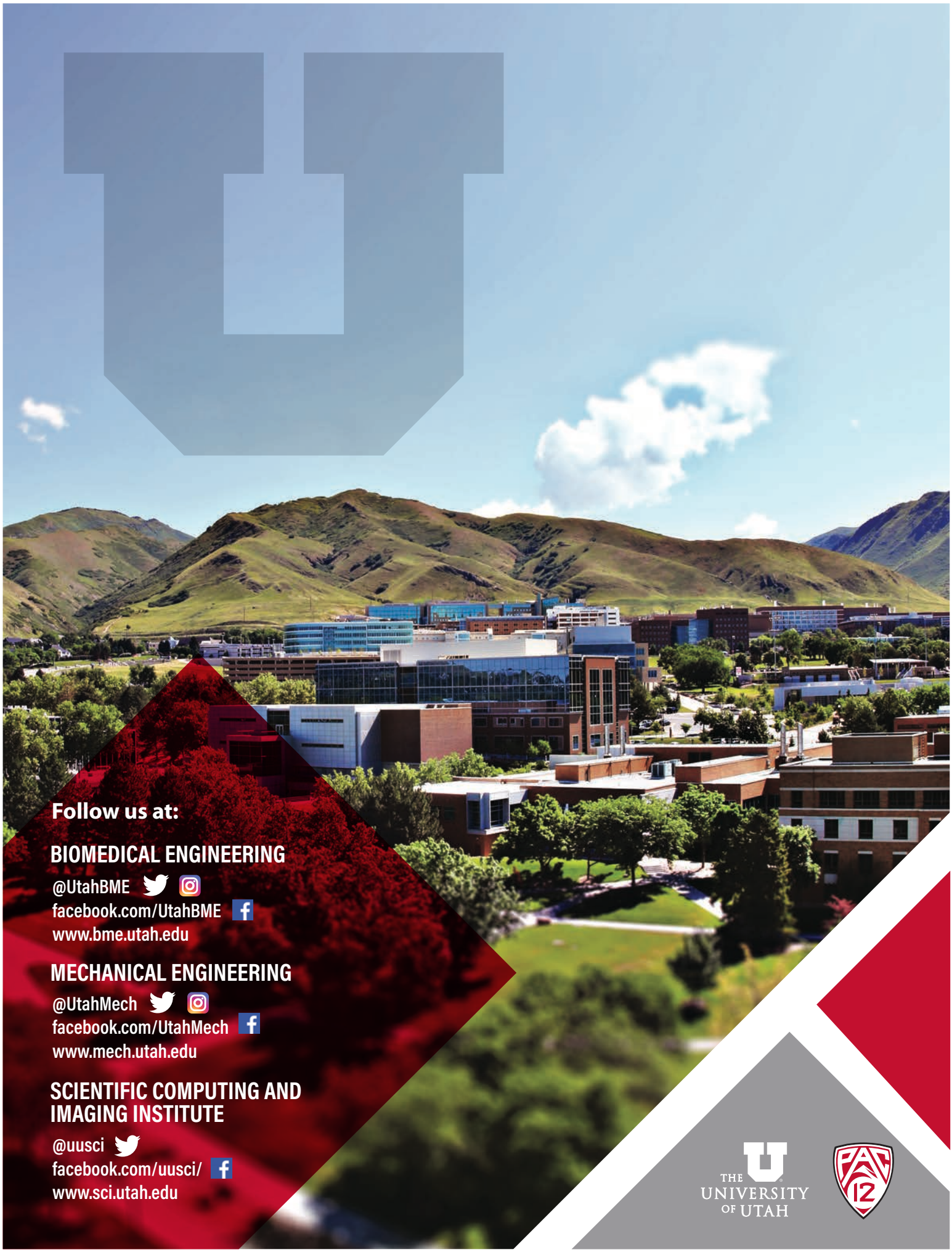
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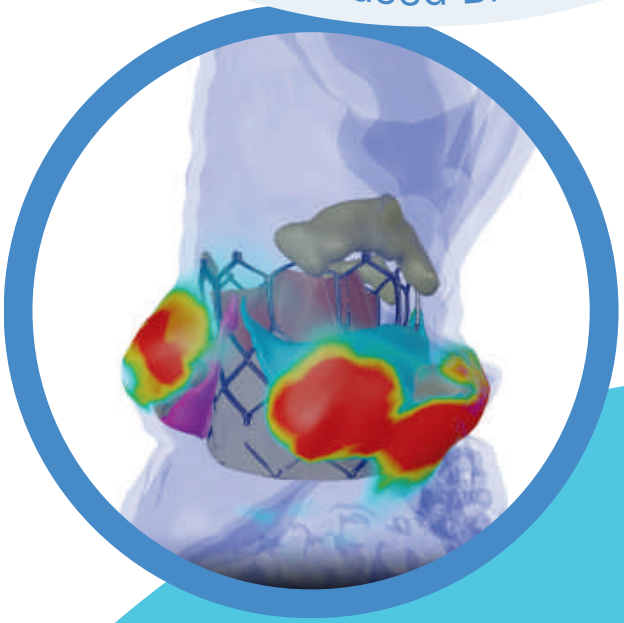

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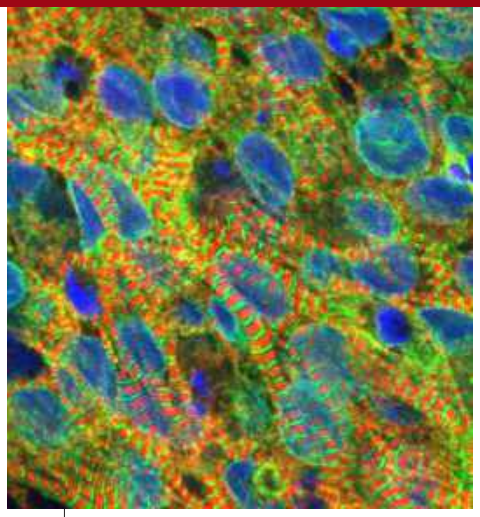

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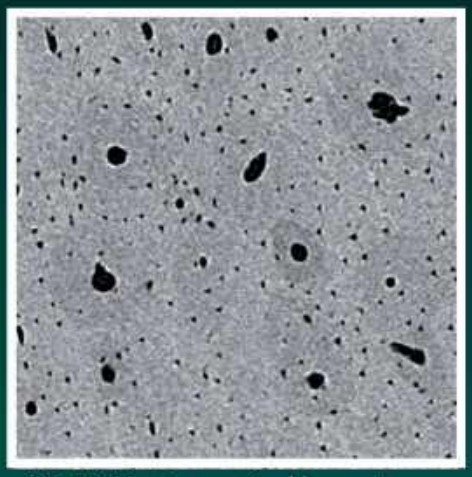
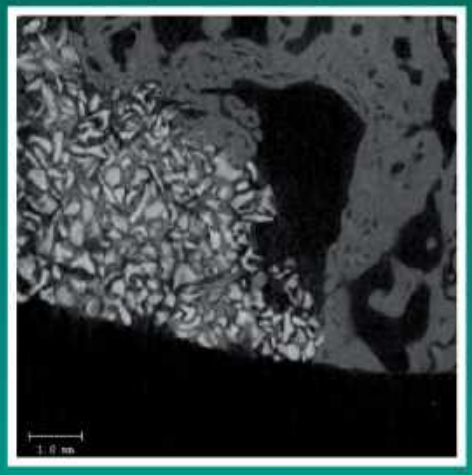


µCT 50, Murine cortical bone, 1 µm

µCT 50, Temporal bone, 6 µm



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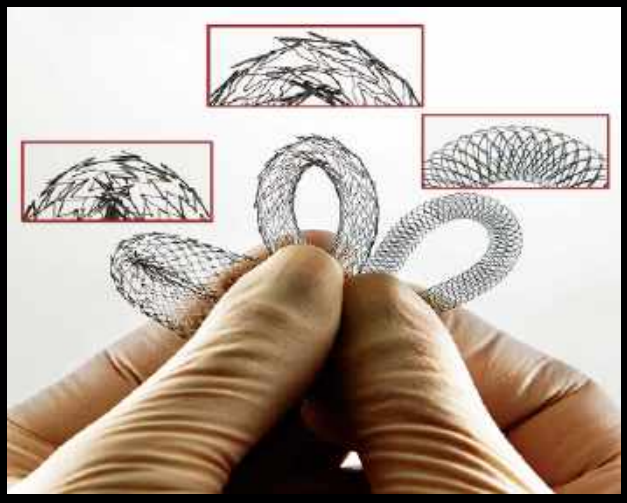

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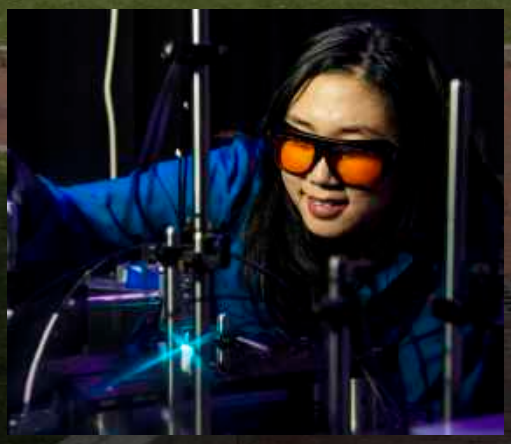

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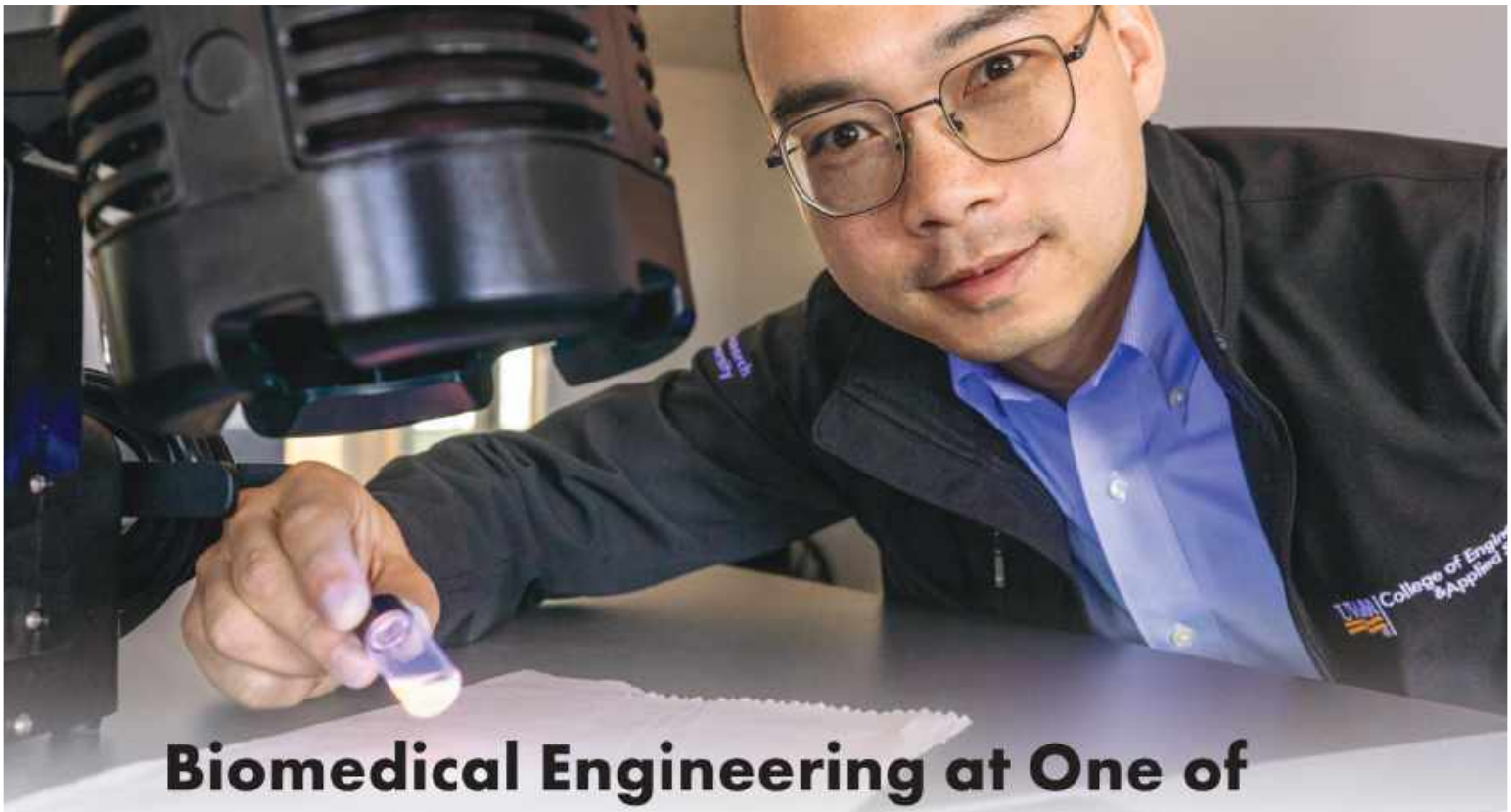

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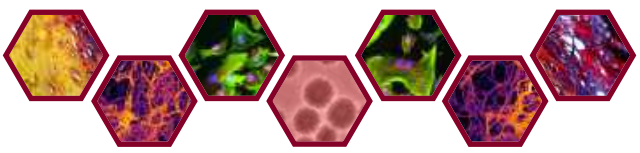

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SB^{3}C 2024 • PROGRAM AT-A-GLANCE

Room:	Loramoor A	Loramoor B	Loramoor C	Maple Lawn A	Maple Lawn B	Maple Lawn C	Linwood
Tuesday, June 11, 2024							
12:00 – 1:00 pm						**ASME Open Meeting**	
1:00 – 2:00 pm				**TCOM: Education**	**TCOM: Industry**	**TCOM: Fluid Mech.**	**Student Leadership Committee Panel**
2:00 – 3:00 pm				**TCOM: Biotransport**	**TCOM: DDRR**	**TCOM: Tissue & Cell**	
3:00 – 4:00 pm						**TCOM: Solid Mech.**	**Workshop:** Transitioning Between Academia & Industry
4:15 – 5:45 pm	Modeling Cardiac & Coronary Artery Flow & Physiology	Valvular Biomechanics	AI & Machine Learning in Biofluids	Mechanobiology in Cancer	Cartilage Structure, Lubrication & Mechanics	Fiber Mechanics	Spine & Disc
6:00 – 7:10 pm	**Plenary** (Grand Ballroom)						
7:15 – 9:00 pm	**Welcome Reception** (Forum)						

Wednesday, June 12, 2024							
All Day	**Exhibits**						
8:00 – 9:30 am	Cancer Mechanics I	Engineered In Vitro Models	Cardiovascular Devices & Design	Emerging Topics: Biomechanics & Mechanobiology	Nano, Micro, Tissue & Multiscale Mechanics	Biomedical Devices & Materials for Global Health Solutions	Ligament & Tendon Mechanics & Imaging
9:45 – 11:15 am	**Nerem ASME Medal** | **Mow ASME Medal** | **Fung ASME Medal** (Grand Ballroom)						
11:15 – 11:30 am	**Coffee Break**						
11:30 – 1:00 pm	Cancer Mechanics II	Emerging Topics in Tissue & Cellular Engineering	Cardiovascular Patient-specific Modeling in the Setting of Disease	Growth, Modeling & Repair	Emerging Topics: Soft Tissue Mechanics	Digital Health & Computational Modeling to Improve Health Outcomes	Novel Approaches to Bioengineering Education/Outreach
1:00 – 2:30 pm	**Meet NSF Prog. Directors** 2:00 – 3:15 pm	**POSTER SESSION I with Lunch, Including BS Student Paper Competition** (Forum)					
2:30 – 3:45 pm		**LGBTQ+ Networking Event** (Chalet)					
3:45 – 5:15 pm	**Workshop: Bias in Peer Review** (Linwood)				**Translational Tech. Pitch Competition** (Maple Lawn C)		
5:15 – 6:15 pm	**Prospective Faculty Poster Session** (Forum)				**Industry/Exhibitor Networking Event** (Embers Terrace)		
6:15 – 7:15 pm	**SB3C Open Meeting** (Maple Lawn C)						

Thursday, June 13, 2024							
All Day	**Exhibits**						
8:00 – 9:30 am	Mineralized & Soft Tissue Mechanics & Modeling	Thrombosis, Hemolysis & Mechanical Circulatory Support	Mechanobiology & Fluid Mechanics in the Setting of Disease	Mechanobiology & Engineering of Musculoskeletal Tissues	Joint Biomechanics	Machine Learning: Computational Modeling & Predicting Patient Outcomes	Emerging Topics: Computational Modeling & Imaging in Soft Tissues
9:45 – 10:45 am	**Lissner ASME Medal** (Grand Ballroom)						
10:45 – 11:00am	**Coffee Break**						
11:00 – 12:30 pm	**PhD SPC:** Biotransport, Human Motion, Reproductive, & Emerging Topics	**PhD SPC:** Platelets & Cardiovascular Biomechanics	**PhD SPC**: Heart Valves, Devices, & Computational Methods	**PhD SPC**: Neural, Lung, & Developmental Solid Mechanics	**PhD SPC**: Musculoskeletal, Joint, & Spine		**PhD SPC**: Development, Tissue Engineering, Mechanobiology, & Emerging Topics
12:30 – 2:00 pm	**POSTER SESSION II with Lunch, including MS Student Paper Competition** (Forum)						
2:00 – 3:30 pm				**Workshop:** Application of Generative AI in Teaching & Research	**Workshop:** Creating a World Where Health Equity is a Reality for All	**Workshop:** Data-driven Constitutive Models of Soft Tissues	**Workshop:** Biomech., Bioeng., & Biotransport: Clinician Perspective
3:30 – 5:00 pm	**Diversity Workshop** (Evergreen Ballroom)						
5:00 – 6:00 pm	**Women's Faculty & Post-Doc Networking Event** (Maple Lawn AB)				**Student Networking Event/Social Event** (Indoor Pool)		
7:00 – 10:00 pm	**CONCERT** (Pavilion)						

Room:	Loramoor A	Loramoor B	Loramoor C	Maple Lawn A	Maple Lawn B	Maple Lawn C	Evergreen I
Friday, June 14, 2024							
All Day	**Exhibits**						
8:30 – 10:00 am	**Workshop:** CRIMSON	**Workshop:** ShapeWorks	**Workshop:** SimVascular			**Workshop:** simVITRO	**Workshop:** FEBio
10:00 – 11:30 am					Undergraduate Design Competition		
12:45 – 2:15 pm	Special Session Honoring Ken Diller	Speech Biomechanics	Head & Injury Mechanics I	Emerging In Vitro, Experimental & Computational Methods in Fluids I	Mechanobiology in Tissue & Cellular Engineering	Knee Biomechanics	Cardiac Biomechanics
2:15 – 2:30 pm	**Coffee Break**						
2:30 – 4:00 pm	Biotech & Drug Delivery	Bone & Cartilage Mechanobiology & Tissue Engineering	Head & Injury Mechanics II	Emerging In Vitro, Experimental & Computational Methods in Fluids II	Vascular Biomechanics & Pathology I	Emerging Tools for Cell Mechanics	Reproductive Biomechanics
4:00 – 4:15 pm	**Coffee Break**						
4:15 – 5:45 pm	Nanotechnology & Microfluidics	Engineering Tissue Regeneration & Wound Healing	Head & Injury Mechanics III	Heart Valve & Ventricular Fluid Mechanics	Vascular Biomechanics & Pathology II	Emerging Topics: Extracellular Matrix Adaptation, Alterations & Therapy	Cell-Microstructure Interactions in Cardiovascular Mechanics
6:00 – 7:00 pm	**Grood ASME Medal** | **Woo ASME Medal** (Grand Ballroom)						
7:00 – 7:30 pm	**Banquet Reception** (Forum)						
7:30 – 10:00 pm	**Banquet and Awards Ceremony** (Forum)						