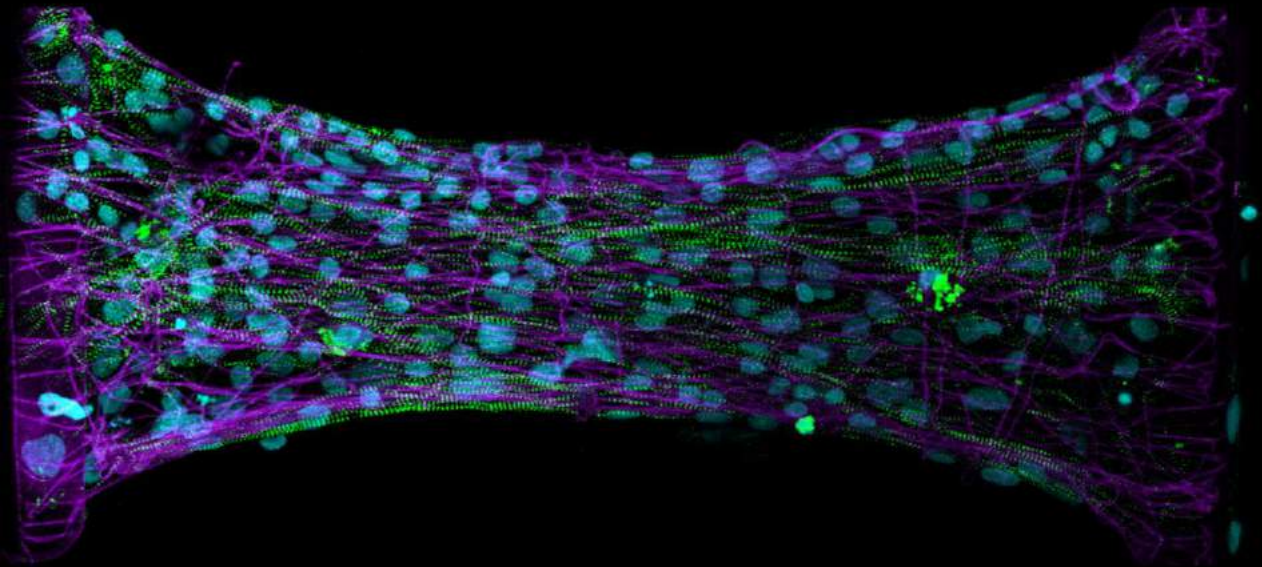


CONFERENCE PROGRAM



*2022 Summer Biomechanics, Bioengineering, and
Biotransport Conference*

June 20th -23rd, 2022
Eastern Shore, Maryland



*Reconnecting Networks in Biomechanics,
Bioengineering and Biotransport*

Funding for this conference was made possible (in part) by the National Science Foundation's Civil, Mechanical, and Manufacturing Innovation Division (Biomechanics and Mechanobiology) 2209028. Funding for this conference was also made possible (in part) by 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 the Department of Health and Human Services; nor does mention of trade names, commercial practices, or organizations imply endorsement by the U.S. Government. Prizes and other support for the Student Paper Competition were provided by the Bioengineering Division of the American Society of Mechanical Engineers.

The 2022 Summer Biomechanics, Bioengineering, and Biotransport Conference (SB³C) organizers gratefully acknowledge the support of the National Science Foundation, the National Institutes of Health, and American Society of Mechanical Engineers.



Congratulations to the 2021 Cover Art Contest Winner:

Samuel DePalma, University of Michigan

Title: Mechanical Cues Drive the Robust Assembly of Microfabricated Stem Cell-Derived Cardiac Tissues

Description: Engineered cardiac microtissue composed of induced pluripotent stem cell derived cardiomyocytes on a synthetic fibrous matrix (violet) suspended between two elastomeric cantilevers. Sarcomeric Z-discs were visualized via cardiomyocytes encoding fluorescently tagged endogenous Titin (green). Cell nuclei were stained with DAPI (turquoise).

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1 Forward and Acknowledgement

Dear SB³C Community,

On behalf of the entire Organizing Committee and the SB³C Foundation, we welcome you to the Eastern Shore of Maryland for the first in-person Summer Bioengineering, Biomechanics and Biotransport Conference (SB³C) in several years! This year's conference theme is Reconnecting Networks in Biomechanics, Bioengineering, and Biotransport. We selected this theme to emphasize systems biology approaches in biomechanics, bioengineering, and biotransport research, as well as to celebrate reconnecting with colleagues at the conference. Our plenary speaker, Dr. Shayn Peirce-Cottler, will introduce the conference theme in her talk describing how multiscale computational models integrated with in vivo experimental models can advance our understanding of multi-cell interactions and improve regenerative therapies. We hope that attendees will look for the systems biology theme throughout the conference and be inspired to apply these approaches to their own research.

At SB³C 2022, we will honor several ASME medal winners through award lectures. The H.R. Lissner Medal winner, Dr. Lori Setton, is honored for significant contributions to mechanobiology research related to degenerative cartilage disease and for leadership in the bioengineering community. Dr. Zong-Ming Li, winner of the Savio L-Y. Woo Translational Biomechanics Medal, is honored for translating his understanding of the hand's mechanics into a potential treatment for carpal tunnel syndrome. Dr. Robert Mauck will receive the Van C. Mow Medal for meritorious contributions to the fields of bioengineering, musculoskeletal tissue engineering, and mechanobiology; Dr. Zhenpeng Qin will receive the Y.C. Fung Early Career Medal for his work to advance transformative nanotechnologies to understand the brain and point-of-care devices; and Dr. Michele Grimm will receive the Robert M. Nerem Education and Mentorship Medal for leadership in mentoring faculty and supporting biomedical engineering education. We congratulate the awardees and encourage you to attend their plenary talks.

A highlight of our conference is the Student Paper Competition (SPC), which highlights top students at the BS, MS, and PhD levels. The American Society of Mechanical Engineers Bioengineering Division (ASME-BED) supports the awards for all winners, travel for 36 PhD finalists, and ASME memberships for all students in the SPC. Additional funding from the NSF supports travel for the top SPC BS and MS finalists. If you're a student, be sure to attend the professional development and social activities planned by the ASME-BED Student Leadership Committee (SLC).

Finally, with support from the NIH, NSF, and our diversity sponsors, we will celebrate the diversity of our community throughout SB³C 2022. Prior to the conference, we will honor Juneteenth with a talk by Dr. Oliver Myers on the challenges and opportunities to making progress towards equity, justice, and inclusion in STEM, a performance by the West African dance company KanKouran, and a dessert reception. We will also enjoy LGBTQ+ Networking, Diversity Mentor-Mentee, and Women's Networking events. Please take advantage of these opportunities to learn how to support ALL bioengineers.

We hope you take time to relax, reconnect with colleagues you have known for years, and meet new colleagues who will become lifelong friends and collaborators. Enjoy the pools, golf, tennis, volleyball, gameroom, and all the amenities of the Hyatt Chesapeake, as well as the beauty of Maryland's Eastern Shore. We thank the entire SB³C Organizing Committee, the ASME-BED Technical Committees and SLC, Boscov's Travel, the SB³C Foundation, and all the abstract reviewers and SPC judges who are essential to the success of our conference. Enjoy the conference, and please join us again in 2023!

Alisa Morss Clyne, Conference Chair

University of Maryland

Matthew Fisher, Program Chair

North Carolina State University/University of North
Carolina- Chapel Hill

1.1 Conference Code of Conduct

SB³C 2022 is a professional conference of scientifically inclined adult individuals, and is hosted within the United States and thus under the umbrella of its laws and expectations regarding civil rights. Moreover, SB³C 2022 is committed to being an inclusive, welcoming, and harassment-free environment regardless of sex, race, ethnicity, age, gender identity, sexual orientation, nationality or physical ability. As such, all attendees are expected to behave with civility and respect to one another, and to recognize their personal responsibility in exercising good judgement regarding behavior during their attendance at this conference. If you are being harassed, notice that someone else is being harassed, or have any other concerns, please send an email to info@sb3c.org immediately. You may also message any of the organizing committee members via the Whova mobile app. If a participant engages in harassing or non-respectful behavior, the conference organizers may take any action they deem appropriate, including a warning or expulsion from the conference with no refund. Participants asked to stop any harassing behavior are expected to comply immediately. Any questions regarding this policy can be sent to info@sb3c.org.

1.2 Conference COVID Policy

The health and safety of our attendees and guests at SB³C 2022 is paramount. As such, we expect all attendees to self-administer a COVID test no more than one day prior to arrival at the conference site. There is no need to log or report negative test results.

If your test is positive, please stay home and email info@sb3c.org immediately. SB3C will refund your registration, minus a processing fee.

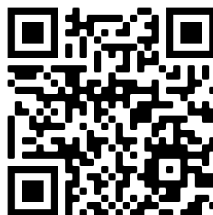
If you are already on-site and feel unwell at any point or test positive, please self-quarantine in your guest room and contact info@sb3c.org immediately. We will have a limited number of free COVID test kits on site. Free test kits are also available from the U.S. federal government for U.S. residents, and we highly recommend bringing some to the meeting. Please allow time for delivery of the kits. For our international guests, if your country requires testing for re-entry, our SB³C registration desk will have recommended testing sites for your convenience.

All attendees and hotel staff are required to wear masks when indoors, except when presenting, eating, or drinking. We will provide as many opportunities as possible to eat and drink outdoors. Please bring enough masks with you for the duration of the conference. A limited number of masks will be available at the registration desk.

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

1.3 Whova online program for SB³C 2022

The SB³C2022 program is also available on Whova app (https://whova.com/portal/webapp/ssbba_202206/) with additional features including recorded podium talk, poster lightning talk, and more. The QR code to the event is below.



For more information on Whova, the user guide is available through this link (<https://whova.com/pages/whova-app-user-guide/>).

2 General Information

All times below are in EDT.

2.1 Networking Events

Sunday, June 19, 2022, 7:30 - 9:30 PM, Chesapeake E-G Juneteenth Celebration

We will commemorate the national Juneteenth holiday with a brief overview of the end of slavery in the United States as well as a celebration of African American culture and achievement. The event will include a talk by guest speaker Dr. Oliver Myers, Associate Dean of Inclusive Excellence for Undergraduate Studies, Clemson University, who was part of the inaugural graduating class (M1) of the renowned Meyerhoff Scholars Program at University of Maryland, Baltimore County. Dr. Myers will discuss the value of programs aimed at supporting marginalized students in STEM and present the challenges and opportunities to making progress towards equity, justice, and inclusion. Additionally, there will be a live performance by the local West African dance company Kankouran! Families are welcome to attend! Light refreshments and desserts will be provided.



Monday, June 20, 2022, 3:30 - 4:30 PM, Schooner A/B LGBTQ+ Networking Event

This is a great opportunity to meet your fellow LGBTQ+ and ally colleagues at SB3C in an hour of networking session. The event will include icebreaker games and a special trivia game focusing on the history of the Pride month. Snacks will be served. We hope to see you there!

Monday, June 20, 2022, 4:30 - 5:30 PM, Chesapeake E-G Diversity Mentor-Mentee Event

This annual event is an opportunity for students, postdocs, and junior faculty to meet with a mentor and get advice on topics related to their career or personal issues. Additionally, this year the event will be introduced by a short description of culturally aware mentoring practices and available resources for training so that mentors can provide support to a wider spectrum of mentees. If you requested to be a mentor/mentee during registration or if you are a Diversity Travel Award recipient, you will be able to find the person you were paired with at this event. If you didn't register in advance but are interested in meeting a mentor/mentee and networking, please join us and we can try to find you people to connect with.

Monday, June 20, 2022, 6:30 - 8:30 PM, Crescent Pool Opening Reception

**Tuesday, June 21, 2022, 4:00 - 5:00 PM, Chesapeake Patio
Women's Networking Event**

The purpose of the ASME BED Women's Group is to provide mentoring, networking and communication for women involved in biomedical engineering to help further their careers and facilitate award nominations.

**Tuesday, June 21, 2022, 4:00 - 5:00 PM, Windjammer
ASME BED Student Networking Event**

Join the ASME Bioengineering Division Student Leadership Committee for refreshments and miniature golf! This is a great opportunity to meet other students in a relaxed setting.

**Tuesday, June 21, 2022, 5:30 - 7:00 PM, Choptank Ballroom
Building Future Faculty**

Organizers: *Maria Holland, Notre Dame; Megan Killian, University of Michigan; Deva Chan, Purdue University; David Pierce, University of Connecticut; Phil Bayly, Washington University St. Louis*

During this poster session, senior graduate students and postdocs will network with faculty members attending SB³C, for the purpose of presenting a vision for their future faculty careers. Participants are encouraged to practice their presentation of a cohesive research record and compelling research plans for the future, while also highlighting their experiences and plans in the areas of funding, teaching, and service. The goal of this event is to foster, within the supportive community of SB³C, the development of young and diverse researchers in biomechanics, bioengineering, and biotransport.

**Tuesday, June 21, 2022, 7:15 - 10:00 PM, Manor Lawn
BEDRock**

Listen to the talented musicians of the ASME Bioengineering Division with your colleagues amidst the beauty of Maryland's Eastern Shore!

**Wednesday, June 22, 2022, 6:30 - 7:30 PM, Chesapeake Foyer and Patio
Banquet Reception**

**Wednesday, June 22, 2022, 7:30 - 10:30 PM, Chesapeake A-D
Banquet and Awards Ceremony**

Come celebrate all awardees, including the winners of the Student Paper Competition, at our closing banquet.

2.2 Committee Meetings

The committee meetings listed below are open to all except the ASME BED Executive meeting, SB³C Board meeting, and the JBME Editors meeting. Attending these meetings is a terrific way to get more involved with the Bioengineering Division of the ASME! Please consider joining one or more of the meetings listed below.

Monday, June 20

ASME BED Executive Meeting	Brigantine Board Room	2:15 - 3:45 PM
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Wednesday, June 22

SB ³ C Board Meeting	Brigantine Board Room	7:30 - 8:30 AM
Industry	Chesapeake E	8:30 - 9:20 AM
Fluid Mechanics (Hybrid) Meeting	Chesapeake F	8:30 - 9:20 AM
Education (Hybrid) Meeting	Chesapeake G	8:30 - 9:20 AM
Tissue and Cell Engineering (Hybrid) Meeting	Cutter A/B	8:30 - 9:20 AM
Biotransport (Hybrid) Meeting	Schooner A/B	9:30 - 10:20 AM
Design, Dynamics, and Rehabilitation (Hybrid) Meeting	Clipper A/B/C	9:30 - 10:20 AM
Solid Mechanics (Hybrid) Meeting	Galleon A/B/C	9:30 - 10:20 AM
ASME BED Open Business Meeting (Hybrid) Meeting	Cutter A/B	10:30 - 11:30 AM
JBME Editors (Hybrid) Meeting	Brigantine Boardroom	11:30 AM - 1:30 PM

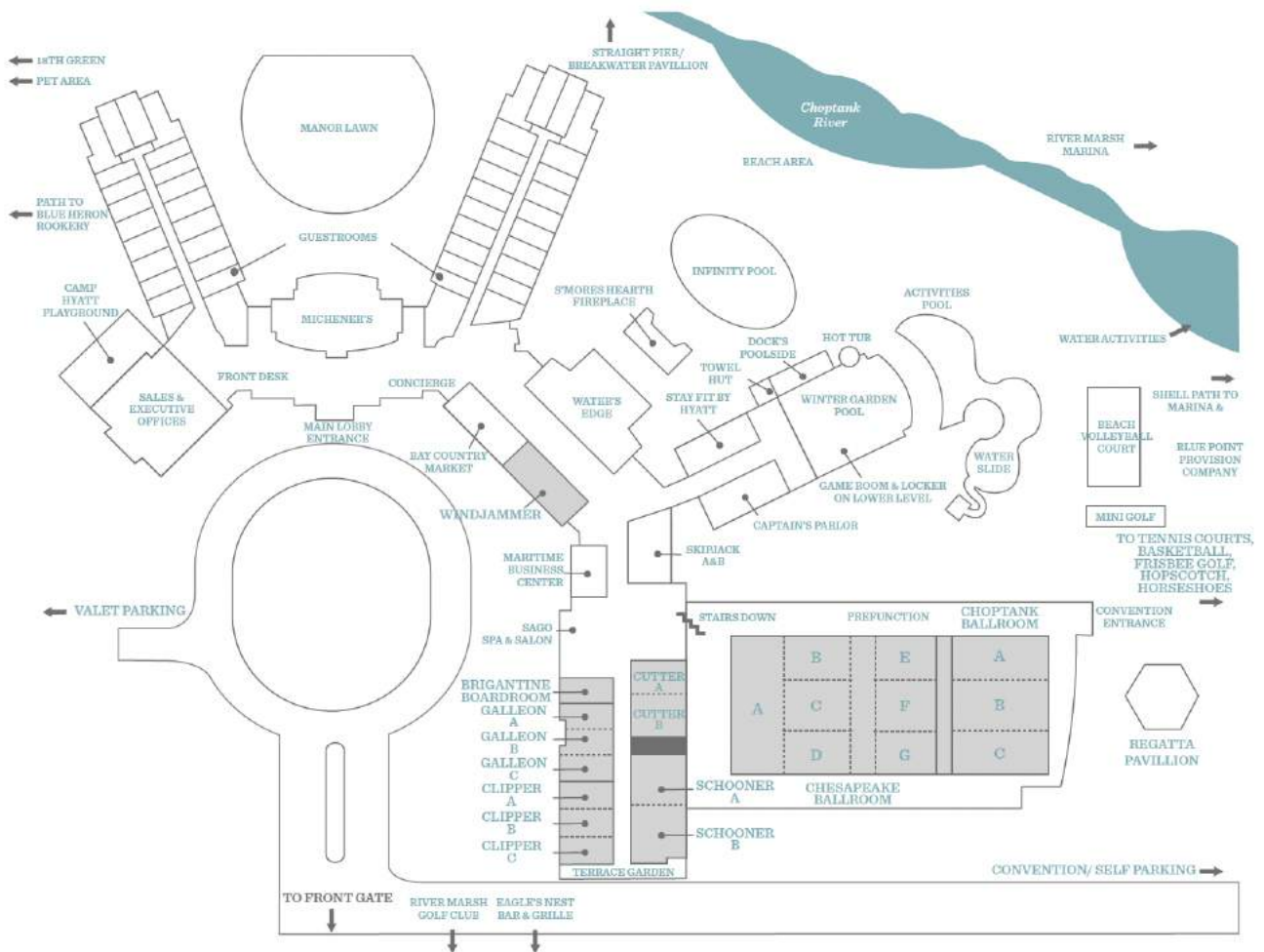
Tuesday, June 28

ASME BED Student Leadership (Virtual)	Zoom Mtg ID: 847 4109 3878 Passcode: 4xSRaq	2:30 - 3:30 PM
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2.3 Instructions for Poster Presenters

The poster Exhibit Hall will be available to attendees starting on Monday morning. Poster boards will be identified by a number corresponding to the abstract number of the poster listed in the Program Book (P1, P2, etc.). Please hang your poster at the corresponding number. Posters should be set up before 12:30pm on Monday, June 20 and must be removed by 5:30 pm on Wednesday, June 22. Poster Session I will be held on Monday, June 20th, 2022 from 12:45pm – 2:15pm. Poster Session II will be held on Tuesday, June 21st, 12:45pm – 2:15pm. The session time for all presentations in the BS-level and MS-level SPC will be in Poster Session I. The session time for all undergraduate design posters will be in Poster Session II. For all other posters, posters with ODD numbers (P43, P45, etc.) will present in Poster Session I. Posters with EVEN numbers (P42, P44, etc.) will present in Poster Session II. A number of virtual posters (V1, V2, etc.) are also available throughout the meeting via the Whova app. Authors should stand next to their poster during the assigned session. Authors may also stand at their posters at any time, such as during scheduled breaks.

2.4 Conference Site Map



3 Conference Organizing Committees

3.1 Organizing Committee



Alisa Morss Clyne, Conference Chair
University of Maryland



Matthew Fisher, Program Chair
North Carolina State University/University of North Carolina- Chapel Hill



Info/Online Chair
Jessica Oakes
Northeastern U



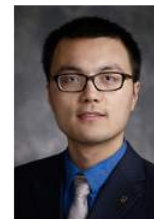
Publications Chair
Anita Singh
Widener U



**Local Arrangements
& Finance Chair**
Lakiesha Williams
U of Florida



Exhibits Chair
Will Richardson
Clemson U



Media/Online Chair
Zhenpeng Qin
UT Dallas



Diversity Chair
Spencer Szczesny
Penn State U

3.2 Program Committee

Matthew Fisher, Chair, Program Committee, North Carolina State University/University of North Carolina- Chapel Hill

Bumsoo Han, Chair, Biotransport Technical Committee, Purdue University

Sihong Wang, Co-Chair, Biotransport Technical Committee, City College of New York

Michael Moreno, Chair, Design, Dynamics, & Rehab Tech. Committee, Texas A&M University

Anita Singh, Co-Chair, Design, Dynamics, & Rehab Tech. Committee, Widener University

Stephanie George, Chair, Education Committee, East Carolina University

Victor Lai, Co-Chair, Education Committee, University of Minnesota Duluth

John LaDisa, Chair, Fluids Tech. Committee, Marquette University

Alejandro Roldan-Alzate, Co-Chair, Fluids Tech. Committee, University of Wisconsin-Madison

Ethan Kung, Chair, Industry Committee, Clemson University

Lin Li, Co-Chair, Industry Committee, Eli Lilly

Kristin Myers, Chair, Solid Mechanics Tech. Committee, Columbia University

Grace O'Connell, Chair, Cell & Tissue Engineering Technical Committee, UC Berkeley

David Corr, Co-Chair, Cell & Tissue Engineering Technical Committee, Rensselaer Polytechnic Institute

3.3 Student Paper Competition Committee

Joao Soares, Chair, Virginia Commonwealth University

Kristin Miller, Ph.D. Level, Tulane University

Megan Killian, M.S. Level, University of Michigan

Mariana Kersh, B.S. Level, University of Illinois at Urbana-Champaign

3.4 Undergraduate Student Design Competition Committee

Anita Singh, Widener University

Michael Moreno, Texas A&M University

Thank you to all committee members!

4 Special Sessions, Plenary Speakers, and Workshops

Monday, June 20	Time 2:00 - 3:30 PM
Ask an NSF Program Director!	Galleon A/B/C
Program Directors: Stephanie George, Engineering of Biomedical Systems (EBMS), Steven Zehnder, Engineering Biology and Health Cluster, and Laurel Kuxhaus, Biomechanics and Mechanobiology (BMMB)	

Please stop by to chat with National Science Foundation (NSF) Program Directors about a variety of topics including:

- what's new at NSF,
- funding opportunities,
- best practices for contacting program directors,
- how to read both the PAPPG and solicitation,
- and more!

Future faculty and graduate students are also encouraged to stop by to learn more about NSF. The following Program Directors will be available to answer your questions: Stephanie George, Engineering of Biomedical Systems (EBMS), Steven Zehnder, Engineering Biology and Health Cluster, and Laurel Kuxhaus, Biomechanics and Mechanobiology (BMMB). If you have specific questions about a potential submission, consider scheduling a one-on-one meeting with a program director during the conference.

Monday, June 20	Time 5:30 - 6:30 PM
Leveraging multiscale networks for tissue regeneration	Chesapeake A-D

Plenary: Shayn Peirce-Cottler, University of Virginia

The most prevalent, devastating, and complex diseases of our time, such as diabetes, cardiovascular disease, cancer, and infectious diseases, involve the dynamic interactions of cells with one another and with their changing environment. However, the drugs we typically use to treat diseases are designed to target a single protein and disregard the fact that cells within tissues are highly heterogeneous and have individualized responses that contribute to the tissue-level outcomes. To bridge the gap between protein and multi-cell/tissue-levels of spatial scale, my lab develops agent-based computational models and uses them in combination with experiments and machine learning approaches to predict how individual cell behaviors give rise to tissue-



level adaptations. We have used these approaches to study blood vessel growth and remodeling, skeletal muscle regeneration, and tissue fibrosis. Our work has suggested new mechanistic hypotheses and provided guidance for the design of novel therapies that account for the dynamic and heterogeneous interactions between different cell types within diseased and regenerating tissues.

Tuesday, June 21	Time 2:15 - 3:45 PM
Cardiovascular Fluid Mechanics of Heart Valves and Pediatric Congenital Heart Defects - in Celebration of Dr. Ajit Yoganathan's Retirement and 40 Year legacy	Clipper A/B/C

Organizers: *Lakshmi Dasi, Georgia Institute of Technology/Emory University and Keefe Manning, Pennsylvania State University*

This mini-symposium is in honor of the 40 year legacy of the pioneering work of Prof. Ajit Yoganathan from Georgia Institute of Technology in the area of heart valves and pediatric congenital heart defects. As is well known, Prof. Yoganathan (recipient of the BMES Pritzker Award for Leadership Contributions to the field of BME, ASME Lissner Medal, and member of the National Academy of Engineering) had made tremendous contributions utilizing biomechanics and modeling concepts towards the fields of heart valves as well as pediatric congenital heart defects. The areas of research that will be highlighted and discussed involve biomechanics, biomaterials, mechanobiology, and imaging with an underlying emphasis on fluid mechanics. The goal is to bring people working in separate areas (particularly new faculty members, graduate students, postdocs etc.) together and inform them of new exciting challenges that need fresh new angles.

Tuesday, June 21	Time 2:15 - 3:45 PM
Diversity and Inclusion in Academic Publication - Increasing the Impact of Your Publications	Galleon A/B/C

Organizer: *Darryl A. Dickerson, PhD, Florida International University* Diversity, equity, and inclusion are often espoused as core values within organizations. In our academic and scientific endeavors, focus on these values often begins with asking critical questions that start with "who."

- Who has access to experiences that lead to an interest in biomechanical engineering?
- Who are the individuals in the lab performing biomechanical research work?
- Who are the researchers leading biomechanical research labs?
- Who can get resources to support their work?

These important questions should lead us to change systems and create structures to provide equitable access and opportunity to historically excluded groups to engage in and benefit from research work. While our efforts may start with asking "who," to ensure that everyone benefits from our work, we must push our inquiry further.

These important questions should lead us to create structures that provide equitable access and opportunity to historically excluded groups to engage in and benefit from research work. In biomedical research, we cannot stop there. Through the way we do our work and the way we disseminate our findings in publications, we have the opportunity to do more.

This workshop, hosted by the editorial board of the Journal of Biomechanical Engineering, is designed to provide our community with a framework to critically examine research practices in the field of biomechanical engineering and in our individual labs in order to develop a shared understanding of how we can perform inclusive research, how we may use our scholarship to make our field more diverse and inclusive, and how we can ensure our publications reflect the core values of inclusive science. Participants will engage in facilitated reflective dialogue to share their approaches to these challenges and to recommend new approaches at the individual level and within journal publications. The outcome of the workshop will be a collective strategy and a set of specific action commitments for participants and for the editorial board of the Journal of Biomechanical Engineering.

Tuesday, June 21	Time 2:15 - 3:45 PM
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Engineering and Modeling of Lung Mechanics and Disease Workshop

Schooner A/B

Organizers: *Ruogang Zhao, University at Buffalo; Samir Ghadiali, Ohio State University*
Lung diseases including the COVID-19 and its long-term complications have been the focus of public attention lately. Respiration motion induced tissue strain is important to both lung homeostasis and disease progression in the lung. Advances in the ex vivo, in vitro and in silico studies of the biomechanics and mechanobiology of the lung offer new opportunities to examine the role of mechanical factors in disease progression. This workshop will feature invited talks from researchers who have developed in vivo, in vitro and in silico approaches for the studies of lung mechanics in health and disease at multiple length scales ranging from lung parenchyma to extracellular matrix. Attendees will have an opportunity to participate in a round table discussion on emerging topics such as the challenges and opportunities faced by the biomechanics and mechanobiology research community on emerging respiratory diseases and the technology and engineering tool development needed to address the challenges associated with the emerging diseases. It is expected that this workshop will help to promote the involvement of this community in the basic, clinical and translation research of the emerging lung diseases.

Speakers:

Bela Suki (Boston University)

Daniel J. Tschumperlin (Mayo Clinic)

Wednesday, June 22	Time 9:30AM - 1:00PM
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Ensuring the reliability of computational models of safety-critical biomedical applications through verification, validation, and uncertainty quantification (VVUQ)

Chesapeake E

Organizers: *Marc Horner, Ansys; Robert Allen, Albert Einstein College of Medicine; Anil Attaluri, The Pennsylvania State University - Harrisburg; Ravi Kodwani, Altair; Lin Li, Eli Lilly; Ethan Kung, Clemson University*

Researchers and engineers are increasingly making use of computational modeling to help streamline the costs of product development and regulatory assessment, as they

not only help to reduce physical testing but also provide insights critical to optimizing performance. However, the credibility of the models must be established to provide confidence in decision-making. But how much VVUQ is required? The process of verification determines if the computational model implementation correctly corresponds to its mathematical formulations; the process of validation determines whether the model accurately represents the real-world application; and uncertainty quantification determines how simulation outcomes are affected by variations in the input parameters and numerical approximations. In this workshop, we will investigate these topics in the context of the biomedical industry through a combination of lectures, case studies, and interactive discussions. Participants will learn how VVUQ can be properly implemented in a biomedical industry setting, with particular emphasis on the ASME VV standards and FDA regulatory pathways. Participants who complete the entire workshop in-person will receive an attendance certificate from the ASME VV 40–Verification and Validation in Computational Modeling of Medical Devices sub-committee and 3.5 CEUs credits.

Speakers:

Robert Allen (Albert Einstein College of Medicine)

Marc Horner (Ansys)

Sudeep Sastry (W. L. Gore Associates)

Wednesday, June 22	Time 12:00 - 1:30 PM
Opportunities for Engineers with Disabilities	Chesapeake F

Organizers: *Sriram Balasubramanian, Drexel University; Anita Singh, Widener University*

There are several ‘practical’ challenges exist in the inclusion of people with disabilities in a multi-disciplinary field such as biomedical engineering. Specifically, in these four areas, namely accessibility, professional networking, mentorship and social perception. The overall goals of this workshop and related activities will be to continue our efforts to:

- 1: Demonstrate the ways in which individuals with disabilities benefit the scientific community as a whole
- 2: Raise awareness of the issues facing BMEs with disabilities in their scientific workplace
- 3: Create strategies for increasing the number of people with disabilities in biomedical engineering, and providing mentorship to help them succeed in their careers
- 4: Provide tools and tangible steps for everyone in the biomedical engineering community for promoting inclusion of people with disabilities

The workshop panelists will present for 5 minutes each. This will be followed by 30 minute concurrent breakout sessions facilitated by the panelists. The workshop attendees will brainstorm specific problems related to each topic in smaller groups and a reflection of these discussions will develop a series of recommendations for immediate next steps..

Speakers:

Dr. Sriram Balasubramanian (Drexel University)

Dr. Vicki Colvin (Brown University)

Ruhi Dharan (Arizona State University)

Olusoji Ogunbode (University of Western Ontario, Canada)

Dr. Siobhán M. Mattison (National Science Foundation)

Alexander Herman (US Food and Drug Administration)

Matthew R. Schwerin (US Food and Drug Administration)

Wednesday, June 22	Time 12:00 - 1:30 PM
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Post-Processing Simulation Data Workshop**Chesapeake G**

Organizers: *Marco A Nino, University of Iowa; Alison Marsden, Stanford University; Amir Arzani, Northern Arizona University; Nathan Wilson, Open Source Medical Software Corporation*

Open-source resources for post-processing simulation data have gained popularity over the years. This workshop aims to highlight ParaView and Python VTK by providing examples of how to develop an efficient workflow for post-processing large datasets of CFD simulation data. ParaView is a multi-platform data analysis and visualization application. This application offers a 3D graphical user interface and the ability to programmatically perform analysis using batch commands. When analyzing large datasets, Python VTK can be leveraged to create scripts that automate the calculations of derived variables. Attendees will follow along in interactive sessions, where invited speakers will be providing examples that highlight the utility of ParaView and Python VTK, alike. There will be a moderated QA session. Students are strongly encouraged to install ParaView (<https://www.paraview.org/>) and SimVascular (offers multi-platform compatibility for Python VTK; <http://www.simvascular.org/>) prior to the conference.

Wednesday, June 22	Time 12:00 - 1:30 PM
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Symposium Honoring Professor Ernest Cravalho**Cutter A/B**

Organizer: *Bumsoo Han, Purdue University*

This symposium is to honor Professor Ernest Cravalho, who passed away on April 13, 2021, for his profound impacts on research, education and mentoring of the biotransport communities and in broader bioengineering fields. He pioneered engineering approach to cryobiology and made seminal contributions in cryopreservation of biomaterials. He was the member of American Society of Mechanical Engineers, the Institute of Medicine, and the National Academy of Sciences. He was also a founding fellow in the American Institute of Biological and Medical Sciences. This symposium will give a unique opportunity to reconnect researchers in the field of bioengineering to the members of biotransport by discussing Professor Cravalho's contributions on the beginning, early development and current status of biopreservation technologies.

Speakers:

Kenneth Diller (University of Texas at Austin)

Mehmet Toner (Harvard Medical School)

John Bischof (University of Minnesota)

John McGrath (Michigan State University)

Ramachandra Devireddy (Louisiana State University)

Rebecca Sandlin (Harvard Medical School)



5 Awards



1977 Robert W. Mann
 1978 Y.C. Fung
 1979 Robert F. Rushmer
 1980 F. Gaynor Evans
 1981 Max Anliker
 1982 R.M. Kenedi
 1983 Henning E. von Gierke
 1984 Perry L. Blackshear
 1985 Richard Skalak
 1986 Albert H. Burstein
 1987 Van C. Mow
 1988 Alf Louis Nachemson
 1989 Robert M. Nerem
 1990 Albert B. Schultz
 1991 Savio Lau-Yuen Woo
 1992 John C. Chato
 1993 Don P. Giddens
 1994 Sheldon Weinbaum
 1995 Robert E. Mates
 1996 Albert I. King
 1997 Ajit P. Yoganathan
 1998 Malcolm H. Pope
 1999 Stephen C. Cowin
 2000 Morton H. Friedman
 2001 W. Michael Lai
 2002 Kenneth R. Diller
 2003 Vijay K. Goel
 2004 John M. Tarbell
 2005 Steven A. Goldstein
 2006 Peter A. Torzilli
 2007 Maury L. Hull
 2008 Noshir A. Langrana
 2009 Thomas P. Andriacchi
 2010 Roger D. Kamm
 2011 Jay D. Humphrey
 2012 David Butler
 2013 Mehmet Toner
 2014 Kyriacos A. Athanasiou
 2015 James A. Ashton-Miller
 2016 Roger C. Haut
 2017 Gerard A. Ateshian
 2018 Louis J. Soslowsky
 2019 Jennifer S. Wayne
 2020 Larry A. Taber
 2021 C. Ross Ethier
 2022 Lori Setton

H.R. Lissner Medal

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

2022 Lori Setton, Ph.D.

Prof. Setton received her B.S.E. from Princeton University and M.S. and Ph.D. degrees in Mechanical Engineering from Columbia University. Prof. Setton joined the Department of Biomedical Engineering at Duke University in 1994, where she served as the Bevan Professor of Biomedical Engineering and Orthopaedic Surgery. In 2015, Prof. Setton joined the Department of Biomedical Engineering at Washington University and holds the position of Lopata Professor, Chair of Biomedical Engineering.

Prof. Setton's research has focused on understanding mechanisms that control drug delivery and tissue regeneration in the knee joints and spine. She has funded her lab through grants from the NIH, NSF, Whitaker Foundation, Coulter Foundation, OREF, AO Foundation, and research agreements with several corporations.

Prof. Setton is a Fellow of the BMES, ASME, ORS, and AIMBE, has served as President of the Biomedical Engineering Society, and received a PECASE Award, Dean's Award for Outstanding Research, Christopher Jacobs Award for Excellence in Leadership, ASME's Mow Medal and Graduate Dean's Award for Excellence in Mentoring. She is delighted to receive ASME's Lissner Medal at the 2022 meeting.





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

Savio L-Y. Woo Medal

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

2022 Zong-Ming Li, Ph.D.

Zong-Ming Li, PhD, is the William and Sylvia Rubin Chair of Orthopedic Research, and Professor of Orthopedic Surgery, Biomedical Engineering and BIO5 Institute at the University of Arizona. Dr. Li serves as the Vice Chair for Research in Department of Orthopedic Surgery, Associate Director of University of Arizona Arthritis Center, Director of Robert G. Volz, MD Orthopedic Research Laboratories, and Director of the Hand Research Laboratory.

Dr. Li has more than 30 years of experience in musculoskeletal research and education. His research focuses on musculoskeletal biomechanics with a particular focus on the hand and upper extremity. He has published more than 125 peer-reviewed articles in 51 journals, given more than 130 invited lectures worldwide, and presented over 350 podium and poster presentations in professional conferences. His research work has resulted in significant impact on biomechanics and motor control of the musculoskeletal function and dysfunction, particularly for the hand and upper extremity. Dr. Li is a Fellow of the College of Fellows of the American Institute for Medical and Biological Engineering (AIMBE) and a Fellow of American Society of Biomechanics (ASB). As this year's recipient of Savio L-Y. Woo Translational Biomechanics Medal, Dr. Li is recognized "for seminal discovery of sensorimotor control function and biomechanics of the human hand, and for translating knowledge into innovative clinical solutions including relieving the symptoms of carpal tunnel syndrome."

As an enthusiastic supporter and contributor to his profession, Dr. Li has served on the editorial boards of 16 journals related to bioengineering and orthopaedics including the Associate Editor of ASME's Journal of Biomechanical Engineering (2012-2018). He contributes nationally and internationally to grant reviews and to the organization of conferences.

Dr. Li was the President of the World Association for Chinese Biomedical Engineers (WACBE, 2013-2015), a member of the Executive Board of the American Society of Biomechanics (ASB, 2009-2012), Co-Chair of the Upper Extremity Topic Committee of the Orthopaedic Research Society (ORS, 2007-2009), a member of the Research Management Committee of the American Society for Surgery of the Hand (ASSH, 2014-2017) and Chair of the Hand and Wrist Topic Committee of Orthopaedic Research Society (ORS, 2020-2022). Dr. Li is the current Chair for Hand and Wrist Biomechanics International (HWBI, 2012).





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

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.

2022 Michele Grimm, Ph.D.

Michele J. Grimm, Ph.D., is the Wielenga Creative Engineering Endowed Professor of Mechanical Engineering and Biomedical Engineering at Michigan State University. Dr. Grimm completed her B.S. in Biomedical Engineering and Engineering Mechanics at The Johns Hopkins University in 1990 and her Ph.D. in Bioengineering at the University of Pennsylvania in 1994. In addition to her interest in injury biomechanics research, Dr. Grimm has dedicated her career to enhancing educational opportunities in engineering and serving as a mentor to students and colleagues.

Dr. Grimm has a significant interest in curriculum design to support student success. She established both the graduate programs (MS and PhD) and undergraduate programs at Wayne State, in 1998 and 2010, respectively. Dr. Grimm believes in the benefit of hands-on experiences to complement traditional classroom learning. She has developed programs with substantial design components to allow students to apply the knowledge from didactic lectures to solving real world problems. She has also served as faculty advisor to Wayne State's Formula SAE team – Warrior Racing, one of a handful of women in this role internationally. Since joining Michigan State, she has taken on the role of faculty advisor to the STARX (Strength Augmenting Robotic Exoskeleton) team in addition to being co-advisor to MSU's Spartan Racing team. Her interest in curricula led to her service as a program evaluator, commissioner, and now member of the Board of Delegates of ABET. She has mentored several hundred undergraduate and graduate students during her faculty career.



She recently finished a 3-year rotation as a program director at the National Science Foundation, overseeing the Biomechanics and Mechanobiology, Engineering of Biomedical Systems, and Disability Rehabilitation Engineering Programs. As a program director, Dr. Grimm identified the opportunity to serve as a mentor and resource to hundreds of faculty across the country. This has continued as she has returned to a faculty role, both for peers at Michigan State as well as other faculty across the country, based on her NSF experience.

During her rotation at NSF, Dr. Grimm served as co-chair of the White House's Office of Science Technology Policy (OSTP) Task Force on Research and Development for Technology to Support Aging Adults. Dr. Grimm currently sits as the only engineer on the National Academy of Medicine Commission on a Global Roadmap for Healthy Longevity. Both of these opportunities allowed her to bring an engineering mind set to the discussion and to instill in her fellow committee members an understanding of how engineering design can be applied to tackle societal challenges related to an aging population. She is a Fellow of the American Society of Mechanical Engineers, the Biomedical Engineering Society, and the American Institute of Medical and Biological Engineering.

Van C. Mow Medal

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

2022 Robert L. Mauck, Ph.D.



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

Dr. Robert L. Mauck, PhD is the Mary Black Ralston Professor of Education and Research in Orthopaedic Surgery and Professor of Bioengineering at the University of Pennsylvania. He is also the Director of the McKay Orthopaedic Research Laboratory at the University of Pennsylvania and a Research Career Scientist and Co-Director of the Translational Musculoskeletal Research Center at the Corporal Michael J. Crescenz VA Medical Center in PA. His research program is focused on the engineering and mechanobiology of musculoskeletal tissues, with a particular interest in restoring articular cartilage, the knee meniscus, and the intervertebral disc.



Dr. Mauck's team uses mechanical and molecular analyses to explore native tissue structure function relationships and employs this information to enhance the functional properties of engineered constructs. His work explores progenitor cell function and efficacy in a variety of biomaterial contexts and across multiple length scales, from subcellular biophysical properties to translation of engineered constructs in large animal models.

Dr. Mauck has been recognized for his contributions to the field with the ISSLS Prize in Biomechanics (2008), the YC Fung Young Investigator Award from the ASME (2009), the BMES-CMBE 'Rising Star' Award (2011), the Penn Medicine Montague Research Prize (2013), election to the College of Fellows of the American Institute for Medical and Biological Engineering (2014), the Kappa Delta Young Investigator Award from the American Academy of Orthopaedic Surgeons (2015), the Berton Rahn Research Award from the AO Foundation (2017), and was inducted as a Fellow of International Orthopaedic Research (FIOR) of the International Combined Orthopaedic Research Societies (ICORS) College of Fellows (2019). At Penn, Dr. Mauck serves as the Co-Director of the Program in Musculoskeletal Regeneration in the Institute for Regenerative Medicine (IRM), is Co-Director of the Biomechanics Core of the Penn Center for Musculoskeletal Disorders (PCMD), and is a founding member of the Center for Engineering Mechanobiology (CEMB).



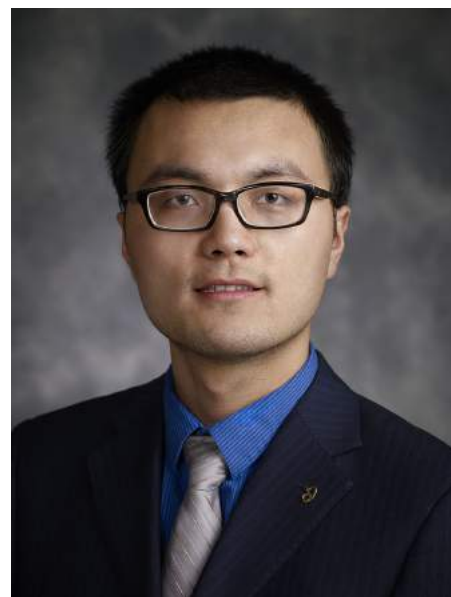
1986 Mark H. Holmes
 1987 Steven A. Goldstein
 1989 David N. Ku
 1990 Jay D. Humphrey
 1991 Michael Kwan
 1992 Cheng Zhu
 1993 John A. Frangos
 1994 Mehmet Toner
 1995 Cheng Dong
 1996 Antony Keaveny
 1997 Gerard A. Ateshian
 1998 Louis J. Soslowsky
 1999 Rebecca Richards-Kortum
 2000 Farshid Guilak
 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

Y.C. Fung Early Career Medal

The Y.C. Fung Early Career Award is given to young investigators who are committed to pursuing research in the field of Bioengineering and have demonstrated significant potential to make substantial contributions to the field of Bioengineering. Such accomplishments may take the form of, but are not limited to, design or development of new methods, equipment or instrumentation in bioengineering; and research publications in peer-reviewed journals. The award was established by the Bioengineering Division in 1985 and operated as a division award until 1998 when it was elevated to a Society award.

2022 Zhenpeng Qin, Ph.D.

Dr. Zhenpeng Qin is an Associate Professor of Mechanical Engineering and Bioengineering at the University of Texas at Dallas, a founding member of the Center for Advanced Pain Studies, and an adjunct faculty at the Department of Surgery at UT Southwestern Medical Center. Qin's lab focuses on developing new nanotechnologies to better understand and overcome barriers in the nervous system, and develop highly sensitive and multiplexed methods for infectious disease diagnostics. Dr. Qin has received numerous awards, including the 2022 ASME Y.C. Fung Early Career Award, NIH MIRA/R35 award for early-stage investigators for his pioneering work on the development of molecular hyperthermia to control protein activity optically,



DOD/CDMRP Discovery Award, Collaborative Sciences Award from American heart association (AHA), CPRIT Individual Research Award, and Faculty Research Award from UT Dallas Jonsson School. His lab has received generous support from NSF, NIH, DOD/CDMRP, AHA, and CPRIT. He actively serves on review panels at NSF, NIH, and DOD, and three startup companies have licensed his research.

Award Lecture Abstracts

Monday, June 20, 2022, 8:15 - 9:15 AM EDT, Chesapeake A-D

Zong-Ming Li, *Savio L-Y. Woo Medal*

Title: CASA - Carpal Arch Space Augmentation

The median nerve is prone to compression neuropathy at the wrist, leading to carpal tunnel syndrome. If left untreated, carpal tunnel syndrome can lead to irreversible degeneration of the median nerve, debilitating the hand. The concept of carpal tunnel surgery has existed for a century without fundamental changes. Alternative, non-surgical treatment options for carpal tunnel syndrome are desirable considering the vast number surgical cases, surgical complications, and symptom recurrences. This talk will present several novel carpal arch space augmentation (CASA) options of radioulnar wrist compression, ligament-muscle interaction, and collagenolysis of transverse carpal ligament as potential treatment for carpal tunnel syndrome. Research on hand biomechanics leading to CASA will also be briefly presented.

Michele Grimm, *Robert M. Nerem Education and Mentorship Medal*

Title: The Importance of Cultivating a Mentoring Tree

Mentoring is often viewed as a unidirectional relationship, with the senior, more seasoned individual imparting knowledge, guidance, and experience to more junior individuals. But this structure limits our ability to recognize that the mentoring relationship can bring benefits and opportunities for growth to the mentor as well. This presentation will discuss the concept of a mentoring tree – in which an individual can identify multiple mentors and mentees, each of whom can provide mutual support and insight as we progress through our careers. Each individual who is part of our mentoring tree can play a role at different times and with different challenges within our professional path. This everchanging and growing structure provides continuous mentoring without overtaxing any single relationship. In this presentation, Dr. Michele Grimm will discuss this concept – drawing on examples from her 36 year academic career.

Tuesday, June 21, 2021, 8:15 - 9:15 AM EDT, Chesapeake A-D

Lori Setton, *H. R. Lissner Medal*

Wednesday, June 22, 2022, 5:30 - 6:30 PM EDT, Chesapeake A-D

Zhenpeng Qin, *Y. C. Fung Early Career Award*

Title: Nanoscale Interface with the Brain Using Light and Advanced Nanomaterials

The brain is the most complex organ in the human body, and brain diseases are highly challenging to diagnose, monitor, and treat. Nanomaterials have emerged as a unique wireless interface with the brain in the micro/nanoscale. I will discuss our recent efforts to develop new tools using advanced nanomaterials and photonics to understand further and access the brain. These include exciting capabilities to remotely control protein activity, study neuromodulation, and change the blood-brain barrier permeability. These new tools provide insights into the brain microenvironment and a unique opportunity to develop strategies to treat brain diseases.

Robert Leon Mauck, *Van C. Mow Medal*

Title: Trying to do some good

One of my longtime idols, Dolly Parton, once said: "If you've got the money and you've got the heart and you're not too selfish, you can do a lot of good". I would not presuppose to liken myself to such an icon, but have thought a lot about this saying and how it relates to being the kind of scientist and mentor that I would like to be. My interpretation is that you should share what you have, believe in what you do (and the people you work with), lift up as many as you can along the way, and in doing so, perhaps, in the end, you might get lucky and do a little good. This seminar will recount my experiences in trying to live up to this motto, things I've learned by trying, the little good I may have achieved, and the work that I've left to do. Time permitting, I will also tell you about some science.

6 Scientific Sessions

SB³C 2022 Meeting Scientific Podium Sessions

Monday, June 20

9:30AM – 11:00AM EDT

Machine Learning and Artificial Intelligence

Chesapeake A-D

Session Chairs: Hadi Wiputra, *University of Minnesota*
Kritika Iyer, *University of Michigan*

- 9:30AM** **Statistical Shape Representation of Ascending Thoracic Aortic Aneurysms: Accounting for Major Branches of the Aortic Arch** SB³C2022-312
Hadi Wiputra¹, Shion Matsumoto², Jessica E. Wagenseil³, Alan C. Braverman³, Victor H. Barocas¹
¹University of Minnesota, ²University of Michigan, ³Washington University
- 9:45AM** **A Bayesian Approach for Inverse Problems on Patient-Specific CFD Simulation of Aorta Using an MI-Based Surrogate Model** SB³C2022-162
Pan Du, Jian-xun Wang
University of Notre Dame
- 10:00AM** **AI-Accelerated Multiscale Modeling for Platelet Adhesion Dynamics and Multi-Platelet Aggregation at Millisecond and Molecular Resolutions** SB³C2022-262
Peineng Wang, Yicong Zhu, Jawaad Sheriff, Peng Zhang, Changnian Han, Yuefan Deng, Danny Bluestein
Stony Brook University
- 10:15AM** **A Deep Learning Method for 3D Vessel Reconstruction Using Uncalibrated X-Ray Angiography Images: Application to Coronary Hemodynamics** SB³C2022-223
Kritika Iyer, Noah C. Stevens, Brahmajee K. Nallamothe, C. Alberto Figueroa, Raj R. Nadakuditi
University of Michigan
- 10:30AM** **Learning Whole Heart Mesh Generation from Patient Images for Computational Simulations** SB³C2022-440
Fanwei Kong, Shawn Shadden
University of California Berkeley
- 10:45AM** **Denoising and Super-Resolving 4D Flow MRI Using Physics-Guided Neural Networks** SB³C2022-259
Neal Patel, Emily Bartusiak, Hemanth Devarapalli, Sean Rothenberger, Amy Schwichtenberg, Edward Delp, Vitaliy Rayz
Purdue University

Vascular Mechanics I

Chesapeake E

Session Chairs: Vijay Vedula, *Columbia University*
Bryan Good, *University of Tennessee*

- 9:30AM Automatic Estimation of Mechanical and Geometrical Parameters of Abdominal Aortic Aneurysms Using 3D+T Ultrasound for Understanding Aneurysm Progression** SB³C2022-211
Esther Maas¹, Arjet Nievergeld¹, Judith Fonken¹, Mirunalini Thirugnanasambandam¹, Marc van Sambeek², Richard Lopata¹
¹Eindhoven University of Technology, ²Catharina Hospital Eindhoven
- 9:45AM Batch-Process Optimization of Kink-Resistant Vascular Grafts with High Compliance** SB³C2022-315
David Jiang¹, Andrew Robinson², Elizabeth Cosgriff-Hernandez², Lucas Timmins¹
¹University of Utah, ²University of Texas at Austin
- 10:00AM Biomechanical Analysis of Local Mural Defects in Angiotensin-II-Induced Thoracic Aortopathies** SB³C2022-475
Dar Weiss¹, Aaron S. Long¹, George Tellides¹, Stéphane Avril², Jay D. Humphrey¹, Matthew R. Bersi³
¹Yale University, ²Mines Saint-Étienne, ³Washington University
- 10:15AM Effects of Nitroglycerin Induced Vasodilation on Elastic versus Muscular Artery Stiffness in Older Veterans** SB³C2022-213
Ryan Pewowaruk¹, Amy Hein¹, Cynthia Carlsson¹, Claudia Korcarz², Adam Gepner¹
¹William S. Middleton Memorial Veterans Hospital, ²University of Wisconsin
- 10:30AM Investigation of The Regional Variations in the Mechanical Properties and Microstructure of Porcine Left Anterior Descending Artery** SB³C2022-117
Sergio A. Pineda-Castillo, Santiago Aparicio-Ruiz, Chung-Hao Lee
University of Oklahoma
- 10:45AM Prediction of Analog Thrombi Mechanical Properties, Composition, and Contraction Using Computed Tomography Imaging** SB³C2022-219
Janneke Cruts¹, Jo-Anne Giezen², Kim van Gaalen¹, Robert Beurskens¹, Yanto Ridwan¹, Marcel Dijkshoorn¹, Heleen van Beusekom¹, Nikki Boodt¹, Aad van der Lugt¹, Frank Gijssen¹, Rachel Cahalane¹
¹Erasmus Medical Center, ²Delft University of Technology

Mineralized Tissue Mechanics

Chesapeake F

Session Chairs: *Natasha Case, Saint Louis University*
Hannah Dailey, Lehigh university

- 9:30AM In-Situ Bone Fracture Mechanics Assessed by 3D-Xray Microscopy** SB³C2022-360
 Glynn Gallaway¹, Rachel Surowiec², Matthew Allen², Joseph Wallace², Laura Pyrak-Nolte¹, Thomas Siegmund¹
¹Purdue University, ²Indiana University
- 9:45AM Prediction of Microarchitecture and Anisotropic Elastic Behaviour of Trabecular Bone Using a QCT-Based Deep Learning Model** SB³C2022-129
 Pengwei Xiao, Eakeen Haque, Tinghe Zhang, Yufei Huang, Xiaodu Wang
University of Texas at San Antonio
- 10:00AM Optimizing and Validating Soft Callus Mechanical Properties in Ovine Bone Fracture Healing Models with Biomechanical Data** SB³C2022-179
 Brendan Inglis¹, Peter Schwarzenberg¹, Karina Klein², Brigitte von Rechenberg², Salim Darwiche², Hannah Dailey¹
¹Lehigh University, ²University of Zurich
- 10:15AM High-Fat Diet Concurrently Alters Bone Microstructure and Nanostructure** SB³C2022-438
 Yoshihiro Obata¹, Neha S. Dole², Claire Acevedo¹, Tamara Alliston²
¹University of Utah, ²University of California, San Francisco
- 10:30AM Entesis Mechanical Properties and Composition Are Dependent on Movement And Development** SB³C2022-370
 Kaitlin McCreery, Olivia Tonti, Callan Luetkemeyer, Corey Neu, Sarah Calve
University of Colorado Boulder
- 10:45AM A Comparative Study of Bone Tissue Growth Between Bioinspired and Square Scaffolds** SB³C2022-394
 Marco Fielder, Arun Nair
University of Arkansas

Biomechanics of the Eye, Pelvic Floor, and Reproductive Track I

Chesapeake G

Session Chairs: Ian Sigal, *University of Pittsburgh*
Megan R. Routzong, *University of California*

- 9:30AM** **Radiation Cystitis Results in Compromised Urinary Function and Decreased Bladder Distensibility** SB³C2022-397
Bernadette Zwaans¹, Marissa Grobbel², Laura Lamb¹, Sara Roccabianca²
¹Beaumont Health, ²Michigan State University
- 9:45AM** **Simulations of The Gravid Human Uterus and Cervix for Patients at High- And Low-Risk for Preterm Birth** SB³C2022-384
Erin Louwagie¹, Mirella Mourad¹, Michael House², Ronald Wapner¹, Kristin Myers¹
¹Columbia University, ²Tufts Medical Center
- 10:00AM** **Dependence of Vaginal Tissue Creep Behavior On Applied Load** SB³C2022-29
Justin Dubik¹, David Dillard¹, Kristin Miller², Raffaella De Vita¹
¹Virginia Tech, ²Tulane University
- 10:15AM** **Simulation of Uterus Active Contraction During Fetus Delivery in Ls-Dyna** SB³C2022-22
Ru Tao, Michele Grimm
Michigan State University
- 10:30AM** **Intraocular Pressure-Induced Lamina Cribrosa Deformations are Larger and More Inhomogeneous Between Quadrants in an Experimental Glaucoma Eye than in Healthy Eye** SB³C2022-381
Bingrui Wang¹, Fuqiang Zhong¹, Junchao Wei¹, Yi Hua¹, Juan Reynaud², Brad Fortune², Ian Sigal¹
¹University of Pittsburgh, ²Legacy Health Research
- 10:45AM** **Shear Properties of Collagen Crosslinked Porcine Cornea** SB³C2022-375
H Hatami-Marbini, M.E Emu
University of Illinois

Joint & Spine Biomechanics

Clipper A-C

Session Chairs: Sagar Singh, *University of Pennsylvania*
Anita Singh, *Widener University*

- 9:30AM** **Why Don't Bats Tear Their Rotator Cuffs Despite Repetitive Overhead Motion** □
SB³C2022-411
Iden Kurtaliaj¹, Jennifer Kunes¹, Michael Rowley², Lynn Ann Forrester¹, Mikhail Golman¹, Guy Genin³, Sharon Swartz⁴, Stavros Thomopoulos¹
¹*Columbia University*, ²*California State University*, ³*Washington University St. Louis*, ⁴*Brown University*
- 9:45AM** **Radiofrequency Ablation of the Medial Nerve for Facet Joint Pain Alters the Biomechanics of The Spine - A Computational Study** SB³C2022-261
Faris A. Amalki, Daniel H. Cortes
Penn State University
- 10:00AM** **Pre-Exposure to a Painful Stretch Increases Both Strains & Neuronal Calcium Activity in Neuron-Collagen Constructs across Physiologic & Supraphysiological Stretch** SB³C2022-190
Sagar Singh, Prabesh Ghimire, Beth Winkelstein
University of Pennsylvania
- 10:15AM** **Progressive Disc and Bone Adaptations Due to Posterolateral Tethering in a Porcine Model of Scoliosis** SB³C2022-286
Axel Moore¹, Adriana Barba², Harrah Newman¹, Kyle Meadows¹, Benjamin Sinder³, Alessandra Fusco², Rachel Hillard², Sriram Balasubramanian⁴, Edward Vresilovic¹, Brian Snyder⁵, Patrick Cahill³, Thomas Schaer², Dawn Elliott¹
¹*University of Delaware*, ²*University of Pennsylvania*, ³*Children's Hospital of Philadelphia*, ⁴*Drexel University*, ⁵*Boston Children's Hospital*
- 10:30AM** **The Influence of Personal Protective Equipment on Male and Female Spinal Loads in Vertical Impact** SB³C2022-460
Sagar Umale, Prashant Khandelwal, John Humm, Narayan Yoganandan
Medical College of Wisconsin
- 10:45AM** **Degeneration of the Lumbar Facet Joint Occurs in Both the Facet Capsular Ligament and the Facet Joint Articular Cartilage** SB³C2022-172
Jill Middendorf, Victor Barocas
University of Minnesota

Mechanobiology

Galleon A-C

Session Chairs: Eno Ebong, *Northeastern University*
 Spencer Szczesny, *Penn State University*

- 9:30AM** **Increased Nuclear Compliance Enables Rapid Confined Migration in Mesenchymal Glioblastoma** SB³C2022-120
 Landon Teer, Neha Anil, Dominic Armagno, Marco Munoz, Shah Tarun, Samuel Vielee, Joseph Chen
University of Louisville
- 9:45AM** **Periventricular White Matter Hyperintensities Associated with Mechanical Changes of the Ependymal Wall** SB³C2022-21
 Andreia Caçoilo¹, Madison Grigg², Henry Rusinek³, Johannes Weickenmeier¹
¹*Stevens Institute of Technology*, ²*West Virginia University*, ³*New York University*
- 10:00AM** **Mechanical Cues from The Environment Make Mesenchymal Stromal Cell Population Heterogeneous** SB³C2022-128
 Samantha Kaonis, Soham Ghosh
Colorado State University
- 10:15AM** **Microenvironmental Stiffness Modulates Responsiveness and Communication with Mesenchymal Stromal Cells** SB³C2022-336
 Sung Yeon Kim, Edward Bonnevie, Carla Scanzello, Robert Mauck
University of Pennsylvania
- 10:30AM** **Heterogeneity in Cell Distribution Due to Collective Organization Leads to Localized Higher Stresses** SB³C2022-469
 Mahvash Jebeli, Samantha Lopez, Qi Wen, Kristen Billiar
Worcester Polytechnic Institute
- 10:45AM** **Glaucomatous Stressors Drive Schlemm's Canal Cell Pathobiology Via Elevated Yap Activity** SB³C2022-49
 Haiyan Li¹, Megan Kuhn², Daniel Stamer², Preethi Ganapathy¹, Samuel Herberg¹
¹*Suny Upstate Medical University*, ²*Duke University*

Transport in Diagnostics

Schooner A-B

Session Chairs: Lyle Hood, *University of Texas at San Antonio*
Zhenpeng Qin, *University of Texas at Dallas*

- 9:30AM** **Development of a Multi-Timestep Approach for Microparticle and Erythrocyte Image Velocimetry** SB³C2022-400
Simon Tupin, Joseph van Batenburg-Sherwood
Imperial College London
- 9:45AM** **Characteristic Impedance with Exercise Testing Correlates with Right Ventricular-Pulmonary Arterial Coupling in Isolated Postcapillary Pulmonary Hypertension** SB³C2022-30
Christopher Lechuga¹, Farhan Raza², Naomi Chesler¹
¹*University of California, Irvine*, ²*University of Wisconsin*
- 10:00AM** **Characterization of Porcine Pancreas Tissue Plasmonic Photothermal Heating at 808 And 1064 Nm Wavelengths** SB³C2022-321
Forhad Akhter¹, Andrea Smith¹, Santiago Manrique-Bedoya¹, Chris Moreau², Yusheng Feng¹, Kathryn Mayer¹, Lyle Hood¹
¹*University of Texas at San Antonio*, ²*UT Health San Antonio*
- 10:15AM** **A Deep Learning Approach to Investigate the Hidden Links Between Cannabis and Cardiovascular Health** SB³C2022-459
Joseph C. E. Messou, Francis Oparaocha, Hasan Imanli, James A. Perry, Timm-Michael L. Dickfeld, Jean Jeudy, Eleonora Tubaldi
University of Maryland
- 10:30AM** **Elucidating the Impact of Plasmonic Nanoparticle Shape on Infectious Virus Diagnosis** SB³C2022-478
Yaning Liu¹, Haihang Ye¹, Tingting Zhang¹, Qi Cai¹, Hoang Dinh Huynh², Jeffery Kahn², Zhenpeng Qin¹
¹*University of Texas Dallas*, ²*University of Texas Southwestern Medical Center*
- 10:45AM** **Patient-Specific Modeling of Obstructed Ventriculoperitoneal Shunt Performance** SB³C2022-37
Sung Min Kwon, Stephanie TerMaath
University of Tennessee

Rehab and Assistive Technologies

Cutter A-B

Session Chairs: Sara Roccabianca, *University of Michigan*
Ria Mazumdar, *Widener University*

- 9:30AM Patient-Specific Models Reveal High Interfragmentary Strain in Distal Femur Fracture Fixation** SB³C2022-181
Jordan Inacio¹, Peter Schwarzenberg², Richard Yoon³, Andrew Kantzos⁴, Ajith Malige⁴, Chinenye Nwachuku⁴, Hannah Dailey¹
¹*Lehigh University*, ²*AO Foundation Davos*, ³*Jersey City Medical Center*, ⁴*St. Luke's University*
- 9:45AM Exercise Therapy Improves Glenohumeral Joint Function when Reaching Behind the Back in Individuals with Rotator Cuff Tears** SB³C2022-301
Luke Mattar, Rachel McLoughlin, Adam Popchak, William Anderst, Volker Musahl, James Irrgang, Richard Debski
University of Pittsburgh
- 10:00AM Predicting Joint Torque Using sEMG and Deep Neural Networks** SB³C2022-304
Heath Boyea, J. Miles Canino
Rose-Hulman Institute of Technology
- 10:15AM Design and Mechanical Testing of a Shoulder-Assistive Exosuit** SB³C2022-355
Kaleb Burch, Jill Higginson
University of Delaware
- 10:30AM An Analysis of Octopus Curvature for Application in Soft Robotic Prostheses** SB³C2022-113
Garrett Weidig, Emily Kelly, Brittany Bush, Galit Pelled, Tamara Reid Bush
Michigan State University
- 10:45AM Evaluating the Capabilities of a Novel Device Designed to Preserve Whole Pancreases Via Oxygenated Perfusion** SB³C2022-43
Daniel Portillo, Jose Gonzalez, Carorina Villareal, Sophia Salazar, Lyle Hood
University of Texas at San Antonio

Patient Specific Flow and Physiology

Chesapeake A-D

Session Chair: Jamasp Azarnoosh, *Medical College of Wisconsin*
Vijay Vedula, *Columbia University*

- 11:15AM** **Image-Based Temporal Quantification of Aortic Coarctation Within the Range of Severities and Durations Seen Clinically** SB³C2022-282
Jamasp Azarnoosh, Arash Ghorbannia, John F. LaDisa Jr.
Medical College of Wisconsin
- 11:30AM** **Aortic Coarctation Assessment - In Vitro 4D Flow MRI Approach** SB³C2022-393
James Rice¹, Labib Shahid¹, Haben Berhane², Cynthia Rigsby³, Joshua Robinson³,
Lindsay Griffin³, Michael Markl², Alejandro Roldan-Alzate¹
¹*University of Wisconsin-Madison*, ²*Northwestern University*, ³*Lurie Children's Hospital*
- 11:45AM** **Personalized Ultrasound-Based Fluid-Structure Interaction Modeling of Abdominal Aortic Aneurysms: From Model Development to Ex-Vivo Verification** SB³C2022-205
Judith Fonken¹, Esther Maas¹, Arjet Nievergeld¹, Floris Verheijen¹, Hein de Hoop¹, Marc van Sambeek², Frans van de Vosse¹, Richard Lopata¹
¹*Eindhoven University of Technology*, ²*Catharina Hospital Eindhoven*
- 12:00PM** **Computational Fluid Dynamics Model of Embryonic Heart and Supporting Vasculature Illustrates Temporal and Spatial Variation in Wall Shear Stress During Cardiac Cycle** SB³C2022-123
Kirsten Giesbrecht, Simone Rossi, Boyce Griffith
University of North Carolina- Chapel Hill
- 12:15PM** **Analysis of Tracheal Air Flow Dynamics in Infant Tracheal Stenosis Before and after Repair Using 3D Printing and Computational Fluid Dynamics Modeling** SB³C2022-406
Clare Richardson^{1,2}, Michael Barbour¹, Seth Friedman², Randall Bly^{1,2}, John Dahl^{1,2},
Kaalán Johnson^{1,2}, Alberto Aliseda¹
¹*University of Washington*, ²*Seattle Children's Hospital*
- 12:30PM** **Analysis of Upper Airway Flow Dynamics in Infants with Robin Sequence Using 4-Dimensional Computed Tomography and Computational Fluid Dynamics Modeling** SB³C2022-398
Michael Barbour¹, Clare Richardson^{1,2}, Michael Bindschadler², Seth Friedman², Randall Bly^{1,2},
John P. Dahl^{1,2}, Alberto Aliseda¹
¹*University of Washington*, ²*Seattle Children's Hospital*

Vascular Mechanics II

Chesapeake E

Session Chairs: Chiara Bellini, *Northeastern University*
 Lucas Timmins, *University of Utah*

- 11:15AM Critical Pressure of Intramural Delamination in Aortic Dissection** SB³C2022-191
 Ehsan Ban, Cristina Cavinato, Jay Humphrey
Yale University
- 11:30AM Effect of Renal Denervation on the Biomechanical Properties of Common Carotid Arteries in Rats** SB³C2022-365
 Anastasia Gkousioudi, Margherita Razzoli, Jesse Moreira, Gianluca Harbert, Richard Wainford, Katherine Zhang
Boston University
- 11:45AM Inter-Donor Variability in the Tensile and Compressive Behaviour of In Vitro Human Thrombi** SB³C2022-224
 Rachel Cahalane, Judith de Vries, Moniek de Maat, Kim van Gaalen, Heleen van Beusekom, Aad van der Lugt, Ali Akyildiz, Frank Gijsen
Erasmus Medical Center
- 12:00PM Measurement of stent retriever removal forces in an experimental model of acute ischemic stroke** SB³C2022-104
 Demitria Poulos, Bryan Good
University of Tennessee
- 12:15PM Using a Tissue-Engineered Model to Investigate the Impact of Collagen Orientation on the Local Mechanical Behavior of Atherosclerotic Plaque Caps** SB³C2022-280
 Hanneke Crielaard¹, Tamar Wissing², Su Guvenir Torun¹, Pablo de Miguel¹, Ranmadusha Hengst³, Gert-Jan Kremers¹, Frank Gijsen¹, Kim van der Heiden¹, Ali Akyildiz¹
¹*Erasmus Medical Center*, ²*Eindhoven University of Technology*, ³*Delft University of Technology*
- 12:30PM Mechanical Remodeling of Murine Thoracic Aorta During Pregnancy** SB³C2022-470
 Ana I. Vargas, Samar Tarraf, Rouzbeh Amini, Chiara Bellini
Northeastern University

Tendon & Ligament Mechanics

Chesapeake F

Session Chairs: Benjamin Wheatley, *Bucknell University*
Jill Middendorf, *University of Minnesota*

- 11:15AM A Soft Tissue Grasping Device for Enhanced Rotator Cuff Repair Inspired By Python Teeth** SB³C2022-232
Iden Kurtaliaj¹, Ethan Hoppe², Yuxuan Huang², Mark Lipkin², Thomas Gardner¹, Liana Tedesco¹, Sohil Desai¹, Silvio Bentacur¹, Linda Effiong¹, William Levine¹, Guy Genin², Stavros Thomopoulos¹
¹Columbia University, ²Washington University
- 11:30AM Shear Wave Speed as a Measure of Regional Tendon Stress** SB³C2022-366
Jonathon Blank¹, Darryl Thelen¹, Matthew Allen², Joshua Roth¹
¹University of Wisconsin-Madison, ²Brigham Young University
- 11:45AM Injury Criteria: Defining Mechanical Thresholds for Collagen in Soft Tissues** SB³C2022-380
Callan Luetkemeyer¹, Kaitlin McCreery¹, Kathryn Jacobson², Corey Neu¹, Sarah Calve¹
¹University of Colorado Boulder, ²Purdue University
- 12:00PM Differences in Porcine ACL Morphology and Function are Minor Between Boars and Barrows at Early Adolescence** SB³C2022-404
Jacob Thompson^{1,2}, Danielle Howe^{1,2}, Lauren Schnabel¹, Matthew Fisher^{1,2}
¹North Carolina State University, ²University of North Carolina-Chapel Hill
- 12:15PM Biological Response of Rabbit Anterior Cruciate Ligaments To Mechanical Loading is Sex-Specific** SB³C2022-329
Lauren Paschall, Aman Dhawan, Spencer Szczesny
Penn State University
- 12:30PM Effect of Mechanical Loading on the Microstructure and Diffusion Imaging Properties of Ligament-Mimicking Fibers** SB³C2022-116
Roberto Pineda Guzman, Noel Naughton, Bradley Sutton, Mariana Kersh
University of Illinois

Biomechanics of the Eye, Pelvic Floor, and Reproductive Track II

Chesapeake G

Session Chairs: Andrew Feola, *Emory University and Atlanta VA Medical Center*
 Cyrus Rezvanifar, *University of Minnesota*

- 11:15AM Mechanical Anisotropy of the Equatorial Sclera Does not Concur with the Primary Collagen Fiber Orientations** SB³C2022-349
 Yi Hua¹, Samuel Salinas², Marissa Quinn¹, Fengting Ji¹, Rouzbeh Amini², Ian A. Sigal¹
¹University of Pittsburgh, ²Northeastern University
- 11:30AM The Effects of Negative Periocular Pressure on Biomechanics of the Optic Nerve Head And Cornea: A Computational Modeling Study** SB³C2022-306
 Babak Safa¹, John Berdahl², C. Ross Ethier¹
¹Georgia Institute of Technology, ²Vance Thompson Vision
- 11:45AM The Strain Response of the Human Lamina Cribrosa from Intraocular Pressure Decrease** SB³C2022-354
 Cameron Czerpak¹, Michael Kashaf², Brandon Zimmerman¹, Harry Quigley¹, Thao Nguyen¹
¹Johns Hopkins University, ²University of California San Diego
- 12:00PM Vaginal Biomechanical Function and Composition in Premenopausal Women with and Without Pelvic Organ Prolapse** SB³C2022-347
 Qinhan Zhou¹, Benard Ogola¹, Jasmine Kiley¹, Shelby White¹, Lyndsey Buckner², Laurephile Desrosiers², Leise Knoepp², Sarah Lindsey¹, Kristin Miller¹
¹Tulane University, ²Ochsner Health System
- 12:15PM Time-Dependent Material Properties of Nonpregnant and Pregnant Human Uterus Under Spherical Nanoindentation** SB³C2022-284
 Daniella Fodera¹, Shuyang Fang¹, Michelle Oyen², Kristin Myers¹
¹Columbia University, ²Washington University in St. Louis
- 12:30PM Female Pelvic Morphological Variation in the Generation of Geometries for Simulations of Vaginal Childbirth** SB³C2022-196
 Megan Routzong¹, Steven Abramowitch²
¹University of California, San Diego, ²University of Pittsburgh

Brain & Injury Mechanics I

Clipper A-C

Session Chairs: Johannes Weickenmeier, *Stevens Institute of Technology*
 Brittany Coats, *University of Utah*

- 11:15AM In Vivo Quantification of Relative Skull-Brain Motion Using MR Elastography**
 SB³C2022-253
 Alexa Diano¹, Grace McIlvain¹, Suhas Vidhate², Andrew Knutsen², Dzung Pham², Curtis Johnson¹
¹University of Delaware, ²Henry M. Jackson Foundation
- 11:30AM Recent Updates on the GHBMC Human Head Finite Element Model- Development of Crash Injury Index for Multiple Brain Injuries** SB³C2022-442
 Ding Lyu, Shirin Phadke, Abhijeet Kumbhare, Liying Zhang
 Wayne State University
- 11:45AM On-Field Evaluation of Mouthpiece- And Helmet-Mounted Sensor Data from Head Kinematics in Football** SB³C2022-314
 Ty Holcomb, Madison Marks, Stewart Pritchard, Logan Miller, Jillian Urban, Joel Stitzel
 Wake Forest School of Medicine
- 12:00PM Simulation of Murine Brain Deformation During Chimera Impacts** SB³C2022-414
 Connor Bradfield, Liming Voo, K.T. Ramesh
 Johns Hopkins University
- 12:15PM Multi-Dimensional Morphometric Analysis of Posterior Fossa to Study Type I Chiari Malformation** SB³C2022-228
 Ya-Chen Chuang¹, Alejandro Carrasquilla², Aymeric Pionteck¹, Javid Abderezaei¹, Addison Quinones², Gizem Bilgili¹, William H. Shuman², Shan Zhao², Raj K. Shrivastava², Mehmet Kurt¹
¹University of Washington, ²Icahn School of Medicine
- 12:30PM Effect of Helmet Size and Velocity on Cervical Spine Segmental Responses Under Rear Impact Acceleration** SB³C2022-419
 Yuvaraj Purushothaman, Hoon Choi, Narayan Yoganandan
 Medical College of Wisconsin

Cardiovascular Tissue Engineering

Galleon A-C

Session Chairs: Zhijie Wang, *Colorado State University*
Will Richardson, *Clemson University*

- 11:15AM** **Vascular Smooth Muscle Cells Upregulate Glycolytic and Contractile Phenotype Genes in the Presence of Glutamine** SB³C2022-362
Pattie Mathieu, Alisa Clyne
University of Maryland College Park
- 11:30AM** **Development of an In Vitro Experimental Model to Study Endothelial Dysfunction from Coarctation of the Aorta** SB³C2022-352
Dylan Schock¹, Hilda Martinez Ramirez¹, Joy Lincoln¹, Abdel Alli², John LaDisa^{1,3}
¹*Medical College of Wisconsin*, ²*University of Florida*, ³*Herma Heart Institute, Children's Wisconsin*
- 11:45AM** **A Structural Bio-Chemo-Mechanical Model for Traction Force Microscopy of Vascular Smooth Muscle Cells** SB³C2022-40
Shannon Flanary, Victor Barocas
University of Minnesota
- 12:00PM** **Mechanical Cues Such as Shear Stress and Piezo1 Activation Generate Red Blood Cell Extracellular Vesicles** SB³C2022-192
Gurneet Sangha, Callie Weber, Ryan Sapp, Morgan Pettebone, Alisa Clyne
University of Maryland College Park
- 12:15PM** **Perturbed Cyclic Strain in Cardiac Fibroblast Cultures Results in a Mechanically-Induced Senescent Phenotype** SB³C2022-418
Stephanie E. Schneider, Adrienne K. Scott, Corey P. Neu
University of Colorado at Boulder
- 12:30PM** **Microfabricated Anisotropic Tissue Bundles for the Production of 3D Cardiac Tissue at Scale** SB³C2022-332
Maggie Jewett, Amanda Bluem, Samuel DePalma, Brendon Baker
University of Michigan

Transport in Hemodynamics and Lymphatics

Schooner A-B

Session Chairs: Ellie Rahbar, *Wake Forest University*
Jifu Tan, *Northern Illinois University*

- 11:15AM** **Material Property Changes of Polymerized Red Blood Cells in Sickle Cell Disease**
SB³C2022-100
Dillon Williams, David Wood
University of Minnesota
- 11:30AM** **Regional Differences in Perivascular Adipose Tissue Following Angiotensin II-Induced Hypertension** SB³C2022-474
Yujun Xu, J. Caleb Snider, Niyousha Karbasion, Matthew R. Bersi
Washington University in St. Louis
- 11:45AM** **Linking Circulatory Turbulence and the Pathophysiology of Sickle Cell Disease**
SB³C2022-160
Eudorah Vital¹, Alice Liu², Christina Caruso³, David Bark², Wilbur Lam¹
¹*Georgia Institute of Technology*, ²*Washington University in St. Louis*, ³*Emory University*
- 12:00PM** **Perivascular Cerebrospinal Fluid Flow is a Major Source of Interstitial Fluid and its Clearance in the Rat Brain** SB³C2022-210
Kristian Mortensen¹, Tuomas Lilius¹, Marko Rosenholm¹, Björn Sigurdsson¹, Douglas Kelley², Maiken Nedergaard¹
¹*University of Copenhagen*, ²*University of Rochester*
- 12:15PM** **Efflux of Cerebrospinal Fluid Through Cervical Lymph Vessels is Reduced in Aged Mice** SB³C2022-271
Aditya Raghunandan, Ting Du, Virginia Pla-Requena, Yara Izhiman, Guojun Liu, Maiken Nedergaard, Douglas Kelley
University of Rochester
- 12:30PM** **Plasmonic Lamp: Highly Specific and Sensitive Detection of SARS-CoV-2 by Plasmonic Sensing of Isothermally Amplified Nucleic Acids** SB³C2022-310
Haihang Ye, Chance Nowak, Yaning Liu, Yi Li, Tingting Zhang, Leonidas Bleris, Zhenpeng Qin
University of Texas at Dallas

Mechanics in Multi-Tissue Networks

Cutter A-B

Session Chairs: Jacqueline Cole, *University of North Carolina and North Carolina State University*
Christopher Price, *University of Delaware*

- 11:15AM** **Evaluating the Effect of Pufas on Hepatic Stellate Cell Activation in a 3D Tissue Engineered Model of Hepatic Fibrosis** SB³C2022-57
L. Madison Kirk¹, Nathaniel Hauser¹, Lucy J. Price¹, Chia-Chi Chuang Key¹, Aleksander Skardal², Elaheh Rahbar¹
¹Wake Forest University, ²Ohio State University
- 11:30AM** **Functional Hyperemia Increases Influx of Cerebrospinal Fluid to the Brain** SB³C2022-130
Yiming Gan¹, Stephanie Holstein-Rønsbo², Douglas Kelley¹, Maiken Nedergaard¹
¹University of Rochester, ²University of Copenhagen
- 11:45AM** **Expression of the Injury Marker Activating Transcription Factor-3 After Exposure to MMP-1 is Decreased in a Neuron Collagen Co-Culture with Phospholipase A2 Inhibition** SB³C2022-279
Sagar Singh, Prabesh Ghimire, Beth Winkelstein
University of Pennsylvania
- 12:00PM** **Investigating Structural Changes of Neonatal Brachial Plexus Post-Stretch** SB³C2022-431
Virginia Orozco¹, Rachel Magee¹, Mital Sahni², Sriram Balasubramanian¹, Anita Singh³
¹Drexel University, ²Sunrise Children's Hospital, ³Widener University
- 12:15PM** **Determining Effects on Pig Gait after Induced Traumatic Brain Injury: Initial Assessments** SB³C2022-187
Sloan Kanat, Paige Cordts, Alesa Hughson, Galit Pelled, Tamara Reid Bush
Michigan State University
- 12:30PM** **Early Removal of the Infrapatellar Fat Pad in a Spontaneous Rodent Model of Osteoarthritis May Beneficially Alter the Development of Osteoarthritis** SB³C2022-165
Tammy Haut Donahue¹, Mary Afzali², Nicole Vigon³, Ryan Ek³, Gerardo Narez³, Kelly Santangelo²
¹University of Memphis, ²Colorado State University, ³University of Massachusetts-Amherst

**PhD-Level Student Paper Competition Session 1:
Biofluid Mechanics and Cardiovascular Imaging**

Chesapeake A-D

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

- 9:30AM** **Radiomics Features on Contrast-Enhanced and Non-Enhanced MRI are Associated with Intracranial Aneurysmal Risk** SB³C2022-105
Sricharan Veeturi, Nandor Pinter, Adnan Siddiqui, Vincent Tutino
University at Buffalo
- 9:45AM** **A Smart-PIV Approach for In Vitro Evaluation of Coronary Hemodynamics**
SB³C2022-31
Elena Torta, Giuseppe Carlo Alp Caridi, Claudio Chiastra, Diego Gallo, Umberto Morbiducci
Politecnico di Torino
- 10:00AM** **Global and Regional Quantification of Cardiotoxicity due to Radiotherapy Using Cardiac Magnetic Resonance Imaging: A Pilot Study in Lung Cancer** SB³C2022-151
Alireza Omidi, Mihaela Rosu-Bubulac, Georgia Thomas, Elisabeth Weiss, John S. Wilson
Virginia Commonwealth University
- 10:15AM** **Predicting Hemodynamic Indices in Coronary Artery Aneurysms Using Response Surface Method: An Application in Kawasaki Disease** SB³C2022-118
Alireza Asadbeygi¹, Simon Lee², John Kovalchin², Hoda Hatoum¹
¹*Michigan Technological University*, ²*Nationwide Children Hospital*
- 10:30AM** **Patient-Specific Finite Element Modeling to Predict Clinical Risks of Percutaneous Pulmonary Valve Implantation** SB³C2022-94
Carly Donahue, Varun Aggarwal, Victor Barocas
University of Minnesota
- 10:45AM** **Computational Modeling of Cryoballoon Ablation for Pulmonary Vein Isolation**
SB³C2022-55
Tejas Patel¹, Chris Li¹, Farshad Raissi², Ghassan Kassab³, Tong Gao¹, Lik Chuan Lee¹
¹*Michigan State University*, ²*University of California*, ³*California Medical Innovations Institute*

**PhD-Level Student Paper Competition Session 2:
Tendon, Ligament, and Joint**

Chesapeake E

Session Chairs: *Brianne Connizzo, Boston University*
Guy Genin, Washington University in St. Louis

- 9:30AM** **Mechanical and Structural Changes Due to Tendon Overload in a Rat Model of Synergist Ablation** SB³C2022-112
Ellen Bloom, Lily Lin, Justin Parreno, Karin Gravare Silbernagel, Dawn Elliott
University of Delaware
- 9:45AM** **Collagen Hybridizing Peptides Extend the Retention Time of Imaging Markers in Healthy and Osteoarthritic Rat Stifle Joints** SB³C2022-139
Emma Luke, Michael Yu, Jeffrey Weiss
University of Utah
- 10:00AM** **Elastic Strength and its Relation to Mineral Density in Juvenile Equine Bones of the Lower Limb** SB³C2022-41
Sara Moshage, Annette McCoy, Mariana Kersh
University of Illinois
- 10:15AM** **Mouse Supraspinatus Tendon Mechanical and Structural Properties are Dependent on Region and Age** SB³C2022-17
Michael DiStefano, Patrick Paglia, Stephanie Weiss, Snehal Shetye, Andrew Kuntz, Louis Soslowsky
University of Pennsylvania
- 10:30AM** **Collagen Fibrils from Positional Tendons Exhibit Increased Amounts of Denatured Collagen Upon Reaching the Yield Point** SB³C2022-134
Allen Lin¹, Steven Eppell², Seungju Yu¹, Jeffrey Weiss¹
¹*University of Utah*, ²*Case Western Reserve University*
- 10:45AM** **Partial ACL Injury Location Impacts Biomechanics and Tissue Remodeling in a Skeletally Immature Porcine Model** SB³C2022-91
Danielle Howe^{1,2}, Jacob Thompson^{1,2}, Andre Bautista^{1,2}, Lauren Schnabel¹, Jeffrey Spang², Matthew Fisher^{1,2}
¹*North Carolina State University*, ²*University of North Carolina- Chapel Hill*

**PhD-Level Student Paper Competition Session 3:
Tissue Engineering, Remodeling, and Emerging Areas**

Chesapeake F

Session Chairs: Raffaella De Vita, *Virginia Tech*
Andrew Feola, *Emory University and Atlanta VA Medical Center*

- 9:30AM** **Epithelial Fluid Secretion and Luminal Pressure Regulate the Patterns of Proliferation that Sculpt the Developing Bronchial Tree** SB³C2022-145
Shelby Mohr-Allen, Victor Varner
University of Texas at Dallas
- 9:45AM** **The Heterogenous and Anisotropic Mechanics of the Airway Tree** SB³C2022-13
Samaneh Sattari, Crystal Mariano, Mona Eskandari
University of California Riverside
- 10:00AM** **PDGF-BB Disrupts the Stiffness-Dependent Myofibroblastic Differentiation of Corneal Keratocytes in Response to TGF-B1** SB³C2022-141
Krithika Shankar Iyer¹, David Schmidtke¹, Matthew Petroll², Victor Varner¹
¹*University of Texas at Dallas*, ²*University of Texas Southwestern Medical Center*
- 10:15AM** **Cervical Material Remodeling in Pregnancy Using a Nonhuman Primate Model**
SB³C2022-125
Shuyang Fang¹, Lei Shi¹, Ivan Rosado-Mendez², Helen Feltovich³, Timothy Hall², Kristin Myers¹
¹*Columbia University*, ²*University of Wisconsin-Madison*, ³*Intermountain Healthcare*
- 10:30AM** **An Experimental and Numerical Investigation of Cardiac Tissue-Patch Interrelation**
SB³C2022-76
Gozde Basara, Gokhan Bahcecioglu, Xiang Ren, Pinar Zorlutuna
University of Notre Dame
- 10:45AM** **Patterns of Tissue Stiffness Correlate with Distributions of Proliferation and Yap Activity Along the Embryonic Ureteric Tree** SB³C2022-154
Somdutta Chakraborty¹, Thomas Carroll², Victor Varner¹
¹*University of Texas at Dallas*, ²*UT Southwestern Medical Center*

Valves

Chesapeake G

Session Chairs: Jonathan Wenk, *University of Kentucky*
Lakshmi Dasi, *Georgia Institute of Technology*

- 9:30AM** **Measuring the Efficacy of Right Atrial Appendage Tissue to Withstand Pulmonary Hypertensive Conditions as a Functional Pulmonary Valve** SB³C2022-188
Kate Appleman¹, Katarina Lettner¹, Andrew Behrmann¹, Pirooz Eghtesady², Shamik Bhattacharya¹
¹Missouri State University, ²Washington University in St. Louis
- 9:45AM** **Texas TriValve 1.0: A Reverse-Engineered, Open Model of the Human Tricuspid Valve** SB³C2022-435
Mrudang Mathur¹, William Meador¹, Marcin Malinowski², Tomasz Jazwiec², Tomasz Timek³, Manuel Rausch¹
¹University of Texas at Austin, ²University of Silesia, ³Spectrum Health
- 10:00AM** **Bioprosthetic Leaflet Stress Following Transcatheter Aortic Valve Replacement in Bicuspid Aortic Valves** SB³C2022-424
Breandan Yeats¹, Aniket Venkatesh¹, Milad Samaee¹, Pradeep Yadav², Venkateshwar Polsani², Vinod Thourani², Lakshmi Dasi¹
¹Georgia Institute of Technology, ²Piedmont Hospital
- 10:15AM** **Dynamic In-Vivo Motion of the Mouse Aortic Heart Valve** SB³C2022-457
Xinzeng Feng¹, Daniel Gramling², Aletea vanVeldhuisen², David McComb³, Christopher Breuer⁴, Craig Goergen², Michael Sacks¹
¹University of Texas at Austin, ²Purdue University, ³Ohio State University, ⁴Nationwide Children's Hospital
- 10:30AM** **An Experimental Approach to Quantify the Pre-Strains of the Tricuspid Heart Valve Leaflets** SB³C2022-405
Devin Laurence, Chung-Hao Lee
University of Oklahoma
- 10:45AM** **Multiscale Modeling of Cardiac Valve Disease Using Cell-Level Signals to Drive Myocardial Growth** SB³C2022-42
Hossein Sharifi, Austin Wellette-Hunsucker, Charles Mann, Kenneth Campbell, Jonathan Wenk
University of Kentucky

Brain & Injury Mechanics II

Clipper A-C

Session Chairs: Mehmet Kurt, *University of Washington*
Sarah Bentil, *Iowa State University*

- 9:30AM** **Network-Based Modeling of Alzheimer's Disease Assessing Impact of Connectome Measures on Progression Patterns** SB³C2022-110
Shima Jalalian¹, Oren Cavier², Johannes Weickenmeier¹
¹Stevens Institute of Technology, ²Swinburne University of Technology
- 9:45AM** **Denosing Instrumented Mouthguards for Accurate Traumatic Brain Injury Detection with Convolutional Neural Network** SB³C2022-8
Xianghao Zhan, Yuzhe Liu, Olivier Gevaert, David Camarillo
Stanford University
- 10:00AM** **Development of a Parameterized Microscale Axonal Injury Model** SB³C2022-26
Chaokai Zhang, Songbai Ji
Worcester Polytechnic Institute
- 10:15AM** **Spatial Gradient in Frontal Lobe Stiffness During Brain Maturation** SB³C2022-333
Kyra Twohy, Grace McIlvain, Curtis Johnson
University of Delaware
- 10:30AM** **Relationships Between Athletic Performance Measures and Head Kinematics in Youth Ice Hockey** SB³C2022-378
Abigail Swenson¹, N. Stewart Pritchard¹, Logan Miller¹, Chesney Oravec¹, Jason Mihalik², Jillian Urban¹, Joel Stitzel¹
¹Wake Forest School of Medicine ²University of North Carolina- Chapel Hill
- 10:45AM** **Infant Skull Fracture Pattern Characteristics from Low-Height Falls** SB³C2022-476
Yousef Alsanea, Tagrid Ruiz-Maldonado, Brittany Coats
University of Utah

Soft Tissue Biomechanics

Galleon A-C

Session Chairs: Chiara Bellini, *Northeastern University*
Babak Safa, *Georgia Institute of Technology*

- 9:30AM** **Carpal Arch Space Augmentation by Volarly Applied Force on the Skin Surface- A Finite Element Study** SB³C2022-14
Hui Zhang, Zong-Ming Li
University of Arizona
- 9:45AM** **A Discrete-Fiber Model for Understanding Cellular Mechanoadaptation** SB³C2022-247
Ryan Mahutga, Patrick Alford
University of Minnesota
- 10:00AM** **Precise Measurement of Microparticle Viscoelastic Properties Using a Microfluidic Extensional Flow Device** SB³C2022-465
Sara Ghanbarpour Mamaghani, Joanna Dahl
University of Massachusetts Boston
- 10:15AM** **Cortical Thickness Correlates with Cortical Morphology Among Human and Non-Human Primate Brains** SB³C2022-52
Nagehan Demirci, Maria Holland
University of Notre Dame
- 10:30AM** **A Novel Approach for Mapping 3D Extracellular Matrix Mechanics at the Cellular Scale Using Magnetic Microparticles** SB³C2022-256
Adil Khan, Jacopo Ferruzzi
University of Texas at Dallas
- 10:45AM** **Comparative Study of Chemical and Nanomechanical Properties of Cat and Rat Vibrissae** SB³C2022-324
Davin Sim, Donna Ebenstein
Bucknell University

Transport in Drug Delivery and Discovery

Schooner A-B

Session Chairs: Govind Srimathveeravalli, *University of Massachusetts Amherst*
Malisa Sarntinoranont, *University of Florida*

- 9:30AM** **An Physiological On-Chip Vessel Platform to Study Vascular Transport of Circulating Tumor Cells** SB³C2022-146
Yue Wu, Yuyuan Zhou, Ratul Paul, Yaling Liu
Lehigh University
- 9:45AM** **Drug Discovery for Selective Targeting of Pancreatic Cancer Cells Using Microfluidic Tumor-Stroma Model** SB³C2022-447
Hye-ran Moon¹, Mark R. Kelley², Melissa L. Fisher², Bumsoo Han¹
¹*Purdue University*, ²*Indiana University*
- 10:00AM** **3D Microfluidic Cell Arrays with Recirculation and Tumor-Stroma Interaction for the Development of Immunotherapeutic Drug** SB³C2022-461
Chun-Wei Chi¹, Yeh-Hsing Lao², A.H. Rezwanuddin Ahmed¹, Kam W. Leong², Sihong Wang¹
¹*CUNY City College of New York*, ²*Columbia University*
- 10:15AM** **Molecular Design of Polyelectrolyte Complex Micelles for Nucleic Acid Delivery** SB³C2022-292
Alexander Marras, Jeffrey Vieregg, Matthew Tirrell
University of Chicago
- 10:30AM** **Minimally Invasive Blood-Spinal Cord Barrier Modulation for Drug Delivery** SB³C2022-243
Zhenghong Gao¹, Eric David¹, Tiffany Wei Leong¹, Xiaoqing Li¹, Qi Cai¹, Monica Giannotta², Elisabetta Dejana², John Wiggins¹, Sharada Krishnagiri¹, Robert Bachoo³, Theodore J. Price¹, Zhenpeng Qin¹
¹*University of Texas at Dallas*, ²*FIRC Institute of Molecular Oncology Foundation*, ³*University of Texas Southwestern Medical Center*
- 10:45AM** **Simple Analytic Model for Peristaltic Flow and Mixing** SB³C2022-51
Ruy Ibanez, Mohammad Shokrian, Jong-Hoon Nam, Douglas Kelley
University of Rochester

Cartilage Mechanics & Musculoskeletal Imaging

Cutter A-B

Session Chairs: Deva Chan, *Purdue University*
 Mohammad Islam, *University of Pittsburgh*

- 9:30AM** **Superficial Zone Chondrocytes can get Compacted Under Physiological Loading: A Multiscale Finite Element Analysis** SB³C2022-455
 Kimberly Kroupa, Katherine Spack, Lianna Gangi, Nadeen Chahine, Clark Hung, Gerard Ateshian
Columbia University
- 9:45AM** **Effects of Compromised Synovial Fluid on Articular Cartilage Tribological Rehydration and Lubrication** SB³C2022-323
 Shamimur Akanda, David Burris, Christopher Price
University of Delaware
- 10:00AM** **A Chemo-Mechano-Biological Model of Evolving Osteoarthritis** SB³C2022-147
 Muhammed M. Rahman¹, Paul N. Watton², Thomas S. E. Öst³, Corey P. Neu⁴, David M. Pierce¹
¹*University of Connecticut*, ²*University of Sheffield*, ³*Swedish Defense Research Agency*, ⁴*University of Colorado Boulder*
- 10:15AM** **Novel In Vivo Articular Cartilage Elastography Pipeline to Determine Mechanical Properties from Dynamic MRI Deformation Analysis** SB³C2022-36
 Emily Miller¹, Hongtian Zhu¹, Woowon Lee¹, Stephane Avril², Corey Neu¹
¹*University of Colorado Boulder*, ²*Univ Lyon Univ Jean Monnet*
- 10:30AM** **Ultrasonic Analysis Reveals Layer-Dependent Shear Wave Propagation in the Patellar Tendon and Superficial Tissues** SB³C2022-343
 Stephanie Cone, Lauren Welte, Darryl Thelen
University of Wisconsin
- 10:45AM** **Accelerated Acquisition of In Vivo Cartilage Strain using Compressed Sensing and Spiral DENSE MRI** SB³C2022-185
 Woowon Lee, Emily Miller, Hongtian Zhu, Corey Neu
University of Colorado Boulder

PhD-Level Student Paper Competition Session 4: Cardiovascular Mechanics

Chesapeake A-D

Session Chairs: Sara Roccabianca, *Michigan State University*
Matthew Bersi, *Washington University in St. Louis*

- 11:15AM** **Aortic Structural and Functional Remodeling in Response to Chronic E-Cigarette or Cigarette Exposure in the Apoe^{-/-} Female Mouse** SB³C2022-149
Yasmeen Farra, Jacqueline Matz, Jessica Oakes, Chiara Bellini
Northeastern University
- 11:30AM** **Multiscale Modeling of Restenosis after Percutaneous Transluminal Angioplasty: Towards a Patient-Specific Analysis** SB³C2022-33
Anna Corti¹, Monika Colombo², Cemre Çelikbudak¹, Philippe Büchler³, Francesco Migliavacca¹, Scott Berceci⁴, Stefano Casarin⁵, Jose Felix Rodriguez Matas¹, Claudio Chiastra⁶
¹*Politecnico di Milano*, ²*ETH Zurich*, ³*University of Bern*, ⁴*University of Florida*, ⁵*Houston Methodist Hospital*, ⁶*Politecnico di Torino*
- 11:45AM** **Tricuspid Valve Annulus Mechanics and Geometry in Newborns with Hypoplastic Left Heart Syndrome** SB³C2022-9
Colton Ross, Elizabeth Trimble, Arshid Mir, Harold Burkhart, Chung-Hao Lee
University of Oklahoma
- 12:00PM** **Assessing Arterial Stiffness in Human Blood Pressure Waveform Using Harmonic Distortion** SB³C2022-95
Nicholas Milkovich¹, Gary Mitchell², Béla Suki¹, Yanhang Zhang¹
¹*Boston University*, ²*The Framingham Heart Study*
- 12:15PM** **A 3D Computational Model of Aortic Valve Interstitial Cell Contractile Behavior within a Peg Hydrogel Medium** SB³C2022-93
Alex Khang, John Steinman, Xinzeng Feng, Michael Sacks
University of Texas at Austin
- 12:30PM** **Post-Stretch Behavior of Vascular Smooth Muscle Cells Depends on Strain-Rate and Actomyosin Interactions** SB³C2022-23
Samuel Boland, Patrick Alford
University of Minnesota

PhD-Level Student Paper Competition Session 5: Orthopaedic Bioengineering and Mechanotherapeutics

Chesapeake E

Session Chairs: *Kyoko Yoshida, University of Minnesota*
Manuel Rausch, University of Texas at Austin

- 11:15AM** **Large Animal Model of Meniscus Injury and Repair Shows Chondroprotection and Partially Restores Joint Kinematics as Measured via MRI** SB³C2022-24
 Kyle Meadows¹, Brendan Stoeckl², John Peloquin¹, Adriana Barba², Eddie Bonnevie²,
 Sonia Bansal², David Steinberg², Miltiadis Zgonis², Thomas Schaer², Robert Mauck²,
 Dawn Elliott¹
¹University of Delaware, ²University of Pennsylvania
- 11:30AM** **Inhibiting Epigenetic Modifiers Rescues Chondrocyte Fate Following Cell Expansion for Cartilage Regeneration** SB³C2022-131
 Adrienne Scott, Katie Gallagher, Stephanie Schneider, Corey Neu
University of Colorado Boulder
- 11:45AM** **Mechanotherapeutics to Modulate the Foreign Body Response** SB³C2022-98
 Niamh Ward¹, William Whyte², Debkalpa Goswami², Ruth Levey¹, Garry Duffy¹, Ellen Roche², Eimear Dolan¹
¹National University of Ireland, ²Massachusetts Institute of Technology
- 12:00PM** **Stimulating the Hedgehog Signaling Pathway to Improve Zonal Tendon-To-Bone Integration** SB³C2022-80
 Timur Kamaliddinov, Keitaro Fujino, Xi Jiang, Sinaia Keith Lang, Mary Evans, Miltiadis Zgonis, Andrew Kuntz, Nathaniel Dymant
University of Pennsylvania
- 12:15PM** **In Vivo Human Knee Varus-Valgus Loading Apparatus for Analysis of MRI-Based Intratissue Strain and Relaxometry** SB³C2022-152
 Hongtian Zhu, Emily Miller, Woowon Lee, Robert Wilson, Corey Neu
University of Colorado Boulder
- 12:30PM** **Hyaluronan, PRG4, and Cytokine Production in Synoviocytes is Sensitive to Cyclic Strain Magnitude** SB³C2022-67
 Meghana Pendyala¹, Paige Woods², Douglas Brubaker³, Elizabeth Blaber¹, Tannin Schmidt², Deva Chan³
¹Rensselaer Polytechnic Institute, ²University of Connecticut, ³Purdue University

PhD-Level Student Paper Competition Session 6: Growth & Remodeling in Injury and Disease

Chesapeake F

Session Chairs: Maria Holland, *University of Notre Dame*
Jacopo Ferruzzi, *University of Texas at Dallas*

- 11:15AM** **APOE E4 Genotype Decreases Barrier Function and Glucose Uptake in Induced Pluripotent Stem Cell-Derived Brain Microvascular Endothelial Cells** SB³C2022-73
Callie Weber, Sophia Zic, Alisa Clyne
University of Maryland College Park
- 11:30AM** **A Multiparameter Whole Blood Hemostasis Assessment Using a Highly Sensitive Flexible Carbon Nanotube Paper-Based Capacitance Sensor** SB³C2022-148
Praveen Kaliappan Sekar, Ye Jin, Dayong Gao
University of Washington
- 11:45AM** **Progressive Mechanical and Structural Changes in Anterior Cerebral Arteries with Alzheimer's Disease** SB³C2022-81
Xiaozhu Liu, Samuel Halvorsen, Nathan Blanke, Irving Bigio, Yanhang Zhang
Boston University
- 12:00PM** **Comparison of Oscillatory Deformation Patterns Excited in the Human Brain In Vivo by Harmonic and Impulsive Skull Motion** SB³C2022-47
Jordan Escarcega¹, Andrew Knutsen², Ahmed Alshareef³, Ruth Okamoto¹, Philip Bayly¹
¹Washington University in St. Louis, ²Henry M. Jackson Foundation, ³Johns Hopkins University
- 12:15PM** **Rate and Region-Dependent Mechanical Properties of Göttingen Minipig Brain Tissue in Oscillatory Shear** SB³C2022-6
Gregory Boiczyk¹, Noah Pearson¹, Aravind Sundaramurthy², Jose Rubio², Dhananjay Subramaniam², Ginu Unnikrishnan², Jaques Reifman², Kenneth Monson¹
¹University of Utah, ²Department of Defense Biotechnology High-Performance Computing Software Applications Institute
- 12:30PM** **The Relationship Between Cardiac Cycle Induced Strain in the Brainstem and Chiari Malformation Type I Symptomatology** SB³C2022-135
Mohamad Motaz Fouad Al Samman¹, Alaaddin Ibrahimy², Blaise Simplicite Talla Nwotchouang³, John N. Oshinski⁴, Daniel L. Barrow⁴, Philip A. Allen³, Rouzbeh Amini¹, Francis Loth¹
¹Northeastern University, ²Yale University, ³University of Akron, ⁴Emory University

Special Session in Honor of Dr. Ajit Yoganathan

Chesapeake G

Session Chairs: Lakshmi Dasi, *Georgia Institute of Technology*
Keefe Manning, *Pennsylvania State University*

- 11:15AM** **Flow Dynamic Differences Between Self-Expanding and Balloon Expandable Transcatheter Aortic Valves** SB³C2022-330
Hoda Hatoum¹, Milad Samaee², Janarthanan Sathanathan³, Stephanie Sellers³, Maximilian Kuetting⁴, Scott Lilly⁵, Abdul Ihdahid⁶, Philipp Blanke³, Jonathon Leipsic³, Vinod Thourani⁷, Lakshmi Prasad Dasi²
¹Michigan Technological University, ²Georgia Institute of Technology, ³University of British Columbia, ⁴New Valve Technology, ⁵Ohio State University, ⁶Harry Perkins Institute, ⁷Piedmont Hospital
- 11:30AM** **A Novel Bi-Ventricle Mechanical Support Configuration for the Failed Fontan Circulation** SB³C2022-283
Emrah Sisli¹, Canberk Yildirim², Ibrahim Basar Aka³, Osman Nuri Tuncer⁴, Yuksel Atay⁴, Mustafa Ozbaran⁴, Kerem Pekkan²
¹Osmangazi University, ²Koc University, ³Istanbul Bilgi University, ⁴Ege University
- 11:45AM** **The Interplay Between Transcatheter Aortic Valve Replacement Complications and Coronary Artery Disease** SB³C2022-198
Seyedvahid Khodaei, Zahra Keshavarz-Motamed
McMaster University
- 12:00PM** **Predicting Valve Performance Using Logistic Regression** SB³C2022-218
Brennan Vogl¹, Yousef Darestani², Juan Crestanello³, Brian Lindman², Mohamad Alkohouli³, Hoda Hatoum¹
¹Michigan Technological University, ²Vanderbilt University Medical Center, ³Mayo Clinic
- 12:15PM** **Hemodynamic Impact of Anterior Leaflet Laceration in Transcatheter Mitral Valve Replacement** SB³C2022-374
Keshav Kohli¹, Zhenglun Alan Wei², Vahid Sadri¹, Andrew Siefert¹, Philipp Blanke³, Emily Perdoncin¹, Adam Greenbaum¹, Jaffar Khan⁴, Robert Lederman⁴, Vasilis Babaliaros¹, Ajit Yoganathan¹, John Oshinski¹
¹Georgia Institute of Technology and Emory University, ²University of Massachusetts, ³University of British Columbia, ⁴National Institutes of Health
- 12:30PM** **Toward Subject-Specific Biomechanics of the Right-Noncoronary Bicuspid Aortic Valve and its Association with Molecular Gene Expression** SB³C2022-59
Hail Kazik¹, Kandail Harkamaljot², Benjamin Goot³, Joy Lincoln³, John LaDisa¹, El-Sayed Ibrahim³
¹Marquette University, ²Cardio Consulting, ³Medical College of Wisconsin

Mechanobiology and Pathology

Clipper A-C

Session Chairs: Mitchel Colebank, *University of California, Irvine*
Giuseppe De Nisco, *Politecnico di Torino*

- 11:15AM** **A Computational Analysis of Experimental Designs to Study Pulmonary Hypertension and Right Ventricular Function** SB³C2022-20
Mitchel Colebank, Naomi Chesler
University of California, Irvine
- 11:30AM** **Computational Fluid-Solid-Interaction Modeling of Normotensive and Angiotensin-II Infused Hypertensive Mice** SB³C2022-214
Sara Hopper¹, Dar Weiss², Federica Cuomo¹, Jay D. Humphrey², C. Alberto Figueroa¹
¹*University of Michigan*, ²*Yale University*
- 11:45AM** **Computational 13C Metabolic Flux Analysis Indicates Endothelial Cells Attenuate Metabolic Perturbations by Modulating TCA Cycle Activity** SB³C2022-161
Bilal Moiz¹, Jonathan Garcia², Sarah Basehore², Angela Sun¹, Andrew Li¹, Surya Padmanabhan¹, Kaitlyn Albus¹, Cholsoon Jang³, Ganesh Sriram¹, Alisa Clyne¹
¹*University of Maryland College Park*, ²*Drexel University*, ³*University of California, Irvine*
- 12:00PM** **Fluid-Structure-Based Computational Model of Hemodynamics-Driven Aortic Growth for FBLN4SMKO Mice** SB³C2022-68
Marisa S. Bazzi¹, Casey D. Hokanson¹, Jessica E. Wagenseil², Victor H. Barocas¹
¹*University of Minnesota*, ²*Washington University*
- 12:15PM** **Wall Shear Stress Topological Skeleton Variability Predicts Atherosclerotic Plaque Growth in Human Coronary Arteries** SB³C2022-237
Giuseppe De Nisco¹, Eline Hartman², Valentina Mazzi¹, Diego Gallo¹, Claudio Chiastra¹, Joost Daemen², Jolanda Wentzel², Umberto Morbiducci¹
¹*Politecnico di Torino*, ²*Erasmus Medical Center*
- 12:30PM** **Changes in CD44 and Drug Resistance in Ovarian Cancer Cells with Differing Mechanical Presentation of Hyaluronic Acid** SB³C2022-293
Maranda Tidwell, Gillian Huskin, Molly Buckley, Mary Sewell-Loftin, Joel Berry
University of Alabama at Birmingham

Cancer & Morphogenesis

Galleon A-C

Session Chairs: Karen Kasza, *Columbia University*
Victor Varner, *University of Texas at Dallas*

- 11:15AM Spatiotemporal Dynamics of Epithelial Cell Packings and Tissue Mechanics During Morphogenesis** SB³C2022-107
Christian Cupo, Cole Allan, Andrew Pomposelli, Karen Kasza
Columbia University
- 11:30AM Actomyosin Contractility Controls Organ-Scale Buckling in the Developing Small Intestine** SB³C2022-340
John Durel, Hyunjee Lim, Nandan Nerurkar
Columbia University
- 11:45AM An In Vitro Model of the Tumor Microenvironment Shaped by Cancer-Associated Fibroblasts** SB³C2022-268
Sarah Shelton¹, Brandon Piel², Tran Thai², Huu Tuan Nguyen¹, Jochen Lorch², Kartik Sehgal², David Barbie², Roger Kamm¹
¹*Massachusetts Institute of Technology*, ²*Dana Farber Cancer Institute*
- 12:00PM Examining Ovarian Cancer HSP27 Regulation Via Mechanotransduction Signaling in a 3D Model** SB³C2022-132
Molly Buckley, Joel Berry, Mary-Kathryn Sewell-Loftin
University of Alabama at Birmingham
- 12:15PM Core-Shelled Microcapsules Produce Tumor Aggregates with Greater Sphericity and Drug Resistance than □Gold-Standard□Liquid Overlay Technique in HER2+ Breast Cancer Cells** SB³C2022-70
Cassandra Roberge¹, Margarida Barroso², David Corr²
¹*Rensselaer Polytechnic Institute*, ²*Albany Medical College*
- 12:30PM A Gravity-Driven Multi Micro Physiological System to Study Tissue Responses to Cancer Therapeutics** SB³C2022-158
Pouria Rafsanjani Nejad, Hossein Taviana
University of Akron

Lung Biomechanics

Schooner A-B

Session Chairs: Ed Sander, *University of Iowa*
Mona Eskandari, *University of California Riverside*

- 11:15AM** **MicroRNA Therapies to Prevent Ventilator Induced Lung Injury During the Acute Respiratory Distress Syndrome** SB³C2022-234
Samir Ghadiali, Qinqin Fei, Basia Gabela-Zuniga, Tricia Oyster, Vasudha Shukla, Megan Ballinger, Joshua Englert
Ohio State University
- 11:30AM** **Mapping Strain Amplification in Lung Cancer: A Geometric Model to Test How Altered Mechanics Could Promote Tumor Progression** SB³C2022-452
Rebecca Zitnay, Keith Carney, Michael Herron, Jeffrey Weiss, Michelle Mendoza
University of Utah
- 11:45AM** **Murine Lung Mechanics in Response to Varying Inflation Volumes and Frequencies** SB³C2022-19
Kathrine Anduaga¹, Talyah Nelson¹, Samaneh Sattari¹, Crystal Mariano¹, Arzu Ulu¹, Edward Dominguez¹, Tara Nordgren², Mona Eskandari¹
¹*University of California*, ²*Colorado State University*
- 12:00PM** **Image-Based Dynamic Strain Estimation of Alveolar Microstructures During Ex Vivo Mechanical Ventilation** SB³C2022-240
Jacob Herrmann, Sarah Gerard, Edward Sander
University of Iowa
- 12:15PM** **A Novel Fibrous Finite Element Model of Soft Tissues** SB³C2022-335
Mohammad R Islam, Fengting Ji, Manik Bansal, Yi Hua, Ian A. Sigal
University of Pittsburgh
- 12:30PM** **Reducing Skin Injuries Induced by Prolonged Usage of Respirator Masks** SB³C2022-122
Rikeen Jobanputra, Kian Kun Yap, Manoj Murali, Margarita Santos, Marc Masen
Imperial College London

Biomechanics of Human Motion

Cutter A-B

Session Chairs: **Sriram Balasubramanian**, *Drexel University*
Lyle Hood, *University of Texas at San Antonio*

- 11:15AM** **Thumb Metacarpal Kinematics: A Volumetric Perspective** SB³C2022-239
Adam Chrzan¹, Nicole Arnold¹, Kevin Chan², Tamara Reid Bush¹
¹Michigan State University, ²Spectrum Health
- 11:30AM** **The Impact of Stiffness Gain on Spine Stability** SB³C2022-427
Valerie Jardon, Sara Wilson
University of Kansas
- 11:45AM** **Tri-Compartment Knee Loading 3 Months after ACL Reconstruction** SB³C2022-305
Jack Williams, Kelsey Neal, Abdulmajeed Alfayyadh, Ashutosh Khandha, Kurt Manal,
Lynn Snyder-Mackler, Thomas Buchanan
University of Delaware
- 12:00PM** **Lateral Distance as a Measure of Balance During 90 Degree Pre-Planned and Late-Cued Turns** SB³C2022-124
Mitchell Tillman, Antonia Zaferiou
Stevens Institute of Technology
- 12:15PM** **Regulation of Whole-Body Angular Momentum in Persons with Parkinson Disease when Transitioning from a Regular to an Irregular Surface** SB³C2022-295
Nicholas Gomez, Kelton Gubler, Andrew Merryweather
University of Utah
- 12:30PM** **Handrim Biomechanics and Wheelchair Fit Measures in Pediatric and Emerging Adult Manual Wheelchair Users** SB³C2022-289
Samantha Schwartz¹, Alyssa Schnorenberg¹, Hannah Frank¹, Matthew Hanks¹, Shubhra Mukherjee², Brooke Slavens¹
¹University of Wisconsin-Milwaukee, ²Shriners Hospital for Children-Chicago

Vascular Mechanics III

Chesapeake A-D

Session Chairs: Chung-Hao Lee, *University of Oklahoma*
 Heather Hayenga, *University of Texas at Dallas*

- 1:45PM** **Clinical Imaging Derived Aortic Stiffness as an Aortic Dissection Risk Stratification Metric** SB³C2022-339
 Ronald Fortunato¹, Thomas Gleason², David Vorp¹, Spandan Maiti¹
¹*University of Pittsburgh*, ²*University of Maryland*
- 2:00PM** **Stochastic Optimization of a Porohyperelastic Bilayered Vascular Graft to Improve Hemocompatibility** SB³C2022-87
 Ali Behrangzade¹, Bruce Simon², William Wagner¹, Jonathan Vande Geest¹
¹*University of Pittsburgh*, ²*University of Arizona*
- 2:15PM** **Collagen Waviness Regulates the Damage of Vein Tissue** SB³C2022-82
 Xuehuan He, Jia Lu
University of Iowa
- 2:30PM** **The Interplay Between Elastin and Proteoglycans and their Effect on Ascending Aortic Aneurysmal Biomechanics** SB³C2022-428
 Miriam Nightingale, Amy Bromley, Jehangir Appoo, Elena Di Martino
University of Calgary
- 2:45PM** **The Influence of Plaque Structural Stress and Wall Shear Stress on Human Coronary Plaque Progression** SB³C2022-177
 Aikaterini Tziotziou, Jolanda Wentzel, Ali Akyildiz
Erasmus Medical Center
- 3:00PM** **Pulmonary Artery Mechanics in Murine Models of Ageing** SB³C2022-311
 Abhay Ramachandra, Edward Manning, Jay Humphrey
Yale University

Ventricular Mechanics I

Chesapeake E

Session Chairs: Zhijie Wang, *Colorado State University*
 Emma Lejeune, *Boston University*

- 1:45PM** **Computational Modeling of the Passive Anisotropic Viscoelastic Behavior of Ovine Right Ventricles** SB³C2022-249
 Wenqiang Liu¹, Kevin Labus¹, Matt Ahern¹, Reza Avazmohammadi², Christian Puttlitz¹, Zhijie Wang¹
¹Colorado State University, ²Texas A&M University
- 2:00PM** **Effect of Geometrical and Microstructural Remodeling on Ventricular Mechanics in Hypertrophic Cardiomyopathy** SB³C2022-290
 Joy Mojumder¹, Lei Fan¹, Thuy Nguyen², Julius Guccione², Theodore Abraham², Lik Chuan Lee¹
¹Michigan State University, ²University of California San Francisco
- 2:15PM** **Modeling Ventricular Mechanics in Patients with Obstructive Hypertrophic Cardiomyopathy (HOCM)** SB³C2022-391
 Lei Shi, Hiroo Takayama, Vijay Vedula
Columbia University
- 2:30PM** **A Novel Model for Passive Myocardium that Incorporates Complete Diffusion Tensor Information** SB³C2022-392
 Christian Goodbrake, Kenneth Meyer, Michael Sacks
University of Texas at Austin
- 2:45PM** **Measuring the Anisotropic Mechanical Properties of Single Neonatal Mouse Cardiac Myocytes** SB³C2022-361
 Taylor Rothermel, Patrick Alford
University of Minnesota
- 3:00PM** **Myosin and Myofibril Dynamics Drive Hypertrophic Cardiomyopathy Disease Mechanisms** SB³C2022-479
 Alison Vander Roest¹, Kathleen Ruppel¹, James Spudich¹, Beth Pruitt², Daniel Bernstein¹
¹Stanford University, ²University of California Santa Barbara

Muscle and Spine Tissue Mechanics

Chesapeake F

Session Chairs: Mariana Kersh, *University of Illinois*
Stephanie Cone, *University of Wisconsin*

- 1:45PM** **Transcriptional Profiling of Mouse Skeletal Muscle Following Daily Bouts of Optogenetic Stimulation** SB³C2022-84
Syeda N. Lamia¹, Elahe Ganji², Iman Bhattacharya², Megan L. Killian¹
¹University of Michigan, ²University of Delaware
- 2:00PM** **Muscle Immobilization Prevents Functional Development of Embryonic Tendons But Does Not Affect Collagen Crosslinking** SB³C2022-27
Benjamin Peterson, Spencer Szczesny
Pennsylvania State University
- 2:15PM** **Estimating Gastrocnemius Muscle Volume by Using Panoramic Ultrasound Images in Orthogonal Planes** SB³C2022-197
Shabnam Rahimnezhad¹, Karin G. Silbernage², Daniel H. Cortes¹
¹Pennsylvania State University, ²University of Delaware
- 2:30PM** **Intervertebral Disc Geometry and Hydration are Altered From In Vivo to Segment Preparation for Mechanical Tests** SB³C2022-298
Harrah Newman¹, Natalie Thurlow², Kyle Meadows¹, Adriana Barba³, Thomas Schaer³, Edward Vresilovic¹, Dawn Elliott¹
¹University of Delaware, ²University of Florida, ³University of Pennsylvania
- 2:45PM** **Contribution of Elastin and Collagen to the Mechanical Behavior of Bovine Nuchal Ligament** SB³C2022-86
Samuel Halvorsen, Ruizhi Wang, Yanhang Zhang
Boston University
- 3:00PM** **Three-Dimensional Strain Assessment of the Lumbar Facet Capsular Ligament During Dynamic Motion** SB³C2022-142
Matthew MacEwen, Rebecca Abbott, Victor Barocas, Arin Ellingson
University of Minnesota

Emerging Methods in Biofluid Mechanics

Chesapeake G

Session Chairs: Keshavarz-Motamed, *McMaster University*
Karol Calò, *Politecnico di Torino*

- 1:45PM** **Comparison of Velocity and Flow-Based Methods to Calculate Wall Shear Stress from 4D Flow CMRI Data** SB³C2022-388
Elliott Hurd¹, Elizabeth Iffrig², John Oshinski², Lucas Timmins¹
¹University of Utah, ²Emory University
- 2:00PM** **4D Flow MRI Study of Large-Scale Hemodynamics Correlation Persistence in the Healthy Human Aorta Using Network Science** SB³C2022-206
Karol Calò¹, Andrea Guala², Diego Gallo¹, Jose Rodriguez Palomares³, Stefania Scarsoglio¹, Luca Ridolfi¹, Umberto Morbiducci¹
¹Politecnico di Torino, ²Universitat Autònoma de Barcelona, ³University Hospital Vall d'Hebron
- 2:15PM** **Automated Tuning of a Lumped Parameter Model for Simulating Resting Cardiovascular Physiology** SB³C2022-102
Akash Gupta, Aseem Pradhan, Surya Sharma, Tyler Schmidt, Ethan Kung
Clemson University
- 2:30PM** **Calibration of Cardiopulmonary and Systemic Circulation Models in Pulmonary Arterial Hypertension and Cardiac Transplant Patients** SB³C2022-382
Christopher Tossas-Betancourt¹, Nathan Y. Li¹, Sheikh M. Shavik², Adam L. Dorfman¹, Seungik Baek¹, Lik C. Lee¹, C. Alberto Figueroa¹
¹University of Michigan, ²Bangladesh University
- 2:45PM** **Real-Time MRI-Based Computational Modeling of Urinary Flow in Urethra** SB³C2022-168
Labib Shahid, Juan Pablo Gonzalez-Pereira, Cody Johnson, Alejandro Roldán-Alzate
University of Wisconsin-Madison
- 3:00PM** **Using Smart Phones to Select Household Fabric for Making Face Coverings: A Case Study by FDA, NIST and High School Students** SB³C2022-300
Alexander Herman¹, Matthew Staymates², Salvatore Trupia³, Victoria Guerrier³, Glenda Garcia³, Gloria Guerrier³, Suvajyoti Guha¹
¹US FDA, ²National Institute of Standard and Technology, ³West Hempstead High School

Thrombosis, Hemolysis and Mechanical Circulatory Support

Clipper A-C

Session Chairs: Colleen Witzenburg, *University of Wisconsin-Madison*
Simon Tupin, *Imperial College London*

- 1:45PM** **Assessment of Interlaboratory Computational Simulations of the FDA Benchmark Blood Pump** SB³C2022-101
Sailahari Ponnaluri¹, Prasanna Hariharan², Luke Herbertson², Richard Malinauskas², Keefe Manning¹, Brent Craven²
¹Pennsylvania State University, ²US FDA
- 2:00PM** **Experiment-Led Continuum Modelling of Microscale Blood Flow** SB³C2022-328
Simon Tupin¹, Stavroula Balabani², Joseph van Batenburg-Sherwood¹
¹Imperial College London, ²University College London
- 2:15PM** **Preliminary Modeling and Experimental Study of Thromboembolism: Effects of Shear Stress on Thrombus Behavior** SB³C2022-238
Arash Azimi, Eathan DiTullio, Keefe Manning
Pennsylvania State University
- 2:30PM** **Platelet Adhesion is Dominated by Large Von Willebrand Factor Multimers at Device Relevant Shear Rates** SB³C2022-200
Connor Watson, Keefe Manning
Pennsylvania State University
- 2:45PM** **In Silico Investigation of Contralateral Embolic Stroke Risks from Carotid Artery Disease** SB³C2022-425
Ricardo Roopnarinesingh, Debanjan Mukherjee
University of Colorado Boulder
- 3:00PM** **Effect of Venous Valve Morphology on Flow Conditions Conducive to Thrombosis** SB³C2022-236
Jacob Biesinger, Matthew Ballard
Utah Valley University

Musculoskeletal Tissue Engineering

Galleon A-C

Session Chairs: *Alix Deymier, University of Connecticut Health Center*
Arun Nair, University of Arkansas

- 1:45PM** **Functional Cartilage Tissue Engineering Does Not Require Culture Media Replenishment** SB³C2022-201
 Tianbai Wang, Yanli Lyu, Yue Liu, Michael Albro
Boston University
- 2:00PM** **Fabrication and Drug Release Kinetics Characterisation of Poly(Glycerol Sebacate Urethane) Anisotropic Scaffolds** SB³C2022-176
 Andreas Samourides, Zacharoula Xenou, Irene Louca, Konstantinos Kapnisis, Andreas Anayiotos
Cyprus University of Technology
- 2:15PM** **Dose- And Time-Dependent Effects of Collagenase Clostridium Histolyticum Injection on Stiffness and Thickness of In Vitro Transverse Carpal Ligament** SB³C2022-16
 Jocelyn Hawk, Sohail Daulat, David Margolis, Zong-Ming Li
University of Arizona
- 2:30PM** **Mechanical Anchoring Drives Stem Cell Differentiation and Tissue Maturation in Tissue Engineered Ligament-To-Bone Entheses** SB³C2022-467
 Ethan Brown, Sophia Murphy, Lais Morandini, Rene Olivares-Navarrete, Jennifer Puetzer
Virginia Commonwealth University
- 2:45PM** **Ultrasound as a Stimulus for Transdermal, Hydrogel-Based Bone Repair** SB³C2022-215
 Fayekah Assanah¹, Kevin Grassie¹, Hanna Anderson¹, Will Linthicum¹, Bryan Huey¹, Yusuf Khansh²
¹*University of Connecticut*, ²*UCONN Health*
- 3:00PM** **Development of Porous, Mineralized Collagen-Chitosan Scaffolds to Recreate the 3D Cancellous Bone Microenvironment** SB³C2022-267
 Sandra Stangeland-Molo, Kathryn Benedict, Jacqueline Cole
University of North Carolina-Chapel Hill and North Carolina State University

Growth, Remodeling, and Repair

Schooner A-B

Session Chairs: *Kyoko Yoshida, University of Minnesota*
Kristin Myers, Columbia University

- 1:45PM** **A Hybrid Discrete-Continuum Analysis of Remodeling In Arteries: An Assessment of Microscopic Features from Macroscopic Observables** SB³C2022-250
 Ryan Mahutga, Elizabeth Gacek, Victor Barocas
University of Minnesota
- 2:00PM** **A Constrained Mixture Model of Thoracic Aortic Aneurysm Growth** SB³C2022-216
 David Li¹, Marcos Latorre², Jay Humphrey¹
¹*Yale University*, ²*Universitat Politècnica de València*
- 2:15PM** **Effects of Scaffold Degradation Behavior on Tissue Engineered Vascular Graft Growth and Remodeling** SB³C2022-377
 Jason Szafron¹, Yuichi Matsuzaki², Stephanie Lindsey³, Christopher Breuer², Jay Humphrey⁴, Alison Marsden¹
¹*Stanford University*, ²*Nationwide Children's Hospital*, ³*University of California San Diego*, ⁴*Yale University*
- 2:30PM** **Effect of Smooth Muscle Tone and Age on Biaxial Mechanics of the Murine Vagina** SB³C2022-357
 Shelby White, Qinhan Zhou, Kristin Miller
Tulane University
- 2:45PM** **In Vivo Large Animal Evaluation of a Mechano-Responsive Fibrous Patch for Anti-Inflammatory Drug Delivery to Promote Repair after Disc Herniation** SB³C2022-48
 Ana Peredo, Chet Friday, Hannah Zlotnick, George Dodge, Daeyeon Lee, Michael Hast, Sarah Gullbrand, Harvey Smith, Robert Mauck
University of Pennsylvania
- 3:00PM** **Calibrating Mechanoregulatory Models of Fracture Repair and Remodeling Using Imaging Data from Sheep** SB³C2022-89
 Tianyi Ren, Hannah Dailey
Lehigh University

Undergraduate Design Competition

Cutter A-B

Session Chairs: Anita Singh, *Widener University*

- 1:45PM** **Clinical Need is the Mother of Biomedical Innovation** SB3C2022
Sriram Balasubramanian
Drexel University
- 2:00PM** **Commode for Neurogenic Bowel: A Mechanism for Achieving The Squatting Position** SB³C2022-534
John Bates, Chastity Chavez, Madison Lang, Alexander Rivera, Camila Ruiz Vega, Amy Lerner, Scott Seidman, Richard Waugh
University of Rochester
- 2:15PM** **Sixth Sense - A Hands Free and Haptic Feedback Navigation Tool for the Visually Impaired** SB³C2022-509
Alyssa Taylor, Joseph Lahmann, Miles Canino
Rose-Hulman Institute of Technology
- 2:30PM** **Dynamic Hand Brake for Manual Wheelchairs** SB³C2022-495
Joshua Coombs, Nicholas Johnson, Nicholas Oram, Shelley Osterhout, Zev Sun, Noelle Tenney, Andrew Merryweather
University of Utah
- 2:45PM** **Temperature Assessment Enabled Simulation Mannequin** SB³C2022-518
Emily Eisele, Mason Klaus, Jessica Guarino, Amelia Wellmon, Sean Blade, Ria Mazumder
Widener University
- 3:00PM** **Developmental Dysplasia of the Hip Pediatric Medical Trainer** SB³C2022-514
Seth Eaby¹, Sheridan Perry¹, Joseph Sauerbrun¹, Victor Huayamave¹, Charles Price²
¹Embry-Riddle Aeronautical University, ²International Hip Dysplasia Institute

Vascular Mechanics IV

Chesapeake A-D

Session Chairs: *Matthew Bersi, Washington University in St. Louis*
Jonathan Vande Geest, University of Pittsburgh

- 3:30PM Identification of Intramural Stress Distribution in Cerebral Aneurysms Using Patient Specific Wall Thickness Maps** SB³C2022-413
 Ronald Fortunato¹, Piyusha Gade¹, Juan Cebral², Anne Robertson¹, Spandan Maiti¹
¹University of Pittsburgh, ²George Mason University
- 3:45PM Effect of Breaking Calcification on the Compliance of Coronary Arteries Brain** SB³C2022-451
 Yasamin Seddighi¹, Aleksandra Gruslova², Drew Nolen², Deborah Vela², L. Maximilian Buja², Marc Feldman², Hai-Chao Han¹
¹University of Texas at San Antonio, ²University of Texas Health Science Center at Houston
- 4:00PM Open-Source Automation of Patient-Specific Atherosclerotic Arteries Reveals Key Biomechanically Driven Remodeling** SB³C2022-119
 Jeremy Warren, John Yoo, Federico Bernardoni, Brandon Boren, Clark Meyer, Stefano Leonardi, Heather Hayenga
 University of Texas at Dallas
- 4:15PM Tissue-Engineered Collagenous Fibrous Cap Models to Explore Atherosclerotic Plaque Rupture** SB³C2022-208
 Tamar Wissing¹, Kim van der Heiden¹, Sheila Serra², Anthal Smits³, Carlijn Bouten³, Frank Gijssen^{1,2}
¹Erasmus Medical Center, ²TU Delft, ³TU Eindhoven
- 4:30PM Local Structural and Rupture Characteristics of Atherosclerotic Human Carotid Arteries Through Second Harmonic Imaging, Tensile Testing and Digital Image Correlation** SB³C2022-209
 Su Guvenir Torun, Pablo de Miguel Munoz, Hanneke Crielaard, Hence J.M. Verhagen, Aad van der Lugt, Gert J. Kremers, Ali C. Akyildiz
 Erasmus Medical Center
- 4:45PM Ultrasound-Based Volume-Time Curves of the Lumen, Thrombus and Vessel Wall for Estimating In-Vivo Thrombus Compressibility and Wall Stiffness** SB³C2022-226
 Arjet Nievergeld¹, Esther Maas¹, Judith Fonken¹, Frans van de Vosse¹, Marc van Sambeek², Richard Lopata¹
¹University of Technology Eindhoven, ²Catharina Hospital Eindhoven

Ventricular Mechanics II

Chesapeake E

Session Chairs: Lik Chuan Lee, *Michigan State University*
 Michael Sacks, *University of Texas at Austin*

- 3:30PM** **Role of Microtubules in Right Ventricle Anisotropic Viscoelasticity with Pulmonary Hypertension Development** SB³C2022-358
 Kristen LeBar, Wenqiang Liu, Kellan Roth, Matt Ahern, Erith Evans, Jassia Pang, Jessica Ayers, Adam Chicco, Zhijie Wang
Colorado State University
- 3:45PM** **A Constitutive-Based Deep Learning Model for the Identification of Active Contraction Properties in the Ventricular Myocardium** SB³C2022-111
 Igor Nobrega, Wenbin Mao
University of South Florida
- 4:00PM** **Assessing Diastolic Function Using Mathematical Modeling of the EDPVR Curve** SB³C2022-126
 Salla Kim¹, Naomi Chesler¹, Benjamin Randall²
¹*University of California Irvine*, ²*University of Michigan*
- 4:15PM** **Construction and Initial Experience with a Four-Chambered Fluid-Structure Interaction Model of the Heart** SB³C2022-44
 Marshall Davey¹, Charles Puelz², Simone Rossi¹, Margaret Anne Smith¹, David Wells¹, Boyce Griffith¹
¹*University of North Carolina-Chapel Hill*, ²*Baylor College of Medicine*
- 4:30PM** **Sepsis-Driven Inflammatory Responses in Cardiac Micro-Tissues** SB³C2022-331
 Connor Virgile, Elise Corbin
University of Delaware
- 4:45PM** **Automated Image Analysis of Human Induced Pluripotent Stem Cell Derived Cardiomyocytes and Cardiac Microtissue** SB³C2022-233
 Hiba Kobeissi, Saeed Mohammadzadeh, Emma Lejeune
Boston University

Cartilage Modeling & Characterization

Chesapeake F

Session Chairs: Michael Albro, *Boston University*
Sonia Bansal, *University of Pennsylvania*

- 3:30PM** **Independent and Synergistic Effects of Interstitial Hydration and Synovial Fluid Presence on Cartilage Lubrication** SB³C2022-344
Emily Lambeth, Meghan Kupratis, David Burris, Christopher Price
University of Delaware
- 3:45PM** **Frictional Forces do not Cause Wear in Human Articular Cartilage** SB³C2022-422
C.V. Sise, Courtney A. Petersen, Brenna Carbone, Clark T. Hung, Gerard A. Ateshian
Columbia University
- 4:00PM** **Parameters to Model Cartilage as Osteoarthritis Progresses** SB³C2022-255
Xiaogang Wang, David Pierce
University of Connecticut
- 4:15PM** **Verification of Biphasic Material Parameter Identifiability by Fully Automated Sensitivity Analysis and Error Checking** SB³C2022-369
John Peloquin, Harrah Newman, Dawn Elliott
University of Delaware
- 4:30PM** **Raman Spectroscopy Probe Assessments of Cartilage Composition and Functional Mechanical Properties** SB³C2022-430
Masumeh Kazemi¹, Dev Mehrotra¹, Juncheng Zhang¹, Chenhao Yu¹, Diya Desai¹, Mark Grinstaff¹, Brian Snyder², Mads Bergholt³, Micheal Albro¹
¹*Boston University*, ²*Beth Israel Deaconess Medical Center*, ³*King, Åôs College London*
- 4:45PM** **Cartilage Mechanical Properties of Developmental Dysplasia of the Hip in a Porcine Model** SB³C2022-410
Kate Benfield¹, Amevi Semodji¹, Vidyadhar Upasani², Christine Farnsworth², Derek Nesbitt¹, Erin Mannen¹, Trevor Lujan¹
¹*Boise State University*, ²*Rady Children's Hospital San Diego*

Device and Treatment Implications

Chesapeake G

Session Chairs: Milad Samaee, *Georgia Institute of Technology*
 Ryan Pewowaruk, *University of Minnesota*

- 3:30PM** **Performance of The Balloon-Expandable Valve in a Self-Expanding Valve at Different Implantation Heights** SB³C2022-445
 Milad Samaee¹, Huang Chen¹, Pradeep Yadav², Vinod Thourani², Lakshmi Prasad Dasi¹
¹*Georgia Institute of Technology*, ²*Piedmont Heart Institute*
- 3:45PM** **Effect of Aortic Curvature on Bioprosthetic Aortic Valve Performance** SB³C2022-220
 Brennan Vogl¹, Rajat Gadhave¹, Zhenyu Wang², Juan Crestanello³, Mohamad Alkohouli³, Hoda Hatoum¹
¹*Michigan Technological University*, ²*Ohio State University*, ³*Mayo Clinic*
- 4:00PM** **Design and Initial Optimization of a Centrifugal Left Ventricular Assist Device** SB³C2022-408
 Huang Chen, Shweta Ashishkumar Karnik, Jeyan Kirtay, Lakshmi Prasad Dasi
Georgia Institute of Technology
- 4:15PM** **A Computational Study of Aortic Dynamic Occlusion in Type B Dissection** SB³C2022-96
 Taeouk Kim, Pieter van Bakel, Nitesh Nama, Himanshu Patel, David Williams, C. Alberto Figueroa
University of Michigan
- 4:30PM** **Quantifying the Impact of Hemorrhagic Shock and Reboa on the Endothelial Glycocalyx Layer** SB³C2022-97
 Antonio Renaldo, Aravindh Ganapathy, Nathaniel Hauser, Magan Lane, James Jordan, Lucas Neff, Timothy Williams, Elaheh Rahbar
Wake Forest School of Medicine
- 4:45PM** **Simulated Performance of a Bioprinted Pulsatile Fontan Conduit** SB³C2022-320
 Zinan Hu, Erica Schwarz, Jessica Herrmann, Mark Skylar-Scott, Alison Marsden
Stanford University

Microfluidics, Optical and CSF

Clipper A-C

Session Chairs: William Polacheck, *University of North Carolina-Chapel Hill & NC State University*
 Jifu Tan, *Northern Illinois University*

- 3:30PM Feature Tracking Microfluidic Analysis Reveals Differential Roles of Viscosity and Friction in Sickle Cell Blood** SB³C2022-275
 Hannah Szafraniec¹, Jose Valdez¹, Elizabeth Iffrig², Wilbur Lam², John Higgins³, Philip Pearce⁴, David Wood¹
¹University of Minnesota, ²Emory University, ³Harvard University, ⁴University College London
- 3:45PM Microfluidic Approach for Quantifying Vascular Permeability in the Presence of Transmural Flow** SB³C2022-138
 Stephanie Huang, William Polacheck
University of North Carolina-Chapel Hill & NC State University
- 4:00PM Transmural Solute Permeability, But Not Hydraulic Conductance, Increases in a Mouse Model of Ascending Thoracic Aortic Aneurysm** SB³C2022-11
 Christie Crandall¹, Sean Kim², Jessica Wagenseil¹
¹Washington University in St. Louis, ²Saint Louis University
- 4:15PM Direct Numerical Simulation of Blood Flow with Cells in Retina Vascular Network** SB³C2022-468
 Kacper Ostalowski, Jifu Tan
Northern Illinois University
- 4:30PM Comparison of CSF Flow Resistance and Brainstem and Cerebellum Displacement for Chiari Malformation Type 1** SB³C2022-150
 Saeed Mohsenian¹, Alaaddin Ibrahimy², John Oshinski³, Blaise Simplicie Talla Nwotchouang⁴, Daniel Barrow³, Rouzbeh Amini¹, Francis Loth¹
¹Northeastern University, ²Yale University, ³Emory University, ⁴University of Akron
- 4:45PM The Effect of Fluid Flow on the Leptomeningeal Cells of the Subarachnoid Space** SB³C2022-245
 Mannthallah Abubaker, David Newport, John Mulvihill
University of Limerick

Emerging Tools in Tissue and Cellular Engineering

Galleon A-C

Session Chairs: Ed Sander, *University of Iowa*
L. Grace Zhang, *George Washington University*

- 3:30PM** **Characterization of Bioengineered Tissues by Digital Holographic Vibrometry and Machine Learning** SB³C2022-433
Colin Hiscox, Juanyong Li, Ziyang Gao, Dmitry Korin, Cosme Furlong, Kristen Billiar
Worcester Polytechnic Institute
- 3:45PM** **Dynamic Mechanical Loading of Photopolymerized Hydrogels as a Tool for Studying Pulmonary Fibrosis** SB³C2022-143
Qi Wang, Jacob Herrmann, Edward Sander, Kristan Worthington
University of Iowa
- 4:00PM** **Evaluating Bio-Sourced Photoinitiators Efficiency for Use in Sustainable 3D Bioprinting** SB³C2022-53
Rion Wendland, Kristan Worthington
University of Iowa
- 4:15PM** **Overcoming the Force-Dependent Inhibition of Collagenase Using Macrophages** SB³C2022-75
Ryan Jamieson, Suzanne Stasiak, Ralston Augspurg, Nihal Bharath, Seyed Mohammad Siadat, Jeff Ruberti, Hari Parameswaran
Northeastern University
- 4:30PM** **DNA-Based Micropatterning Approach to Create Tissues of Defined Size, Shape, and Cellular Composition** SB³C2022-203
Louis Prael, Alex Hughes
University of Pennsylvania
- 4:45PM** **A Novel Machine Learning-Based Framework to Predict The Anisotropic Mechanical Properties in Soft Materials Using Anisotropic Indentation** SB³C2022-241
Habibeh Ashouri Choshali, Juanyong Li, Taylor Paradis, Nima Rahbar, Kristen Billiar
Worcester Polytechnic Institute

Transport in Thermal Therapy

Schooner A-B

Session Chairs: *Fatemeh Hassanipour, University of Texas at Dallas*
Sihong Wang, City College of New York

- 3:30PM** **Single Pulse Heating of Nanoparticle Array for Biological Applications** SB³C2022-115
 Chen Xie, Peiyuan Kang, Zhenpeng Qin
University of Texas at Dallas
- 3:45PM** **Incorporating Vascular Stasis Based Perfusion to Predict the Thermal Signatures of Cell Death Using Modified Arrhenius Equation with Regeneration of Living Tissues** SB³C2022-159
 Manpreet Singh
University of Maryland Baltimore County
- 4:00PM** **Feedback Temperature Control for Magnetic Hyperthermia Therapy to Treat Glioblastoma** SB³C2022-182
 Avesh Jangam¹, Julian Low¹, Aiman Ahmad¹, Anirudh Sharma², Robert Ivkov², Anilchandra Attaluri¹
¹*Pennsylvania State University,* ²*Johns Hopkins University*
- 4:15PM** **Mitigation of Injury to Nerves During Prostate Cancer Cryoablation Using Cryoprotective Agents** SB³C2022-193
 Pegah Ranjbarkehrani¹, David Ramirez¹, Franz Schmidlin², Michael Etheridge¹, Paul laizzo¹, Qi Shao¹, John Bischof¹
¹*University of Minnesota,* ²*Hirslanden Grangettes Group Geneva*
- 4:30PM** **Bioheat Transfer Basis of Human Thermoregulation: Principles and Applications** SB³C2022-307
 Laura Namisnak¹, Shahab Haghayegh², Sepideh Khoshnevis¹, Kenneth Diller¹
¹*University of Texas at Austin,* ²*Harvard Medical School*
- 4:45PM** **Characterization of Cellular Response to Endovascular Ablative Therapies** SB³C2022-463
 Sean Brocklehurst¹, Danielle Stolley², Neda Ghausifam¹, Erik Cressman², David Fuentes², M. Nichole Rylander¹
¹*University of Texas at Austin,* ²*MD Anderson Cancer Center*

Emerging Methods and Multiscale Mechanics

Cutter A-B

Session Chairs: Sara Roccabianca, *Michigan State University*
 Ryan Pewowaruk, *William S. Middleton Memorial Veterans Hospital*

- 3:30PM** **Predicting Temperature Field During Thermal Ablations Using Deep Neural Networks** SB³C2022-202
 Hanife Tugba Kumru¹, Anilchandra Attaluri¹, Vitaly Gordin², Daniel H. Cortes¹
¹*Pennsylvania State University*, ²*Hershey Medical Center*
- 3:45PM** **Automated 4D Meshing of Ex-Vivo Filling of the Murine Urinary Bladder** SB³C2022-432
 Eli Broemer, Sara Purdue, Pragma Saxena, Nathan Tykocki, Sara Roccabianca
Michigan State University
- 4:00PM** **Tensile Response of the Murine Uterosacral Ligament is Nonlinear and Spatially Inhomogeneous** SB³C2022-183
 Lea Savard, Catalina Bastias, Kathleen Connell, Sarah Calve, Callan Luetkemeyer, Virginia Ferguson
University of Colorado
- 4:15PM** **Developing a Precision-Cut Tissue Sectioning Protocol for Fresh Porcine Colonic Tissue for Downstream Mechanical Analysis** SB³C2022-180
 Cliona McCarthy, Kieran McGourty, Michael Walsh, John Mulvihill
University of Limerick
- 4:30PM** **Quantifying Tissue-Specific Differences in Compressive Material Behavior of Porcine Gastrointestinal Tissue** SB³C2022-434
 Samantha Barr, Alexander McGuigan, Caroline Karczewski, Alexander Caulk
Medtronic
- 4:45PM** **The Lasso Stitch: A Novel Suturing Technique for High-Tension Wound Repair in Plastic and Reconstructive Surgery** SB³C2022-303
 Chung-Hao Lee, Colton Ross, Bradley Miyake, Henry Marsh, Parker Bryant, Guilherme Barreiro
University of Oklahoma

Poster Sessions

Posters will be presented in two sessions as listed below. Please see the "Instructions for Poster Presenters" on Page 9. The poster viewing area is located in the Choptank Ballroom and will be open throughout the conference.

Poster Session I	Monday, June 20, 12:45PM – 2:15PM EDT
Poster Session II	Tuesday, June 21, 12:45PM – 2:15PM EDT

BS-Level Student Paper Competition Session 1: Biofluid and Cardiovascular Mechanics

- P1 Blood Clot Removal Pressures in An Experimental Model of Aspiration Thrombectomy**
SB³C2022-493
Nicole Beautz¹, Noah Robison¹, Michael Froehler², Bryan Good¹
¹University of Tennessee, ²Vanderbilt University Medical Center
- P2 4D Flow MRI Comparison of Surgical Grafts for Correction of Pulmonary Artery Aneurysms: A Case Study** SB³C2022-489
Tea Cohen¹, Melody Dong¹, Arshid Azarine², Francois Haddad¹, Olaf Mercier³, Alison Marsden¹
¹Stanford University, ²Groupe Hospitalier Paris Saint-Joseph, ³Marie Lannelongue Hospital
- P3 Investigating the Role of Aspirin on the Geometries and Mechanical Properties of Experimental Blood Clots** SB³C2022-504
Nolan Corbitt, Bryan Good
University of Tennessee
- P4 Design and Validation of a Bioreactor for Dynamic Biaxial Mechanical Stimulation of Engineered Tissue Vascular Grafts** SB³C2022-521
Luke Dague^{1,2}, Hayden Nothacker², Sarah Saunders², Johane Bracamonte², Joao Soares²
¹Georgia Institute of Technology, ²Virginia Commonwealth University
- P5 Vascular Smooth Muscle Cell Alignment on Micropattern Alters Glucose Metabolism**
SB³C2022-515
Yusuf Mastoor, Pattie Mathieu, Alisa Clyne
University of Maryland College Park
- P6 Estimation of Flow Data from Angiographic Time Series** SB³C2022-523
Noah Stevens, Kritika Iyer, Brahmajee Nallamothe, C. Alberto Figueroa
University of Michigan
- P7 A Measure of Platelet Activation and Aggregation Across Two Flow Regimes to Minimize Thromboembolic Events in Blood Pumps** SB³C2022-510
Hannah Sturgis, Nicolas Tobin, Keefe Manning
Pennsylvania State University
- V1 The Role of Actin Corralling in the Formation of Cell-Cell Adhesions** SB³C2022-497
Payton J Thomas, Tamara Bidone
University of Utah

P8 Assessment of Pressure Gradient and Recovery Following Transcatheter Aortic Valve Replacement in Bicuspid Aortic Valves SB³C2022-529
Aniket Venkatesh¹, Breandan Yeats¹, Atefeh Razavi¹, Pradeep Yadav², Venkateshwar Polsani², Vinod Thourani², Lakshmi Dasi¹
¹Georgia Institute of Technology, ²Piedmont Hospital

P9 Characterizing the Mechanical Heterogeneity of Porcine Carotid Artery Bifurcations SB³C2022-492
Claire Westman, Carly Donahue, Victor Barocas
University of Minnesota

BS-Level Student Paper Competition Session 2: Devices, Design, and Cell & Tissue Engineering

P10 Mechanical Improvement and Haptic Quantification of Digital Extenders Intubation Device SB³C2022-499
Tristan Arias¹, Lyle Hood², Emma Treadway¹,
¹Trinity University, ²University of Texas San Antonio

P11 Establishing an Optimized Annuloplasty Ring Type Using In Vivo and Ex Vivo Biomechanical Analyses SB³C2022-490
Katelynne Berland¹, Sanchita Bhat¹, Andrew Siefert¹, Maeve Janecka¹, Shelley Gooden¹, Beatrice Ncho¹, Takayuki Kawashima², Mori Kazuki², Satoshi Kozaki², Robert Gorman², Joseph Gorman², Ajit Yoganathan¹
¹Georgia Institute of Technology, ²University of Pennsylvania

V2 The Influence of Emboli Size and Density on their Transport in a Cardiopulmonary Bypass Flow Loop SB³C2022-513
Amy Chandler, Bryan Good
University of Tennessee

P12 Prediction of Diabetes Mellitus Progression using Supervised Machine Learning SB³C2022-326
Apoorva Chauhan, Mathew Varre, Kenneth Izuora, Mohamed Trabia, Janet Dufek
University of Nevada Las Vegas

P13 Low-Intensity Vibrations Induce Changes in Microtubule Dynamics In Vitro SB³C2022-527
Chase Crandall, Nina Nikitina, Gunes Uzer
Boise State University

P14 EMG Analysis of Vastus Lateralis and Vastus Medialis with Different Bicycle Crank Lengths, Pedaling Rate, and Pedal Speed SB³C2022-531
Jackson Crovella, Karoline Wucherer, Christiane O'Hara
California Polytechnic State University

P15 Open-Source System for Real-Time Functional Assessment of Engineered Multicellular Filtration Barriers SB³C2022-498
Tess Fallon¹, Alan Stern², Nanditha Anandakrishnan², Ilse Daehn², Evren Azeloglu²
¹Columbia University, ²Icahn School of Medicine

P16 Optimization of ECM/Gelatin Solution in a Near Field Electrospinning System for Engineering Tendon SB³C2022-508

Aasim Hussain, Zachary Davis, Matthew Fisher
University of North Carolina-Chapel Hill & North Carolina State University

V3 In Vitro Human Lung Fibroblast-To-Myofibroblast Transition from Profibrotic Growth Factor Stimulation SB³C2022-484

Catherine Sano, Julie Leonard-Duke, Shayn Peirce-Cottler
University of Virginia

P17 IPSC-Derived Brain Microvascular Endothelial Cells Increase Glycolysis and Glucose Transport in Hyperglycemia SB³C2022-511

Sophia Zic, Callie Weber, Alisa Clyne
University of Maryland College Park

**BS-Level Student Paper Competition Session 3:
Solid Mechanics**

P18 Gadolinium-Infused Silicone: A New Material for Cyclically Deforming MRI Phantoms SB³C2022-526

Andrew Baldassarre¹, Caroline Buckley¹, Sebastian Ardila¹, Francis Loth¹, John Oshinski², Rouzbeh Amini¹
¹Northeastern University, ²Emory University

P19 The Effect of Pregnancy on Mechanical Injury Criteria in Murine Uterosacral Ligaments SB³C2022-488

Catalina Bastias, Lea Savard, Kathleen Connell, Sarah Calve, Callan Luetkemeyer, Virginia Ferguson
University of Colorado

P20 Laboratory and On-Field Evaluation of a Padded Football Helmet Shell Cover SB³C2022-528

Ashlyn Callan, Nicholas Cecchi, Yuzhe Liu, Landon Watson, Xianghao Zhan, Gerald Grant, Michael Zeineh, David Camarillo
Stanford University

P21 Visual Characterization of Aponeurosis Microstructure SB³C2022-491

Olivia Dyer¹, Mark Seeley², Benjamin Wheatley¹
¹Bucknell University, ²Geisinger Medical Center

P22 Physiochemical Mechanisms of Bone Dissolution Play a Significant Role in Regulating Bone Composition and Function in Acidosis SB³C2022-494

Margaret Easson, Stephanie Wong, Mikayla Moody, Tannin Schmidt, Alix Deymier
University of Connecticut Health Center

P23 The Impact of Hyperglycemia and Ovariectomy on Host Response to Vaginal Prolapse Mesh Implants SB³C2022-520

Abigail Fisk¹, Gabrielle King², Kristina Weber², Rui Liang¹
¹University of Pittsburgh, ²Magee Women's Research Institute

P24 The Relationship Between Intramuscular Pressure and Compression of Skeletal Muscle SB³C2022-487

Sabrina Lorza¹, Pierre-Yves Rohan², Mark Seeley³, Benjamin B Wheatley¹
¹Bucknell University, ²Arts et Métiers, ³Geisinger Medical Center

- P25 Exercise Therapy Does Not Alter Kinematic Repeatability in Individuals with Rotator Cuff Tears when Reaching Behind the Back** SB³C2022-530
Rachel McLoughlin, Luke Mattar, Adam Popchak, William Anderst, Volker Musahl, James Irrgang, Richard Debski
University of Pittsburgh
- P26 Effect of Development Slow Elongation in Driving Hierarchical Collagen Fiber Formation in Engineered Tissues** SB³C2022-524
Kelly Ott, Jennifer Puetzer
Virginia Commonwealth University
- P27 Development of 3D Brain Structures from Histology Images** SB³C2022-482
John Sayut, Maria Holland
University of Notre Dame

MS-Level Student Paper Competition Session 1: Solid and Biofluid Mechanics of Cardiovascular, Lung, and Soft Tissues

- P28 An Iterative Approach to Assign Tumor-specific Flow Boundary Conditions for Liver Cancer Using Multi-modal Image Analysis** SB³C2022-477
Summer Andrews, Premal Trivedi, Debanjan Mukherjee
University of Colorado
- P29 Spectral Analysis of Kinetic Energy in a Healthy Aorta** SB³C2022-99
David Büchner¹, Emily Manchester², Xiao Yun Xu²
¹*University of Stuttgart*, ²*Imperial College London*
- P30 Bioengineered Three-Dimensional Lung Airway Model To Study Neonatal Intratracheal Surfactant Delivery** SB³C2022-186
Hannah Combs, Hossein Tavana
University of Akron
- P31 Phosphorylation Patterns of Vascular Endothelial Growth Factor Receptor-2 and Angiogenesis are Driven by Biomechanical Forces** SB³C2022-342
Bronte Miller, Molly Buckley, McKenzie Johnson, Joel Berry, M.K. Sewell-Loftin
University of Alabama
- P32 Layer-Specific Aortic Aneurysm Biomechanics Suggest Relationship Between Medial Stiffness and Interfacial Strength in Patients with Bicuspid Aortic Valve** SB³C2022-423
Louise Neave¹, Tais Sigaeva², Paul Fedak¹, Elena Di Martino¹
¹*University of Calgary*, ²*University of Waterloo*
- P33 Fabrication and Characterization of 3D-Printed Anisotropic, Hydrogel Lattices** SB³C2022-269
Margrethe Ruding, Daniel Yoon, Charlotte Guertler, Annabella Mascot, Philip Bayly
Washington University in St. Louis
- P34 Predictive Urodynamics of Bladder Voiding Using MRI-Based CFD: A Pilot Study** SB³C2022-167
Labib Shahid¹, Juan Pablo Gonzalez-Pereira¹, Cody Johnson¹, Yanheng Li², David Rowinski², Alejandro Roldán-Alzate¹

¹University of Wisconsin-Madison, ²Convergent Science, Inc.

- P35 Hemodynamic Changes in the Aortic Root Upon Transcatheter Aortic Valve (Tav) Implantation** SB³C2022-401
Hunter Tashman¹, Mia Bonini¹, Marc Hirschvogel², Yunus Ahmed¹, George Deeb¹, Stanley Chetcuti¹, Nicholas Burris¹, David Nordsletten¹
¹University of Michigan-Ann Arbor, ²King's College London

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- P36 Flow and Pressure Calibration of Polyvinylidene Fluoride Polymer for Biosensor Applications** SB³C2022-399
Matthew Danley, Jack Kloster, Ping Zhao, Victor Lai
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- P37 Non-Muscle Myosins are Critical Regulators of Skeletal and Connective Tissue Formation** SB³C2022-390
Mary Kate Evans¹, Tonia Tsinman¹, Xi Jiang¹, Ellie Ferguson¹, Joel Boerckel¹, Lin Han², Eiki Koyama³, Robert Mauck¹, Nathaniel Dymant¹
¹University of Pennsylvania, ²Drexel University, ³Children's Hospital of Philadelphia
- P38 Assessment of Bladder Biomechanics Using MRI** SB³C2022-353
Juan Gonzalez-Pereira, Cody Johnson, Wade Bushman, Shane Wells, Alejandro Roldan-Alzate
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- P39 Disc Geometry Measurement Methods Alter Reported Compressive Mechanics by Up To 65%** SB³C2022-12
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- P40 Computational Modeling of iPSC-Derived Engineered Cardiac Microtissues** SB³C2022-364
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- V5 Continuous Separation of Biological Cells Using a New Type of Dielectrophoresis-Based Microfluidic Device** SB³C2022-173
Yoshinori Seki¹, Aoi Nagasaka¹, Tsukushi Gondo¹, Masanori Eguchi², Shigeru Tada¹
¹National Defense Academy, ²National Institute of Technology Kure College
- P41 Macromolecular Uptake affects Cartilage Mechanics and Chondrocyte Vulnerability** SB³C2022-195
Yingjie Wu, Alexander Kotelsky, Mark Buckley
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- P43 Carrier Solution Composition affects Recovery of Cpa-Perfused Rat Hearts** SB³C2022-246
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- P45 Spinal Cord Injury Increases Arterial Stiffness and Perivascular Adipose Tissue Inflammation in Mice** SB3C2022-178
Ryan Sapp¹, Swathi Swaminathan², Pattie Mathieu¹, Annie Barnes¹, Gurneet Sangha¹, Valerie Bracchi-Ricard², Alisa Clyne¹
¹*University of Maryland College Park*, ²*Drexel University*
- P46 Transcranial Blood-Brain-Tumor Barrier Modulation for Enhancing Drug Delivery To Glioblastoma** SB3C2022-309
Qi Cai¹, Xiaoqing Li¹, Hejian Xiong¹, Xiaofei Gao², Ryan Margolis¹, Monica Giannotta³, Kenneth Hoyt¹, Robert Bachoo², Zhenpeng Qin¹
¹*University of Texas at Dallas*, ²*University of Texas Southwestern Medical Center*, ³*FIRC Institute of Molecular Oncology*
- P47 Probing Molecular Diffusion in the Brain and Tumor Extracellular Space by the Fast Release from Plasmonic Nanovesicles** SB3C2022-385
Hejian Xiong¹, Blake Wilson¹, Aditi Naik², Sabina Hrabetova², Robert Bachoo³, Zhenpeng Qin¹
¹*University of Texas*, ²*SUNY Downstate Health Sciences University*, ³*University of Texas Southwestern Medical Center*
- P48 A Timescale-Guided Microfluidic Synthesis of Hydrophobic Drug Nanoparticles with Metal-Phenolic Network Coatings** SB3C2022-403
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¹*University of Texas at Dallas*, ²*University of Texas Southwestern Medical Center*
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Molly Brennan, Susan Leggett, Celeste Nelson
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- P53 Mathematical Model for Combined Effects of Heat Transfer and Pressure in Causing Soft Tissue Injury** SB³C2022-308
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¹University of Texas at Austin, ²Yale University
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- V6 Laser-Induced Calcium Influx and Propagation for Temporary Blood-Brain Barrier Opening** SB³C2022-106
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¹University of Texas at Dallas, ²FIRC Institute of Molecular Oncology, ³University of Texas Southwestern Medical Center

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Alexandria Mallinos¹, Kerwyn Jones², Brian Davis¹
¹Cleveland State University, ²Akron Children's Hospital
- P60 On Predicting Ground Reaction Force from Thigh and Shank Imu Data During Jump Landings: An In Vitro Study** SB³C2022-79
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- P62 Designing a Sustainable In-Clinic Protocol to Expand Postural Stability Data Collection** SB³C2022-288
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- P63 A Case Study to Evaluate Pediatric Gait Speed and Effects of Chiari Malformation** SB³C2022-481
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- P64 In Silico Fatigue Optimization of Tavr Stent Designs with Physiological Motion in a Beating Heart Model** SB³C2022-244
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¹Stony Brook University, ²University of Arizona
- P65 Novel Patient-Specific Computer Modelling of Stent Retriever Thrombectomy** SB³C2022-383
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¹Canon Stroke and Vascular Research Center, ²University at Buffalo
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- P70 Seated Shear Forces are Affected by Pants and Cushion Cover Materials** SB³C2022-230
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¹Widener University, ²Drexel University
- P73 A Stand-Alone Module to Introduce Medical Image Segmentation into the BME Curriculum** SB³C2022-389
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Bucknell University
- P74 Community Based Capstone Design Projects at The University of South Florida (USF)** SB³C2022-351
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- P75 Confidence Expression in Personal Statements from a Biomedical Engineering REU Site** SB³C2022-496
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¹Stevens Institute of Technology, ²University of Washington
- P78 Automated Vascular Design and Simulation For 3D Bioprinting** SB³C2022-437
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¹Stanford University, ²Carnegie Mellon University
- P79 Real-Time Shape Optimization of the Total Cavopulmonary Connection in Fontan Surgical Planning Via Reduced Order Modeling** SB³C2022-367
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¹Georgia Institute of Technology, ²Virginia Tech, ³Oklahoma State University, ⁴Emory University
- P80 Effect of Bulging Sinus on Hemodynamic Performance of Polymeric RV-PA Conduit for Pediatric and Adult Patients** SB³C2022-444
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¹Georgia Institute of Technology, ²Colorado State University
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¹Ohio State University, ²Michigan Technological University, ³Mayo Clinic

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- P83 Fluid Structure Interaction Modeling of the Migration and Trapping of Physically Realistic Blood Clots in an Inferior Vena Cava Filter** SB³C2022-345
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¹*Flatiron Institute*, ²*US Food and Drug Administration*, ³*University of North Carolina*
- P84 An In-Vitro Study of the Flow Past a Transcatheter Aortic Valve Using Time-Resolved 3D Particle Tracking** SB³C2022-409
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¹*Georgia Institute of Technology*, ²*Nationwide Children's Hospital*
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Nien-Wen Hu¹, Lomel Banks¹, Peter Balogh², Walter L. Murfee¹
¹*University of Florida*, ²*New Jersey Institute of Technology*
- P86 Restructuring of the Endothelial Glycocalyx after Pneumonectomy** SB³C2022-517
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¹*Worcester Polytechnic Institute*, ²*Brigham and Women's Hospital*
- P87 Fabrication of Polymeric Heart Valves Through Additive Manufacturing** SB³C2022-449
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- P88 Left Atrial Hemodynamics after Catheter Ablation** SB³C2022-58
Brennan Vogl¹, Ahmed El Shaer², Martin Van Zyl², Ammar Killu², Mohamad Alkohouli², Hoda Hatoum¹
¹*Michigan Technological University*, ²*Mayo Clinic*
- P89 An Open Loop System for the Computational Investigation of Suspected Coronary Disease with the Patient-Specific CT-Data** SB³C2022-83
Sumit Kumar¹, BV Rathish Kumar¹, Sanjay Kumar Rai¹, Om Shankar², Ashish Verma²
¹*Indian Institute of Technology (BHU)*, ²*Institute of Medical Sciences*
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¹*Research Campus STIMULATE*, ²*University of Washington*, ³*University Hospital Magdeburg*
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- P93 An Ultrasound Based One-Dimensional Modeling Framework for the Assessment of Peripheral Arterial Disease** SB³C2022-396

Milan Gillissen¹, Frans van der Vosse¹, Marc van Sambeek², Richard Lopata¹
¹University of Technology Eindhoven, ²Catharina Hospital Eindhoven

- P94 Evaluation of Pressure Drop Across Aortic Coarctation: A Comparison of Zero-Dimensional and Three-Dimensional Models** SB³C2022-439
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¹East Carolina University, ²University of Wisconsin-Madison
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Shashwat Shah¹, Zachary Soler², Ethan Kung¹
¹Clemson University, ²Medical University of South Carolina
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Andrea Alonso, Mahsa Dabagh
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- V10 Post-Operative Vena Cava Boundary Condition Prediction for Fontan Surgical Planning**
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Wenyuan Song¹, Reena Ghosh², Mark Fogel², David Frakes¹
¹*Georgia Institute of Technology*, ²*Children's Hospital of Philadelphia*
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¹*University of Malaya*, ²*King Khalid University Abha*
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¹*Georgia Institute of Technology*, ²*Piedmont Heart Institute*, ³*Wexner Medical Center*
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¹*University of Texas at Austin*, ²*University of Pennsylvania*

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¹*Stanford University*, ²*Columbia University*, ³*UCLA*
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¹Michigan State University, ²California Medical Innovations Institute, ³Cardiovascular Research Foundation
- P119 Determining the Risk of Post-TAVR Cardiac Conduction Abnormalities in Tricuspid and Bicuspid Valves in a Beating Heart Using a Computational Approach** SB³C2022-199
Salwa Anam¹, Symon Reza¹, Brandon Kovarovic¹, Matteo Bianchi¹, Ashraf Hamdan², Rami Haj-Ali³, Danny Bluestein¹
¹Stony Brook University, ²Rabin Medical Center, ³Tel-Aviv University
- P120 A Predictive Simulation of Core Valve Implantation in a Patient with Three Bioprosthetic Valves in Place - A Case Study** SB³C2022-322
Fateme Esmailie¹, Breandan Yeats¹, Huang Chen¹, Milad Samaee¹, Atefeh Razavi¹, Sri Krishna Sivakumar¹, Pradeep Yadav², Venkateshwar Polsani², Vinod Thourani², Lakshmi Prasad Dasi¹
¹Georgia Institute of Technology / Emory University School of Medicine, ²Piedmont Hospital
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¹Georgia Institute of Technology, ²Emory University
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¹University of Texas at Austin, ²University of Pennsylvania
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¹Georgia Institute of Technology, ²HCU Valladolid, ³Ohio State University-Wexner Medical Center, ⁴Piedmont Heart Institute
- P124 Carotid Artery Stiffness Mechanisms Associated with Cardiovascular Disease Events and Incident Hypertension: The Multi-Ethnic Study of Atherosclerosis (MESA)** SB³C2022-212
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¹William S. Middleton Memorial Veterans Hospital, ²University of Wisconsin, ³Vanderbilt University, ⁴Wake Forest School of Medicine, ⁵Northwestern University, ⁶National Heart, Lung, and Blood Institute
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- V13 Biomechanical and Microstructural Characterizations of Human Healthy and Hypertrophic Septal Tissues** SB³C2022-316
Katherine Copeland¹, Uday Chintapula¹, Alan Taylor¹, Yi Hong¹, Kytai Nguyen¹, Matthias Peltz², Pietro Bajona³, Jun Liao¹
¹University of Texas at Arlington, ²University of Texas Southwestern Medical Center, ³Allegheny Health Network
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- V15 Dimensional Variability in Tensile Strength of the Tricuspid Annulus** SB³C2022-7
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- V16 Assessing Local Delivery Capability of a Novel Septal Ablation System via an Ex Vivo Pig Heart Model** SB³C2022-317
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¹University of Texas at Arlington, ²University of Texas Southwestern Medical Center, ³Allegheny Health Network
- V17 Biomechanical Wall Thickness and Stiffness Uncertainty Quantification in an Idealized Model of the Pre-stretched Dissected Aorta** SB³C2022-88
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¹Ghent University, ²KU Leuven, ³Delft University of Technology

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- P127 Computational Modeling of Brain Bilayer Under Cerebrospinal Fluid Pressure** SB³C2022-302
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- P128 Multiscale Model of Pregnancy-Induced Heart Growth Applied to Postpartum Recovery** SB³C2022-66
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- P129 A Multilayer Mechanical Cellular-Potts Model of Migrating Mesendoderm** SB³C2022-252
Tien Comlekoglu¹, Gustavo Pacheco¹, Bette Dzamba¹, David Shook¹, T.J. Sego², James Glazier², Shayn Peirce-Cottler¹, Douglas DeSimone¹
¹University of Virginia, ²Indiana University

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¹University of Texas at Arlington, ²University of Texas at Dallas, ³Mississippi State University, ⁴Allegheny Health Network, ⁵University of Texas Southwestern Medical Center

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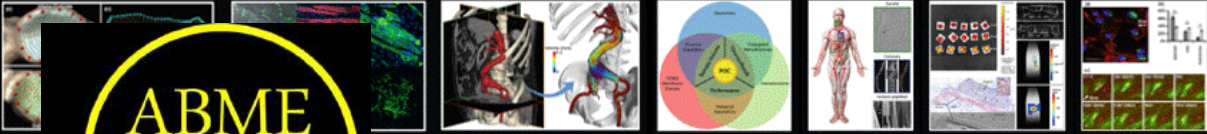
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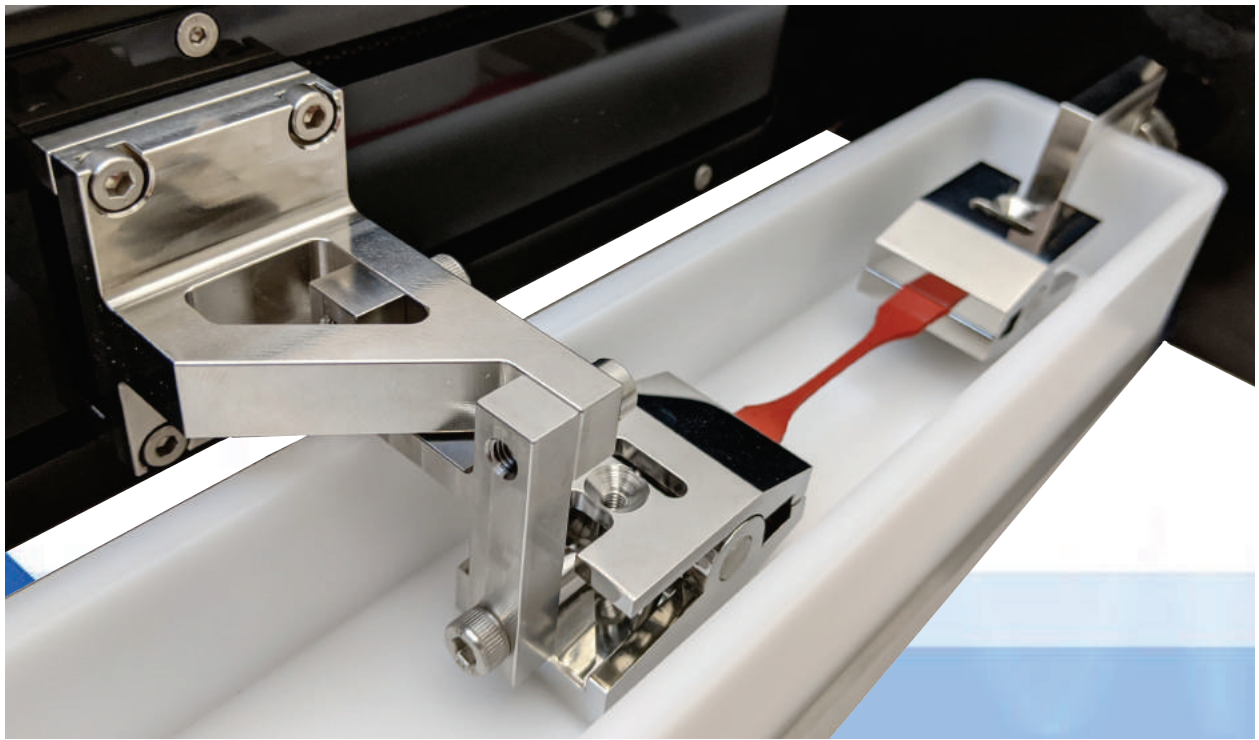
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Please join us in 2023 for another exciting in-person conference!

SB³C 2022 - PROGRAM AT A GLANCE

Room	Chesap. A-D	Chesap. E	Chesap. F	Chesap. G	Clipper	Galleon	Schooner	Cutter
Sunday, June 19, 2022								
7:30 - 9:30 pm	Juneteenth Celebration Event (Chesapeake E-G)							

MONDAY, June 20, 2022								
7:00 - 8:00 am	Breakfast (Chesapeake Foyer)							
All Day	Exhibits (Chesapeake Foyer & Choptank Foyer)							
8:15 - 9:15 am	Woo & Nerem Award Lectures (Chesapeake A-D)							
9:30 - 11:00 am	Machine Learning and AI	Vascular Mechanics I	Mineralized Tissue Mechanics	Eye, Pelvic Floor, & Reproductive Track I	Joint & Spine Mechanics	Mechanobiology	Transport in Diagnostics	Rehab & Assistive Technologies
11:00 - 11:15 am	Coffee Break (Chesapeake Foyer)							
11:15 - 12:45 pm	Patient Specific Flow & Physiology	Vascular Mechanics II	Tendon & Ligament Mechanics	Eye, Pelvic Floor, & Reproductive Track II	Brain & Injury Mechanics I	Cardiovascular Tissue Engineering	Transport in Hemodynamics & Lymphatics	Mechanics in Multi-Tissue Networks
12:45 - 2:15 pm	POSTER SESSION I with Lunch including BS & MS Student Paper Competitions (Choptank Ballroom)							
3:30-4:30 pm	LGBTQ+ Networking Event (Schooner A/B)							
4:30 - 5:30 pm	Diversity Mentor-Mentee Event (Chesapeake E-G)							
5:30 - 6:30 pm	PLENARY – Shayn Peirce-Cottler, PhD (Chesapeake A-D)							
6:30 - 8:30 pm	Opening Reception (Crescent Pool)							

TUESDAY, June 21, 2022								
7:00 - 8:00 am	Breakfast (Chesapeake Foyer)							
All Day	Exhibits (Chesapeake Foyer & Choptank Foyer)							
8:15 - 9:15 am	Lissner Award Lecture (Chesapeake A-D)							
9:30 - 11:00 am	PhD Competition: Biofluid Mech & CV Imaging	PhD Competition: Tendon, Ligament, & Joint	PhD Competition: Tiss Eng, Remod, & Emerg Areas	Valves	Brain & Injury Mechanics II	Soft Tissue Biomechanics	Transport in Drug Delivery & Discovery	Cartilage Mech & Musculoskeletal Imaging
11:00 - 11:15 am	Coffee Break (Chesapeake Foyer)							
11:15 - 12:45 pm	PhD Competition: Cardiovascular Mechanics	PhD Competition: Ortho Bioeng & Mechanotherap	PhD Competition: G&R in Injury & Disease	Special Session in Honor of Ajit Yoganathan	Mechanobiology & Pathology	Cancer & Morphogenesis	Lung Biomechanics	Biomechanics of Human Motion
12:45 - 2:15 pm	POSTER SESSION II with Lunch (Choptank Ballroom)							
2:15 - 3:45 pm					Symposium in Honor of Ajit Yoganathan	Diversity & Inclusion in Academic Pub	Engin. & Model. of Lung Mech. and Disease	
4:00 – 5:00 pm	Women’s Networking Event (Chesapeake Patio)				ASME BED Student Networking Event (Windjammer)			
5:30 – 7:00 pm	Building Future Faculty (Choptank Ballroom)							
7:15 - 10:00 pm	BEDROCK CONCERT (Manor Lawn)							

WEDNESDAY, June 22, 2022								
All Day	Exhibits (Chesapeake Foyer & Choptank Foyer)							
9:30 - 12:30 pm	Committee Meetings							
9:30 - 1:30 pm		Verification & Validation (9:30am)	Opportunities for Engineers with Disabilities (12:00pm)	Post-processing Simulation Data (12:00pm)				Symp. in Honor of Prof. Cravalho (12:00pm)
1:30 - 1:45 pm	Coffee Break (Chesapeake Foyer)							
1:45 -3:15 pm	Vascular Mechanics III	Ventricular Mechanics I	Muscle & Spine Tissue Mechanics	Emerging Methods in Biofluid Mech	Thrombosis, Hemolysis, & Mech Circ Supp	Musculoskeletal Tissue Engineering	Growth, Remodeling, & Repair	Undergraduate Design Competition
3:15 - 3:30 pm	Coffee Break (Chesapeake Foyer)							
3:30 - 5:00 pm	Vascular Mechanics IV	Ventricular Mechanics II	Cartilage Modeling & Characteriz	Device & Treatment Implications	Microfluidics, Optical, & CSF	Emerging Tools in Tissue and Cellular Engin	Transport in Thermal Therapy	Emerg Meth & Multi-Scale Mech
5:30 - 6:30 pm	Fung & Mow Award Lectures (Chesapeake A-D)							
6:30 - 7:30 pm	Banquet Reception (Chesapeake Foyer and Patio)							
7:30 - 10:30 pm	Banquet and Awards Ceremony (Chesapeake A-D)							

THURSDAY, June 23, 2022								
9:00 - 1:00 pm						CRIMSON Workshop	FEBio Workshop	SimVascular Workshop