



SB³C

biomechanics.
bioengineering.
biotransport.

Conference Program

2019 Summer Biomechanics, Bioengineering,
and Biotransport Conference

June 25 - 28, Seven Springs, PA

Funding for this conference was made possible (in part) by the National Science Foundation's Civil, Mechanical and Manufacturing Innovation Division (Biomechanics and Mechanobiology) #1856203.

Funding for this conference was also made possible (in part) by 1R13EB028126-01 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 2019 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.



National Institute of Biomedical Imaging and Bioengineering
Creating Biomedical Technologies to Improve Health



Congratulations to the inaugural Cover Art Contest Winner:

Mikhail Golman, Columbia University - (Podium SB³C2019-140)

Title: Failure Mechanisms In The Tendon Enthesis Under Quasistatic, Cyclical, And Pathological Loading

Description: Three dimensional visualization of tendon enthesis using contrast-enhanced microCT imaging. An unloaded control sample revealed that, hidden within the well-known larger apparent attachment footprint area, is a smaller, much denser primary insertion site where tendon fibers insert directly into the bone surface.

ISBN 978-0-578-51219-8

1 Forward and Acknowledgement

We are excited to welcome you to the fourth annual Summer Bioengineering, Biomechanics and Biotransport Conference (SB³C). On behalf of the entire Conference Committee and the SB³C Foundation, we welcome you to Seven Springs, PA. We are happy to announce our Platinum Sponsor, The American Society of Mechanical Engineers Bioengineering Division (ASME-BED). ASME-BED is sponsoring the Student Paper Competition (SPC) awards, travel for all 36 PhD SPC finalists and ASME memberships for all students who entered the SPC. Additionally, for the first time, with generous support from the National Institutes of Health (NIH) and the National Science Foundation (NSF), we supported travel for many of the SPC BS and MS finalists, as well as over 30 Diversity Travel Awards.

This year is special as we celebrate the 100th birthday of Y.C. Fung, who is world renowned as a "Founder of Modern Biomechanics." In 1972, Y.C. Fung established the Biomechanics Symposium under ASME. We honor Dr. Fung with two symposia highlighting research from both early career and established investigators whose careers and work exemplify that of Professor Fung. We also remember Dr. Christopher Jacobs, a leader in cellular mechanotransduction and computational biomechanics, through two sessions focused on mechanobiology.

This year's conference theme is Creating Multiscale Connections: The Keystone of Integrative Biomechanics, Bioengineering and Biotransport. A keystone is placed at the top of an arch or vault, locking the stones in place and allowing the structure to bear weight. Since Pennsylvania is the Keystone state, we centered this year's conference on workshops and sessions that integrate research across size scales and organ systems, as this is critical to both discovery and impact in the field. We hope that attendees will be inspired to engage in multiscale research, while renewing old connections and initiating new conversations with the diversity of colleagues who attend SB³C.

We continue the tradition of honoring the ASME medal winners, and we are especially proud of the diversity among the award recipients. The H.R. Lissner Medal winner, Dr. Jennifer Wayne, is honored for outstanding achievement in experimental and computational joint biomechanics, in addition to her educational impact and service to ASME-BED. Dr. Rita Patterson, winner of the Savio L-Y. Woo Translational Biomechanics Medal, is honored for biomechanics research on the hand and wrist that translated into surgical interventions that have improved patients' quality of life. Dr. Tony Huang will receive the Van C. Mow Medal for pioneering research in acoustofluidics; Dr. Grace O'Connell will receive the Y.C. Fung Early Career Medal for exceptional intervertebral disc research; and Dr. Kenneth Diller will receive the Robert M. Nerem Education and Mentorship Medal for investing in the personal and professional development of his colleagues. We congratulate all of the awardees and encourage you to attend their talks during the conference.

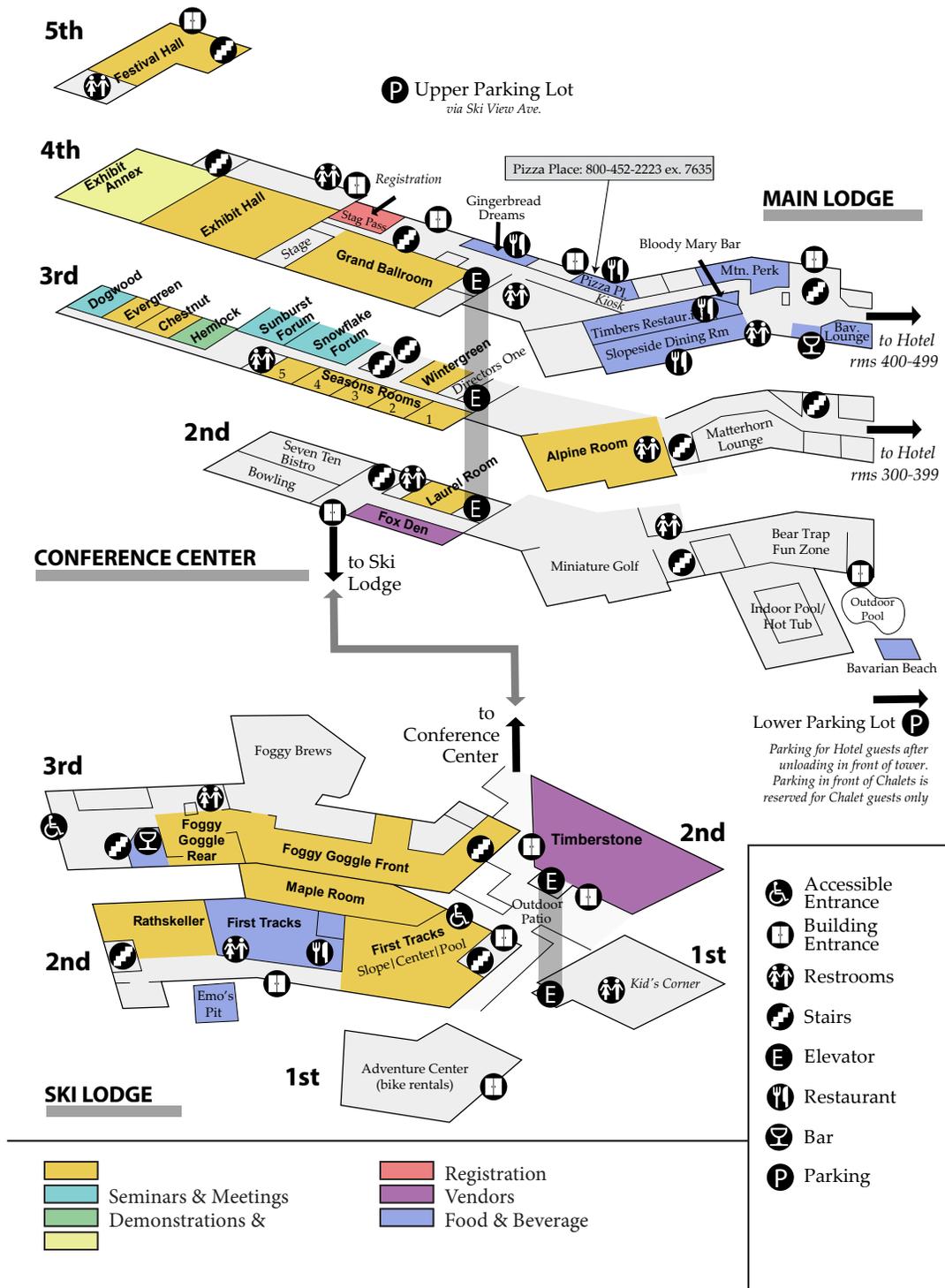
Our student delegates, who make up approximately 50% of our total delegates, are represented by a strong Student Leadership Committee (SLC). The SLC has planned both professional development activities as well as social activities for all students. We are proud to announce that we have a record number of SPC submissions and especially proud of the record number of bachelor level submissions.

We hope you have time to enjoy the beautiful Allegheny Mountains of Seven Springs and take time to hike, golf, mountain bike, ride the zip line, battle at paintball, or take it easy in the spa. Last but certainly not least, we wholeheartedly thank the entire SB³C Conference Committee, the ASME-BED Technical Committees, the SLC, Boscov's Travel, the SB³C Foundation, and all the abstract reviewers and SPC judges who work so hard to ensure we have an amazing conference. Enjoy the conference, and please join us again in Vail 2020!

Tammy Haut Donahue, Conference Chair
University of Massachusetts Amherst

Alisa Morss Clyne, Program Chair
University of Maryland

2 Conference Site Map and Accessibility



ACCESSIBILITY

All floors being used for the meeting spaces are accessible. The following entrances are accessible: Conference Center entrance ramp, Pizza Place entrance, Hotel Lobby Entrance and Conference Center lower level back entrance. The hotel has on-site accessible self-parking as well as valet service. Service animals are permitted for persons with disabilities. Should you require specific accessibility accommodations, please contact the resort's front desk at 814-352-7777 x3000.

Table of Contents

| | |
|--|-----|
| 1 Forward and Acknowledgement | 3 |
| 2 Conference Site Map and Accessibility | 4 |
| 3 General Information | 6 |
| 3.1 Social Program | 6 |
| 3.2 Conference Registration Hours | 6 |
| 3.3 Instructions for Poster Presenters | 6 |
| 3.4 Speaker Ready Rooms | 6 |
| 3.5 Committee Meetings | 7 |
| 4 Conference Organizing Committees | 8 |
| 4.1 Organizing Committee | 8 |
| 4.2 Program Committee | 8 |
| 4.3 Student Paper Competition Committee | 9 |
| 4.4 Undergraduate Design Competition Committee | 9 |
| 4.5 ASME BED Student Leadership Committee Planned Events | 9 |
| 5 Special Sessions, Plenary Speakers, and Workshops | 11 |
| 6 Awards | 19 |
| 7 Reviewers | 24 |
| 8 Podium Sessions | 27 |
| 9 Poster Sessions | 63 |
| 9.1 Poster Session I | 63 |
| 9.2 Poster Session II | 76 |
| Author Index by Page Number | 89 |
| Session Chair Index | 102 |

3 General Information

3.1 Social Program

Tuesday June 25

| | | |
|-------------------|---------------|----------------|
| Opening Reception | Pavers Circle | 6:30 - 8:30 PM |
|-------------------|---------------|----------------|

Wednesday June 26

| | | |
|---------------------------|---------------------|----------------|
| ASME SLC Walk and Talk | Front of Main Lodge | 3:00 - 4:30 PM |
| Diversity/Mentoring Event | Matterhorn Lounge | 4:30 - 6:00 PM |

Thursday June 27

| | | |
|----------------------------|--------------------|-----------------|
| Women's Networking Event | Seven/Ten Bistro | 3:45 - 4:45 PM |
| IAB SLC Career Connections | Exhibit Hall | 5:30 - 7:00 PM |
| BEDRock | Foggy Goggle Stage | 8:00 - 11:00 PM |

Friday June 28

| | | |
|--|--------------------|------------------|
| ASME Student Leadership Committee Meeting | Wintergreen | 10:30 - 11:30 AM |
| Lissner Reception | Exhibit Hall Annex | 6:30 - 7:30 PM |
| Conference Banquet & Awards | Exhibit Hall | 7:30 - 10:30 PM |

3.2 Conference Registration Hours

| | |
|--------------------|-------------------|
| Tuesday, June 25 | 9:00AM - 9:00 PM |
| Wednesday, June 26 | 6:30AM - 2:00 PM |
| Thursday, June 27 | 6:30AM - 2:30 PM |
| Friday, June 28 | 11:30PM - 2:00 PM |

3.3 Instructions for Poster Presenters

The Exhibit Hall will be available to attendees from Tuesday-Friday. Session I posters should be set up between 11am-3:30pm on Tuesday, June 25 and must be removed between 3-4pm on Wednesday, June 26. Session II posters should be set up between 4-6pm on Wednesday, June 26 and can be removed on Thursday, June 27 after 4pm (Friday morning at the latest). Students with posters in the competition should remain at their posters throughout the designated poster sessions. Any poster remaining after the assigned take down period for a Poster Session will be removed by the organizers.

Poster Session I (Wed June 26, 12:45PM - 2:15PM)

| Poster # | Theme |
|----------|-------------------------------|
| 1-33 | ASME SPC BS Level Competition |
| 34-60 | ASME SPC MS Level Competition |
| 61-86 | Fluids |
| 87-132 | Solids |
| 133-150 | Cell & Tissue Eng. |

Poster Session II (Thurs June 27, 12:45PM - 2:15PM)

| Poster # | Theme |
|----------|----------------------------|
| 151-165 | Biotransport |
| 166-177 | Design, Dynamics, & Rehab. |
| 178-182 | Education |
| 183-203 | Fluids |
| 204-282 | Solids |
| 283-298 | Cell & Tissue Eng. |

3.4 Speaker Ready Rooms

For podium speakers, session rooms will be available outside of the scheduled session times. Speakers are encouraged to test their presentations in the appropriate room prior to their presentation.

3.5 Committee Meetings

Unless denoted by asterisks (*), the committee meetings listed below are open to all. 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.

Tuesday, June 25

SB³C Meetings

| | | |
|--|-------------|--------------------|
| SB ³ C Board Meeting* | Seasons 1-3 | 9:00AM - 10:00 AM |
| SB ³ C Organizing & Program** | Seasons 1-3 | 10:10AM - 11:20 AM |

ASME BED Meetings

| | | |
|---------------------------|-------------|--------------------|
| Fluid Mechanics | Fox Den | 8:30AM - 9:20 AM |
| Biotransport | Seasons 4-5 | 11:30AM - 12:20 PM |
| Education | Wintergreen | 11:30AM - 12:20 PM |
| Cell & Tissue Engineering | Seasons 1-3 | 11:30AM - 12:20 PM |
| Design, Dynamics & Rehab | Wintergreen | 12:30PM - 1:20 PM |
| Solid Mechanics | Seasons 1-3 | 12:30PM - 1:20 PM |

Wednesday, June 26

| | | |
|---|----------------|------------------|
| BED Executive* | Director's One | 2:00PM - 4:30 PM |
| ASME Bioengineering Division Open Business Meeting | Wintergreen | 6:00PM - 7:00 PM |

Thursday, June 27

| | | |
|-------------------------------|----------------------|------------------|
| JBME Editors (with lunch) *** | Slopeside Restaurant | 1:00PM - 2:00 PM |
|-------------------------------|----------------------|------------------|

* Closed Meeting

** SB³C Organizing committee meeting: members for three conference years (2019, 2020, 2021) should attend.
SB³C Program committee meeting: Program Chair (2020), Program Chair (2021), and Chairs of Technical Committees for these years. Organizing Committee chaired by Conference Chair 2019; Program Committee chaired by Program Chair 2019.

*** JBME editors and co-editors.

4 Conference Organizing Committees

4.1 Organizing Committee



Tammy Haut Donahue, Conference Chair
University of Massachusetts Amherst



Alisa Morss Clyne, Program Chair
University of Maryland

Joseph Iaquinto, Information Chair, CLiMB, VA Puget Sound & University of Washington
Matthew Fisher, Local Arrangements Chair, NC State University & UNC-Chapel Hill
Naomi Chesler, Exhibits Chair, University of Wisconsin
Daniela Valdez-Jasso, Diversity Chair, University of California San Diego
Jonathan Vande Geest, Publications Chair, University of Pittsburgh
Shannon Stott, Student Paper Competition Chair, Mass Gen Hospital, Harvard Med School
Carla Winsor, Student Leadership Chair, University of Wisconsin
Justin Scott, Student Leadership Co-Chair, Michigan State University
Megan Killian, Social Media Chair, University of Delaware

4.2 Program Committee

Alisa Morss Clyne, Chair, Program Committee, University of Maryland
Xiaoming (Shawn) He, Chair, Biotransport Technical Committee, University of Maryland
Rafael Davalos, Vice Chair, Biotransport Technical Committee, Virginia Tech University
Tammy Bush, Chair, Design, Dynamics, and Rehab Tech Committee, Michigan State University
Michael Moreno, Vice Chair, Design, Dynamics, and Rehab Tech Committee, Texas A&M
Alison Marsden, Chair, Fluids Technical Committee, Stanford University
John LaDisa, Vice Chair, Fluids Technical Committee, Marquette University
Alisa Morss Clyne, Chair, Education Technical Committee, University of Maryland
Ferris Pfeiffer, Vice Chair, Education Technical Committee, University of Missouri
Ed Guo, Chair, Cell & Tissue Engineering Technical Committee, Columbia University
Grace O'Connell, Vice Chair, Cell & Tissue Engineering Technical Committee, UC Berkeley
Jonathan Vande Geest, Chair, Solid Mechanics Technical Committee, University of Pittsburgh
Vicky Nguyen, Vice Chair, Solid Mechanics Technical Committee, Johns Hopkins University
Carla Winsor, Student Leadership Chair, University of Wisconsin
Justin Scott, Student Leadership Vice Chair, Michigan State University
Shannon Stott, ASME BED SLC Advisor, Mass Gen Hospital, Harvard Med School

4.3 Student Paper Competition Committee

Shannon Stott, Chair, Student Paper Competition, Mass Gen Hospital, Harvard Med School
Sara Roccabianca, PhD Level, Michigan State University
Ian Sigal, MS Level, University of Pittsburgh
Joao Soares, BS Level, Virginia Commonwealth University

4.4 Undergraduate Design Competition Committee

Michael Moreno, Chair, Undergraduate Student Design Competition, Texas A&M University
Ted Conway, Co-Chair, Undergraduate Student Design Competition, Florida Institute of Tech

4.5 ASME BED Student Leadership Committee Planned Events

Wednesday, June 26th, 2019: Walk and Talk

Take a hike with some friends! We will be hiking around the Seven Springs area and might even run into some of the surrounding lakes. We will be taking a break to talk and eat some snacks, but talking and meeting new people along the way is always encouraged! Snacks will be provided.

Time: 3:00-4:30 PM

Location: In front of the main lodge

Thursday, June 27th, 2019: Career Connections Mixer

Are you interested in a career in industry or academia? The Career Connections Mixer is an opportunity for undergraduate students, graduate students, and post docs to connect face-to-face with potential employers from industrial and academic backgrounds to discuss career paths in bioengineering.

Time: 5:30-7:00 PM

Location: Seasons 1, 2, and 3

Friday, June 28th, 2019: Student Leadership Committee Open Meeting

Come join the student leadership committee as we discuss plans for the next year and ways to better serve the student community. This is a chance to see how events and services for students get planned and potentially get involved in the process yourself.

Time: 10:30-11:30 AM

Location: Wintergreen

JUNE
27
5:30 PM

CAREER CONNECTIONS

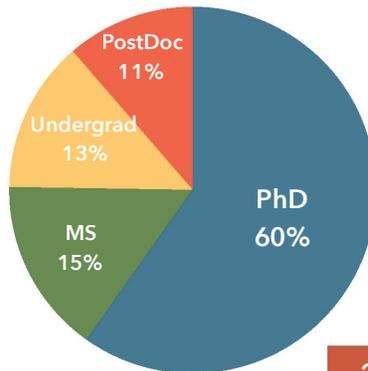
AT THE 2019 SB³C

APPLY | RECRUIT | NETWORK

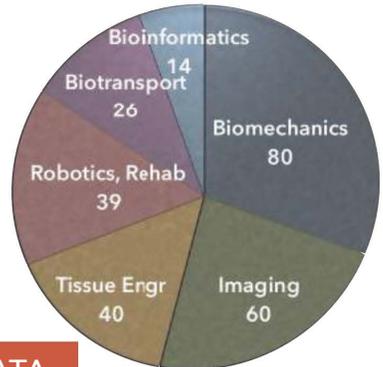
SB³C biomechanics.
bioengineering.
biotransport.
June 25-28, 2019, Seven Springs, PA

Job? Ph.D. position?
Post doc?
Network with
Employers and/or
Professors

Organized by the
Industry Committee and
Student Leadership Committee



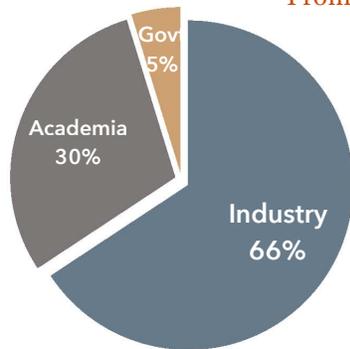
DEGREE STATUS



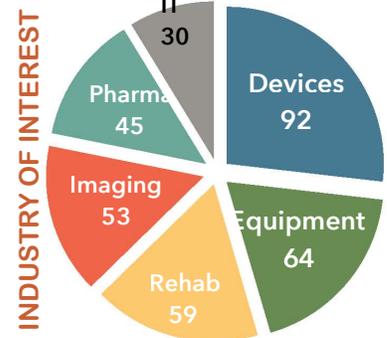
EXPERTISE

2017 DATA

From 105 student registrants



SEEKING CAREER IN



INDUSTRY OF INTEREST

Students and employers may register at
<http://sb3c.org/program/career-connections>



Thursday, June 27, 2019 5:30 - 7 PM
Exhibit Hall, Seven Springs Resort, PA

The SB³C is the annual conference for Bioengineering Division of the American Society of Mechanical Engineers. The Career Connections Event is a forum for networking among the nation's top students, elite bioengineering research laboratories and potential employees.

Enquiries:

Students: Marissa Grobbel (Student Leadership Committee), grobbe12@msu.edu

Employers: Suresh M.L. Raghavan (Industry Committee), ml-raghavan@uiowa.edu

SB3C.ORG

5 Special Sessions, Plenary Speakers, and Workshops

| | |
|-------------------------|-----------------------|
| TUESDAY, JUNE 25 | 9:30 - 11:30AM |
|-------------------------|-----------------------|

Patient-specific blood flow simulations using CRIMSON

Fox Den

Organizers: *Alberto Figueroa, University of Michigan; Chris Arthurs, King's College London*

CRIMSON, the CardiovasculaR Modelling and SimulatiON Environment, is a complete software pipeline for segmenting blood vessels from medical imaging data, generating meshes, designing and specifying boundary conditions and material properties, and performing finite element simulation of blood flow on thousands of CPU cores, using the SUPG-stabilised incompressible Navier-Stokes equations. Upon completing the short course, attendees will have the basic knowledge required for performing image-derived patient-specific simulations of arterial blood flow using CRIMSON in their own research groups. Because of CRIMSON's focus on presenting cutting-edge modelling and simulation features via a modern and intuitive user interface, complete novices can learn to perform their first segmentation and simulation in a short period of time. The second half of the short course will teach some selected advanced features of CRIMSON, such as custom boundary condition design tools, transitional physiology and cardiovascular control scripting, or PC-MRI boundary condition imposition, depending on the interest of the attendees. Attendees will leave the short course with an in-depth understanding of how CRIMSON can accelerate their own research. Attendees will be required to bring their own laptops and a proper mouse, and should have CRIMSON pre-installed from www.crimson.software.
Speakers:

Alberto Figueroa (University of Michigan)

Chris Arthurs (King's College London)

Sabrina Lynch (University of Michigan)

| | |
|-------------------------|------------------------------|
| TUESDAY, JUNE 25 | Time 11:30AM - 1:30PM |
|-------------------------|------------------------------|

SimVascular Workshop and New User Training

Fox Den

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

SimVascular is the only fully open source software package providing a complete pipeline from medical image data to cardiovascular blood flow simulation results and analysis (www.simvascular.org). It offers capabilities for image segmentation, unstructured adaptive meshing, physiologic boundary conditions, and two Navier-Stokes finite element solvers with fluid structure interaction capabilities, including large deformation motion with an Arbitrary Lagrangian Eulerian (ALE) formulation. An accompanying vascular model repository provides over 100 clinical data sets with simulation results from different parts of the vasculature to enable research. Extensive online documentation and tutorials with clinical examples are provided online. In this workshop, we will interactively take new users through a step-by-step tutorial, covering basic steps of model construction, meshing, flow simulations, and best practices for high quality results. We will also introduce several new features of SimVascular, including a module for image segmentation with machine learning, a python scripting interface, and a pipeline for reduced-order modeling with a 1D solver. Following a series of interactive demonstrations, we will moderate a question and answer session for current and potential users.

| | |
|-------------------------|----------------------------|
| TUESDAY, JUNE 25 | Time 2:00 - 3:30 PM |
|-------------------------|----------------------------|

Thermal Damage Processes in Tissues - in Celebration of Dr. John Pearce's 70th Birthday

Sunburst

Organizers: *Rupak Banarjee, University of Cincinnati*

This special workshop/symposium is dedicated to the valuable contributions of Dr. John Pearce to the topic of thermal damage processes in tissues. Motivated by clinical experience in the Department of Surgery at the Medical University of South Carolina in the early 1970s, Dr. Pearce has worked for over 40 years on this topic, from his dissertation on the "The Thermal Performance of Electrosurgical Dispersive Electrodes" to, his 1986 book on Electrosurgery, to the development of the Ligasure vessel sealing system, and more recent work on accurate modeling of intrinsic cell death processes at low temperatures. After 35 years on the faculty of the Electrical and Computer Engineering Department at the University of Texas at Austin he retired as Temple Foundation Professor Emeritus. He is a Fellow of the ASME, and the International Microwave Power Institute.

Speakers:

John Bischof (University of Minnesota)

Kenneth Diller (University of Texas at Austin)

| | |
|-------------------------|----------------------------|
| TUESDAY, JUNE 25 | Time 2:00 - 3:30 PM |
|-------------------------|----------------------------|

Bridging the scales: Emerging tools in multi-scale mechanical imaging of biological tissues

Snowflake

Organizers: *Mehmet Kurt, Stevens Institute of Technology; Brittany Coats, University of Utah*

Since the onset of medicine, the simplest, most immediate hands-on diagnostic tool has been the test of palpation: variations in the local mechanical properties of tissue can in fact be indicative of a variety of pathologies. Even within modern medicine, this remains a precious way to assess the need of more sophisticated clinical investigations. However, there remain two critical roadblocks in translating imaging methods into clinical practice: 1) How can we palpate and image tissues that are relatively inaccessible and deep within the human body, such as the brain and the liver? 2) How can we bridge the understanding between tissue-level mechanical properties and the underlying cellular mechanics and physiology? In this workshop, we will hear from researchers who have developed successful mechanical imaging methods that are making an immediate impact in clinical diagnosis and treatment within the context of these main research challenges. Attendees will learn about various multi-scale mechanical imaging techniques that have already made substantial clinical impact and gain insights into where some of the challenges in multi-scale mechanical imaging lie.

Speakers:

Claire Acevedo (University of Utah)

Philip Bayley (Washington University - St Louis)

Deva Chan (Rensselaer Polytechnic Institute)

Daniel Cortes (Penn State University)

Darryl Overby (Imperial College London)

| | |
|-------------------------|----------------------------|
| TUESDAY, JUNE 25 | Time 2:00 - 3:30 PM |
|-------------------------|----------------------------|

Medical Device Design, Development, and Approval

Wintergreen

Organizers: *Michael Moreno, Texas A&M; Nandini Duraiswamy, FDA*

A workshop on how to design your new medical device and get it approved for sale. Brief presentations on product design and development process used in the development of medical devices,

getting FDA approval for your device, and where to get help. Bring your idea and we will help you put together an action plan to take our idea to the next level.

| | |
|-------------------------|----------------------------|
| TUESDAY, JUNE 25 | Time 2:00 - 3:30 PM |
|-------------------------|----------------------------|

Best Practices in Promoting Academic Code of Honor and Ethics

Seasons 1-3

Organizers: Sara Wilson, University of Kansas; Michele Grimm, National Science Foundation; Victor Lai, University of Minnesota Duluth; Rouzbeh Amini, University of Akron

Many SB³C attendees are graduate students, post-doctoral trainees, and faculty members who are or will soon be teaching their first classes. Promoting ethical behavior among students and handling disciplinary issues when academic misconduct takes place can be some of the most challenging tasks to be undertaken by a first-time instructor. The purpose of this workshop is to provide an overview of best practices for promoting an honor system among the students, preventing the underlying issues that can lead to academic misconduct, and handling difficult conversations/decisions that result from the violation of such ethical standards. The workshop includes three 20-minute seminars presented by three of our more seasoned colleagues, who will share their experiences and best practices. Time at the end of the workshop will be provided for an open Q & A session and potential input from the audience. The topics of discussion include encouraging students to focus on mastering the material rather than only trying to do well on tests and assignments, adopting methods to increase students' self-efficacy, developing a reputation for being a "fair professor", clearly defining academic misconduct, using resources to check for plagiarism, etc. The organizers and presenters expect to prepare a manuscript for submission to the ASME Journal of Biomechanical Engineering Annual Educational issue to further disseminate the information provided in this workshop.

| | |
|-------------------------|----------------------------|
| TUESDAY, JUNE 25 | Time 5:30 - 6:30 PM |
|-------------------------|----------------------------|

Plenary Lecture

Grand Ballroom

Multi-scale Approaches to Identify Brain Injury Thresholds in Children

Susan Margulies, Wallace H. Coulter Department of Biomedical Engineering, Georgia Institute of Technology and Emory University

In traumatic brain injury (TBI), we integrate animal experiments, tissue and surrogate tests, clinical studies, and computational models to define biomechanical and molecular cascades, assess acute and longer-term outcomes. Integrating across scale and species, and across computational and experimental approaches in our novel interdisciplinary platform, we identify thresholds for predicting traumatic brain injuries in the developing brain. By increasing our understanding of how head injuries occur in children, this crucial information enables engineers to design safer protective equipment (e.g. car seats, helmets) for children and provides physicians with tools to assist them in the prevention, diagnosis and treatment of head injuries in children.



| | |
|---------------------------|----------------------------|
| WEDNESDAY, JUNE 26 | Time 8:15 - 8:45 AM |
|---------------------------|----------------------------|

YC Fung Early Career Medal Award Lecture: Computational and Experimental Analyses of the Intervertebral Disc and Implications for Failure

Grand Ballroom

Grace D. O'Connell, PhD (University of California Berkeley)

The intervertebral disc is a complex avascular fibrocartilaginous organ with limited healing capacity. Tissue failure within the disc leads to mechanical dysfunction and herniation. Age and degeneration results in large compositional changes that greatly effects the disc's ability to imbibe water and nutrients, altering tissue- and joint-level mechanical behavior. This talk will discuss how experimental and modeling techniques are being used to gain insight into the biomechanics of the intervertebral disc and its subcomponents, such as the annulus fibrosus. Specifically, we will look at how sub-tissue components contribute to failure and intradiscal stress distributions and implications for developing biological repair strategies for the disc.

| | |
|---------------------------|----------------------------|
| WEDNESDAY, JUNE 26 | Time 8:45 - 9:15 AM |
|---------------------------|----------------------------|

Van C. Mow Medal Award Lecture: Acoustofluidics - merging acoustics and microfluidics for biomedical applications

Grand Ballroom

Tony Jun Huang, PhD (Duke University)

The past two decades have witnessed an explosion in lab-on-a-chip research with applications in biology, chemistry, and medicine. The continuous fusion of novel properties of physics into microfluidic environments has enabled the rapid development of this field. Recently, a new lab-on-a-chip frontier has emerged, joining acoustics with microfluidics, termed acoustofluidics. Here we summarize our recent progress in this exciting field and show the depth and breadth of acoustofluidic tools for biomedical applications through many unique examples, from exosome separation to cell-cell communications to 3D bioprinting, from circulating tumor cell isolation and detection to ultra-high-throughput blood cell separation for therapeutics, from high-precision micro-flow cytometry to portable yet powerful fluid manipulation systems. These acoustofluidic technologies are capable of delivering high-precision, high-throughput, and high-efficiency cell/particle/fluid manipulation in a simple, inexpensive, cell-phone-sized device. More importantly, the acoustic power intensity and frequency used in these acoustofluidic devices are in a similar range as those used in ultrasonic imaging, which has proven to be extremely safe for health monitoring during various stages of pregnancy. As a result, these methods are extremely biocompatible; i.e., cells and other biospecimen can maintain their natural states without any adverse effects from the acoustic manipulation process. With these unique advantages, acoustofluidic technologies meet a crucial need for highly accurate and amenable disease diagnosis (e.g., early cancer detection and monitoring of prenatal health) as well as effective therapy (e.g., transfusion and immunotherapy).

| | |
|---------------------------|----------------------------|
| WEDNESDAY, JUNE 26 | Time 4:30 - 6:00 PM |
|---------------------------|----------------------------|

Diversity Mentor-Mentee Event

Matterhorn Lounge

Organizers: *Daniela Valdez-Jasso*

Being a junior scientist can be intimidating so why not meet others and exchange experiences? The Diversity Mentor-Mentee Event this year will have a networking component, where you will meet junior & senior students, postdoctorates, and junior & senior faculty members from the field. This will be followed by round-table discussions on "how to deal with ... situations." At the end of the event, we

will hear how one of our leaders in the field have "shaped the environment of their scientific career." As part of attending this event, you will be matched with a mentor with whom you hold a teleconference within a year of SB³C.

Registration is not required but encouraged to have enough ice-cream and supplies of pastries!

Who should attend: anyone interested in making the scientific environment more welcoming to all!

Note: if there is a specific topic you would like to include for discussion, please send it by June 1st to dvaldezjasso@ucsd.edu. Additional questions can also be directed to: dvaldezjasso@ucsd.edu

| | |
|--------------------------|----------------------------|
| THURSDAY, JUNE 27 | Time 8:15 - 8:45 AM |
|--------------------------|----------------------------|

Savio L-Y. Woo Medal Award Lecture: Form = Function: Translating Biomechanics to improve Hand Surgery and Rehabilitation **Grand Ballroom**

Rita M. Patterson, PhD (University of North Texas Health Science Center)

This talk will focus on how working in a medical school environment, we formed collaborative inclusive teams to translate engineering principles to answer clinical questions. Specifically, how we combined knowledge of anatomy and biomechanics to understand wrist injury and determine better surgical procedures and rehabilitation protocols to facilitate wrist function. Throughout this process, we were able to combine experimental data collected with medical imaging to create real time videos of motion to provide visualization to surgeons and therapists to help them understand the complex motions in the wrist. This work has allowed us to evaluate and recommend surgical procedures to help patients with a variety of wrist injuries.

| | |
|--------------------------|----------------------------|
| THURSDAY, JUNE 27 | Time 8:45 - 9:15 AM |
|--------------------------|----------------------------|

Robert M. Nerem Education and Mentorship Medal Award Lecture: Teaching and Mentoring for 46 Years at the University of Texas **Grand Ballroom**

Kenneth R. Diller, ScD (University of Texas at Austin)

As a faculty member one of the most rewarding activities occurs with the opportunity to invest in the personal and professional development of (mostly younger) colleagues. Teaching and mentoring provide common platforms for this type of interaction. Teaching is often thought of as being more formal within the structure of a curriculum with courses in which defined elements of knowledge are shared and hopefully imparted for future practical application. Mentoring is conducted in a more informal context involving one-on-one or small group contacts. Over many years as an educator, my practices of teaching and mentoring have grown more similar in exercise, stimulated in no small part by the adoption of inquiry-based instructional methodologies. I find the educational philosophy widely attributed to Albert Einstein to be very inspiring: "Education is not the learning of facts but the training of the mind to think." Life as a professor has provided a rich environment to experience the rewards and satisfaction of being a teacher and mentor. Bob Nerem was for me an outstanding model of what it means to be a teacher and mentor.

| | |
|--------------------------|----------------------------|
| THURSDAY, JUNE 27 | Time 2:15 - 3:45 PM |
|--------------------------|----------------------------|

Multiscale Musculoskeletal Mechanics Across Interfaces **Sunburst**

Organizers: David Pierce, Mariana Kersh, Matthew Fisher

Understanding of the mechanics of both soft and hard tissues has greatly improved over the last few decades. In parallel, recent advances have pushed this understanding to the cellular and subcellular levels. However, the community developed the bulk of this understanding using isolated tissues and

cells *ex vivo*. Meanwhile, the interfaces and gradients inherent to many soft tissues often prove crucial to their function, e.g. muscle-tendon-bone and cartilage-bone. Moreover, these tissues interact over multiple length scales. This session will focus on such, often understudied, multiscale interfaces. The goal of this workshop (a series of talks followed by a curated discussion) is to promote cross-fertilization of ideas and collaborative experimental and computational efforts towards more rapid progress in advancing understanding of the multiscale mechanics across interfaces and is therefore a joint workshop between the Solid Mechanics and the Cell & Tissue Engineering groups. Important themes include: Solid Mechanics (Growth, Remodeling and Repair; Injury; Musculoskeletal Soft Tissue Mechanics; Bone Mechanics; Joint and Spine Mechanics), Cell & Tissue Engineering (Nano, Micro and Multiscale; Tissue Engineered Disease Models; Musculoskeletal Tissue Engineering; The Cellular Microenvironment; Mechanotransduction and Sub-cellular Biophysics; Cellular and Molecular Biomechanics).

Speakers:

Dawn Elliott (University of Delaware)

Virginia Ferguson (University of Colorado at Boulder)

Mariana Kersh (University of Illinois at Urbana-Champaign)

| | |
|-------------------------------------|----------------------------|
| THURSDAY, JUNE 27 | Time 2:15 - 3:45 PM |
| BME Education Summit Readout | Snowflake |

Organizers: *Kristen Billiar, Worcester Polytechnic Institute*

Track Chairs from the BME Education Summit (May 2019, Cleveland, OH) will provide a summary of the discussion from the sessions at the Summit, and they will solicit additional comments.

Speakers:

Kristen Billiar (Worcester Polytechnic Institute)

Susan Margulies (Georgia Tech)

Bob Tranquillo (University of Minnesota)

| | |
|--|----------------------------|
| THURSDAY, JUNE 27 | Time 2:15 - 3:45 PM |
| From Mouse to Human: Challenges of Using Rodent Models to Understand Human Diseases | Wintergreen |

Organizers: *Chiara Bellini and Jessica Oakes (Department of Bioengineering, Northeastern University, Boston, MA)*

Rodent models are often leveraged to gain a better understanding of disease processes, with the ultimate goal of identifying key features for the benefit of human health. This has become even more true as genetically-modified mice have become widely available and technology advancements have made it possible to quantify physiological processes at a small scale. The aim of this workshop is to discuss the pros/cons of working with rodent models and emerging methods on how to link data collected in rodents, or pre-clinical models, to humans. Specifically, we will bring together experts in imaging, mechanics, and predictive modeling to address these challenges and facilitate a discussion over a broad range of disciplines. Each speaker will focus on a different system and/or disease.

Speakers:

Naomi Chesler (University of Wisconsin)

Craig Goergen (Purdue University)

| | |
|--------------------------|----------------------------|
| THURSDAY, JUNE 27 | Time 2:15 - 3:45 PM |
|--------------------------|----------------------------|

Community Based Learning in Biomedical Engineering Education**Seasons 1-3****Organizers:** Anita Singh, Widener University

Community-based learning (CBL) holds many benefits for students by: a) enhancing learning within the core content area, b) broadening of professional skills that are needed in today's global economy, and c) deepening our learning about the communities we live in. Bridging the gap between Science, Technology, Engineering and Mathematics (STEM) disciplines and human and environmental needs embedded within our communities has also proven to increase interest in the STEM topics and careers, especially with populations traditionally underrepresented in these fields. Community-based learning has been widely adopted in higher education but less so in the STEM, especially engineering disciplines. This workshop will explore ways to integrate community-based learning into biomedical engineering education using successful examples as a framework and active discussions with participants to explore issues and constraints within their own classrooms. The workshop will actively engage participants in developing plans and ideas for their own students within their local community.

| | |
|--------------------------|----------------------------|
| THURSDAY, JUNE 27 | Time 2:15 - 3:45 PM |
|--------------------------|----------------------------|

FEBio Workshop and Discussion**Seasons 4-5****Organizers:** Jeffrey A. Weiss, University of Utah (point of contact); Gerard Ateshian, Columbia University; Steve Maas, University of Utah

FEBio is a nonlinear finite element software suite that is specifically designed for applications in biomechanics and biophysics (www.febio.org). FEBio uses the finite element method to discretize the equations for conservation of mass, linear momentum, and charge. The resulting equations allow fully coupled simulation of solid mechanics, solid-fluid mixtures, fluid mechanics, fluid-solid interactions, transport, reaction and diffusion of neutral and charged species, contact, prestrain, growth and remodeling. The governing equations are formulated based on mixture theory. It offers modeling scenarios, constitutive models and boundary conditions that are relevant to many research areas in biomechanics. All features can be used together seamlessly, giving the user a powerful tool for solving 3D problems in computational biomechanics. The software is open-source, and pre-compiled executables for Windows, Mac OS X and Linux platforms are available. There are over 8,000 registered users of the FEBio software suite. This workshop will provide a brief overview of the FEBio project, followed by presentation and demonstration of new capabilities in the software that have been added over the last two years. This will include computational fluid dynamics analysis, fluid-solid interactions, parameter optimization, and applications of the plugin framework. Following the presentations and demonstrations, we will moderate an open question-and-answer period for users and potential users.

Speakers:

Jeff Weiss (University of Utah)**Gerard Ateshian** (Columbia University)

| | |
|--------------------------|----------------------------|
| THURSDAY, JUNE 27 | Time 3:45 - 4:45 PM |
|--------------------------|----------------------------|

SB³C Women's Networking Event**Seven/Ten Bistro****Organizers:** Rita M. Patterson (University of North Texas Health Science Center)

Our purpose is to provide mentoring, networking, and communication for women involved in biomedical engineering to help further their careers and facilitate award nominations.

| | |
|--------------------------|----------------------------|
| THURSDAY, JUNE 27 | Time 5:30 - 7:00 PM |
|--------------------------|----------------------------|

Career Connections Mixer**Sessions 1 - 3****Organizers:** *Industry Committee and Student Leadership Committee*

The **Career Connections Mixer** is an opportunity for undergraduate students, graduate students and post docs to connect face-to-face with potential employers from the industry and academia to discuss career paths in bioengineering. Students are encouraged to attend, bring their resumes, and speak with professionals hiring in their field. Registration is required; those who register early (by May 15, 2019) may have the option of having their resume included in an employer handbook. The Career Connections Mixer is organized by the ASME BED Industry Committee and Student Leadership Committee. Students and employers can register at: <http://sb3c.org/program/career-connections/>.

| | |
|------------------------|----------------------------|
| FRIDAY, JUNE 28 | Time 5:30 - 6:30 PM |
|------------------------|----------------------------|

H.R. Lissner Medal Award Lecture: 3D Computational Modeling of the Three Legged Stool**Grand Ballroom****Jennifer S. Wayne, PhD** (Virginia Commonwealth University)

Biomedical Engineering advances rely heavily on experimental evidence informing theoretical and computational analyses. The impact of these successful relationships extends in multiple directions - engineering itself, clinical practice, education, etc. This presentation will focus on the computational work begun in my early years in the field for articular cartilage mechanics to our current 3D joint analyses, and how such efforts dovetail with the training of students and curricula.

**2019 RICHARD SKALAK AWARD
ASME JOURNAL OF BIOMECHANICAL ENGINEERING**

Each year the Editors-in-Chief and the editorial board members of the ASME Journal of Biomechanical Engineering select a paper that they believe is the most meritorious of all the papers published in the Journal in the previous calendar year. The authors of this paper are the recipients of the Richard Skalak Award, named after an early leader within the ASME Bioengineering community. The 2019 award winners will be announced at the conference banquet.

6 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

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.

2019 Jennifer S. Wayne, PhD

Dr. Jennifer S. Wayne is Professor of Biomedical Engineering at Virginia Commonwealth University. She received her BS degree in Engineering Mechanics (summa cum laude) from Virginia Tech, MS degree in Biomedical Engineering from Tulane University, and PhD degree in Bioengineering from the University of California at San Diego. She began her faculty career in 1991 at Virginia Commonwealth University in a joint appointment with Biomedical Engineering and Orthopaedic Surgery. She directs the VCU Orthopaedic Research Laboratory and is currently Associate Chair of Biomedical Engineering. She has mentored over 125 residents, fellows, and medical students in basic research as well as over 30 senior engineering capstone projects and 30 graduate theses.

Dr. Wayne's research efforts explore joint biomechanics from both experimental and computational approaches to characterize healthy function and for assessing effectiveness of reparative strategies. This began with articular cartilage function and expanded to 3D patient specific computational simulations. Dr. Wayne has served ASME in multiple capacities including the first female chair of the Bioengineering Division. She was elected Fellow of ASME in 2007. She is also a Fellow of AIMBE, a Program Evaluator for ABET, the international accrediting body for engineering and technology, and begins as BMES representative to the Engineering Accreditation Commission (EAC) of ABET in July 2019. In addition, Dr. Wayne has served on the Board of Directors of the Orthopaedic Research Society (ORS) and currently serves on the ORS Ethics Committee.



Savio L-Y. Woo Medal



2016 Baruch Barry Lieber
 2017 Arthur Erdman
 2018 Kyriacos A. Athanasiou
 2019 Rita M. Patterson

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.

2019 Rita M. Patterson, PhD

Rita M. Patterson, PhD., Professor, University of North Texas Health Science Center (UNTHSC) Fort Worth Texas, for biomechanics research on the hand and wrist that has led to changes in surgical interventions and has significantly impacted the treatment of patients with hand/wrist disorders; for well-cited and high-quality publications; and for influencing medical practice through the dedicated mentoring of students.

Her research revolves around applying engineering principles to solve medical problems in applied research in Orthopaedics, human performance, and rehabilitation (hmplab@unthsc.edu). The lab is a collaboration between several departments and schools in Fort Worth that are interested in human performance. Our team of engineers, physical therapists, physicians and basic scientists work together to understand biomechanics and kinematics in the neuro-musculo-skeletal system. Through video motion capture, virtual reality environments, custom instrumentation and computational modeling we analyze abnormal motions due to disease processes and evaluate rehabilitation treatments. Other aspects of my research include collaborations to develop soft robotic devices to measure joint function that can aid in the diagnosis of hand problems and help provide objective measures to track patient progress during rehabilitation. Ultimately this diverse team works together to understand biomechanics and kinematics to answer clinically meaningful questions that can help make people's lives better.

Patterson mentors students at all levels from high school to the post-doctoral level. She is an Associate Editor of the Journal of Hand Surgery and the ASME Journal of Medical Devices.

Patterson is an ASME fellow. She was an ASME minority leadership program intern and later member in the Center for Research and Technology. She has also been very active in the Bioengineering Division serving as member and chair for the student paper competition (1999-2002), chair of the Design, Dynamics, & Rehabilitation committee (2001-2003), chair of the Summer bioengineering meeting in Naples, FL (2010), and chair of the division (BED) in 2010. She is a founding organizer of the Women's Networking Event held annually at the summer meeting.

Patterson is a member of the American Institute for Medical and Biological Engineering. She and her students have received numerous awards for best scientific content at clinical and engineering meetings and in 2017 she received UNTHSC's first Medical School faculty achievement award for excellence in research, teaching and service.



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.

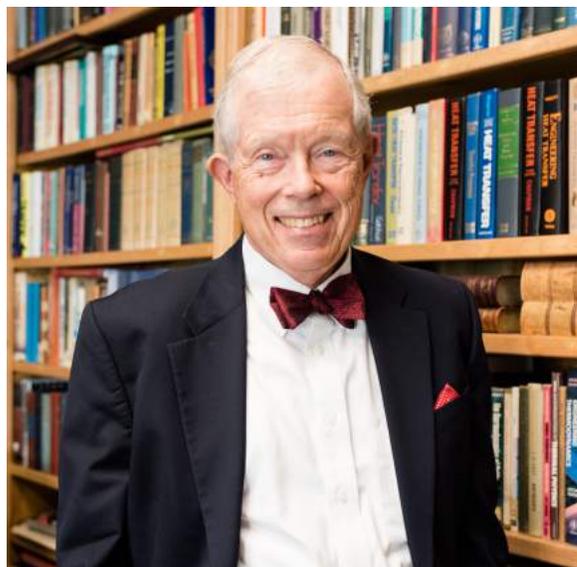
2019 Kenneth R. Diller, ScD

Ken Diller is the 2019 Nerem Medal Awardee for his leadership in establishing three Biomedical Engineering Departments within the University of Texas System, authoring a prominent Biotransport text, and mentoring more than 50 grad students, thousands of undergrads, and countless faculty at UT and across the United States. Ken was born and raised in Orrville, Ohio. He earned a Bachelor of Mechanical Engineering degree from Ohio State in 1966 (with honors) and a M.Sc. in 1967. Subsequently, he was awarded an Sc.D. in M.E. in 1972 from M.I.T. where he was one of the early grad students to focus on biomedical applications of engineering. He was an NIH Postdoc and became an Asst. Prof. in Mechanical Engineering at the University of Texas at Austin in 1973, with promotions to Assoc. Prof. in 1979 and Full Prof. in 1984. He served as department chair of Mechanical Engineering and then Biomedical Engineering covering a span of 19 years. Dr. Diller has held many leadership positions within the ASME and other professional organizations. He has chaired the Bioengineering Division (98-99), the BED Honors Committee (91-94), the Lissner Medal Committee (91-94), and the Biotransport Technical Committee (87-88).



2018 Roger D. Kamm
2019 Kenneth R. Diller

In addition, he was Editor of the Journal of Biomechanical Engineering (97-02). Dr. Diller has won numerous teaching and research awards internal to UT and internationally. He has been honored by ASME as: Fellow (90), Heat Transfer Division Memorial Award (94) and 75th Anniversary Medal (13), ASME Distinguished Lecturer (98-01), Lissner Medal (02), and Max Jakob Award (14). In addition, he received the UT Dad's Association University Teaching



Award (92), Alexander von Humboldt Fellow (83-84), NIH Fogarty Senior International Fellow (89-90), Ohio State Outstanding ME grad (92) and Thomas French Achievement Award (17), Cryobiology Luyet Medal (13), and Fellow membership of AAAS, AIMBE, BMES, Society for Cryobiology, and Clare Hall College at the Univ. of Cambridge.

Van C. Mow Medal

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

2019 Tony Jun Huang, PhD

Tony Jun Huang is the William Bevan Professor of Mechanical Engineering and Materials Science at Duke University. Previously he was a professor and the Huck Distinguished Chair in Bioengineering Science and Mechanics at The Pennsylvania State University. He received his Ph.D. degree in Mechanical and Aerospace Engineering from the University of California, Los Angeles (UCLA) in 2005. His research interests are in the fields of acoustofluidics, optofluidics, and micro/nano systems for biomedical diagnostics and therapeutics. He has authored/co-authored over 200 peer-reviewed journal publications in these fields. His journal articles have been cited more than 14,000 times, as documented at Google Scholar (h-index: 64). He also has 20 patents and invention disclosures.



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

He was elected a fellow of the following five professional societies: the American Institute for Medical and Biological Engineering (AIMBE), the American Society of Mechanical Engineers (ASME), the Institute of Electrical and Electronics Engineers (IEEE), the Institute of Physics (IOP), and the Royal Society of Chemistry (RSC). Huang's research has gained international recognition through numerous prestigious awards and honors including a 2010 National Institutes of Health (NIH) Director's New Innovator Award, a 2012 Outstanding Young Manufacturing Engineer Award from the Society for Manufacturing Engineering, a 2013 American Asthma Foundation (AAF) Scholar Award, JALA



Top Ten Breakthroughs of the Year Award in 2011, 2013, and 2016, the 2014 IEEE Sensors Council Technical Achievement Award from the Institute of Electrical and Electronics Engineers (IEEE), the 2017 Analytical Chemistry Young Innovator Award from the American Chemical Society (ACS), and the 2019 Van Mow Medal from the American Society of Mechanical Engineers (ASME).

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.



- 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

2019 Grace D. O'Connell, PhD

Grace D. O'Connell is an Assistant Professor of Mechanical Engineering at UC Berkeley, where she has been on the faculty since 2013. She is also an affiliated assistant professor in the Department of Orthopaedic Surgery at UC San Francisco. After receiving her BS in Aerospace Engineering from the University of Maryland, Dr. O'Connell trained with Dr. Dawn Elliott at the University of Pennsylvania in the Department of Bioengineering. Her PhD research focused on understanding the effect of injury and degeneration on disc joint and tissue-level mechanics, using noninvasive imaging, computational modeling, and mechanical testing techniques. She also did a post doc with Dr. Clark Hung at Columbia University, where her research focused on cartilage tissue engineering.

Her current research focuses on mechanobiology of fiber-reinforced soft tissues, such as the annulus fibrosus of the intervertebral discs. Combining skills from her PhD and postdoc training, her research group employs multi-scale computational modeling and mechanical testing to study tissue failure and mechanics with degeneration. Ongoing work is focused on understanding failure propagation through fiber-reinforced composites and how tissue remodeling due to disease alters stress distributions. Dr. O'Connell has been an active member of the ASME Bioengineering division since 2010, and is currently the Vice Chair of the Cell and Tissue Engineering Committee. Dr. O'Connell is the



recipient of the NSF CAREER award, the ACS Young Investigator Award, and is the inaugural chair of the Don M. Cunningham Professorship in Mechanical Engineering at UC Berkeley. She lives in Berkeley, California with her husband, Nathan Bartley, and is an avid rock climber.

7 Reviewers

The SB³C Conference and Program Committees thank all of our abstract reviewers!

| | | | |
|-----------------------|--------------------------|---------------------------|----------------------|
| Aggarwal, Ankush | Ahmadzadeh, Hossein | Akyildiz, Ali | Alford, Patrick |
| Amini, Rouzbeh | Anderson, Andrew | Andrews, Dennis | Arumugam, Jayavel |
| Arzani, Amirhossein | Avaz, Reza | Ayyalasomayajula, Avinash | Baek, Seungik |
| Baker, Brendon | Ban, Ehsan | Banks, Darren | Barocas, Victor |
| Bayly, Philip | Bell, Rebecca | Berman, Alycia | Bersi, Matthew |
| Bey, Michael | Bhattacharya, Shamik | Blokpoel, Lia | Brazile, Bryn |
| Brieu, Mathias | Calve, Sarah | Camarillo, David | Campbell, Ian |
| Canchi, Tejas | Chakraborty, Nilay | Chan, Deva | Chao, P. Grace |
| Chassagne, Fanette | Chivukula, Venkat Keshav | Choi, Joseph | Chueh, Juyu |
| Coats, Brittany | Cone, Stephanie | Connizzo, Brianne | Corr, David |
| Dabagh, Mahsa | Dahl, Joanna | Dasi, Lakshmi | Davalos, Rafael |
| De Vita, Raffaella | Deymier, Alix | Dholakia, Ronak | Dixon, Brandon |
| Doddasomayajula, Ravi | Doyle, Matthew | Dyment, Nathaniel | Eberhardt, Alan |
| Elmasry, Shady | Eskandari, Mona | Ethier, Ross | Feng, Yuan |
| Feola, Andrew | Ferruzzi, Jacopo | Figuroa, C. Alberto | Fischenich, Kristine |
| Fischer, Ken | Fisher, Matthew | Florio, Catherine | Furlong, Laura-Anne |
| Gallant, Nathan | Gallo, Diego | Gambaruto, Alberto | Gao, Cai |
| Gao, Xin | Garcia, Kara | Genin, Guy | George, Stephanie |
| George, Uduak | Gharraee, Nazli | Ghosh, Soham | Girard, Michael |
| Goergen, Craig | Goktas, Selda | Good, Bryan | Gouveia, Pedro |
| Grosberg, Anna | Gu, Qimei | Gullbrand, Sarah | Gurkan, Umut |
| Gustafson, Jonathan | Hang, Tianqi | Haskett, Darren | Hatoum, Hoda |
| He, Xiaoming "Shawn" | Heise, Rebecca | Henak, Corinne | Henderson, Jonathan |
| Henderson, Kyvory | Henninger, Heath | Heys, Jeff | Higginson, Jill |
| Hood, Lyle | Hosseini, Seyedhadi | Hua, Yi | Huang, Charles |
| Huang, Zhongping | Hyun, Sinjae | laquinto, Joseph | Jackson, Alicia |
| Jacot, Jeffrey | Jain, Kartik | Jamison, David | Jimnez, Juan |
| Joyce, Michael | Kadlowec, Jennifer | Kapnisis, Konstantinos | Keller, Brandis |
| Kemper, Andrew | Kennedy, Eric | Kersh, Mariana | Khandha, Ashutosh |
| Khoshgoftar, Mehdi | Kia, Danial Sharifi | Kishore, Vipuil | Knutsen, Andrew |
| Kolli, Kranthi | Korin, Netanel | Kraft, Reuben | Kuo, Calvin |
| Kurt, Mehmet | LaDisa, John | Lai, Victor | Lake, Spencer |
| Laksari, Kaveh | Leask, Richard | Lee, Chung-Hao | Lei, Ying |
| Leitkam, Sam | Lessner, Susan | Levene, Howard | Li, Kewei |
| Li, Ying | Liao, Jun | Lindsey, Stephanie | Lu, Jia |
| Lu, Yuan-Chiao | Lundberg, Hannah | Lv, Mengxi | Maher, Suzanne |
| Maiti, Spandan | Mao, Haojie | Marsden, Alison | Martin, Bryn |
| Martin, John | Merrill, Thomas | Meyer, Eric G. | Michalek, Arthur |
| Midha, Prem | Miller, Kristin | Moghaddam, Hesam | Mohanraj, Bhavana |
| Molony, David | Monson, Ken | Moore, Emily | Moraes, Christopher |
| Morbiducci, Umberto | Mukherjee, Debanjan | Murfee, Walter | Muthusamy, Jayaveera |
| Myers, Kristin | Nagatomi, Jiro | Nedrelov, David | Nerurkar, Nandan |
| Neu, Corey | Nguyen, Thao | Nicholas, Kurniawan | Nicolella, Daniel |
| Nikou, Amir | O'Connell, Grace | O'Leary, Cian | Oganesyan, Ruben |
| Ohashi, Toshiro | Oomen, Pim | Ozkan, Alican | Paliwal, Nikhil |
| Papaharilaou, Yannis | Patnaik, Sourav | Pedrigi, Ryan | Peloquin, John |
| Penkova, Anita | Pfeiffer, Ferris | Pierce, David M | Piskin, Senol |
| Ploeg, Heidi | Provenzano, Paolo | Puttlitz, Christian | Qin, Yixian |
| Qin, Zhenpeng | Quindlen-Hotek, Julia | Raghav, Vrishank | Raghavan, Raghu |
| Ramaswamy, Sharan | Rausch, Manuel | Raut, Samarth | Richardson, Will |

| | | | |
|------------------------|------------------|--------------------------|---------------------------------|
| Roccabianca, Sara | Roth, Joshua | Rowson, Steve | Rutledge, Bradley |
| Ryu, Jae Joong | Sacks, Michael | Sadegh, Ali | Saha, Amit |
| Samourides, Andreas | Sanches, Augusto | Sastry, Sudeep | Saw, Shier Nee |
| Schiele, Nathan | Segers, Patrick | Sewell-Loftin, M.K. | Shavik, Sheikh Mohammad |
| Shearn, Jason | Sheriff, Jawaad | Shetye, Snehal | Shiwariski, Daniel |
| Siefert, Andrew | Sigal, Ian A. | Singh, Anita | Singh, Sagar |
| Smith, Joshua | Soares, Joao | Solitro, Giovanni | Spratley, Meade |
| Steineman, Brett | Steinman, David | Stern, Amber | Stitzel, Joel |
| Stoker, Aaron | Stott, Shannon | Stylianou, Antonis | Sun, Wei |
| Szczesny, Spencer | Tang, Dalin | Tepole, Adrian Buganza | Thirugnanasambandam, Mirunalini |
| Thomopoulos, Stavros | Tian, Lian | Timmins, Lucas | Unal, Mustafa |
| Urban, Jillian | Vahdati, Ali | Valen-Sendstad, Kristian | Vande Geest, Jonathan |
| Vanderby, Ray | Voo, Liming | Wallace, Joseph | Wang, Hai |
| Wang, Liang | Wang, Sihong | Wang, Vincent | Wang, Yiru |
| Wang, Zhijie | Wayne, Jennifer | Weaver, Ashley | Wei, Feng |
| Weickenmeier, Johannes | Weiss, Dar | Weiss, Jeffrey | Wenk, Jonathan |
| Wheatley, Benjamin | Wilson, Sara | Win, Zaw | Winkelstein, Beth |
| Witzenburg, Colleen | Wojcik, Laura | Wood, Scott | Wu, Lyndia C. |
| Wu, Wei | Xu, Gang | Xu, Jun | Yang, Bin |
| Yang, Weiguang | Yap, Choon Hwai | Yoshida, Kyoko | Yousefi, Atieh |
| Yu, Guanglin | Zagorski, Wu Pan | Zakerzadeh, Rana | Zhan, Li |
| Zhang, Jianguye | Zhang, Liying | Zhang, Mingzi | Zhang, Yanhang (Katherine) |
| Zhao, Wei | Zhou, Yilu | | |

SCIENTIFIC SESSIONS

8 Podium Sessions

| | |
|---|---|
| Tuesday, June 25 | 3:45PM - 5:15PM |
| Thermal Damage Processes in Tissues | |
| Sunburst | |
| Session Chair: Rupak Banerjee <i>University of Cincinnati</i> | |
| Session Co-Chair: Liang Zhu <i>University of Maryland Baltimore County</i> | |
| 3:45PM | Adventures In Thermal Therapy: From Surgery To Cancer Treatment SB ³ C2019-001 John Pearce ¹ , ¹ <i>The University of Texas at Austin, United States</i> |
| 4:00PM | Microwave Thermal Therapy of Benign Adrenal Adenomas For Treatment of Primary Aldosteronism SB ³ C2019-002 Punit Prakash ¹ , Martin O'Halloran ² , Michael Dennedy ² , ¹ <i>Kansas State University, United States</i> , ² <i>National University of Ireland - Galway, Ireland</i> |
| 4:15PM | Metabolize Or Die: John Pearce'S Fascination With Bioenergetics In Cancer, and What We Know (and do Not Know) Now SB ³ C2019-003 Michael Graner ¹ , Petr Paucket ² , Natalie Serkova ³ , Anthony Fringuello ¹ , Steven Ojemann ¹ , Aviva Abosch ¹ , Julia Craft ¹ , Xiaoli Yu ¹ , ¹ <i>University of Colorado Denver, Anschutz Medical Campus, Department of Neurosurgery, United States</i> , ² <i>University of Colorado Denver, Anschutz Medical Campus, Department of Neurology, United States</i> , ³ <i>University of Colorado Denver, Anschutz Medical Campus, Department of Anesthesiology, United States</i> |
| 4:30PM | Examining Arrhenius Kinetics Over A Large Temperature Range SB ³ C2019-004 Daipayan Sarkar ¹ , Peiyuan Kang ¹ , Zhenpeng Qin ¹ , ¹ <i>University of Texas at Dallas, United States</i> |
| 4:45PM | Heating Protocol Design Affected By Thermal Damage Model In Magnetic Nanoparticle Hyperthermia For Cancer Treatment SB ³ C2019-005 Manpreet Singh ¹ , Qimei Gu ¹ , Ronghui Ma ¹ , Liang Zhu ¹ , ¹ <i>University of Maryland Baltimore County, United States</i> |
| Tuesday, June 25 | 3:45PM - 5:15PM |

Heart Valve Mechanics and Cardiovascular Devices

Snowflake

Session Chair: Ankush Aggarwal *University of Glasgow*

Session Co-Chair: Ali Akyildiz *Erasmus Medical Center*

- 3:45PM** **A Physiologically-Driven Biaxial Bioreactor System To Investigate Valve Interstitial Cell Phenotypic State After Surgical Repair** SB³C2019-006
Salma Ayoub¹, Jordan Graves¹, Chung-Hao Lee², Michael Sacks¹, ¹*The University of Texas at Austin, United States*, ²*The University of Oklahoma, United States*
- 4:00PM** **Restriction of Annulus Movement Alters The Dynamic Deformation and Strain Distribution of The Tricuspid Valve Leaflets: A Simulation Study** SB³C2019-007
Keyvan Amini Khoiy¹, Rouzbeh Amini¹, ¹*The University of Akron, United States*
- 4:15PM** **Tricuspid Valve Leaflet Strains In The Beating Ovine Heart** SB³C2019-008
Manuel Rausch¹, Mrudang Mathur¹, William Meador¹, Marcin Malinowski², Tomasz Jazwiec², Tomasz Timek², ¹*University of Texas at Austin, United States*, ²*Spectrum Health, United States*
- 4:30PM** **Materially Heterogeneous Annuloplasty Ring Reduces Loading On Posterior Annular Sutures** SB³C2019-009
Beatrice Ncho¹, Eric Pierce¹, Ajit Yoganathan¹, ¹*Georgia Institute Of Technology, United States*

4:45PM 3d Reconstructions of Deployed Coronary Stents In The Clinical Setting: Investigation of Distortion Effects From Curvature On The Circumferential Orientation of Oct Images SB³C2019-010
 Mark Elliott¹, David Molony², Brigham Smith³, Sarang Joshi¹, Habib Samady², Lucas Timmins¹, ¹University of Utah, United States, ²Emory University School of Medicine, United States, ³University of Utah School of Medicine, United States

5:00PM Effects of Right Ventricular Assist Device On Treating Pulmonary Arterial Hypertension: An In-Silico Study Using Image Based Biventricular Modeling Framework SB³C2019-011
 Sheikh Mohammad Shavik¹, Lik Chuan Lee¹, ¹Michigan State University, United States

| | |
|-------------------------|------------------------|
| Tuesday, June 25 | 3:45PM - 5:15PM |
|-------------------------|------------------------|

Cardiovascular Biomechanics and Tissue Engineering

Wintergreen

Session Chair: Joao Soares *Virginia Commonwealth University*

Session Co-Chair: Zhijie Wang *Colorado State University*

3:45PM Controlling Compliance of Polycaprolactone/gelatin Tissue Engineered Vascular Graft In A Rat Model SB³C2019-012
 Kenneth Furdella¹, Shinichi Higuchi¹, Kang Kim¹, William Wagner¹, Jonathan Vande Geest¹, ¹University of Pittsburgh, United States

4:00PM A Bio-Chemo-Mechanical Computational Model of Tissue Engineered Vascular Graft Development In Vivo SB³C2019-013
 Ramak Khosravi¹, Abhay Ramachandra¹, Jason Szafron¹, Christopher Breuer², Jay Humphrey¹, ¹Yale University, United States, ²Nationwide Children's Hospital, United States

4:15PM Role of Hyaluronic Acid In Regulation of Contractile Forces In Heart Valve Tissue Constructs SB³C2019-014
 Ying Lei¹, Luciano Bortolin¹, Frank Benesch-Lee¹, Teniola Oguntolu¹, Kristen Billiar¹, ¹Worcester Polytechnic Institute, United States

4:30PM Adipose Stromal Cell Secreted Factors Induce The Elastogenesis Cascade Within Aortic Smooth Muscle Cells SB³C2019-015
 Aneesh Ramaswamy¹, Rachel Sides¹, Eoghan Cunnane², David Vorp¹, Justin Weinbaum¹, ¹University of Pittsburgh, United States, ²University of Pittsburgh; Royal College of Surgeons in Ireland, United States

4:45PM Quantifying and Modeling Spatial Heterogeneity In Valve Interstitial Cells SB³C2019-016
 Emma Lejeune¹, Alex Khang¹, Michael Sacks¹, ¹University of Texas at Austin, United States

5:00PM Cyclic Stretch Causes Liberation of Caveolin-1 In Extracellular Vesicles From Vascular Smooth Muscle Cells SB³C2019-017
 Mohammad Shaver¹, Jessica Molina¹, Joshua Daniel Hutcheson¹, ¹Biomedical Engineering Department of Florida International University, United States

| | |
|-------------------------|------------------------|
| Tuesday, June 25 | 3:45PM - 5:15PM |
|-------------------------|------------------------|

Mechanics of Cartilage in Health and Disease

Seasons 1-3

Session Chair: Corinne Henak *University of Wisconsin-Madison*

Session Co-Chair: Corey Neu *University of Colorado Boulder*

3:45PM Focal Chondral Defects In The Dysplastic Hip Cause Activity- and Size-Dependent Increases In Stress and Strain SB³C2019-018

Jocelyn Todd¹, Travis Maak¹, Jeffrey Weiss¹, ¹University of Utah, United States

- 4:00PM Mechanical Property Changes In The Tibial Plateau Cartilage Following Traumatic Injury and Repair Procedures To The Lapine Knee** SB³C2019-019
Patrick Vaughan¹, Feng Wei¹, Albane Fauron¹, Loic Dejardin¹, Tammy Haut Donahue², Roger Haut¹, ¹Michigan State University, United States, ²University of Massachusetts - Amherst, United States
- 4:15PM Collagen-Derived Residual Stress Enhances The Biphasic Lubrication Property In Articular Cartilage** SB³C2019-020
Hiromichi Fujie¹, Soh Morishita¹, Seido Yarimitsu¹, ¹Tokyo Metropolitan University, Japan
- 4:30PM Shorter More Regular Activity Improves Cartilage Function Compared To Longer Less Regular Activity** SB³C2019-021
Brian Graham¹, Axel Moore², David Burris¹, Christopher Price¹, ¹University of Delaware, United States, ²Imperial College London, United Kingdom
- 4:45PM Impact of Decorin On Cartilage Pericellular Matrix Micromechanics and Chondrocyte Mechanotransduction** SB³C2019-022
Daphney R. Chery¹, Prashant Chandrasekaran¹, Qing Li¹, Biao Han¹, Su Chin J. Heo², Renato V. Iozzo³, Motomi Enomoto-Iwamoto⁴, Robert L. Mauck², Lin Han¹, ¹School of Biomedical Engineering, Science and Health Systems, Drexel University, United States, ²Department of Orthopaedic Surgery, University of Pennsylvania, United States, ³Department of Pathology, Anatomy and Cell Biology, Thomas Jefferson University, United States, ⁴Department of Orthopedics, University of Maryland, United States
- 5:00PM Through-Thickness Patterns of Shear Strain Change With Early-Stage Progression of Osteoarthritis** SB³C2019-023
Franz Maier¹, Courtland G. Lewis², David M. Pierce¹, ¹University of Connecticut, United States, ²Hartford Health-care, United States

| | |
|-------------------------|------------------------|
| Tuesday, June 25 | 3:45PM - 5:15PM |
|-------------------------|------------------------|

Reproductive and Abdominal Biomechanics

Seasons 4-5

Session Chair: Raffaella De Vita Virginia Tech

Session Co-Chair: Kristin Miller Tulane University

- 3:45PM Material Property Characterization of Human Cervical Tissue Based On Biphasic Viscoelastic Model** SB³C2019-024
Lei Shi¹, Joy Vink², Ronald Wapner², Kristin Myers¹, ¹Department of Mechanical Engineering, Columbia University, United States, ²Department of Obstetrics and Gynecology, Columbia University, United States
- 4:00PM Effects of Pelvic Organ Prolapse On The Biaxial Biomechanical Behavior of Post-Menopausal Uterosacral Ligament** SB³C2019-025
Elvis Danso¹, Jason Schuster¹, Isabella Johnson¹, Emily Harville¹, Laurephile Desrosiers², Leise Knoepp², Kristin Miller¹, ¹Tulane University, United States, ²Ochsner Clinical School, United States
- 4:15PM Rupture Mechanisms of The Vagina Under Inflation** SB³C2019-026
Jeffrey McGuire¹, Woowon Lee², Kimani Toussaint², Caleb Stine¹, Jennifer Munson¹, Raffaella De Vita³, ¹Virginia Tech, United States, ²University of Illinois at Urbana Champaign, United States, ³Virginia tech, United States
- 4:30PM Remodeling of The Diabetic Urinary Bladder: A Comparison of An Obese and A Lean Animal Model of Type II Diabetes** SB³C2019-027
Marissa Grobbel¹, Matthew Lewis¹, Anne Tonson¹, Robert Wiseman¹, Sara Roccabianca¹, ¹Michigan State University, United States

- 4:45PM Lactating Human Breast Response To Infant Oral Movements** SB³C2019-028
Diana Alatalo¹, Lin Jiang¹, Fatemeh Hassanipour¹, ¹*The University of Texas at Dallas, United States*
- 5:00PM Contribution To The Understanding of The Genese of The Ligamental System of The Pelvic System** SB³C2019-029
Olivier Mayeur¹, Mathias Brieu², Michel Cosson³, ¹*Centrale Lille, France*, ²*California State University, United States*, ³*CHR Lille - Jeanne de Flandres, France*

| | |
|-------------------------|------------------------|
| Tuesday, June 25 | 3:45PM - 5:15PM |
|-------------------------|------------------------|

Biomedical Engineering Education

Hemlock

Session Chair: Sara Wilson *University of Kansas*

Session Co-Chair: Choon Hwai Yap *National University of Singapore*

- 3:45PM Broadening Research Exposure and Research Participation In Mechanical Engineering: Findings From The Umbric Me S-Stem Scholarship Program** SB³C2019-030
Liang Zhu¹, Ronghui Ma¹, Deepa Madan¹, Charles Eggleton¹, L. D. Timmie Topoleski¹, Shuyan Sun¹, ¹*University of Maryland Baltimore County, United States*
- 4:00PM Lessons Learned: Five Years of The Biomedical Engineering In Simulations, Imaging, and Modeling (bme-Sim) Reu Site** SB³C2019-031
Stephanie George¹, ¹*East Carolina University, United States*
- 4:15PM Incorporating Clinical Rotations, Online Lectures, and Business Concepts In Bme Senior Capstone Design: Are We There Yet?** SB³C2019-032
Alan Eberhardt¹, Joel Dobbs¹, ¹*University of Alabama at Birmingham, United States*
- 4:30PM Outcomes of Incorporating Clinical Simulation Laboratories In Biomedical Engineering Education** SB³C2019-033
Anita Singh¹, Dawn Ferry¹, ¹*Widener University, United States*
- 4:45PM Industrial Ergonomics Risk Assessment Meets Research In The Biomechanics Classroom** SB³C2019-034
Johannes Brombach¹, Megan DeRidder², Laurel Kuxhaus², ¹*University of Applied Sciences, Germany*, ²*Clarkson University, United States*
- 5:00PM On The Role of Project-Based Active Learning Techniques On Computer Programming Self-Efficacy of Undergraduate Biomedical Engineering Students and The Interactive Effects of Gender** SB³C2019-035
S. Cyrus Rezvanifar¹, Rouzbeh Amini¹, ¹*The University of Akron, United States*

| | |
|-------------------------|------------------------|
| Tuesday, June 25 | 3:45PM - 5:15PM |
|-------------------------|------------------------|

Respiratory, Lymphatic, Ocular and Other Organ System Fluid Mechanics

Fox Den

Session Chair: Jessica Oakes *Northeastern University*

- 3:45PM Numerical Modeling of Lamina Cribrosa Hemodynamics** SB³C2019-036
Yi Hua¹, Bryn L. Brazile¹, Ian A. Sigal¹, ¹*University of Pittsburgh, United States*
- 4:00PM Particle Deposition Correlates With Wall Shear Stress Divergence In Human Airways** SB³C2019-037
Ali Farghadan¹, Kamran Poorbahrani², Sahar Jalal³, Jessica Oakes², Filippo Coletti³, Amirhossein Arzani¹, ¹*Northern Arizona University, United States*, ²*Northeastern University, United States*, ³*University of Minnesota, United States*

- 4:15PM Computational Modeling of Pathogen Leakage Through N95 Respirators** SB³C2019-038
Prasanna Hariharan¹, Neha Sharma², Gavin D'Souza², Suvajyoti Guha¹, Rupak Banerjee², Matthew Myers¹, ¹US Food and Drug Administration, United States, ²University of Cincinnati, United States
- 4:30PM Regional Targeting of Therapeutic Particles In Healthy and Asthmatic Lungs** SB³C2019-039
Kamran Poorbahrami¹, Sean Fain², David Mummy², Jessica Oakes¹, ¹Northeastern University, United States, ²University of Wisconsin-Madison, United States
- 4:45PM Differential Effects of Bladder Outlet Obstruction Associated Pressure Cycling On Urothelial Cell Inflammation and Fibrosis In Vitro** SB³C2019-040
Cody Dunton¹, Todd Purves², Francis Hughes², Jiro Nagatomi¹, ¹Clemson University, United States, ²Duke University Medical Center, United States
- 5:00PM Effect of Airway Cilia Properties On Its Physiological Functioning** SB³C2019-041
Uduak George¹, ¹San Diego State University, United States

| | |
|---------------------------|------------------------|
| Wednesday, June 26 | 9:30AM -11:00AM |
|---------------------------|------------------------|

Drug Delivery in Cancer, Ocular, and Central Nervous Systems

Sunburst

Session Chair: Ying Li *University of Connecticut*

Session Co-Chair: Bryn Martin *University of Idaho*

- 9:30AM In Vivo Measurement of Bevacizumab Diffusion Coefficient In The Rabbit Vitreous Humor Using Fluorescein Labeling** SB³C2019-042
Anita Penkova¹, Shuqi Zhang¹, Komsan Rattanakijstorn², Mark Humayun¹, Juan Carlos Martinez¹, Alejandra Gonzalez Calle¹, Ana Galesic¹, Abigail Tadde¹, Matthew Pratt¹, Mark Thompson¹, Satwindar Sadhal¹, ¹University of Southern California, United States, ²Ubon Ratchathani University, Thailand
- 9:45AM Precise Targeting of Polr2a As A Therapeutic Strategy For Human Triple Negative Breast Cancer** SB³C2019-043
Jiangsheng Xu¹, Xiaoming He¹, ¹University of Maryland, United States
- 10:00AM Characterization of Injection-Induced Tissue Swelling During Subcutaneous Injection of Biologics** SB³C2019-044
Yingnan Shen¹, Bumsoo Han¹, ¹Purdue University, United States
- 10:15AM Analysis of Convective and Diffusive Transport In The Brain Interstitium** SB³C2019-045
Lori Ray¹, Jeff Iliff², Jeff Heys¹, ¹Montana State University, Chemical & Biological Engineering, United States, ²Ohsu, United States
- 10:30AM Three-Dimensional Nonlinear Biphase Finite Element Model of Backflow During Flow-Controlled Infusions Into The Brain** SB³C2019-046
Gustavo Orozco¹, Joshua Smith², Jos Garca³, ¹University of Eastern Finland, Finland, ²Lafayette College, United States, ³Universidad del Valle, Colombia
- 10:45AM Relating Chemical and Physical Properties of Oligonucleotide Polyelectrolyte Complex Micelles** SB³C2019-047
Alexander Marras¹, Jeffrey Viereg¹, Jeffrey Ting¹, Matthew Tirrell¹, ¹University of Chicago, United States

| | |
|---------------------------|------------------------|
| Wednesday, June 26 | 9:30AM -11:00AM |
|---------------------------|------------------------|

Growth Remodeling and Repair I**Snowflake****Session Chair: Colleen Witzenburg** *University of Wisconsin***Session Co-Chair: Sara Roccabianca** *Michigan State University*

- 9:30AM Structural Remodeling and Volumetric Growth In The Right Ventricle Under Pulmonary Arterial Hypertension** SB³C2019-048
Reza Avaz¹, Emilio Mendiola¹, Michael Sacks², ¹*UT Austin, United States*, ²*University of Texas at Austin, United States*
- 9:45AM Mathematical Modeling of Regional Hypertensive Aortic Remodeling Reveals A Critical Role For Inflammation** SB³C2019-049
Marcos Latorre¹, Matthew Bersi², Jay Humphrey¹, ¹*Yale University, United States*, ²*Vanderbilt University, United States*
- 10:00AM Effect of Glucose On The Interlamellar Bonding of Arterial Elastin** SB³C2019-050
Ruizhi Wang¹, Xunjie Yu¹, Yanhang Zhang¹, ¹*Boston University, United States*
- 10:15AM Cortical Thickness Differences Emerge From Passive Physical Forces Generated By Growth** SB³C2019-051
Maria Holland¹, Ellen Kuhl², Alain Goriely³, ¹*University of Notre Dame, United States*, ²*Stanford University, United States*, ³*University of Oxford, United Kingdom*
- 10:30AM Targeting Cadherin-11 For Renal Fibrosis** SB³C2019-052
Tessa Huffstater¹, Leslie Gewin¹, W. David Merryman¹, ¹*Vanderbilt University, United States*
- 10:45AM Plastic Remodeling of Collagen Upon Tumor Growth Alters Fluid Transport Properties of The Extracellular Matrix** SB³C2019-053
Jacopo Ferruzzi¹, Meng Sun¹, Anastasia Gkousioudi¹, Anahita Pilvar¹, Darren Roblyer¹, Yanhang Zhang¹, Muhammad Zaman¹, ¹*Boston University, United States*

| | |
|---------------------------|------------------------|
| Wednesday, June 26 | 9:30AM -11:00AM |
|---------------------------|------------------------|

Celebration of YC Fung's 100th birthday**Wintergreen****Session Chair: Grace O'Connell** *UC Berkeley*

- 9:30AM Yc Fung Symposium Introduction** SB³C2019-054
Robert Nerem
- 9:45AM Pulmonary Arterial Mechanics: Something Old, Something New, Something Borrowed, Something Blue** SB³C2019-055
Naomi Chesler¹, ¹*University of Wisconsin - Madison, United States*
- 10:00AM Coronary Calcifications: From Vesicles To Plaque Rupture** SB³C2019-056
Natalia Maldonado¹, Luis Cardoso², Sheldon Weinbaum², ¹*New York City College of Technology, United States*, ²*The City College of New York, United States*
- 10:15AM The Impact of Hemodynamic Reflex Compensation Following Myocardial Infarction On Subsequent Ventricular Growth** SB³C2019-057
Colleen Witzenburg¹, Jeffrey Holmes², ¹*University of Wisconsin, United States*, ²*University of Virginia, United States*

- 10:30AM Effect of Ltbp-3 On The Circumferential and Axial Mechanics of The Aorta In A Mouse Model of Marfan Syndrome** SB³C2019-058
Arina Korneva¹, Arunika Makam², Jay Humphrey¹, Chiara Bellini², ¹*Yale University, United States*, ²*Northeastern University, United States*
- 10:45AM Contribution of Matrix Remodeling To Biaxial Mechanics of Right-Ventricular Myocardium In Pulmonary Arterial Hypertension** SB³C2019-059
Daniela Velez-Rendon¹, Justin Shieh², Daniela Valdez-Jasso², ¹*University of Illinois at Chicago, United States*, ²*University of California San Diego, United States*

| | |
|---------------------------|------------------------|
| Wednesday, June 26 | 9:30AM -11:00AM |
|---------------------------|------------------------|

Biomechanics of Lower and Upper Extremities

Seasons 1-3

Session Chair: Mariana Kersh *University of Illinois at Urbana-Champaign*

Session Co-Chair: Jennifer Wayne *Virginia Commonwealth University*

- 9:30AM Flexion Angle Dependent Differences In Joint Kinematics and Acl Force In Response To Applied Loads Are Conserved Throughout Skeletal Growth In The Porcine Stifle Joint** SB³C2019-060
Stephanie Cone¹, Danielle Howe¹, Emily Lambeth¹, Jorge Piedrahita², Jeffrey Spang³, Matthew Fisher¹, ¹*North Carolina State University and the University of North Carolina – Chapel Hill, United States*, ²*North Carolina State University, United States*, ³*University of North Carolina – Chapel Hill, United States*
- 9:45AM A Novel Geometric Ratio To Predict The Flexion Gap In Total Knee Arthroplasty** SB³C2019-061
Shady Elmasry¹, Peter Sculco¹, Timothy Wright¹, Andrew Pealre¹, Michael Cross¹, David Mayman¹, Cynthia Kahlenberg¹, Geoffrey Westrich¹, Carl Imhauser¹, ¹*Hospital for Special Surgery, United States*
- 10:00AM Micromotion In Tibial Components Recovered Post Mortem: A Pilot Study** SB³C2019-062
Heath Baskin¹, Elie Ghanem¹, Jack Lemons¹, Alan Eberhardt¹, ¹*University of Alabama at Birmingham, United States*
- 10:15AM Computational Mechanics Demonstrate How A Transcondylar Screw Enhances Healing of Subchondral Bone Cysts** SB³C2019-063
Lance Frazer¹, Elizabeth Santschi², Kenneth Fischer¹, ¹*University of Kansas, United States*, ²*Kansas State University, United States*
- 10:30AM A Generalized Framework For Objective Determination of Functional Musculoskeletal Joint Coordinate Systems** SB³C2019-064
Tara Nagle¹, Ahmet Erdemir¹, Robb Colbrunn¹, ¹*Cleveland Clinic, United States*
- 10:45AM Cartilage Contact Stiffness Effects On Contact Pressure and Area At The Elbow Joint** SB³C2019-065
Jonathan Parman¹, Cuneyd Gunay², Akin Cil¹, Antonis Stylianou¹, ¹*University of Missouri - Kansas City, United States*, ²*Eskisehir Osmangazi University, Turkey*

| | |
|---------------------------|------------------------|
| Wednesday, June 26 | 9:30AM -11:00AM |
|---------------------------|------------------------|

Ocular Biomechanics**Seasons 4-5****Session Chair: Rouzbeh Amini** *The University of Akron***Session Co-Chair: Andrew Feola** *Atlanta VA and Georgia Institute of Technology*

- 9:30AM A Multiscale Finite Element Modeling Approach To Characterize Iris Deformation** SB³C2019-066
Vineet Thomas¹, Sam Salinas¹, Anup Pant¹, Cyril Dorairaj², Rouzbeh Amini¹, ¹*The University of Akron, United States*, ²*Mayo Clinic, United States*
- 9:45AM Correlation of Human Lamina Cribrosa Strain Response To Axon Counts In The Optic Nerve Across Racioethnic Donor Eyes** SB³C2019-067
Hirut Kollech¹, Reza Behkam¹, Katelyn Axman¹, Jr-Jiun Liou¹, Jonathan Vande Geest¹, ¹*University of Pittsburgh, United States*
- 10:00AM Tensile Behavior of Anterior and Posterior Corneal Flaps Subjected To Cxl Treatment Procedure** SB³C2019-068
Hamed Hatami-Marbini¹, ¹*University of Illinois at Chicago, United States*
- 10:15AM Genomic Loci Modulating Ocular Compliance In Mice** SB³C2019-069
Elizabeth Boazak¹, Cassandra Chu¹, Rebecca King², Joseph Sherwood³, Darryl Overby³, Eldon Geisert², C. Ross Ethier¹, ¹*The Georgia Institute of Technology, United States*, ²*Emory University, United States*, ³*Imperial College London, United Kingdom*
- 10:30AM Characterizing The Actin and Gfap Network Structure of The Astrocytic Lamina In Mouse Eyes** SB³C2019-070
Yik Tung Tracy Ling¹, Mary Pease², Harry Quigley², Thao (Vicky) Nguyen¹, ¹*Department of Mechanical Engineering, Johns Hopkins University, United States*, ²*Wilmer Eye Institute, Johns Hopkins University, United States*
- 10:45AM Snapshot Polarized Light Microscopy To Visualize and Quantify Collagenous Soft Tissue Microstructure At 156 Frames/second** SB³C2019-071
Bin Yang¹, Po-Yi Lee¹, Bryn Brazile¹, Ian Sigal¹, ¹*University of Pittsburgh, United States*

| | |
|---------------------------|------------------------|
| Wednesday, June 26 | 9:30AM -11:00AM |
|---------------------------|------------------------|

Human Movement and Gait**Hemlock****Session Chair: Wu Pan Zagorski** *Lear Corporation***Session Co-Chair: Antonis Stylianou** *University of Missouri Kansas City*

- 9:30AM A Human Cadaveric Model For Quantifying Knee Joint Mechanics During Simulated Gait: Effect of Astm and Iso Derived Input Profiles** SB³C2019-072
Amanda Wach¹, Olufunmilayo Adebayo¹, Caroline Brial¹, Tony Chen¹, Russell Warren¹, Peter Torzilli¹, Suzanne Maher¹, ¹*Hospital for Special Surgery, United States*
- 9:45AM Predicted Gait Alterations Due To A Unilateral Reduction In Muscle Synergies** SB³C2019-073
Marleny Arones¹, Carolyn Patten², Benjamin J. Fregly¹, ¹*Rice University, United States*, ²*University of California, United States*
- 10:00AM System Identification of Pressure-Measuring Insoles For Determining Ground Reaction Force During Walking** SB³C2019-074
Jessica DeBerardinis¹, Janet S. Dufek¹, Mohamed B. Trabia¹, Yann Le Gall², Nicolas Da Silva Sacoto², ¹*University of Nevada Las Vegas, United States*, ²*Ecole Superieure d'Electronique de l'Ouest, France*

- 10:15AM Utilizing Cross-Correlation To Determine Phase Shift In Gait Data For A Neural Prosthesis** SB³C2019-075
Martin L. Tanaka¹, David Hudson¹, ¹*Western Carolina University, United States*
- 10:30AM Movement Patterns In Dancers** SB³C2019-076
Rita Patterson¹, Nathan Hersberger¹, Elizabeth Balyakina¹, Sajid Surve¹, ¹*University of North Texas Health Science Center, United States*
- 10:45AM Can Superhydrophobic Slip Flow Improve Centrifugal Blood Pump Performance and Reduce Blood Damage?** SB³C2019-077
Wei Xuan Chan¹, Vivek Vasudevan¹, Jia Jun Low Adriel¹, Janani Venkatesan¹, Choon-Hwai Yap¹, ¹*National University of Singapore, Singapore*

| | |
|---------------------------|------------------------|
| Wednesday, June 26 | 9:30AM -11:00AM |
|---------------------------|------------------------|

Data Driven Fluid Mechanics Modeling and Visualization

Fox Den

Session Chair: Alejandro Roldan-Alzate *University of Wisconsin-Madison*

- 9:30AM Non-Invasive Diagnostics of Coronary Artery Disease Using Machine Learning and Computational Fluid Dynamics** SB³C2019-078
Kritika Iyer¹, Christopher J. Arthurs², Cyrus P. Najarian¹, S.M. Reza Soroushmehr¹, Brahmajee K. Nallamothu¹, C. Alberto Figueroa¹, ¹*University of Michigan, United States*, ²*King's College London, United Kingdom*
- 9:45AM Statistical Modeling For Assessment of Aneurysm Rupture Status - Implications For Japanese and Finnish Populations** SB³C2019-079
Felicitas Detmer¹, Sara Hadad¹, Sven Hirsch², Philippe Bijlenga³, Yuya Uchiyama⁴, Juhana Frsen⁵, Juan Cebra¹, ¹*George Mason University, United States*, ²*ZHAW University of Applied Sciences, Switzerland*, ³*University of Geneva, Switzerland*, ⁴*Tokyo University of Science, Japan*, ⁵*Kuopio University Hospital, Finland*
- 10:00AM Accelerating Cardiovascular Model Building With Convolutional Neural Networks** SB³C2019-080
Gabriel Maher¹, Nathan Wilson², Alison Marsden¹, ¹*Stanford University, United States*, ²*Open Source Medical Software Corporation, United States*
- 10:15AM Cardiac Motion Tracking From Noisy Ultrasound Images - Exploiting Cyclic Constraint Fitted To Non-Rigid Image Registration** SB³C2019-081
Hadi Wiputra¹, Wei Xuan Chan¹, Yoke Yin Foo¹, Yu Zheng¹, Sheldon Ho¹, Choon Hwai Yap¹, ¹*National University Of Singapore, Singapore*
- 10:30AM Deep Neural Networks For Hemodynamic Analysis of Human Thoracic Aorta** SB³C2019-082
Liang Liang¹, Wenbin Mao², Wei Sun², ¹*Department of Computer Science at University of Miami, United States*, ²*Georgia Institute of Technology and Emory University, United States*
- 10:45AM Effect of Nonlinear Elastic Properties of Arterial Walls On Pulse Wave Propagation** SB³C2019-083
Alberto Coccarelli¹, Sanjay Pant¹, Ankush Aggarwal², ¹*Swansea University, United Kingdom*, ²*University of Glasgow, United Kingdom*

| | |
|---------------------------|-------------------------|
| Wednesday, June 26 | 11:15AM -12:45PM |
|---------------------------|-------------------------|

Biotransport in a Tumor Microenvironment

Sunburst

Session Chair: Sihong Wang *The City College of New York*

Session Co-Chair: Rana Zakerzadeh *University of Texas at Austin*

- 11:15AM Fast Tumor Spheroid Growth In Microfluidic Device** SB³C2019-084
Yaling Liu¹, Chris Uhl¹, Yuyuan Zhou¹, ¹*Lehigh University, United States*
- 11:30AM A Microfluidic Tissue Array For Mid-Throughput Drug Screening Using Tumor Tissues For Personalized Medicine** SB³C2019-085
AH Rezwanuddin Ahmed¹, Xuejun Jiang², Sarat Chandarlapaty², Sihong Wang¹, ¹*The City College of New York, United States*, ²*Memorial Sloan Kettering Cancer Center, United States*
- 11:45AM Circulating Tumor Cell Transport and Adhesion In Microfluidic Devices** SB³C2019-086
Jifu Tan¹, Zhenya Ding², Wei Li², ¹*Northern Illinois University, United States*, ²*Texas Tech University, United States*
- 12:00PM An In Vitro Tumor Platform For Modeling Breast Tumor Stromal Interactions and Characterizing The Subsequent Response** SB³C2019-087
Manasa Gadde¹, Marissa Rylander¹, ¹*University of Texas at Austin, United States*
- 12:15PM Computational Fluid Dynamics Model of Pressurized Intraperitoneal Aerosol Chemotherapy: Gravity Matters!** SB³C2019-088
Mohammad Rahimi-Gorji¹, Leen Van de Sande¹, Charlotte Debbaut¹, Patrick Segers¹, Wouter Willaert¹, Wim Ceelen¹, ¹*Ghent University, Belgium*
- 12:30PM Microtissues For Biomechanical Investigations of Angiogenesis** SB³C2019-089
M.K. Sewell-Loftin¹, Priscilla Hwang¹, Joshua Katz¹, Steve George², Gregory Longmore¹, ¹*Washington University School of Medicine in St. Louis, United States*, ²*University of California, Davis, United States*

| | |
|---------------------------|-------------------------|
| Wednesday, June 26 | 11:15AM -12:45PM |
|---------------------------|-------------------------|

Cardiac Mechanics

Snowflake

Session Chair: Manuel Rausch *University of Texas at Austin*

Session Co-Chair: Colleen Witzenburg *University of Wisconsin*

- 11:15AM A Robust 3d Constitutive Model For The Passive Properties of Left Ventricular Myocardium** SB³C2019-090
David Li¹, Reza Avazmohammadi¹, Samer Merchant², Tomonori Kawamura³, Edward Hsu², Joseph Gorman³, Robert Gorman³, Michael Sacks¹, ¹*The University of Texas at Austin, United States*, ²*University of Utah, United States*, ³*University of Pennsylvania, United States*
- 11:30AM Fast Predictions of Cardiac Growth During Ventricular Dyssynchrony** SB³C2019-091
Pim Oomen¹, Colleen Witzenburg², Thien-Khoi Phung¹, Kenneth Bilchick¹, Jeffrey Holmes¹, ¹*University of Virginia, United States*, ²*University of Wisconsin, United States*
- 11:45AM Role of Talin1 In Cardiac Fibroblasts On Cardiac Hypertrophy** SB³C2019-092
Natalie Noll¹, Qinkun Zhang¹, Hind Lal¹, W. David Merryman¹, ¹*Vanderbilt University, United States*

- 12:00PM Modeling of Anisotropic Reverse Cardiac Growth In Response To Local Alteration of Electromechanics** SB³C2019-093
Jayavel Arumugam¹, Ghassan Kassab², Lik Chuan Lee¹, ¹Michigan State University, United States, ²California Medical Innovations Institute, United States
- 12:15PM The Effect of Collagen Heterogeneity On Rat Myocardial Infarct Mechanics In A Multiscale Fiber Network Model** SB³C2019-094
Christopher Korenczuk¹, William Richardson², Victor Barocas¹, ¹University of Minnesota - Twin Cities, United States, ²Clemson University, United States
- 12:30PM Analyzing The Biomechanical Response of Failing Right Ventricular Tissue To Sacubitril/valsartan Treatment** SB³C2019-095
Danial Sharifikia¹, Claire Tushak¹, Evan Benza², Kang Kim³, Marc Simon³, ¹Department of Bioengineering, University of Pittsburgh, United States, ²Heart and Vascular Institute, University of Pittsburgh Medical Center (UPMC), United States, ³Department of Bioengineering, University of Pittsburgh; Division of Cardiology, School of Medicine, University of Pittsburgh; Heart and Vascular Institute, University of Pittsburgh Medical Center (UPMC); McGowan Institute for Regenerative Medicine, Univer, United States

| | |
|---------------------------|-------------------------|
| Wednesday, June 26 | 11:15AM -12:45PM |
|---------------------------|-------------------------|

Celebration of YC Fung's 100th birthday

Wintergreen

Session Chair: Spencer Lake *Washington University in St. Louis*

- 11:15AM Osmotic Swelling Behavior of The Pregnant Mouse Cervix and The Contribution of Hyaluronic Acid** SB³C2019-096
Charles Jayyosi¹, Shanmugasundaram Nallasamy², Priya Madhukaran², Mala Mahendroo², Kristin Myers¹, ¹Columbia University, United States, ²University of Texas Southwestern Medical Center, United States
- 11:30AM From Biomechanics To T Cell Affinity To Systems Immunology My Path In Biomedical Engineering That Is Inspired By Dr. Yc Fung** SB³C2019-097
Ning Jiang¹, ¹University of Texas at Austin, United States
- 11:45AM A Mathematical Model For The Post-Implant Collagen Maturation Behavior of Engineered Tissues** SB³C2019-098
Michael Sacks¹, ¹University of Texas at Austin, United States
- 12:00PM Non-Invasive Brillouin Moduli and Membrane Fluctuation Measurements of Live Tumor Cell Nuclei** SB³C2019-099
Anya Roberts¹, Vijay Singh¹, Peter So¹, Roger Kamm¹, ¹Mit, United States
- 12:15PM A Micromechanical Model For Collagenous Tissues and Applications To Study Growth and Remodeling** SB³C2019-100
Thao Vicky¹, ¹Johns Hopkins University, United States
- 12:30PM Yc Fung Symposium Conclusion** SB³C2019-101
Savio Woo

| | |
|---------------------------|-------------------------|
| Wednesday, June 26 | 11:15AM -12:45PM |
|---------------------------|-------------------------|

Mechanics of Cartilage and Meniscus

Seasons 1-3

Session Chair: Deva Chan *Rensselaer Polytechnic Institute*

Session Co-Chair: David M Pierce *University of Connecticut*

- 11:15AM Mechanical Property Changes In The Meniscus In A Novel Closed Joint Animal Impact and Surgical Model** SB³C2019-102

Gerardo Narez¹, Albane Fauron², Loic Dejardin², Feng Wei², Roger C. Haut², Tammy L. Haut Donahue¹,
¹University of Massachusetts, Amherst, United States, ²Michigan State University, United States

- 11:30AM Non-Invasive Mri Assessment of Meniscus and Cartilage Changes In A Large Animal Model of Meniscus Injury** SB³C2019-103
 Kyle Meadows¹, Sonia Bansal², John Peloquin¹, Liane Miller², Jay Patel², Kamiel Saleh², Michael Hast², Miltiadis Zgonis², Robert Mauck², Dawn Elliott¹, ¹University of Delaware, United States, ²University of Pennsylvania, United States
- 11:45AM Maintaining Cartilage Hydration During Sliding Part 2: Modes and Competitive Recovery Rates** SB³C2019-104
 David Burris¹, Axel Moore², Brian Graham¹, Jamie Benson¹, Caroline Kook¹, Steven Voinier¹, Christopher Price¹,
¹University of Delaware, United States, ²Imperial College London, United Kingdom
- 12:00PM Collagen Fiber Orientation and Mechanical Properties Correlate Across Human Articular Cartilage Zones** SB³C2019-105
 Kristine Fischenich¹, Joseph Wahlquist¹, Virginia Ferguson¹, ¹University of Colorado at Boulder, United States
- 12:15PM Toward Quantifying Changes In The Collagen Network of Human Articular Cartilage During Early-Stage Osteoarthritis** SB³C2019-106
 Szarek E. Phoebe¹, Magnus B. Lilledahl², Courtland G. Lewis³, David M. Pierce¹, ¹University of Connecticut, United States, ²Norwegian University of Science and Technology, Norway, ³Hartford Healthcare, United States
- 12:30PM Type III Collagen Is A Key Regulator of Collagen Fibrillar Structure In Cartilage Pericellular Matrix** SB³C2019-107
 Chao Wang¹, Becky Brisson², Qing Li¹, Masahiko Terajima³, Motomi Enomoto-Iwamoto⁴, Mitsuo Yamauchi³, Susan Volk², Lin Han¹, ¹Drexel University, United States, ²University of Pennsylvania, United States, ³University of North Carolina, United States, ⁴University of Maryland, United States

| | |
|---------------------------|-------------------------|
| Wednesday, June 26 | 11:15AM -12:45PM |
|---------------------------|-------------------------|

Injury: imaging

Seasons 4-5

Session Chair: Steve Rowson *Virginia Tech*

Session Co-Chair: Liming Voo *Johns Hopkins University Applied Physics Laboratory*

- 11:15AM A Comparison of The Deformation Response of The Brain To Mild Acceleration In The Axial and Sagittal Planes In A Healthy Volunteer** SB³C2019-108
 Andrew Knutsen¹, Arnold Gomez², Jerry Prince², Philip Bayly³, John Butman⁴, Dzung Pham¹, ¹The Henry M Jackson Foundation, United States, ²Johns Hopkins University, United States, ³Washington University in St. Louis, United States, ⁴National Institutes of Health, United States
- 11:30AM Longitudinal Head Impact Exposure and White Matter Integrity Analysis Among Returning Youth Football Players** SB³C2019-109
 Mireille Kelley¹, Jillian Urban², Derek Jones², Elizabeth Davenport³, Logan Miller², Beverly Snively⁴, Alexander Powers⁵, Christopher Whitlow⁶, Joseph Maldjian³, Joel Stitzel², ¹Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences, United States, ²Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, United States, ³Department of Radiology, University of Texas Southwestern, United States, ⁴Department of Biostatistical Sciences, Wake Forest School of Medicine, United States, ⁵Department of Neurosurgery, Wake Forest School of Medicine, United States, ⁶Department of Radiology (Neuroradiology), Wake Forest School of Medicine, United States
- 11:45AM Imaging and Mechanical Characterization of The Pia-Arachnoid Complex** SB³C2019-110
 Nikolaus Benko¹, Emma Luke², Yousef Alsanea¹, Brittany Coats¹, ¹University of Utah Mechanical Engineering, United States, ²University of Rochester Biomedical Engineering, United States

- 12:00PM Mechanical and Interfacial Characterization of Meningioma Through Mr Imaging** SB³C2019-111
Efe Ozkaya¹, Dominic Nistal², Zeynep Suar¹, Alexander Chartrain², Cassandra Gologorsky³, Priti Balchandani², Raj Shrivastava², Mehmet Kurt¹, ¹*Stevens Institute of Technology, United States*, ²*Icahn School of Medicine at Mount Sinai, United States*, ³*Cornell University, United States*
- 12:15PM A Network-Based Brain Injury Metric For Concussion Prediction** SB³C2019-112
Shaoju Wu¹, Wei Zhao¹, Bethany Rowson², Steve Rowson², Songbai Ji¹, ¹*Worcester Polytechnic Institute, United States*, ²*Virginia Tech, United States*
- 12:30PM Changes In Brain Tissue In Vivo Deformation Following Decompression Surgery In Chiari Patients** SB³C2019-113
Maggie Eppelheimer¹, Blaise Simplicie Talla Nwotchouang¹, Soroush Heidari Pahlavian², John Oshinski³, Daniel Barrow³, Rouzbeh Amini¹, Francis Loth¹, ¹*The University of Akron, United States*, ²*USC Stevens Neuroimaging and Informatics Institute University of Southern California, United States*, ³*Emory University, United States*

| | |
|---------------------------|-------------------------|
| Wednesday, June 26 | 11:15AM -12:45PM |
|---------------------------|-------------------------|

UG Design Competition

Hemlock

Session Chair: Michael Moreno *Texas A&M University*
Session Co-Chair: Ted Conway *Florida Institute of Technology*

- 11:15AM Design and Optimization of A Finger-By-Finger Vibrational Therapy** SB³C2019-114
Joshua Posen¹, George Durrant¹, Samuel Langlois¹, Chirsteen Abdalla¹, Gary Drzewiecki¹, ¹*Rutgers University, United States*
- 11:30AM Jogging Stroller Attachment Device For Natural Arm Motion** SB³C2019-115
Tamara Chambers¹, Amy Ramos¹, Meghan Blanks¹, ¹*Embry-Riddle Aeronautical University, United States*
- 11:45AM Assistive Device For Stretching Exercise In Patients With Frozen Shoulder Syndrome** SB³C2019-116
Maria Owsiak¹, Monsour Al Awami¹, Ryan Daher¹, Scott Goeltz¹, Rebecca Gomezrueda¹, Russel Maurer¹, Andrew Saylor¹, Ria Mazumder¹, ¹*Widener University, United States*
- 12:00PM Wearable Robotic Wrist Orthosis For Stroke Rehabilitation** SB³C2019-117
Neshat Baset¹, Dona Antony¹, Mahdi Haghshenas-Jaryani¹, Muthu Wijesundara¹, ¹*University of Texas at Arlington Research Institute, United States*
- 12:15PM Design of 3d Printed Robotic Glove Augmenting Manual Manipulation of Humans** SB³C2019-118
Mason Araujo¹, Immanuel Ponminissery¹, Seok Chang Ryu¹, ¹*Texas A&M University, United States*
- 12:30PM Assistive Device For Muscular Degeneration In The Upper Arm** SB³C2019-119
Alexandria Barber¹, Emily Eaton¹, Jillian Farmer¹, Samantha Gladd¹, Natalie Jagelski¹, Jenny Lin¹, ¹*Clarkson University, United States*

| | |
|---------------------------|-------------------------|
| Wednesday, June 26 | 11:15AM -12:45PM |
|---------------------------|-------------------------|

Translational Cardiovascular Diagnosis and Treatment

Fox Den

Session Chair: John LaDisa *Marquette University*

- 11:15AM Analyses of Hemodialysis Arteriovenous Fistula Geometry Obtained By Serial Magnetic Resonance Imaging** SB³C2019-120
Yong He¹, Daniel Pike², Yan-Ting Shiu², Prabir Roy-Chaudhury³, Alfred Cheung², Scott Berceci¹, ¹*University of Florida, United States*, ²*University of Utah, United States*, ³*University of Arizona, United States*

- 11:30AM Effect of Gravity On Hemodynamics In Cerebral Aneurysms - An In Vitro Study** SB³C2019-121
Melissa Brindise¹, Sean Rothenberger¹, Susanne Schnell², Michael Markl², David Saloner³, Vitaliy Rayz¹, Pavlos Vlachos¹, ¹*Purdue University, United States*, ²*Northwestern University, United States*, ³*University of California San Francisco, United States*
- 11:45AM A Nonlinear Mechanics-Based Virtual Coiling Method For Intracranial Aneurysm** SB³C2019-122
Seyyed Mostafa Mousavi Janbeh Sarayi¹, Robert J. Damiano¹, Palak Patel¹, Gary Dargush¹, Adnan H. Siddiqui¹, Hui Meng¹, ¹*University at Buffalo, The State University of New York, United States*
- 12:00PM Computational Assessment of Left-Ventricular Outflow Tract Hemodynamic Alterations In Discrete Subaortic Stenosis** SB³C2019-123
Jason Shar¹, Sundeep Keswani², Jane Grande-Allen³, Philippe Sucosky¹, ¹*Wright State University, United States*, ²*Texas Children's Hospital, United States*, ³*Rice University, United States*
- 12:15PM Blood Flow Modeling of Cerebral Aneurysm Treated With Intrasaccular Flow Diverting Devices** SB³C2019-124
Fernando Mut¹, Bong Jae Chung², Juan Cebral¹, ¹*George Mason University, United States*, ²*Montclair State University, United States*
- 12:30PM Impact of Post-Tavr Patient-Specific Geometry On Neo-Sinus Flow: A Computational Fluid Dynamics Study** SB³C2019-125
Shelly Singh-Gryzbon¹, Sanchita Bhat¹, Vahid Sadri¹, Joseph Choi¹, Mandy Salmon¹, Zhenglun (Alan) Wei¹, Philipp Ruile², Franz-Joseph Neumann², Philipp Blanke³, Ajit Yoganathan¹, ¹*Georgia Institute of Technology, United States*, ²*University Heart Center Freiburg-Bad Krozingen, Germany*, ³*St Paul's Hospital and University of British Columbia, Canada*

| | |
|--------------------------|------------------------|
| Thursday, June 27 | 9:30AM -11:00AM |
|--------------------------|------------------------|

PhD Paper Competition: Cell & Tissue engineering

Sunburst

Session Chair: Tamara Bush *Michigan State University*

Session Co-Chair: Zhenpeng Qin *The University Of Texas At Dallas*

- 9:30AM Igf-1 Suppresses Trpv4 Osmosensation Through The Map7 Binding Domain In Chondrocytes** SB³C2019-126
Nicholas Trompeter¹, Lauren Hurd¹, Joseph Gardinier², Victor DeBarros II¹, Mary Boggs¹, Randall Duncan¹, ¹*University of Delaware, United States*, ²*Henry Ford Health System, United States*
- 9:45AM High-Velocity Stretching Causes Mechanically-Induced Tau Pathology In Neurons** SB³C2019-127
Nicholas Braun¹, Dezhi Liao¹, Patrick Alford¹, ¹*University of Minnesota - Twin Cities, United States*
- 10:00AM Introduction of Heterogeneous Cell Properties For Modeling Emergent Stress Fields In Multicellular Systems** SB³C2019-128
Zachary Goldblatt¹, Heather Cirka¹, Habibeh Ashouri Choshali¹, Nima Rahbar¹, Dannel McCollum², Kristen Billiar¹, ¹*Worcester Polytechnic Institute, United States*, ²*UMASS Medical School, United States*
- 10:15AM Concentration Dependent Tgf-Beta Internalization Rate In Engineered Musculoskeletal Tissues** SB³C2019-129
Sedat Dogru¹, Danial Sharifikia¹, Samuel Sze¹, Michael Albro¹, ¹*Boston University, United States*
- 10:30AM A Micropatterning Approach To Study Cellular Communication Via Mechanical Forces In Fibrous Microenvironments** SB³C2019-130
Christopher Davidson¹, Brendon Baker¹, ¹*University of Michigan, United States*
- 10:45AM Endothelial Nitric Oxide Synthase Glycosylation Is A Potential Target For Reducing Endothelial Dysfunction** SB³C2019-131
Sarah Basehore¹, Alisa Morss Clyne¹, ¹*Drexel University, United States*

| | |
|--------------------------|------------------------|
| Thursday, June 27 | 9:30AM -11:00AM |
|--------------------------|------------------------|

PhD Paper Competition: Imaging, Injury, and Biomedical Engineering Education

Snowflake

Session Chair: Corinne Henak *University of Wisconsin-Madison*

Session Co-Chair: Victor Barocas *University of Minnesota*

9:30AM Developing A Stem+m Identity In Underrepresented Minority Groups Through Sports and Biomechanics SB³C2019-132

Brittany Marshall¹, Amy Loya², John Drazan³, Anthony Prato⁴, Nicole Conley⁵, Stavros Thomopoulos¹, Katherine Reuther¹, ¹*Columbia University, United States*, ²*Rensselaer Polytechnic Institute, United States*, ³*University of Pennsylvania, United States*, ⁴*SUNY Geneseo, United States*, ⁵*Union College, United States*

9:45AM 3d Strain Gradients Correlate With Murine Myocardial Infarct Severity SB³C2019-133

Arvin Soepriatna¹, John Boyle², Abigail Clifford¹, Alex Yeh¹, Semih Bezci³, Grace O'Connell³, Craig Goergen¹, ¹*Purdue University, United States*, ²*Washington University in Saint Louis, United States*, ³*University of California Berkeley, United States*

10:00AM Development of A Dual-Venc 4d Flow Mri Framework For The Generation of Patient Specific Aortic Finite Element Models SB³C2019-134

Jamie Concannon¹, Kevin Moerman¹, Peter Dockery¹, Peter McHugh¹, Christof Karmonik², Patrick McGarry¹, ¹*National University of Ireland Galway, Ireland*, ²*MRI Core, DeBakey Heart and Vascular Center, Houston Methodist, TX, USA, United States*

10:15AM 5-Ht2b Antagonism Controls Border Zone Mechanics To Improve Outcomes Following Myocardial Infarction SB³C2019-135

J. Caleb Snider¹, Qinkun Zhang¹, Hind Lal¹, W. David Merryman¹, ¹*Vanderbilt University, United States*

10:30AM An Integrated Machine Learning-Inverse Finite Element Approach For Identification of Patient-Specific Material Properties of The Aortic Wall From Clinical Ct Images SB³C2019-136

Minliang Liu¹, Liang Liang², Fatiesa Sulejmani¹, Xiaoying Lou³, Glen Iannucci³, Edward Chen³, Bradley Leshnowar³, Wei Sun¹, ¹*Georgia Institute of Technology, United States*, ²*University of Miami, United States*, ³*Emory University, United States*

10:45AM Comparative Analysis of Head Impact Kinematics In High School and Collegiate Football Using Mig2.0 Instrumented Mouthguard SB³C2019-137

Ileana Pirozzi¹, Michael Fanton¹, Chiara Giordano¹, Sohrab Sami¹, India Rangel¹, William Mehring¹, Pritha Roy¹, Brett Avery¹, Michael Zeineh¹, Gerald Grant¹, David Camarillo¹, ¹*Stanford University, United States*

| | |
|--------------------------|------------------------|
| Thursday, June 27 | 9:30AM -11:00AM |
|--------------------------|------------------------|

PhD Paper Competition: Extracellular Matrix Biomechanics

Wintergreen

Session Chair: Alejandro Roldan-Alzate *University of Wisconsin-Madison*

Session Co-Chair: Bahareh Behkam *Virginia Tech*

9:30AM Plasticity and Elasto-Plastic Damage Mechanics Using Reactive Constrained Solid Mixtures: A Modeling Approach For Biomedical Materials SB³C2019-138

Brandon Zimmerman¹, Gerard Ateshian¹, ¹*Columbia University, United States*

9:45AM Inflammatory and Non-Inflammatory Synovial Fluids Exhibit Distinct Tribological Phenotypes SB³C2019-139

Elizabeth Feeney¹, Devis Galesso², Cynthia Secchieri², Roberta Ramonda³, Lawrence Bonassar¹, ¹*Cornell University, United States*, ²*Fidia Farmaceutici S.p.A., Italy*, ³*University of Padua, Italy*

- 10:00AM Failure Mechanisms In The Tendon Enthesis Under Quasistatic, Cyclical, and Pathological Loading** SB³C2019-140
Mikhail Golman¹, Adam Abraham², Iden Kurtaliaj², Brittany Marshall², Guy Genin³, Victor Birman⁴, Stavros Thomopoulos², ¹*Columbia University, United States*, ²*Columbia University, United States*, ³*Washington University in St. Louis, United States*, ⁴*Missouri Science & Technology, United States*
- 10:15AM Real-Time Measurement of Collagen Architecture and Deformations At Sub-Micron Resolution** SB³C2019-141
Po-Yi Lee¹, Bin Yang¹, Ian A Sigal¹, ¹*University of Pittsburgh, United States*
- 10:30AM Collagen Fatigue Damage Evolves With Creep Strain and Is Strain Rate Dependent** SB³C2019-142
Jared Zitnay¹, Gang Seob Jung², Allen Lin¹, Zhao Qin², Yang Li¹, Markus Buehler², S. Michael Yu¹, Jeffrey Weiss¹, ¹*University of Utah, United States*, ²*Massachusetts Institute of Technology, United States*
- 10:45AM Collagen Denaturation Occurs Upon Tissue Failure In Energy Storing Tendons** SB³C2019-143
Allen Lin¹, Jared Zitnay¹, Alexandra Allan¹, Jeffrey Weiss¹, ¹*University of Utah, United States*

Thursday, June 27

9:30AM -11:00AM

Bone Mechanics**Seasons 1-3****Session Chair: Daniel Nicoletta** *Southwest Research Institute*

- 9:30AM Metabolic Acidosis Causes Physio-Chemically Induced Mechanical and Compositional Changes To Murine Bones** SB³C2019-144
Kathryn Morozov¹, Brian Wingender¹, Anna Peterson¹, Alix Deymier¹, ¹*UConn Health, United States*
- 9:45AM Effect of Hydration On Mechanical Properties of Individual Collagen Fibrils and Extrafibrillar Matrix** SB³C2019-145
Heber Martinez Barron¹, Wei Gao¹, Xiaodu Wang¹, ¹*University of Texas at San Antonio, United States*
- 10:00AM Effects of Exercise and Posture On Subchondral Bone Density and Thickness of Sheep** SB³C2019-146
Hyunggwil Song¹, John Polk¹, Mariana Kersh¹, ¹*University of Illinois at Urbana-Champaign, United States*
- 10:15AM Statistical Shape Analysis For The Assessment of Proximal Femur Shape Features Meaningful To Osteoporotic Risk of Fracture** SB³C2019-147
Alessandra Aldieri¹, Mara Terzini¹, Cristina Bignardi¹, Alberto L. Audenino¹, Umberto Morbiducci¹, ¹*Politecnico di Torino, Italy*
- 10:30AM Nondestructive Mapping of 3d Bone-Implant Contact and 3d Peri-Implant Strain** SB³C2019-148
Yuxiao Zhou¹, Chujie Gong¹, Mehran Hossaini-Zadeh², Jing Du¹, ¹*The Pennsylvania State University, United States*, ²*Temple University, United States*

Thursday, June 27

9:30AM -11:00AM

**Frontiers in Experiments, Imaging, and Modeling in Tissue
Solid Mechanics****Seasons 4-5****Session Chair: Adrian Buganza Tepole** *Purdue University***Session Co-Chair: Mathias Brieu** *California State University - Los Angeles*

- 9:30AM Choroidal Swelling Is Predicted To Cause Significant Optic Nerve Head Deformation: Potential Relevance To Sans** SB³C2019-149

Andrew Feola¹, Brian Samuels², Brandon Macias³, Michael Stenger⁴, Nimesh Patel⁵, C. Ross Ethier⁶, ¹Atlanta VA and Georgia Institute of Technology, United States, ²University of Alabama at Birmingham, United States, ³KBRwyle, United States, ⁴Nasa-jsc, United States, ⁵University of Houston, United States, ⁶Georgia Tech, United States

- 9:45AM Biomechanical Characterization of Active and Passive Properties of Murine Branch Pulmonary Arteries** SB³C2019-150
Abhay B. Ramachandra¹, Jay Humphrey¹, ¹Yale University, United States
- 10:00AM Effects of Long Term Spinal Cord Injury On The Mechanical Behavior of The Urinary Bladder Extracellular Matrix** SB³C2019-151
Tyler Tuttle¹, Heidi Lujan¹, Stephen DiCarlo¹, Sara Roccabianca¹, ¹Michigan State University, United States
- 10:15AM Multi-Scale Model of Pressure-Driven Hypoxia In The Skin Resulting From Microvascular Collapse** SB³C2019-152
Vivek Sree¹, Manuel Rausch², Adrian Buganza Tepole¹, ¹Purdue University, United States, ²The University of Texas at Austin, United States
- 10:30AM A Comparative Classification Analysis of Abdominal Aortic Aneurysm By Machine Learning Algorithms** SB³C2019-153
Balaji Rengarajan¹, Wei Wu¹, Crystal Weidner², Satish Mukul³, Mark Eskandari⁴, Ender Finol¹, ¹Department of Mechanical Engineering University of Texas at San Antonio San Antonio, TX, U.S.A., United States, ²Department of Management Science and Statistics University of Texas at San Antonio San Antonio, TX, U.S.A., United States, ³Department of Thoracic & Cardiovascular Surgery, Allegheny General Hospital Allegheny Health Network Pittsburgh, PA, U.S.A., United States, ⁴Division of Vascular Surgery, Feinberg School of Medicine Northwestern University Chicago, IL, U.S.A., United States
- 10:45AM Design, Calibration, and Preliminary Testing of A System To Measure The Viscoelastic Properties of A Pacinian Corpuscle** SB³C2019-154
Tiffany Senkow¹, Emily Chandler¹, Amy Moeller², Victor Barocas¹, ¹University Of Minnesota, United States, ²Twin Cities Orthopedics, United States

| | |
|--------------------------|------------------------|
| Thursday, June 27 | 9:30AM -11:00AM |
|--------------------------|------------------------|

Rehabilitation and Assistive Technologies

Hemlock

Session Chair: Sara Wilson *University of Kansas*

Session Co-Chair: Carrie Peterson *Virginia Commonwealth University*

- 9:30AM The Effect of Intermittent Theta Burst Stimulation On Biceps Corticomotor Excitability In Nonimpaired Individuals and Individuals With Tetraplegia** SB³C2019-155
Neil Mittal¹, Blaize Majdic¹, Carrie Peterson¹, ¹Virginia Commonwealth University, United States
- 9:45AM Inertial Measurement Units Used To Quantify Arm Elevation Angles of Manual Wheelchair Users and Able-Bodied Controls Throughout A Typical Day** SB³C2019-156
Brianna Goodwin¹, Stephen Cain², Meegan Van Straaten¹, Emma Fortune¹, Melissa Morrow¹, ¹Mayo Clinic, United States, ²University of Michigan, United States
- 10:00AM Exercise Therapy Affects Glenohumeral Kinematics In Patients With Isolated Supraspinatus Tears** SB³C2019-157
Luke Mattar¹, Camille Johnson¹, Tom Gale¹, Adam Popchak¹, James Irrgang¹, William Anderst¹, Volker Musahl¹, Richard Debski¹, ¹University of Pittsburgh, United States
- 10:15AM Changes In Hand Function Due To Basal Joint Suspensionplasty** SB³C2019-158
Joshua Drost¹, James Clarkson¹, Tamara Bush¹, ¹Michigan State University, United States

10:30AM Macroscopic Surface Deformation of Retrieved Glenoid Components For Total Shoulder Arthroplasty SB³C2019-159

Giuliana Davis¹, Noah Bonnheim¹, Louis Malito¹, Stephan Gunther², Tom Norris³, Lisa Pruitt¹, ¹*Department of Mechanical Engineering, University of California, Berkeley, United States*, ²*Martha Jefferson Hospital, United States*, ³*San Francisco Shoulder, Elbow & Hand Clinic, United States*

10:45AM Development of An Annular Flow Mechanism For Maintaining Intraocular Pressure With A Glaucoma Drainage Device SB³C2019-160

Sara Wilson¹, Anna Donovan¹, Hussain Alantari², Paul Munden³, Ronald Dougherty¹, ¹*University of Kansas, United States*, ²*University of Missouri - Kansas City, United States*, ³*Oklahoma City VA Health Care System, United States*

Thursday, June 27**9:30AM -11:00AM****Ventricular and Valvular Flow****Fox Den****Session Chair: Lakshmi Prasad Dasi** *Ohio State University***9:30AM Aortic Sinus Vortex Spatio-Temporal Variations With Leaflet Calcification SB³C2019-161**

Hoda Hatoum¹, Lakshmi Prasad Dasi¹, ¹*The Ohio State University, United States*

9:45AM An Initial Fluid Mechanics Study of Bioprosthetic Heart Valves In An Accelerated Dynamic Environment SB³C2019-162

Sailahari Ponnaluri¹, Ming-Chen Hsu², Michael Sacks³, Keefe Manning¹, ¹*The Pennsylvania State University, United States*, ²*Iowa State University, United States*, ³*University of Texas, United States*

10:00AM Experimental Testing of Polymeric Tavr Valve Performance In Patient-Specific Models SB³C2019-163

Brandon Kovarovic¹, Oren Rotman¹, Marvin Slepian², Danny Bluestein¹, ¹*Department of Biomedical Engineering, Stony Brook University, Stony Brook, NY, United States*, ²*Sarver Heart Center, University of Arizona, Tucson, AZ, United States*

10:15AM Comparative Quantification of Mitral Regurgitation By Computer Modeling and Simulated Echocardiography SB³C2019-164

Wenbin Mao¹, Andrs Caballero¹, Rebecca Hahn², Susheel Kodali², Wei Sun¹, ¹*Georgia Institute of Technology, United States*, ²*Columbia University Medical Center, United States*

10:30AM The Effects of Anterior Mitral Leaflet Laceration On Left Ventricular Flow With Transcatheter Mitral Valves: An In Vitro Study SB³C2019-165

Thomas Easley¹, Vahid Sadri¹, Pranav Dorbala¹, Norihiko Kamioka², Vasilis Babaliaros², Ajit Yoganathan¹, ¹*Georgia Institute of Technology, United States*, ²*Emory University, United States*

10:45AM Patient-Specific Modeling of The Left Ventricular Hemodynamics Using The Chimera Overset Mesh Technique SB³C2019-166

Federico Can¹, Matteo Selmi², Gianluca De Santis³, Alberto Redaelli⁴, Patrick Segers¹, Joris Degroote⁵, ¹*IBiTech bioMMeda, Department of Electronics and Information Systems, Ghent University, Belgium*, ²*Division of Cardiac Surgery, Department of Surgery, Universit di Verona, Italy*, ³*FEops NV, Belgium*, ⁴*Department of Electronics, Informatics and Bioengineering, Politecnico di Milano, Italy*, ⁵*Department of Flow, Heat and Combustion Mechanics, Ghent University, Belgium*

| | |
|-------------------|------------------|
| Thursday, June 27 | 11:15AM -12:45PM |
|-------------------|------------------|

PhD Paper Competition: Computational Biomechanics and Diagnostic Models

Sunburst

Session Chair: Chiara Bellini *Northeastern University*

Session Co-Chair: Craig Goergen *Purdue University*

- 11:15AM Designing Tissue Engineered Vascular Grafts For Young and Aged Hosts: In Vivo, Ex Vivo and In Silico Study** SB³C2019-167
Piyusha Gade¹, Keewon Lee¹, Yadong Wang², Anne Robertson¹, ¹*University of Pittsburgh, United States*, ²*Cornell University, United States*
- 11:30AM Computational Fluid Dynamics Modeling of Myocardial Bridging Using Coronary Angiography** SB³C2019-168
Mohammadali Sharzehee¹, Ran Gao², Yuan Chang², Jiangping Song², Hai-Chao Han³, ¹*University Of Texas At San Antonio, United States*, ²*Fuwai Hospital, China*, ³*Professor, United States*
- 11:45AM Axial Stretch Modulates Lymphatic Contractility: An Experimental-Computational Approach In A Novel Rat Tail Model** SB³C2019-169
Mohammad S. Razavi¹, Julie Leonard-Duke¹, Rebecca Hardie¹, Brandon Dixon¹, Rudolph Gleason¹, ¹*Georgia Institute of Technology, United States*
- 12:00PM Simulation of Cardiac Flow: Analysis of Geometry Simplification** SB³C2019-170
Fanwei Kong¹, Christoph Augustin², Kevin Sack³, Shawn Shadden¹, ¹*Department of Mechanical Engineering, University of California, Berkeley, United States*, ²*Institute of Biophysics, Medical University of Graz, Austria*, ³*Division of Biomedical Engineering Department of Human Biology, University of Cape Town, South Africa*
- 12:15PM A Combined Mri Arterial Spin Labeling and Computational Modeling Strategy To Quantify Patient-Specific Blood Flow and Perfusion In Cerebrovascular Occlusive Disease** SB³C2019-171
Jonas Schollenberger¹, Luis Hernandez-Garcia², C. Alberto Figueroa³, ¹*Department of Biomedical Engineering, University of Michigan, United States*, ²*fMRI Laboratory and Department of Biomedical Engineering, University of Michigan, United States*, ³*Departments of Surgery and Biomedical Engineering, University of Michigan, United States*
- 12:30PM Evaluation of Artificial Neural Networks As A Potential Rupture Discrimination Model** SB³C2019-172
Sricharan S Veeturi¹, Hamidreza Rajabzadeh-Oghaz¹, Jason M Davies¹, Hui Meng¹, ¹*University at Buffalo, United States*

| | |
|-------------------|------------------|
| Thursday, June 27 | 11:15AM -12:45PM |
|-------------------|------------------|

PhD Paper Competition: Morphogenesis, Development, Growth, and Remodeling

Snowflake

Session Chair: Kristin Miller *Tulane University*

Session Co-Chair: Jeffrey Weiss *University of Utah*

- 11:15AM Systematic Modulation of Cell-Cell Adhesion In Vivo Modulates Epithelial Tissue Mechanics and Remodeling** SB³C2019-173
Xun Wang¹, Karen Kasza¹, ¹*Columbia University, United States*
- 11:30AM Relating Bone Strain To Local Changes In Radius Microstructure Following 12 Months of Axial Forearm Loading In Women** SB³C2019-174
Megan Mancuso¹, Karen Troy¹, ¹*Department of Biomedical Engineering, Worcester Polytechnic Institute, United States*

- 11:45AM Effects of Reproduction and Lactation History On Rat Maternal Bone Mechano-Responsiveness and Osteocyte Microenvironment** SB³C2019-175
Yihan Li¹, Ashutosh Parajuli², Chantal de Bakker¹, Hongbo Zhao¹, Wei-Ju Tseng¹, Rebecca Chung¹, Liyun Wang², X. Sherry Liu¹, ¹*University of Pennsylvania, United States*, ²*University of Delaware, United States*
- 12:00PM Biphasic Network Model of Collagen and Elastin Remodelling Recapitulates Compositional and Organizational Changes During Aortic Growth and Development** SB³C2019-176
Ryan Mahutga¹, Victor Barocas¹, ¹*University of Minnesota, United States*
- 12:15PM Pregnancy and Lactation Impair Subchondral Bone Leading To Reduced Rat Supraspinatus Tendon Failure Properties** SB³C2019-177
Ashley Fung¹, Snehal Shetye¹, Yihan Li¹, X. Sherry Liu¹, Louis Soslowsky¹, ¹*University of Pennsylvania, United States*
- 12:30PM Modeling Adaptive Remodeling of The Bladder Wall During Aging** SB³C2019-178
Fangzhou Cheng¹, Lori Birder¹, Paul Watton², Anne Robertson¹, ¹*University of Pittsburgh, United States*, ²*University of Sheffield, United States*

| | |
|--------------------------|-------------------------|
| Thursday, June 27 | 11:15AM -12:45PM |
|--------------------------|-------------------------|

PhD Paper Competition: Cellular Mechanics, Drug Delivery, and Therapeutics **Wintergreen**

Session Chair: Sarah Bentil *Iowa State University*

Session Co-Chair: Brendon Baker *University of Michigan*

- 11:15AM Membrane Wrapping Efficiency of Elastic Nanoparticles During Endocytosis: Size and Shape Matter** SB³C2019-179
Zhiqiang Shen¹, Huilin Ye¹, Xin Yi², Ying Li¹, ¹*University of Connecticut, United States*, ²*Peking University, China*
- 11:30AM Neck Skin Thermal Features As A Measure of Stenosis In The Carotid Artery: Computational and In-Vivo Study** SB³C2019-180
Ashish Saxena¹, Eddie Yin Kwee Ng¹, Vignesh Raman¹, Soo Teik Lim², ¹*Nanyang Technological University, Singapore*, ²*National Heart Center Singapore, Singapore*
- 11:45AM A Cold-Responsive Nanoparticle Enables Intracellular Delivery and Rapid Release of Trehalose For Fast Freezing of Stem Cells** SB³C2019-181
Samantha Stewart¹, Xiaoming He², ¹*University of Maryland, College Park, United States*, ²*University of Maryland, College Park, United States*
- 12:00PM Engineering and Characterization of Collagenase-Expressing Salmonella Typhimurium For Enhanced Interstitial Transport In Tissue** SB³C2019-182
Eric Leaman¹, Bahareh Behkam¹, ¹*Virginia Tech, United States*
- 12:15PM A Systematic Approach To The Thermal Mitigation of Irreversible Electroporation Therapy** SB³C2019-183
Timothy O'Brien¹, Melvin Lorenzo¹, Yajun Zhao¹, Robert Neal, II², John Robertson¹, S. Nahum Goldberg³, Rafael Davalos¹, ¹*Department of Biomedical Engineering and Mechanics, Virginia Tech, United States*, ²*AngioDynamics, United States*, ³*Department of Radiology, Hadassah Hebrew University Hospital, Israel*
- 12:30PM Optical Opening of Blood-Brain Barrier For Macromolecules Penetration By Laser Excitation of Vasculature-Targeted Plasmonic Nanoparticles** SB³C2019-184
Xiaoqing Li¹, Hejian Xiong¹, Vamsidhara Vemireddy², Xiuying Li¹, Monica Giannotta³, Heather Hayenga¹, Edward Pan², Shashank Sirsi¹, Elisabetta Dejana³, Robert Bachoo², Zhenpeng Qin¹, ¹*University of Texas at Dallas, United States*, ²*University of Texas Southwestern Medical Center, United States*, ³*FIRC Institute of Molecular Oncology Foundation, Italy*

| | |
|--------------------------|-------------------------|
| Thursday, June 27 | 11:15AM -12:45PM |
|--------------------------|-------------------------|

Musculoskeletal Tissue Engineering

Seasons 1-3

Session Chair: *Alix Deymier UConn Health*

Session Co-Chair: *Spencer Szczesny Pennsylvania State University*

- 11:15AM Recapitulating The Complex Biomechanical Properties of Intervertebral Disc Using Tunable 3d Printing** SB³C2019-185
Samantha Marshall¹, Timothy Jacobsen¹, Kevin Anton¹, Archana Murali¹, Nadeen Chahine¹, ¹*Columbia University, United States*
- 11:30AM Orientation and Size of The Porcine Anterior Cruciate Ligament Vary Between Yorkshire and Yucatan Breeds At Early Adolescence** SB³C2019-186
Stephanie Cone¹, Danielle Howe¹, Emily Lambeth¹, Jorge Piedrahita², Lynn Fordham³, Jeffrey Spang³, Matthew Fisher¹, ¹*North Carolina State University and the University of North Carolina – Chapel Hill, United States*, ²*North Carolina State University, United States*, ³*University of North Carolina – Chapel Hill, United States*
- 11:45AM For Ligaments, Material Stiffness Is Not What It Appears To Be: How To Build More Accurate Material Models and Implications On Acl Graft Selection** SB³C2019-187
Callan Luetkemeyer¹, Ellen Arruda¹, ¹*University of Michigan, United States*
- 12:00PM An Engineered Biomaterial Microenvironment To Direct The Formation of A Living Barrier To Seal Cartilage Defects** SB³C2019-188
Jay Patel¹, Claudia Loebel¹, Brian Wise¹, Kamiel Saleh¹, James Carey¹, Jason Burdick¹, Robert Mauck¹, ¹*University of Pennsylvania, United States*
- 12:15PM Sustained Release of Tgf-3 From Heparinized Collagen Biofabric Induces Chondrogenic Differentiation of Human Mesenchymal Stem Cell Macromass** SB³C2019-189
Hyungjin Jung¹, Phillip McClellan¹, Ozan Akkus¹, ¹*Case Western Reserve University, United States*

| | |
|--------------------------|-------------------------|
| Thursday, June 27 | 11:15AM -12:45PM |
|--------------------------|-------------------------|

Nano to Micro Multiscale Mechanics

Seasons 4-5

Session Chair: *Kristin Myers Columbia University*

Session Co-Chair: *Vicky Nguyen Johns Hopkins University*

- 11:15AM A Computational and Experimental Study of Short Bowel Syndrome Biomechanics** SB³C2019-190
Hadi S. Hosseini¹, Jordan S. Taylor¹, James C. Y. Dunn¹, ¹*Stanford University, United States*
- 11:30AM A Discrete Fiber Network Model of Arterial Elastin Considering Inter-Fiber Crosslink** SB³C2019-191
Xunjie Yu¹, Yanhang Zhang¹, ¹*Boston University, United States*
- 11:45AM In Vivo Lamin A/c Deficiency Maintains Bulk Nuclear Shape and Stiffness, But Leads To Abrogated Intranuclear Mechanics and Chromatin Organization** SB³C2019-192
Soham Ghosh¹, Adrienne Scott¹, Jessica Kelly¹, Benjamin Seelbinder¹, Xin Xu¹, Stephanie Schneider¹, Corey Neu¹, ¹*University of Colorado Boulder, United States*
- 12:00PM Tunable Dna Nanocalipers Capable of Applying Forces To Biomolecules** SB³C2019-193
Jenny Le¹, Kyle Crocker¹, Michael Darcy¹, Michael Poirier¹, Ralf Bundschuh¹, Carlos Castro¹, ¹*The Ohio State University, United States*

- 12:15PM Microstructure of Tendon Reveals Helically Wrapped Fibrils With The Potential To Mediate Mechanical Load Transfer By Friction** SB³C2019-194
Babak N. Safa¹, John Peloquin¹, Jessica Natriello¹, Jeffrey Caplan¹, Dawn Elliott¹, ¹*University of Delaware, United States*
- 12:30PM Deformation Characteristics of The Rat Pia-Arachnoid Complex Through Multimodal Imaging** SB³C2019-195
Zeynep M. Suar¹, Gloria Fabris¹, Luke Langner¹, Mehmet Kurt¹, ¹*Stevens Institute of Technology, United States*

| | |
|--------------------------|-------------------------|
| Thursday, June 27 | 11:15AM -12:45PM |
|--------------------------|-------------------------|

Vascular Biomechanics

Hemlock

Session Chair: Patrick Alford *University of Minnesota*
Session Co-Chair: Seungik Baek *Michigan State University*

- 11:15AM Uncertainty Analysis of Vascular Surrogate Models** SB³C2019-196
Zhenxiang Jiang¹, Jongeun Choi², Seungik Baek¹, ¹*Michigan State University, United States*, ²*Yonsei University, South Korea*
- 11:30AM Effect of Calcification & Fibrous Tissue Features On Rupture Risk In Atherosclerotic Plaques** SB³C2019-197
Bas Vis¹, Hilary Barrett¹, Astrid Moerman¹, Frank Gijssen¹, Ali Akyildiz¹, ¹*Erasmus Medical Center, Netherlands*
- 11:45AM Initiation of Dissection In The Aortic Arch** SB³C2019-198
Brian FitzGibbon¹, Kevin Moerman¹, Peter McHugh¹, Patrick McGarry¹, ¹*National University of Ireland Galway, Ireland*
- 12:00PM Comparative Biomechanical Phenotyping of The Murine Central Vasculature** SB³C2019-199
Jay Humphrey¹, ¹*Yale University, United States*
- 12:15PM Regional Anisotropic Mechanical Characterization of Porcine Pulmonary Arteries** SB³C2019-200
Narasimha Rao Pillalamarri¹, Sourav Patnaik¹, Senol Piskin¹, Ender Finol¹, ¹*University of Texas at San Antonio, United States*
- 12:30PM Investigating The Effects of Extracellular Stiffness On Vascular Smooth Muscle Cell Stress and Mechanical Properties** SB³C2019-201
Elizabeth Shih¹, Patrick Alford¹, ¹*Department of Biomedical Engineering at University of Minnesota Twin Cities, United States*

| | |
|--------------------------|-------------------------|
| Thursday, June 27 | 11:15AM -12:45PM |
|--------------------------|-------------------------|

Patient-Specific Flow and Physiology

Fox Den

Session Chair: Amirhossein Arzani *Northern Arizona University*

- 11:15AM Cardiac Flow Dynamics of Healthy Volunteers : Sex Differences** SB³C2019-202
David Rutkowski¹, Gregory Barton¹, Christopher Francois¹, Alejandro Roldan-Alzate¹, ¹*University of Wisconsin-Madison, United States*
- 11:30AM Wall Shear Stress Topological Skeleton Identification In Cardiovascular Flows: A Practical Approach** SB³C2019-203

Valentina Mazzi¹, Diego Gallo¹, Karol Cal¹, Muhammad O. Khan², David A. Steinman³, Umberto Morbiducci¹,
¹Polito BIOMed Lab, Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Turin, Italy,
²Cardiovascular Biomechanics Computation Lab, Department of Pediatrics Stanford University, Stanford, United States,
³Biomedical Simulation Laboratory, Department of Mechanical & Industrial Engineering University of Toronto, Toronto, Canada

- 11:45AM Patient-Specific Fluid-Structure Interaction Analysis of A Bicuspid Aortic Valve** SB³C2019-204
 Monica Emendi¹, Ram Ghosh², Matteo Bianchi², Francesco Sturla³, Filippo Piatti³, Alberto Redaelli¹, Danny Bluestein², ¹Politecnico di Milano, Italy, ²Stony Brook University, United States, ³IRCCS Policlinico San Donato, Italy
- 12:00PM Introduction of A Simple 2d Computational Model To Predict Risk of Coronary Obstruction During Transcatheter Aortic Valve Replacement** SB³C2019-205
 Megan Heitkemper¹, Hoda Hatoum¹, Amirsepher Azimian¹, Breandan Yeats¹, Jennifer Dollery¹, Bryan Whitson¹, Gregory Rushing¹, Juan Crestanello¹, Scott Lilly¹, Lakshmi Prasad Dasi¹, ¹The Ohio State University, United States
- 12:15PM Machine Learning For Discrimination of Posterior Communicating Artery Aneurysm Rupture Status** SB³C2019-206
 Felicitas Detmer¹, Daniel Lckehe², Fernando Mut¹, Martin Slawski¹, Sven Hirsch³, Philippe Bijlenga⁴, Gabriele von Voigt², Juan Cebra¹, ¹George Mason University, United States, ²Leibniz University Hannover, Germany, ³ZHAW University of Applied Sciences, Switzerland, ⁴University of Geneva, Switzerland
- 12:30PM A Reduced Order Modeling Method For Cardiovascular Flow** SB³C2019-207
 Mehran Mirramezani¹, Shawn Shadden¹, ¹University of California, Berkeley, United States

Friday, June 28

12:00PM - 1:30PM

Biotransport in Thermal Therapy and Cryopreservation

Sunburst

Session Chair: R. Lyle Hood *University of Texas at San Antonio*

Session Co-Chair: Nilay Chakraborty *University of Michigan Dearborn*

- 12:00PM Whole Body Hyperthermia Induced Interstitial Fluid Pressure Reduction and Enhanced Nanoparticle Delivery To Pc3 Tumors** SB³C2019-208
 Qimei Gu¹, Shuaishuai Liu¹, Arunendra Saha Ray¹, Lance Dockery¹, Marie-Christine Daniel¹, Charles Bieberich¹, Ronghui Ma¹, Liang Zhu¹, ¹University of Maryland Baltimore County, United States
- 12:15PM Quantification of Tissue Electrical and Thermal Response Due To High Frequency Irreversible Electroporation: A Pilot Study In Ex Vivo Perfused Livers** SB³C2019-209
 Melvin Lorenzo¹, Tim O'Brien², Kenneth Aycock¹, Navid Manuchehrabadi³, Rafael Davalos¹, ¹Department of Biomedical Engineering and Mechanics Virginia Polytechnic and State University, United States, ²Virginia Department of Biomedical Engineering and Mechanics Virginia Polytechnic and State University, United States, ³AngioDynamics, United States
- 12:30PM Magnetic Nanoparticle Hyperthermia For Pancreatic Cancer: A Computational Study** SB³C2019-210
 Anilchandra Attaluri¹, Sri Kamal Kandala², Robert Ivkov³, ¹The Pennsylvania State University - Harrisburg, United States, ²University of Texas MD Anderson Cancer Center, United States, ³Johns Hopkins University School of Medicine, United States
- 12:45PM In Situ Photo-Inactivation of Proteins By Molecular Hyperthermia** SB³C2019-211
 Peiyuan Kang¹, Xiaoqing Li¹, Stephanie Shiers¹, Hejian Xiong¹, Theodore Price¹, Zhenpeng Qin¹, ¹The university of texas at dallas, United States

- 1:00PM Diffusion Limited Cryopreservation of Arterial Tissue To 1.5 Mm With Radiofre-Quency Heated Metal Forms** SB³C2019-212
Zonghu Han¹, Zhe Gao¹, Anirudh Sharma², John Bischof², ¹University Of Minnesota, United States, ²University of Minnesota, United States
- 1:15PM Counterintuitive Scaling Effects In The Developing Thermomechanical Stress During Cryogenic Cooling of The Kidney With Implications To Electromagnetic Rewarming For Organ Banking** SB³C2019-213
Prem Solanki¹, Yoed Rabin¹, ¹Carnegie Mellon University, United States

Friday, June 28

12:00PM - 1:30PM

Aneurysm Mechanics**Snowflake****Session Chair: Spandan Maiti** *University of Pittsburgh***Session Co-Chair: Yanhang (Katherine) Zhang** *Boston University*

- 12:00PM Patient-Specific Estimation of Ascending Thoracic Aneurysm Growth and Remodeling: Fem Based Constrained Mixture Model** SB³C2019-214
S. Jamaledin Mousavi Mousavi¹, Stephane Avril¹, ¹Mines Saint-Etienne, Univ Lyon, Univ Jean Monnet, INSERM, U 1059 Sainbiose, Centre CIS, F - 42023 Saint-Etienne France, France
- 12:15PM Machine Learning Prediction of Rupture Strength of Ascending Aortic Aneurysm Tissue** SB³C2019-215
Xuehuan He¹, Anna Ferrara², Yuanming Luo¹, Ferdinando Auricchio², Jia Lu¹, ¹University Of Iowa, United States, ²Universit degli Studi di Pavia, Italy
- 12:30PM Wall Stress and Geometric Measures In Electively Repaired Abdominal Aortic Aneurysms** SB³C2019-216
Balaji Rengarajan¹, Wei Wu¹, Mirunalini Thirugnanasambandam², Shalin Parikh², Raymond Gomez¹, Ender Finol¹, ¹Department of Mechanical Engineering University of Texas at San Antonio San Antonio, TX, U.S.A., United States, ²UTHSA/UTHSA Joint Graduate Program in Biomedical Engineering University of Texas at San Antonio San Antonio, TX, U.S.A., United States
- 12:45PM A Particle-Based Model Reveals An Insidious Feed-Back Loop Between Aortic Lamellar Disruption and Cell Apoptosis** SB³C2019-217
Hossein Ahmadzadeh¹, Jay Humphrey¹, ¹Yale University, United States
- 1:00PM Alterations In Biomechanical Properties of Aortic Wall In A Mouse Model of Marfan Syndrome** SB³C2019-218
Nazli Gharraee¹, Rahul Raghavan¹, Yujian Sun¹, Susan Lessner¹, ¹University of South Carolina, United States
- 1:15PM Can The Elastase Induced Aneurysm Model Be Used To Study Remodeling In Saccular Aneurysms** SB³C2019-219
Chao Sang¹, David Kallmes², Watkins Simon¹, Anne Robertson¹, ¹University of Pittsburgh, United States, ²Mayo Clinic, United States

Friday, June 28

12:00PM - 1:30PM

Mechanobiology - a Symposium in Memory of Christopher R. Jacobs**Wintergreen****Session Chair: Eno Ebong** *Northeastern University***Session Co-Chair: Ed Guo** *Columbia University*

- 12:00PM Adhesion Models For Cell Migration Simulator On Continuous Substrate** SB³C2019-220
Jay Hou¹, Liam Tyler¹, Daniel Keefe¹, David Odde¹, Victor Barocas¹, ¹University of Minnesota, United States

- 12:15PM Red Blood Cell Biomechanics In Chronic Fatigue Syndrome** SB³C2019-221
Amit Saha¹, Brendan Schmidt², Arun Kumar², Amir Saadat¹, Vineeth Suja¹, Vy Nguyen², Justin Do², Wendy Ho², Mohsen Nemat-Gorgani¹, Eric Shaqfeh¹, Anand Ramasubramanian², Ronald Davis¹, ¹*Stanford University, United States*, ²*San Jose State University, United States*
- 12:30PM Development of Recombinant Inner-Ear Motor Protein Prestin Equipped With Affinity Tag** SB³C2019-222
Michio Murakoshi¹, Hiroshi Wada², ¹*Kanazawa University, Japan*, ²*Tohoku Bunka Gakuen University, Japan*
- 12:45PM Inhibition of Gsk-3 By Licl Does Not Affect Msc Differentiation In Vitro Or Bone Formation In Situ** SB³C2019-223
Alyssa Oberman¹, Angela Patel¹, Glen Niebur¹, ¹*University of Notre Dame, United States*
- 1:00PM Mechanical Feedback and Cooperativity In A Theoretical Model of Airway Smooth Muscle Cell-Matrix Adhesion** SB³C2019-224
Linda Irons¹, Markus Owen², Reuben O'Dea², Bindi Brook², ¹*Yale University, United States*, ²*University of Nottingham, United Kingdom*
- 1:15PM Extracellular Matrix Stiffness Regulates Calcium Oscillations In Multicellular Ensembles, But Not In Isolated Cells** SB³C2019-225
Suzanne Stasiak¹, Ryan Jamieson¹, Hari Krishnan Parameswaran¹, ¹*Northeastern University, United States*

Friday, June 28

12:00PM - 1:30PM

Imaging and Mechanics of Ligament and Tendon**Seasons 1-3****Session Chair: Mona Eskandari** *University of California Riverside***Session Co-Chair: Mariana Kersh** *University of Illinois at Urbana-Champaign*

- 12:00PM Elastography Evaluation of The Elbow Ulnar Collateral Ligament In Overhead Throwing Athletes** SB³C2019-226
Seyedali Sadeghi¹, Dov Bader¹, Daniel Cortes¹, ¹*Penn State University, United States*
- 12:15PM Assessment of Tendon Hydraulic Permeability Using Osmotic Loading and Biphasic Finite Element Modeling** SB³C2019-227
Babak N. Safa¹, Ellen Bloom¹, Andrea Lee¹, Michael Santare¹, Dawn Elliott¹, ¹*University of Delaware, United States*
- 12:30PM Three Dimensional Morphological Changes In Carpal Tunnel Ligament Arch In Response To Wrist Compressive Forces** SB³C2019-228
Rakshit Shah¹, Zong-Ming Li¹, ¹*Hand Research Laboratory, Department of Biomedical Engineering, United States*
- 12:45PM Fibroblast-Like Synoviocytes Alter Matrix Mechanics & Neuronal Mmp-1 Expression Under Tensile Failure To Different Degrees Depending On Concentration** SB³C2019-229
Meagan Ita¹, Nicholas Stiansen¹, Sarah St Pierre², Beth Winkelstein¹, ¹*University of Pennsylvania, United States*, ²*Worcester Polytechnic Inst, United States*
- 1:00PM Aging Adversely Affects Different Rat Rotator Cuff Tendons Similarly** SB³C2019-230
Joseph Newton¹, George Fryhofer¹, Snehal Shetye¹, Ashley Rodriguez¹, Andrew Kuntz¹, Lou Soslowsky¹, ¹*University of Pennsylvania, United States*
- 1:15PM Comparison of The Deformation Behavior of The Anterior Cruciate Ligament In Response To Various External Knee Loadings** SB³C2019-231
Satoshi Yamakawa¹, Richard Debski¹, Hiromichi Fujie², ¹*University of Pittsburgh, United States*, ²*Tokyo Metropolitan University, Japan*

| | |
|------------------------|-------------------------|
| Friday, June 28 | 12:00PM - 1:30PM |
|------------------------|-------------------------|

Injury: Models**Seasons 4-5****Session Chair: Brittany Coats** *University of Utah***Session Co-Chair: Mehmet Kurt** *Stevens Institute of Technology*

- 12:00PM Development of Finite Element Model of Subhuman Primate Brain and Investigation of Diffuse Axonal Injury Thresholds Induced By Head Rotation** SB³C2019-232
Tushar Arora¹, Priya Prasad², Liying Zhang¹, ¹Wayne State University, United States, ²Prasad Engineering, LLC, United States
- 12:15PM Development of A Computational Biomechanics Mouse Model For Traumatic Axonal Injury** SB³C2019-233
Connor Bradfield¹, Liming Voo¹, KT Ramesh², ¹Johns Hopkins Applied Physics Lab, United States, ²Johns Hopkins Department of Mechanical Engineering, United States
- 12:30PM A Study of The Brain-Skull Interface Conditions of The Worcester Rat Head Injury Model (wrhim)** SB³C2019-234
Wei Zhao¹, Brian Stemper², Songbai Ji¹, ¹Worcester Polytechnic Institute, United States, ²Marquette University & Medical College of Wisconsin, United States
- 12:45PM Probabilistic Analysis of Injury Risk Using Human Body Finite Element Models** SB³C2019-235
Travis Eliason¹, Matthew Davis², Derek Jones², Daniel Nicoletta¹, ¹Southwest Research Institute, United States, ²Elemance, United States
- 1:00PM Characterization of Injured Brain Tissue After Controlled Cortical Impact** SB³C2019-236
Suhao Qiu¹, Wenheng Jiang², Changxin Lai¹, Tianyao Wang³, Wei Chen², Luyang Tao², Mingyuan Gao², Jun Liu³, Jianfeng Zeng², Yuan Feng¹, ¹Shanghai Jiao Tong University, China, ²Soochow University, China, ³Fudan University, China
- 1:15PM A Model of Tension-Induced Organization of Subcortical Axons During Cortical Folding of The Brain** SB³C2019-237
Kara Garcia¹, Christopher Kroenke², Philip Bayly³, ¹Indiana University School of Medicine, United States, ²Oregon Health and Science University, United States, ³Washington University in St. Louis, United States

| | |
|------------------------|-------------------------|
| Friday, June 28 | 12:00PM - 1:30PM |
|------------------------|-------------------------|

Cardiovascular and Musculoskeletal Device Design**Hemlock****Session Chair: Amy Throckmorton** *Drexel University***Session Co-Chair: Lucas Timmins** *University of Utah*

- 12:00PM Synthesis and Characterization of Porous Shape Memory Polymer Materials For Use In The Design of Implantable Medical Devices** SB³C2019-238
Robert Kunkel¹, Jingyu Wang¹, Jishan Luo¹, Bradley Bohnstedt², Yingtao Liu¹, Chung-Hao Lee¹, ¹University of Oklahoma, United States, ²University of Oklahoma Health Sciences Center, United States
- 12:15PM Dual-Support Mechanical Assistive Technology For Pediatric and Young Adult Patients** SB³C2019-239
Carson Fox¹, Randy Stevens², Joseph Rossano³, Francisco Arabia⁴, Amy Throckmorton¹, ¹Biomedical Engineering, Drexel University, United States, ²St. Christopher's Hospital for Children, United States, ³Cardiology, The Children's Hospital of Philadelphia, United States, ⁴Cardiothoracic Surgery, University of Arizona, United States
- 12:30PM Durable and Flexible Superhydrophobic and Blood-Repelling Surface With Shape-Customizable Features For Biomedical Applications** SB³C2019-240

Zhe Li¹, Ba Loc Nguyen², Junmin Xue³, Graeme MacLaren⁴, Choon Hwai Yap¹, ¹*Department of Biomedical Engineering, National University of Singapore, Singapore, Singapore*, ²*National University of Singapore Department of Biomedical Engineering, National University of Singapore, Singapore, Singapore*, ³*Department of Material Science and Engineering, National University of Singapore, Singapore, Singapore*, ⁴*Department of Surgery, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore*

- 12:45PM Quantifying The Capacitance and Resistance of A Double-Walled Aortic Stent-Graft Prototype** SB³C2019-241
Shannen B Kizilski¹, Omid Amili¹, Filippo Coletti¹, Rumi Faizer¹, Victor H Barocas¹, ¹*University of Minnesota, United States*
- 1:00PM Development and Evaluation of An Intratracheal Aerosol Delivery Device For Avian Wildlife Conservation Efforts** SB³C2019-242
Carlos Ruvalcaba¹, Susana Ramirez-Perez¹, Stephanie Ortega¹, Lisa Tell¹, Jean-Pierre Delplanque¹, ¹*University of California Davis, United States*

| | |
|------------------------|-------------------------|
| Friday, June 28 | 12:00PM - 1:30PM |
|------------------------|-------------------------|

Thrombosis Hemolysis and Mechanical Circulatory Support

Fox Den

Session Chair: Keefe Manning *The Pennsylvania State University*

- 12:00PM Superhydrophobicity and Vortex Generators Potential To Reduce Thrombogenicity After Prosthetic Valve Implantation** SB³C2019-243
Hoda Hatoum¹, David Bark², Hamed Vahabi², Sanli Movafaghi², Brandon Moore², Marcio Forleo², Arun Kota², Ketul Popat², Lakshmi Prasad Dasi¹, ¹*The Ohio State University, United States*, ²*Colorado State University, United States*
- 12:15PM A Multiscale Model For Simulating Platelet Aggregation: Correlating With In Vitro Results** SB³C2019-244
Peng Zhang¹, Prachi Gupta¹, Jawaad Sherif¹, Changnian Han¹, Marvin J. Slepian², Yuefan Deng¹, Danny Bluestein¹, ¹*Stony Brook University, United States*, ²*University of Arizona, United States*
- 12:30PM 3d Flexible Non-Newtonian Computational Framework To Study Thrombosis Initiation** SB³C2019-245
Sabrina R. Lynch¹, Christopher J. Arthurs², Zelu Xu³, Onkar Sahni³, Jose A. Diaz¹, C. Alberto Figueroa¹, ¹*University of Michigan, United States*, ²*King's College London, United Kingdom*, ³*Rensselaer Polytechnic Institute, United States*
- 12:45PM Refining A Numerical Model For Device-Induced Thrombosis** SB³C2019-246
Ling Yang¹, Steven Deutsch¹, Keefe Manning¹, ¹*Department of Biomedical Engineering, The Pennsylvania State University, United States*
- 1:00PM Investigation of The Interplay Between Blood and Thrombus Mechanical Properties: A 3d Fluid-Solid Interaction Model** SB³C2019-247
Fatama T. Huda¹, Tarek Abdel-Salam¹, Nathan E. Hudson¹, Ali Vahdati¹, ¹*East Carolina University, United States*
- 1:15PM Numerical Models of Valve-In-Valve Deployment To Evaluate The Risk of Leaflets Thrombosis** SB³C2019-248
Halit Yaakobovich¹, Dar Weiss¹, Uri Zaretsky¹, Shmuel Einav¹, Gil Marom¹, ¹*Tel Aviv University, Israel*

| | |
|------------------------|------------------------|
| Friday, June 28 | 1:45PM - 3:15PM |
|------------------------|------------------------|

Biotransport in Disease Detection and Therapy

Sunburst

Session Chair: Zhongping Huang *West Chester University*

Session Co-Chair: Rebecca Heise *Virginia Commonwealth University*

- 1:45PM Accurate Detection of Differential Interaction Strengths In Energy Landscapes Using Machine Learning** SB³C2019-249
Ahmad Haider¹, Alan Liu¹, Todd Sulchek¹, ¹*Georgia Institute of Technology, Atlanta, United States*
- 2:00PM Aerosolized Surfactant Replacement Therapy In An In Vivo Rodent Lung Injury Model** SB³C2019-250
Franck J Kamga Gninzeko¹, Michael Valentine¹, Sahil Chindal¹, Susan Boc², Sneha Dhapare¹, Michael Hindle¹, Dale Farkas¹, P. Worth Longest¹, Rebecca Heise¹, ¹*Virginia Commonwealth University, United States*, ²*Virginia Commonwealth University, United States*
- 2:15PM Numerical Analysis of Dense Suspension Rheology of Red Blood Cells In A Shear Flow** SB³C2019-251
Naoki Takeishi¹, Marco Rosti², Yohsuke Imai³, Shigeo Wada¹, Luca Brandt², ¹*Osaka University, Japan*, ²*Royal Institute of Technology (KTH), Sweden*, ³*Kobe University, Japan*
- 2:30PM Deep Learning Assisted Label-Free On-Chip Selective Extraction of Single-Cell-Laden Droplets From Oil Into Aqueous Solution With Dielectrophoresis** SB³C2019-252
Alisa White¹, Yuntian Zhang², Gang Zhao², Xiaoming He¹, ¹*University of Maryland College Park, United States*, ²*University of Science and Technology of China, China*
- 2:45PM Biotransport In The Glymphatic System: Measuring and Modeling Flow Through Perivascular Spaces** SB³C2019-253
Humberto Mestre¹, Jeffrey Tithof², Ting Du¹, Wei Song¹, Weiguo Peng¹, Amanda Sweeney¹, Genaro Olveda¹, John Thomas², Maiken Nedergaard¹, Douglas Kelley², ¹*University of Rochester Medical Center, United States*, ²*University of Rochester, United States*

| | |
|------------------------|------------------------|
| Friday, June 28 | 1:45PM - 3:15PM |
|------------------------|------------------------|

Vascular Pathology and Disease Progression

Snowflake

Session Chair: Umberto Morbiducci *Politecnico di Torino*

- 1:45PM Prediction of Carotid Restenosis Risk After Endarterectomy By Hemodynamic and Geometric Analysis: A 5-Years Follow-Up** SB³C2019-254
Diego Gallo¹, Maurizio Domanin², Christian Vergara³, Umberto Morbiducci¹, ¹*Politecnico di Torino, Italy*, ²*Universit di Milano, Italy*, ³*Politecnico di Milano, Italy*
- 2:00PM Comparison of Healthy and Pulmonary Hypertension Hemodynamics** SB³C2019-255
Senol Piskin¹, Ender A. Finol¹, ¹*University Of Texas At San Antonio, United States*
- 2:15PM Functional Characterization of Arteriovenous Fistula On Swine Models Using Mri** SB³C2019-256
Eleonora Tubaldi¹, Jose A. Rosado-Toro¹, Diego Celdran-Bonafonte¹, Prabir Roy-Chaudhury¹, ¹*University of Arizona, United States*
- 2:30PM Impact of Hemodynamics and Endothelial Glycocalyx On Cancer Cell Adhesion To Vascular Wall Endothelium** SB³C2019-257
Solomon Mensah¹, Alina Nersesyan¹, Ian Harding¹, Mark Niedre¹, Vladimir Torchilin¹, Eno Ebong¹, ¹*Northeastern University, United States*

- 2:45PM Pulmonary Artery Hemodynamic Changes In Pediatric Patients With Ventricular Septal Defects** SB³C2019-258
Melody Dong¹, Weiguang Yang¹, Marlene Rabinovitch¹, Jeffrey Feinstein¹, Alison Marsden¹, ¹*Stanford University, United States*
- 3:00PM Fluid-Solid Growth Modeling of Pulmonary Vascular Tree: Establishing A Homeostatic Baseline State** SB³C2019-259
Hamidreza Gharahi¹, Seungik Baek¹, Vasilina Filonova², C. Alberto Figueroa², ¹*Michigan State University, United States*, ²*University of Michigan, United States*

Friday, June 28

1:45PM - 3:15PM

Mechanobiology - a Symposium in Memory of Christopher R. Jacobs

Wintergreen

Session Chair: Kara Garcia *Indiana University School of Medicine*

Session Co-Chair: Tammy Haut Donahue *University of Massachusetts Amherst*

- 1:45PM An Active Chemo-Mechanical Model Predicts Adhesion and Microenvironmental Regulation of 3d Cell Shapes** SB³C2019-260
Xingyu Chen¹, Veronika te Boekhorst², Peter Friedl², Vivek Shenoy¹, ¹*University of Pennsylvania, United States*, ²*University of Texas MD Anderson Cancer Center, United States*
- 2:00PM Myosin-Independent Regulation of Cell and Nuclear Structures In Wavy Patterns** SB³C2019-261
Bor-Lin Huang¹, Chin-Hsun Huang¹, Richard Assoian², Pen-hsiu Grace Chao¹, ¹*National Taiwan University, Taiwan*, ²*University of Pennsylvania, United States*
- 2:15PM Mapping 3d Mechanical Strains During Tissue Formation With A Novel Fibronectin-Based Nanomechanical Biosensor** SB³C2019-262
Daniel Shiwarski¹, Joshua Tashman¹, Alkis Tsamis¹, Quintin Jallerat¹, Malichi Blundon¹, John Szymanski¹, Brooke McCartney¹, Lance Davidson², Adam Feinberg¹, ¹*Carnegie Mellon University, United States*, ²*University of Pittsburgh, United States*
- 2:30PM Tendon Enthesis Cilium Assembly Is Driven By Mechanical Loading and Hedgehog Signaling** SB³C2019-263
Fei Fang¹, Andrea Schwartz², Stavros Thomopoulos¹, ¹*Columbia University, United States*, ²*Washington University in St. Louis, United States*
- 2:45PM Sensing The Curvature: Protrusive Sensitivity of Invasive Breast Cancer Cells** SB³C2019-264
Apratim Mukherjee¹, Bahareh Behkam¹, Amrinder Nain¹, ¹*Virginia Tech, United States*
- 3:00PM Towards Fiber-Level Traction Force Microscopy In Collagen Gels** SB³C2019-265
Lauren Bersie-Larson¹, Jay Hou¹, Victor Barocas¹, Paolo Provenzano¹, ¹*University Of Minnesota, United States*

Friday, June 28

1:45PM - 3:15PM

Spine Biomechanics

Seasons 1-3

Session Chair: Alicia Jackson *University of Miami*

Session Co-Chair: Daniel Cortes *Penn State University*

- 1:45PM Inhibition of The Integrin Beta-1 Subunit Increases Strain Thresholds For Peripheral Neuron Dysfunction and Injury** SB³C2019-266
Sagar Singh¹, Beth Winkelstein¹, ¹*University of Pennsylvania, United States*

- 2:00PM Vertebral Endplate Remodeling Reduces Small Molecule Diffusion Into Degenerative Intervertebral Discs** SB³C2019-267
Beth Ashinsky¹, Edward Bonnevie¹, Sai Mandalapu¹, Stephen Pickup¹, Chao Wang², Lin Han², Robert Mauck¹, Harvey Smith¹, Sarah Gullbrand¹, ¹University of Pennsylvania, United States, ²Drexel University, United States
- 2:15PM In-Plane Shear Mechanical Characterization of The Lumbar Facet Capsular Ligament** SB³C2019-268
Emily Bermel¹, Arin Ellingson¹, Victor Barocas¹, ¹University of Minnesota - Twin Cities, United States
- 2:30PM Direct Quantification of Intervertebral Disc Water Content Using Magnetic Resonance Imaging** SB³C2019-269
Bo Yang¹, Michael Wendland¹, Yu Ma¹, Grace O'Connell¹, ¹University Of California Berkeley, United States
- 2:45PM Location-Wise Fatigue Damage Prediction For The Intervertebral Disc Annulus of The Cervical Spine** SB³C2019-270
Adhitya Vikraman Subramani¹, Phillip Whitley², Harsha Teja Garimella², Reuben Kraft¹, ¹Pennsylvania State University, United States, ²CFD Research, United States
- 3:00PM Bone Volume Fraction Vs. Bone Mass Density As A Predictor For Mechanical Properties of The Cancellous Bone of Human Lumbar Vertebral Bodies** SB³C2019-271
Francesco Travascio¹, Abeer Al-Barghouthi², Loren Latta¹, ¹University of Miami, United States, ²Max Biedermann Institute for Biomechanics, Mount Sinai Medical Center, United States

Friday, June 28

1:45PM - 3:15PM

Growth Remodeling and Repair II: Musculoskeletal System Seasons 4-5

Session Chair: Reuben Kraft *Penn State University*

Session Co-Chair: Johannes Weickenmeier *Stevens Institute of Technology*

- 1:45PM Murine Rotor Cuff Tendinopathy Models: The Role of Muscle Loading** SB³C2019-272
Adam Abraham¹, Fei Fang¹, Mikhail Golman¹, Panagiotis Oikonomou¹, Stavros Thomopoulos¹, ¹Columbia University, United States
- 2:00PM The Effect of Fatigue On The Impact Response of Rat Ulna** SB³C2019-273
Chenxi Yan¹, Mariana Kersh¹, ¹University of Illinois Urbana Champaign, United States
- 2:15PM Microindentation Maps Two Gradients In Mechanical Properties Across The Zones of The Growth Plate** SB³C2019-274
Kevin Eckstein¹, Karin Payne², Virginia Ferguson¹, ¹University of Colorado at Boulder, United States, ²University of Colorado at Anschutz, United States
- 2:30PM Fibrous Network Topography Regulates Fibrotic Phenotypes In Annulus Fibrosus Cells** SB³C2019-275
Edward Bonnevie¹, Sarah Gullbrand¹, Beth Ashinsky², Tonia Tsinman¹, Dawn Elliott³, Harvey Smith¹, Robert Mauck¹, ¹University of Pennsylvania and CMC VA Medical Center, United States, ²University of Pennsylvania, CMC VA Medical Center, and Drexel University, United States, ³University of Delaware, United States
- 2:45PM Mitochondria Function, Structural, and Mechanical Outcomes After Exposure To Near-Infrared Light During Tendon Maturation and Adult Healing** SB³C2019-276
Ryan Locke¹, Elisabeth Lemmon¹, Ellen Dudzinski¹, Sarah Kopa¹, Harrah Newman¹, Elahe Ganji¹, Megan Killian¹, ¹University of Delaware, United States
- 3:00PM Primary Synovial Fibroblast-Collagen Gels Exhibit Unique Tensile Failure Properties & Microstructure From 3T3-Collagen Gels** SB³C2019-277
Meagan Ita¹, Harrison Troche¹, Beth Winkelstein¹, ¹University of Pennsylvania, United States

| | |
|------------------------|------------------------|
| Friday, June 28 | 1:45PM - 3:15PM |
|------------------------|------------------------|

Soft Tissue Mechanics**Hemlock****Session Chair: Kristin Myers** *Columbia University***Session Co-Chair: Joao Soares** *Virginia Commonwealth University*

- 1:45PM Contact Experiments Reveal Pressure Evolution In Soft Hydrated Interfaces** SB³C2019-278
Christopher Johnson¹, Jiho Kim¹, Alison Dunn¹, ¹*University of Illinois at Urbana-Champaign, United States*
- 2:00PM Harmonic Shear Wave Imaging: A New Elastography Method To Evaluate Mechanical Properties of Soft Tissues** SB³C2019-279
Seyedali Sadeghi¹, Daniel Cortes¹, ¹*Penn State University, United States*
- 2:15PM Strong Triaxial Coupling and Anomalous Poisson Effect In Collagen Networks** SB³C2019-280
Ehsan Ban¹, Hailong Wang², J Matthew Franklin³, Jan Liphardt³, Paul Janmey¹, Vivek Shenoy¹, ¹*University of Pennsylvania, United States*, ²*University of Science and Technology of China, China*, ³*Stanford University, United States*
- 2:30PM Fiber Orientation and Structure Characterization of Pregnant and Nonpregnant Human Uterus** SB³C2019-281
Shuyang Fang¹, James McLean², Christine Hendon², Joy Vink³, Kristin Myers¹, ¹*Department of Mechanical Engineering Columbia University, United States*, ²*Department of Electrical Engineering Columbia University, United States*, ³*Department of Obstetrics and Gynecology Columbia University Medical Center, United States*
- 2:45PM Cadherin-11 Regulates Aortic Valve Interstitial Cell Force Generation and Mechanical Properties** SB³C2019-282
Matthew Bersi¹, Meghan Bowler¹, W. David Merryman¹, ¹*Vanderbilt University, United States*
- 3:00PM A Volumetric Growth Model For Healing Post-Infarction Scar** SB³C2019-283
Derek Bivona¹, Ana Estrada¹, Jeffrey Holmes¹, ¹*University of Virginia, United States*

| | |
|------------------------|------------------------|
| Friday, June 28 | 1:45PM - 3:15PM |
|------------------------|------------------------|

Emerging Computational and Experimental Methods in Fluid Mechanics**Fox Den****Session Chair: C. Alberto Figueroa** *University of Michigan*

- 1:45PM A Multiscale Flow-Mediated Platelet Adhesion Model and Its Experimental Validation** SB³C2019-284
Peng Zhang¹, Jawaad Sheriff¹, Peineng Wang¹, Marvin J. Slepian², Yuefan Deng¹, Danny Bluestein¹, ¹*Stony Brook University, United States*, ²*University of Arizona, United States*
- 2:00PM Deep-Learning Based Region-of-Interest Selection In 3d Cerebrovascular Images** SB³C2019-285
Tatsat Rajendra Patel¹, Prakhar Jaiswal¹, Nikhil Paliwal¹, Adnan H Siddiqui¹, Rahul Rai¹, Hui Meng¹, ¹*University at Buffalo, United States*
- 2:15PM A Forward Incremental Prestressing Approach For Nonlinear Fluid-Structure Interaction Hemodynamics** SB³C2019-286
Nitesh Nama¹, Miquel Aguirre², Jay D. Humphrey³, C. Alberto Figueroa¹, ¹*University of Michigan, United States*, ²*Mines Saint-tienne, France*, ³*Yale University, United States*
- 2:30PM Fsi Modeling of Cyclic Aspiration For Acute Ischemic Stroke Patients** SB³C2019-287
Bryan Good¹, Francesco Costanzo¹, Scott Simon², Keefe Manning¹, ¹*The Pennsylvania State University, United States*, ²*Penn State Hershey Medical Center, United States*

- 2:45PM A Systematic Methodology For Correcting Pc-Mri and Cfd Incompatibilities** SB³C2019-288
Thomas Puiseux¹, Anou Sewonu², Franck Nicoud¹, Simon Mendez¹, Ramiro Moreno², ¹IMAG, Univ. Montpellier, CNRS, France, ²ALARA Expertise, France
- 3:00PM Reduced-Order Leaflet Models For Numerical Experiments On Transcatheter Aortic Valves** SB³C2019-289
Shantanu Bailoor¹, Jung-Hee Seo¹, Hoda Hatoum², Lakshmi Prasad Dasi², Rajat Mittal¹, ¹Johns Hopkins University, United States, ²Ohio State University, United States

Friday, June 28

3:30PM - 5:00PM

Multiscale Biotransport in Hemodynamics and Lymphatics**Sunburst****Session Chair: Brandon Dixon** *Georgia Institute of Technology***Session Co-Chair: Mona Eskandari** *University of California Riverside*

- 3:30PM Biotransport In The Glymphatic System: Pulsation, Peristalsis, and High Blood Pressure** SB³C2019-290
Humberto Mestre¹, Jeffrey Tithof¹, Ting Du¹, Wei Song¹, Weiguo Peng¹, Amanda M. Sweeney¹, Genaro Olveda¹, John H. Thomas¹, Maiken Nedergaard¹, Douglas H. Kelley¹, ¹University of Rochester, United States
- 3:45PM Micro Particle Image Velocimetry For In Vitro Assessment of Patient Specific Whole Blood Rheology** SB³C2019-291
Erdem Kucukal¹, Yuncheng Man¹, Ailis Hill¹, Shichen Liu¹, Jane Little¹, Umut Gurkan¹, ¹Case Western Reserve University, United States
- 4:00PM Patient-Specific Metrics From Quantitative Rheology of Whole Sickle Blood Using Microfluidics** SB³C2019-292
Jose Valdez¹, Yvonne Datta², John Higgins³, David Wood¹, ¹University of Minnesota-Department of Biomedical Engineering, United States, ²University of Minnesota-Department of Medicine, United States, ³Harvard University-Department of Systems Biology, United States
- 4:15PM Instability of Phospholipid Bilayer Under Shear Flow: Molecular Dynamics Simulation** SB³C2019-293
Taiki Shigematsu¹, Kenichiro Koshiyama², Shigeo Wada³, ¹Global Center for Medical Engineering and Informatics, Osaka University, Japan, ²Graduate School of Technology, Industrial and Social Sciences, Tokushima University, Japan, ³Graduate School of Engineering Science, Osaka University, Japan
- 4:30PM Computational Simulations of Thrombolytic Therapy In Acute Ischaemic Stroke** SB³C2019-294
Boram Gu¹, Andris Piebalgs¹, Yu Huang¹, Dylan Roi², Kyriakos Lobotesis², Rongjun Chen¹, Simon A. Thom³, Xiao Yun Xu¹, ¹Department of Chemical Engineering, Imperial College London, United Kingdom, ²Imaging Department, Charing Cross Hospital, Imperial College Healthcare NHS Trust, United Kingdom, ³National Heart & Lung Institute, Imperial College London, United Kingdom
- 4:45PM Combined Microfluidic-Computational Approach To Quantify The Effect of Sickle-Cell Disease On Blood Rheology** SB³C2019-295
Marisa Bazzi¹, Jose Valdez², David Wood², Victor Barocas², ¹Department of Chemical Engineering and Material Science University of Minnesota, United States, ²Department of Biomedical Engineering University of Minnesota, United States

| | |
|------------------------|------------------------|
| Friday, June 28 | 3:30PM - 5:00PM |
|------------------------|------------------------|

Cardiovascular Mechanics: Other**Snowflake**

Session Chair: Seungik Baek *Michigan State University*

Session Co-Chair: Sourav Patnaik *University of Texas at San Antonio*

- 3:30PM Mechanical Characterization of Atherosclerotic Coronary Arteries By Ex-Vivo Inflation Testing and Inverse Finite Element Modeling** SB³C2019-296
Su Guvenir¹, Giulia Gandini¹, Irene Berselli², Veronica Codazzi², Francesco Migliavacca², Claudio Chiastra², Frank J.H. Gijssen¹, Ali C. Akyildiz¹, ¹*Erasmus Medical Center, Netherlands*, ²*Politecnico Di Milano, Italy*
- 3:45PM Histomechanical Analysis of Decellularized Porcine Internal Thoracic Arteries** SB³C2019-297
Colton Kostelnik¹, Wayne Carver², John Eberth², ¹*University of South Carolina - Department of Biomedical Engineering, United States*, ²*University of South Carolina School of Medicine - Department of Cell Biology and Anatomy, United States*
- 4:00PM Understanding The Transmural Variation In Extracellular Matrix Fiber Orientation Using Multi-Photon Microscopy** SB³C2019-298
Anastasia Gkousioudi¹, Jacopo Ferruzzi¹, Yanhang Zhang¹, ¹*Boston University, United States*
- 4:15PM Kinematic Analysis of Murine Cardiac Hypertrophy Using High-Frequency Four-Dimensional Ultrasound** SB³C2019-299
Frederick Damen¹, Mauro Costa², Craig Goergen¹, ¹*Purdue University, United States*, ²*The Jackson Laboratory, United States*
- 4:30PM Selective Stiffening of A Myocardial Infarct Improves Predicted Systolic Function Without Impairing Filling** SB³C2019-300
Kyoko Yoshida¹, Ana Estrada¹, Jeffrey Holmes¹, William Richardson², ¹*University of Virginia, United States*, ²*Clemson University, United States*
- 4:45PM Hypertension-Induced Changes In The Mechanical Behavior of The Left Ventricular Wall** SB³C2019-301
Marissa Grobbel¹, Ari Hollander¹, Analeeza Dubay¹, Emma Darios Flood¹, Kibrom Alula¹, Gregory Fink¹, Stephanie Watts¹, Lik Chuan Lee¹, Sara Roccabianca¹, ¹*Michigan State University, United States*

| | |
|------------------------|------------------------|
| Friday, June 28 | 3:30PM - 5:00PM |
|------------------------|------------------------|

Biofabrication and 3D in Vitro Systems**Wintergreen**

Session Chair: Matthew Fisher *NC State University*

Session Co-Chair: Anna Grosberg *University of California, Irvine*

- 3:30PM Bioprinting 3d Breast Epithelial Spheroids To Study Vascular Interactions In Human Cancer** SB³C2019-302
Swathi Swaminathan¹, Alisa Morss Clyne¹, ¹*Drexel University, United States*
- 3:45PM Fabricating 3d Cellular Aggregates Via Laser Direct-Write Bioprinting: Size- and Shape-Controlled Embryoid Bodies and Tumor Spheroids** SB³C2019-303
David Kingsley¹, Cassandra Roberge¹, David Corr¹, ¹*Rensselaer Polytechnic Institute, United States*
- 4:00PM Fluid-Structure Interaction At Drop-Drop Interface During Drop-On-Demand Printing of Hydrogel-Based Soft Materials** SB³C2019-304
Cih Cheng¹, George T. C. Chiu¹, Bumsoo Han¹, ¹*Purdue University, United States*

- 4:15PM Directed Self-Assembly of 3d In Vitro Tissue Models Using Droplet Microfluidics** SB³C2019-305
Jasmine Shirazi¹, Michael Donzanti¹, Jason Gleghorn¹, ¹*University of Delaware, United States*
- 4:30PM Engineering A 3d Model of Ductal Carcinoma In Situ Using Multimaterial Fresh 3d Bioprinting** SB³C2019-306
Joshua Tashman¹, Thomas Hinton¹, Daniel Brown², Daniel Shiwarski³, Andrew Lee¹, Andrew Hudson¹, Adrian Lee², Adam Feinberg¹, ¹*Carnegie Mellon University, United States*, ²*University of Pittsburgh, United States*, ³*Carnegie Mellon University, United States*
- 4:45PM Integrating In Vitro and In Silico Technologies: Development of A Perfusion Bioreactor and Its Digital Twin** SB³C2019-307
Liesbet Geris¹, Mohammad Mehrian¹, Sebastien de Bournonville², Toon Lambrechts², Jean-Marie Aerts², Frank Luyten², Ioannis Papantoniou², ¹*University of Lige, Belgium*, ²*KU Leuven, Belgium*

Friday, June 28

3:30PM - 5:00PM

Mechanics and Modeling of Musculoskeletal Soft Tissues Seasons 1-3

Session Chair: Sara Roccabianca *Michigan State University*

Session Co-Chair: Adrian Buganza Tepole *Purdue University*

- 3:30PM Sex-Dependent Orientation and Size of The Anterior Cruciate Ligament Throughout Skeletal Growth In The Porcine Stifle Joint** SB³C2019-308
Danielle Howe¹, Stephanie Cone¹, Jorge Piedrahita², Lynn Fordham³, Jeffrey Spang³, Matthew Fisher¹, ¹*North Carolina State University and the University of North Carolina- Chapel Hill, United States*, ²*North Carolina State University, United States*, ³*University of North Carolina- Chapel Hill, United States*
- 3:45PM Decorin, Alone and In Tandem With Biglycan, Alters Viscoelasticity In Aged Tendons** SB³C2019-309
Ryan Leiphart¹, Snehal Shetye¹, Stephanie Weiss¹, Louis Soslowsky¹, ¹*University of Pennsylvania, United States*
- 4:00PM Bath Osmolarity Alters Multiscale Mechanics and Damage In Tendon** SB³C2019-310
Ellen Bloom¹, Andrea Lee¹, Dawn Elliott¹, ¹*University of Delaware, United States*
- 4:15PM Quantifying Differences In The Mechanical Properties of The Flexor and Extensor Muscles In The Human Forearm Using Mr Elastography** SB³C2019-311
Daniel Smith¹, Andrea Zonnino¹, Peyton Delgorio¹, Raymond Duda¹, Fabrizio Sergi¹, Curtis Johnson¹, ¹*University of Delaware, United States*
- 4:30PM Sex-Related Differences In Carpal Arch Morphology** SB³C2019-312
Kishor Lakshminarayanan¹, Rakshit Shah¹, Zong-Ming Li¹, ¹*Hand Research Laboratory, Department of Biomedical Engineering, United States*
- 4:45PM Utilizing Arfi Imaging To Predict Linear Region Modulus of Tendons From Toe Region Data** SB³C2019-313
Gerald A Ferrer¹, Waqas Khalid¹, Volker Musahl¹, Kang Kim¹, Richard E Debski¹, ¹*University of Pittsburgh, United States*

| | |
|------------------------|------------------------|
| Friday, June 28 | 3:30PM - 5:00PM |
|------------------------|------------------------|

Injury: Biomechanics**Seasons 4-5****Session Chair: Songbai Ji** *WPI***Session Co-Chair: Yuan Feng** *Shanghai Jiao Tong University*

- 3:30PM Shear Wave Propagation and Estimation of Material Parameters In A Nonlinear, Fibrous Material** SB³C2019-314
Zuoxian Hou¹, Ruth Okamoto¹, Philip Bayly¹, ¹*Washington University in St.Louis, United States*
- 3:45PM Shock Wave Propagation In Brain Tissue** SB³C2019-315
Donghoon Keum¹, Soroush Assari¹, Kurosh Darvish¹, ¹*Temple University, United States*
- 4:00PM Effect of Corpus Callosum Demyelination On Murine Brain Injury Mechanism** SB³C2019-316
Javid Abderezaei¹, Gloria Fabris¹, Zachary Lopez¹, Cassandra Gologorsky², Johannes Weickenmeier¹, Mehmet Kurt¹, ¹*Stevens Institute of Technology, United States*, ²*Cornell University, United States*
- 4:15PM High-Rate Anisotropic and Region-Dependent Properties In Human Infant Cranial Bone** SB³C2019-317
Robert Metcalf¹, Jessica Comstock², Brittany Coats¹, ¹*University of Utah, Mechanical Engineering, United States*, ²*University of Utah, Pediatric Pathology, United States*
- 4:30PM Bilateral Skull Fractures Due To Controlled Head Drops In Infant Porcine Specimens** SB³C2019-318
Patrick Vaughan¹, Alexis Goots¹, Todd Fenton¹, Roger Haut¹, Feng Wei¹, ¹*Michigan State University, United States*
- 4:45PM Estimates of High-Risk Single and Cumulative Head Impact Doses In American Football** SB³C2019-319
Adam Bartsch PhD¹, ¹*Prevent Biometrics, United States*

| | |
|------------------------|------------------------|
| Friday, June 28 | 3:30PM - 5:00PM |
|------------------------|------------------------|

Government Perspectives on Multiscale Biomechanics, Bioengineering, and Biotransport**Hemlock****Session Chair: Alisa Morss Clyne**, *University of Maryland***Grace Peng**, *NIH Program Director, Division of Discovery Science & Technology and Mathematical Modeling, Simulation, and Analysis***Michele Grimm**, *NSF Program Director, Biomedical Engineering***Laurel Kuxhaus**, *ASME Federal Fellow*

| | |
|------------------------|------------------------|
| Friday, June 28 | 3:30PM - 5:00PM |
|------------------------|------------------------|

Pediatric and Congenital Fluid Mechanics**Fox Den****Session Chair: Amy Throckmorton** *Drexel University*

- 3:30PM Stent Intervention Improves Flow Distribution and Vascular Growth In Porcine Pulmonary Artery Stenosis** SB³C2019-320
Ryan Pewowaruk¹, Klarka Mendrisova¹, Carolina Larrain¹, Christopher Francois¹, Luke Lamers¹, Alejandro Roldan-Alzate¹, ¹*University of Wisconsin - Madison, United States*

- 3:45PM Shear Stress Modulates Cardiomyocyte Proliferation Via Endothelial Cell-Cardiomyocyte Signaling** SB³C2019-321
 Matthew Watson¹, Lauren Black², Erica Kemmerling³, ¹*Tufts University, Department of Mechanical Engineering and Department of Biomedical Engineering, United States,* ²*Tufts University, Department of Biomedical Engineering, United States,* ³*Tufts University, Department of Mechanical Engineering, United States*
- 4:00PM Computational Surgical Planning For Peripheral Pulmonary Artery Stenosis In Children With Alagille and Williams Syndromes** SB³C2019-322
 Ingrid Lan¹, Weiguang Yang², Jeffrey Feinstein³, Alison Marsden³, ¹*Bioengineering, Stanford University, United States,* ²*Pediatric Cardiology, Stanford University, United States,* ³*Bioengineering and Pediatric Cardiology, Stanford University, United States*
- 4:15PM Fluid-Structure Analysis of A Collapsible Axial Impeller and Protective Cage For Dysfunctional Fontan Physiology** SB³C2019-323
 Matthew Hirschhorn¹, Evan Bisirri¹, Randy Stevens², Joseph Rossano³, Amy Throckmorton¹, ¹*Drexel University, United States,* ²*St. Christopher's Hospital for Children, United States,* ³*Children's Hospital of Philadelphia, United States*
- 4:30PM Mechanics and Efficiency of The Zebrafish Embryonic Heart Tube** SB³C2019-324
 Alireza Sharifi¹, Alex Gendernalik¹, Deborah Garrity¹, David Bark Jr.¹, ¹*Colorado State University, United States*
- 4:45PM Whole Embryonic Heart Ultrasound Imaging, Motion Tracking and Flow Simulations Reveal Hemodynamic Role of Embryonic Atria** SB³C2019-325
 Sheldon Ho¹, Wei Xuan Chan², Nhan Phan-Thien², Choon Hwai Yap², ¹*Biomedical Engineering, National University of Singapore, Singapore,* ²*National University of Singapore, Singapore*

9 Poster Sessions

9.1 Poster Session I

Wednesday, June 26 12:45PM - 2:15PM

Posters - BS Level Competition: Cardiovascular System

Assessment of Pulmonary Arterial Structure and Its Association With Right Ventricular Function SB³C2019-P001

Frankangel Servin¹, Rebecca R Vanderpool², Rajesh Janardhanan³, Jose Rosado⁴, Franz P Rischar⁵, Jason X.J Yuan⁶,
¹University of Arizona, Department of Biomedical Engineering, United States, ²University of Arizona, Department of Biomedical Engineering, Division of Translational and Regenerative Medicine, United States, ³University of Arizona, Department of Medical Imaging, United States, ⁴University of Arizona, Department of Medical Imaging, United States, ⁵University of Arizona, Division of Pulmonary, Allergy, Critical Care and Sleep Medicine, United States, ⁶University of Arizona, Division of Translational and Regenerative Medicine, United States

Quantitative Analysis of Flow Distribution Within The Fetal Heart Using In-Vitro 4d Flow Mri SB³C2019-P002

Lucille Anzia¹, Katrina Ruedinger¹, Shardha Srinivasan², Barbara Trampe¹, Timothy Heiser¹, J. Igor Iruretagoyena², Alejandro Roldan-Alzate¹, ¹University of Wisconsin Madison, United States, ²University of Wisconsin School of Medicine and Public Health, United States

On The Use of Pentagalloyl Glucose For Mechanistic Suppression of Abdominal Aortic Aneurysm SB³C2019-P003

Vangelina Osteguín¹, Sourav Patnaik¹, Alycia Berman², Craig Goergen², Ender Finol¹, ¹University of Texas at San Antonio, United States, ²Purdue University, United States

Novel Method of Detecting The Effect From Inhaled Anesthetics On Peripheral Venous Pressure Waveforms

SB³C2019-P004

Kaylee Henry¹, Ali Al-Alawi¹, Md Abul Hayat¹, Patrick Bonasso², Hanna Jensen¹, Jingxian Wu¹, Kevin Sexton², Morten Jensen¹, ¹University of Arkansas, United States, ²University of Arkansas for Medical Sciences, United States

Fluvastatin Decreases Endothelial Nitric Oxide Synthase O-GlcNacetylation SB³C2019-P005

Danika Meldrum¹, Sarah Basehore¹, Alisa Morss Clyne¹, ¹Drexel University, United States

Investigations of The Chordae Tendineae'S Mechanical Properties of Porcine Atrioventricular Heart Valves

SB³C2019-P006

Colton Ross¹, Devin Laurence¹, Yan Zhao², Ming-Chen Hsu³, Ryan Baumwart⁴, Yi Wu¹, Chung-Hao Lee¹, ¹The University of Oklahoma, United States, ²The University of Oklahoma Health Sciences Center, United States, ³Iowa State University, United States, ⁴Oklahoma State University, United States

Relationship of Platelet Adhesion With Surface Topography In The Penn State Pvad SB³C2019-P007

Cecilia Richardsen¹, Ashlyn Mueser¹, Branka Lukic², Christopher Siedlecki², William Weiss², Keefe Manning¹, ¹Pennsylvania State University, United States, ²Penn State Hershey Medical Center, United States

Mouse Aortic Mechanical Properties From Finite Element Model Optimized To Match Ring-Pull Experiments

SB³C2019-P008

Carl Schoepfoerster¹, Ryan Mahutga¹, Victor Barocas¹, ¹Department of Biomedical Engineering, University of Minnesota-Twin Cities, United States

A Computational Study of The Role of The Pericardium On Cardiac Function In Normal and Hypertensive Hearts

SB³C2019-P009

Emilio A. Mendiola¹, Huan Nguyen¹, Reza Avaz¹, Michael S. Sacks¹, ¹The University of Texas at Austin, United States

Estimating The Contribution of The Endovascular Catheter On Cerebral Hypoperfusion During Mechanical Thrombectomy SB³C2019-P010

Christina Ngo¹, Jeffrey Pyne², Jaiyoung Ryu³, Shawn Shadden², ¹*Department of Bioengineering, UC Berkeley, United States*, ²*Department of Mechanical Engineering, UC Berkeley, United States*, ³*Department of Mechanical Engineering, Chung-Ang University, South Korea*

Alteration of The Mechanical Response of Porcine Tricuspid Valve Anterior Leaflets Following Exposure To De-ionized Water SB³C2019-P011

Margaret Clark¹, Samuel Salinas¹, Rouzbeh Amini¹, ¹*The University of Akron, United States*

On The Distribution of Aortic Valve Cusp Calcification SB³C2019-P012

Varshini Guhan¹, Megan Heitkemper¹, Lakshmi Prasad Dasi¹, ¹*The Ohio State University, United States*

An Investigation of Layer-Specific Tissue Biomechanics of Porcine Atrioventricular Valve Anterior Leaflets SB³C2019-P013

Cortland Johns¹, Katherine Kramer¹, Anju Babu¹, Chung-Hao Lee¹, ¹*Biomechanics and Biomaterials Design Lab, School of Aerospace and Mechanical Engineering, The University of Oklahoma Norman, OK, USA, United States*

A Study of Pressure Dynamics Across A Stenotic Orifice SB³C2019-P014

Tori Burton¹, Hoda Hatoum¹, Lakshmi Prasad Dasi¹, ¹*Department of Biomedical Engineering at The Ohio State University, United States*

A Study of The Effects of An Increased Beat Rate On The Penn State Pediatric Ventricular Assist Device SB³C2019-P015

Brady Houtz¹, Sailahari Ponnaluri¹, Maureen Gallagher¹, Charlee Dawson¹, Bryan Good¹, Steven Deutsch¹, Keefe Manning¹, ¹*Pennsylvania State University, United States*

Hemodynamics of Coronary Artery Aneurysms In Kawasaki Disease An Idealized Aneurysm Model SB³C2019-P016

Alex Lu¹, Noelia Grande Gutierrez¹, Alison Marsden¹, ¹*Stanford University, United States*

Fluid Dynamics Study of An Implantable Blood Pump For Patients With A Failed Fontan Circulation SB³C2019-P017

Cody Kubicki¹, Bryan Good¹, William Weiss², Keefe Manning¹, ¹*The Pennsylvania State University, United States*, ²*Penn State Hershey Medical Center, United States*

Posters - BS Level Competition: Musculoskeletal, Respiratory, Ocular and Other Systems

Heterogeneity and Anisotropy In The Microscale Energy Dissipating Properties of The Knee Meniscus SB³C2019-P018

Kev'ther Hoxha¹, Chao Wang¹, Biao Han¹, Robert Mauck², Lin Han¹, ¹*Drexel University, United States*, ²*University of Pennsylvania, United States*

2d Or Not 2d; Comparing 2d and 3d Measurements of Collagen Microstructure SB³C2019-P019

Gosia Fryc¹, Bin Yang¹, Alexandra Gogola¹, Bryn Brazile¹, Yi Hua¹, Tian Yong Foong¹, Ian A. Sigal¹, ¹*University of Pittsburgh, United States*

The Effect of A Cannabinoid Receptor 2 Agonist On Motor Function After Blast-Induced Neurotrauma SB³C2019-P020

Bayan Alturkestani¹, Soroush Assari¹, Ola M Sharaf¹, Ian Hendricks¹, Sara J. Ward¹, Ronald F. Tuma¹, Kurosh Darvish¹, ¹*Temple University, United States*

Drone Blade Induced Skin Laceration and Eye Injury Risk; An Investigation of Skin and Eye Surrogate Models SB³C2019-P021

Lauren Duma¹, Mark Begonia², Barry Miller¹, Stefan Duma¹, ¹*Virginia Tech, United States*, ²*Virgina Tech, United States*

Direct Measurement of Collagen Fiber Orientation Along The Surface of Ligaments and Tendons of The Knee In A Porcine Model SB³C2019-P022

Emily Lambeth¹, Stephanie Cone¹, Matthew Fisher¹, ¹*North Carolina State University and the University of North Carolina - Chapel Hill, United States*

Elastase Treatment Increases and Accelerates Stress Relaxation In Tendon. SB³C2019-P023

James Abraham¹, Jeremy Eekhoff², Spencer Lake³, ¹*Department of Mechanical Engineering and Materials Science at Washington University in St. Louis, United States*, ²*Department of Biomedical Engineering at Washington University in St. Louis, United States*, ³*Department of Mechanical Engineering and Materials Science at Washington University in St. Louis, Department of Biomedical Engineering at Washington University in St. Louis, Department of Orthopaedic Surgery at Washington University in St. Louis, United States*

Ultrasound Shear Wave Elastography of The Anterior Cruciate Ligament SB³C2019-P024

Gabi Schwartz¹, Rachel Heller¹, Seyedali Sadeghi¹, Daniel Cortes¹, ¹*Penn State, United States*

Extracellular Matrix Stiffness Alters Chondrocyte Phenotype Through Trpv4 Regulation SB³C2019-P025

Ryan Skinner¹, Mallory Griffin¹, Nicholas Trompeter¹, Cindy Farino¹, Omar Banda¹, John Slater¹, Randall Duncan¹, ¹*University of Delaware, United States*

Asthmatic and Healthy Airway Morphology Measured From Ct-Based Geometries SB³C2019-P026

Irina Pyataeva¹, Kamran Poorbahrami¹, Ellesse Cooper¹, Ben Piperno¹, David Mummy², Sean Fair², Jessica Oakes¹, ¹*Northeastern University, United States*, ²*University of Wisconsin-Madison, United States*

Contributions of Collagen Ii, Laminin, and Fibronectin To Vitreoretinal Adhesion In Human Eyes SB³C2019-P027

Joseph Phillips¹, Christopher Creveling¹, Brittany Coats¹, ¹*University of Utah, United States*

Rapid Quantitative Assessment of Postural Control Function For Mild Traumatic Brain Injury: Evaluation of A Portable Force Plate Device SB³C2019-P028

Jonathan VanPaeppegem¹, Kunal Dave¹, Liying Zhang¹, ¹*Wayne State University, United States*

Mechanical Influence of Graphitic Carbon Nitride Filler On Poly(vinyl Alcohol) Thin Film Hydrogels For Wound Healing SB³C2019-P029

Bradley Henderson¹, Katelyn Cudworth¹, Andrew Clifford², Dylan Quintana², John Thurston², Trevor Lujan¹, ¹*Boise State University, United States*, ²*College of Idaho, United States*

A Novel Workflow For Generation of Patient-Specific Asthmatic Airway Models From Ct Data SB³C2019-P030

Ellesse Cooper¹, Kamran Poorbahrami¹, Ben Piperno¹, David Mummy², Sean Fair², Jessica Oakes¹, ¹*Northeastern University, United States*, ²*University of Wisconsin, United States*

Water Sport Head Injuries; Ability of Helmets To Reduce Head Impact Accelerations SB³C2019-P031

Brock Duma¹, Mark Begonia¹, Casey Charron¹, Stefan Duma¹, ¹*Virginia Tech, United States*

The Influence of Radiographic Projection Angle On Visualization of The Subtalar Joint SB³C2019-P032

Kalebb Howell¹, Nicola Krahenbuhl², Rich Lisonbee¹, Beat Hintermann², Charles Saltzman¹, Andrew Anderson¹, Alexej Barg¹, Amy Lenz¹, ¹*University of Utah, United States*, ²*Kantonsspital Baselland, Switzerland*

Effects of Volumetric Boundary Conditions On The Compressive Mechanics and Modeling of Passive Skeletal Muscle SB³C2019-P033

Anurag Vaidya¹, Benjamin Wheatley¹, ¹*Bucknell University, United States*

Posters - MS Level Competition: Solid Mechanics

The Effect of In Vivo Ionizing Radiation On The Micromechanics of Mouse Vertebrae SB³C2019-P034

Tongge Wu¹, Megan Pendleton¹, Noah Bonnheim¹, Joshua Alwood², Tony Keaveny¹, ¹*University of California, Berkeley, United States*, ²*NASA Ames Research Center, United States*

Investigating Sex-Specific Accuracy of Proximal Femur Coordinate Systems Derived From Statistical Shape Models SB³C2019-P035

Carla Winsor¹, Xinshan Li², Ju Zhang³, Corinne Henak¹, Heidi-Lynn Ploeg⁴, ¹University of Wisconsin - Madison, United States, ²University of Sheffield, United Kingdom, ³Auckland Bioengineering Institute, New Zealand, ⁴Queen's University, Canada

Effects of Collagenase and Elastase On The Mechanical Properties of Porcine Abdominal Aorta SB³C2019-P036

Celeste Blum¹, Chris Korenczuk², Victor Barocas², ¹University of Minnesota - Twin Cities, United States, ²University of Minnesota- Twin Cities, United States

Finite Element Simulation Framework For Investigating Pathological Effects On Organ-Level Tricuspid Valve Biomechanical Function SB³C2019-P037

Devin Laurence¹, Emily Johnson², Ming-Chen Hsu², Arshid Mir³, Harold Burkhart³, Yi Wu¹, Chung-Hao Lee¹, ¹University of Oklahoma, United States, ²Iowa State University, United States, ³University of Oklahoma Health Sciences Center, United States

An Integrated Opto-Mechanical System For Quantification of Dynamic Microstructure and Mechanics of Heart Valve Tissues SB³C2019-P038

Samuel Jett¹, Zachary Schuermann¹, Arshid Mir², Harold Burkhart³, Chung-Hao Lee¹, ¹Biomechanics and Biomaterials Design Laboratory, School of Aerospace and Mechanical Engineering, The University of Oklahoma Norman, OK, USA, United States, ²Division of Pediatric Cardiology, Department of Pediatrics, University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA, United States, ³Division of Cardiothoracic Surgery, Department of Surgery, University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA, United States

Computational Analysis of Unhelmeted Bicycle Accidents Through Multi-Body and Finite Element Simulations SB³C2019-P039

Lise Gheysen¹, Michel Woering², Markos Kapeliotis², Jos Vander Sloten², ¹UGent, Belgium, ²KU Leuven, Belgium

Repeated Non-Injurious Loading Induces Changes In Local Mechanics & Collagen Fiber Organization That May Be Injurious SB³C2019-P040

Travis Kotzur¹, Beth Winkelstein¹, ¹University of Pennsylvania, United States

Investigation of Scaling Techniques Used For Developing Brain Injury Criterion By Finite Element Models of The Primate and Human Head Simulating Head Rotation SB³C2019-P041

Tushar Arora¹, Priya Prasad², Liying Zhang¹, ¹Wayne State University, United States, ²Prasad Engineering, LLC, United States

Determination of Tissue Level Injury Threshold For Ocular Trauma By Finite Element Analysis SB³C2019-P042

Kunal Dave¹, Liying Zhang¹, ¹Wayne State University, United States

Computational Analysis of Lisfranc Surgical Repairs SB³C2019-P043

M. Tyler Perez¹, John Owen¹, Robert Adelaar², Jennifer Wayne¹, ¹Virginia Commonwealth University, United States, ²McGuire VA Medical Center, United States

McDespot Quantitative Mri Correlates With Articular Cartilage Material Properties SB³C2019-P044

Matthew Grondin¹, Fang Liu¹, Michael Vignos¹, Richard Kijowski¹, Corinne Henak¹, ¹University of Wisconsin-Madison, United States

Characterization of Shear Wave Speed-Stress Relationship In Collateral Ligaments SB³C2019-P045

Jonathon Blank¹, Joshua Roth¹, Darryl Thelen¹, ¹Department of Mechanical Engineering, University of Wisconsin-Madison, United States

Tribocorrosion Behavior of Metallic Implants: A Comparative Study of CoCrMo and Ti6Al4v SB³C2019-P046

Mihir Patel¹, Edward Cudjoe¹, Jae Joong Ryu¹, ¹Youngstown State University, United States

An Age-Aware Constitutive Model For Human Sclera Incorporating Experimentally-Measured Collagen Fiber Tortuosity SB³C2019-P047

Tian Yong Foong¹, Yi Hua¹, Alexandra Gogola¹, Rouzbeh Amini², Ian A. Sigal¹, ¹*University of Pittsburgh, United States*,
²*University of Akron, United States*

Posters - MS Level Competition: Biotransport, Fluids, Tissue Engineering and Dynamics

Stochastic Model For Platelet Spreading Under Flow SB³C2019-P048

Iain Briongos¹, Peter Hammes¹, David Bark¹, ¹*Colorado State University, United States*

Evaluating Single Muscle Contraction Using Electrical Stimulation and Shear Wave Elastography SB³C2019-P049

Heer Patel¹, Seyedalil Sadeghi¹, Daniel Cortes¹, ¹*The Pennsylvania State University, United States*

Implementing Real-Time Extrinsic Muscle Control In A Robotic Gait Simulator For Investigating Lower Extremity Function SB³C2019-P050

Watson Spivey¹, Cody O'Cain¹, Bronislaw Gepner¹, Edward Sprately¹, Jason Kerrigan¹, ¹*University of Virginia, Center for Applied Biomechanics, United States*

Evaluation of Accuracy of Four Muscle Models Using Intramuscular Pressure A Surrogate For Muscle Force SB³C2019-P051

Grant Boggess¹, Mohammad Shorijeh¹, Filiz Ates², William Litchy², Krista Coleman-Wood², Kenton Kaufman², BJ Fregly¹,
¹*Rice University, United States*, ²*Mayo Clinic, United States*

The Effects of Ankyloglossia On The Tongue Motility of Infants During Breastfeeding SB³C2019-P052

Yiela Saperstein¹, David Elad², Andrew Laine¹, Scott Siegel³, Catherine Watson Genna⁴, ¹*Columbia University, United States*,
²*Tel Aviv University, Israel*, ³*Stony Brook University, United States*, ⁴*Private Practice, United States*

Development of A Computational Model of Braided Stent For Cerebral Aneurysm Treatment SB³C2019-P053

Shunya Shiozaki¹, Tomohiro Otani¹, Shigeo Wada¹, ¹*Department of Mechanical Science and Bioengineering, Graduate School of Engineering Science, Osaka University, Japan*

Accelerometers Used To Measure Magnitude and Frequency of Hand Movement For Children With Cerebral Palsy During Constraint Induced Movement Therapy SB³C2019-P054

Brianna Goodwin¹, Emily Sabelhaus², Ying-Chun Pan¹, Kristie Bjornson¹, Kelly Pham¹, William Walker¹, Katherine Steele¹,
¹*University of Washington, United States*, ²*Seattle Children's Hospital, United States*

Reduction of Wall Shear Strain Rates In Arteriovenous Graft Venous Anastomoses SB³C2019-P055

Dillon Williams¹, Guy Genin¹, Mohamed Zayed¹, ¹*Washington University, United States*

Flow Through Soft Tissue Equivalents: Measuring The Hydraulic Permeability of Collagen Gels SB³C2019-P056

Christopher Vidmar¹, Brittany Fisher¹, Victor Lai¹, ¹*Department of Chemical Engineering at the University of Minnesota-Duluth, United States*

Effect of Different Inlet Velocity Profiles On Patient-Specific Cfd Simulations of Healthy Trachea SB³C2019-P057

Bipin Tiwari¹, Tarun Kore¹, Sandeep Bodduluri², Surya Bhatt², Vrishank Raghav¹, ¹*Auburn University, United States*,
²*University of Alabama at Birmingham, United States*

Quantifying Distortion Energy In Collagen Matrices Subjected To Complex Loads Using A Biaxial Bioreactor SB³C2019-P058

Katherine Hollar¹, Danielle Siegel¹, John Everingham¹, Abdullah Ahmad¹, Alvaro Morfin¹, Gunes Uzer¹, Trevor Lujan¹,
¹*Boise State University, United States*

An Intercalating Crosslinkable and Biocompatible Hydrogel System For Resurfacing Damaged Cartilage SB³C2019-P059

Brian Wise¹, Jay Patel¹, Claudia Loebel¹, Jason Burdick¹, Robert Mauck¹, ¹*University of Pennsylvania, United States*

Engineering Spatial Gradients of Diamagnetic Particles and Cells In Hydrogels Using Negative Magnetophoresis SB³C2019-P060

Hannah Zlotnick¹, Andy Clark², Xuemei Cheng², Robert Mauck¹, ¹University of Pennsylvania, United States, ²Bryn Mawr, United States

Posters - Fluids: Cardiovascular Fluid Mechanics

Computational Hemodynamics & Complex Networks Integrated Platform To Study Intravascular Flow In The Carotid Bifurcation SB³C2019-P061

Karol Cal¹, Diego Gallo¹, Valentina Mazzi¹, Stefania Scarsoglio¹, Muhammad O. Khan², David A. Steinman³, Luca Ridolfi¹, Umberto Morbiducci¹, ¹Polito BIOMed Lab, Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Turin, Italy, ²Cardiovascular Biomechanics Computation Lab, Department of Pediatrics, Cardiology, Stanford University, Stanford, United States, ³Biomedical Simulation Lab, Department of Mechanical & Industrial Engineering, University of Toronto, Toronto, Canada

Automatic Techniques For Determining Boundary Condition Parameters In Computational Haemodynamics SB³C2019-P062

Christopher J. Arthurs¹, C. Alberto Figueroa², ¹King's College London, United Kingdom, ²University of Michigan, United States

Developing A Scalable Open-Source Solver To Simulate Hemodynamics In The Human Pulmonary Vasculature SB³C2019-P063

Narasimha Rao Pillalamarri¹, Senol Piskin¹, Ender Finol¹, ¹University of Texas at San Antonio, United States

Solution Adaptive Refinement of Cut-Cell Cartesian Meshes Improves Mechanical Heart Valve Simulation Performance SB³C2019-P064

Ryan Pewowaruk¹, Tim Ruesink¹, Yanheng Li², David Rowinski², Alejandro Roldan-Alzate¹, ¹University of Wisconsin - Madison, United States, ²Convergent Science, United States

Uncertainty Quantification of Outflow Boundary Conditions On Non-Invasive Pressure Quantification In Aortorenal Artery System SB³C2019-P065

Huidan (whitney) Yu¹, Monsurul Khan¹, Hao Wu¹, Xiaoping Du¹, Alan Sawchuk¹, ¹Indiana University-Purdue University Indianapolis, United States

Modeling Pulse Wave Propagation For Idealized and Physiological Arteries With Fluid-Structure Interactions In Febio SB³C2019-P066

Jay Shim¹, Vittorio Gatti¹, Pierre Nauleau¹, Grigorios Karageorgos¹, Elisa Konofagou¹, Gerard Ateshian¹, ¹Columbia University, United States

In Vitro Volumetric Lagrangian Particle Tracking and 4d Pressure Field In A Left Ventricle Model SB³C2019-P067

Hicham Saaid¹, Matteo Novara², Jason Voorneveld³, Christiaan Schinkel⁴, Jos Westenberg⁵, Frank Gijssen⁶, Patrick Segers¹, Pascal Verdonck¹, Johan Bosch⁶, Sasa Kenjeres⁴, Daniel Schanz², Sebastian Gesemann², Andreas Schrder², Tom Claessens⁷, ¹BioMMeda, Institute Biomedical Technology Ghent University, Belgium, ²Institute of Aerodynamics and Flow Technology, German Aerospace Center (DLR), Germany, ³Thoraxcenter Biomedical Engineering, Erasmus Medical Center, Netherlands, ⁴Department of Chemical Engineering Delft University of Technology, Netherlands, ⁵Department of Radiology Leiden University Medical Center, Netherlands, ⁶Thoraxcenter Biomedical Engineering Erasmus Medical Center, Netherlands, ⁷Department of Materials, Textiles And Chemical Engineering, Ghent University, Belgium

Impact of Different Bifurcation Stenting Techniques On The Endothelial Shear Stress Within A Peripheral Bifurcation SB³C2019-P068

Azadeh Lotfi¹, Tracie Barber¹, ¹UNSW Australia, Australia

Improvement and In Vitro Validation of A Finite Element Based Virtual Coiling Method For Intracranial Aneurysm SB³C2019-P069

Robert Damiano¹, Saeb Ragani¹, Adnan Siddiqui¹, Jason Davies¹, Hui Meng¹, ¹University at Buffalo, United States

Automated Segmentation of Cerebral Arteries From Patient-Specific 3d Cerebrovascular Images Using Deep-Learning and Group Morphology SB³C2019-P070

Tatsat Rajendra Patel¹, Nikhil Paliwal¹, Prakhar Jaiswal¹, Adnan H Siddiqui¹, Rahul Rai¹, Hui Meng¹, ¹University at Buffalo, United States

Fabrication of A Flexible Idealized 3d Printed Aortic Dissection For In Vitro Analysis SB³C2019-P071

Sylvana Garca-Rodriguez¹, Alexander B. Holtz¹, Huairan Zhou¹, Rafael Medero¹, Alejandro Roldan-Alzate¹, ¹University of Wisconsin-Madison, United States

Experimental Evaluation of Two Fast Virtual Stenting Algorithms For Modeling Flow Diverters In Patient-Specific Intracranial Aneurysms SB³C2019-P072

Saeb Ragani Lamooki¹, Vincent Tutino¹, Nikhil Paliwal¹, Setlur Nagesh¹, Robert Damiano¹, Adnan Siddiqui¹, Hui Meng¹, ¹University at Buffalo, United States

Adhesion Effect On Localization of Deformable Micro-Particles In Blood Flow SB³C2019-P073

Huilin Ye¹, Zhiqiang Shen¹, Ying Li¹, ¹University of Connecticut, United States

4d Flow Mri Determination of Windkessel Parameters For Patient Specific Cardiovascular Simulation SB³C2019-P074

Ryan Pewowaruk¹, Alejandro Roldan-Alzate¹, ¹University of Wisconsin - Madison, United States

Differences In Parent Artery Geometry Between Acom and Mca Aneurysms SB³C2019-P075

Fernando Mut¹, Megan Lawson¹, Juan Cebral¹, ¹George Mason University, United States

Predicting Aneurysmal Degeneration In The Dissected Thoracic Aorta: A Computational Fluid Dynamic Approach SB³C2019-P076

Arianna Forneris¹, Alina Ismaguilova¹, Giampaolo Martufi¹, Jehangir Appoo¹, Elena Di Martino¹, ¹University of Calgary, Canada

Patient-Specific Evaluation of Post-Tevar Hemodynamic Performance In Aortic Dissection SB³C2019-P077

Selene Pirola¹, Claudia Menichini¹, Baolei Guo², Simone Saitta¹, Weiguo Fu², Zhihui Dong², Xiao Yun Xu¹, ¹Imperial College London, United Kingdom, ²Fudan University, China

Image-Based Assessment of The Hemodynamic Performance of Surgical and Transcatheter Aortic Valve Replacements SB³C2019-P078

Selene Pirola¹, Omar A. Jarral¹, Mohammad Y. Salmasi¹, Declan P. O'Regan¹, John R. Pepper², Thanos Athanasiou¹, Xiao Yun Xu¹, ¹Imperial College London, United Kingdom, ²Royal Brompton and Harefield NHS Foundation Trust, United Kingdom

Hemodynamic Characteristics Associated With Cerebral Aneurysms Evolution SB³C2019-P079

Seyedeh Fatemeh Salimi Ashkezari¹, Fernando Mut¹, Juan Raul Cebral¹, ¹George Mason University, United States

Intensity of Stenosis-Induced Flow Instabilities of The Internal Carotid Artery: A Computational Approach SB³C2019-P080

Viviana Mancini¹, Aslak W. Bergersen², Kristian Valen-Sendstad², Patrick Segers¹, ¹IBiTech bioMMeda, Ghent University, Belgium, ²Department of Computational Physiology, Simula Research Laboratory, Norway

Predicting Thrombosis Risk In The Left Atrial Appendage of Human Heart SB³C2019-P081

Breandan Yeats¹, Hoda Hatoum¹, Thura Harfi¹, Lakshmi Prasad Dasi¹, ¹The Ohio State University, United States

Effects of Subject-Specific, Spatially Reduces, and Idealized Boundary Conditions On The Predicted Hemodynamic Environment In The Murine Aorta SB³C2019-P082

Kelly Smith¹, Samer Merchant¹, Edward Hsu¹, Lucas Timmins¹, ¹University of Utah, United States

Pre-Procedural Patient-Specific In-Silico Deployment of Sapien and Evolut Transcatheter Aortic Valves SB³C2019-P083

Sri Krishna Sivakumar¹, Hoda Hatoum¹, Jennifer Dollery¹, Scott Lilly¹, Lakshmi Prasad Dasi¹, ¹*The Ohio State University, United States*

Effects of Resolution and Dynamic Range of Dual-Venc 4d Flow Mri On Flow Measurements In Cerebral Aneurysms: In Vitro 4d Flow Study In A Scaled Model SB³C2019-P084

Sean Rothenberger¹, Melissa Brindise¹, Joseph Muskat¹, Susanne Schnell², Pavlos Vlachos¹, Vitaliy Rayz¹, ¹*Purdue University, United States*, ²*Northwestern University, United States*

In-Silico Characterization of Patient-Specific Pulmonary Hypertension Hemodynamics SB³C2019-P085

Narasimha Rao Pillalamarri¹, Senol Piskin¹, Sourav Patnaik¹, Alifer Bordonnes¹, Vitaly Kheyfets², Ender Finol¹, ¹*University of Texas at San Antonio, United States*, ²*University of Colorado, Denver, United States*

Development of An Experimental System Exploring The Efficacy of Cyclic Aspiration On Clot Displacement In A Cerebral Thrombectomy Model SB³C2019-P086

Joshua Kugel¹, Connor Foust¹, Bryan Good¹, Keefe Manning¹, ¹*The Pennsylvania State University, United States*

Posters - Solid Mechanics: Bone Mechanics**Assessing Femoral Implant Failure Risk By Applying Controllable Torque With Robot Manipulator and 6 Dof Sensor** SB³C2019-P087

Marius Gudauskis¹, Abel Pietros², Brian L. Davis², Brandon Jonard³, ¹*Institute of Mechatronics, Kaunas University of Technology, Lithuania*, ²*Department of Biomedical Engineering, The University of Akron, United States*, ³*Department of Orthopaedics, Summa Healthcare System, United States*

Drill Plunge In Orthopedic Surgery Defined SB³C2019-P088

Scott Baskerville¹, Ted Conway¹, Samantha Schultz¹, ¹*Florida Institute of Technology, United States*

A Preliminary Study On Correlations Between Microarchitectural Parameters of Human Trabecular Bone SB³C2019-P089

Pengwei Xiao¹, Joel Gomez¹, Matthew Kirby¹, Ed Guo², Xiaodu Wang¹, ¹*The University of Texas at San Antonio, United States*, ²*Columbia University, United States*

Posters - Solid Mechanics: Cardiovascular Tissue Mechanics**Three-Dimensional Anisotropic Residual Stresses In The Abdominal Aorta** SB³C2019-P090

Taisiya Sigaeva¹, Gerhard Sommer², Gerhard A. Holzapfel³, Elena Di Martino¹, ¹*University of Calgary, Canada*, ²*Graz University of Technology, Austria*, ³*Graz University of Technology, Norwegian University of Science and Technology, Austria*

A Biomechanics-Based Risk Prediction Metric For Thoracic Aortic Dissection SB³C2019-P091

Spandan Maiti¹, James Thunes¹, Leonid Emerel¹, Thomas Gleason¹, David Vorp¹, ¹*University of Pittsburgh, United States*

Physiologic Strength of Ascending Thoracic Aortic Tissue Depends On Stress Biaxiality SB³C2019-P092

James Thunes¹, Ronald Fortunato¹, Thomas Gleason¹, David Vorp¹, Spandan Maiti¹, ¹*University of Pittsburgh, United States*

Inverse Mixed Strain Method For Aneurysm Stress Analysis SB³C2019-P093

Yuanming Luo¹, Jia Lu¹, ¹*the University of Iowa, United States*

Microstructural Characterization of Intraluminal Thrombus In Abdominal Aortic Aneurysms SB³C2019-P094

Pete Gueldner¹, Sourav Patnaik¹, Senol Piskin¹, Mirunalini Thirugnanasambandam¹, Satish Muluk², Ender Finol¹, ¹*University of Texas at San Antonio, United States*, ²*Allegheny General Hospital, United States*

Material Characterization of Atherosclerotic Plaques With Virtual Fields Method SB³C2019-P095

Ronald van den Berg¹, Stephane Avril², Frank Gijssen¹, Ali Akyildiz¹, ¹*Erasmus Medical Center, Netherlands*, ²*Mines Saint-Etienne, France*

Microstructure-Based Finite Element Modeling Framework For Simulating Passive Inflation of The Left Ventricle

SB³C2019-P096

Ce Xi¹, Ghassan Kassab², Lik Chuan Lee¹, ¹*Michigan State University, United States*, ²*California Medical Innovations Institute, United States*

A Thermodynamically Motivated Cross-Bridge Cycling Framework To Predict Myofibril Remodeling Under Conditions Associated With Lv Hypertrophy SB³C2019-P097

Eoin McEvoy¹, Patrick McGarry¹, ¹*National University of Ireland Galway, Ireland*

Contractility Modelling Towards Predicting Eccentric Hypertrophy In A Patient-Specific Heart Model SB³C2019-

P098

Ryan Coleman¹, Eoin McEvoy¹, Patrick McGarry¹, ¹*NUI Galway, Ireland*

Cardiac Growth and Remodeling: Using Machine Learning To Correlate Cell and Organ Scales SB³C2019-P099

Mathias Peirlinck¹, Francisco Sahli Costabal², Kevin Sack³, Jenny Choy⁴, Ghassan Kassab⁴, Julius Guccione⁵, Matthieu De Beule¹, Patrick Segers¹, Ellen Kuhl², ¹*Ghent University, Belgium*, ²*Stanford University, United States*, ³*University of Cape Town, South Africa*, ⁴*California Medical Innovations Institute, Inc., United States*, ⁵*University of California at San Francisco, United States*

Changes In The Anisotropic and Viscoelastic Properties of The Ovine Right Ventricle Under Chronic Pressure Overload SB³C2019-P100

Wenqiang Liu¹, Michael Nguyen-Truong¹, Elisabeth Gray¹, Jeremiah Easley¹, Eric Monnet¹, Christian Puttlitz¹, Zhijie Wang¹, ¹*Colorado State University, United States*

Mechanical Characterization of Bovine Embolus Analogs For Investigating Acute Ischemic Stroke Recanalization

SB³C2019-P101

Gretchen Hiller¹, Bryan Good¹, Keefe Manning¹, ¹*Department of Biomedical Engineering The Pennsylvania State University University Park, PA, United States*

Assessment of Ascending Aortic Wall Stresses For Nondissected Patients With Bicuspid Aortic Valve and Dissected Patients With Tricuspid Aortic Valve SB³C2019-P102

Sreyas Ravi¹, David Vorp¹, Spandan Maiti¹, ¹*University of Pittsburgh, United States*

Application of Digital Image Correlation To The Local Strain Analysis of Mouse Aortas: Novel Method To Create Speckle Pattern SB³C2019-P103

Liya Du¹, Brooks Lane¹, John Eberth¹, Susan Lessner¹, ¹*University of South Carolina, United States*

Towards An Ultrasound Imaging Framework For Transmural Evaluation of Right Ventricular Myocardial Fiber Orientation Under Loading SB³C2019-P104

Danial Sharifikia¹, Marc Simon², Kang Kim², ¹*Department of Bioengineering, University of Pittsburgh, United States*, ²*Department of Bioengineering, University of Pittsburgh; Division of Cardiology, School of Medicine, University of Pittsburgh; Heart and Vascular Institute, University of Pittsburgh Medical Center (UPMC); McGowan Institute for Regenerative Medicine, Univer, United States*

Improved Strain Analysis of Left Ventricular Function Post Myocardial Infarction In Mice SB³C2019-P105

Danielle Wilson¹, Zhen Zhu¹, Stephanie George¹, Jitka Virag¹, ¹*East Carolina University, United States*

Structural Changes In The Progression of Pulmonary Arterial Hypertension SB³C2019-P106

Erica Pursell¹, Daniela Valdez-Jasso¹, ¹*Ucsd, United States*

Dynamic Mechanics of Cyclically Stretched Vascular Smooth Muscle Cells SB³C2019-P107Taylor Rothermel¹, Patrick Alford¹, ¹University of Minnesota - Twin Cities, United States**Mechanics of The Bulbus Arteriosus In Zebrafish: Why The Shape of The P-D Loop Is Crucial** SB³C2019-P108Matthias Van Impe¹, Patrick Sips², Julie De Backer², Patrick Segers¹, ¹Ghent University, Belgium, ²Ghent University Hospital, Belgium**The Effect of Leaflet Residual Strains On Aortic Valve Dynamics** SB³C2019-P109Rana Zakerzadeh¹, Ming-Chen Hsu², Michael Sacks¹, ¹University of Texas at Austin, United States, ²Iowa State University, United States**Effects of -80c Freezing Onthe Biomechanical Response of Tricuspid Valve Leaflets** SB³C2019-P110Samuel Salinas¹, Margaret Clark¹, Rouzbeh Amini¹, ¹The University of Akron, United States**Role of Glycosaminoglycans In Biaxial Mechanical Behaviors of Porcine Atrioventricular Heart Valve Leaflets**SB³C2019-P111Chung-Hao Lee¹, Colton Ross¹, Devin Laurence¹, Lauren Evans¹, Jacob Richardson¹, Anju Babu¹, Ean Beyer¹, Yi Wu¹, Gerhard Holzapfel², Arshid Mir³, Harold Burkhart³, ¹The University of Oklahoma, United States, ²Graz University of Technology, Austria, ³The University of Oklahoma Health Sciences Center, United States**State of The Art Simulation of The Early Stages of Bioprosthetic Heart Valve Fatigue** SB³C2019-P112Will Zhang¹, Rana Zakerzadeh², Michael Sacks², ¹University of Michigan, United States, ²The University of Texas at Austin, United States**Image-Based Simulation of The Mitral Valve Repair Surgery In Ischemic Mitral Regurgitation Patients** SB³C2019-P113Amir Khalighi¹, Bruno Rego¹, Robert Gorman², Joseph Gorman², Michael Sacks¹, ¹The University of Texas at Austin, United States, ²University of Pennsylvania, United States**A Non-Invasive Method To Quantify Aortic Valve Leaflet Deformation** SB³C2019-P114Bruno Rego¹, Samuel Potter², Alison Pouch³, Robert Gorman³, Michael Sacks², ¹University of Texas at Austin, United States, ²University of Texas at Austin, United States, ³University of Pennsylvania, United States**Collagen Architecture, Cellularity, and Biaxial Mechanics of Ovine Tricuspid Valve Leaflets** SB³C2019-P115William Meador¹, Mrudang Mathur¹, Marcin Malinowski², Tomasz Jazwiec², Tomasz Timek², Manuel Rausch¹, ¹The University of Texas at Austin, United States, ²Spectrum Health, United States**Quantification of Simultaneous Structure, Strain, and Stress Behaviors In Layered Soft Tissues** SB³C2019-P116Samuel Potter¹, Will Goth¹, James Tunnell¹, Michael Sacks¹, ¹The University of Texas at Austin, United States**The Role of Sclerostin In Calcific Aortic Valve Disease** SB³C2019-P117J. Ethan Joll¹, W. David Merryman¹, ¹Vanderbilt University, United States**A Spatial Mean Curvature Map of The Aortic Valve-Relevance To Calcification** SB³C2019-P118Amanda Barreto¹, Asad Mirza¹, Sharan Ramaswamy¹, ¹FIU-Biomedical Engineering Department, United States**Posters - Solid Mechanics: Growth Remodeling and Repair****Matching Material and Cellular Timescales Maximizes Cell Spreading On Viscoelastic Substrates** SB³C2019-P119Ze Gong¹, Spencer Szczesny², Steven Caliar³, Elisabeth Charrier¹, Ovijit Chaudhuri⁴, Xuan Cao¹, Yuan Lin⁵, Robert Mauck¹, Paul Janmey¹, Jason Burdick¹, Vivek Shenoy¹, ¹University of Pennsylvania, United States, ²The Pennsylvania State University, United States, ³University of Virginia, United States, ⁴Stanford University, United States, ⁵University of Hong Kong, Hong Kong

Extracellular Matrix Microstructure Modulates Myofibroblast Differentiation Within 3d Fibrous Microenvironments In Vitro SB³C2019-P120

Daniel Matera¹, Brendon Baker¹, ¹*University of Michigan, United States*

Architecture and Function of Chick Embryonic Heart Cells Are Mediated By Geometric Ecm Patterning Cues SB³C2019-P121

Bernard Cook¹, Patrick Alford¹, ¹*University of Minnesota, United States*

Three-Dimensional Ct Morphometric Image Analysis of The Clivus and Sphenoid Sinus In Chiari Malformation Type I SB³C2019-P122

Blaise Simplicie Talla Nwotchouang¹, Maggie Eppelheimer¹, Paul Bishop², Dipankar Biswas¹, Janna Andronowski¹, Jayapalli Bapuraj³, David Frim⁴, Rick Labuda⁵, Rouzbeh Amini¹, Francis Loth¹, ¹*University of Akron, United States*, ²*Cleveland Clinic, United States*, ³*University of Michigan Health System, United States*, ⁴*University of Chicago, United States*, ⁵*Conquer Chiari, United States*

Controlled Release From Mechanically-Activated Microcapsules In Developing Tissue Microenvironments SB³C2019-P123

Ana Peredo¹, Yun Kee Jo¹, Daeyeon Lee¹, George Dodge¹, Robert Mauck¹, ¹*University of Pennsylvania, United States*

Finite Element Modeling To Study Musculoskeletal Growth: A Comparison of Node and Element-Based Approaches SB³C2019-P124

Danielle Howe¹, Nikhil Dixit², Katherine Saul², Matthew Fisher¹, ¹*North Carolina State University and the University of North Carolina- Chapel Hill, United States*, ²*North Carolina State University, United States*

Mitral Valve Leaflet Remodeling Following Myocardial Infarction SB³C2019-P125

Bruno Rego¹, Amir Khalighi¹, Eric Lai², Robert Gorman², Joseph Gorman², Michael Sacks¹, ¹*The University of Texas at Austin, United States*, ²*University of Pennsylvania, United States*

A Machine Learning Material Model For Soft Tissue Remodeling SB³C2019-P126

Wenbo Zhang¹, Tan Bui-Thanh¹, Michael Sacks¹, ¹*The University of Texas at Austin, United States*

Biomechanical Restoration Potential of Pentagalloyl Glucose After Arterial Extracellular Matrix Damage SB³C2019-P127

Sourav Patnaik¹, Narasimha Rao Pillalamarri¹, Senol Piskin¹, Mirunalini Thirugnanasambandam¹, Vangelina Osteguin¹, Gladys P. Escobar², Eugene Sprague², Ender A. Finol¹, ¹*University of Texas at San Antonio, United States*, ²*University of Texas Health San Antonio, United States*

Low-Energy Mechanical Impacts To Articular Cartilage Increase At Least One Anabolic Protein In Chondrocytes SB³C2019-P128

Stephany Santos¹, Kelsey Richard¹, Melanie C. Fisher², Caroline N. Dealy², David M. Pierce¹, ¹*University of Connecticut, United States*, ²*University of Connecticut Health Center, United States*

Alpha Smooth Muscle Actin-Expressing Bone Marrow Progenitor Cells Contribute To Tunnel Integration Following Acl Reconstruction SB³C2019-P129

Timur Kamalidinov¹, Keitaro Fujino¹, Yaping Ye¹, Xi Jiang¹, Snehal Shetye¹, Ashley Rodriguez¹, Miltiadis Zgonis¹, Andrew Kuntz¹, Nathaniel Dymant¹, ¹*University of Pennsylvania, United States*

In Silico Modeling of Soft Tissue Failure From Subfailure Damage To Complete Rupture SB³C2019-P130

Ronald Fortunato¹, Anne Robertson¹, Chao Sang¹, Spandan Maiti¹, ¹*University of Pittsburgh, United States*

Myofibroblast Activation In Synthetic Fibrous Matrices Composed of Dextran Vinyl Sulfone SB³C2019-P131

Christopher Davidson¹, Danica Jayco¹, Daniel Matera¹, William Wang¹, Brendon Baker¹, ¹*University of Michigan, United States*

Interaction of Pentagalloyl Glucose With The Microenvironment of Macrophages SB³C2019-P132

Sourav Patnaik¹, Vangelina Osteguín¹, Tina Rodgers¹, Rohini Vishwanath¹, Craig Goergen², Dan Simionescu³, Gabriela Uribe¹, Ender Finol¹, ¹University of Texas at San Antonio, United States, ²Purdue University, United States, ³Clemson University, United States

Posters - Cell & Tissue Engineering: Quantitative Micro/Nanodevices**Rapid Actuation and Tunable Control of Dna Machines** SB³C2019-P133

Alexander Marras¹, Stephanie Lauback², Ze Shi³, Gaurav Arya⁴, Ratnasingham Sooryakumar⁵, Carlos Castro⁵, ¹University of Chicago, United States, ²Juniata College, United States, ³University of California San Diego, United States, ⁴Duke University, United States, ⁵Ohio State University, United States

High-Throughput Cell Mechanical Property Measurements From Creep Experiments In An Extensional Flow Microfluidic Device SB³C2019-P134

Huda Irshad¹, Safwa Ali¹, Gwendolyn Cramer¹, Jonathan Celli¹, Joanna Dahl¹, ¹University of Massachusetts Boston, United States

Posters - Cell & Tissue Engineering: Cardiovascular**A Computational Approach For Optimal Design of Tissue Engineered Vascular Grafts** SB³C2019-P135

Jason Szafron¹, Abhay Ramachandra¹, Christopher Breuer², Alison Marsden³, Jay Humphrey¹, ¹Yale University, United States, ²Nationwide Children's Hospital, United States, ³Stanford University, United States

Curling Angle Measurement of Lv Bi-Layered Surface Strip Reveals Residual Stress In The Epicardium SB³C2019-P136

Xiaodan Shi¹, Yue Liu², Katherine Copeland¹, Sara McMahan¹, Song Zhang³, Ryan Butler³, Yi Hong¹, Michael Cho⁴, Pietro Bajona⁵, Huajian Gao², Jun Liao¹, ¹University of Texas at Arlington, United States, ²Brown University, United States, ³Mississippi State University, United States, ⁴University of Texas Arlington, United States, ⁵University of Texas Southwestern Medical Center, United States

Effects of Microgravity On 3d Bioprinted Constructs To Assess Cardiovascular Disorders SB³C2019-P137

Likitha Somasekhar¹, Prabhuti Kharel¹, Kenia Nunes¹, Paul Gatenholm², Kunal Mitra¹, ¹Florida Institute of Technology, United States, ²Chalmers university of Technology, Sweden

Patient Specific, In Vitro Studies of Pathologies Caused By Heart Disease Associated Lamin A/c Mutations SB³C2019-P138

Mehrsa Mehrabi¹, Richard Tran¹, Halida Widyastuti¹, Cecilia Nguyen¹, Michael V. Zaragoza¹, Anna Grosberg¹, ¹University of California, Irvine, United States

Adipose Stromal Cell Derived Extracellular Vesicles Induce Elastin and Collagen Deposition By Aortic Smooth Muscle Cells SB³C2019-P139

Eoghan Cunnane¹, Aneesh Ramaswamy¹, David Vorp¹, Justin Weinbaum¹, ¹University of Pittsburgh, United States

Posters - Cell & Tissue Engineering: Mechanobiology - a symposium in memory of Christopher R. Jacobs**Tissue-Engineered Intra-Arterial Barrier For Mechanobiology Studies** SB³C2019-P140

Sara Ben Saadon¹, David Elad¹, ¹Tel Aviv University, Israel

The Role of Prestress In Calcification of Human Coronary Artery Smooth Muscle Cells In Vitro SB³C2019-P141

Amirala Bakhshian Nik¹, Daniela Medina¹, Manuel Garcia Russo¹, Walter Heatherly¹, Joshua Daniel Hutcheson¹, ¹Florida International University, United States

Regulation of Nuclear Architecture, Mechanics and Nucleo-Cytoplasmic Shuttling of Epigenetic Factors By Cell Geometric Constraints SB³C2019-P142

Farid Alisafaei¹, Doorgesh Sharma Jokhun², GV Shivashankar², Vivek Shenoy¹, ¹*University of Pennsylvania, United States*, ²*National University of Singapore, Singapore*

Computational Models of Endothelial Cell Biochemical Responses To Shear Stress SB³C2019-P143

Jonathan Garcia¹, Alisa Morss Clyne¹, ¹*Drexel University, United States*

Perlecan Deficiency Impairs The Intracellular Calcium Signaling In Mechanically Loaded Bone and Osteocytes SB³C2019-P144

Shaopeng Pei¹, Sucharitha Parthasarathy¹, Ashutosh Parajuli¹, Jerahme Martinez¹, Mengxi Lv¹, Sida Jiang¹, Danielle Wu², Shuo Wei¹, X. Lucas Lu¹, Mary C. Farach-Carson², Catherine B. Kirn-Safran¹, Liyun Wang¹, ¹*University of Delaware, United States*, ²*University of Texas Health Center, United States*

A Modified Bioreactor Configuration To Study Effects of Low Intensity Pulsed Ultrasound Treatment SB³C2019-P145

Abdolrasol Rahimi¹, Zach Pittz¹, Nicholas Weaver¹, Natasha Case¹, ¹*Saint Louis University, United States*

Design and Computational Modeling of An Ultrasound Bioreactor For Stimulation of Cell-Seeded Scaffolds SB³C2019-P146

Jacob Crapps¹, Abdolrasol Rahimi¹, Natasha Case¹, ¹*Saint Louis University, United States*

Pulsatile Electromagnetic Fields Regulate Bone Integrity Through Activation of Voltage Sensitive Calcium Channels SB³C2019-P147

Abigail Dela Paz¹, Case Gregory¹, Randall Duncan¹, Mark Mirotznik¹, ¹*University of Delaware, United States*

Posters - Cell & Tissue Engineering: Other

Creating The Storkel: A Water Occluding Device For Accidental Submersion With A Tracheostoma SB³C2019-P148

Claire M. Chaisson¹, Samantha K. Denning¹, Kelli E. Grimes¹, William J. Pelowski¹, Michael A. Valteau¹, Byron D. Erath¹, ¹*Clarkson University, United States*

Dynamic Tracking of Fluorescently Labeled Type I Collagen Molecules; Direct Quantification of Molecular Association With Native Fibrils SB³C2019-P149

Seyed Mohammad Siadat¹, Jeffrey Ruberti¹, ¹*Northeastern University, United States*

Mechanical Advances In Cardiopulmonary Resuscitation SB³C2019-P150

Jeffrey Stransky¹, Morgan Dean¹, Thomas Merrill¹, Jennifer Kadlowec¹, ¹*Rowan University, United States*

9.2 Poster Session II

Thursday, June 27 12:45PM - 2:15PM

Posters - Biotransport

Thermal Analysis of Partial Vitrification With Application To Large-Size Cryopreservation SB³C2019-P151Purva Joshi¹, Yoed Rabin¹, ¹*Carnegie Mellon University, United States***Point-of-Care Diagnosis of Respiratory Syncytial Virus By Digital Nanobubble Detection** SB³C2019-P152Yaning Liu¹, Varsha Godakhindi¹, Ruth Levitz², Jeffrey Kahn², Zhenpeng Qin¹, ¹*University of Texas at Dallas, United States*, ²*University of Texas Southwestern Medical Center, United States***Safe Duration of A Person Soaking Inside A Hot Tub: Theoretical Prediction of Temperature Elevations In Human Bodies Using A Whole Body Heat Transfer Model** SB³C2019-P153Myo Min Zaw¹, Manpreet Singh¹, Ronghui Ma¹, Liang Zhu¹, ¹*University of Maryland Baltimore County, United States***Creating A Distinct Capture Zone In Microfluidic Flow Greatly Enhances The Throughput and Efficiency of Cancer Detection** SB³C2019-P154Jiangsheng Xu¹, Xiaoming He¹, ¹*University of Maryland, United States***Fundamental Aspects of Paper-Based Microchip Electrophoresis Ph Gradient** SB³C2019-P155Muhammad Noman Hasan¹, Ran An¹, Asya Akkus¹, Derya Akkaynak², Adrienne Minerick³, Umut Gurkan¹, ¹*Case Western Reserve University, United States*, ²*Princeton University, United States*, ³*Michigan Technological University, United States***Robustness of Convolutional Neural Networks For Malaria Parasite Identification In Thin Blood Smear Images With Adversarial Image Noise** SB³C2019-P156Bill Sun¹, Liang Liang², ¹*Walton High School, United States*, ²*Department of Computer Science at University of Miami, United States***Towards Patient Specific Vascular Navigation of Therapeutics** SB³C2019-P157Luke Puller¹, Matthew Charles¹, Darien Perez¹, Scott Anderson¹, Anilchandra Attaluri¹, ¹*The Pennsylvania State University - Harrisburg, United States***Theoretical Evaluation of Temperature Elevation, Thermal Damage, Tumor Porosity Enhancement, and Magnetic Nanoparticle Migration In Tumors During Local Heating** SB³C2019-P158Manpreet Singh¹, Ronghui Ma¹, Liang Zhu¹, ¹*University of Maryland Baltimore County, United States***Aloe Alginate Hydrogels For Cervical Cancer Treatment: Antioxidant and Drug Release Activity** SB³C2019-P159Sierra McConnell¹, Patrick Charron¹, Rachael Oldinski¹, ¹*University of Vermont, United States***Modelling Lymph Propulsion In A Series of Pumping Lymphangions** SB³C2019-P160Ghazal Adeli Koudehi¹, Matthias Van Impe¹, Carlos Alejandro Silvera Delgado¹, Charlotte Debbaut¹, Christophe Casteleyn¹, Pieter Cornillie¹, Patrick Segers¹, ¹*Ghent University, Belgium***A 2d Axisymmetric Computational Model For The Study of Mass Transport Into Lymphatic Capillaries and Pre-Collector Vessels** SB³C2019-P161Carlos Alejandro Silvera Delgado¹, Ghazal Adeli Koudehi¹, Matthias Van Impe¹, Charlotte Debbaut¹, Patrick Segers¹, ¹*Ghent University, Belgium***Microfluidic Assessment of Red Blood Cell Deformability and Microvascular Occlusion Risk In Malaria and Sickle Cell Disease** SB³C2019-P162Yuncheng Man¹, Erdem Kucukal¹, Quentin Watson¹, Jurgen Bosch¹, Jane Little¹, Peter Zimmerman¹, Umut Gurkan¹, ¹*Case Western Reserve University, United States*

Microfluidic Assessment of Red Blood Cell Detachment In Simulated Microvascular Flow SB³C2019-P163

Utku Goreke¹, Shamreen Iram¹, Gundeep Singh¹, Jane A Little¹, Michael Hinczewski¹, Umut A Gurkan¹, ¹*Case Western Reserve University, United States*

Effects of Leaky Tumor Vasculature On Tissue Stress and Porosity In A Biphasic Model of Brain Glioma

SB³C2019-P164

Julian Rey¹, Malisa Sarntinoranont¹, James Ewing², ¹*Mechanical and Aerospace Engineering, University of Florida, Gainesville, FL, United States*, ²*Henry Ford Health System, Detroit, Michigan, United States*

Modelling Advection-Based Nanoparticle Drug Delivery To The Left Ventricle Using A Splitting Method For Advection-Diffusion Kinetics SB³C2019-P165

Alexandra Diem¹, Kristian Valen-Sendstad¹, ¹*Simula Research Laboratory, Norway*

Posters - Design Dynamics & Rehabilitation**Comparison of Principal Component Analysis and Non-Negative Matrix Factorization In Prediction of Unmeasured Muscle Excitations** SB³C2019-P166

Di Ao¹, Mohammad Shourijeh¹, Carolyn Patten², Benjamin Fregly¹, ¹*Rice University, United States*, ²*UC Davis, United States*

Variance In Swimmer Symmetry Due To Effort and Fatigue SB³C2019-P167

Casey Main¹, Craig Goehler¹, ¹*Valparaiso University, United States*

Joint Stiffness Modulation of Gait Variability In A Stroke SB³C2019-P168

Geng Li¹, Di Ao¹, Mohammad Shourijeh¹, Marleny Arones¹, Carolyn Patten², Benjamin Fregly¹, ¹*Rice University, United States*, ²*UC Davis, United States*

Analytical Calculation of Musculoskeletal Joint Stiffness SB³C2019-P169

Mohammad S. Shourijeh¹, Di Ao¹, Carolyn Patten², Benjamin J. Fregly¹, ¹*Rice University, United States*, ²*UC Davis, United States*

Identifying Postural Instability Using Topological Data Analysis SB³C2019-P170

Kyle Siegrist¹, James Chagdes¹, Amit Shukla¹, Ryan Kramer², Michael Cinelli³, ¹*Miami University, United States*, ²*Air Force Research Laboratory, United States*, ³*Wilfrid Laurier University, Canada*

A Novel Strategy For Concurrent Reduction of Fluid Drag and Protein Adsorption For Cardiovascular Medical Devices. SB³C2019-P171

Cheng Yi-Chih¹, Yap Choon Hwai¹, ¹*National University of Singapore, Taiwan*

Integrated Switchable Ventricular Assist Device For Pediatric Patients SB³C2019-P172

Harut Sarkisyan¹, Randy Stevens², Amy Throckmorton¹, ¹*Biomedical Engineering, Drexel University, United States*, ²*St. Christopher's Hospital for Children, United States*

Experimental Modeling of Coronary Intervention: Towards Computational Simulation SB³C2019-P173

Maxwell Bean¹, David Jiang², Sam Stephens¹, Megan Laughlin¹, Hanna Jensen¹, Barry Uretsky³, Lucas Timmins², Morten Jensen¹, ¹*University of Arkansas, United States*, ²*University of Utah, United States*, ³*University of Arkansas for Medical Sciences, United States*

Agonist / Antagonist Control Combining Mixed Sensitivity Design and Iterative Learning SB³C2019-P174

Patrick Schimoler¹, Jeffrey Viperman², Mark Carl Miller¹, ¹*Allegheny General Hospital, United States*, ²*University of Pittsburgh, United States*

Analysis of A Poly(ethylene Glycol) Diacrylate (PEGDA) Optical Sensor-Based Whispering Gallery Mode Shift Subjected To Shock Wave Impact SB³C2019-P175

Ling Zhang¹, Maurizio Manzo², Sarah Bentil¹, ¹*Iowa State University, United States*, ²*University of North Texas, United States*

Exercise Therapy Affects Glenohumeral Joint Stability In Patients With Isolated Supraspinatus Tears SB³C2019-P176

Luke Mattar¹, Camille Johnson¹, Tom Gale¹, Adam Popchak¹, James Irrgang¹, William Anderst¹, Volker Musahl¹, Richard Debski¹, ¹*University of Pittsburgh, United States*

Biceps Voluntary Activation: Method To Calculate Pre-Stimulus Moment Affects Magnitude But Not Reproducibility SB³C2019-P177

Thibault Roumengous¹, Paul Howell¹, Carrie Peterson¹, ¹*Virginia Commonwealth University, United States*

Posters - Education

Effectiveness of An Extensively Active and Authentic Learning Environment In An Undergraduate Biomedical Engineering Module A Case Study In A South-East Asian Cohort SB³C2019-P178

Vivek Vasudevan¹, Alberto Corrias¹, Martin Buist¹, Hwa-Liang Leo¹, Choon-Hwai Yap¹, ¹*National University of Singapore, Singapore*

Injury Prevention Via Computer Modeling of Stud Traction SB³C2019-P179

Justin Rittenhouse¹, Peter Gustafson¹, ¹*Western Michigan University, United States*

An Ecg Analysis Determining The Impact of Mother'S Metabolic Equivalent Value In Pregnancy On Infant Heart Rate Variability SB³C2019-P180

Alexandra Williams¹, Colby Jolly¹, Christy Isler¹, Kelley Haven¹, Edward Newton¹, Linda May¹, Stephanie George¹, ¹*Ecu, United States*

For Your Information: Student Evaluations of Teaching Are Biased Against Women and Faculty of Color SB³C2019-P181

Naomi Chesler¹, Dante Fratta², Elizabeth Harris¹, Wayne Pferdehirt¹, Heidi Ploeg³, Barry Vanveen¹, ¹*University of Wisconsin - Madison, United States*, ²*University of Wisconsin-Madison, United States*, ³*Queens University, Canada*

Incorporating National Biomechanics Day Into Biomechanical Engineering Courses SB³C2019-P182

Sara Wilson¹, ¹*University of Kansas, United States*

Posters - Fluids: Cardiovascular Fluid Mechanics

Developing The Components of A Multiscale Computational Platform In The Design of A Geometrically Tunable Blood Shunt For Norwood Recipients SB³C2019-P183

Ellen Garven¹, Kara Spiller¹, Randy Stevens², Amy Throckmorton¹, ¹*Drexel University, United States*, ²*St. Christopher's Hospital for Children, United States*

Quantifying Hemodynamics In Hypoplastic Left Heart Syndrome SB³C2019-P184

Banafsheh Zebhi¹, Hadi Wiputra², Lisa Howley³, Bettina Cuneo³, Dawn Park³, Hilary Hoffman³, Lisa Gilbert³, Choon Hwai Yap², David Bark Jr¹, ¹*Colorado State University, United States*, ²*National University of Singapore, Singapore*, ³*Children's Hospital Colorado, United States*

On The Quantification of Hemodynamics In The Ascending Aorta To Predict Pathogenesis In Bicuspid Aortic Valve Disease SB³C2019-P185

Tejas Canchi¹, Sargon A Gabriel¹, Mustafa Gok¹, David F Fletcher², Stuart Michael Grieve¹, ¹*The Heart Research Institute, Australia*, ²*The University of Sydney, Australia*

Multiple Mitraclips: The Balancing Act Between Pressure Gradient and Regurgitation SB³C2019-P186

Shelley Gooden¹, Hoda Hatoum¹, Konstantinos Boudoulas¹, Lakshmi Prasad Dasi¹, ¹*The Ohio State University, United States*

Basilica-Type Leaflet Laceration To Reduce Risk of Thrombosis In Transcatheter Aortic Valve Replacement

SB³C2019-P187

Hoda Hatoum¹, Pablo Maureira², Scott Lilly¹, Lakshmi Prasad Dasi¹, ¹*The Ohio State University, United States*, ²*Centre Hospitalier Universitaire de Nancy, France*

Early Diagnosis of Reduced Leaflet Mobility After Transcatheter Aortic Valve Replacement SB³C2019-P188

Hoda Hatoum¹, Jung-Hee Seo², Shantanu Bailoor², Scott Lilly¹, Rajat Mittal², Lakshmi Prasad Dasi¹, ¹*The Ohio State University, United States*, ²*Johns Hopkins University, United States*

Hemodynamics, In Addition To Morphology, Predicts Long-Term Outcome of Intracranial Aneurysms Treated With Flow Diverters SB³C2019-P189

SB³C2019-P189

Nikhil Paliwal¹, Jason Davies¹, Adnan Siddiqui¹, Hui Meng¹, ¹*University at Buffalo, United States*

Correlation of Computational Instantaneous Wave-Free Ratio With Fractional Flow Reserve In The Case of Multiple Intermediate Coronary Artery Stenosis In A Left Main Bifurcation SB³C2019-P190

Arash GhorbanniaHassankiadeh¹, David S. Marks², John F. LaDisa, Jr.¹, ¹*Marquette University and Medical College of Wisconsin, United States*, ²*Medical College of Wisconsin, United States*

The Effects of Oscillatory Shear Regulation On Paracrine Signaling Between Vascular Endothelial Cells and Vascular Smooth Muscle Cells SB³C2019-P191

Chia-Pei Hsu¹, Alexandra Tchir¹, Joshua Hutcherson¹, Sharan Ramaswamy¹, ¹*Florida International University, United States*

Non-Linear Cd31 Expression In Vascular Endothelial Cells In Response To Increasing Oscillatory Flow Conditions

SB³C2019-P192

Alexandra Tchir¹, Chia-Pei Hsu¹, Sharan Ramaswamy¹, ¹*Florida International University, United States*

Intra-Valvular Pressure Dynamics and Valve Specific Pressure Recovery In Transcatheter Aortic Valve Replacement: Implication On Validity of Echo Derived Gradient SB³C2019-P193

Hoda Hatoum¹, Maurice Alston¹, David Orsinelli¹, Gregory Rushing¹, Susan O'Neil¹, Nancy Matre¹, Konstantinos Boudoulas¹, Scott Lilly¹, Lakshmi Prasad Dasi¹, ¹*The Ohio State University, United States*

Design of A Cost-Effective Cardiac Flow Loop For Testing Tavr Placement In Patient-Specific Anatomy SB³C2019-P194

Christine Buffinton¹, Benjamin Conser¹, M. Laura Beninati¹, Shikhar Agarwal², ¹*Bucknell University, United States*, ²*Geisinger Medical Center, United States*

Effect of Leaflet Opening Geometry On Turbulent Characteristics For Prosthetic Aortic Valve Applications

SB³C2019-P195

Megan Heitkemper¹, Hoda Hatoum¹, Jun Kim¹, Lakshmi Prasad Dasi¹, ¹*The Ohio State University, United States*

In Vitro Forward Flow Performance of The Konect Resilia Aortic Valved Conduit SB³C2019-P196

Vahid Sadri¹, Immanuel David Madukauwa-David¹, Ajit Yoganathan¹, ¹*Georgia Institute of Technology, United States*

Posters - Fluids: Respiratory and Other Fluid Mechanics**Autonomous Pumping In A Physical Model of A Multi-Lymphangion System** SB³C2019-P197

John Montani¹, Luke Riexinger¹, Lance Munn², James Baish¹, ¹*Bucknell University, United States*, ²*Harvard Medical School, United States*

Culture of Lymphatic Endothelial Cells In A Custom Bioreactor For Studies Combining Stretching and Fluid Shear Stress SB³C2019-P198

Caleb Davis¹, Walter Cromer², David Zawieja², Michael Moreno¹, ¹Texas A&M University, United States, ²Texas A&M Health Science Center, United States

In Vitro Anthropomorphic Model of The Cerebrospinal Fluid System: Application To Subarachnoid Hemorrhage Filtration SB³C2019-P199

Lucas Sass¹, Mohammadreza Khani¹, Gabryel Conley Natividad¹, Elliott Marsden¹, Shavaine Byass¹, Omolola Bangudu¹, Aaron McCabe², Laura Zitella Verbick², Shivanand Lad³, Bryn Martin¹, ¹University of Idaho, United States, ²Minnetronix Neuro, Inc., United States, ³Duke University, United States

Impact of Cerebrospinal Fluid Filtration On Subarachnoid Hemorrhage Clearance: A Computational Fluid Dynamics Study SB³C2019-P200

Mohammadreza Khani¹, Lucas Sass¹, M. Keith Sharp², Aaron McCabe³, Laura Zitella Verbick³, Shivanand Lad⁴, Bryn Martin¹, ¹University of Idaho, United States, ²University of Louisville, United States, ³Minnetronix Neuro, Inc., United States, ⁴Duke University School of Medicine, United States

Towards Physiologically-Relevant Vocal Fold Models For Voiced-Speech Investigations SB³C2019-P201

Mohsen Motie-Shirazi¹, Natalie Jagelski², Byron Erath¹, ¹Clarkson University, United States, ²Clarkson Univeristy, United States

Computational Methodology To Estimate Resistance To Cerebrospinal Fluid Motion In The Spinal Canal For Chiari Patients With Specific and Nonspecific Symptoms SB³C2019-P202

Alaaddin Ibrahimy¹, Rafeeqe Bhadelia², Abraham Bezuidenhout², Francis Loth¹, ¹The University of Akron, United States, ²Beth Israel Deaconess Medical Center, United States

Multiphase Fluid Dynamics of Shear-Thinning Droplets In A Microfluidic Flow-Focusing Device SB³C2019-P203

Ali Bozorgnezhad¹, Jason Gleghorn¹, ¹University of Delaware, United States

Posters - Solid Mechanics: Injury

Fracture Patterns In Concentrated 4-Point Bending of The Ovine Femora: The Effects of Age and Rate of Loading SB³C2019-P204

Patrick Vaughan¹, Feng Wei¹, Roger Haut¹, ¹Michigan State University, United States

The Importance of Skull Morphology In Remote Blunt Impact Induced Fracture Initiation SB³C2019-P205

Paul Snyder¹, Steven Rundell², Todd Fenton¹, Roger Haut¹, Feng Wei¹, ¹Michigan State University, United States, ²Explico Engineering Company, United States

Subject-Specific Madymo Analysis of A Low Speed Rear-End Collision SB³C2019-P206

David Sproule¹, Stephanie Rossman¹, Paul Snyder¹, Keith Button¹, Brian Weaver¹, Steve Rundell¹, ¹Explico Engineering, United States

Development of A Portable Suction Device For Combat Medics SB³C2019-P207

Forhad Akhter¹, Austin Schoppe¹, Omar Navarro¹, Christopher Carroll¹, Priya Jain¹, Ricardo Pescador¹, Robert De Lorenzo², Bruce D. Adams², Yusheng Feng¹, R. Lyle Hood¹, ¹University of Texas at San Antonio, United States, ²University of Texas Health Science Center at San Antonio, United States

Finite Element Model of Neonatal Brachial Plexus and Spinal Cord SB³C2019-P208

Anita Singh¹, Christian D'Andrea², Sriram Balasubramanian², ¹Widener Univ, United States, ²Drexel Univ, United States

Development of Visual Analysis Tracking Method For Use In Conjunction With Novel Animal Model of Mtb SB³C2019-P209

Allison Gleason¹, Lisa Pruitt¹, Daniela Kaufer¹, Ellen Parker², ¹University of California - Berkeley, United States, ²Dalhousie University, Canada

Biomechanical Response of The Mandible To Blunt Impact and Corresponding Biofidelity of The Focus Headform
SB³C2019-P210

Charles Weisenbach¹, Jodie Gomez¹, Andrea Dargie¹, Ray Daniel¹, Valeta Chancey², Frederick Brozoski¹, ¹*U.S. Army Aeromedical Research Laboratory, United States*, ²*U.S. Army Aeromedical Research Laboratory, United States*

Converting The Worcester Head Injury Model From Abaqus To Ls-Dyna SB³C2019-P211

Kianoosh Ghazi¹, Wei Zhao¹, Songbai Ji¹, ¹*Worcester Polytechnic Institute, United States*

Quasi-Linear Viscoelastic Fitting of Thoracic Tissues and Ballistics Gel For Modeling Behind Armor Blunt Trauma
SB³C2019-P212

Madelyn Eaton¹, Robert Salzar¹, ¹*University of Virginia, United States*

Inhibiting Spinal Phospholipase A2 Prevents Pain and Modifies Spinal Neuron Activity & Glutamate Signaling Early After Nerve Root Compression SB³C2019-P213

Julia Quindlen-Hotek¹, Sonia Kartha¹, Prabesh Ghimire¹, Beth Winkelstein¹, ¹*University of Pennsylvania, United States*

Viscoelastic Response of Shock Wave Impacted Brain Tissue SB³C2019-P214

Annastacia McCarty¹, Ling Zhang¹, Sarah Hansen¹, William Jackson¹, Sarah Bentil¹, ¹*Iowa State University, United States*

Effects of Excessive Impact On Bone Conduction In Contact Sports SB³C2019-P215

Shinji Hamanishi¹, Namkeun Kim², Seongho Mo², Takashi Watanabe¹, Yoshihiro Aoki¹, ¹*Sendai National College of Technology, Japan*, ²*Incheon National University, South Korea*

Properties of The Six Layers of The Gray Matter SB³C2019-P216

Arpad Bakonyi¹, Alan Fajtelewicz², Siavash Hashemi², Ali Sadegh², ¹*University of Applied Sciences Technikum Vienna, Austria*, ²*The City College of the City Univ. of New York, United States*

Helmeted Head-Neck Kinematics With Localized Impacts and Implications For Brain Injury Metrics SB³C2019-P217

Narayan Yoganandan¹, John Humm¹, Mark Meyer¹, Frank Pintar¹, Tyler Rooks², Frederick Brozoski², Joseph McEntire², Valeta Chancey², ¹*Medical College of Wisconsin, United States*, ²*Usaarl, United States*

Investigate The Variations of The Head Impact Response In A Rodent Head Impact Acceleration Model By Finite Element Modeling SB³C2019-P218

Runzhou Zhou¹, Liying Zhang¹, ¹*Wayne State University, United States*

Injury Risk Curves Using A Novel (bayesian) Techinque To Describe Human Tolerance In Impact Biomechanics
SB³C2019-P219

Nicholas DeVogel¹, Anjishnu Banerjee¹, Narayan Yoganandan¹, ¹*Medical College of Wisconsin, United States*

Designing An Impact Pendulum To Test Different Concussion Prevention Helmet Aecessories SB³C2019-P220

Farryl Groder¹, Efe Ozkaya¹, Luca Conetta², Mehmet Kurt¹, ¹*Stevens Institute of Technology, United States*, ²*The Packer Collegiate Institute, United States*

Head Impact Characterization In Men'S and Women'S Collegiate Rugby SB³C2019-P221

Emily Kieffer¹, Grace Pierce¹, Chase Vaillancourt¹, Steven Rowson¹, ¹*Virginia Tech, United States*

History Dependent Damage Modelling For Axonal Fiber Tracts of The Brain SB³C2019-P222

Ritika Menghani¹, Ouniol Aklilu¹, Reuben Kraft¹, ¹*The Pennsylvania State University, United States*

Chestband-Based Injury Metrics In Far-Side Impacts SB³C2019-P223

Yuvaraj Purushothaman¹, John Humm², Hans Hauschild², Klaus Driesslein², Frank Pintar², Narayan Yoganandan², ¹*Medical College Of Wisconsin, United States*, ²*Medical College of Wisconsin, United States*

Application of Six-Year-Old Child Human Body Finite Element Models With Accurate Anatomical Characteristics For Understanding The Injury Mechanisms SB³C2019-P224

Haiyan Li¹, Yongqiang Huang¹, Wenle Lv¹, Shihai Cui¹, Lijuan He¹, Shijie Ruan¹, Chunxiang Wang², ¹*International Joint Research Centre of modern automobile safety technology, Tianjin University of Science and Technology, China*, ²*Tianjin Children Hospital, China*

Effect of Microstructural Variation In The Biomechanics of Oligodendrocyte-Neuron Co-Cultures SB³C2019-P225

Zeynep M. Suar¹, Mateusz Urbanski², Gloria Fabris¹, Carmen V. Melendez-Vasquez², Mehmet Kurt¹, ¹*Stevens Institute of Technology, United States*, ²*Hunter College, United States*

An Atlas-Based Finite Element Model of Mouse Brain For Controlled Cortical Impact SB³C2019-P226

Changxin Lai¹, Suhao Qiu¹, Yuan Feng¹, ¹*Shanghai Jiao Tong University, China*

Biomechanical Characterization of Ovine Pia Arachnoid Complex SB³C2019-P227

Gabryel Conley Natividad¹, Sophia Theodossiou¹, Nathan Schiele¹, Gordon Murdoch², Goutham Burla¹, Gabriel Potirniche³, Bryn Martin¹, ¹*University of Idaho, Department of Biological Engineering, United States*, ²*University of Idaho, Department of Animal and Veterinary Science, United States*, ³*Univerisyt of Idaho, Department of Mechanical Engineering, United States*

Posters - Solid Mechanics: Joint and Spine Mechanics

Template Models For Surface Manipulation of Musculoskeletal Extremity Regions SB³C2019-P228

Sean Doherty¹, Ben Landis¹, Tammy Owings¹, Ahmet Erdemir¹, ¹*Cleveland Clinic, United States*

A Parametric Study of Transcondylar Screw Effectiveness To Enhance Healing of Subchondral Bone Cysts of Varied Sizes SB³C2019-P229

Lance Frazer¹, Elizabeth Santschi², Kenneth Fischer¹, ¹*University of Kansas, United States*, ²*Kansas State University, United States*

Reducing Kinematic Data Uncertainty During Mechanical Testing of Orthopaedic Implants: The Benefits and Pitfalls of Auxiliary Motion Capture Systems SB³C2019-P230

Callan Gillespie¹, Quinn Saluan¹, Tara Nagle¹, Joe Little², Willy Theodore², Robb Colbrunn¹, ¹*Cleveland Clinic, United States*, ²*360 Knee Systems, United States*

Effect of Pelvis and Limb Position On Radiographic Leg Length Discrepancy Measurement: A Sawbones Model SB³C2019-P231

Isaac Livshetz¹, Awais Hussain¹, Matthew Robinson¹, Farid Amirouche¹, Mark Gonzalez¹, ¹*University of Illinois College of Medicine at Chicago, United States*

Clinical Representation of Joint Coordinate System Forces SB³C2019-P232

Callan Gillespie¹, Tara Nagle¹, Robb Colbrunn¹, ¹*Cleveland Clinic, United States*

Biomechanics of Three-Level Cervical Fusion Comparing A Stand-Alone Cage Construct To Anterior Plate and Cages Construct - A Cadaveric Study SB³C2019-P233

Robert McGuire¹, Abeer Al-Barghouthi², Loren Latta³, Francesco Travascio³, ¹*University of Mississippi, United States*, ²*Max Biedermann Institute for Biomechanics, Mount Sinai Medical Center, United States*, ³*University of Miami, United States*

A Posture Controlling Test Device To Dynamically Load Lumbar Spinal Columns SB³C2019-P234

John Humm¹, Narayan Yoganandan², ¹*Medical College of Wisconsin and Marquette University, United States*, ²*Medical College of Wisconsin, United States*

3d Surface Kinematics of The Lumbar Facet Capsular Ligament During Inflation Testing SB³C2019-P235

Elizabeth Gacek¹, Emily Bermel¹, Arin Ellingson¹, Victor Barocas¹, ¹*University of Minnesota Twin-Cities, United States*

Dorsal Subluxation of The First Metacarpal At The Basilar Thumb Joint During Key Pinch: Comparison To Osteoarthritis Grading Systems SB³C2019-P236

Nolan Norton¹, Brandon Barnds², Terence McIff², E. Bruce Toby², Kenneth Fischer¹, ¹University of Kansas, United States, ²University of Kansas Medical Center, United States

Wheelchair Seat Position and Footprint Length Effects On Shoulder and Elbow Angles On Graded Surfaces SB³C2019-P237

Amogha Vijayvargiya¹, Sarah Bass², Hailee Kulich², Alicia Koontz², ¹University of Pittsburgh, United States, ²Human Engineering Research Laboratories, United States

Posters - Solid Mechanics: Musculoskeletal Soft Tissue Mechanics

An Alternative Method To Characterize Poroelastic Material Properties of Murine Articular Cartilage SB³C2019-P238

Alexander Kotelsky¹, Joseph Carrier¹, Mark Buckley¹, ¹University of Rochester, United States

Comparison of The Effects of Boundary Lubricants On The Tribological Rehydration of Articular Cartilage SB³C2019-P239

Margot Farnham¹, David Burris¹, Christopher Price¹, ¹University of Delaware, United States

Effect of Counterface Surface Roughness On Tribological Rehydration of Articular Cartilage SB³C2019-P240

Meghan Kupratis¹, Margot Farnham¹, David Burris¹, Christopher Price¹, ¹University of Delaware, United States

Maintaining Cartilage Hydration During Sliding Part 1: The Effect of Migration Length SB³C2019-P241

Jamie Benson¹, Caroline Kook¹, Axel Moore², Steven Voinier¹, Christopher Price¹, David Burris¹, ¹University of Delaware, United States, ²Imperial College London, United Kingdom

Improved Methods For Mechanically Testing Foot and Ankle Ligaments: Preparation, Length Estimation, Environmental Maintenance, and Semi-Automation SB³C2019-P242

Alexander Berardo-Cates¹, Christopher Prasanna², Levi Davis¹, Mathew Kindig², William Ledoux³, Joseph Iaquinto¹, ¹Center for Limb Loss and MoBility, University of Washington, United States, ²Center for Limb Loss and MoBility, United States, ³Center for Limb Loss and MoBility, University of Washington, Department of Orthopedics and Sports Medicine, United States

Testing Medial Ulnar Collateral Ligament Fatigue Failure SB³C2019-P243

David Jordan¹, Alexander Kharlamov², Patrick Schimoler³, Patrick DeMeo², Mark Carl Miller³, ¹University of Pittsburgh, United States, ²Allegheny General Hospital, United States, ³Allegheny General Hospital and University of Pittsburgh, United States

Experimental Measurement of Embryonic Tendon Multiscale Mechanics SB³C2019-P244

Benjamin Peterson¹, Spencer Szczesny¹, ¹Pennsylvania State University, United States

Femoral Tunnel Location Affects Acl Excursion During Knee Flexion SB³C2019-P245

Patrick Schimoler¹, J. Jared Guth¹, Alexander Kharlamov¹, J. Daniel Thompson¹, Sam Akhavan¹, Mark Carl Miller¹, ¹Allegheny General Hospital, United States

Utilization of Multi-Foci Arfi Imaging To Generate Larger Tendon Displacement SB³C2019-P246

Gerald A Ferrer¹, Waqas Khalid¹, Volker Musahl¹, Kang Kim¹, Richard E Debski¹, ¹University of Pittsburgh, United States

Using Optical Tracking To Calculate Non-Recoverable Strain In The Glenohumeral Capsule SB³C2019-P247

Jocelyn Hawk¹, Calvin Chan¹, Robert Tisherman¹, Richard Debski¹, ¹Orthopaedic Robotics Laboratory, United States

3d Strain Components and Their Viscoelastic Behavior For Knee Meniscus Tissue In Circumferential Tension Under Stress Relaxation and Creep SB³C2019-P248

John Peloquin¹, Michael Santare¹, Dawn Elliott¹, ¹University of Delaware, United States

Intramuscular Pressure and Shear Modulus of Lower Leg Muscles Are Correlated SB³C2019-P249

Seyedali Sadeghi¹, Dov Bader², Daniel Cortes¹, ¹*Penn State University, United States*, ²*Penn State College of Medicine, United States*

Development of Displacement-Controlled Multiaxial Stretching Device For Characterising Viscoelastic Properties of Female Pelvic Floor Tissue SB³C2019-P250

Katie Harte¹, Gary Menary¹, Alex Lennon¹, ¹*Queen's University Belfast, United Kingdom*

Body Position Effects On Thigh Soft Tissue Properties SB³C2019-P251

Justin Scott¹, Sheng Chen¹, Sara Roccabianca¹, Tamara Reid Bush¹, ¹*Michigan State University, United States*

Python-Inspired Grasping Teeth For Tendon To Bone Repair SB³C2019-P252

Iden Kurtaliaj¹, Ethan Hoppe², Dong Hwan Yoon², Lester Smith³, Victor Birman⁴, Guy Genin², Stavros Thomopoulos¹, ¹*Columbia University, United States*, ²*Washington University, United States*, ³*Indiana University, United States*, ⁴*Missouri Science & Technology, United States*

Optimizing Non-Linear Mechanical Behavior of Soft Tissues In Finite Element Model of Human Thigh SB³C2019-P253

Eli Broemer¹, Sheng Chen¹, Justin Scott¹, Tamara Bush¹, Sara Roccabianca¹, ¹*Michigan State University, Mechanical Engineering, United States*

Design of A Novel Biaxial Mechanical Testing System and Protocols For Analysis of Biological Tissues and Tissue-Engineered Constructs SB³C2019-P254

Mingliang Jiang¹, Michael Moreno¹, ¹*Texas A&M University, United States*

Dissimilar Linear Friction Welding (Ifw) Technology For Manufacturing of Functional Materials: Bi-Metallic Ti6Al4v-Cocromo Joint Implants SB³C2019-P255

David Irwin¹, Christina Seydlorsky¹, Agraha Gautam¹, Aspen Glaspell¹, Kyosung Choo¹, Jae Joong Ryu¹, ¹*Youngstown State University, United States*

Posters - Solid Mechanics: Multiscale Mechanics, Reproductive, Ocular and Others**Automated Fiber Orientation Quantification In Three Dimensional Images** SB³C2019-P256

Jeremy Eekhoff¹, Spencer Lake¹, ¹*Washington University in St. Louis, United States*

The Effect of Composition and Hydration On The Mechanics of Carbonated Apatite SB³C2019-P257

Brian Wingender¹, Masashi Azuma¹, Christina Krywka², Paul Zaslansky³, John Boyle⁴, Alix Deymier¹, ¹*UConn Health, United States*, ²*Zentrum fr Material- und Kstenforschung GmbH, Germany*, ³*Charit - Universittsmedizin Berlin, Germany*, ⁴*Columbia University, United States*

Application of Micro-Raman Spectroscopy To Mechanical Characterization of Hydrogels SB³C2019-P258

Hui Zhou¹, John M. Maloney¹, Alexander M. Knapp¹, Malisa Sarntinoranont¹, Chelsey S. Simmons¹, Ghatu Subhash¹, ¹*University of Florida, United States*

High Fidelity Modeling of 3d Euler Buckling and Stress Transmission Through Mother-Daughter Crosslink Captures Reversible Collapse In Compressing Dendritic Actin Mesh SB³C2019-P259

Jyothirmai Simhadri¹, Preethi Chandran¹, ¹*Howard University, United States*

Ultrashort Laser Fragmentation of Plasmonic Gold Nanoparticles: Coulomb Expulsion Versus Photothermal Evaporation SB³C2019-P260

Peiyuan Kang¹, Daipayan Sarkar¹, Zhenpeng Qin¹, ¹*The University of Texas at Dallas, United States*

In Vivo Estimation of Optic Nerve Sheath Stiffness Using Noninvasive Mri Measurements and Finite Element Modeling SB³C2019-P261

Chanyoung Lee¹, Jesse Rohr², Austin Sass², Stuart Sater², Bryn Martin², Arslan Zahid¹, John Oshinski¹, C. Ross Ethier¹,
¹Georgia Institute of Technology and Emory University, United States, ²University of Idaho, United States

Peripapillary Deformation and Its Relation To Material Properties of The Eye Globe SB³C2019-P262

Jafar A. Mehr¹, Heather M. Moss², Hamed Hatami-Marbini¹, ¹University of Illinois at Chicago, United States, ²Stanford University, United States

The Effects of Size and Location of Laser Peripheral Iridotomy On The Changes In Pressure Difference Across The Iris Following Dilation SB³C2019-P263

Anup Pant¹, Rodolfo Repetto², Syril Dorairaj³, Rouzbeh Amini¹, ¹University of Akron, United States, ²University of Genoa, Italy, ³Mayo Clinic, United States

In Vivo Measurements of Trabecular Meshwork Stiffness SB³C2019-P264

Ross Ethier¹, Guorong Li², Chanyoung Lee¹, Ke Wang¹, Iris Navarro², Joseph Sherwood³, Karen Crews⁴, Sina Farsiu², Cheng-Wen Lin⁴, Dan Stamer², ¹Georgia Tech/Emory, United States, ²Duke University, United States, ³Imperial College London, United Kingdom, ⁴Aerie Pharmaceutical, United States

A Comparison of Two Continuum Modeling Approaches For Corneal Stroma Mechanical Response SB³C2019-P265

Shuolun Wang¹, Hamed Hatami-Marbini¹, ¹University of Illinois at Chicago, United States

Microstructural Changes At The Vitreoretinal Interface With Region and Age In Human Eyes SB³C2019-P266

Christopher Creveling¹, Yousef Alsanea¹, Brittany Coats², ¹The University of Utah, United States, ²University of Utah, United States

Development of A Finite Element Simulation To Estimate Corneal Elasticity SB³C2019-P267

Usmaan Siddiqui¹, Nathan Gallant², ¹University of South Florida, United States, ²Univeristy of South Florida, United States

Clot Contraction: Investigating The Impact On Clot Mechanical Behavior and Microstructure SB³C2019-P268

Sarah Johnson¹, Juyu Chueh², Matthew Gounis², Michael Glivarry³, Ray McCarthy³, Patrick McGarry¹, Peter McHugh¹,
¹National University Of Ireland Galway, Ireland, ²University of Massachusetts Medical School, United States, ³Cerenovus, Johnson & Johnson, Ireland

Arterial Stiffness Compared Across Scales: From Cells To Extracellular Matrix To Vessels SB³C2019-P269

Bart Spronck¹, Jay D. Humphrey¹, ¹Department of Biomedical Engineering, Yale University, United States

Review of Hyperelastic Modeling of Brain Tissue SB³C2019-P270

Kristen Cirincione¹, Joshua Smith¹, ¹Lafayette College, United States

On The Viscoelasticity of Extra- and Intra-Parenchymal Bronchi SB³C2019-P271

Samaneh Sattari¹, Mona Eskandari¹, ¹University of California, Riverside, United States

Does The Random Generation Algorithm Affect The Results of Numerical Models For Mechanical Response of Filamentous Networks? SB³C2019-P272

Hamed Hatami-Marbini¹, ¹University of Illinois at Chicago, United States

Vascular Remodeling and Proteoglycan Accumulation In The Aorta of Progeria Mice Result In Fatal Cardiovascular Effects SB³C2019-P273

Sae-Il Murtada¹, Yuki Kawamura¹, Alexander Caulk¹, Nicole Guerrero², Hossein Ahmadzadeh¹, Nathan Maulding², Kristin Zimmerman², Dar Weiss¹, Marcos Latorre¹, Dillon Kavanagh², Zhenwu Zhuang², Demetrios Braddock², Jay Humphrey¹,
¹Yale University, United States, ²Yale School of Medicine, United States

Mechanical Effects of Fiber Interweaving SB³C2019-P274

Bingrui Wang¹, Yi Hua², Fengting Ji², Ian A. Sigal², ¹*Southwest Jiaotong University, China*, ²*University of Pittsburgh, United States*

A Connectome-Based Network Model To Simulate Prion-Like Protein Propagation In Neurodegenerative DiseasesSB³C2019-P275

Xuesong Zhang¹, Johannes Weickenmeier¹, ¹*Stevens Institute of Technology, United States*

Determination of The Linear Viscoelastic Behavior of Aponeurosis SB³C2019-P276

Keith Grega¹, Benjamin Wheatley¹, ¹*Bucknell University, United States*

Mri-Based Analysis of 3d Printed Patient Specific Prostate Slicing Molds SB³C2019-P277

David Rutkowski¹, Shane Wells¹, Brian Johnson¹, Wei Huang¹, David Jarrard¹, Joshua Lang¹, Steve Cho¹, Alejandro Roldan-Alzate¹, ¹*University of Wisconsin-Madison, United States*

Murine Vaginal Wall Biaxial Contractile Response Following Elastase Digestion SB³C2019-P278

Gabrielle Clark¹, Laurephile Desrosiers², Leise Knoepp², Kristin Miller¹, ¹*Tulane University, United States*, ²*Ochsner Clinical School, United States*

Toward Fast and Accurate Automated Female Pelvic Floor 3d Geometric Model Reconstruction Based On Deep Convolutional Neural Networks SB³C2019-P279

Fei Feng¹, James A. Ashton-Miller², John O.L. DeLancey³, Jiajia Luo¹, ¹*University of Michigan Shanghai Jiao Tong University Joint Institute Shanghai Jiao Tong University, China*, ²*Department of Mechanical Engineering University of Michigan Ann Arbor, United States*, ³*Department of Obstetrics and Gynecology University of Michigan Ann Arbor, United States*

Viscoelastic Mechanical Behavior of Decorin Knockout Mouse Cervical Tissue SB³C2019-P280

Nicole Lee¹, Charles Jayyosi¹, Shanmugasundaram Nallasamy², Mala Mahendroo², Kristin Myers¹, ¹*Columbia University, United States*, ²*Department of Obstetrics and Gynecology and Green Center for Reproductive Biology Sciences University of Texas Southwestern Medical Center, United States*

Determination of The Active and Passive Mechanical Properties of The Non-Pregnant Murine Cervix SB³C2019-P281

Cassandra Conway¹, Gabrielle Clark¹, Mala Mahendroo², Kristin Miller¹, ¹*Tulane University, United States*, ²*University of Texas Southwestern Medical Center, United States*

Traction Force Microscopy On Human Aortic Smooth Muscle Cells SB³C2019-P282

Claudie Petit¹, Alain Guignandon², Stephane Avril¹, ¹*Ecole des Mines de Saint-Etienne, SalnBioSE INSERM U1059, France*, ²*Universite Jean Monnet, SalnBioSE INSERM U1059, France*

Posters - Cell & Tissue Engineering: Musculoskeletal

Effects of Solvent and Gelatin Concentration Near-Field, Direct-Write Electrospinning of Gelatin SB³C2019-P283

Zachary Davis¹, Paul Warren¹, Matthew Fisher¹, ¹*North Carolina State University and University of North Carolina - Chapel Hill, United States*

Volumetric Intensity Histogram Analysis Method For Quantification of Fatty Infiltration Following Rotator Cuff Repair SB³C2019-P284

Victoria Webster-Wood¹, Phillip McClellan², Lekha Kesavan¹, Greg Learn², Ozan Akkus², ¹*Carnegie Mellon University, United States*, ²*Case Western Reserve University, United States*

Fiber Morphology and Tensile Modulus of Melt Electrowritten Scaffolds Are Dependent On Process Parameters SB³C2019-P285

Paul Warren¹, Zachary Davis¹, Matthew Fisher¹, ¹*North Carolina State University and University of North Carolina - Chapel Hill, United States*

Translation of An Engineered Porcine Accessory Carpal Osteochondral Unit As A Model For Treatment of Thumb Oa SB³C2019-P286

Brendan Stoeckl¹, Hannah Zlotnick¹, Megan Farrell¹, Liane Miller¹, Josh Baxter¹, Thomas Schaer¹, Michael Hast¹, David Steinberg¹, Robert Mauck¹, ¹*University of Pennsylvania, United States*

Muscle and Tendon Derived Extracellular Matrix Promotes Expression of Myotendinous Junction Specific Integrins In Myoblast Cell Culture SB³C2019-P287

Lewis Gaffney¹, Matthew Fisher¹, Donald Freytes¹, ¹*North Carolina State University and the University of North Carolina – Chapel Hill, United States*

Posters - Cell & Tissue Engineering: Organs Morphogenesis and Development

Smooth Muscle Differentiation Actively Patterns The Airway Epithelium During Branching Morphogenesis SB³C2019-P288

Katharine Goodwin¹, Andrej Kosmrlj¹, Celeste Nelson¹, ¹*Princeton University, United States*

The Effects of Oxygen and Air-Liquid-Interface Culture On Human Bronchial Epithelial Cell Differentiation SB³C2019-P289

Sonya Kouthouridis¹, Julie Goepf¹, Carolina Martini¹, Elizabeth Matthes¹, John Hanrahan¹, Christopher Moraes¹, ¹*McGill University, Canada*

Ectopic Sources of Fibroblast Growth Factor 10 Drive Epithelial Buckling and Supernumerary Bud Formation In Cultured Embryonic Lungs. SB³C2019-P290

Kara Peak¹, Victor Varner¹, ¹*The University of Texas at Dallas, United States*

Posters - Cell & Tissue Engineering: Other

Bioelectric Gradients Emerge Downstream of Mechanical Forces In Epithelial Tissues SB³C2019-P291

Brian Silver¹, Celeste Nelson¹, ¹*Princeton University, United States*

Characterization of Collagen/keratin Hydrogels As An Extracellular Matrix For 3d In Vitro Thermal Stress Studies SB³C2019-P292

Kameel Isaac¹, Neda Ghouisfiam¹, Sean Brocklehurst¹, Mark Van Dyke², Marissa Rylander¹, ¹*UT Austin, United States*, ²*Virginia Polytechnic Institute and State University, United States*

Microrna Sequencing of Ascs Undergoing Endothelial-Genesis SB³C2019-P293

Shahensha Shaik¹, Elizabeth Martin¹, Daniel Hayes², Jeffrey Gimble³, Ram Devireddy¹, ¹*Louisiana State University, United States*, ²*Pennsylvania State University, United States*, ³*LaCell LLC, United States*

In Vitro Degradation of Electrospun Polycaprolactone Tissue Engineered Scaffolds Under Cyclical Dynamic Loading SB³C2019-P294

Johane Bracamonte¹, Sarah Saunders¹, Sam Cole², Gilbert Annohene², Gary Tepper², Joao Soares², ¹*Virginia Commonwealth University, United States*, ²*Virginia Commonwealth University, United States*

Transcorneal Electrical Stimulation Shown To Reduce The Signs of Glaucoma SB³C2019-P295

McKay Cavanaugh¹, Assraa Jassim², Lucy Coughlin², Jessica Stukel¹, Denise Inman², Rebecca Willits¹, ¹*The University of Akron, United States*, ²*Northeast Ohio Medical University, United States*

Optimization of Topographical and Mechanical Properties of Peg-Da Based Hydrogels For Promoting Neurodegeneration SB³C2019-P296

David Hall¹, Sourav Patnaik¹, Ender Fino¹, Gabriela Romero Uribe¹, ¹*University of Texas at San Antonio, United States*

Maintaining Multipotency of Neural Stem Cells Using Synthetic Fgf Peptide Microenvironments SB³C2019-P297

Diana Philip¹, Elena Silantyeva¹, Matthew Becker¹, Rebecca Willits¹, ¹*The University of Akron, United States*

Huvec Tubular Formation On Bio-Inspired Vascularization Substrate SB³C2019-P298

Luis Garcia¹, Patrick Charron¹, Rachael Oldinski¹, ¹*University of Vermont Engineered Biomaterials Research Laboratory, United States*

Author Index by Page Number

A

- Abdalla, Chirsteen 39
 Abdel-Salam, Tarek 53
 Abderezaei, Javid 61
 Abosch, Aviva 27
 Abraham, Adam 42, 56
 Abraham, James 65
 Adams, Bruce D. 80
 Adebayo, Olufunmilayo 34
 Adelaar, Robert 66
 Adeli Koudehi, Ghazal 76
 Adriel, Jia Jun Low 35
 Aerts, Jean-Marie 60
 Agarwal, Shikhar 79
 Aggarwal, Ankush 24, 35
 Aguirre, Miquel 57
 Ahmad, Abdullah 67
 Ahmadzadeh, Hossein 24, 50, 85
 Ahmed, AH Rezwanuddin 36
 Akhavan, Sam 83
 Akhter, Forhad 80
 Akkaynak, Derya 76
 Akkus, Asya 76
 Akkus, Ozan 47, 86
 Aklilu, Ouniol 81
 Akyildiz, Ali 24, 48, 59, 71
 Al Awami, Monsour 39
 Al-Alawi, Ali 63
 Al-Barghouthi, Abeer 56, 82
 Alantari, Hussain 44
 Alatalo, Diana 30
 Albro, Michael 40
 Aldieri, Alessandra 42
 Alejandro Silvera Delgado, Carlos 76
 Alford, Patrick 24, 40, 48, 72, 73
 Ali, Safwa 74
 Alisafaei, Farid 75
 Allan, Alexandra 42
 Alsanea, Yousef 38, 85
 Alston, Maurice 79
 Alturkestani, Bayan 64
 Alula, Kibrom 59
 Alwood, Joshua 65
 Amili, Omid 53
 Amini Khoiy, Keyvan 27
 Amini, Rouzbeh 24, 27, 30, 34, 39, 64, 67, 72, 73, 85
 Amirouche, Farid 82
 An, Ran 76
 Anderson, Andrew 24, 65
 Anderson, Scott 76
 Anderst, William 43, 78
 Andrews, Dennis 24
 Andronowski, Janna 73
 Annohene, Gilbert 87
 Anton, Kevin 47
 Antony, Dona 39
 Anzia, Lucille 63
 Ao, Di 77
 Aoki, Yoshihiro 81
 Appoo, Jehangir 69
 Arabia, Francisco 52
 Araujo, Mason 39
 Arones, Marleny 34, 77
 Arora, Tushar 52, 66
 Arruda, Ellen 47
 Arthurs, Christopher J. 35, 53, 68
 Arumugam, Jayavel 24, 37
 Arya, Gaurav 74
 Arzani, Amirhossein 24, 30
 Ashinsky, Beth 56
 Ashouri Choshali, Habibeh 40
 Ashton-Miller, James A. 86
 Assari, Soroush 61, 64
 Assoian, Richard 55
 Ates, Filiz 67
 Ateshian, Gerard 41, 68
 Athanasiou, Thanos 69
 Attaluri, Anilchandra 49, 76
 Audenino, Alberto L. 42
 Augustin, Christoph 45
 Auricchio, Ferdinando 50
 Avaz, Reza 24, 32, 63
 Avazmohammadi, Reza 36
 Avery, Brett 41
 Avril, Stephane 50, 71, 86
 Axman, Katelyn 34
 Aycock, Kenneth 49
 Ayoub, Salma 27
 Ayyalasomayajula, Avinash 24
 Azimian, Amirsepher 49
 Azuma, Masashi 84
- ### B
- Babak, N. Safa 48, 51
 Babaliaros, Vasilis 44
 Babu, Anju 64, 72
 Bachoo, Robert 46
 Bader, Dov 51, 84
 Baek, Seungik 24, 48, 55
 Bailoor, Shantanu 58, 79
 Baish, James 79
 Bajona, Pietro 74
 Baker, Brendon 24, 40, 73
 Bakhshian Nik, Amirala 74
 Bakonyi, Arpad 81
 Balasubramanian, Sriram 80
 Balchandani, Priti 39
 Balyakina, Elizabeth 35
 Ban, Ehsan 24, 57
 Banda, Omar 65
 Banerjee, Anjishnu 81
 Banerjee, Rupak 31
 Bangudu, Omolola 80
 Banks, Darren 24
 Bansal, Sonia 38
 Bapuraj, Jayapalli 73
 Barber, Alexandria 39
 Barber, Tracie 68
 Barg, Alexej 65
 Bark Jr., David 53, 62, 67, 78
 Barnds, Brandon 83
 Barocas, Victor 24, 37, 43, 46, 50, 55, 56, 58, 63, 66, 82
 Barocas, Victor H 53
 Barreto, Amanda 72
 Barrett, Hilary 48
 Barrow, Daniel 39
 Barton, Gregory 48
 Bartsch PhD, Adam 61
 Basehore, Sarah 40, 63
 Baset, Neshat 39
 Baskerville, Scott 70
 Baskin, Heath 33
 Bass, Sarah 83
 Baumwart, Ryan 63
 Baxter, Josh 87
 Bayly, Philip 24, 38, 52, 61
 Bazzi, Marisa 58
 Bean, Maxwell 77
 Becker, Matthew 88
 Begonia, Mark 64, 65
 Behkam, Bahareh 46, 55
 Behkam, Reza 34
 Bell, Rebecca 24
 Bellini, Chiara 33
 Ben Saadon, Sara 74
 Benesch-Lee, Frank 28
 Beninati, M. Laura 79
 Benko, Nikolaus 38
 Benson, Jamie 38, 83
 Bentil, Sarah 78, 81
 Benza, Evan 37
 Berardo-Cates, Alexander 83
 Berceli, Scott 39
 Bergersen, Aslak W. 69
 Berman, Alycia 24, 63
 Bermel, Emily 56, 82
 Berselli, Irene 59
 Bersi, Matthew 24, 32, 57
 Bersie-Larson, Lauren 55
 Bey, Michael 24
 Beyer, Ean 72
 Bezci, Semih 41
 Bezuidenhout, Abraham 80
 Bhadelia, Rafeeqe 80
 Bhat, Sanchita 40
 Bhatt, Surya 67

| | | | | | |
|-------------------------|----------------|--------------------------|----------------|--------------------------|--------------------|
| Bhattacharya, Shamik | 24 | Brown, Daniel | 60 | Chandrasekaran, Prashant | 29 |
| Bianchi, Matteo | 49 | Brozoski, Frederick | 81 | Chang, Yuan | 45 |
| Bieberich, Charles | 49 | Buckley, Mark | 83 | Chao, P. Grace | 24, 55 |
| Bignardi, Cristina | 42 | Buehler, Markus | 42 | Charles, Matthew | 76 |
| Bijlenga, Philippe | 35, 49 | Buffinton, Christine | 79 | Charrier, Elisabeth | 72 |
| Bilchick, Kenneth | 36 | Buganza Tepole, Adrian | 43 | Charron, Casey | 65 |
| Billiar, Kristen | 28, 40 | Bui-Thanh, Tan | 73 | Charron, Patrick | 76, 88 |
| Birder, Lori | 46 | Buist, Martin | 78 | Chartrain, Alexander | 39 |
| Birman, Victor | 42, 84 | Bundsschuh, Ralf | 47 | Chassagne, Fanette | 24 |
| Bischof, John | 50 | Burdick, Jason | 47, 67, 72 | Chaudhuri, Ovijit | 72 |
| Bishop, Paul | 73 | Burkhart, Harold | 66, 72 | Chen, Edward | 41 |
| Bisirri, Evan | 62 | Burla, Goutham | 82 | Chen, Rongjun | 58 |
| Biswas, Dipankar | 73 | Burriss, David | 29, 38, 83 | Chen, Sheng | 84 |
| Bivona, Derek | 57 | Burton, Tori | 64 | Chen, Tony | 34 |
| Bjornson, Kristie | 67 | Bush, Tamara | 43, 84 | Chen, Wei | 52 |
| Black, Lauren | 62 | Butler, Ryan | 74 | Chen, Xingyu | 55 |
| Blank, Jonathon | 66 | Butman, John | 38 | Cheng, Cih | 59 |
| Blanke, Philipp | 40 | Button, Keith | 80 | Cheng, Fangzhou | 46 |
| Blanks, Meghan | 39 | Byass, Shavaine | 80 | Cheng, Xuemei | 68 |
| Blokpoel, Lia | 24 | | | Chery, Daphney R. | 29 |
| Bloom, Ellen | 51, 60 | C | | Chesler, Naomi | 32, 78 |
| Bluestein, Danny | 44, 49, 53, 57 | Caballero, Andrs | 44 | Cheung, Alfred | 39 |
| Blum, Celeste | 66 | Cain, Stephen | 43 | Chiastra, Claudio | 59 |
| Blundon, Malichi | 55 | Caliari, Steven | 72 | Chindal, Sahil | 54 |
| Boazak, Elizabeth | 34 | Calve, Sarah | 24 | Chiu, George T. C. | 59 |
| Boc, Susan | 54 | Cal, Karol | 49, 68 | Chivukula, Venkat Keshav | 24 |
| Bodduluri, Sandeep | 67 | Camarillo, David | 24, 41 | Cho, Michael | 74 |
| Boggess, Grant | 67 | Campbell, Ian | 24 | Cho, Steve | 86 |
| Boggs, Mary | 40 | Canchi, Tejas | 24, 78 | Choi, Jongeun | 48 |
| Bohnstedt, Bradley | 52 | Can, Federico | 44 | Choi, Joseph | 24, 40 |
| Bonassar, Lawrence | 41 | Cao, Xuan | 72 | Choo, Kyosung | 84 |
| Bonasso, Patrick | 63 | Caplan, Jeffrey | 48 | Choon Hwai, Yap | 77 |
| Bonnevie, Edward | 56 | Cardoso, Luis | 32 | Choy, Jenny | 71 |
| Bonnheim, Noah | 44, 65 | Carey, James | 47 | Chu, Cassandra | 34 |
| Bordones, Alifer | 70 | Carrier, Joseph | 83 | Chueh, Juyu | 24, 85 |
| Bortolin, Luciano | 28 | Carroll, Christopher | 80 | Chung, Bong Jae | 40 |
| Bosch, Johan | 68 | Carver, Wayne | 59 | Chung, Rebecca | 46 |
| Bosch, Jurgén | 76 | Case, Natasha | 75 | Cil, Akin | 33 |
| Boudoulas, Konstantinos | 79 | Casteleyn, Christophe | 76 | Cinelli, Michael | 77 |
| Bowler, Meghan | 57 | Castro, Carlos | 47, 74 | Cirincione, Kristen | 85 |
| Boyle, John | 41, 84 | Caulk, Alexander | 85 | Cirka, Heather | 40 |
| Bozorgnezhad, Ali | 80 | Cavanaugh, McKay | 87 | Claessens, Tom | 68 |
| Bracamonte, Johane | 87 | Cebal, Juan | 35, 40, 49, 69 | Clark, Andy | 68 |
| Braddock, Demetrios | 85 | Ceelen, Wim | 36 | Clark, Gabrielle | 86 |
| Bradfield, Connor | 52 | Celdran-Bonafonte, Diego | 54 | Clark, Margaret | 64, 72 |
| Brandt, Luca | 54 | Celli, Jonathan | 74 | Clarkson, James | 43 |
| Braun, Nicholas | 40 | Chagdes, James | 77 | Clifford, Abigail | 41 |
| Brazile, Bryn | 24, 30, 34, 64 | Chahine, Nadeen | 47 | Clifford, Andrew | 65 |
| Breuer, Christopher | 28, 74 | Chaisson, Claire M. | 75 | Clyne, Alisa Morss | 59, 63, 75 |
| Brial, Caroline | 34 | Chakraborty, Nilay | 24 | Coats, Brittany | 24, 38, 61, 65, 85 |
| Brieu, Mathias | 24, 30 | Chambers, Tamara | 39 | Coccarelli, Alberto | 35 |
| Brindise, Melissa | 40, 70 | Chan, Calvin | 83 | Codazzi, Veronica | 59 |
| Briongos, Iain | 67 | Chan, Deva | 24 | Colbrunn, Robb | 33, 82 |
| Brisson, Becky | 38 | Chan, Wei Xuan | 35, 62 | Cole, Sam | 87 |
| Brocklehurst, Sean | 87 | Chancey, Valeta | 81 | Coleman, Ryan | 71 |
| Broemer, Eli | 84 | Chandarlapaty, Sarat | 36 | Coleman-Wood, Krista | 67 |
| Brombach, Johannes | 30 | Chandler, Emily | 43 | Coletti, Filippo | 30, 53 |
| Brook, Bindi | 51 | Chandran, Preethi | 84 | Comstock, Jessica | 61 |

| | | | | | |
|---------------------------|--------------------------------|----------------------------|--------------------|-------------------------|------------------------|
| Concannon, Jamie | 41 | Davenport, Elizabeth | 38 | Dogru, Sedat | 40 |
| Cone, Stephanie | 24, 33, 47, 60, 65 | Davidson, Christopher | 40, 73 | Doherty, Sean | 82 |
| Conetta, Luca | 81 | Davidson, Lance | 55 | Dollery, Jennifer | 49, 70 |
| Conley Natividad, Gabryel | 80, 82 | Davies, Jason | 45, 68, 79 | Domanin, Maurizio | 54 |
| Conley, Nicole | 41 | Davis, Brian L. | 70 | Dong, Melody | 55 |
| Connizzo, Brianne | 24 | Davis, Caleb | 80 | Dong, Zhihui | 69 |
| Conser, Benjamin | 79 | Davis, Giuliana | 44 | Donovan, Anna | 44 |
| Conway, Cassandra | 86 | Davis, Levi | 83 | Donzanti, Michael | 60 |
| Conway, Ted | 70 | Davis, Matthew | 52 | Dorairaj, Syril | 34, 85 |
| Cook, Bernard | 73 | Davis, Ronald | 51 | Dorbala, Pranav | 44 |
| Cooper, Ellesse | 65 | Davis, Zachary | 86 | Dougherty, Ronald | 44 |
| Copeland, Katherine | 74 | Dawson, Charlee | 64 | Doyle, Matthew | 24 |
| Cornillie, Pieter | 76 | De Backer, Julie | 72 | Drazan, John | 41 |
| Corr, David | 24, 59 | de Bakker, Chantal | 46 | Driesslein, Klaus | 81 |
| Corrias, Alberto | 78 | De Beule, Matthieu | 71 | Drost, Joshua | 43 |
| Cortes, Daniel | 51, 57, 65, 67, 84 | de Bournonville, Sebastien | 60 | Drzewiecki, Gary | 39 |
| Cosson, Michel | 30 | De Lorenzo, Robert | 80 | Du, Jing | 42 |
| Costa, Mauro | 59 | De Santis, Gianluca | 44 | Du, Liya | 71 |
| Costanzo, Francesco | 57 | De Vita, Raffaella | 24, 29 | Du, Ting | 54, 58 |
| Coughlin, Lucy | 87 | Dealy, Caroline N. | 73 | Du, Xiaoping | 68 |
| Craft, Julia | 27 | Dean, Morgan | 75 | Dubay, Analeeza | 59 |
| Cramer, Gwendolyn | 74 | DeBarros II, Victor | 40 | Duda, Raymond | 60 |
| Crapps, Jacob | 75 | Debbaut, Charlotte | 36, 76 | Dudzinski, Ellen | 56 |
| Crestanello, Juan | 49 | DeBerardinis, Jessica | 34 | Dufek, Janet S. | 34 |
| Creveling, Christopher | 65, 85 | Debski, Richard | 43, 51, 60, 78, 83 | Duma, Brock | 65 |
| Crews, Karen | 85 | Degroote, Joris | 44 | Duma, Lauren | 64 |
| Crocker, Kyle | 47 | Dejana, Elisabetta | 46 | Duma, Stefan | 64, 65 |
| Cromer, Walter | 80 | Dejardin, Loic | 29, 38 | Duncan, Randall | 40, 65, 75 |
| Cross, Michael | 33 | Dela Paz, Abigail | 75 | Dunn, Alison | 57 |
| Cudjoe, Edward | 66 | DeLancey, John O.L. | 86 | Dunn, James C. Y. | 47 |
| Cudworth, Katelyn | 65 | Delgorio, Peyton | 60 | Dunton, Cody | 31 |
| Cui, Shihai | 82 | Delplanque, Jean-Pierre | 53 | Durrant, George | 39 |
| Cuneo, Bettina | 78 | DeMeo, Patrick | 83 | Dyment, Nathaniel | 24, 73 |
| Cunnane, Eoghan | 28, 74 | Deng, Yuefan | 53, 57 | | |
| D | | Dennedy, Michael | 27 | E | |
| D'Andrea, Christian | 80 | Denning, Samantha K. | 75 | Easley, Jeremiah | 71 |
| D'Souza, Gavin | 31 | DeRidder, Megan | 30 | Easley, Thomas | 44 |
| Da Silva Sacoto, Nicolas | 34 | Desrosiers, Laurephile | 29, 86 | Eaton, Emily | 39 |
| Dabagh, Mahsa | 24 | Detmer, Felicitas | 35, 49 | Eaton, Madelyn | 81 |
| Daher, Ryan | 39 | Deutsch, Steven | 53, 64 | Eberhardt, Alan | 24, 30, 33 |
| Dahl, Joanna | 24, 74 | Devireddy, Ram | 87 | Eberth, John | 59, 71 |
| Damen, Frederick | 59 | DeVogel, Nicholas | 81 | Ebong, Eno | 54 |
| Damiano, Robert | 40, 68, 69 | Deymier, Alix | 24, 42, 84 | Eckstein, Kevin | 56 |
| Daniel, Marie-Christine | 49 | Dhapare, Sneha | 54 | Eekhoff, Jeremy | 65, 84 |
| Daniel, Ray | 81 | Dholakia, Ronak | 24 | Eggleton, Charles | 30 |
| Danso, Elvis | 29 | Di Martino, Elena | 69, 70 | Einav, Shmuel | 53 |
| Darcy, Michael | 47 | Diaz, Jose A. | 53 | Elad, David | 67, 74 |
| Dargie, Andrea | 81 | DiCarlo, Stephen | 43 | Eliason, Travis | 52 |
| Dargush, Gary | 40 | Diem, Alexandra | 77 | Ellingson, Arin | 56, 82 |
| Darios Flood, Emma | 59 | Ding, Zhenya | 36 | Elliott, Dawn | 38, 48, 51, 56, 60, 83 |
| Darvish, Kurosh | 61, 64 | Dixit, Nikhil | 73 | Elliott, Mark | 28 |
| Dasi, Lakshmi | 24 | Dixon, Brandon | 24, 45 | Elmasry, Shady | 24, 33 |
| Dasi, Lakshmi Prasad | 44, 49, 53, 58, 64, 69, 70, 79 | Do, Justin | 51 | Emendi, Monica | 49 |
| Datta, Yvonne | 58 | Dobbs, Joel | 30 | Emerel, Leonid | 70 |
| Davalos, Rafael | 24, 46, 49 | Dockery, Lance | 49 | Enomoto-Iwamoto, Motomi | 29, 38 |
| Dave, Kunal | 65, 66 | Dockery, Peter | 41 | Eppelheimer, Maggie | 39, 73 |
| | | Doddasomayajula, Ravi | 24 | Erath, Byron | 75, 80 |
| | | Dodge, George | 73 | Erdemir, Ahmet | 33, 82 |

- Escobar, Gladys P. 73
Eskandari, Mark 43
Eskandari, Mona 24, 85
Estrada, Ana 57, 59
Ethier, C. Ross 34, 43, 85
Ethier, Ross 24
Evans, Lauren 72
Everingham, John 67
Ewing, James 77
- F**
- Fabris, Gloria 48, 61, 82
Fain, Sean 31, 65
Faitelewicz, Alan 81
Faizer, Rumi 53
Fang, Fei 55, 56
Fang, Shuyang 57
Fanton, Michael 41
Farach-Carson, Mary C. 75
Farghadan, Ali 30
Farino, Cindy 65
Farkas, Dale 54
Farmer, Jillian 39
Farnham, Margot 83
Farrell, Megan 87
Farsiu, Sina 85
Fauron, Albane 29, 38
Feeney, Elizabeth 41
Feinberg, Adam 55, 60
Feinstein, Jeffrey 55, 62
Feng, Fei 86
Feng, Yuan 24, 52, 82
Feng, Yusheng 80
Fenton, Todd 61, 80
Feola, Andrew 24, 43
Ferguson, Virginia 38, 56
Ferrara, Anna 50
Ferrer, Gerald A 60, 83
Ferruzzi, Jacopo 24, 32, 59
Ferry, Dawn 30
Figueroa, C. Alberto ... 24, 35, 45, 53,
55, 57, 68
Filonova, Vasilina 55
Fink, Gregory 59
Finol, Ender 43, 48, 50, 54, 63, 68, 70,
73, 74, 87
Fischenich, Kristine 24, 38
Fischer, Ken 24, 33, 82, 83
Fisher, Brittany 67
Fisher, Matthew 24, 33, 47, 60, 65, 73,
86, 87
Fisher, Melanie C. 73
FitzGibbon, Brian 48
Fletcher, David F 78
Florio, Catherine 24
Foo, Yoke Yin 35
Foong, Tian Yong 64, 67
Fordham, Lynn 47, 60
- Forleo, Marcio 53
Forneris, Arianna 69
Fortunato, Ronald 70, 73
Fortune, Emma 43
Foust, Connor 70
Fox, Carson 52
Francois, Christopher 48, 61
Franklin, J Matthew 57
Fratta, Dante 78
Frazer, Lance 33, 82
Fregly, Benjamin 34, 67, 77
Freytes, Donald 87
Friedl, Peter 55
Frim, David 73
Fringuello, Anthony 27
Fryc, Gosia 64
Fryhofer, George 51
Frseen, Juhana 35
Fu, Weiguao 69
Fujie, Hiromichi 29, 51
Fujino, Keitaro 73
Fung, Ashley 46
Furdella, Kenneth 28
Furlong, Laura-Anne 24
- G**
- Gabriel, Sargon A 78
Gacek, Elizabeth 82
Gadde, Manasa 36
Gade, Piyusha 45
Gaffney, Lewis 87
Gale, Tom 43, 78
Galesic, Ana 31
Galesso, Devis 41
Gallagher, Maureen 64
Gallant, Nathan 24, 85
Gallo, Diego 24, 49, 54, 68
Gambaruto, Alberto 24
Gandini, Giulia 59
Ganji, Elahe 56
Gao, Cai 24
Gao, Huajian 74
Gao, Mingyuan 52
Gao, Ran 45
Gao, Wei 42
Gao, Xin 24
Gao, Zhe 50
Garcia Russo, Manuel 74
Garcia, Jonathan 75
Garcia, Kara 24, 52
Garcia, Luis 88
Garca, Jos 31
Garca-Rodriguez, Sylvana 69
Gardinier, Joseph 40
Garimella, Harsha Teja 56
Garrity, Deborah 62
Garven, Ellen 78
Gatenholm, Paul 74
- Gatti, Vittorio 68
Gautam, Agraha 84
Geisert, Eldon 34
Gendernalik, Alex 62
Genin, Guy 24, 42, 67, 84
George, Stephanie 24, 30, 71, 78
George, Steve 36
George, Uduak 24, 31
Gepner, Bronislaw 67
Geris, Liesbet 60
Gesemann, Sebastian 68
Gewin, Leslie 32
Ghanem, Elie 33
Gharahi, Hamidreza 55
Gharraee, Nazli 24, 50
Ghazi, Kianoosh 81
Gheysen, Lise 66
Ghimire, Prabesh 81
GhorbanniaHassankiadeh, Arash .. 79
Ghosh, Ram 49
Ghosh, Soham 24, 47
Ghousifam, Neda 87
Giannotta, Monica 46
Gijssen, Frank 48, 59, 68, 71
Gilbert, Lisa 78
Gillespie, Callan 82
Gimble, Jeffrey 87
Giordano, Chiara 41
Girard, Michael 24
Gkousioudi, Anastasia 32, 59
Gladd, Samantha 39
Glaspell, Aspen 84
Gleason, Allison 80
Gleason, Rudolph 45
Gleason, Thomas 70
Gleghorn, Jason 60, 80
Glivarry, Michael 85
Godakhindi, Varsha 76
Goehler, Craig 77
Goeltz, Scott 39
Goepf, Julie 87
Goergen, Craig 24, 41, 59, 63, 74
Gogola, Alexandra 64, 67
Gok, Mustafa 78
Goktas, Selda 24
Goldberg, S. Nahum 46
Goldblatt, Zachary 40
Golman, Mikhail 2, 42, 56
Gologorsky, Cassandra 39, 61
Gomez, Arnold 38
Gomez, Jodie 81
Gomez, Joel 70
Gomez, Raymond 50
Gomezrueda, Rebecca 39
Gong, Chujie 42
Gong, Ze 72
Gonzalez Calle, Alejandra 31
Gonzalez, Mark 82

- Good, Bryan 24, 57, 64, 70, 71
 Gooden, Shelley 79
 Goodwin, Brianna 43, 67
 Goodwin, Katharine 87
 Goots, Alexis 61
 Goreke, Utku 77
 Goriely, Alain 32
 Gorman, Joseph 36, 72, 73
 Gorman, Robert 36, 72, 73
 Goth, Will 72
 Gounis, Matthew 85
 Gouveia, Pedro 24
 Graham, Brian 29, 38
 Grande Gutierrez, Noelia 64
 Grande-Allen, Jane 40
 Graner, Michael 27
 Grant, Gerald 41
 Graves, Jordan 27
 Gray, Elisabeth 71
 Grega, Keith 86
 Gregory, Case 75
 Grieve, Stuart Michael 78
 Griffin, Mallory 65
 Grimes, Kelli E. 75
 Grobbel, Marissa 29, 59
 Groder, Farryl 81
 Grondin, Matthew 66
 Grosberg, Anna 24, 74
 Gu, Boram 58
 Gu, Qimei 24, 27, 49
 Guccione, Julius 71
 Gudauskis, Marius 70
 Gueldner, Pete 70
 Guerrero, Nicole 85
 Guha, Suvajyoti 31
 Guhan, Varshini 64
 Guignandon, Alain 86
 Gullbrand, Sarah 24, 56
 Gunay, Cuneyd 33
 Gunther, Stephan 44
 Guo, Baolei 69
 Guo, Ed 70
 Gupta, Prachi 53
 Gurkan, Umut 24, 58, 76, 77
 Gustafson, Jonathan 24
 Gustafson, Peter 78
 Guth, J. Jared 83
 Guvenir, Su 59
- H**
- Hadad, Sara 35
 Haghshenas-Jaryani, Mahdi 39
 Hahn, Rebecca 44
 Haider, Ahmad 54
 Hall, David 87
 Hamanishi, Shinji 81
 Hammes, Peter 67
 Han, Biao 29, 64
 Han, Bumsoo 31, 59
 Han, Changnian 53
 Han, Hai-Chao 45
 Han, Lin 29, 38, 56, 64
 Han, Zonghu 50
 Hang, Tianqi 24
 Hanrahan, John 87
 Hansen, Sarah 81
 Hardie, Rebecca 45
 Harding, Ian 54
 Harfi, Thura 69
 Hariharan, Prasanna 31
 Harris, Elizabeth 78
 Harte, Katie 84
 Harville, Emily 29
 Hasan, Muhammad Noman 76
 Hashemi, Siavash 81
 Haskett, Darren 24
 Hassanipour, Fatemeh 30
 Hast, Michael 38, 87
 Hatami-Marbini, Hamed 34, 85
 Hatoum, Hoda 24, 44, 49, 53, 58, 64,
 69, 70, 79
 Hauschild, Hans 81
 Haut Donahue, Tammy 29, 38
 Haut, Roger 29, 38, 61, 80
 Haven, Kelley 78
 Hawk, Jocelyn 83
 Hayat MD, Abdul 63
 Hayenga, Heather 46
 Hayes, Daniel 87
 He, Lijuan 82
 He, Xiaoming 31, 46, 54, 76
 He, Xuehuan 50
 He, Yong 39
 Heatherly, Walter 74
 Heidari Pahlavian, Soroush 39
 Heise, Rebecca 24, 54
 Heiser, Timothy 63
 Heitkemper, Megan 49, 64, 79
 Heller, Rachel 65
 Henak, Corinne 24, 66
 Henderson, Bradley 65
 Henderson, Jonathan 24
 Henderson, Kyvory 24
 Hendon, Christine 57
 Hendricks, Ian 64
 Henninger, Heath 24
 Henry, Kaylee 63
 Heo, Su Chin J. 29
 Hernandez-Garcia, Luis 45
 Hersberger, Nathan 35
 Heys, Jeff 24, 31
 Higgins, John 58
 Higginson, Jill 24
 Higuchi, Shinichi 28
 Hill, Ailis 58
 Hiller, Gretchen 71
 Hinczewski, Michael 77
 Hindle, Michael 54
 Hintermann, Beat 65
 Hinton, Thomas 60
 Hirsch, Sven 35, 49
 Hirschhorn, Matthew 62
 Ho, Sheldon 35, 62
 Ho, Wendy 51
 Hoffman, Hilary 78
 Holland, Maria 32
 Hollander, Ari 59
 Hollar, Katherine 67
 Holmes, Jeffrey 32, 36, 57, 59
 Holtz, Alexander B. 69
 Holzapfel, Gerhard 70, 72
 Hong, Yi 74
 Hood, Lyle 24, 80
 Hoppe, Ethan 84
 Hossaini-Zadeh, Mehran 42
 Hosseini, Hadi S. 47
 Hosseini, Seyedhadi 24
 Hou, Jay 50, 55
 Hou, Zuoxian 61
 Houtz, Brady 64
 Howe, Danielle 33, 47, 60, 73
 Howell, Kalebb 65
 Howell, Paul 78
 Howley, Lisa 78
 Hoxha, Kevt'her 64
 Hsu, Chia-Pei 79
 Hsu, Edward 36, 69
 Hsu, Ming-Chen 44, 63, 66, 72
 Hua, Yi 24, 30, 64, 67, 86
 Huang, Bor-Lin 55
 Huang, Charles 24
 Huang, Chin-Hsun 55
 Huang, Wei 86
 Huang, Yongqiang 82
 Huang, Yu 58
 Huang, Zhongping 24
 Huda, Fatama T. 53
 Hudson, Andrew 60
 Hudson, David 35
 Hudson, Nathan E. 53
 Huffstater, Tessa 32
 Hughes, Francis 31
 Humayun, Mark 31
 Humm, John 81, 82
 Humphrey, Jay 28, 32, 33, 43, 48, 50,
 57, 74, 85
 Hurd, Lauren 40
 Hussain, Awais 82
 Hutcheson, Joshua Daniel . 28, 74, 79
 Hwang, Priscilla 36
 Hyun, Sinjae 24
- I**
- Iannucci, Glen 41

laquinto, Joseph 24, 83
 Ibrahimy, Alaaddin 80
 Lliff, Jeff 31
 Imai, Yohsuke 54
 Imhauser, Carl 33
 Inman, Denise 87
 Iozzo, Renato V. 29
 Iram, Shamreen 77
 Irons, Linda 51
 Irrgang, James 43, 78
 Irshad, Huda 74
 Iruretagoyena, J. Igor 63
 Irwin, David 84
 Isaac, Kameel 87
 Isler, Christy 78
 Ismaguilova, Alina 69
 Ita, Meagan 51, 56
 Ivkov, Robert 49
 Iyer, Kritika 35

J

Jackson, Alicia 24
 Jackson, William 81
 Jacobsen, Timothy 47
 Jacot, Jeffrey 24
 Jagelski, Natalie 39, 80
 Jain, Kartik 24
 Jain, Priya 80
 Jaiswal, Prakhar 57, 69
 Jalal, Sahar 30
 Jallerat, Quintin 55
 Jamieson, Ryan 51
 Jamison, David 24
 Janardhanan, Rajesh 63
 Janmey, Paul 57, 72
 Jarral, Omar A. 69
 Jarrard, David 86
 Jassim, Assraa 87
 Jayco, Danica 73
 Jayyosi, Charles 37, 86
 Jazwicz, Tomasz 27, 72
 Jensen, Hanna 63, 77
 Jensen, Morten 63, 77
 Jett, Samuel 66
 Ji, Fengting 86
 Ji, Songbai 39, 52, 81
 Jiang, David 77
 Jiang, Lin 30
 Jiang, Mingliang 84
 Jiang, Ning 37
 Jiang, Sida 75
 Jiang, Wenheng 52
 Jiang, Xi 73
 Jiang, Xuejun 36
 Jiang, Zhenxiang 48
 Jimnez, Juan 24
 Jo, Yun Kee 73
 Johns, Cortland 64

Johnson, Brian 86
 Johnson, Camille 43, 78
 Johnson, Christopher 57
 Johnson, Curtis 60
 Johnson, Emily 66
 Johnson, Isabella 29
 Johnson, Sarah 85
 Jokhun, Doorgesh Sharma 75
 Joll, J. Ethan 72
 Jolly, Colby 78
 Jonard, Brandon 70
 Jones, Derek 38, 52
 Jordan, David 83
 Joshi, Purva 76
 Joshi, Sarang 28
 Joyce, Michael 24
 Jung, Gang Seob 42
 Jung, Hyungjin 47

K

Kadlowec, Jennifer 24, 75
 Kahlenberg, Cynthia 33
 Kahn, Jeffrey 76
 Kallmes, David 50
 Kamalitdinov, Timur 73
 Kamga Gninzeko, Franck J 54
 Kamioka, Norihiko 44
 Kamm, Roger 37
 Kandala, Sri Kamal 49
 Kang, Peiyuan 27, 49, 84
 Kapeliotis, Markos 66
 Kapnisis, Konstantinos 24
 Karageorgos, Grigorios 68
 Karmonik, Christof 41
 Kartha, Sonia 81
 Kassab, Ghassan 37, 71
 Kasza, Karen 45
 Katz, Joshua 36
 Kaufer, Daniela 80
 Kaufman, Kenton 67
 Kavanagh, Dillon 85
 Kawamura, Tomonori 36
 Kawamura, Yuki 85
 Keaveny, Tony 65
 Keefe, Daniel 50
 Keller, Brandis 24
 Kelley, Douglas 54, 58
 Kelley, Mireille 38
 Kelly, Jessica 47
 Kemmerling, Erica 62
 Kemper, Andrew 24
 Kenjeres, Sasa 68
 Kennedy, Eric 24
 Kerrigan, Jason 67
 Kersh, Mariana 24, 42, 56
 Kesavan, Lekha 86
 Keswani, Sundeep 40
 Keum, Donghoon 61

Khalid, Waqas 60, 83
 Khalighi, Amir 72, 73
 Khan, Monsurul 68
 Khan, Muhammad O. 49, 68
 Khandha, Ashutosh 24
 Khang, Alex 28
 Khani, Mohammadreza 80
 Kharel, Prabhuti 74
 Kharlamov, Alexander 83
 Kheyfets, Vitaly 70
 Khoshgoftar, Mehdi 24
 Khosravi, Ramak 28
 Kia, Danial Sharifi 24
 Kieffer, Emily 81
 Kijowski, Richard 66
 Killian, Megan 56
 Kim, Jiho 57
 Kim, Jun 79
 Kim, Kang 28, 37, 60, 71, 83
 Kim, Namkeun 81
 Kindig, Mathew 83
 King, Rebecca 34
 Kingsley, David 59
 Kirby, Matthew 70
 Kirn-Safran, Catherine B. 75
 Kishore, Vipuil 24
 Kizilski, Shannen B. 53
 Knapp, Alexander M. 84
 Knoepp, Leise 29, 86
 Knutsen, Andrew 24, 38
 Kodali, Susheel 44
 Kollech, Hirut 34
 Kolli, Kranthi 24
 Kong, Fanwei 45
 Konofagou, Elisa 68
 Kook, Caroline 38, 83
 Koontz, Alicia 83
 Kopa, Sarah 56
 Kore, Tarun 67
 Korenczuk, Christopher 37, 66
 Korin, Netanel 24
 Korneva, Arina 33
 Koshiyama, Kenichiro 58
 Kosmrlj, Andrej 87
 Kostelnik, Colton 59
 Kota, Arun 53
 Kotelsky, Alexander 83
 Kotzur, Travis 66
 Kouthouridis, Sonya 87
 Kovarovic, Brandon 44
 Kraft, Reuben 24, 56, 81
 Krahenbuhl, Nicola 65
 Kramer, Katherine 64
 Kramer, Ryan 77
 Kroenke, Christopher 52
 Krywka, Christina 84
 Kubicki, Cody 64
 Kucukal, Erdem 58, 76

- Kugel, Joshua 70
Kuhl, Ellen 32, 71
Kulich, Hailee 83
Kumar, Arun 51
Kunkel, Robert 52
Kuntz, Andrew 51, 73
Kuo, Calvin 24
Kupratis, Meghan 83
Kurt, Mehmet .. 24, 39, 48, 61, 81, 82
Kurtaliaj, Iden 42, 84
Kuxhaus, Laurel 30
- L**
- Labuda, Rick 73
Lad, Shivanand 80
LaDisa, John 24, 79
Lai, Changxin 52, 82
Lai, Eric 73
Lai, Victor 24, 67
Laine, Andrew 67
Lake, Spencer 24, 65, 84
Laksari, Kaveh 24
Lakshminarayanan, Kishor 60
Lal, Hind 36, 41
Lambeth, Emily 33, 47, 65
Lambrechts, Toon 60
Lamers, Luke 61
Lan, Ingrid 62
Landis, Ben 82
Lane, Brooks 71
Lang, Joshua 86
Langlois, Samuel 39
Langner, Luke 48
Larrain, Carolina 61
Latorre, Marcos 32, 85
Latta, Loren 56, 82
Lauback, Stephanie 74
Laughlin, Megan 77
Laurence, Devin 63, 66, 72
Lawson, Megan 69
Le Gall, Yann 34
Le, Jenny 47
Leaman, Eric 46
Learn, Greg 86
Leask, Richard 24
Ledoux, William 83
Lee, Adrian 60
Lee, Andrea 51, 60
Lee, Andrew 60
Lee, Chanyoung 85
Lee, Chung-Hao .. 24, 27, 52, 63, 64,
66, 72
Lee, Daeyeon 73
Lee, Keewon 45
Lee, Lik Chuan 28, 37, 59, 71
Lee, Nicole 86
Lee, Po-Yi 34, 42
Lee, Woowon 29
- Lei, Ying 24, 28
Leiphart, Ryan 60
Leitkam, Sam 24
Lejeune, Emma 28
Lemmon, Elisabeth 56
Lemons, Jack 33
Lennon, Alex 84
Lenz, Amy 65
Leo, Hwa-Liang 78
Leonard-Duke, Julie 45
Leshnowar, Bradley 41
Lessner, Susan 24, 50, 71
Levene, Howard 24
Levitz, Ruth 76
Lewis, Courtland G. 29, 38
Lewis, Matthew 29
Li, David 36
Li, Geng 77
Li, Guorong 85
Li, Haiyan 82
Li, Kewei 24
Li, Qing 29, 38
Li, Wei 36
Li, Xiaoqing 46, 49
Li, Xinshan 66
Li, Xiuying 46
Li, Yang 42
Li, Yanheng 68
Li, Yihan 46
Li, Ying 24, 46, 69
Li, Zhe 53
Li, Zong-Ming 51, 60
Liang, Liang 35, 41, 76
Liao, Dezhi 40
Liao, Jun 24, 74
Lilledahl, Magnus B. 38
Lilly, Scott 49, 70, 79
Lim, Soo Teik 46
Lin, Allen 42
Lin, Cheng-Wen 85
Lin, Jenny 39
Lin, Yuan 72
Lindsey, Stephanie 24
Ling, Yik Tung Tracy 34
Liou, Jr-Jiun 34
Liphardt, Jan 57
Lisonbee, Rich 65
Litchy, William 67
Little, Jane 58, 76, 77
Little, Joe 82
Liu, Alan 54
Liu, Fang 66
Liu, Jun 52
Liu, Minliang 41
Liu, Shichen 58
Liu, Shuaishuai 49
Liu, Wenqiang 71
Liu, X. Sherry 46
- Liu, Yaling 36
Liu, Yaning 76
Liu, Yingtao 52
Liu, Yue 74
Livshetz, Isaac 82
Lobotesis, Kyriakos 58
Locke, Ryan 56
Loebel, Claudia 47, 67
Longest, P. Worth 54
Longmore, Gregory 36
Lopez, Zachary 61
Lorenzo, Melvin 46, 49
Lotfi, Azadeh 68
Loth, Francis 39, 73, 80
Lou, Xiaoying 41
Loya, Amy 41
Lu, Alex 64
Lu, Jia 24, 50, 70
Lu, X. Lucas 75
Lu, Yuan-Chiao 24
Luetkemeyer, Callan 47
Lujan, Heidi 43
Lujan, Trevor 65, 67
Luke, Emma 38
Lukic, Branka 63
Lundberg, Hannah 24
Luo, Jiajia 86
Luo, Jishan 52
Luo, Yuanming 50, 70
Luyten, Frank 60
Lv, Mengxi 24, 75
Lv, Wenle 82
Lynch, Sabrina R. 53
Lckehe, Daniel 49
- M**
- Ma, Ronghui 27, 30, 49, 76
Ma, Yu 56
Maak, Travis 29
Macias, Brandon 43
MacLaren, Graeme 53
Madan, Deepa 30
Madhukaran, Priya 37
Madukauwa-David, Immanuel David
79
Mahendroo, Mala 37, 86
Maher, Gabriel 35
Maher, Suzanne 24, 34
Mahutga, Ryan 46, 63
Maier, Franz 29
Main, Casey 77
Maiti, Spandan 24, 70, 71, 73
Majdic, Blaize 43
Makam, Arunika 33
Maldjian, Joseph 38
Maldonado, Natalia 32
Malinowski, Marcin 27, 72
Malito, Louis 44

| | | | | | |
|---|----------------|---------------------------------------|------------------------|---|--------------------|
| Maloney, John M. | 84 | Meador, William | 27, 72 | Moraes, Christopher | 24, 87 |
| Man, Yuncheng | 58, 76 | Meadows, Kyle | 38 | Morbiducci, Umberto .. | 24, 42, 49, 54, 68 |
| Mancini, Viviana | 69 | Medero, Rafael | 69 | Moreno, Michael | 80, 84 |
| Mancuso, Megan | 45 | Medina, Daniela | 74 | Moreno, Ramiro | 58 |
| Mandalapu, Sai | 56 | Mehr, Jafar A. | 85 | Morfin, Alvaro | 67 |
| Manning, Keefe 44, 53, 57, 63, 64, 70, 71 | | Mehrabi, Mehrsa | 74 | Morishita, Soh | 29 |
| Manuchehrabadi, Navid | 49 | Mehrian, Mohammad | 60 | Morozov, Kathryn | 42 |
| Manzo, Maurizio | 78 | Mehring, William | 41 | Morrow, Melissa | 43 |
| Mao, Haojie | 24 | Meldrum, Danika | 63 | Morss Clyne, Alisa | 40 |
| Mao, Wenbin | 35, 44 | Melendez-Vasquez, Carmen V. | 82 | Moss, Heather M. | 85 |
| Markl, Michael | 40 | Menary, Gary | 84 | Motie-Shirazi, Mohsen | 80 |
| Marks, David S. | 79 | Mendez, Simon | 58 | Mousavi Janbeh Sarayi, Seyyed Mostafa | 40 |
| Marom, Gil | 53 | Mendiola, Emilio | 32 | Mousavi, S. Jamaledin Mousavi .. | 50 |
| Marras, Alexander | 31, 74 | Mendiola, Emilio A. | 63 | Movafaghi, Sanli | 53 |
| Marsden, Alison 24, 35, 55, 62, 64, 74 | | Mendisova, Klarka | 61 | Mueser, Ashlyn | 63 |
| Marsden, Elliott | 80 | Meng, Hui | 40, 45, 57, 68, 69, 79 | Mukherjee, Apratim | 55 |
| Marshall, Brittany | 41, 42 | Menghani, Ritika | 81 | Mukherjee, Debanjan | 24 |
| Marshall, Samantha | 47 | Menichini, Claudia | 69 | Mukul, Satish | 43 |
| Martin, Bryn | 24, 80, 82, 85 | Mensah, Solomon | 54 | Muluk, Satish | 70 |
| Martin, Elizabeth | 87 | Merchant, Samer | 36, 69 | Mummy, David | 31, 65 |
| Martin, John | 24 | Merrill, Thomas | 24, 75 | Munden, Paul | 44 |
| Martinez Barron, Heber | 42 | Merryman, W. David 32, 36, 41, 57, 72 | | Munn, Lance | 79 |
| Martinez, Jerahme | 75 | Mestre, Humberto | 54, 58 | Munson, Jennifer | 29 |
| Martinez, Juan Carlos | 31 | Metcalf, Robert | 61 | Murakoshi, Michio | 51 |
| Martini, Carolina | 87 | Meyer, Eric G. | 24 | Murali, Archana | 47 |
| Martufi, Giampaolo | 69 | Meyer, Mark | 81 | Murdoch, Gordon | 82 |
| Matera, Daniel | 73 | Michalek, Arthur | 24 | Murfee, Walter | 24 |
| Mathur, Mrudang | 27, 72 | Midha, Prem | 24 | Murtada, Sae-Il | 85 |
| Matre, Nancy | 79 | Migliavacca, Francesco | 59 | Musahl, Volker | 43, 60, 78, 83 |
| Mattar, Luke | 43, 78 | Miller, Barry | 64 | Muskat, Joseph | 70 |
| Matthes, Elizabeth | 87 | Miller, Dr. Mark Carl | 83 | Mut, Fernando | 40, 49, 69 |
| Mauck, Robert .29, 38, 47, 56, 64, 67, 68, 72, 73, 87 | | Miller, Kristin | 24, 29, 86 | Muthusamy, Jayaveera | 24 |
| Maulding, Nathan | 85 | Miller, Liane | 38, 87 | Myers, Kristin | 24, 29, 37, 57, 86 |
| Maureira, Pablo | 79 | Miller, Logan | 38 | Myers, Matthew | 31 |
| Maurer, Russel | 39 | Miller, Mark Carl | 77, 83 | | |
| May, Linda | 78 | Min Zaw, Myo | 76 | N | |
| Mayeur, Olivier | 30 | Minerick, Adrienne | 76 | Nagatomi, Jiro | 24, 31 |
| Mayman, David | 33 | Mir, Arshid | 66, 72 | Nagesh, Setlur | 69 |
| Mazumder, Ria | 39 | Mirotnik, Mark | 75 | Nagle, Tara | 33, 82 |
| Mazzi, Valentina | 49, 68 | Mirramezani, Mehran | 49 | Nain, Amrinder | 55 |
| McCabe, Aaron | 80 | Mirza, Asad | 72 | Najarian, Cyrus P. | 35 |
| McCarthy, Ray | 85 | Mitra, Kunal | 74 | Nallamothe, Brahmajee K. | 35 |
| McCartney, Brooke | 55 | Mittal, Neil | 43 | Nallasamy, Shanmugasundaram .. | 37, 86 |
| McCarty, Annastacia | 81 | Mittal, Rajat | 58, 79 | Nama, Nitesh | 57 |
| McClellan, Phillip | 47, 86 | Mo, Seongho | 81 | Narez, Gerardo | 38 |
| McCollum, Dannel | 40 | Moeller, Amy | 43 | Natriello, Jessica | 48 |
| McConnell, Sierra | 76 | Moerman, Astrid | 48 | Nauleau, Pierre | 68 |
| McEntire, Joseph | 81 | Moerman, Kevin | 41, 48 | Navarro, Iris | 85 |
| McEvoy, Eoin | 71 | Moghaddam, Hesam | 24 | Navarro, Omar | 80 |
| McGarry, Patrick | 41, 48, 71, 85 | Mohanraj, Bhavana | 24 | Ncho, Beatrice | 27 |
| McGuire, Jeffrey | 29 | Molina, Jessica | 28 | Neal, II, Robert | 46 |
| McGuire, Robert | 82 | Molony, David | 24, 28 | Nedergaard, Maiken | 54, 58 |
| McHugh, Peter | 41, 48, 85 | Monnet, Eric | 71 | Nedrelow, David | 24 |
| McCliff, Terence | 83 | Monson, Ken | 24 | Nelson, Celeste | 87 |
| McLean, James | 57 | Montani, John | 79 | Nemat-Gorgani, Mohsen | 51 |
| McMahan, Sara | 74 | Moore, Axel | 29, 38, 83 | | |
| | | Moore, Brandon | 53 | | |
| | | Moore, Emily | 24 | | |

- Nerem, Robert 32
 Nersesyan, Alina 54
 Nerurkar, Nandan 24
 Neu, Corey 24, 47
 Neumann, Franz-Joseph 40
 Newman, Harrah 56
 Newton, Edward 78
 Newton, Joseph 51
 Ng, Eddie Yin Kwee 46
 Ngo, Christina 64
 Nguyen, Ba Loc 53
 Nguyen, Cecilia 74
 Nguyen, Huan 63
 Nguyen, Thao 24
 Nguyen, Vicky 34
 Nguyen, Vy 51
 Nguyen-Truong, Michael 71
 Nicholas, Kurniawan 24
 Nicolella, Daniel 24, 52
 Nicoud, Franck 58
 Niebur, Glen 51
 Niedre, Mark 54
 Nikou, Amir 24
 Nistal, Dominic 39
 Noll, Natalie 36
 Norris, Tom 44
 Norton, Nolan 83
 Novara, Matteo 68
 Nunes, Kenia 74
 Nwotchouang, Blaise Simplicie Talla
 39, 73
- O**
 O'Brien, Tim 46, 49
 O'Cain, Cody 67
 O'Connell, Grace 24, 41, 56
 O'Dea, Reuben 51
 O'Halloran, Martin 27
 O'Leary, Cian 24
 O'Neil, Susan 79
 Oakes, Jessica 30, 31, 65
 Oberman, Alyssa 51
 Odde, David 50
 Oganessian, Ruben 24
 Oguntolu, Teniola 28
 Ohashi, Toshiro 24
 Oikonomou, Panagiotis 56
 Ojemann, Steven 27
 Okamoto, Ruth 61
 Oldinski, Rachael 76, 88
 Olveda, Genaro 54, 58
 Oomen, Pim 24, 36
 Orozco, Gustavo 31
 Orsinelli, David 79
 Ortega, Stephanie 53
 Oshinski, John 39, 85
 Osteguín, Vangelina 63, 73, 74
 Otani, Tomohiro 67
- Overby, Darryl 34
 Owen, John 66
 Owen, Markus 51
 Owings, Tammy 82
 Owsiak, Maria 39
 Ozkan, Alican 24
 Ozkaya, Efe 39, 81
 O'Regan, Declan P. 69
- P**
 Paliwal, Nikhil 24, 57, 69, 79
 Pan, Edward 46
 Pan, Ying-Chun 67
 Pant, Anup 34, 85
 Pant, Sanjay 35
 Papaharilaou, Yannis 24
 Papantoniou, Ioannis 60
 Parajuli, Ashutosh 46, 75
 Parameswaran, Hari Krishnan 51
 Parikh, Shalin 50
 Park, Dawn 78
 Parker, Ellen 80
 Parman, Jonathan 33
 Parthasarathy, Sucharitha 75
 Patel, Angela 51
 Patel, Heer 67
 Patel, Jay 38, 47, 67
 Patel, Mihir 66
 Patel, Nimesh 43
 Patel, Palak 40
 Patel, Tatsat Rajendra 57, 69
 Patnaik, Sourav 24, 48, 63, 70, 73, 74,
 87
 Patten, Carolyn 34, 77
 Patterson, Rita 35
 Paucket, Petr 27
 Payne, Karin 56
 Peak, Kara 87
 Pealre, Andrew 33
 Pearce, John 27
 Pease, Mary 34
 Pedrigi, Ryan 24
 Pei, Shaopeng 75
 Peirlinck, Mathias 71
 Peloquin, John 24, 38, 48, 83
 Pelowski, William J. 75
 Pendleton, Megan 65
 Peng, Weiguo 54, 58
 Penkova, Anita 24, 31
 Pepper, John R. 69
 Peredo, Ana 73
 Perez, Darien 76
 Perez, M. Tyler 66
 Pescador, Ricardo 80
 Peterson, Anna 42
 Peterson, Benjamin 83
 Peterson, Carrie 43, 78
 Petit, Claudie 86
- Pewowaruk, Ryan 61, 68, 69
 Pfeiffer, Ferris 24
 Pferdehirt, Wayne 78
 Pham, Dzung 38
 Pham, Kelly 67
 Phan-Thien, Nhan 62
 Philip, Diana 88
 Phillips, Joseph 65
 Phoebe, Szarek E. 38
 Phung, Thien-Khoi 36
 Piatti, Filippo 49
 Pickup, Stephen 56
 Piebalgs, Andris 58
 Piedrahita, Jorge 33, 47, 60
 Pierce, David M 24, 29, 38, 73
 Pierce, Eric 27
 Pierce, Grace 81
 Pietros, Abel 70
 Pike, Daniel 39
 Pillalamarri, Narasimha Rao .. 48, 68,
 70, 73
 Pilvar, Anahita 32
 Pintar, Frank 81
 Piperno, Ben 65
 Pirola, Selene 69
 Pirozzi, Ileana 41
 Piskin, Senol ... 24, 48, 54, 68, 70, 73
 Pittz, Zach 75
 Ploeg, Heidi 24, 66, 78
 Poirier, Michael 47
 Polk, John 42
 Ponminissery, Immanuel 39
 Ponnaluri, Sailahari 44, 64
 Poorbahrami, Kamran 30, 31, 65
 Papat, Ketul 53
 Popchak, Adam 43, 78
 Posen, Joshua 39
 Potirniche, Gabriel 82
 Potter, Samuel 72
 Pouch, Alison 72
 Powers, Alexander 38
 Prakash, Punit 27
 Prasad, Priya 52, 66
 Prasanna, Christopher 83
 Prato, Anthony 41
 Pratt, Matthew 31
 Price, Christopher 29, 38, 83
 Price, Theodore 49
 Prince, Jerry 38
 Provenzano, Paolo 24, 55
 Pruitt, Lisa 44, 80
 Puiseux, Thomas 58
 Puller, Luke 76
 Pursell, Erica 71
 Purushothaman, Yuvaraj 81
 Purves, Todd 31
 Puttlitz, Christian 24, 71
 Pyataeva, Irina 65

- Pyne, Jeffrey 64
- Q**
- Qin, Yixian 24
 Qin, Zhao 42
 Qin, Zhenpeng . 24, 27, 46, 49, 76, 84
 Qiu, Suhao 52, 82
 Quigley, Harry 34
 Quindlen-Hotek, Julia 24, 81
 Quintana, Dylan 65
- R**
- Rabin, Yoed 50, 76
 Rabinovitch, Marlene 55
 Ragani Lamooki, Saeb 69
 Ragani, Saeb 68
 Raghav, Vrishank 24, 67
 Raghavan, Raghu 24
 Raghavan, Rahul 50
 Rahbar, Nima 40
 Rahimi, Abdolrasol 75
 Rahimi-Gorji, Mohammad 36
 Rai, Rahul 57, 69
 Rajabzadeh-Oghaz, Hamidreza . . 45
 Ramachandra, Abhay 28, 43, 74
 Raman, Vignesh 46
 Ramasubramanian, Anand 51
 Ramaswamy, Aneesh 28, 74
 Ramaswamy, Sharan 24, 72, 79
 Ramesh, KT 52
 Ramirez-Perez, Susana 53
 Ramonda, Roberta 41
 Ramos, Amy 39
 Rangel, India 41
 Rattanakijsumtorn, Komsan 31
 Rausch, Manuel 24, 27, 43, 72
 Raut, Samarth 24
 Ravi, Sreyas 71
 Ray, Arunendra Saha 49
 Ray, Lori 31
 Rayz, Vitaliy 40, 70
 Redaelli, Alberto 44, 49
 Rego, Bruno 72, 73
 Reid Bush, Tamara 84
 Rengarajan, Balaji 43, 50
 Repetto, Rodolfo 85
 Reuther, Katherine 41
 Rey, Julian 77
 Rezvanifar, S. Cyrus 30
 Richard, Kelsey 73
 Richardsen, Cecilia 63
 Richardson, Jacob 72
 Richardson, Will 24, 37, 59
 Ridolfi, Luca 68
 Riexinger, Luke 79
 Rischard, Franz P 63
 Rittenhouse, Justin 78
 Roberge, Cassandra 59
 Roberts, Anya 37
- Robertson, Anne 45, 46, 50, 73
 Robertson, John 46
 Robinson, Matthew 82
 Roblyer, Darren 32
 Roccabianca, Sara . 25, 29, 43, 59, 84
 Rodgers, Tina 74
 Rodriguez, Ashley 51, 73
 Rohr, Jesse 85
 Roi, Dylan 58
 Roldan-Alzate, Alejandro . 48, 61, 63, 68, 69, 86
 Romero Uribe, Gabriela 87
 Rooks, Tyler 81
 Rosado-Toro, Jose 54, 63
 Ross, Colton 63, 72
 Rossano, Joseph 52, 62
 Rossman, Stephanie 80
 Rosti, Marco 54
 Roth, Joshua 25, 66
 Rothenberger, Sean 40, 70
 Rothermel, Taylor 72
 Rotman, Oren 44
 Roumengous, Thibault 78
 Rowinski, David 68
 Rowson, Bethany 39
 Rowson, Steve 25, 39, 81
 Roy, Pritha 41
 Roy-Chaudhury, Prabir 39, 54
 Ruan, Shijie 82
 Ruberti, Jeffrey 75
 Ruedinger, Katrina 63
 Ruesink, Tim 68
 Ruile, Philipp 40
 Rundell, Steve 80
 Rushing, Gregory 49, 79
 Rutkowski, David 48, 86
 Rutledge, Bradley 25
 Ruvalcaba, Carlos 53
 Rylander, Marissa 36, 87
 Ryu, Jae Joong 25, 66, 84
 Ryu, Jaiyoung 64
 Ryu, Seok Chang 39
- S**
- S. Razavi, Mohammad 45
 S. Shourijeh, Mohammad 77
 Saadat, Amir 51
 Saaid, Hicham 68
 Sabelhaus, Emily 67
 Sack, Kevin 45, 71
 Sacks, Michael 25, 27, 28, 32, 36, 37, 44, 63, 72, 73
 Sadegh, Ali 25, 81
 Sadeghi, Seyedali . 51, 57, 65, 67, 84
 Sadhal, Satwindar 31
 Sadri, Vahid 40, 44, 79
 Saha, Amit 25, 51
 Sahli Costabal, Francisco 71
- Sahni, Onkar 53
 Saitta, Simone 69
 Saleh, Kamiel 38, 47
 Salimi Ashkezari, Seyedeh Fatemeh 69
 Salinas, Samuel 34, 64, 72
 Salmasi, Mohammad Y. 69
 Salmon, Mandy 40
 Saloner, David 40
 Saltzman, Charles 65
 Saluan, Quinn 82
 Salzar, Robert 81
 Samady, Habib 28
 Sami, Sohrab 41
 Samourides, Andreas 25
 Samuels, Brian 43
 Sanches, Augusto 25
 Sang, Chao 50, 73
 Santare, Michael 51, 83
 Santos, Stephany 73
 Santschi, Elizabeth 33, 82
 Saperstein, Yielia 67
 Sarkar, Daipayan 27, 84
 Sarkisyan, Harut 77
 Sarntinoranont, Malisa 77, 84
 Sass, Austin 85
 Sass, Lucas 80
 Sastry, Sudeep 25
 Sater, Stuart 85
 Sattari, Samaneh 85
 Saul, Katherine 73
 Saunders, Sarah 87
 Saw, Shier Nee 25
 Sawchuk, Alan 68
 Saxena, Ashish 46
 Saylor, Andrew 39
 Scarsoglio, Stefania 68
 Schaer, Thomas 87
 Schanz, Daniel 68
 Schiele, Nathan 25, 82
 Schimoler, Patrick 77, 83
 Schinkel, Christiaan 68
 Schmidt, Brendan 51
 Schneider, Stephanie 47
 Schnell, Susanne 40, 70
 Schoepfoerster, Carl 63
 Schollenberger, Jonas 45
 Schoppe, Austin 80
 Schrder, Andreas 68
 Schuermann, Zachary 66
 Schultz, Samantha 70
 Schuster, Jason 29
 Schwartz, Andrea 55
 Schwartz, Gabi 65
 Scott, Adrienne 47
 Scott, Justin 84
 Sculco, Peter 33
 Secchieri, Cynthia 41

| | | | |
|-----------------------------------|--------------------------------|-----------------------------|----------------|
| Seelbinder, Benjamin | 47 | Sree, Vivek | 43 |
| Segers, Patrick | 25, 36, 44, 68, 69, 71, 72, 76 | Srinivasan, Shardha | 63 |
| Selmi, Matteo | 44 | St Pierre, Sarah | 51 |
| Senkow, Tiffany | 43 | Stamer, Dan | 85 |
| Seo, Jung-Hee | 58, 79 | Stasiak, Suzanne | 51 |
| Sergi, Fabrizio | 60 | Steele, Katherine | 67 |
| Serkova, Natalie | 27 | Steinberg, David | 87 |
| Servin, Frankangel | 63 | Steineman, Brett | 25 |
| Sewell-Loftin, M.K. | 25, 36 | Steinman, David | 25, 49, 68 |
| Sewonu, Anou | 58 | Stemper, Brian | 52 |
| Sexton, Kevin | 63 | Stenger, Michael | 43 |
| Seydlorsky, Christina | 84 | Stephens, Sam | 77 |
| Shadden, Shawn | 45, 49, 64 | Stern, Amber | 25 |
| Shah, Rakshit | 51, 60 | Stevens, Randy | 52, 62, 77, 78 |
| Shaik, Shahensha | 87 | Stewart, Samantha | 46 |
| Shaqfeh, Eric | 51 | Stiansen, Nicholas | 51 |
| Shar, Jason | 40 | Stine, Caleb | 29 |
| Sharaf, Ola M | 64 | Stitzel, Joel | 25, 38 |
| Sharifi, Alireza | 62 | Stoeckl, Brendan | 87 |
| Sharifikia, Danial | 37, 40, 71 | Stoker, Aaron | 25 |
| Sharma, Anirudh | 50 | Stott, Shannon | 25 |
| Sharma, Neha | 31 | Stransky, Jeffrey | 75 |
| Sharp, M. Keith | 80 | Stukel, Jessica | 87 |
| Sharzehee, Mohammadali | 45 | Sturla, Francesco | 49 |
| Shaver, Mohammad | 28 | Stylianou, Antonis | 25, 33 |
| Shavik, Sheikh Mohammad | 25, 28 | Suar, Zeynep M. | 39, 48, 82 |
| Shearn, Jason | 25 | Subhash, Ghatu | 84 |
| Shen, Yingnan | 31 | Subramani, Adhitya Vikraman | 56 |
| Shen, Zhiqiang | 46, 69 | Sucosky, Philippe | 40 |
| Shenoy, Vivek | 55, 57, 72, 75 | Suja, Vineeth | 51 |
| Sheriff, Jawaad | 25, 53, 57 | Sulchek, Todd | 54 |
| Sherwood, Joseph | 34, 85 | Sulejmani, Fatiesa | 41 |
| Shetye, Snehal | 25, 46, 51, 60, 73 | Sun, Bill | 76 |
| Shi, Lei | 29 | Sun, Meng | 32 |
| Shi, Xiaodan | 74 | Sun, Shuyan | 30 |
| Shi, Ze | 74 | Sun, Wei | 25, 35, 41, 44 |
| Shieh, Justin | 33 | Sun, Yujian | 50 |
| Shiers, Stephanie | 49 | Surve, Sajid | 35 |
| Shigematsu, Taiki | 58 | Swaminathan, Swathi | 59 |
| Shih, Elizabeth | 48 | Sweeney, Amanda M. | 54, 58 |
| Shim, Jay | 68 | Szafron, Jason | 28, 74 |
| Shiozaki, Shunya | 67 | Szczesny, Spencer | 25, 72, 83 |
| Shirazi, Jasmine | 60 | Sze, Samuel | 40 |
| Shiu, Yan-Ting | 39 | Szymanski, John | 55 |
| Shivashankar, GV | 75 | | |
| Shiwarski, Daniel | 25, 55, 60 | T | |
| Shorijeh, Mohammad | 67 | Tadle, Abegail | 31 |
| Shourijeh, Mohammad | 77 | Takeishi, Naoki | 54 |
| Shrivastava, Raj | 39 | Tan, Jifu | 36 |
| Shukla, Amit | 77 | Tanaka, Martin L. | 35 |
| Siadat, Seyed Mohammad | 75 | Tang, Dalin | 25 |
| Siddiqui, Adnan | 68, 69, 79 | Tao, Luyang | 52 |
| Siddiqui, Adnan H | 57, 69 | Tashman, Joshua | 55, 60 |
| Siddiqui, Adnan H. | 40 | Taylor, Jordan S. | 47 |
| Siddiqui, Usmaan | 85 | Tchir, Alexandra | 79 |
| Sides, Rachel | 28 | te Boekhorst, Veronika | 55 |
| Siedlecki, Christopher | 63 | Tell, Lisa | 53 |
| | | Tepole, Adrian Buganza | 25 |
| Siefert, Andrew | 25 | | |
| Siegel, Danielle | 67 | | |
| Siegel, Scott | 67 | | |
| Siegrist, Kyle | 77 | | |
| Sigaeva, Taisiya | 70 | | |
| Sigal, Ian A. | 25, 30, 34, 42, 64, 67, 86 | | |
| Silantyeva, Elena | 88 | | |
| Silver, Brian | 87 | | |
| Silvera Delgado, Carlos Alejandro | 76 | | |
| Simhadhri, Jyothirmai | 84 | | |
| Simionescu, Dan | 74 | | |
| Simmons, Chelsey S. | 84 | | |
| Simon, Marc | 37, 71 | | |
| Simon, Scott | 57 | | |
| Simon, Watkins | 50 | | |
| Singh, Anita | 25, 30, 80 | | |
| Singh, Gundeep | 77 | | |
| Singh, Manpreet | 27, 76 | | |
| Singh, Sagar | 25, 55 | | |
| Singh, Vijay | 37 | | |
| Singh-Gryzbon, Shelly | 40 | | |
| Sips, Patrick | 72 | | |
| Sirsi, Shashank | 46 | | |
| Sivakumar, Sri Krishna | 70 | | |
| Skinner, Ryan | 65 | | |
| Slater, John | 65 | | |
| Slawski, Martin | 49 | | |
| Slepian, Marvin J. | 44, 53, 57 | | |
| Smith, Brigham | 28 | | |
| Smith, Daniel | 60 | | |
| Smith, Harvey | 56 | | |
| Smith, Joshua | 25, 31, 85 | | |
| Smith, Kelly | 69 | | |
| Smith, Lester | 84 | | |
| Snider, J. Caleb | 41 | | |
| Snively, Beverly | 38 | | |
| Snyder, Paul | 80 | | |
| So, Peter | 37 | | |
| Soares, Joao | 25, 87 | | |
| Soepriatna, Arvin | 41 | | |
| Solanki, Prem | 50 | | |
| Solitro, Giovanni | 25 | | |
| Somasekhar, Likitha | 74 | | |
| Sommer, Gerhard | 70 | | |
| Song, Hyunggi | 42 | | |
| Song, Jiangping | 45 | | |
| Song, Wei | 54, 58 | | |
| Sooryakumar, Ratnasingham | 74 | | |
| Soroushmehr, S.M. Reza | 35 | | |
| Soslowky, Louis | 46, 51, 60 | | |
| Spang, Jeffrey | 33, 47, 60 | | |
| Spiller, Kara | 78 | | |
| Spivey, Watson | 67 | | |
| Sprague, Eugene | 73 | | |
| Spratley, Edward | 67 | | |
| Spratley, Meade | 25 | | |
| Spronck, Bart | 85 | | |
| Sproule, David | 80 | | |

- Tepper, Gary 87
Terajima, Masahiko 38
Terzini, Mara 42
Thelen, Darryl 66
Theodore, Willy 82
Theodossiou, Sophia 82
Thirugnanasambandam, Mirunalini
25, 50, 70, 73
Thom, Simon A. 58
Thomas, John 54, 58
Thomas, Vineet 34
Thomopoulos, Stavros 25, 41, 42, 55,
56, 84
Thompson, J. Daniel 83
Thompson, Mark 31
Throckmorton, Amy ... 52, 62, 77, 78
Thunes, James 70
Thurston, John 65
Tian, Lian 25
Timek, Tomasz 27, 72
Timmins, Lucas 25, 28, 69, 77
Ting, Jeffrey 31
Tirrell, Matthew 31
Tisherman, Robert 83
Tithof, Jeffrey 54, 58
Tiwari, Bipin 67
Toby, E. Bruce 83
Todd, Jocelyn 29
Tonson, Anne 29
Topoleski, L. D. Timmie 30
Torchilin, Vladimir 54
Torzilli, Peter 34
Toussaint, Kimani 29
Trabia, Mohamed B. 34
Trampe, Barbara 63
Tran, Richard 74
Travascio, Francesco 56, 82
Troche, Harrison 56
Trompeter, Nicholas 40, 65
Troy, Karen 45
Tsamis, Alkis 55
Tseng, Wei-Ju 46
Tsinman, Tonia 56
Tubaldi, Eleonora 54
Tuma, Ronald F. 64
Tunnell, James 72
Tushak, Claire 37
Tutino, Vincent 69
Tuttle, Tyler 43
Tyler, Liam 50
- U**
Uchiyama, Yuya 35
Uhl, Chris 36
Unal, Mustafa 25
Urban, Jillian 25, 38
Urbanski, Mateusz 82
Uretsky, Barry 77
- Uribe, Gabriela 74
Uzer, Gunes 67
- V**
Vahabi, Hamed 53
Vahdati, Ali 25, 53
Vaidya, Anurag 65
Vaillancourt, Chase 81
Valdez, Jose 58
Valdez-Jasso, Daniela 33, 71
Valen-Sendstad, Kristian .. 25, 69, 77
Valentine, Michael 54
Valleau, Michael A. 75
Van de Sande, Leen 36
van den Berg, Ronald 71
Van Dyke, Mark 87
Van Impe, Matthias 72, 76
Van Straaten, Meegan 43
Vande Geest, Jonathan ... 25, 28, 34
Vander Sloten, Jos 66
Vanderby, Ray 25
Vanderpool, Rebecca R 63
VanPaepeghem, Jonathan 65
Vanveen, Barry 78
Varner, Victor 87
Vasudevan, Vivek 35, 78
Vaughan, Patrick 29, 61, 80
Veeturi, Sricharan S 45
Velez-Rendon, Daniela 33
Vemireddy, Vamsidhara 46
Venkatesan, Janani 35
Verdonck, Pascal 68
Vergara, Christian 54
Vicky, Thao 37
Vidmar, Christopher 67
Vieregg, Jeffrey 31
Vignos, Michael 66
Vijayvargiya, Amogha 83
Vink, Joy 29, 57
Vipperman, Jeffrey 77
Virag, Jitka 71
Vis, Bas 48
Vishwanath, Rohini 74
Vlachos, Pavlos 40, 70
Voinier, Steven 38, 83
Volk, Susan 38
von Voigt, Gabriele 49
Voo, Liming 25, 52
Voorneveld, Jason 68
Vorp, David 28, 70, 71, 74
- W**
Wach, Amanda 34
Wada, Hiroshi 51
Wada, Shigeo 54, 58, 67
Wagner, William 28
Wahlquist, Joseph 38
Walker, William 67
Wallace, Joseph 25
- Wang, Bingrui 86
Wang, Chao 38, 56, 64
Wang, Chunxiang 82
Wang, Hai 25
Wang, Hailong 57
Wang, Jingyu 52
Wang, Ke 85
Wang, Liang 25
Wang, Liyun 46, 75
Wang, Peineng 57
Wang, Ruizhi 32
Wang, Shuolun 85
Wang, Sihong 25, 36
Wang, Tianyao 52
Wang, Vincent 25
Wang, William 73
Wang, Xiaodu 42, 70
Wang, Xun 45
Wang, Yadong 45
Wang, Yiru 25
Wang, Zhijie 25, 71
Wapner, Ronald 29
Ward, Sara J. 64
Warren, Paul 86
Warren, Russell 34
Watanabe, Takashi 81
Watson Genna, Catherine 67
Watson, Matthew 62
Watson, Quentin 76
Watton, Paul 46
Watts, Stephanie 59
Wayne, Jennifer 25, 66
Weaver, Ashley 25
Weaver, Brian 80
Weaver, Nicholas 75
Webster-Wood, Victoria 86
Wei, Feng 25, 29, 38, 61, 80
Wei, Shuo 75
Wei, Zhenglun (Alan) 40
Weickenmeier, Johannes .. 25, 61, 86
Weidner, Crystal 43
Weinbaum, Justin 28, 74
Weinbaum, Sheldon 32
Weisenbach, Charles 81
Weiss, Dar 25, 53, 85
Weiss, Jeffrey 25, 29, 42
Weiss, Stephanie 60
Weiss, William 63, 64
Wells, Shane 86
Wendland, Michael 56
Wenk, Jonathan 25
Westenberg, Jos 68
Westrich, Geoffrey 33
Wheatley, Benjamin 25, 65, 86
White, Alisa 54
Whitley, Phillip 56
Whitlow, Christopher 38
Whitson, Bryan 49

- Widyastuti, Halida 74
Wijesundara, Muthu 39
Willaert, Wouter 36
Williams, Alexandra 78
Williams, Dillon 67
Willits, Rebecca 87, 88
Wilson, Danielle 71
Wilson, Nathan 35
Wilson, Sara 25, 44, 78
Win, Zaw 25
Wingender, Brian 42, 84
Winkelstein, Beth .. 25, 51, 55, 56, 66,
81
Winsor, Carla 66
Wiputra, Hadi 35, 78
Wise, Brian 47, 67
Wiseman, Robert 29
Witzenburg, Colleen 25, 32, 36
Woering, Michel 66
Wojcik, Laura 25
Woo, Savio 37
Wood, David 58
Wood, Scott 25
Wright, Timothy 33
Wu, Danielle 75
Wu, Hao 68
Wu, Jingxian 63
Wu, Lyndia C. 25
Wu, Shaoju 39
Wu, Tongge 65
Wu, Wei 25, 43, 50
Wu, Yi 63, 66, 72
- X**
Xi, Ce 71
Xiao, Pengwei 70
Xiong, Hejian 46, 49
Xu, Gang 25
Xu, Jiangsheng 31, 76
Xu, Jun 25
Xu, Xiao Yun 58, 69
Xu, Xin 47
- Xu, Zelu 53
Xue, Junmin 53
- Y**
Yaakovovich, Halit 53
Yamakawa, Satoshi 51
Yamauchi, Mitsuo 38
Yan, Chenxi 56
Yang, Bin 25, 34, 42, 64
Yang, Bo 56
Yang, Ling 53
Yang, Weiguang 25, 55, 62
Yap, Choon Hwai ... 25, 35, 53, 62, 78
Yarimitsu, Seido 29
Ye, Huilin 46, 69
Ye, Yaping 73
Yeats, Breandan 49, 69
Yeh, Alex 41
Yi, Xin 46
Yi-Chih, Cheng 77
Yoganandan, Narayan 81, 82
Yoganathan, Ajit 27, 40, 44, 79
Yoon, Dong Hwan 84
Yoshida, Kyoko 25, 59
Yousefi, Atieh 25
Yu, Guanglin 25
Yu, Huidan (whitney) 68
Yu, S. Michael 42
Yu, Xiaoli 27
Yu, Xunjie 32, 47
Yuan, Jason X.J 63
- Z**
Zagorski, Wu Pan 25
Zahid, Arslan 85
Zakerzadeh, Rana 25, 72
Zaman, Muhammad 32
Zaragoza, Michael V. 74
Zaretsky, Uri 53
Zaslansky, Paul 84
Zawieja, David 80
Zayed, Mohamed 67
- Zebhi, Banafsheh 78
Zeineh, Michael 41
Zeng, Jianfeng 52
Zgonis, Miltiadis 38, 73
Zhan, Li 25
Zhang, Jiangyue 25
Zhang, Ju 66
Zhang, Ling 78, 81
Zhang, Liying 25, 52, 65, 66, 81
Zhang, Mingzi 25
Zhang, Peng 53, 57
Zhang, Qinkun 36, 41
Zhang, Shuqi 31
Zhang, Song 74
Zhang, Wenbo 73
Zhang, Will 72
Zhang, Xuesong 86
Zhang, Yanhang (Katherine) .. 25, 32,
47, 59
Zhang, Yuntian 54
Zhao, Gang 54
Zhao, Hongbo 46
Zhao, Wei 25, 39, 52, 81
Zhao, Yajun 46
Zhao, Yan 63
Zheng, Yu 35
Zhou, Huairan 69
Zhou, Hui 84
Zhou, Runzhou 81
Zhou, Yilu 25
Zhou, Yuxiao 42
Zhou, Yuyuan 36
Zhu, Liang 27, 30, 49, 76
Zhu, Zhen 71
Zhuang, Zhenwu 85
Zimmerman, Brandon 41
Zimmerman, Kristin 85
Zimmerman, Peter 76
Zitella Verbick, Laura 80
Zitnay, Jared 42
Zlotnick, Hannah 68, 87
Zonnino, Andrea 60

Session Chair Index

| | |
|--------------------------------|--------|
| A | |
| Aggarwal, Ankush | 27 |
| Akyildiz, Ali | 27 |
| Alford, Patrick | 48 |
| Amini, Rouzbeh | 34 |
| Arzani, Amirhossein | 48 |
| B | |
| Baek, Seungik | 48, 59 |
| Baker, Brendon | 46 |
| Banerjee, Rupak | 27 |
| Barocas, Victor | 41 |
| Behkam, Bahareh | 41 |
| Bellini, Chiara | 45 |
| Bentil, Sarah | 46 |
| Brieu, Mathias | 42 |
| Buganza Tepole, Adrian | 42, 60 |
| Bush, Tamara | 40 |
| C | |
| Chakraborty, Nilay | 49 |
| Chan, Deva | 37 |
| Clyne, Alisa Morss | 61 |
| Coats, Brittany | 52 |
| Conway, Ted | 39 |
| Cortes, Daniel | 55 |
| D | |
| Dasi, Lakshmi Prasad | 44 |
| De Vita, Raffaella | 29 |
| Deymier, Alix | 47 |
| Dixon, Brandon | 58 |
| E | |
| Ebong, Eno | 50 |
| Eskandari, Mona | 51, 58 |
| F | |
| Feng, Yuan | 61 |
| Feola, Andrew | 34 |
| Figueroa, C. Alberto | 57 |
| Fisher, Matthew | 59 |
| G | |
| Garcia, Kara | 55 |
| Goergen, Craig | 45 |
| Grosberg, Anna | 59 |
| Guo, Ed | 50 |
| H | |
| Haut Donahue, Tammy | 55 |
| Heise, Rebecca | 54 |
| Henak, Corinne | 28, 41 |
| Hood, Lyle | 49 |
| Huang, Zhongping | 54 |
| Hwai Yap, Choon | 30 |
| J | |
| Jackson, Alicia | 55 |
| Ji, Songbai | 61 |
| K | |
| Kersh, Mariana | 33, 51 |
| Kraft, Reuben | 56 |
| Kurt, Mehmet | 52 |
| L | |
| LaDisa, John | 39 |
| Lake, Spencer | 37 |
| Li, Ying | 31 |
| M | |
| Maiti, Spandan | 50 |
| Manning, Keefe | 53 |
| Martin, Bryn | 31 |
| Miller, Kristin | 29, 45 |
| Morbiducci, Umberto | 54 |
| Moreno, Michael | 39 |
| Myers, Kristin | 47, 57 |
| N | |
| Neu, Corey | 28 |
| Nguyen, Vicky | 47 |
| Nicolella, Daniel | 42 |
| O | |
| O'Connell, Grace | 32 |
| Oakes, Jessica | 30 |
| P | |
| Patnaik, Sourav | 59 |
| Peterson, Carrie | 43 |
| Pierce, David M | 37 |
| Q | |
| Qin, Zhenpeng | 40 |
| R | |
| Rausch, Manuel | 36 |
| Roccabianca, Sara | 32, 60 |
| Roldan-Alzate, Alejandro | 35, 41 |
| Rowson, Steve | 38 |
| S | |
| Soares, Joao | 28, 57 |
| Stylianou, Antonis | 34 |
| Szczesny, Spencer | 47 |
| T | |
| Throckmorton, Amy | 52, 61 |
| Timmins, Lucas | 52 |
| V | |
| Voo, Liming | 38 |
| W | |
| Wang, Sihong | 36 |

| | |
|------------------------------|--------|
| Wang, Zhijie | 28 |
| Wayne, Jennifer | 33 |
| Weickenmeier, Johannes | 56 |
| Weiss, Jeffrey | 45 |
| Wilson, Sara | 30, 43 |
| Witzenburg, Colleen | 32, 36 |

Z

| | |
|----------------------------------|----|
| Zagorski, Wu Pan | 34 |
| Zakerzadeh, Rana | 36 |
| Zhang, Yanhang (Katherine) | 50 |
| Zhu, Liang | 27 |

*VIRGINIA TECH
CONGRATULATES
DR. JENNIFER WAYNE*



on receiving the H.R. Lissner Medal
and welcomes her as our new
Department Head of Biomedical
Engineering and Mechanics.



Biomedical Engineering at UMass Amherst

Research to Improve Human Health

Faculty are active participants in the Institute for Applied Life Sciences (IALS), launched in 2014 with a \$150 million investment from the Massachusetts Life Science Center and UMass Amherst. The vision for IALS is to translate fundamental research into innovations and services that deliver benefits to human health and well-being. IALS is product-focused, interdisciplinary, collaborative, outward-looking, and entrepreneurial.

Interdisciplinary focus areas

include: biomaterials; biomechanics; biosensors; tissue engineering; and mechanobiology.

Department Highlights

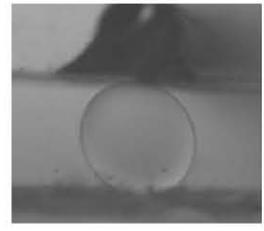
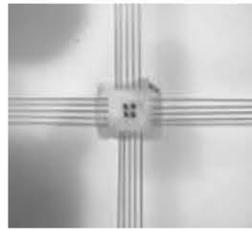
- Launched in Fall 2017
- 148 undergraduate students
- 26% of undergraduates are members of Commonwealth Honors College
- Growing MS and PhD programs
- Highly interdisciplinary and collaborative
- Synergetic lab space in UMass Medical Center and IALS



University of Massachusetts Amherst

UMass Amherst is one of the nation's top public universities. We currently rank number 26 in a field of more than 700 public, four-year colleges and universities by *U.S. News & World Report*. Distinguished by the excellence and breadth of our academic, research, and community outreach programs — UMass Amherst is making a profound, transformative impact to the common good.

For more information, visit us at BME.UMASS.EDU



CellScale was founded in 2005 with the goal of making custom mechanical test systems developed at the University of Waterloo available to other researchers. Since then, we have developed a complete line of mechanical testing and cell stimulation products. Our BioTester remains the market leader for biaxial testing of biomaterials while our newly launched MicroTester pushes the boundaries of high resolution micro-scale testing. Come visit CellScale at our booth this week at SB3C!



Find out more at www.cellscale.com





REAL- WORLD RESEARCH

At **VCU Engineering**, graduate students and fellows work alongside our diverse faculty on projects that will shape the future of medicine. From cellular mechanobiology to systems-level mechanics and imaging, our research is propelling ideas from the lab to the larger community.

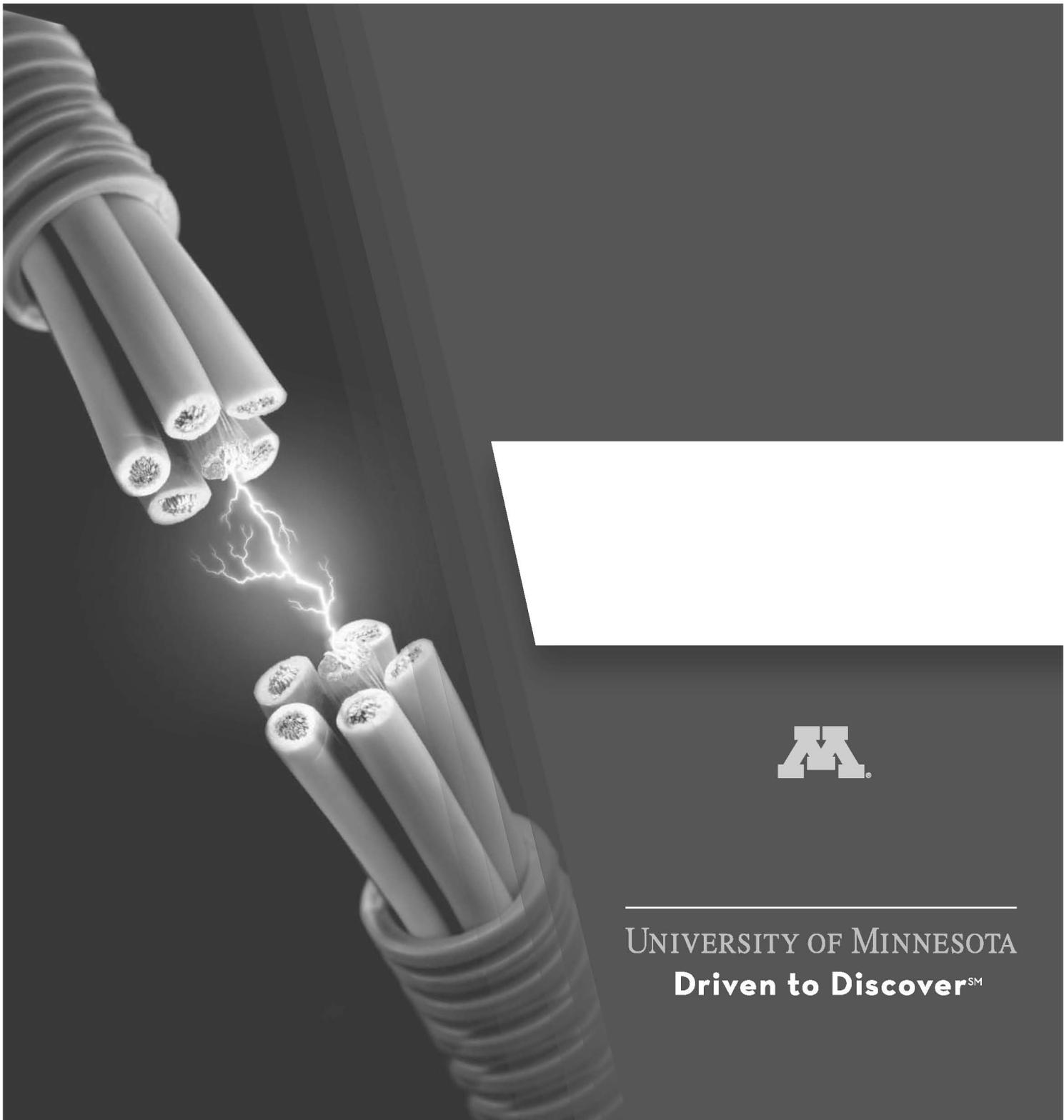
#EngineersMakeItReal

Look for us at our booth at SB3C.

egr.vcu.edu



VCU College of Engineering



UNIVERSITY OF MINNESOTA
Driven to DiscoverSM



WE ARE CELLINK

CELLINK was the first bioink company in the world and is today's leading provider of 3D bioprinters. We design and commercialize bioprinting technologies – enabling researchers to 3D print organs and tissue for applications that span industries, from pharmaceutical to cosmetic.

Founded in 2016, CELLINK is now changing the future of medicine in hundreds of labs across more than 50 countries. To find out more, visit www.cellink.com.



MECHANICAL TESTING SOLUTIONS FOR BIOMATERIALS AND TISSUES

The Mach-1™ multiaxial mechanical tester is the only all-in-one device used in multiple research labs and is deemed an excellent educational tool for students.



Visit our website



BIOMOMENTUM

Laval, Qc, Canada

1-450-667-2299

info@biomomentum.com

SimVascular Workshop SB³C 2019

THE OPEN SOURCE PIPELINE FOR CARDIOVASCULAR MODELING

Learn how to use SimVascular

- Build 3D patient-specific cardiovascular models
- Run computational blood flow simulations
- Visualize and analyze simulation data

Join our workshop on June 25th

Time: 11:30-1:30

Location: TBD

And come visit our booth at SB³C!

Also check out us online: www.simvascular.org

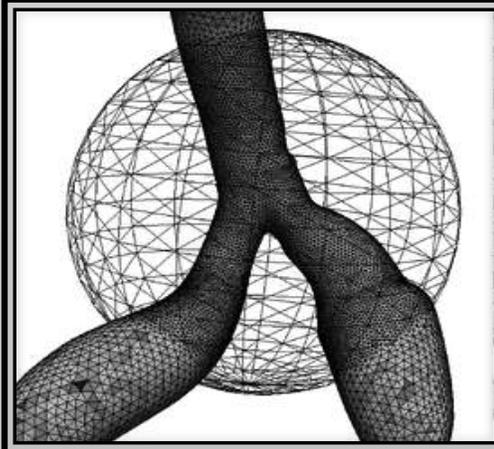
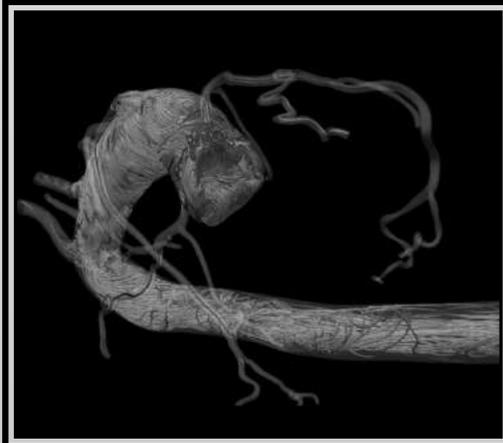
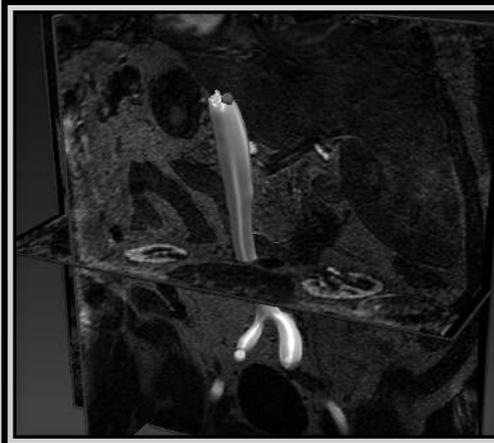


Image Analysis: volume rendering, image denoising, edge detection

Model Construction: level set segmentation, model repair tools

Meshing: radius-based and boundary layer meshing, adaptive mesh refinement

Simulation: deformable walls, variable properties, highly parallelized solver

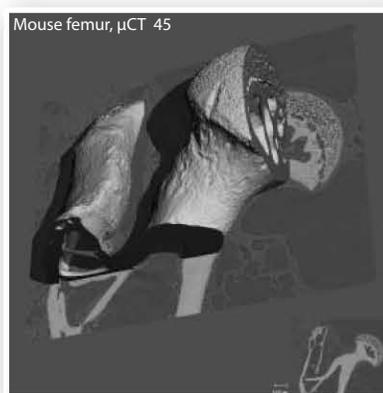
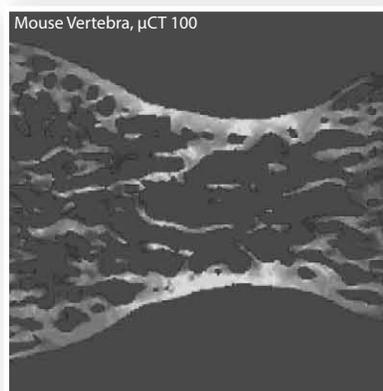
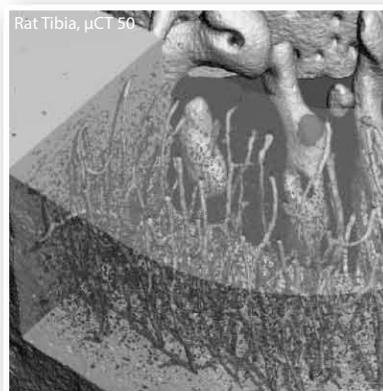
Cross-Platform support: Mac, Windows, Linux

NEW FEATURES !

- **Machine learning** to accelerate vascular segmentation
- **Python interface**
- Automated pipeline for **1D simulations**
- Enhanced capabilities for **3D segmentation**

SCANCO MEDICAL

MicroCT Systems & Solutions



- high resolution imaging for accurate results
- automatic sample changer
- large field of view/large samples
- streamlined, advanced 3D analysis
- compression/tension stage
- optional FE analysis

- scan and analysis services

www.scanco.ch
www.microct.com
info@scanco.ch

μ CT 45 - μ CT 50 - μ CT 90 - μ CT 100 - μ CT 100 HE - vivaCT 80 - XtremeCT II

swiss precision since 1988



The University of Akron
College of Engineering

DEPARTMENT OF BIOMEDICAL ENGINEERING

ABOUT THE GRADUATE PROGRAM

The graduate program in the Department of Biomedical Engineering (BME) is designed to be flexible enough to accommodate students with varied backgrounds and to promote an interest in theoretical and applied research while preparing students for a career in industry, government or academia. Departmental assistantships are available to incoming students to allow exploration of research areas prior to selecting an advisor.

Faculty members in the department have strong research programs in a variety of areas and are active participants in the Institute for Biomedical Engineering Research. Research areas include biomaterials, nanotechnology, regenerative medicine & tissue engineering, signal processing, bone biomechanics & mechanobiology, soft tissue mechanics, and device development and bioinstrumentation.

Degrees Offered

- Doctor of Philosophy (Ph.D.) in Engineering
- Master of Science (M.S.) in Engineering

University Accolades

Named by the National Science Foundation (NSF) as one of 10 exemplars for technology transfer and commercialization and industrial partnerships.

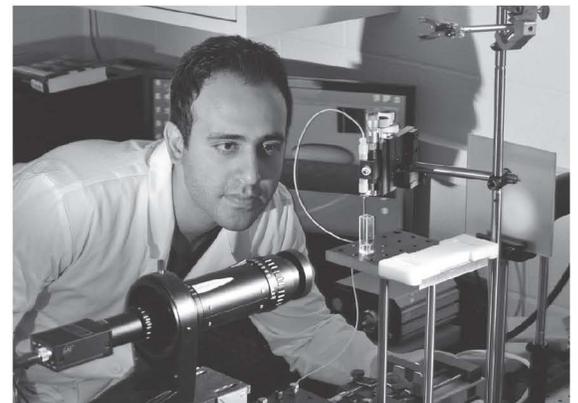
Designated by the state of Ohio as a Center of Excellence in Biomedicine and Health Care and a Center of Excellence in Enabling Technologies: Advanced Materials and Sensors. Programs in these centers attract millions of federal, state and foundation dollars.

Growth

The department has seen significant growth over the past ten years, with six new hires, three endowed chair positions, and NSF CAREER award winners. Additionally, the laboratory and office space has doubled in size.

CONTACT

To learn more about graduate research, visit bme.uakron.edu or email bmegrad@uakron.edu.







UNIVERSITY OF MARYLAND





Tenure Track Position in Biomedical Engineering (Biomechanics)

Marquette University

Department of Biomedical Engineering, Opus College of Engineering

The Department of Biomedical Engineering (BME) at Marquette University invites applications for a tenure-track faculty position in the field of Biomechanics to start August 2019. This position is expected to be at the assistant professor level; however, exceptional candidates for higher rank will also be considered. We seek outstanding candidates who are developing an internationally recognized research program, and whose teaching will advance Marquette's educational mission. This new faculty position will grow our established research and educational programs in Biomechanics.

The ideal candidate will have earned a PhD in Biomedical Engineering, Biomechanical Engineering or a related engineering field. Candidates are expected to develop a strong, externally funded research program and to be effective educators at the undergraduate and graduate levels. Knowledge of Biomechanical Engineering in the broadly defined area of computational biomechanics, robotics, prosthetics/orthotics and/or finite element methods is preferred. While not required, experience in orthopaedics, rehabilitation or trauma is welcome.

The BME department at Marquette has a close, collaborative relationship with the Medical College of Wisconsin and offers BS, MS, ME and PhD degrees. The department currently has over 350 undergraduate students and 50 graduate students with a 5-year projection of over 500 students across all degrees with the greatest growth in Master's and PhD disciplines. Strong collaborative programs are in place with the Departments of Orthopaedic Surgery, Neurosurgery, and Physical Medicine and Rehabilitation which include the Orthopaedic and Rehabilitation Engineering Center (OREC), Stroke Rehabilitation Center of Southeastern Wisconsin, and Neuroscience and Biomechanics Research Laboratories at the nearby Clement J. Zablocki VA Medical Center and Vehicle Crashworthiness Laboratory. These groups have received national recognition and multiple grant awards for a variety of biomechanical studies.

Applications must be submitted online. Applications should include a cover letter with the names and contact information for three references, a current CV, and statements of research and teaching objectives (two-page maximum each). The search is ongoing with a targeted start date of August 2019. Inquiries can be directed to Gerald Harris, Chair of the Biomechanics Faculty Search Committee, Gerald.Harris@marquette.edu, 414-288-1586.

Marquette is a Catholic, Jesuit University that offers educational, professional and cultural advantages of its location in the heart of Milwaukee to all members of its diverse community. *Marquette University is an Equal Opportunity Employer; women and minorities are encouraged to apply.*

CMBBE 2019

16th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering and 4th Conference on Imaging and Visualization
14 – 16 August 2019
New York City, United States
Conference venue: Columbia University
www.cmbbe2019.com



Conference Chair
Christopher R. Jacobs
(in memoriam)

Program Chair
Gerard A. Ateshian

Co-Chair (Imaging & Visualization)
João Manuel R.S. Tavares

Local Arrangements Chair
Kristin M. Myers

PLENARY SPEAKERS



Natalia Trayanova
*Professor of Biomedical Engineering and Medicine
at Johns Hopkins University*
Lecture: Blending Engineering and Medicine



Liesbet Geris
*Professor Faculty of Engineering Science,
University of Liège & KU Leuven*
Lecture: Digital twins in tissue engineering:
from bench to bedside via the computer



Ravi Iyengar
*Department of Pharmacological Sciences and Institute
for Systems Biomedicine, Systems Biology Center,
Icahn School of Medicine at Mount Sinai, New York–USA*
Lecture: Integrated models of cell shape
and function in tissue organization

FOLLOW US   

www.cmbbe2019.com | cmbbe2019@codan-consulting.com | [@CMBBE2019](https://twitter.com/CMBBE2019)

 **COLUMBIA UNIVERSITY**
IN THE CITY OF NEW YORK

NOTES

The 2019 Summer Biomechanics, Bioengineering, and Biotransport Conference (SB³C) organizers gratefully acknowledge the support of our Industry and Academic Sponsors.



VIRGINIA TECH™



UMassAmherst
College of Engineering
Biomedical Engineering



BIOMOMENTUM



CELLINK®



SCANCO MEDICAL



VCU College of
Engineering



The University of Akron
College of Engineering



Wallace H. Coulter Department of
Biomedical Engineering



EMORY
UNIVERSITY



Parker H. Petit Institute for
Bioengineering and Bioscience

PITT | SWANSON
ENGINEERING
BIOENGINEERING



Department of
Biomedical Engineering
UNIVERSITY OF WISCONSIN-MADISON



CRC Press
Taylor & Francis Group

SB³C 2019 - PROGRAM AT A GLANCE

| Room | Sunburst | Snowflake | Wintergreen | Seasons 1-3 | Seasons 4-5 | Hemlock | Fox Den |
|---|--|--|---|--|---|----------------------------------|--|
| TUESDAY, June 25, 2019 | | | | | | | |
| 7:00 - 1:30 pm | Committee Meetings | | | | | | |
| 9:30 - 3:30 pm (see specific times for each) | Workshop: John Pearce 70 th birthday celebration (2:00 - 3:30 pm) | Workshop: Bridging the scales (2:00 - 3:30 pm) | Workshop: Medical device design, developmt, and approval (2:00 - 3:30 pm) | Workshop: Promoting academic code of honor and ethics (2:00 - 3:30 pm) | | | Workshops: CRIMSON (9:30 - 11:30) Simvascular (11:30 - 1:30 pm) |
| 3:45 - 5:15 pm | Thermal damage processes in tissues | Heart valve mechanics and CV devices | CV biomechanics and tissue engineering | Mechanics of cartilage in health and disease | Reproductive and abdominal biomechanics | Biomedical engineering education | Respiratory, ocular, lymphatic, and other organ systems |
| 5:15 - 5:30 pm | Coffee Break (Grand Ballroom) | | | | | | |
| 5:30 - 6:30 pm | OPENING PLENARY – Susan Margulies (Grand Ballroom) | | | | | | |
| 6:30 - 8:30 pm | Opening Reception (Pavers Circle) | | | | | | |

| | | | | | | | |
|---------------------------------|--|--------------------------------|--|---|---------------------|-------------------------|--|
| WEDNESDAY, June 26, 2019 | | | | | | | |
| 7:00 - 8:00 am | Breakfast (Grand Ballroom) | | | | | | |
| All Day | Industry Exhibits (Exhibitor Foyer) | | | | | | |
| 8:15 - 9:15 am | Fung and Mow Award Lectures (Grand Ballroom) | | | | | | |
| 9:30 - 11:00 am | Drug delivery in cancer, ocular, and nervous systems | Growth remodeling and repair I | YC Fung 100 th birthday symposium | Biomechanics of lower and upper extremities | Ocular biomechanics | Human movement and gait | Data driven modeling and visualization |
| 11:00 - 11:15 am | Coffee Break (Grand Ballroom) | | | | | | |
| 11:15 - 12:45 pm | Biotransport in tumor microenvironment | Cardiac mechanics | YC Fung 100 th birthday symposium | Mechanics of cartilage and meniscus | Injury: imaging | UG design competition | Translational CV diagnosis and treatment |
| 12:45 - 2:15 pm | POSTER SESSION I (Exhibit Hall) with Lunch including BS & MS Student Paper Competitions | | | | | | |
| 4:30 - 6:00 pm | Diversity Mentor-Mentee Event (Matterhorn Lounge) | | | | | | |

| | | | | | | | |
|--------------------------------|---|--|--|---|-------------------------------------|---|--------------------------------------|
| THURSDAY, June 27, 2019 | | | | | | | |
| 7:00 - 8:00 am | Breakfast (Grand Ballroom) | | | | | | |
| All Day | Industry Exhibits (Exhibitor Foyer) | | | | | | |
| 8:15 - 9:15 am | Nerem and Woo Award Lectures (Grand Ballroom) | | | | | | |
| 9:30 - 11:00 am | PhD competition: Cell & tissue engineering | PhD competition: Imaging, injury, & BME education | PhD competition: ECM biomechanics | Bone mechanics | Frontiers in tissue solid mechanics | Rehabilitation and assistive technologies | Ventricular and valvular flow |
| 11:00 - 11:15 am | Coffee Break (Grand Ballroom) | | | | | | |
| 11:15 - 12:45 pm | PhD competition: Comp biomech & diagnostic models | PhD competition: Morpho, develop, growth, & remod. | PhD competition: Cell mech, drug delivery, & therap. | Musculoskeletal tissue engineering | Nano to micro multiscale mechanics | Vascular biomechanics | Patient-specific flow and physiology |
| 12:45 - 2:15 pm | POSTER SESSION II (Exhibit Hall) with Lunch | | | | | | |
| 2:15 - 3:45 pm | Workshop: Multiscale musculoskeletal mechanics | Workshop: BME education summit readout | Workshop: From mouse to man | Workshop: Community based learning in BME | Workshop: FEBio | | |
| 3:45 - 4:45 pm | Women's Networking Event (Seven/Ten Bistro) | | | | | | |
| 5:30 - 7:00 pm | Career Connections (Seasons 1, 2, 3) | | | | | | |
| 8:00 - 11:00 pm | BEDROCK CONCERT (Foggy Goggle Stage) | | | | | | |

| | | | | | | | |
|------------------------------|---|--|--|--|--|--------------------------------------|---|
| FRIDAY, June 28, 2019 | | | | | | | |
| 12:00 - 5:00 pm | Industry Exhibits (Exhibitor Foyer) | | | | | | |
| 12:00 - 1:30 pm | Biotransport in thermal therapy and cryopreserv. | Aneurysm mechanics | Mechanobiology - in memory of Christopher Jacobs | Imaging and mechanics of ligament & tendon | Injury: models | CV and musculoskeletal device design | Thromb., hemolysis and mechanical circulatory support |
| 1:30 - 1:45 pm | Coffee Break (Grand Ballroom) | | | | | | |
| 1:45 - 3:15 pm | Biotransport in disease detection and therapy | Vascular pathology and disease progression | Mechanobiology - in memory of Christopher Jacobs | Spine biomechanics | Growth remodeling and repair II: musculoskeletal | Soft tissue mechanics | Emerging computation and exp. methods |
| 3:15 - 3:30 pm | Coffee Break (Grand Ballroom) | | | | | | |
| 3:30 - 5:00 pm | Multiscale biotransport in hemo & lymph | Cardiovascular mechanics: other | Biofabrication and 3D in vitro systems | Musculoskeletal soft tissue mech. and modeling | Injury: biomechanics | <i>Government Initiatives</i> | Pediatric and congenital fluid mechanics |
| 5:30 - 6:30 pm | Lissner Award Lecture – (Grand Ballroom) | | | | | | |
| 6:30 - 7:30 pm | Lissner Reception (Exhibit Hall Annex) | | | | | | |
| 7:30 - 10:30 pm | Banquet and Awards Ceremony (Exhibit Hall) | | | | | | |