



UBEC

**Utah Biomedical
Engineering Conference
2026 Program**

**University of Utah
Oct. 1st-2nd**



Welcome to UBEC!

Hello,

And welcome to the 21st annual Utah Biomedical Engineering Conference! We are so grateful to have you here. During this conference, expect to see cutting-edge research, expand your network, and enjoy celebrating the amazing biomedical advancements taking place in Utah and around the Mountain West.

UBEC started in 2005 to bring together biomedical professionals across industry, academia, and government. In the twenty years since, the conference has gone through a number of changes, like becoming student-organized and now including a networking night this year. This is looking to be one of the biggest and best years yet!

Whatever your background, we're sure there will be something for you. We hope you enjoy absorbing the amazing biomedical research done by students, faculty, and industry from around the Mountain West, meeting some of our fantastic sponsors, and learning things you did not know before.

Sincerely,

The 2026 UBEC Student Planning Committee - Emma Welsh, Adam lossner, Donovan Durand, Desmond Kuan, and Daniel Zhu

Our Keynote Speakers



Dr. Elizabeth Vargis is an Associate Professor of Biological and Chemical Engineering and a Faculty Fellow in the Office of Research at Utah State University. She earned a BS in Bioengineering from UC Berkely and MS and PhD degree in Biomedical Engineering from Vanderbilt University. Her research integrates tissue engineering, biomaterials, and microfabrication to develop human-relevant *in vitro* models of aging and disease. Her lab studies retinal degeneration, muscle atrophy, and space biology. Supported by the NSF, NIH, DOE, NASA, and private foundations, she has mentored more than 75 student researchers while advancing interdisciplinary innovation. Dr. Vargis lives in Logan with her partner, 2 kids, and 1 dog.

Dr. Tony Chou has over 30 years of healthcare experience as both an academic interventional cardiologist and medical device industry executive. He completed his cardiology and interventional cardiology training at UCSF and previously served as Director of the Adult Cardiac Catheterization Laboratories at UCSF Moffitt-Long Hospitals as a fulltime faculty member. His industry experience started as part of the corporate/business development team at Abbott Laboratories, and he transitioned to various positions in general management and business development in the business unit which became known as Abbott Vascular. As Division Vice President and General Manager of Vascular Closure, he oversaw the development, manufacturing, clinical trials, FDA PMAS/PMA, international regulatory registration and global launches of the femoral closure devices Perclose ProGlide and StarClose SE. Dr. Chou became a General Partner of the healthcare-focused venture capital firm The Vertical Group in 2006. In that capacity, he is or has served as director or advisor to the boards of Silk Road Medical (IPO, acquired by Boston Scientific), Outset Medical (IPO), Singular Bio (acquired by Invitae), Atheromed (acquired by Volcano), Accriva/Accumetrics (acquired by Werthen), Lutonix (acquired by CR Bard), Omada Health, eV3 (acquired by Covidien), and other privately held companies. Dr. Chou was a founder and served as initial CEO of Silk Road Medical and currently serves as CEO and Founder of Route 92 Medical. He remains active as an early stage investor in the medical technology space and has served as investor and advisor to Hinge Health, Shiratronics, Luminopia, Microtransponder, Carlsmed, Radiation, Neuros, Mobia and Monteris among others.

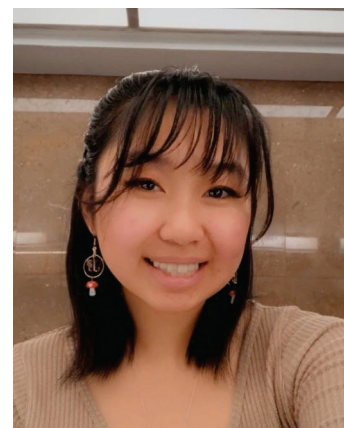


Alumni Panel



Calvin Coates is a biomedical engineer and quality professional in the medical device industry. He completed his B.S./M.S in biomedical engineering from the University of Utah and has experience in new product development, manufacturing engineering, and quality engineering. His work focuses on nonconformance management, corrective and preventive action, process validation, inspection improvement, and audit readiness. Calvin has led cross-functional and cross-site initiatives involving manufacturing, research and development, and regulatory partners, with an emphasis on patient safety, compliance, and practical process improvement. Outside of work, he enjoys hiking, biking, spending time with his wife, and playing with their cat

Holly Tang is a recent University of Utah graduate, earning both her BS and MS in Biomedical Engineering. During her time at the University she completed her EMT license, SolidWorks Certification, performed cadaver dissection and prototyped multiple clinician projects. Holly completed an engineering internship at DiscGenics, a regenerative stem cell start-up and an internship at Becton Dickinson where she currently works. At BD, Holly has taken on many various R&D roles, in catheter securement and insertion site devices, ultrasound/imaging technology, and most recently tariff mitigation projects. She is passionate about design, development and the intersection of technology and medicine. Outside of work, Holly enjoys baking, photography, painting and sewing.



Jake Elliott is a University of Utah graduate, earning both his BS and MS in Biomedical Engineering. He began his professional journey as a Quality Control Analyst at Teva Pharmaceuticals and currently works as a QA Engineer at Varex Imaging, where he supports the manufacture of X-ray imaging components. Dedicated to continuous improvement and ensuring regulatory compliance, he has geared his career toward quality assurance and regulatory affairs with the ultimate goal of becoming a Director or VP of Quality. Outside of his professional life, Jake enjoys playing golf and spending quality time with his family.

Alumni Panel



Tess Heiner works as an R&D Design Engineer at Stryker Neurovascular, where she focuses on the testing, design, and development of Acute Ischemic Stroke (AIS) products. Tess received her Bachelor's degree in Biomedical Engineering from the University of Utah, where she studied nanoplastics at the Digital Pharmaceuticals Laboratory. Additionally, she worked as a teaching assistant, where she shared her love of 3D design and hands-on projects. Outside of work, Tess enjoys reading, painting, playing the piano, and spending time with her family.

Annika Gilmore is a Senior R&D Engineer and associate in Becton Dickinson's Technology Leadership Development Program. She currently supports early-stage innovation and new product development within BD's Surgical Solutions portfolio. Annika received her PhD in Biomedical Engineering from the University of Utah, where she developed and tested preclinically an antibiotic formulation designed to manage biofilm-related infections in partnership with DePuy Synthes. Outside of work, Annika is an avid equestrian, skier, and mountain biker, but most enjoys spending time with her husband and daughter..



Conference Schedule

Networking Night

Location: Cleone Peterson Eccles Alumni House

Time	Event
5-5:45pm	Registration/Dinner
5:45-6pm	Welcome Announcements
6-6:30pm	Industry/Gov Keynote
6:30-7pm	Alumni Panel
7-9pm	Open networking, industry spotlight/grand rounds

Academic Conference

Location: S.J. Quinney College of Law

Time	Event	Location
8-9:00am	Registration, Breakfast with Industry	Moot Court Room
9-9:05am	Welcome Speech	Moot Court Room
9:05-9:35am	Keynote Speaker	Moot Court Room
9:40-10:25am	Podium Session A	Moot Court Room, Rm 6500, Rm 661
10:25-10:30	Break/Reflection	Main Area
10:30-11:15am	Podium Session B	Moot Court Room, Rm 6500, Rm 661
11:20-12:05pm	Poster Session A	Rm 6623, Rm 6619
12:05-1:00pm	Lunch with Industry Expo	Main Area
1:00-1:15pm	Poster Exhibiton/Grand Rounds	Moot Court Room
1:20-2:05pm	Podium Session C	Moot Court Room, Rm 6500, Rm 661
2:10-2:55pm	Podium Session D	Moot Court Room, Rm 6500, Rm 661
3:00-3:45pm	Poster Session B	Rm 6623, Rm 6619
3:55-4:25pm	Closing Remarks/Award Ceremony	Moot Court Room

Session A

34 presentations

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| <p>11 Allison Sobieri
Tunable Synthetic Mucins as a Platform for Probing Glycan-Mediated Host-Microbe Interactions</p> | <p>27 Yingduo Yang
Enhanced Internalization of Antibody-Drug Conjugates Mediated by Transferrin Receptor Recognition</p> |
| <p>13 Cate Westbrook
Probing Antifreeze Proteins' Structure-Function Relationship Using Synthetic Polypeptide Mimics</p> | <p>29 Atsushi Arino
Dynamic In Vivo Three-Dimensional Acromiohumeral Bony Clearance During Elevation and Elevated-Arm Axial Rotation in Healthy Shoulders</p> |
| <p>15 Emma Welsh
A Comparison of anti-CD47 Peptides for Suitability in an Antibody/Peptide Conjugate Targeting Multiple Myeloma</p> | <p>31 Eli Francom
Understanding orthotic bypass effects on the gait of able-bodied individuals</p> |
| <p>17 Jonah Holbrook
ZNF865 (BLST) Gene Modulation Regulates DNA repair and Promotes Recovery from Multiple Forms of Induced DNA Damage</p> | <p>33 Kaitlyn Kuchinka
EMG-Validation of RTSA Subject-Specific Musculoskeletal Modelling Demonstrates Variable Biomechanics</p> |
| <p>19 Kristin Durrant
Enhancing the Extensibility and Tensile Toughness of Recombinant Hagfish Intermediate Filaments Using Flagelliform Silk Motifs</p> | <p>35 Kyra Platt
The Biomechanical Effects of Late Stance Positive Energy Injection from an Active Knee Prosthesis in Transfemoral Amputees</p> |
| <p>21 Molly Czachor
ZNF865 as a Novel Gene Therapy Target: ZNF865 Induces Degeneration and Painful Outcomes in a Rodent Model of Intervertebral Disc Degeneration</p> | <p>37 Braeden Goff
Cardiac Radiation Therapy for Ventricular Tachycardia</p> |
| <p>23 Priyanka Arunachalam
Sex-dependent toxicity of PEG coated silica nanoparticles in BALB/c mice</p> | <p>39 Laura Valentina Salazar
Right Ventricular Electrical Remodeling in a Preclinical Model of Dilated Ischemic Cardiomyopathy</p> |
| <p>25 Shannuo Li
Model-Informed PK/PD Optimization of MATCH-Mediated T-Cell Immunotherapy</p> | <p>43 Sofia Ruiz
cBIN1 Gene Therapy Restores Ventricular Synchrony in a Pre-Clinical Model of Ischemic Heart Failure</p> |
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Session A

34 presentations / continued

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| <p>45 Dongxiang Zhang
From spikes to network controllability: a reproducible, LLM-agent-orchestrated pipeline for longitudinal MEA analysis</p> | <p>61 Alana Maluszcak
Intracellular Calcium Dynamics in Spatially Extended Computational CA3 Pyramidal Neuron</p> |
| <p>47 Veronica Peacock
Deep Learning Approach to Single-Channel EEG Seizure Detection for Epilepsy Research</p> | <p>63 Brian Philip
Bipolar focalized stimulation yields diffuse cortico-cortical evoked potentials</p> |
| <p>49 Davi Cavinatto
Ultrasound Through-Transmission for Acoustic Property Monitoring During FUS Breast Ablation: A Simulation Feasibility Study</p> | <p>65 Donggue Kim
Basal ganglia spatio-spectral signatures of motor subtypes in Parkinson's disease</p> |
| <p>51 Alex Madsen
Preclinical Assessment of Local and Systemic Safety for Sustained Local Antibiotic Delivery</p> | <p>67 Ethan Vega
Evoked Resonant Neural Activity During Deep Brain Stimulation Reflects Target and Disease Specific Physiology in Parkinson's Disease and Dystonia</p> |
| <p>53 Evan Marsh
Middle Meatal Swab-Derived Eosinophil Peroxidase Activity Identifies Eosinophilic Chronic Rhinosinusitis: Impact of Sampling Matrix on Assay Performance</p> | <p>69 Jaron Ashton
Rheoencephalography Correlates with Supraorbital Over Peripheral Photoplethysmography During Induced Postural Changes</p> |
| <p>55 Jesse Prime
Design of a Miniaturized Active V-Belt Continuously Variable Transmission for Wearable Robotics</p> | <p>71 John Morris
Medial entorhinal cortex integrates temporal reward statistics to guide adaptive foraging</p> |
| <p>57 Nathan Langford
An Integrated Battery, Charging, and Boost Conversion System for Take-Home Use of High-Power Wearable Robots</p> | <p>73 Leonardo Ferrisi
Towards Prosthetics that Learn How You Move: Data Aggregation for Deep Learning Prosthesis Control from Chronically Implanted Electrodes</p> |
| <p>59 Abigail Harrison
Bilateral Differences in the Posterior Root Muscle Reflex in Healthy Individuals</p> | <p>75 Patrick R. Brashear
Developing a Behavioral Task for Identifying a Neural Marker of Internally Initiated Attention</p> |
| <p>41 Sonny Jones
Adapting to Muscle Weakness: Continual Learning Agent in a Simulation of Impaired Gait</p> | <p>77 Robert Usevitch
Auditory Neuromodulation through Fast Amplitude Modulations</p> |
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Session B

44 presentations

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| <p>1° Tara Buzinski Wilson
Synthetic Antifreeze Polypeptides to Support the Cryopreservation of Biopharmaceuticals</p> <hr/> <p>2° Sean Lavering
Sustained Local Antibiotic Therapy via the Purgo Pouch Manages Spine-Related Infection Better than Systemic Antibiotics Alone in a Sheep Model</p> <hr/> <p>3° Rui Jin
Predicting Atrial Fibrosis from Local Electrograms Using Machine Learning</p> <hr/> <p>4° Ashwith Jay
Neuromuscular Activation Patterns Associated with Dynamic Knee Valgus During Drop-Landing in Young Adults: Effects of Cognitive Load</p> <hr/> <p>5° Sophia Day
Humeral Torsion Using a Forearm Reference: Anatomic Variability and the Role of Proximal Landmarks</p> <hr/> <p>6° Eli Child
Koi-utils: a Framework for Uncertainty Quantification in Cardiac Simulation</p> <hr/> <p>7° Sumaiya Tabassum Dipty
MR-Guided Focused Ultrasound-Mediated Non-Thermal Ablation and Chemotherapy Delivery in a Rat Glioma Model</p> <hr/> | <p>8° Adrienne Williams
Biomechanical Analysis of Cable-Driven Waist Perturbation Recovery Strategies in Transfemoral Amputees</p> <hr/> <p>9° Camryn Sheen
Identifying Stepping Patterns with a Custom Machine Learning Model: a Study Protocol</p> <hr/> <p>10° Ivan Khimach
An Adaptive Template-Matching Method for Extracting Gait Cycles from Underfoot Pressure Data</p> <hr/> <p>12 Camden Long
Design and Preliminary Pressure Characterization of a PLLA-Based Osmotic Pump for Local Glioblastoma Therapy</p> <hr/> <p>14 Christian Fielding
Modulating Macrophage Response through Tunable Biopolymer Multilayer Coatings</p> <hr/> <p>16 John Michael Thomas
Silk-Elastinlike Protein Polymers for Localized Delivery of Chemotherapeutics in Transarterial Chemoembolization of Hepatocellular Carcinoma</p> <hr/> <p>18 Joseph Shami
Treatment of Hematologic Malignancies Mediated by CD33 Biorecognition</p> <hr/> <p>20 Luke Woodland
Fabrication of Highly Porous Fluorapatite Scaffolds for Bone Regeneration</p> <hr/> |
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Session B

44 presentations / continued

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- 22 Patricia Guenkawa**
Design and Validation of an In Vitro Setup for Thermal Exposure of Tumor Spheroids
-
- 24 Rebecca Patush**
Mechanical and Diffusive Design Strategies to Mitigate the Foreign Body Response to Subdural Neural Interfaces
-
- 26 Tian Morrison**
Dye Effects on Collagen Hybridizing Peptide Pharmacokinetics
-
- 28 Yingduo Yang**
Treatment of Acute Myeloid Leukemia with 2-in-1 Polymer Enhanced Antibody-Drug Conjugates
-
- 30 AJ Crimson**
Investigating Novel Materials in Treating Vocal Fold Scar in a Rabbit Model
-
- 32 Greta E. Scheidt**
A Case Study Exploration of the Effects of Electromyography-based Control of a Powered Knee Prosthesis on Lower-Limb Joint Coordination during Stair Ascent
-
- 34 Spencer Stowell**
Linear Regression as an Intuitive Design Tool for Optimal Parallel Elastic Actuators
-

- 36 Benjamin Orkild**
Automated Left Atrial Scar Segmentation Using a Cascaded Convolutional Neural Network
-
- 38 Eric Paccione**
Temporal Dose-Dependent Dynamics of the Myocardium after Stereotactic Radiotherapy
-
- 40 Precious Vann**
Vestibular Sensitivity to Anthropogenic Energy
-
- 42 Sakura Stankey**
cBIN1 Gene Therapy Reduces Sustained Ventricular Arrhythmias in a Rat Model of Pulmonary Arterial Hypertension
-
- 44 Bergen Braun**
Volumetric Statistical Shape Modeling: A novel approach to establish anatomical correspondence across patient volumes
-
- 46 Miguel Cuevas**
SHANK3-mediated regulation of human cortico-striatal circuit development in health and disease.
-
- 48 Seoyeon Jang**
Membrane Composition and Phosphorylation Regulate PECAM-1 Structure and Accessibility
-
- 50 Kahlil Monje**
Evaluating Vesicle-Loaded Indocyanine Green in Tissue Phantoms for Fluorescence-Guided Surgery
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Session B

44 presentations / continued

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|-----------|---|-----------|--|
| 52 | Ali Ramezani
Diffusion-corrected urinary PO ₂ sensing for bedside renal oxygen monitoring | 66 | Eli Finlinson
Relationship Between CT-Derived Skull Characteristics and Transcranial Ultrasound Response |
| 54 | Donovan Durand
Simulated incubator conditions alone do not reproduce Parylene-C degradation: implications for automated long-term digital microfluidic cell culture | 68 | Ian Robert
Thalamus Displays Greater Phase Locking During Generalized vs. Non-Generalized Seizure |
| 56 | Muhammad Taha
3D Printed Microfluidic Isothermal Titration Calorimetry | 70 | Joshua Whiting
From Formulation to In Vivo Efficacy: Ultrasound-Responsive Microdroplets for Glioblastoma |
| 58 | Trey Blackwell
Bench Analysis of Oxygen Concentration Under Surgical Drapes and Surgical Fire Risk with Supplemental Oxygen Delivery | 72 | Laura Needham
Latent dimensionality influences recovery in manifold-aligned BCI decoder stabilization |
| 60 | Adam Losser
Accurate Ultrasound Skull Attenuation Estimation Using Analytical Relative Through-Transmit Compensation with Single-Element Ultrasound Transducers in Ex-Vivo Human Skulls | 74 | Madilee Shellman
Can Focused Ultrasound Effectively Treat Opioid Use Disorder? |
| 62 | Alyssa Murphy
Electromagnetic Field-Induced Modulation of Microglial Calcium Signaling | 76 | Phuong Anh Bui
Developmental Alterations in Brain HIF-1 α Expression and Respiratory Function in a Mouse Model of Dravet Syndrome |
| 64 | Disha Rachur
EEG for Education: Signal Reliability and Sleep Stage Detection Using AI-Assisted Analysis | 78 | Tianyu Chen
Engineering a Human Microglia-Immune-Organoid Platform to Investigate Microglial Function and Phagocytic Responses |
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Session A

9:40 - 10:25 AM

Moot Court Room

BIOMATERIALS

Tamanna Islam

Bioengineered Approach to Study Cell-specific Durotaxis in Pulmonary Arterial Hypertension

Debika Ghatak

Reduction of Hydrophobic Drug Adsorption in Extracorporeal Membrane Oxygenation Systems

Md Mahedi Hasan

iMAC-Chip: An Inflatable chip to study Malignant Ascites in Ovarian Cancer

Christopher Young

Mechanical Overload of Articular Cartilage Induces Rate-Dependent and Spatially Inhomogeneous Collagen Denaturation

Room 6500

BIOMECHANICS

Clare Severe

The Cost of Assistance: High Prosthetic Knee Torque Reduces Biological Joint Work but Induces Symmetry Trade-Offs in Knee Power and Center-of-Mass Velocity During Stair Ascent

Elise Nielsen

Optimizing Prosthesis Knee Damping Minimizes Intact-Knee Contact Forces During Ramp Descent in Transfemoral Amputees

Tim Dixon

Design of a Biomechanics-Inspired 2 Degree of Freedom Hip Exoskeleton for Mobility Assistance

Kai Pruyn

Powered Knee-Ankle-Foot Orthosis Reduces Hip Effort and Increases Clearance in One Individual with Lower-Limb Paresis

Room 6613

NEUROENGINEERING

Monika Buczak

Expanding Adaptive Access: Electromyography on the Ski Slope

Tyler Nafziger

Probabilistic deep brain stimulation sweet spots for alleviating depression in Parkinson's disease

Saloni Madkaikar

A Real-Time Feedback System for Quantifying Head Motion Accuracy in Canalith Repositioning Maneuvers

Claire Sanderson

Development of a Real-Time Experimental Control Platform for Neurostimulation Using RTXI

Session B

10:30 - 11:15 AM

Moot Court Room

BIOMATERIALS

Ata Ullah

Development of Physiologically Relevant 3D-Printed Lung Microphysiological System

Emilia Huff

Development of Drug-Loaded Intranasal Nanoparticles for Potential Application in Viral Infection Treatment and Alzheimer's Disease

Munawar Jawad

An Integrated Laminate Microfluidic Platform for Point-of-Care CRISPR-RPA Detection of High-Risk HPV

Room 6500

BIOMECHANICS

Farhan Muhib

Advancing Multiscale Mechanobiological Modeling in FEBio Through Integrated Computational Frameworks

Abby Stamper

Variable-Speed Powered Ankle Control Increases Prosthetic Ankle Work and Reduces Biological Hip Work Across Walking Speeds in One Transtibial Amputee

Nastaran Gholami

Efficacy of OMNI Universal Repositioning Maneuver to Resolve Benign Paroxysmal Positional Vertigo

Owen Winship

A Comparison of Lower Limb Sensor Placements for a Machine Learning Perturbation Detector for Above-Knee Amputee Walking*

Room 6613

DATA SCIENCE

Onkar M Joshi

Systematic Modulation of Transmembrane Helix Packing Reveals Extension-Associated Dynamics of Integrin $\alpha 11\beta 3$

Cameron Jacobson

Modeled Propofol-Opioid Exposure During Single-versus Dual-Syringe Total Intravenous Anesthesia

Boyi Guo

LabWeaver: reliable agentic data analysis grounded in laboratory knowledge

Desmond Kuan

Class-Conditioned Latent Diffusion for Generative Modeling of 3D Breast MRI in Image-Guided Focused Ultrasound Treatment Planning

Session C

1:20 - 2:05 PM

Moot Court Room

BIOINNOVATE

| Jade Bookwalter

Design and Characterization of a Human-Scale Osmotically Augmented Brain Implant for Sustained Drug Delivery

| Krishnam Goel

FOCUS: Closing the Sterility Gap — Portable, Water-Free UV-C Sterilization for Battlefield, Humanitarian, and Resource-Limited Care

| Spencer Roberts

Wafer-scale, Two-sided a-SiC Encapsulation of Suspended Silicon Neural Implants

Room 6500

CARDIOVASCULAR

| Ezra Johnson

Integrative Clinical-Molecular Modeling Identifies LRRN4CL as a Determinant of Structural and Functional Myocardial Improvement

| Lledó Nebot

Sex as a Biological Variable in Computational Cardiac Electrophysiology

| Ava Vaziri

Accelerated Idioventricular Rhythm Shows an Early Peak and Predictable Post-Myocardial Infarction Time Course in a Preclinical Model

| Emmanuel Offei

Left Bundle Branch Area Pacing Preserves Mechanical Strain and Synchrony Compared to Right Ventricular Apical Pacing in an Acute Paired Preclinical Model

Room 6613

EMPTY

No presentations scheduled

Session D

2:10 - 2:55 PM

Moot Court Room

BIOMECHANICS

| Chelsea Haddy

Comparing the Summed Power of Prosthetic and Intact Limbs Using a Single Element Analysis

| TJ Roskelley

A new approach to modeling the kinematics of a prosthetic knee during traditional motion capture by minimizing out-of-plane knee angles

| James Anderson

Subaxial Cervical Fusion Affects Vertebral Joints Regardless of Proximity to Fusion: a Finite-Element Study

Room 6500

NEUROENGINEERING

| J  r  mi Godbout

Temporal Interference Stimulation Affects Visual Perception in a Stimulus-Onset Asynchrony Task in Non-Human Primates

| Chang Ni

Spatially resolved arterial and paravascular CSF pulsatility using DECAF MRI: reproducibility and opposing effects of age and pulse pressure

| Phillip Comeaux

FEF neuron response to photostimulation-induced visual inputs is modulated by neuron specialization

| Nathan Thyberg

Towards Individually Corrected Simulation for Transcranial Ultrasound Neuromodulation

Room 6613

EMPTY

No presentations scheduled

Thank You to Our Sponsors!



Dr. Patrick Tresco

**In Gratitude of the Estate of
Li Chen**