UBEC

Utah Biomedical Engineering Conference

2025 Program

University of Utah

Sept. 11-12

Welcome to UBEC!

Hello,

And welcome to the 20th 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 2025 UBEC Student Planning Committee
Diego, James, Emma, Adam, Abby

Our Keynote Speakers

Dr. Rich Linder is a seasoned medical device entrepreneur and inventor with over 100 patents spanning interventional cardiology, orthopedic surgery, neuro-intervention, reproductive medicine, and more. With degrees from BYU and the U of U, Dr. Linder began his career at Merit Medical Systems and has since held executive positions at Boston Scientific and Remedy Informatics and served as president/CEO of CoNextions Medical, Coherex Medical, and now Xenter. He is also the founder and chairman emeritus of BioUtah, served on USTAR's Governing Authority overseeing $430M in innovation funding, and has contributed to numerous corporate and nonprofit boards.

Dr. Atim Atte Enyenihi is a scientist, strategist, and advocate for aligning careers with purpose and impact. Starting with a PhD from UNC Chapel Hill, she has nearly 18 years of experience in life sciences across academia, industry, and government. She discovered peptide targets that are now in development as CAR T-cell immunotherapy for acute myeloid leukemia, developed diagnostic assays for MRSA, and developed a newborn screening test for a rare genetic disorder. She recently transitioned into city government, where she works at the intersection of technology, innovation, and economic development. In her keynote address, you'll hear real stories, gain practical insight, and leave with a new way to think about success—not just as achievement, but as meaningful alignment between who you are and what you do.

Alumni Panel

Dr. Kara Johnson is an incoming Assistant Professor at the University of Utah in the BME and Neurosurgery departments. She is currently a postdoctoral fellow at the University of Florida, and earned her BS and PhD in Biomedical Engineering from the University of Utah. Her neural engineering research aims to understand the therapeutic mechanisms of deep brain stimulation (DBS) using intracranial neurophysiology, neuroimaging, and computational modeling. She holds special interest in nonmotor symptoms and psychiatry, including Tourette syndrome and mood/anxiety disorders. Her ultimate goal is to develop multimodal, translational approaches to guide neuromodulation therapies to improve treatments and quality of life for patients with neurological and psychiatric disorders.

Shana Melby is a Clinical Staff Engineer at Blackrock Neurotech. She specializes in the development, design, and management of clinical trials for in-human testing of Blackrock products. Shana received her PhD in Biomedical Engineering from the University of Utah, identifying novel neuromodulation targets to treat neuropathic pain in individuals with spinal cord injury. Her postdoctoral training examined myelin degeneration in individuals with ALS. Prior to graduate school, Shana worked in a neurorehabilitation clinic and in a U of U neural engineering lab. Shana is passionate about finding new solutions to patient problems and connecting industry, academia, and healthcare partners to improve research and patient outcomes. Shana enjoys physical fitness, reading horror and mystery thrillers, and spending time with her daughter, husband, and dog.

Emily Smith is a recent University of Utah graduate, earning both her BS and MS in Biomedical Engineering. While balancing her rigorous studies, Emily was a dedicated full-time member of the Utah Women's Volleyball Team. She also completed an internship at Workman Nydegger, a local law firm that specializes in intellectual property, where she now works as a Patent Agent. Passionate about patent law, she aims to build her career specializing in this field and is currently preparing for law school. Outside of work and studies, Emily enjoys camping and traveling, is an avid reader, and keeps her love for volleyball alive through recreational leagues.

Conference Schedule

Networking Night

Location: Wagner Jewish Community Center

Time	Event
5-5:45pm	Registration/Dinner
5:45-6pm	Welcome Announcements
6-6:30pm	Keynote Speaker: Dr. Rich Linder
6:30-7pm	Alumni Panel
7-9pm	Open networking, industry spotlight/grand rounds
7:30-7:50pm	Snaptron Industry Talk

Academic Conference

Location: University Park Marriott

Time	Event	Location
	Registration, Breakfast	Main Area
9-9:15am	Welcome Speech	Bonneville Ballroom
9:15-10am	Keynote Speaker: Dr. Atim Enyenihi	Bonneville Ballroom
10:10-10:50am	Podium Session A	Bonneville Ballroom, Amphitheater, Connor Room
10:50-11:05	Break/Reflection	Main Area
11:10-11:55am	Podium Session B	Bonneville Ballroom, Amphitheater, Connor Room
12-1:15pm	Lunch with Industry Expo	Main Area
1:15-1:30pm	Poster Exhibiton/Grand Rounds	Bonneville Ballroom
1:30-2:15pm	Poster Session A	Bonneville Ballroom
2:20-2:40pm	Break/Reflection	Main Area
2:50-3:30pm	Podium Session C	Bonneville Ballroom, Amphitheater, Connor Room
3:30-3:45pm	Break/Reflection	Main Area
3:50-4:30pm	Podium Session D	Bonneville Ballroom, Amphitheater, Connor Room
4:35-5:20pm	Poster Session B	Bonneville Ballroom
5:30-6pm	Closing Remarks/Award Ceremony	Bonneville Ballroom

Podium Schedule

Session A

Room: Bonneville Ballroom **Topic:** Biomaterials or Therapeutics

Time	Name	Title
10:10 - 10:18 AM	Jonah Holbrook	DNA Damage in Intervertebral Disc Degeneration: CRISPR Modulation of ZNF865 (BLST)
10:20 - 10:28 AM	Christopher Young	Detecting Denatured Collagen in Damaged Articular Cartilage Using Collagen Hybridizing Peptides
10:30 - 10:38 AM	Nitish Khurana	PEGylation of Propofol for Reducing Drug Adsorption in Extracorporeal Membrane Oxygenators (ECMO)
10:40 - 10:48 AM	Md Mahedi Hasan	Inflatable Chip to Study Malignant Ascites in Ovarian Cancer

Room: Amphitheater **Topic:** Biomechanics

Time	Name	Title
10:10 - 10:18 AM	Luke Hudson	Effects of Bone Deformation on Patient-Specific Finite Element Predictions of Hip Chondrolabral Mechanics
10:20 - 10:28 AM	Brooklyn Vargas	Hip Joint Kinetics and Kinematics are Altered in Symptomatic Femoroacetabular Impingement
10:30 - 10:38 AM	Karen Walker	Replicating Early Stance Knee Flexion in Above-Knee Amputees with an Active Knee Prosthesis

Room: Connor Room **Topic:** Imaging

Time	Name	Title
10:10 - 10:18 AM	Davi Cavinatto	An MR-Compatible Ultrasound Through Transmission System for Focused Ultrasound Thermal Therapy
10:20 - 10:28 AM	Nathan Thyberg	Magnetic Resonance based Quantification of Obliquely Propagating Ultrasound
10:30 - 10:38 AM	Christian Hales	3D Spiral Thermometry Deblurred with a Neural Network
10:40 - 10:48 AM	Hunter Harris	Base Resolution Impacts Quantitative Accuracy in a 3 T Magnetic-Resonance Hydrophone

Session B

Room: Bonneville Ballroom **Topic:** Biomaterials or Therapeutics

Time	Name	Title
11:10 - 11:18 AM	Tanya Chhibber	Topical application of ultradeformable cationic liposomes loaded with highly specific AURKB inhibitor as a chemopreve
11:20 - 11:28 AM	Priyanka Arunachalam	Evaluation of the toxicity of PEG-conjugated porous and nonporous silica nanoparticles on murine macrophages
11:30 - 11:38 AM	Tian Morrison	PET-Collagen Hybridizing Peptides Enable Visualization of Breast Cancer Remodeling Activity
11:40 - 11:48 AM	Tamanna Islam	Bioengineered Approach to Study Cell-specific Durotaxis in Lung Fibrosis and Pulmonary Arterial Hypertension

Room: Amphitheater **Topic:** Biomechanics

Time	Name	Title
11:10 - 11:18 AM	Elise Nielsen	Effects of Varying Prosthesis Knee Damping During Ramp Descent in Transfemoral Amputees
11:20 - 11:28 AM	Farhan Muhib	Bridging the Gap: Finite Element Analysis Workflow for Studying Local Mechanics at Segmental Bone Defect

Room: Bconnor Room **Topic:** Neuro and Imaging

Time	Name	Title
11:10 - 11:18 AM	Phillip Comeaux	Optogenetic manipulation of visual inputs to FEF during visual working memory reveals dynamic gating of communicati
11:20 - 11:28 AM	Monika Buczak	Predicting Motor Intent from Residual Neck Muscle Activity in Individuals with ALS
11:30 - 11:38 AM	Kyle Valestrino	A Modified Spinal Cord Stimulator Implantation Technique for Targeting the Ventrolateral Spinal Cord
11:40 - 11:48 AM	Chang Ni	Simultaneous Assessment of Intracranial Artery and Cerebrospinal Fluid Pulsation using 3D whole brain Diffusion-Prep

Podium Schedule - Cont'd

Session C

Room: Bonneville Ballroom **Topic:** Cardio

Time	Name	Title
2:50 - 2:58 PM	Vu Nguyen	Cardio protection via Non-canonical Actin-Mediated Mitophagy
3:00 - 3:08 PM	Sofia Ruiz	Cardiac Bridging Integrator 1 Gene Therapy Reduces Fibrosis in Failing Myocardium in a Pre-Clinical Model of Ischemic
3:10 - 3:18 PM	Ava Vaziri	Telemetry Reveals Arrhythmia Onset and Resolution in the Days Following Heart Attack in a Preclinical Model
3:20 - 3:28 PM	ONKARM JOSHI	Structural Dynamics of Vinculin-Actin Directional Catch Bonding through Steered Molecular Dynamics Simulations

Room: Amphitheater **Topic:** Biomaterials or Therapeutics

Time	Name	Title
2:50 - 2:58 PM	Ata Ullah	An Osmosis-Driven 3D-Printed Brain Implant for Drug Delivery
3:00 - 3:08 PM	Amanda Wood	Synthetic mucins effectively modulate the complex yeast-to-hyphal transition of the commensal pathogen Candida albi

Room: Connor Room **Topic:** Innovation

Time	Name	Title
2:50 - 2:58 PM	Katia Oler	Measuring Peripheral Nerve Stimulation in Human Subjects
3:00 - 3:08 PM	Connor Tarbet	Development of an Antrum-Pylorus Simulator for Gastroretentive Device Testing
3:10 - 3:18 PM	Tim Dixon	Impact of Assistive Hip Exoskeleton on Muscle Effort in Squat Lifting Task

Session D

Room: Bonneville Ballroom **Topic:** Neuro and Biomaterials

Time	Name	Title
3:50 - 3:58 PM	Carter Lybbert	Transcranial Focused Ultrasound Neuromodulation Increases Level of Consciousness Under Propofol Anesthesia in N
4:00 - 4:08 PM	Jude Werth	Modeling Glioblastomaâ€™s Effect on Neural Networks using Brain Organoids
4:10 - 4:18 PM	Joseph Rich	Acoustofluidic thermal flocculation of caged gold nanostars for enhanced SERS detection

Room: Amphitheater **Topic:** Cardio and Biomechanics

Time	Name	Title
3:50 - 3:58 PM	Emmanuel Offei	Capture of the ventricular conduction system leads to improved success rate of antitachycardia pacing delivered to the
4:00 - 4:08 PM	Ben Orkild	Left Atrial Scar Segmentation from LGE MRI
4:10 - 4:18 PM	Eric Paccione	Chronic Electrical Remodeling of the Irradiated Ventricle
4:20 - 4:28 PM	Seth Kussow	Standing Anterior Pelvic Tilt is Correlated with the Proximal Femur Shape of Individuals with Cam Morphology

Poster Session A

Number	Title
1	MRI-Free Targeting for Noninvasive Neuromodulation Therapies
2	Monopolar stimulation elicits focal CCEPs compared to Bipolar Stimulation
3	Powered Knee Exoskeleton Improves Self-Selected Walking Speed and Paretic Joint Range of Motion During
4	Improvements in Cognitive Performance Following Intranasal and Transcranial Photobiomodulation Treatment
5	Determining Changes in Spinal Cord Excitability After Lower-Limb Amputation Using the Posterior Root Muscle
6	Temporal Interference Affects Visual Field in Stimulus-Onset Asynchrony Task in Non-Human Primates
8	Computational Hodgkin-Huxley Model of Axon: Spiking Driven By Pulse-Width Modulated Temporal Interference
9	Hierarchical Reinforcement Learning Framework for Adaptive Walking Control Using General Value Functions of
10	Exogenous inputs that scale ion channel kinetics modulate activity in a computational CA3 pyramidal cell
11	Phase Shift Microbubbles and MRI-guided focused ultrasound: a combination for mediating intracranial non-
12	Effect of Stereotactic Arrhythmia Radiotherapy on Cardiac Strain and Ejection Fraction in Healthy Myocardium
13	Short Pulse Transducer Fabrication for Transcranial Ultrasound Stimulation
14	Toward Safer Steps: Analysis of Cable-Driven Waist Perturbation Recovery Strategies in Transfemoral Amputees
15	Development of Isatuximab-Based Conjugates Against Multiple Myeloma
16	A Workflow for Designing Photoactivatable Analogs of Oxytocin and Vasopressin
17	Protein-X as a Mechanistic Driver and Therapeutic Target in Fibroblast Activation and Myocardial Fibrosis
18	Highly Interactive Enhancers as Cancer-Specific Regulatory Nodes Perturbed by Germline Variation
19	Application of Order and Sample Testing in Uncertainty Quantification of Cardiac Models
20	Modulation of cell signaling pathways in silica nanoparticle-saturated macrophages
21	How Cells Feel and Respond to Force: A Multiscale Modeling Approach
22	Impact of breast biopsy markers on magnetic resonance-guided focused ultrasound breast cancer treatments
23	Tidal Volume Measurement Evaluation in a Venturi Adapter CPAP System for Sedation
24	Nonlinear Responses of the Tympanic Membrane to Static Pressure and Low-Frequency Tones: A
25	Functional Modulation of Macrophages by Mesoporous Silica Nanoparticles
26	Local Drug Delivery As Breast Cancer Treatment: Miniature Implantable Osmogenically-Driven Pump
27	Silk-Elastinlike Protein Polymers for Localized Delivery of Doxorubicin in Transarterial Chemoembolization of
28	Inertial Measurement Units to Predict Ground Reaction Force During Walking
29	FOCUSED ULTRASOUND SYSTEM FOR THERMAL EXPOSURE OF TUMOR SPHEROIDS
30	Insulin Receptor Substrate 2 Sensitivity to Asparagine Deprivation
31	Artificial Extracorporeal Replicate for Drugs (AERx): A Mimic of Extracorporeal Membrane Oxygenation (ECMO)
32	Design and Characterization of a Miniaturized Phased-Array Transducer for MRI-Guided Focused Ultrasound
33	Sustained delivery of glycosaminoglycans in chronic rhinosinusitis and asthma
34	Medial entorhinal cortex flexibly encodes elapsed time during adaptive foraging
35	A Low Frequency FUS device for Mechanical Therapies
36	SIMULTANEOUS MYOELECTRIC CONTROL OF THE HAND AND WRIST POST-STROKE FOR ASSISTIVE
37	Targeting Acute Myeloid Leukemia with a 2-in-1 Antibody-Drug Conjugate
38	Simplified Ultrasound Device Enables Accurate Skull Compensation for Neuromodulation
39	Photobiomodulation Therapy in Individuals With Moderate to Severe TBI and Stroke: Preliminary Mental Health
40	Functional Connectivity Aging Biomarkers of Autism: An 18-year Longitudinal Study
45	Sinonasal Tissue Microenvironment Characterization in Eosinophilic Chronic Rhinosinusitis
48	Enhancing Drug Delivery to the Brain: Development of PLGA-Poloxamer 188 Nanoparticles for Nasal Treatment
50	Mechanistic insights into GM-0111: Blocking CCL5-driven inflammatory responses in vitro
51	Optimizing Sensor Placement for Terrain Prediction During Walking
54	Linking Material Design to the Foreign Body Response in ECoG Implants
77	When Temperature Tips the Balance: Pseudomonas chlororaphis O6 and Bacillus atrophaeus Competition
79	Analyzing Local Strains Experienced in Brain Blood Vessels from Traumatic Brain Injury Using Microsphere

Poster Session B

Number	Title
41	VARYING PROSTHETIC PYLON EMULATOR STIFFNESSES UNDER GAIT LOADING
42	Mediated Microbial Survival Following Antibiotic Treatment
43	Skin cancer diagnosis with electrical impedance dermography
44	Enabling High-Power Activities in Powered Prostheses via a Compact, Bidirectional DC-DC Boost Converter
46	Characterizing TIVA Administration Patterns with PK/PD,ÄëInformed Response Surfaces: A Feasibility Study in
47	Targeted drug release for effective treatment of glioblastoma (GBM)
49	Prosthetic Energy Modulation Using a Powered Knee-Ankle Prosthesis During Stair Ambulation
52	Estrogen receptor alpha binding control in the contexts of breast and endometrial cancer
53	Self-Assembling Multi-Antigen T Cell Hybridizers for Precision Immunotherapy of Multiple Myeloma
55	Targeting Therapy Resistance in Head and Neck Cancer with Methylselenocysteine-Hyaluronic Acid Conjugates
56	Development of 3D Printed Microfluidic Isothermal Titration Calorimeter
57	Wireless Charging and Data Retrieval of Implanted Medical Devices (IMDs)
58	Transit-Time–Corrected Urinary Oxygen Monitoring for Early Detection of Renal Hypoxia in Cardiac Surgery
59	Prevention of Propofol Sequestration in Extracorporeal Membrane Oxygenation Systems.
60	Mapping the Planus Through Cavus Foot Type Spectrum with Statistical Shape Modeling and Weightbearing CT
61	Antimicrobial efficacy of on-label vs. hand-mixed irrigation solutions against S. aureus biofilms
62	A Novel Automated Template-Matching Method for Extracting Gait Cycles from Underfoot Pressure Data
63	Modeling SHANK3-Related Autism Circuit Deficits Using Human Cortico-Striatal Assembloids
64	Developing a Pharmacokinetic Model for use with an Intra-Wound Therapeutic Delivery Device
65	Premotor Cortico-Subcortical Synchrony During Speech Perception and Production
66	Three-Dimensional Shape Modeling Reveals Morphologic Differences Between Japanese and Non-Japanese
67	GJA1-20k Mitigates Renal Injury and Improves Survival after Traumatic Hemorrhagic Shock
68	Quantification of The Magnetic Gradient Using MR Imaging
69	Testing the Efficacy of a Local Antibiotic Delivery Device for Biofilm Eradication in the Spine
70	CRISPRa Regulation of ZNF865 Decreases SASP Expression and Reprograms Gene expression in Human
71	Multimodal Evaluation of a Long-Term Porcine Neuritis Model
72	Applications of ZNF865 CRISPR-activation Upregulation in Biopharmaceutics
73	Craniocervical Fusion Worsens Cervical Spine Biomechanics
74	Design modification of a multimodal, high-density carbon fiber array to achieve commercialization
75	In Vitro and In Vivo Evaluation of Fluorapatite Scaffolds Loaded with Stromal Vascular Fraction for Bone Repair
76	Antibody-Functionalized LNPs for Targeted mRNA Delivery to Treat Chronic Myeloid Leukemia
78	MAST1, Novel Mitochondrial Trafficking Regulator
80	Image Processing of X-rays of the Spine and Spinal Cord Stimulation Implants

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