



62nd IBSIS-RMBS
the joint
62nd International Biomedical Sciences Instrumentation Symposium
&
62nd Rocky Mountain Bioengineering Symposium



April 10-13, 2025
(scientific sessions April 11-12, 2025)

Program Chair
Jeff Anderson

Conference Chairs
Jonathan Barrett and Steven Barrett

Note: All program times are provided in local time
for Saint George, Utah (U.S. Mountain Time (MT))

Thursday, April 10, 2025

- **Activity:** Conference Registration
- **Time:** 5:00 – 7:00 PM
- **Location:**

Best Western Plus Abbey Inn
1129 S. Bluff St.
St. George, UT 84770
(435) 652-1234

- **Primary Contact:** Jeff Anderson, James and Debbie Kretzschmar



Friday, April 11, 2025

7:00 AM – 8:15 AM	Breakfast at hotel for registered guests Best Western Plus Abbey Inn
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Science, Engineering & Technology (SET) Building

Utah Tech University
225 South University Avenue
St. George, UT 84770

Parking

- Parking Lots C, D, V
- Park in any White striped parking stall

Friday, April 11, 2025

7:30 AM – 5:00 PM	Registration on campus – SET Building James and Debbie Kretzschmar
8:30 – 8:40 AM	Conference Welcome - RMBS President – Hamed Benghuzzi - 2025 Program and Conference Chairs: Jeff Anderson, Jonathan Barrett, Steve Barrett - Dean (interim), College of Science, Engineering, and Technology, Utah Tech University, Aaron Davis, Ph.D.
	Sabrina White: I am a Ph.D. student in Dr. Michael Dillon's lab at the University of Wyoming. I am broadly interested in insect adaptations to living in extreme environments, and I am currently using Arduino and UHF RFID technology to measure the effects of heat stress on bumble bee worker capabilities and how that in turn impacts a colony's success. I am also passionate about teaching and outreach, and I love to increase community involvement in pollinator protection programs. I received my B.S. in Entomology and Nematology from the University of Florida in 2014, where I studied insect pest resistance to radiation under modified atmospheric conditions. Afterwards, I pursued work in the outdoor industry and served as a satellite and network communications officer in the U.S. Navy before returning to graduate school.
8:45 – 9:15 AM	Keynote 1 – speaker introduction: Steven Barrett "Are bumble bees toast? Using open-source technology to study animal stress" Sabrina White, Ph.D. candidate, University of Wyoming
9:15 AM	Break – light refreshments

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Friday, April 11, 2025 - Session 1 – 5 papers, Topic: Bioinstrumentation

Session Chair: Steven Barrett

9:30 AM	Biofidelic Intracranial Pressure Test Bench Jaren Sandbeck Yitzi Devor David Stewart Bianka Valecruz Jessica Chambless Enrique Alvarez University of North Dakota
9:45 AM	The Modification of High-Performance Liquid Chromatography Mobile Phase Reservoirs For Use In A Microgravity Environment Christopher Wike Faith Taggart Esben O'connell University of North Dakota
10:00 AM	Smart Reusable Pressure – Temperature – Moisture Monitor For Pressure Ulcers Teneng Jawneh-Marenah Silvia Galindo Samuel Temgoua Bailey Buenarte Gabriella Stucke Victor Tsui University of North Dakota
10:15 AM	Development of a Non-Invasive Transcutaneous Vagus Nerve Disruption Device for Obesity Management Jaren Sandbeck Sara Alasaly Beaver Manvel Taylor Kinnunen University of North Dakota
10:30 AM	Correlating Raman Spectroscopy with Biological Assessments for Stress Response Analysis in CACO-2 and A549 Cells Nikki Kosari Morgan Christensen Anhong Zhou Department of Biological Engineering, Utah State University, Logan, UT
10:45 – 11:00 AM	Break – Gardner Building - Authors set up for poster session 1



Poster Session 1 - 11:00 AM -12:30 PM

Poster presenters will set up posters before lunch.

Session Chair: Jeff Anderson

Poster Title/Authors	Affiliation
Closed-loop Wearable System with Augmented Proprioceptive Feedback for Precise in-home Squat Exercises Jesus Gonzalez Bing Jiang Hayden Chittock	Utah Tech University
Development and evaluation of a sensory feedback system for improving obstacle detection in visually impaired navigation Bryson Fossati Luka Dimitrijevic Bing Jiang	Utah Tech University
Enhancing VR-Based Robotic Control accuracy with Real-Time Haptic Feedback Daniel Jin Bing Jiang Yuanfei Sun	Utah Tech University
Machine Learning Powered Anaerobic Digestion Modeling using Real-Time Electrical Signals Generated by Bioelectrochemical Sensors Hao Cao Hayden Harrison Luguang Wang	Department of Biological Engineering, Utah State University, Logan, UT
Identifying Electrocardiogram Indicators of Hypoglycemia in Type 1 Diabetes with Explainable AI Md Rifatul Islam Md Maruf Hossain Shuvo	The University of Texas at El Paso
Benchtop Model Used to Measure the Effect of Distance Between ECG Electrodes Aiden Eilertson Abhinav Gudapati Nethshan Narasinghe	Department of Biomedical Engineering, University of North Dakota
Integrative Care Utilizing Wearable Technology and Smartphone Application Jalynn Reeves Baylee Schumacher Jacob Galindo	Utah Tech University
Deciphering Synergy: Pterostilbene and Dabrafenib in Melanoma Treatment Reno Blackmore Jacob Mead Wyatt Legas Dr. Jennifer Meyer	Utah Tech University

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Evaluating Pterostilbene's Role in Mitigating NOX-Driven Oxidative Stress in Endothelial Cells Under Hyperglycemic Conditions Easton Eddie Gabe Matthews Dr. Jennifer Meyer	Utah Tech University
Uncovering Mixture Interactions Through Excess Heat Capacity Calvin Crawford Gabriela Chilom	Utah Tech University
Microplastics in Soil: Testing Detection Limits with FTIR and DSC Jenna Olivier Gabriela Chilom	Utah Tech University
Chronic Exposure of POSS Hydrogel in a Rat Model Hamed Benghuzzi	Jackson State University

Lunch 12:30 – 1:30 Lunch at Gardner Combo ABC

	Dave Christensen: I grew up in Northern Utah where I enjoyed woodwork, tennis, and exploring the mountainous wilderness in my backyard. I first attended Dixie State University in 2004 to pursue architectural drafting. After taking some science and engineering courses, my interests turned to power engineering and my wife and I moved to attend the University of Utah in 2009. While pursuing my B.S. degree, I worked in the mechanical engineering undergraduate advising office where I learned the ins-and-outs of engineering curriculum and wrote advising software that the office still uses to this day. I also did software consulting work on the side. After earning my B.S. degree, I stayed at the U of U as a research assistant to pursue a M.S. and Ph.D. My research focused on ultrasonic power transfer where the goal was to power a micro medical sensor that could be non-surgically implanted in the body. My work was highly computational and I developed techniques to efficiently model acoustic power transfer. To enhance my knowledge, I also worked for Constantine Technologies designing and prototyping ultrasonic transducers to perform functions such as cataract surgery and materials testing. This job taught me a number of lessons including the importance of hands-on training for engineers. In 2017, I had the privilege of being involved in the creation of the engineering programs at DSU. I enjoy sharing my experience and hands-on curriculum with engineering students.
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1:30 – 2:15 PM Keynote 2 – “Design Day checkoff/video,” Dave Christensen at Gardner Combo ABC

Speaker introduction: Jeff Anderson



Friday, April 11, 2025 - Session 2 – 6 papers, Topic: Biological Signal Acquisition & Processing

Location: SET Building

Session Chair: Jonathan Barrett

2:30 PM	APDC: An accessible, open-source package for smart automation of single-cell fluorescence microscopy experiments Dmitri Svetlov Jack Forman Eric Ron Tatsuya Morisaki Tim Stasevich Brian Munsky School of Biomedical Engineering, Colorado State University School of Biomedical Engineering, Colorado State University School of Biomedical Engineering, Colorado State University Department of Biochemistry and Molecular Biology, Colorado State University Department of Biochemistry and Molecular Biology and School of Biomedical Engineering, Colorado State University Department of Chemical and Biological Engineering and School of Biomedical Engineering, Colorado State University
2:45 PM	Exploration of a Low-Cost Vein Mapping Device Using NIR Wavelengths and the Hessian-Frangi Filter Kordell Mitchell Tan, P.E. University of North Dakota
3:00 PM (Hybrid presentation)	Integrated Radiomics and Clinical Features for Breast Tumor Grade Classification Using Machine Learning Approaches Priyadharshini Babu Mythili Asaithambi Anandh K R School of Electronics Engineering, Vellore Institute of Technology, Vellore-632014, Tamil Nadu, India School of Electronics Engineering, Vellore Institute of Technology, Vellore-632014, Tamil Nadu, India Department of Radiology Cincinnati Children's Hospital Medical Center the United States.
3:15 PM (Hybrid Presentation)	Selection of Channels and Features for EEG-Based User Identification Using Optimization Algorithms Vasanthavalli.S K Mohanavelu Jac Fredo AR T Christy Bobby Department of Electronics and Communication, M S Ramaiah University of Applied Sciences, Bengaluru, India Biomedical Technology, DEBEL, DRDO, Bengaluru, India School of Biomedical Engineering, Indian Institute of Technology (BHU), Varanasi, India Department of Electronics and Communication, M S Ramaiah University of Applied Sciences, Bengaluru, India
3:30 PM (Hybrid Presentation)	Assessment of Driver Stress State Using Multimodal Fusion of Simultaneous Contact Free Photoplethysmography and Facial Videos Swarubini P J Nagarajan Ganapathy Indian Institute of Technology, Hyderabad

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3:45 PM (Hybrid Presentation)	Automated Cardiac Support System: Real-Time ECG Monitoring and Automated CPR Using FPGA and LIDAR Technologies Pranabesh Bhattacharjee Tanmay Sindhwani Aniruddha Datta Department of Electrical and Computer Engineering, Texas A&M University, College Station, TX
4:00 PM	Break

Friday, April 11, 2025 - Session 3 – 6 papers, Topic: Biomechanics & Rehabilitation

Session Chair: Carolyn Hampton

4:15 PM	Elevator Passenger Accelerations during Emergency Stops, Normal Elevator Travel, and Everyday Activities Gadir Hazime Anne Mathias Julius Roberts Hana Chan Mireille Kelley Engineering Systems Inc. (ESi)
4:30 PM	Hybrid Prosthetic Leg Development? Chelsea Fuller Jacqueline Kim Correa Lillian Berger University of North Dakota
4:45 PM	Modeling Biological Responses to Space Radiation: Evaluating E. Coli and S. Cerevisiae for Radiation Shielding Efficacy in Deep Space Charles J. Baker Steven J. Simske Department of Systems Engineering, Colorado State University
5:00 PM	InQuick Prosthetic Leg Socket Kyla Faldet Madeline Larson Teneng Jawneh-Marenah Michelle Di Cicco Tyson Sporbert University of North Dakota
5:15 PM	Impact of Non-Skid Socks and Anterior Weight on Postural Response and Stability During Perturbation Rahul Soangra Crean College of Health and Behavioral Sciences, Chapman University, Orange, CA
5:30 PM (Hybrid Presentation)	Low-Cost Rehabilitation Exercise Safety Device for Enhanced Accessibility David Paulus Luke Paulus Emma Paulus University of Arkansas Southside High School, Fort Smith, AR University of Arkansas

Dinner is on your own. St George has a wide variety of excellent restaurants!

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Saturday, April 12, 2025

7:00 AM – 8:15 AM	Breakfast at hotel for registered guests Best Western Plus Abbey Inn
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Utah Tech University
225 South University Avenue
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Saturday, April 12, 2025

7:30 AM – 5:00 PM	Registration on campus – SET Building James and Debbie Kretzschmar
8:30 AM	Conference Welcome - 2025 Program and Conference Chairs: Jeff Anderson, Jonathan Barrett, Steve Barrett
	Aaron Davis: I am a native of Northern Utah, and began teaching at UT in 2016. My Ph.D. work was in biotechnology and genetics. I worked on improving cloning efficiency by studying genetics and epigenetics of cloned cattle. My research focuses on using molecular biology tools to understand the genetics involved in human traits, such as athletic performance and susceptibility to some diseases. I am passionate about Biology Education and strive to interact with students in all settings.
8:45 – 9:15 AM	Keynote 3 – Speaker introduction: Jeff Anderson Future of Hands-on Learning in STEM Aaron Davis
9:15 AM	Break – light refreshments

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Saturday, April 12, 2025 - Session 4 – 4 papers, Topic: Biotechnology

Session Chair: Ryan Stryker

9:30 AM	Detecting Postural Instability Among Healthy Young Adults Using Nano Sensor, Wavelet Transforms and Neural Network Analysis Liora Mayats-Alpay Rahul Soangra Crean College of Health and Behavioral Sciences, Chapman University, Orange CA
9:45 AM (Hybrid presentation)	Dielectric Characterization of Porcine Heart Towards Noninvasive AI Powered Cardiac Sensing Sunil Gaddam ^{1,2,3} Poulami Samaddar ⁴ Akhila Sai Sree Cherukuri ² Sharanya Manga ² Keirthana Aedma ² Shuvashis Dey ^{2,5} Dipankar Mitra ^{2,6} Kanchan Kulkarni ^{7,8} Shivaram P. Arunachalam ^{1,2,3} ¹ Digital Engineering & Artificial Intelligence Laboratory (DEAL), Department of Critical Care Medicine, Mayo Clinic, Jacksonville, FL, USA ² Microwave Engineering & Imaging Laboratory (MEIL), Department of Critical Care Medicine, Mayo Clinic, Jacksonville, FL, USA ³ Department of Biomedical Informatics & Computational Biology (BiCB), University of Minnesota, Minneapolis, MN, USA ⁴ Department of Physiology & Biomedical Engineering, Mayo Clinic, Rochester, MN, USA ⁵ Department of Electrical & Computer Science Engineering, North Dakota State University, Fargo, ND, USA ⁶ Department of Computer Science and Computer Engineering, University of Wisconsin, LaCrosse, WI, USA ⁷ IHU-LIRYC, Heart Rhythm Disease Institute, Fondation Bordeaux Université, 33600, Pessac, Bordeaux, France ⁸ INSERM, Centre de Recherche Cardio-Thoracique de Bordeaux, U1045, University of Bordeaux, 33000, Bordeaux, France Corresponding Author: Shivaram Poigai Arunachalam
10:00 AM	More Efficient, Sustainable, and Cost-Effective Medical Transportation Container Adam Marzak Vaughn College, Flushing, NY
10:15 AM (Hybrid presentation)	Automated Identification of Driver In attention State Using Textile Electrocardiograms and Bispectrum Based Classification Kaveti Pavan Ankit Singh Digvijay S. Pawar Nagarajan Ganapathy Indian Institute of Technology, Hyderabad, Telangana
10:30 AM	Break – Authors set up for poster session 2



Poster Session 2 – 11:00 AM - 12:30 PM

Posters presenters will set up posters before lunch.

Session Chair: Jeff Anderson

Poster Title/Authors	Affiliation
Synthesis and Characterization of Novel Pterostilbene Derivatives for Potential use as Therapeutics Austin Lamoreaux	Utah Tech University
Use of Y1 Receptor Antagonist Can Improve Bone Quality in Female Adult SLE Mice Michelle Tucci	University of Mississippi Medical Center
RFID-based Real-Time Crowd Tracking System for Large Venues Thomas Anderson Armando Montalvo Austin Espinoza Levi Dockstader	Utah Tech University
Wheelchair for Limited Mobility Users via Eye Gaze and Voice Control Makaila Freeman Dananga Agalakotuwa Nicholas Garver Anna Scofield Taylor Sturdivant	United States Air Force Academy
Rapid Stroke Detection using Nanotechnology Ashwin Jayachandran, M.D. Schuyler Vink Caleb Wilkins Manon Hallemans Casey Coenen	University of North Dakota
Blood Sample Imaging-based CTC-immune Cell Interaction Characterization for Metastatic Cancer Prognosis Using Deep Learning Yuanfei Sun Bing Jiang	Utah Tech University

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Machine Learning-Driven Artificial MRI Synthesis from Unpaired Multimodal Data for Enhanced Breast Cancer Diagnosis Aarthi Muthukumar	Rocky Vista University College of Osteopathic Medicine
The Effect of Supraphysiological Level of Sustained Delivery of T on Gonadotropins Using Adult Male Rats as Model Ibrahim Farah	Jackson State University
Ankle Push-Off Metrics and Electromyography During Gait in Children with Osteogenesis Imperfecta Katherine A. Konop	Orthopaedic and Rehabilitation Engineering Center, Marquette University, Milwaukee, WI
Next-Generation Hypothermia Prevention and Warming System for Air Force Special Operations Command Katy Felix Lois Klecha Kaeli Monahan Yura Seo Reed Zitting Jason Christopher Ioan Feier	United States Air Force Academy United States Air Force Academy Brigham Young University United States Air Force Academy Brigham Young University United States Air Force Academy United States Air Force Academy
Developing A Composite Hydrogel Brain Model As a Tool For Traumatic Brain Injury Research Caleb Gayner Anna Machart Pauline Denner Makenna Green Rhina Rivera Brandon Fugger	University Of North Dakota
PONIXPROS: A Novel Greywater Hydroponics System Myshela Todd Ryan Jamison Schuyler Baer	Utah Tech University
Photochromic Solution to Skin Cancer Taron Thang Kylee Jamison Michael Orr Utah Tech University	Utah Tech University

Lunch 12:30 – 1:30 Lunch at Gardner Combo ABC



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Dr. Amanda Brooks is a molecular biologist and educator, currently serving as a Professor and Vice Provost of Research and Scholarly Activity at Rocky Vista University. She holds a Ph.D. in Molecular Biology from the University of Wyoming and has completed extensive postdoctoral training in pharmaceutical chemistry and bioengineering. With much of her career focused on breaking down barriers between disciplines through her research on using spider silk for innovative applications in drug delivery and tissue engineering, Dr. Brooks has held various academic positions, including Associate Professor at North Dakota State University and Research Assistant Professor at the University of Utah. Dr. Brooks has an extensive publication record, and she has received several grants for her innovative work in drug delivery systems and microbiome research. While Dr. Brooks routinely presents her work at national conferences and gave a TED talk title "Engineering Spider Silk and Spinning Science Fiction into Reality" in 2017, she began her career presenting her work at the 2004 RMBS meeting and she is thrilled to be back! Dr. Brooks is committed to fostering interdisciplinary collaboration and mentoring the next generation of scientists.

1:30 – 2:15 PM Keynote 4 – From Threads to Theories: Bridging Disciplines & Finding Connections, Amanda Brooks at Gardner Combo ABC

Saturday, April 12, 2025 - Session 5 – 5 papers, Topic: Biotechnology II

Session Chair: Ken Butler

2:30 PM	Bathroom Activity Logging in a Mobile App: Foundation for a Rag-Based Health and Hygiene Recommender System Collins Poku Obeng Ryan Striker Nethshan Madhawa Narasinghe Mohamed Mahmoud Amitavo Ganguli Enrique Alvarez Vazquez University of North Dakota
2:45 PM	Investigating the Cognitive Impact of High Speed Training in Competitive Luge Athletes Paige Jones Daniel Voxland Caitlin Lambert Rachel Francis Gabriel Hanson University of North Dakota
3:00 PM	Role of Peripheral Vision in Enhancing Balance Rahul Soangra Crean College of Health and Behavioral Sciences, Chapman University, Orange, CA
3:15 PM (Hybrid presentation)	Subregion Classification of Glioma MRI based on Label Weighting using Machine Learning Techniques Kiranmayee Janardhan T. Christy Bobby Department of Electronics and Communication Engineering, Ramaiah University of Applied Sciences, Bengaluru, India Department of

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	Electronics and Communication Engineering, Ramaiah University of Applied Sciences, Bengaluru, India
3:30 PM (Hybrid presentation)	Optimizing EEG Channels and Features for Enhanced Biometric User Identification S Sushma K Mohanavelu Jac Fredo AR T Christy Bobby Department of Electronics and Communication, M S Ramaiah University of Applied Sciences, Bengaluru, India Biomedical Technology, DEBEL, DRDO, Bengaluru, India School of Biomedical Engineering, Indian Institute of Technology (BHU), Varanasi, India Department of Electronics and Communication, M S Ramaiah University of Applied Sciences, Bengaluru, India
3:45 PM	Break

Saturday, April 12, 2025 - Session 6 – 3 papers, Topic: Bioethics, physics, and chemistry
Session Chair: Michelle Tucci

4:00 PM	4D Printing in Medicine and Healthcare: An Anticipatory Ethical Analysis Richard Wilson Towson University
4:15 PM	CRISPR and Cognitive Enhancement: An Anticipatory Ethical Analysis Richard Wilson Towson University
4:30 PM (hybrid presentation)	Diffusion Graph VAE for Anti-cancer Drug Efficacy Prediction Madhurima Mondal Subrahmanyam Arunachalam Shili Wu Aniruddha Datta Department of Electrical and Computer Engineering Texas A&M University College Station, USA

7:00 PM – 8:30 PM President's Banquet and awards at Gardner Combo ABC

- **Student Award presentations**
- **President Award presentation**

8:30 PM Conference Closing

Sunday, April 13, 2025

8:30 RMBS Executive Board Meeting – Breakfast at hotel