

University of Calgary
15th Annual Biomedical Engineering
Undergraduate Summer Research Symposium
August 18th, 9:00AM – 1:30PM over Zoom

Thank you for participating in the 15th Biomedical Engineering Undergraduate Summer Research Symposium!

The Biomedical Engineering Summer Symposium is an opportunity for undergraduate students to showcase their summer work, practice their presentation skills, and learn about the exciting biomedical research being conducted at the University of Calgary.

Many of the student presenters have received awards allowing them to participate in academic research, and their presentations cover a range of topics including human mobility, biomedical imaging, regenerative medicine, medical technology, health management & monitoring, and precision diagnostics.

[View abstracts.](#)

Presentation are 6 minutes with 2 minutes for questions.

REGISTER HERE: <https://tinyurl.com/wdm7hs5m>



**BIOMEDICAL
ENGINEERING**
Graduate Students'
Association



UNIVERSITY OF CALGARY
Biomedical Engineering Graduate Program

Acknowledgments: Thank you to Dr. Walter Herzog for sponsoring the presentation prizes. Thank you to the BME Graduate Program and BMEG for their help in organizing this event and for sponsoring the abstract prize. Thank you to the graduate and undergraduate volunteers, session chairs, and judges. Lastly, thank you to all the presenter and supervisors for making this event possible!

Event Sponsored By:

Dr. Walter Herzog &
Biomedical Engineering Graduate Program

Symposium Schedule

9:00-9:10	Introduction and Welcome Meeting Link Meeting ID: 986 3163 9028 Passcode: 226598			
9:10-9:40	Keynote Presentation by Dr. Mariana Bento, PhD Meeting Link Meeting ID: 986 3163 9028 Passcode: 226598			
9:40-10:45	Human Mobility Meeting Link Meeting ID: 936 6777 4364 Passcode: 530635	Biomedical Imaging Meeting Link Meeting ID: 986 3163 9028 Passcode: 226598	Regenerative Medicine & Medical Technology Meeting Link Meeting ID: 970 5907 8668 Passcode: 992140	Health Management & Precision Diagnostics Meeting Link Meeting ID: 932 3629 6704 Passcode: 634319
10:45-11:05	Break			
11:05-12:10	Human Mobility Meeting Link Meeting ID: 936 6777 4364 Passcode: 530635	Biomedical Imaging Meeting Link Meeting ID: 986 3163 9028 Passcode: 226598	Regenerative Medicine & Medical Technology Meeting Link Meeting ID: 970 5907 8668 Passcode: 992140	Health Management & Precision Diagnostics Meeting Link Meeting ID: 932 3629 6704 Passcode: 634319
12:10-1:10	Lunch Break			
1:10-1:30	Presentation of Awards Meeting Link Meeting ID: 986 3163 9028 Passcode: 226598			

Keynote Speaker

We are excited to announce our keynote speaker, Dr. Mariana Bento!

Mariana Bento, PhD is an Assistant Professor in the Department of Electrical and Software Engineering. Her research interests include brain imaging and automatic data quality assessment using image processing and machine learning techniques.



Human Mobility Session

Session Chair: Tiffany Dang

Judges: Isabella Vandergaag & Brett Abraham

9:40 – *Is Force Depression Present in Cardiac Muscle?*

Presenter: Torri Heiser

Supervisor: Dr. Walter Herzog

9:48 – *Titin Isoform changes in Eccentrically trained Rabbit's quadriceps muscle. (The TIER Muscle Pilot Study)*

Presenter: Gavin Thomas

Supervisor: Dr. Patricia Doyle-Baker

9:56 – *Impact of Floor Compliance on Jump Performance and Fatigue*

Presenter: Jake Ruschkowski

Supervisor: Dr. Darren Stefanyshyn

10:04 – *Examination of Bone Deposition in Ovariectomized Cynomolgus Monkeys post-Antiresorptive Treatment*

Presenter: Alana Stahl

Supervisor: Dr. Roman Krawetz

10:12 – *Intervertebral Disc Degeneration in a Novel Murine Model*

Presenter: Jessica May Corpuz

Supervisor: Dr. Roman Krawetz

10:20 – *Alendronate treatment increases bone density and does not reduce fatigue life in hind-limb bones of ovariectomized rabbits*

Presenter: Savithi Tissera

Supervisor: Dr. Brent Edwards

10:28 – *Hydroxyproline Content in the Achilles Tendon of Rats Fed a High Fat/High Sucrose Diet*

Presenter: Sara Housh

Supervisor: Dr. Walter Herzog

10:36 – *High-dose alendronate therapy improves bone mineral density and bone strength in a preclinical model of osteoporosis*

Presenter: Mackenzie Eberts

Supervisor: Dr. Brent Edwards

10:45 – 11:05 BREAK

11:05 – *Investigating titin isoforms and content in the skeletal muscle of obese rats*

Presenter: Maleeka Malik

Supervisor: Dr. John Holash

11:13 – *The Effect of Postural Task on Lower-Limb Reflex Excitability*

Presenter: Taha Butt

Supervisor: Dr. Ryan Peters

11:21 – *Feasibility of Using Home Video Data to Evaluate Postural Control Associated with Robotic Gait Trainer Use*

Presenter: Sunaina Rangarajan

Supervisor: Dr. Elizabeth Condliffe

11:29 – *Kinetics of Titin Domain Unfolding*

Presenter: Wejdaan Faridi

Supervisor: Dr. Walter Herzog

11:37 – *Muscle Stretch Reflexes Assessed in Real and Virtual Environment*

Presenter: Sarah Ajao

Supervisor: Dr. Art Kuo

11:45 – *Effects of instrumenting novel technologies directly measuring muscle-tendon interactions on the gait of sheep*

Presenter: Asmi Multani

Supervisor: Dr. Walter Herzog

11:53 – *Evaluation of Two Methods of Sarcomere Length Determination*

Presenter: Patricia Sharleen

Supervisor: Dr. Walter Herzog

12:10-1:10 LUNCH BREAK

1:10-1:30 PRESENTATION OF AWARDS

Biomedical Imaging Session

Session Chair: Ainsley Smith

Judges: Jenny Shin & Thomas Lijnse

9:40 – *Does Magnetic Resonance Spectroscopy Show Changes in Brain Metabolites At 3 or 6 Months Post Concussion in Pediatric Patients?*

Presenter: Robyn Walker

Supervisor: Dr. Ashley Harris

9:48 – *Identification and quantification of bone erosions in rheumatoid arthritis patients*

Presenter: Mingjie Zhao

Supervisor: Dr. Sarah Manske

9:56 – *Intracranial Aneurysm Flow-Diversion Stent Treatment Diverts Away from Metal towards a Biodegradable Device*

Presenter: Rosalie Morrish

Supervisor: Dr. Alim Mitha

10:04 – *Using MicroCT-Derived Statistical Shape Models to Investigate Knee Arthritis Phenotypes*

Presenter: Chen Chai

Supervisor: Dr. Sarah Manske

10:12 – *Cerebral blood flow alterations in individuals with persistent post-concussive symptoms*

Presenter: Lydia Cho

Supervisor: Dr. Ashley Harris

10:20 – *Designing an EEG Phantom Representing Neurological Injury*

Presenter: Kirsten Korsrud

Supervisor: Dr. Eli Kinney-Lang

10:28 – *Using in-vivo 9.4T MRI to measure reduced cerebral blood flow and increased brain R2* in a model of systemic inflammation*

Presenter: Qandeel Shafqat

Supervisor: Dr. Jeffrey Dunn

10:36 – *Impact of STRIVE White Paper on Small Vessel Disease Publications*

Presenter: Kristy Lee

Supervisor: Dr. Richard Frayne

10:45 – 11:05 BREAK

11:05 – *Fabella Prevalence in Individuals Following Anterior Cruciate Injury Using Multi-Modal Imaging Techniques*

Presenter: Hunter Pedersen

Supervisor: Dr. Steven Boyd

11:13 – *Shining Light on Mitochondrial Dysfunction in Multiple Sclerosis – a Near-Infrared Spectroscopy Study*

Presenter: Ayden Hansen

Supervisor: Dr. Jeffrey Dunn

11:21 – *Predicting Cardiovascular Risk Factors From T-1 Weighted MRI Brain Scans With Machine Learning*

Presenter: Agampreet Aulakh

Supervisor: Dr. Nils Forkert

11:29 – *Building a Convenient Open Access Portal to Assess Bone Health*

Presenter: Armaan Mohar

Supervisor: Dr. Steven Boyd

11:37 – *Deep Reinforcement Learning Bounding Boxes for Acute Ischemic Stroke Lesion Localisation in MRI Images*

Presenter: Samuel Robertson

Supervisor: Dr. Nils Forkert

11:45 – *Incorporating GPU and CPU parallel processing for neuroimaging analysis*

Presenter: Andrew Dunn

Supervisor: Dr. Jeffrey Dunn

11:53 – *Location of atypical femoral fracture can be predicted from patient-specific finite element models*

Presenter: Aria Ahadzadeh Ardebili

Supervisor: Dr. Brent Edwards

12:01 – *Determining the Aortic Stiffness in Healthy Aging Aorta Based on Aortic Distensibility*

Presenter: Rani Sandhu

Supervisor: Dr. Elena Di Martino

12:10-1:10 LUNCH BREAK

1:10-1:30 PRESENTATION OF AWARDS

Regenerative Medicine & Medical Technology
Session

Session Chair: Nathan Meulenbroek
Judges: Daphne Kaketsis & Manmeet
Dhiman

9:40 – *Improving Functional Treatment Planning for Liver Stereotactic Body Radiation*

Presenter: Jade Fischer

Supervisor: Dr. Nicolas Ploquin

9:48 – *Insulative Coating Design Considerations for an AC Electrothermal Micropump!*

Presenter: Stirling Cenaiko

Supervisor: Dr. Colin Dalton

9:56 – *Validation of a New Machine Learning Based Motion Analysis Tool for Clinical Applications*

Presenter: Emma Mackey

Supervisor: Dr. Megan Metzler

10:04 – *Development of an Improved Nuclei Counting Method Using Crystal Violet & Triton X-100 for Human Bone Marrow Mesenchymal Stromal Cells Expansion in Vertical Wheel Bioreactors*

Presenter: Juan E. Cepeda

Supervisor: Dr. Michael Kallos

10:12 – *A Novel Biological-based Approach of Rare Earth Element Extraction for use in Medical Technologies*

Presenter: Subasthika Thangadurai

Supervisor: Dr. Belinda Hynes

10:20 – *Neuroprotective Capabilities of Mesenchymal Stromal Cell Secretome Fractions for the Treatment of Parkinson's Disease*

Presenter: Thristan Paulo B Taberna

Supervisor: Dr. Alim Mitha, Dr. Arindom Sen

10:28 – *Using Proteomics to Better Understand the Effect of Changing Culturing Platforms on Human Induced Pluripotent Stem Cells*

Presenter: Joshua Day

Supervisor: Dr. Michael Kallos

10:36 – *Aneurysmal Aortic Tissue Structure: Microscopy Methods and Digital Processing*

Presenter: Zainab Ali

Supervisor: Dr. Elena Di Martino

10:45 – 11:05 BREAK

11:05 – *Optimization of Dynamic Culture Media for Improved Expansion and Serial Passaging of Human Induced Pluripotent Stem Cells Through the Investigation of Pluronic as an Additive*

Presenter: Julia Malinovska

Supervisor: Dr. Michael Kallos

11:13 – *Gaining Insight into Exosomes and Navigating the Regulatory Landscape of Emerging Research and Technology*

Presenter: Christine Dowling

Supervisor: Dr. Arindom Sen

11:21 – *Design of an Array of Multiaxial Sensors for Usage in Passive Cavitation Imaging*

Presenter: Raya Subah

Supervisor: Dr. Samuel Pichardo

11:29 – *Developing a Hydraulic Pressure Regulator for Emergency Ventilator Shortages*

Presenter: Sophia Lu

Supervisor: Dr. Mark Ungrin

11:37 – *Proteomic Analysis of Mouse Embryonic Stem Cells in Dynamic Culture*

Presenter: Amina Khan

Supervisor: Dr. Michael Kallos

11:45 – *Birnam Wood: Empowering Kinetic Rate Constant Predictions for Process Pharmacology*

Presenter: Jonathan Chong

Supervisor: Dr. Behrouz Far

11:53 – *Normalization Layers in Deep Learning Image Segmentation Tasks*

Presenter: Rachel Renegado

Supervisor: Dr. Richard Frayne

12:10-1:10 LUNCH BREAK

1:10-1:30 PRESENTATION OF AWARDS

Health Management & Precision Diagnostics
Session

Session Chair: Conrad Mielczarek

Judges: Sam Leech & Milad Shamsi

9:40 – *Gluten-Chek: An innovative aptamer-based gluten sensing kit*

Presenter: Basma Akhter

Supervisor: Dr. Orly Yadid-Pecht

9:48 – *The Role of Collagen in Abdominal Aortic Aneurysm*

Presenter: Maria Tahir

Supervisor: Dr. Elena Di Martino

9:56 – *Exploring Patient-Borne Costs and Wait Times for Care of Obstructive Sleep Apnea (OSA) in Rural and Urban Populations in Alberta*

Presenter: Duaa Fatima

Supervisor: Dr. Sachin Pendharkar

10:04 – *Regional Analysis of Anatomical Positions of Aorta*

Presenter: Maria Machon

Supervisor: Dr. Elena Di Martino

10:12 – *Detection and Typing of Renal Amyloidosis by Spectroscopy Using the Microenvironmentally Sensitive Fluorophore K114*

Presenter: Paula Brandt

Supervisor: Dr. Daniel Muruve

10:20 – *Comparing Vibration-Emitting Smartphone Application to Clinical Neurological Tests*

Presenter: Hanan Hammad

Supervisor: Dr. Art Kuo

10:28 – *Quantitative Lipid Droplet Analysis to Establish a Glomerulonephritis Biomarker*

Presenter: Asha Swamy

Supervisor: Dr. Justin Chun

10:36 – *Audio Signal Processing for Environmental Noise Elimination*

Presenter: Hemantha Krishna Bharadwaj

Supervisor: Dr. Mike Smith

10:45 – 11:05 BREAK

11:05 – *Gamification of a BCI Spelling Application for Children with Severe Physical Disabilities*

Presenter: Lisa Huang

Supervisor: Dr. Eli Kinney-Lang

11:13 – *The BioBox: An Infectious Disease Detection Device*

Presenter: Duncan Kennedy

Supervisor: Dr. Keekyoung Kim

11:21 – *Using least squares system identification to mathematically model the insulin-glucose dynamic in patients with diabetes*

Presenter: Shaakira Gadiwan

Supervisor: Dr. Jeff Pieper

11:29 – *Using Fluorescence to Monitor Nerve Regeneration*

Presenter: Thanusha Veeraperumal

Supervisor: Dr. Kartik Murari

11:37 – *Clinical Integration of 3Dimensional Imaging for Scar Assessment*

Presenter: Shyla K Bharadia

Supervisor: Dr. Vincent Gabriel

11:45 – *Development of an electrical cuff for peripheral nerve regeneration and impedance-based monitoring*

Presenter: Alec Lamb

Supervisor: Dr. Colin Dalton

11:53 – *Impact of Variable Transport on Hospital Patient Volumes, Excellent Outcomes and Healthcare Cost Savings using a Stroke Triage Mapping Software*

Presenter: Huda Abbas

Supervisor: Dr. Noreen Kamal

12:01 – *Technology-Based Strategies to Improve Treatment Adherence in Adolescents and Young Adults with Rheumatic Disease*

Presenter: Akanksha Bhargava

Supervisor: Dr. Nadia Luca

12:10-1:10 LUNCH BREAK

1:10-1:30 PRESENTATION OF AWARDS