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THE DEPARTMENT OF
BIOMEDICAL ENGINEERING'S
**ANNUAL SENIOR
RESEARCH
SYMPOSIUM**

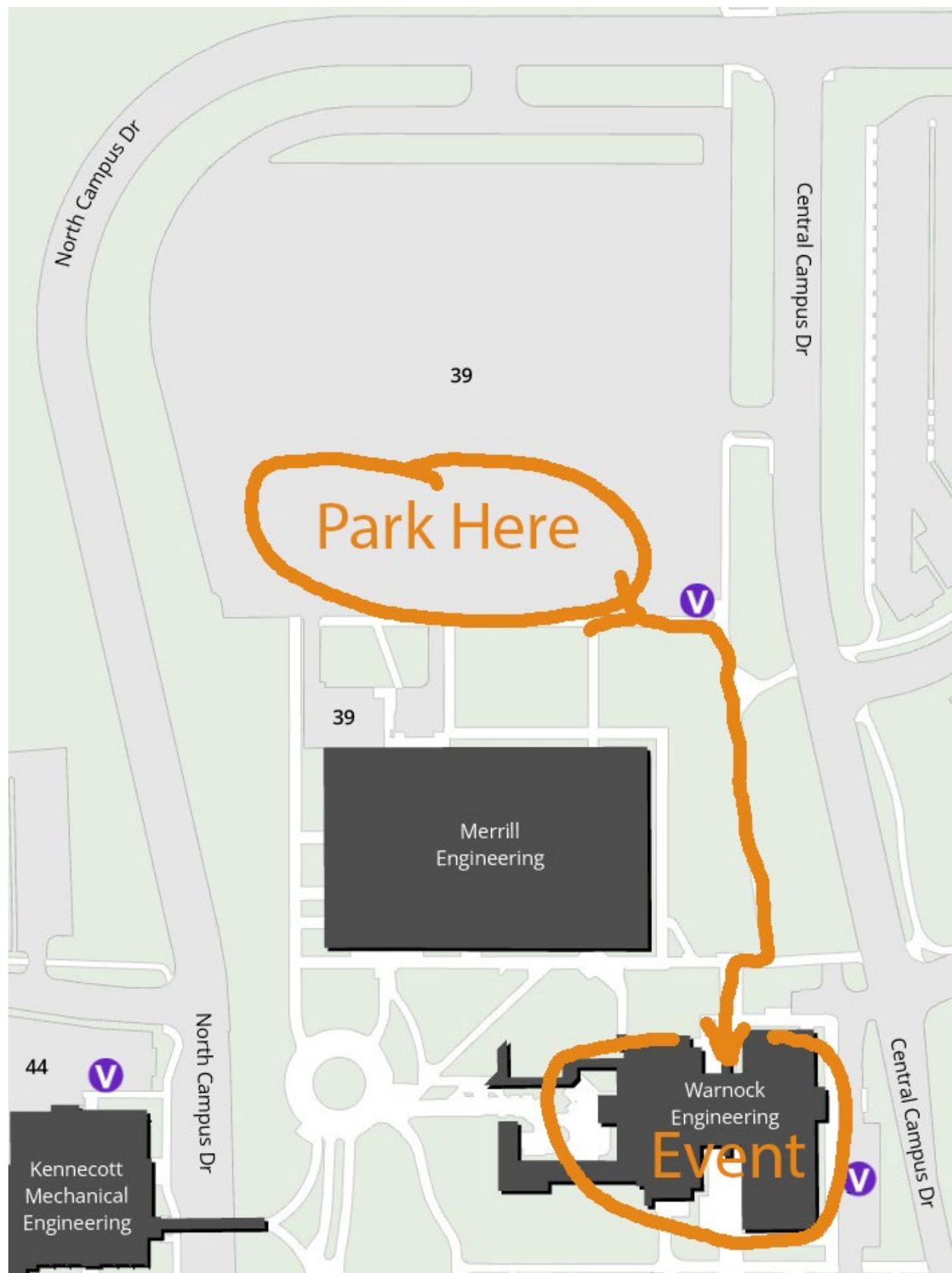


April 18th from 6:00 to 9:30 p.m.

Warnock Engineering Building
Catmull Gallery

Department of
BIOMEDICAL ENGINEERING

JOHN AND MARCIA PRICE COLLEGE OF ENGINEERING
THE UNIVERSITY OF UTAH



Biomedical Engineering Senior Research Symposium

Friday, April 18, 2025, 6:00 p.m. – 9:30 p.m.

WEB 1230, WEB 1250, and WEB 2230

| <u>Session I: WEB 1230</u> | | <u>Session I: WEB 1250</u> | | <u>Session I: WEB 2230</u> | |
|--|--------------------------------------|--|------------------------------------|--|---------------------------------------|
| David Grainger & Michael Yu Guest Judge: Al Ng, PhD | | Chuck Dorval & Sam Adams Guest Judge: Jennifer Seagrave, PhD | | Kelly Broadhead & Kylee North Guest Judge: Seetha Veeraghanta, PhD | |
| 6:00 | Introduction: David Grainger, PhD | 6:00 | Introduction: Chuck Dorval, PhD | 6:00 | Introduction: Kelly Broadhead, PhD |
| 6:05 | Annika Bachman | 6:05 | Yasmine Abuelhija | 6:05 | Naomi Kababe |
| 6:10 | Maddie Lodico | 6:10 | Alina Dzhioeva | 6:10 | Charlie Osborne |
| 6:15 | Meghan Carter | 6:15 | Charlotte LoConte | 6:15 | Margaret Pozo |
| 6:20 | Jesus Carbajal | 6:20 | Fatima Al-Sudani | 6:20 | Maddie Hopkins |
| 6:25 | Xavier Grube | 6:25 | Collin Santoro | 6:25 | Noel Short |
| 6:30 | Ashton Park | 6:30 | Derek Lewis | 6:30 | James Harris |
| 6:35 | Nick Thomson | 6:35 | Lara Schlickmann | 6:35 | Kishore Jay |
| 6:40 | Mikhail Ahmed | 6:40 | Brigham Boyack | 6:40 | Bryson Anderson |
| 6:45 | Kathryn Richens | 6:45 | Patrick Jess | 6:45 | Madelyn Lott |
| 6:50 | Ellie Karren | 6:50 | Celeste Kalapala | 6:50 | Tina Ly |
| 6:55 | Isabella White | 6:55 | Sylvia Pack | 6:55 | Jessie Owsley |
| 7:00 | Yousuf Haidari | 7:00 | Adam Nelson | 7:00 | Mckenna Coughlin |
| 7:05 | Andy Moore | 7:05 | Kyle Harshany | 7:05 | Heidi Perry |
| 7:10 | Tyler Adamson | 7:10 | Jacob Peacock | 7:10 | Rachel Revillo |
| 7:15 – 7:45 Refreshments and Poster Viewing – Catmull Gallery WEB | | | | | |
| <u>Session II: WEB 1230</u> | | <u>Session II: WEB 1250</u> | | <u>Session II: WEB 2230</u> | |
| Michael Yu & David Grainger Guest Judge: Al Ng, PhD | | Sam Adams & Chuck Dorval Guest Judge: Jennifer Seagrave, PhD | | Kylee North & Kelly Broadhead Guest Judge: Seetha Veeraghanta, PhD | |
| 7:45 | Bethany Miller | 7:45 | Abbie Saccomanno | 7:45 | Emily Herdic |
| 7:50 | Nathan Wallace | 7:50 | Madeleine Gaztambide | 7:50 | Emma Breen |
| 7:55 | Jonathan Hong | 7:55 | Carson Davis | 7:55 | Giuliana Rezende |
| 8:00 | Andy Yu | 8:00 | Jordan Langford | 8:00 | Alec Tzeng |
| 8:05 | Sanaa Sadiq | 8:05 | Mckenzie Price | 8:05 | Ian Aist |
| 8:10 | Amir Sharaf | 8:10 | Eliana Moreno | 8:10 | Sky Jalili |
| 8:15 | Noble Ledbetter | 8:15 | Sarah Kingsley | 8:15 | Daniel Candland |
| 8:20 | Haven Redd | 8:20 | Ian Seoane | 8:20 | Kevin Pan |
| 8:25 | Malia Mason | 8:25 | Alize Robles | 8:25 | River Tobias |
| 8:30 | Ava Folkman | 8:30 | Ryleigh Smith | 8:30 | Alyssa Kotter |
| 8:35 | Gosha Polishchuk | 8:35 | Helena Vu | 8:35 | Duncan Stewart-Jackson |
| 8:40 | Daniela Arrieta | 8:40 | Chimdi Ihediwa | 8:40 | Jashanpreet Kaur |
| 8:45 | Lauren Hulse | 8:45 | Jude Werth | 8:45 | Jared Hunt |
| 8:50 | Kaysen Hansen | 8:50 | Luke Loehding | 8:50 | Anit Jhaveri |
| 8:55 | Kyrene Benfield | | | | |
| 9:00-9:20 Refreshments and Poster Viewing – Catmull Gallery WEB | | | | | |
| 9:20 Awards Presentations <u>WEB 1230</u> | | | | | |



Department of
BIOMEDICAL ENGINEERING

JOHN AND MARCIA PRICE COLLEGE OF ENGINEERING
THE UNIVERSITY OF UTAH

ORAL SESSION I, room I—WEB 1230

6:00 – 7:15 pm

Moderator: David Grainger & Michael Yu
Department of Biomedical Engineering

Guest Judge: Al Ng, PhD

6:00 Introduction by David Grainger, PhD

6:05 Annika Bachman (Advisor: Amy Lenz, PhD) "Advancing Ankle Osteoarthritis Diagnosis: Integrating Imaging and Statistical Shape Modeling with Convolutional Neural Network"

6:10 Maddie Lodico (Advisor: Alan Dorval, PhD) "Axon Geometry Impacts Activation Threshold: Implications for Deep Brain Stimulation"

6:15 Meghan Carter (Advisor: Amy Lenz, PhD) "Calculating Radiographic Measurements for Progressive Collapsing Foot Deformity Using Anatomical Coordinate Systems"

6:20 Jesus Carbajal (Advisor: Andrew E. Anderson, PhD) "Comparison of Simplified Simulation Method to Finite Element Analysis When Analyzing Hip Impingement Via Strain Estimations"

6:25 Xavier Grube (Advisor: Ashley Spear, PhD) "Design of Scaffolding to Promote Osseointegration in Joint Replacement Implants"

6:30 Ashton Park (Advisor: Amanda Stark, PhD) "Developing an MRI Image Processing Pipeline for Improved Vocal Disorder Understanding "

6:35 Nick Thomson (Advisor: Yan-Ting Shiu, PhD) "Higher Wall Shear Stress in AVFs Reduces Neointimal Hyperplasia: Insights From Porcine Models"

6:40 Mikhail Ahmed (Advisor: Andrew E. Anderson, PhD) "Increased Strain in Symptomatic Cam-Type Impingement Patients with Soft Tissue Overlap (STO)"

6:45 Kathryn Richens (Advisor: Ademuyiwa Aromolaran, PhD, FAHA, FHRS) "Lipotoxicity-induced Increase of Potassium channels: Implications for Obesity-Related Arrhythmias"

6:50 Ellie Karren (Advisor: Ben Ellis, PhD) "Negative Biomechanical Effects of Craniocervical Fusion: A Finite Element Study"

6:55 Isabella White (Advisor: Alphonsus Ng, PhD & Yue Lu, PhD) "Optimizing a Multiplex Fluorescent Protocol to Facilitate Extracellular Vesicle Analysis"

7:00 Yousuf Haidari (Advisor: Aysha Amjad, MD) "Quality of Life in Left Ventricular Assist Device Therapy: Comparing Bridge-to-Transplant Versus Destination Therapy Patients"

7:05 Andy Moore (Advisor: Andrew E. Anderson, PhD) "The Identification of Sport and Sex Specific Patterns in Hemi-Pelvis Morphology and Cartilage Structure in NCAA Athletes"

7:10 Tyler Adamson (Advisor: Andrew E. Anderson, PhD) "Understanding the Effect of FAIS Through Hip Joint Reaction Forces and Kinematics"

7:15 REFRESHMENTS AND POSTER VIEWING – CATMULL GALLERY WEB



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JOHN AND MARCIA PRICE COLLEGE OF ENGINEERING
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ORAL SESSION I, room II—WEB 1250

6:00 – 7:15 pm

Moderator: Chuck Dorval & Sam Adams

Department of Biomedical Engineering

Guest Judge: Jennifer Seagrave, PhD

6:00 Introduction by Chuck Dorval, PhD

6:05 Yasmine Abuelhija (Advisor: Lucas Timmins, PhD) "A Finite Element Model Used to Predict Plaque Rupture Risk from Mechanical Stresses in an Image-Based Diseased Artery"

6:10 Alina Dzhioeva (Advisor: Ken Monson, PhD) "Analysis of Blood Vessel Damage From Traumatic Brain Injury"

6:15 Charlotte LoConte (Advisor: Pooya Elahi, PhD) "Applying Foam and Gel-Casting Methods to Fluorapatite Bone Grafts to Mimic Cancellous Bone Density "

6:20 Fatima Al-Sudani (Advisor: Joshua Andersen, PhD) "Comparing Artificial Intelligence and Real Protein Interactions"

6:25 Collin Santoro (Advisor: Melodie Weller, PhD) "Detection of Plant Viruses in Human Plasma"

6:30 Derek Lewis (Advisor: Natasha Pavlova, PhD) "Developing a Novel Quantification of tRNA Charging for Use in Cancerous Tissue Slices"

6:35 Lara Schlickmann (Advisor: Jindřich Kopeček, PhD, DSc & Jiyuan Yang, PhD) "Development of a Novel PD-L1 Targeted Chemo-Immunotherapy for Ovarian Cancer Treatment "

6:40 Brigham Boyack (Advisor: Taylor Webb, PhD) "Frame Design for the Development of Magnetic Resonance Sound Wave Imaging"

6:45 Patrick Jess (Advisor: Pooya Elahi, PhD) "Method to Formulate Implantable, Synthetic, Fluorapatite Bone Grafts Utilizing a 3D Printed Scaffolding"

6:50 Celeste Kalapala (Advisor: Jessica Kramer, PhD) "Mimicking Mucus: Investigating the Enzymatic Degradability of Synthetic Mucin Polymers"

6:55 Sylvia Pack (Advisor: Jeffrey Weiss, PhD) "Modeling Lung Tumor Growth and the Effect on Nearby Tissue"

7:00 Adam Nelson (Advisor: Robert K. Mackay) "Modern Statistical Process Control: Web Based AQL Sampling Automation"

7:05 Kyle Harshany (Advisor: William Holland, PhD) "Targeting Excess Veramides as an Alzheimer's Disease Intervention"

7:10 Jacob Peacock (Advisor: Kent Bachus, PhD) "Use of Mobile X-Ray for the Analysis of Bone Mineral Density"

7:15 REFRESHMENTS AND POSTER VIEWING – CATMULL GALLERY WEB



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THE UNIVERSITY OF UTAH

ORAL SESSION I, room III—WEB 2230

6:00 – 7:15 pm

Moderator: Kelly Broadhead & Kylee North
Department of Biomedical Engineering

Guest Judge: Seetha Veeraghanta, PhD

6:00 Introduction by Kelly Broadhead, PhD

6:05 Naomi Kababe (Advisor: Punam Sawant-Pokam, PhD) "Alterations in excitability 1 week Post-TBI in Mice"

6:10 Charlie Osborne (Advisor: Jessica Kramer, PhD) "Characterization of Potent Antifreeze Molecule"

6:15 Margaret Pozo (Advisor: Larry F. Abbott, PhD) "Computational Representation of Skin Pattern in Dwarf Cuttlefish"

6:20 Maddie Hopkins (Advisor: Jesse Christensen, DPT, PhD) "Exploring the Relationship Between Muscle Strength and Knee Biomechanics in Patients with Osteoarthritis"

6:25 Noel Short (Advisor: Mar Janna Dahl, PhD) "Heating Control System for an Incubator to Maintain Thermoregulation in Neonatal Lambs"

6:30 James Harris (Advisor: Kimberley Evason, MD, PhD) "Identifying Drugs to Target Lipid Metabolism in Hepatocellular Carcinoma"

6:35 Kishore Jay (Advisor: Karen Wilcox, PhD) "Onset and Offset Dynamics in Animal Models of Epilepsy: Response to Valproic Acid and Phenobarbital"

6:40 Bryson Anderson (Advisor: Lars Laurentius, PhD) "Optimization of Hydrogel Strand Dimensions for Glucose Sensing Applications"

6:45 Madelyn Lott (Advisor: Kent Bachus, PhD) "Optimization of the Oseometric Analyses of Orthopedic CT scans"

6:50 Tina Ly (Advisor: Moriel Zelikowsky, PhD) "Partner Response to Social Stress "

6:55 Jessie Owsley (Advisor: Lars Laurentius, PhD) "Quantification of Degradation Mechanisms in Biodegradable Hydrogel Strands for Diabetes Monitoring"

7:00 Mckenna Coughlin (Advisor: Jessica Kramer, PhD) "The Design and Synthesis of Authentic Mucus Mimics"

7:05 Heidi Perry (Advisor: Melissa M Dixon, PhD) "The Interplay Between Mental and Physical Ability in Congenital Myotonic Dystrophy"

7:10 Rachel Revillo (Advisor: Michelle Mendoza, PhD) "The Role of Strain in Promoting Lung Cancer Progression"

7:15 REFRESHMENTS AND POSTER VIEWING – CATMULL GALLERY WEB



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THE UNIVERSITY OF UTAH

ORAL SESSION II, room I— WEB 1230

7:45 – 9:00 pm

Moderator: Michael Yu and David Grainger
Department of Biomedical Engineering

Guest Judge: Al Ng, PhD

7:45 Bethany Miller (Advisor: Florian Solzbacher, PhD) "Bend Testing of ECoG Device with potential Quality Assurance application"

7:50 Nathan Wallace (Advisor: Jacob George, PhD) "Determining Optimal EMG Electrode Size for Gesture Discrimination at the Wrist"

7:55 Jonathan Hong (Advisor: Edoardo Battaglia, PhD) "Development and Evaluation of a Kinematic Simulator Arm for Arm Swing Rehabilitation"

8:00 Andy Yu (Advisor: Hamid Ghandihari, PhD & Nitish Khurana, PhD) "Development of a Cost Efficient Extracorporeal Membrane Oxygenation Mimic For Efficient Drug Testing"

8:05 Sanaa Sadiq (Advisor: Colin Brankin) "Equipment Validation: Evaluating the Honle UV LED Curing System"

8:10 Amir Sharaf (Advisor: Carly Magleby, BD Medical) "Field Assurance Investigation Assistance Tool"

8:15 Noble Ledbetter (Advisor: Henrik Odeen, PhD) "Improving Magnetic Resonance Guided Focused Ultrasound Targeting of the Ventralis Intermedius for Essential Tremor Patients"

8:20 Haven Redd (Advisor: Henry Fu, PhD) "Increased Flagellar Motility of Helicobacter pylori in Liquid Cultures"

8:25 Malia Mason (Advisor: Eric Tuday, MD, PhD) "Large Artery Stiffness in Mice as a Result of Simulated Spaceflight"

8:30 Ava Folkman (Advisor: Jacob George, PhD) "Multi-Electrode Transcutaneous Nerve Stimulation at the Wrist Increases Selectivity of Artificial Sensations on the Hand"

8:35 Gosha Polishchuk (Advisor: Thirupura Shankar, PhD) "Protein Z as a Potential Anti-Fibrotic Therapeutic for Cardiovascular Fibrosis"

8:40 Daniela Arrieta (Advisor: Fei Wang, PhD) "The Role of CTRP1 in Regulating Water Balance"

8:45 Lauren Hulse (Advisor: James Baldwin-Brown, PhD & Nitin Phadnis, PhD) "The Sperm Racetrack: A Novel Microfluidic Method for Speed-Based Sperm Sorting"

8:50 Kaysen Hansen (Advisor: Jacob George, PhD) "Wrist Posture Influences Hand Sensations Evoked by Transcutaneous Nerve Stimulation at the Wrist"

8:55 Kyrene Benfield (Advisor: Kota Takahashi, PhD) "Analyzing the Effect of Toe Flexor Strength in Walking"

9:00 REFRESHMENTS AND POSTER VIEWING - CATMULL GALLERY WEB



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ORAL SESSION II, room II—WEB 1250

7:45 – 9:00 pm

Moderator: Sam Adams & Chuck Dorval
Department of Biomedical Engineering

Guest Judge: Jennifer Seagrave, PhD

7:45 Abbie Saccomanno (Advisor: Ademuyiwa Aromolaran, PhD, FAHA, FHRS) "Cancer Treatment-Linked Myocarditis in Obese Guinea Pigs"

7:50 Madeleine Gaztambide (Advisor: Eva Serio) "A Two-Step Approach to Customizable Antibiotic-Eluting Bone Void Fillers to Target Orthopedic Infection"

7:55 Carson Davis (Advisor: Erika M. Pliner, PhD) "Analysis of Ground Condition on Ladder Setup Angle and Climbing Friction"

8:00 Jordan Langford (Advisor: Amy Lenz, PhD) "Ankle Joint Bone Shape Comparison Between Mild and Severe Post-Traumatic Osteoarthritis in Pilon Fracture Patients"

8:05 McKenzie Price (Advisor: Jack Silcox, PhD and Brennan Payne, PhD) "Can Alpha Activity Compensate for Background Noise?"

8:10 Eliana Moreno (Advisor: Amy Lenz, PhD) "Cortical Thickness of Bones in the Foot and Ankle of Individuals with Charcot Marie Tooth Disease"

8:15 Sarah Kingsley (Advisor: Bill Howard, PhD) "Design and Investigation of a Platinum-Based Molecule with 2,2'-Bipyridine and Iodine for Anticancer Activity"

8:20 Ian Seoane (Advisor: Jan Kubanek, PhD) "Drug Release Mechanisms in Perfluorocarbon Nanoparticles"

8:25 Alize Robles (Advisor: Christopher Souther) "Effects of Thermal Cycler Heating and Cooling Methods on PCR Performance and Lifespan"

8:30 Ryleigh Smith (Advisor: Guillaume Hoareau, PhD, DVM) "GJA1-20k Treatment for Ischemia-Reperfusion Injury"

8:35 Helena Vu (Advisor: Dustin Williams, PhD) "How bacteria survive in response to antibiotic treatment"

8:40 Chimdi Ihediwa (Advisor: Ashley Dalrymple, PhD) "Image Processing Of X-rays Of The Lumbar Spine & Spinal Cord Stimulation Implants"

8:45 Jude Werth (Advisor: Jan Kubanek, PhD) "Modeling Glioblastoma's Effect on Neural Networks Using Brain Organoids"

8:50 Luke Loehding (Advisor: Jan Kubanek, PhD) "Pain treatments using ultrasonic modulation of dorsal root ganglia: Targeting"

9:00 REFRESHMENTS AND POSTER VIEWING - CATMULL GALLERY WEB



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ORAL SESSION II, room III— WEB 2230

7:45 – 9:00 pm

Moderator: Kylee North & Kelly Broadhead

Department of Biomedical Engineering

Guest Judge: Seetha Veeraghanta, PhD

7:45 Emily Herdic (Advisor: Viola Rieke, PhD) "Accuracy of Magnetic Resonance Guided Focused Ultrasound for Treatment of Chronic Low Back Pain"

7:50 Emma Breen (Advisor: Yan-Ting Shiu, PhD) "Assessment of a Gene Therapy Method to Improve Vascular Access Success"

7:55 Giuliana Rezende (Advisor: Alan Dorval, PhD) "Characterizing Speech Production Between Cortical and Subcortical Regions"

8:00 Alec Tzeng (Advisor: Yan-Ting Shiu, PhD) "Computational Analysis of the Effects of Nitric Oxide on Mouse Arteriovenous Fistulas"

8:05 Ian Aist (Advisor: Stavros Drakos, MD, PhD) "Conditional Cardiac Specific Deletion of UDP-Glucose Ceramide Glucosyltransferase (UGCG) Leads to a Heart Failure Phenotype in a Murine Model"

8:10 Sky Jalili (Advisor: Robby Bowles, PhD) "CRISPR Upregulation of Type II Collagen in the Goat Genome for Degenerative Disc Disease Cell Therapy"

8:15 Daniel Candland (Advisor: Tara Deans, PhD) "Determining Transcription Factor Dynamics During Osteogenesis"

8:20 Kevin Pan (Advisor: Yan-Ting Shiu, PhD) "Does Nitric Oxide Nano-gel Preserve Collagen Pattern and Integrity In Arteriovenous Fistula"

8:25 River Tobias (Advisor: Yan-Ting Shiu, PhD) "Effects of the Receptor for Advanced Glycation End Products (RAGE) on Arteriovenous Fistula Maturation"

8:30 Alyssa Kotter (Advisor: Tara Mastren, PhD) "Examining the Adsorption Behavior of Pa-233 and U-230 on Ion-Exchange Resins for Targeted Alpha Therapy Applications"

8:35 Duncan Stewart-Jackson (Advisor: Tommaso Lenzi, PhD and Dante Archangeli) "Ground Contact Sensor Redesign for a Powered Knee Prosthesis"

8:40 Jashanpreet Kaur (Advisor: Punam Sawant-Pokam, PhD) "Investigating Neural Edema in Female mice with Post-Traumatic Brain Injury"

8:45 Jared Hunt (Advisor: Zane VanWagoner) "Optimizing Actuator Feeding in Autoguard BC IV Catheter Production"

8:50 Anit Jhaveri (Advisor: Henry Crandall) "Design of a Discreet Cardiac Health Monitoring Patch"

9:00 REFRESHMENTS AND POSTER VIEWING - CATMULL GALLERY WEB



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