THE UNIVERSITY OF BRITISH COLUMBIA

School of Biomedical Engineering

Faculties of Applied Science and Medicine

SBME RESEARCH DAY

FEBRUARY 17, 2026

Trainee Talks & Posters

Morning Session: 10:15 – 11:20am
TRAINEE TALK #1

Rohan Birk

Master's Student, SBME

Supervisor: Dr. Antony Hodgson
Surgical Technologies Laboratory

Scapular Tip Osseous Free Flap in (Sub-)Total Nasal Reconstruction Using Virtual Surgical Planning: Clinical, Functional and Cephalometric Outcomes

Rohan Birk, Alex Chen, Cornelius Kürten, Khanh Linh Tran, Amelie Marshall, Amanda Ding, Antony Hodgson, Sidney Fels, J. Scott Durham, Eitan Prisman

Virtual Surgical Planning | Computer-Aided Surgery | Nasal Reconstruction

Background and Objective: Reconstructing the nose after cancer resection is challenging due to its critical functional and aesthetic role. The scapular free flap has recently been used for these complex reconstructions due to its triangular geometry, blood supply, and soft tissue options. However, little has been published regarding virtual surgical planning (VSP), surgical techniques, or patient outcomes. This study develops and applies VSP for total nasal reconstruction with the scapular free flap.

Methods: Eight (sub-)total nasal reconstructions were planned with in-house VSP and intraoperatively guided using 3D-printed models and cutting guides. Patient-reported outcomes (SCHNOS, NAFEQ, DASH) were administered. Cephalometric measurements on the pre-operative, virtual plan, and post-operative models were collected.

Results: VSP was successfully applied in eight cases, with an average operative time of 258±122.1 minutes. Patients reported adequate functional and aesthetic outcomes (SCHNOS cosmesis sub-scale: 34±39.4/100, NAFEQ function sub-scale: 22.4±4/35) as well as low donor site morbidity (21.5±15.2/100). The mean signed difference between the pre-operative and post-operative soft-tissue CT for the nasal bridge length, nasofrontal angle, and nasal tip angle was 0.45 ± 3.9 mm, 7.2 ± 11.8°, and 8.7 ± 14.8°, respectively, indicating that the VSP-guided reconstructions accurately recreated the pre-operative nasal aesthetics.

Conclusions: This is the largest case series involving the scapular free flap for complex nasal reconstruction, and the first to utilize VSP for preplanning. This technology aided surgeons in accurately recreating pre-operative nasal structure and following the reconstructive plan.

Morning Session: 10:15 – 11:20am
TRAINEE TALK #2

Alice Hong

Master's Student, SBME

Supervisor: Dr. Carolina Tropini
Tropini Lab

A Genetically Engineered Probiotic Bacterium to Report Changes in the Gut Microenvironment

Alice Hong, Jerry He, Alex Pei, Juan Burckhardt, Tatiana Lau, Giselle McCallum, Maria Orozco, Carolina Tropini

Synthetic Biology | Gut Microbiome | Biosensors

Malabsorption is a gastrointestinal perturbation that arises from poor digestion or absorption of solutes in the gut, leading to high particle accumulation and increased osmolality in the gut lumen. This condition commonly arises in diseases such as celiac disease and inflammatory bowel disease. Current diagnostic methods only detect malabsorption once symptoms become overt, missing crucial opportunities for early therapeutic intervention. To bridge this gap, we engineered gut bacteria as living biosensors capable of reporting on the state of the gut in real time and non-invasively. Utilizing the probiotic strain Escherichia coli Nissle 1917, we identified transcriptional responses to osmotic and oxidative stress in the gut. We then used the promoters to these genes to produce a fluorescent response to increased gut osmolality and in regions of oxidative stress. To improve the dynamic range of our biosensors, we screened ribosomal binding sites with a range of strengths to alter translational initiation intensity, boosting fluorescence levels when induced. Next, we reduced basal levels of expression by driving antisense transcription from promoters placed downstream of the fluorescent protein. Finally, we demonstrated non-invasive in vivo detection of malabsorption using stool sampling and flow cytometry, validating these biosensors for biomedical applications. This work offers a promising approach for early detection of gastrointestinal disorders and could be further adapted to deliver therapeutic molecules directly in the gut, providing a personalized probiotic platform for improved gut health management.

Morning Session: 10:15 – 11:20am
TRAINEE TALK #3

Arshdeep Khurana

Master's Student, SBME

Supervisor: Dr. Babak Shadgan
Implantable Biosensing Laboratory

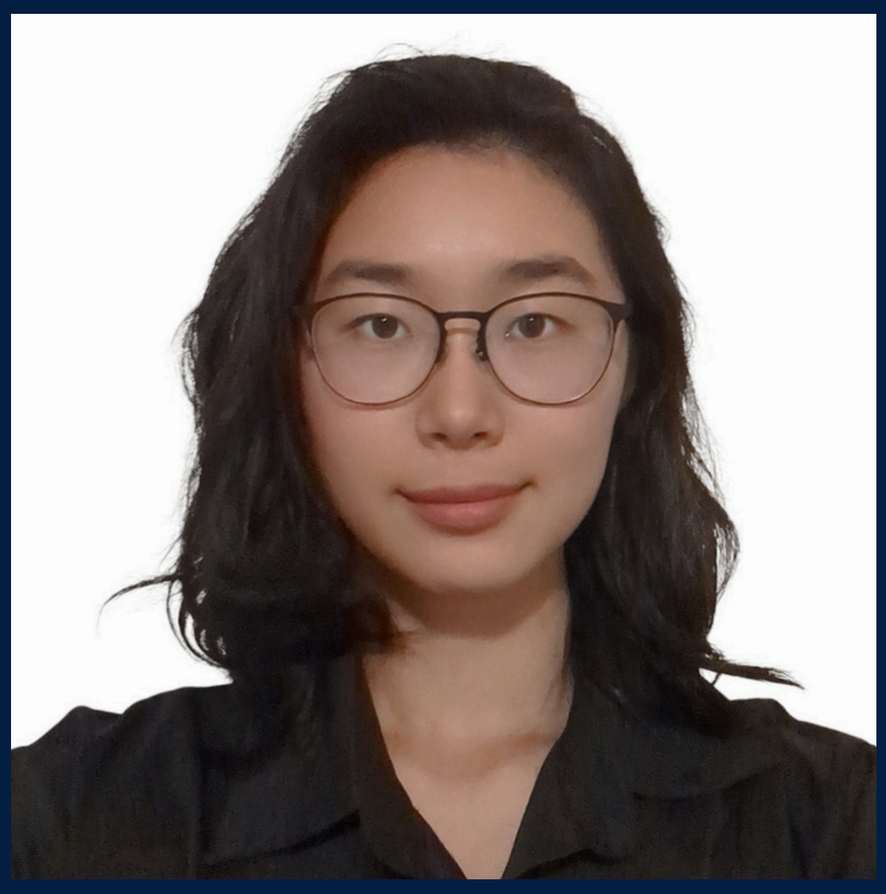
Hemodynamic Effects of Surgical Maneuvering in Hypospadias Repair: a Near-Infrared Imaging Study

Arshdeep Khurana; Babak Shadgan, Kourosh Afshar

Near-Infrared Imaging | Urology | Hypospadias

Hypospadias is a common pediatric genital defect, in which the urethral opening, or meatus, is proximally displaced from the tip of the penis. Hypospadias is generally treated with a complex reconstructive procedure whereby donor tissue is transferred from the patient to correct abnormalities in the urethral plate, prepuce, or deeper structures. Successful tissue transfer depends on maintenance of a strong vascular supply, with poor perfusion potentially resulting in suboptimal outcomes like poor healing or urethral fistula. The donor tissue blood supply is currently evaluated based on a subject, visual examination by the surgeon, and can be confounded by surgical experience, creating a gap for an objective intraoperative assessment methodology of tissue oxygenation and viability.

Near-infrared imaging (NIRI) is a non-invasive, non-contact imaging technique that leverages the differential absorption properties of oxy- and deoxyhemoglobin to compute the microvascular tissue oxygen saturation. We applied a handheld NIRI device that is focussed 30 cm from the imaging site to monitor how the oxygenation of the donor flap and recipient site evolves throughout the surgical intervention. The ventral and dorsal aspects of the penis were imaged before and after the development of a coverage flap. For all images, the anatomical region of interest was segmented in MATLAB and its average oxygenation was calculated. Time-series oxygenation data shows that surgical manipulation of the ventral aspect of the penis to correct meatal displacement indeed increases oxygenation. Mobilization of a coverage flap from the dorsal aspect slightly reduces oxygenation, though not to an appreciable extent.



Morning Session: 10:15 – 11:20am
TRAINEE TALK #4

Katie Chen

PhD student, SBME

Supervisor: Dr. Calvin Kuo
HuMBL

Clinical Validation of an Optically-Tracked Ultrasound System for Hip Dysplasia Screening

Kexin Katie Chen, María José Bontá Suárez, Jakub Piwowarczyk, Emily Schaeffer, Kishore Mulpuri, Antony Hodgson

Ultrasound Imaging | Pediatric Orthopedics | Hypospadias

Developmental dysplasia of the hip (DDH) is a common pediatric hip dysmorphology that, when undetected or inadequately treated in early life, can substantially impair quality of life, leading to gait abnormalities, chronic pain, and early-onset osteoarthritis. Clinical diagnosis of DDH relies primarily on conventional 2D ultrasound. However, this modality is highly plane-dependent and subject to inter- and intra-operator variability that can produce inconsistent diagnostic outcomes for the same hip.

Automated extraction of DDH metrics from 3D ultrasound using deep learning has demonstrated improved diagnostic reliability, but the high cost of 3DUS systems limit their availability in routine pediatric practice. To bridge this gap, we developed and evaluated an optically tracked 2D ultrasound system (OTUS) in a clinical setting and acquired a multimodal dataset comprising repeated OTUS scans and a single reference 3DUS scan per hip from pediatric patients at BC Children's Hospital. Our results showed that (1) although OTUS is generally less repeatable than 3DUS, the overall magnitudes of variability across repeated scans of the same hip were comparable, and (2) clinically acceptable DDH metrics could not be robustly reproduced across the full dataset, but in cases where OTUS scan quality was high, we obtained anatomically plausible segmentations and DDH metrics that closely resembled those derived from the corresponding 3DUS scans.

By assembling technically mature components into a deployable system, this work characterized the performance and limitations of OTUS under real-world conditions and identified key barriers for clinical use. These findings inform targeted refinements, particularly improvements to scan acquisition quality and the incorporation of geometry-constrained metric extraction, that are necessary to advance OTUS towards clinical readiness. Collectively, this study represents a critical translational step toward a more accessible, repeatable, and operator-independent alternative for DDH screening in routine pediatric care.

Morning Session: 10:15 – 11:20am
TRAINEE TALK #5

Laura Gonzalez

PhD Student, SBME

Supervisor: Dr. Peter Zandstra
Stem Cell Bioengineering Lab

Novel Humanized DRAGA Mouse Recapitulates Human T-Cell Differentiation in the Mouse Thymus With HLA-Matched Donors

Laura I. Gonzalez, Mariana Rendeiro, Vivian Wu, Glenn Edin, Margaret Hale, Fabio M.V. Rossi, David J.H. F. Knapp, Connie J. Eaves, and Peter W. Zandstra

Humanized Mouse Model | T-cell Differentiation | HLA Matching

Differences between mice and humans, including variations in the major histocompatibility complex (MHC) and immune function, pose challenges for accurately modeling human biology in mice. Therefore, improving humanized mouse models, particularly models of human hematopoietic lineages (such as functional lymphocytes), is essential. This optimization is particularly relevant to the study of the immune system, as it advances treatments such as CAR-T therapy and immune checkpoint inhibitors for cancer.

A novel mouse model with the essential immune components to generate mature B and T cells has been developed. The DRAGA mouse model, with NRG background, carries human HLA-A*02:01 and HLA-DRB1*04:01 transgenes. These transgenes enhance hematopoietic engraftment and promote the development of functional T and B cells.

We evaluated the efficacy of HLA-matched versus HLA-unmatched CD34+ cord blood (CB) cells engrafted into DRAGA mice. Flow cytometric analysis of bone marrow, peripheral blood, and thymus revealed statistically significant differences between groups, suggesting that HLA-matched CB cells provide superior support for both early and late stages of T-cell differentiation compared with HLA-unmatched CB cells.

We further characterized thymic tissue from humanized mice using CODEX imaging. Human progenitor cells from HLA-matched CB successfully complete early T-cell development, as indicated by double-positive (DP) cells, and undergo T-cell positive and negative selection, as shown by CD40 and CD68 expression. Comparison with human thymic tissue revealed conserved T-lineage phenotypes and thymic architecture. This mouse model provides a platform for studying human immune system biology and may facilitate the development of cancer immunotherapies such as CAR-T and checkpoint inhibitors.

Morning Session: 10:15 – 11:20am
TRAINEE TALK #6

Tiffany Tse

PhD Student, SBME

Supervisor: Dr. Myeong Jin Ju
Computational Ophthalmic Imaging Lab

Melanin-Contrast-Driven 3D Mapping and Quantification of Choroidal Vasculature Using Polarization-Diversity OCT

Tiffany Tse, Joseph Soo, Mohammad Shahidul Islam, Parnian Akrami, Zaid Mammo, Myeong Jin Ju

Optical Coherence Tomography | Retinal Imaging | Polarization Diversity

The choroid plays a critical role in maintaining retinal health by supplying oxygen and nutrients to the outer retina, retinal pigment epithelium (RPE), and photoreceptors. Structural and vascular abnormalities of the choroid are implicated in numerous retinal diseases, including central serous chorioretinopathy, age-related macular degeneration, and high myopia. However, consistent visualization and quantification of the choroid remain challenging due to limited contrast, signal attenuation with depth, and speckle noise in conventional OCT. Polarization-diversity OCT (PD-OCT) provides melanin-specific contrast through degree-of-polarization-uniformity (DOPU), enabling enhanced delineation of melanin-rich layers such as the RPE and choroid.

In this study, healthy controls were imaged using a custom-built PD-OCT system. Ten volumetric scans per eye were motion-corrected and registered using an AI-assisted 3D feature-based algorithm to improve SNR and structural continuity. The derived transformations were applied to DOPU volumes to enhance melanin contrast. The RPE and choroid–scleral interface were segmented using the DOPU signal, enabling choroidal thickness computation. Choroidal vasculature was extracted using a multi-scale Optimally Oriented Flux vesselness filter followed by adaptive thresholding to generate 3D vessel masks.

Quantitative analysis included measurements of choroidal thickness, choroidal vascularity index (CVI), retinal thickness, and regional DOPU values. En face vascular projections and thickness maps were generated for visualization of regional vascular and structural patterns. Furthermore, a U-Net model was trained to predict choroidal vasculature directly from single-intensity OCT volumes using DOPU-derived vessel masks as ground truth. This framework enables robust, quantitative 3D mapping of choroidal vasculature and structure, supporting clinically translatable assessment of choroidal biomarkers.

Afternoon Session: 2:30 – 3:20 pm
TRAINEE TALK #7

Dr. Tiffany Carlaw

Postdoctoral Fellow, SBME

Supervisor: Dr. Sarah Hedtrich
Hedtrich Lab

Non-Viral in situ Gene Editing Effectively and Safely Rescues Congenital Ichthyosis-Causing Mutations in Human Skin

Tiffany Carlaw, Dilem Ceren Apaydin, Gaurav Sadhnani, Jan Renziehausen, Elena Lizunova, Viviane Filor, Anna Hiller, Sophia Brumhard, Vincent Halim, Ulrike Brüning, Johannes Bischof, Rafaela Horbach Marodin, Daniel Z. Kurek, Manuel Rhiel, Sandra Ammann, Tatjana I. Cornu, Toni Cathomen, Leif Erik Sander, Benedikt Obermayer, Fabian Coscia, Jennifer Kirwan, Ulrich Koller, Achim D. Gruber, Wolfgang Bäumer, Sarah Hedtrich

Gene Editing | Lipid Nanoparticle Delivery | 3D Human Disease Models

Autosomal recessive congenital ichthyosis (ARCI) is a group of rare, but highly debilitating skin disorders which significantly impair patients' quality of life and currently lack any effective treatment options.

In previous work, our lab provided the proof-of-concept that in situ gene editing of human skin tissue is possible via the topical application of LNPs34. After screening a library of LNP formulations, we identified a lead candidate, LNP H, which achieved superior gene editing of the model gene HPRT in primary human keratinocytes and native human skin following topical application. Here, we report clinically-relevant in situ correction of the most common ARCI-causing mutation TGM1 c.877-2A>G, a splice-site aberration, in 3D human disease models using patient-derived keratinocytes.

Targeted skin barrier modulation followed by topical application of the cytosine base editor eTD mRNA packaged into lipid nanoparticles yielded functional restoration of ~30% of wild-type transglutaminase 1 enzyme activity in skin tissue. Aiming for durable and potentially curative effects, we combined non-invasive live confocal microscopy and laser microablation to create tiny pores in the viable epidermis which facilitated direct access to the skin stem cells. In vitro and in vivo toxicity studies harnessing human-based and rodent models demonstrated an excellent safety profile even after repeated application, without systemic distribution of the LNPs and the genetic cargo.

Overall, this study presents the first comprehensive preclinical data on in situ correction of an ARCI-causing mutation showcasing its therapeutic potential and paving the way the first effective and potentially curative treatment option for genodermatoses.

Afternoon Session: 2:30 – 3:20 pm
TRAINEE TALK #8

Mayur Mallya

PhD Student, Graduate Program in Bioinformatics

Supervisor: Dr. Ali Bashashati
AIM Lab

AI-Driven Biomarker Identification for Bevacizumab Treatment in High-Grade Serous Ovarian Cancer using Whole Slide Images

Mayur Mallya, Hossein Farahani, Stefan Kommoss, Ali Bashashati

Digital Pathology | Deep Learning | Computer Vision

The administration of bevacizumab in conjunction with the standard carboplatin paclitaxel chemotherapy has shown to increase the progression-free survival (PFS) among advanced epithelial ovarian cancer patients. The lack of effective biomarkers for predicting patient responses to bevacizumab, however, remains a major challenge in the personalization of its treatment. Additionally, the high costs and the toxic side effects make it imperative to identify patients who can benefit from bevacizumab.

In this work, we leverage pre-treatment whole-slide images (WSI) from two large-scale phase 3 bevacizumab clinical trials (OVAR11 and OVAR17) to develop AI-based deep survival models to identify high-grade serous ovarian cancer patients favorable to bevacizumab therapy. We train a bevacizumab-specific AI model using the OVAR17 cohort (841 WSIs from 287 patients) and evaluate the trained model on both arms of the OVAR11 cohort – chemotherapy arm (453 WSIs from 179 patients) and the added bevacizumab arm (473 WSIs from 191 patients).

The model significantly stratified the bevacizumab arm of the OVAR11 cohort with PFS as the endpoints (HR 1.6, 95% CI 1.1-2.4, p<0.05) while being unable to stratify the chemotherapy arm of the OVAR11 cohort (HR 1.2, 95% CI 0.7-2.0, p>0.05), suggesting that the model is identifying bevacizumab-response specific histology from the WSIs. The high attention regions from the WSI of patients identified as favorable to the added bevacizumab therapy have the potential to unlock novel predictive imaging biomarkers for bevacizumab therapy in high-grade serous ovarian cancer.

Afternoon Session: 2:30 – 3:20 pm
TRAINEE TALK #9

Rosalyn Carr

PhD Student, SBME

Supervisor: Dr. Matthias Görges
Digital Health Innovation Lab

Offering Return of Results as a Motivator for Research Participation: A Discrete Choice Experiment Survey

Rosalyn Carr, Nicholas West, Matthias Görges

Research Engagement | Study Design | Research Ethics

Return of results (RoR) is the process by which researchers share their findings with participants. Often viewed as a considerate act or obligation, the promise of aggregate or personalized RoR could motivate participation in research. Other studies identified factors affecting participation, including study benefits, prior research experience, financial incentives, and social factors. However, none of these studies considered RoR as a potential factor that might affect interest in participation. With research ethics board approval and implied consent, we surveyed members of the general public. Participants were presented with imaginary research scenarios, containing a description of the study and a varied combination of three factors: study duration (30 vs. 90 minutes), remuneration (none vs. $10 gift card), and RoR (none, aggregate, or personalized). Additional participant characteristic data were also collected, including prior research experience. 483 participants completed the survey, yielding 454 valid responses: 76% identified as female, 21% as male, and 3% as another gender. Most participants identified as White (76%), followed by Asian (21%), and Indigenous (4%). Many participants reported having a chronic condition (52%) or disability (30%). The promise of aggregate RoR was associated with increased willingness to participate compared with no results-sharing (odds ratio 2.90, 95% CI: 2.62–3.22). Providing personalized RoR showed a stronger effect (5.54, 95% CI: 4.99–6.15). Offering monetary incentives showed the strongest effect (6.74, 95% CI: 6.18–7.35). Longer study duration showed a negative effect (0.25, 95% CI: 0.23–0.27). These findings provide quantitative support for integrating personalized RoR into study design.

Afternoon Session: 2:30 – 3:20 pm
TRAINEE TALK #10

Sanchit Chopra

PhD Student, SBME

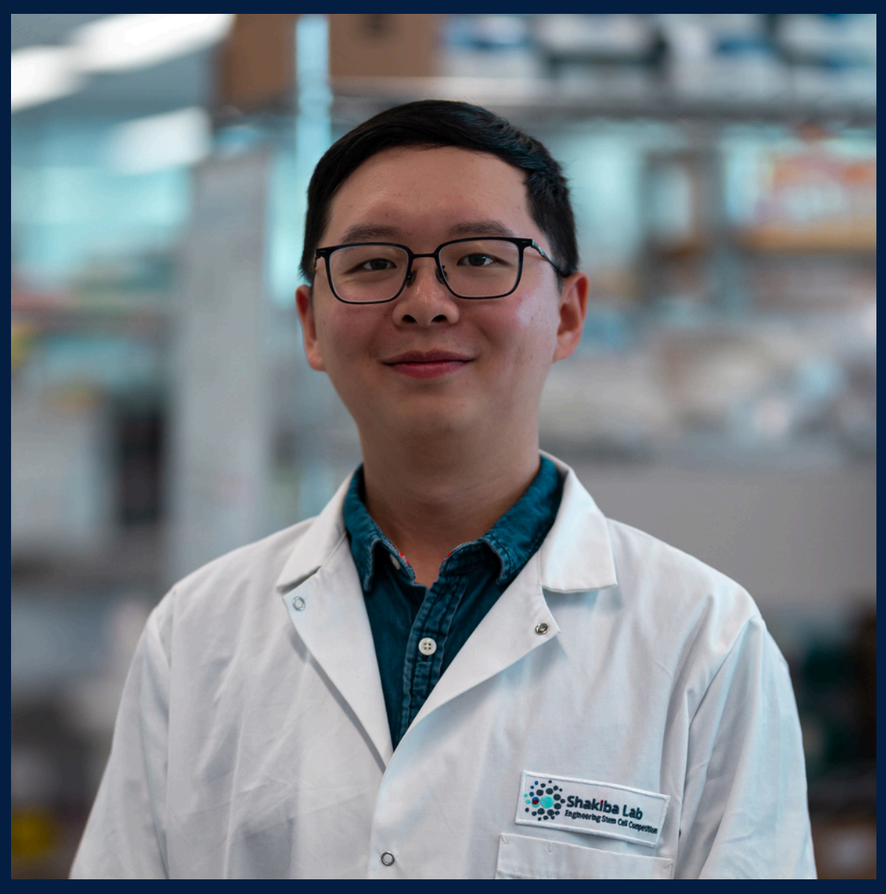
Supervisor: Dr. Nozomu Yachie
Yachie Lab

Efforts Towards a Spatiotemporal microRNA Atlas of Embryogenesis

Sanchit Chopra, Arman Adel, Nanami Masuyama, Nozomu Yachie

Genome Editing | Developmental Biology | Lineage Tracing

Human development begins with a single fertilized egg. In response to different signals, the cell proliferates and determines its fate by executing a complex choreography of molecular reactions. These processes lead to the formation of highly organized tissues in the body. While the early stages of development can be observed under a microscope, the coordinated molecular and cellular reactions that guide whole-body development have been largely unexplored. Over the past three decades, transcriptomic technologies such as microarray, bulk RNA sequencing, and single-cell RNA sequencing have evidently enabled detailed profiling of coding genes to reveal gene expression as the major determinant of cellular diversity, but are limited to offering snapshots in time. MicroRNAs are a type of molecule that regulates gene expression and shapes cell identity and function. As cells evolve, tracking dynamic changes in microRNA profiles offers novel insights into how complex tissues arise. This project aims to create a cellular recording system within human embryonic stem cells. This system will capture and record microRNA activity on synthetic “DNA tapes” as cells spatially organize and differentiate into a gastruloid, a model for a critical early developmental stage characterized by the formation of three distinct cellular layers, each giving rise to different tissues. By recording these microRNA profiles, our system provides a unique capability to read back the developmental history and trajectory of each cell as it progresses through human embryogenesis. This technology will advance our understanding of how tissues develop from single cells and has potential implications for regenerative medicine.



Afternoon Session: 2:30 – 3:20 pm
TRAINEE TALK #11

Harry Chun Man Cheng

PhD Student, GSAT

Supervisor: Dr. Nika Shakiba
Shakiba Lab

An Embryonic Stem Cell Simulator That Incorporates Biological Time

Harry Chun Man Cheng, Maria Abou Chakra, Gary D Bader, Nika Shakiba

ESC Simulator | Cell Cycle | Live Cell Imaging

During development, embryonic stem cells (ESCs) make cell fate decisions – whether to divide, die or differentiate. Each ESC is akin to a tiny computer, carrying a DNA-based processor that allows it to interpret the signals it receives from its microenvironment. By understanding the rules that govern this processor, we open the door to engineering ESCs in robust manufacturing processes, deriving cell therapies for clinical use. A key ingredient that may govern the ESC's genetic processor is the cell cycle. Cell cycle duration changes drastically during development, generally starting with fast cycles and slowing down as the cells differentiate. Theoretically, the cell cycle acts as a transcriptional filter to control gene expression, where the length of DNA on which a gene is encoded determines the time it takes for transcription. However, current models of the ESC gene regulatory mechanisms do not include cell cycle and gene length effects. Here, through live cell imaging, we monitored the cell cycle progression of human ESCs during in vitro pluripotency maintenance and differentiation into different germ layers using the fluorescent ubiquitination-based cell cycle indicator (FUCCI) system. We tracked individual cells and input their cell cycle history as a new parameter in simulating ESC. Aided by a computational model, we predict that differences in gene transcript levels under different cell cycle durations give rise to transcriptional heterogeneity and the emergence of divergent cell types. Using an experiment-to-computation loop, we are building the ESC simulator to predict the cell fate trajectory of ESC-derived cells reliably.

SBME Research Day Poster Presenters

The poster session will take place from 1:00 – 2:30 pm in the L2 Atrium of the Gordon B. Shrum Building.

1	**Alex Pieters**	**Master's Student, SBME**	**BioMEMS Lab**
	Evaluating Riboflavin As a Biocompatible Photo-initiator for Gelma Hydrogels in Spinal Cord Injury Repair		*Keywords: Hydrogel; Tissue Engineering; Spinal Cord injury*
2	**Alexandre Leblond**	**Staff, SBME**	**Cellular Microenvironment Design Lab**
	Improving Access To Sanitary Products in Uganda Via Sustainable and Distributable Fungal Biomanufacturing		*Keywords: Fungal Biomaterials; Menstrual Pads; Biocomposites*
3	**Ali Khajegili Mirabadi**	**PhD Student, Bioinformatics**	**Bashashati Lab**
	Pathology Report Representation Learning for Patient Outcome Prediciotn		*Keywords: Computational Pathology; Survival Prediction; Large Language Models*
4	**Ali Shahdoost**	**PhD Student, SBME**	**Shakiba Lab**
	Metabolic Profiling of Genetically Variant Human Pluripotent Stem Cells		*Keywords: Human Pluripotent Stem Cells; Metabolic Regulation; Genetic Stability*
5	**Amir Rad**	**PhD Student, SBME**	**Molecular Mechatronics Lab**
	Next-Generation AI-Enabled Multimodal Wearable for Physiological Monitoring and Haptic Feedback in Human-Centric Digital Health		*Keywords: Multimodal Wearable; AI-Enabled; Physiological Monitoring*
6	**Ansel Chen**	**Master's Student, SBME**	**Computational Ophthalmic Imaging Lab**
	Label-Free Spectroscopic Differentiation of Retinal Deposits in Alzheimer's Disease Using Visible Light Optical Coherence Microscopy		*Keywords: Label-Free Spectroscopy; Ad Retinal Imaging; Optical Coherence Microscopy*
7	**Anthony Wong**	**Postdoctoral Fellow, SBME**	**Rossi Lab**
	Mapping and Enhancing mRNA Vaccine Delivery and Immune Activation for SARS-COV-2		*Keywords: Vaccines; Sars-Cov-2; Lipid Nanoparticles*
8	**Arman Adel**	**PhD Student, SBME**	**Yachie Lab**
	A Cuffed CRISPR Guide RNA for MicroRNA Activity-Dependent Genome Editing		*Keywords: miRNA; Genome Editing; Molecular Recording*
9	**Behnam Maneshgar**	**PhD Student, Bioinformatics**	**Aim Lab**
	GeneExpert: A Foundation Model for Gene Expression Understanding		*Keywords: Foundation Model; Gene Expression; RNA-Seq Applications*
10	**Behnam Panahi Velashedi**	**PhD Student, SBME**	**Yachie Lab**
	Development of a 3D Bioprinted Atrial Tissue Model to investigate Fibrosis and Atrial Fibrillation Mechanisms		*Keywords: Bioprinting; Atrial Fibrillation; Tissue Engineering*
11	**Beth Castle**	**PhD Student, SBME**	**Stem Cell Bioengineering Lab**
	Mapping Variability in Pluripotent Stem Cell-Derived Hemogenic Endothelial Cells Using Cellular Indexing of Transcriptomes and Epitopes Sequencing		*Keywords: Cellular Engineering; Blood Development; Regenerative Medicine*
12	**Brett Kiyota**	**Staff, SBME**	**Yachie Lab**
	Global Embedding and Contextualization of Hundreds of Millions of Single-Cell Genomics Profiles		*Keywords: Single-Cell Analysis; Large-Scale Data; Perturbation Analysis*
13	**Bruce Lin**	**PhD Student, SBME**	**Rossi Lab**
	Identifying Mechanistic Differences Between Regenerative and Degenerative Infarcted Hearts		*Keywords: Cardiac Fibrosis; Fibroblast Activation; Gene Regulatory Network*
14	**Catherine Ko**	**Master's Student, SBME**	**Zandstra Lab**
	Linking Soluble Microenvironment Dynamics To Cell Fate: Predictive Analytics for iPSC To HSC Differentiation		*Keywords: Regenerative Medicine; Bioprocess Engineering; Process Analytics*
15	**Chaehyeon Lee**	**Staff, SBME**	**Yachie Lab**
	MILK: Exploring Large-Scale in Vitro Single-Cell Perturbation Datasets via Representative Subsampling		*Keywords:Bioinformatics; Representative Subsampling; Cellular Bioengineering*
16	**Chengyu Ye**	**PhD Student, SBME**	**Yachie Lab**
	A Rapid Retrospective Cell Clone Isolation Method		*Keywords: RNA Editing; Clone Isolation; Adar*
17	**Chun WAICheung**	**PhD Student, SBME**	**Rossi Lab**
	Characterization of DPP4+ Fibroadipogenic Progenitors in Skeletal Muscle		*Keywords: Muscle Regeneration; Fibroadipogenic Progenitor; Regenerative Medicine*

SBME Research Day Poster Presenters

18	**Dayag Sheykhkarimli**	**Postdoctoral Fellow, SBME**	**Yachie Lab**
	Environmental Remodelling of the Yeast Protein Interactome		*Keywords: Interactome; Perturbation; Barcode Fusion*
19	**Diego Perez Hidalgo**	**Undergraduate Student, SBME**	**Yachie Lab**
	Engineering Magnetically Inducible Split TEVp for Controlled Membrane Expression		*Keywords: Protein-Level Regulation; Magnetogenetics; Protein Modelling*
20	**Divy Raval**	**PhD Student, SBME**	**Zandstra Lab**
	Temporally Resolved Gene Regulatory Networks Reveal Changing Transcription Factor Activities Throughout Thymic T-Cell Development		*Keywords: Gene Regulation; Multiomics; Developmental Biology*
21	**Doris Liang**	**PhD Student, SBME**	**Wang Lab**
	Bone Adaptation in Human Proximal Femur – A Synchrotron Radiation Micro-CT Study		*Keywords: Biomaterials; Hip Fracture; High Resolution Imaging*
22	**Dustin Ameis**	**PhD Student, SBME**	**de Boer Lab / Yachie Lab**
	Light-Activated Lentiviruses		*Keywords: Virus; Optogenetics; Molecular Biology*
23	**Edward Melnyk**	**Master's Student, SBME**	**Hedtrich Lab**
	Developing a Clinically Translatable inhaled Lipid Nanoparticle-Mediated Gene Therapy for Cystic Fibrosis		*Keywords: Lipid Nanoparticles; Gene therapy; Cystic Fibrosis*
24	**Elham Mohseni**	**PhD Student, SBME**	**BioAugmentative Interfaces Laboratory**
	Design and Development of a Soft and Implantable Sensor-Actuator Device for Bladder Management		*Keywords: Biomaterials; Implantable Devices; Sensors*
25	**Ellie Leung**	**Master's Student, SBME**	**Laksman Lab**
	Extrusion-Based 3D Bioprinting of Cardiac Tissues Using Collagen–Fibrin Bioinks and HiPSC-Derived Cardiomyocytes and Cardiac Fibroblasts		*Keywords: 3D Bioprinting; Regenerative Medicine; Tissue Engineering*
26	**Enzo Giacopino**	**PhD Student, SBME**	**Shakiba Lab**
	Signature of Elite hPSC Sub-Populations for Blood-Vessel Organoid Formation		*Keywords: Human Pluripotent Stem Cells; Clonality; Organoid Engineering*
27	**Eric Yan**	**Staff, SBME**	**de Boer Lab**
	Characterization of Transcription Factors in iPSC-Derived Lung Cell Differentiation		*Keywords: Regenerative Medicine; Gene Regulatory Network; Stem Cell Differentiation*
28	**Evan Wilson**	**Master's Student, SBME**	**Lang Neurosurgery Lab**
	Investigating the Network Effects of theta Frequency Deep Brain Stimulation in Parkinson's Disease With Functional Magnetic Resonance Imaging		*Keywords: Neuromodulation; Parkinson's Disease; Imaging*
29	**Genevieve Bonnor**	**Master's Student, SBME**	**HuMBL**
	Modeling Soft Tissue in IMU Kalman Filters Improves Measurement Accuracy		*Keywords: Biomechanics; Wearable Sensing; Kalman Filters*
30	**Herbert Yao**	**PhD Student, SBME**	**Yachie Lab**
	Human Gene Regulatory Network inference Through a Custom Peter-Clark Algorithm		*Keywords: Systems Biology; High Performance Computing; Causal Discovery*
31	**Hourieh Movasat**	**PhD Student, SBME**	**Shakiba Lab**
	Mapping Beta Cell Heterogeneity: Cellular insights From hPSC-Derived Differentiation		*Keywords: Diabetes; Cell Fate Tracking; Synthetic Biology*
32	**Iman Amani Tehrani**	**PhD Student, SBME**	**Keywords: Implantable Biosensing Laboratory (IBL)**
	Regional Tissue Perfusion index (RTPI): a New Optical-Based Metric for Quantifying Regional Tissue Perfusion		*Keywords: Blood Flow; Near-infrared Spectroscopy; Tissue Perfusion*
33	**Ipek Egilmez**	**Master's Student, GSAT**	**Shakiba Lab**
	A Game-theoretic Perspective On Embryonic Development: a 'Goldilocks' Cell Number Optimizes Viability		*Keywords: Embryonic Development; Game theory; Modeling*
34	**Jae-Yoon Kim**	**Undergraduate Student, SBME**	**He Lab**
	Developing Scalable, Clean, and Affordable Growth Factor Production for Cell Culture		*Keywords: Recombinant Cytokines; Protein Engineering; Cost-Effective Protein Production*
35	**Jerry He**	**PhD Student, Microbiology**	**Tropini Lab**
	Exploring the Role of Commensal Biofilms in Gut Microbial Community Dynamics		*Keywords: Gut Microbiome; Genetic Engineering; Biofilms*

SBME Research Day Poster Presenters

36	**Jessica Xin**	**Undergraduate Student, SBME**	**Mcnagny Lab**
	Evaluating a Bile Acid Metabolite for Managing Steroid-Insensitive, Severe Asthma		*Keywords: Asthma; Bile Acid; Therapeutics*
37	**Jj Hum**	**Master's Student, SBME**	**de Boer Lab**
	Scaling Up Massive Parallel Reporter Assays With Bulk Quantitative Density-Based Cell Sorting		*Keywords: Reporter Assays; Genome Regulation; Cell Sorting*
39*	**Joshua De Guzman**	**Staff, SBME**	**Shakiba Lab**
	Investigating the Role of Intercellular Mitochondrial Transfer in Cell Competition of Human Pluripotent Stem Cells		*Keywords: Mitochondrial Networks; Cell Competition; Human Pluripotent Stem Cells*
40	**Juan Burckhardt**	**PhD Student, MBIM**	**Tropini Lab**
	A Bacteroides Synthetic Biology Toolkit to Build an in vivo Malabsorption Biosensor		*Keywords: Bacterial Biosensors; Microbiome; Synthetic Biology*
41	**Julia Brown**	**Master's Student, SBME**	**Hedtrich Lab**
	Adenine Base Editors Effectively Correct Epidermolytic Ichthyosis Causing Mutations		*Keywords: Base Editing; Gene Therapy; Disease Modeling*
42	**Jun Song**	**PhD Student, SBME**	**Computational Ophthalmic Imaging Lab (COIL)**
	Quantitative Analysis of in vivo Imaging Characteristics of Mouse Retina		*Keywords: Optical Coherence Tomography; Retinal Imaging; in vivo Imaging*
43	**Justin Qian**	**Undergraduate Student, SBME**	**de Boer Lab**
	Evaluation of Active Learning Selection Strategies and Characterization of Selected Sequences for Sequence-to-Expression Models		*Keywords: Computational Biology; Regulatory Genomics; Machine Learning*
44	**Kimiya Mousavi**	**Master's Student, SBME**	**Optical Cancer Imaging Lab**
	Label-Free Quantification and Characterization of Trophoblast Organoids Using Dynamic Optical Coherence Microscopy		*Keywords: Optical Coherence Tomography; Trophoblast Organoids; Label-Free Imaging*
45	**Lauren Puumala**	**PhD Student, SBME**	**BioMEMS Lab**
	Minimizing Biofouling On Polydopamine-Functionalized Biosensors		*Keywords: Biosensors; Surface Functionalizaiton; Diagnostics*
46	**Lixin Chu**	**Master's Student, SBME**	**Tam Lab**
	Converting Lung Structure to Function: Developing Deep Learning Image Synthesis of Chest CT to 129XeMRI		*Keywords: Hyperpolarized Xenon-129 MRI; CT; Deep Learning*
47	**Madina Kagieva**	**Master's Student, SBME**	**Yachie Lab**
	Massive Parallel Screening to Increase Genome Editing Outcomes in Human Stem Cells		*Keywords: Human Stem Cell; Genome Editing; Virus Like Particles*
48	**Mahsa Khalili**	**Researcher, SBME**	**HuMBL**
	Assessing Photoplethysmogram (PPG) Signal Quality Across Participant Groups and Settings		*Keywords: Photoplethysmography (PPG); Wearable Devices; Cardiac Monitoring*
49	**Marvin Wu**	**Master's Student, SBME**	**Bashashati Lab**
	Multimodal Fusion of Machine Learning Models on Histopathology Slides, Computed Tomography Scans, and Demographic Data for Predicting EGFR Mutation in Lung Adenocarcinoma		*Keywords: Lung Cancer; Image Classification; Multimodal Machine Learning*
50	**Mohammad Shahidul Islam**	**PhD Student, SBME**	**Computational Ophthalmic Imaging Lab (COIL)**
	Advanced Choriocapillaris Perfusion Quantification With a Robust Variable Interscan Time Analysis Framework		*Keywords: OCT-Angiography; Variable Interscan Time Analysis; Perfusion Dynamics*
51	**Mona Siu**	**PhD Student, SBME**	**Stem Cell Bioengineering Lab**
	Unveiling Novel Genes and Gene Regulatory Networks for T-Cell Specification Using CRISPR Screens in Human Pluripotent Stem Cell-Derived Hematopoietic Progenitors		*Keywords: HSC and T Cell Differentiation; CRISPR Screen; Notch Signalling*
52	**Omar Bashth**	**PhD Student, SBME**	**Shakiba**
	A Synthetic Device to Monitor the interaction Between Human Embryonic Stem Cells		*Keywords: Stem Cells; Synthetic Biology; Differenitation*
53	**Quynh Nguyen**	**Master's Student, SBME**	**Laksman Lab**
	Identifying the Transcriptomic Signatures Underlying Hypertrophic Cardiomyopathy Using Single-Nucleus RNA Sequencing		*Keywords: Single Cell RNA Sequencing; Hypertrophic Cardiomyopathy; Multiomics*

*Note: There is no poster #38

SBME Research Day Poster Presenters

54	**Raha Ahmadi**	**Master's Student, SBME**	**Tam Lab**
	Interpretable Deep Learning for COPD Detection From CT Imaging		*Keywords: COPD Detection; Deep Learning; Medical Image Analysis*
55	**Robben Liu**	**Undergraduate Student, SBME**	**Shakiba Lab**
	Expansion and Controlled Individual Settlement of hPSC Aggregates in a Microfluidic System for Differentiation and Formation of Organ-Like Models		*Keywords: Stem Cell Engineering; Organ On a Chip; Scale Up System*
56	**Sam Khalilitousi**	**Master's Student, SBME**	**Yachie Lab**
	TOPIC: Topic-Guided Probabilistic Image-Based Cell-Segmentation		*Keywords: Spatial Transcriptomics; Cell Segmentation; Bioinformatics*
57	**Sambina Islam Aninta**	**PhD Student, SBME**	**de Boer Lab**
	Position Dependent Variant Effects Reveal Importance of Context in Genomic Regulation		*Keywords: Variant Effects; Genome Regulation; Machine Learning*
58	**Satyam Priyadarshi**	**Staff, SBME**	**de Boer Lab**
	GAME: Genomic API for Model Evaluation		*Keywords: Standardized Genomic Model Benchmarking; Functional Genomics; Machine Learning*
59	**Sean Okawa**	**PhD Student, SBME**	**Yachie Lab**
	Deciphering the Phosphocode of Cell Differentiation and Development		*Keywords: Genome Editing; Stem Cell Differentiation; Signal Transduction*
60	**Shahriar Shalileh**	**PhD Student, SBME**	**BioAugmentative Interfaces Laboratory**
	Fully-Implantable Optical Devices for Neuromodulation of the Spinal Cord		*Keywords: Sof Electronics; Optogenetics; Implantable Devices*
61	**Shrivatsan Rajagopalan**	**PhD Student, SBME**	**Computational Ophthalmic Imaging Lab**
	Spatial-Phase Resolved, Extended-Depth ex vivo Ocular Tissue Imaging Using Self-Referenced Optical Coherence Microscopy		*Keywords: Optical Coherence Microscopy; Computational Refocusing; Ex-Vivo Retina, Cornea*
62	**Si Xuan Chen**	**Undergraduate Student, Faculty of Science**	**McNagny Lab**
	Optimizing Lenti-Transduction of PBMC-Derived T Cells Using GMP-Grade Products for CAR-T Cell Generation		*Keywords: Chimeric Antigen Receptor; Lentiviral Transduction; T Lymphocytes*
63	**Sofia Romero**	**PhD Student, SBME**	**Yachie Lab**
	CASTOR: a Platform To Robustly Reconstruct Evolutionarily Plausible Sequences From the Most Diverse Evolutionary Scenario Space		*Keywords: Ancestral Sequence Reconstruction; Protein Engineering; Sequence Space*
64	**Sophie Perry**	**Undergraduate Student, SBME**	**Laboratory of Microtechnologies for Quantitative Biomedicine**
	Microfluidic Analysis of Spatial Drug Response Heterogeneity in Cancer Cell Migration		*Keywords: Cancer Heterogeneity; Collective Cell Migration; Spatiotemporal Analysis*
65	**Taia Yuen-Joaquin**	**Master's Student, SBME**	**Stem Cell Bioengineering Lab**
	Developing an ex vivo Platform for Increasing Lymphoid Progenitor Output in Aged HSCs for Thymic Rejuvenation		*Keywords: Aging; Regenerative Medicine; Stem Cells*
66	**Thurayyah (Omnia) Taha**	**Master's Student, SBME**	**Hedtrich Lab**
	A Lymphoreticular Unit to Model T Cell Dynamics in the Lymph Node		*Keywords: Tissue Engineering; 3D Models; Immunomodulation*
67	**Vincent Halim**	**PhD Student, SBME**	**Hedtrich Lab**
	Optimizing CRISPR-Cas9 mRNA for Epithelial Skin and Lung Gene Editing		*Keywords: Genome Editing; mRNA Design; Epithelial Tissues*
68	**William Cheney**	**PhD Student, SBME**	**de Boer Lab**
	Directed Evolution of DNA Binding Domains		*Keywords: Directed Evolution; Synthetic Biology; Protein Design*
69	**Yas Oloumi Yazdi**	**PhD Student, SBME**	**BioMEMS**
	Impact of MRI on an Injectable Hydrogel With Magnetically Alignable Microstructures for Oriented Cell Growth		*Keywords: MRI; Biomaterial; Magnetic Microstructures*
70	**Yeganeh Dorri Nokoorani**	**PhD Student, SBME**	**Shakiba Lab**
	Comparing Growth Dynamics of Wild-Type and Genetically Variant Human Pluripotent Stem Cells Between Adherent and Suspension Cultures in Mono- and Co-Culture Settings		*Keywords: Human Pluripotent Stem Cells; Scale-Up; Genetic Variations*
71	**Yin Liu**	**PhD Student, SBME**	**Yachie Lab**
	Massively Parallel Survey of CRISPR Base Editing Activities		*Keywords: Genome Editing; CRISPR; Cytidine Deaminses*