June 14-15
Engineering in Cardiovascular Health, Disease, and Treatment
Physical Sciences Building, Cornell University
Ithaca, NY

DAY 1 – June 14

6:30am       Bus departure from 1300 York Ave - WCM to Ithaca (arrival around 11am)

11:20am      Lunch
12:00pm      Welcome and Introductions (Symposium Co-Chairs)

Dr. Lynden Archer - Joseph Silbert Dean of Engineering
Dr. Timothy Hackett - Clinical Sciences Dept Chair, College of Veterinary Medicine
Dr. Mert Sabuncu - Electrical and Computer Eng. (CU & CT), Vice Chair AI and Eng. Res, Dep. of Rad. (WCM)
Dr. Robert Harrington - Dean of Weill Cornell Medicine

12:40pm      Session 1 – Cardiovascular Imaging Technology and Machine Learning
Discussion leaders – Mert Sabuncu (CU, CT, WCM) and Jiwon Kim (WCM)

1. Jeffrey Ketterling (WCM) – “High-speed ultrasound in cardiac imaging”
2. Edwin Kan (CU) – “Non-invasive continuous monitoring of cardiac dynamics”
3. Pascal Spincemaille (WCM) – “Cardiovascular applications of quantitative susceptibility mapping”
4. Santosh Balakrishnan (CU) – “Optical coherence tomography for cardiac and mechanobiology research”
5. Jiwon Kim (WCM) – “Right heart imaging: Challenges and opportunities”
6. James Antak (CU) – “Progress and challenges of developing a miniature maglev pediatric VAD”
7. Bobak Mosadegh (WCM) – “Use of deep learning and mixed reality for guiding cardiovascular interventions”
8. Robert Shepherd (CU) – “Volumetric additive manufacturing as a tool for biomedical cardiovascular devices”
9. Simon Dunham (WCM) – “Novel solutions for minimally invasive cardiac care based on soft materials”

2:30pm      Coffee break
3:30pm      Session 2 – Animals Models, Tissue Engineering, Molecular
Discussion leaders – James Lo (WCM) and Jonathan Butcher (CU)

1. James Lo (WCM) – “Mechanisms connecting metabolic and cardiovascular diseases”
2. Weihow Hsue (CU) – “Myocardial infarction and scar-related ventricular tachycardia porcine models”
5. Todd Evans (WCM) - “Modeling human congenital heart disease caused by loss of GATA6”
7. Nozomi Nishimura (CU) – “Intravital multiphoton microscopy in the heart in mouse models”
8. Shuibing Chen (WCM) – “Spatial multiomics analysis of Human fetal sinoatrial node”
9. Shana Mintz (CU) – “Animal models of sinus node dysfunction”
10. Jingli Cao (WCM) – “An epicardial floor plan for heart development and regeneration”

5:30pm Poster Session with Refreshments
6:30pm Reception/Dinner at Statler (by invitation)

DAY 2 June 15

8:00am Breakfast
9:00am Session 3 – Veterinary and Clinical Therapy/Surgery
Discussion leaders – Katharyn Mitchell (CU) and Jonathan Weinsaft (WCM)

1. Jonathan Weinsaft (WCM) – “Advances in cardiovascular imaging – Research programs and collaboration opportunities at Weill Cornell”
2. Romain Pariaut (CU) – “Interventional cardiology techniques in veterinary practice interventional cardiology”
3. Vinay Kini (WCM) – “Assessing the value and utilization of cardiovascular technologies?”
4. Joaquin Araos (CU) – “Leveraging large animal models for translational acute cardiopulmonary studies”
5. Geoff Pitt (WCM) – “Ion channels and their auxiliary subunits: cardiac arrhythmias and non-rhythm physiology”
6. Jim Cheung (WCM) – “Innovations in diagnosis and treatment in cardiac electrophysiology”
7. Katharyn Mitchell (CU) – “Large animal cardiovascular models – what are the challenges, what are the benefits?”
8. Evelyn Horn (WCM) – “Endophenotypes for pulmonary hypertension”

10:40am Coffee Break
11:00am Concurrent Breakout Session for Working Groups (WG)

Closed Session: for participants of the Symposium only

WG1: Technology WG for imaging/device technology and applications (Clark Hall Rm. 294A)
Discussion leaders – Bobak Mosadegh (WCM) and Jim Antaki (CU)
(1) How do we avoid duplication and self-competition?
(2) How do we leverage expertise at both campuses for pilot studies and grant applications so it is a win win?
(3) How do we combine imaging modalities for maximum clinical or preclinical information?
(4) What new methods/technologies can we implement and improve upon?

WG2: Technology WG for translation of fundamental research to pre-clinical (Clark Hall Rm. 294B)
Discussion leaders – Edwin Kan (CU) and Jiwon Kim (WCM)
(1) How to better leverage all the expertise at vet school, particularly for larger animal translational medicine?
(2) How do we incorporate input from clinicians to ensure research has viable applications?
(3) What technologies can we adapt/implement to improve imaging and quantifications of methods.
How do we leverage expertise at both campuses for pilot studies and grant applications?

WG3: Clinical WG for translation of mature research to clinic (Clark Hall Rm. 294C)
Discussion leaders – Romain Pariaut (CU) and Jonathan Weinsaft (WCM)
(1) What are the major weaknesses in diagnostic capabilities of current cardiac imaging modalities?
(2) How to share clinical data with Ithaca Engineering for improved decision making, clinical outcomes, and improved research grants (e.g., machine learning)?
(3) Would a general IRB for de-identified data that is consented by helpful?
(4) How do we identify when projects are mature enough to translate to clinic or to pre-clinical and how do we guide the development to maximize chance for success?
(5) How do we facilitate how engineers and clinical communicate and pursue projects when approaching them from different viewpoints?

WG4: WG to enhance cross campus trainee opportunities (Clark Hall Rm. 294E)
Discussion leaders – Geoffrey Pitt (WCM) and Jonathan Butcher (CU)
(1) What are the difficulties of a trainee working on cross campus projects?
(2) Developing a training grant of some sort in cardiology/engineering that can leverage expertise from both sites and support folks from both campuses.
(3) Does more “medicine” need to be in Ithaca or more “engineering or pre-clinical” in New York City?
(4) Are there initiatives that could be put in place to make cross campus projects more productive for trainees?

12:20pm Lunch Break (Physical Sciences Building)
1:00pm Presentations/recommendations from individual WGs (Physical Sciences Building)
Closed Session: for participants of the Symposium only

1pm WG1 report/recommendations (~10’) and ensuing discussion (~20’)
1:30pm WG2 report/recommendations and ensuing discussion
2pm WG3 report/recommendations and ensuing discussion
2:30pm WG4 Trainees WG report/recommendations and discussion

3:00pm Coffee Break
3:15pm Consensus development for overall recommendations and action items from the Symposium
Closed Session: for participants of the Symposium only

4:15pm Summary, Concluding Remarks, and Next Steps (Co-Chairs)

4:30pm Meeting adjourned

4:45pm Bus departure from Physical Sciences Building, Ithaca to WCM (Boxed meals for traveling guests only)
Poster Session/Reception
June 14
5:30-6:30pm Physical Sciences Building

Posters will be set up for viewing during the whole conference.

- Geraldi Wahyulaksana (WCM) – “Flow Pattern Quantification With High-Frequency Ultrasound in Murine Heart”
- Ku-Chi Tsao (WCM) – "Coordinated epicardial hypoxia dictates the positioning and myocardial integration of coronary vessels during zebrafish heart maturation".
- Santosh Balakrishnan (CU) – “Combined optical coherence microscopy and confocal microscopy for the imaging of 3D engineered cardiac tissue models”
- Renhao Lu (CU) – “A 3D in vitro model of secondary lymphatic valve morphogenesis reveals WNT as a therapeutic target for inflammation-induced lymphatic valve dysfunction”
- Juan A. Azcona (WCM) – “2-[18F]Fluoropropionic Acid-based PET: A Reporter of Cardiac Metabolic Reprogramming”
- Zachary Kalmanson (WCM) – “Adaptive zebrafish atrium expansion and vascularization is driven by epicardial Vegfaa”
- Anthony D'Amato (CU) - “Complete Transformation of Bioresorbable Synthetic Vascular Graft in the Common Carotid Artery”
- Chia-Weh Yeh (CU) – “Long Circulating Molecular Condensate for Drug Delivery”
- Gening Dong (CU) – “Medical Image-Based Computational Modeling in Cardiovascular Development and Disease”
- Alex Cruz (CU) – “Calcific Aortic Valve Disease In-Vitro Modeling and Therapeutic Targeting”
- Elizabeth Louie (Vet) – “Myocardial dysfunction associated with endotoxin administration in adult horses”
- Ann Buglione (CU) – “Capillary stalling by neutrophils is a novel mechanism underlying myocardial hypoperfusion in heart failure with preserved ejection fraction”
- Abishek Karmakar (CU) – “Investigation of the effect of surgical procedures on inlet cannula angle in patients with HeartMate 3”
• Sahar Jalal (WCM) – “3D-Printed Coronary Arteries with Realistic Tissue-Mimicking Bio-Mechanics”
• Thomas Conroy (CU) – “Non-invasive Cardiac Volume Analysis using Near-field Radiofrequency Sensors in Pathological Pig Models”
• Lina Sanchez-Botero (WCM) – “Optimization of a soft robotic electrode array for cardiac mapping and ablation in ex-vivo porcine hearts”
• Yingxi Cao (WCM) – “Utilizing epicardial enhancers to identify regulators of heart regeneration in zebrafish”
• Lindsay Hale (CU) – “Minimally Invasive Device to Correct Mitral Valve Disease in Dogs”
• Preethi Byregowda (CU) – “Standard Sizer for Heart Valve Replacement Surgery”
• Pranav Sakre (CU) – “Management of hydrocephalus through third ventriculostomy for pediatric patients”
• Seonae Breckenridge (CU) – “Novel Containment Solutions for Global Vaccines”
• Sofia Kashtelyan (CU) – “Improving Blood Line Draws”