

**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”
3. Michael Harrison(WCM) – “Blood and lymphatic vasculature: formation and function in zebrafish maturation and Regeneration”
4. Jonathan Butcher (CU) – “Technologies for mechanobiological investigation in cardiovascular health and disease”
5. Todd Evans (WCM) - “Modeling human congenital heart disease caused by loss of GATA6”
6. Yadong Wang (CU) – “Bioelastomers and molecular condensates”
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.

- (4) 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**

only)

Bus departure from Physical Sciences Building, Ithaca to WCM (Boxed meals for traveling guests

**Poster Session/Reception**  
**June 14**  
**5:30-6:30pm Physical Sciences Building**

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

- Gerald 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-[<sup>18</sup>F]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”
- Mansur Zhussupbekov (CU) – “Initial In-vivo Validation of the 5th Generation PediaFlow Fully-Magnetically-Levitated Axial Flow Pediatric VAD”
- Abishek Karmakar (CU) – “Investigation of the effect of surgical procedures on inlet cannula angle in patients with HeartMate 3”
- Joaquin Araos (Vet) – “Right Ventriculoarterial Coupling During Positive End-expiratory Pressure Titration Based on a Pressure-based Single Beat Method: A Proof-of-Concept Study”

- 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”