Penn/ELSO Symposium
on ECMO and Temporary Circulatory Support 2019
Friday-Sunday, October 4-6, 2019

A CME/CNE-ACCREDITED SYMPOSIUM

Smilow Center for Translational Research
at Penn Medicine
3400 Civic Center Boulevard
Philadelphia, PA 19104

https://upenn.cloud-cme.com/ecmo2019

COURSE DIRECTORS:
Christian A. Bermudez, MD | Penn Medicine
Kasia Hryniewicz, MD | ELSO
This symposium is designed as a three-day educational program with a series of lectures on adult extracorporeal membrane oxygenation (ECMO) and temporary circulatory support (TCS) devices used in patients with cardiogenic shock. The symposium will also offer the opportunity for hands-on training on these support devices to expand on indications and technical aspects of the different devices considered. Subject experts will present insights into the technical aspects of the use of extracorporeal membrane oxygenation and other devices along with risks, benefits, and outcomes. Best practices in medical and nursing management of patients along with how perfusion can empower nursing to manage these patients in the critical care setting will be discussed.

This activity has been designed for cardiovascular, pulmonary, critical care and anesthesia physicians, surgeons, perfusionists, nurse practitioners, physician assistants, respiratory therapists, nurses, fellows, residents and other healthcare professionals who want to enhance their extracorporeal membrane oxygenation and temporary circulatory support knowledge.

**Learning Objectives**

Upon completion of this activity, participants should be able to:

- Discuss the appropriate care of adult ECMO and TCS patients with respiratory and/or cardiac compromise
- Review the risk/benefit and outcomes of ECMO and TCS technology in different clinical scenarios
- Describe best practices regarding the medical and nursing management of the ECMO or TCS-supported patient
- Define center-based interaction between perfusionists and nurses to improve management in ECMO or TCS-supported patients in the critical care setting

**Accreditation**

In support of improving patient care, Penn Medicine is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

**Designation of Credit**

**Physicians:** Penn Medicine designates this live activity for a maximum of 19.25 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

**Nurses:** This activity is approved for 18.9 contact hours.

**Perfusionists:** An application for certification has been submitted to the American Board of Cardiovascular Perfusion.

**Physician Assistants:** AAPA accepts certificates of participation for educational activities certified for AMA PRA Category 1 Credit™ from organizations accredited by ACCME or a recognized state medical society. PAs may receive a maximum of 19.25 Category 1 credits for completing this activity.
Certificates and Transcripts: After the conference has concluded, all participants will receive a follow-up email with instructions and a link with instructions on how to claim their credit. Once participants submit the request for credit, the earned credits will be available for viewing on your transcript or available for printing at https://upenn.cloud-cme.com. Please note that the individual certificate will not be mailed.

Disclosures
Penn Medicine, Office of Continuing Medical and Interprofessional Education, adheres to the ACCME Standards for Commercial Support. Faculty disclosure information will be made available in the conference materials and syllabus. Faculty members are also expected to disclose to participants any discussions of off-label and/or investigational uses of pharmaceutical products within their presentations.

Registration Fee
The registration fees for Penn/ELSO Symposium on ECMO and Temporary Circulatory Support 2019 for the symposium on October 4 and 5 (1.5 days) are $600 for physicians and industry employees and $400 for perfusionists, nurse practitioners, physician assistants, nurses, healthcare professionals, residents and fellows. The registration fee for the Simulation Workshop on October 5 and 6 (two ½ days) are $700 for physicians and industry employees and $350 for perfusionists, nurse practitioners, physician assistants, nurses, healthcare professionals, residents and fellows. Registration for the Live symposium is REQUIRED in order to register for the simulation session.

Penn Medicine and affiliates employees, faculty, staff and students will receive special symposium rates of $300 for physicians and $200 for perfusionists, nurse practitioners, physician assistants, nurses, healthcare professionals, residents and fellows to attend the symposium. The registration fee for the simulation workshop is $350 for physicians and $200 perfusionists, nurse practitioners, physician assistants, nurses, healthcare professionals, residents and fellows. A valid Penn Medicine ID is required to receive the registration discount.

The registration fee includes attendance to the symposium or the symposium and simulation workshop, a symposium booklet, access to view the presentations online, continental breakfast, breaks and lunch including a Friday evening reception. Please see agenda for full break schedule.

If you are registering with a credit card, please register online at https://upenn.cloud-cme.com/ecmo2019. You must log-in with your Penn ID or your email and password or if you do not already have a profile, you must create one before you can register for an event. We cannot accept faxed or mailed registration forms with credit card information. To pay by check, complete the registration form and mail it in with your check. Please see the registration form for mailing information. Please note: mailed registrations can take up to 5-10 business days before they are received. All registrations will be confirmed by email as long as your registration is received no later than September 27, 2019.

Cancellation and Refund Policy
In order to process refunds for course withdrawals, cancellations must be received in writing by September 27, 2019 (subject to a service charge of 10% of the registration fee but not less than $15.00). No refunds will be issued after September 27, 2019.

The University reserves the right to cancel or postpone any course due to unforeseen circumstances. In the event of cancellation or postponement, the University will refund registration fees but is not responsible for related costs or expenses to participants, including cancellation fees assessed by hotels, airlines, and travel agencies.

Meeting Location
Penn/ELSO Symposium on ECMO and Temporary Circulatory Support 2019 will be held Friday-Saturday, October 4-6, 2019 in the Arthur H. Rubenstein Auditorium at the Smilow Center for Translational Research at Penn Medicine, 3400 Civic Center Boulevard, Philadelphia, Pennsylvania, 19104.
Directions & Parking

Directions: We strongly recommend you use GPS or an online driving directions site (such as googlemaps.com) for directions to and from your starting point. If you prefer to take public transportation to and from campus, please visit http://www.upenn.edu/services/transportation for options. The University City station is the stop closest to Smilow TRC and Jordan Medical Education Center.

Parking: On Friday, October 4, 2019 the 3600 Civic Center Blvd Parking Garage is open for public parking. This garage is accessible from Civic Center Blvd and is located at Civic Center Blvd and West Service Drive (next to the Colket Research Center). Smilow TRC is about a 5 minute walk from this parking garage. Parking is about $20 per day. This garage is only open Monday-Friday. It is closed on weekends.

On Saturday & Sunday, October 5-6, 2019, the Perelman Center for Advanced Medicine garage (3400 Civic Center Blvd) is open to those attending this conference. Parking is about $20 per day. Parking fees are the responsibility of the attendee and will not be reimbursed or validated. Please do not attempt to park in this garage Monday-Friday if you do not have parking privileges to do so.

Overnight Accommodations

A block of rooms has been reserved at the Study Hotel at University City and at the Sheraton University City Hotel at a special group rate of $209 per night (single or double occupancy). Taxes are 16.36% per room per night and are subject to change. Both hotels require a credit card to hold the reservation. They accept all major credit cards. Hotel check-in is at 3 pm, check-out is at noon. Deadline for Reservations is September 3, 2019. To make hotel reservations, please contact:

The Study Hotel at University City
20 S. 33rd Street, Philadelphia, PA 19104
Call 215-387-1400 or make your reservation online using this link: https://reservations.travelclick.com/99716?groupID=2565833

Parking at The Study: valet-parking is available for $20 per car for the day or $42 for overnight guests. Parking costs are not validated or reimbursed.

The Sheraton University City
3600 Chestnut Street, Philadelphia, PA 19104
Call 215-387-8000 or use the following link: https://www.marriott.com/event-reservations/reservation-link.mi?id=1563891419904&key=GRP&app=resvlink

Parking at The Sheraton: self-parking is available for $20-$26 per car for the day or $35 for overnight guests. Parking costs are not validated or reimbursed.

Both hotels are a 10-15 minute walk to/from the Smilow Center.

Services for the Disabled
If special arrangements are required for an individual with a disability to attend this meeting, please contact the Office of Continuing Medical and Interprofessional Education no later than September 27, 2019, at 215-898-6400.

Nondiscrimination Statement
The University of Pennsylvania values diversity and seeks talented students, faculty, and staff from diverse backgrounds. The University of Pennsylvania does not discriminate on the basis of race, sex, sexual orientation, gender identity, religion, color, national or ethnic origin, age, disability, or status as a Vietnam Era Veteran or disabled veteran in the administration of educational policies, programs or activities; admissions policies; scholarship and loan awards; athletic, or other University administered programs or employment. Questions or complaints regarding this policy should be directed to Executive Director, Office of Affirmative Action and Equal Opportunity Programs, 3600 Chestnut Street, Sansom Place East Suite 228, Philadelphia, PA 19104-6106 or 215-898-6993 (Voice) or 215-898-7803 (TDD). www.upenn.edu/affirm-action.
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Presbyterian Medical Center at Penn Medicine  
Philadelphia, PA
Friday, October 4, 2019

7:30 – 8:00 AM  Registration and Breakfast

8:00 – 8:10 AM  Welcome
Christian A. Bermudez, MD, Penn Course Director
Kasia Hryniewicz, MD, ELSO Course Director

GENERAL ECLS INTRODUCTION
Moderators: Christian Bermudez, MD, Kasia Hryniewicz, MD

8:10 – 8:25 AM  Overview of Current ECLS Circuit (Pumps and Oxygenators)
Justin Sleasman

8:25 – 8:40 AM  Physiology in Veno-Arterial ECLS Support
Daniel Burkhoff, MD, PhD

8:40 – 8:55 AM  Current Indications and Contraindications of Veno-Arterial ECLS
Jacob Gutsche, MD

8:55 – 9:05 AM  Unusual ECLS Indications – Sepsis
Cara Agerstrand, MD

9:05 – 9:15 AM  Unusual ECLS Indications – Pulmonary Embolism
Taisei Kobayashi, MD

9:15 – 9:30 AM  Case Discussion: Current Status of ECLS and TCS. Considerations and Current Gaps in Knowledge
Michael McMullan, MD

9:30 – 9:45 AM  The Impact of ECLS on Patients with Advanced Cardiopulmonary Disease: Patient Perspective
ECMO: Is it Worth it? Lisa Iannone

9:45 – 10:05 AM  Keynote Speaker
The Evolution of Extracorporeal Cardiopulmonary Resuscitation
Robert Bartlett, MD

10:05 – 10:20 AM  Panel Discussion with Q&A
Panel: Christian Bermudez, MD, Kasia Hryniewicz, MD, Justin Sleasman, Daniel Burkhoff, MD, PhD, Jacob Gutsche, MD, Cara Agerstrand, MD, Michael McMullan, MD, Robert Bartlett, MD, Taisei Kobayashi, MD

10:20 – 10:40 AM  Coffee Break

GENERAL TCS INTRODUCTION
Moderators: Saif Anwaruddin, MD, Karol Mudy, MD, Matthew Williams, MD

10:40 – 10:55 AM  Physiology and Staging of Cardiogenic Shock
David Baran, MD

10:55 – 11:10 AM  Overview of Current Temporary Right Ventricular Assist Devices
Edo Birati, MD

11:10 – 11:25 AM  Overview of Current Temporary Left Ventricular Assist Devices
Saif Anwaruddin, MD
11:25 – 11:40 AM  Indications and Contraindications of TCS  
Joyce Wald, DO, FACC, DO, FACC

11:40 – 11:55 AM  Case Study: Decision Making and Work Flow of Patients on TCS: Device Selection and Escalation Strategies  
J. Eduardo Rame, MD

11:55 AM – 12:10 PM  Panel Discussion with Q&A  
Panel: Saif Anwaruddin, MD, David Baran, MD, Edo Birati, MD, Karol Mudy, MD, J. Eduardo Rame, MD, Joyce Wald, DO, FACC, DO, FACC, Matthew Williams, MD

12:10 – 1:00 PM  Lunch

HYBRID APPROACHES: WHEN DO WE COMBINE DEVICES?  
Moderators: J. Eduardo Rame, MD, David Baran, MD, Christian Bermudez, MD

1:00 – 1:15 PM  Options to Manage LV Distention in Peripheral ECMO: IABP, Ecpella, ECMO with Direct LV Venting and ASD.  
Karol Mudy, MD

1:15 – 1:30 PM  Supporting the Right Ventricle in LVAD Patients (percutaneous RVAD, Central RVAD, or ECMO)  
Jonathan Haft, MD

1:30 – 1:45 PM  ECMO as a Bridge to Durable LVAD or Transplant  
Christian Bermudez, MD

1:45 – 2:00 PM  Case Study: Complex Case Presenting Possible Challenges of Device Combination  
Karol Mudy, MD

2:00 – 2:15 PM  Panel Discussion with Q&A  
Panel: Christian Bermudez, MD, David Baran, MD, Jonathan Haft, MD, Karol Mudy, MD, J. Eduardo Rame, MD,

2:15 – 2:30 PM  Coffee Break

ESTABLISHING AN ECMO / TCS PROGRAM  
Moderators: Robert Bartlett, MD, Kasia Hryniewicz, MD

2:30 – 2:45 PM  Building an ECMO / TCS Program: The Multidisciplinary Teams and System Impact  
Elizabeth Moore, MBA, RN

2:45 – 3:00 PM  Finances: Funding, Billing and Reimbursement of an ECMO/TCS Program  
Jonathan Haft, MD

3:00 – 3:15 PM  The Shock Team: What is the Evidence and What are the Next Steps  
Joyce Wald, DO, FACC, DO, FACC

3:15 – 3:30 PM  Logistics and Transport  
Dana Mullin, MS, CCP, LP
### Penn/ELSO Symposium on ECMO and Temporary Circulatory Support 2019
**Friday-Sunday, October 4-6, 2019**

<table>
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<tr>
<th>Time</th>
<th>Event Description</th>
<th>Presenters</th>
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<tr>
<td>3:30 – 3:45 PM</td>
<td>Panel Discussion with Q&amp;A</td>
<td>Panel: Robert Bartlett, MD, Jonathan Haft, MD,</td>
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<td>’Brien, MD, Kasia Hryniewicz, MD, Elizabeth Moore, MBA, RN, Dana Mullin, MS, CCP,</td>
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<td>LP, Joyce Wald, DO, FACC, DO, FACC</td>
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<td>3:30 – 3:45 PM</td>
<td>Case Studies of ECMO and TCS focusing on 4 Objectives (Patient – Device selection,</td>
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<td>physiologic problem, prevention and management of complications)</td>
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<td>4:00 – 4:20 PM Kasia Hryniewicz, MD</td>
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<td>4:20 – 4:40 PM Karianna Milewski, MD</td>
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<td>4:40 – 5:00 PM Marisa Cevasco, MD</td>
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<td>5:00 – 6:00 PM</td>
<td>Cocktail Reception</td>
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### Saturday, October 5, 2019

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<thead>
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<tr>
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<td>Registration and Breakfast</td>
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**ECMO SPECIFICS**
*Moderators: William Vernick, MD, Heidi Dalton, MD*

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<tr>
<td>8:00 – 8:15 AM</td>
<td>Veno-arterial ECMO Cannulation</td>
<td>Ivan Chavez, MD</td>
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<tr>
<td>8:15 – 8:30 AM</td>
<td>Management of Patients on VA ECMO: Anticoagulation and Hemo-Metabolic Goals</td>
<td>Heidi Dalton, MD</td>
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<tr>
<td>8:30 – 8:45 AM</td>
<td>Unusual ECLS Indications – Cath Lab</td>
<td>Ivan Chavez, MD</td>
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<td>8:45 – 9:00 AM</td>
<td>Use of ECMO as a Bridge to Recovery: How to Wean for a Durable Outcome. Clinical</td>
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<td>and Echocardiographic Parameters</td>
<td>Kasia Hryniewicz, MD</td>
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<tr>
<td>9:00 – 9:15 AM</td>
<td>Panel Discussion with Q&amp;A</td>
<td>Panel: Ivan Chavez, MD, Heidi Dalton, MD, Kasia</td>
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<td>Hryniewicz, MD, William Vernick, MD</td>
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**TCS SPECIFICS**
*Moderators: Edo Birati, MD, Salim Olia, PhD*

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<tr>
<td>9:15 – 9:30 AM</td>
<td>Axial Flow Pumps: Peripheral and Central Cannulation</td>
<td>Christian Bermudez, MD</td>
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<td>9:30 – 9:45 AM</td>
<td>Centrifugal Flow Pumps: Peripheral and Central Cannulation</td>
<td>Marisa Cevasco, MD</td>
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| 9:45 – 10:00 AM  | Management of Patients on TCS: Anticoagulation and Optimal Medical Management  
|                  | Jacob Gutsche, MD                                                      |
| 10:00 – 10:15 AM | Panel Discussion with Q&A                                             
|                  | Panel: Edo Birati, MD, Marisa Cevasco, MD, Jacob Gutsche, MD, Salim Olia, PhD |
| 10:15 – 10:45 AM | Coffee Break                                                          |

**PATIENT MANAGEMENT**

*Moderators: Jiri Horak, MD, Kelly Hoenisch, BSN, RN*

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<th>Time</th>
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| 10:45 – 11:00 AM | Ancillary Procedures While on ECMO / TCS from Central Line, Chest Tubes and CRT  
|                  | John Greenwood, MD                                                   |
| 11:00 – 11:15 AM | Pitfalls. Preventing Complications in Patients Supported on ECMO/TCS  
|                  | Jiri Horak, MD                                                       |
| 11:15 – 11:30 AM | Futile Support: Role of Palliative Care in Patients on ECMO/TCS      
|                  | Rachel Klinedinst, DNP                                                |
| 11:30 – 11:45 AM | Cardiac Imaging during ECMO/TCS                                       
|                  | Kasia Hryniewicz, MD                                                 |
| 11:45 AM – 12:00 PM | Panel Discussion with Q&A  
|                  | Panel: John Greenwood, MD, Kelly Hoenisch, BSN, RN, Jiri Horak, MD, Kasia Hryniewicz, MD, Rachel Klinedinst, DNP |
| 12:00 – 1:00 PM  | Lunch                                                                 |

**SIMULATIONS**

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<tr>
<td>1:00 – 3:00 PM</td>
<td>Simulations</td>
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<td>3:00 – 3:30 PM</td>
<td>Coffee Break</td>
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<td>Simulations</td>
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**Sunday, October 6, 2019**

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<tr>
<td>8:00 – 10:00 AM</td>
<td>Simulations</td>
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<tr>
<td>10:00 – 10:30 AM</td>
<td>Coffee Break</td>
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| 10:30 AM – 12:30 PM | Simulations  

**SIMULATION SCENARIOS**

*Basic outline of each scenario and what the group will perform/discuss during the SIM*

1. **ECMO Hemorrhage / tamponade**
   - Scenario – post-cardiotomy patient on peripheral VA ECMO, bleeding, showing tamponade physiology
   - Simulate – volume management, recognizing signs of tamponade, reading echocardiograms, managing ECMO circuit to maximize flows

2. **ECMO North south syndrome/LV distension**
   - Scenario – VA ECMO patient with minimal pulsatility
   - View echo that shows LV distension
   - Discuss clinical implications of LV distension – clot, AV issues, stroke, pulmonary congestion/hypoxia, lung injury
   - Discuss treatment options – Impella, LV vent, second inflow cannula to
   - Scenario – VA ECMO patient with return of pulsatility
   - ABG changes based on arterial placement – right vs. left radial, post-oxygenator
   - Treatment strategies for syndrome – ECMO flow management, Bicaval RA cannulation, VAA or VAV cannulation, ventilator management, clinical management

3. **ECMO Walking ECMO**
   - Cannulation configuration TBD

4. **ECMO System failure – Pump failure**
   - Circuit disruption / accidental decannulation
   - Air entrainment
   - Console failure – switch out console or utilize hand crank

5. **ECMO System failure – Oxygenator failure**
   - Low PaO2 on post oxygenator ABG – discuss causes of oxygenator failure and how to treat.
   - Simulate oxygenator change-out

6. **MCS RV infarct / centrifugal flow pump**
   - Scenario – patient with RV failure
   - Simulate – review echocardiograms, EKG, hemodynamic profiles.
   - Discuss treatment options and percutaneous support options

7. **MCS Cardiogenic shock / axial flow pump**
   - Indications for pump
   - Types
   - Management strategies – maximizing flow, unloading the LV, weaning/recovery
   - Troubleshooting

8. **Meet the experts – Panel of experts for one on one question and answer sessions**
   - Cannulation strategies
     - Discuss cannulation tips, techniques, equipment, cannula options (venous/arterial, SFA, dual lumen), wires/dilators
     - Dressing care / infection control – dressing supplies/kits and suggestions, suturing and securing cannula.
REGISTRATION FORM

Penn/ELSO Symposium on ECMO and Temporary Circulatory Support 2019
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If you are registering using your credit card, please register online at:
https://upenn.cloud-cme.com/ecmo2019

Questions? Contact us at:
Phone: 215-898-6400 or 215-898-8005 • penncmepennmedicine.upenn.edu

Please note we are unable to accept faxed registration forms.

Please print or type

Name (First) (Last)
Academic Degree
Medical Specialty
Affiliation (Hospital, Office, or Company)
Address (☐ Affiliation or ☐ Home)
City State Zip
Phone Fax
E-mail

Registration Fee (pre-payment is required to be officially registered)

Symposium on October 4 and 5 (1.5 days):
☐ Practicing Physicians and Industry – $600
☐ Perfusionists, Nurse Practitioners, Physician Assistants, Nurses, other Healthcare Professionals, Residents and Fellows – $400

Registration for the Live symposium is REQUIRED in order to register for the simulation session.

Simulation Workshop on October 5 and 6 (two ½ days):
☐ Practicing Physicians and Industry – $700
☐ Perfusionists, Nurses, Healthcare Professionals, Residents and Fellows – $350

Penn Medicine Rates
☐ Symposium – Penn Medicine Physicians – $300
☐ Symposium – Penn Medicine Perfusionists, Nurse Practitioners, Physician Assistants, Nurses, Other Healthcare Professionals, Residents and Fellows – $200
☐ Simulation Workshop – Penn Medicine Physicians – $350
☐ Simulation Workshop – Penn Medicine Perfusionists, Nurse Practitioners, Physician Assistants, Nurses, Other Healthcare Professionals, Residents and Fellows – $200

Penn Medicine ID # ______________________________

☐ I have a reservation at the Sonesta and will take the complimentary shuttle to and from Smilow CTR

Payment Method
• If you are paying by credit card, please register online at https://upenn.cloud-cme.com/ecmo2019
• If you are paying by check, you may mail your completed registration form and check made payable to The Trustees of the University of Pennsylvania/CME to:
Conference Coordinator, Office of Continuing Medical and Interprofessional Education, 150 Anatomy/Chemistry Building, 3620 Hamilton Walk, Philadelphia, PA 19104-6061
• Do not include any credit card information on the registration form or email any credit card information

Please Note: Walk-in registrants must bring payment to the program. Seating may be limited for walk-in registrants.