



NEWSLETTER

Editor: Omar Alibrahim, MD

Co-Editor: Kennethia Banks

Message from the President

Our 33rd Annual Meeting is upon us and we could not be more excited to be together again, especially in person. I am looking forward to seeing so many of our colleagues and friends together again.

I hope you will take a moment to say hello and let me know what you would like ELSO to be working on in the coming years.



In addition to our upcoming conference, I am very pleased to announce leadership changes on the ELSO Board of Directors. As is our tradition at our conferences, we like to celebrate the incoming President. I am honored to share that ELSO will be welcoming our first international President this year, Graeme MacLaren. I have worked with Graeme on many things over the years and could not be more excited about what he will bring to ELSO in this role.

We continue to think about our leadership composition, roles, and membership. Last year we were so fortunate to be able to add Jay Shiland, a former ECMO patient, and Elizabeth Maringer, his wife, and therefore ECMO family member to the Board. They have already had a huge impact on ELSO - priorities, initiatives, and perspective.

This year we will further improve our non-US based leadership with the addition of Thomas Müller to the Board of Directors. Thomas replaces Graeme as Global Representative. Having both voices leading our global organization is another good step forward for the ELSO community. Please see the next section, ELSO Board Leadership Announcements, for more about our leadership team.

We are hosting a special Meet & Greet session for the ELSO Steering Committee during our conference this year. If you are interested in getting more involved with ELSO, and we hope you are, please stop by. Each Committee Chair will be sharing more about the initiatives they are working on. I hope you can find a place that you are interested in spending more time. Please see the conference program for details.

Looking forward to seeing you in Boston!

Matthew Paden, President, ELSO

IN THIS ISSUE

-
- Letter from President 1
 - Board Leadership Announcements 2-3
 - Committee Roundup 4-9
 - Research 9
 - Bedside with Bartlett 10-12
 - ECMO Around the World 13-14
 - CEO Remarks 15
-

ELSO Board Leadership Announcements

ELSO is excited to announce that Graeme MacLaren will serve as President starting January 1, 2023. In addition to having an endearing Scottish accent, Graeme is an influential and long-standing leader in the ELSO community. While Graeme is already a well-published clinician scientist, his lengthiest publication may be his most recent: The ELSO Red Book 6th Edition. Graeme's most recent role with ELSO has been the international representative to the ELSO Board of Directors. He will become the first President of ELSO in its 33-year history from outside of North America. Please join us in congratulating Graeme MacLaren in his new role as President of ELSO.

Replacing Graeme MacLaren as Global Representative will be Thomas Müller. As a global organization, ELSO emphasizes a representative directorship. Thomas is an esteemed ELSO colleague, with leadership in ELSO's European Chapter, EuroELSO, for many years. Thomas has worked on global ELSO initiatives and publications often and is well known in the field for his leadership and expertise.

We are equally excited about the opportunity to extend the President-related role of Daniel Brodie. Dan will continue on as President-Elect for this upcoming term. Dan will progress to President after Graeme's term concludes. Graeme's willingness to step in as President in this next term reflects the camaraderie among leadership that we admire at ELSO, and this will allow Dan to better focus on his role at ELSO in addition to other current commitments.

Matt Paden will progress to Past President in January. We plan an appropriate appreciation and acknowledgement of Mark Ogino's leadership in our final Newsletter of 2022, who completes his service at the end of this year.

About Graeme

Graeme MacLaren was born and raised in Scotland before emigrating to Australia in his teens. He graduated from the University of Melbourne and trained in adult and pediatric critical care medicine. He moved to Singapore and became the Director of Cardiothoracic ICU in the Department of Cardiac, Thoracic, and Vascular Surgery at the National University Hospital, while continuing to commute to Melbourne to work as a visiting consultant in the Paediatric ICU of the Royal Children's Hospital until the COVID-19 pandemic brought international travel to a standstill.



He first met Dr. Bartlett in 2009 and was subsequently invited to deliver the Keynote Address, "ECMO in Sepsis," at the annual ELSO conference. He was elected to the ELSO Steering Committee in 2011 and became the Inaugural Chair of AP ELSO in 2013, jointly hosting the chapter's first meeting in Beijing. He joined the ELSO Executive Committee in 2018 and the Board of Directors in 2020, where he has served as Global Chapter Representative. Graeme was awarded a FELSO in 2018. He was an editor of the Red Book for the 4th and 5th editions and became Editor-in-Chief for the 6th edition.

Graeme has cared for ECLS patients for over 20 years, ranging in age from premature neonates through to septuagenarians. He obtained a Masters degree in Infectious Diseases from the London School of Hygiene and Tropical Medicine in 2018 and has a special interest in infection and ECMO.

ELSO Board Leadership Announcements

About Thomas

Prof. Dr. Thomas Müller was born in 1962 and graduated in Medicine at the Friedrich-Alexander University, Erlangen and University College, Dublin. He is married and father of four children.

He is a Consultant of Intensive Care Medicine and Pneumology at the University Hospital Regensburg (UKR), where he heads the Medical ICU since 2002. UKR is ELSO Centre of Excellence and one of Germany's most active ECMO Centres with about 200 ECMO runs per year. He was one of the founding members of EuroELSO in 2011 and currently is Honorary Secretary of the Steering Committee of EuroELSO and member of ECMOnet. In 2015 he hosted the 4th International EuroELSO Congress in Regensburg.



In 2019 he was bestowed an honorary fellowship of the Extracorporeal Life Support Organization. He also is an honorary member of the Hungarian Society of Cardiology.

His special professional interests include the treatment of severe acute lung failure, and the management of patients post resuscitation. Since 1996 his department is engaged in the optimization of miniaturized ECMO devices in use for severe ARDS, circulatory failure, and CO₂ removal. A focus of research is set on a better understanding of complications of ECLS.

Committee Roundup

Conference Committee

The Conference Committee is excited to welcome you to Boston September 14th-17th for the 33rd Annual Conference! We're thrilled to have Derek Angus as our Keynote speaker and a diverse group of international speakers! This year's Conference will include a great deal of new and innovative content, thought-provoking debates, a hands-on heart lab (requires prior registration – spots still available!). Pre-conference (requires prior registration) offers a deep dive into the basics of ECMO and how to build and grow a high quality program. In addition to the educational content, we're looking forward to a fabulous social program and a chance to reconnect with friends and colleagues from around the world.



We look forward to gathering together again and we hope to see you there!

Upcoming Meetings

Event: 33rd Annual ELSO Conference

Location: Boston Marriott Copley Place in Boston, Massachusetts

Dates: September 14, 2022 - September 17, 2022

Please visit our Conference Site here: <https://cvent.me/m7xbVy>

Pre-Conference is September 14-15, 2022. Conference Dates: September 15-17, 2022

Event: ELSO LATAM Congress 2022

Location: Lima, Peru

Dates: November 10, 2022 - November 12, 2022

Event: SWACC ELSO 2023

Location: Punjab, India

Dates: February 25-27, 2023

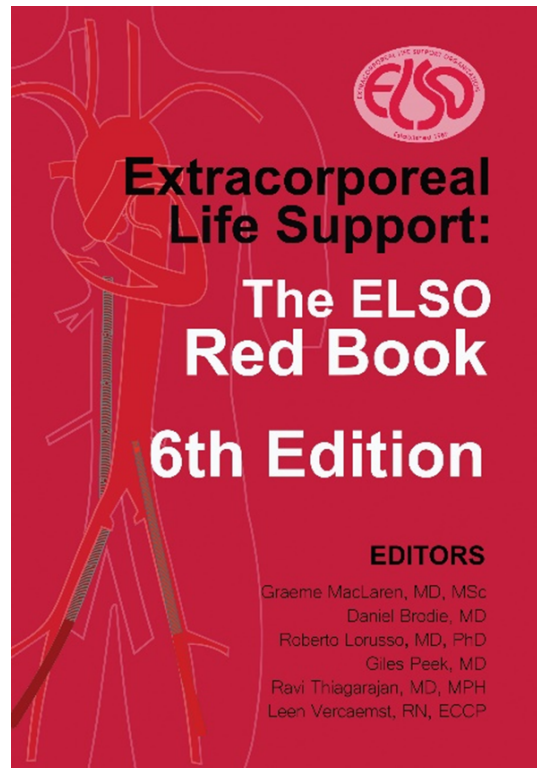
The latest information on ELSO & Collaborative Meetings can be found [here](#).

Committee Roundup

Publications Committee

The ELSO Red Book 6th Edition launches officially at our 33rd Annual Conference next month. We hope you are as excited as we are to read the latest thinking from ELSO. More than 230 authors contributed to this edition, our largest and most diverse authors yet. New chapters and content, including emerging infectious disease, crisis management, and cannulation.

There will be a reduced rate during the Annual Conference for purchase in-person. The book will then be available for purchase starting September 21, 2022.



ELSO will soon have two new Monographs available:

- 1) Neonatal and Pediatric Simulation Scenarios by Lyndsay Johnston, Lillian Su, and Catherine Allan; and
- 2) Post-Cardiotomy ECLS and other Temporary Mechanical Circulatory Supports in Adult Patients, with Roberto Lorusso as Senior Editor and a robust team of international authors.

The ECPR and Resuscitative ECMO monograph, edited by Zach Shinar and Jenelle Badulak, is available on ELSO's Publications page: www.else.org/publications.

ELSO Academy

The ELSO – Adult ECMO Certification (E-AEC) Exam

ELSO has outlined standardized educational criteria and launched an online application process via ELSO Academy for ECMO clinicians who have demonstrated satisfactory completion of criteria listed on our website. This journey is designed to be inclusive of the entire ECMO interprofessional team. Certification is valid for three years; upon which time a renewal can be pursued to maintain certification.

This exam is comprised of National Board of Medical Examiner (NBME)-style questions aimed at helping health professionals, across the continuum of care, enhance and demonstrate their clinical knowledge. ELSO undertook a multi-stage implementation process to ensure we can bring forward a solid knowledge assessment tool for the ECMO community. Our exam development process included several rounds of psychometric analysis, on both expert and novice level ECMO clinicians. For additional information, please visit:

<https://www.elseo.org/Education/certificationexam.aspx>

ELSO Foundations:

ELSO Foundations: Adult ECMO Training Course is a self-paced ECMO course consisting of 53 modules, covering over 80 learning objectives which are anchored in the foundational concepts that will allow practitioners to develop, strengthen, and refine clinical skills related to ECMO patient care skills.

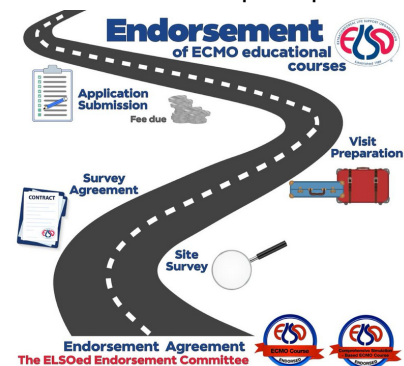
Registration: <https://www.elseo.org/education/elseoandelseoendorsedcoursesworkshops.aspx>

Expanding Global Access

ELSO Endorsed Courses

In an effort to enable global access to a standard approach for education and training, while maintaining local access, ELSO is happy to announce our new endorsed course application process.

For more information and to apply, please look [here](#).

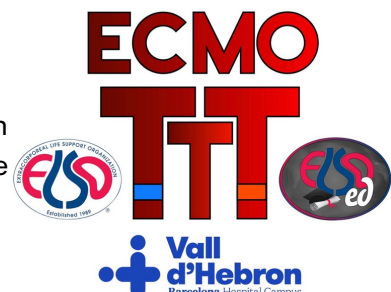


Train the Trainer (TTT)

Learn how to design your courses to meet ELSO standards.

Join us at the Vall d'Hebron Center for Advanced Clinical Simulation in Barcelona, Spain, October 12 - 14, 2022. To register, please see

[here](#).





Upcoming ELSO In-Person Training Courses

We will be announcing more new courses soon. Don't miss anything by checking [here](#).

In Person Simulation Course

Event: ELSO Simulation Courses (two sessions)

Dates: November 2-3, 2022 & November 4-5, 2022

Location: Ann Arbor Marriott Ypsilanti at Eagle Crest

Address: 1275 S Huron St, Ypsilanti, MI 48197, near Ann Arbor

[Register Here](#)



This course is designed for learners who have completed the ELSO Virtual ECMO Training Course or for practitioners with a strong foundational knowledge of ECMO patient care. Using patient case scenarios, VA and VV ECMO concepts are further explored. In the setting of small groups, students will have an opportunity for hands on learning and troubleshooting of clinical cases. This is a great opportunity to apply what was discussed in the multi-day lecture series. This course is structured for multidisciplinary learning at various stages of experience. Two one and a half day sessions are available for up to 60 learners each.



Event: ECMO Cannulation Workshop

Date: October 24, 2022 & October 25, 2022

Location: ELSO Headquarters,
3001 Miller Road, Ann Arbor, MI



More cannulation workshops are being planned for 2023.



Research Committee

Applications are currently opened for ELSO Research Grants for 2023. All applications must be received by September 30th, 2022. Notifications will be announced in December 2022. More details can be found on the website by clicking the link below. (<https://www.else.org/ecmo-resources/ResearchGrantApplication.aspx>).

Nominations & Membership Committee

The ELSO Committee Meet and Greet event will be held at the 33rd Annual ELSO Conference in Boston, MA on Friday, September 16th from 7:00-8:00am (EST). Format will be a large group presentation by the chair of each committee describing what it is that they do followed by small group break out for each committee for interested conference attendees to speak with the chairs and committee members and learn more about opportunities to join.

Registry Committee

Soon ELSO will launch an update to the Cardiac Addendum. This update will be a significant one, based on your feedback. It expands the scope to a more comprehensive set of cardiac categories.

A team will be enhancing the bibliography that ELSO maintains for all publications using ELSO Registry data.

Perfusion Updates

AmSECT Meeting will be March 24-26, 2023 in Orlando, Florida International Conference

International Conference - AmSECT

AmSECT National Headquarters 330 N Wabash Ave, Suite 2000 Chicago, IL 60611

PHONE 312.321.5156 FAX 312.673.6656

amsect@amsect.org and www.amsect.org



Coordinator's Corner

We look forward to hosting a special ECMO Coordinators Symposium during the ELSO Coordinators Meeting at the 33rd Annual ELSO Conference on Saturday, September 17th from 7:00am - 8:00AM est. The discussion, Navigating Unique Circumstances, will include two brief case study presentations followed by an inclusive discussion moderated by our ELSO Coordinator Steering Group focusing on unique mechanisms of patient support, equipment utilization and program implications.

The next coordinator's symposium is currently scheduled to take place on December 14th. This Symposium will highlight topics that are important to a large number of centers in the current environment. Symposia will be co-moderated by two members of the committee and will offer panelists the opportunity to present short topic-based informational presentations. Following the panel presentations, there will be an open forum for group Q&A and discussion. This Symposium is scheduled to be 90 minutes in duration.

Date: December 14, 2022, 4p PST / 7p EST

Title: Identifying Creative Operational & Staffing Models During a Period of Scarce Resources

Moderators: Wei Ting Chen & Guillermo Herrera

Panelists: TBD

Webinars will be available on our webinar page, where the first Coordinator Symposium is already available on **Starting a New Program:** <https://www.else.org/ecmo-resources/WebinarsVideos.aspx>

Research Alley

There is no current consensus on whether neonates should receive therapeutic hypothermia (TH) who suffer perinatal hypoxic ischemic encephalopathy or later onset hypoxic-ischemic brain injury as a result of or associated with cardiorespiratory failure or arrest, and require ECMO. We aim to better understand the practice of TH in neonatal ECMO by surveying the care provided by ECMO programs across the world.

This project has received IRB approval through Boston Children's Hospital. All data will be presented as aggregated, de-identified data only.

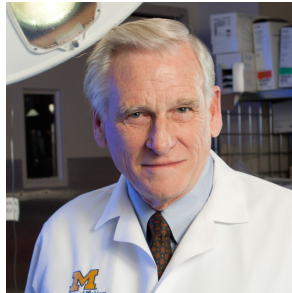
This activity should take less than 10 minutes to complete and is geared towards ECMO medical directors only.

Survey link is: https://redcap.tch.harvard.edu/redcap_edc/surveys/?s=YFYWEEYE4R

Thank you so much in advance for your assistance!

Bradley De Souza, MB BCH BAO, FRCPC

Bedside with Bartlett



Robert Bartlett, MD
 Founder, Board of Directors Emeritus, ELSO
 Professor Emeritus of Surgery, University of Michigan

Case Review

A 75 kg patient is on max VV support at 4L/min circuit flow. He has no native lung function. His cardiac output is 8 L/min. Therefore; the ratio of circuit flow to native venous flow in the right atrium is 1:1. Hb is 8gm/dL. Arterial blood gases: PO₂ 42, SaO₂ 75%, PCO₂ 50. The patient is very hypoxic. Someone suggests the oxygenator is not working enough and we should **add a second oxygenator**

1.) To make that decision we **need more data:**

Venous (drainage) blood gases: PO₂ 27, SaO₂ 50, PCO₂ 56

Arterial oxygen content is 8cc/dL (8 gm HB/dL x 75%sat x 1.34 cc O₂/ gm Hb) Venous content is 5.3 cc/dL

Systemic oxygen delivery (DO₂) is 8cc/dL x 80dL/min = 640 cc/min

Oxygen consumption (VO₂) is estimated at 3cc/kg/min = 225cc/min

DO₂:VO₂ = 2.8 (normal DO₂:VO₂ is 5)

So the DO₂/VO₂ is over 2 and the **support** is adequate, but any activity (increased VO₂) will make the support inadequate.

2.) To know how the oxygenator is working we **need more data**

The inlet content is the venous content, 5.3 cc/dL

The EC flow is 4L/min

The outlet blood gases are: PO₂ 100, SO₂ 100%, (content 10.7cc/dL). PCO₂. 40

Oxygen supplied by the circuit is **420 cc/min** (10,7 x 40). The actual amount of oxygen added to the inlet blood is 10.7 – 5.3 = 5.4cc/dL/min or 216 cc/min (5.4 x 40)

So, the oxygenator is working well.

Bedside with Bartlett

Case Review....continued

3.) To treat the hypoxia (and anticipating increased VO₂ with activity) we could:

1. Increase EC flow by adding another drainage cannula
2. Increase circuit oxygen supply by adding a second oxygenator
3. Increase circuit oxygen supply by increasing hemoglobin
4. Decrease the cardiac output,(total venous return) to increase the ratio of circuit: native venous flow. (this will increase PaO₂ but decrease systemic DO₂; **Always a bad idea**)

A. Adding another cannula is not necessary because there is a simpler solution

B. Adding a second oxygenator will increase the outlet oxygen content from 10.7cc/dL to 12.2cc/dL. (**adding 1.5cc/dL**) because the PO₂ will go from 100 to 500 and more oxygen is dissolved in the blood. The PO₂ will go from 100 to 500 because the flow in each parallel oxygenator will be 2L/min resulting in longer transit time allowing near equilibrium with the 100% Oxygen in the sweep gas. The solubility coefficient of oxygen in blood is .003cc /dL per mmHg so the amount of dissolved oxygen is 0.3 cc/dL at 100 mmHg and 1.5cc/dL at 500 mmHg.

At 40 dL /minute circuit flow this would increase the circuit O₂ supply from 420 cc/min to **488 cc/min**. The actual amount of oxygen added to the inlet blood is 6.9cc/dL,(12.2-5.3) or 276 cc/min (6.9 x 40)). When this circuit blood is mixed with venous blood in the right atrium the arterial content goes from 8cc/dL to 8.8 cc/dL. DO₂ increases from 640cc/min (8 x 80) to 704 cc/min (8.8 x 80). DO₂:VO₂ is 3.1

C. Increasing the hemoglobin from 8 to 12 will increase the outlet oxygen content from 10.7cc/dL to 16.1cc/dL (**adding 5.4cc/dL**). At 40 dL/min this would increase the circuit oxygen supply from 420 cc/min to **644 cc/ min**. The actual amount of oxygen added to the blood is 10.8 cc/dL ((16.1 – 5.3) or 432 cc/min (10.8 x 40) When this circuit blood mixes with venous blood in the right atrium the arterial content goes from 8cc.dL to 10.7 cc/dL. The arterial sat and PO₂ will increase steadily as DO₂: increases from 640cc./min to 856 cc/min (10.7 x 80).

DO₂ :VO₂ is 3.8

So, transfusion to Hb 12 is easier, safer and less risk than adding a cannula or an oxygenator.

Bedside with Bartlett

Case Review....continued

4.) CO₂ control is much easier than oxygenation in membrane lungs. You can make the PaCO₂ anything you wish. CO₂ clearance is OK (PCO₂ 56 to 40), but could be increased by increasing the sweep flow (4 to 8L/min for example) and by "coughing" the oxygenator to blow out water condensed in the fibers.

Lessons from this case:

1. The primary problem in cardiac or pulmonary failure is $DO_2:VO_2 < 2$.
2. Manage ECMO patients by calculating all the variables of oxygen kinetics, beginning with oxygen content. (PO₂ and saturation are not very valuable)
3. The goal of VV or VA ECMO is to keep the $DO_2:VO_2 > 3$
4. Anemia is the most common cause of hypoxemia and low DO₂ in ECMO. Anemia is best treated by transfusion which is safe and simple.
5. CO₂ control is easy

ANNOUNCEMENTS

Guideline Topics: ELSO is developing a one-page document for center members to complete and submit for new guideline topics that you would like to be considered for publishing and submitted to ELSO for approval. We will make this document available on the Guidelines page in the coming weeks. New guidelines require approval by the Board, with reviews scheduled several times a year.

ECMO AROUND THE WORLD

LA ELSO Updates

Dr. Rene D. Gomez, LA ELSO Chairman

We are ready for the 5th Latam ELSO Conference! We have a very attractive scientific program, as well as engaging pre-conference workshops. Likewise, we emphasize that Peru has ancestral historical places to visit taking advantage of the attendance to the conference. We invite you to register.

<http://www.congresoelsoperu.crystal-research.com.pe/>



Hotel link: <https://www.countryclublimahotel.com/>

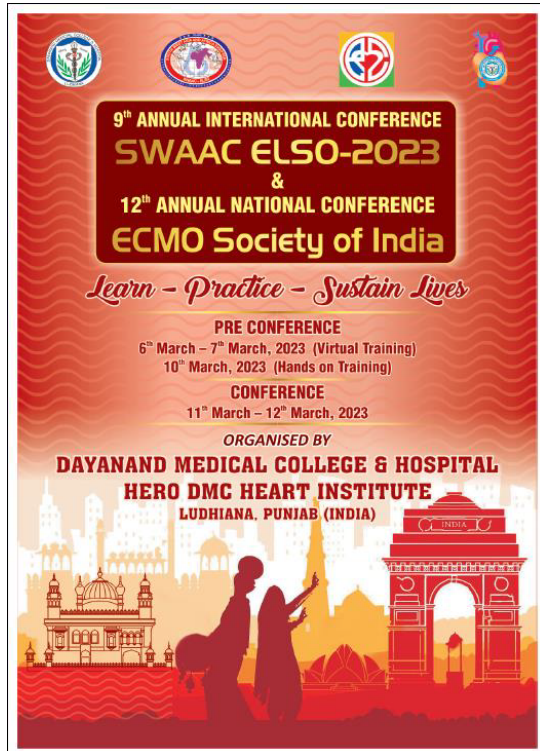
We are happy to announce the first course in Latin America endorsed by the new ELSO education platform: Monterrey Mx Comprehensive ECMO Course. This course meets requirements for Step 1 and Step 2 criteria for E-AEC. Using the theoretical part in a digital platform and patient case scenarios, VA and VV ECMO concepts are further explored. In the settings of small groups, participants have an opportunity for hands on learning and troubleshooting of clinical cases. This course is structured for multidisciplinary learning at various stage of experience. Link to course information: www.ecmoeducacion.mx

We have had high attendance at our monthly on-line sessions, webinars and journals club. These last two: "The Evolution of Extracorporeal Membrane Oxygenation Circuitry and Impact on Clinical Outcome in Children": A systemic Review. Discussed by Grace Van Leeuwen, Andres Castillo, and Guillermo Moreno. "Unconventional Cannulations" by Gustavo Calado from Brazil. We are convinced that these are a very interesting educational tool to keep our ELSO LATAM community involved. For more updates visit our website: elsolatam.net

See you in the next newsletter!

SWAAC ELSO Updates

Dr. Poonam Malhotra Kapoor, SWAAC ELSO Chairman



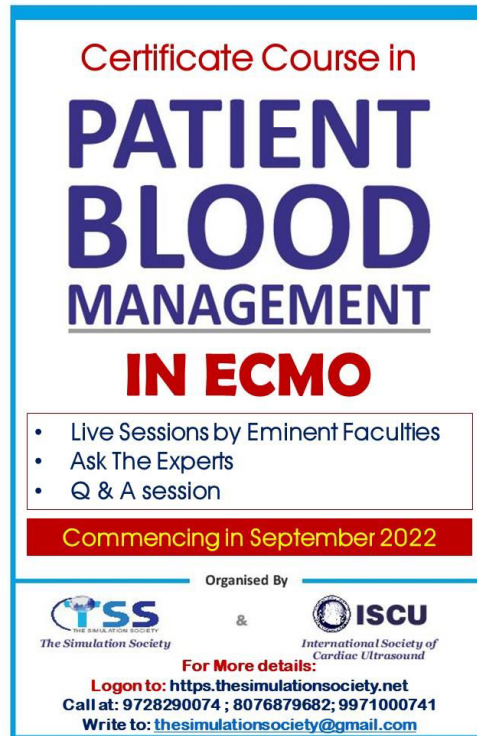
**9th ANNUAL INTERNATIONAL CONFERENCE
SWAAC ELSO-2023
&
12th ANNUAL NATIONAL CONFERENCE
ECMO Society of India**

Learn - Practice - Sustain Lives

PRE CONFERENCE
6th March - 7th March, 2023 (Virtual Training)
10th March, 2023 (Hands on Training)

CONFERENCE
11th March - 12th March, 2023

ORGANISED BY
DAYANAND MEDICAL COLLEGE & HOSPITAL
HERO DMC HEART INSTITUTE
LUDHIANA, PUNJAB (INDIA)



**Certificate Course in
PATIENT
BLOOD
MANAGEMENT
IN ECMO**

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- Ask The Experts
- Q & A session

Commencing in September 2022

Organised By

TSS
The Simulation Society

&

ISCU
International Society of
Cardiac Ultrasound

For More details:
Logon to: <https://thesimulationsociety.net>
Call at: 9728290074 ; 8076879682; 9971000741
Write to: thesimulationsociety@gmail.com



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**ELSO ENDORSED
COMPREHENSIVE
SIMULATION -
BASED ECMO
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**Center of Excellence -
Platinum - 9/2021 - 9/2024
Gold - 8/2018 - 8/2021**

**ECMO INDIA
2022
MUMBAI
SEPTEMBER 2022
13 - 14 - VIRTUAL TALK
16 - 18 - HANDS ON &
SIMULATION**

ECMO SAVES LIVES.....

at...
**Riddhivinayak Critical Care and Cardiac Centre
ELSO Designated - Center of excellence - (Platinum)**

ESOI

ELSO SOCIETY OF INDIA

Chief Executive Officer Remarks

ELSO's 33rd Annual Conference is in the final planning stages. Excitement is in the air! We cannot wait to greet you in person in Boston soon. After a two-year in person hiatus, it will be a welcome change. I am personally looking forward to meeting many of you for the first time - and my hope is that my biggest personal health issue at the end of the conference is my face and stomach hurting from good (and bad?) jokes. Most importantly, please share what ideas you have for ELSO. The more we think together about what is needed, the more we can make that happen. Please come and say hello when you can!

While together in Boston, we hope you don't miss some of the exciting talks and hands-on experiences that are planned, including a livestreamed opening session that features:

- Keynote speaker Derek Angus, Chair, Department of Critical Care Medicine at UPMC
- Dr. Bartlett's introduction of Don Hill to celebrate 50 years since the very first ECMO patient
- Bart Griffith's discussion of the recent xenotransplantation patient at the University of Maryland
- Peta Alexandar's discussion of pediatric ECMO research and trial design
- Roberto Lorusso presentation on new frontiers of ECLS in cardiovascular medicine

For those unable to attend in person, ELSO will be opening registration soon for the virtual program. Even if you do attend in person, you can catch all sessions you might have missed virtually (and 3x the CME will be available virtually). The virtual program will be available starting 9/21 to peruse at your pace. As always, ELSO members will have access to the full program's recordings starting in January, but without CME at that time. As a global organization, providing access to everyone in a convenient format is important to us and we hope everyone is able to participate as best you can either in person or virtually.

The ELSO Red Book 6th Edition will be officially released at the conference. This edition includes the latest thinking from the most globally diverse leaders in ECLS, with over 230 contributors. We are excited to get this version out in the world. A huge thank you to the tireless efforts of Graeme MacLaren, Editor-in-Chief, and the Red Book Editorial Board: Daniel Brodie, Roberto Lorusso, Giles Peek, Raji Thiagarajan, and Leen Vercaemst.

See you in Boston!

Christine



Christine Stead, MHA
CEO, ELSO



The Extracorporeal Life Support Organization

Our Mission

Providing global leadership in extracorporeal life support through innovation, advocacy, and advancing knowledge.

Our Vision

ELSO will be the premier organization for the advancement of extracorporeal life support throughout the world.

Guiding Principles

Innovation

Seeking to identify and promote advances for the application of extracorporeal therapies.

Expertise

Bringing together world leaders in the care of critically ill patients for collaboration to advance quality of care through education and publication.

Clinical Support

Maintaining a comprehensive registry of data to assist in reducing morbidity and improving survival of patients requiring extracorporeal therapies.

Community

Fostering communication and collaboration among professionals who apply advanced technologies in the treatment of refractory organ failure.



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