

Letter from the President

Dear Members of the European Society for Artificial Organs,

Please find enclosed the second issue of the ESAO Newsletter in 2023, which was edited by Pedro Baptista, our Secretary General.



The year 2023 started with the ESAO Winter School on "Artificial Organs and Tissue Engineering - From Basics to

Clinical Application", which took place in Lutherstadt Wittenberg, Germany, from February 15 - 18, 2023. The event was organized by Thomas Groth on the occasion of his retirement. We sincerely thank Thomas and his team for the organization of this event, but more than that, for his great dedication and commitment for ESAO over the years.

Our ESAO-IFAO Webinar series was continued with contributions from Pedro Baptista, EUROoCS -represented by Marc Vila Cuenca and Paola Occhetta -Sebastian Jansen, Michael Neidlin and Berlin Heart - represented by Susanna Straat, Nadia Sinner and Jan-Philipp Minol. We thank Marc Müller for the organization. The webinars will continue and starting again in October after the summer break.

This year, a new President Elect, Dimitrios Stamatialis, the second term of our Secretary General, Pedro Baptista, and four Members of the Board will be elected. We received six candidatures from colleagues with relevant experience for the four open positions. One of them, Krzysztof Zielinski, has been Board Member in the last three years and has significantly contributed to the activities of the ESAO. In addition, Katharine Helen Fraser, Libera Fresiello, Michael Neidlin, Anna Stecka and Bente Kristina Thamsen have applied to become a Member of the Board. The voting will be closed on August 29 at 23:59. Please still use the time to vote.

Now, we are looking forward to Bergamo and to the joint 49th ESAO and IFAO Conference, which will take place from August 29 to September 1, 2023, organized by Andrea Remuzzi and his team. The topic is "Biomedical Research to Improve Artificial Organs". The scientific program ranges from apheresis and adsorption, bioprinting and additive technology, biomaterials and tissue engineering, blood compatibility, artificial kidney and liver, heart support mechanical systems to organs-on-a-chip. All current information is available at www.esao2023.com. The winners of the ESAO-SAGE-Research Award 2023, the ESAO-PhD Awards 2023 and the yESAO Exchange Awards will pre-

ESAO Newsletter August 2023

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Edited by: Pedro M. Baptista -sent their works during the ESAO Congress. I would like once again to acknowledge SAGE Publishing for sponsoring the ESAO-SAGE-Research Award. Additionally, three poster prizes will be awarded at the congress. We do hope to meet many of you in Bergamo in August to make this event a great success!

Finally, we would like to encourage all ESAO members to consider the International Journal of Artificial Organs as a medium for disseminating their research results or to review papers to serve the scientific community. Andrea Remuzzi, the Editor-in-Chief of IJAO together with the Editorial Board are doing their best to maintain high quality and improve the standing of the journal. However, good quality submissions are prerequisite for their efforts to be effective.

With that, let me conclude and express my hope that science and the ESAO community will continue to contribute to bringing people together to work for progress and for a peaceful future, more than ever needed.

With warm regards, Viktoria Weber

ESAO Elections 2023 Candidates

This year, once again, the ESAO elections are run exclusively online with four Governor positions available, a new President Elect and the second term of our Secretary General. You can, and you should, vote on the online link provided to you by ESAO (if you have your annual fees in good order) until August 29 at 23:59. If you didn't receive this link, please contact Anita Aichinger (anita.aichinger@donau-uni.ac.at) for one.

Candidates for Governors of the Board of ESAO

Katharine Helen Fraser (Bath, United Kingdom)



Her research interests are focussed on cardiovascular engineering with particular emphases in: mechanical circulatory support, especially understanding damage caused to the blood components and the use of computational simulations in the design of devices; and arterial haemodynamics with both computational and experimental methods, particularly novel ultrasound methods. She is a Senior Lecturer (Associate Professor) at the Dept. of Mechanical Engineering of the University of Bath, UK. She is a member of ESAO since 2013.

Libera Fresiello (Enschede, The Netherlands)

Her research is focused on investigating the interaction between medical devices and the cardiovascular system. She is an Assistant Professor at the Cardiovascular and Respiratory Physiology Group, Faculty of Science and Technology, University of Twente in The Netherlands. She is a member of ESAO since 2011 and was a member of the yESAO from 2011-2016.



Michael Neidlin (Aachen, Germany)



His research interests are computational and experimental methods in cardiovascular hemodynamics, patient-specific cardiovascular medicine, and data-driven modelling for clinical applications. He is the Group Leader of the Modeling & Simulation Research Group at the Institute of Applied Medical Engineering, RWTH, Aachen University, Germany. He is a member of ESAO since 2013.

Anna Stecka (Warsaw, Poland)

Her research interests are focused on the therapeutic thoracentesis and independent lung ventilation. She is currently a lecturer at the College of Rehabilitation in Warsaw, and she is employed also at the Nalecz Institute of Biocybernetics and Biomedical Engineering of the Polish Academy of Sciences in the Laboratory for Diagnostics and Therapy of Cardiovascular-Respiratory System since 2015. She was a member of the yESAO Core Team from 2016-2022, and of the ESAO since 2017. She would like to use this experience and continue contributing to the society as a member of the ESAO's Board of Governors.



Bente Kristina Thamsen (Vienna, Austria)



She is currently a postdoctoral research associate at the Division of Cardiac Surgery, Medical University of Vienna, Austria. She is a member of the ESAO since 2013, and of the yESAO core team from 2014-2019.

Krzysztof Zielinski (Warsaw, Poland), second term

His research interests are modelling of physiology and computer simulations of the cardiovascular and respiratory systems, including cardiopulmonary interaction, circulatory and respiratory mechanical support, real-time simulators, and biomedical data analysis. He is an Assistant Professor and Head of the Lab. for Diagnostics and Therapy of Cardiovascular-Respiratory System at the Nalecz Institute of Biocybernetics and Biomedical Engineering of the Polish Academy of Sciences. He is a member of the ESAO since 2009 and a board member since 2020



in the frame of the first election. He would like to use all his experience during the second election to better support the Society.

Candidate for President Elect of ESAO

Dimitrios Stamatialis (Enschede, The Netherlands)



He has long experience in the field of (bio)artificial organs, biomaterials and biomedical membranes and he has been involved in numerous projects leading to products and applications, some licensed to companies. He has been a promotor of 20 PhD students and inventor of 9 patents. Besides his participation to the working groups of ESAO and the scientific committees of various ESAO conferences, he is a regular member of scientific committees of TERMIS, ASAIO and EMS conferences, summer and winter schools. He is a full professor of

(bio)artificial organs and leader of the Advanced Organ Bioengineering and Therapeutics Research Group at the TechMed Centre of the University of Twente in the Netherlands. He is a member of the board of the ESAO, and chairman of the working group "Bioartificial organs" of the ESAO since 2017. He is also member of the Board of the International Federation of Artificial Organs (IFAO) since 2021.

Candidate for Secretary General of ESAO

Pedro M. Baptista (Zaragoza, Spain), second term

His research interests are liver organ bioengineering for transplantation and other medical applications, as well as endodermal stem cell biology and organoids, biomaterial revascularization and the intestinal microbiome effects on the liver. He is a Senior ARAID Foundation Researcher at the Health Research Institute of Aragon (IIS Aragon), Zaragoza, Spain, where he is the Group Leader of the Laboratory of Organ Bioengineering and Regenerative Medicine. He is also the Chairman of the EASL Consortium for Regenerative Hepatology. Among



other things, he co-organized the ESAO Congress 2018 in Madrid and organized the Winter School in 2021. He is a member of ESAO since 2015 and a member of the board since 2018. In 2020, he got elected Secretary General of ESAO.

Update on 49th ESAO Meeting 2023 in Bergamo, Italy

The 49th Congress of the European Society of Artificial Organs (ESAO) will be held in Bergamo from 28 August to 1 September, in collaboration with the International Federation of Artificial Organs. The Congress, organized with the contribution of the University of Bergamo, will be hosted in the prestigious Middle Ages buildings of Sant'Agostino, within the wall surrounding the old city. This prestigious location will host the scientific activities of the Congress that traditionally are based on the collaboration of medical doctors and engineers to ensure that technological advances can improve patient care and assistance.

The scientific program, already available in the Congress website (<u>www.esao2o23.com</u>), ranges from basic research and numerical modeling to clinical trials of artificial organs and medical devices. The

field of artificial organs is very multidisciplinary and for this reason, the Congress represents an opportunity to bring together scientists and physicians for the discussion of new advances of biomedical technologies, clinical applications as well as basic research. Researchers and experts are expected mainly from European countries but also from other countries such as the United States and Japan.



While the use of artificial organs is now routine clinical practice for the survival of a large patient population, new developments in this area are needed to overcome today limitations of these treatments. This is particularly important for artificial kidney and in general for renal replacement therapy. We therefore aimed to extend the scientific program to these broader challenges. Among these, an important role is represented by theoretical modeling which is today increasingly powerful and based on an ever-growing mass of clinical data. Digitization in the medical field in fact continuously generates clinical data that our community has the ability to analyze and use to make medical care more efficient and make precision medicine possible. At the same time, this large amount of data opens the possibility of using the AI approach to get more reliable predictions and help assisting clinical applications.

In this context, the safety of artificial organs, and of medical devices in general, must deal with the requirements of the new European Regulation on Medical Devices. This is a theme that will be discussed during the Congress, to evaluate the advantages and challenges of an important change in the industrial production and clinical use of all medical devices. The science program also contains communications on bioartificial devices and technologies, as well as biofabrication, as the advancement of technology and life sciences is constantly evolving. The Congress scientific and social

program will allow for the interaction of attendees with different backgrounds and skills, both young and more experienced scientists, in line with the tradition of our annual Congress.

We look forward to meeting with you in person in Bergamo for sharing the more recent developments of science and technology in the field of artificial organs, as well for experiencing the Bergamo atmosphere, one of the most interesting historical site of the northern part of Italy.

Andrea Remuzzi Congress 2023 President Editor in Chief of The International Journal of Artificial Organs

yESAO Congress 2023 and news

yESAO Congress 2023

This year's main ESAO Congress in Bergamo, Italy, will again be launched by the yESAO meeting on August 28th and 29th. The upcoming yESAO Congress builds upon the success of last year's memorable event. The yESAO is eager to keep the great momentum initiated by the community in Krems, Austria, last year.

The program includes diversified Sessions covering a multitude of scientific disciplines:

Monday, August 28th:

After a Welcome Lunch and the yESAO Opening Words, the scientific program will start on Monday afternoon with an interactive Keynote lecture of Dr. Michael Neidlin on the topic "How to Survive in Academia". This will be followed by a Pitch Session where participants present key aspects of their research in no more than 3 minutes and one static slide. The purpose of this Session is to learn about the difficulty and importance of conveying your passion for the project to an audience not familiar with the topic. This Session will spark interesting scientific discussions about the attendees' work, and eventually transition to the yESAO Discover & Connect Session. This Session offers participants the chance to explore the yESAO Exchange Award, which includes traveling funds, while engaging with scientific groups from other institutions. By creating a platform for attendees to discover potential research overlaps, within this Session collaboration can be fostered, and connections with likeminded researchers established. Through interactive networking activities, participants can connect and find exciting avenues for collaborative research. Following the scientific program on Monday afternoon, it will be the time to get together and enjoy the evening during the yESAO social program. This includes the yESAO conference dinner at the restaurant Circolino di Città Alta followed by the yESAO Party.

Tuesday, August 29th:

The scientific program on Tuesday will start with comprehensive institute visits: attendees get the chance to visit either the Clinical Center Aldo and Cele Daccò – Villa Camozzi or the Anna Maria Astori Center – Science and Technology Park Kilometro Rosso where they can explore detailed insights into the research conducted in Bergamo. After lunch, the scientific program will continue by the inspiring Keynote lecture of Dr. Seraina Dual on the topic "My Journey in Academia". She will talk about her

research endeavors and share her experience in the academic setting in relation to the talk of Dr. Neidlin. Later in the afternoon, the participants will have the opportunity to get hands-on experience during the yESAO Workshop Session: This workshop will revolve around sustainability in scientific and laboratory work, providing a platform for participants to explore green lab practices, sustainable materials, energy-efficient technologies, life cycle analysis, and collaboration for a greener future. Attendees are encouraged to share their personal experiences and will acquire practical knowledge and strategies to integrate sustainable practices into their work environments.

The great echo with more than 95 registrations for the yESAO meeting reflects the eagerness of the participants to connect with their peers and to create memorable moments and long-lasting collaborations and friendships. The yESAO is excited about the upcoming on-site meeting. We look forward to welcoming you in Bergamo.

Jana, Andi & the yESAO Core Team

yESAO News

The yESAO leveraged the substantial growth of the core team to implement several new initiatives as detailed in the following:

New Website and yESAO Webinar Series

Attention, the yESAO appears in a new website design: <u>https://youngesao.com/</u> Further, on July 11th the yESAO launched the yESAO webinar series, an exciting initiative aimed at connecting and supporting young researchers in the field of artificial organs. The first webinar centered around essential tips and tricks for attending and presenting at conferences. Former yESAO coordinator Dr. Martin Maw shared his firsthand experience of attending his first conference, providing valuable insights into what to expect at these events. Femke Cappon offered practical advice on how to prepare and deliver an engaging conference talk that captivates your audience. Tom Bode introduced the yESAO Buddy Program, which will be part of the upcoming yESAO Congress 2023.



yESAO Buddy Program and yESAO Safety Measures

With the new Buddy Program, the yESAO launches a fantastic mentoring scheme that pairs up junior and senior yESAO members, facilitating knowledge exchange and personal growth. The program aims at fostering the exchange of experiences, practicing before, taking pictures during and giving feedback after the presentation for junior attendees during the (y)ESAO. Further, to ensure safety and comfort of attendees during our annual conferences, the yESAO recently implemented a yESAO safety program and elected a responsible safety team.

Retreat and Conference Planning in Leuven June 16th to 18th 2023

On June 16th the yESAO core team met for its annual retreat in Leuven to welcome the new core team members in person, and to initiate the intensive period of conference planning. During this retreat, colleagues became friends and duties became joy, and the current conference program evolved.



ESAO Winter School 2024

A call has been put out for candidates interested in organizing the ESAO Winter School 2024. So far we didn't receive any expression of interest. Hence, we ask again all our members for expressions of interest in organizing our next Winter School. Please let us know as soon as possible.

Report about activities of International Federation for Artificial Organs (IFAO) (by Chairman Heinrich Schima & IFAO-Secretary-Treasurer Thomas Groth)

IFAO is looking forward to the opening of next ESAO-IFAO Congress organized by Andrea Remuzzi which will take place from August 29 – September 1, 2023 in Bergamo, Italy. IFAO has supported the congress with a stipend to be used for travel grants for PhD students from other continents and invitation of plenary speakers.

To support intercontinental cooperations as one of its key tasks, the International Federation of Artificial Organs (IFAO) has this year the first time announced an intercontinental scholarship of \$5.000 USD. This scholarship shall be be awarded to a young researcher as support for an intercontinental travel to another center to do joint research. 14 Applications were received at the deadline on July 31 and forwarded to the Jury. The Winner shall be announced on the upcoming ESAO-IFAO Congress in Bergamo in late August."

IFAO also has the pleasure to announce that Assist. Prof. Libera Fresiello from University of Twente is willing to take over the function of Secretary-Treasurer of IFAO from January 2024 on, because Thomas Groth has finished his four-year term. Dr. Fresiello has a background in biomedical engineering and cardiovascular therapies and is a member of the European Society for Artificial Organs. The Board Members of IFAO are very grateful to Dr. Fresiello to take over this important duty.



If you have any questions or suggestions regarding the activities of IFAO you can contact ThomasGroth(thomas.groth@pharmazie.uni-halle.de)orHeinrichSchima(heinrich.schima@meduniwien.ac.at)You can also visit the website of IFAO at www.ifao.org.

Working Group Activities

WG Bioartificial Organs

The WG is organizing a symposium at the ESAO Congress 2023 in Bergamo on "Wearable and Implantable Artificial Kidney".

Wednesday, August 30, 2023

AULA 8			
14:00-15:30		B13 - Symposium: Wearable and Implantable Artificial Kidney Chair: <i>D. Stamatialis, W. Fokko</i>	
14:00-14:30	IL-K	An overview of current wearable and implantable artificial kidney initiatives <i>B. Stegmayr</i>	
14:30-14:50	IL	Can financial engineering create an artificial kidney? A. Lo	
14:50-15:10	IL	Portable, wearable & implantable artificial kidneys: What membranes do we need? <i>D. Stamatialis</i>	
15:10-15:30	IL	How to organize an international consortium for WAK/IAK development? F. Wieringa	

The WG is also participating at the JSAO 2023 (Tokyo, Japan) in November.

Furthermore, the WG BAO participates in the COST Action "PerMediK – Personalized Medicine in Chronic Kidney Disease" and in the Dutch Program on Bioartificial Organs, with its Kickoff Meeting last May 2023.

The WG is also organizing the ESAO Congress 2025 at the University of Twente in The Netherlands.

ESAO Members Corner

We welcome the support of ESAO Members to provide information to our website (<u>www.icaot.org</u>). In particular, we would welcome contributions to our Milestones and Virtual Museum. The medical fields of artificial organs and transplantation have accomplished so much in the past decades and have given a better life to so many worldwide that we should recognize their accomplishments and those that made it possible. These fields offer promise for many in the future to provide them a full life.

We continue to look for a permanent site for our Artificial Organ Collection. The history and on-going developments in the fields of artificial organs and transplantation have made and will continue to make major contributions to medical science and the lives of millions worldwide. Link to the article: Artificial Organ Museum looking for a new home: https://onlinelibrary.wiley.com/doi/10.1111/aor.14112

Paul S. Malchesky, D.Eng. President, International Center for Artificial Organs & Transplantation (ICAOT)

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ESAO Corporate Members Corner

Berlin Heart®

Berlin Heart develops, produces and markets innovative systems for mechanical circulatory support. With our products EXCOR® Adult and EXCOR® Pediatric, we cover the entire scope of medical indications. We are the only company in the world offering systems that can support patients of every age and size, from newborns all the way to adults.

Find out more about Berlin Heart on www.berlinheart.de/en/

Corporate Symposium at the 49th Annual ESAO Congress

Learn more about Berlin Heart and our ventricular assistant devices and their applications in the Corporate Symposium on the **49th Annual ESAO Congress**:

Wednesday, August 30, 2023

AULA CASTOLDI - 5				
11:15-12:45		A 12 - Corporate Symposium: New Trends and Applications in Mechanical Circulatory Support Chair: <i>M. Granegger, D. Medart</i>		
11:15-11:45	019-К	Subpulmonary Support of Fontan Patients - From Computer Simulation to Clinical Application S. Hansen		
11:45-12:00	IL	Opportunities and Challenges in Mechanical Circulatory Support E. Schima		
12:00-12:15	O20	Development and Testing of the CorWave Membrane Pump F. Cornat		
12:15-12:30	021	Is It Time to Rethink the Role Of Chronic Animal Studies in MCS Development? I.L. Perkins		
12:30-12:45	022	Mechanical Support for Failing Lymphatic Function: A Conceptual Study A. Escher		

Don't miss the presentation on "Subpulmonary Support of Fontan Patients", held by Dr. Sven Hansen at 11:15-11:45 **"Subpulmonary Support of Fontan Patients - From Computer Simulation to Clinical Application".**

New hope for Fontan Patients

Berlin Heart is proud to present a innovative, standardized, pulsatile, subpulmonary circulatory support for patients with Fontan failure EXCOR ® Revive.

Univentricular hearts are among the most severe congenital heart defects. An estimated 70,000 patients around the world currently live with Fontan palliation, with more being added every year. Fontan circulation can result in what is known as "Fontan failure", meaning that the patient's circulatory system no longer offers adequate support. Heart transplant (HTx) then remains the only long term treatment option.

Patients with Fontan failure often suffer from increasing ascites, protein loss enteropathy (PLE), and Fontan associated liver and kidney disease. Patients' muscles break down to the point that they can hardly bear weight. These complications make heart transplant candidacy difficult or even impossible.

For more information on this topic, we would like to highlight the presentation by Dr. Sven Hansen: "Subpulmonary Support of Fontan Patients From Computer Simulation to Clinical Application" Application". Wednesday, August 30, 11:15 11:45

EXCOR® Revive



EXCOR® Revive combines an innovative venous cannula with the established **EXCOR® VAD-System**, allowing standardized, pulsatile, subpulmonary support.

EXCOR® Revive is intended to compensate for the lack of right heart function in Fontan patients. It can also support a weakening system ventricle.

EXCOR® Revive aims to normalize hemodynamics, improve venous and lymphatic congestion, and mobilize the patient until transplantation.

The story of our first patient: Luca

Fontan patient Luca was 17 years old when he needed to be listed for a heart transplant. However, Luca had to be removed from the transplant list due to significant deterioration because of his failing Fontan palliation (massive ascites, PLE, FALD, massive sarcopenia, etc.). He was weak, immobile, and could barely keep food down.

Together with his treating physicians and his family, Luca then decided to try EXCOR[®] Revive as a lifesaving treatment option. Luca's condition improved steadily on the EXCOR[®] Revive system. His failing Fontan symptoms dramatically improved. He regained the ability to feed himself normally,

and was soon more active and completely mobile, which meant that he could be relisted for heart transplant. After 132 days on the EXCOR[®] Revive system, he underwent successful donor heart implantation.



Luca, the first patient saved with the new venous cannula from Berlin Heart.

Announcements





