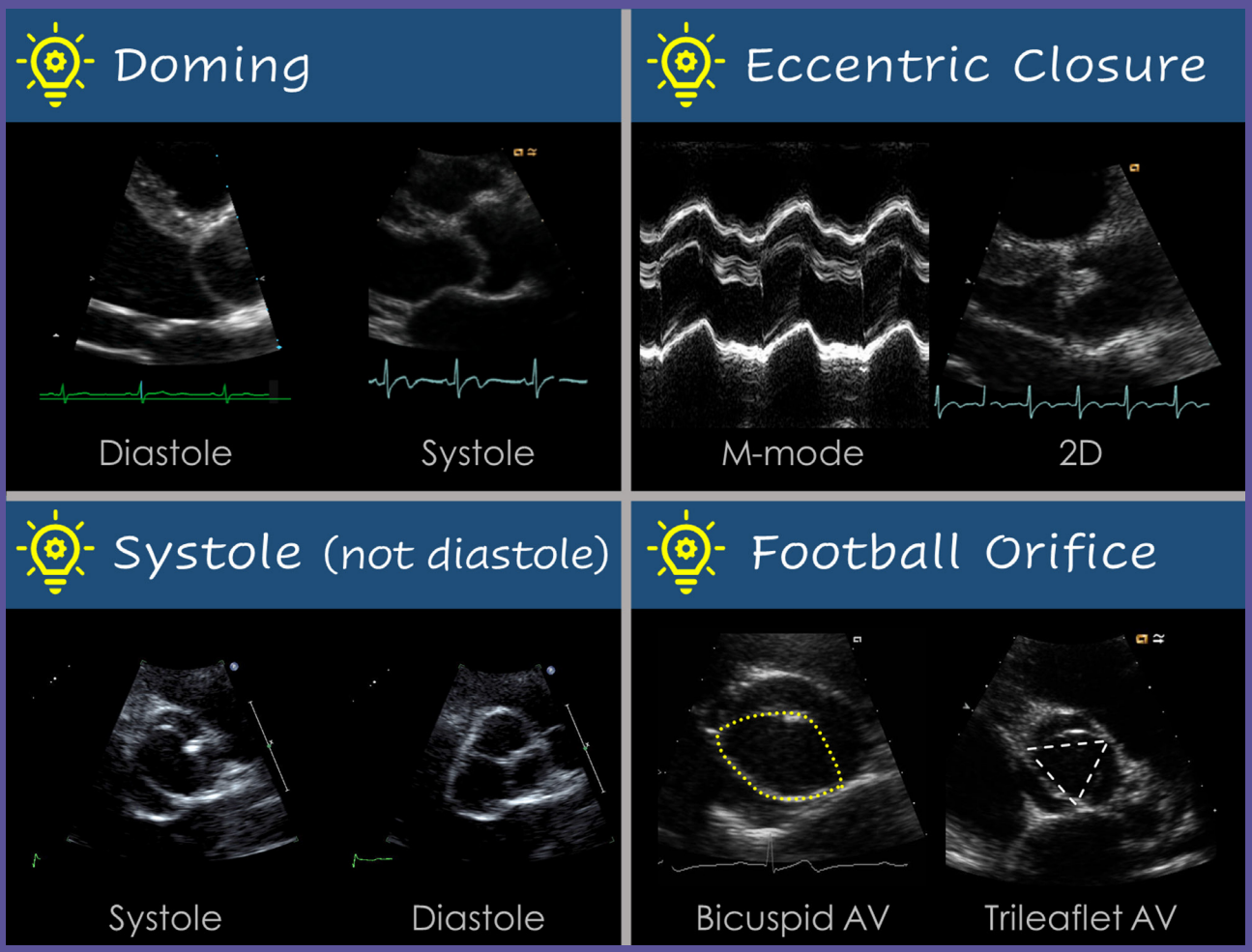
ECHO



VOLUME 11 ISSUE 1 JANUARY 2022

2022 EDUCATION CALENDAR

JANUARY

31st Annual Echo Hawaii

January 17-21, 2022
Kohala Coast, HI

Echo Hawaii 2022 On-Demand
Available February 4 - May 5, 2022
Jointly provided by ASE and the ASE Foundation

FEBRUARY

34th Annual State-of-the-Art Echocardiography: Virtual Experience

February 19-20, 2022
Online with Live Q&A

Jointly provided by ASE and the ASE Foundation

MAY

23rd Annual ASCeXAM/ReASCE Review Course

Content Available May 2022 | VIRTUAL

Jointly provided by ASE and the ASE Foundation

JUNE

33rd Annual Scientific Sessions

June 10-13, 2022 | Seattle, WA

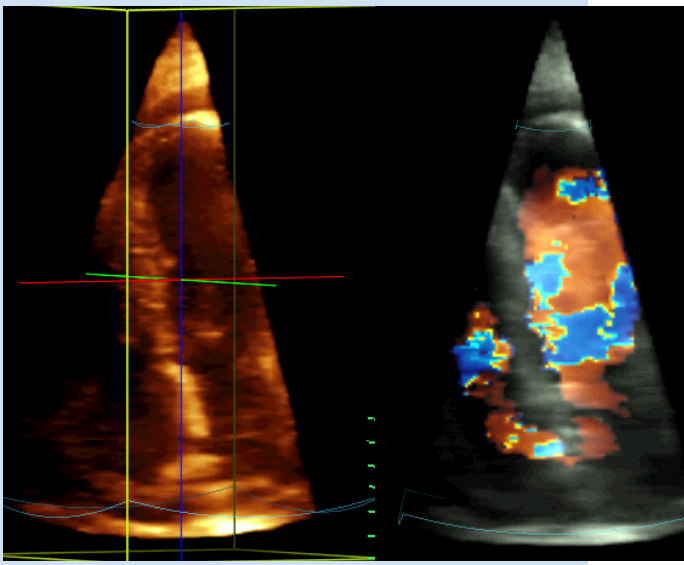
Jointly provided by ASE and the ASE Foundation

OCTOBER

10th Annual Echo Florida

October 8-10, 2022
Walt Disney World®, Florida

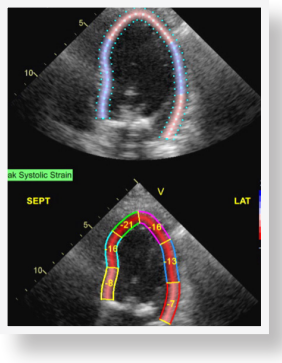
Jointly provided by ASE and the ASE Foundation



Discounted rates for ASE members.
To learn more and register, visit us at ASEcho.org/Education.

This text also appears in the January JASE.
OnlineJASE.com

Contents



+93319

AMERICAN SOCIETY OF ECHOCARDIOGRAPHY

Meridian Corporate Center
2530 Meridian Parkway, Suite 450
Durham, NC 27713

ASEcho.org | ASEFoundation.org

Phone: 919-861-5574

Fax: 919-882-9900

FOLLOW US

Twitter.com/ASE360

Facebook.com/ASECHO

YouTube.com/ASE360

Instagram.com/ASE360

Connect.ASEcho.org

American Society of Echocardiography

Cover art: Bicuspid Aortic Valve Diagnostic Tips. Contributed by: Bonita Anderson, DMU(Cardiac), MAppSc(MedUltrasound), AMS, ACS, FASE, The Prince Charles Hospital, Brisbane, Australia

Member Since 1998

EDITORS' NOTE

ASE is very grateful to our members who contribute to *Echo* magazine and values their willingness to share personal insights and experiences with the ASE community, even if they may not be in total alignment with ASE's viewpoint.

MESSAGE FROM EDITORS

Dear Colleagues:

We are excited to launch the first monthly issue of *Echo* magazine. This online open access publication, previously published only once or twice a year, features in-depth articles on the cardiovascular ultrasound field. As ASE continues to grow, so does the need to have a place to publish important information from our Councils and Specialty Interest Groups (SIGs). Monthly publication of *Echo* magazine will allow for more frequent communications from these groups. It also provides a venue for any of our members to write articles highlighting issues of interest related to echocardiography and an excellent opportunity for this information to be shared far and wide.

An *Echo* Magazine Review Task Force has been established with stakeholders from ASE Councils, and we are both happy to lead this new oversight body to assure that the *Echo* magazine content is consistent with ASE's mission and core values. We are very much looking forward to this new expansion, and hope it becomes a more regular presence in our members' lives. There is so much to share about our vital and essential field!

We ask that you consider writing an article to share with your fellow members and peers. There is a rolling deadline for submission on the 15th of every month. We will also be accepting outstanding images with captions (not accompanied by an article) as submissions that may not fit in the category of case submissions to CASE. You can review the guidelines on formatting, word length, and the process for submitting online at ASEcho.org/EchoMagazine. If you have any questions, please email Echo@ASEcho.org. We look forward to receiving your submissions!

Sincerely,

Meryl Cohen, MD, FASE and Benjamin Eidem, MD, FASE
Echo Magazine Review Task Force Chairs

Echo Magazine Task Force

Ben Eidem, MD, FASE
Co-Editor

Meryl Cohen, MD, FASE
Co-Editor

Aaron Aday, MD, MSc, RPVI
ASE Council on Circulation & Vascular Ultrasound

Neha Soni Patel, Med, BSME, RCCS, RDCS (AE/PE), FASE
ASE Council on Pediatric and Congenital Heart Disease

Ken Horton, ACS, RCS, FASE
ASE Council Cardiovascular Sonography Representative

Jeffrey Astbury, MD, FACC, FASA, MSBE, MSEE, FASE
ASE Council on Perioperative Echocardiography

Ratna Vadlamudi, MD, FASE
ASE Council on Perioperative Echocardiography

STARTING A NEW TRADITION FOR THE ASE FOUNDATION GALA

Contributed by Raymond Stainback MD, FASE, Chief of Non-invasive Cardiology at the Texas Heart Institute at Baylor St. Luke's Medical Center in Houston, Texas and associate professor of Medicine at Baylor College of Medicine.

One of the Society's most treasured annual events is the ASE Foundation Gala. Held since 2009, this black-tie celebration raises significant funds to support Cardiovascular Research. Peg Knoll, sonographer mentor of many, coined the phrase "ASE's Prom" to describe the level of excitement that goes into this event. A wonderful way to connect with others, celebrate the Society's award winners and raise needed funding, each Scientific Sessions we sell tables and seats to this event. In 2021, as part of the Foundation's fundraising efforts to build the Pamela S. Douglas Research Scholar endowment fund, the Foundation Board of Directors decided to offer the opportunity to purchase naming rights for a table at this Annual Research Awards Gala. A gift of $5,000 will name a table in honor or in memory of an ASE luminary (i.e., a member with a significant relationship to ASE) for a period of five years; a gift of $35,000 will name that table in perpetuity. Attendees at the Gala each year will then have the opportunity to buy a seat at the "X Table" for example. This opportunity was recently announced to the ASE Board, and as president, I felt it was fitting for the ASE to support this worthwhile research funding project and be able to use this opportunity to recognize some of our legends in a meaningful way.

After discussion, the Executive Committee authorized the use of 2021 funding unused by the board due to all the Covid-related travel cancellations, to purchase two "Legacy" tables to honor ASE's living legends. Each of these individuals made a big impact on the field and are still making noteworthy contributions to the field.

The first table will be named in honor of ASE's founder, Dr. Harvey Feigenbaum. He has been at ASE's side since 1975, energetically supporting the Society, and continuing to push new advances. Each year he personally attends the Scientific Sessions to award the best young investigator in recognition of his or her significant contribution to research in the field and for their potential to continue at a high level of achievement. These "Feigenbaum Awardees" have met this challenge and several past winners have become ASE presidents—Judy Hung, Jonathan Lindner, and Madhav Swaminathan. We owe Dr. Feigenbaum a debt of gratitude for starting the Society, starting JASE, and his continued role in encouraging the field to advance.

The second table will be named in honor of an international legend, Liv Hatle, the Norwegian scientist whose research and clinical work put Doppler on the map. Hatle, as one of the early women in the field, also became role model for the future generation of young female cardiologists. Now that almost 20% of our membership is from outside the United States, it is fitting to honor this important segment of our membership by recognizing that the echo field is world-wide and important discoveries take place in many settings.

I hope others in our membership will read this article and take this opportunity to buy a seat at one of these tables, or another table for the Gala to be held on June 19 in Seattle, WA. Registration for this event begins this month. I look forward to presiding over this event, along with the chair of the ASE Foundation, and recognizing these pillars of echocardiography, while building funding to support the future careers of others who will come after them.

Raymond Stainback,
ASE President

Introducing the ASE Council on Pediatric and Congenital Heart Disease (PCHD)

Carolyn A. Altman, MD, FASE

Chair, PCHD Steering Committee
caaltman@texaschildrens.org

Carrie Altman is an enthusiastic, long-standing member of ASE, becoming FASE in 1997. ASE has afforded her multiple opportunities for collaboration, friendship, and mentorship (first as mentee, and now as mentor). She is the Associate Chief for Pediatric Cardiology at Texas Children's Hospital. Her practice centers on echo, fetal cardiology, Kawasaki Disease, and CHD. Her husband, children, and grandkids bring joy to her life, and she cannot wait to travel the world again!

Craig E. Fleishman, MD, FASE

Chair-Elect, PCHD Steering Committee
craig.fleishman@orlandohealth.com

Craig Fleishman is the Chief of Pediatric Cardiology and Director of Non-invasive Cardiac Imaging at Orlando Health Arnold Palmer Hospital for Children in Florida. He is a long-time member of ASE, his professional home, where he has had the privilege to serve on multiple committees and task forces as well as the PCHD Steering Committee. He is most proud of his wonderful wife and two adult daughters. When not working, Craig and his wife love to travel the world.

Piers C.A. Barker, MD, FASE

Immediate Past Chair,
PCHD Steering Committee
piers.barker@duke.edu

Piers Barker is Professor of Pediatrics and Obstetrics/Gynecology, and Section Head of Non-Invasive Cardiac Imaging in the Duke Pediatric and Congenital Heart Center. Born in England but raised in Canada, Dr. Barker has been in the United States since his undergraduate and medical school education at Cornell University. He trained in Pediatrics at the Johns Hopkins Hospital, Pediatric Cardiology at the University of Michigan, and joined the Duke University faculty in 2004. Dr. Barker is fascinated in all aspects of imaging, including the intersection of human and veterinary cardiology.

Meryl S. Cohen, MD, MSEd, FASE

ASE Council Representative,
PCHD Steering Committee
cohenm@chop.edu

Meryl Cohen is a Professor of Pediatrics at University of Pennsylvania Perelman School of Medicine and the Associate Chief of the Division of Cardiology at The Children's Hospital of Philadelphia. She is the former echo lab director and now runs the cardiology fellowship program. She recently completed a Masters of Medical Education and has become the Educational Officer for the Cardiac Center at CHOP. She enjoys exercise, reading novels, cross-word puzzles, knitting, and spending time with her family and friends.

Gregory H. Tatum, MD, FASE

Education Committee Representative,
PCHD Steering Committee
gregory.tatum@duke.edu

Greg Tatum is an Associate Professor of Pediatrics at Duke University Medical Center and Director of Education and Director of Quality for the pediatric echo lab. He is a graduate of the first ASE Leadership Academy and a member of the ASE Foundation Board of Directors. A native Texan, who was an exchange student in Madrid, Spain, he combines a passion for travel, echocardiography and education in participation in multiple global health events.

Brian D. Soriano, MD, FASE

Guidelines and Standards Committee Representative, PCHD Steering Committee
Brian.soriano@seattlechildrens.org

Brian Soriano is a Pediatric Cardiologist at Seattle Children's. He is Associate Professor and Adjunct Associate Professor in the Departments of Pediatrics and Radiology respectively, at the University of Washington School of Medicine. He completed his Pediatric Cardiology fellowship and senior fellowship in Noninvasive Cardiology at Boston Children's Hospital. He enjoys spending time with his family, exploring the Pacific Northwest and British Columbia by water, road, or mountains.

David A. Parra, MD, FASE

Scientific Sessions Track Chair, PCHD Steering Committee
david.parra@vumc.org

David Parra is a pediatric cardiologist at Monroe Carell Jr. Children's Hospital at Vanderbilt who specializes in echocardiography and cardiovascular MRI. He is the director of advanced cardiac imaging for Vanderbilt's Children's Hospital. Dr. Parra has been an active member of ASE, and he is the Chair of the Pediatric and Congenital Track of the 2022 Scientific Sessions.

Luciana T. Young, MD, FASE

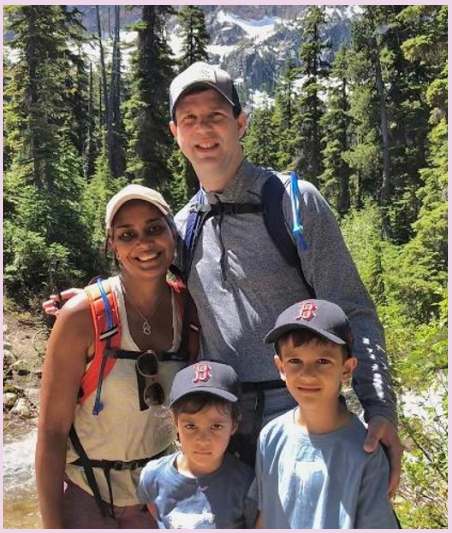
Scientific Sessions Track Co-Chair, PCHD Steering Committee
Luciana.young@seattlechildrens.org

Luciana Young is a pediatric cardiologist who specializes in echocardiography and fetal cardiology. She is the Director of the Echocardiography Laboratory at Seattle Children's Hospital and a Professor of Pediatrics at the University of Washington. Dr. Young has been a long-time member of the American Society of Echocardiography and is honored to be co-Chair for the upcoming 2022 Scientific Sessions in Seattle, WA. When not working, she enjoys cooking, being a volleyball mom, paddle boarding, skiing, and traveling with her family.

Bhawna Arya, MD, FASE

Member at Large, PCHD Steering Committee
Bhawna.arya@seattlechildrens.org

Bhawna Arya is Associate Professor of Pediatrics at the University of Washington School of Medicine and Director of the Prenatal Diagnosis Program and Director of Fetal Cardiology at Seattle Children's Hospital. She has been an active member of ASE since 2010 and is thrilled to serve on the PCHD Steering Committee. When not taking care of her patients, she enjoys exploring the great outdoors and traveling the world with her family.



Pei-Ni Jone, MD, FASE

Member at Large, PCHD Steering Committee
pei-ni.jone@childrenscolorado.org

Pei-Ni Jone is a Professor of Pediatrics, Pediatric Cardiology at the University of Colorado Anschutz Medical Campus and Children's Hospital Colorado and is Director of 3D Echocardiography and Director of Kawasaki Disease Clinic. She is excited to be on the PCHD Steering Committee and active within ASE committees. Her passion is innovative work within the ultrasound field. She loves advocating and mentoring sonographers, fellows, and junior faculty. She enjoys cooking, reading books, and traveling.

Neha Soni-Patel, MEd, BSME, RCCS, RDCS (AE/PE), FASE

Member at Large, Education Committee, PCHD Steering Committee
sonipan@ccf.org

Neha Soni-Patel is the Education Coordinator at Cleveland Clinic Children's in Pediatric Echo. She trains sonographers and fellows, and provides didactics and hands-on training for her lab. She has a background in Mechanical Engineering and recently completed a Masters of Education for Health Professions. In her downtime, Neha enjoys good action movies, a big bonfire with family and friends, challenging jigsaw puzzles, and would love to do more nature traveling.

Seda Tierney, MD, FASE

Member at Large, PCHD Steering Committee
tierneys@stanford.edu

Seda Tierney is an Associate Professor of Pediatrics at Stanford University in the Division of Cardiology, where she runs the Pediatric Vascular Research Laboratory and serves as the Director of Research in the Echo Laboratory. She is an NIH-funded Clinician Scientist with a special interest in tele-health interventions. In addition to imaging, her clinical focus revolves around Kawasaki and Marfan patients. She loves to hang out with her boys, exercise, cook, travel, and see plays/shows. She is thrilled to be part of the Steering Committee.

Jennifer K. Tresness, RDCS (PE/AE), RDMS (FE), FASE

Member at Large, PCHD Steering Committee
jenni.tresness@seattlechildrens.org

Jennifer Tresness is a pediatric and fetal echocardiographer at Seattle Children's Hospital. While working as a Department of Defense civilian she enjoyed her educator role during implementation of tele-echocardiography programs. She is currently serving on the ASEF Annual Appeals Committee as well, and feels very fortunate for these opportunities. Her true joy comes from her family, her kids, time spent on the water, and yoga.

Impressions and Notes
from the Fall Retreat of the Steering Committee of the Council on Perioperative Echocardiography

*Contributed by **G. Burkhard Mackensen, MD, PhD, FASE**, Interim Chair of the Department of Anesthesiology & Pain Medicine at the University of Washington, Director of Interventional Echocardiography at the UW Medicine Heart Institute, Seattle, WA, Chair of the ASE Council on Perioperative Echocardiography (COPE), and co-chair of the ASE Industry Roundtable Committee (IRT).*

WITH THE GENEROUS SUPPORT from the American Society of Echocardiography (ASE), ASE's Council on Perioperative Echocardiography (COPE) recently held a much anticipated in-person retreat in Cary, North Carolina. This full-day event was held on November 19th, 2021 and offered a very timely opportunity to review the new 2020-2025 ASE Strategic Goals and assess their implications for COPE and its members. For this purpose, we were fortunate to have COPE member and ASE past president Dr. Madhav Swaminathan join the steering committee. Following a stimulating introduction to all five goals (see Figure 1) by Dr. Swaminathan, who was instrumental in leading the ASE board of directors through a strategic retreat in 2019, the steering committee conducted a thorough and engaged analysis of COPE's purpose, strengths, potential threats, and opportunities to implement and fully live up to the ASE's current strategic goals. The good news is that COPE not only seems to be well positioned and aligned with the ASE's mission and vision, but also actively works within the current strategic goals. I briefly touch upon each goal here:

1. ASE effectively develops strategic partnerships and funding opportunities to support guidelines and research in cardiovascular ultrasound: A great illustration of COPE's contribution to this goal is a recently published guideline that focuses on a systematic approach to assist the perioperative echocardiographer with surgical decision-making (Guidelines for the Use of Transesophageal Echocardiography to Assist with Surgical Decision-Making in the Operating Room: A Surgery-Based Approach from the American Society of Echocardiography in Collaboration with the Society of Cardiovascular Anesthesiologists and the Society of Thoracic Surgeons). During this retreat, we also had very promising discussions with the Council on Pediatric and Congenital Heart Disease about our shared goal of developing new guidelines that will focus on the utility of 3D transesophageal echocardiography (TEE) in adult patients with congenital heart disease. We have several other guideline documents that are either "work in progress" or in planning stages. We also learned more about ASE's plans to move towards more concise "living guidelines" – a society-wide effort to make guidelines more user-friendly while keeping them current.

The good news is that COPE not only seems to be well positioned and aligned with the ASE's mission and vision, but also actively works within the current strategic goals.

2. ASE is the leader in meeting the educational needs of the cardiovascular ultrasound community: Along with other councils, COPE supports ASE's leadership role in education with various educational offerings. A recently conducted and well-attended webinar on "Decision Making in Complex Endocarditis" is now available on-demand through the ASE's Learning Hub. During the retreat, we also heard from the current COPE scientific track chair Dr. Kimberly Howard-Quijano

Current members of the COPE steering committee who participated in the 2021 November in-person retreat in Cary: (from left to right): Meryl Cohen, MD, MSEd, FASE (council representative); Danny Ramzy MD, PhD (Member at Large); G. Bukhard Mackensen MD, PhD, FASE (Council Chair); Alina Nicoara, MD, FASE (Immediate Past Chair); Sheela Pai Cole MD, FASE (Council Co-Chair); Kimberly Howard-Quijano MD, MS, FASE (Scientific Sessions Track Chair); Jeffrey Astbury MD, FASE, FACC, FASA (Member at Large); Richard Sheu MD, FASE (Member at Large); Ratna Vadlamudi MD, FASE (Member at Large); and Jeremy J. Thaden MD, FASE (Scientific Sessions Track Co-Chair). Yasdet Maldonado, MD, MMM, FASE (Representative to Guidelines and Standards Committee) and Himani Bhatt DO, MPA, FASE (Representative to the Education Committee) are not pictured here, but attended the retreat virtually via Zoom. ASE Past President Madhav Swaminathan MD, FASE, also joined the COPE steering committee meeting as an invited guest.

and co-chair Dr. Jeremy Thaden, who together with the steering committee members have compiled a top-notch series of live and on-demand (virtual) panels and lectures as part of the perioperative track for next year's 2022 ASE Scientific Sessions (speaking of which, the 2022 Scientific Sessions will be held in Seattle, WA – stay tuned for upcoming details here in the *Echo* magazine). The scientific track's content will undoubtedly offer something for everyone interested in perioperative imaging and state-of-the-art TEE.

3. ASE is indispensable for the development of any new cardiovascular ultrasound technology and applications: Such advances are intended to ensure the highest quality patient care and improved clinical outcomes, and COPE participates in these advances in multiple ways. During the COPE retreat, we discussed several new opportunities for perioperative imagers to engage with and contribute to ASE's ImageGuide Registry. This will require us to further refine the perioperative TEE module and identify perioperative echocardiography services that are willing to contribute. Nevertheless, this also presents an exciting opportunity to leverage several databases at the same time. Recently, Dr. Alina Nicoara et al. published a multidisciplinary update on the Society of Thoracic Surgeons (STS) adult cardiac surgery database (ACSD) through the perspective of the echocardiographer (PMID: 34536378). This update not only highlights the importance of collecting accurate and consistent echocardiography data in the STS ACSD but also identifies opportunities for growth and improvement in large database research. During the retreat, Dr. Nicoara also provided us with an update on the accreditation for perioperative echocardiography services by The Intersocietal Accreditation Commission (IAC). Five pilot sites

have been identified: the University of Michigan, Duke University, the University of Washington, the Cleveland Clinic, and the Brigham and Women's Hospital. Despite COVID-19-related delays at the onset of the application process, the IAC is hoping to have initial applications from all five sites by March 2022.

4. ASE is a growing organization and recognized as the world's leading voice in cardiovascular ultrasound: To support the ASE with this goal, the COPE council discussed future opportunities to engage current and new users of cardiovascular ultrasound. Specifically, we aim to better engage several distinct groups: early learners of perioperative imaging, non-traditional users of cardiovascular ultrasound, and our international audience. We hope to accomplish this by pursuing innovative, bite-sized educational options such as live webinars for journal clubs, short vodcasts, and more case-based webinars. To expand our international recognition, we plan to engage with our international partners in perioperative echocardiography and identify opportunities for international leaders in this space to be represented on the steering committee of COPE. The opportunity to reach out to the broader ASE community with monthly communications within the *Echo* magazine will certainly facilitate COPE's outreach.

5. ASE embraces and advocates for all cardiovascular ultrasound users: Similar to when ASE welcomed passionate perioperative imagers when COPE was founded in 1993, COPE embraces new members of this growing council, regardless of background and training. The COPE steering committee also promotes an inclusive and equitable environment for the advancement of all users of cardiovascular ultrasound.

In summary, I found that it was very special being back together in person and having face-to-face discussions around the future of perioperative echocardiography. COPE's mission and vision seem well-aligned with ASE's overall strategic plan. If you are interested in learning more, we would love to hear from you through Connect@ASE or through our council liaison Ms. Natalya Read (NRead@ASEcho.org).

Figure 1: 2020-2025 ASE Strategic Goals

A Sonographer's Guide to our Role in Artificial Intelligence

Contributed by Madeline Jankowski, BS, RDCS, ACS, FASE, Echocardiography Research Associate at Northwestern University, Chicago, Illinois and Member-at-Large on the ASE Council on Cardiovascular Sonography Steering Committee

ARTIFICIAL INTELLIGENCE (AI) is making its way into all facets of our lives, especially in medicine. As something a human can't physically see, the concepts of AI can be confusing and hard to decipher. In my first interaction with artificial intelligence in echocardiography, I thought I was going to walk into a room with a robot scanning my patient! This article will aim to clarify my understanding of this technology, its current uses, and how sonographers aid in the process of building these exceptional tools.

Artificial intelligence is a broad term describing the development of computers to perform human tasks. We see this in everyday use from speech recognition on our smart phones to GPS and traffic navigation.

Artificial intelligence is a broad term describing the development of computers to perform human tasks. We see this in everyday use from speech recognition on our smart phones to GPS and traffic navigation. Machine learning is an application of artificial intelligence that uses algorithms to search data, learn from that data, and then apply what it's learned to make decisions. An algorithm is the set of rules to be followed by the computer. These algorithms are designed by engineers with backgrounds in coding and complex math. Once given this set of directions, computers can then sort through a huge number of data points in a short period of time. In medicine, these data points may be measurements on an echo, or on lab results. It can also be used to assess certain disease states. There are two types of machine learning that we currently use, supervised and unsupervised learning. Supervised learning is an approach that uses labeled datasets to train the computer. For example, you could train an algorithm to identify images of dogs. Supervised learning would have experts label images of dogs in comparison to other animals. The computer then learns to identify the image as a dog or other animal and begins to know what it can skip. The more labeled images you input, the smarter the algorithm will be at detecting which image is a dog. The next step is to get more specific, maybe feeding in images of wolves that may look like dogs. The other approach to machine learning is unsupervised learning, which does not use labels, but lets the computer detect hidden patterns in the data and group them based on these patterns. The tricky part is the inability to know for certain why the computer grouped them, as there are no outputted directions from the computer. This type of learning could be useful in a research space when trying to pick up patterns from a large set of data points to find novel avenues for study. The biggest difference between supervised and unsupervised learning is labeled data. Lastly, deep learning is a subset of machine learning where the algorithms are layered to create an "artificial neural network." This type of AI is the closest computers come to mimicking the human brain's ability to learn, allowing the algorithms to learn and make intelligent decisions on its own. An example of this is virtual assistants like Siri, that learn voice recognition and continue to improve accuracy

as you use it. In medicine, machine learning and, subsequently, supervised learning, is frequently used because of the amount of data we have and the access to labeling done by experts[1]. (Figure 1)

Many echo systems are already using AI in the performance of echocardiograms. A few examples of this includes the machines ability to detect apical views for strain analysis, perform automated measurements, or automated border detection in 3D analysis. These tools are aimed to help the workflow of the sonographer and cardiologist, allowing them more time for patient care and less time spent with post processing or image analysis. Companies outside of hospitals and healthcare centers are also developing tools that have AI technology to further the field of ultrasound. These companies are developing products that aim to accommodate access to ultrasound imaging and advanced techniques or provide real-time acquisition guidance for a non-sonographer. Details about these products are discussed in the article in this issue by Ashlee Davis, BSMI, ACS, RDCS, FASE.

Sonographers are a crucial part of research teams investigating artificial intelligence and also the development of these products that are built with AI technology. For products that use supervised learning to analyze echo images, sonographers are a part of the expert panel for labeling these images! For example, for a software that can detect a particular echocardiographic view, sonographers label images with the correct view, allowing the algorithm to learn how to detect each view. Another way that sonographers are a part of the product development is to provide expert comparison. For example, quantification of left ventricular ejection fraction by machine learning was compared with expert reads and measurements done by sonographers and cardiologists with an r value of 0.94, which indicates a very strong correlation between machine readings and human experts[2]. The presence of sonographers on these studies is imperative to utilize the expertise within our field and to help engineers capture the nuances of our profession. In research labs, artificial intelligence is being studied, and sonographers are a crucial part of the team. A sonographer can be the interface between the clinical and research worlds: coordinating resources for imaging, using advanced technology for data analysis, and working with a multi-disciplinary team. At Northwestern, there is a combination of homegrown research and partnership with AI companies to work on projects incorporating AI technology. At our institution, we are using algorithms to identify data points in a population of patients to aid in streamlining patient care. These algorithms can look at thousands of data points in a matter of seconds, whereas it might take a clinician months to analyze that data. Working with outside companies, we can help to validate products by testing out use in a busy clinical lab, examining the products accuracy, and determining how it meets the needs of our clinicians and patients. AI is on an upward trajectory and sonographers are a vital part of the team, incorporating skill in echocardiography as well as experience with direct patient care. The field of AI is being studied not only to improve care and outcomes for our patients but also to offer focus and streamlining to healthcare professionals. Artificial intelligence enhances echocardiography, and sonographers are a vital part of guiding its impact.

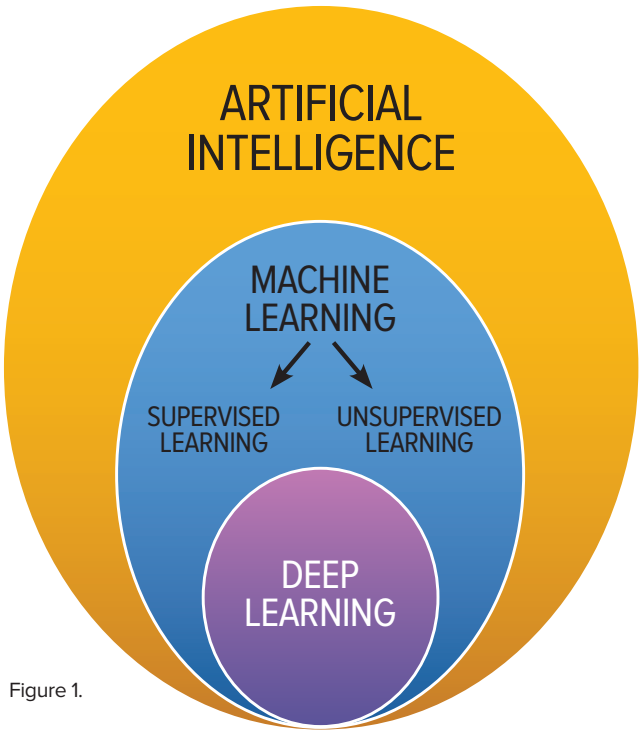


Figure 1.

References

1 Davis A, Billick K, Horton K, Jankowski M, Knoll P, Marshall J, et al. Artificial Intelligence and Echocardiography: A Primer for Cardiac Sonographers. J Am Soc Echocardiogr 2020;33:1061-6. doi.org/10.1016/j.echo.2020.04.025

2 Asch FM, Poilvert N, Abraham T, Jankowski M, Cleve J, Adams M, et al. Automated Echocardiographic Quantification of Left Ventricular Ejection Fraction Without Volume Measurements Using a Machine Learning Algorithm Mimicking a Human Expert. Circ Cardiovasc Imaging. 2019;12(9):e009303. doi:10.1161/CIRCIMAGING.119.009303

Artificial Intelligence to the Cardiac Sonographer: Friend or Foe?

Contributed by Ashlee Davis, BSMI, ACS, RDCS, FASE, Chief Technologist in the Cardiac Diagnostic Unit at Duke University Hospital, Durham, NC and Member-at-Large on the ASE Council on Cardiovascular Sonography Steering Committee.

ARTIFICIAL INTELLIGENCE (AI) - just the name sounds kind of scary, reminiscent of a bad sci-fi movie from the '80s where robots take over the earth. As AI has gained momentum over the last few years there have been various feelings expressed by Cardiac Sonographers. A mixture of interest, excitement, trepidation, and "What the heck is it?". The most common question has been "Will AI replace cardiac sonographers?". I feel confident in answering that question with a resounding "No". We need not be concerned that AI will replace cardiac sonographers, we should instead be asking how can AI make our jobs easier, more accurate, and hopefully less painful. One of the things that makes our field both very satisfying, as well as introduces variability, is its dependence on user expertise and skills. As we all know, user variability is an Achilles heel of echocardiography. By introducing more machine learning software and reducing the amount of echocardiographer-based decisions, AI aims to reduce this inter-observer variability. AI can also assist new users by increasing confidence in image optimization and acquisition and help more seasoned sonographers use their knowledge and expertise in a more efficient and impactful way.

If you are interested in learning more about how AI is developed, and particularly what the sonographer's role has been, check out *A Sonographer's Guide to our Role in Artificial Intelligence* by Madeline Jankowski, BS, RDCS, ACS, FASE, also found on page 14. A combination of deep learning, supervised learning, and unsupervised learning is being used by companies to develop AI software in echocardiography. Sonographer and echocardiographer expertise are heavily relied upon to ensure that engineers have a robust understanding of the nuances

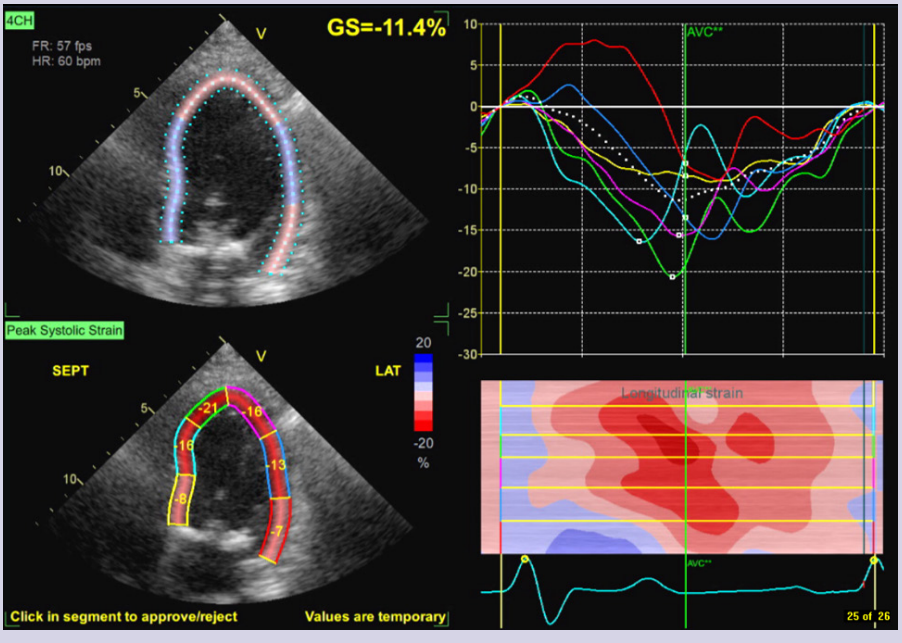


Figure 1. Apical 4ch Global Longitudinal Strain obtained by GE AI AFI LV

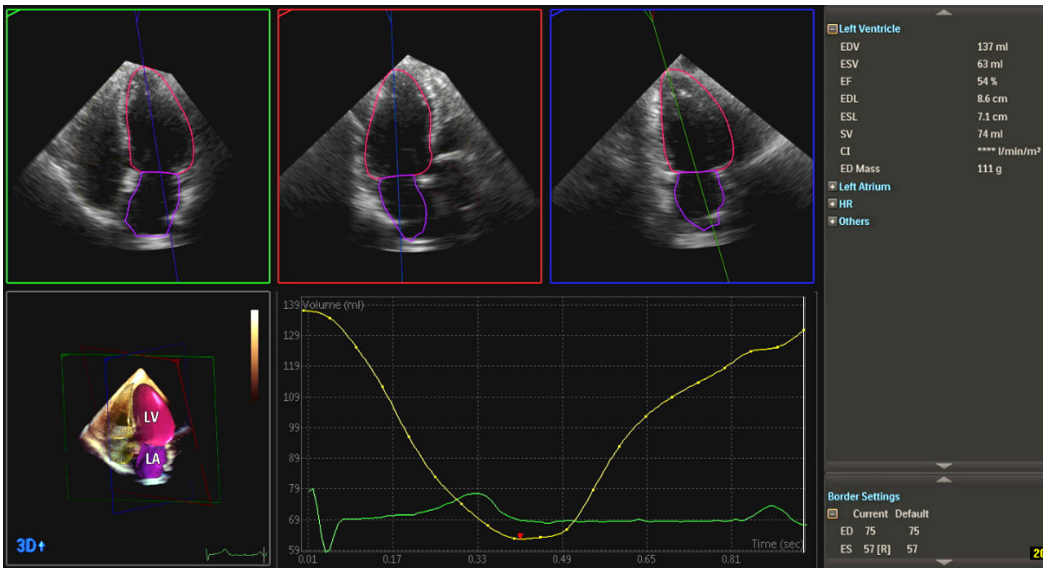


Figure 2. Philips Dynamic HeartModelA.I. application.

and details required in the field of echocardiography.

There are many ways that AI has already been integrated into our daily workflow without us even realizing it. Some of you may recall when the development of the automatic image optimization button first came about on ultrasound machines. This "easy button" assesses the gain levels, time gain compensation, and compression and adjusts it automatically to a more homogeneous and appropriate level. Many machine platforms now have a setting to make this adjustment automatic throughout your exam. Features such as this can decrease sonographer's probe time on the chest by allowing them to use their skills to obtain the optimal image without needing to make minute adjustments. This algorithm also aims to raise the image quality of less experienced users by making these adjustments where they may not yet be proficient. A more modern application of AI integration is auto-recognition of the Apical views needed for strain imaging. In many machines, the software has the capability to recognize and label the view such as Apical 4-chamber, Apical 2-chamber, and Apical 3-chamber. Some will even auto-detect and trace borders with only one click required by the sonographer. This auto-recognition and tracing can decrease the time needed by sonographers to assess the image, place starting points, and assign views when doing strain analysis. (Figure 1)

Auto ejection fraction is also a widely used AI software on many machines in clinical use today. In some cases, the software uses large banks of hearts previously measured by expert users (supervised learning), then analyzes the image obtained and compares it to the bank of data to report out ejection fraction and volumes. This may be done with both 2D and 3D data. A study out of the University of Chicago compared the Philips HeartModel A.I. with traditional 2D EF measurements, HeartModel A.I was found to reduce quantification time by 82% when done without edits, and 63% with minor edits. (Figure 2)

We need not be concerned that AI will replace cardiac sonographers, we should instead be asking how can AI make our jobs easier, more accurate, and hopefully less painful.

Another example of AI use on clinically available ultrasound machines today is AI-based spectral Doppler recognition and measurement. (Figure 3) This feature decreases user clicks by automatically opening the appropriate measurement package and auto-measuring spectral Doppler signals. This decreases sonographer time to measure and increases inter and intra-observer variability. I find this feature especially helpful in patients with an

arrythmia that require measurements over multiple beats, as well as in device optimization or research studies that require repetitive measurements.

As we think about the ways AI will be used in the future, image assessment and diagnosis prediction will likely become part of the echo reader's toolbox. This will not replace clinical knowledge or physician expertise but instead will support their diagnosis with deep learning data. One of the biggest concerns amongst all echocardiographers is missing a diagnosis. The utilization of AI can act as a support backup for readers to catch patterns seen by the software. One example of this type of pattern recognition is in infiltrative disease such as Amyloidosis, which has echo findings easily discovered by machine learning. Imagine a pop-up window while reading an echo that states the patient's likelihood of having Amyloidosis based on patterns discovered by the software program. This will continue to require the physician's clinical expertise but will alert them to investigate this possible diagnosis.

In all of these examples of current and future uses of AI in echocardiography, there are two overarching themes: saving time and improving reproducibility. Adequate time to perform an echo, complete with complex measurements and advanced imaging techniques, is a concern for echo labs across the country. Patients are becoming more complex, and the demand for echo services seems to only be growing. The ability to improve sonographer workflow and decrease tedious button pushing will allow sonographers to move patients through the lab more efficiently while also spending their time using their skills for more advanced work. We also know that the majority of cardiac conditions we see in the echo lab are chronic conditions that require following patients over many years. For these patients, it is extremely important that our measurements are reproducible and can easily be repeated by sonographers at all skill levels. This is no easy task, but with the help of AI, we can reduce variability in many of the measurements discussed above. I hope that this article has helped to remind you that we are already using AI in much of our echo work today, and it should be looked at not as a tool to replace us, but as a tool to help us.

References

1. Medvedofsky, D. MD, Salgo, I. MD, Weinert, L, BSc, Mor-Avi, V, PhD, Lang, R.M MD. Automated transthoracic three-dimensional echocardiographic quantification of the left heart chambers. University of Chicago Medical Center, Chicago, Illinois. USA, incenter.medical.philips.com.

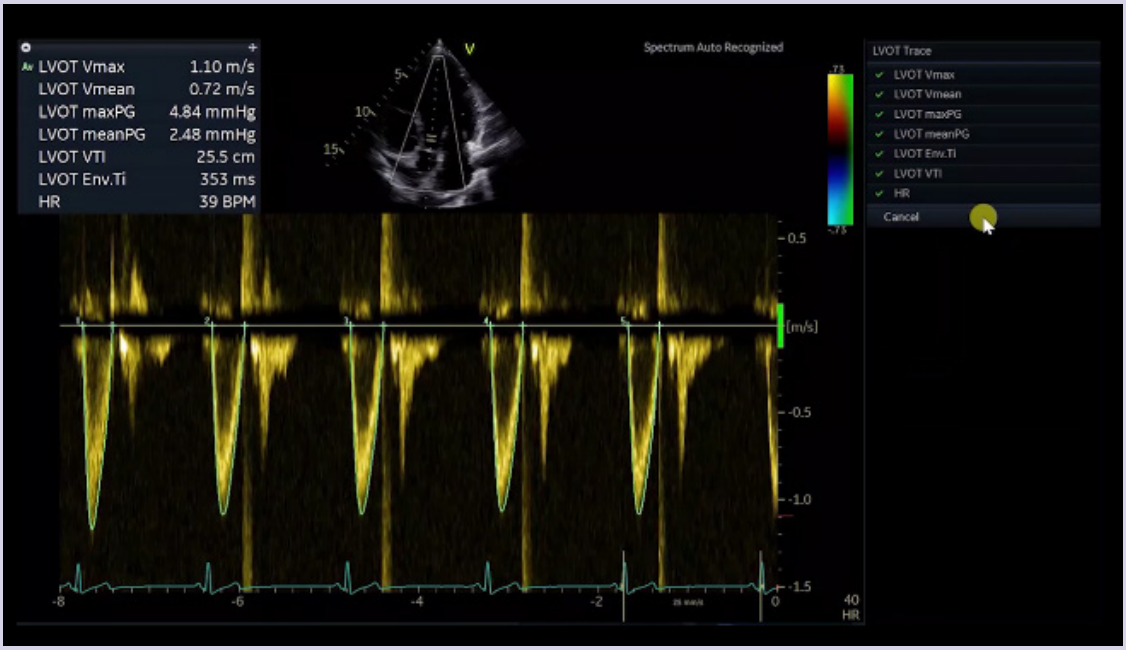


Figure 3. Multi-beat LVOT tracings performed by Cardiac Auto Doppler

WOMEN of PIONEERS
Echocardiography

Echocardiography is the primary modality cardiologists, and sonographers use to diagnose heart disease in children and adults. It has become so ubiquitous that use has extended to other practitioners such as emergency room physicians, critical care specialists, and neonatologists. This article will present three women pioneers in echocardiography, Liv Hatle, Catherine Otto, and Roberta Williams, who have made outstanding contributions to echocardiography.

The use of echocardiography in the medical field began with Edler and Hertz. Their groundbreaking work in the 1950s, transformed SONAR (sound navigation and ranging) and RADAR (radio detection and ranging) which had previously been used to detect enemy submarines and airplanes in World War II into a system that could "see" into the body without radiation. Though initially shunned from the medical community, echocardiography eventually took hold approximately 20 years after its first use in humans to detect mitral stenosis. In the U.S., Harvey Feigenbaum was one of the first cardiologists to apply cardiac ultrasound in the real world to detect pericardial effusions and to measure ventricular size and function.

Liv Hatle, MD, FASE, pictured here with A. Jamil Tajik, MD, the first Lifetime Achievement Award winner at ASE's 2010 Scientific Sessions.

Once color and spectral Doppler were introduced, it was the work of Liv Hatle and her colleagues that brought their clinical applications to the forefront. Dr. Hatle completed medical school in Oslo, Norway, and became an internist. In a recent interview for an honorary doctorate in Leuven, Belgium, she was noted to say, "When I started studying medicine in that period, I saw no difference between the abilities of men and women. And my parents had absolutely no objection to me studying medicine."[1] She eventually made her way to Trondheim, Norway where she specialized

Contributed by **Meryl S. Cohen, MD, MS Ed, FASE, FACC**, Director of the Children's Hospital of Philadelphia Cardiology Fellowship Training Program and Associate Chief of the Division of Cardiology, Philadelphia, PA; and **Ritu Thamman, MD, FASE, FACC**, Assistant Clinical Professor of Medicine at the University of Pittsburgh School of Medicine, Pittsburgh, PA.

in cardiology and developed an interest in the new technology called echocardiography. She humbly stated, "Because this technique was at my disposal in a very early stage, I had time to work out its potential. But otherwise, I just did my best."[1]

Some of her groundbreaking research included findings that we take for granted when performing echocardiograms today. She first reported that continuous wave Doppler could estimate maximal blood velocities across stenotic valves in the heart and that this approach was feasible in children with aortic valve disease and coarctation of the aorta.[2-4] Other remarkable contributions include such observations as: use of continuous wave Doppler to measure the pressure drop across a ventricular septal defect [5], pressure half-time as a measure of severe aortic regurgitation[6], and noninvasive estimation of valve area in aortic stenosis using 2D echocardiography and Doppler. [4] She was also one of the first to report noninvasive estimate of right ventricular pressure using the tricuspid regurgitation jet, something that is done in almost every echocardiogram performed in the present day.[7]

> **"I was never consciously a role model. My exceptional position never caused me any difficulty, but perhaps I was just lucky to work in healthy environments..."**
>
> –Dr. Liv Hatle

Of her role as a woman in a field dominated by men at that time, she stated that she never felt disrespected because of her gender. "I was never consciously a role model. My exceptional position never caused me any difficulty, but perhaps I was just lucky to work in healthy environments..."[1] Dr. Hatle has deservedly been named the mother of Doppler echocardiography, and her 1982 textbook *Doppler Ultrasound in Cardiology* remains one of the most significant contributions on this topic.

Catherine Otto is another pioneer in echocardiography and a female icon in adult cardiology. She is presently the J. Ward Kennedy-Hamilton Endowed Chair in Cardiology at the University of Washington. She broke the glass ceiling by becoming the Editor-in-Chief of *Heart*. In addition, Dr. Otto received the Lifetime Achievement award from ASE in 2020 and the Distinguished Alumni Award from the University of Washington in 2013. Despite her tremendous accolades, including the authorship of several books and hundreds of manuscripts, Dr. Otto has always been approachable and has sponsored women whenever she could. It is a proud moment when a young echocardiographer sees this icon present at the late-breaking clinical trials on TAVR at the ACC and holds her own against other giants in the field. She is an extraordinary role model and remains committed to mentoring women in echocardiography and cardiology.

On the pediatric side, Roberta Williams is one of the primary innovators who started the field of congenital cardiac imaging. She attended the University of North Carolina at Chapel Hill for medical school where she researched phonocardiograms and electrocardiograms with Dr. Ernest Craig. As a medical student, she rotated in pediatrics at Boston Children's Hospital. She was so well informed about phonocardiograms from her previous work that when Dr. Alexander Nadas (Chief of Cardiology) met her, he offered her a fellowship on the spot. She completed a medicine-pediatrics residency at Chapel Hill before returning to Boston Children's Hospital for her cardiology fellowship. Dr. Nadas went to London on sabbatical and when Dr. Williams visited him there, he stated that he had heard about a new technology called ultrasound of the heart and

Selfie Time with Ritu Thamman, Catherine Otto, and ASE Past President Judy Hung.

Roberta Williams, MD, a primary innovator in starting the field of congenital cardiac imaging.

(Photo courtesy of Children's Hospital Los Angeles)

that she was going to take this on as her project. Boston Children's Hospital purchased an ultrasound machine with grant funding, and she started to use it to help diagnose children with congenital heart disease undergoing open heart surgery. At the same time that she was asked to start an echocardiography laboratory at Boston Children's Hospital, she was also tasked with starting one of the first pediatric cardiac intensive care units. She spent endless hours using echocardiography to enhance diagnosis of congenital heart disease to initially complement cardiac catheterization but then to ultimately overtake it as the primary diagnostic modality.

Regarding pediatric echocardiography, Dr. Williams went on to report the first experiences with such congenital heart defects as common atrioventricular canal defect[8], valvar stenosis[9], atrial septal defects[9], left ventricular inflow obstruction[10] and transposition of the great arteries[11]. In addition, along with one of her cardiology fellows Fred Bierman, Dr. Williams was the first to describe the subxiphoid view [12-14], a view that pediatric echocardiography laboratories use daily to detect many cardiac lesions of the systemic veins, atrial septum, ventricular septum, and the outflow tracts. She even pioneered the use of transthoracic echocardiography to guide balloon atrial septostomy in transposition of the great arteries so that critically ill infants did not have to be transferred to the cardiac catheterization laboratory for that procedure.[15] It is not surprising that Dr. Williams held many leadership positions over her remarkable career. She ultimately became Division Chief of Pediatric Cardiology at UCLA, and Department Chair of Pediatrics at UNC. She returned to California where she recently stepped down as Department Chair of Pediatrics and VP for Academic Affairs at Children's Hospital of Los Angeles and where she continues to mentor and teach.

I had the opportunity to talk with Dr. Williams about her career and life experiences as a pioneer in pediatric echocardiography. I asked her how she managed to be a successful leader at a time when women were not given such opportunities. With her great sense of humor and humble demeanor, she said that being tall helped, being naïve meant you didn't have the sense to be quiet and that she knew that she had to be unafraid to fail in order to succeed. "If you fall on your face you need to know if you will be able to get up and go on." She is too modest to say that she worked tirelessly, always said yes when given a challenge, and was exceedingly good at her job.

Liv Hatle, Catherine Otto, and Roberta Williams have paved the way for women practitioners in echocardiography. They innovated and collaborated, all in the effort to provide outstanding care to their patients. They were the ultimate translational physician-scientists. Despite the obstacles of gender at the time, these women had the fortitude to overcome biases (in some cases by ignoring them) to ultimately achieve exceptional success in their field.

References

1. https://www.kuleuven.be/english/about-kuleuven/honorary-doctorates/liv-hatle
2. Hatle L. Maximal blood flow velocities-haemodynamic data obtained noninvasively with CW Doppler. Ultrasound Med Biol 1984;10:225-37.
3. Hatle L. Assessment of aortic blood flow velocities with continuous wave Doppler ultrasound in the neonate and young child. J Am Coll Cardiol 1985;5(Suppl I):113S-119S.
4. Skjaerpe T, Hegrenaes L, Hatle L. Noninvasive estimation of valve area in patients with aortic stenosis by Doppler ultrasound and two-dimensional echocardiography. Circulation 1985;72:810-8.
5. Hatle L, Rokseth R. Noninvasive diagnosis and assessment of ventricular septal defect by Doppler ultrasound Acta Med Scand Suppl 1981:645-7.
6. Samstad SO, Hegrenaes L, Skjaerpe T, Hatle L. Half time of the diastolic aortoventricular pressure difference by continuous wave Doppler ultrasound: a measure of the severity of aortic regurgitation? Br Heart J 1989;61:336-43.
7. Skjaerpe T, Hatle L. Noninvasive estimation of systolic pressure in the right ventricle in patients with tricuspid regurgitation. Eur Heart J 1986;7:704-10.
8. Williams RG, Rudd M. Echocardiographic features of endocardial cushion defects. Circulation 1974;49:418-22.
9. Williams RG, LaCorte MA. Echocardiographic evaluation of valvar and shunt lesions in children. Prog Cardiovasc Dis 1978;20:423-40.
10. LaCorte M, Harada K, Williams RG. Echocardiographic features of congenital left ventricular inflow obstruction. Circulation 1976;54:562-6.
11. Bierman FZ, Williams RG. Prospective diagnosis of d-transposition of the great arteries in neonates by subxiphoid two-dimensional echocardiography. Circulation 1979;60:1496-502.
12. Bierman FZ, Williams RG. Subxiphoid two-dimensional imaging of the interatrial septum in infants and neonates with congenital heart disease. Circulation 1979;60:80-90.
13. Bierman FZ, Williams RG. Prospective identification of ventricular septal defects in infancy using subxiphoid two-dimensional echocardiography. Circulation 1980;62:807-17.
14. Sanders S, Bierman FZ, Williams RG. Conotruncal malformations: Diagnosis in infancy using subxiphoid two-dimensional echocardiography. Am J Cardiol 1982;50:1361-7.
15. Lin AE, DiSessa TG, Williams RG. Balloon and blade atrial septostomy facilitated by two-dimensional echocardiography. Am J Cardiol 1986;57:273-7.

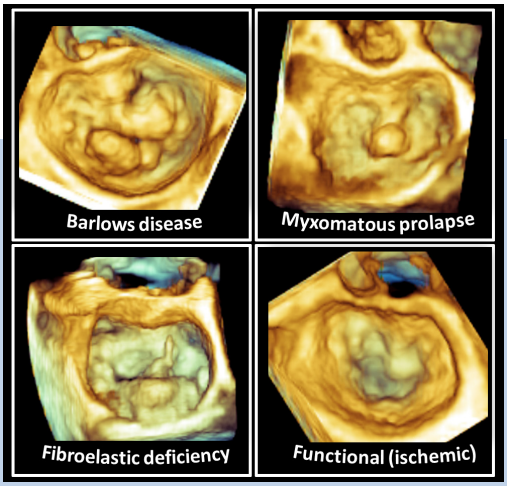
NEW ADD-ON CPT CODE +93319
AND VALUE FOR 3D ECHOCARDIOGRAPHY

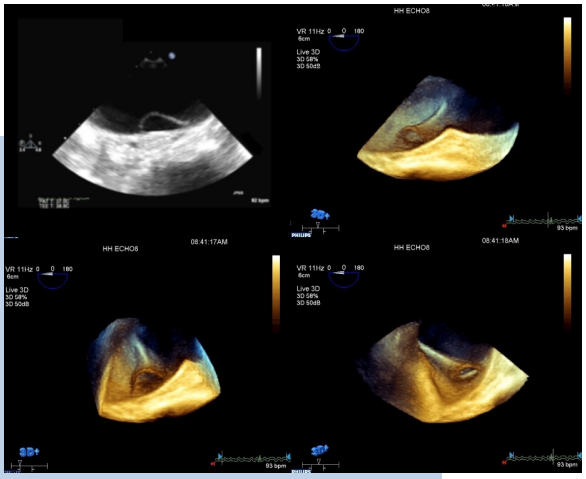
Contributed by Contributed by **Susan A. Mayer, MD, FACC, FASE**, St. Luke's Mid America Heart Institute, Kansas City, MO, Chair and CPT Advisor, ASE Advocacy Committee; and **Denise Garris, CPC**, The Korris Group, Washington, D.C.

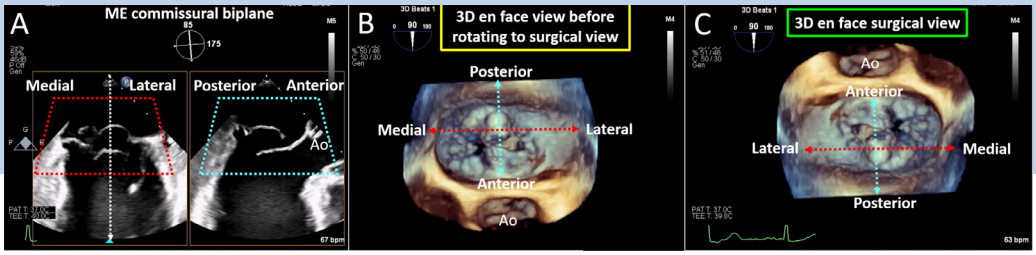
ASE is committed to ensuring that echocardiography services are appropriately identified and reimbursed. ASE worked to develop and value a new add-on CPT code for three-dimensional (3D) echocardiography. On November 2, 2021, when the Centers for Medicare and Medicaid (CMS) Medicare Physician Fee Schedule final rule was published, it included a new add-on code for 3D echo +93319©. This code along with the RUC-recommended physician work RVU of 0.50 for this new code were effective on January 1, 2022.

Add-on CPT code +93319 describes the clinical work involved in 3D echocardiographic imaging and post-processing during transesophageal echocardiography, or during transthoracic echocardiography for congenital cardiac anomalies and includes the assessment of cardiac structures and function (cardiac chambers, valves, left atrial appendage, interatrial septum, and function for example), when performed. To use this new add-on CPT code, you must list this code in addition to the appropriate base echocardiography code: congenital transthoracic (CPT codes 93303, 93304) or transesophageal echocardiography (CPT codes 93312, 93314, 93315, 93317). It is important to note that this is not an add-on code for CPT code 93355 since this code already includes 3D imaging for guidance of a structural intervention.

It is recommended that the ordering provider request 3D imaging while ordering the transesophageal echocardiogram or a congenital transthoracic echocardiogram. The add-on code can also be added by the echocardiographer when 3D imaging is deemed medically necessary. However, prior authorization may be required before the 3D procedure. In addition, all medically appropriate documentation about why







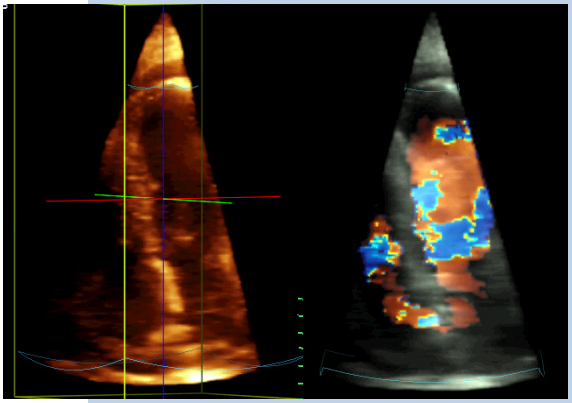
3D imaging is needed is recommended on the echo report.

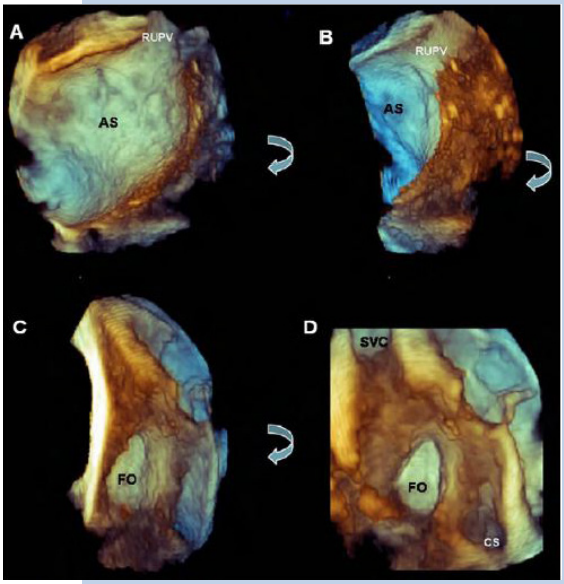
Additionally, there are two existing CPT codes 3D imaging 76376 and 76377. These codes are for 3D rendering with image interpretation and image post-processing under concurrent physician supervision. The physician work RVUs for CY2022 is – 76376 – 0.20; 76377 – 0.79. CPT codes 76376 and 76377 are not add-on codes. ASE encourages providers to refer to the CPT® code descriptions to ensure that a billed code meets the specific requirements defined for each individual code. The local Medicare contractor/payer should be contacted for interpretation of applicable policies. Finally, the National Correct Coding Initiative (NCCI) edits should be reviewed.

CPT code +93319 is a new code for CY2022, therefore coverage and reimbursement are being established. Often, it will take time for commercial payers to review and support new technology codes/policies and the associated literature. The COVID pandemic may delay the process even further. Criteria for coverage/indications for use is established by the individual payers is based on their individual policy and criteria. We have not yet seen updated coverage policies for CY2022. Reimbursement for new codes and technologies and clinical indications is a process. Now that there is a CPT code to accurately report the work of 3D imaging during the echocardiography service, filing claims with the payers will expedite the coverage process, build awareness of clinical utility, and lead to reimbursement.

ASE suggests that providers always verify with the payers if prior authorization must be approved in advance. Claims can be appealed based on the individual patient issue and how 3D supported the diagnosis or treatment for patients with non-coverage policies. There are multiple peer reviewed articles which highlight how 3D supports patient management, and it is recommended this be included in an appeal packet. In addition, when submitting an appeal, providers can also submit clinical literature specifics or appropriate use criteria guidelines as support.

Finally, ASE retains an expert in coding to answer individual member coding questions. This service is available by logging in the ASE Member Portal and clicking "Ask a Coding Expert" to get an answer from an expert.





REALITY OF VIRTUAL LEARNING

*Contributed by **Christina LaFuria**, ASE's Vice President of Educational Activities*

Over the past two years, the online education world has been transformed. What was once a secondary option for education, virtual learning has now become the primary place our members turn for continuing education.

ASE has embraced this new world. From adding the virtual classroom as part of our in-person meetings to creating completely virtual courses to reach a larger audience, ASE values the added benefit virtual learning offers our members. Although not new, virtual learning has become the heart of ASE's education. The ASE Learning Hub is a convenient, central place where ASE education unfolds. Although there are many fundamental similarities between a traditional in-person course and the online education experience, learning through a virtual classroom offers many benefits that traditional programs don't provide. Here are a few that made our list of top benefits:

Access to coursework from anywhere at any time – The freedom to study and complete coursework 24/7 from anywhere and at any time that suits a busy schedule.

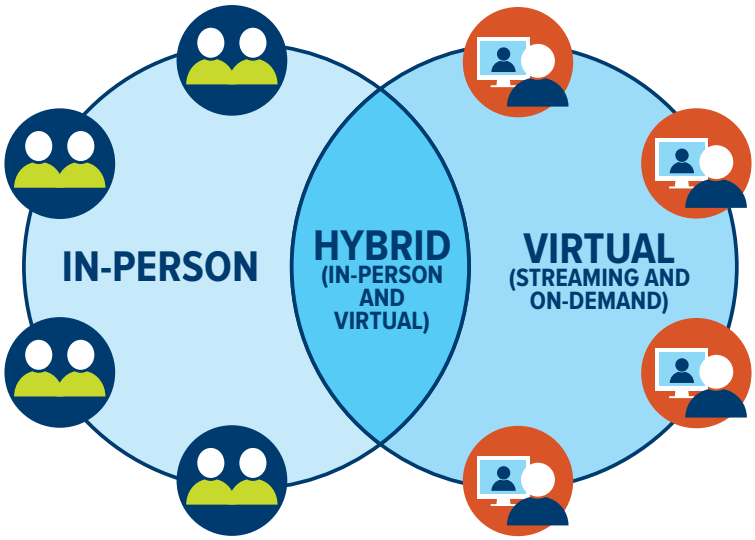
Effective time management – An online education provides a welcome environment for working adults who need to balance work and family.

Expanded world view – Online courses attract attendees from across the U.S. and around the world, who bring different perspectives from diverse cultures.

In-Person Learning vs. Hybrid Leaning vs. Virtual Learning

In-Person learning is large part of what ASE has offered for over 30 years. Echo Hawaii, State-of-the-Art, ASCeXAM/ReASCE Review Course, and Echo Florida provided the opportunity to focus on specific subject matter and have our attendees engage with our expert faculty. Often times, there are workshops or learning labs to further enhance the experience. Our annual Scientific Sessions is our signature event that offers a variety of learning styles in addition to many networking opportunities.

Virtual learning, also referred to as online learning, is what ASE has offered over the years through ASEUniversity and now the ASE Learning Hub. Our education portfolio includes webinars, JASE articles, online courses, and lecture series. Our members are able to claim CME and MOC credits online as well. All of these activities can be accessed from any digital device at any time.



ASE's virtual offerings have expanded over the past 20 months to include:

- Virtual courses – Presentations that are either delivered live or pre-recorded by expert faculty and include live Q&A sessions. These events are broadcast on a specific date at a published time.
  - Echo Access: State-of-the-Art (March 2020)
  - 2020 ASCeXAM/ReASCE Review Course (Content Online in May, Live Q&A August)
  - ASE 2020 Scientific Sessions (August 2020)

- Advance Echo Virtual Experience (February 2021)
- 2021 ASCeXAM/ReASCE Review Course (Content Online in May, Live Q&A July)
- ASE 2021 Scientific Sessions (June 2021)
- Echo Access: Advanced Imaging for Sonographers (October 2021)
- Echo Florida Virtual Experience (October 2021)
- Echo Access: Advanced Echo (coming in March 2022)
- Echo Access: Pediatric and Congenital Focus (coming in 2022)

- On-demand content – Recordings from our in-person courses and virtual courses. This type of content allows for our members that couldn't attend the original activity to attend on their own schedule. Great for supporting different time zones, schedules and commitments.

Hybrid learning is the best of both worlds. Although there are many different definitions of hybrid learning, ASE defines it as the capability to have one group of in-person/face-to-face attendees connect virtually with other meeting attendees. This allows for those who can't attend in person to still take part in a live portion of the meeting. The ASE 2022 Scientific Sessions will be a hybrid learning event.

ASE Education – Making the Transition

In 2022, ASE plans to offer all three forms of education. In-person courses will either be a hybrid event or we will be offering selected content on-demand after the event.

ASE Scientific Sessions 2022 will be a hybrid event. There will be in-person sessions offered as well as live streaming of selected sessions for those who can not attend. There will also be sessions that are pre-recorded and offered on-demand only. This allows for more education than one three-day event can offer. All the live content will be recorded and offered on-demand as well.

The 22nd Annual ASCeXAM/ReASCE Review Course will be virtual in 2022. This allows our atteedees to study on their time, at their pace, giving them time to process the information and be better prepared for the exam. ASE will also offer a live Q&A session to all attendees to allow them to have their questions answered and concepts explained.

Echo Hawaii, State-of-the-Art, and Echo Florida will have a live component but also offer the content on-demand. The course will be recorded and then shared with attendees for 90 days after the event. This allows for those that attended live to revisit their favorite lectures as well as make the content available to our members who weren't able to attend.

ASE will continue to grow our catalog of virtual offerings in our ASE Learning Hub. Here are just some of the new products we have to offer:

- **ASE's Comprehensive Sonographer Curriculum Resource** – This educational product is designed to be a curricular resource for Cardiac Sonography Programs. Current curated ASE content was mapped to Standards and Guidelines for the CAAHEP CVT and DMS programs. ASE content was also mapped to the NEC document. From this curriculum mapping activity, a curricular resource for accredited Cardiac Sonography programs was developed. *Available now*.
- **Formula Review Guide Part 3: Strain, Stress, 3D and Ultrasound Enhancing Agents** – This is the final volume of our Formula Review Guide series. This guide focuses not only on formulas but also has references for clinical applications. *Coming Soon*.
- **Advanced Cardiac Sonographer Review Guide – 2nd Edition** – Created based on the revised format of the ACS exam, this video and workbook set includes 33 modules on a variety of topics. Each lecture has been carefully designed to include a thorough review and clinical application through real video case study presentations. The questions associated with this product include a variety of formats that include multiple choice, multiple response, fill in the blank, and matching. *Available now*.

What does the Future Hold?

That is the questions of the times. Whatever that might be, ASE will continue to embrace the evolution of education, both in-person and virtual. We hope you will join us.

ECHO

ASE'S MISSION

To advance cardiovascular ultrasound and improve lives through excellence in education, research, innovation, advocacy, and service to the profession and the public.

VOLUME 11 ISSUE 1 **JANUARY 2022**