

# NEWS IN ultrasound

AI AND SIMULATION IN EDUCATION AND CLINICAL PRACTICE

ISSUE 6



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## Intelligent Ultrasound enters into an agreement with FUJIFILM SonoSite, Inc. to develop clinician training

*Intelligent Ultrasound is pleased to announce that FUJIFILM SonoSite, Inc., specialists in developing cutting-edge, point-of-care ultrasound solutions, and part of the greater Fujifilm Healthcare portfolio, has entered into an agreement with the Intelligent Ultrasound Group allowing the companies to deliver a training solution to the point-of-care ultrasound (POCUS) market. The agreement includes Intelligent Ultrasound Group's BodyWorks Eve POCUS training solution and the HeartWorks transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) simulator training platforms that can be used to accelerate training for all Fujifilm SonoSite's POCUS systems.*

*"This agreement will allow clinicians the opportunity to work with two leading companies in their respective markets to access a robust POCUS training solution that will facilitate increased adoption of a critical imaging modality in their institutions."*

**Rich Fabian, President and Chief Operating Officer of Fujifilm SonoSite**

BodyWorks Eve is Intelligent Ultrasound Group's ultra-realistic patient simulator designed for interactive POCUS scenario training. It comes complete with 100 real patient scans and over 10,000 pathology variations across cardiac, lung, transabdominal and pelvic ultrasound, which will help Fujifilm SonoSite's POCUS users train for a diverse case load in Emergency Medicine and Critical Care disciplines. Specific focus areas of this simulator include recognition of common abnormalities and pathology, assessment skills to guide decisions for patient referral or discharge, Doppler and M-mode functions and more.

*"We are excited to join Fujifilm SonoSite in offering the ultrasound market a solution to both train and confidently perform POCUS. We feel this agreement will have a very positive effect, not only on improving scanning skills of the clinicians, but on patient outcomes as well."*

**Ian Whittaker, COO and Head of the Simulation Division at Intelligent Ultrasound Group**

The agreement also includes Intelligent Ultrasound Group's Heartworks TTE simulator, which is designed to aid POCUS users in understanding cardiac anatomy, and TEE simulator, which will help POCUS users to develop the required cognitive and psychomotor skills for this discipline. While using Fujifilm SonoSite's POCUS systems, clinicians have the convenience and mobility they need to address urgent cardiac conditions at a patient's side, wherever that may be. Now with the help of Intelligent Ultrasound Group's TTE and TEE simulators, they will have access to added training modules that will help improve their clinical knowledge and diagnostic confidence.

**FUJIFILM**  
Value from Innovation

**SonoSite**

## Training the next generation of Nurse Anesthetists with Hi-Fidelity Simulation

*John Shields, DNP, CRNA, a certified registered nurse anesthetist and professor from Middle Tennessee School of Anesthesia is using ultrasound simulation to completely revolutionize his university's CRNA training program – and he has the research to back it up. Shields, a pioneer in the world of CRNA education, is working to establish and introduce formal transesophageal echocardiography (TEE) and point-of-care ultrasound (PoCUS) training guidelines for the next generation of CRNAs in the United States. His co-authored research article, Effect of Simulation Training on Transesophageal Echocardiography Cognitive Performance, has been published in the February 2020 issue of the AANA Journal, the official journal of nurse anesthesia. The research aims to highlight the importance of simulation training and hypothesizes that TEE-learning could be better accomplished with a simulator than with online or web-based training.*



### Nurse Anesthetists have an important role in the future of perioperative care

The present role of ultrasound scanning in a CRNA's day-to-day activities is limited. However, there is a push for more duties to fall into the hands of nurse anesthetists and other advanced practice nurses. Shields notes, "There is a national movement for incorporation of TTE/TEE and other PoCUS scanning into our training. [The] Council on Accreditation [of Nurse Anesthesia Educational Programs] is currently assessing the need to have PoCUS as a requirement for graduation. It is the future of perioperative care."

At Middle Tennessee School of Anesthesia, Shields is developing TEE and PoCUS curricula specifically for the CRNA program. Shields mentions, "We are planning on acquiring strategic partnerships with national organizations in developing a PoCUS certification program involving all aspects of ultrasound used during the perioperative period including echocardiography and other assessments of cardiopulmonary instability. There will be online learning with didactic and clinical through virtual scanning. Participants will be required to scan at clinical sites as well as pass difficult case-based scenarios using BodyWorks Eve and HeartWorks simulators." He hopes to launch the program in 2020.

### PoCUS is the new stethoscope

His reason for building out an expansive training program with ultrasound simulation is simple: "Need. TEE is the most robust cardiovascular monitor available and is used in almost all cardiac operations. CRNAs are a vital part of healthcare, especially in critical access hospitals. Our patients deserve the best care possible and PoCUS is the new stethoscope. The next generation of providers need this vital skillset. We envision other programs drawing from our experiences and curriculum and establishing their own programs. There are 50,000 CRNAs in [the United States] and 105 programs, and they should all be providing similar training."



*"There is a national movement for incorporation of TTE/TEE and other PoCUS scanning into our training."*

For Shields' program to work effectively, he needs the highest quality and most realistic ultrasound simulators on the market – that's why he has advocated for his university to purchase systems from Intelligent Ultrasound. According to Shields, "HeartWorks gives you the whole TEE experience. We train with an 11-year-old [HeartWorks] unit at a major academic center that still runs like a new unit. BodyWorks Eve is even better with the non-cardiac features such as pulmonary, pelvic and abdominal scanning. BodyWorks Eve should be fabulous as I can take it on a plane and go wherever there is a need."

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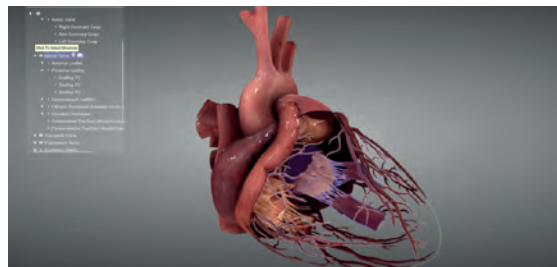
It's not just professors and program directors who value the capabilities of HeartWorks and BodyWorks Eve. Most importantly, students who are now able to actively engage in hands-on learning are quite drawn to the technology. Shields added, "[The students] love it. This age group learns the best with hands-on. At the end of every session, I have students asking when they can scan again, when it will be available for them again and expressing how much more they understand the heart and pathology."

Today, the use of ultrasound is expanding, and making a meaningful impact on more and more specialities throughout the healthcare system. Intelligent Ultrasound is proud to work closely with healthcare educators from around the world to develop market leading simulators and learning systems that will help better prepare and support clinicians in the care of their patients.

## Overcoming ECHO training challenges in Critical Care Settings

*James MacBrayne, Consultant in Critical Care and Anaesthesia at Aberdeen Royal Infirmary (UK) looks at the obstacles to ECHO training within intensive care and how simulation training is reversing the skills deficit of this diagnostic skill in the Critical Care unit.*

The hospital acquired a HeartWorks Simulator for TOE and TTE education a year ago to meet the growing demand for echo training within the Cardiology and Critical Care departments. Commenting on the hospital's training provision prior to introducing simulation into their programmes, Dr. MacBrayne said, "We could only really practice on real patients and in the critical care environment many of the TTE windows were suboptimal meaning it was difficult for those learning to appreciate what they were meant to be seeing. With regard to the TOE training, that could only really be done in cardiac theatres or cardiology where there was a clinical justification for inserting a TOE probe given the potential complications. Many of the awake patients in cardiology did not tolerate some of the gastric TOE views, so it was difficult for the trainees to get good exposure and experience at obtaining these images."





Aberdeen Royal Infirmary now runs courses for both TOE and TTE where simulation is an integral component of training. The HeartWorks simulator resides in the Intensive Care Unit allowing maximum opportunity for doctors to develop and hone their skills. The cardiology department are also frequent users of the simulator to teach their trainees the basics of TOE prior to examining real patients.

“We have trainees rotating through Critical Care on a regular basis”, continued Dr. MacBrayne, “and those who want to pursue Critical Care as a career are now expected to have a basic level of ECHO skills (FICE).”

### ECHO simulation making an impact on outcomes

Commenting on the impact simulation has had on trainees’ educational outcomes, he observes, “Prior to having the simulator, any TTE echo practice involved real patients, many with sub-optimal views. For trainees starting out in ECHO the most important learning objectives are that they have an understanding of what views they should be trying to visualise, the anatomy of those views and how the probe cuts through the heart in the various positions. The HeartWorks simulator allows all of this along with the ability for trainees to practice image gathering and interpretation in a safe non clinical environment.

TOE is not a benign procedure and needs to have a clinical justification. This means that getting practice on patients



in critical care is often difficult and in the awake patients, obtaining all the views can be almost impossible. The simulator gives trainees the chance to practice probe manipulation and image optimisation, so when they are performing real examinations they can get far more out of the experience.”

### Integrated and accelerated learning

The availability of the HeartWorks simulator has allowed the hospital’s trainees to get started on their ECHO learning early and allows them to practise in their own time. Regular group teaching sessions also take place to improve image optimisation. Commenting on trainee feedback to the new training approach, Dr. MacBrayne said, “The feedback from those who have attended the courses we have run and used the HeartWorks simulator on the unit has been entirely positive and I am sure has helped develop ECHO skills quicker than previously would have happened.”

Looking ahead, Aberdeen Royal Infirmary are looking to develop further TOE and TTE courses. “With the demand for Critical Care ECHO accreditation increasing, we look certain to be using our simulator to train more and more trainees.”

“ *Half the battle with ECHO is having a three-dimensional understanding of cardiac anatomy and how the relevant structures relate to each other.* ”

## Teaching Emergency Resuscitative TEE with BodyWorks Eve

*With BodyWorks Eve celebrating her second full year in production after being launched at IMSH 2018 in Los Angeles, her success is not only measured by the number of systems placed in medical schools and sonography programs, but also the growing number of ways she is utilized in specialized clinical education settings. Leaders in the fields of Emergency Medicine, Cardiology, Anesthesia and other specializations are utilizing Eve for simulation-based learning and are pioneering the future of transesophageal echocardiography (TEE), transthoracic echocardiography (TTE) and Point-of-Care Ultrasound (PoCUS) training. One such leader is Dr. Maria O'Rourke, MD, an emergency medicine physician from California.*

Recalling her early experience with echo, Dr. O'Rourke reveals, "I realized that it was much more difficult to diagnosis emergent conditions in cardiac arrest patients with TTE, particularly in patients who are undergoing active CPR. First, it is difficult to visualize the heart during chest compressions; the gel can cause the rescuer's hands to slide around on the patient's chest and ribs can get in the way. Furthermore, air is the enemy of ultrasound, so for patients with extensive lung disease, in congestive heart failure, or patients on mechanical ventilation, it can be difficult to obtain usable images in real time to make life saving decisions."

*I started to teach myself TEE and realized that I could not learn TEE from a book.*

### Starting the EMTEE Course

In 2016, Dr. O'Rourke teamed up with her partners, Dr. Byron Mendenhall, Chief of Cardiovascular Anesthesiology in Visalia, California and Dr. Benjamin Wiederhold, Chief of the Emergency Department at Stockton Medical Center, to direct the EMTEE program, a one day course for practitioners to refine their skills in transesophageal echocardiography. EMTEE stands for: Emergency Medicine TransEsophageal Echo. When asked what the program is all about, Dr. O'Rourke stated, "We teach

emergency department and critical care doctors how to perform resuscitative emergency echocardiography. We aim to spend minimal time lecturing to allow maximum simulation training to learn how to perform a limited 6 view exam in the emergency department."

The EMTEE program offers seven hours of hyper-focused TEE training split into two parts: pre-course reading and hands-on training. The pre-course material consists of one hour spent reviewing basic information about TEE, while the hands-on training portion is a dedicated six hours spent using the high-fidelity HeartWorks system. Attendees will familiarize themselves with the probe and learn how to obtain a Quick 6 + systematic approach to limited TEE views that include:

- Mid Esophageal 4 Chamber at 0 degrees
- Mid Esophageal 2 Chamber at 90 degrees
- Mid Esophageal Long Axis (LAX), Aorta/Aortic Root at 120 degrees
- Mid Esophageal Bicaval at 120 degrees
- Mid Esophageal RV Inflow-Outflow at 60-90 degrees
- Trans Gastric Mid Papillary Short Axis (SAX), Left Ventricle at 0 degrees
- Trans Gastric to Mid Esophageal to Upper Esophageal Short Axis (SAX), Descending Aorta and Aortic Arch at 0 degrees

Primary learning objectives for attendees of the program include understanding the basic principles of TEE probe manipulation in order to achieve the different planes of movement necessary to generate images, as well as transducer movements such as advancement, withdrawal, antelexion, retroflexion and omni-plane movements. Additionally, attendees will make use of BodyWorks Eve's 10,000+ pathology variations and learn to detect a multitude of cardiac pathologies.

## Incorporating HeartWorks

HeartWorks has proven to be an invaluable component of the BodyWorks Eve platform for many residencies and now programs like EMTEE. At its core is an anatomically correct, virtual, beating 3D heart that is unrivalled in the teaching of cardiac anatomy and manikin-based simulation in echocardiography.

“ *Without HeartWorks, I could not teach TEE. I have been able to teach more fellow emergency medicine fellowship directors throughout California, and two programs now perform TEE in their emergency departments.* ”

## Incorporating ScanTrainer

One aspect unique to the EMTEE program is the upcoming inclusion of OB/GYN ultrasound training that will utilize the ScanTrainer transvaginal system (TVS). Dr. O'Rourke mentions, "I will be able to offer additional transvaginal ultrasound training with normal OB and GYN anatomy, with pathology in all specialties using a simulator alone without the need for live models. No other teaching company is offering a transvaginal techniques course in the near future. This is useful since there are very limited training opportunities for that procedure."

## Establishing a Reputation

After four years of hard work, Dr. O'Rourke and her colleagues run a successful operation that has taught numerous physicians the important techniques involved with resuscitative TEE. The demand for this necessary skill is growing and programs like EMTEE can fill the gaps left by some residencies, which has given them quite a reputation to build upon.

Dr. O'Rourke commented, "I was at AIUM last year and walked into a lecture on TEE where a few Ultrasound Directors and fellows from Highland and UCSF were sitting in the last row. As I walked in, someone turned around and said, 'There she is, there she is. The TEE Girl!' This was a highlight for me! I am proud to say that I am one of two Emergency Medicine Physicians teaching other EM Physicians Resuscitative TEE, with the help of my two HeartWorks simulators, six hours of hands-on training, a lot of sweat, and the amazing teaching styles that my lead team (Drs. Mendenhall & Wiederhold) bring to the course."



To learn more and to reserve your spot at an upcoming course, visit [em-tee-courses.com](http://em-tee-courses.com)

## Eve attends first SONOcamp to further student interest in STEM courses

*This past year Intelligent Ultrasound supported ArkanSONO, a Science, Technology, Engineering and Mathematics (STEM) outreach program funded by the National Institute of General Medical Sciences (NIGMS) through a 5-year, \$1.27 million dollar Science Educational Partnership Award (SEPA) grant. We spoke with the program's director, Dr. Kevin D. Phelan, to discuss the program's primary objective, its successes, and how BodyWorks Eve has made a lasting impact.*



### What is ArkanSONO, and what is the objective of this program?

"The overall objective of this program is to increase the diversity of students interested in pursuing a career in one of the STEM fields. The program targets 9th grade students in public high schools in the Little Rock School District and is a partnership between Physical Science teachers in the district and faculty in the College of Medicine at the University of Arkansas for Medical Sciences (UAMS). The program consists of both technology focused outreach sessions to the classroom and a weeklong summer

day camp that is focused on cardiovascular health and imaging technology. This last year was our first year of the program and the ArkanSONO team (consisting of 3 PhD faculty at UAMS) visited 50 separate classrooms at least twice and reached nearly 900 students. We end the week of SONOcamp with a friendly team-based SONOlympics competition where the students apply the knowledge and skills that they have learned during the week."

### How does ultrasound imaging and hi-fidelity simulation fit into the program's goals?

"We are using the transformative power of ultrasound to stimulate student interest in STEM. The hand-held ultrasound devices that we use in our outreach visits to classrooms are intuitively easy for the students to use because they are used to using mobile phones. They are excited to use this technology and be in control of holding it and obtaining scans.

“ We are using the transformative power of ultrasound to stimulate student interest in STEM. ”

In our camp we also use hi-fidelity simulators like the BodyWorks Eve simulator. This allowed students to see how technology has evolved to provide simulation of both normal anatomy and pathological anatomy. We had BodyWorks Eve at one of our stations and as the teams of 5 students approached the station the second year medical student who staffed the station (Mason Sifford) informed them that they had to use the probe to determine what problem the patient had with no patient



history. As the medical student said, ‘Ultrasound imaging fits perfectly into the program’s goals. ArkanSONO is an ultrasound focused program and being able to visualize different pathologies that are rarely seen in the real world is an amazing experience for the participants. Not only do they get to imagine real-life scenarios where their skills and abilities would be important, but they get to actively control the situation promoting their interest and engagement with ultrasound and STEM.’”

**What do the students involved in the program think of BodyWorks Eve and some of the other technology?**

“The sophisticated technology in BodyWorks Eve provided an opportunity for the high school students to engage in a simulated clinical environment. As Mason put it, ‘BodyWorks Eve is an excellent program that allows for a variety of different scenarios. The students absolutely loved that they could visualize a variety of different pathologies, and more importantly that you could quickly change different vital signs and specific clinical findings in each scenario. During SONOcamp this allowed for students to be able to work through a scenario where they find out that a patient is injured with no other information and quickly work through every organ of a FAST exam since they are all available on BodyWorks Eve. During our scenarios, the students would do a FAST until they realized that there was a pericardial effusion through both



“*BodyWorks Eve is an excellent program that allows for a variety of different scenarios. The students absolutely loved that they could visualize a variety of different pathologies, and more importantly that you could quickly change different vital signs and specific clinical findings in each scenario.*”

visualization of the phenomenon plus cardiac tamponade being indicated by the vitals and EKG. The students then got to work through how they would treat the tamponade and then watch as the patient’s vitals and ultrasound normalized.”

The first year of the ArkanSONO program “SONOcamp” proved to be a fun experience for all those involved. For more information, you can follow the ArkanSONO team STEM outreach efforts on Twitter: [@ArkanSONO](https://twitter.com/ArkanSONO)

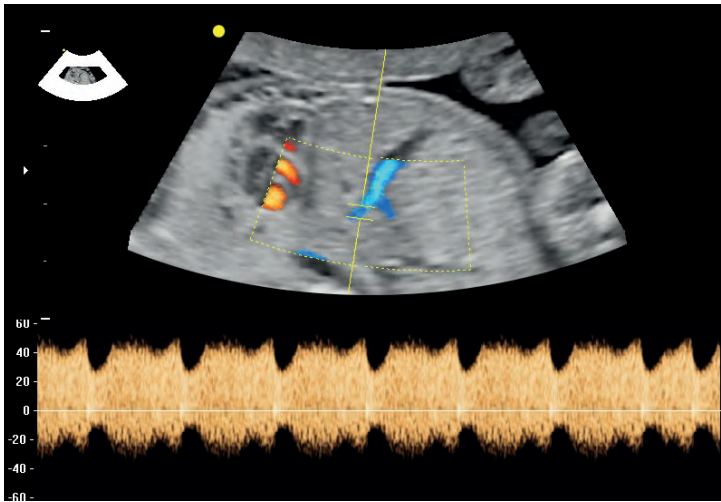
To read more of our case studies, visit [intelligentultrasound.com/case-studies](https://intelligentultrasound.com/case-studies)



# What's NEW...

## ScanTrainer update | Coming this June

*ScanTrainer will soon be getting some important new modules and functionality. The update includes modules teaching Spectral Doppler for Obstetrics and assessment of fetal lie and placenta location, as well as the ability to upload your own scans from Samsung ultrasound machines. The update will make ScanTrainer the only simulator to teach the important skill of Spectral Doppler in Obstetrics and aims to facilitate the efforts of the Saving Babies' Lives initiative in the UK.*



*Spectral Doppler of Abdomen at 22 Weeks*



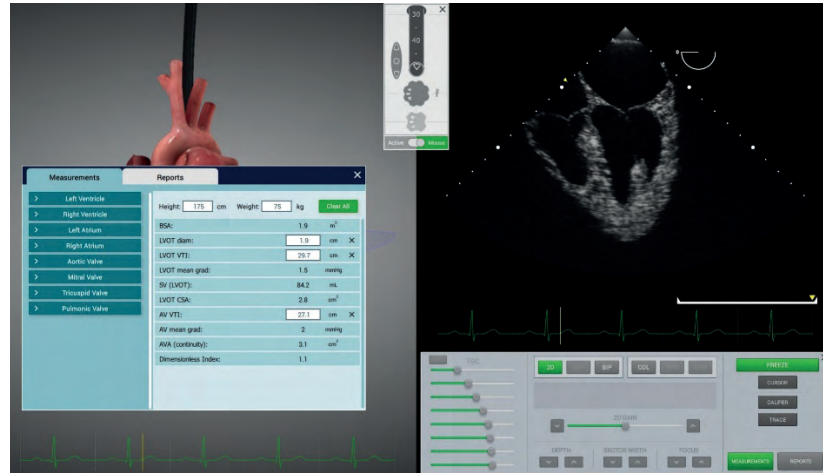
To learn more about ScanTrainer, visit [intelligentultrasound.com/scantrainer](https://intelligentultrasound.com/scantrainer)

Get in touch at [hello@intelligentultrasound.com](mailto:hello@intelligentultrasound.com) to find out about purchasing or upgrading your system

## HeartWorks Module 12

### Measurements & Calculations

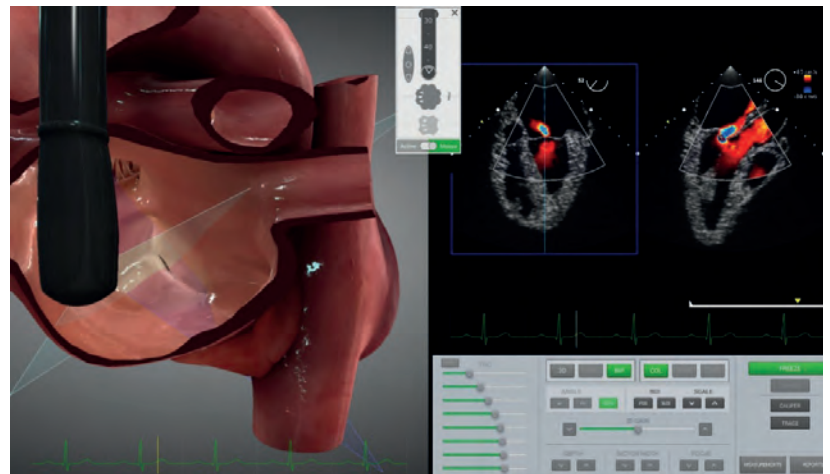
*New measurement and reporting functionality has been added to the HeartWorks platform allowing students to learn and practise methods of quantification and reporting in echocardiography and will support institutional student evaluation and accreditation processes.*



## HeartWorks Module 13

### Biplane Imaging

*Biplane imaging is available in TTE and TEE modalities, Live control of both position and angle is possible and with either imaging plane displayed within the 3D model of the heart. Biplane imaging can be used simultaneously with colour imaging and is fully integrated with the measurement functionality of HeartWorks.*



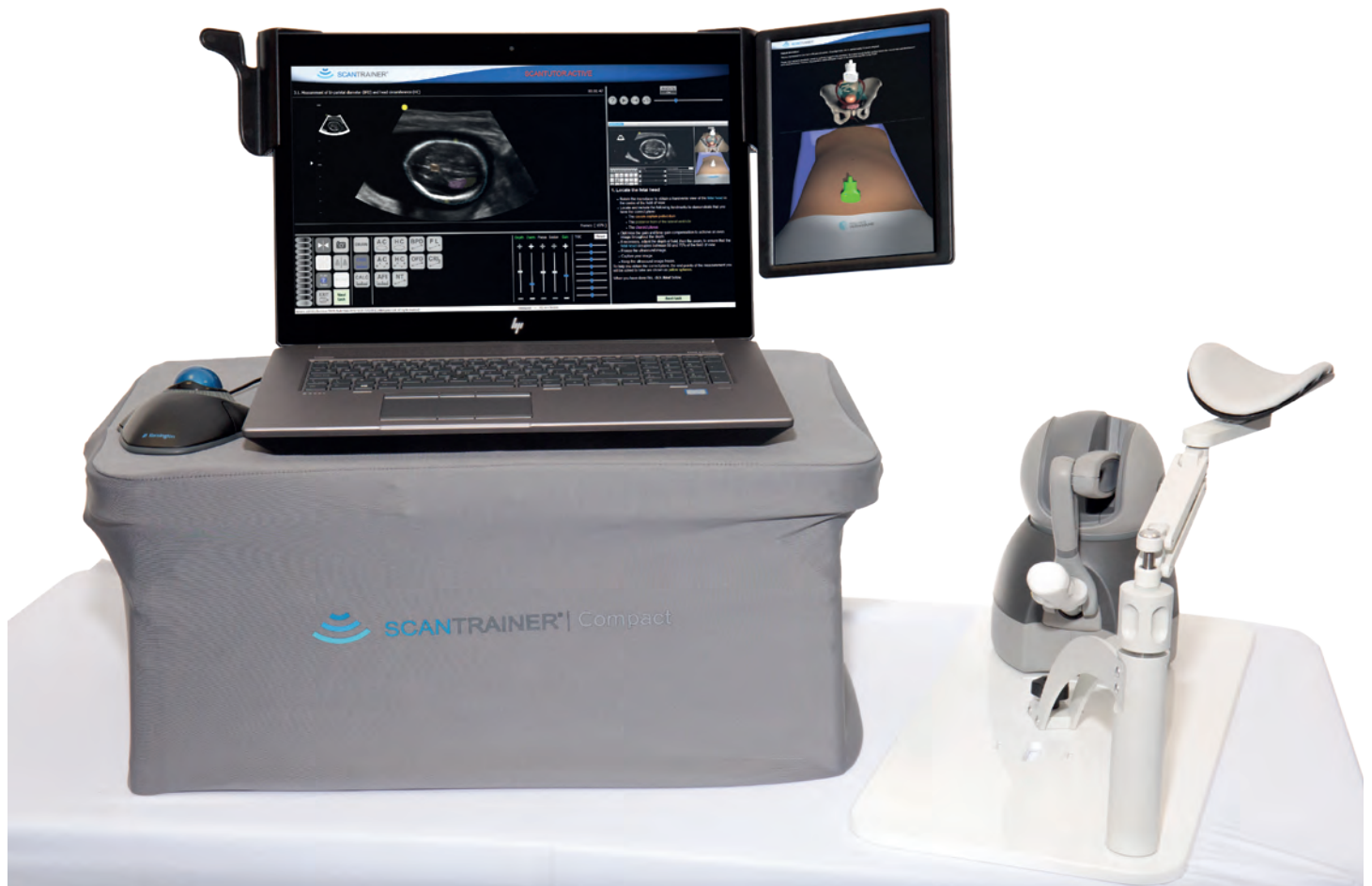
To learn more about HeartWorks, visit [intelligentultrasound.com/heartworks](https://intelligentultrasound.com/heartworks)  
Get in touch at [hello@intelligentultrasound.com](mailto:hello@intelligentultrasound.com) to find out about purchasing or upgrading your system

# What's NEW...

*Introducing...*

 **SCANTRAINER®** | Compact

Extensive ultrasound training in one small package!



## SCANTRAINER® | Compact

*ScanTrainer Compact has been designed for medical professionals who wish to learn transabdominal (TA) and transvaginal (TV) ultrasound.*

The simulator offers a comprehensive and structured educational pathway from learning basic principles of ultrasound to scanning and diagnosing anomalies and pathology across multiple clinical disciplines.

- Learn TA and TV probe handling skills to acquire accurate, diagnostic ultrasound images.
- Identify and interpret image relationships between anatomy and ultrasound views.
- Recognize pathology relevant to obstetrics, gynaecology, emergency medicine and general medicine.
- Learn diagnostic skills

## Educational Modules

Extensive educational modules are available for use with ScanTrainer Compact to teach core and advanced scanning skills in a range of scenarios.



EMERGENCY  
MEDICINE



OBSTETRICS



GYNAECOLOGY



GENERAL  
MEDICINE



A simple switch of the probes allows you to alternate between transvaginal and transabdominal ultrasound in your training programs easily.

# What's NEW...

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*Introducing...*



Augmented Reality (AR) is now an exciting and integral part of the HeartWorks learning experience.

Through tablet-based AR, students of cardiac anatomy and echo can now immerse themselves in the critically acclaimed and anatomically correct HeartWorks 3D heart.

They can hold it in their hands, turn it around and look deep inside for an unparalleled understanding of structures and ultrasound views.

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*An educational tool that's versatile,  
easy to use and portable*

HeartWorks AR allows users to increase and vary the timing and location of learning sessions including use in the clinical environment. From self-directed exploration of cardiac anatomy, single student and tutor training episodes, and demonstrating anatomy and imaging principles to small group tutorials, the display can also be projected onto a larger screen when teaching and lecturing to large groups.



*Helping patients understand their condition  
and their treatment*

HeartWorks AR is not just an engaging learning tool, it can be used in the operating room or echocardiography laboratory, whilst performing patient imaging to illustrate particular anatomic relationships relevant to the clinical scan. It can help explain anatomy and abnormalities to other clinicians, and help the clinician explain heart structure and function to patients. Disease states as well as therapeutic options can be more clearly illustrated.

## Upcoming Conferences Q1/Q2:

### AIUM

21<sup>st</sup> - 25<sup>th</sup> March 2020

New York Hilton Midtown

New York, NY, USA

### RCOG World Congress

25<sup>th</sup> - 28<sup>th</sup> March 2020

Oman Convention & Exhibition Centre

Muscat, Oman

### SHM

15<sup>th</sup> - 18<sup>th</sup> April 2020

San Diego Convention Center

San Diego, CA, USA

### AAEM

19<sup>th</sup> - 23<sup>th</sup> April 2020

Sheraton Phoenix Downtown

Phoenix, AZ, USA

### EBCOG

14<sup>th</sup> - 16<sup>th</sup> May 2020

Grieghallen

Bergen, Norway

### RA UK

18<sup>th</sup> - 19<sup>th</sup> May 2020

Sheffield City Hall

Sheffield, UK

### SonoUK

21<sup>st</sup> - 22<sup>nd</sup> May 2020

Baltic Centre for Contemporary Arts

Newcastle, UK

## Courses & Workshops Q1/Q2:

### British Cardiovascular Society TOE Workshop

1<sup>st</sup> - 3<sup>rd</sup> June 2020

Manchester Central

Manchester, UK

### The Resuscitative TEE Workshop (Dr. Felipe Teran)

5<sup>th</sup> March 2020

Sydney, Australia

28<sup>th</sup> March 2020

Toronto, Canada

17<sup>th</sup> - 18<sup>th</sup> April 2020

Phoenix, AZ, USA

19<sup>th</sup> - 20<sup>th</sup> May 2020

Montreal, Canada

19<sup>th</sup> - 20<sup>th</sup> June 2020

Seattle, WA, USA

For more information, visit [resuscitativetee.com](http://resuscitativetee.com)

### EACTA Echo Course

27<sup>th</sup> - 30<sup>th</sup> June 2020

Herzzentrum Leipzig

Leipzig, Germany

### Further information

If you wish to learn more about our products or would like to arrange a demonstration, please email [hello@intelligentultrasound.com](mailto:hello@intelligentultrasound.com)

### Contribute your article and share your news

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