Schallware

ULTRASOUND SIMULATOR

INTERNAL MEDICINE ABDOMEN, THYROID
EMERGENCY MEDICINE
OBSTETRICS AND GYNAECOLOGY
CARDIOLOGY TTE, TEE
PEDIATRICS, NEW-BORN

Feedback
ultrasound screen
spatial ROI's
(segmentation)

Tutorial
videostreaming
recording
tutorial videos

Hands-On
manikin & dummy probe

Panel
QnA dialogue
table of contents
findings

KRAKEN
self-learning questionnaire sonography

ULTRASOUND
SIMULATOR

Welcome

Situated in Berlin, the Schallware company was founded in 2001 and it released its first ultrasound simulator in 2008 which works on the basis of real-patient clinical data. Over time we have added more features, more simulated patients and increased the intricacy of 3D representations in the areas of internal medicine, obstetrics and gynaecology as well as cardiology.

In 2017, we added a transesophageal echocardiogram (TEE) application and virtual models of the heart, abdomen and fetus. Besides Berlin, Schallware runs additional acquisition workplaces in Hanover MHH, Erfurt and Hamburg UKE. In September 2016 we have opened our own simulation center to offer and develop new course types, new intensive workshop ideas. In 2022 we have released new simulator model 'Kraken' with self-learning questionnaires and feedback functions.

Schallware comprises software developers, 3D artists, hardware and dummy manufacturers, acquisition specialists in the field of 3D ultrasound volumes as well as ultrasound course managers. To date we have sold the Schallware simulator to 100 customers worldwide, for example to universities and simulation centres in Lübeck, Vladivostok, Edmonton, Dubai, Stockholm, Paris, Beijing, Boston and many other locations. Furthermore we have run over 600 courses using up to 25 simulators in Germany, Switzerland, Austria, the Netherlands, Belgium and other countries. This means that over 15000 physicians have already benefited from a Schallware teaching event. Courses can be booked on www.schallware.de

If you have any queries, requests or ideas, please contact us at info@schallware.de or call on +49 177 4911854

Yours sincerely

Gernot Jehle, GM

Contents

ULTRASOUND SIMULATOR

clinical data   virtual data

The Schallware Simulator is based on clinical ultrasound data offering pathological findings as well as variants of anatomical textures and structures in real patients (advanced).
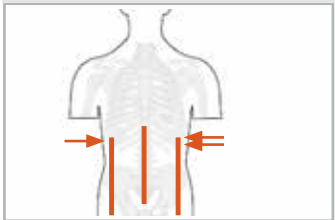
In addition, virtual models of an animated heart, foetus or abdomen are available for continuous scanning around organs to help beginners better understand the body's anatomy.

Description of Schallware Ultrasound Simulator

The Schallware Ultrasound Simulator allows your doctors to practice ultrasound diagnosis congruent with real conditions. Moving the tracked probe over the torso produces an exact B-mode image of the case chosen. In each module, the simulator offers a set of patients. Every one of these is represented by several 3D volumes, or more precisely six abdominal and two intercostal volumes (also see red lines in pictogram). When using the multi-volume mode, all these scans are available. To facilitate this we have acquired data of single patients' entire abdomens, averaging around 6000 images per patient. The Schallware Pathology Database spans the fields of internal medicine, cardiology, obstetrics and gynaecology. You currently have access to 250 cases in internal medicine, 200 in obstetrics and gynaecology and about 60 in cardiology. For some simulated patients, additional data has been acquired showing differing characteristics such as varying dates, sources (colour doppler or linear probe (8 MHz)) etc.
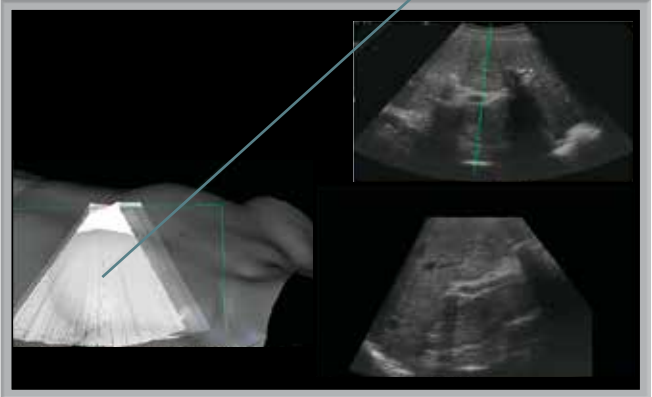
All documented cases include a medical history, questions leading to a diagnosis, comments on ultrasound diagnosis (i.e. what is visible with the simulator) and a pathological description. The simulator enables you to find physiological or pathological structures using regions of interest (ROI). More than 6000 ROIs have already been defined and you can add new ones if you wish. You can additionally take advantage of the simulator as an ultrasound device using a login mode for studies, measurements, storing of freeze-frame images, creating pdf reports or writing questions and answers for tutorials or examinations in a Q&A format.

Acquisition

Volume representation is based on the clinical data from real patients. The light area shows a fan volume of a right side intercostal scan.

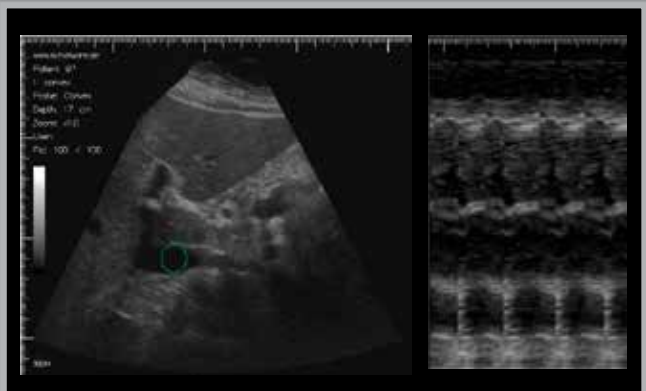Reconstructed plane shows volume quality (green line).

ULTRASOUND SIMULATOR
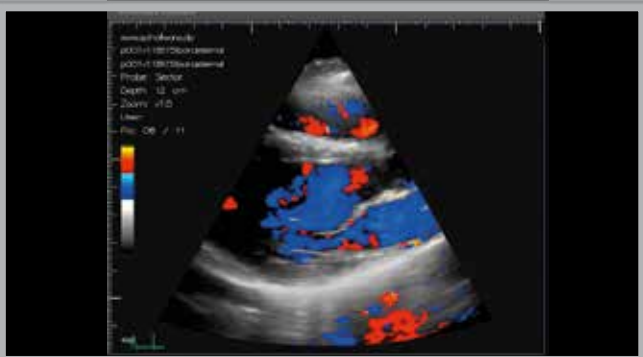
Schallware Ultrasound image modi

The Schallware Simulator shows different image modi:
- B-Mode
- color doppler
- 4D B-Mode (foetal heart, heart)
- 4D color doppler mode
- 2/3/4D virtual data
- M-Mode
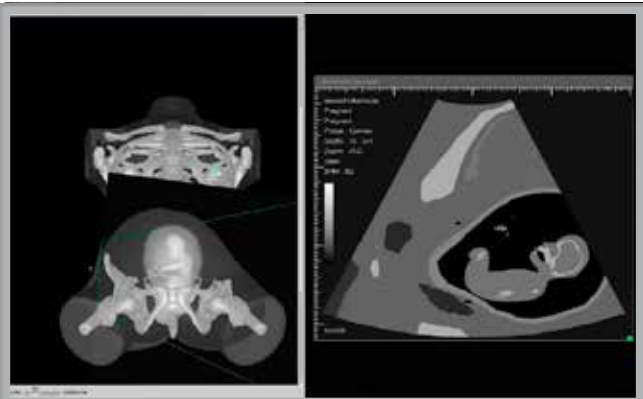- PW-Doppler
- CW-Doppler

B Mode image, M Mode

color doppler static and in 4D

4D volumes heart, B-Mode

virtual data for obstetrics, foetus 20th week of gestation

virtual data of animated heart, lungs, whole male abdomen

Self-study through thousands of predefined regions of interest (ROI)

There is a list of ROIs available which directs you to images of related structures. For use in question-and-answers scripts (Q&A), our system enables you to create additional ROIs that can be seen as circles on the image concerned.

ULTRASOUND SIMULATOR

for
INTERNAL MEDICINE • EMERGENCY CARDIOLOGY • GYNAECOLOGY

Ensuring quality diagnosis through ultrasound simulation.

Provide your doctors with a revolutionary, easy-to-use system for hands-on practice in ultrasound diagnosis.

The Schallware Ultrasound Simulator provides the most comprehensive pathology database of simulated patients (500 in 2017) based on clinical data acquired in the form of individual original ultrasound modi. The representation of authentic pathological cases using our simulator enables you to perform teaching sessions for advanced physicians which can be repeated. You have the choice between providing a range of patients in a Q&A format, as a test with scores or simply a tutorial. Even self-study is feasible facilitated by image documentation of regions of interests (ROI) which automatically lead you to interesting physiological and pathological structures. Data relating to some patients has been acquired at several stages of their treatment, using either B mode, colour doppler or linear high frequency probes. We also offer virtual data models of an animated foetus, heart and abdomen to enable beginners to study their anatomy. The scanned data is organized into thematic modules which range in levels of difficulty from beginner to advanced. Our system consisting of three dummy torsi and five dummy probes covers ultrasound diagnosis scenarios in the fields of internal medicine, emergencies, cardiology and gynaecology. Our Core System includes one dummy torso, three modules and corresponding probes. Various add-on modules are available from our ever-growing library, produced by our affiliated clinics. Each module includes up to twelve documented patient cases.

Ensure consistent quality and knowledge by allowing doctors to regularly revisit documented cases at any time.

With the use of our Simulator, your doctors can now regularly practice ultrasound diagnosis on both common cases and those which may only arise once a year. Doctors can test their knowledge by comparing their diagnosis to the documentation that comes with each module. In such a way, the simulator serves as a reference for your clinic, being available at any time. Providing these consistently accessible training and reference resources to your doctors sets a consistent quality standard in ultrasound diagnosis throughout your clinic.

*"By providing these resources, you can set a consistent **quality** standard throughout your clinic."*

Schallware pathology database contains more than 500 cases

Using our Schallware ultrasound simulator, you benefit from a huge case database.
Schallware has developed its own recording technique (3D freehand). We run several acquisition labs that source data from affiliated clinics. The efficiency of our database continues to increase year by year. What distinguishes us from our competitors is the case quality, all of which reflects original ultrasound data – not virtual-world cartoon style. Our high-resolution simulator data covers both abdomen and flanks and every case is recorded with its own volumes.

On-site train-the-trainer courses

All modules are produced by our internationally recognized affiliate clinics that use our Schallware acquisition platform. Most modules consist of scans sourced from 12 patients.
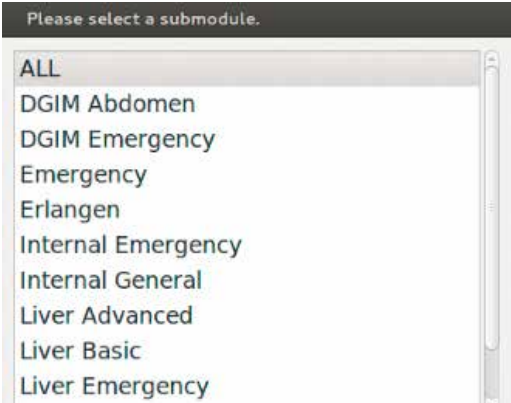
INTERNAL MEDICINE
Emergency • Abdomen • Gall Bladder • Aorta • Intestines• Blood Vessels • Neck • FAST
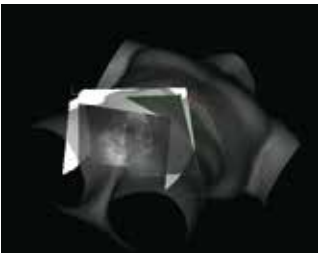
CARDIOLOGY male torso
Mitral Regurgitation and Stenosis Aorta • Insufficiency and Stenosis Kinetics • Hypertension

GYNAECOLOGY pregnant female torso
Gynaecology • Obstetrics • Emergency • Pelvis • Foetal Echocardiography

Please select a submodule.

ALL
DGIM Abdomen
DGIM Emergency
Emergency
Erlangen
Internal Emergency
Internal General
Liver Advanced
Liver Basic
Liver Emergency

Top right: Simulated ultrasound scan as displayed on computer.

Top left: Internal working details of B-scan superimposition on torso.

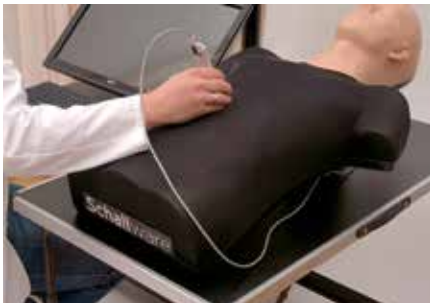***Left:*** Sector probe on male dummy torso tracked with DOF

- clinical data of 500 patients, abdomen in its entirety
- virtual models of animated heart, foetus and abdomen
- high-resolution volumes created with Schallware free-hand technology
- multi-volumes enabling scans of entire abdomen and flanks
- database offering details of patients with internal medicine, obstetrics/gynaecology, cardiology and pediatric conditions
- measurement tools, findings editor as well as print, login and archive functions
- cases where synchronized MRI and CT data have been fused
- documentation with regions of interest (automatic navigation, feedback function)

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Internal medicine

The pictures show a scan of Morison's pouch, the upper right abdomen, and the left flank as a fan viewed through the intercostal space.

The core of Schallware's pathology database is the internal medicine element consisting of original ultrasound data (3D volumes).

Obstetrics, gynaecology, foetal echocardiography

With the pregnant female dummy normal, pathologic vaginal and abdominal cases are available. The obstetrics module allows foetometry of trimenon I, II and III including weight estimation. Different examination types such as 'abdominal' or 'vaginal' enable measurement of correct parameters. Foetal heart cases show several congenital heart defects in motion (4D).

4D Cardiology

The cardiology modules are available as an add-on to the internal medicine simulator. They are equipped with an extra tool for left ventricle measurement in B and M modes (EF). All cardiac cases facilitate scans from a parasternal, apical or subcostal perspective. The case database includes the following: kinetics, right ventricle, hypertension in combination with mitral regurgitation and stenosis as well as aortic insufficiency combined with stenosis. What is more, all cases offer extra data in the form of colour cine loops and spectral doppler images.

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Internal medicine training

About 250 cases are available for internal medicine, each ready for use with its own data set. This means that each patient represents a single case, consisting of up to 9 volumes. You have the option to switch from one volume to the next and scan the patient's entire abdomen and flanks. All volumes are created with Schallware free-hand technology in high-resolution quality. Because you have access to full-patient data, each case can be used for different diagnostic tasks. You have the option to examine several pathologies in one case, find the cause of a patient's pain or the initial disease that lead to pathological developments. The Schallware Simulator allows real diagnostic training for the entire range of possible pathologies. In addition to this, you can even define your own submodules. Your favourite cases can be found by means of a keyword search machine.

2. Gall module

Gall bladder
1. gall bladder NAD
2. thickened bile
3. sludge
4. microliths

Cholecystolithiasis
1. large stone
2. several medium-sized stones
3. small-particle stones

Bile ducts
1. congested intrahepatic bile duct
2. dilated ductus choledochus
3. choledocholithiais
4. pancreatic tumor

ultrasound window pathology: gall stone

panel window with tutorial

1. Abdomen module

1. liver NAD
2. cholecystolithiasis
3. liver metastases
4. fatty liver with less fatty areas
5. liver cirrhosis
6. liver cirrhosis with ascites

ultrasound window
pathology: cystic liver tumor

panel window
with regions of interest (ROIs)

3. Kidney module

1. kidney NAD
2. Hydronephrosis, ureteral occlusion I-IV
3. renal cyst
4. renal tumor
5. shrunken kidney
6. double kidney

ultrasound window shows resclice according to convex probe position on manikin

panel window with ultrasound device controls and patient history.

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4. Emergency module

1. FAST, E-FAST
2. abdominal aortic aneurysm (AAA)
3. biliary stones
4. bladder and renal congestion
5. deep-vein thrombosis
6. structure and function of heart

ultrasound window shows pleural effusion

panel window shows tutorial and available data of case
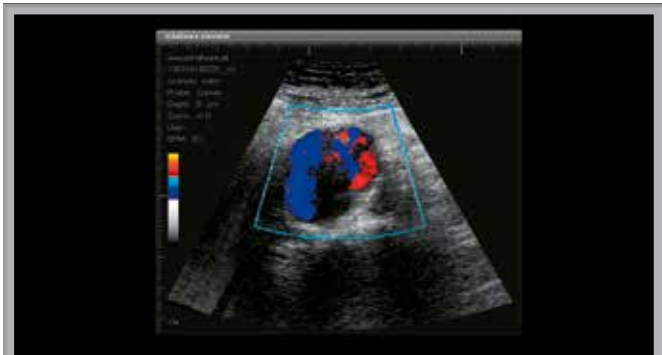

5. Vascular and aorta module

1. normal aorta
2. aortic sclerosis
3. aneurysm
4. dissection

ultrasound window aneurysma in aorta

ultrasound window with colour doppler aneurysma in aorta

6. Small pelvis module

1. ascites
2. lymphomas
3. diverticulitis
4. tumour
5. bladder
6. enlarged bladder
7. enlarged prostata

ultrasound window with bladder

panel window with tutorial

7. Neck module

1. transversal NAD
2. longitutinal NAD
3. thyroid adenoma
4. hemithyroidectomy
5. thyroiditis
6. cervical lymph nodes

ultrasound window tyroid check on neck

panel window with description of findings and screenshots

8. IBD (inflammatory bowel disease) module

1. normal appendix
2. diverticulitis
3. wall thickening
4. hypervascularisation

5. fistula
6. therapy progress
   (3 months)
7. abscess

ultrasound window with colour doppler
hypervascularity of bowel wall

panel window with tutorial

2. Pathology example

left side abdomen, long volume
with visible mechanical ileus

ultrasound window with ileus

panel window with findings editor

1. Measurement example

9 volumes available, full abdomen
with visible spleen measurement

ultrasound window with spleen

panel window with tutorial

3. Pathology example

9 volumes, full abdomen
with visible liver cirrhosis
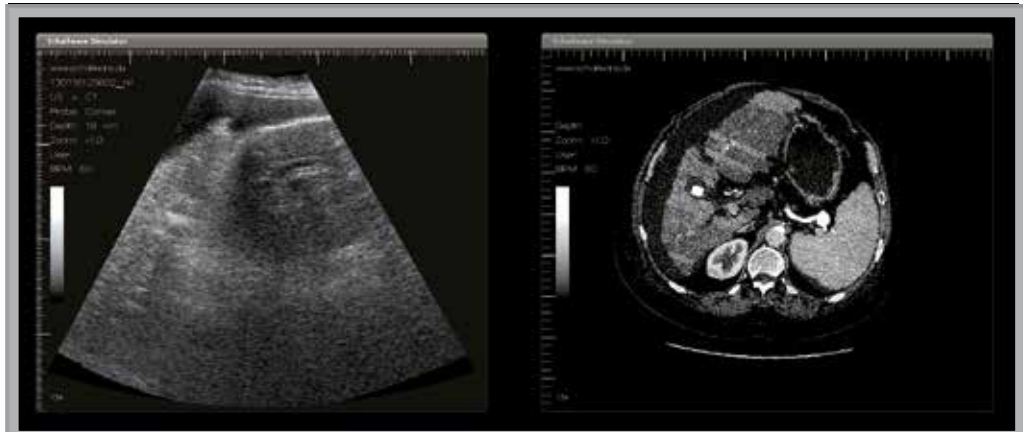

ultrasound window with liver and ascites

panel window with regions of interest

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4. Fusion window

US + CT/MRI of same patient

CT/MRI synchronized to ultrasound data

5. Customized modules
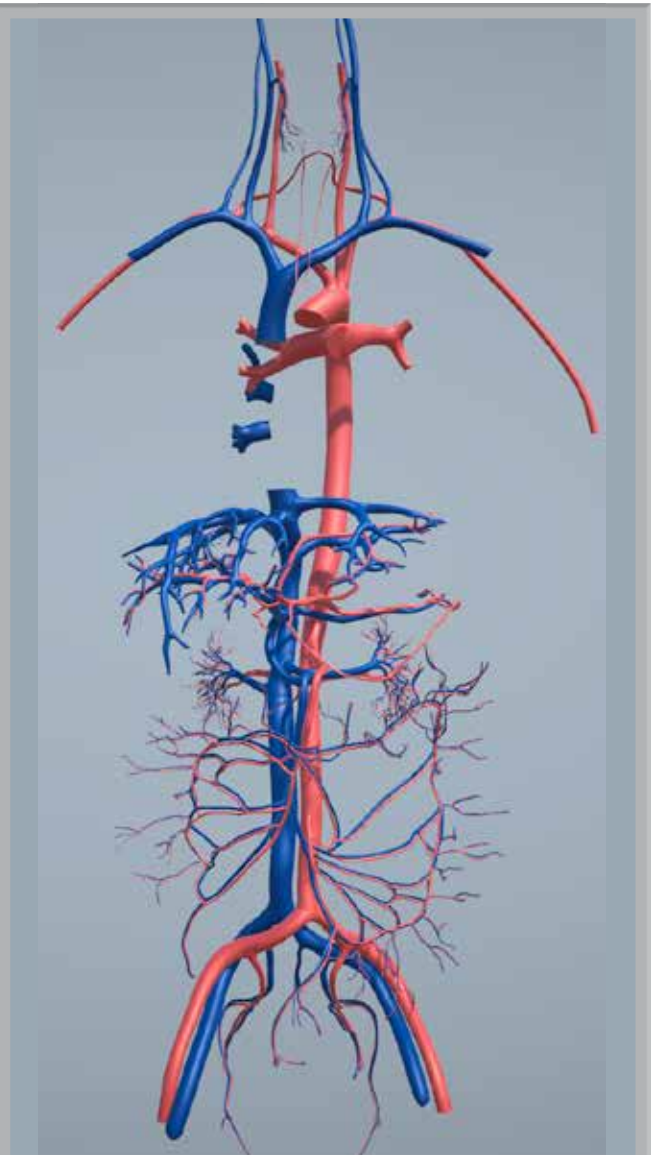
manikin in premature stage

premature head module, thrombosis

Schallware hands-on course in SimCenter Berlin-Buch

a_abdominalis	v_axilliaris_dextra
a_arcus_aortae	v_axilliaris_sinistra
a_axilliaris_dextra	v_cava_interior
a_axilliaris_sinistra	v_cava_superior
a_carotis_communis_dextra	v_hepatica_dextra
a_carotis_communis_sinistra	v_hepatica_media
a_gastrica_dextra	v_hepatica_sinistra
a_gastrica_sinistra	v_ileo_colica
a_gastro_duodenalis	v_iliaca_communis
a_gastroomentalis_sinistra	v_iliaca_externa
a_hepatica_communis	v_iliaca_interna
a_hepatica_propria_dextra	v_jejunalis_ileaslis
a_hepatica_propria_sinistra	v_jugularis_externa
a_ileocolica	v_jugularis_interna
a_iliaca_comunis_dextra	v_lienalis
a_iliaca_comunis_sinistra	v_mesenterica_superior
a_iliaca_externa	v_portae hepatis
a_iliaca_interna	v_pulmonaris_dextra
a_lienalis	v_renalis
a_mesenterica_inferior	v_sacralis_mediana
a_mesenterica_superior	v_subclavia
a_pulmonalis	v_thyroidea
a_renalis	
a_sinus_caroticus	
a_subclavia_dextra	
a_subclavia_sinistra	
a_thyroidea	
a_thyroidea_superior	
a_truncus_brachiocephalicus	
a_truncus_coeliacus	
a_truncus_thyrocerialis	

virtual Schallware model shows vascular tree

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Obstetrics training

Pathological vaginal and abdominal cases are available with the use of a normal pregnant female dummy. The obstetrics module allows foetometry of trimenon I, II and III including weight estimation. Different examination types such as 'abdominal' or 'vaginal' enable measurement of correct parameters. Foetal heart cases show several congenital heart defects in motion (4D).

Various virtual foetus models are available for nuchal translucency measurement in the 12th week of gestation and foetometry as of the 20th week of gestation.

1. Obstetrics example trimenon I

long volume acquisition
triplets
measurement of CRL

ultrasound window with reslice image (triplets)

panel window with tutorial

2. Obstetrics foetometry example

long volume acquisition
foetus profile

ultrasound window with reslice image

panel window with tutorial

3. Obstetrics foetometry example 20th week of gestatio

measurement of abdominal diameter (ATD)

measurement of head (HC, BPD)
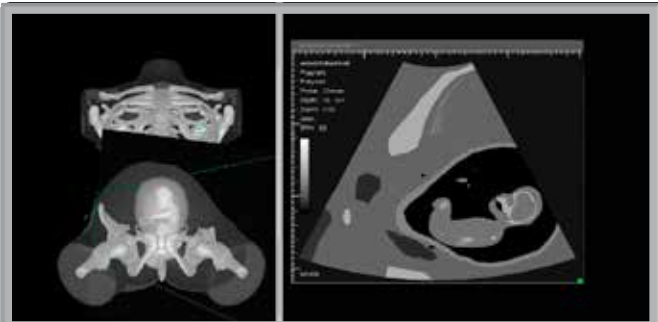

measurement of femur lengtgh (FL)

panel window with parameter list for weight estimation

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Ob/Gyn TV probe

In addition to abdominal convex probe the Schallware simulator provides also transvaginal probe.

Besides virtual female model there are transvaginal cases available for obstetrics (trimenon I) and gynecology training.

Various virtual foetus models available for nuchal translucency measurement in the 12th week of gestation and foetometry as of the 20th week of gestation.

2. Ob TV example

first trimester screening

list of regions of interest

1. Obstetrics example trimenon I

first trimester screening

list of regions of interest

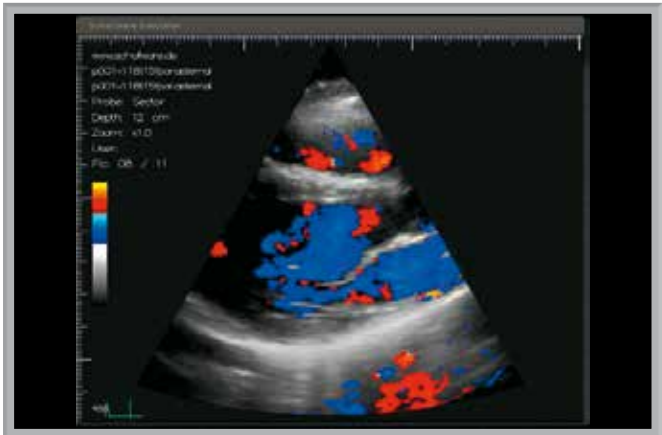### 3. Gyn TV example

tumor of right ovary

list of regions of interest

ULTRASOUND SIMULATOR

Cardiology training TTE

The cardiology modules are available as an add-on to the internal medicine simulator. They are equipped with an extra tool for left ventricle measurements in B and M modes (EF). All cardiac cases facilitate scans from a parasternal, apical or subcostal perspective. The case database includes the following: kinetics, right ventricle, hypertension in combination with mitral regurgitation and stenosis as well as aortic insufficiency combined with stenosis. What is more, all cases offer extra data in the form of colour cine loops and spectral doppler images.

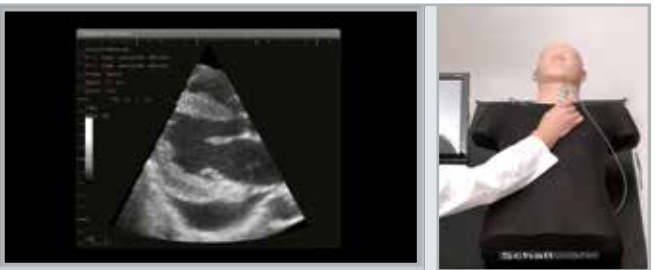clinical data: 4D color doppler volumes

Right ventricle example

The image on the left shows a panel screen with additional data as colour doppler cine loops. The pictures below show different perspectives.

panel window

subcostal view with congestion

parasternal view with huge right ventricle
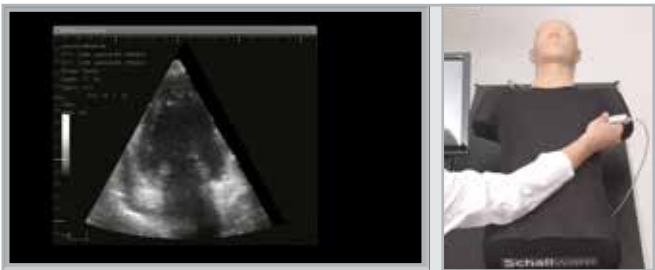

panel window

Pericardial effusion example

The left picture shows the panel screen displaying ultrasound device controls such as gain and brightness, position of volume, type of probe, freeze button and measurement tool. The two lower right pictures show the distribution of image slices on the ultrasound simulator's screen, reflecting the probe's position on the dummy and the type of probe used.

This technology enables you to examine the heart, save cine loops and measure the ventricle's EF.
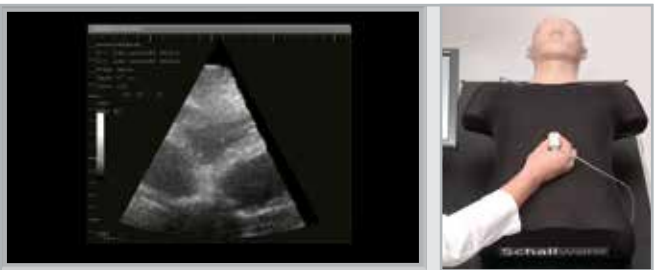

parasternal short axis

Parasternal view, long axis
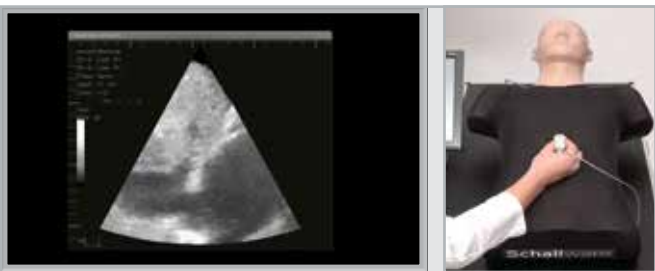

jump to apical 4D volume with 2 chamber view

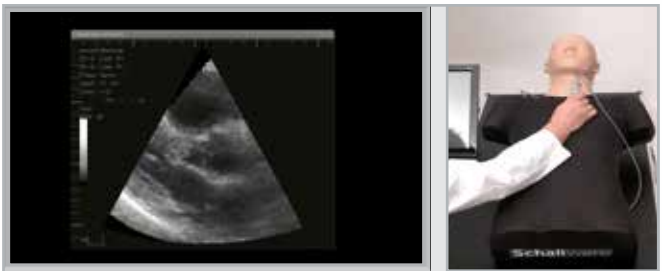jump to subcostal perspective: right and left ventricles are visible

ULTRASOUND SIMULATOR

TEE application

The second screen shows the resulting plane of the virtual model or loaded clinical data.

TEE application and virtual model

Select patient and activate clinical data volumes, switch from model to real ultrasound data.

TEE application and clinical data

The Schallware Simulator has an inbuilt transesophageal echocardiogram (TEE) application comprising a real endoscope (translation, rotation, flexion and transducer-rotation wheels and buttons) and a dummy with chest and oesophagus. The endoscope allows for all familiar movements, thanks to its two wheels and two electronic buttons (plus and minus) for scanning plane rotation.

The TEE application is based on a virtual model of an animated heart. Pathology data is available in clinical form (4D volumes on fixed positions along oesophagus and stomach).

TEE application and virtual model

This shows a 3D screen of the human body with transparent anatomy so as to follow the current probe plane of the TEE endoscope.

clinical data: 4D color doppler volumes

ULTRASOUND SIMULATOR

The configuration of your Schallware Simulator should meet your requirements.
Select your dummies, probes, modules and your hardware design.

Two different systems available:

design

station 128 for scientific work, case implementation, documentation, studies, hands-on courses, multi manikins and probes, data acquisition upgrade

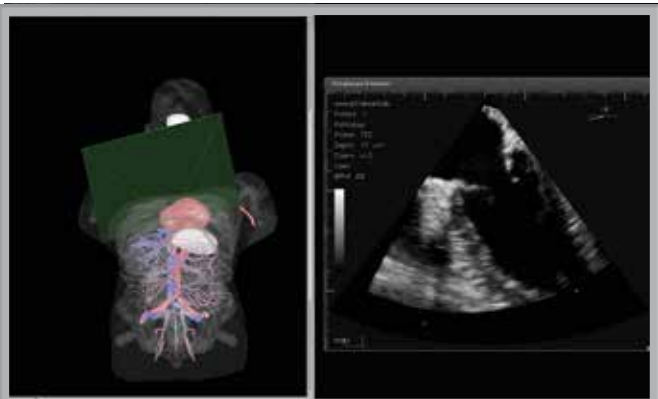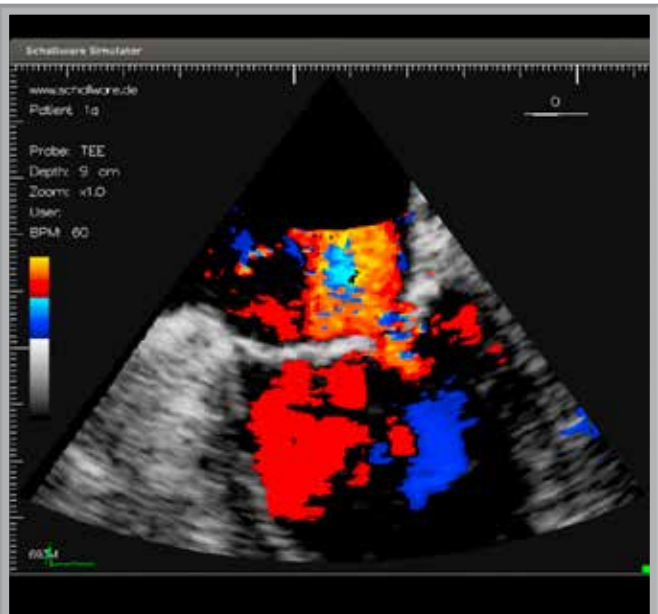**compact 128** for easy hands-on courses, dedicated ultrasound simulator for internal, obstetrics/gynecology or cardiology (TTE/TEE)

manikins

male, pregnant female, male manikin with chest and esophagus, premature baby with skull and chest

premature manikin, pediatrics

dummy probes

convex, linear, sector probe, transvaginal probe, transesophageal endoscope probe

cases (modules)

Patient 7	Pan-ulcerative colitis with backwash ileitis	Freehand	convex
Patient 8	Infiltrated appendix	Freehand	convex, linear, color
Patient 9	Colon carcinoma at right flexure, Paracolic abscess and malignant infiltration	Freehand	convex
Patient 10	Crohn's disease (sigmoid), Sigmoid stenosis, involvement of cecum-colon-ileum	Freehand	convex, linear, color
Patient 11	Terminal ileitis Crohn, enterocutaneous fistula, psoas abscess	Freehand	convex, linear, color

- Ileus, peritoneal carcinosis, skin metastasis, necrotic liver metastasis
- Adrenal tumour
- Appendicitis

2. Abdomen Emergency

- Thrombus in vena cava (Budd-Chiari syndrome), Thrombus in middle hepatic vein (renal cell carcinoma)
- Steatohepatitis, Ascites decompensation, HCC (hepatocellular carcinoma)
- Budd-Chiari, Cruveilhier-Baumgarten syndrome, Common bile duct with stones
- Chronic sclerosing cholangitis (ITBL), LTX
- Aneurysm of portal and splenic vein with septic thrombus
- Acute edematous pancreatitis, cholecystolithiasis, biliary duct stones
- Splenic rupture and necrotizing pancreatitis, Intraperitoneal bleeding
- Splenic hydatid cyst, morbus Ormond, carcinosis stenosis
- Mechanical small bowel ileus
- Aortic dissection
- Acute appendicitis
- Peritoneal carcinosis by liposarcoma
- Alveolar echinococcosis

3. Liver Basic

- Budd-Chiari, Cruveilhier-Baumgarten syndrome, ascites
- Hepaticojejunostomy, aerobilia, renal cyst, pancreatic pseudo cyst
- Liver cysts, bright liver tumours

simulator configurations

kraken-1
internal 250 cases, cardiology tte 40 cases, questionnaires 15h

kraken-2
ob/gyn 250 cases, questionnaires 25h

kraken-3
internal 250 cases, , cardiology tte 40 cases, pediatrics new born 40 cases questionnaires 20h

kraken-4
internal 250 cases, cardiology tte 40 cases, pediatrics new born 40 cases, ob/gyn 250 cases, questionnaires 30h

kraken-5
internal 250 cases, cardiology tte 40 cases, cardiology tee endoscope 40 cases, questionnaires 25h

kraken-6
internal 250 cases, cardiology tte 40 cases, ob/gyn 250 cases, cardiology tee endoscope 40 cases, questionnaires 30h

kraken-7
internal 250 cases, cardiology tte 40 cases, pediatrics new-born 40 cases, ob/gyn 250 cases, cardiology tee endoscope 40 cases, questionnaires 35h

add-on puncture-needle

self-learning questionnaires projects:

1. beginner course abdomen (Dr. Claudia Lucius, Berlin), 6h

2. beginner course abdomen (Prof. Dietrich Bern, Suisse), 6h

3. Liver segments (Dr. Claudia Lucius, Berlin), 2h

4. screening trimenon I, II, III, obstetrics (Dr. Andreas Brueckmann), 6h

5. Inflammatory bowel diseases (Dr. Claudia Lucius, Berlin), 7h

6. emergency medicine (Kiel, Germany), 4h

7. cardiology tte standard planes, measurement EF, PW and CW Doppler (Berlin), 3h

8. pediatrics new-born, brain, spine, hips measurement, 6h

ULTRASOUND SIMULATOR

Cases are acquired as single volume (B-image, color doppler), multivolumes, different probes or even dates.
The red bars in acquired examples show available patient data and the direction of the acquired sweep (not a plane).
One volume may contain between 500 and 2000 images.
All cases are published under **www.schallware.de/cases**.
If you choose a module and select details, you can browse through all regions of interest (ROI) marked images of a case.

Patient 7		Pan-ulcerative colitis with backwash ileitis	Freehand	convex
Patient 8		Infiltrated appendix	Freehand	convex, linear, color
Patient 9		Colon carcinoma at right flexure, Paracolic abscess and malignant infiltration	Freehand	convex
Patient 10		Crohn's disease (sigmoid), Sigmoid stenosis, involvement of cecum-colon-ileum	Freehand	convex, linear, color
Patient 11		Terminal ileitis Crohn, enterocutaneous fistula, psoas abscess	Freehand	convex, linear, color

1. Abdomen General

- Liver tumours, peritonitis
- Liver cysts, Crohn's disease, adenomyomatosis, cholecystolithiasis, nephrolithiasis, stenosis of ileocecal anastomosis
- Liver metastases
- Polycystis liver and kidneys
- LTX, NHL (non Hodkin's lymphoma), gallbladder wall edema,
- Aerobilia, choledocholithiasis
- Pancreatic pseudocyst, chronic pancreatitis, pancreatic duct dilatation, necrotizing pancreatitis, hydronephrosis, renal pelvic stone, parapelvic cysts, ascites,
- Infected splenic cyst
- Ileus, peritoneal carcinosis, skin metastasis, necrotic liver metastasis
- Adrenal tumour
- Appendicitis

2. Abdomen Emergency

- Thrombus in vena cava (Budd-Chiari syndrome), Thrombus in middle hepatic vein (renal cell carcinoma)
- Steatohepatitis, Ascites decompensation, HCC (hepatocellular carcinoma)
- Budd-Chiari, Cruveilhier-Baumgarten syndrome, Common bile duct with stones
- Chronic sclerosing cholangitis (ITBL), LTX
- Aneurysm of portal and splenic vein with septic thrombus
- Acute edematous pancreatitis, cholecystolithiasis, biliary duct stones
- Splenic rupture and necrotizing pancreatitis, Intraperitoneal bleeding
- Splenic hydatid cyst, morbus Ormond, carcinosis stenosis
- Mechanical small bowel ileus
- Aortic dissection
- Acute appendicitis
- Peritoneal carcinosis by liposarcoma
- Alveolar echinococcosis

3. Liver Basic

- Budd-Chiari, Cruveilhier-Baumgarten syndrome, ascites
- Hepaticojejunostomy, aerobilia, renal cyst, pancreatic pseudo cyst
- Liver cysts, bright liver tumours
- FNH (focal nodular hyperplasia)
- NHL (non-Hodkin's lymphoma) of liver
- Free fluid, renal cysts
- Fatty liver hepatitis, cirrhosis

4. Liver Advanced

- Alveolar echinococcosis, peritonitis
- Hepatic cysts, enlarged ductus choledochus
- Hydatid cyst WHO CE3a (WHO-IWGE classification)
- Extensive polycystic liver disease
- Hepatitis C, cholecystolithiasis, normal Lymph nodes in hepatoduodenal ligament
- Toxic liver cirrhosis, fatty degeneration of the liver, reopened umbilical vein
- Choledocholithiasis, enlarged lymph nodes in hepatoduodenal ligament
- Space occupying lesions (breast cancer metastases), cavathrombus pars hepatica
- Budd-Chiari, Cruveilhier-Baumgarten syndrome

5. Liver Emergency

- Chronic cholecystitis, CBD stenosis, enlarged lymph nodes
- NET (neuroendocrine tumour), hepatomegaly
- Large thrombus in vena cava, ascites between liver and duodenum
- Steatohepatitis, ascites, HCC
- Acute cholecystitis with lithiasis, Fatty liver
- Thrombus in hepatic artery stump
- Hydatid cyst
- Bright tumours, strong dilatation of hepatic ducts, CBD stenosis, Stent implanted
- Peritoneal carcinosis by liposarcoma
- Thrombosis of portal and splenic vein
- Portal vein thrombosis, TIPS, hypertrophic additional spleen
- Budd-Chiari

6. Neck

- MTC (medullary tyroid carcinoma)
- Paratyroid gland adenoma
- Medullary hypeplasia
- MEN 2 (multiple endocrine neoplasia type 2)

7. Emergency / FAST

- Acute appendicitis
- Free fluid in Morison's pouch and Douglas space
- Perihepatic ascites
- Acute splenic rupture
- Massive left and right pleural effusion
- Aortic dissection type B, Aortic aneurysm and dissection, Marfan syndrome and HTX
- thrombosis, vascular tree, lymph nodes

8. IBD (Inflammatory bowel disease)

- Normal terminal ileum and appendix
- Ulcerative colitis with stenosis, pan-ulcerative colitis
- Diverticulitis
- Terminal ileum with stenosis and interloop abscess
- Crohn's disease (with many recordings within a 6 months treatment) with stenosis and fistula, with entero-cutaneous fistula and with involvement of cecum, colon and ileum
- Infiltrated appendix
- Colon carcinoma

9. pediatrics

- gastroenterology: IBD, invagination, appendicitis
- kidney, lungs, liver transplants ..

10. urology

- kidney, bladder, prostate

11. echo contrast liver, kidney, spleen, AA

2. Female manikin, convex and transvaginal probe

- normal / pathologic cases for 1st, 2nd and 3rd trimenon obstetrical ultrasound examination (abdominal, transvaginal, foetal heart)
- non-pregnant cases: abdominal and transvaginal
  Examples for obstetrics pathologies: total 100 obstetrics and gynaecology cases in database

1. Chapter Gemini

- Abortion
- Club feet
- NT (nuchal translucency)
- 2 to 12 multiples
- Dichorionic-diamnotic twins

2. Chapter umbilical cord, placenta

- Breus Mole (massive subchorial thrombohaematoma)
- Knot or looping
- Hernia
- Placenta bipratita, placenta vacuoles, placenta cysts
- Extrachorealis
- Pro singular artery

3. Chapter neuro sonography

- Blake' Pouch Cyst
- Corpus-callosum-agenesie
- Plexus chorioideus cyst
- Ventricle-megaly dangling plexus
- White spots
- Holoprosencephalocely

4. Chapter skeleton

- Spina bifada
- Arthrogryposis multiplex congenita
- Pes equinovarus

5. Chapter urogenital:

- Potter 2A
- Kidney cysts
- Sponge kidney ...

6. Chapter echocardiography

  (4D stic volumes implemented in freehand high-resolution volumes)
- VSD (ventricular septum defect)
- Turner syndrome
- DORV (double outlet right ventricle)
- Aortic stenosis
- D-TGA

7. Chapter abdomen:

- Gastrochisis
- Omphalocele

8. Chapter thorax:

- CCAML Type 1, 2
- Diaphragmatic hernia

3. TTE/TEE cardiac cases

- Virtual heart model
- Up to 40 volumes per phase
- normal cases
- Up to 16 volumes per phase real colour doppler volumes
- Virtual heart for anatomy study

Case database TTE (40 cases)
- Normal cardiac cases
- Pericardial effusion
- Kinetics
- hypertension
- Mitral stenosis and mitral regurgitation
- Aortic stenosis, regurgitation
- Right ventricle

Case database TEE (30 cases)
Besides virtual model you can switch on discrete positions and perspectives to real data volumes.
- Normal cardiac cases: mid-esophagus, transgastric, Aorta descendens ..
- Mitral stenosis and regurgitation
- Aortic stenosis and regurgitation
- Kinetics

4. pediatrics

manikin new-born can be turned

- Virtual model new born, animated heart, brain, abdomen

cases for new-born hips with measurement (Graf)
cases for new-born spine
cases for new-born brain

cases child inflammatory bowel diseases and abdomen

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Karolinska University Huddinge
141 86 Stockholm
phone: 08-585.800 00

Main Emergency Department Office:
Main Emergency Dept.
1800 Orleans Street
Sheikh Zayed 1, Room 1085
Baltimore, MD 21287

Fatima College
Abu-Dhabi, 2 universities

Abbvie Deutschland GmbH & Co. KG
Mainzer Strasse 81
65189 Wiesbaden

Region Hovedstaden
Regionsgarden
Kongens Vaenge 2
3400 Hillerod

MSD SHARP & DOHME GMBH
Lindenplatz 1
D-85540 Haar

Ultraschallschule der Medizinischen Klinik 1 Erlangen
Ulmenweg 18
91054 Erlangen

Ärztekammer Niedersachsen
Berliner Allee 20
30175 Hannover

University Moldavia
bd. Ştefan cel Mare şi Sfânt, 165
MD-2004, Chişinău, Repubd.
Ştefan cel Mare şi Sfânt, 165

Universitätsspital Zürich
Rämistrasse 100
8091 Zürich
Schweiz

Kantonsspital St.Gallen
Rorschacher Strasse 95
CH- 9007 St. Gallen

Medizinische Hochschule Hannover
Carl-Neuberg-Str. 1
30625 Hannover

Universite Bordeaux
146 Rue Léo Saignat,
33000 Bordeaux, Frankreich

Universität des Saarlandes
Campus
66123 Saarbrücken

Norsk Luftambulanse AS
(legehelikopteroperatør)
Besøk: Holterveien 24, 1448 Drøbak

St. Clair College
Centre for the Arts
201 Riverside Drive West
Windsor, ON N9A 5K4

Universitätsklinikum Frankfurt
Theodor-Stern-Kai 7
60590 Frankfurt

Johannes Wesling Klinikum Minden
Hans-Nolte-Straße 1
32429 Minden

Necker enfants malades
149 Rue de Sèvres,
75015 Paris, Frankreich

Department of Radiology, and the Simulationscenter, Rigshospitalet
Nørregade 10, PO Box 2177
1017 Copenhagen K

Schallware

ULTRASOUND SIMULATOR

University of Alberta
Department Name
116 St. and 85 Ave.
Edmonton, Alberta T6G 2R3

Klinikum Aschaffenburg
Am Hasenkopf
63739 Aschaffenburg

Universitätsmedizin Greifswald
Fleischmannstraße 8
17475 Greifswald

Fort Sam Houston
Santa Clara
USA

The Northern Alberta Institute of Technology
11762 106 Street Edmonton,
Alberta, Canada, T5G 2R1

Klinikum Nürnberg Nord
Prof.-Ernst-Nathan-Str. 1
90419 Nürnberg

Simulation Center SIMMERK
Istanbul / Tuerkei

Lokmanya Tilak Municipal General Hospital and Lokmanya Tilak Municipal Medical College, Sion Mumbai
Dr. Babasaheb Ambedkar Road,
Sion (West), Mumbai 400022

IVSMU
Pacific State Medical University, Vladivostok
Russia

Ministry of Health Care of Sakha (Yakutia) Republik, Russia

Kunming Medical University
191 Renmin West Road,
Xishan, Kunming, Yunnan
China

Southern Medical University
China

Third Military Medical University
No.30 Gaotanyan Street, Shapingba District,
Chongqing 400038, China.

Tianjin Medical University
22 Qixiangtai Road, Heping,
Tianjin, China

Harbin Medical University Nursing College
Tienan Hutong, Nangang, Harbin,
Heilongjiang, China

Chinese People's Armed Police Force Academy

Ultraschall-Akademie der DEGUM GmbH
Schiffbauerdamm 40
10117 Berlin

Accurate S.r.l.
Piazzale Gennaro Biguzzi, 20/1
47521 Cesena (FC)

Nederlands Vereniging voor Hepatologie
Postbus 657
2003 RR Haarlem

Krankenhaus Maria Hilf
Dahlienweg 3
53474 Bad Neuenahr-Ahrweiler

Beth Israel Deaconess Medical Center
P.O. Box 15704
Boston MA 02215-0014, USA

Tehnoplus Medical
Strada Odobești, nr. 1, sector 3, București
Romania

TİLDA TEL. PAZ. DAN. BİL. SAN. VE TİC. L TD. ŞTİ.
Ankara Teknoloji Geliştirme Böl.Cyberpark B Blok
B205 Bilkent/Ankara

UEC & Partners I Medical Education GmbH
Waldstr. 18
64405 Fischbachtal

Faculty of Medicine, Lund University
SE-221 00 Lund

РУДН Moskow
Russische Universität der
Internationalen Freundschaft
117198, Moscow, Miklukho-Maklaya-Str. 6

Faculty of Medicine of Monastir
Tunisia

Faculty of Medicine of Sfax
Tunisia

UKE Hamburg
Kinderklinik

Prince Sattam bin Abdulaziz University
2017, 1438 H, KSA

HCT Sharjah Women's College
University of Sharjah
27272 Sharjah, UAE

Gulf Medical University
in Ajman, UAE

Odense Universitetshospital
J.B. Winsløws Vej 4, Indgang 5 Penthouse/2,
5000 Odense C DENMARK

Republican clinical medical center
220030, Minsk, Krasnoarmeyskaya Str., 10
BELARUS

Schallware GmbH
Gernot Jehle General Manager

Robert-Rössle-Straße 10/Haus 55
13125 Berlin, Germany

+49 (0) 30 94 89 20 71
+49 (0) 177 491 18 54

g.jehle@schallware.de

schallware.de
schallware-ultrasound-simulator.de

schallware.de