

# Schallware

## ULTRASOUND SIMULATOR

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

### Tutorial

videostreaming  
recording  
tutorial videos

### Feedback

ultrasound screen  
spatial ROI's  
(segmentation)

### Hands-On

manikin & dummy probe

### Panel

QnA dialogue  
table of contents  
findings



## KRAKEN

self-learning questionnaire sonography





## 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](http://www.schallware.de)

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

Yours sincerely

Gernot Jehle, GM

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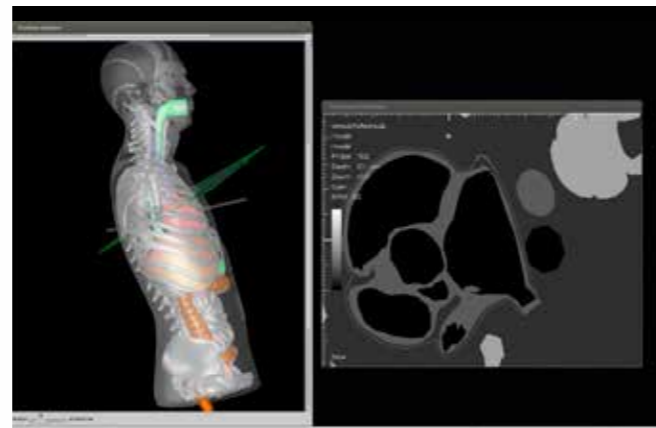


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clinical data

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).

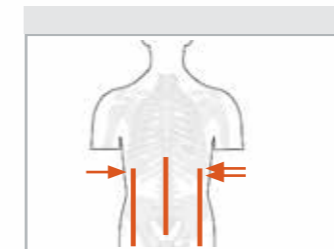
In addition, virtual models of an animated heart, foetus or abdomen are available for continuous scanning around organs to help beginners better understand the body's anatomy.

## 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.

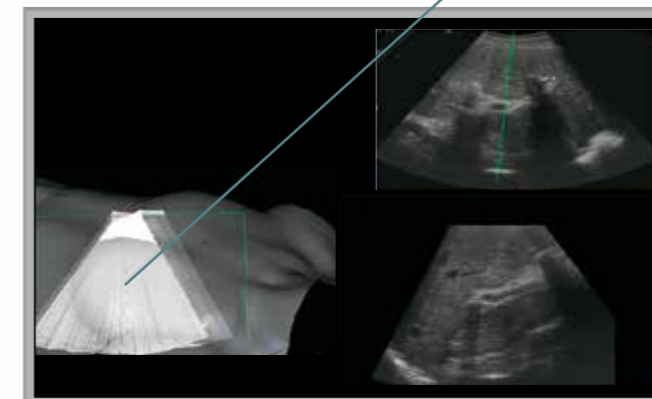
All documented cases include a medical history, questions leading to a diagnosis, comments on ultrasound diagnosis (i.e. what is visible with the simulator) and a pathological description. The simulator enables you to find physiological or pathological structures using regions of interest (ROI). More 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).

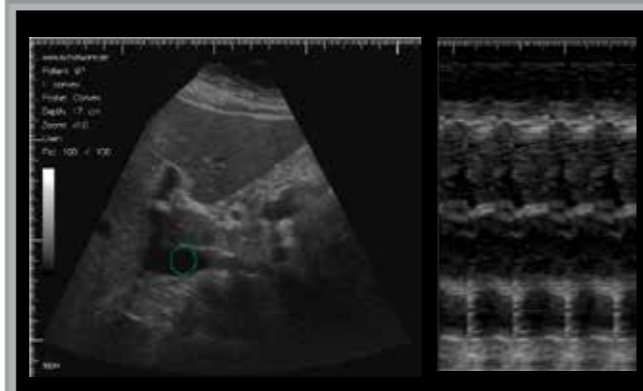


## ULTRASOUND SIMULATOR

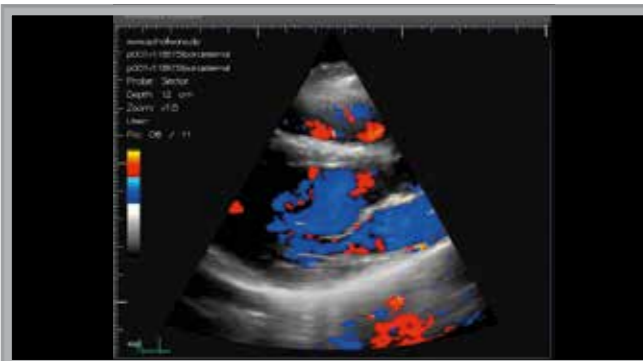
The Schallware Simulator shows different image modi:

- 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

### Schallware Ultrasound image modi



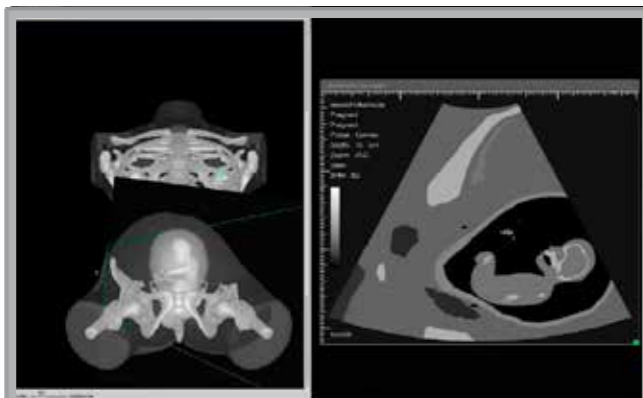
B Mode image, M Mode



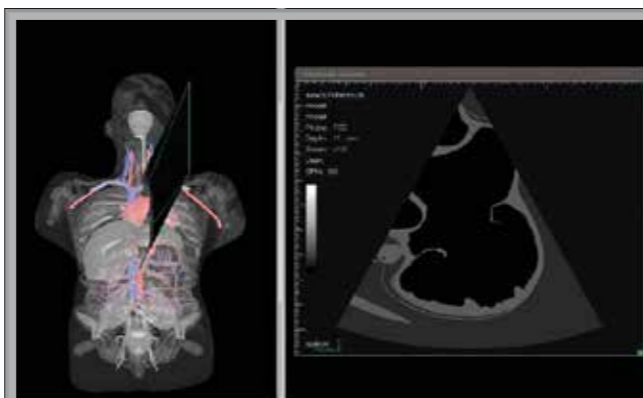
color doppler static and in 4D



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.

### 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

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.



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.

“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



### Modules

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

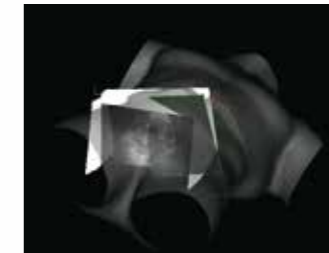
#### CARDIOLOGY male torso

Mitral Regurgitation and Stenosis Aorta  
• Insufficiency and Stenosis Kinetics  
• Hypertension

#### GYNAECOLOGY pregnant female torso

Gynaecology • Obstetrics • Emergency • Pelvis  
• Foetal Echocardiography

### Technology



Top right: Simulated ultrasound scan as displayed on computer.

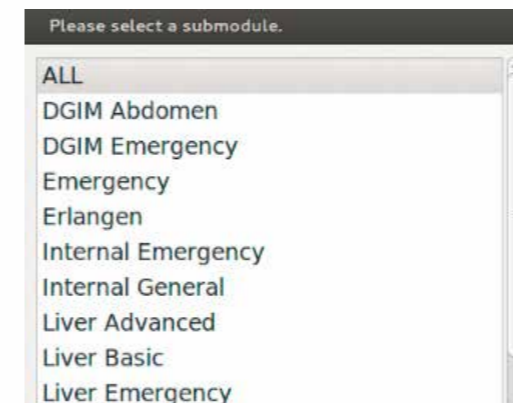


Top left: Internal working details of B-scan superimposition on torso.

Left: Sector probe on male dummy torso tracked with DOF

### Benefits

- 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)



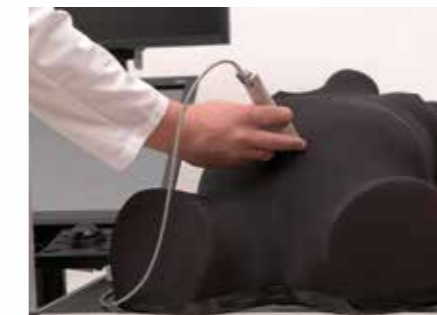
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Internal medicine

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. choledocholithiasis
4. pancreatic tumor



ultrasound window pathology: gall stone



panel window with tutorial



### 1. Abdomen module

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



ultrasound window pathology: cystic liver tumor



panel window with regions of interest (ROIs)



### 3. Kidney module

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



ultrasound window shows reslice 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



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



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



7. Neck module

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



ultrasound window thyroid check on neck



panel window with description of findings and screenshots

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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

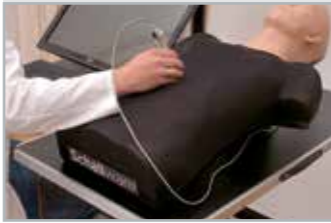


ultrasound window with liver and ascites



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

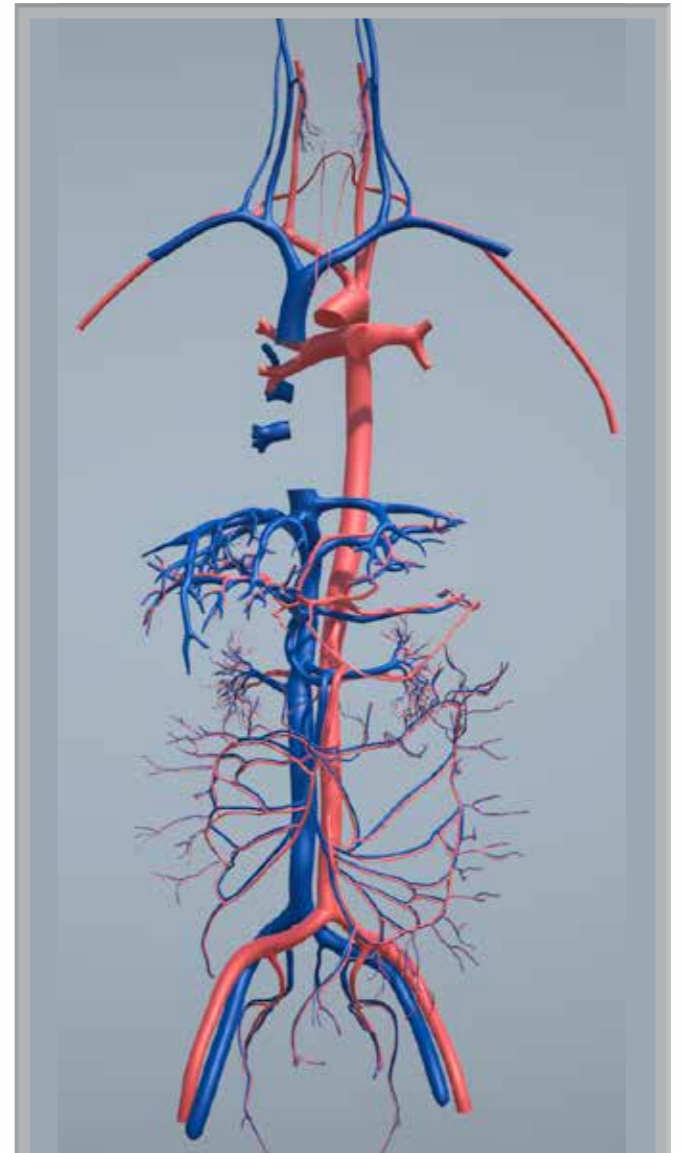


premature head module, thrombosis



Schallware hands-on course in SimCenter Berlin-Buch

- a\_abdominalis
- a\_arcus\_aortae
- a\_axilliaris\_dextra
- a\_axilliaris\_sinistra
- a\_carotis\_communis\_dextra
- a\_carotis\_communis\_sinistra
- a\_gastrica\_dextra
- a\_gastrica\_sinistra
- a\_gastro\_duodenalis
- a\_gastrointestinalis\_sinistra
- a\_hepatica\_communis
- a\_hepatica\_propria\_dextra
- a\_hepatica\_propria\_sinistra
- a\_ileocolica
- a\_iliaca\_communis\_dextra
- a\_iliaca\_communis\_sinistra
- a\_iliaca\_externa
- a\_iliaca\_interna
- a\_lienalis
- a\_mesenterica\_inferior
- a\_mesenterica\_superior
- a\_pulmonalis
- 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
- v\_axilliaris\_dextra
- v\_axilliaris\_sinistra
- v\_cava\_inferior
- v\_cava\_superior
- v\_hepatica\_dextra
- v\_hepatica\_media
- v\_hepatica\_sinistra
- v\_ileo\_colica
- v\_iliaca\_communis
- v\_iliaca\_externa
- v\_iliaca\_interna
- v\_jejunalis\_ilealis
- v\_jugularis\_externa
- v\_jugularis\_interna
- v\_lienalis
- v\_mesenterica\_superior
- v\_portae\_hepatis
- v\_pulmonaris\_dextra
- v\_renalis
- v\_sacralis\_mediana
- v\_subclavia
- v\_thyroidea



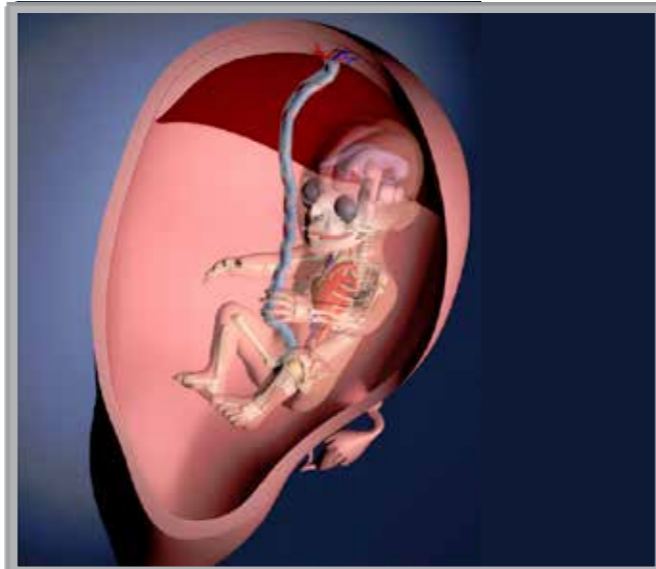
virtual Schallware model shows vascular tree

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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.

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



1. Obstetrics example trimenon I

long volume acquisition  
triplets  
measurement of CRL



ultrasound window with reslice image (triplets)



panel window with tutorial



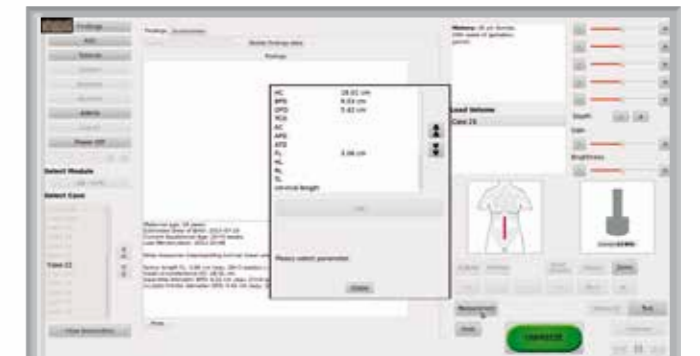
measurement of abdominal diameter (ATD)



measurement of head (HC, BPD)



measurement of femur length (FL)



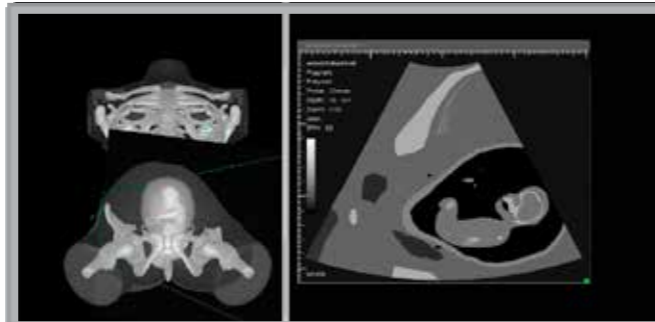
panel window with parameter list for weight estimation

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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

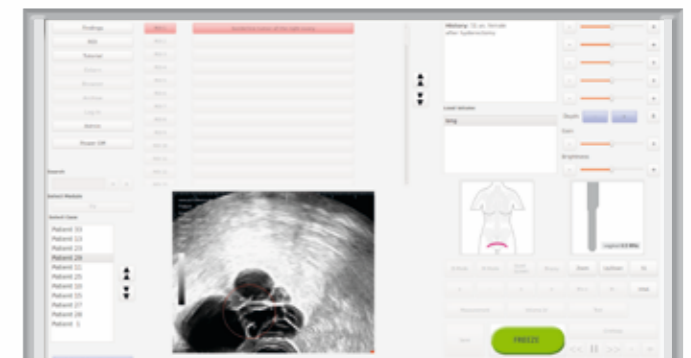


list of regions of interest

3. Gyn TV example



tumor of right ovary



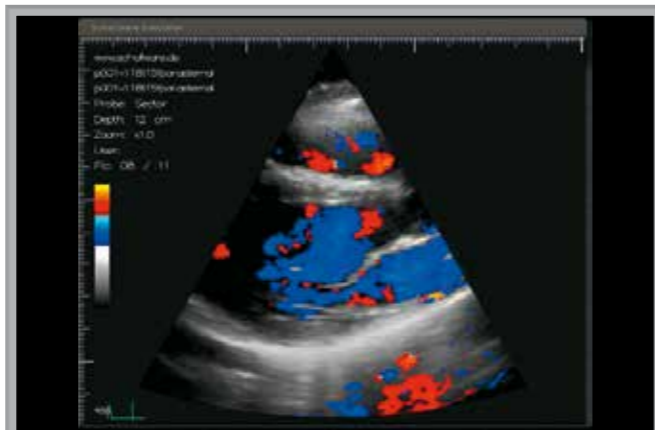
list of regions of interest

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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.



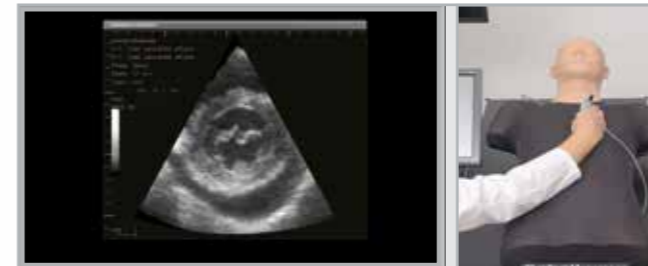
clinical data: 4D color doppler volumes



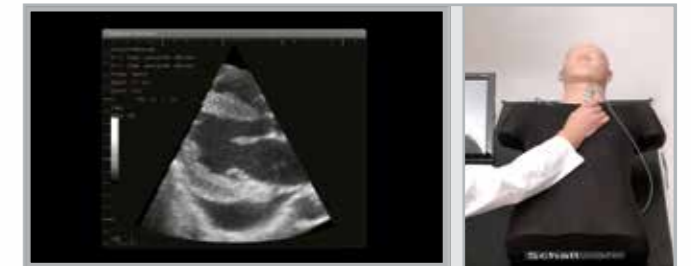
panel window

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



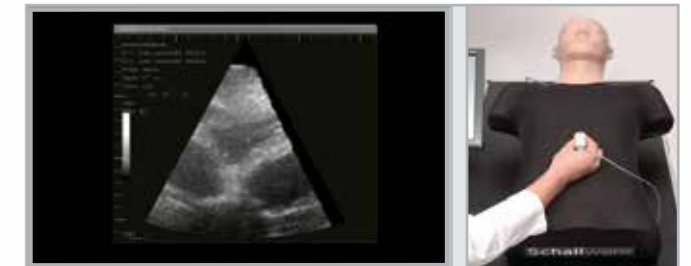
panel window

Right ventricle example

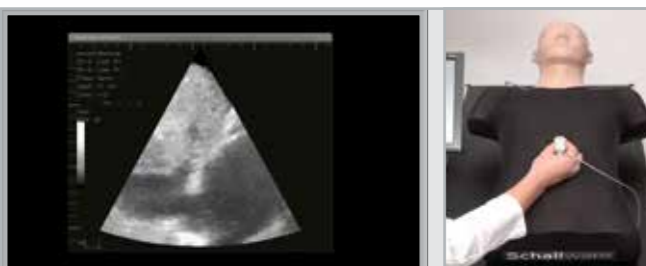
The image on the left shows a panel screen with additional data as colour doppler cine loops. The pictures below show different perspectives.



jump to apical 4D volume with 2 chamber view



jump to subcostal perspective: right and left ventricles are visible



subcostal view with congestion



parasternal view with huge right ventricle

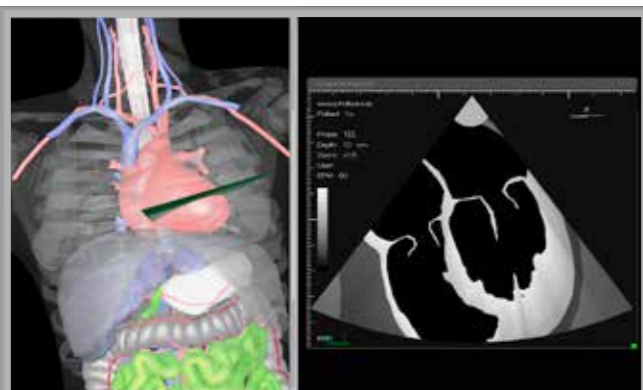
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TEE application

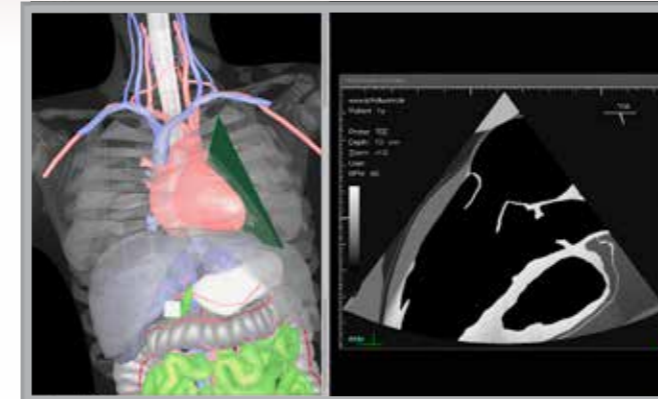
The Schallware Simulator has an inbuilt transesophageal echocardiogram (TEE) application comprising a real endoscope (translation, rotation, flexion and transducer-rotation wheels and buttons) and a dummy with chest and oesophagus. The endoscope allows for all familiar movements, thanks to its two wheels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



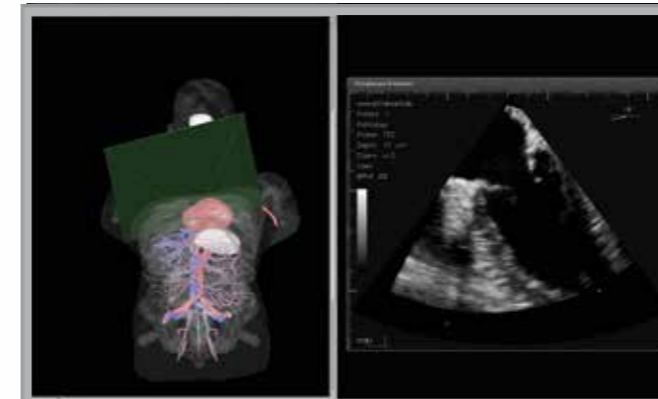
TEE application and virtual model

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



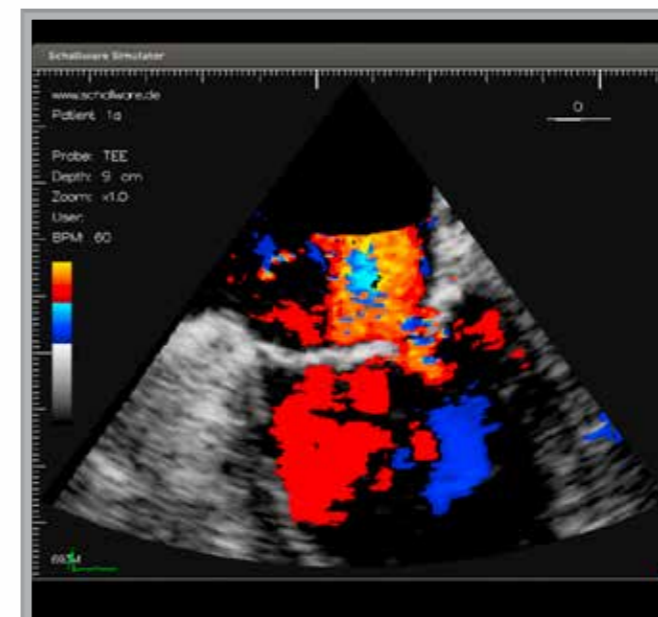
TEE application and virtual model

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



TEE application and clinical data

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



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, Intraoperative 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-abdomen**

internal 250 cases, cardiology tte 40 cases, questionnaires 10h,  
adult manikin, convex-, linear-, sector-probe

#### **kraken-2-ob/gyn**

obstetrics/gynecology 250 cases, questionnaires 10h, female manikin, convex-, transvaginal-probe

#### **kraken-3-abdomen-ob/gyn**

internal 250 cases, cardiology tte 40 cases, obstetrics/gynecology 250 cases, questionnaires 20h,  
adult and female manikin, convex-, linear-, sector-, transvaginal-probe

#### **kraken-4-abdomen-ob/gyn-new-born**

internal 250 cases, cardiology tte 40 cases, pediatrics new born 40 cases, ob/gyn 250 cases, questionnaires 30h,  
adult and female manikin, new-born manikin, convex-, linear-, sector-, transvaginal-probe

#### **kraken-5-abdomen-cardio-tee**

internal 250 cases, cardiology tte 40 cases, cardiology tee endoscope 40 cases, questionnaires 10h,  
adult manikin esophagus, convex-, linear-, sector-probe, tee-endoscope

#### **kraken-6-cardio-tte-tee**

cardiology tte 40 cases, cardiology tee endoscope 40 cases  
sector probe, tee-endoscope  
adult manikin esophagus

#### **kraken-7-neo-child**

pediatrics new-born manikin and adult/child manikin, 40 cases, questionnaires 6h,  
convex-, linear-, sector-probe

#### **kraken-8-complete**

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  
adult and female manikin, new-born manikin, adult esophagus, convex-, linear-, sector-, transvaginal-probe, tee-endoscope

### 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  
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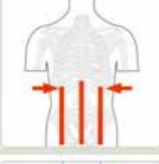
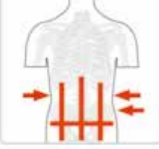
Cases are acquired as single volume (B-image, color doppler), multivolumes, different probes or even dates.

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](http://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 Hodgkin'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, Intraoperative 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

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### 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 thyroid carcinoma)
- Parathyroid gland adenoma
- Medullary hyperplasia
- 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 trimester 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-diamniotic twins

### 2. Chapter umbilical cord, placenta

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

### 3. Chapter neuro sonography

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

### 4. Chapter skeleton

- Spina bifida
- 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

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- 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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Find current scientific publications with Schallware Simulator here:

[www.schallware.de/downloads](http://www.schallware.de/downloads)

Schallware customers worldwide, more than 80 installations of ultrasound simulator station 128/64, also 50 courses yearly with up to 10 simulators ([www.schallware.de/calendar](http://www.schallware.de/calendar))

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