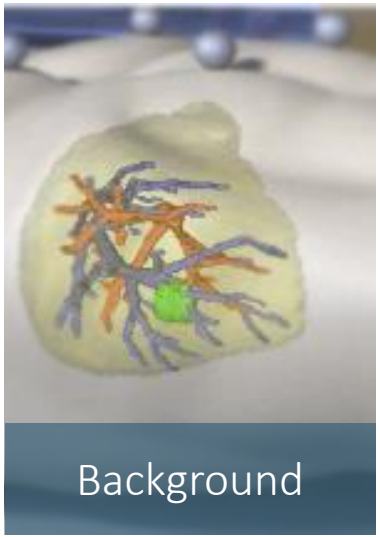
APPLIED MIXED REALITY
IN HEALTH

eHelse 2017

sopra steria

Oslo University Hospital
The Intervention Centre

AGENDA



ABOUT US

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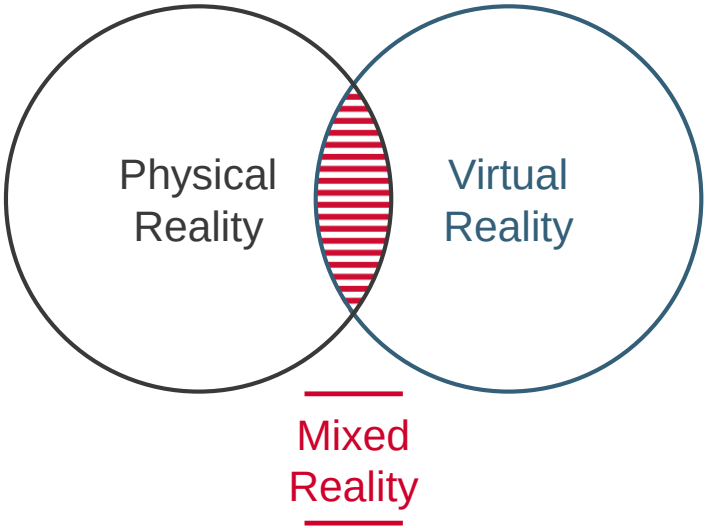
Oslo University Hospital

The Intervention Centre

- R&D Department within the hospital – Image guided Minimally Invasive treatment
- Develop new procedures and methods, treatment strategies
- Study social, economic and organizational consequences of new methods
- Staff: 45 nurses, radiographers, surgeons, engineers and physicists
- More than 1400 patients in their infrastructure
- More than 50 patents or patents pending

BLENDING DIGITAL CONTENT INTO THE PHYSICAL WORLD



The blending of physical and virtual worlds

WHAT IS HOLOLENS?

First fully untethered holographic computer

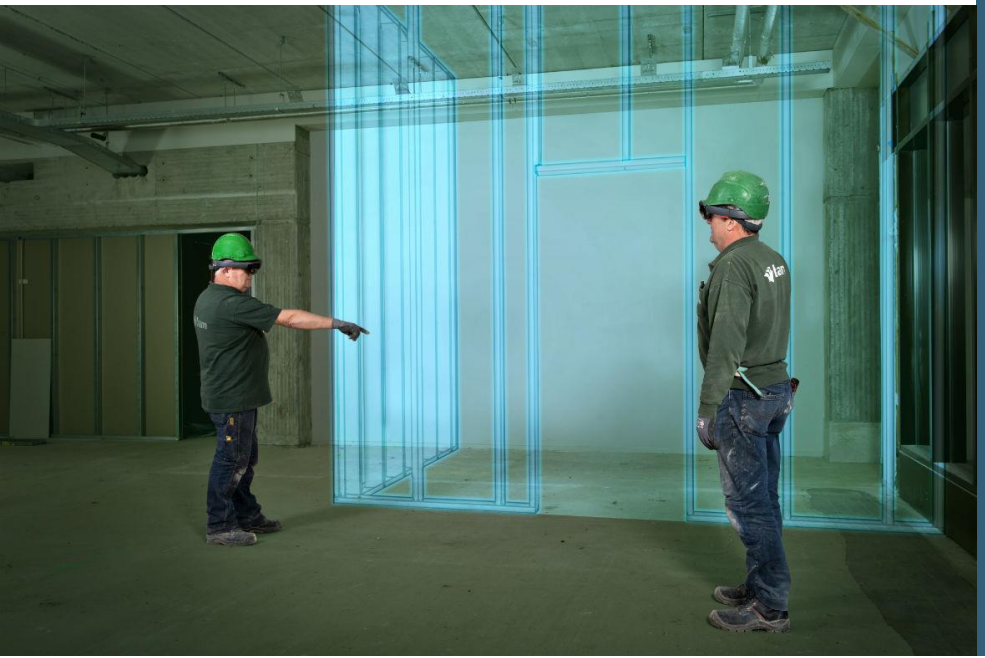
Transparent lenses

Sensors that makes it possible to anchor digital content in the real world

Interact with voice or gestures

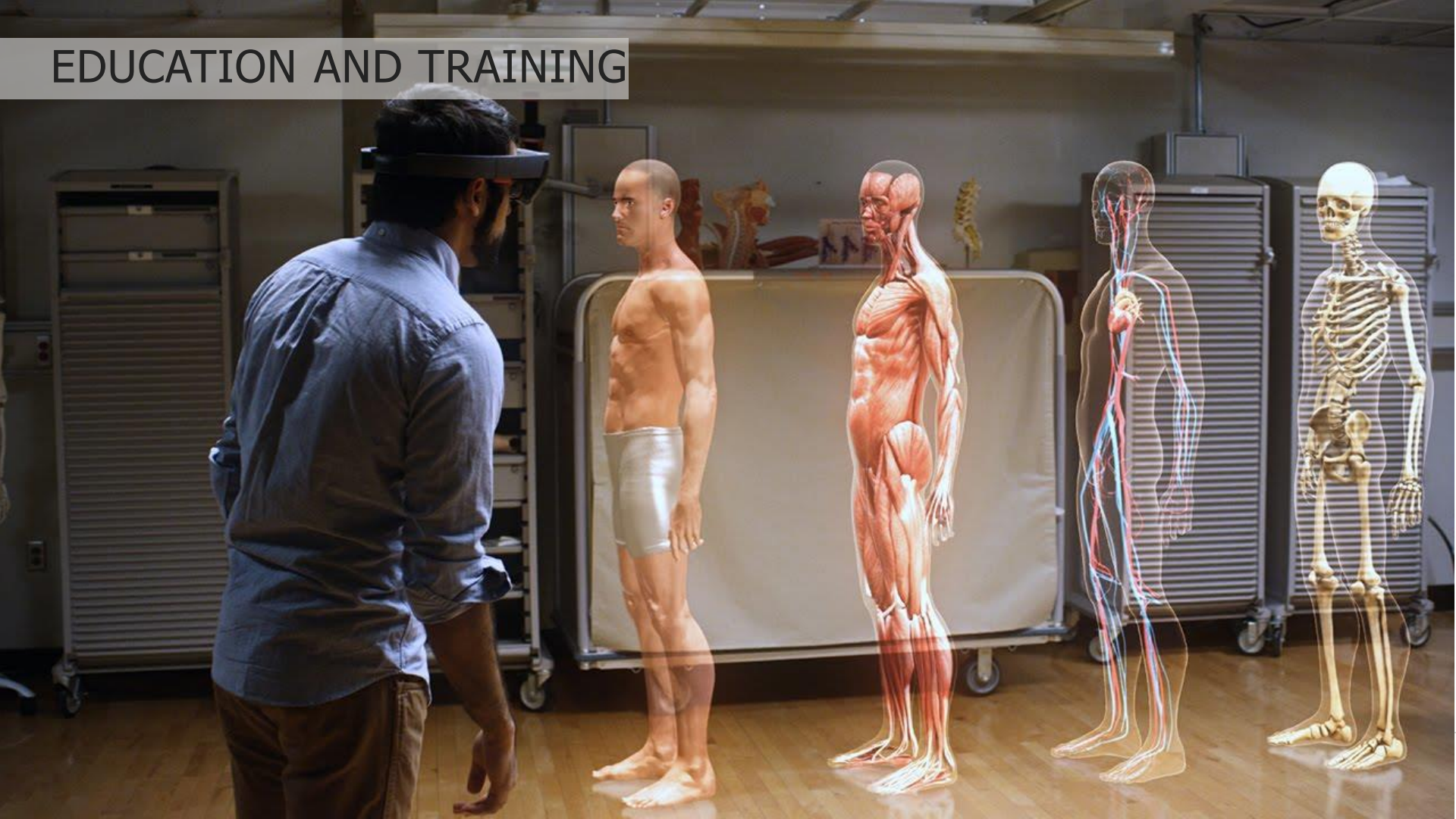
A more natural way to interact

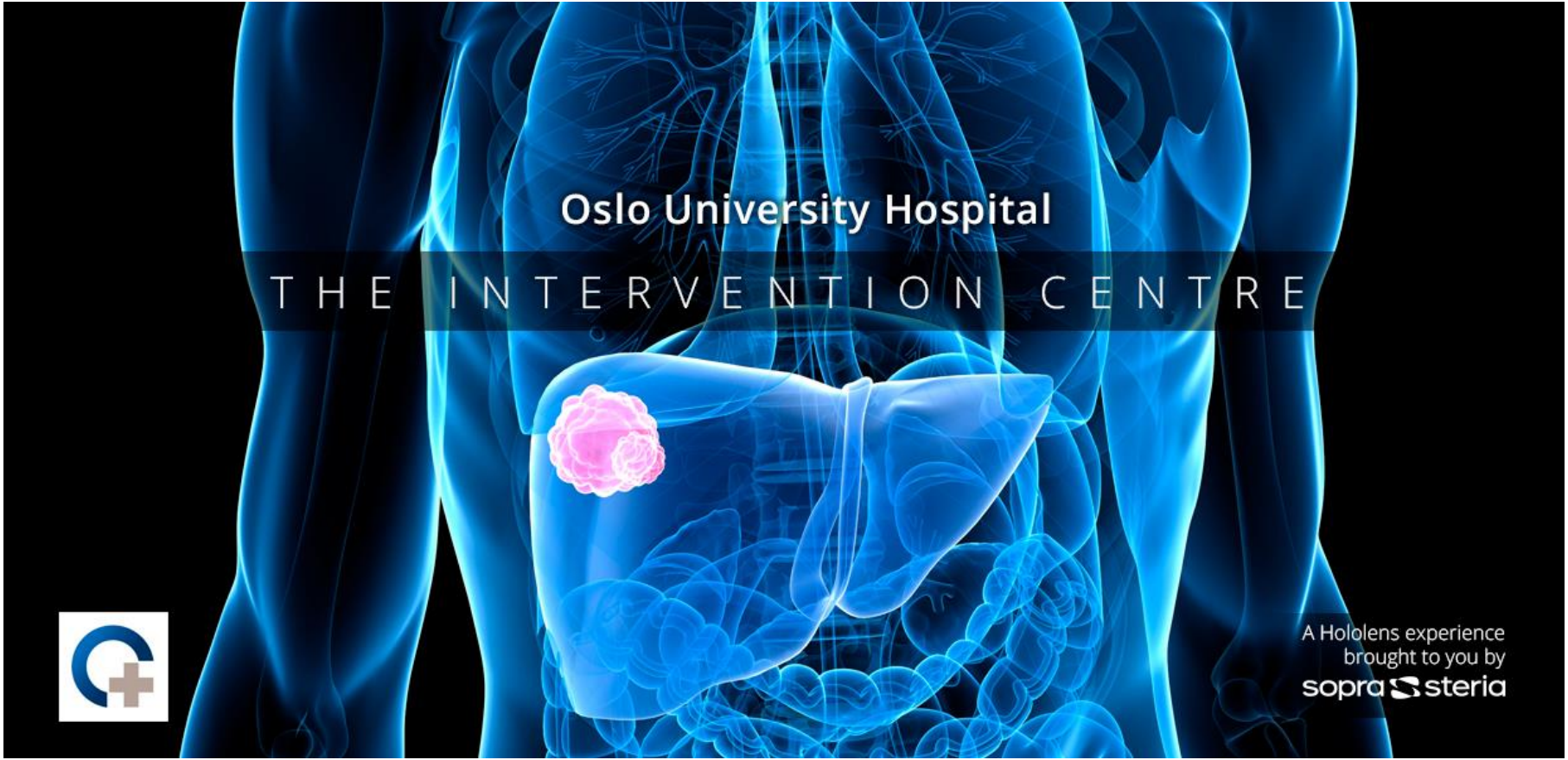
AUGMENTING THE HUMAN



- Be present in the physical environment
- Break digital content out of the constrains of viewing it on 2D screens, and interacting on it by touching keyboards and screens
- Enhance the senses with the use of sensors and network, that can analyse and bring information in the right context with complex analytics in real time

EDUCATION AND TRAINING




Oslo University Hospital
THE INTERVENTION CENTRE
A Hololens experience
brought to you by
sopra steria

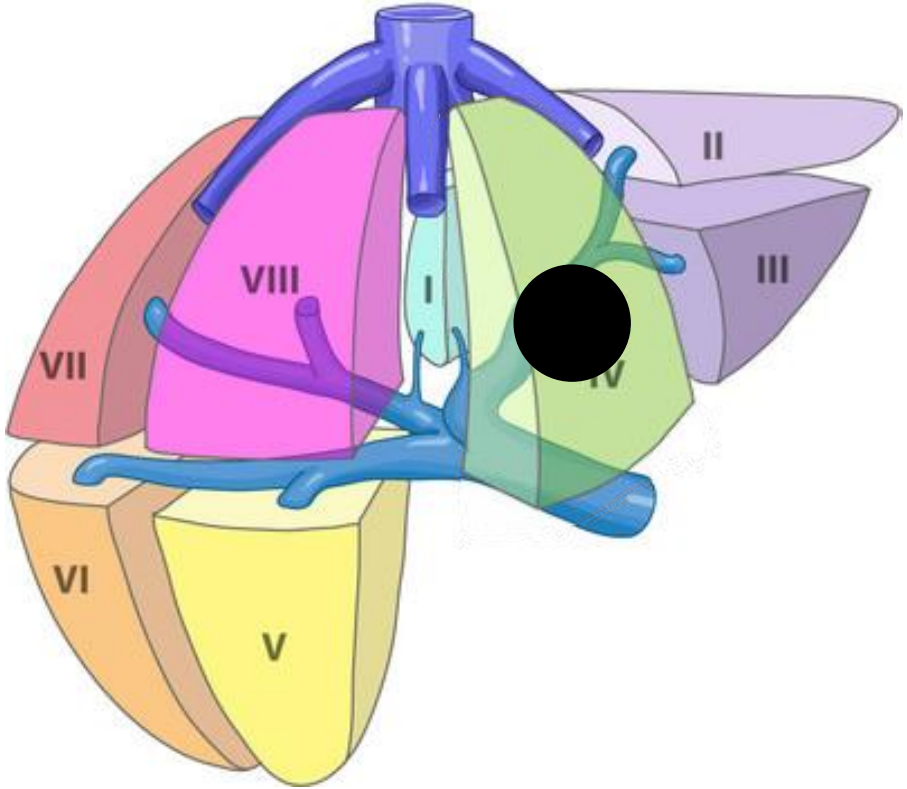
THE GOAL OF LIVER SURGERY IS TO REMOVE TUMOR TISSUE AND ITS SURROUNDINGS FROM HEALTHY LIVER TISSUE.

Open Surgery

Laparoscopic Surgery

NEW TECHNIQUES GETS WIDELY USED TO

SAVE AS MUCH HEALTHY LIVER TISSUE AS POSSIBLE



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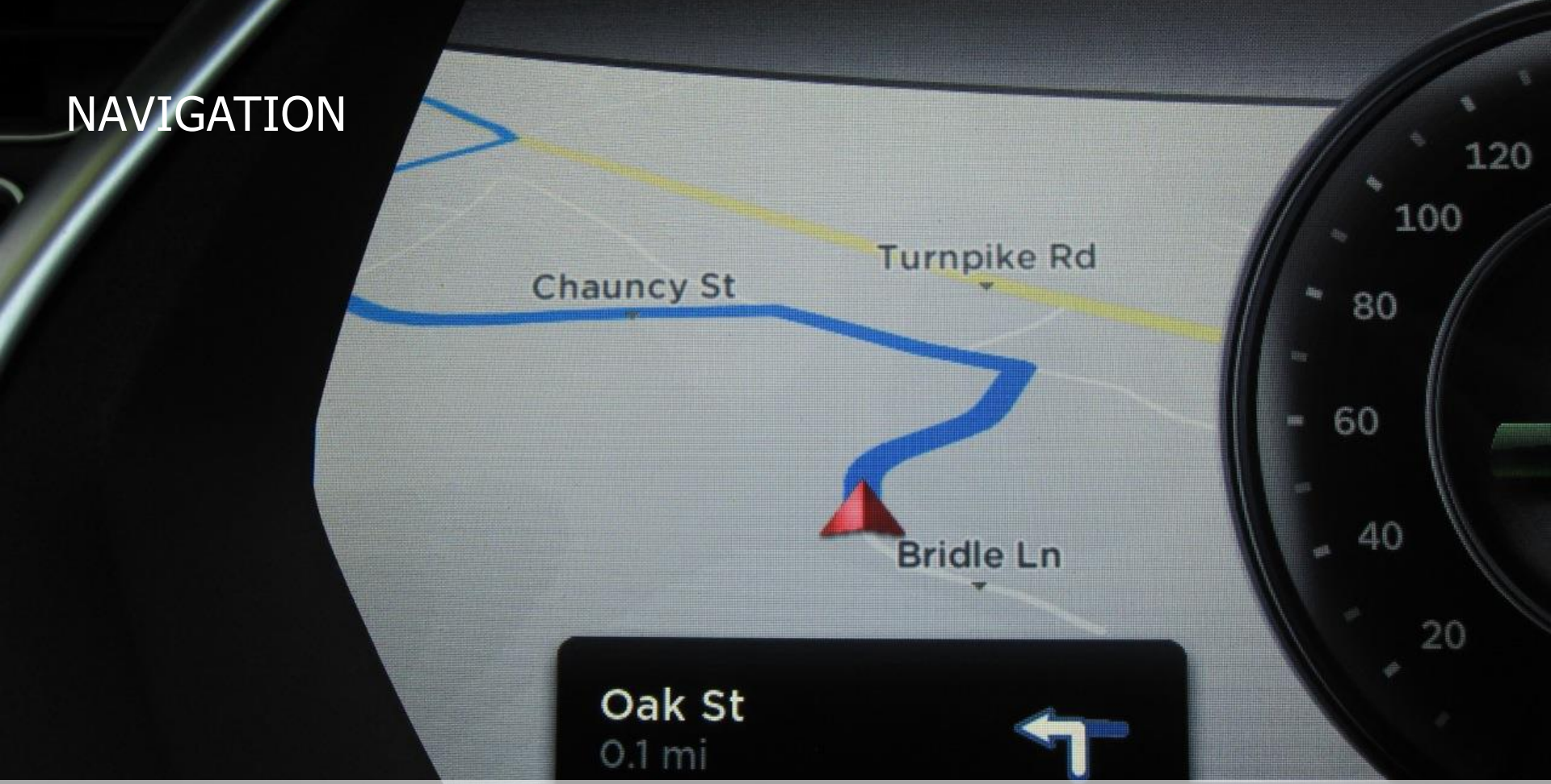
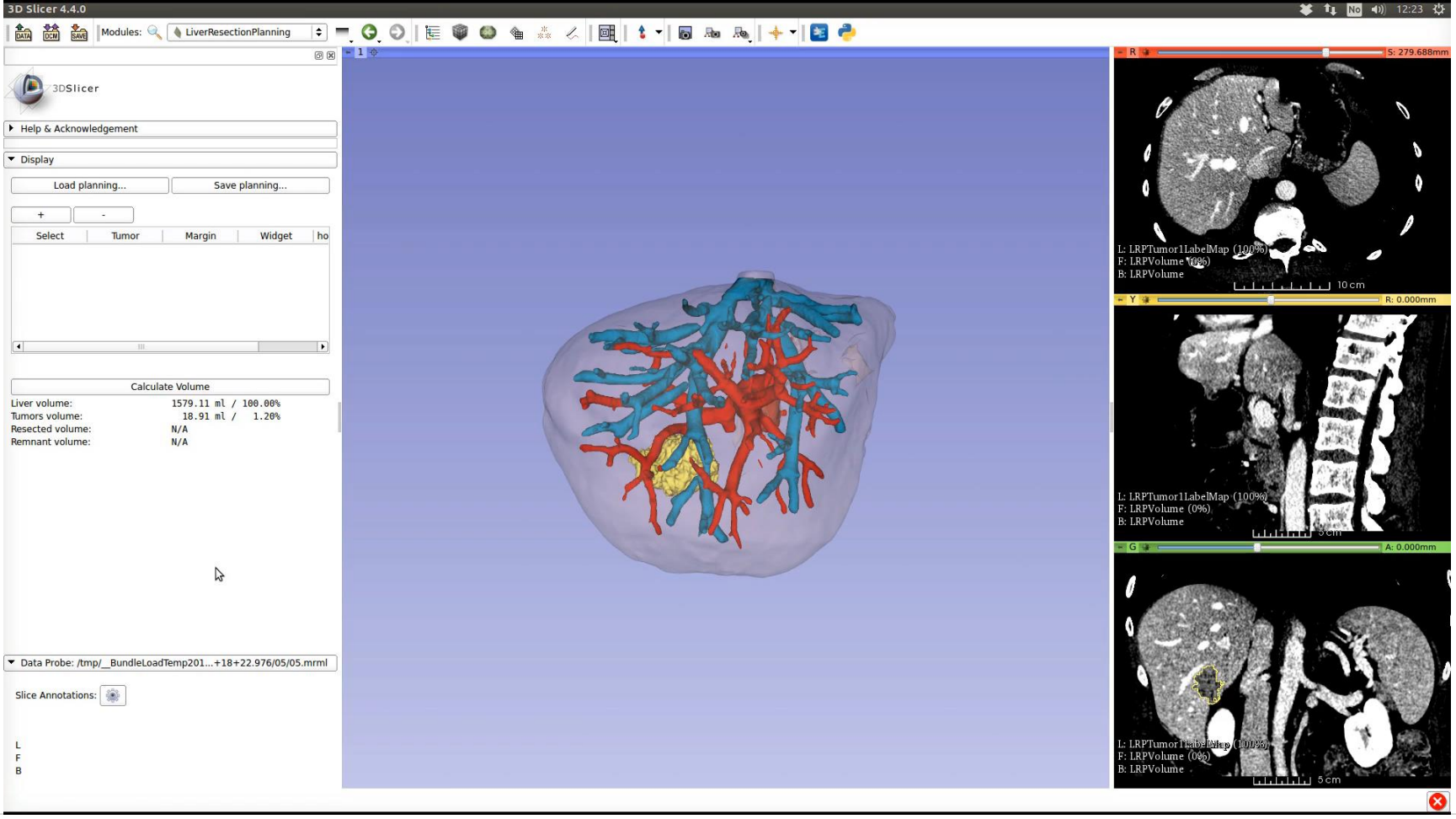
LIVER CANCER SURGERY – NEW TECHNIQUES

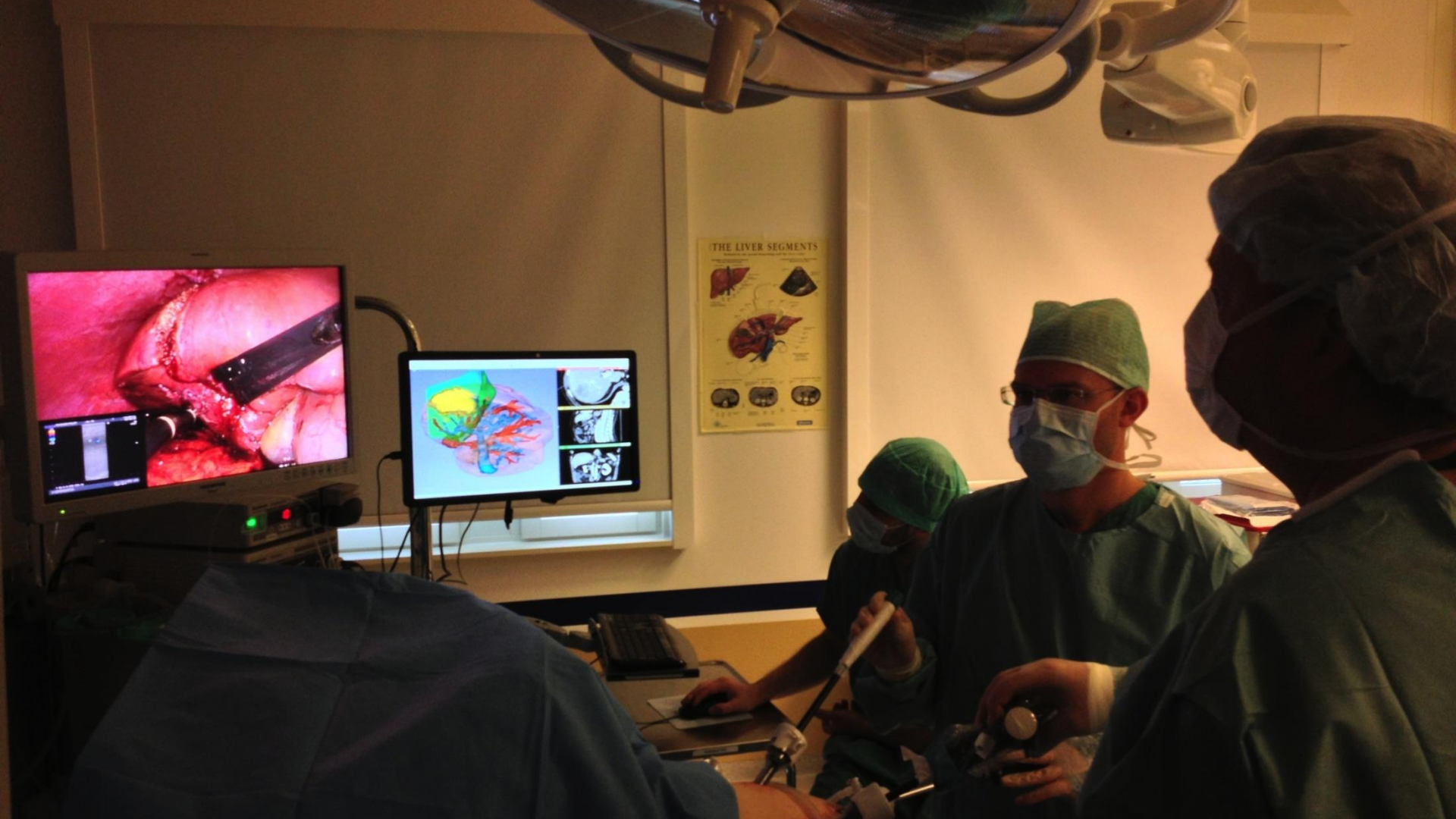
NAVIGATION


Chauncy St
Turnpike Rd
Bridle Ln
Oak St
0.1 mi
120
100
80
60
40
20

PLANNING AND NAVIGATION OF LIVER SURGERY

ARISER – AUGMENTED REALITY IN SURGERY, 2004-2008 - 3D ANATOMICAL MAP VISUALIZATION


3D Slicer 4.4.0
Modules: LiverResectionPlanning
3DSlicer
Help & Acknowledgement
Display
Load planning...
Save planning...
Select
Tumor
Margin
Widget
Calculate Volume
Liver volume: 1579.11 ml / 100.00%
Tumors volume: 18.91 ml / 1.20%
Resected volume: N/A
Remnant volume: N/A
Data Probe: /tmp/__BundleLoadTemp201...+18+22.976/05/05.mrml
Slice Annotations:
L
F
B
L: LRPTumor1LabelMap (100%)
F: LRPVolume (0%)
B: LRPVolume
10 cm
R: 0.000mm
5 cm
A: 0.000mm


THE LIVER SEGMENTS

MICROSOFT HOLOLENS

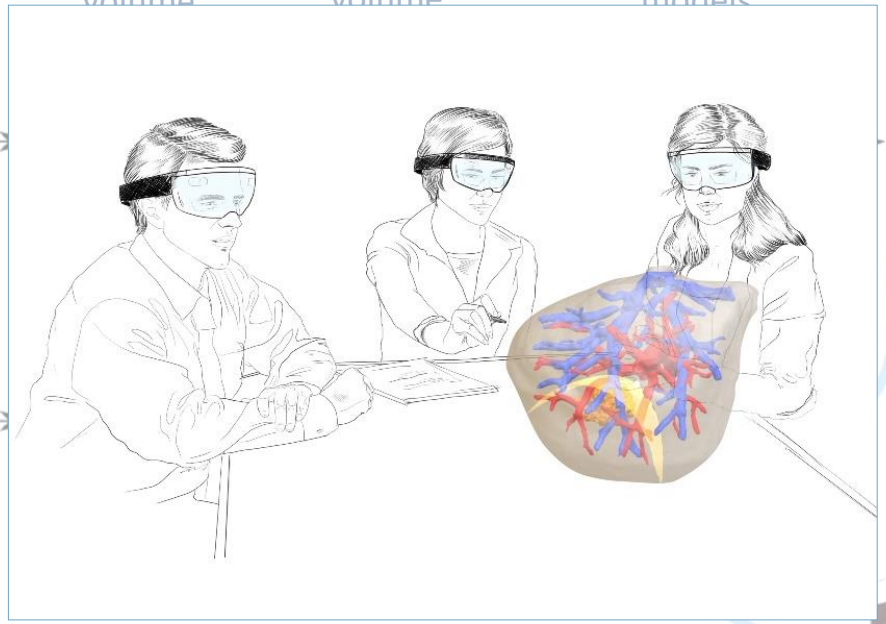
Computed tomography

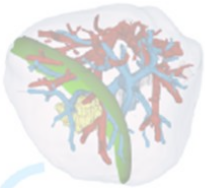
Medical volume

Segmented volume

3D Surface models

Resection plan

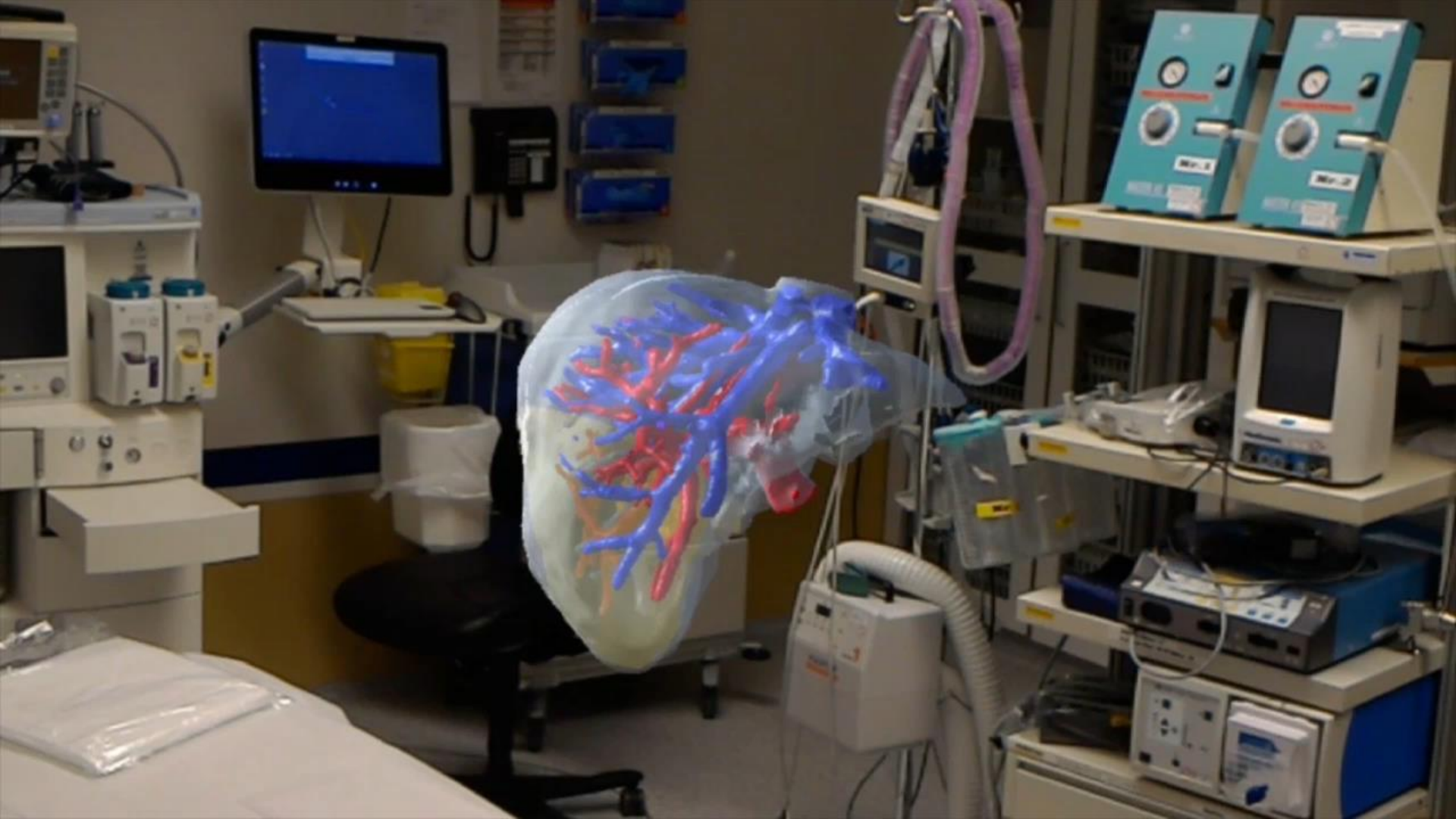




2D/3D Laparoscopic view

Magnetic resonance

Medical volume



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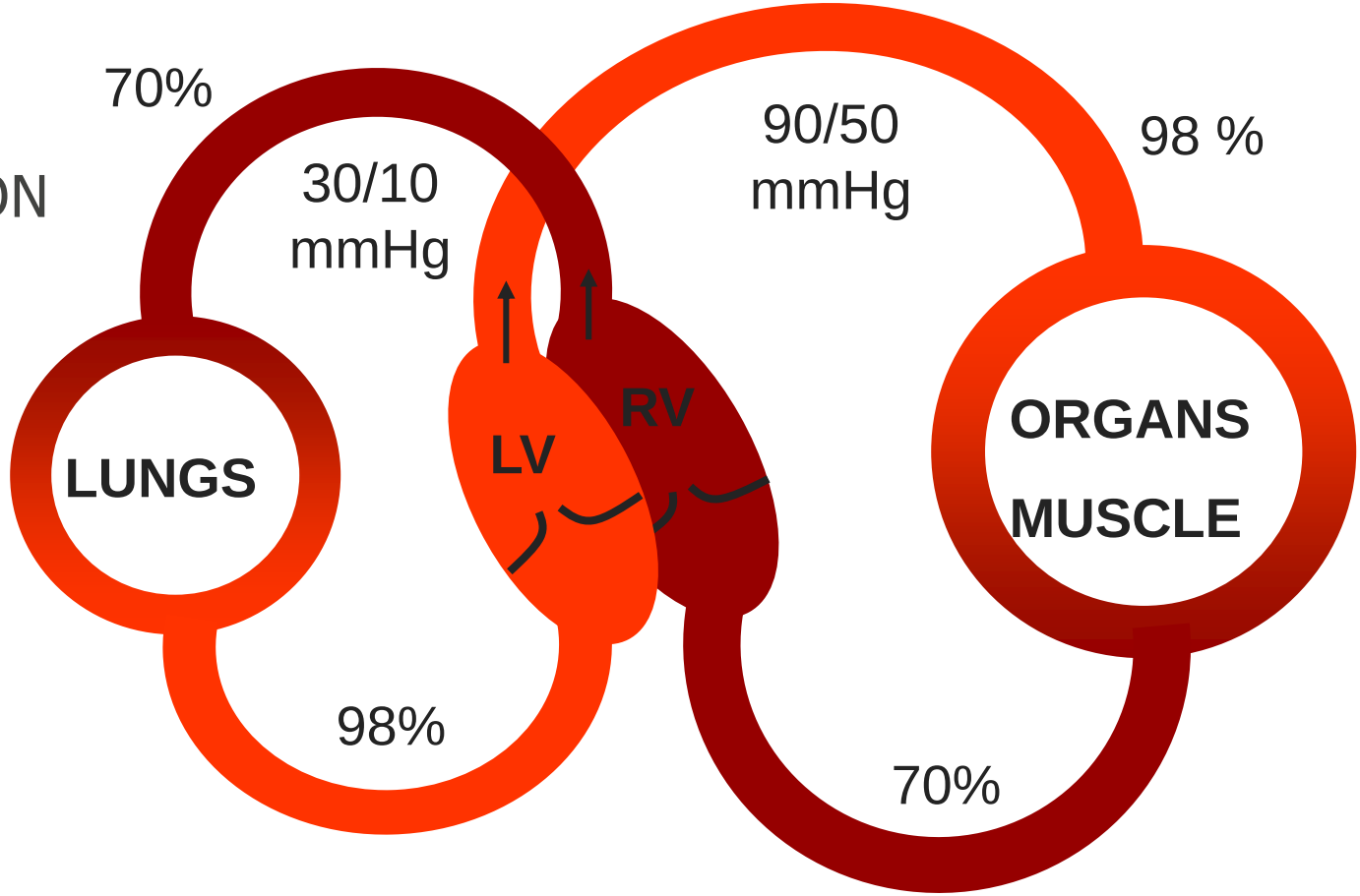
NORMAL CIRCULATION



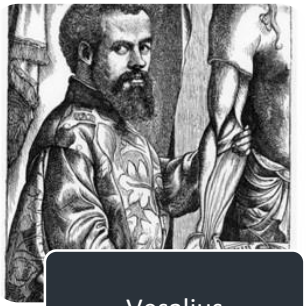
THE CRAZY PLUMBER

GOOD AND BAD PLUMBING

Normal Heart Model

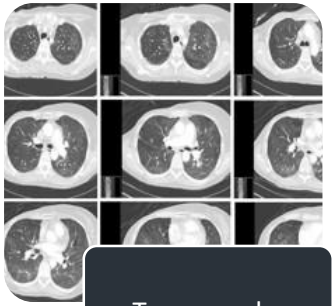
Very Sick Heart Model

FROM 3D TO 2D AND BACK AGAIN

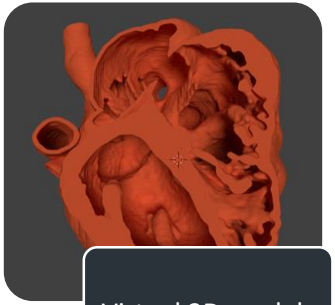


Vesalius

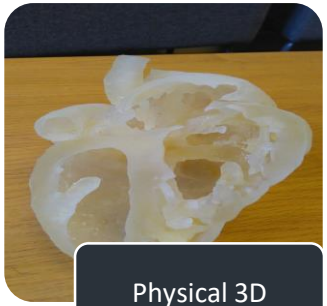
X-Rays



Tomography



Virtual 3D models



Physical 3D printed models

STANDARD 2D HEART DIAGNOSTICS

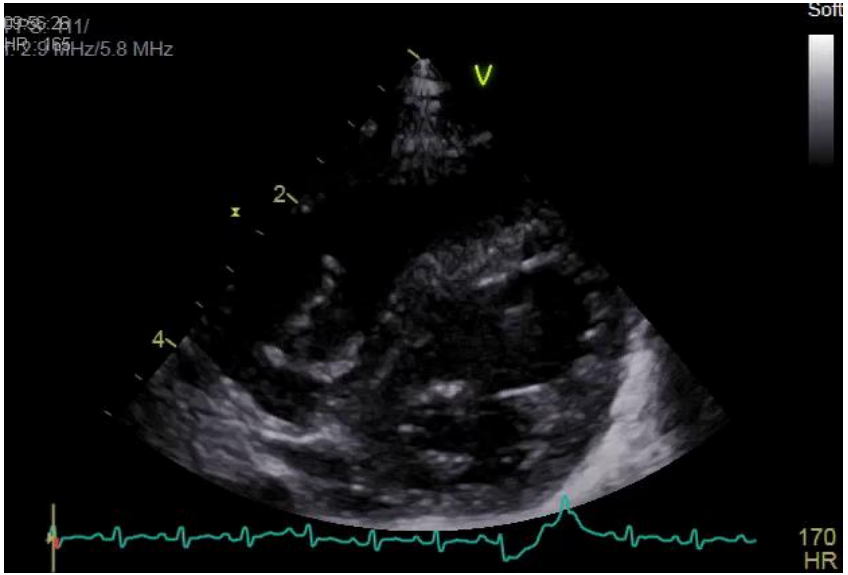
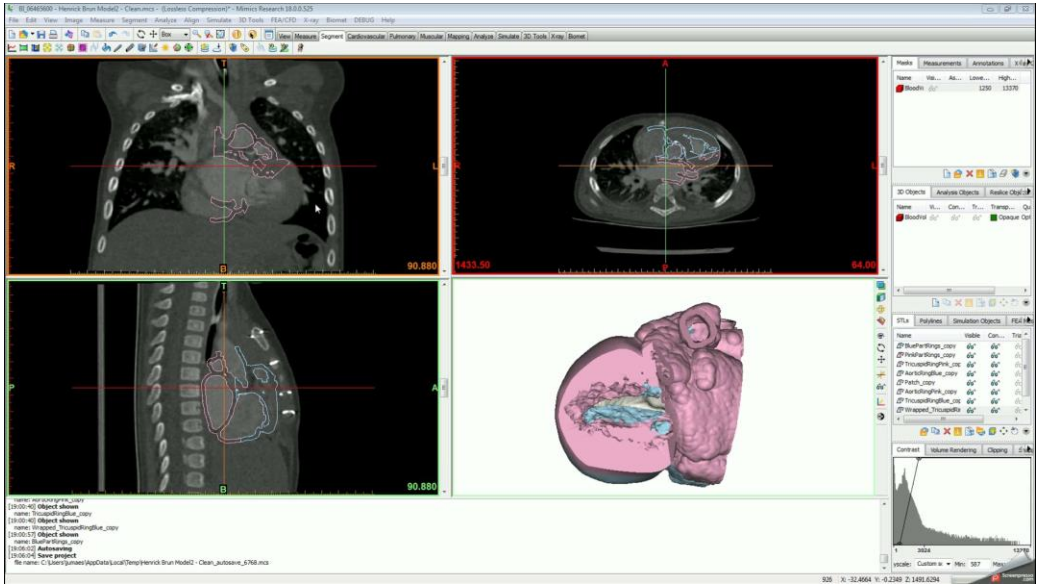
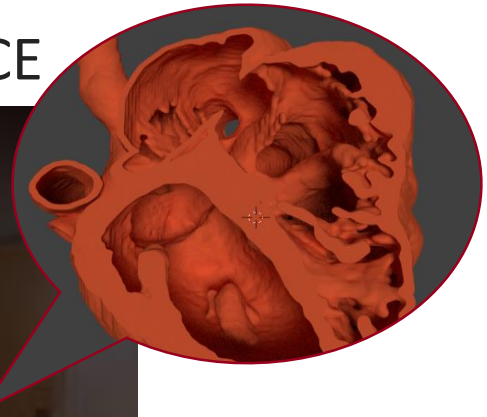


IMAGE → KNOWLEDGE → MODEL



HEART SURGEON – PLUMBER WITH A GOOD PLAN

OLD STYLE 2D HEART SURGICAL CONFERENCE



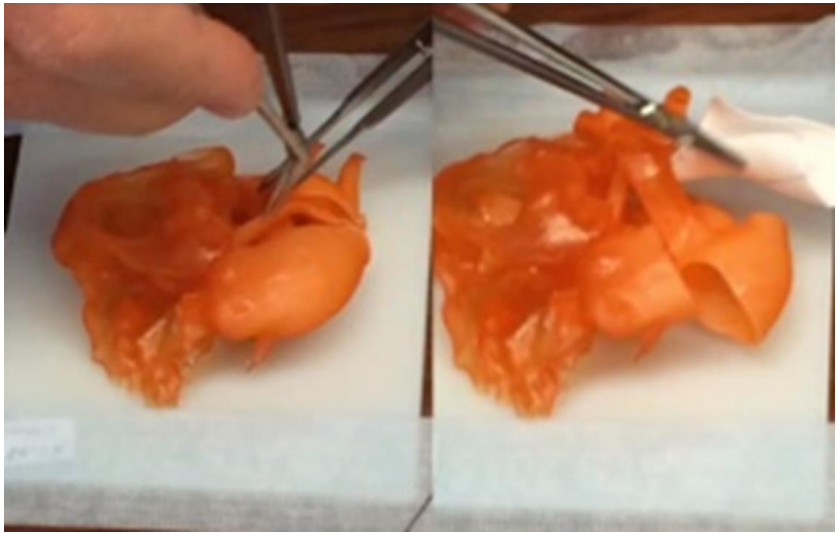
HEART SURGICAL CONFERENCE – 3D PRINTED MODEL

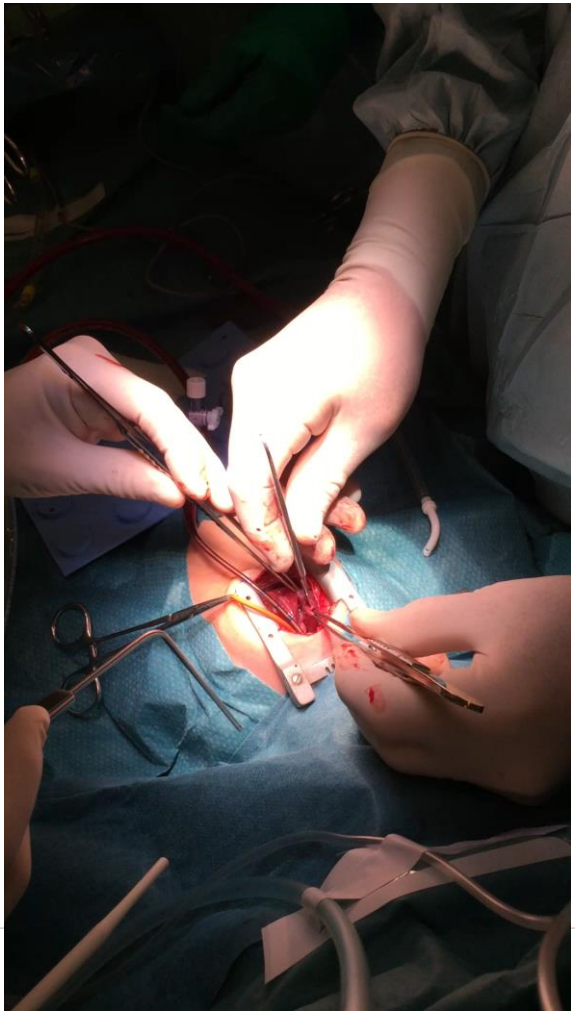
HOLOGRAPHIC HEART SURGICAL CONFERENCE

THE **HEARTVIZ** PROJECT
- CAN 3D MODELS SAVE LIVES ?

- 3D print
  - Implants
  - Practise Surgery
  - Teach Students and Patients
- Hologram
  - Plan surgery
  - Monitor interventions
  - Valve analysis

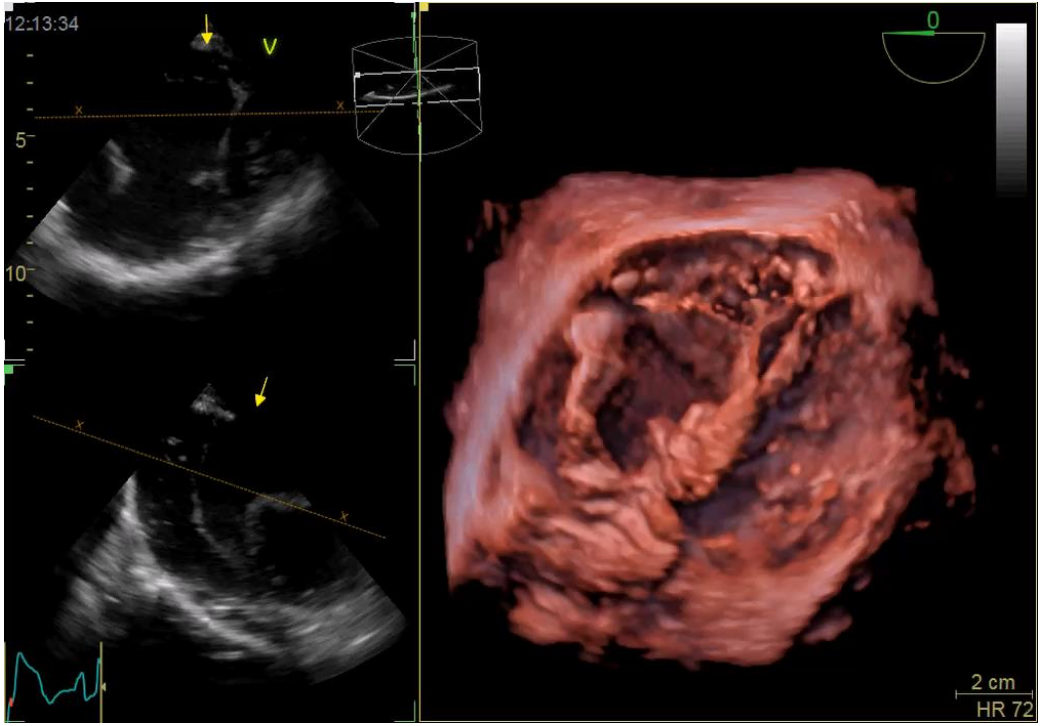
PRACTISE ON PLASTIC



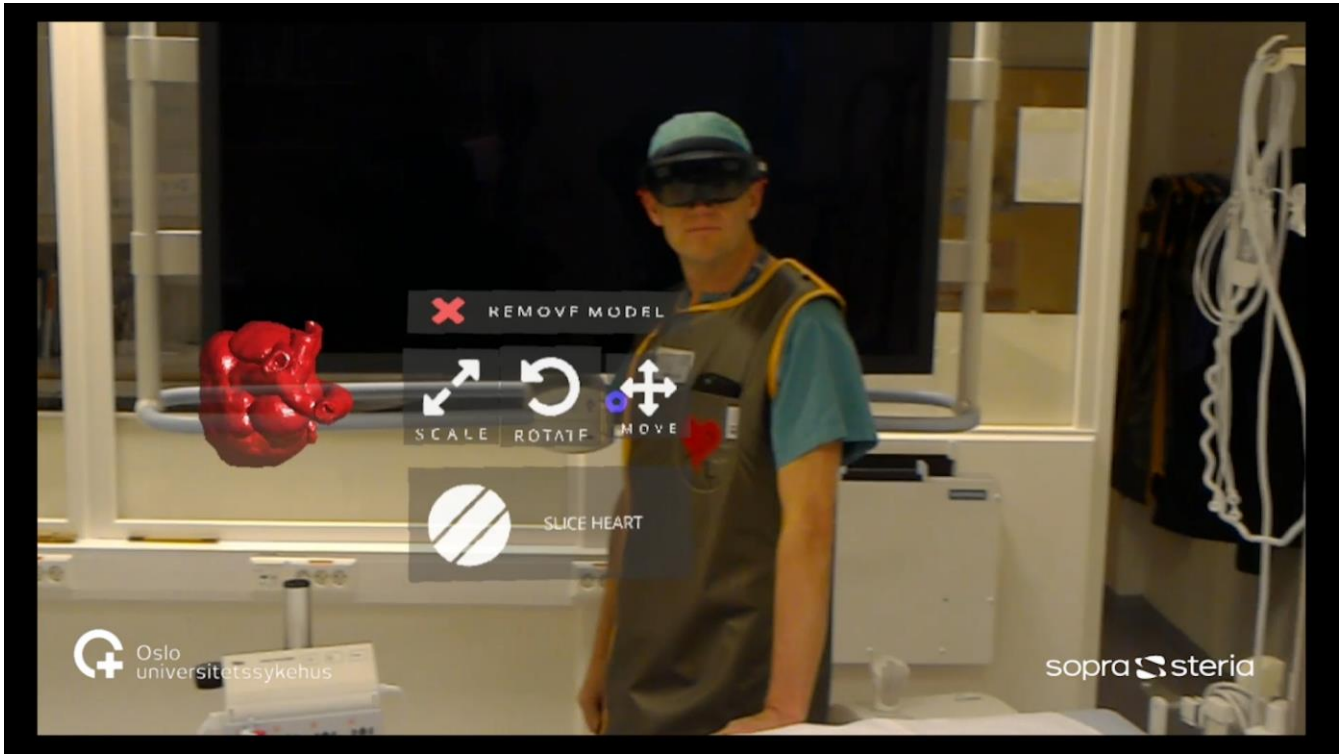


3D ULTRASOUND : HEART VALVES

- Live stream
- Cropping Tools
- Virtual Surgery



TOOLBOX DEVELOPMENT



COLLABORATORS

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- Dept for Pediatric Radiology, Oslo Univ Hospital
- Prof Shi Joon Yoo, Hospital for Sick Children, Toronto
- Giovanni Biglino, Bristol, UK
- PRECISE Resarch Group, Oslo University Hospital
- GE Vingmed, Norway

FUNDING

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- South Eastern Health Authorities, Norway
- Norwegian Research Council
- European Comission, Work Programme for research
- Sopra Steria

Thank you!

Q&A