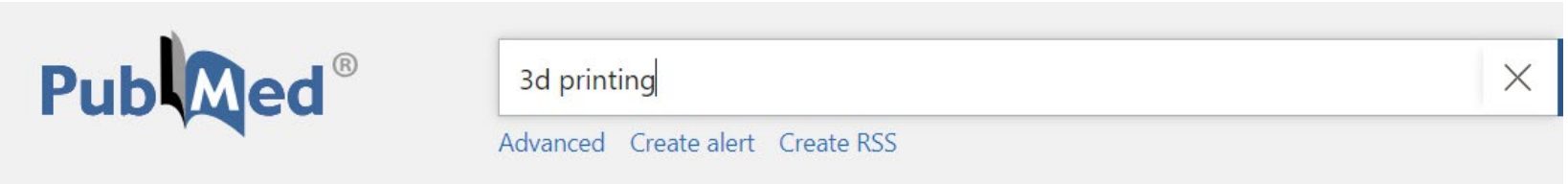
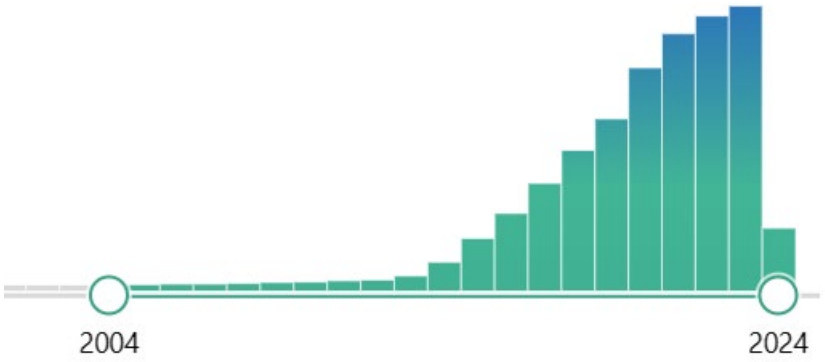
LMU KLINIKUM
Gemeinsam. Fürsorglich. Wegweisend.

Enhancing Pediatric Cardiology with 3D Printing:

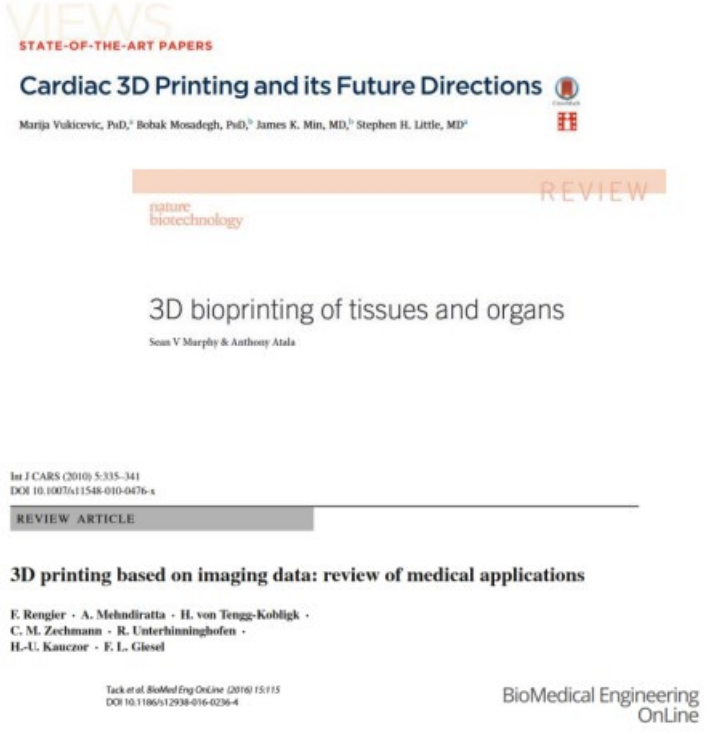
Insights from a Clinical Engineer at LMU

1. 3D Printing @POC (point of care)
3D Printing in medical field





- Pub-Med results for "3d printing" are rapidly growing
- 28,469 papers of which 5436 published in 2023 (March 2024)
- Case-reports, clinical studies, reviews (& books)



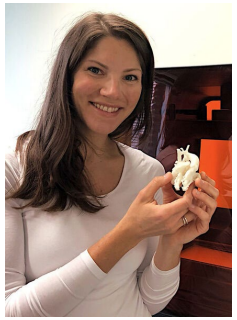
→ **3D printing: a key enabling technology in medicine with a growing community**

1. 3D Printing @POC (point of care)
European community – Core team

EU3DSIG

Marina Nagel
Biomedical Engineer
Munich, Germany

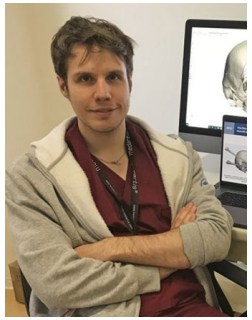
Giovanni Biglino
Biomedical Engineer
Bristol, UK



Carina Hopfner
Biomedical Engineer
Munich, Germany

Arnau Valls Esteve
Biomedical Engineer
Barcelona, Spain

Francesco Moscato
Biomedical Engineer
Vienna, Austria



Alessandro Tel
CMF Surgeon
Udine, Italy

Gunpreet Oberoi
Dental implantologist
Vienna, Austria

Joakim Lindhardt
Engineer
Aarhus, Denmark

1. 3D Printing @POC (point of care)
European community - Objectives

Mission

To **promote excellence in healthcare outcomes**, education, research and innovation **using 3D technologies*** by creating a **European community** that fosters the **sharing of knowledge and advances awareness**

Vision

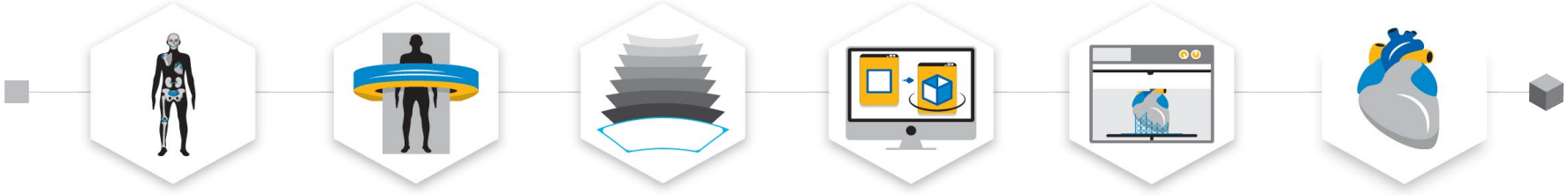
A stable European community focused on in-hospital 3D technologies

A community that uses 3D technologies at point-of-care to improve patient outcomes via knowledge sharing, international projects and research studies

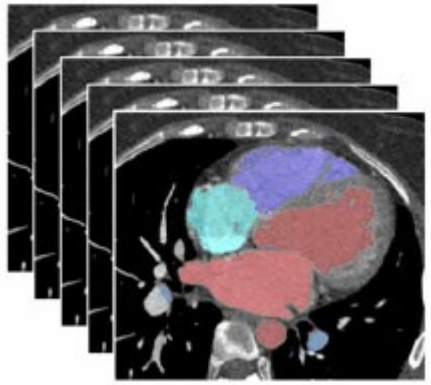
* Not just **3D Printing** but also other technologies
such as **3D Digital Modeling**, **Simulation**, **Augmented and Virtual Reality, etc.**

2. Excursus 3D Model creation

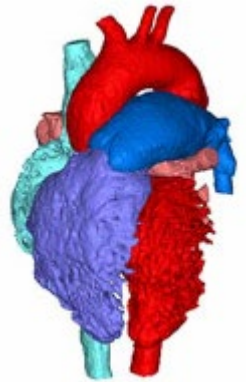
3D Workflow for cardiac cases



Materialise NV, Point of Care 3 D Printing Brochure

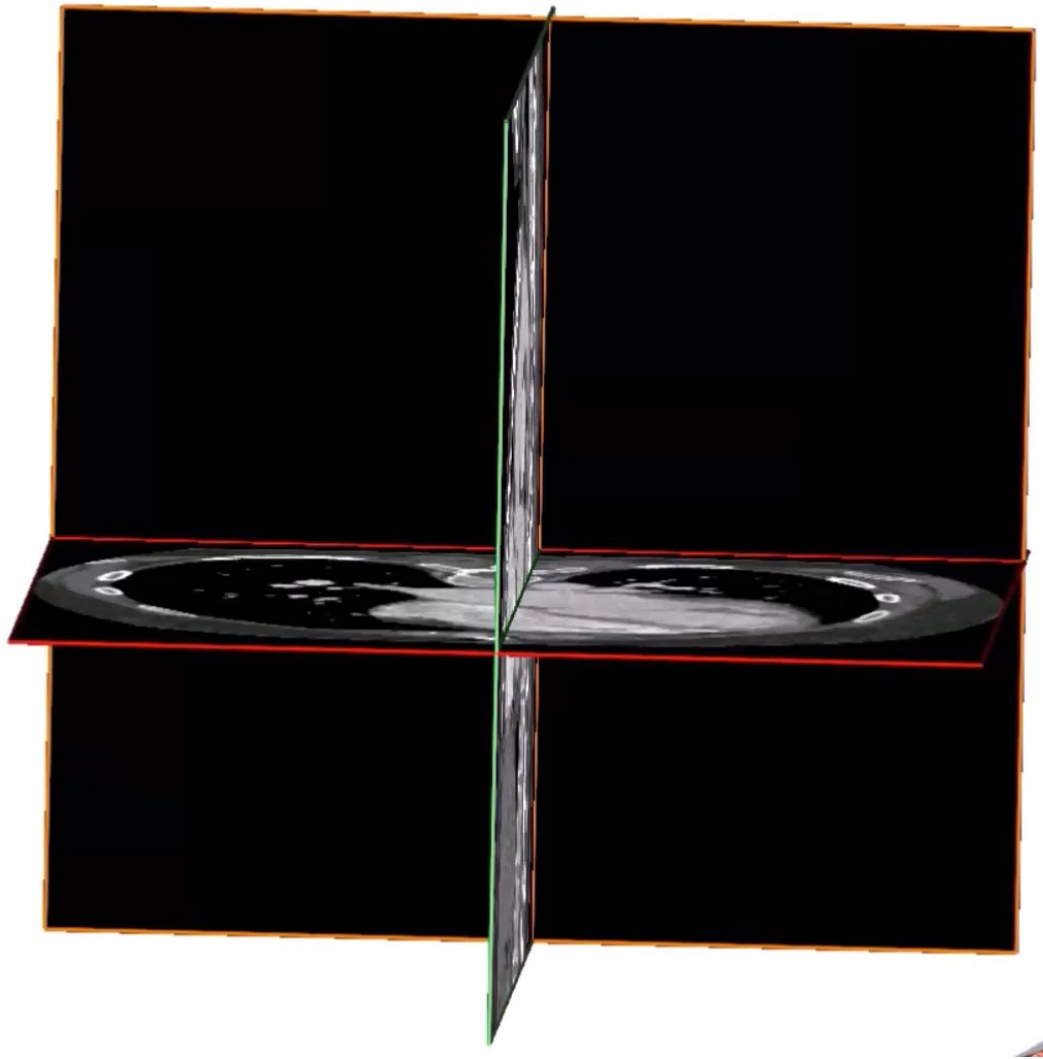


Step by step
1. Patient
2. Imaging
3. Segmentation
4. Creation of 3D model
5. Design & Finetuning
6. Print



2. Excursus 3D Model creation

3D Workflow for cardiac cases – All steps



3. 3D Printing @ LMU - Pediatric Cardiology

The four pillars of my activity

Pre- and post-op planning

Virtual OR planning provides physicians with a clear 3D visualisation of the patient's anatomy to develop a treatment plan before entering the operating theatre.

Patient education

With anatomically correct & patient-specific models, physicians can increase patient competence and visually explain therapy concepts.

Teaching & Training

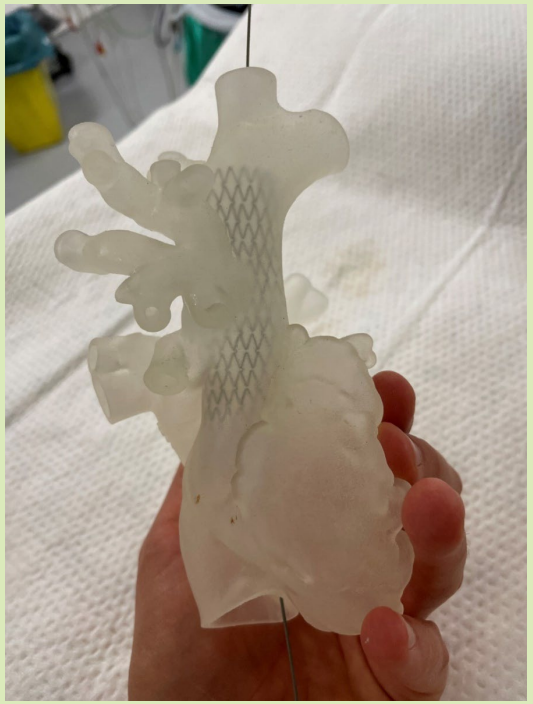
Virtual or 3D printed models can be used to improve student and clinical training in complex pathologies, e.g. "Hands On Patient Off" catheter course at the LMU paediatric cardiology.

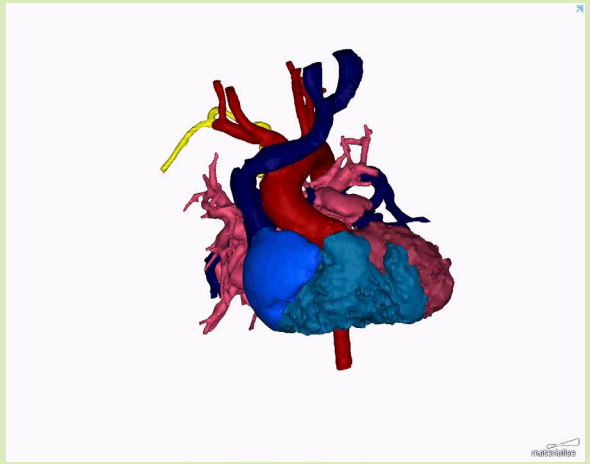
Research

3D printing pioneering digital innovations such as Mixed Reality and Artificial Intelligence in the operating theatre.

3. 3D Printing @ LMU - Pediatric Cardiology

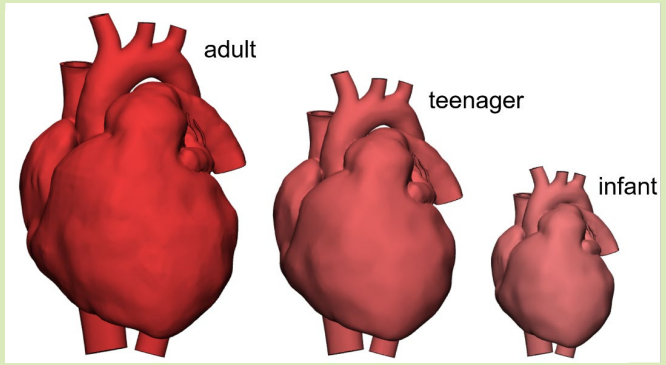
Pre- and post-op planning

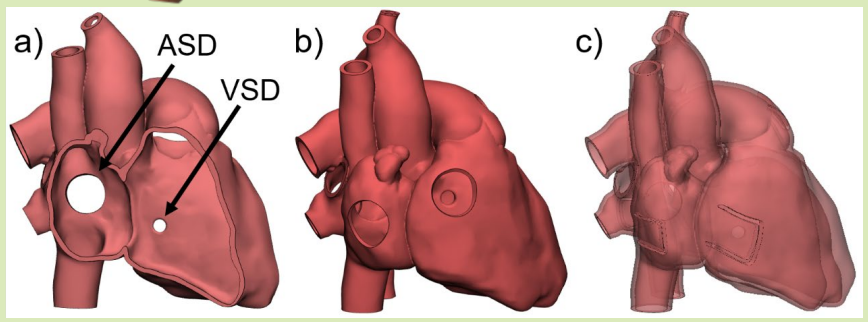


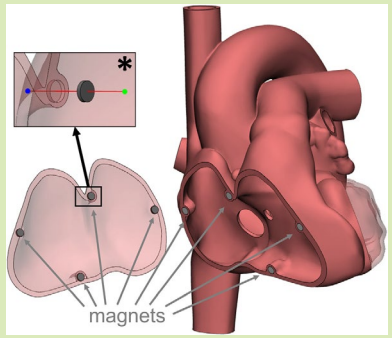


3. 3D Printing @ LMU - Pediatric Cardiology

Patient education







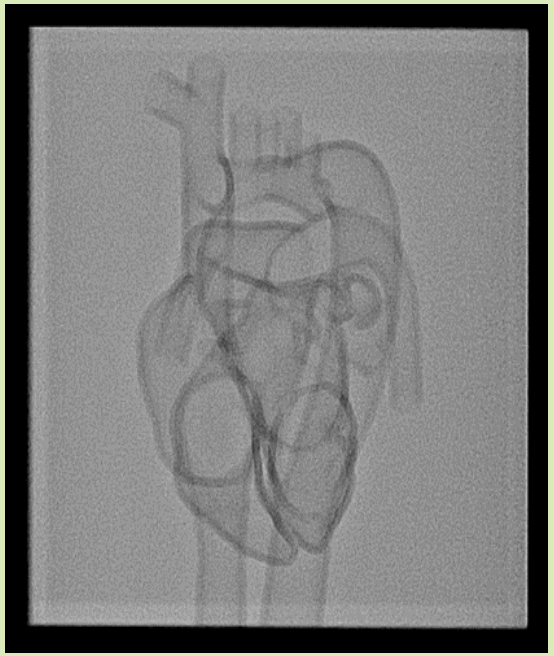
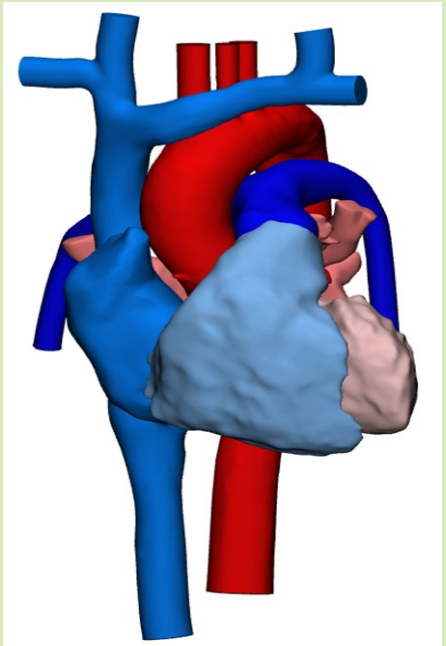
3. 3D Printing @ LMU - Pediatric Cardiology

Teaching & Training - General

3. 3D Printing @ LMU - Pediatric Cardiology

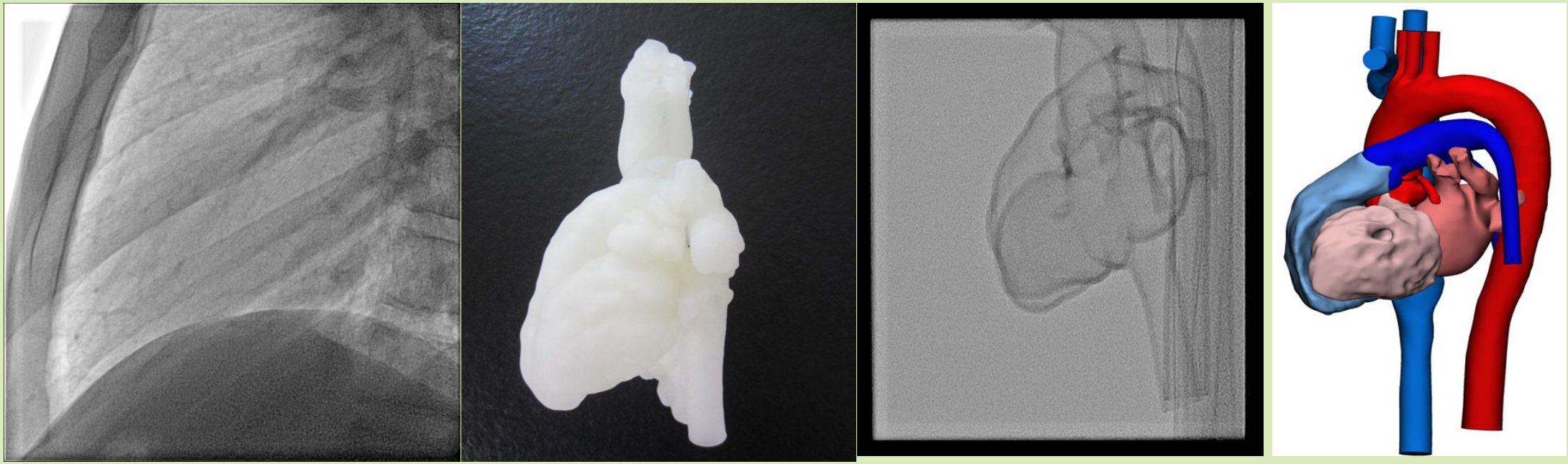
Teaching & Training - Projections



3. 3D Printing @ LMU - Pediatric Cardiology

Teaching & Training - Projections



3. 3D Printing @ LMU - Pediatric Cardiology

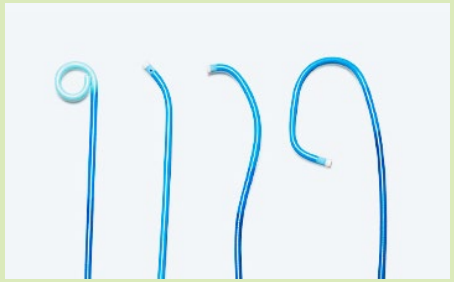
Teaching & Training - Setting

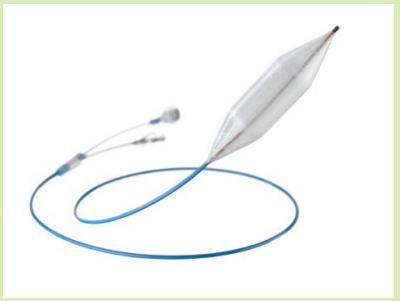
C A T H

L A B

3. 3D Printing @ LMU - Pediatric Cardiology

Teaching & Training - Materials





3. 3D Printing @ LMU - Pediatric Cardiology

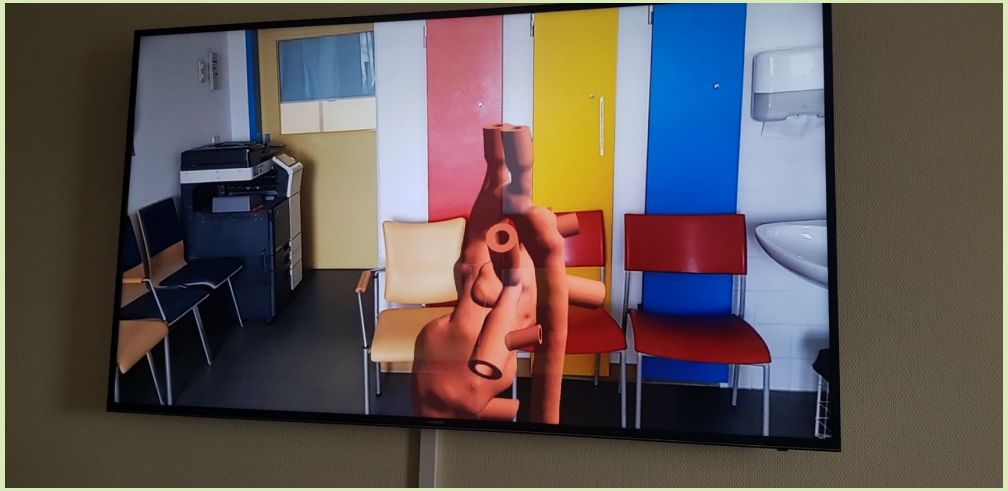
Teaching & Training - Insights

3. 3D Printing @ LMU - Pediatric Cardiology

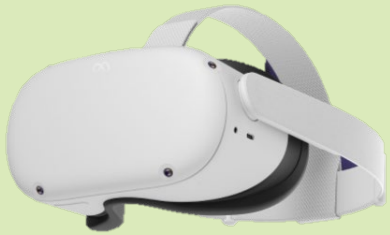
Teaching & Training- Ethiopia

3. 3D Printing @ LMU - Pediatric Cardiology

Research



Virtual Reality



Meta Quest 2: Immersives all-in-one VR-Headset | Meta Store | Meta Store

Augmented Reality

HoloLens 2 – Übersicht, Funktionen und Spezifikationen | Microsoft HoloLens

Any questions?