

# Extended Reality Solutions for Nursing

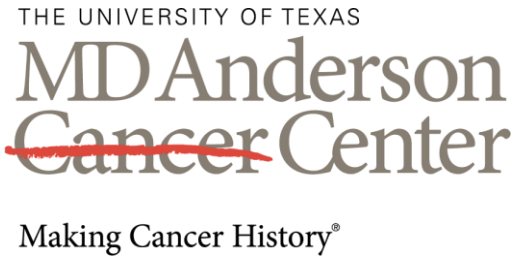
Stuart J. Corr, PhD

May 4, 2023

**HOUSTON METHODIST INSTITUTE**  
FOR ROBOTICS, IMAGING, & NAVIGATION

HOUSTON  
**Methodist**<sup>®</sup>  
LEADING MEDICINE

# Good morning – Welcome to XR

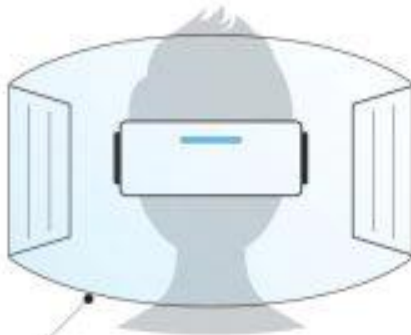
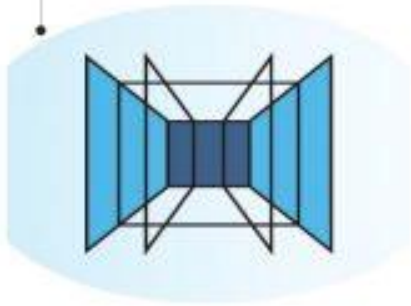


- Director of Innovation Systems Engineering
- Director of DeBakey CV Education
- Executive Director, Pumps & Pipes
- DeBakey Heart and Vascular Center
- Methodist Institute for Technology, Innovation & Education (MITIE)

# MITIE XR – Extended Reality Program

## VIRTUAL REALITY (VR)

Completely digital environment



Fully enclosed, synthetic experience with no sense of the real world.

## AUGMENTED REALITY (AR)

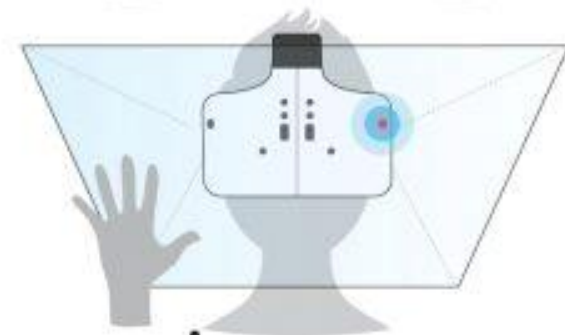
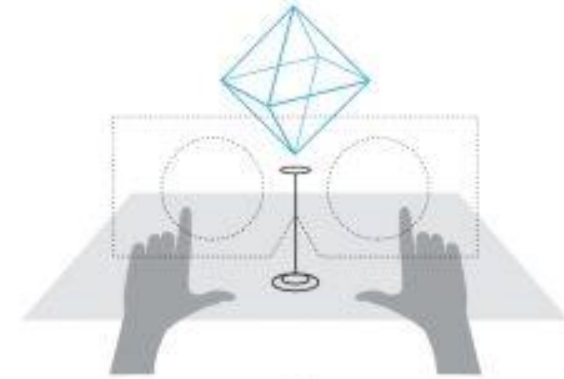
Real world with digital information overlay



Real world remains central to the experience, enhanced by virtual details.

## MERGED REALITY (MR)

Real and the virtual are intertwined



Interaction with and manipulation of both the physical and virtual environment.

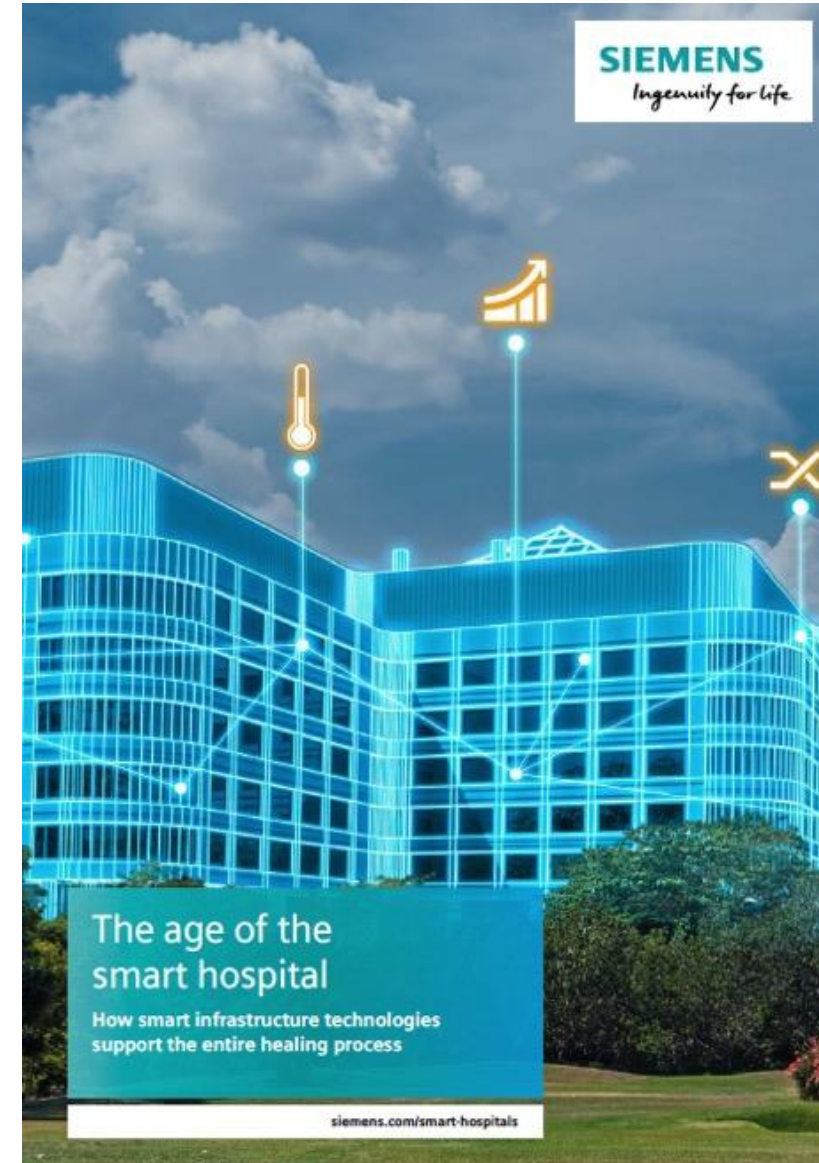
*Our mission is to develop and integrate robotic, imaging & navigation technologies into the hospital system to allow for enhanced and precise delivery of patient care.*

Key results are measured by advances in:


- (i) **Image-Guided Robotics**
- (ii) **Extended Reality (XR)**
- (iii) **Tele-Robotics**
- (iv) **Training & Education**

**HOUSTON METHODIST INSTITUTE**  
FOR ROBOTICS, IMAGING, & NAVIGATION

HOUSTON  
**Methodist**<sup>®</sup>  
LEADING MEDICINE







# 2<sup>nd</sup> Annual Symposium of the Houston Methodist Institute for Robotics, Imaging & Navigation

**OCT. 4, 2022**

9 a.m. – Noon | Livestreamed via YouTube

Visit **[www.mirin22.info](http://www.mirin22.info)**

HOUSTON  
**Methodist**  
DEBAKEY HEART &  
VASCULAR CENTER

UC San Diego  
JACOBS SCHOOL OF ENGINEERING

FUNDAMENTAL  
**SVRGERY** ✱

3DLIFE  
Prints

**ABB**  
ROBOTICS

The University of Texas at Austin  
Walker Department  
of Mechanical Engineering  
Cockrell School of Engineering

HOUSTON  
**Methodist**  
J.C. WALTER JR.  
TRANSPLANT CENTER

CASE SCHOOL  
OF ENGINEERING  
CASE WESTERN RESERVE  
UNIVERSITY

Join us as we disseminate  
advancements in the fields of  
surgical robotics, extended  
reality, and image-guided  
navigation.

**[www.robotichealth.org](http://www.robotichealth.org)**

## Featured Speakers



Ann Majewicz Fey, PhD  
University of Texas at Austin



Farshid Alambeigi, PhD  
University of Texas at Austin



Jose Manuel Collados,  
ABB Inc.



Chris Scattergood  
Fundamental Surgery



Michael Yip, PhD  
UC San Diego



Ghalib Abbasi, PharmD  
Houston Methodist



Stephanie Yi, MD  
Houston Methodist



Stuart Corr, PhD  
Houston Methodist



Zonghe Chau, PhD  
Case Western Reserve  
University



Sunny Bhakta, PharmD  
Houston Methodist



Edward Chan, MD  
Houston Methodist



Alan Lumsden, MD  
Houston Methodist



Join us as we disseminate advancements in the fields of surgical robotics, extended reality, and image-guided navigation.



# New Extended Reality (XR) Initiatives







## **MITIEverse™** – A Metaverse for Medical Innovation

**Description:** Join us as we embark on creating the world's largest metaverse dedicated to delivering medical innovation, technology, training & education. Interact with world-leading surgeons and healthcare providers. Understand complex surgical procedures through case study video footage and anatomical 3D models. Participate in hands-on didactic training modules. Network with medical device and digital health companies to learn about emerging technologies.

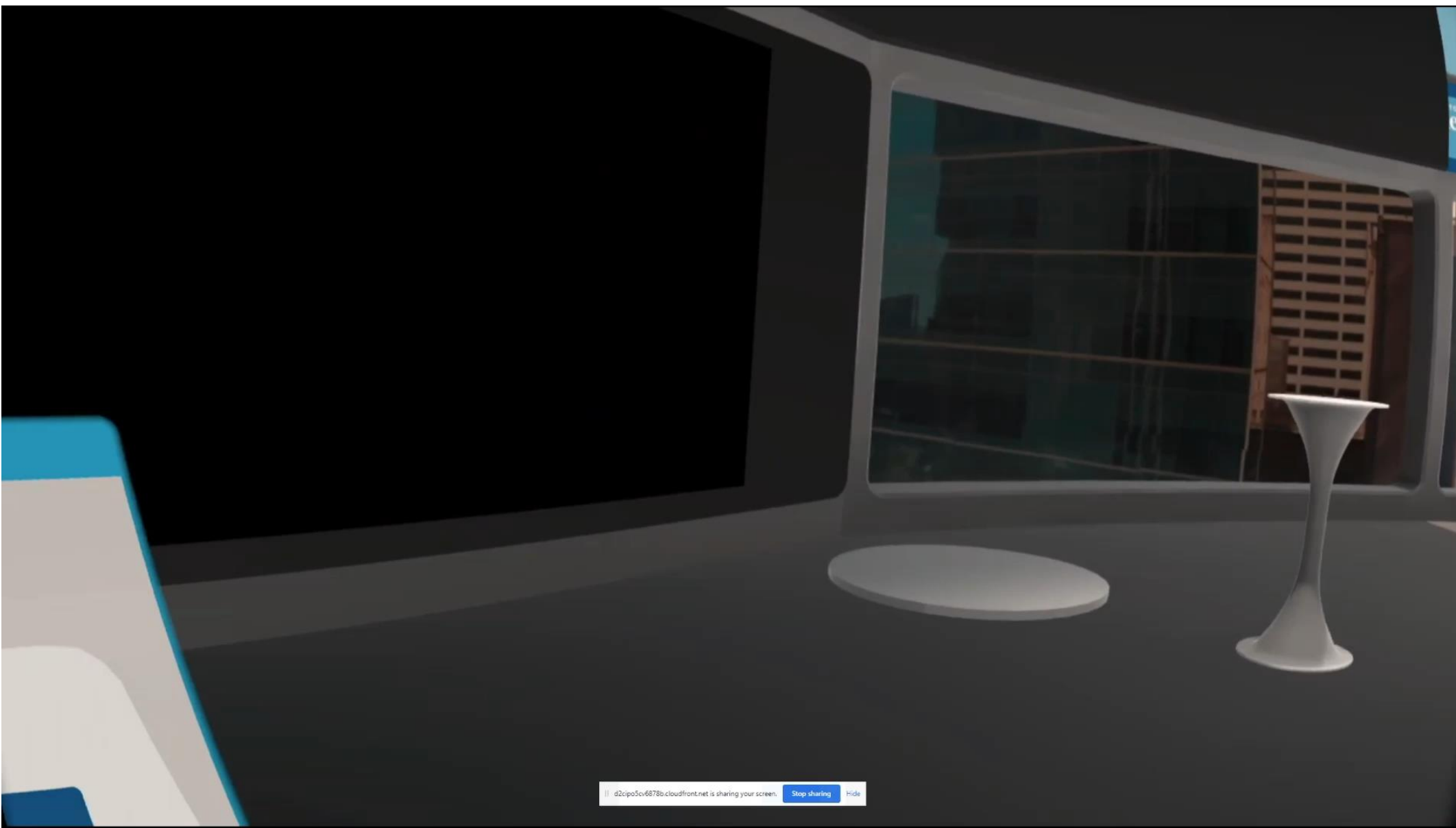
Our flagship product is the **MITIEverse™** VR app, available for use on Oculus Quest headsets ([www.mitieverse.app](http://www.mitieverse.app) for information).

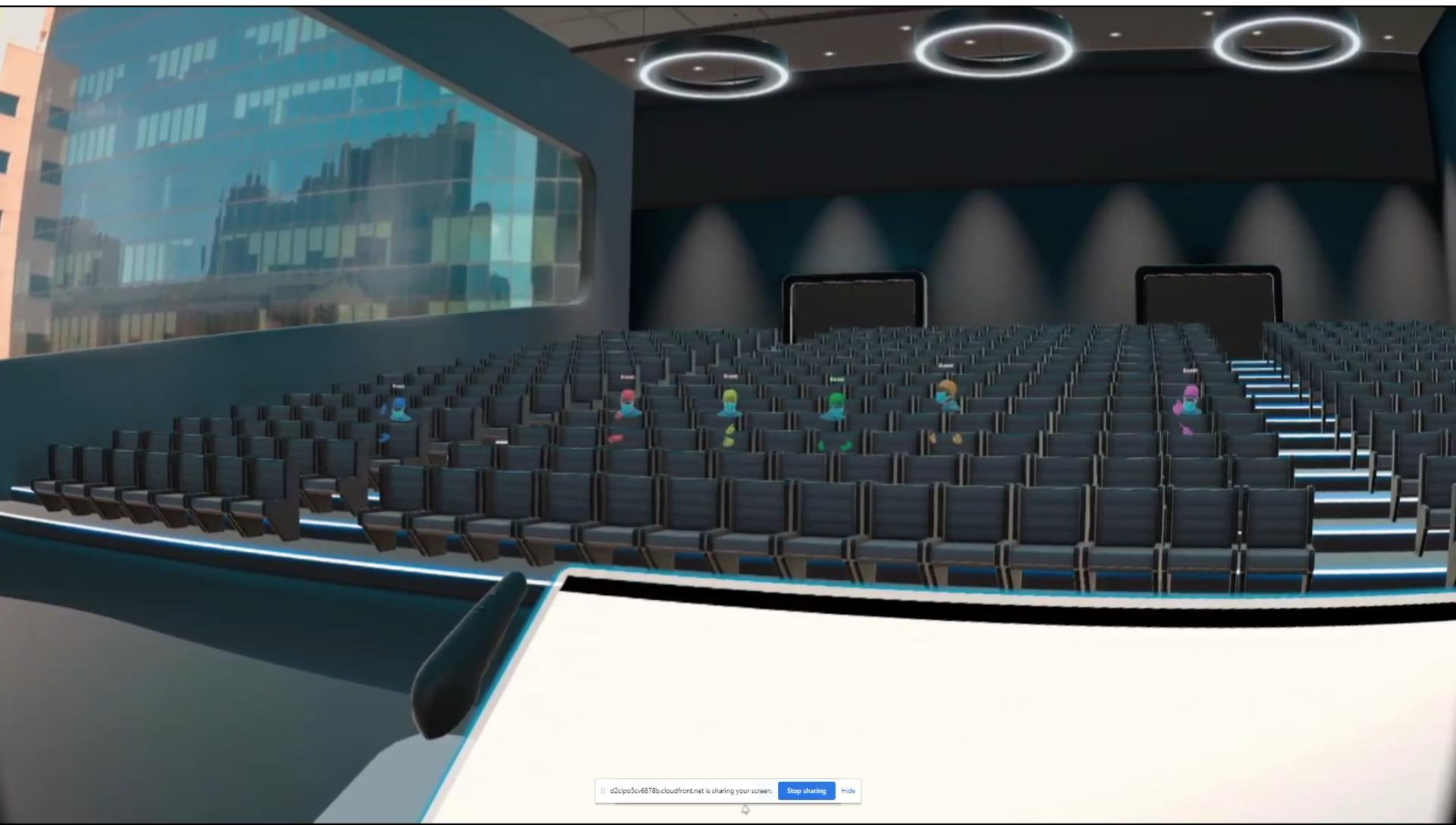
Development partner - **FundamentalVR**

Collaborative partner – **Insight Surgery**

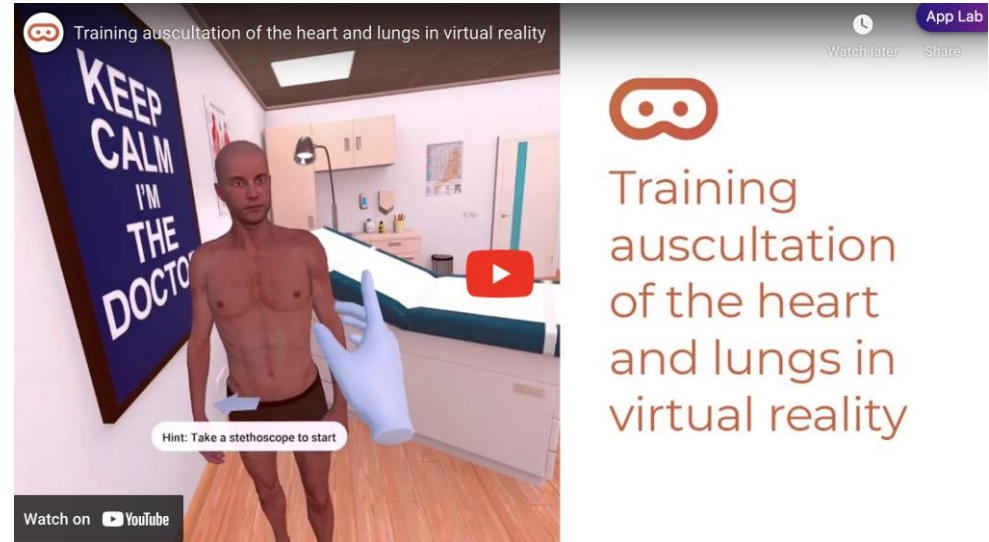
**QUESTION: How do we offer VR services using a 'Leading Medicine' approach?**













# Sana - FundamentalVR Partnership

**FVR, in partnership with Sana, has developed a pilot program, CareVR. CareVR is an immersive OR environment aiming to accelerate nursing training in the operating room:**

- Multi-user simulation to train nurses about the equipment protocols and procedures in the operating room
- Nurses will be able to participate in 2 sets of 2-person activities:
  - Sterile preparation of surgical instruments and resources
  - Counting gauzes that have been inserted to or removed from a patient
- Main features include:
  - Full mockup of OR room
  - Key equipment units and furniture
  - Sterile zone illustration (on/off)
  - WHO Surgical Safety Checklist
  - Objects can be handled with basic interactions
  - Data reporting backend integration
- Product due to be delivered in **German and English** language

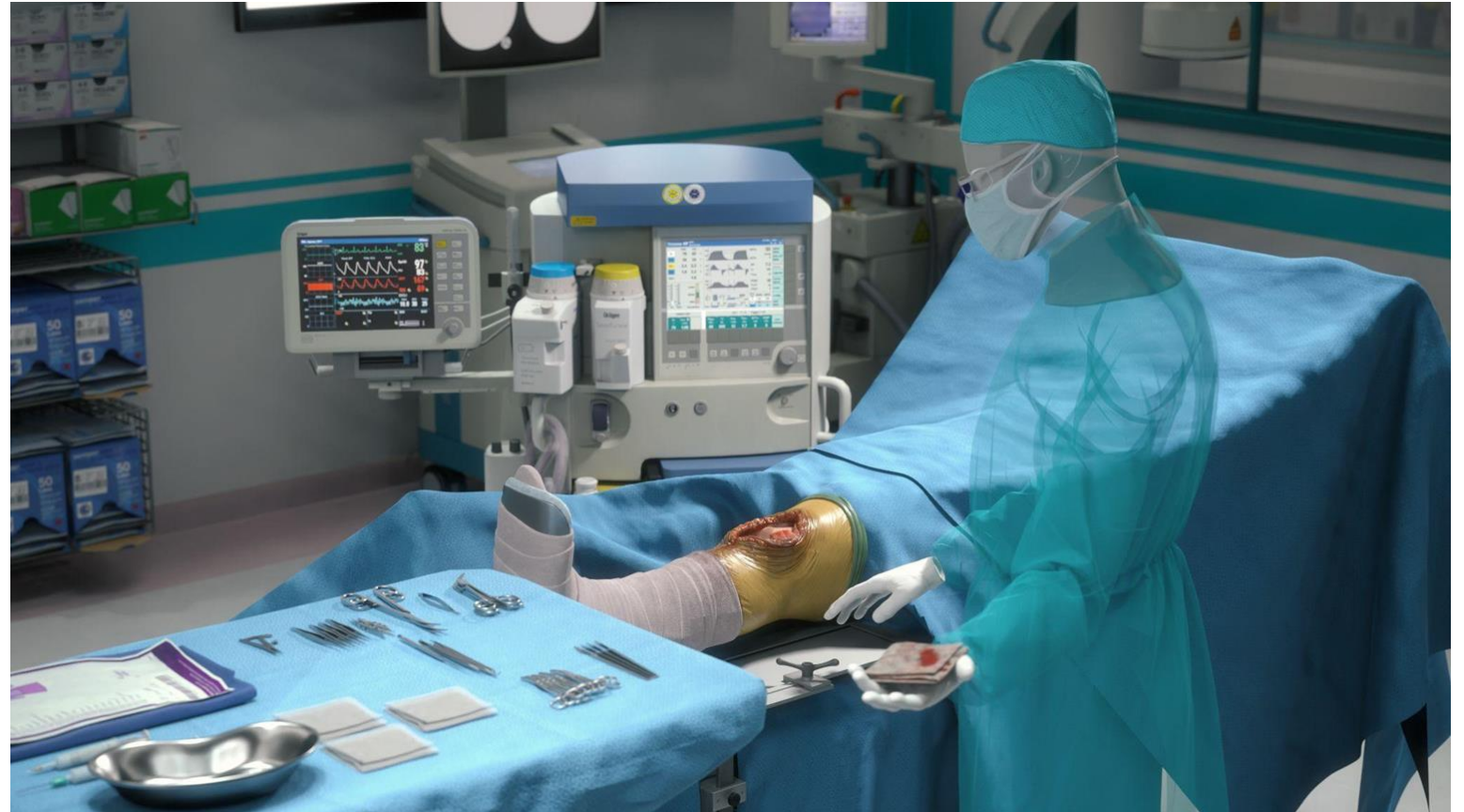
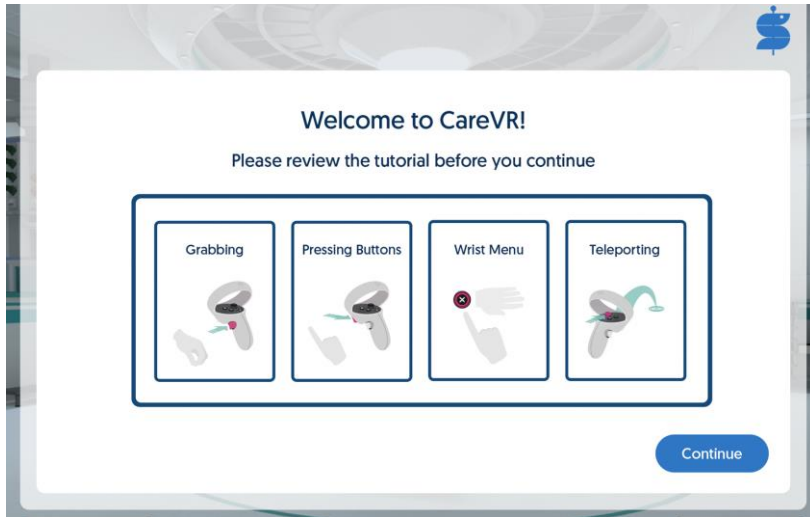
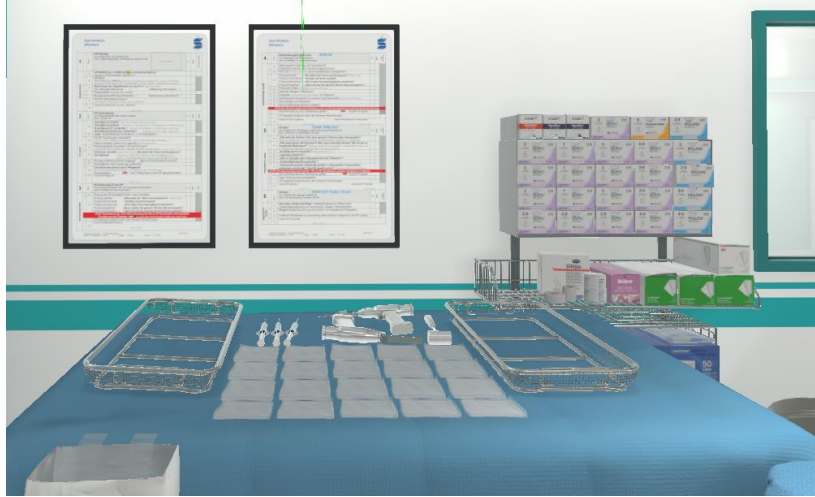
## FUNDAMENTALVR

---

FUNDAMENTAL**SVRGERY** 

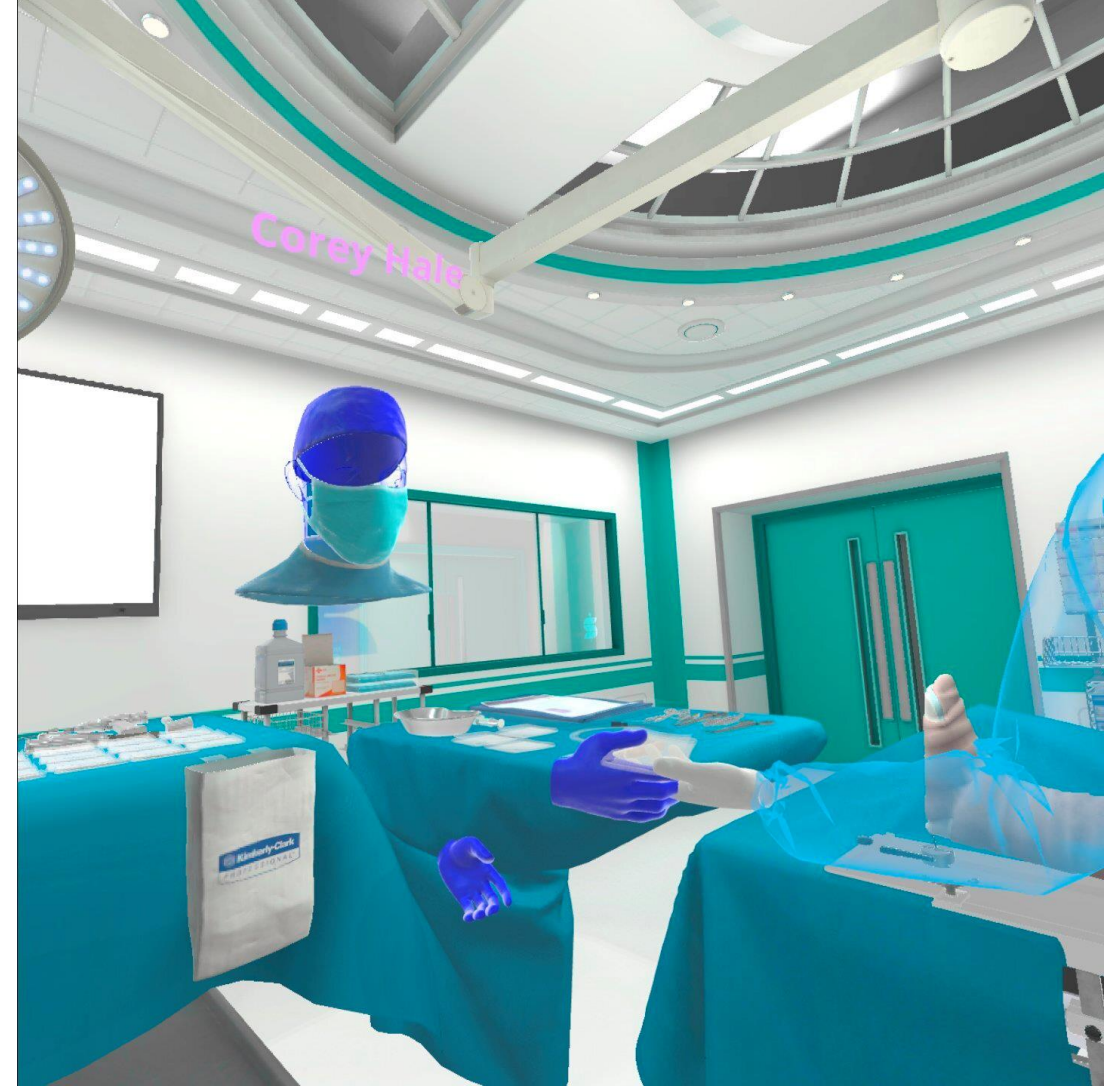


# CareVR – Nursing Training in the OR



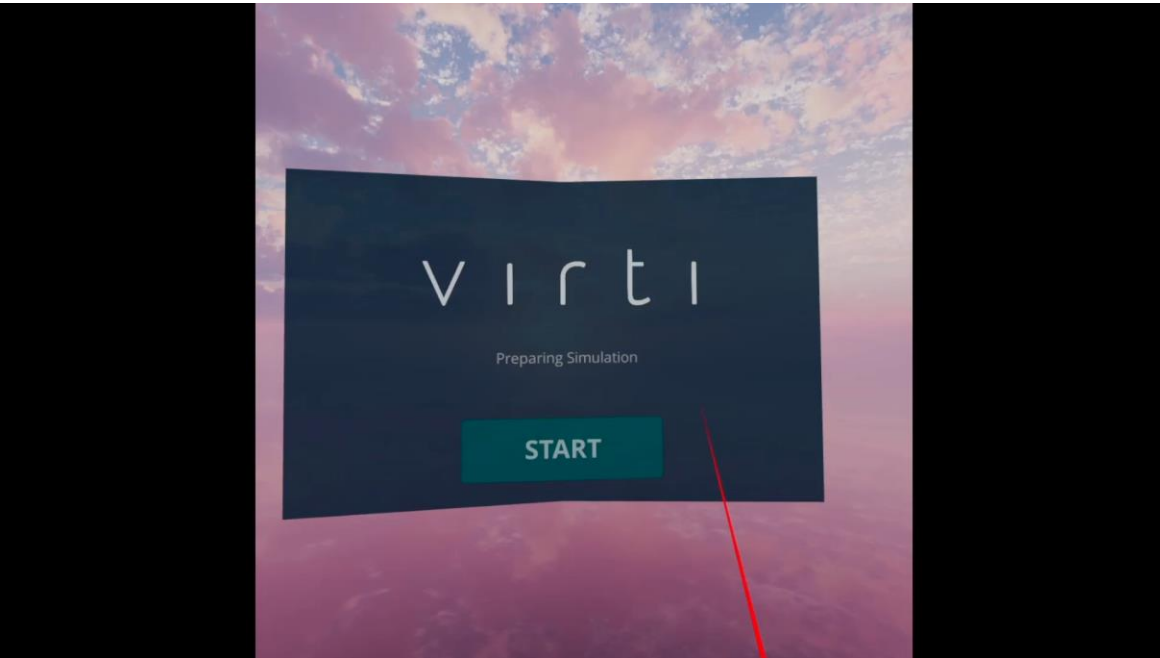


# CareVR – Nursing Training in the OR



# XR for Education/Training

VIRTI is an XR-based Education and Training Simulation Platform.

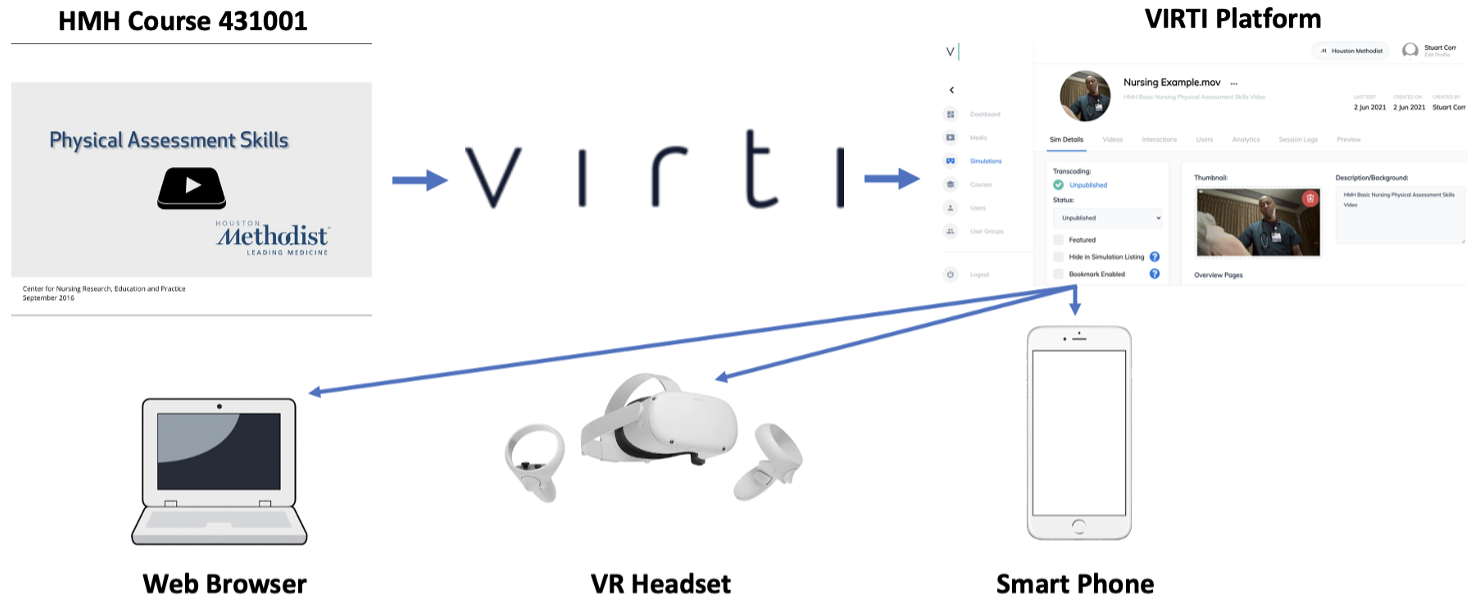


It allows for scripting and authoring of various video content including 360-Videos.

We will utilize VIRTI at Cardiovascular Resident training workshops at MITIE.

360 Videos will be recorded and merged into the VIRTI platform. Questions and tests will be embedded at various points in the 360-video.

We anticipate greater knowledge retention & examination outcomes. Click **PLAY** on left.



**Fig. 1.** Overview of process. The existing 2D video of HMH Course 431001 will be transcoded and uploaded into the VIRTi platform to allow for new course/simulation development. The final course will consist of 2D videos, and 2D/360 videos embedded with interactive questions, made playable via web browsers, VR headsets or smart phones.



**Hsin-Mei Chen, PhD, MBA**



**Shannan Hamlin, PhD, RN**



TEXAS A&M UNIVERSITY  
School of Nursing



TEXAS A&M UNIVERSITY  
Visualization

# *Virtual Reality Simulation in Nursing*

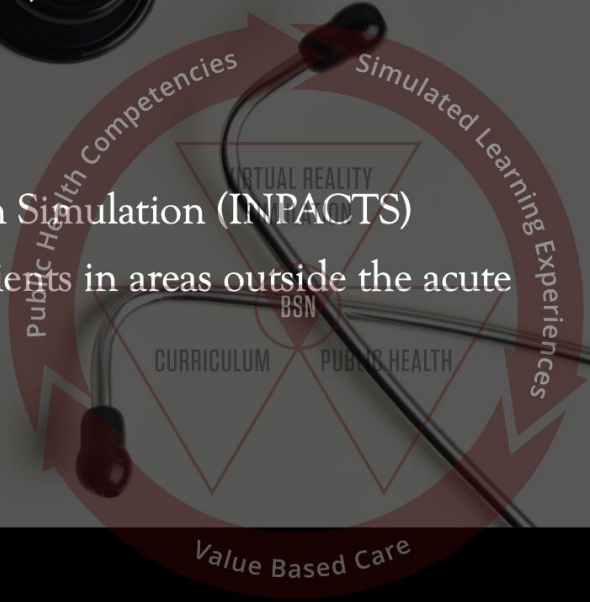
Elizabeth Wells-Beede, PhD, RN, C-EFM, CHSE-A,  
CNE, ACUE, FAAN

Jinsil Hwarvyoung Seo, PhD. M.F.A, M.A., B.A.



# VR Simulations: A Collaborative Partnership

- Screening Brief Intervention and Referral to Treatment (SBIRT)
- Forensic Examinations for Sexual Assault Nurse Examiners (SANE)
- Post-partum hemorrhage
- Sepsis recognition and early intervention\*\*
- Increasing Nursing Access Across Populations with Technology in Simulation (INPACTS)
  - 4 immersive VR simulations increasing care and access for patients in areas outside the acute care setting





## *Exemplar*

- Pediatric care of student in school setting. Student has Type 1 Diabetes and has trouble with DKA.\*\*

\*\*Acknowledgment of funds from HRSA.

HOUSTON **Methodist**  
DEBAKEY HEART & VASCULAR CENTER

DEBAKEY CV LIVE: Innovation on the Loose  
SEPTEMBER 23, 2021

## Synthetic Data – Democratizing Healthcare Data



**STUART J. CORR, BEng, MEng, MA, PhD - HOST**  
Director of Innovation Systems Engineering, Houston Methodist DeBakey Heart & Vascular Center,  
Houston Methodist Institute for Robotics, Imaging, & Navigation,  
Houston Methodist Institute for Technology, Innovation & Education (MITIE)



**MICHAEL LESH, MD, FACC**  
Founder and CEO  
Synapse



**CARTER PRINCE, MBA**  
Head of Business Development  
Synapse

Synthetic Data – Democratizing Healthcare Data (Stuart Corr, PhD and guests) September 23, 2021

553 views • Streamed live on Sep 23, 2021

6 DISLIKE SHARE DOWNLOAD CLIP SAVE ...

HOUSTON **Methodist**  
DEBAKEY HEART & VASCULAR CENTER

DEBAKEY CV LIVE: Innovation on the Loose  
JANUARY 27, 2022

## Varjo – Mixed Reality Workflows in Healthcare



**STUART J. CORR, BEng, MEng, MA, PhD**  
Director of Innovation Systems Engineering,  
Houston Methodist DeBakey Heart & Vascular Center,  
Houston Methodist Institute for Robotics, Imaging, & Navigation,  
Houston Methodist Institute for Technology, Innovation & Education (MITIE)



**GEOFFREY BUND**  
Head of Business Development,  
North America  
Varjo Technologies

Varjo – Mixed Reality Workflows in Healthcare (Stuart Corr, PhD and Geoffrey Bund) January 27, 2022

598 views • Streamed live on Jan 27, 2022

8 DISLIKE SHARE DOWNLOAD CLIP SAVE ...

HOUSTON **Methodist**  
DEBAKEY HEART & VASCULAR CENTER

DEBAKEY CV LIVE: Innovation on the Loose  
FEBRUARY 24, 2022

## Wearable Haptics for XR Environments



**STUART J. CORR, BEng, MEng, MA, PhD**  
Director of Innovation Systems Engineering,  
Houston Methodist DeBakey Heart & Vascular Center,  
Houston Methodist Institute for Robotics, Imaging, & Navigation,  
Houston Methodist Institute for Technology, Innovation & Education (MITIE)



**MARCIA K. O'MALLEY, PhD**  
Associate Dean for Research and Innovation, George R. Brown School of Engineering  
Thomas Michael Panoz Family Professor in Mechanical Engineering  
Special Advisor to the Provost on Education and Research Initiatives  
for Collaborative Health (ENVRCH), Rice University

Wearable Haptics for XR Environments (Stuart Corr, PhD, Marcia K. O'Malley, PhD) February 24, 2022

294 views • Streamed live on Feb 24, 2022

4 DISLIKE SHARE DOWNLOAD CLIP SAVE ...

HOUSTON **Methodist**  
DEBAKEY HEART & VASCULAR CENTER

DEBAKEY CV LIVE: Innovation on the Loose  
MARCH 24, 2022

## Extracorporeal Blood Filtration for Sepsis



**STUART J. CORR, BEng, MEng, MA, PhD - HOST**  
Director of Innovation Systems Engineering, Houston Methodist DeBakey Heart & Vascular Center,  
Houston Methodist Institute for Robotics, Imaging, & Navigation,  
Houston Methodist Institute for Technology, Innovation & Education (MITIE)



**SINEAD MILLER, PhD**  
Co-founder  
PATH EX



**ALEX WIESELER, MBA**  
Co-founder and COO  
PATH EX

Extracorporeal Blood Filtration for Sepsis (Stuart J. Corr, PhD and guests) March 24, 2022

1,460 views • Streamed live on Mar 24, 2022

21 DISLIKE SHARE DOWNLOAD CLIP SAVE ...

HOUSTON **Methodist**  
DEBAKEY HEART & VASCULAR CENTER

DEBAKEY CV LIVE: Innovation on the Loose  
APRIL 28, 2022

## Medical Modeling and Planning in VR



**STUART J. CORR, BEng, MEng, MA, PhD**  
Director of Innovation Systems Engineering, Associate Research Professor  
Houston Methodist DeBakey Heart & Vascular Center,  
Houston Methodist Institute for Robotics, Imaging, & Navigation,  
Houston Methodist Institute for Technology, Innovation & Education (MITIE)



**JUSTIN SUTHERLAND, PhD**  
Co-founder and CEO  
Realize Medical Inc.,  
Ottawa, Ontario, Canada

Medical Modeling and Planning in VR (Stuart J. Corr, PhD and guests) April 28, 2022


1,250 views • Streamed live on Apr 28, 2022

15 DISLIKE SHARE DOWNLOAD CLIP SAVE ...


HOUSTON **Methodist**  
DEBAKEY HEART & VASCULAR CENTER

DEBAKEY CV LIVE: Innovation on the Loose  
MAY 26, 2022

## Smart and Autonomous Surgery



**STUART J. CORR, BEng, MEng, MA, PhD**  
Director of Innovation Systems Engineering, Associate Research Professor  
Houston Methodist DeBakey Heart & Vascular Center,  
Houston Methodist Institute for Robotics, Imaging, & Navigation,  
Houston Methodist Institute for Technology, Innovation & Education (MITIE)



**AXEL KRIEGER, PhD**  
Assistant Professor in Mechanical Engineering  
Whiting School of Engineering,  
The Malone Center for Engineering in Healthcare, Johns Hopkins University

Smart and Autonomous Surgery (Stuart J. Corr, PhD and guests) May 26, 2022

657 views • Streamed live on May 26, 2022

9 DISLIKE SHARE DOWNLOAD CLIP SAVE ...

[www.dcve.org](http://www.dcve.org)

HOUSTON  
**Methodist**<sup>®</sup>  
LEADING MEDICINE