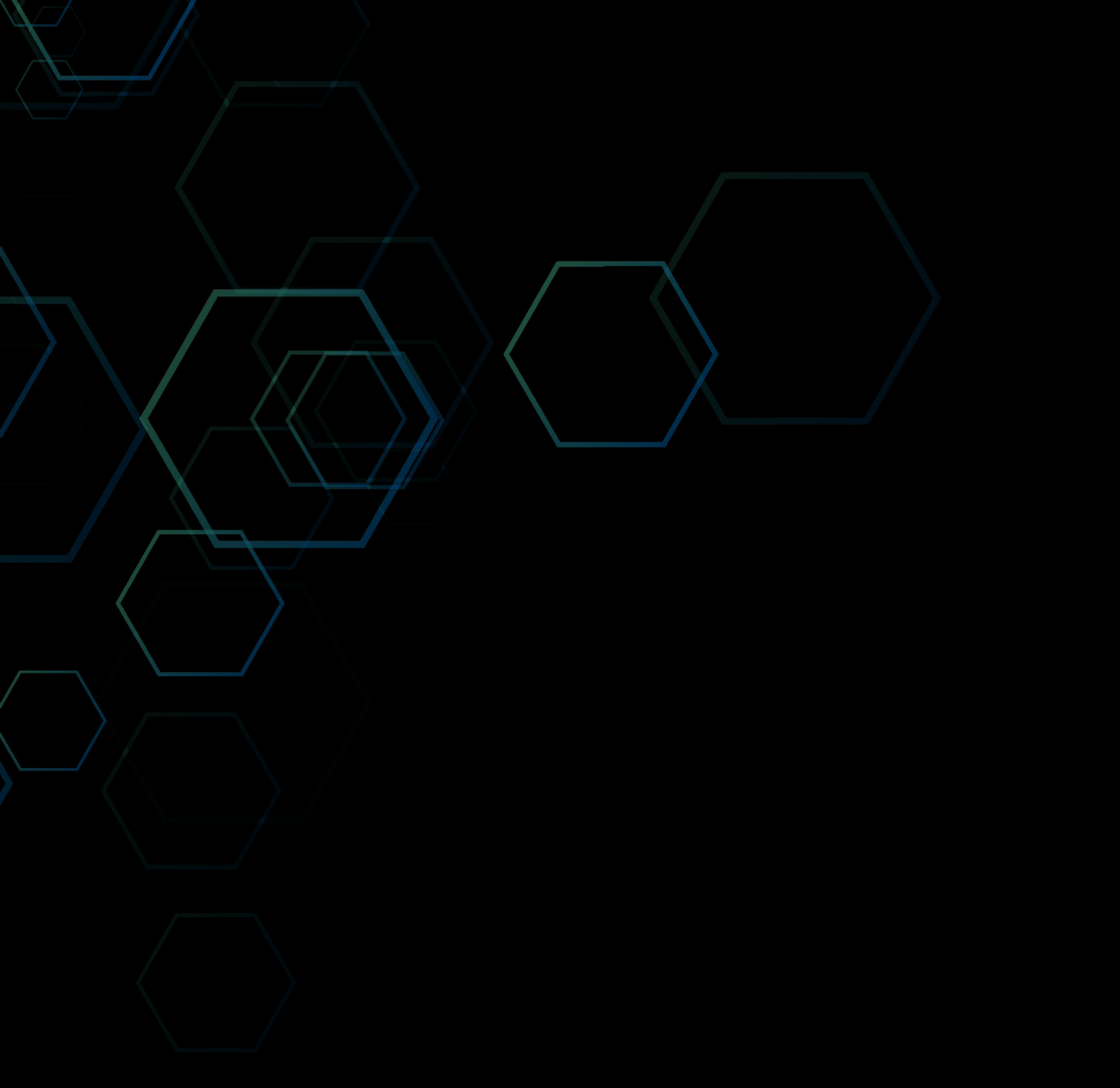


Experience meaningful medical collaboration, enhance patient education, and support preoperative surgical planning with the apoQlar VSI HoloMedicine® software platform deployed on Microsoft HoloLens 2.

apoQlar





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## Reimagine healthcare with mixed reality

### The face of modern medicine is changing.

There's no denying that technology is the driving force behind improvements in healthcare. From artificial intelligence to augmented and virtual reality solutions, healthcare practitioners and institutions are learning how to achieve the best outcomes while optimizing costs and streamlining operations. This transformation has become even more profound with the advent of mixed reality in patient care. Within the healthcare industry alone, 3 in 4 organizations are using mixed reality solutions via head-mounted devices (HMDs) to improve clinical training and patient education among many other scenarios.\* That means the transformation

of healthcare with MR technology is no longer a future vision but is already being realized today.

Where before surgeons used 2D DICOM images such as CTs and MRIs to plan and execute operations, now it's possible to view a patient's complete anatomy and pathology in 3D rendering. And unlike virtual reality tools where users are fully immersed in a digital environment, mixed reality solutions allow doctors to never lose sight of what's real and directly in front of them. This puts patients at the forefront of emerging mixed reality technology for healthcare.

#### Imagine...

A future where medical students can break free from textbooks and step into an immersive experiential learning environment like never before.

#### Envision...

A world where digital and physical realities converge to bring a patient's medical scans, as well as other live streamed procedures, directly into a physician's field of vision – without any physical monitors.

#### Dream...

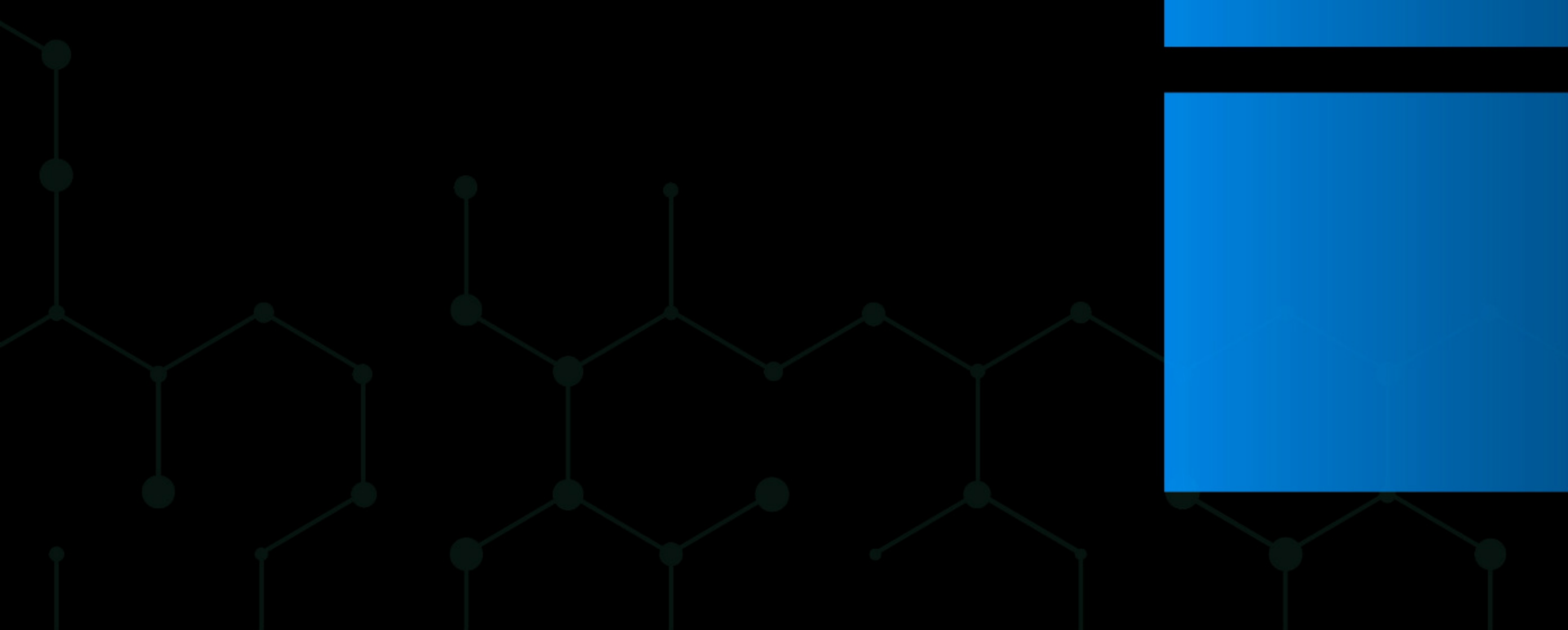
Of a surgeon instantly rendering 3D DICOM images and manually superimposing 3D medical imaging objects onto patients for improved surgical planning.



# Add an indispensable dimension to your reality.

From immersing ourselves in digitally created worlds to digitally enhancing our physical world, mixed reality is a spectrum that offers limitless possibilities. To bring this new technology into the healthcare space, apoQlar has worked with an advisory board of over 30 medical professionals across the medical spectrum to deliver industry-specific solutions that can be deployed on Microsoft HoloLens 2.

## Where can we help you?





## Surgeon

What if you had an improved understanding of the patient's anatomy and pathology prior to an incision?

What if you could better visualize surgical procedures before operation?

Imagine if you never had to take your eyes off your patient to understand their anatomy and pathology.

How do you improve patient comprehension and reduce procedure anxiety?

## Medical school

What if you could help your students go beyond the textbook and experience anatomy and clinical procedures in volumetric 3D?

What would be the impact to your students' education if you could give them the ability to interact with medical objects, colleagues, professors, and physicians around the world anytime, anywhere?

What if you could enhance your students' lab experiences with holographic views of human anatomy and cadaver pathology?

## Medical technology partner

What if there was an easy way for the medical community to partner with medical technology providers?

What if medical institutions could easily upload critical information from essential technologies like MRIs and CT scans into one comprehensive software platform for streamlined analysis and collaboration?

What would be the impact if we could change the face of modern medicine together?



# Experience collaborative medicine

VSI HoloMedicine® is a medically certified cloud-based software platform that leverages Microsoft HoloLens 2 hardware to transform medical images, clinical workflows, and medical education into an interactive 3D mixed reality environment. The solution is agnostic with respect to medical field, entirely independent from other physical hardware, and supports the surgical episode of care. apoQlar customers range across 13 different medical fields and use the VSI HoloMedicine® software platform to collaborate with other physicians globally as virtual avatars, conduct surgical planning in 3D, engage patients, and educate future doctors in medical academia.

## Deploy VSI HoloMedicine®...

Collaborate with other physicians globally as virtual avatars, conduct surgical planning in 3D, engage patients, and educate the doctors of tomorrow in medical academia with apoQlar's transformative software application.

## ... On HoloLens 2

Launch VSI HoloMedicine® on Microsoft's ergonomic, untethered, self-contained device that enhances data displays by giving users the ability to view holograms or animations. Enhance remote communication, training, and understanding through 3D experiences.

*It is important to note that VSI HoloMedicine® is not intended for intraoperative use and is not to be relied upon for diagnosis. Additionally, the HoloLens 2 hardware is marketed as a general purpose product and is not designed to supplement medical devices. While users can explore new healthcare scenarios using Microsoft's mixed reality technology, it cannot substitute for professional medical diagnosis, treatment, or judgment.*

# Generate real added value for surgeons, patients, and students alike.

## Innovative surgical planning and collaboration

Plan surgeries or other procedures instantly in 3D with the VSI HoloMedicine® medical field-agnostic visualization technology.

## Meaningful patient education

Alleviate patient concerns by illustrating their procedures in detail with anatomically correct holographic images.

## Interactive and immersive medical education

Provide medical students, residents, and fellows an experiential, collaborative learning environment powered by next-generation mixed reality technology.



# Innovative surgical planning and collaboration

*Utilize an end-to-end mixed reality software platform to gain deeper insights into patient anatomy and pathology.*

Revolutionize your approach to surgical planning with medical mixed reality. The VSI HoloMedicine® platform first constructs a 3D image based on DICOM images. Physicians can then view this data in volumetric 3D via HoloLens 2 to create a fully immersive experience for surgeons as they view patient information and plan complex medical procedures. apoQlar's solution is currently used in over 13 different medical fields with ever increasing use cases around the world.

## Transform medical images into 3D mixed reality holograms:

- Easily transform any STL/OBJ object or real-world DICOM image, such as CT, MRI, ANGIO-CT, CBCT, SPECT, PETCT, and many more, as a 3D hologram for an enhanced view of a patient's anatomy and pathology.
- Visualize presegmented DICOM scans in 3D or utilize our natural rendering function for multiple perspectives.
- View renderings of prosthetics, implants, and other medical devices in 3D.
- Eliminate physical contact with nonsterile objects and mouse clicks with interactive holographic technology and voice control commands.

## Instantly collaborate with physicians at hospitals across town or across the globe:

- Collaborate with leading physicians in 3D mixed reality – whether that's across the hospital campus or the globe. VSI HoloMedicine® connects the global medical community like never before.
- Efficiently coordinate care across technical barriers and hospital borders.
- Share completely anonymized patient data via a highly secure software platform.
- Virtually collaborate on 3D medical cases alongside colleagues who appear as 3D avatars standing in the room next to you.





## Gain unique perspectives of your patient's anatomy and pathology prior to surgery.

With VSI HoloMedicine®, physicians can transform 2D and greyscale DICOM scans into 3D holograms that are displayed in vivid lifelike color. The solution extracts information layer by layer from individual scans of a certain area of the body, creating an anatomically correct hologram that can be viewed and positioned virtually anywhere in the room via the HoloLens 2 device. VSI HoloMedicine® then enables the physician to manually superimpose the 3D image onto a patient to enhance their preoperative surgical planning procedure.

## Case study: Identifying new surgical routes across the medical spectrum

### *How a nerve was saved with VSI HoloMedicine® in oral and maxillofacial surgery*

A patient presenting with a malignant tumor in the mandible region was clinically very challenging for Prof. Dr. Mark McGurk, Professor & Surgeon of Oral & Maxillofacial Surgery at University College London. At first, the surgical team considered sacrificing the facial nerve in order to remove this tumor. But with the help of apoQlar VSI HoloMedicine®, it was possible to adjust the procedure during the preoperative planning stages.

Relying on his own professional medical expertise, the surgeon was able to trace a tiny facial nerve through the parotid gland. The surgeon then used the VSI HoloMedicine® platform to visualize this data in 3D mixed reality. This enabled the care team to replan the surgery and save the patient's facial nerve.





# Meaningful patient education

*Improve patient comprehension, reduce procedure anxiety, and increase patient satisfaction.*

Microsoft HoloLens 2 gives users the ability to move beyond the realm of 2D and into a more immersive 3D experience. This capability is especially valuable in the context of patient education.

## Engage and educate patients by walking them through a 3D model of their unique anatomy and upcoming procedure.

Using the VSI HoloMedicine® software platform with HoloLens 2, physicians are able to upload DICOM scans from their computer and render them as interactive holograms. This enables a unique set of benefits:

- Physicians can choose to show specific aspects of the image, thereby using the model to better articulate procedures to patients.
- Doctors no longer need to rely on black and white 2D images to illustrate complex operations or point out specific anatomy or pathology.
- Patients can feel a sense of peace knowing more about the procedure they will undergo.



## Case study: The Heart Institute at Nicklaus Children's Health System

Rosemaylee, a 13-year-old girl from Haiti, arrived in the United States with her family in 2018. When she visited The Heart Institute at Nicklaus Children's Health System in Miami, Florida, she was diagnosed with a rare and complex defect involving three separate structures in her heart that required immediate surgical intervention.

With the help of our VSI HoloMedicine® software platform and the HoloLens 2 device, Rosemaylee was able to better understand her predicament and was comforted knowing the surgeons had a 3D view of her unique case, why she needed the medical procedure, and how the doctors were going to help.

"I don't think Rosemaylee understood what she had in terms of her heart problem until we gave her the model, until we showed her with the HoloLens exactly what the issue was... she understood and understands why she needs open heart surgery now and the surgeons understand better her very complicated anatomy."

– Dr. Robert Hannan, MD, Cardiovascular Surgeon at Nicklaus Children's Health System in Miami, Florida.

**Discover how VSI HoloMedicine® and HoloLens 2 comforted a pediatric patient prior to a complex heart surgery.**

# Interactive and immersive medical education and training

*Transform traditional medical classrooms into immersive and experiential 3D environments to provide students with hands-on learning opportunities.*

Using the VSI HoloMedicine® software platform and Microsoft HoloLens 2 device, medical students, professors, and physicians can join together and create a new ecosystem of collaborative medicine and interactive learning globally.

## View real-world anatomy, pathology, and lectures in volumetric 3D:

- Visualize anatomy via any real-world DICOM image, such as CT, MRI, ANGIO-CT, CBCT, SPECT, PET-CT, and many more, as a 3D hologram for a 360° perspective.
- Enable students to collaborate with each other, professors, and physicians in real time with the same medical image object for a meaningful learning experience.

## Enhanced views of human anatomy and cadaver pathology:

- Offer students segmentation tools to give them an understanding of structural relationships with bone rendering, natural rendering, vessel segmentation, among other specific tools.
- Instantly superimpose medical imaging objects onto cadaver subjects or medical mannequins for a comprehensive view of anatomy.



## Case study: University of Florida College of Medicine

Discover how medical students explored an entirely new world of collaborative medicine using the apoQlar VSI HoloMedicine® mixed reality software platform and the Microsoft HoloLens 2 device.



Medical students experience mixed reality technology in healthcare.



# Revolutionize how medicine is practiced, experienced, learned

apoQlar is recognized as a Microsoft Gold Mixed Reality Partner because of their innovation with mixed reality technology in the healthcare and higher education industries. VSI HoloMedicine® is a medically certified software platform that uses the Microsoft HoloLens 2 hardware to transform medical images, clinical workflows, and medical education into 3D mixed reality.

## Trusted globally:

- 30+ hospitals are using VSI HoloMedicine® around the world
- 13+ medical fields where VSI HoloMedicine® is currently used
- 10+ countries where VSI HoloMedicine® is innovating medicine

## Quality Certifications:

- Medical Devices Single Audit Program Certified (MDSAP US Jurisdiction) - 21 CFR 820
- ISO 13485:2016

## Medically certified:

- CE Class 1 approved (EU)
- HSA Class A approved (Singapore)
- R&D Class II - Approval for Clinical Study (Canada)
- FDA 510(k) is currently under review (USA)

## Gold status:

- apoQlar is a Microsoft Gold Mixed Reality Partner
- Earned the 2020 Microsoft Partner of the Year Finalist Healthcare Award



# Ready to experience VSI HoloMedicine® for yourself?

## *apoQlar Disclaimers:*

*Not all features and aspects mentioned are included in the VSI HoloMedicine® medical certification intended use. Features such as bone rendering and vessel segmentation are not included in our medical certifications but are for research and education purposes only.*

*VSI HoloMedicine® is not intended for intraoperative use and is not to be relied upon for diagnosis.*

*For education and research use only in the USA.*

*VSI HoloMedicine® is CE Class I Certified, HSA Class A Certified, and an approved R&D Class II Device in Canada.*

*HoloMedicine® is a registered trademark of apoQlar GmbH in the USA and EU.*

## *Microsoft Disclaimers:*

*The Microsoft HoloLens 2 is not designed, intended, or made available as a medical device(s), and is not designed or intended to be a substitute for professional medical advice, diagnosis, treatment, or judgment. The HoloLens 2 is marketed as a general-purpose device and is not designed or intended for use in any application or situation where failure of any kind of the device could lead to death, serious injury, or severe environmental damage.*

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\* [Hypothesis Group 2020, Mixed Reality Intelligence, Healthcare Edition, Microsoft](#)

