Stony Brook University

Leveraging Innovative Technologies in Practice

Exploring VR Applications in College Classes: An SBU Showcase

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Center for Excellence in Learning and Teaching (CELT)

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CELT VR Team

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About CELT VR Team

- Our CELT VR team started on June 2022
- Set up CELT VR interest group on Yammer platform, share VR related research and technology to academic community.
- Actively collaborate with faculty to apply VR tech in their teaching.
- Partner with Classroom Support Team and Department of Information Technology (DoIT) to disseminate VR/XR technology.
- Conducted many VR sessions to many departments and symposiums.

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CELT VR Studio

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Agenda

1. Discuss how effective utilization of VR can benefit teaching and learning at SBU
2. SBU VR Faculty Showcase
3. Demonstration of VR technologies:
   - **Station 1**: 360 video/photo and WebXR (FrameVR)
   - **Station 2**: Immersive public speaking VR app - Ovation
   - **Station 3**: Medical VR simulation (Medical Holodeck, CPR simulator)

Overview of Technologies

360° VR Photo / Video

A 360-degree video/image is photo and/or video that is recorded in all directions, providing the viewer with a 360-degree view.

WebXR

WebXR stands for “Extended Reality” for the web, which includes both virtual reality (VR) and augmented reality (AR), as well as all other related immersive technologies

Medical App for Meta Headset

There are a variety of apps for VR headsets such as the Oculus Quest series that allow learners to discuss medical imaging, run clinical scenarios independently or with colleagues, and more.

Images by ph.vector and Freepik

360° Photo/Video

A 360-degree video/image is photo and/or video that is recorded in all directions, providing the viewer with a 360-degree view. When watching these videos or looking at these photos you are able to look around you anywhere you want. In order to film 360-degree video or take 360-degree photos, you must have access to a 360-degree camera.

Photo by A.J Colores on Unsplash

Use Cases for 360° Photo and Video

3D Storytelling

Learners can develop stories and creative works with VR headsets. This technology allows for an immersive storytelling experience with interactive elements and a multisensory experience.

Virtual Field Trips

Using VR Headsets for virtual field trips can allow students to see and experience locations and experiences that they might not otherwise be able to which provides an experience that is immersive and could be more cost effective as well.

Scenario-Based Learning

By participating in virtual simulations, students can learn from mistakes at no cost to participants, stakeholders, or other expenses. They may also attempt as many tries as necessary.

Pros of 360° Photo/Video

Easier to Implement

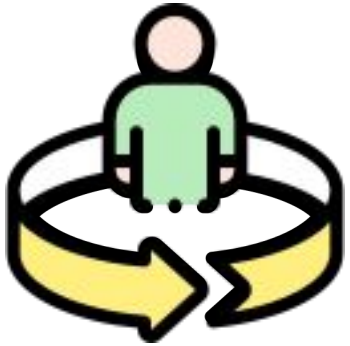
Wide Device Compatibility

Low Cost

Photo Credit | Flaticon

Cons of 360° Photo/Video

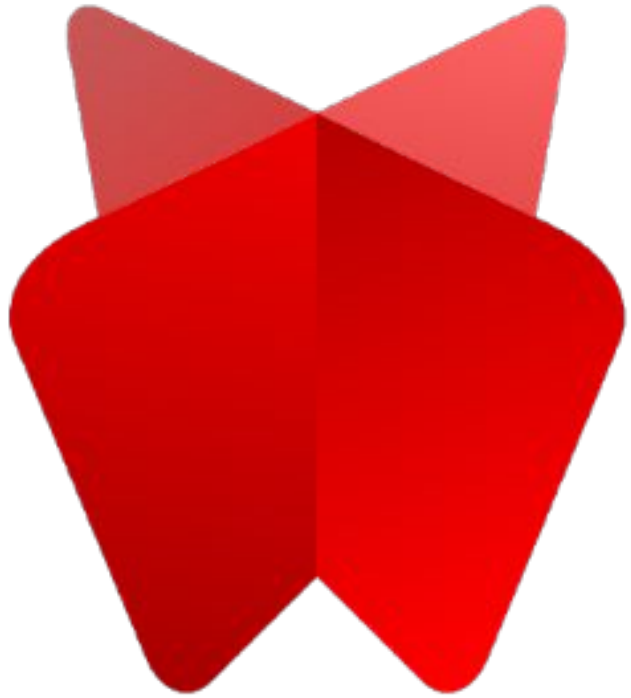
Limited Interactivity



Lower Immersion Compared to Other VR

WebXR

WebXR stands for “Extended Reality” for the web, which includes both virtual reality (VR) and augmented reality (AR), as well as all other related immersive technologies, including but not limited to mobile devices and more. It allows users to tap into the power of the web through immersive environments and experiences.



Use Cases for WebXR (FrameVR)

3D Models

3D models provide useful information and a unique user experience. These interactive models improve understanding of concepts and can enhance learning and training.

Virtual Modeling

By allowing learners to work with 3D models, learners are able to work with 3D renderings of objects that can be too small to see with our eyes alone or too large to fit in the classroom. This allows for a more hands-on learning experience.

Remote Learning

The accessibility factor of VR allows learning to occur on-demand from most locations and times that is convenient for the learner or group of learners.

Pros of WebXR

Cross Platform Compatibility

High Interactivity

Web Based

Photo Credit | Flaticon

Cons of WebXR

May Require High Development SKill

Cost for Pre-Built Learning Content

Photo Credit | Flaticon

Medical Apps for Meta Headset

There are a variety of apps that are available for VR headsets such as the Meta Oculus Quest series that allow for an immersive experience that can be more accessible and allow the user to access learning experiences from any convenient location.

CPR Simulator app allow users to practice CPR using full body movements, with a virtual instructor.

Medical Holodeck app allows learners to visualize, edit, and discuss medical imaging, human dissections, and 3D human anatomy models in a VR environment.

Use Cases for CPR Simulator and Medical Holodeck

3D Medical Anatomy

Learners are able to visualize, edit, and discuss 3D medical imaging either individually or in collaborative groups. Dissections and surgeries are possible entirely in virtual reality.

Medical Collaboration & Teamwork

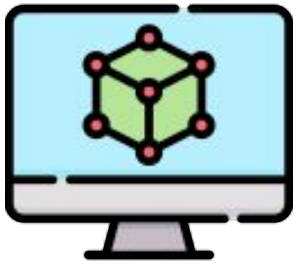
Discuss medical imaging in collaborative groups, participate in group trainings, and participate in the virtual classroom experience with learners on a global scale.

Record Lessons & Simulations

Learners are able to record their own content, create lessons and record their progress, store, as well as share with other users worldwide.

Pros of CPR Simulator

High Immersion



Realistic Simulations

Specialized VR Software

Photo Credit | Flaticon

Cons of CPR Simulator

Higher Cost

Limited to
Oculus Quest 2

Potential
Learning Curve

Photo Credit | Flaticon

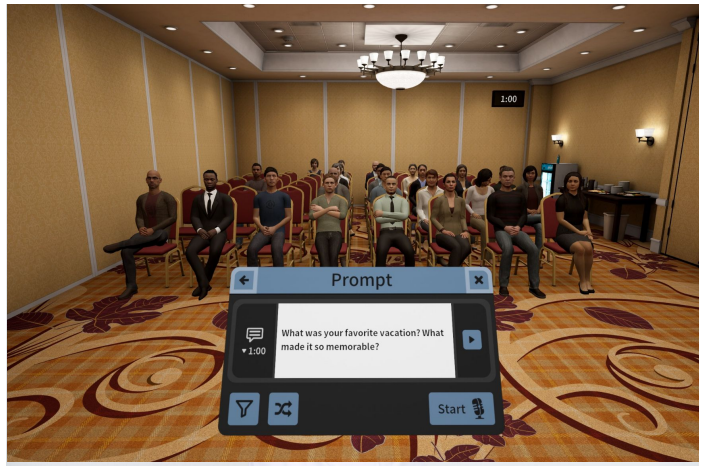
Public Speaking VR App - Ovation

Realistic Public Speaking Environment

Ovation provides a virtual public speaking environment where the audience can track your movement and react to your comments in real-time.

Real Time Feedback

Ovation provides feedback instantaneously while you are speaking to help you make adjustments to your public speaking and articulate your ideas more effectively.



Highly Customizable

You can import your own documents such as text, slides, and slide notes and can choose from a variety of different tools and environments for your session.

Photo Credit | Ovation

Dr. Guleed Ali - GEO 122 Virtual Field Trip

Dr. Guleed Ali

Department of Geosciences

IDEA Fellow in Sustainable Climate Justice and Solutions
Stony Brook University

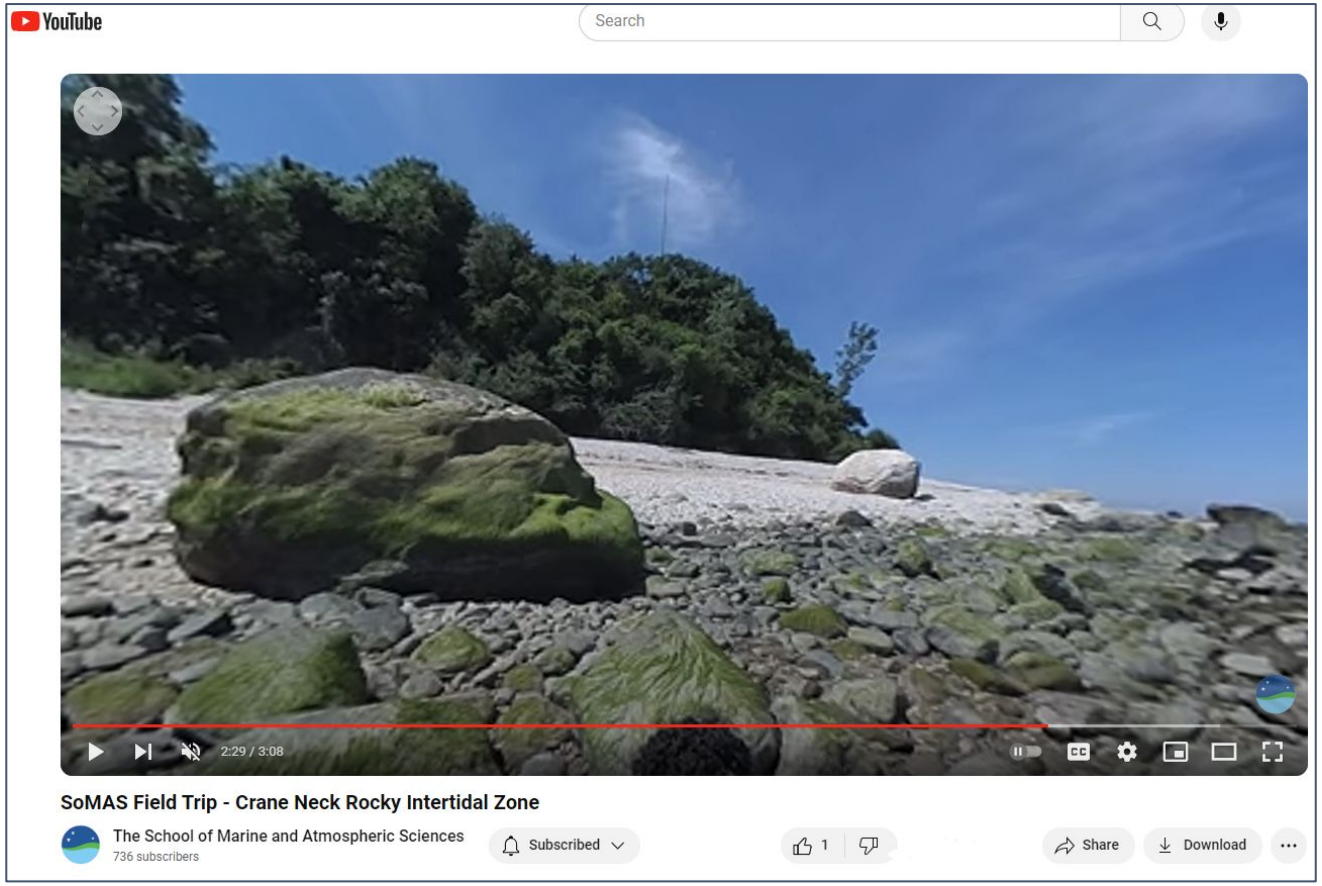
Dr. Ali used GoPro Max to film 360 degree videos and photos for his GEO 122 class. He aim to provide a sustainable solution for students to visit remote sites virtually.

A screenshot of a 360° Video from Dr. Guleed's recent Geoscience work

Mark Lang - Virtual Field Trip for School of Marine and Atmospheric Science (SoMAS)

Mark Lang, a 360-degree video and photo expert at SoMAS, collaborated with Dr. Darcy Lonsdale during COVID filmed a **virtual field trip to the Rocky Intertidal Zone at Crane Neck Point on Long Island Sound**, allowing students to explore marine ecosystems remotely, and learn from Dr. Lonsdale's narrative at the same time.

Mark Lang - Virtual Field Trip for School of Marine and Atmospheric Science (SoMAS)



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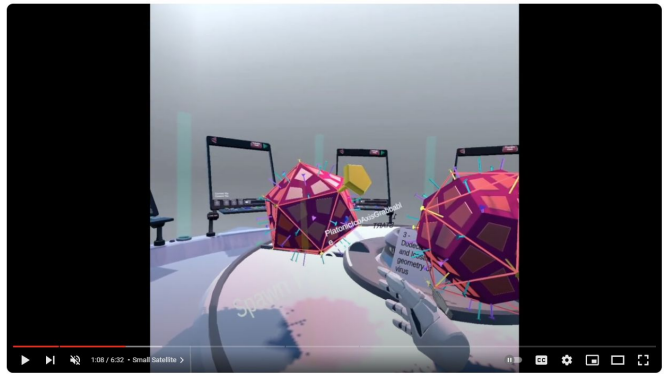
Data Visualization VR App for HBM 640 Molecular Mechanisms of Microbial Pathogenesis

Dr. Carol Carter

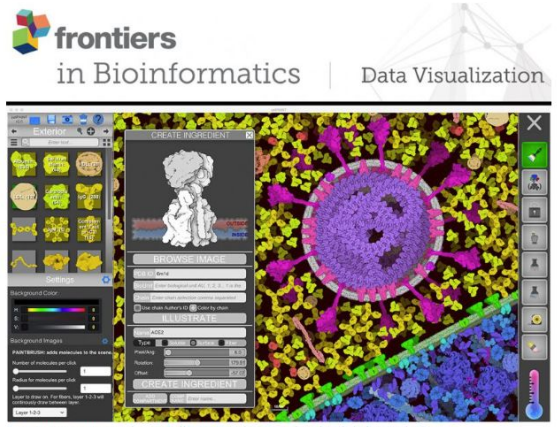
Distinguished Professor and Member of the National Academy of Sciences
Department of Microbiology and Immunology
Adjunct Professor, Department of Physiology & Biophysics
Stony Brook University



CellPAINT-VR Virus Symmetry --A multiplayer lesson

CellPAINT

Dr Carol Carter plan to use the data visualization app CellPAINT in her HBM 640 this Fall. With VR, students are provided a simulated 3D environment that enables them to explore and interact with a virtual surrounding in a way that approximates reality, as it is perceived through their own senses.



See our new paper about CellPAINT2.0 in "Frontiers in Bioinformatics"

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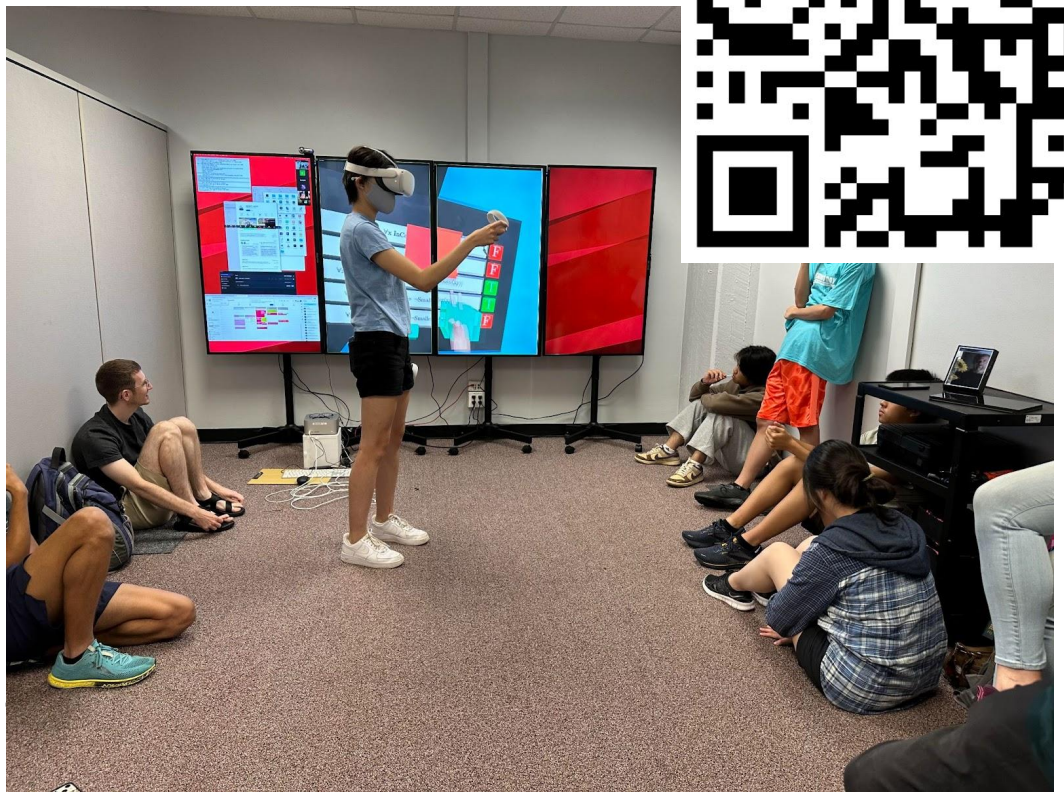
VR Game to teach logic of possibility and necessity in physics and philosophy

Dr. Gary Mar
Professor
Department of Philosophy
College of Arts and Sciences

Paul St. Denis
Coordinator of Teaching and Learning Lab
Department of Information Technology

Dr. Mar use virtual reality game "Tarski's World" created by Paul St. Denis in classroom to teach students first-order logic. This interactive game can modal logic of possibility and necessity, used in "many worlds" models in physics and philosophy, thereby making is possible to introduce of temporal logic.



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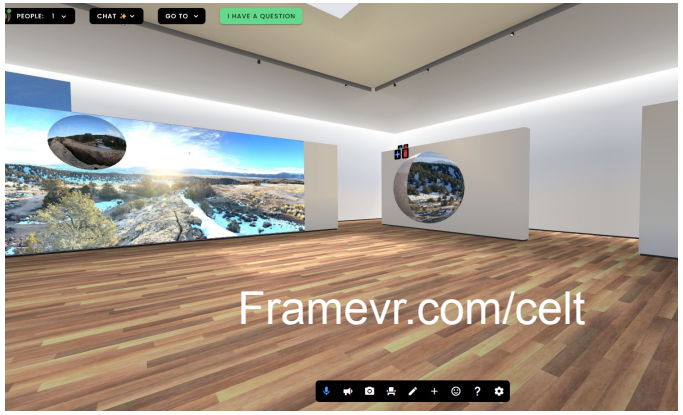
Ovation


CPR Simulator


Framevr.com/celt


360 VR

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Thank You!

Contact us at CELT@stonybrook.edu