

"Virtual Reality Module Depicting Catheter-Associated Urinary Tract Infection as Educational Tool to Reduce Antibiotic Resistant Hospital-Acquired Bacterial Infections (VR CAUTI 2.0) with a Focus on Antimicrobial Resistance (AMR) Mechanisms"

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Check out the live demo at the foyer!

INTRODUCTION

- VR and AR are used in medical education to enhance learning outcomes through simulation models
- Rising antibiotic resistance and infectious diseases call for immediate action
- The research aims to develop a VR educational tool depicting CAUTI caused by antibiotic resistant bacteria. We improve on already existing and award winning VR-CAUTI 2.0 that our team developed in 2020.
- The VR-CAUTI module aims to raise awareness and provide insights to reduce the spread of antibiotic resistant infections
- VR-based modules have the potential to revolutionize learning and make medical education compatible with IoT in the 4th industrial revolution

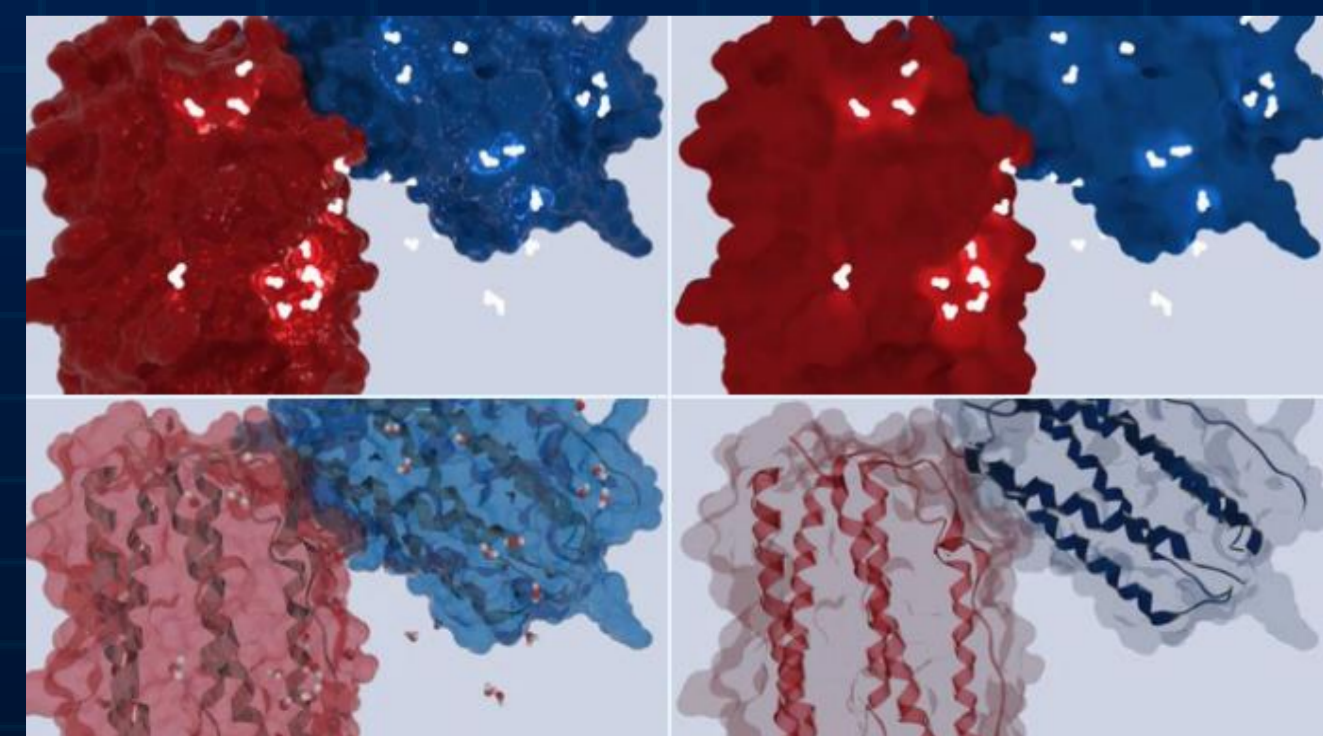


Figure 1 Real time tracing available in UnityMol.

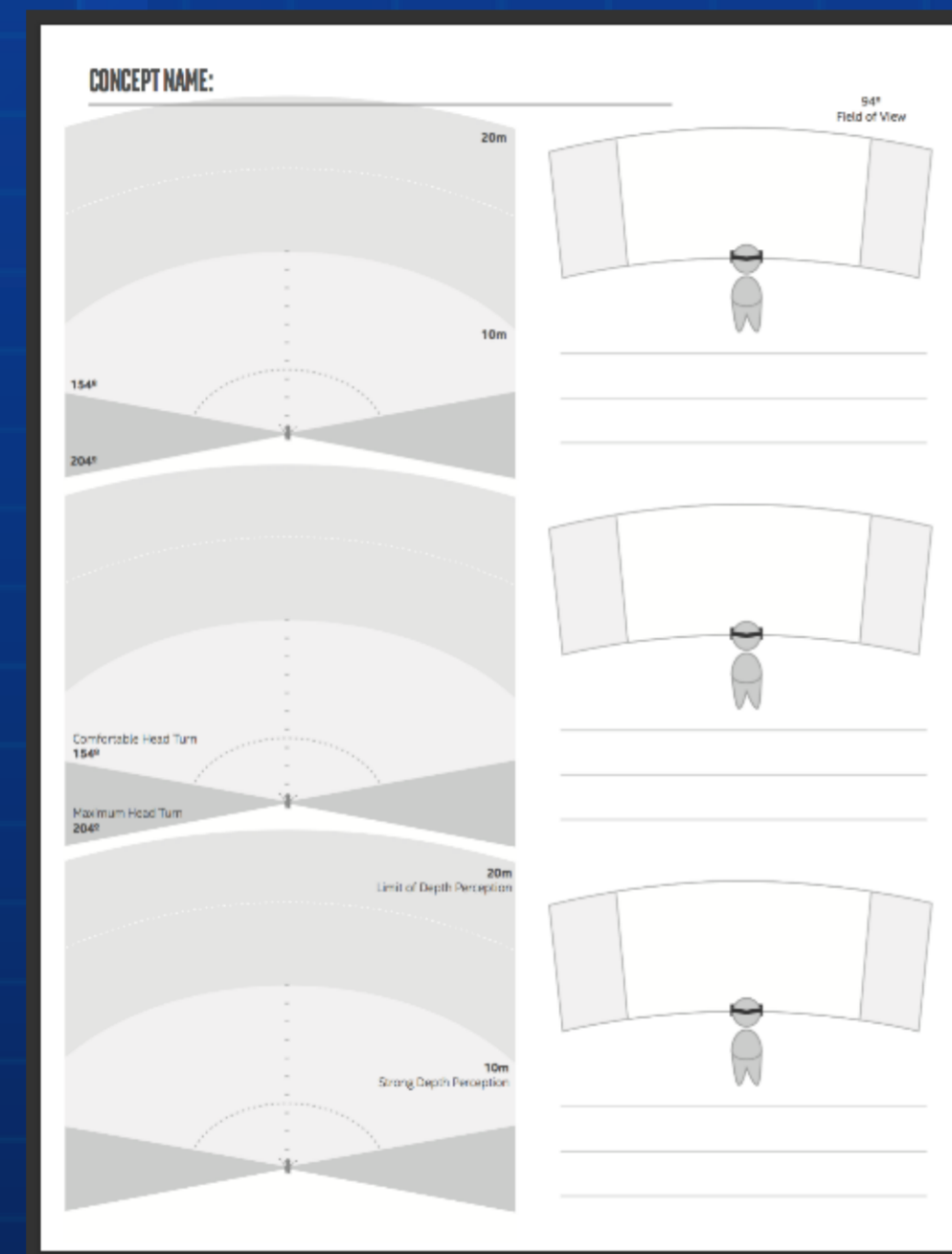


Figure 2 Typical VR Sketch Sheets used to plan different parts of the storyboard at once.

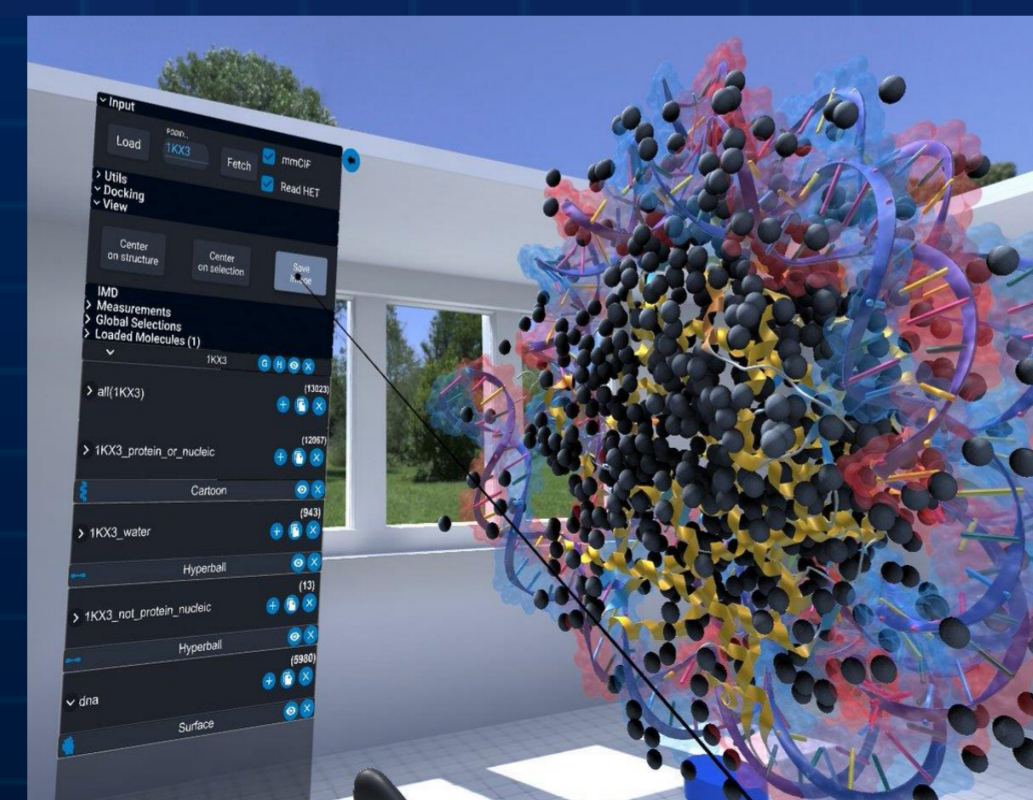


Figure 3 UnityMol 1.1.0 upon launch

METHODOLOGY

Preproduction:

- Storyboard was created to accentuate every interaction between assets.
- Medium shots were employed to lay out each element in detail while giving order.
- Concept art was used to express the desired tone of the location and characters.

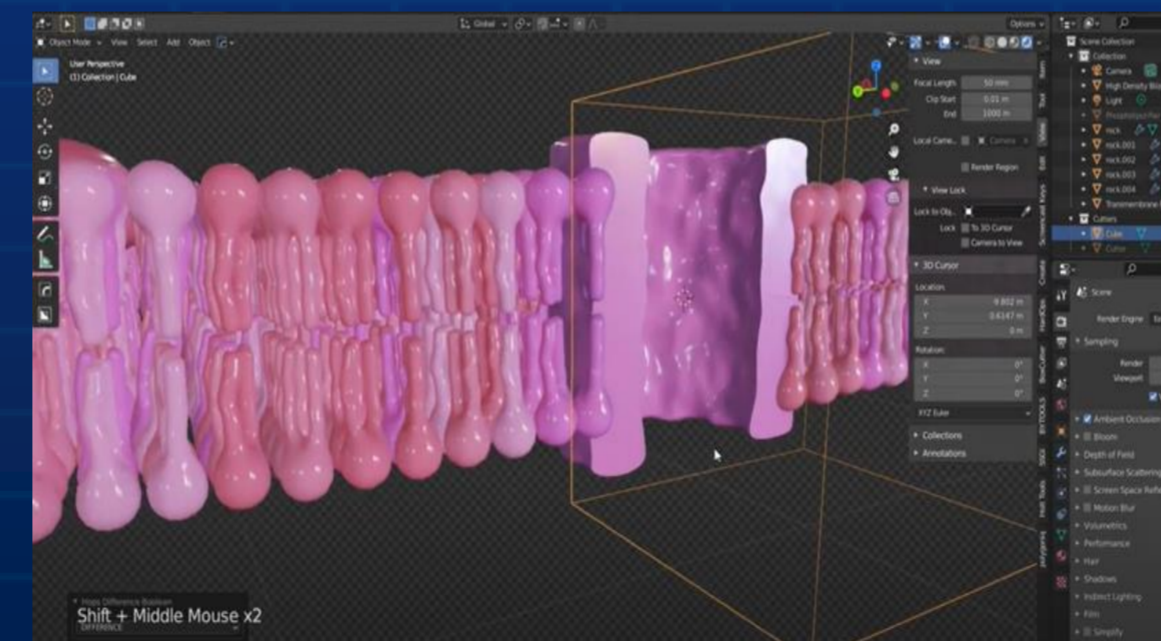


Figure 4 Blender View of Cell membrane

Production:

- New 3D models were created for mobile genetic elements, membrane efflux pumps, antibiotics, cell membrane, ribosomes, and proteins.
- Constructive solid geometry was learned to improve mesh/polygon clipping technique.

CONCLUSIONS

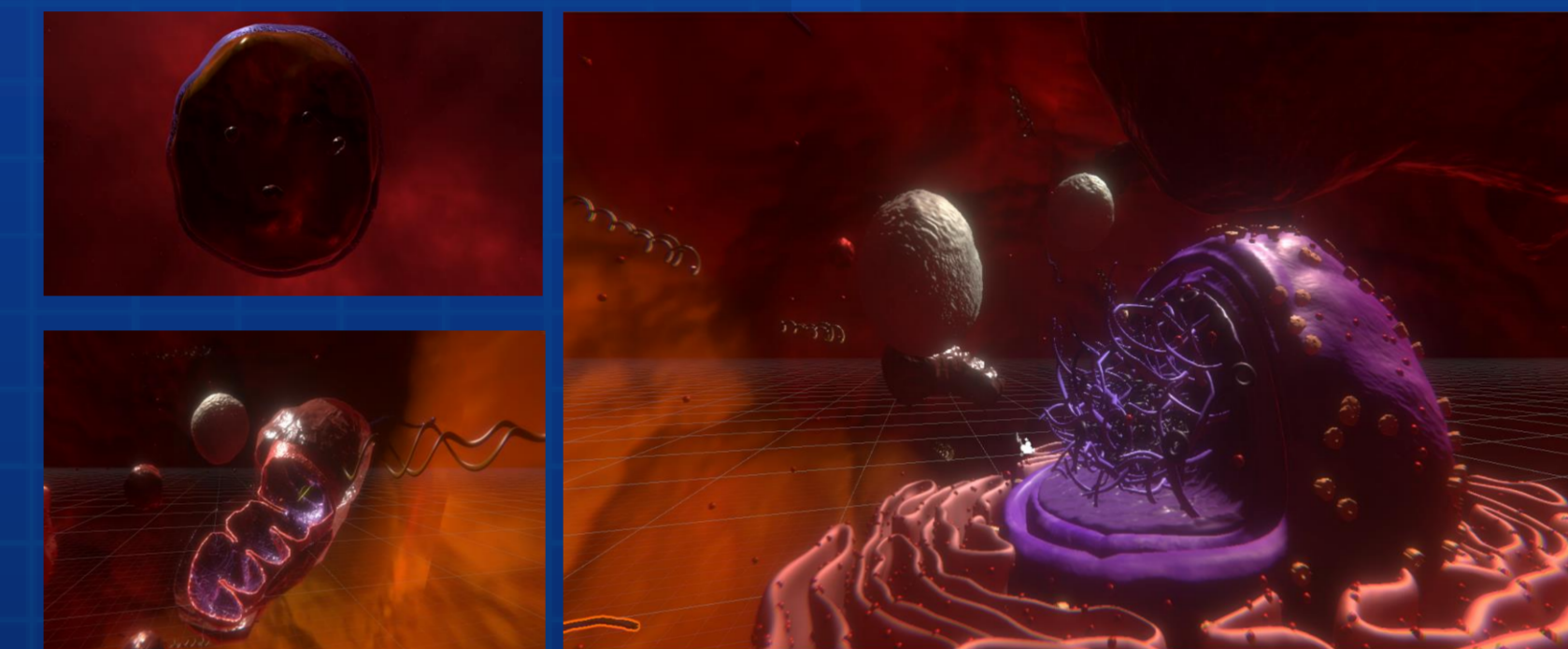


Figure 5 Final render of module

- VR module for medical education tested on students for feedback and applicability
- Virtual Reality Interest Group formed by medical and computer science students
- VR-CAUTI module is proof-of-concept for accurate medical simulations to improve learning and IoT compatibility
- AI element could analyze student performance data to identify areas of struggle and tailor learning experience
- AI could generate personalized quizzes based on performance in VR module

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Y. M. Mekki, M. M. Mekki, M. A. Hammami and S. M. Zughaier, "Virtual Reality Module Depicting Catheter-Associated Urinary Tract Infection as Educational Tool to Reduce Antibiotic Resistant Hospital-Acquired Bacterial Infections," 2020 IEEE International Conference on Informatics, IoT, and Enabling Technologies (ICIoT), Doha, Qatar, 2020, pp. 544-548, doi: 10.1109/ICIoT48696.2020.9089488.