METAVERSE IN HKBU

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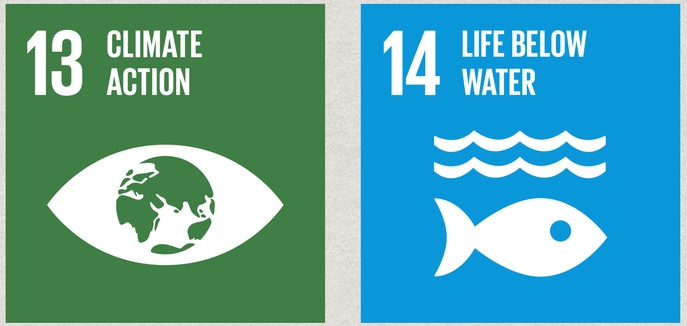
Agenda

- Two metaverse projects
  - Pilot project for **cross-border collaboration** on **sea turtle eco-system simulation**.
  - A **digital twin** of the JCCC building, as a platform for **learning scenes development** and facilitate user content contribution.

The Sea-Turtle Project

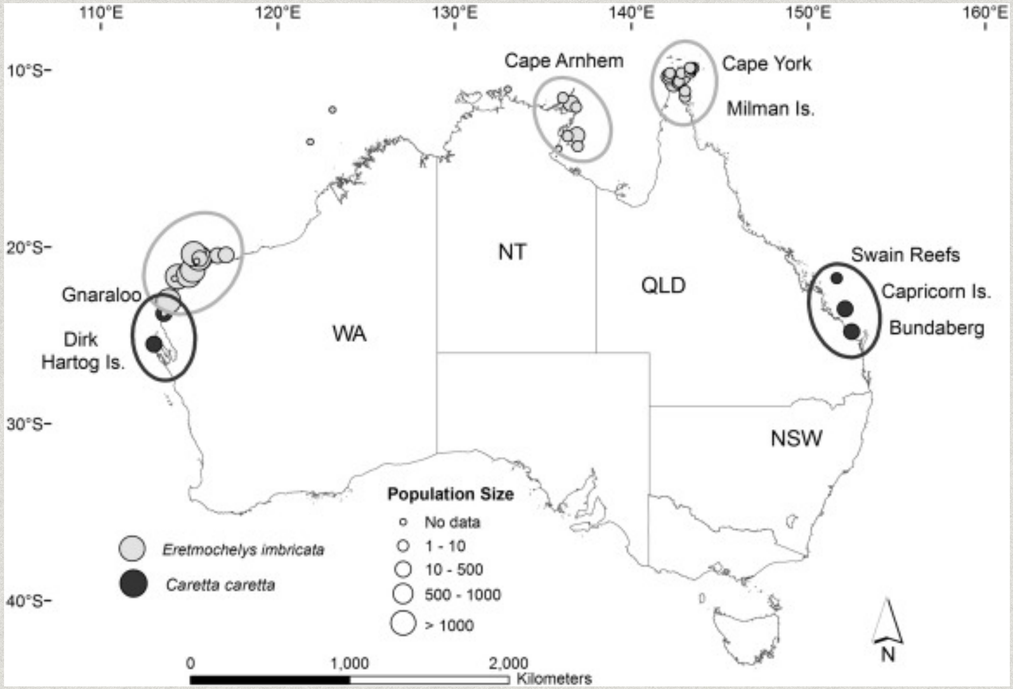
- We've been working with the **Western Sydney University** on the studies of some global sustainability issues.
- One project is to allow students from WSU and HKBU to **work collaboratively on a metaverse project** to simulate and illustrate a particular environmental issue.



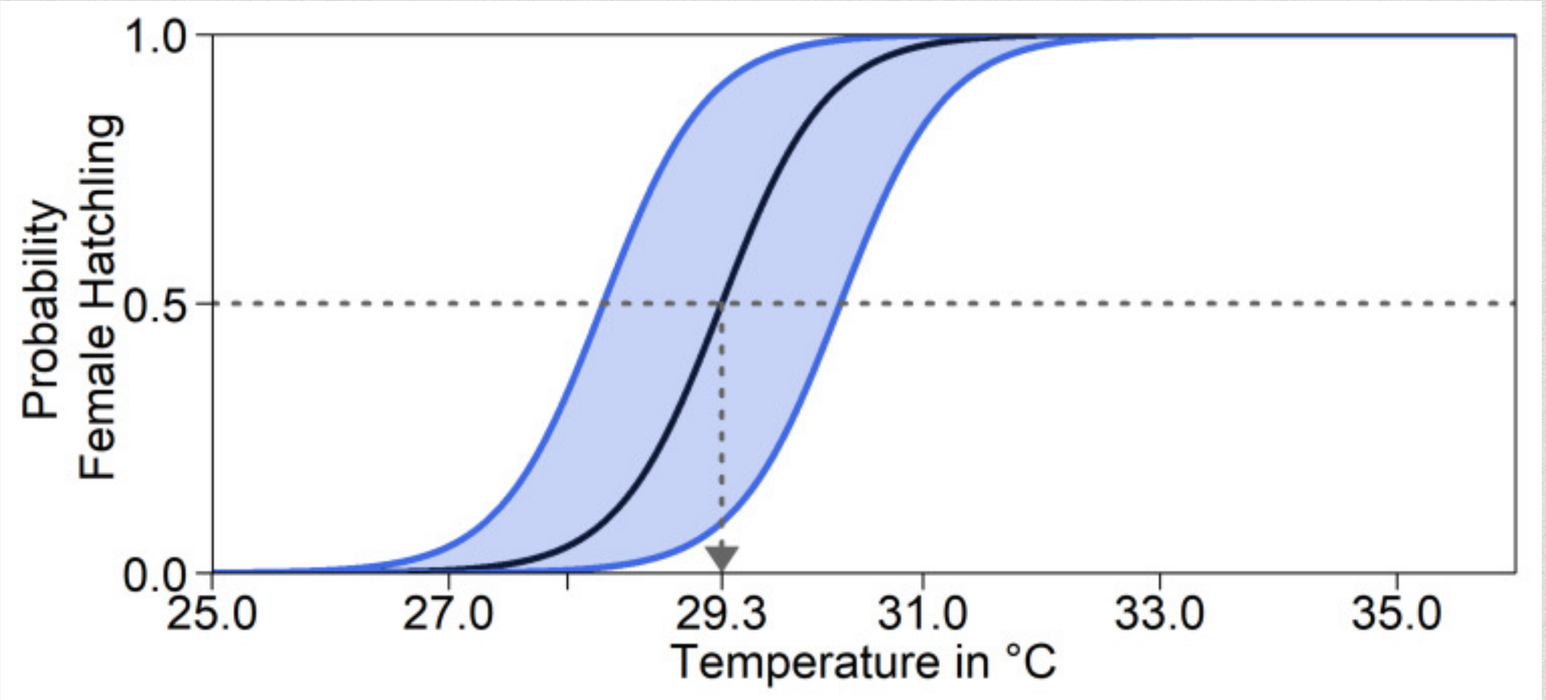
Students

- On the HKBU side, we target to invite some students from GCAP3055 (**GE Capstone Interdisciplinary Independent Study**) to join this project.
  - Student will choose a **community issue or concern** that is of interest to her/him, conduct systematic study, **apply knowledge and skills that s/he has gained from the major study and other disciplines**, and provide an innovative solution to address the issue.
  - This course will be offered in the next semester.

Project Background

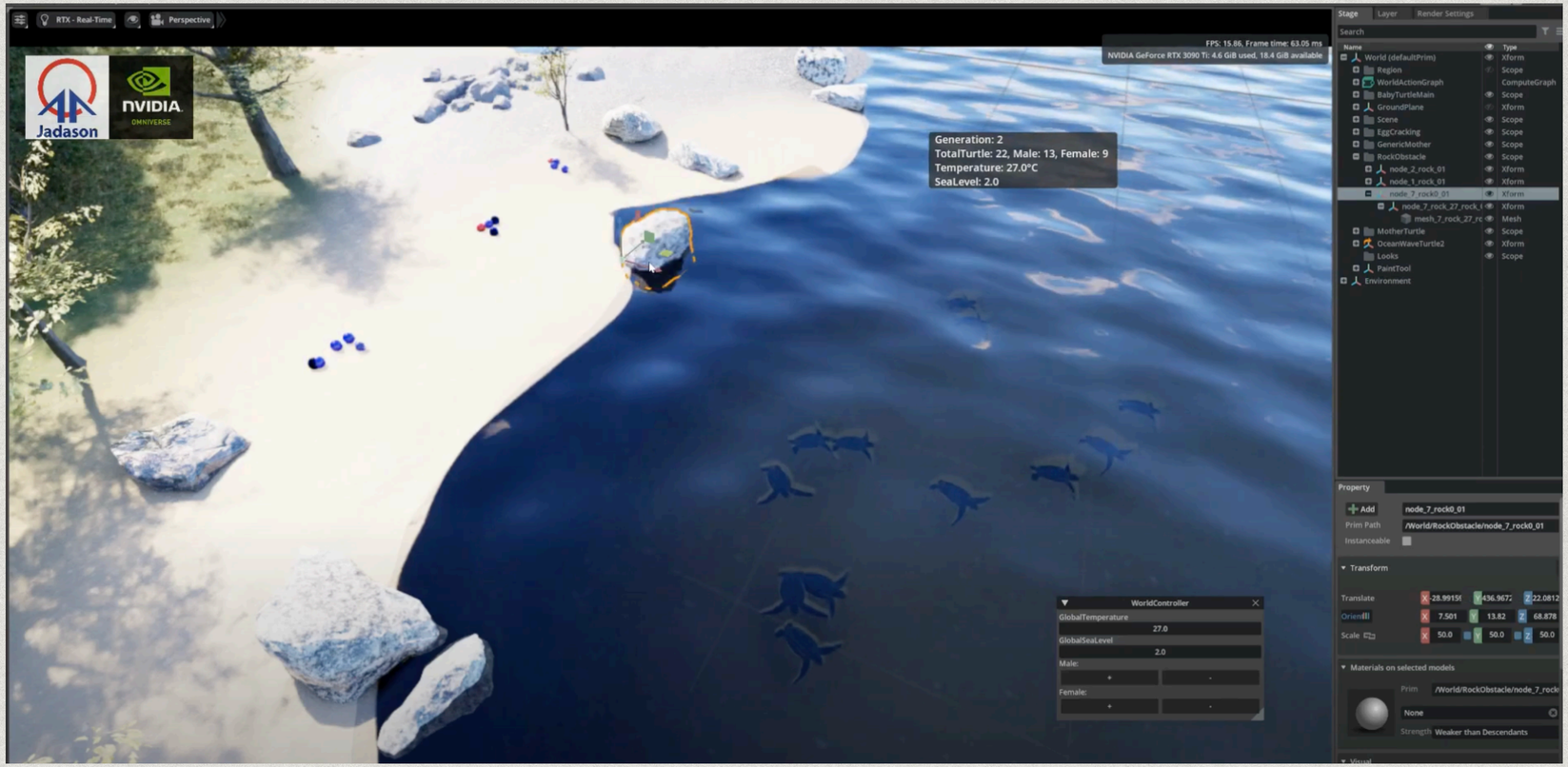


- There have been many discussions on how **climate change** can influence the **ecosystem of sea-turtles**.
  - https://sharkresearch.rsmas.miami.edu/climate-change-effects-on-sea-turtles/
  - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7288305/



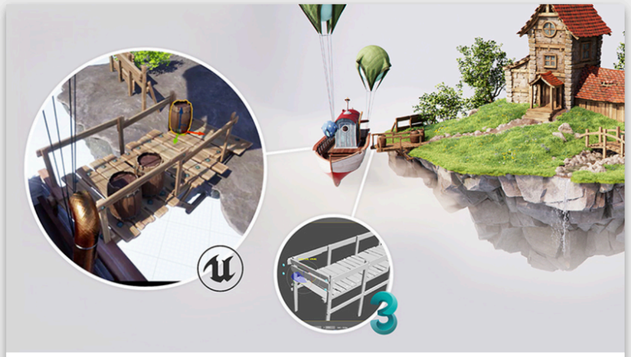
- Sea level would **affect the sand area**, where the turtles hatch eggs.
- The gender of the hatchling is heavily affected by the temperature.
  - **More female would be produced** with a **slight increase of temperature**.

- We’ve tested some software, and a prototype has been developed…



https://www.youtube.com/watch?v=dgzzLBwAkNY

Tool



Connect 3D Worlds and Workflows

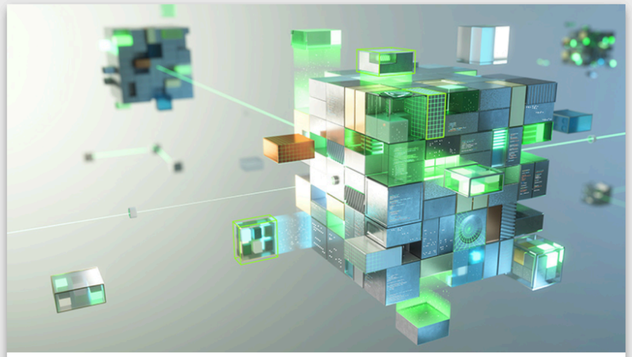
Built on Pixar's **Universal Scene Description (USD)**, NVIDIA Omniverse enables individuals and teams to enhance their existing 3D workflows with more seamless connections and powerful AI-enhanced capabilities.

Learn More About 3D Design Collaboration in Omniverse ›

Simulate Large Scale Worlds

Enterprises are harnessing the power of large scale world simulation to transform their industries and revolutionize scientific discovery. From digital twins to virtual worlds for training AIs, learn how some of the leading technology companies are applying metaverse applications today.

Learn More About Digital Twins in Omniverse ›



Develop Once, for Every 3D World

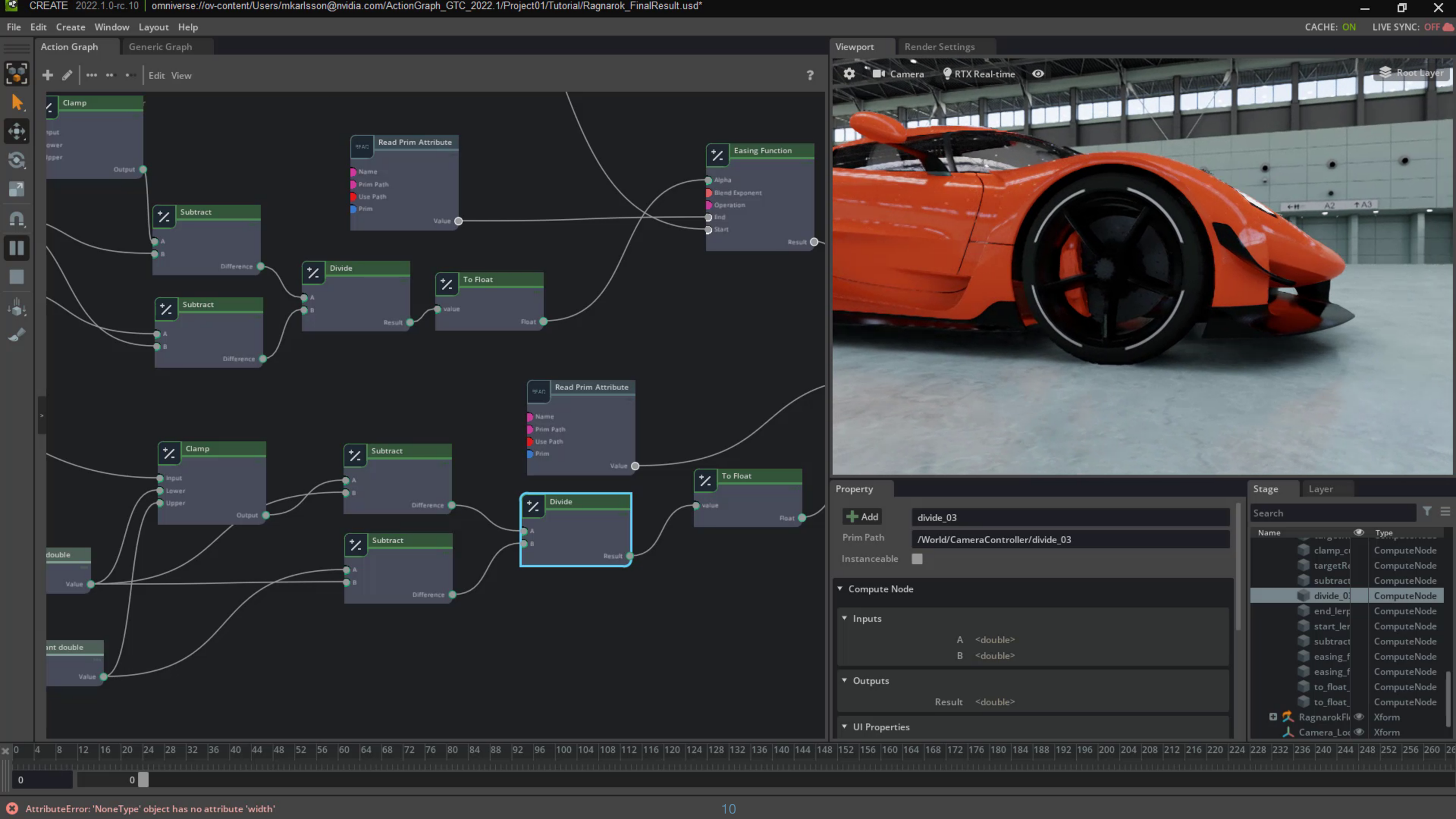
Modular and easily extensible, Omniverse replaces monolithic development, enabling developers, researchers, and technical artists of every skillset to build their own advanced, AI and **RTX-enabled Python-based tools** quickly. Plus, Omniverse lets developers achieve maximum interoperability across 3D software ecosystems since it's based on USD.

Learn More About Developing on Omniverse ›

- The prototype was developed with **Nvidia Omniverse**.

Omniverse Create

- Allow users to **develop scenes collaboratively**
- **Many connectors** with major 3D modelling softwares, such as Blender, 3dsMax, etc.
- Easy to use **but require Nvidia RTX cards**….
- Support python and **visual programming**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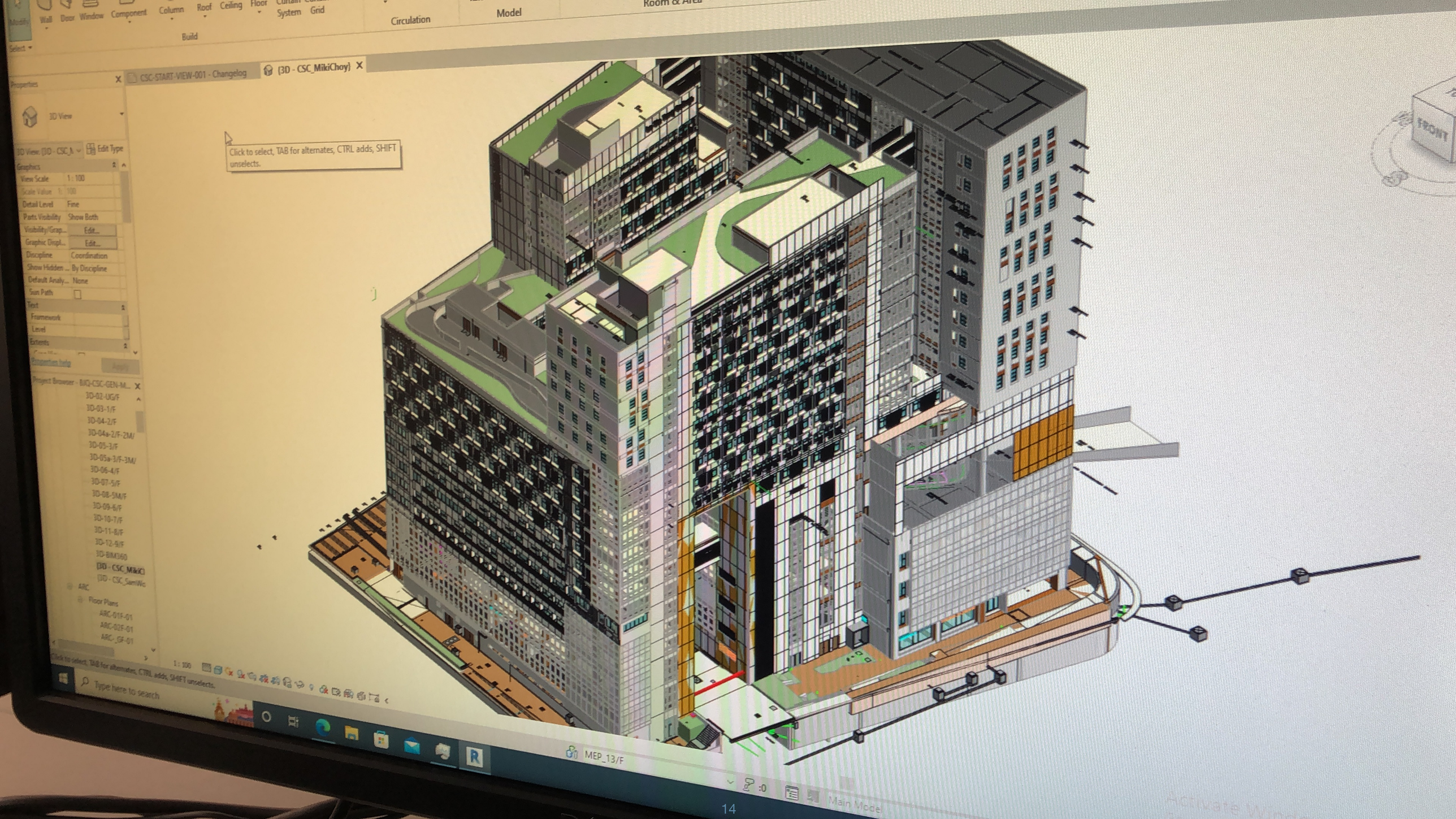
Expectation

- Students are expected to
  - Develop **an interactive scene** which allows users to **specify the temperature and sea level**.
  - Simulate the **turtle population change** by leveraging the **particle spawn system**
  - Deploy the final product on metaverse to **arouse public concern on this topic**.

JCCC

Hostel and Academic Building Complex

- A joint effort from COMP, IMD (Interactive Media Department) and many other entities in HKBU.
- We construct a **digital twin** of the JCCC building, a building still under construction.
- Since it is a new building, we've obtained the **BIM file** from the construction company.
  - The BIM file contains all the structures and architectures of this building.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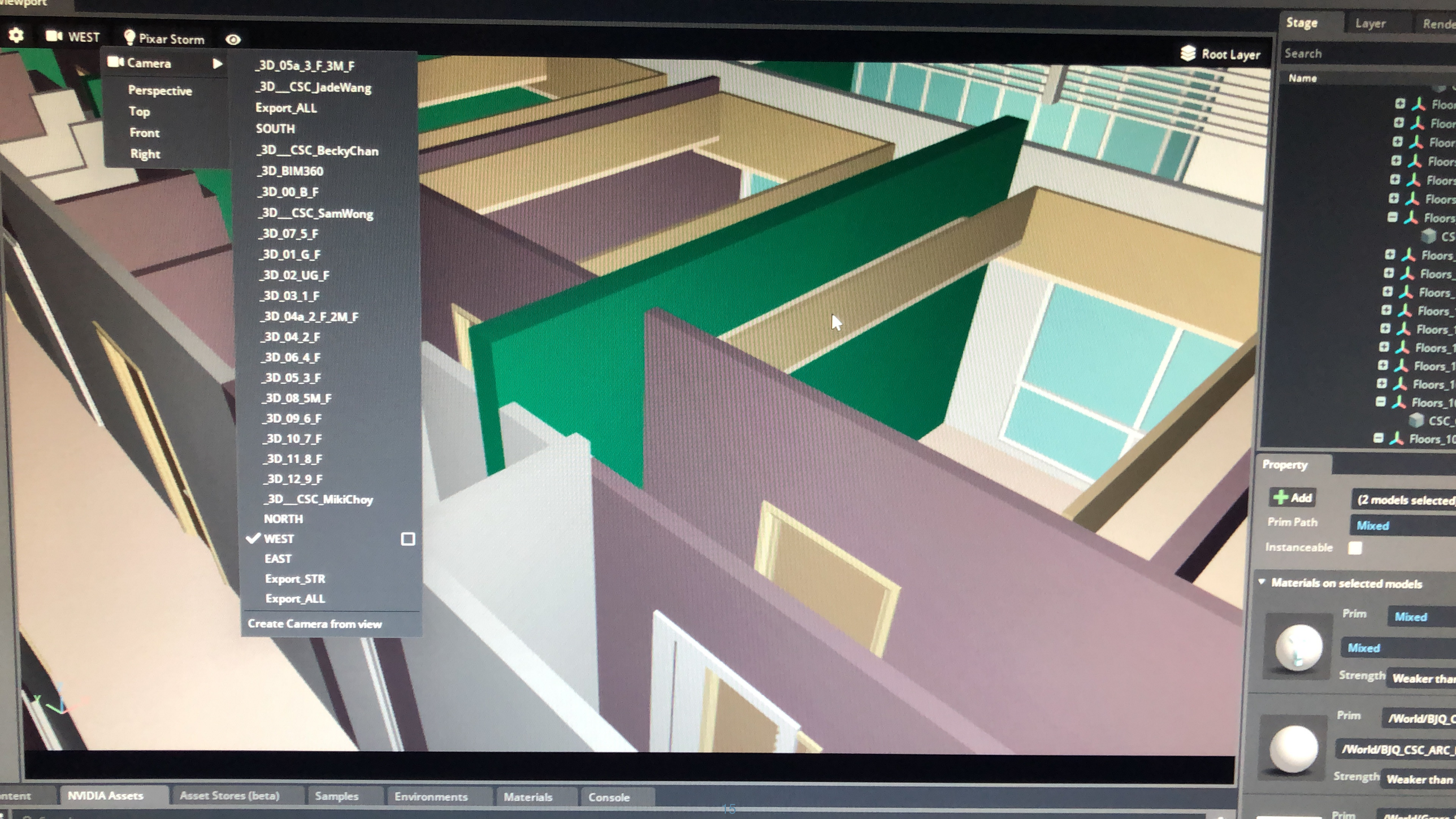
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NVIDIA Assets
Asset Stores (beta)
Samples
Environments
Materials
Console

Tools

- We have tried to import the BIM file to the Omniverse Create.
  - The whole architecture was imported as a **giant mesh**. Basically we can’t edit (or apply texture on) each object.
- We have switched back to the **Unreal engine**, which we are more familiar with.

Demo Tour

https://www.youtube.com/watch?v=3SJGg3MLEbo

Potential Applications

- We can tailor make **learning scenes** for colleagues from different disciplines.
- COMP and IMD students can **contribute content** such as 3D models, animations and gameplays to this platform.
- There could also be **GE courses** to allow students from other disciplines to contribute content to this platform.