

Welcome to the

ADVANCED COMPUTER SCIENCE APPLICATIONS FOR CULTURAL HERITAGE

Laboratory

CA' FOSCARI UNIVERSITY

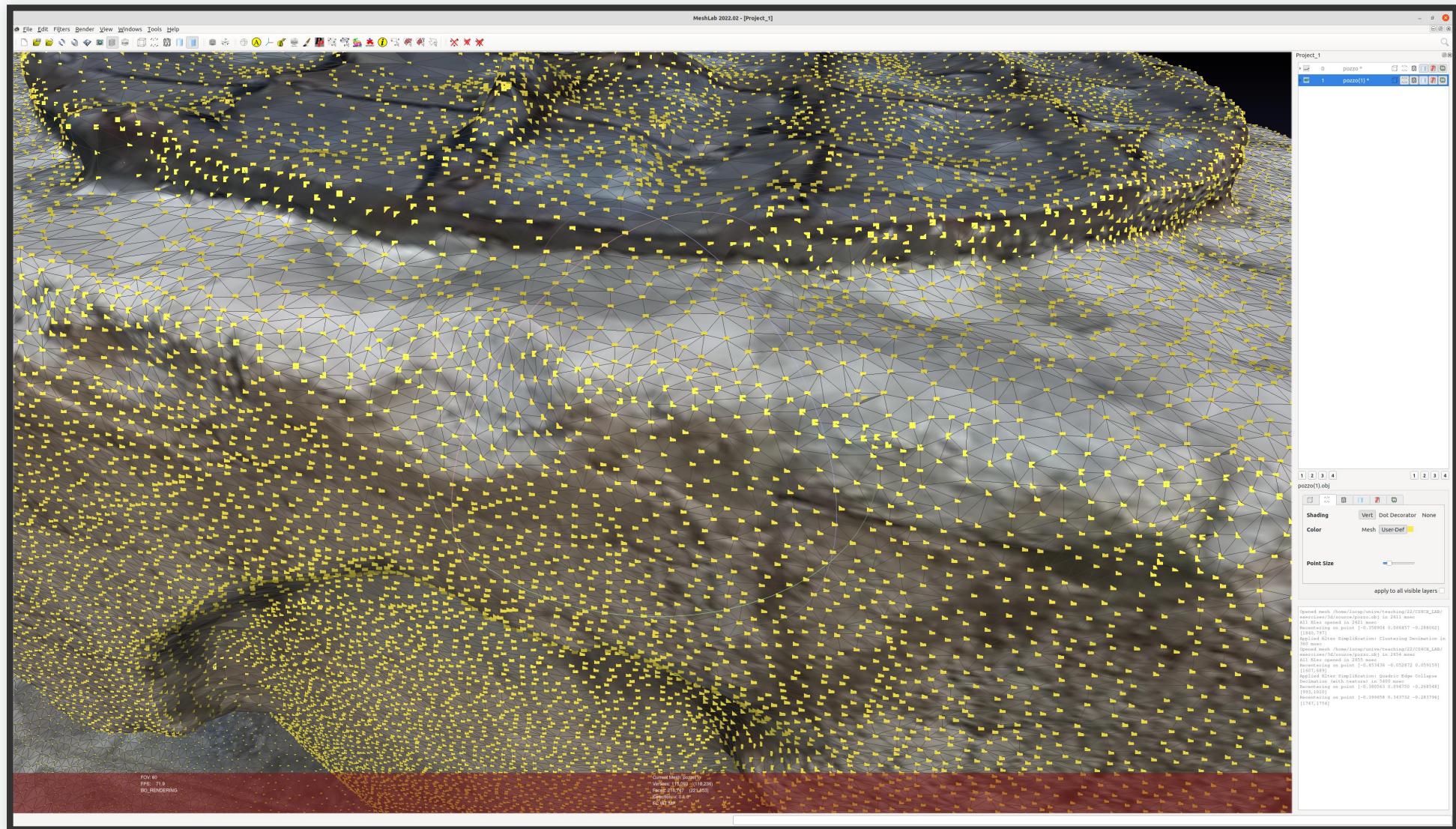
3D Data

What are the different 3D formats

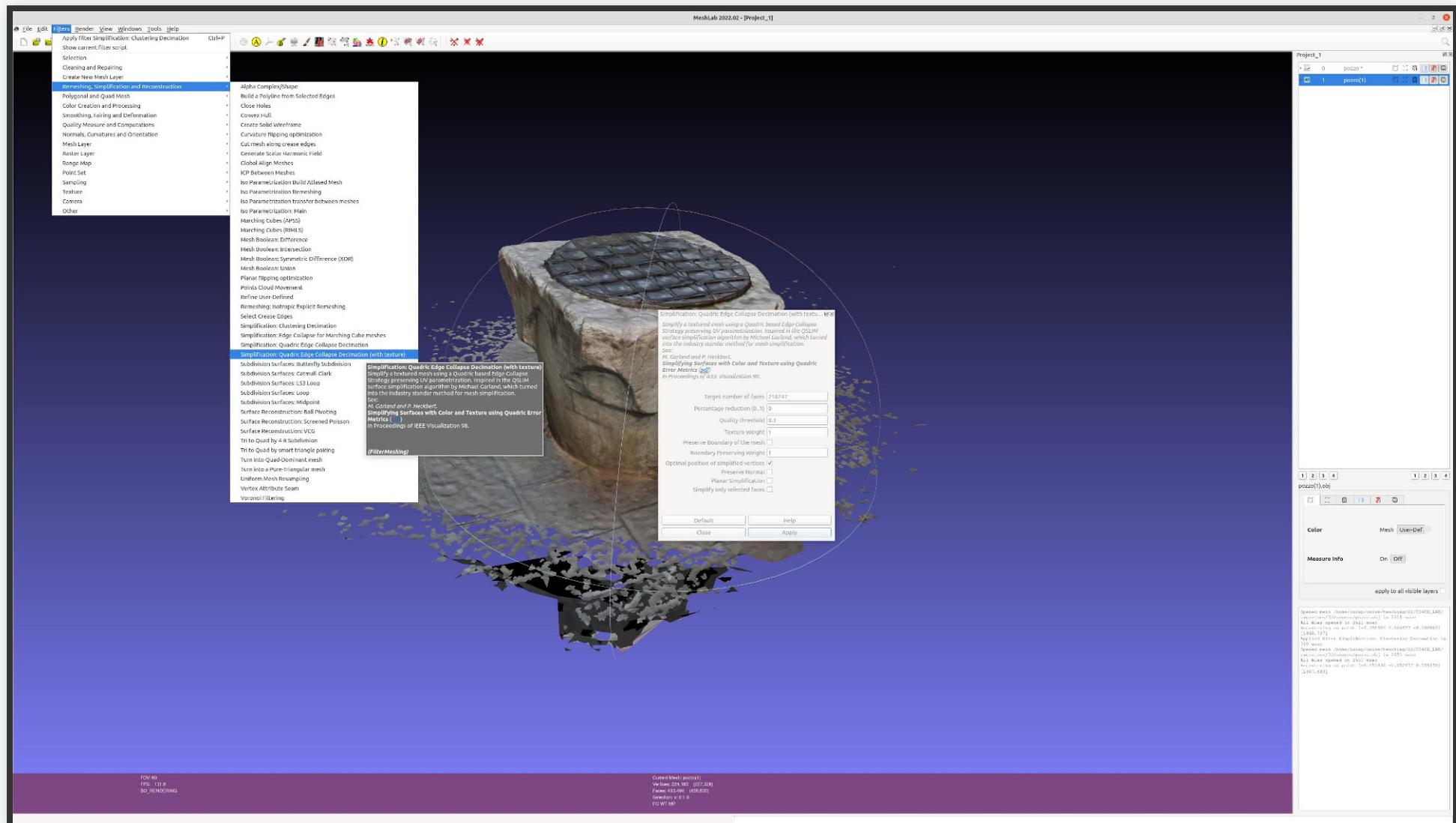
Format	Access	Characteristics
.STL	open	only triangle meshes, no colors
.PLY	open	only points, color but no texture
.OBJ	open	mesh + materials + texture
.FBX	closed	from AutoCad/Maya/Fusion 360
.BLEND	open	specific for Blender full scenes
.GLTF	open	3d scene + animations
.USDZ	closed	from Apple and Pixar for AR and VR
more	..	.CAD, .3DS, .GLB, .X3D and more

Meshlab

Visualizing Points and Triangles



Simplification



3D Scene

Composition of 3D assets

3D Assets

Scanning multiple objects

Most of the assets can be found online

3D models

Sketchfab

venice

CANCEL

STORE MODELS See more ›

Venice Winged Lion Bronze... \$32.00

Bridge Ponte De Ca' Marcel... \$

Allegory of Divine Providen... \$9.95

Venice well DD228W at Ca... \$9.99

Venice M... 23.5k 30 1.1k

CityScene V... 5.3k 5 102

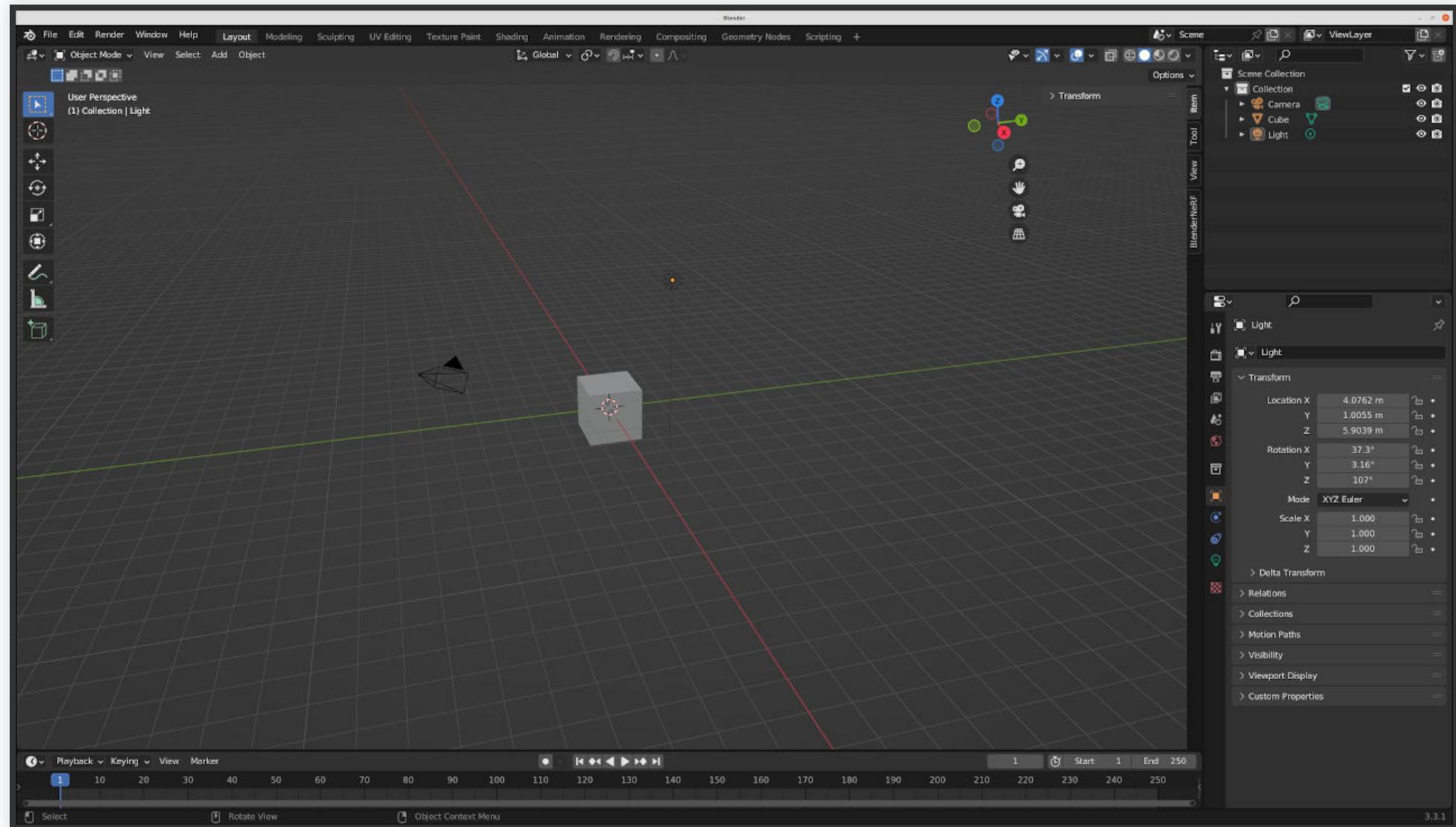
Test City S... 8.1k 16 114

Venice, It... 13.8k 10 280

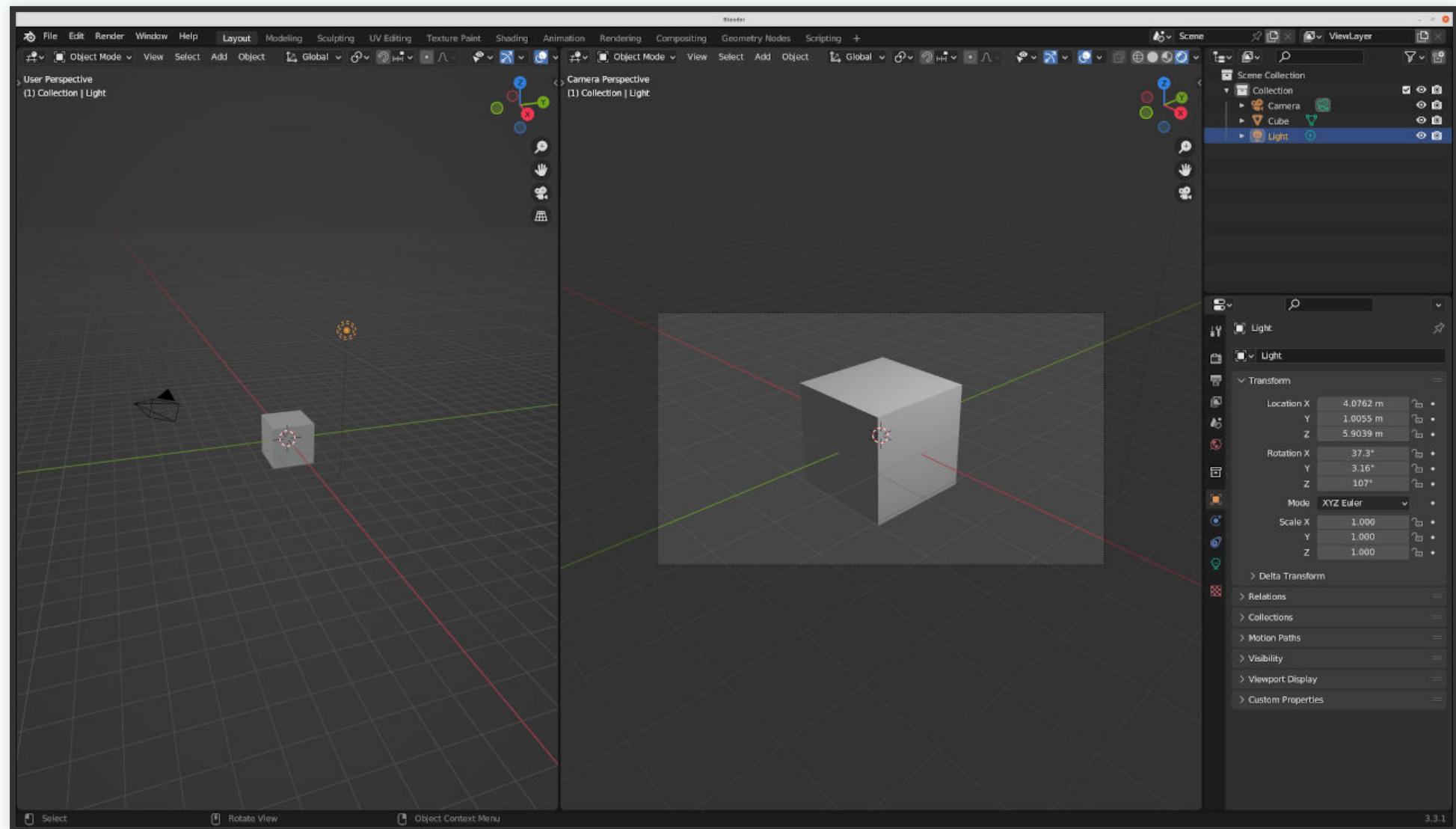
Blender

3D software for modelling, rendering and
animating a scene

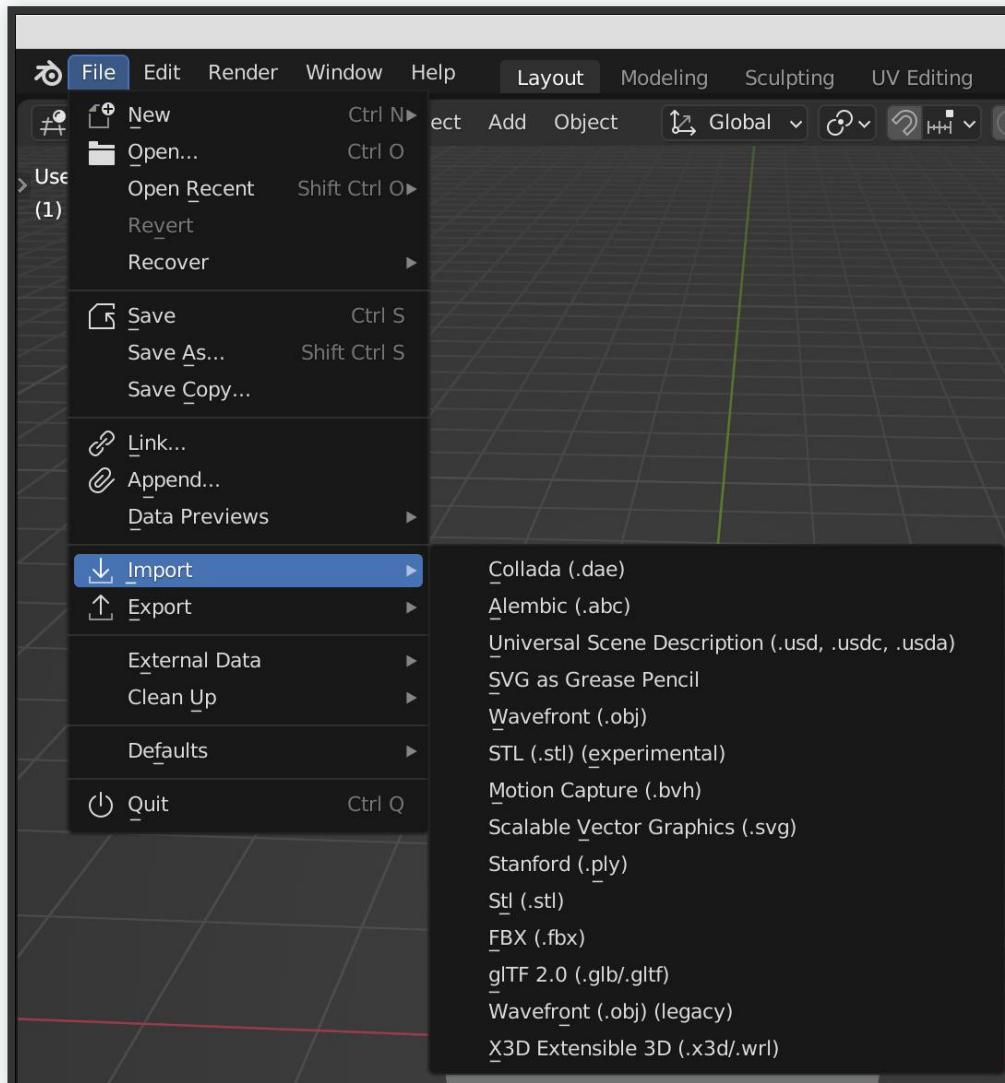
Interface



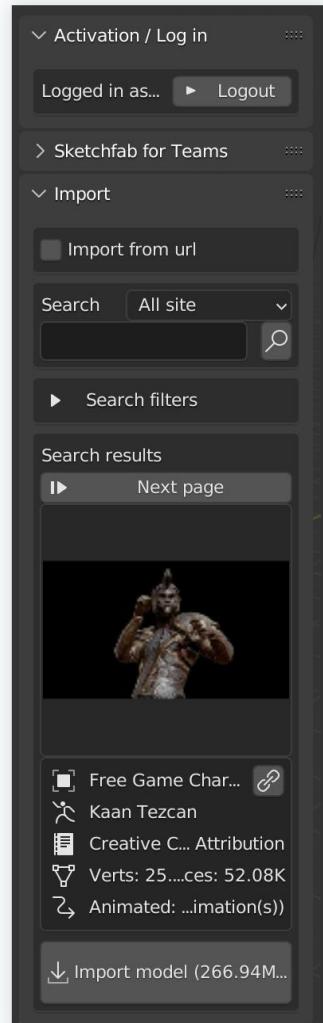
Camera and Lights



Importing



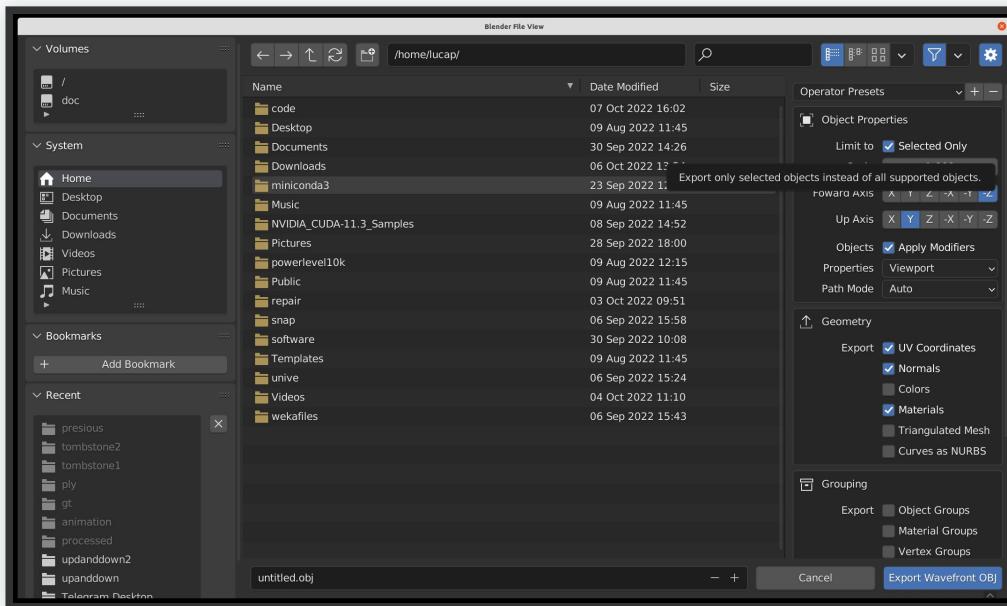
Sketchfab Add-on



Blender Cheat-Sheet

Action	Key Shortcut
Move an object	G (+X/Y/Z for axis)
Scale an object	S (+X/Y/Z for axis)
Shift to Camera	Ctrl + 0 (numpad zero)
Align view perspective to an axis	1, 3, 5, 7 (numpad)
Rotate view perspective of 90 degrees	2, 4, 6, 8 (numpad)

Exporting



Visualization of 3D scenes

What can we do with a 3D scene, if screens are only
2D?

Possible Applications

- 3D model viewer
- Virtual/Augmented Reality
- 2D renderings with different conditions
- Animation of the 3D scene (moving objects or camera)

Uploading to Sketchfab

Sketchfab is a good wrapper with many features:

1. Online repository of 3D model
2. Automatic conversion between different formats
3. Annotations on the 3D model

Annotations

Currently editing **pozzo_12k**

Help Center EXIT SAVE SETTINGS

Annotation 1

Description with a [link](https://sketchfab.com/)
(<https://sketchfab.com/>)

OK

Annotation 1

The image shows a 3D rendering of a stone well (pozzo) with a textured, weathered appearance. The well is surrounded by a tiled floor. A floating annotation window is centered over the well, titled 'Annotation 1'. Inside the window, the text 'Description with a [link] (https://sketchfab.com/)' is displayed. At the bottom of the window are three buttons: 'OK' (blue), an edit icon (pencil), and a delete icon (trash). The software interface includes a top bar with file and settings icons, a toolbar on the left, and a navigation bar at the bottom.

A possible project



An annotated reconstruction

3D Model Viewer

[Android App](#) [iOS App](#)



Virtual or Augmented Reality

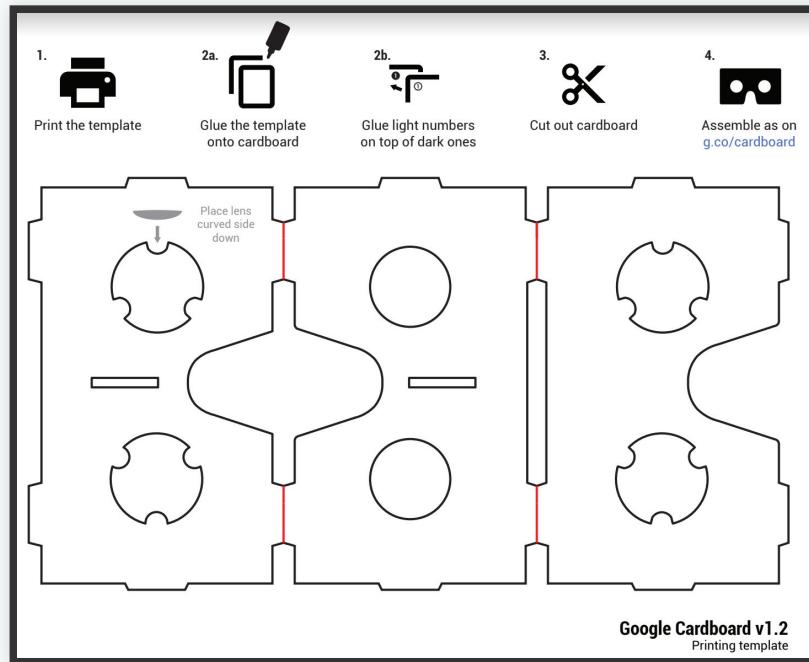
What is the difference?

Google Cardboard

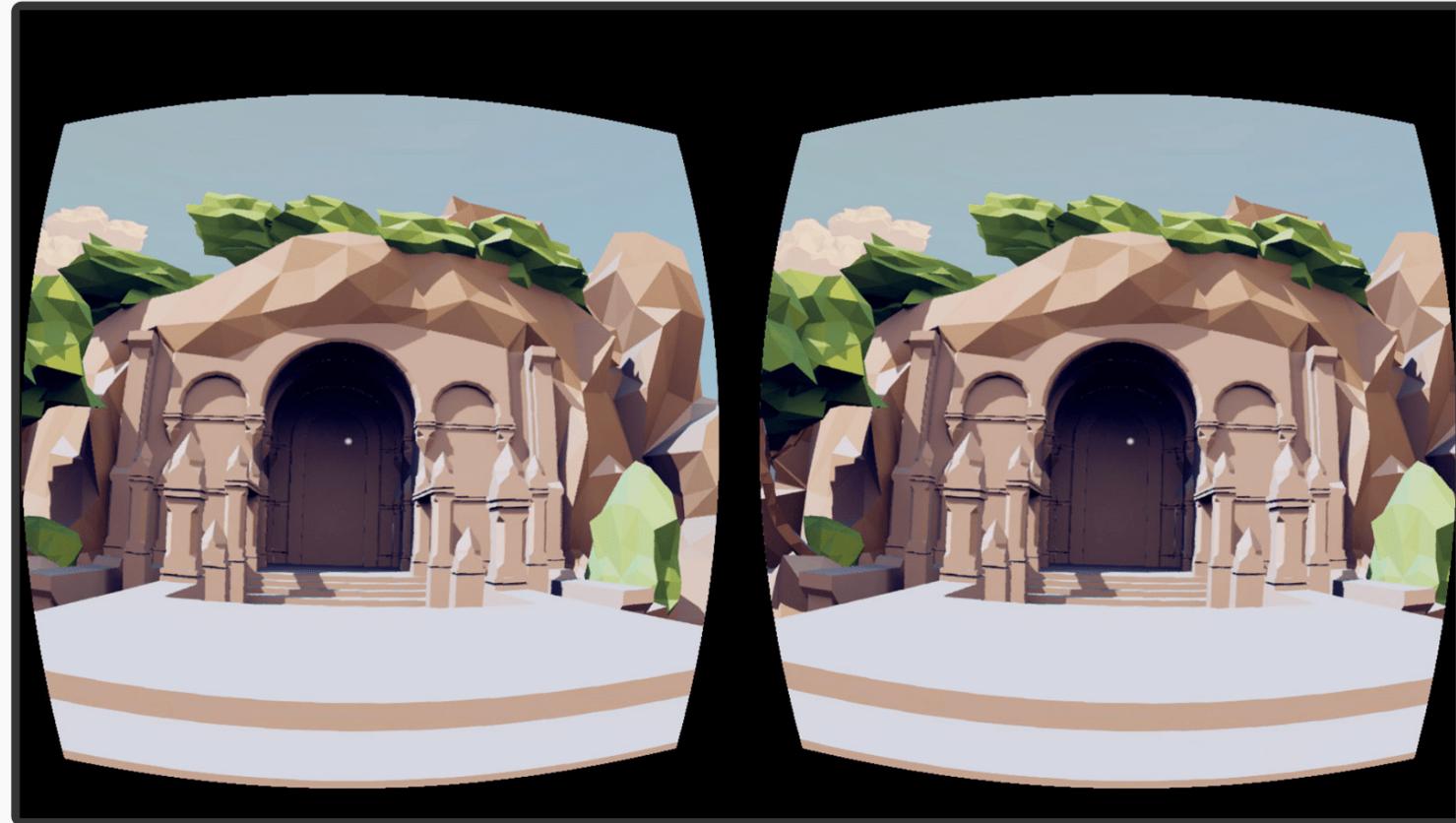


Get a cardboard

Google Cardboard DIY



Sketchfab Mobile App



Android - iOS

2D Rendering from a 3D Model

Blender Render



View Result



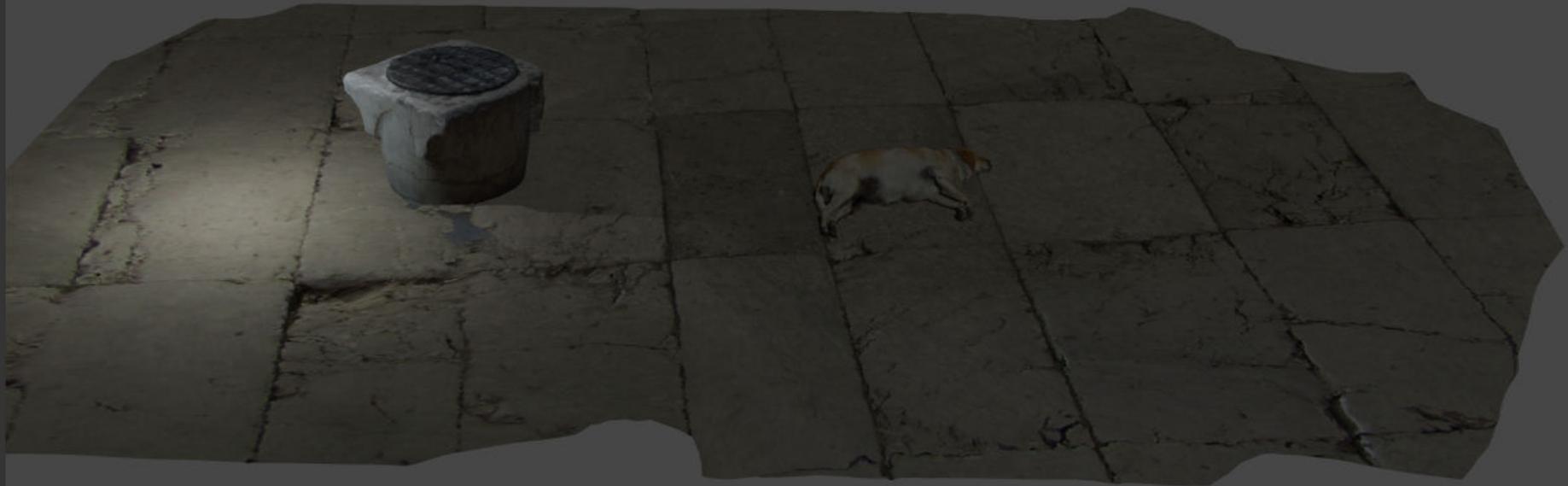
Slot 1



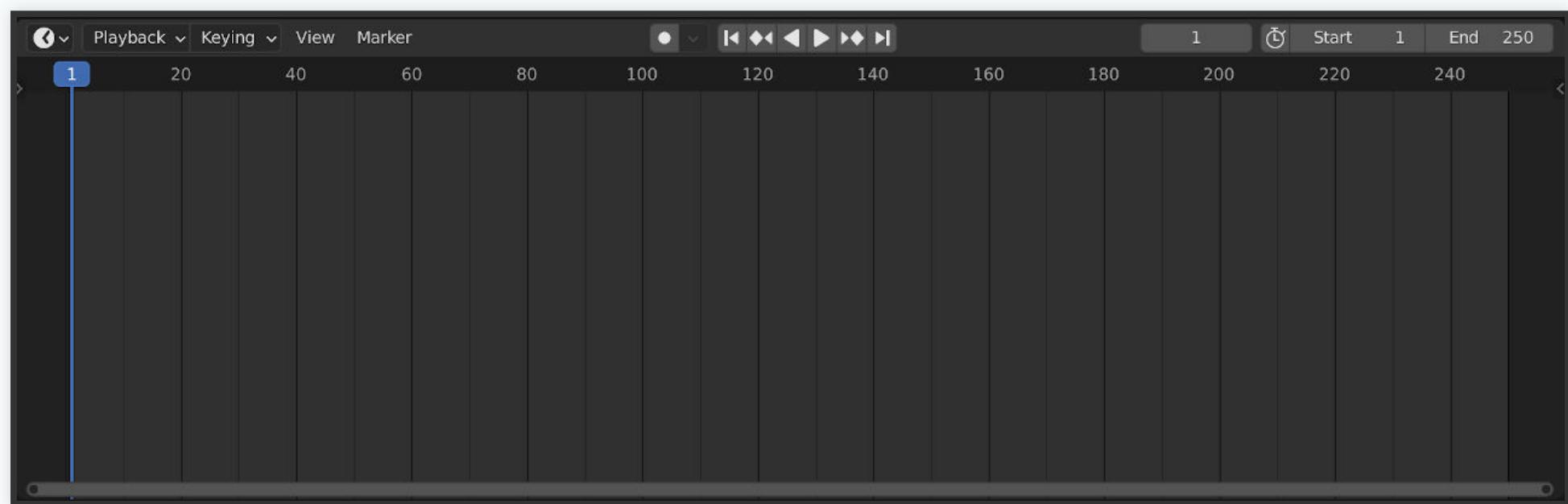
ViewLayer



Frame:1 | Time:00:09.76 | Mem:512.17M (Peak 544.59M)



Rendering Animations



For the next time

- install [Blender](#) for 3D modelling
- create an account on [Sketchfab](#)
- choose one object and one scene, either yours or from sketchfab