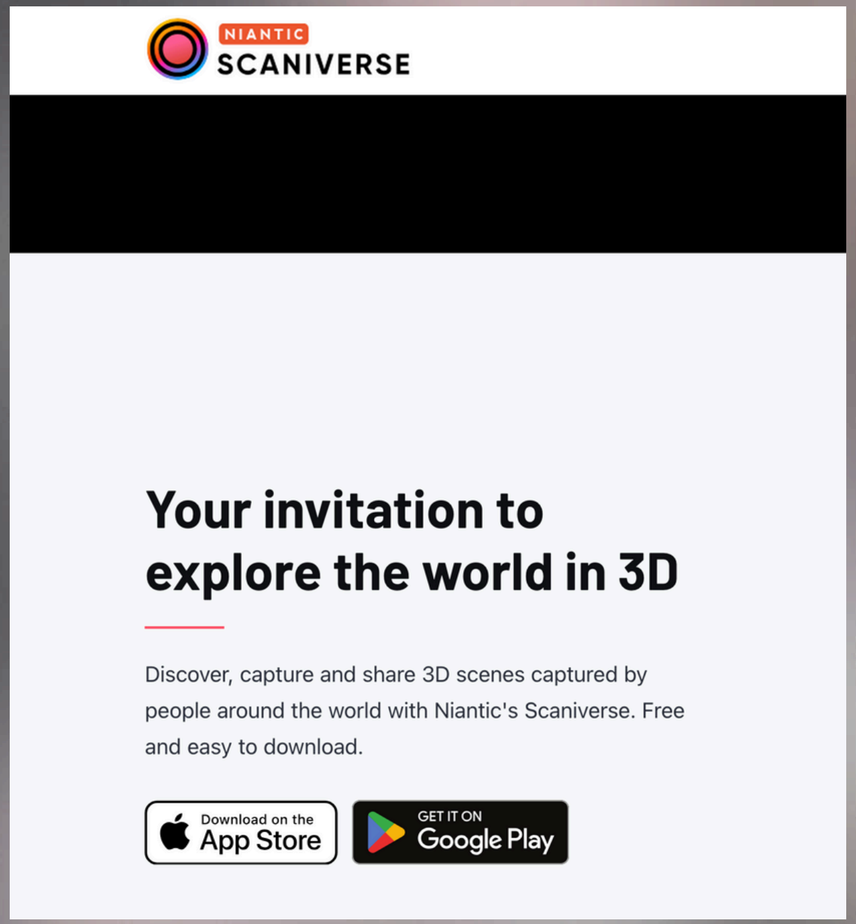


3D MODELING WITH AI

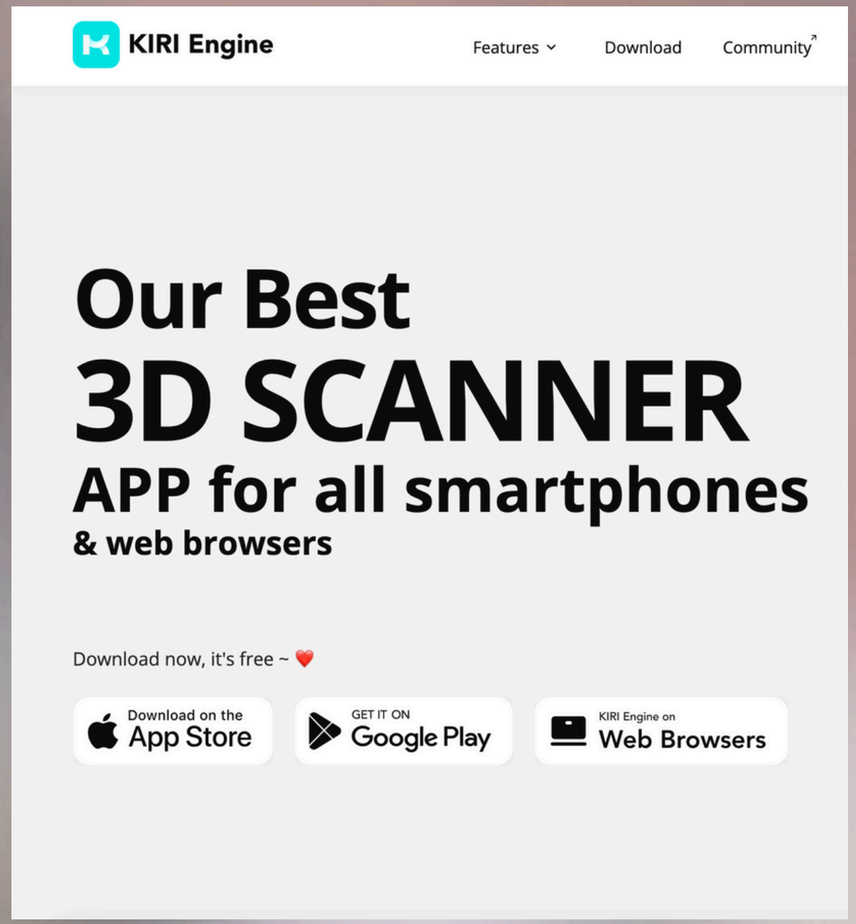
BUILDING IMMERSIVE ENVIRONMENTS

KLIMENTINA LI, 2025

DOWNLOAD



Scannverse



KIRI Engine

WHO?

KLIMENTINA LI

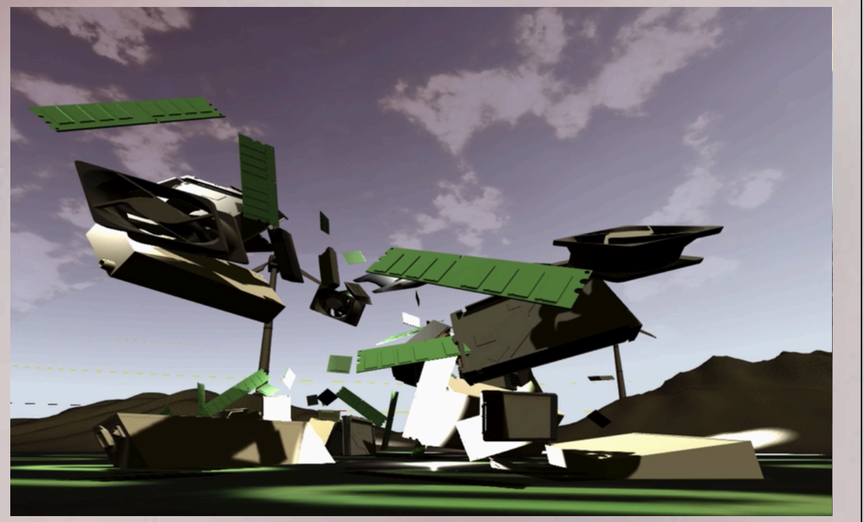
New Media Art & Research.
Audiovisual Compositions

hello@klimentinali.com
www.klimentinali.com

Klimentina Li's primary focus is interaction. As a new media artist, curator, and educator, her work ranges from research-driven game novels to audiovisual compositions and workshops. Her artistic practice explores the contradictory relationships between humans and technologies. Throughout her narratives, she observes alternative approaches to immersive experiences while questioning the already known.

Her background in media art and pedagogy inspires her to find ways to communicate digital concepts in a playful manner. Her work carries the ability to open conversations. She was part of the core team of major European media art festivals. Such as CIVA Festival Vienna 2022-2023, Digitale Welten 2022 Frankfurt, and Ars Electronica Linz 2017-2019.





GLOSSARY

TOPICS

3D Modeling with AI: Building Immersive Environments

Introduction to 3D & AI
- Photogrametry
- Gaussian Splatting
- NeRF scan
- SPLATS
- Lidar

Tools and Worksflows
- 3D Scanning - KIRI Engine
- 3D Mesh Generation

In Practice:
- Gaussian Splatting
- Photogrametry
- NeRF

3D Software Integration
- Blender

Outcomes
- render file - image + video
- 3D Mesh

TOOLS & SOFTWARE

TYPES & TASKS

3D Scanning
- LUMA AI - Nerf Scans
- Scanniverse - Gausian Splatting
- KIRI - All types of scanning + Gaussian Splatting to Mesh

3D Mesh Generation
- Hunyuan3D-2

Texture Generation
- Janus-Pro-7B - open source, free
- Flux Pro AI - open source free
- Stable Diffusion - open source, free

3D Software
- Blender - open source, free
- Unity - free

USABILITY & PURPOSE

01 process

3D scanning on every device

02 process

Fast generation of 3D environments

03 process

UV maps and texturing models

04.1 outcome

3D space showcase

04.2 outcome

Movie/ Music Video

04.3 outcome

Game Enviroments

04.4 outcome

PR & Advertisment

05 purpose

- To create a Virtual Environment
- Interactivity
- Extended Reality - AR + VR
- Fast and Smooth Workflow

TERMINOLOGY

LIDAR

Light detection and ranging.

LiDAR (Light Detection and Ranging) is a remote sensing technology that uses laser pulses to measure distances to objects or surfaces, creating highly accurate 3D maps or point clouds of environments by calculating the time it takes for the light to reflect back to the sensor.

POINT CLOUD

Collection of data points in 3D space

A point cloud is a collection of data points in 3D space, where each point represents a specific location (X, Y, Z coordinates) and may include additional attributes like color, intensity, or normal vectors. Point clouds are typically generated by 3D scanning devices (e.g., LiDAR, photogrammetry, or depth cameras) and are used to represent the surface or structure of objects or environments.

UV MAP

U & V - axes of 2D space

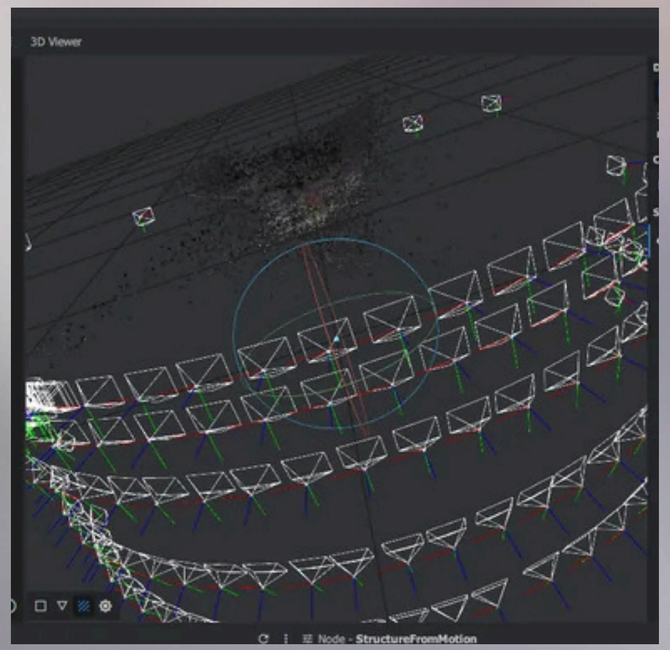
A UV map is a 2D representation of a 3D model's surface that "unwraps" the model into a flat layout, where "U" and "V" are the axes of the 2D texture space, it acts as a guide to precisely apply textures, colors, and details onto the 3D model by mapping the 2D image onto its surface.

VOXEL

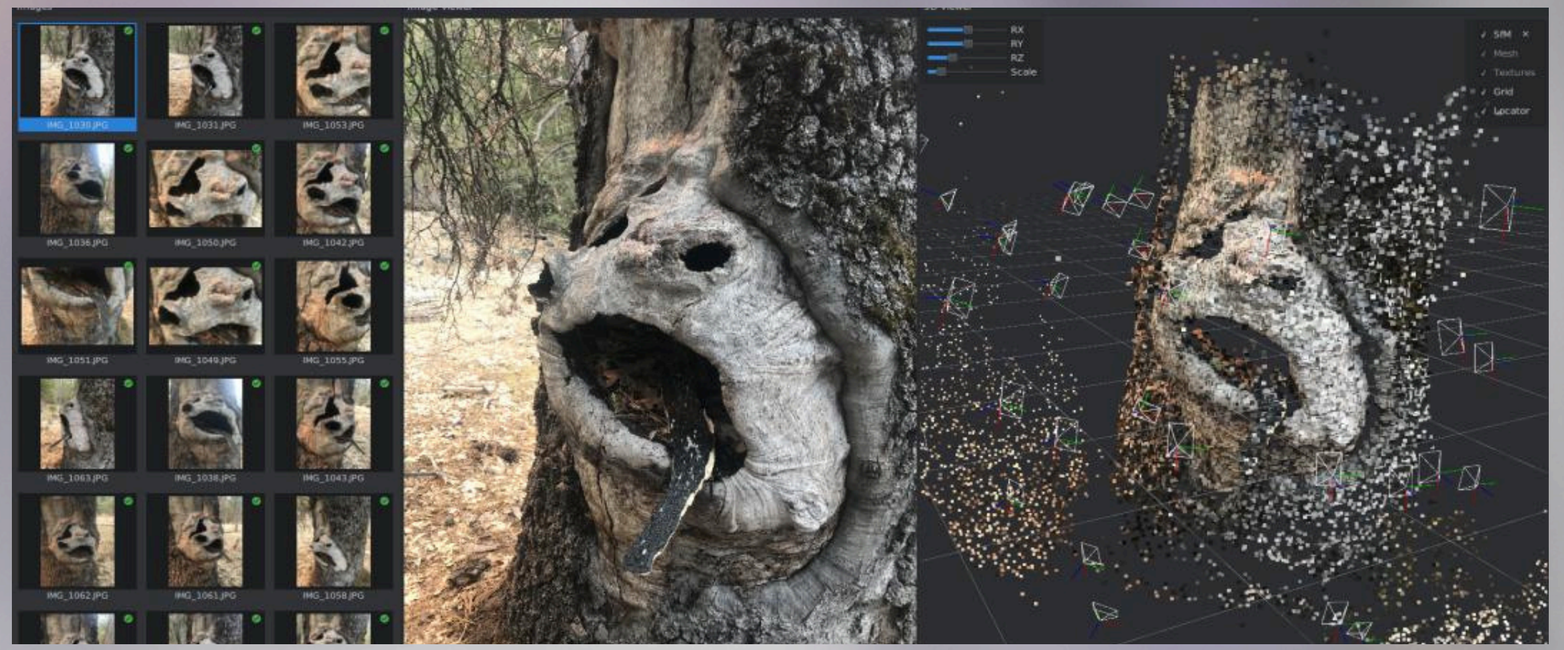
Volumetric Pixel

A voxel (short for "volumetric pixel") is the 3D equivalent of a 2D pixel. While a pixel represents a single point in a 2D image, a voxel represents a single point in a 3D grid or volume. Each voxel contains information about its position in 3D space and often additional attributes like color, density, or material properties.

3D Scanning Techniques



Meshroom - Photogrametry



Found Footage by Alice Vision Meshroom video - Photogrametry

Photogrametry

A technique that uses multiple 2D photos to create a 3D model.

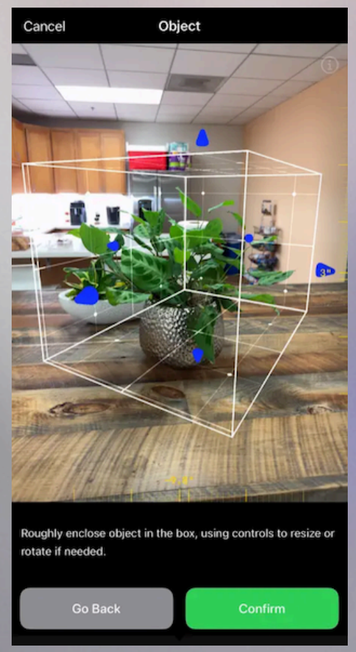
- + Pros: High detail, works with standard cameras.
- – Cons: Requires many photos, struggles with reflective/transparent surfaces.

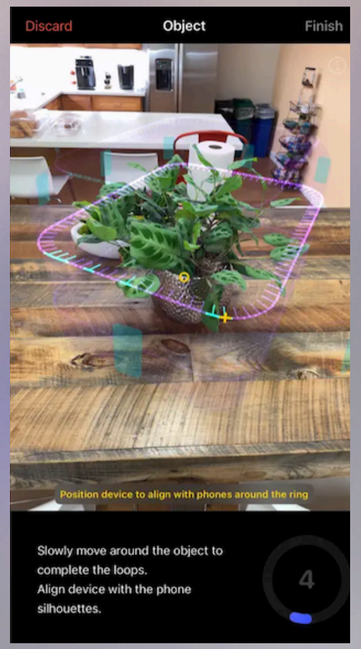
AI Role: AI improves photogrammetry by automating feature detection, reducing errors, and enhancing texture details. Scanning a statue with 50 photos. AI helps align images faster and fills in missing details (e.g., Meshroom or RealityCapture software).

AI Photogrametry Softwares

- Meshroom (by AliceVision) , Regard3D – Free & Open Source
- KIRI Engine, 3DF Zephyr Free, Metashape (by Agisoft) – Licensed

3D Scanning Techniques





Luma AI - Workflow



Personal Footage - NeRF Scan with Luma AI

NeRF (Neural Radiance Fields)

NeRF is a technique that uses AI to turn 2D photos into 3D scenes by learning how light interacts with objects. It's like teaching a computer to "imagine" what a 3D object looks like from different angles using just a few pictures.

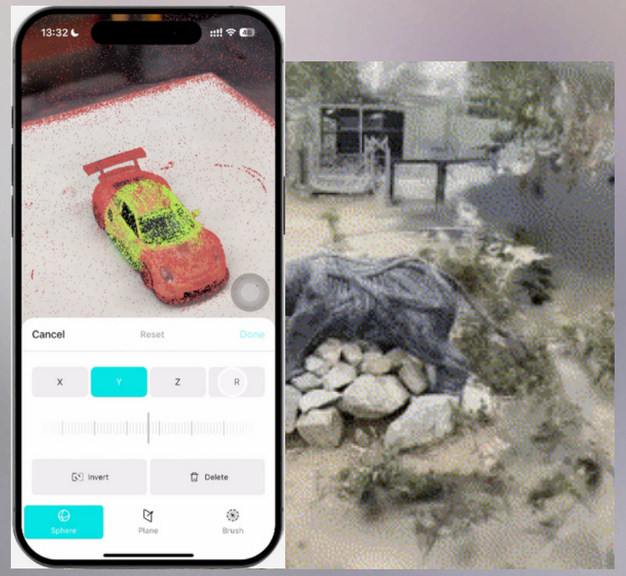
- + Pros: High-quality rendering, handles complex lighting.
- - Cons: Computationally intensive, requires powerful hardware.

AI (neural networks) predicts how light interacts with objects, enabling realistic 3D reconstructions from sparse inputs. Capturing a room with a video. AI generates a photorealistic 3D scene, even interpolating views between frames (e.g., NVIDIA Instant NeRF).

AI NeRF Apps

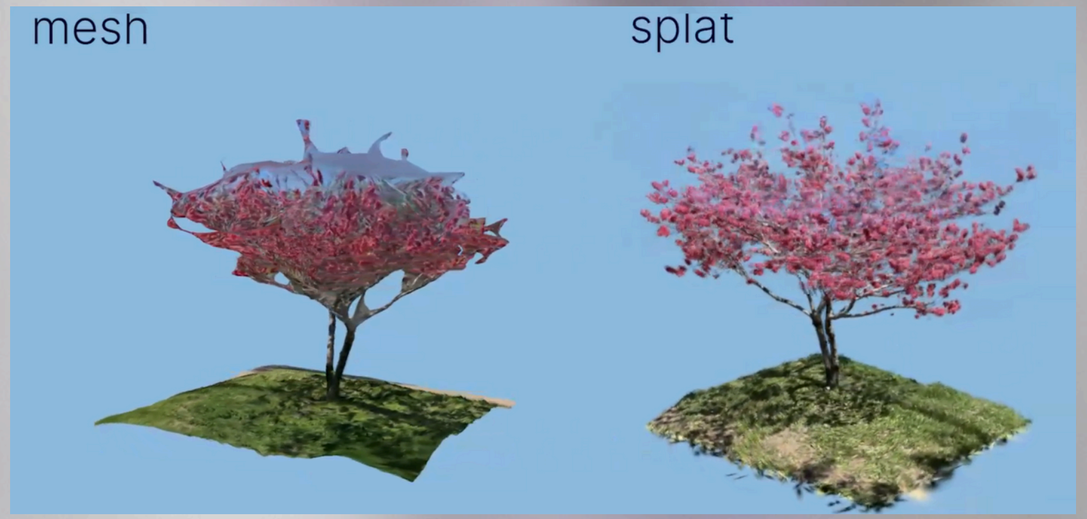
- LumaAI

3D Scanning Techniques



KIRI Engine Workflow





Comparison of Splat and Mesh - Polycam

Gaussian Splatting or 3DGS

Gaussian Splatting is a technique to create 3D scenes by breaking them into tiny, fuzzy blobs (called "Gaussians") that represent shapes and colors. It's like using digital paint splats to build a 3D model, making it fast and efficient for real-time applications like games or AR/VR.

- + Pros: Fast rendering, efficient for real-time use.
- – Cons: Less detail compared to NeRF or photogrammetry, still evolving.

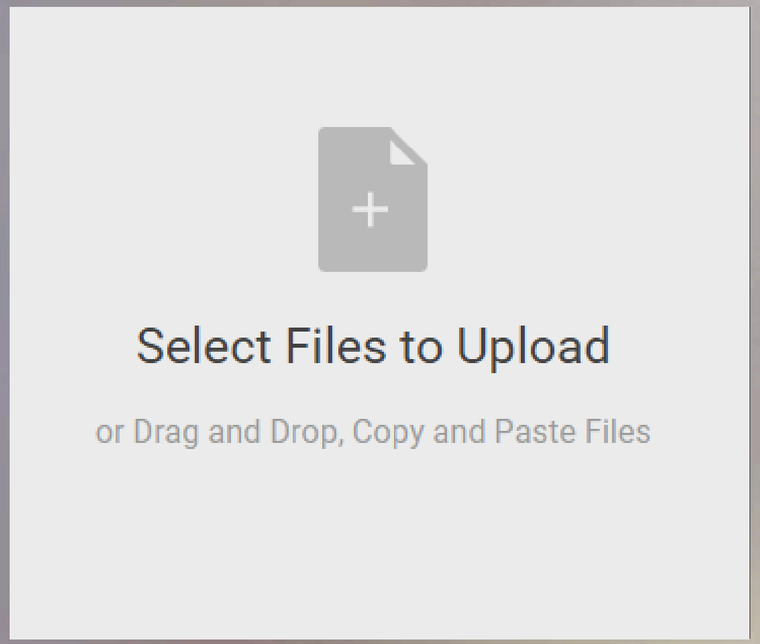
AI optimizes the placement and shape of "splats" (Gaussian functions) to approximate surfaces efficiently. Real-time 3D reconstruction of a moving object. AI enables smooth, real-time rendering for AR/VR applications

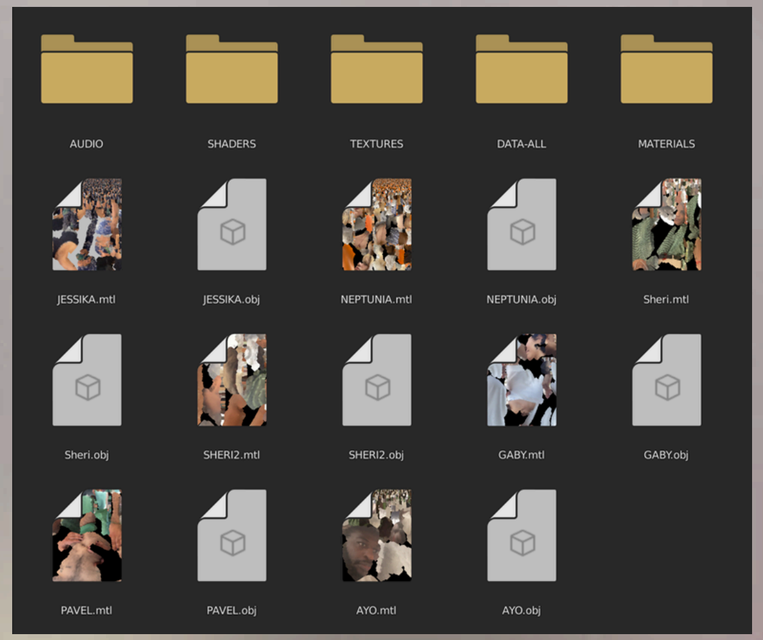
AI Apps that support Gaussian Splatting

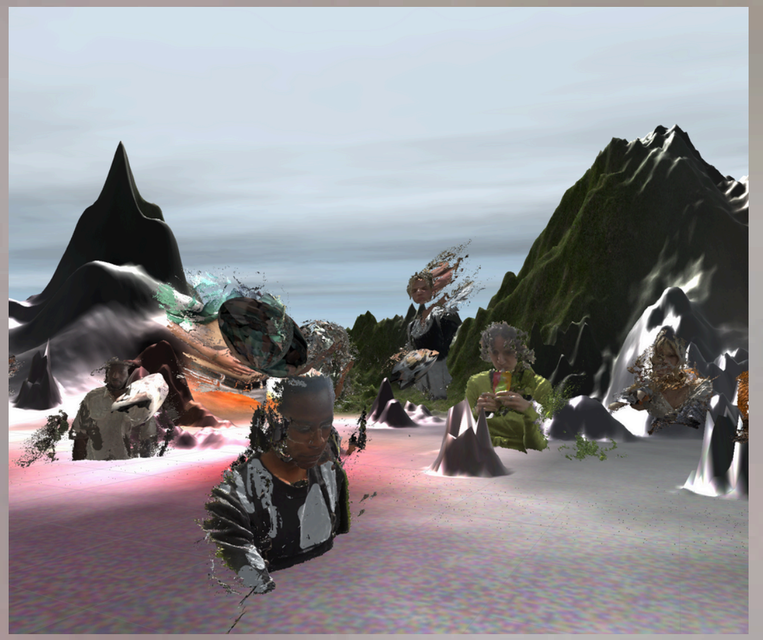
- KIRI Engine
- Scanniverse
- Polycam

HANDS ON

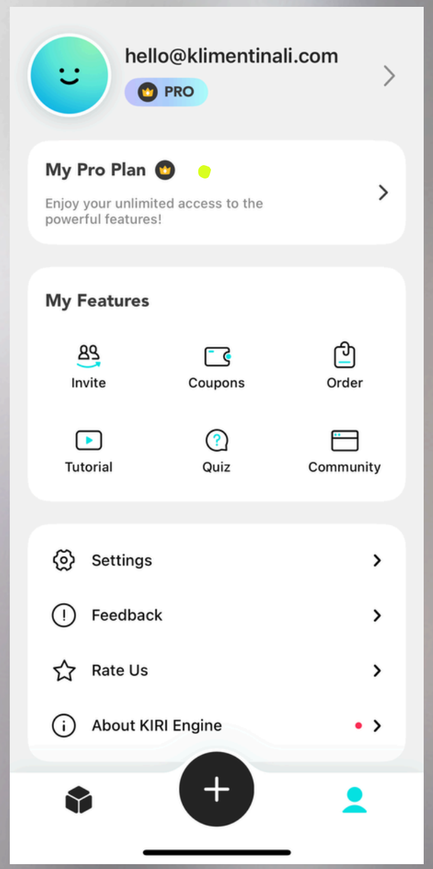
- 3D Scanning
- Install Software + Add On + Import
- Edit + Lighting + Render



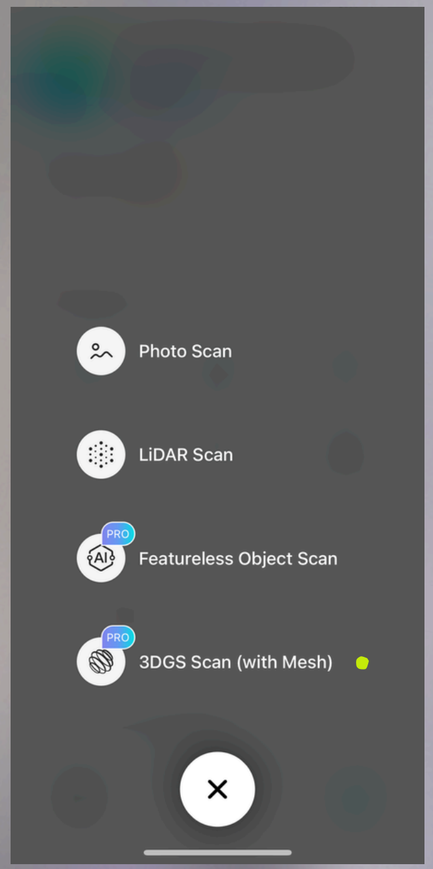




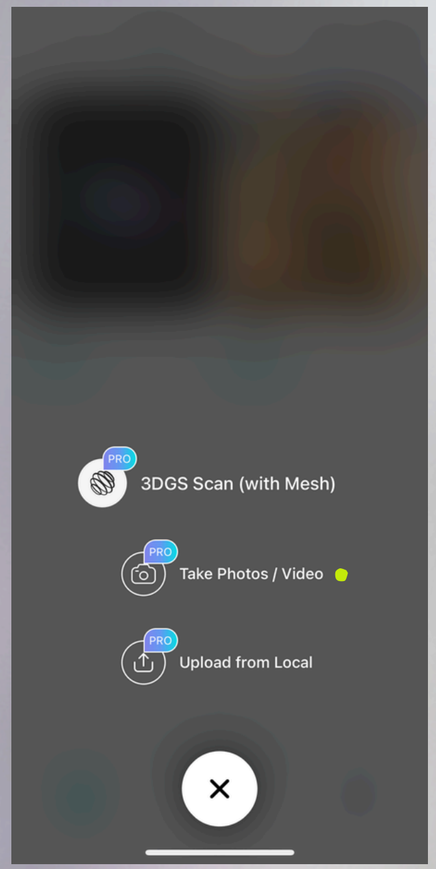
TUTORIAL - 3D Scanning - KIRI



1/ Make a profile



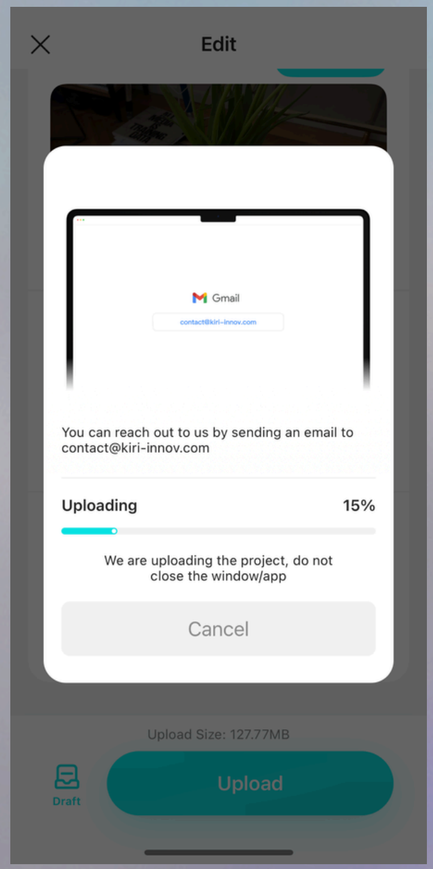
2/ New 3DGS Scan



3/ Choose type of upload

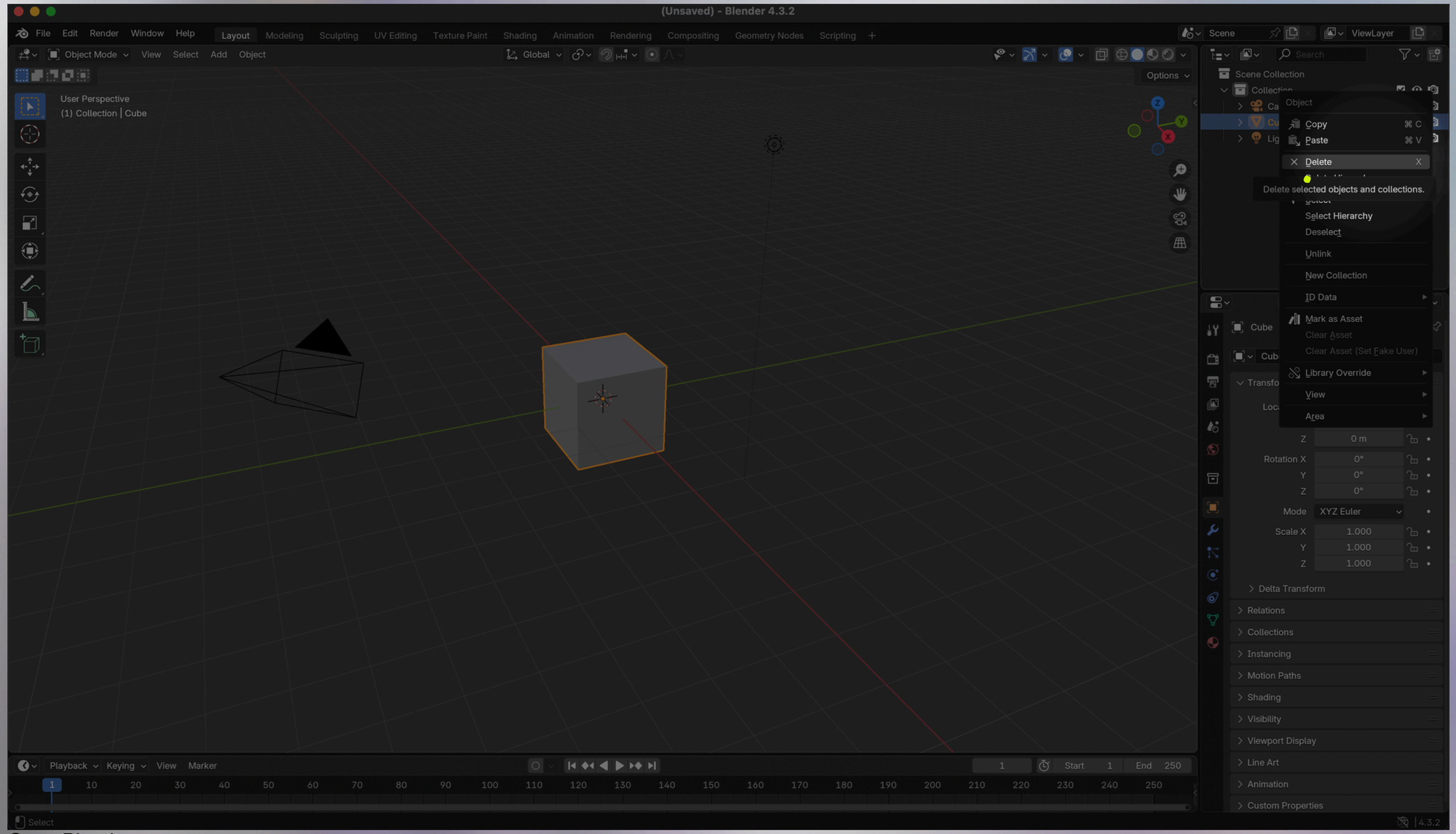


4/ Take Photos/Video



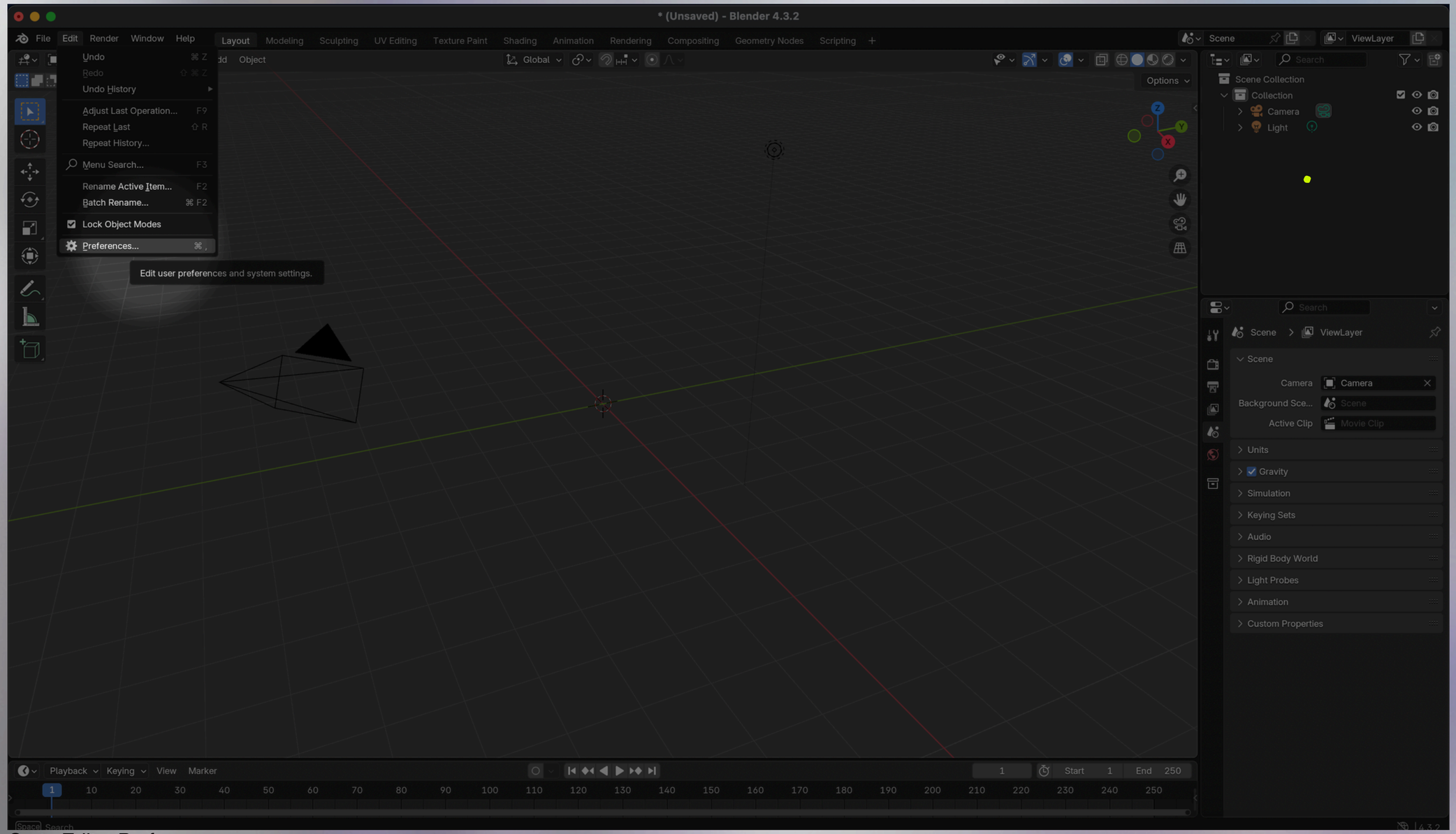
5/ Upload and processing

TUTORIAL - Installation



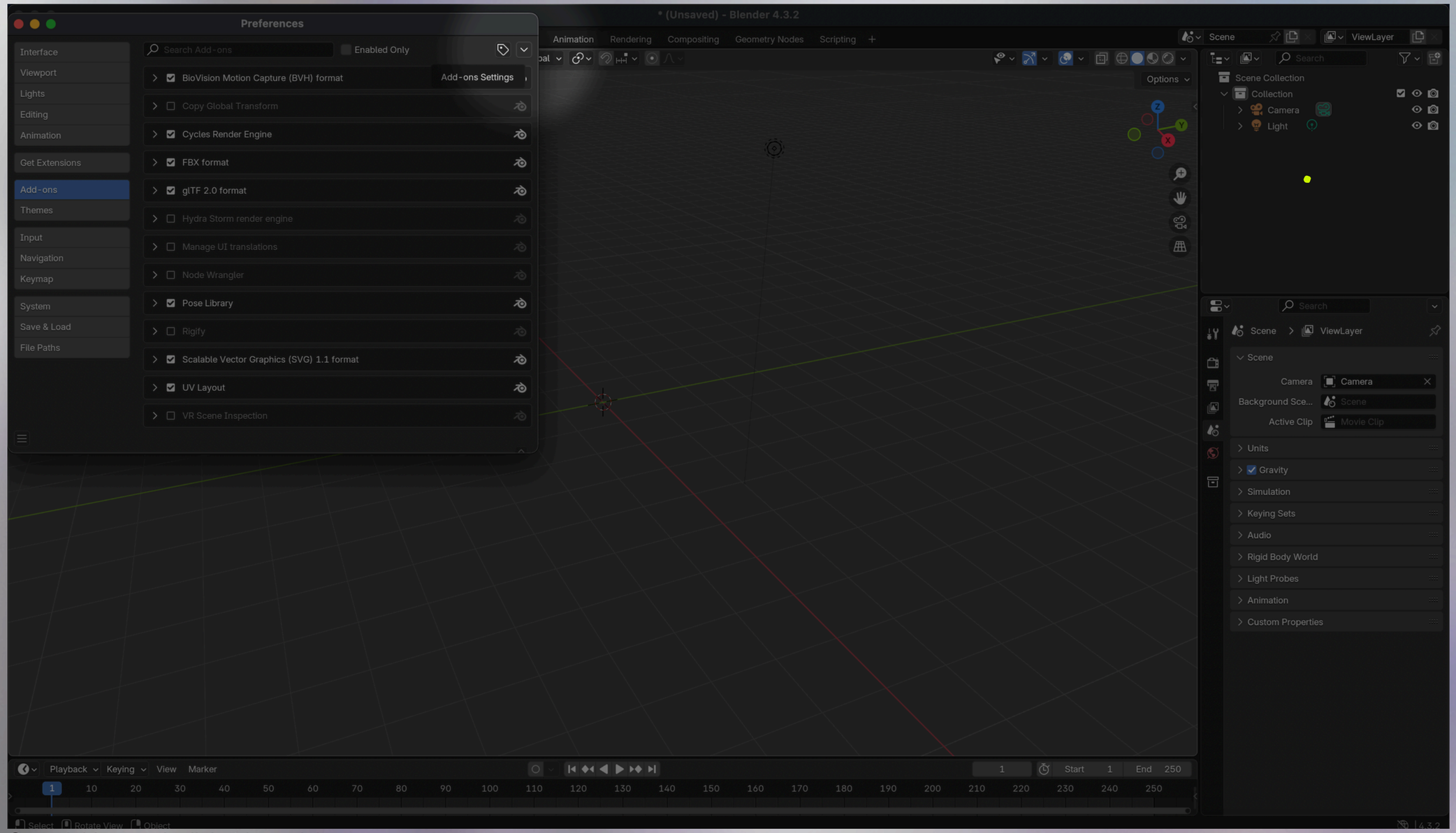
Open Blender

TUTORIAL - Installation



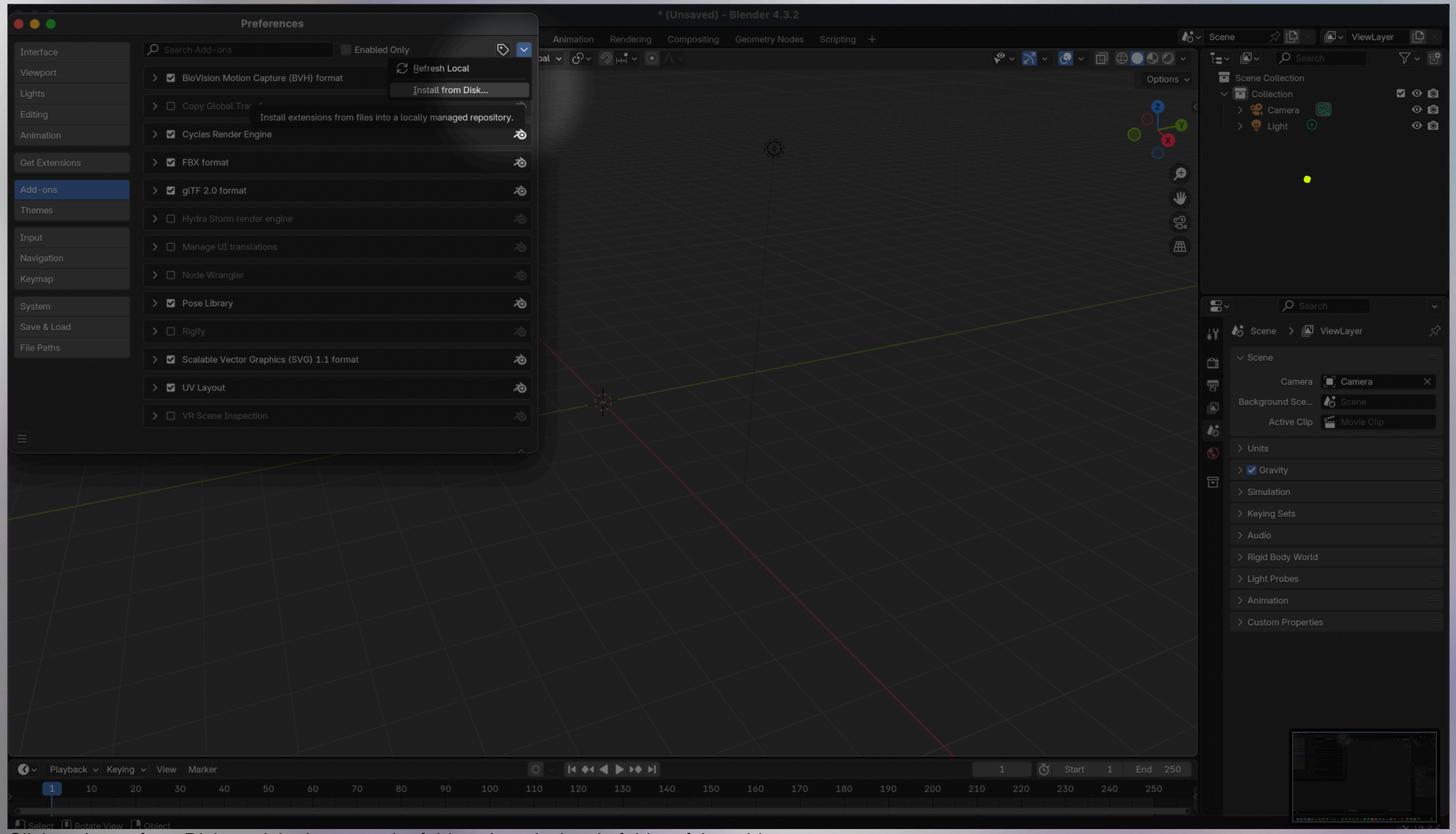
Go to Edit > Preferences

TUTORIAL - Installation



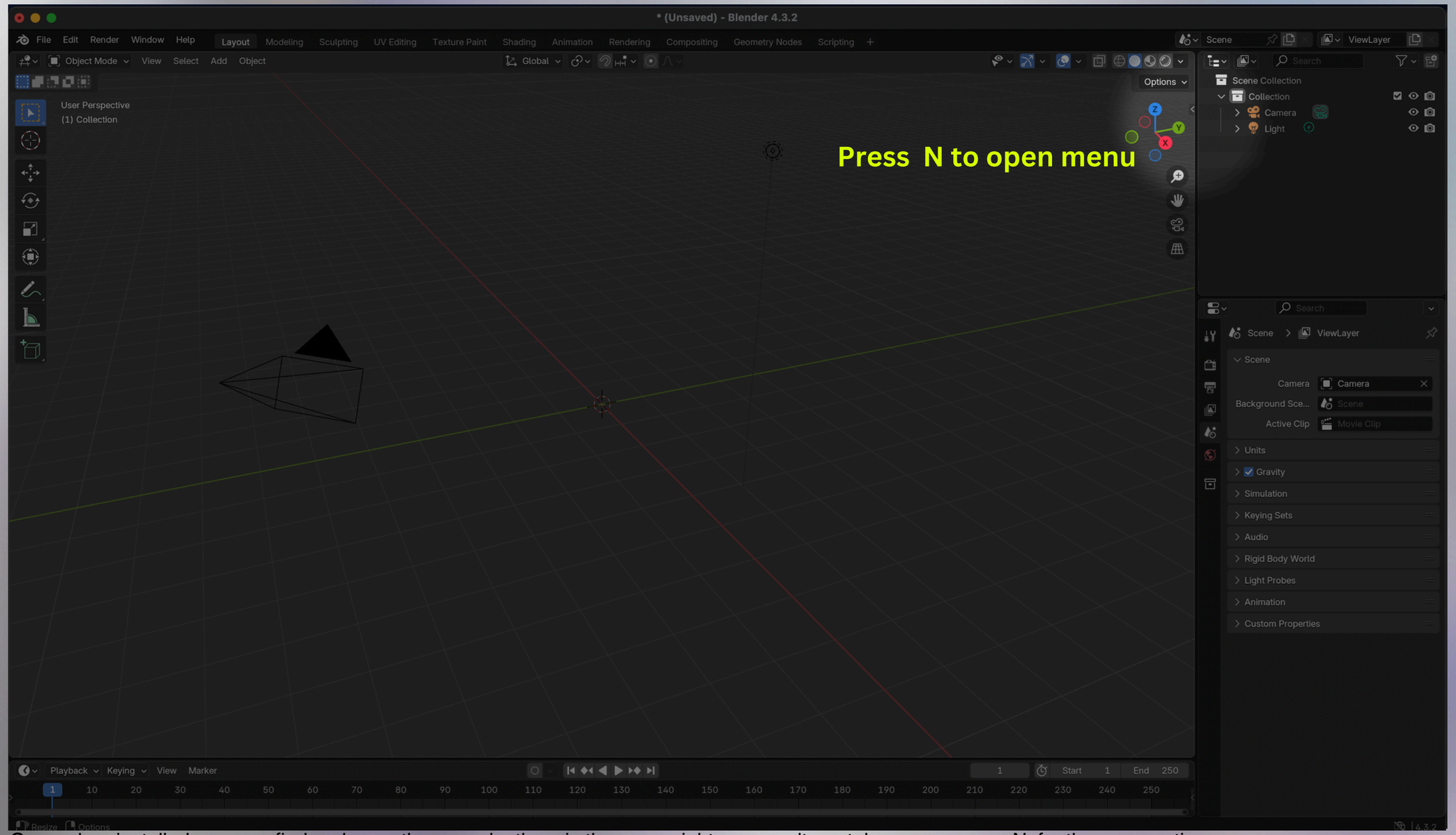
Go to Add ons > the little ^ in up right corner

TUTORIAL - Installation



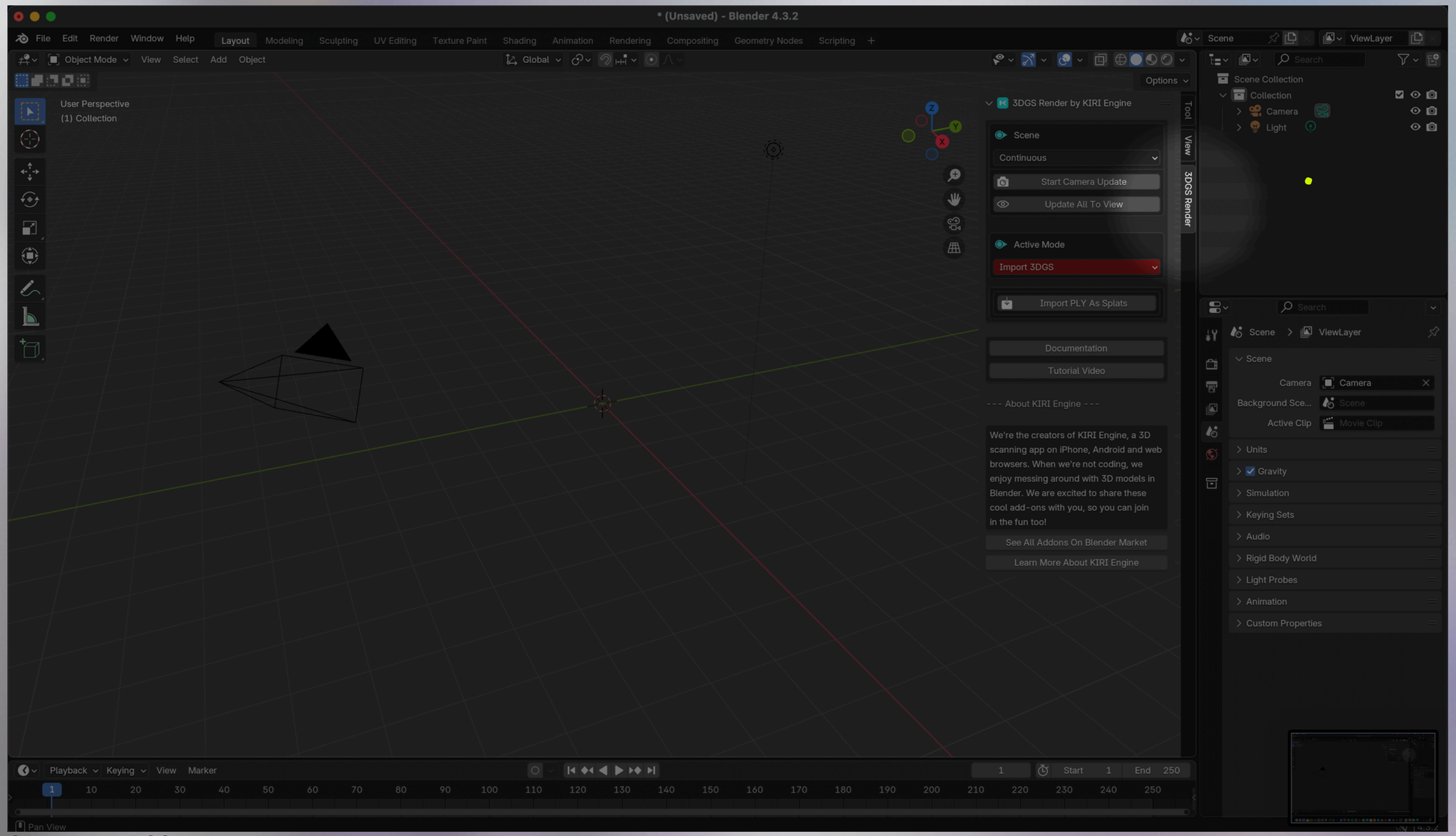
Click on Insert from Disk, and the locate to the folder where is the zip folder of the add on

TUTORIAL - Import



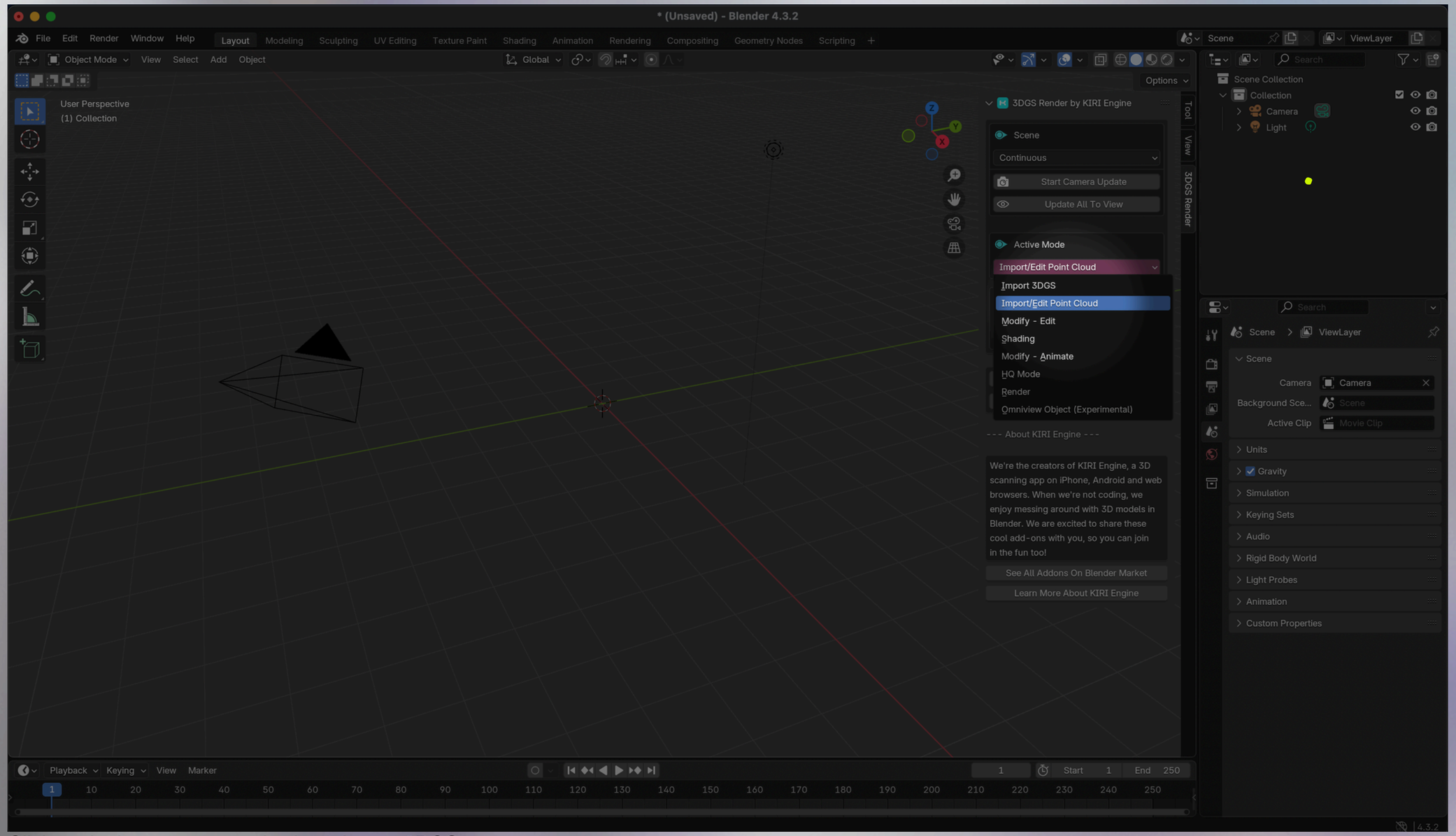
Once when installed, you can find and open the menu by the < in the upper right corner. alternately you can press N, for the same action

TUTORIAL - Import



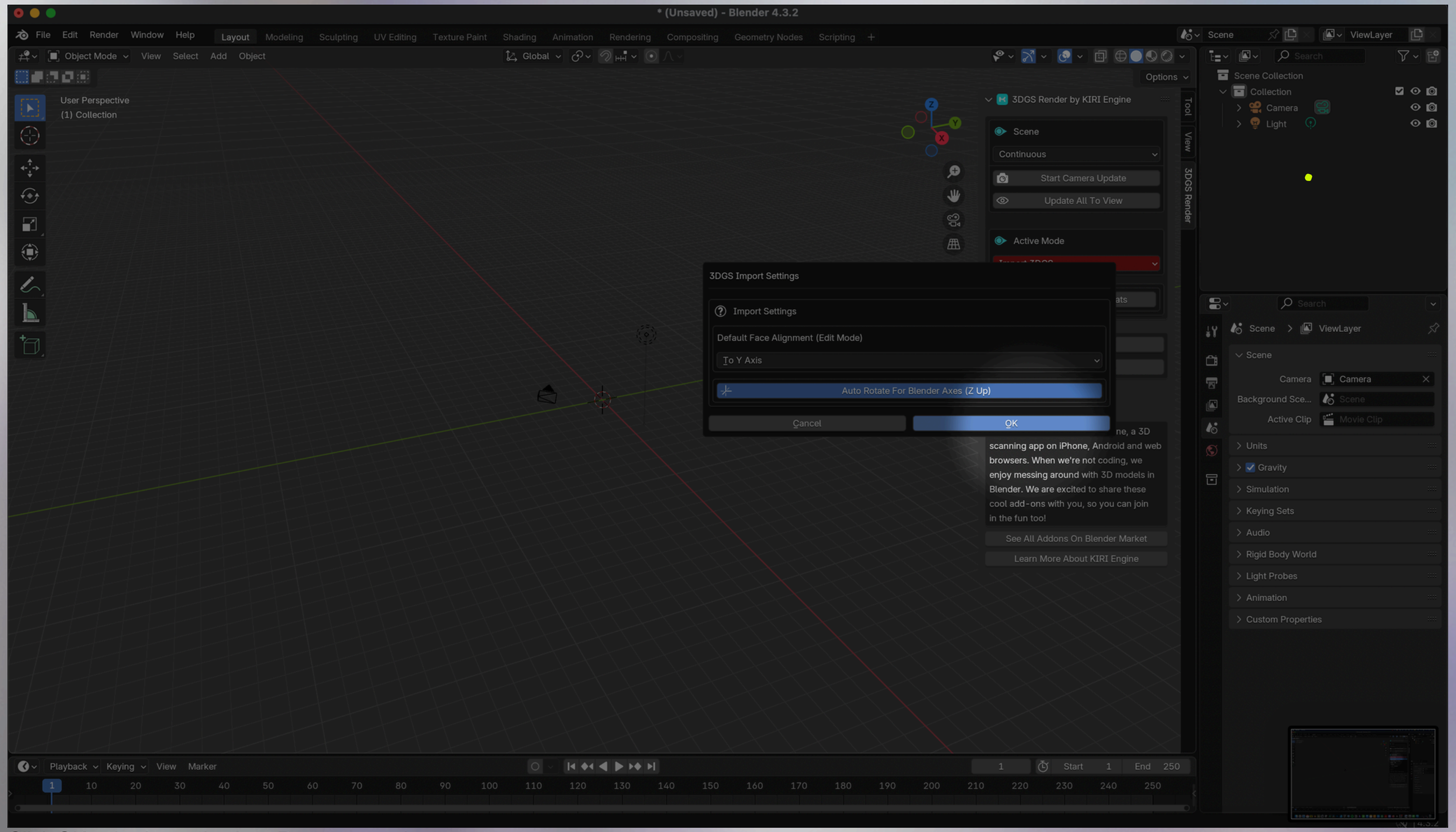
Click on the 3DGS menu to open

TUTORIAL - Import



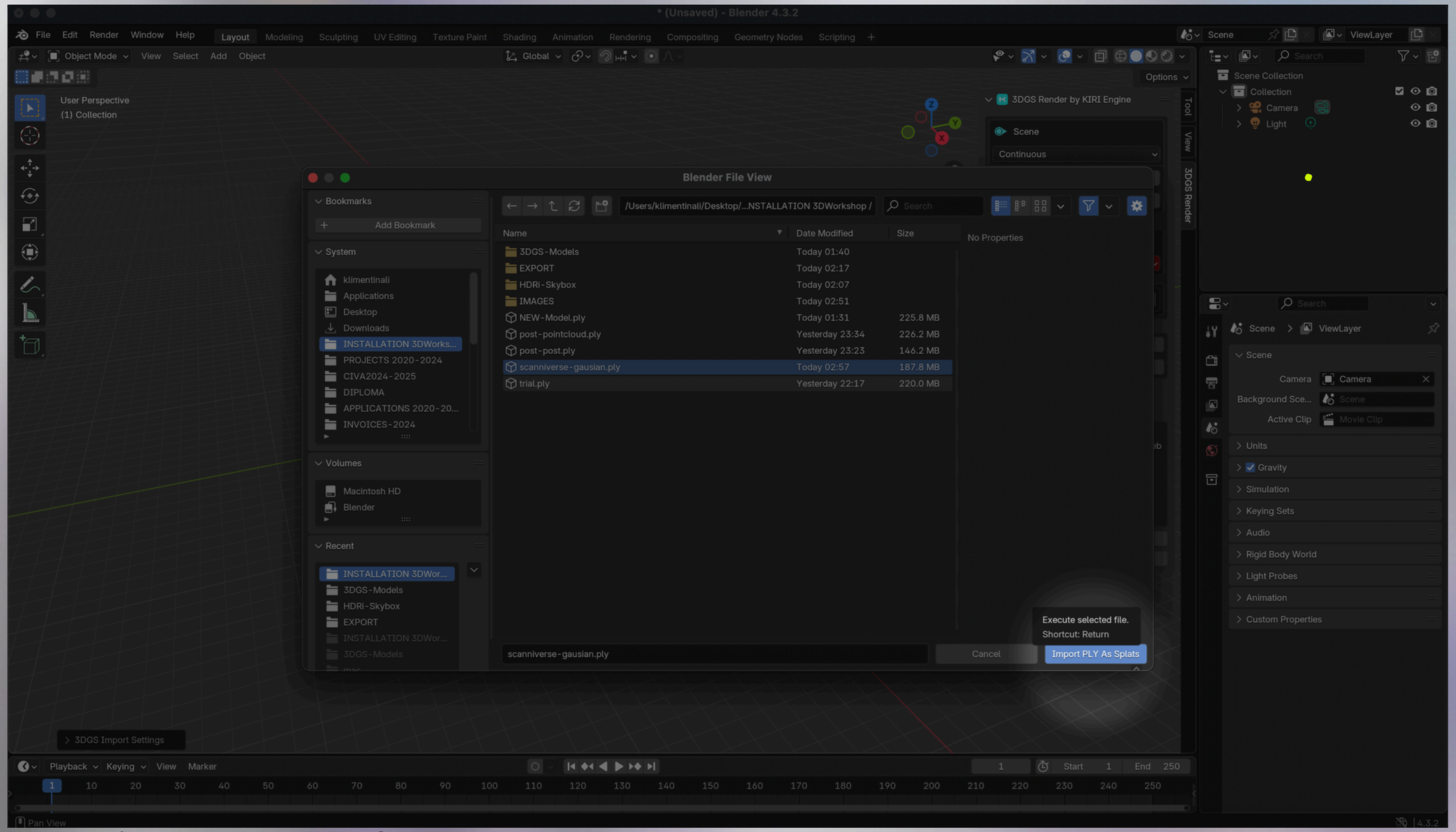
Click on the import menu and select - Import 3DGS

TUTORIAL - Import



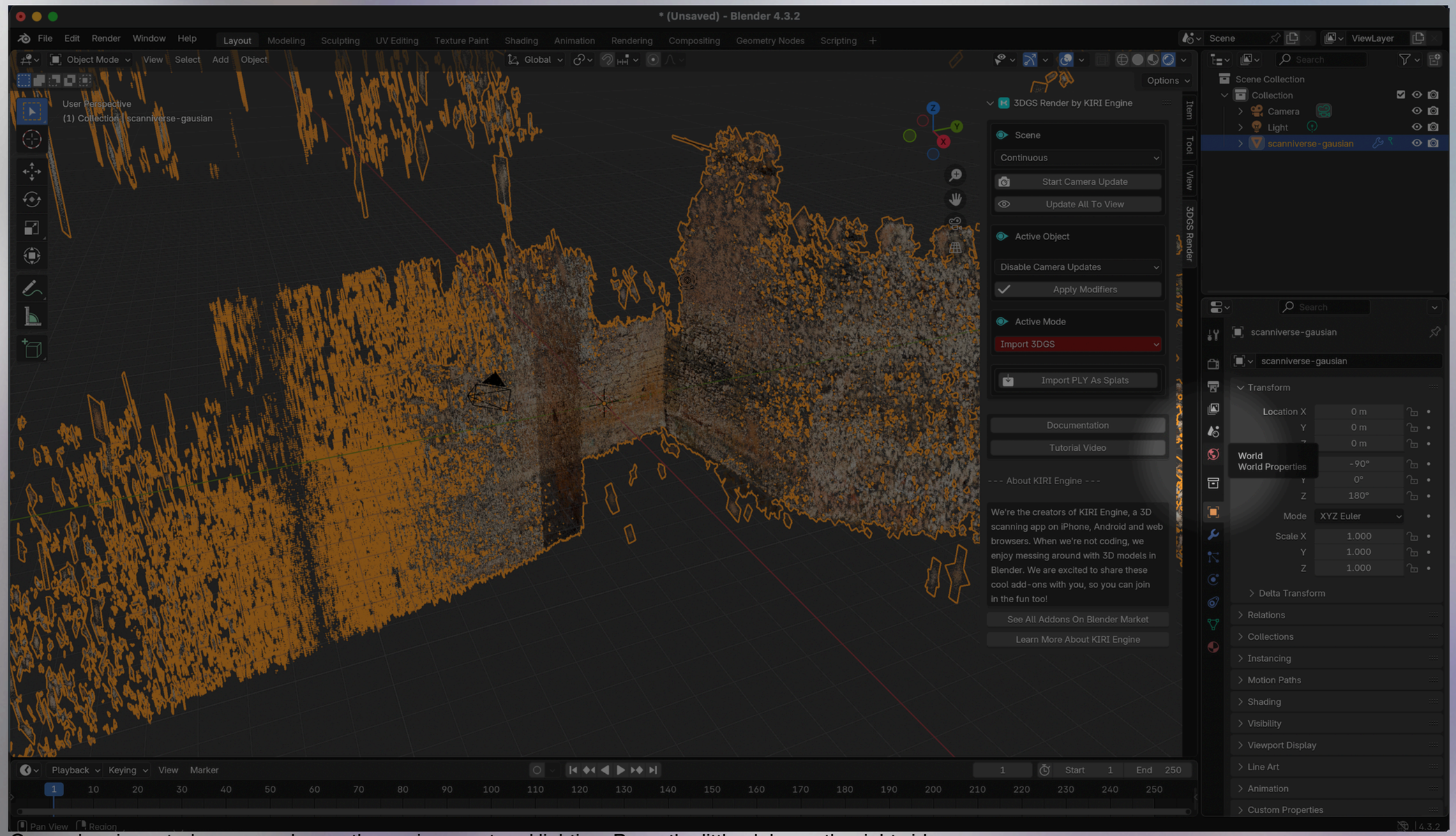
Click OK - plus leave the Auto Route pressed on

TUTORIAL - Import



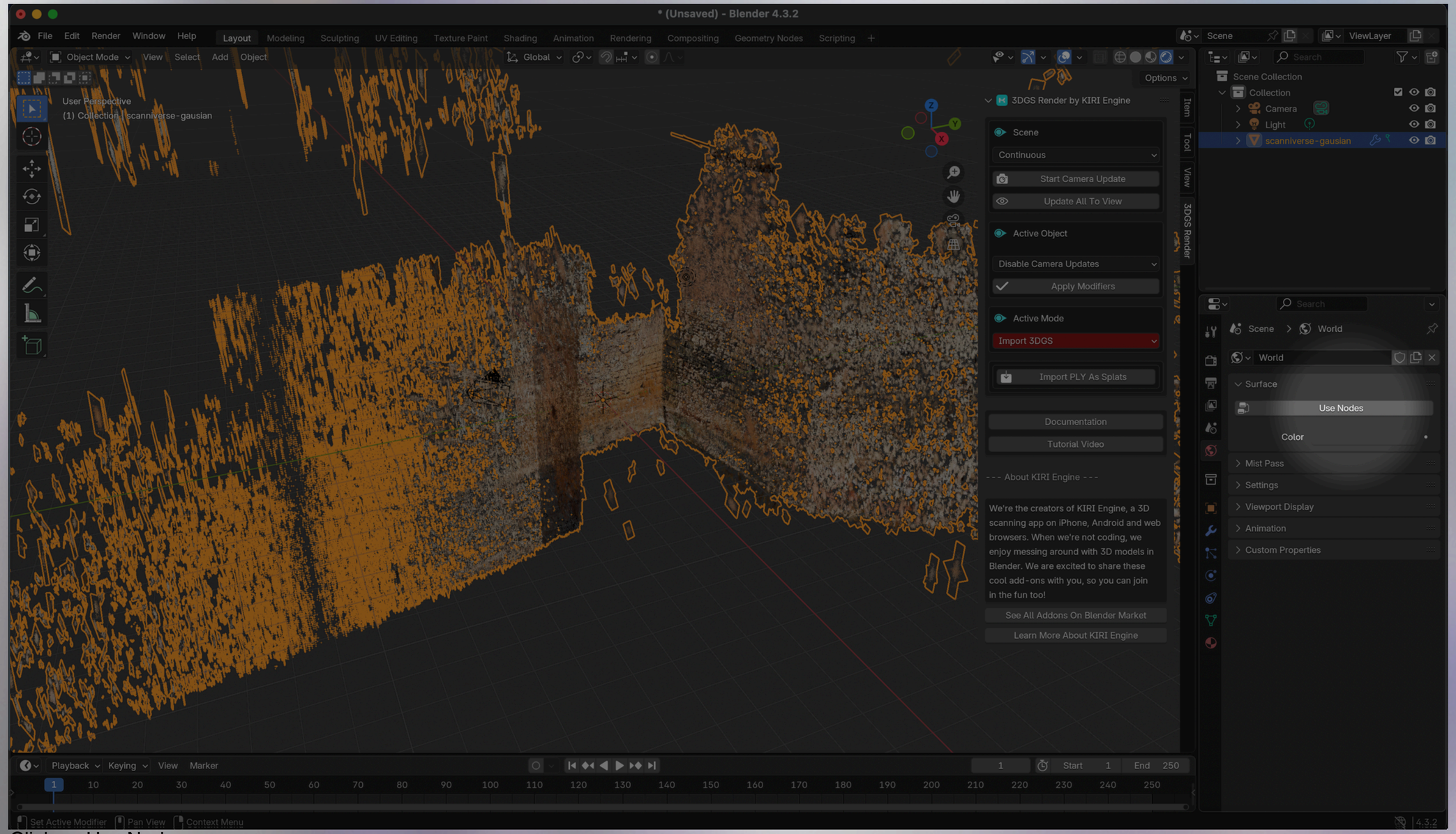
Locate your file and press Import PLY As Splats

TUTORIAL - Light & Environment



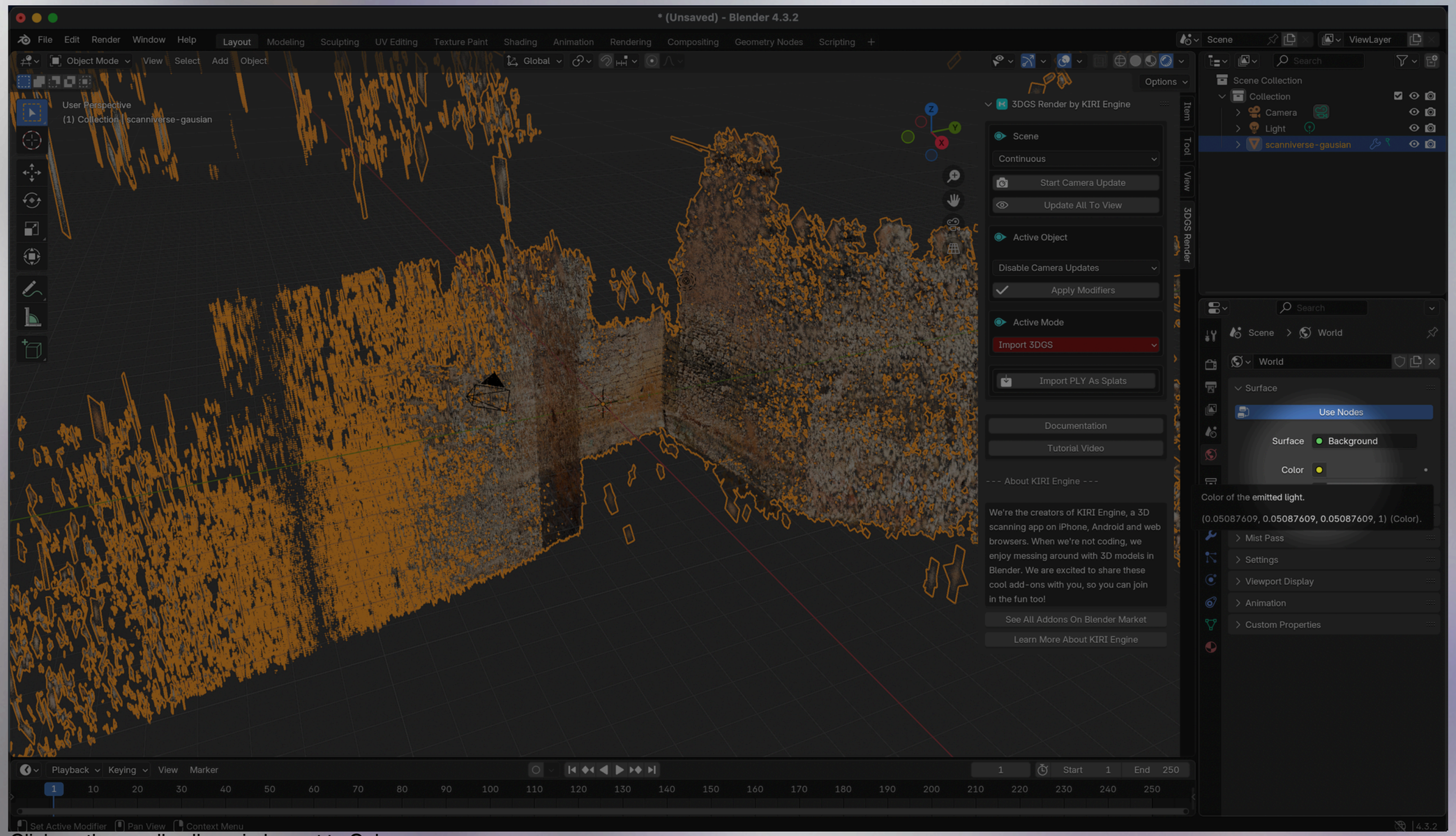
Once when imported. you can change the environment and lighting. Press the little globe on the right side menu

TUTORIAL - Light & Environment



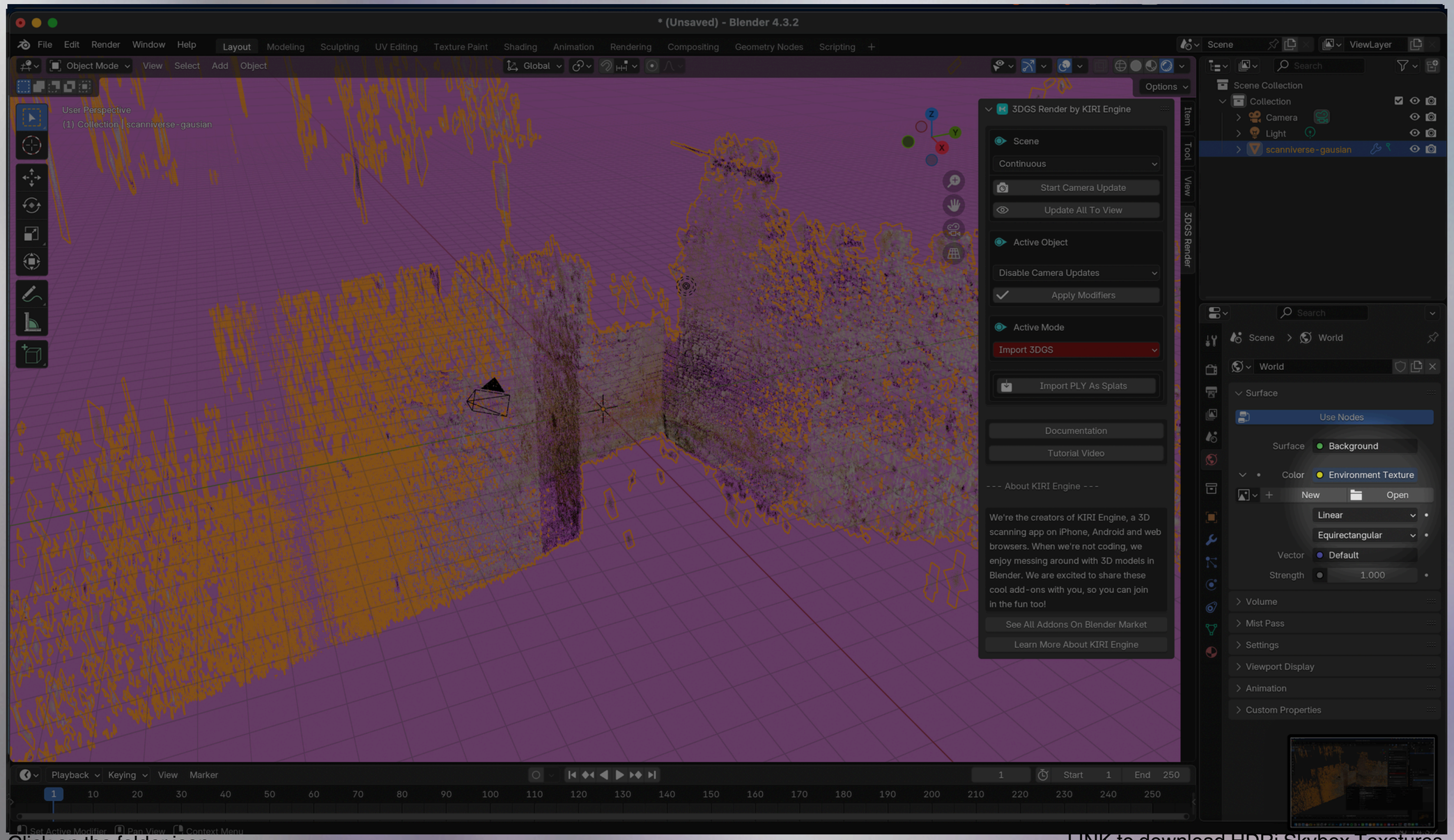
Click on Use Nodes

TUTORIAL - Light & Environment



Click on the small yellow circle next to Color

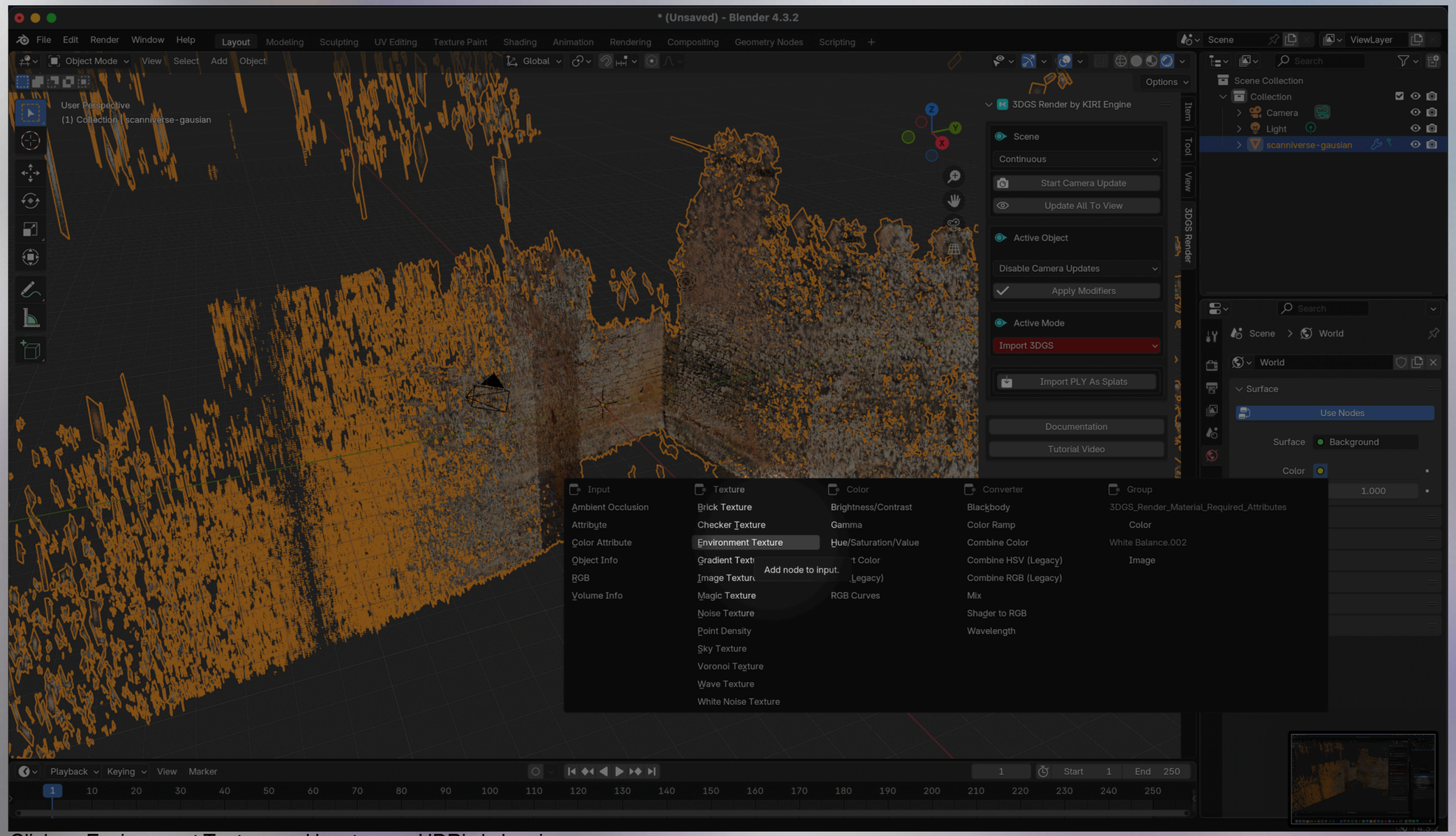
TUTORIAL - Camera Positioning



Click on the folder icon

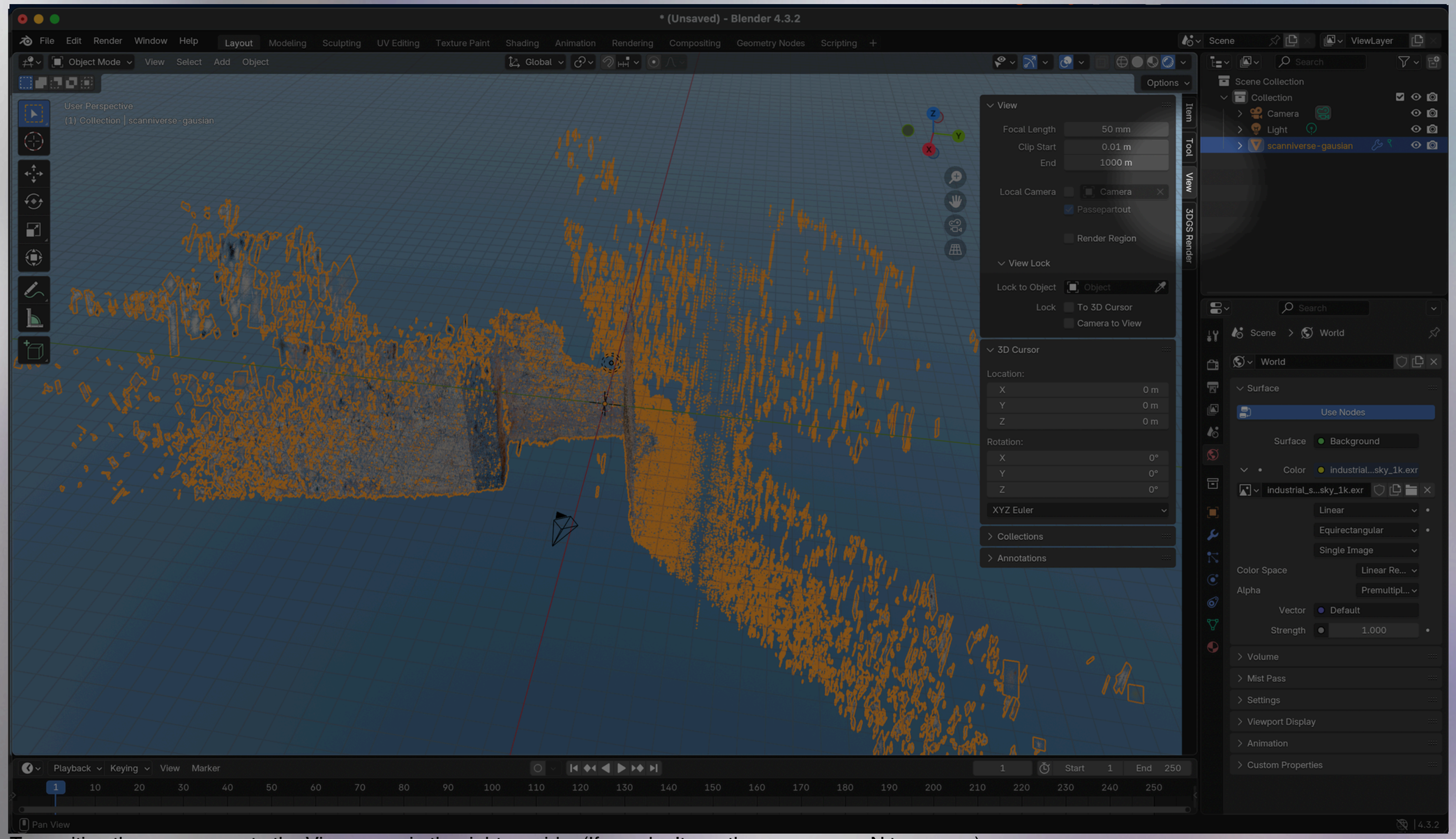
LINK to download HDRi Skybox Texstures

TUTORIAL - Camera Positioning



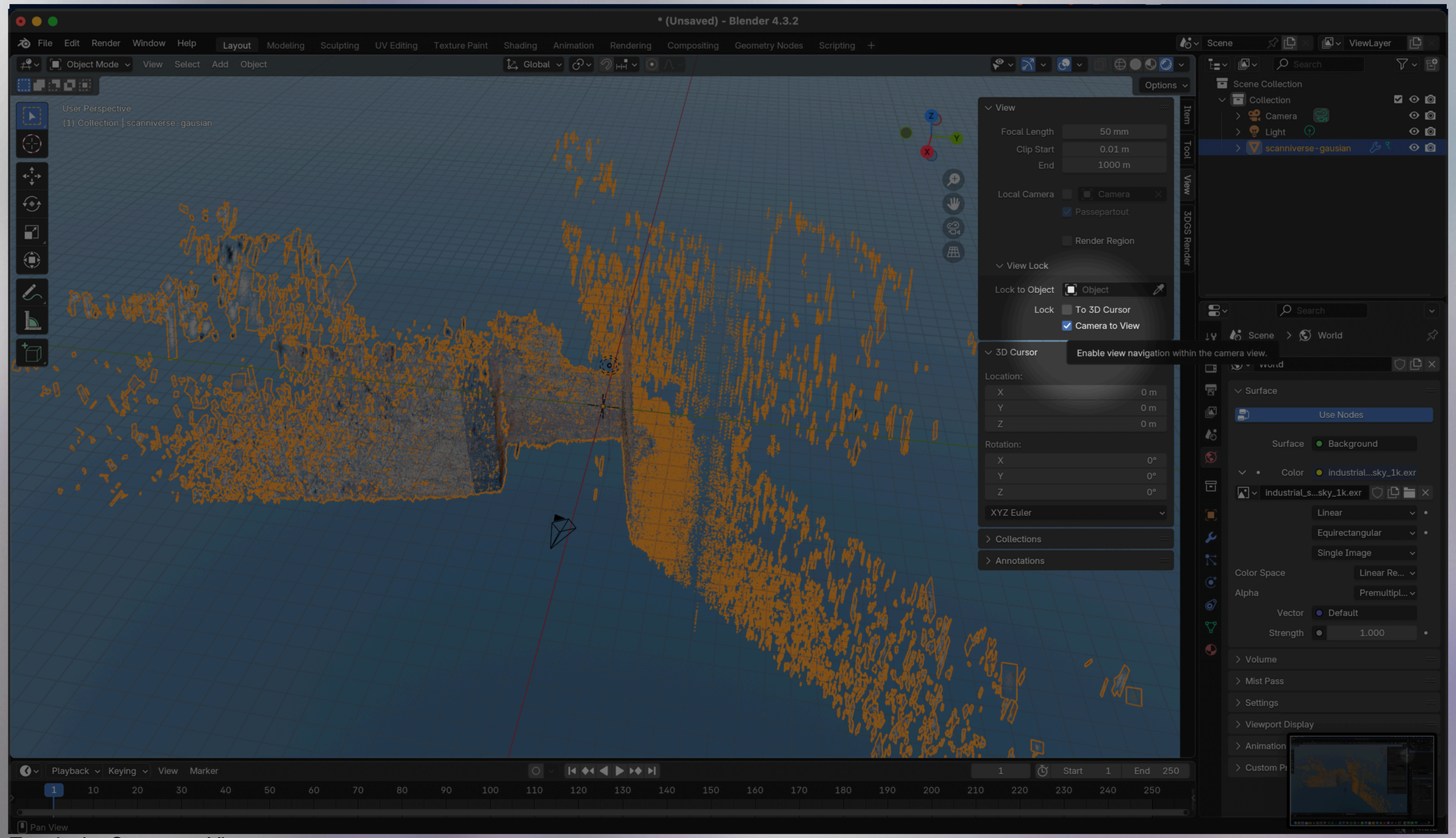
Click on Environment Texture and locate your HDRi skybox image

TUTORIAL - Camera Positioning



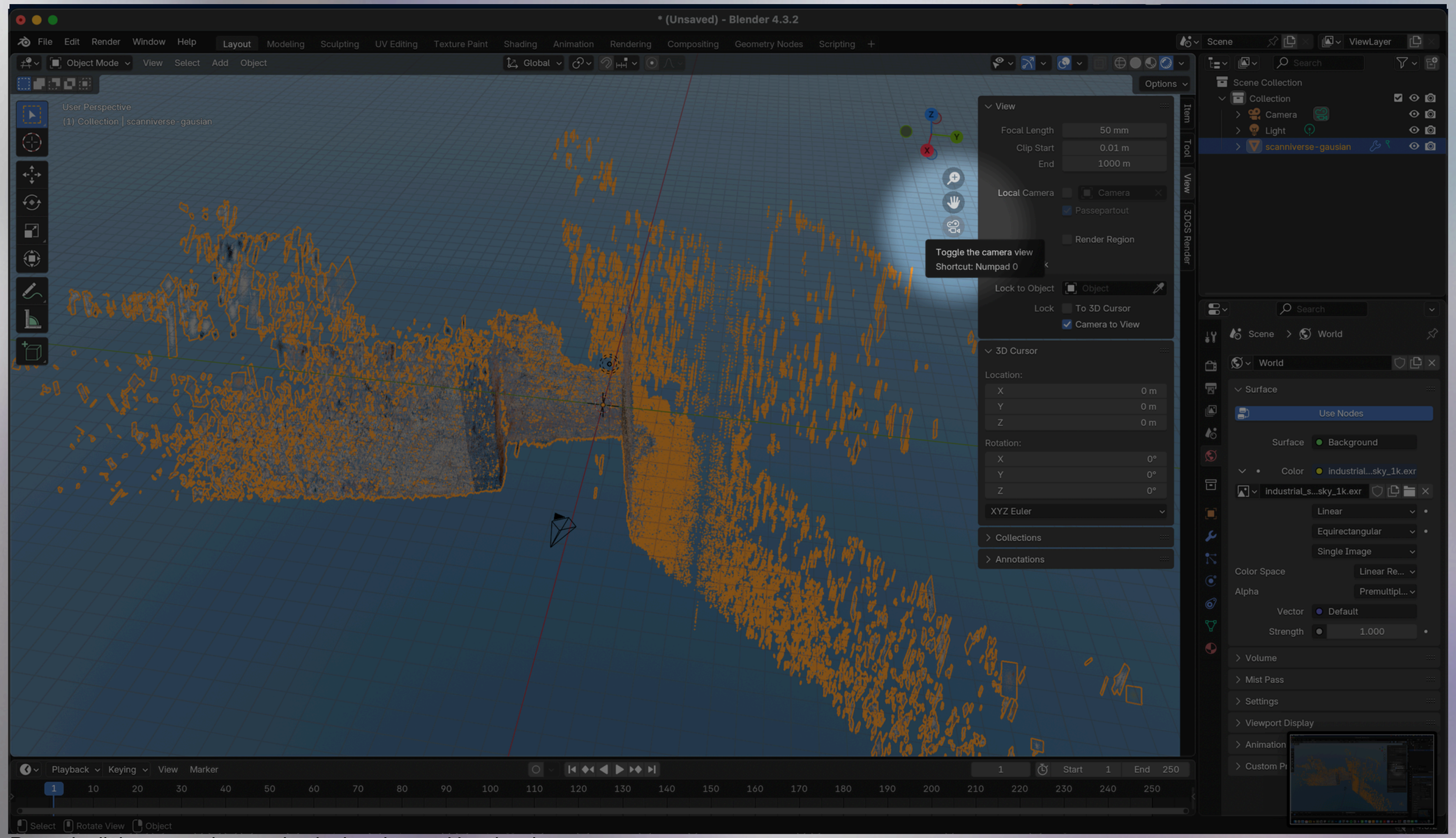
To position the camera, go to the View menu in the right up side. (If you don’t see the menu press N to appear)

TUTORIAL - Camera Positioning



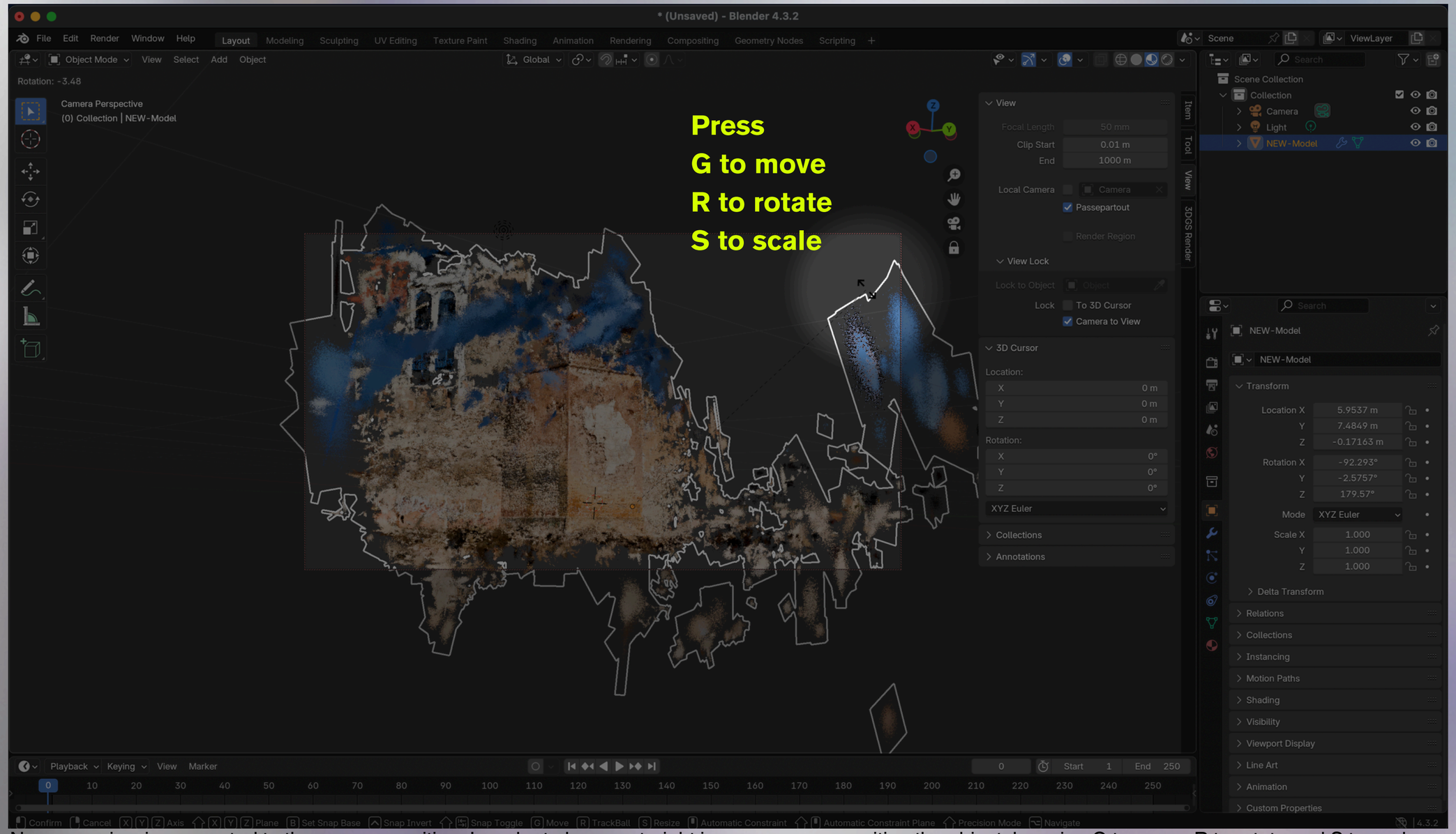
Toggle the Camera to View

TUTORIAL - Camera Positioning



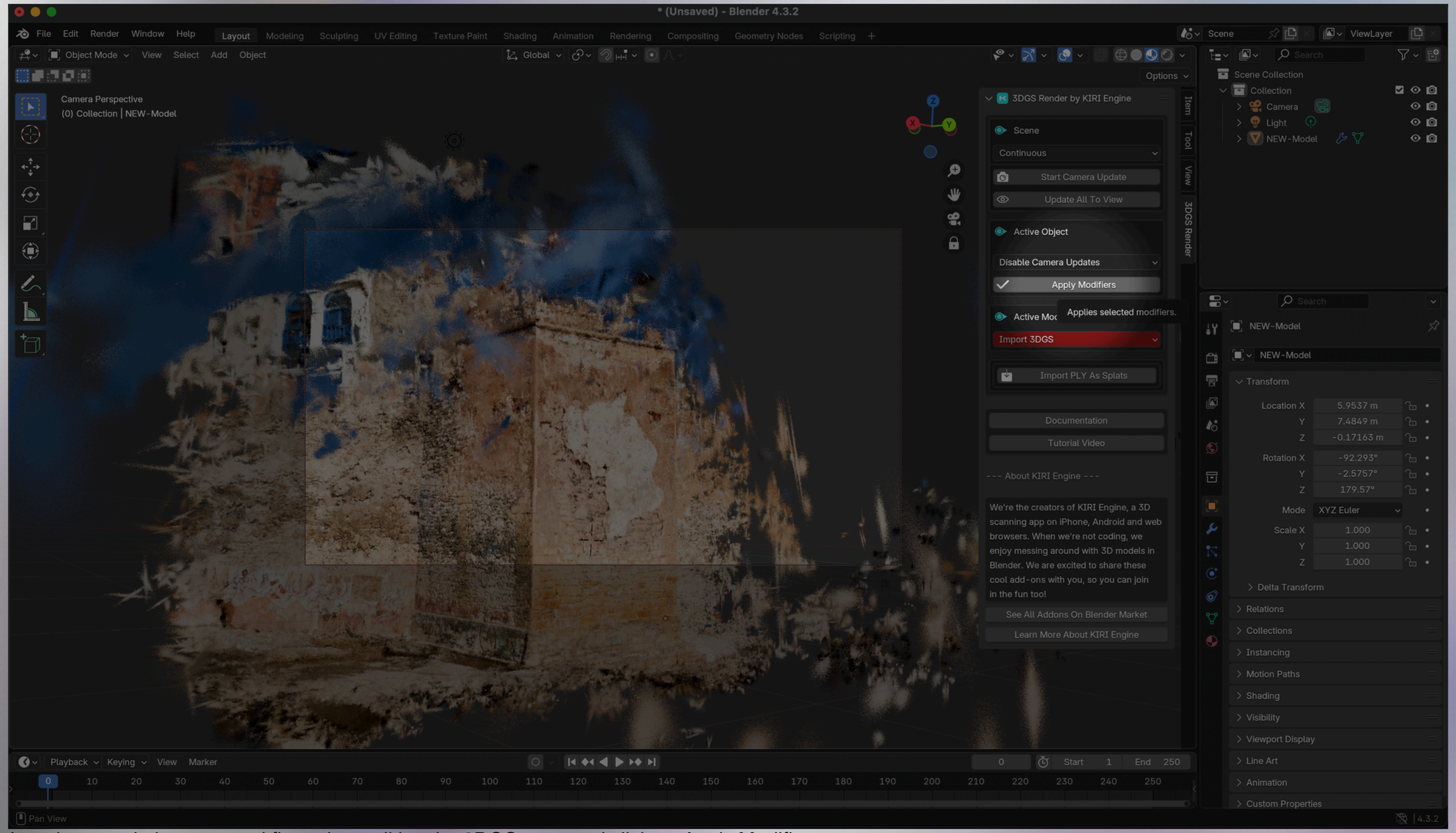
Press the little camera icon under the hand to position the view

TUTORIAL - Camera Positioning



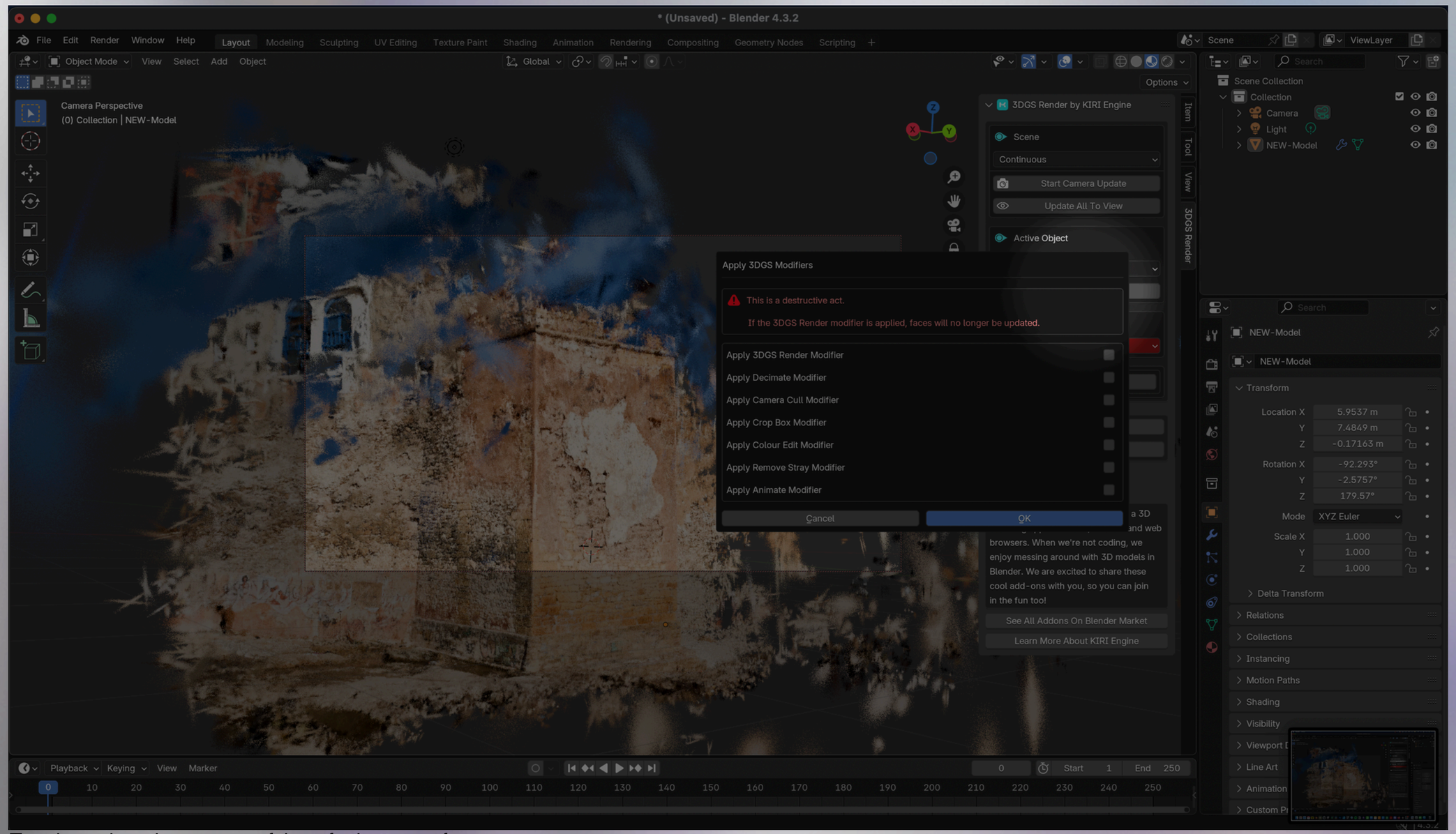
Now your view is connected to the camera position. In order to have a straight image, you can position the object, by using G to move, R to rotate and S to scale

TUTORIAL - Modifiers



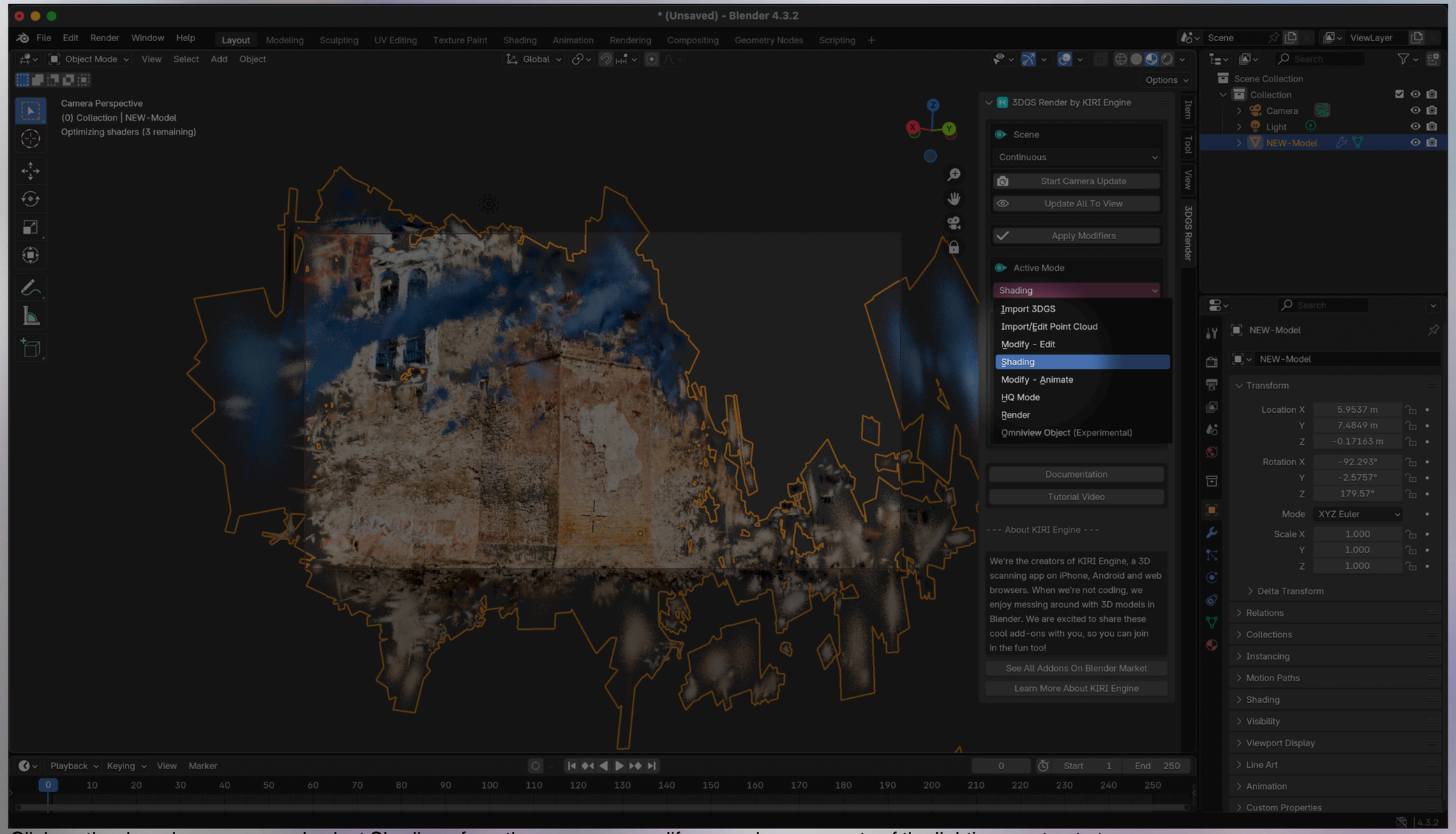
In order to optimize your workflow when editing the 3DGS go to and click on Apply Modifiers

TUTORIAL - Modifiers



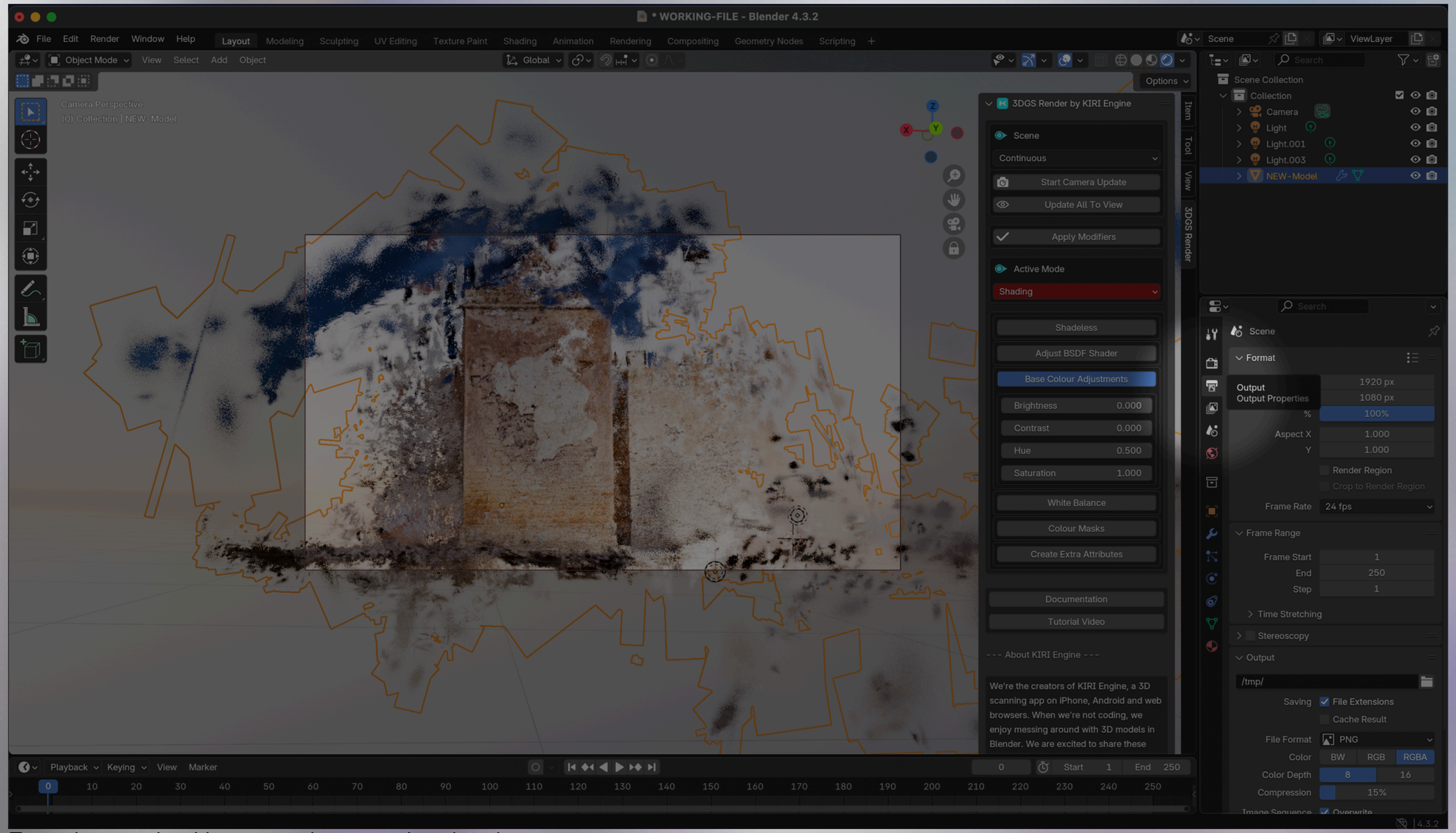
Toggle each and every one of them for better performance

TUTORIAL - Modifiers



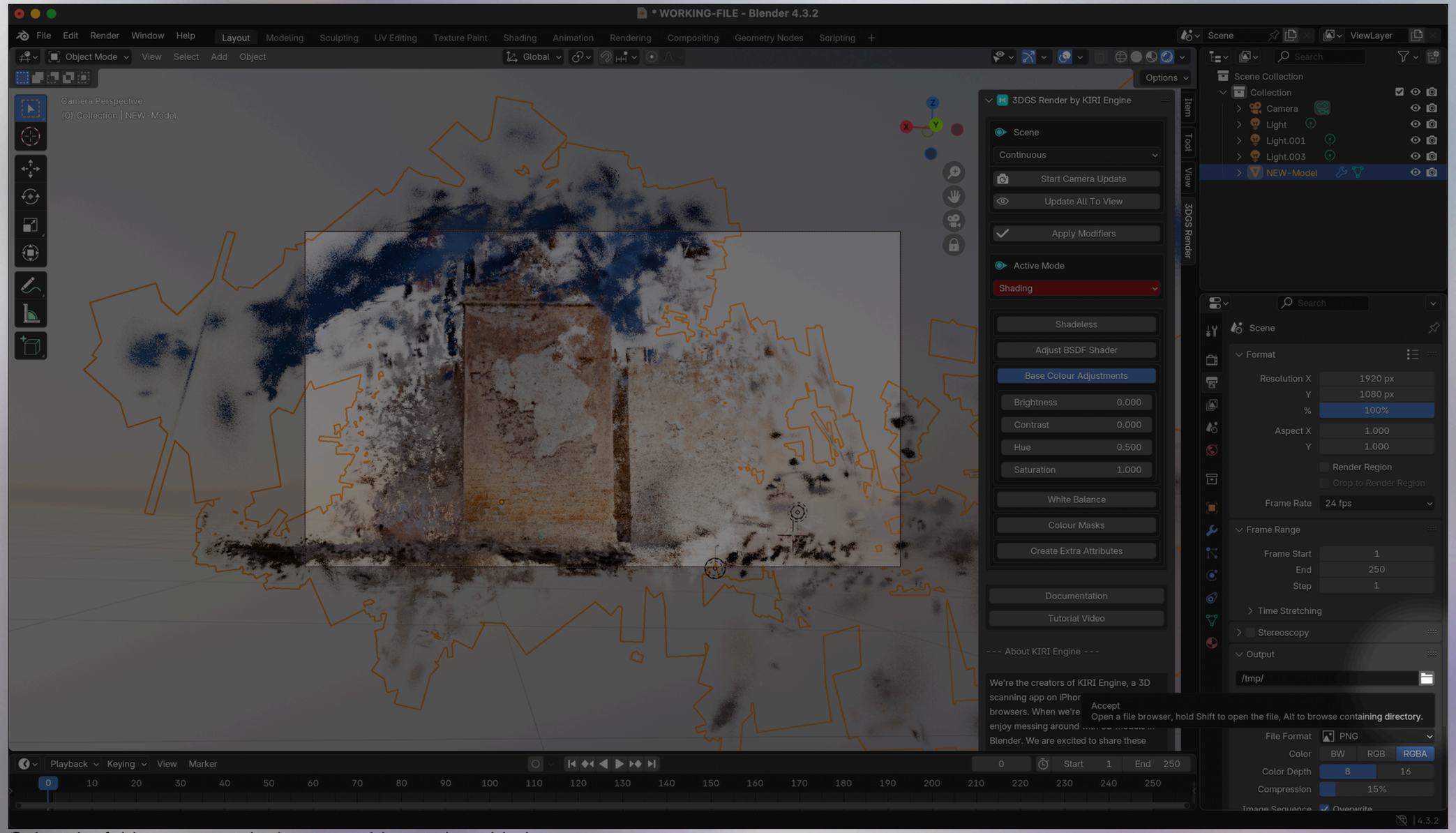
Click on the drop down menu and select Shading - from there you can modify several components of the lighting, contrast etc.

TUTORIAL - Rendering



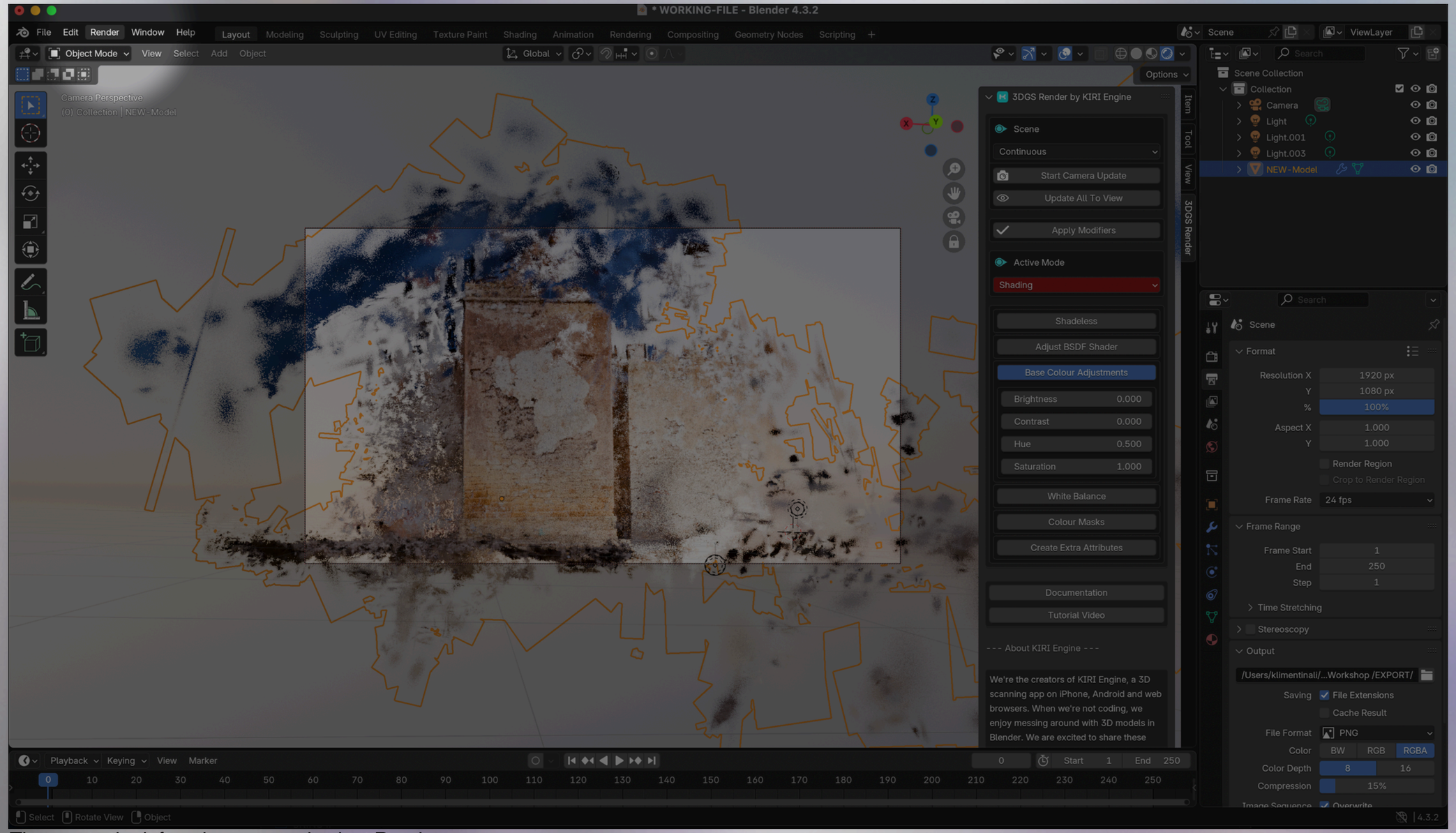
To render go to the side menu and press on the printer icon

TUTORIAL - Rendering



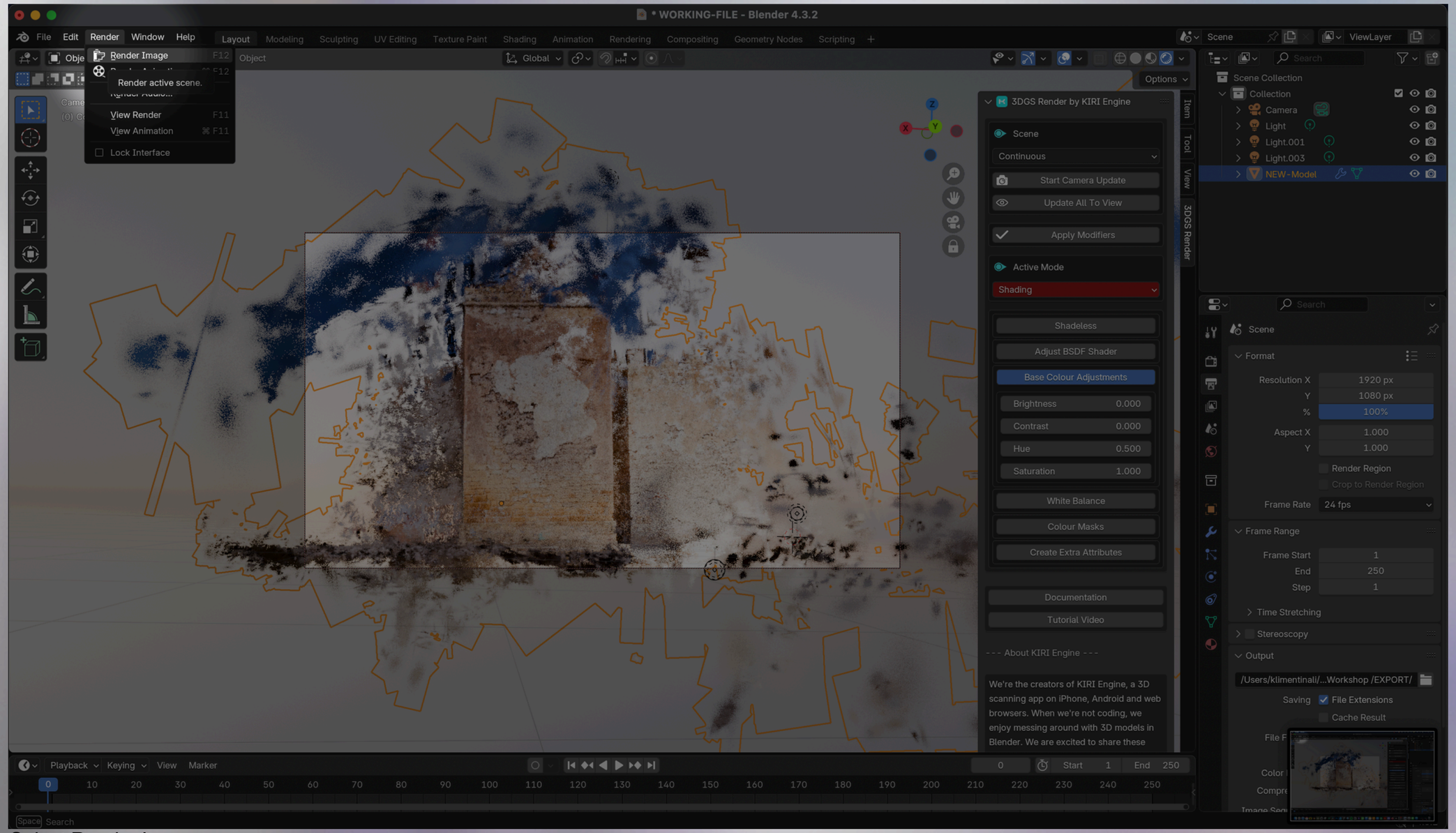
Select the folder you want the image or videos to be added

TUTORIAL - Rendering



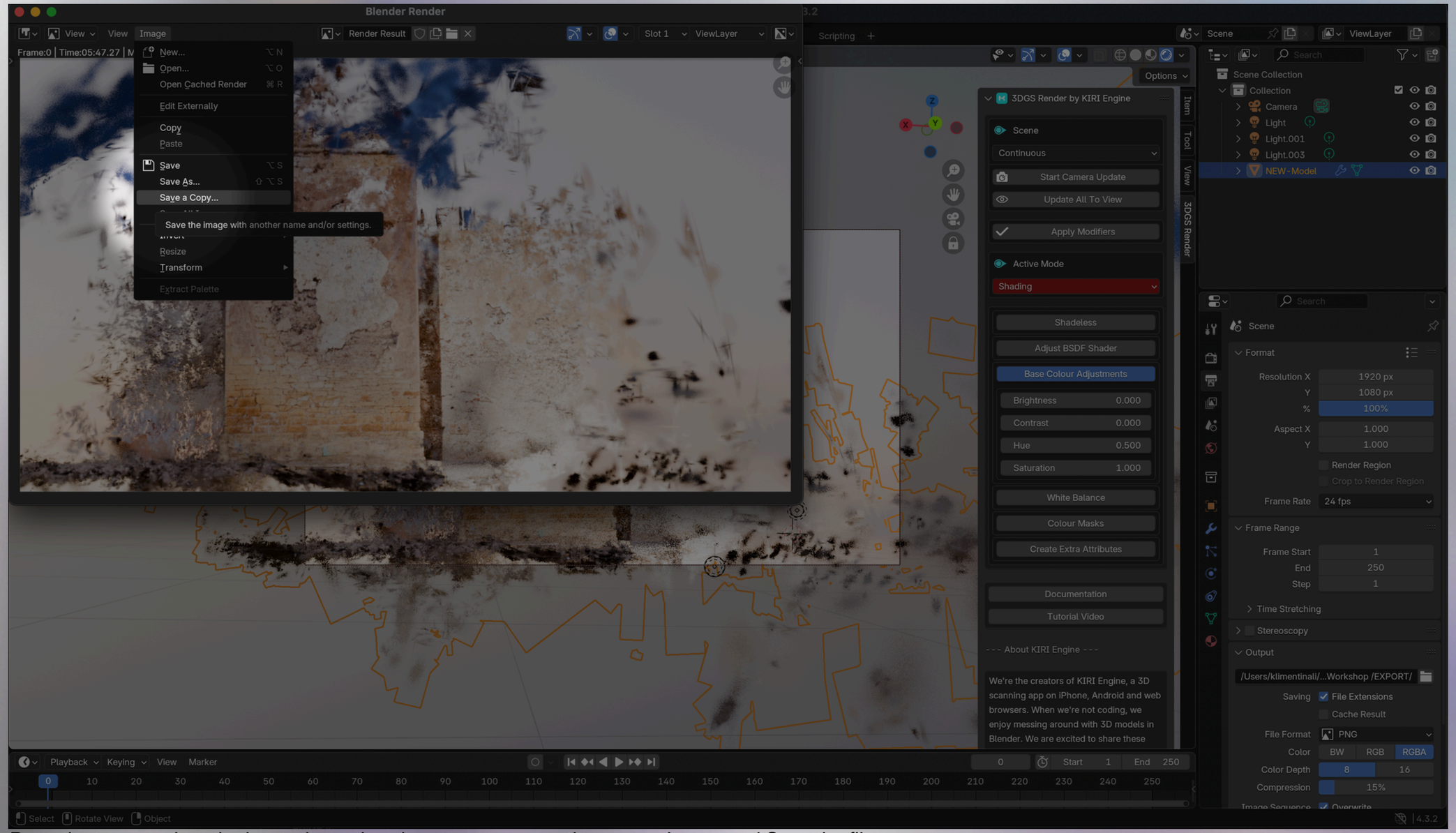
Then go to the left main menu and select Render

TUTORIAL - Rendering



Select Render Image

TUTORIAL - Rendering



Be patient, once when the image is rendered you can press on the menu - Image and Save the file.

TUTORIAL - Render Results

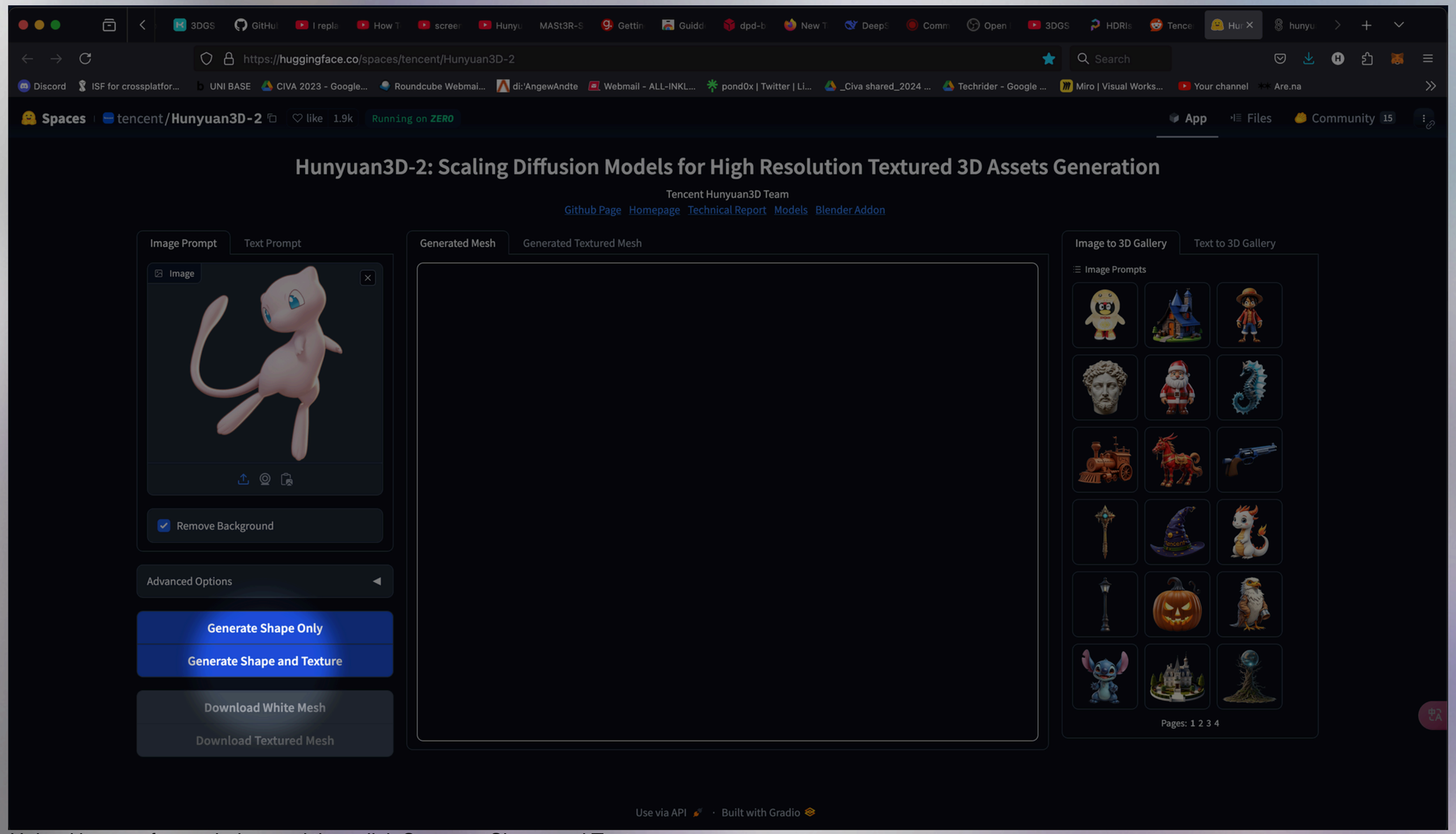


KIRI Engine - Gaussian Splat



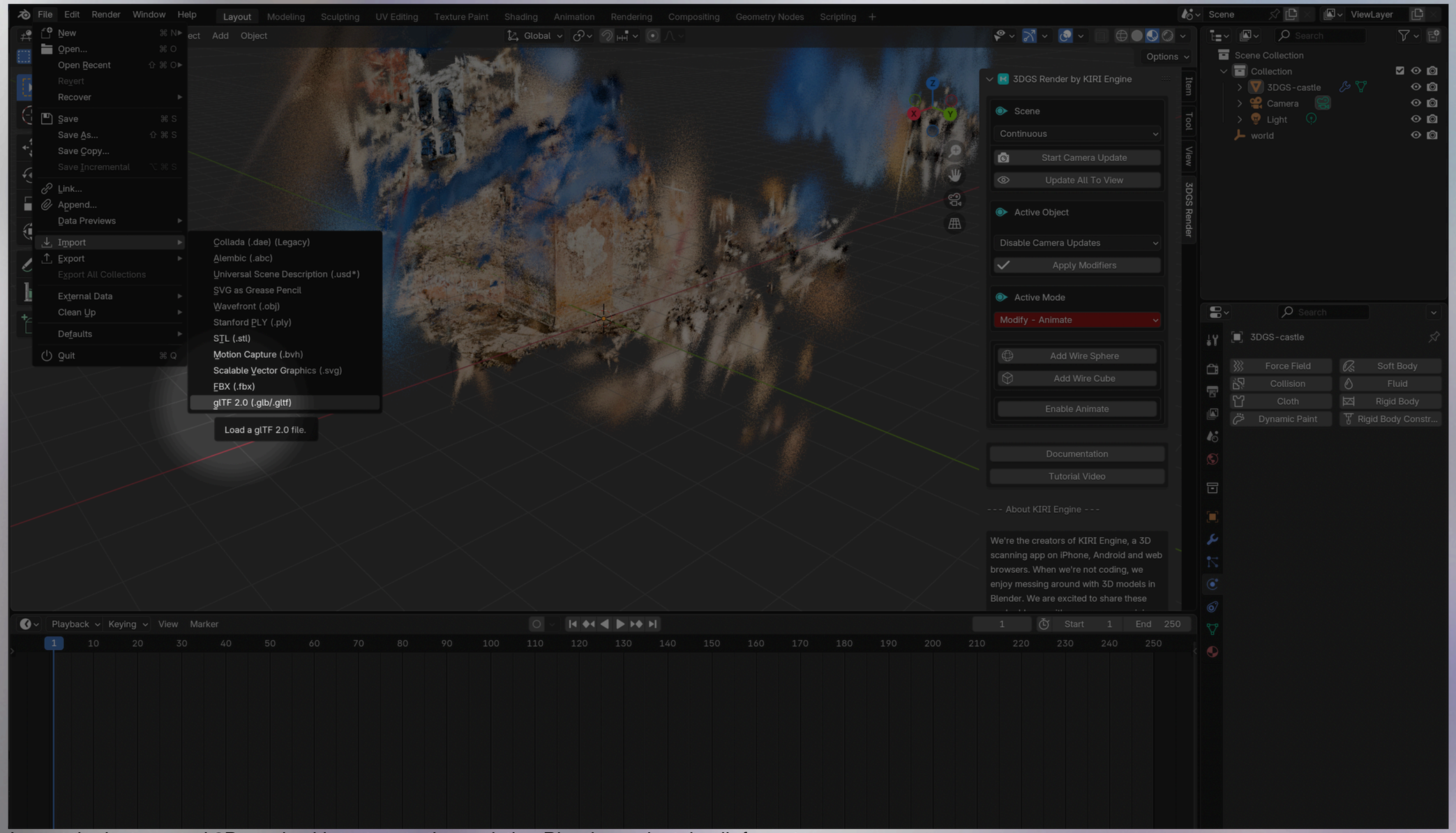
Scanniverse - Gaussian Splat

TUTORIAL - 3D Mesh Generation



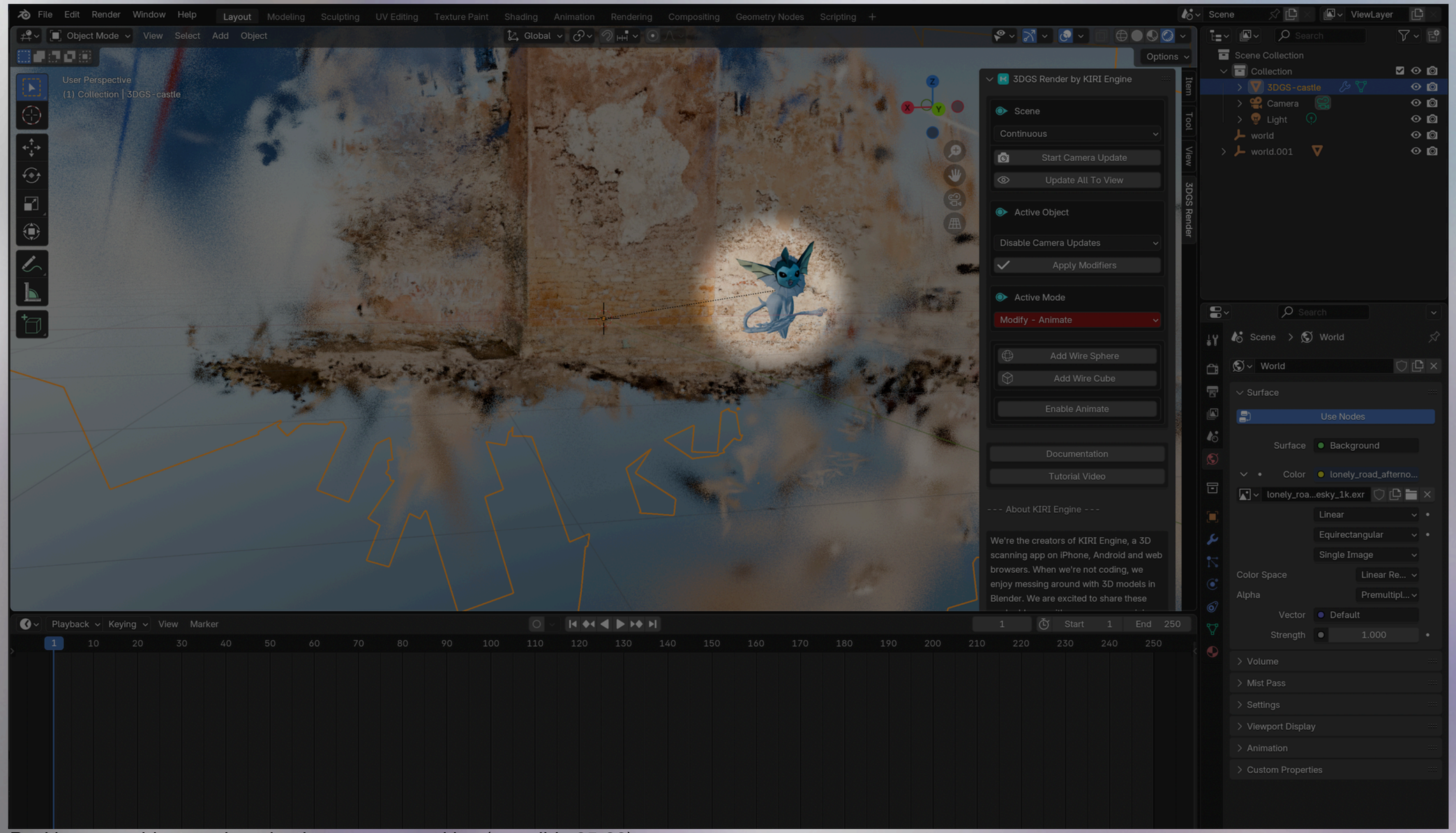
Upload image of your choice, and then click Generate Shape and Texture

TUTORIAL - 3D Mesh Generation



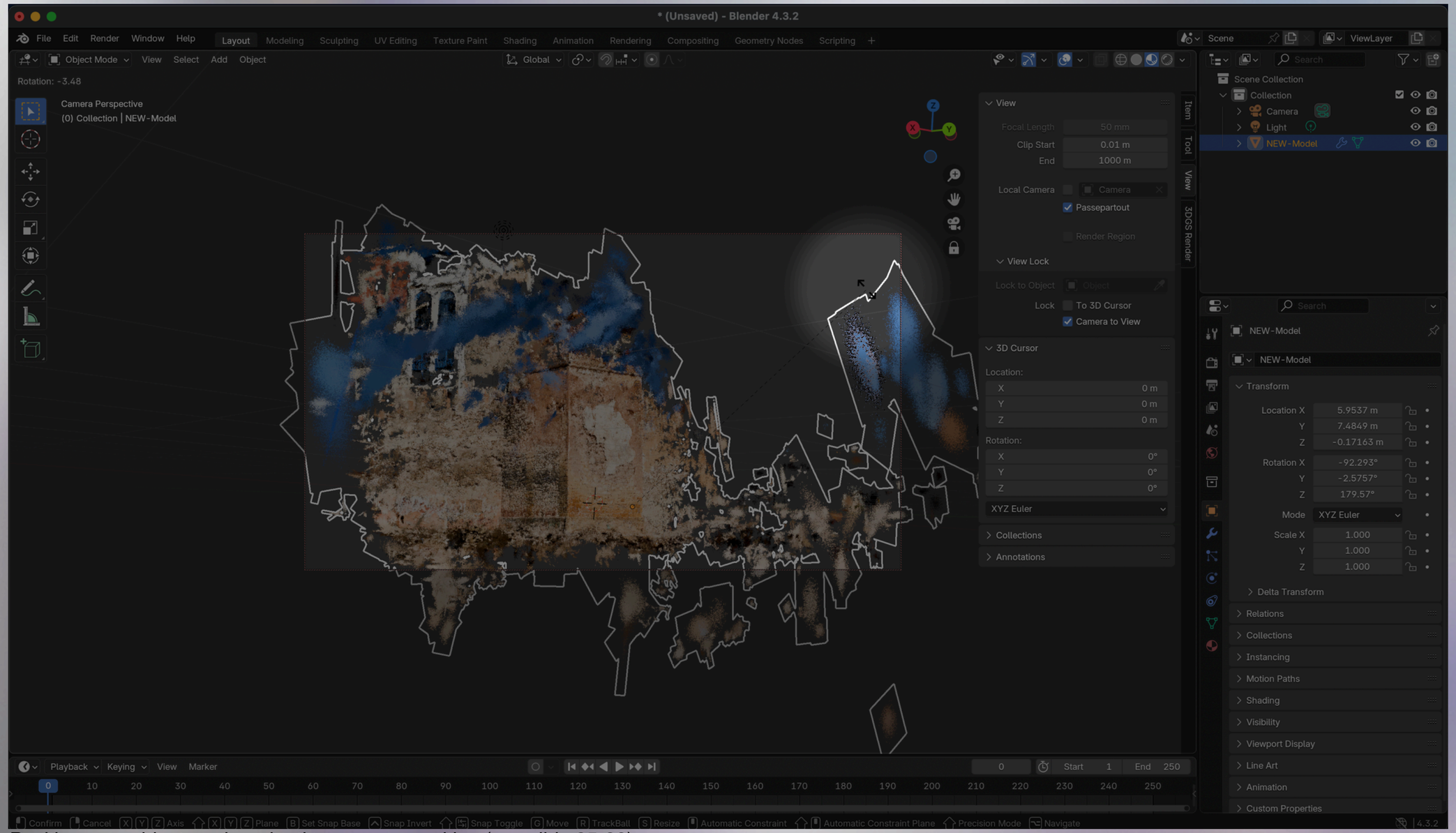
Import the just created 3D mesh with texture to the excisting Blender project, in glb format.

TUTORIAL - 3D Mesh Generation



Position your object, and render the new composition (see slide 35-38)

TUTORIAL - 3D Mesh Generation



Position your object, and render the new composition (see slide 35-38)



Render Result. *Gaussian Splat* scan and *AI generated 3D* mesh

LINKS & Tutorials

From 3D scanning to Add on's

General

- Introduction to generative AI in 3D

3D Scanning

- LUMA AI - From video to 3D scan
- Scanniverse - Gausian Splatting
- From KIRI Engine to Blender

3D Mesh Generation

- Generators > Modeling

3D Software

- Blender add on's
- Blender + Gaussian Splatting