

# MatchMove

Digital Visual Effects, Spring 2013

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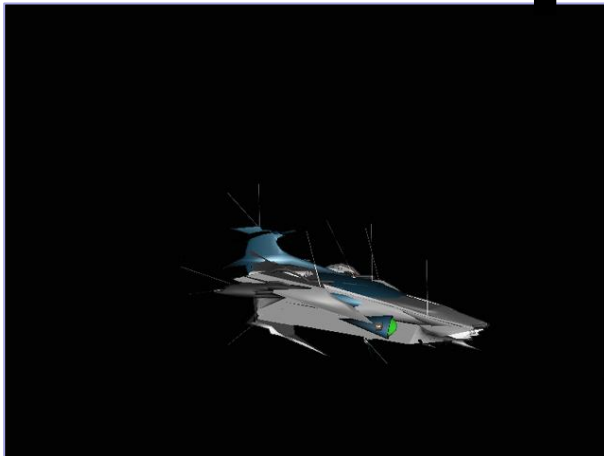
2013/4/24

# Flowchart

Input



Video



CGI Animation

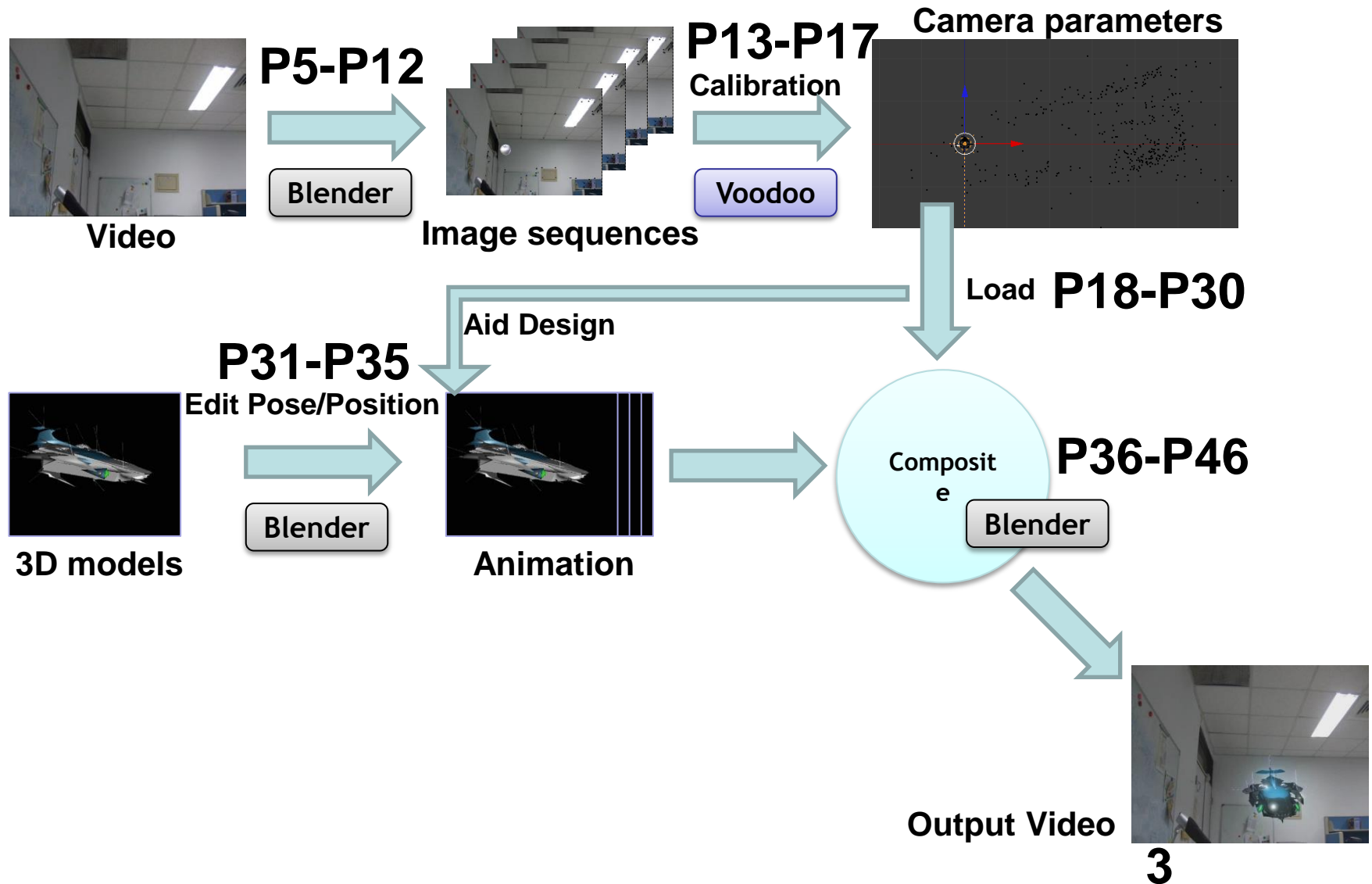
**Matchmove** is a technique of estimating camera parameters from an input video sequence so that computer generated imagery (CGI) could be seamlessly inserted into the sequence.



Output



# Flowchart (detailed)



# Environment Setting

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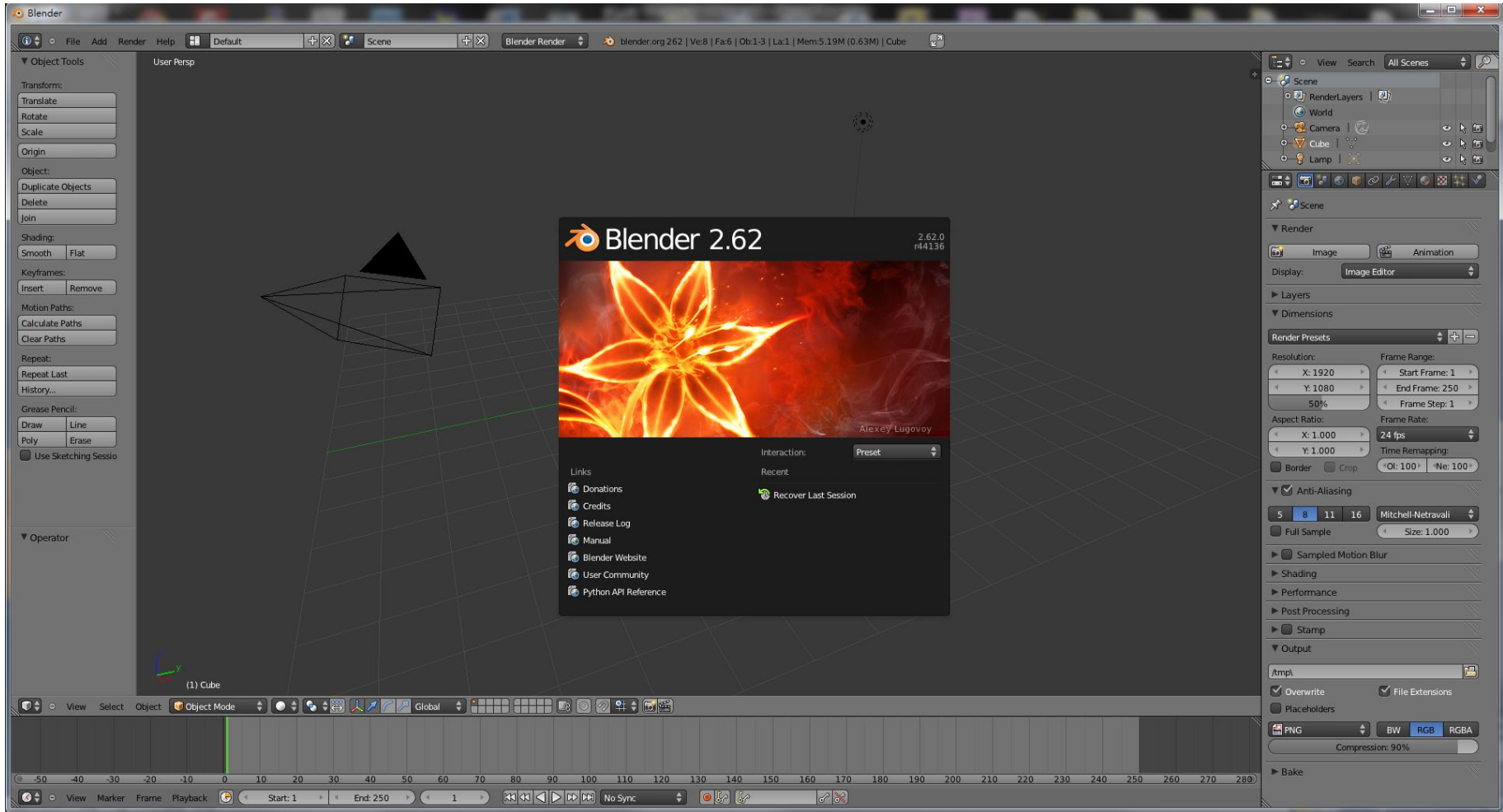
- Blender
  - Version 2.6.2 <http://download.blender.org/release/>
  - Using version 2.6.6 might get error while running python scripts
- Voodoo
  - Version 1.2.0 <http://www.viscoda.com/index.php/en/voodoo-download>
- Other options
  - Free: Blender + ICARUS
  - Pay: boujou + 3D Max, boujou + Maya, ...

# Recipe: Get Image Sequence

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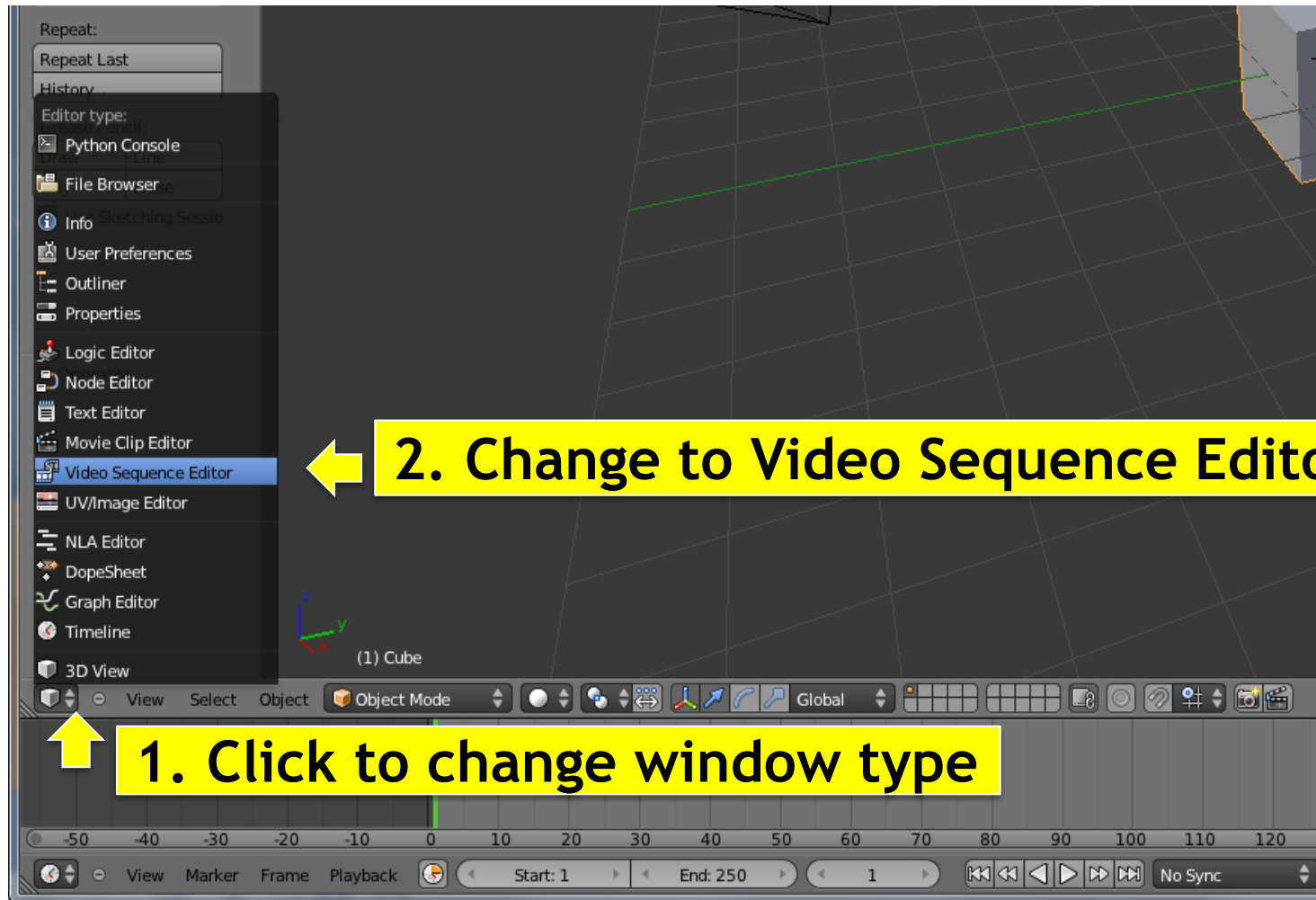
- Open Blender
- Load video file:
  - Change window type to “Video Sequence Editor”
  - Select Add → Movie
  - Put the strip in Layer 1
- Do sequence:
  - Frame
    - Set number of frames and resolution of frames
    - Choose output file type (Targa)
  - Time interval: select start and end of the sequence
  - Choose output location
- Click “Animation” button

# Step by Step: Get Image Sequence



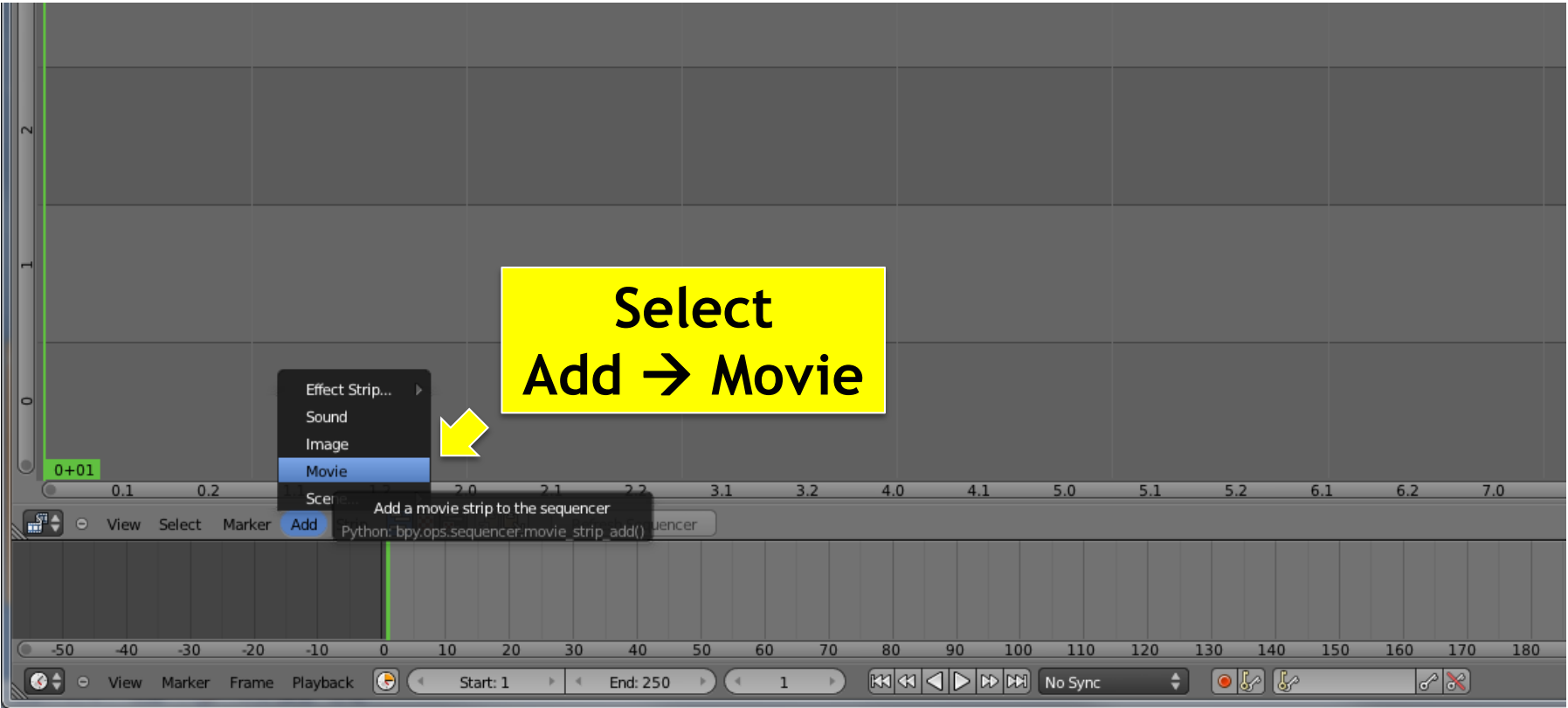
Start up Blender

# Step by Step: Get Image Sequence



Change window type

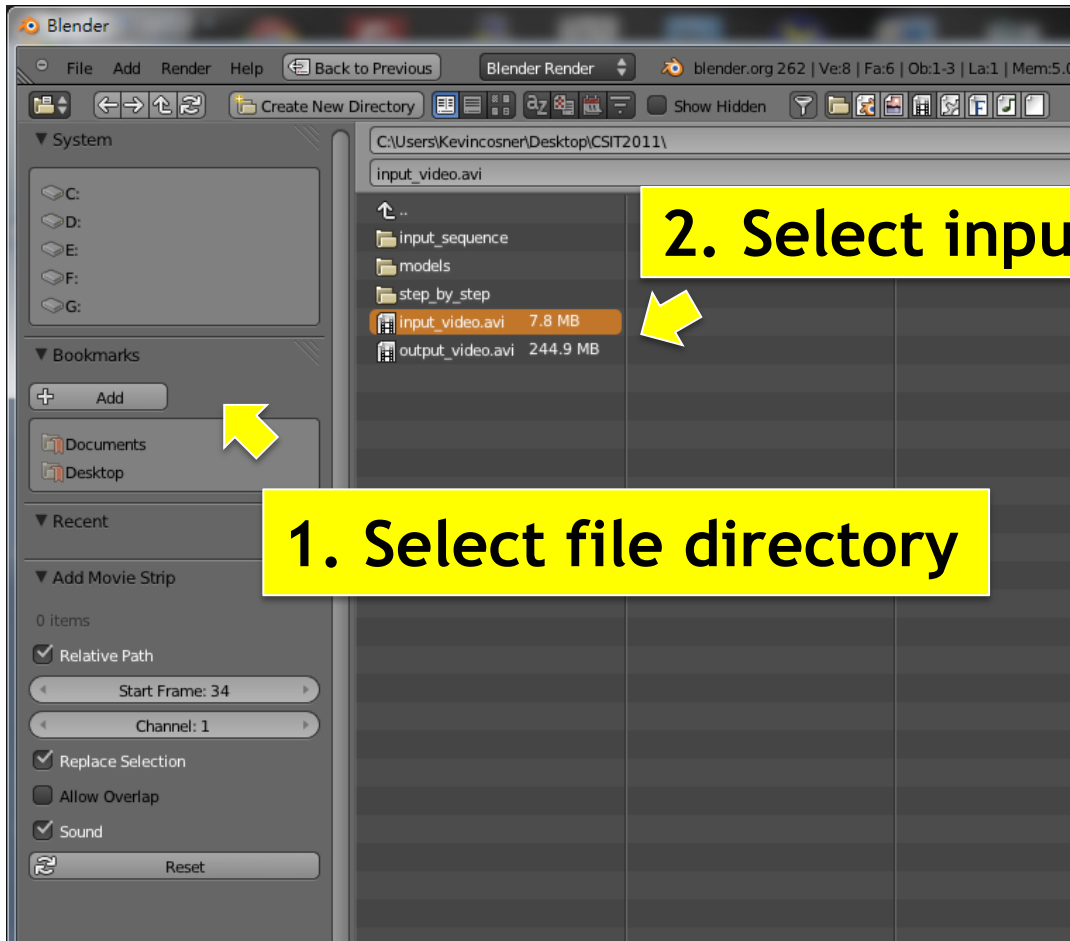
# Step by Step: Get Image Sequence



Add video

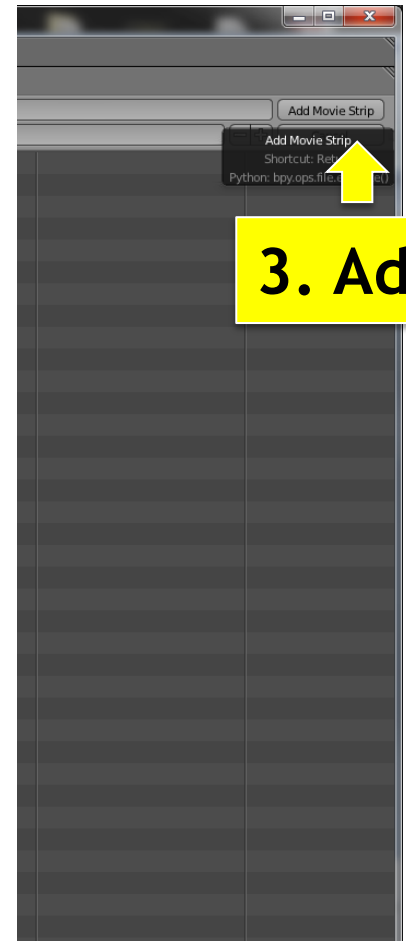


# Step by Step: Get Image Sequence



1. Select file directory

2. Select input file

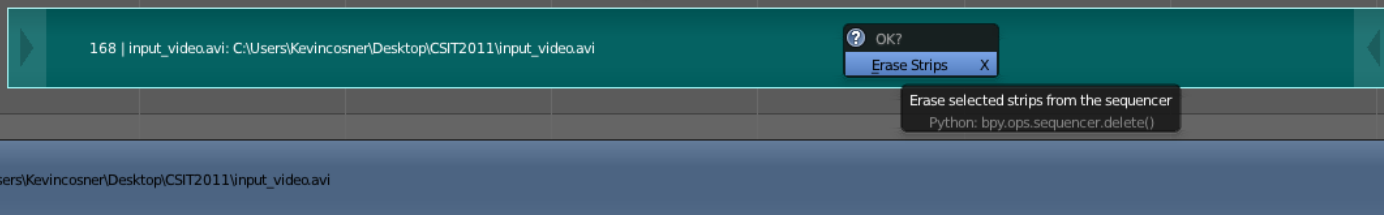


3. Add

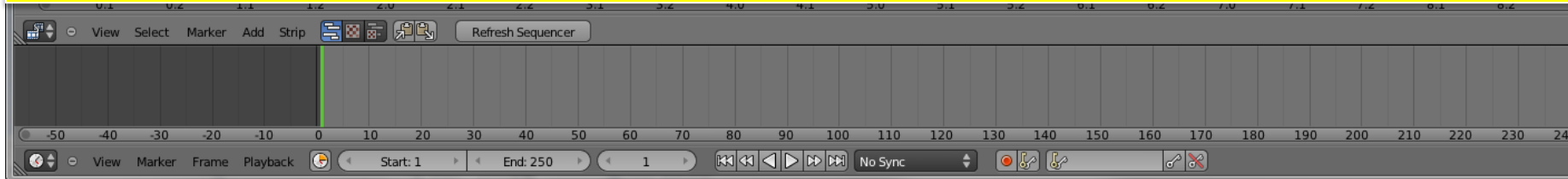
Select input video

# Step by Step: Get Image Sequence

1. Delete unnecessary layer (audio)



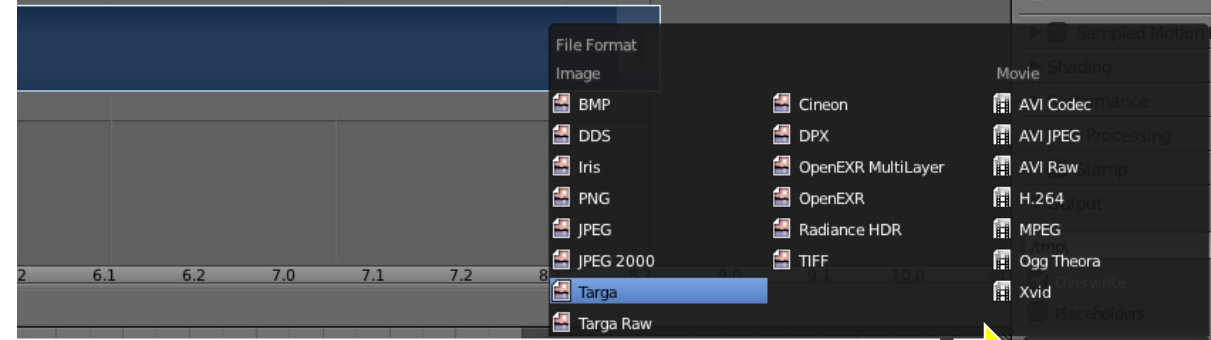
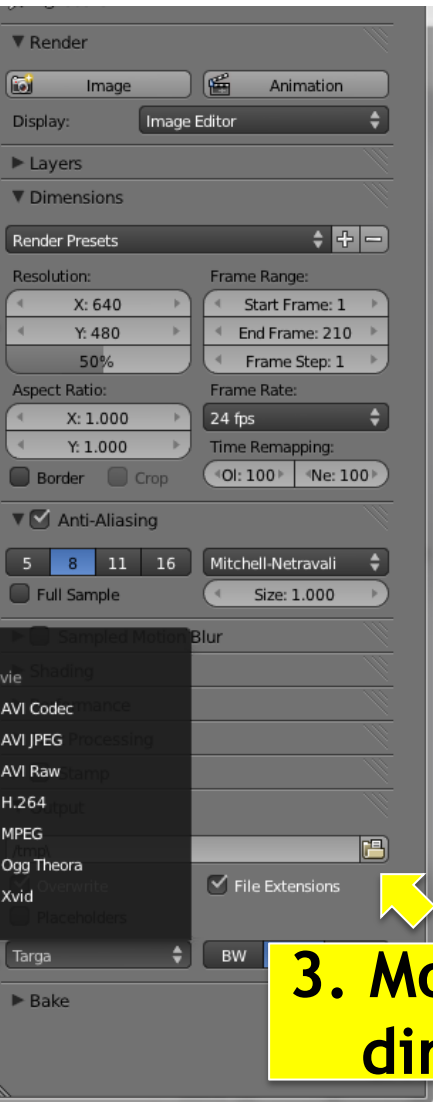
2. Right-click to drag the strip to the "1<sup>st</sup> Frame" in Layer 1



Edit layers (Right click and drag, left click to set)

# Step by Step: Get Image Sequence

1. Set  
a. Resolution  
b. Start/End Frame



2. Set file types to Targa(TGA)

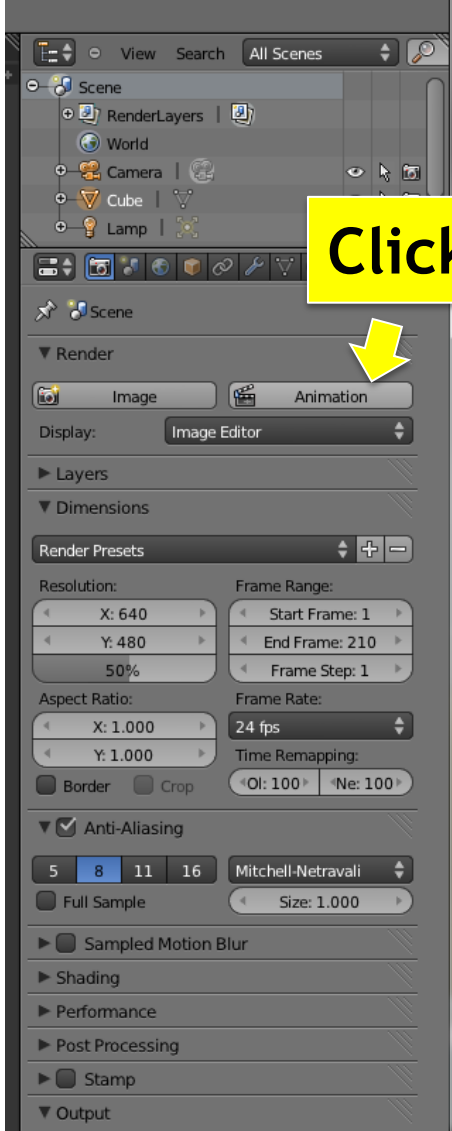


3. Modify output directory

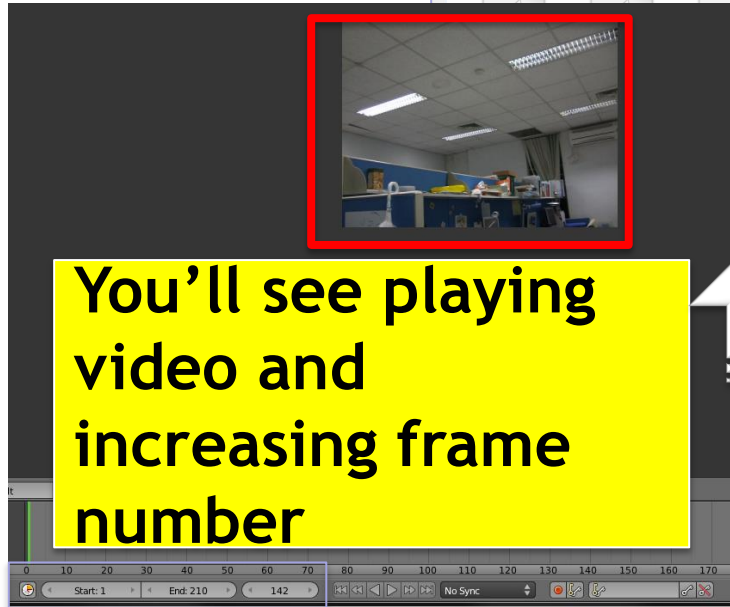
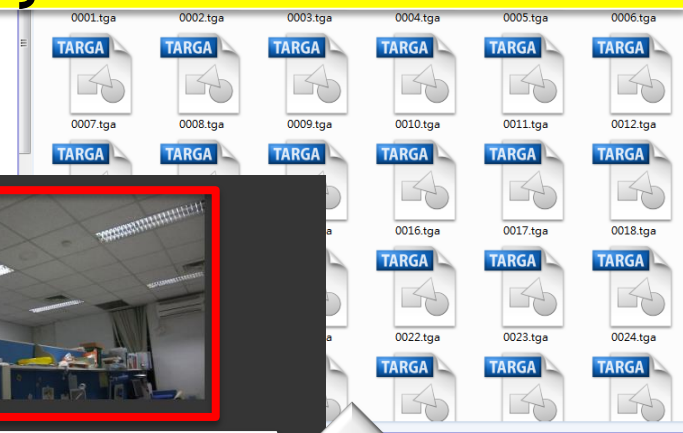


# Step by Step: Get Image Sequence

**Finish!**  
You can find the image sequences in output directory



**Click Animation**



**You'll see playing video and increasing frame number**



**Render image sequence**

**Back to flowchart**

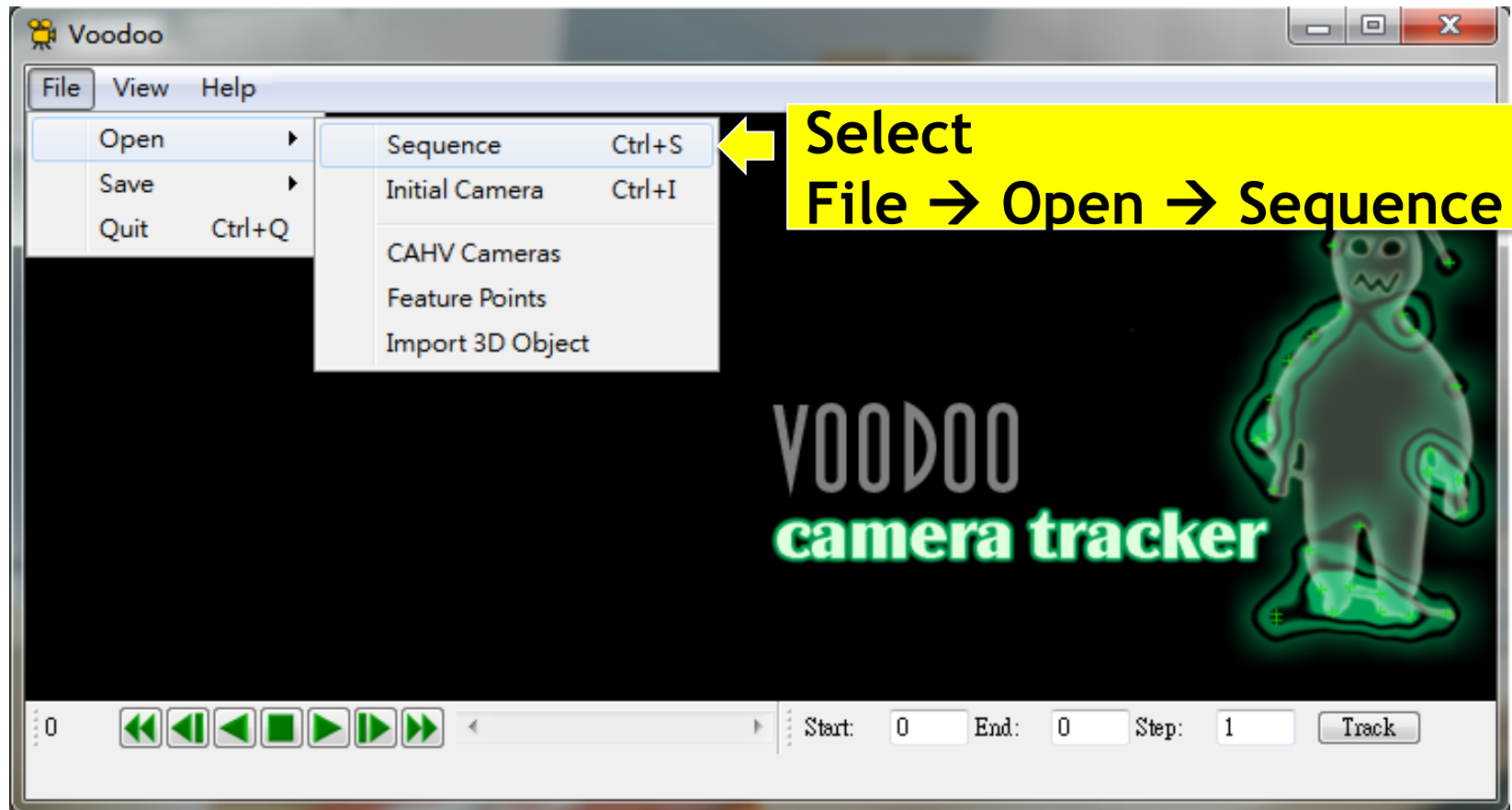


# Recipe: Calibration

---

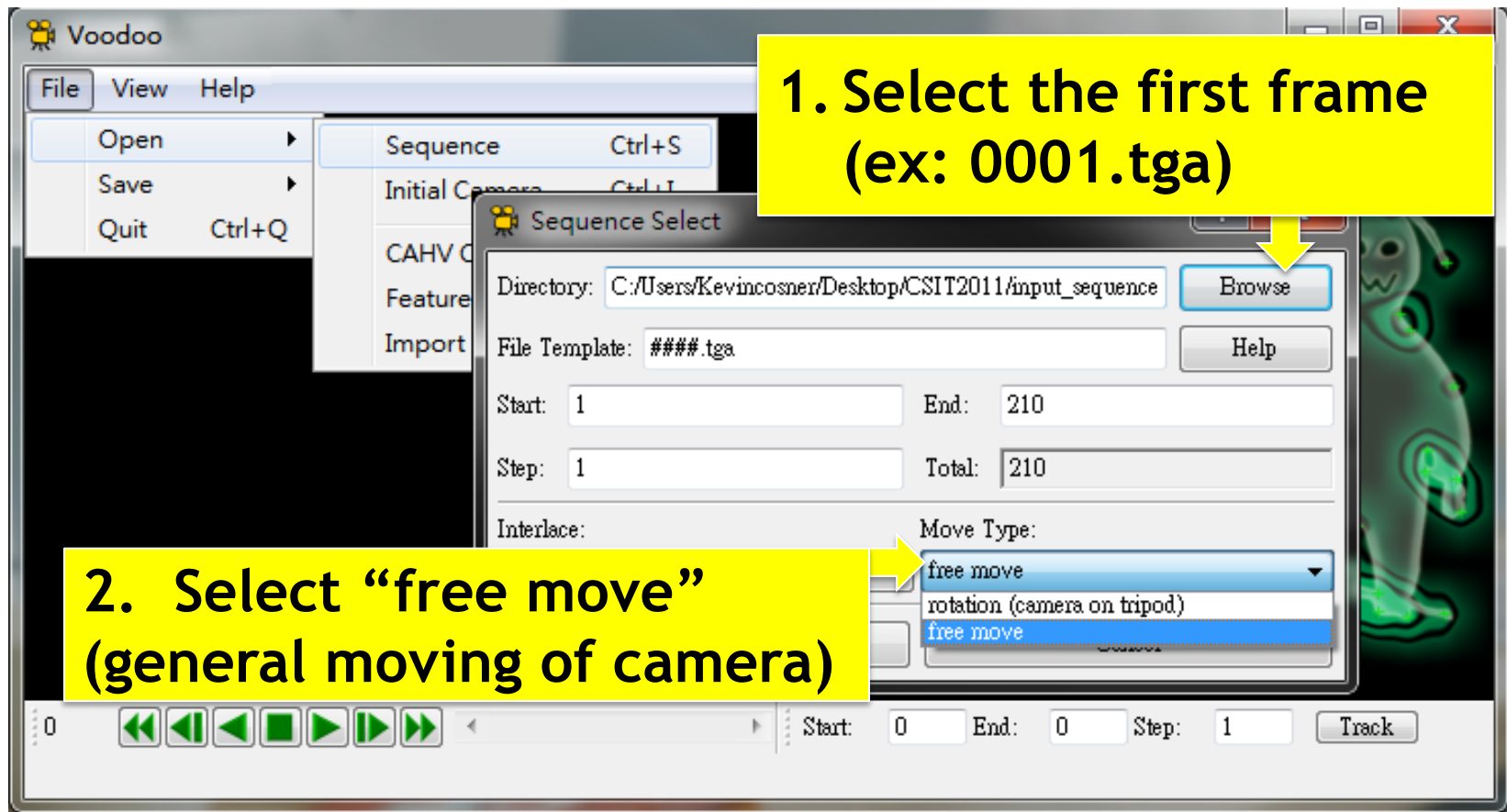
- Open Voodoo
- Open image sequence:
  - Select File → Open → Sequence
  - Select the first frame
  - Set Move Type to “free move”
- Track:
  - Click Track button
- Export Python script:
  - Select File → Save → Blender Python Script
  - Save .py file (Blender 2.5x and higher)

# Step by Step: Calibration



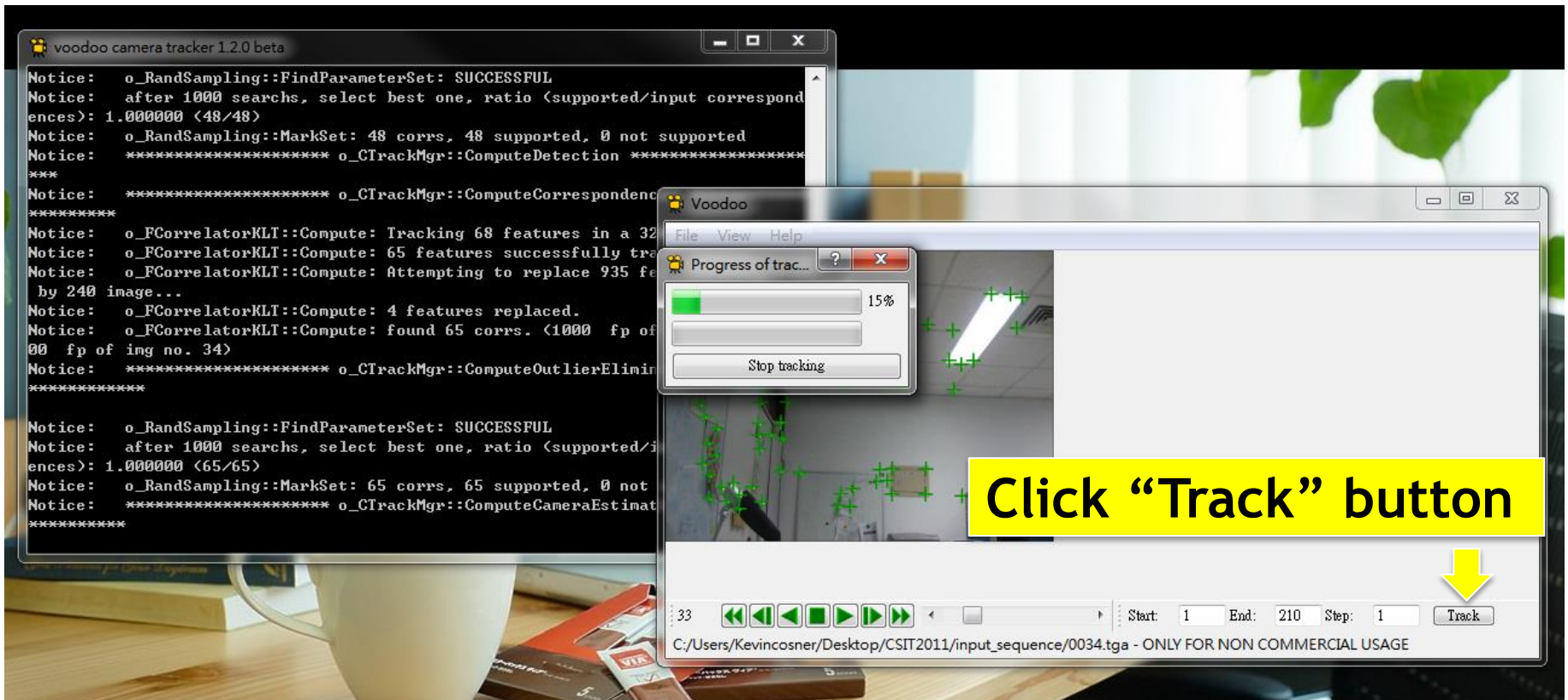
Use Voodoo to load image sequence

# Step by Step: Calibration



Choose and set sequence

# Step by Step: Calibration



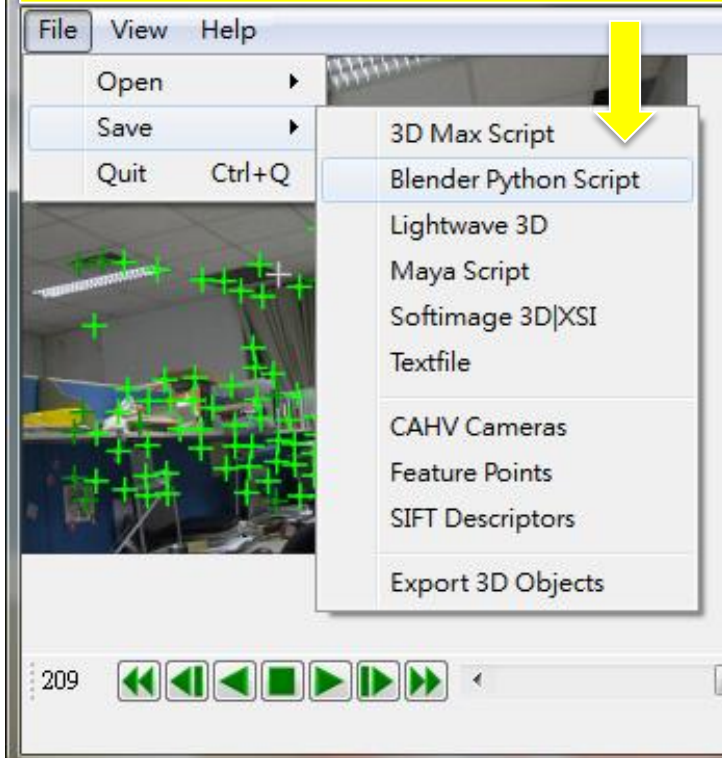
Tracking features



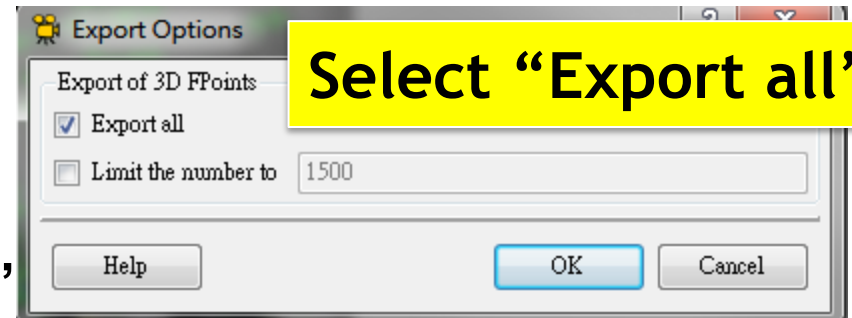
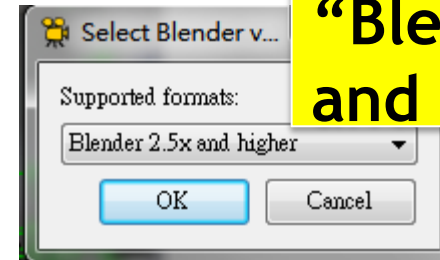
# Step by Step: Calibration

Select  
File → Save → Blender Python Script

[Back to flowchart](#)



Select  
“Blender 2.5x  
and higher”



Save results to “Blender Python Script”

# Recipe: Import 3D Motions

---

- Open Blender
- Delete default objects
  - Choose the object and press “Delete”
- Load Python Script
  - Change Window Type to “Text Editor”
  - Select Text → Open Text Block
  - Select the .py file (exported from Voodoo)
  - Click “Run Script”

(cont.)

# Recipe: Import 3D Motions

---

(cont.)

- Load Background Images
  - Change window type to “3D View”
  - Select View → Cameras → Set Active Object as Active Camera
  - Load background images
  - Set the parameters of background images
  - Change the view
    - View → View Persp / Ortho
    - View → Front
- Load models and edit their poses/motions in the video

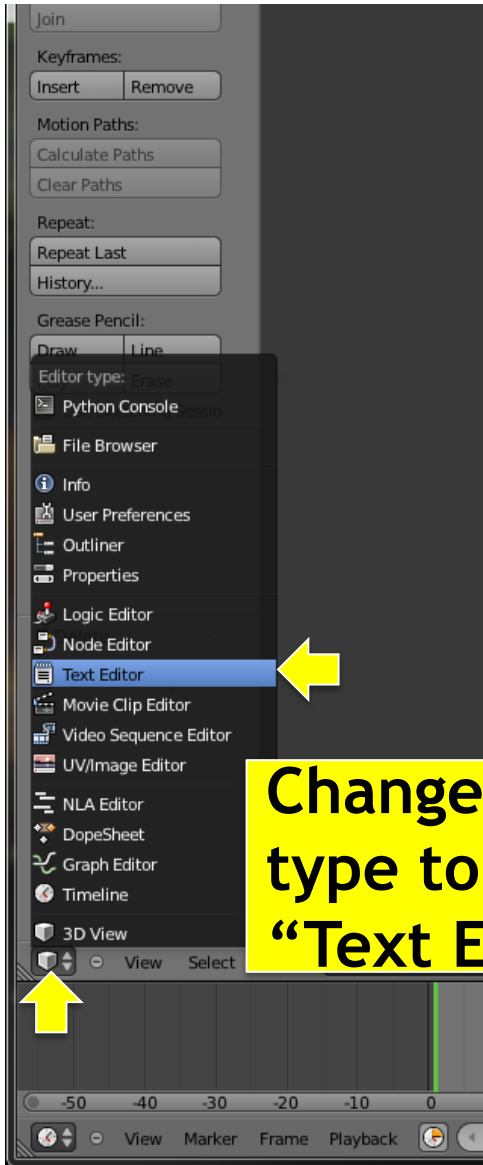
# Step by Step: Import 3D Motions



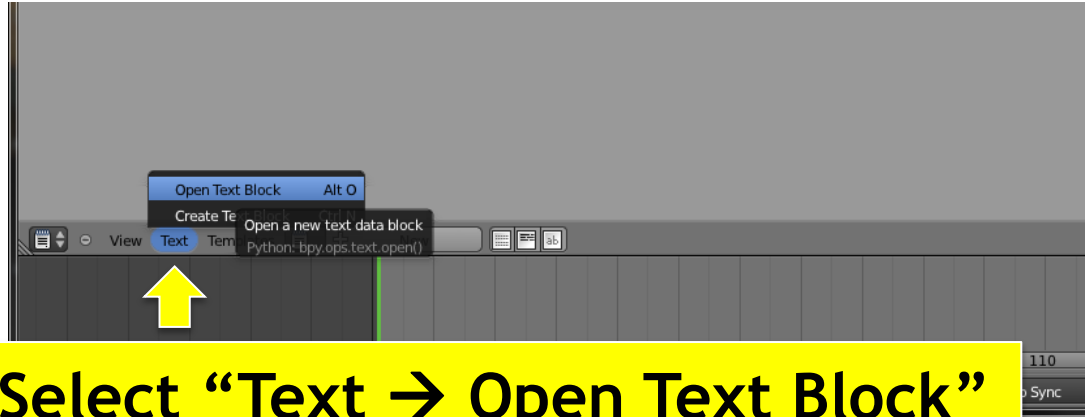
Press "a" twice to select all objects, then press "Delete" on your keyboard

Delete default objects

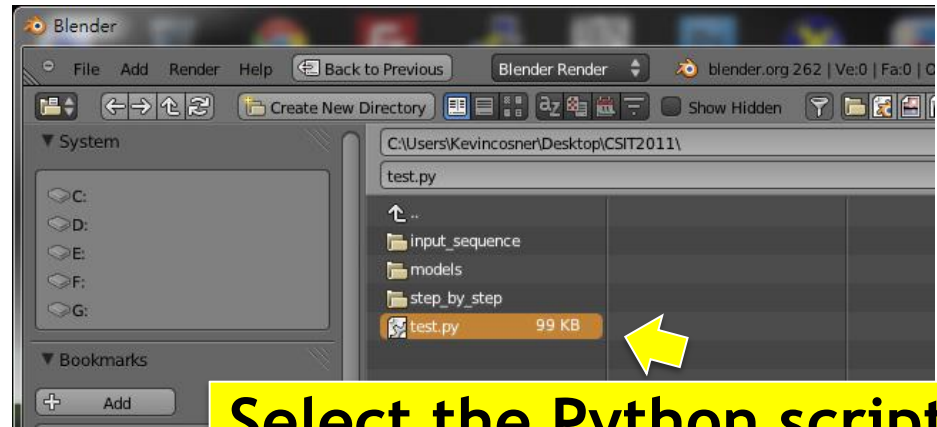
# Step by Step: Import 3D Motions



**Change window type to "Text Editor"**



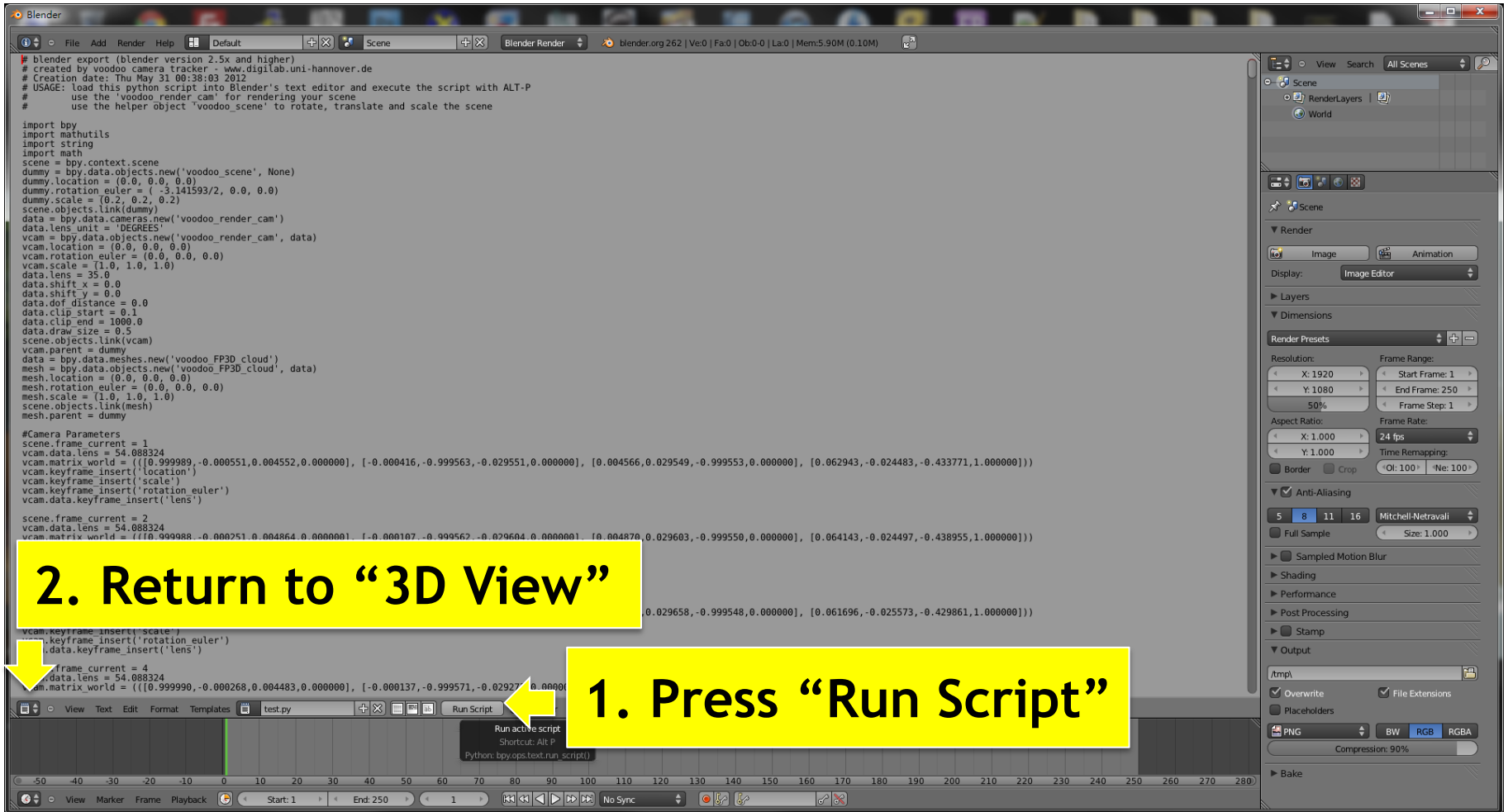
**Select "Text → Open Text Block"**



**Select the Python script exported by Voodoo**

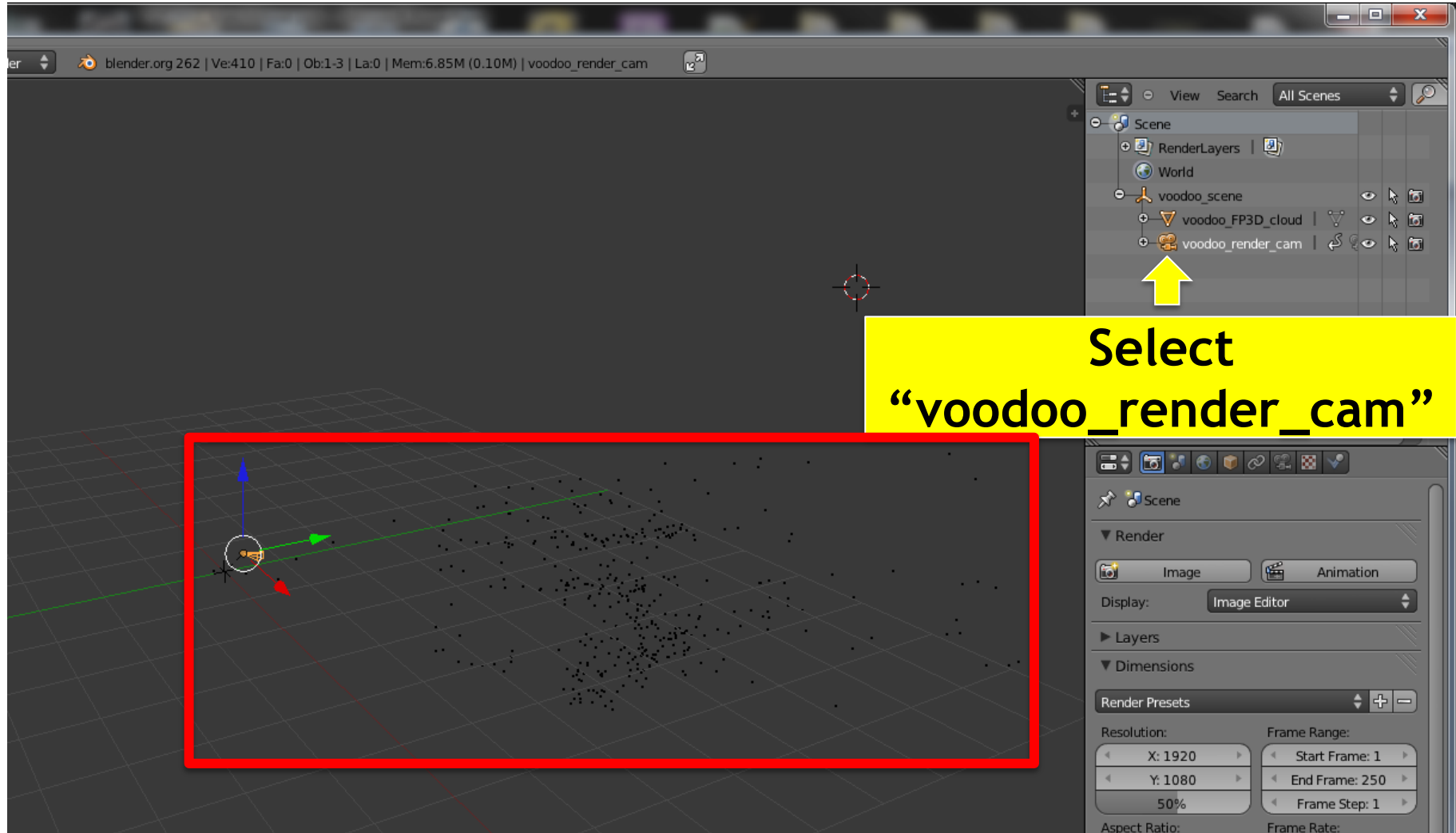
**Load python script**

# Step by Step: Import 3D Motions



Run script

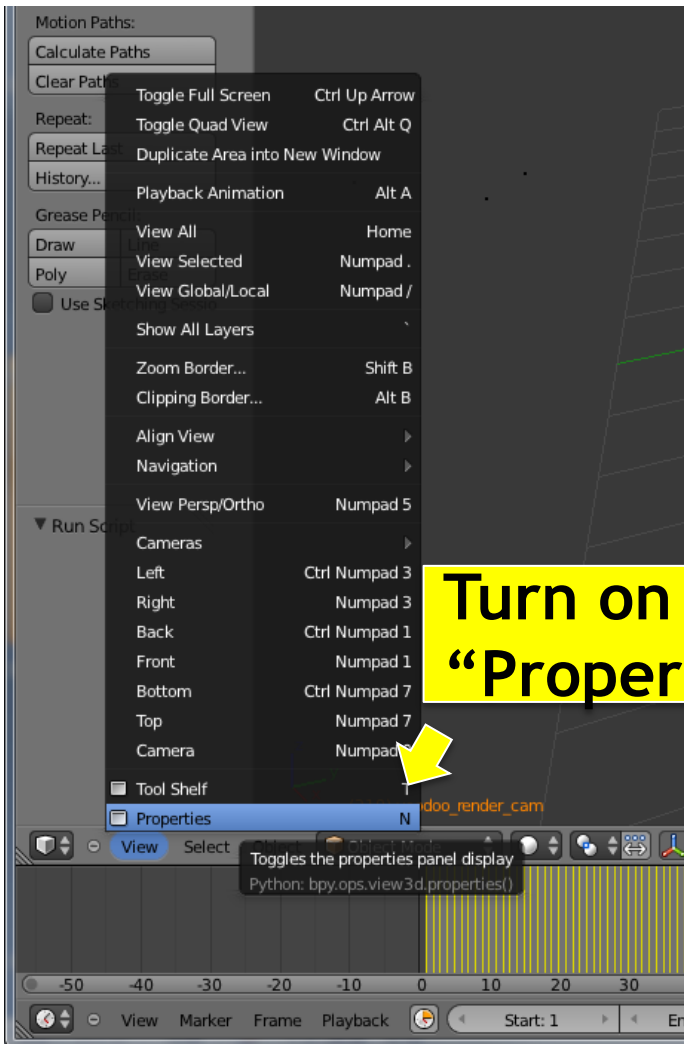
# Step by Step: Show Background Images



Select  
"voodoo\_render\_cam"

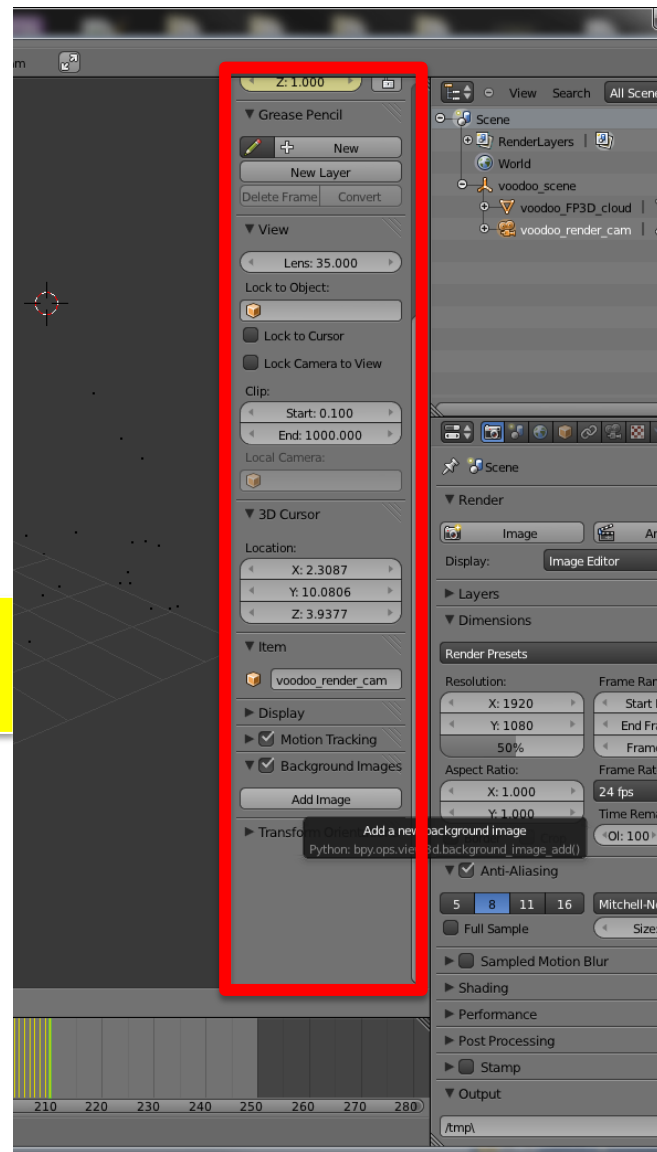
Select Voodoo camera

# Step by Step: Show Background Images



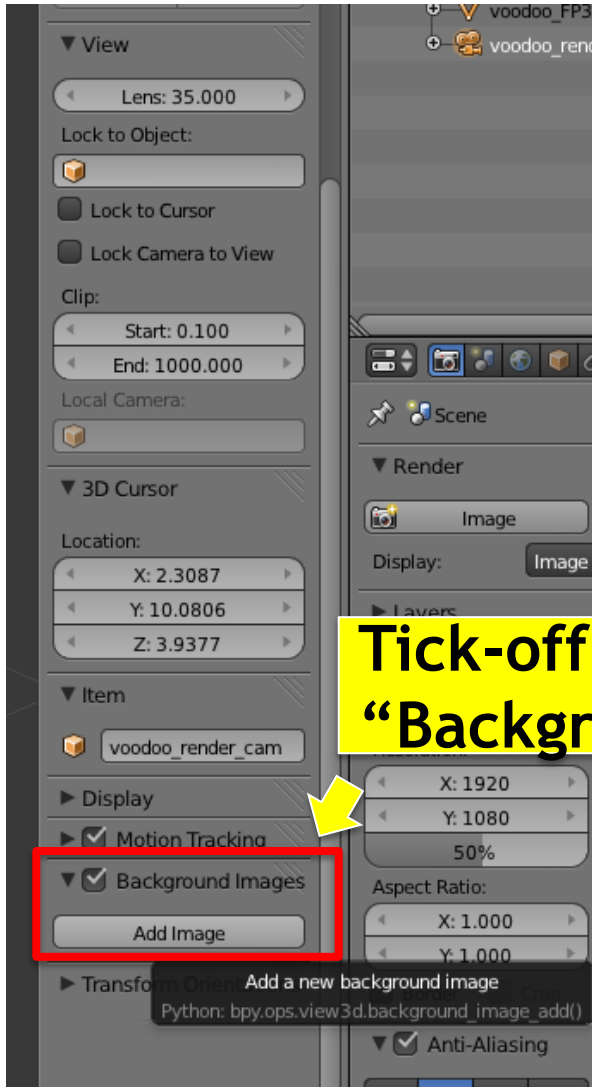
Turn on  
"Properties" Panel

Show Property Panel

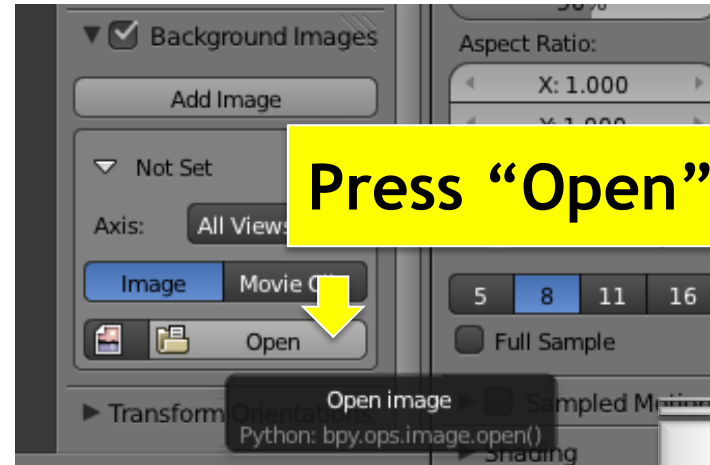




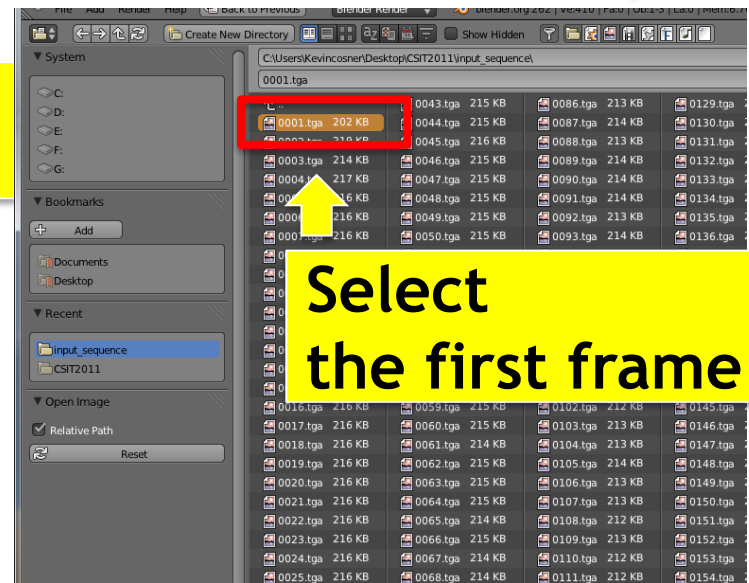
# Step by Step: Show Background Images



Tick-off  
"Background Images"

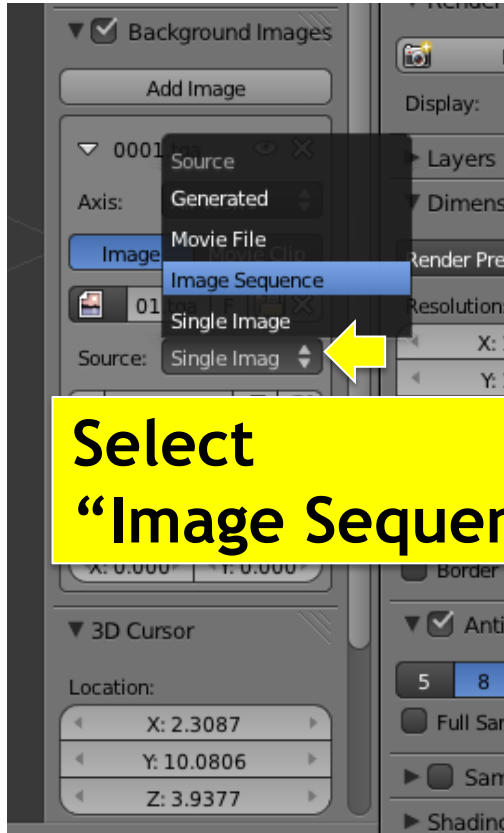


Press "Open"

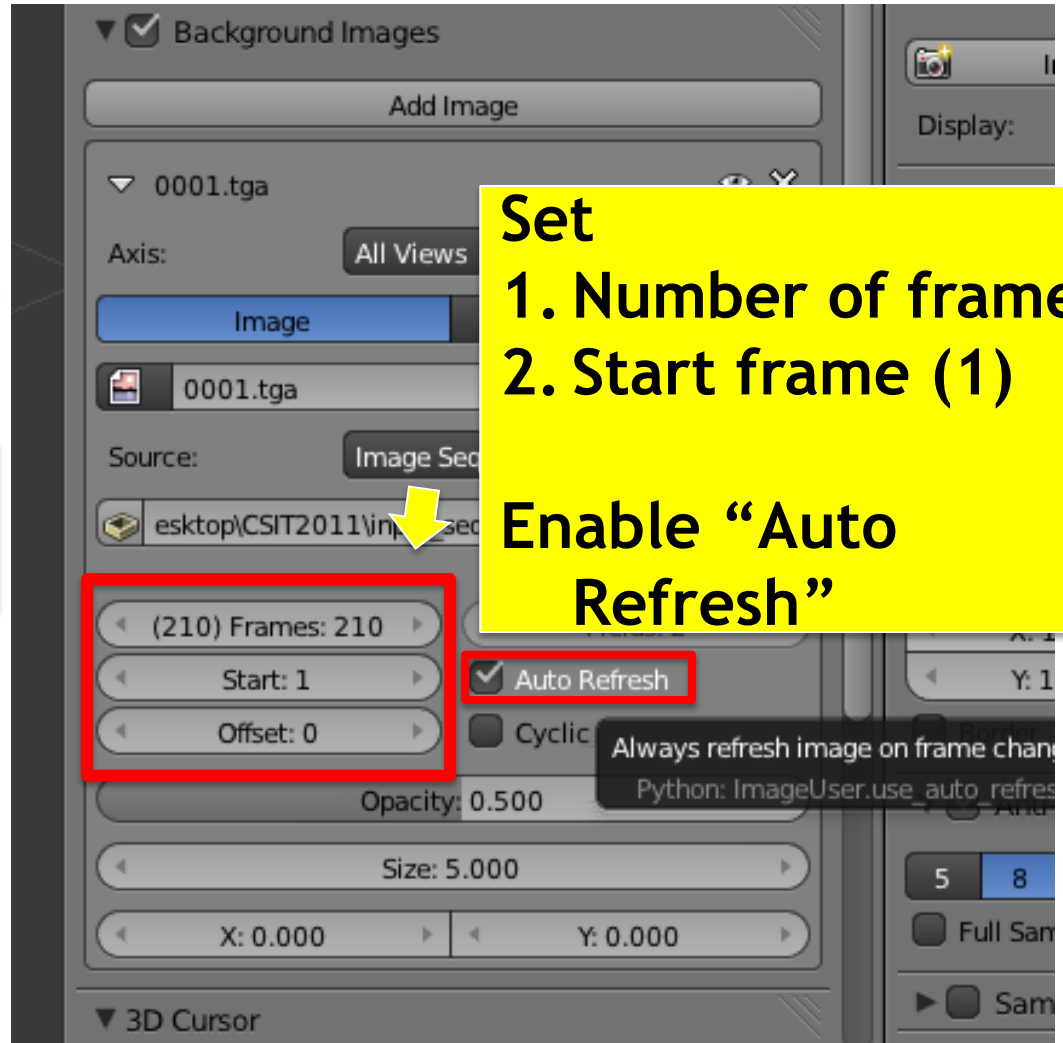


Select  
the first frame

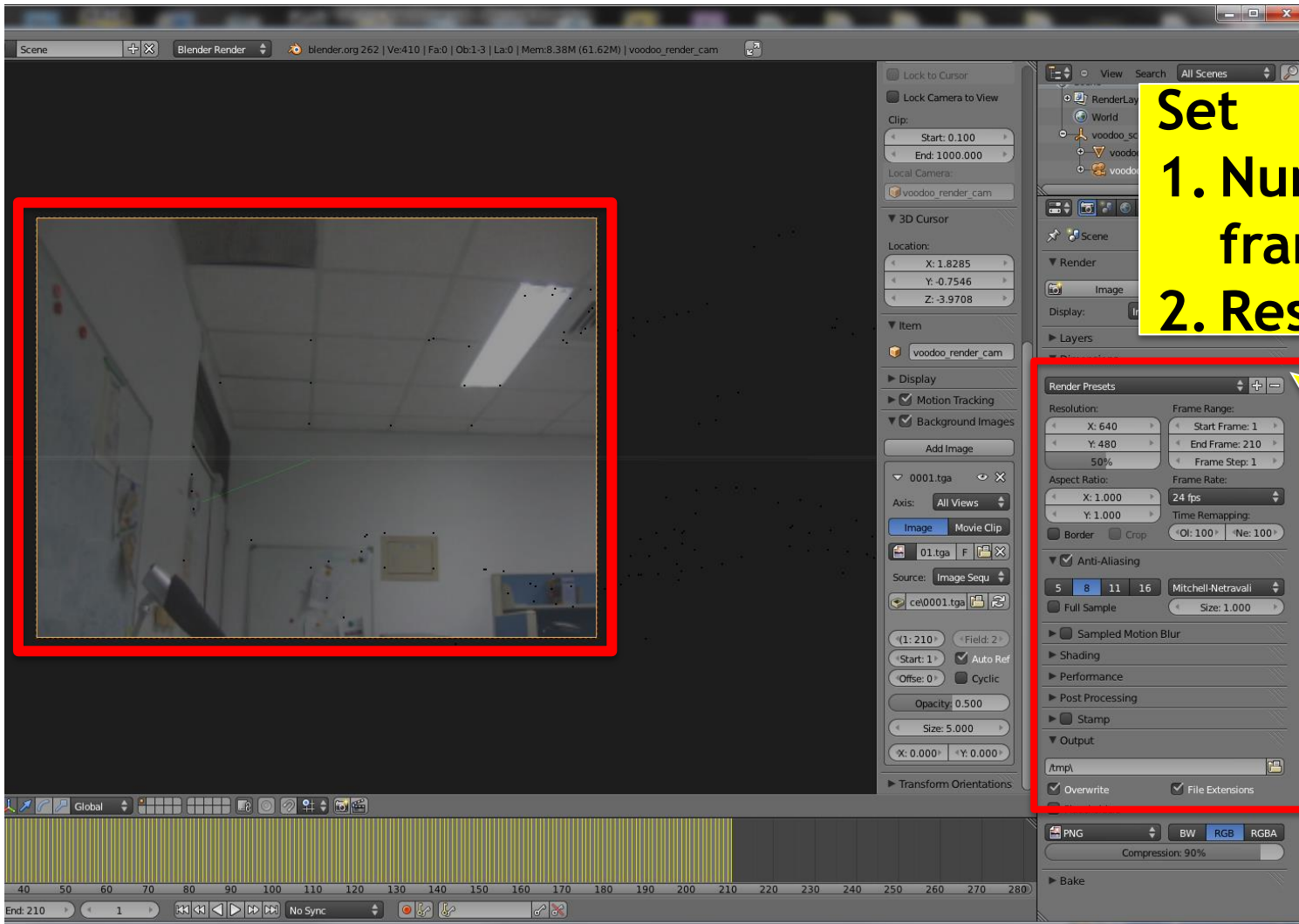
# Step by Step: Show Background Images



**Change background type**



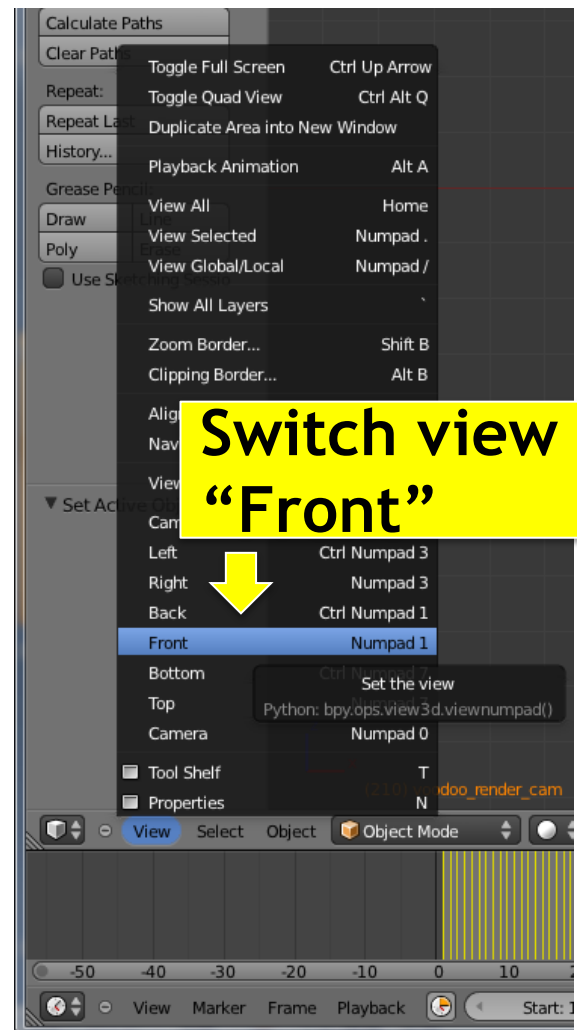
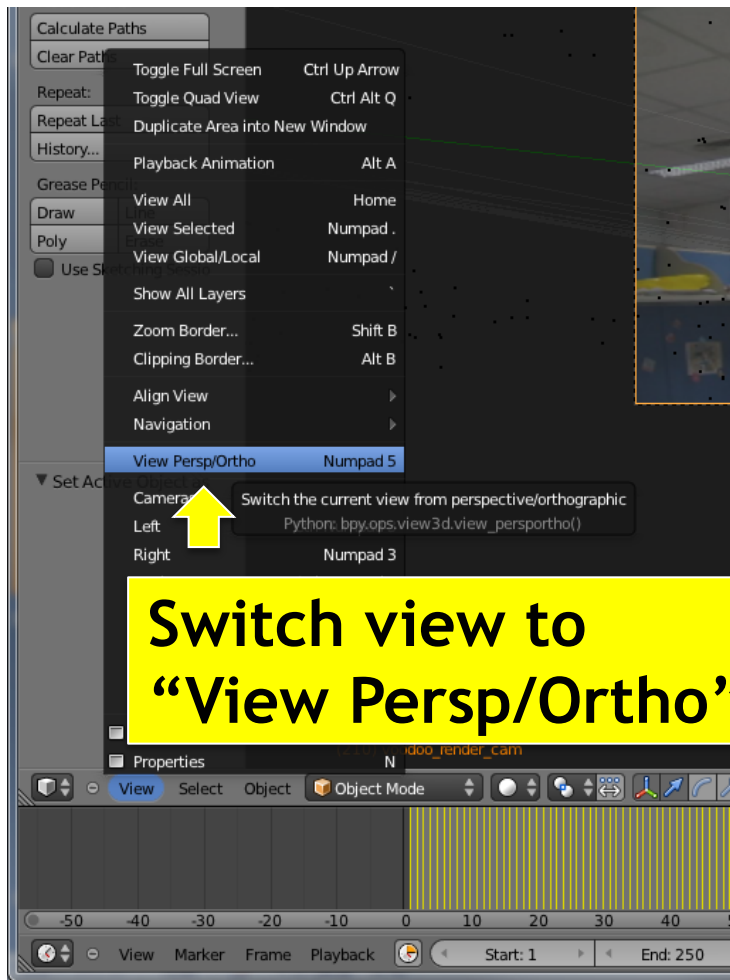
# Step by Step: Show Background Images



**Set**  
**1. Number of frames**  
**2. Resolution**

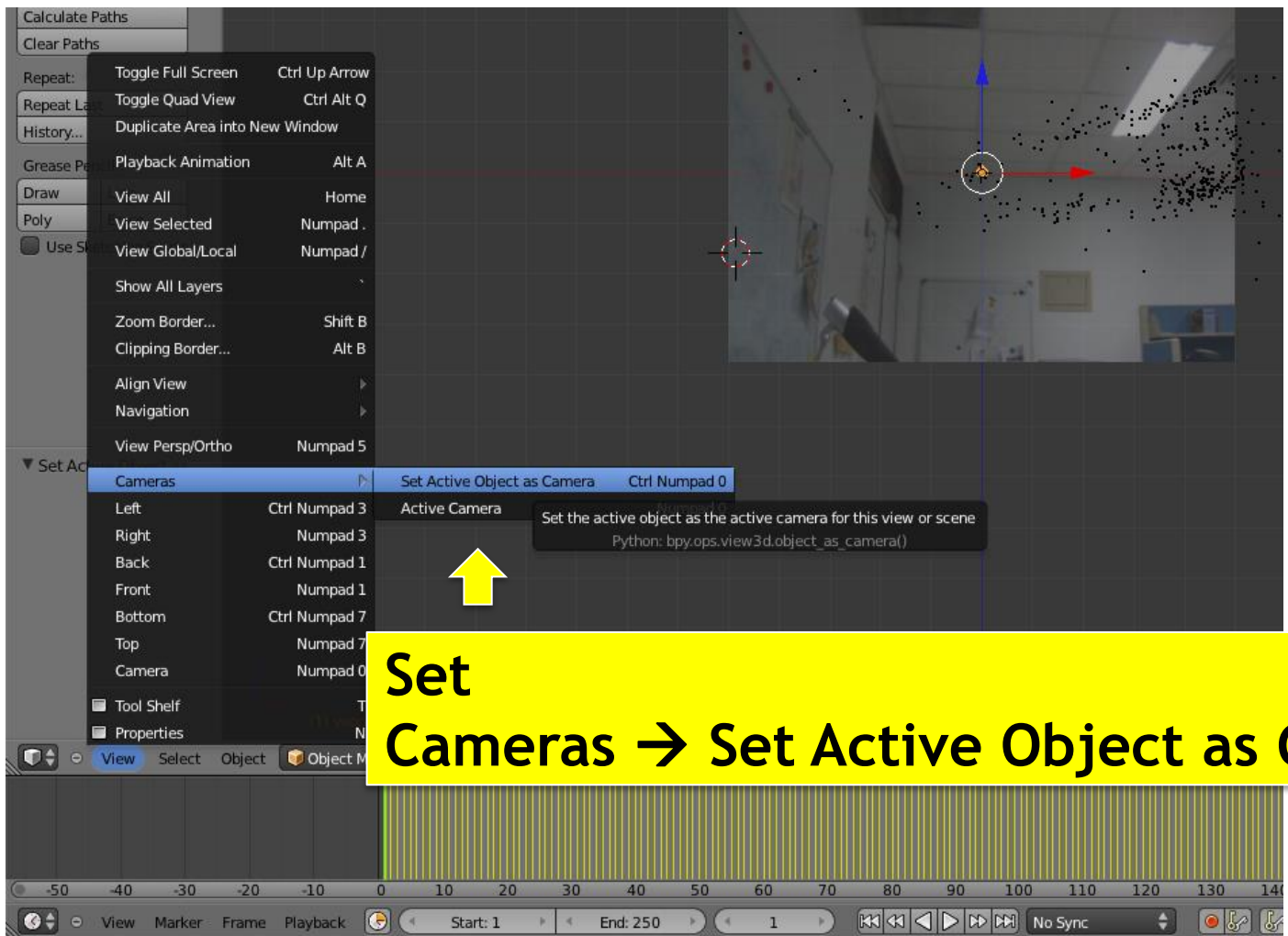
**Set resolution**

# Step by Step: Show Background Images



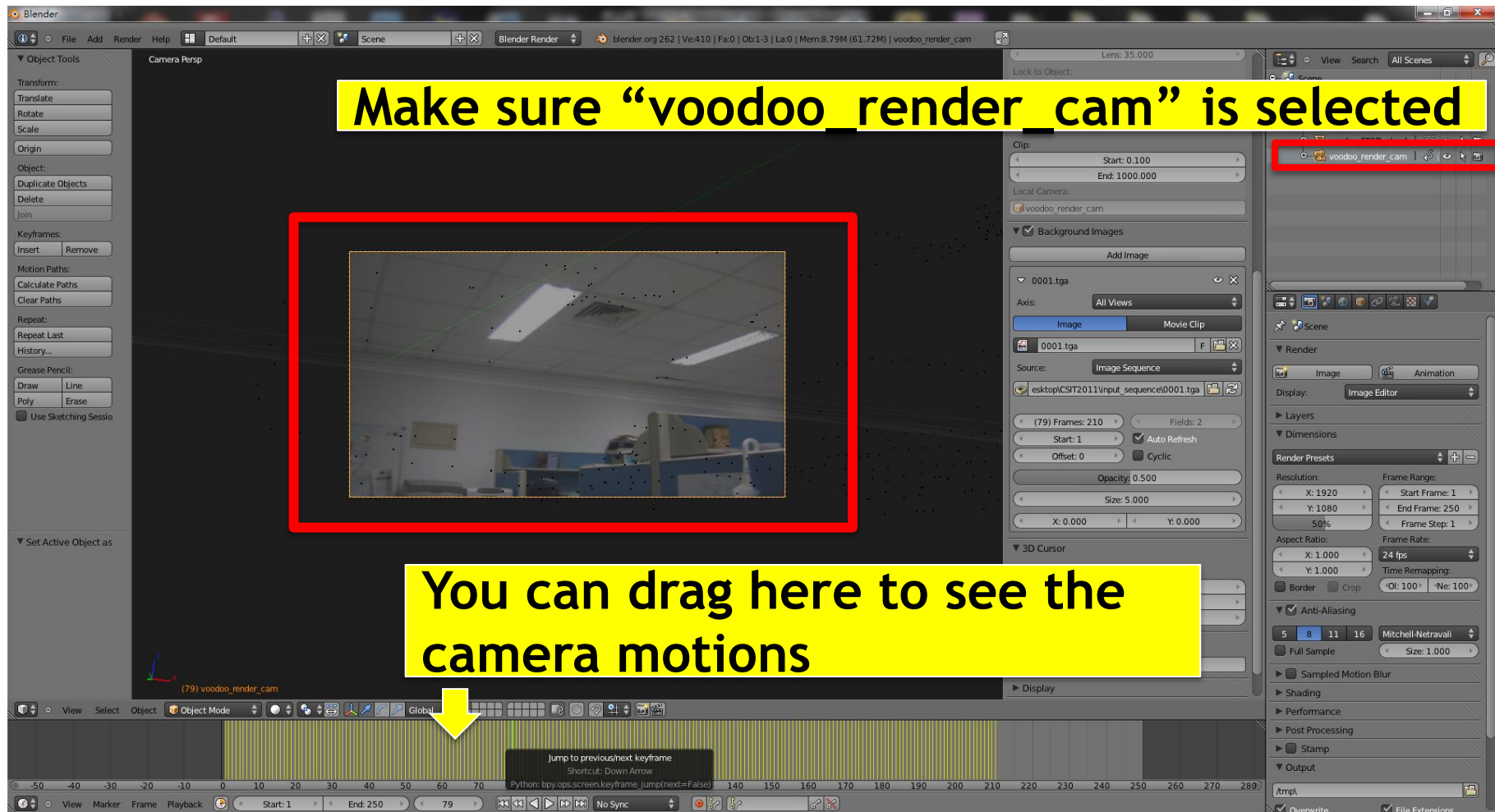
Set view

# Step by Step: Show Background Images

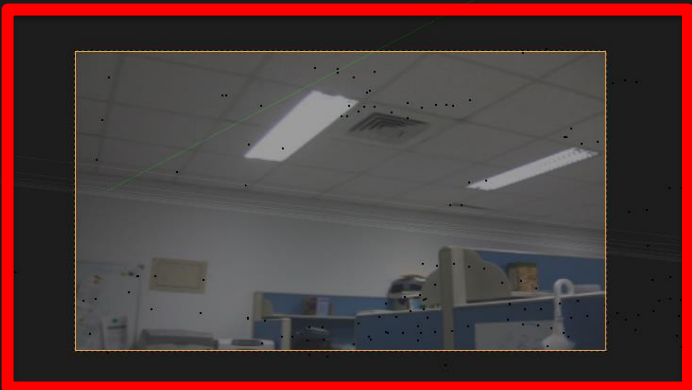


Set active camera

# Step by Step: Show Background Images



Make sure "voodoo\_render\_cam" is selected



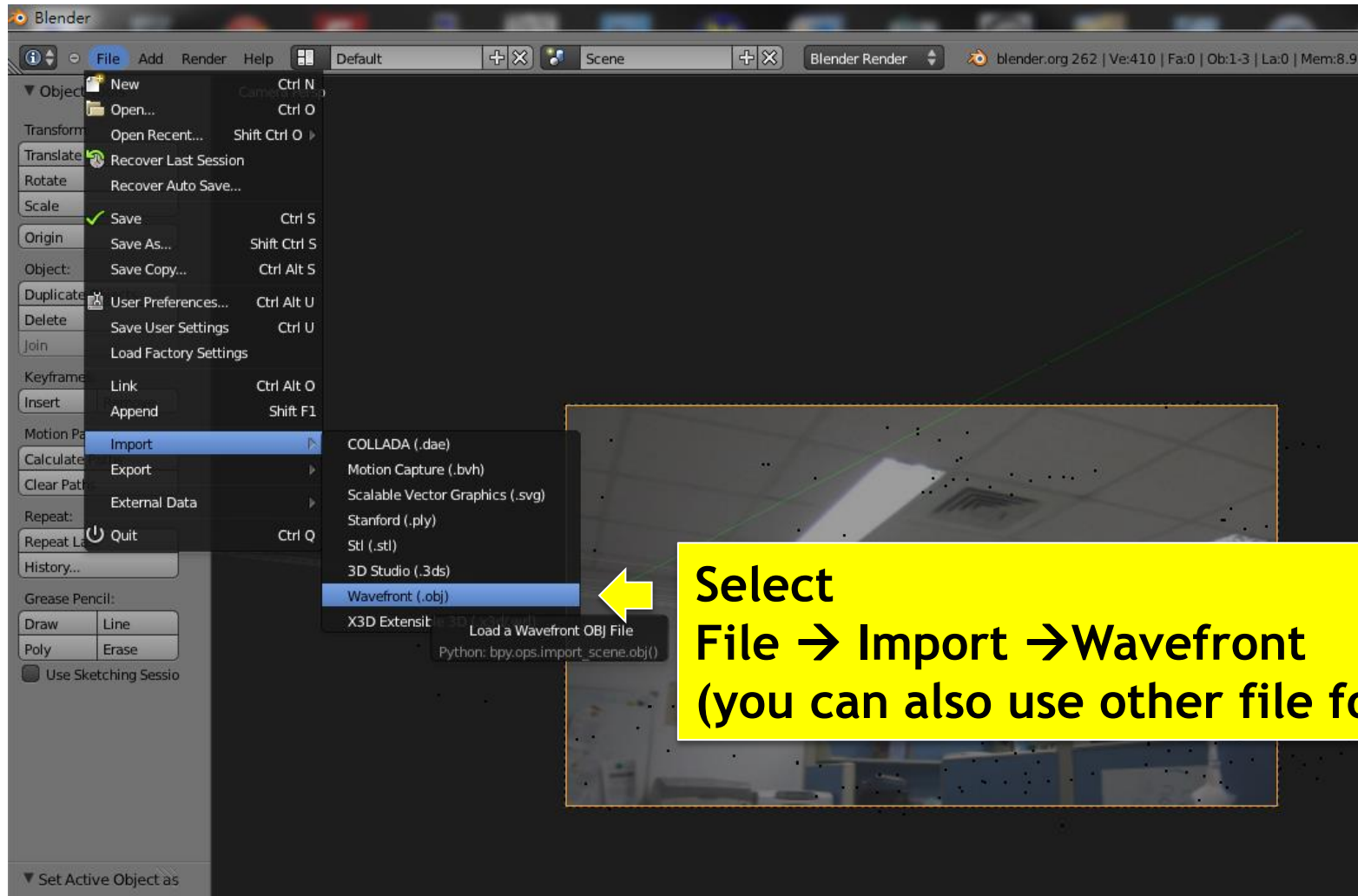
You can drag here to see the camera motions

Check background

Back to flowchart

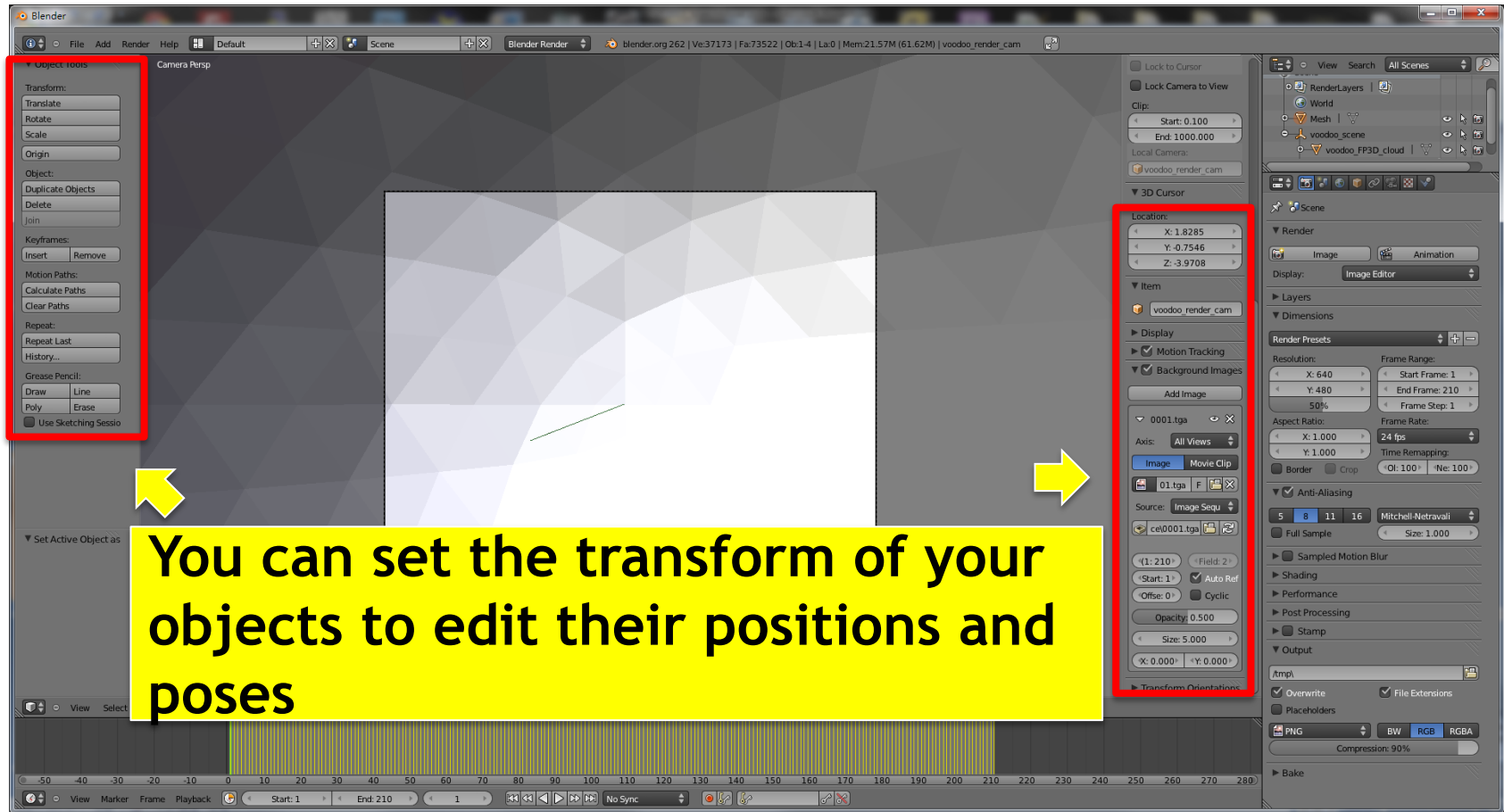


# Step by Step: Load Models



Load models

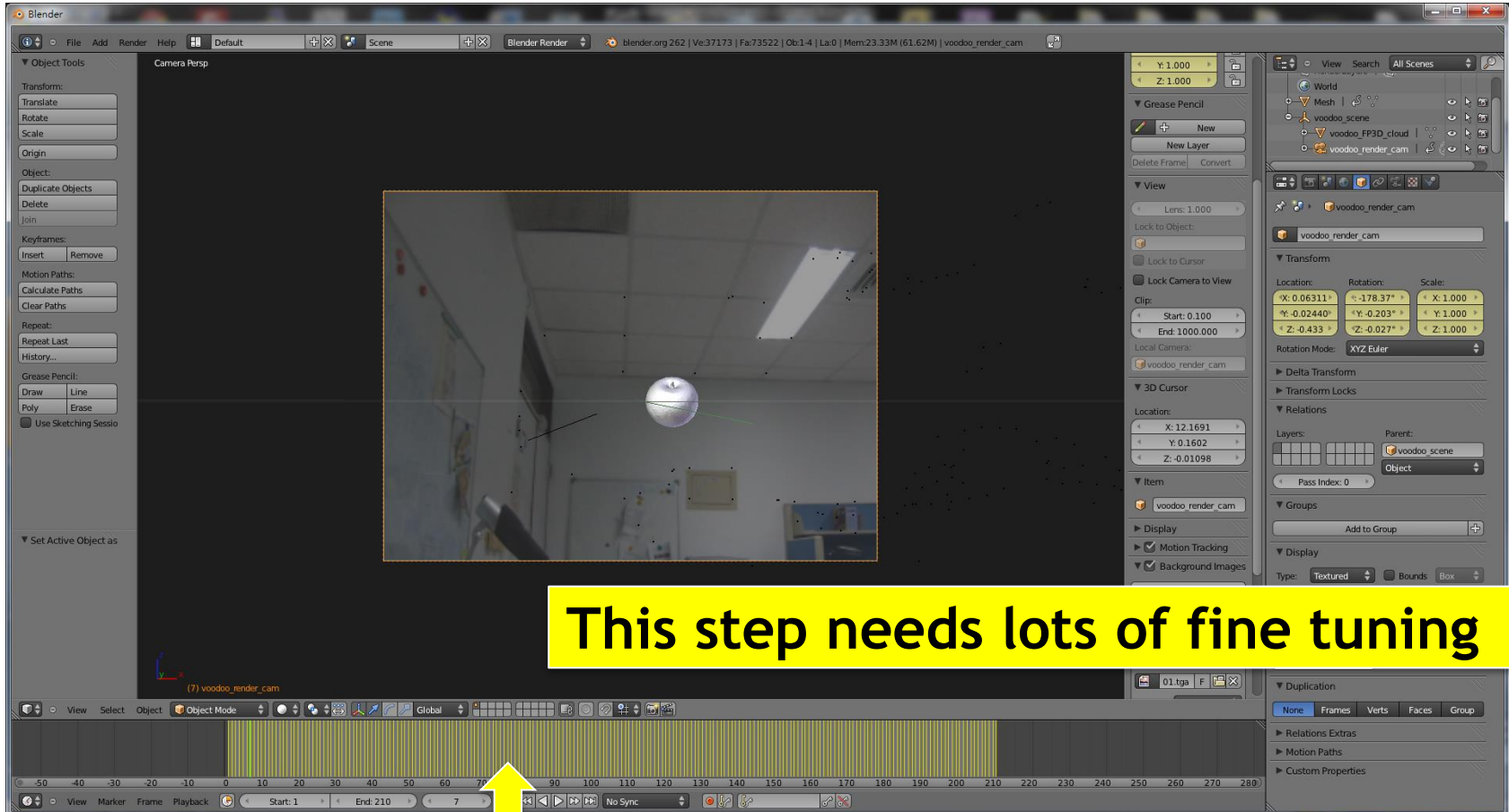
# Step by Step: Load Models



Set poses / positions for models



# Step by Step: Load Models



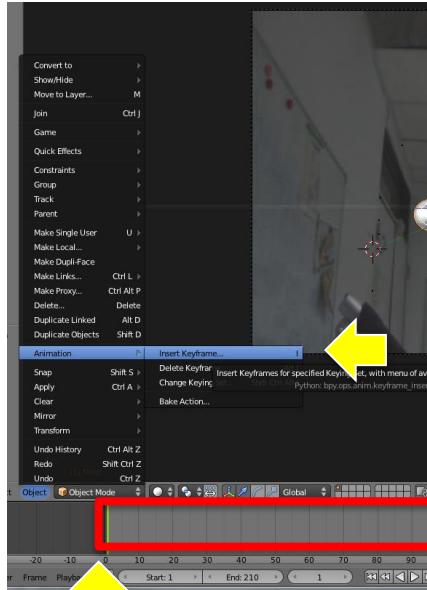
**This step needs lots of fine tuning**

**Fine tuning**

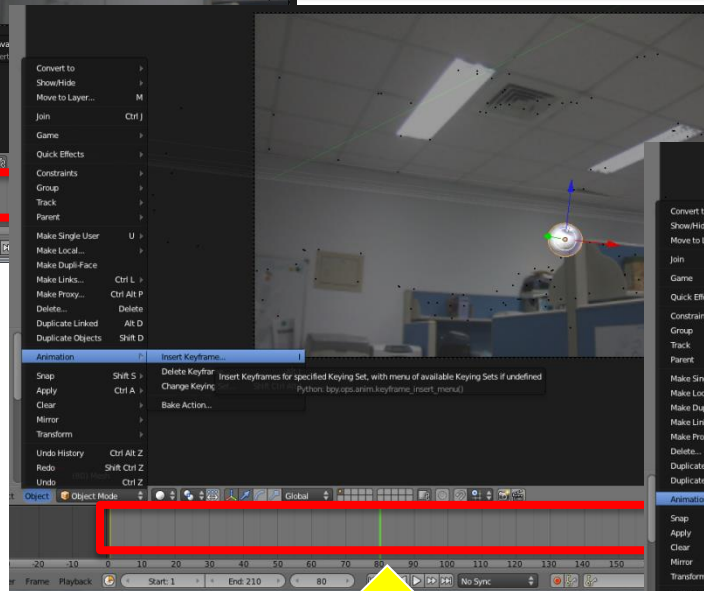
**You can drag here to see whether your tuning is correct or not (is the object located at the correct position?)**

# Step by Step: Set Animation DigiVFX

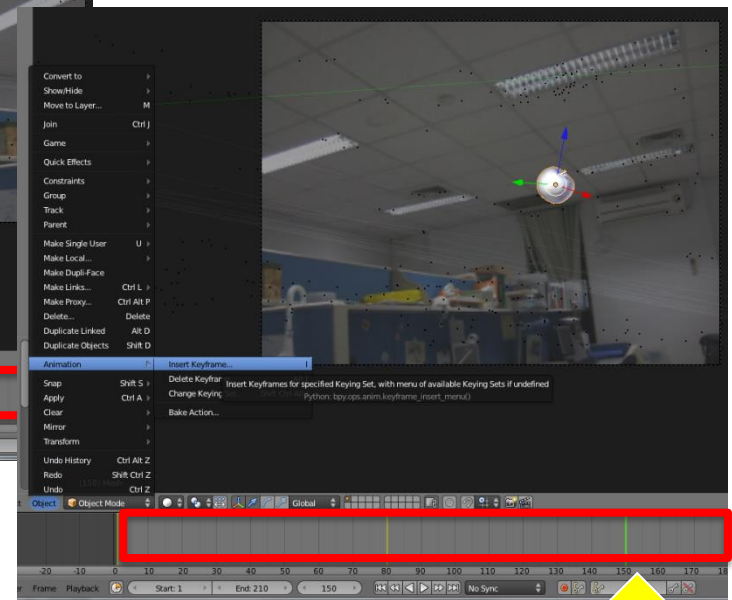
1. Select the frame that you want to insert a key frame
2. Select Object → Animation → Insert Keyframe..
3. Repeat multiple times



Frame 1



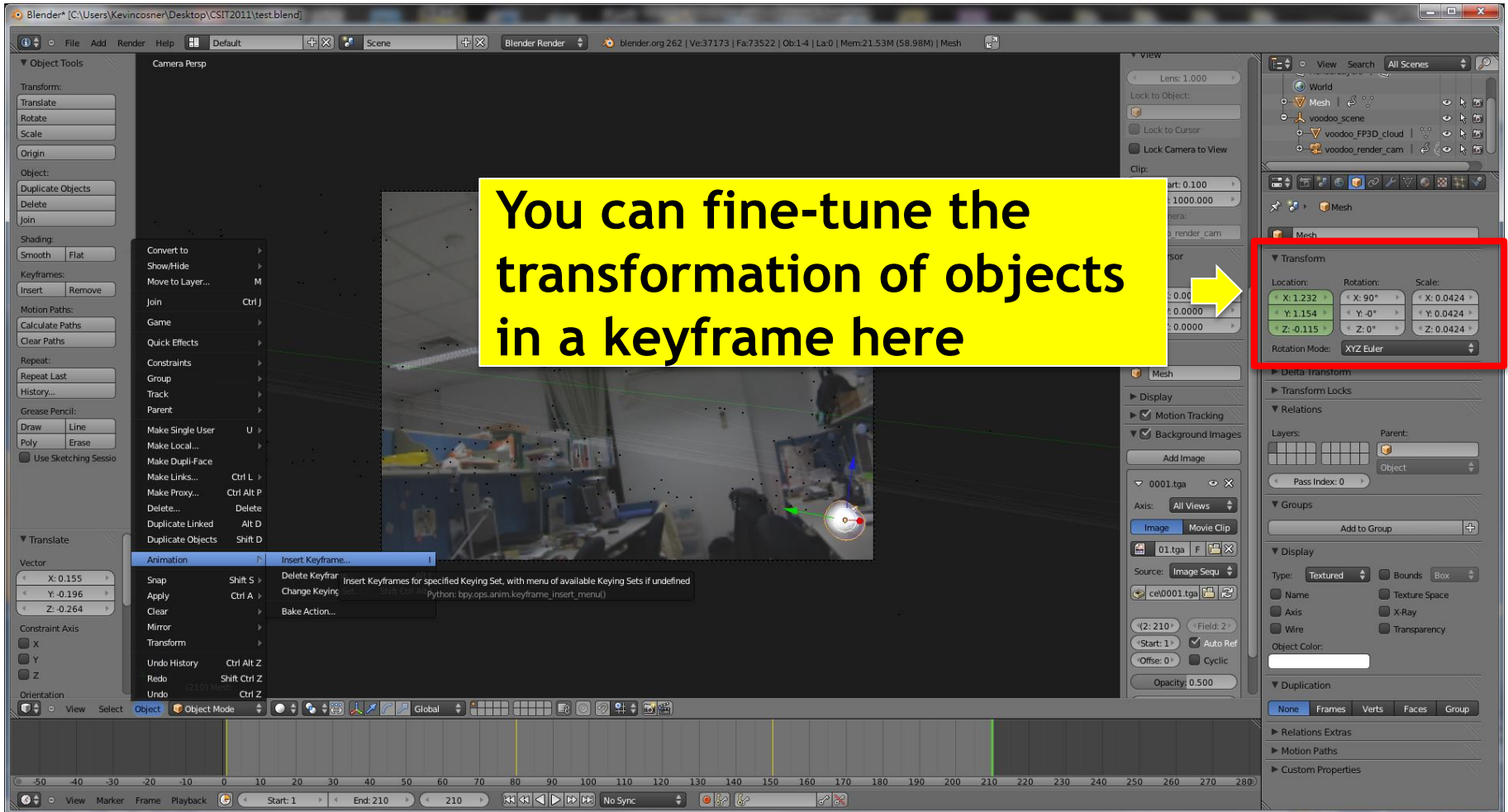
Frame 80



Frame 150  
34

Set keyframes

# Step by Step: Set Animation



Fine tuning

Back to flowchart

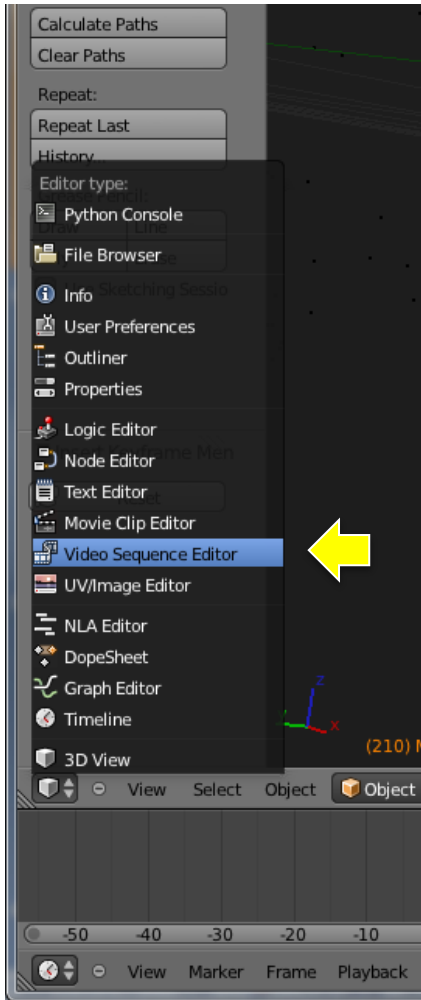


# Recipe: Compositing

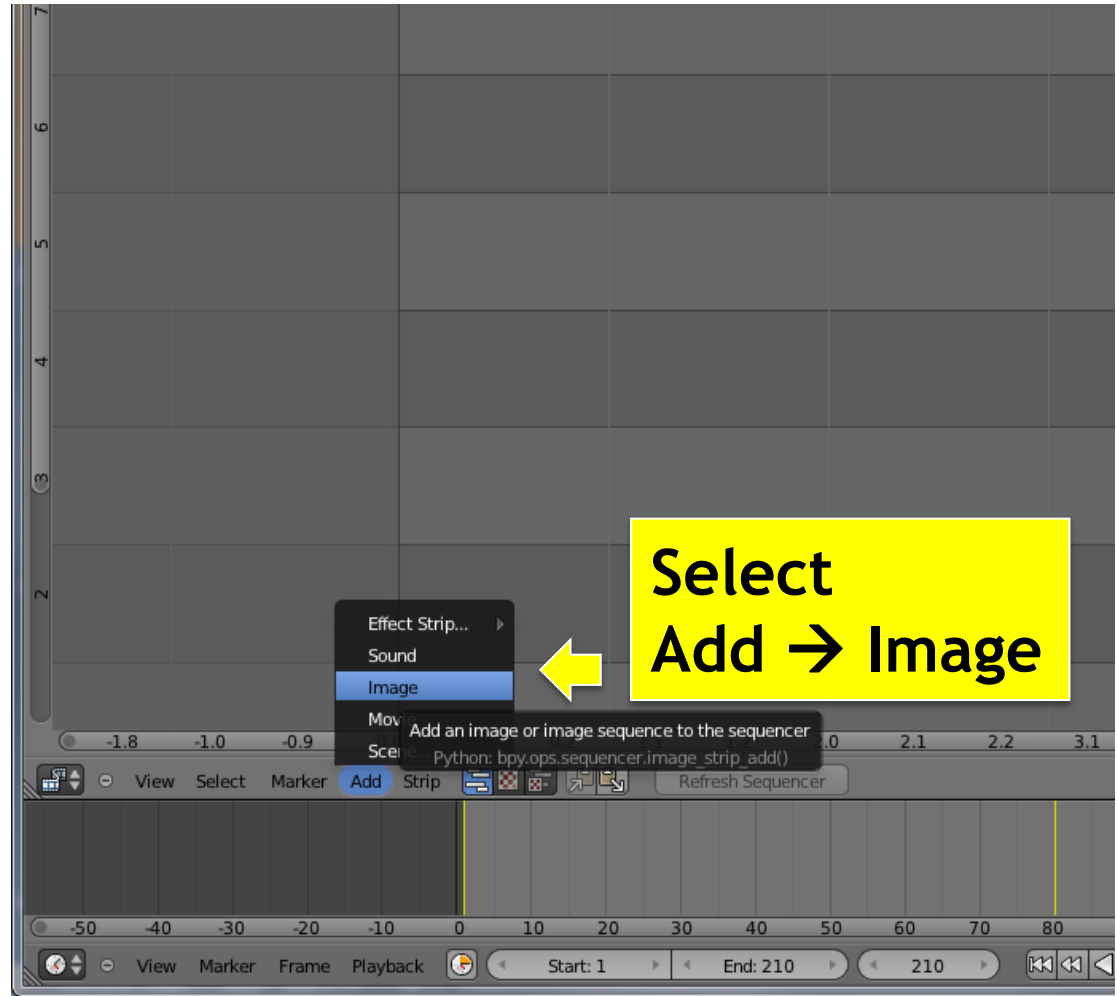
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- Add image sequence
  - Change window type to “Video Sequence Editor”
  - Select Add → Images and select all images
  - Drag the strip to the “1<sup>st</sup> Frame” in Layer 1
- Add scene
  - Select Add → Scene
  - Drag the scene strip to the “1<sup>st</sup> Frame” in Layer 2
- Set Scene
  - Change scene property to “Alpha Over”
  - Set parameters of frame and video
- Click “Animation”

# Step by Step: Compositing DigiVFX

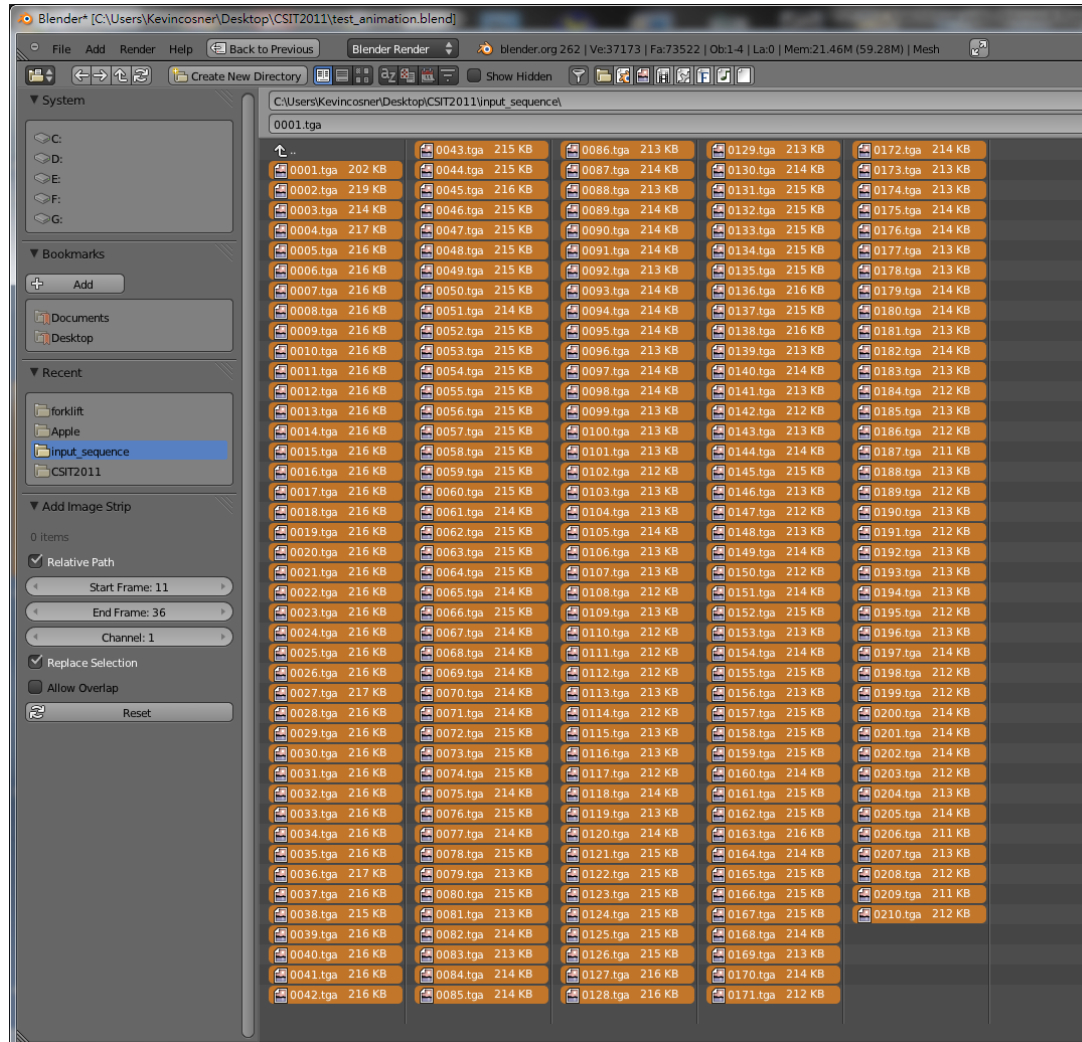


**Set to Video Sequence Editor**



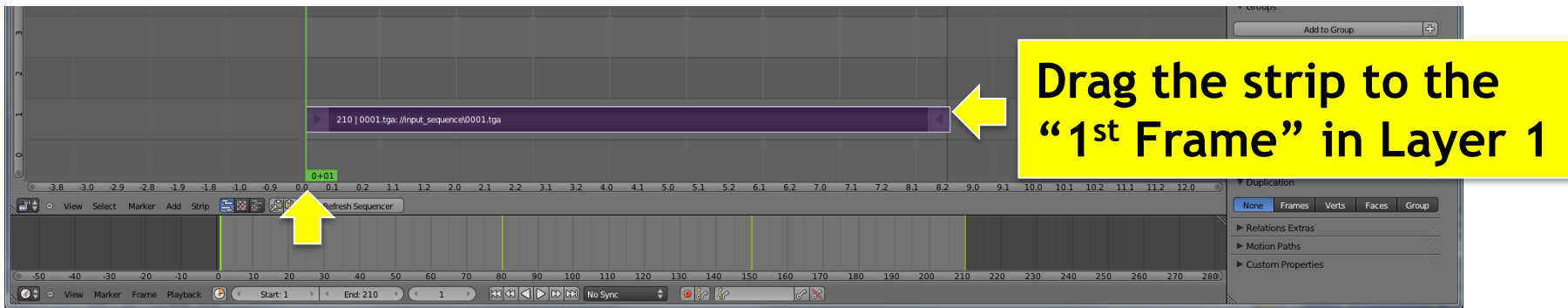
**Add image sequence (Video Channel)**

# Step by Step: Compositing



**This time, select all frames (Press A)**

# Step by Step: Compositing DigiVFX

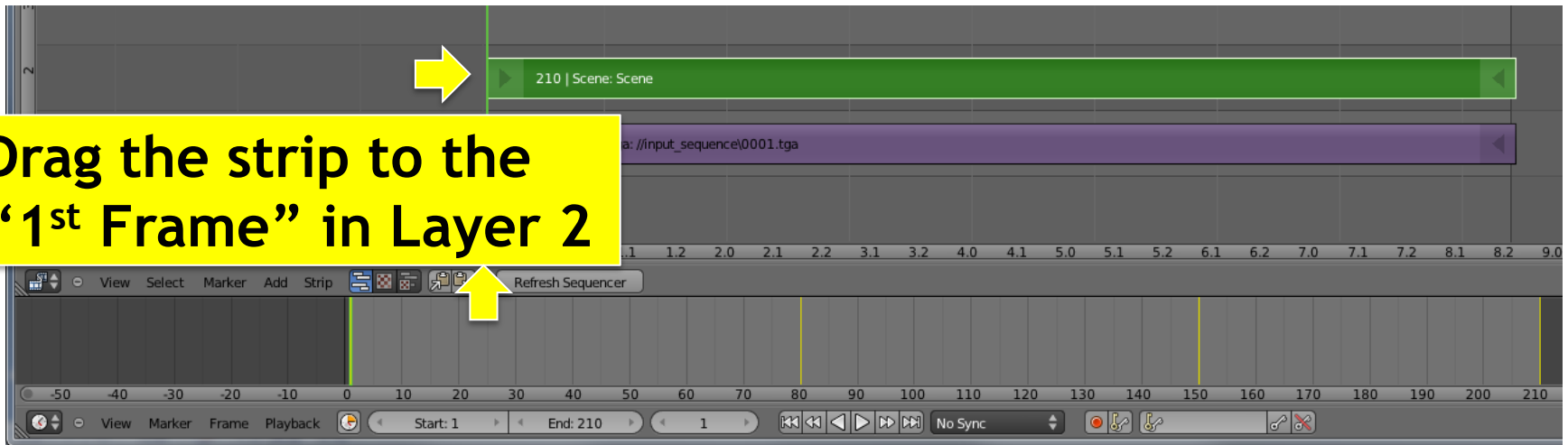


**Edit Video Layer (Right click and drag, left click to set)**

# Step by Step: Compositing



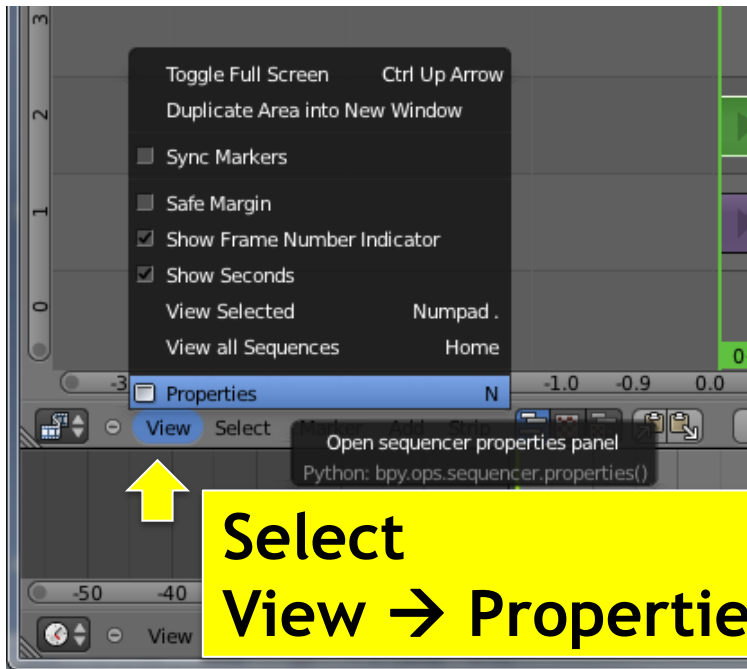
Add scene layer



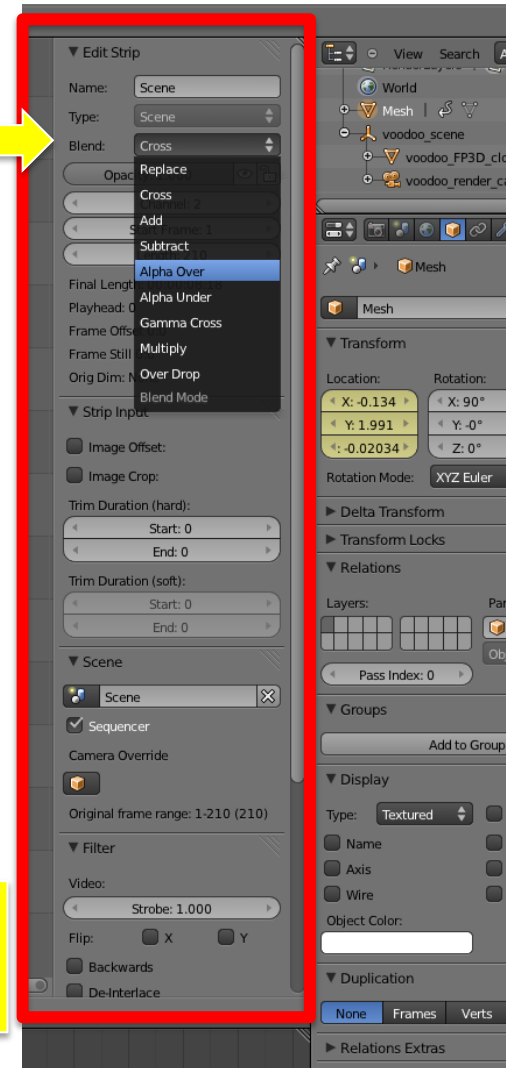
Edit scene layer (Right click and drag, left click to set)



# Step by Step: Compositing



You will see the Properties Panel



Show Properties Panel

Select  
Blend → Alpha Over

Set Blend Type  
41

# Step by Step: Compositing

Frame Offset 0:0  
Frame Still 0:0  
Orig Dim: None

▼ Strip Input

Image Offset:  
 Image Crop:

Trim Duration (hard):  
Start: 0  
End: 0

Trim Duration (soft):  
Start: 0  
End: 0

▼ Scene

Scene

Sequencer

Camera Override

Original frame range: 1-210 (210)

▼ Filter

Video:  
Strobe: 1.000

Flip:  X  Y

Backwards  
 De-Interlace

Colors:  
Saturation: 1.000  
Multiply: 1.000

Premultiply  
 Convert Float  
 Use Color Balance

▼ Proxy / Timecode

Proxy Custom Directory  
 Proxy Custom File

Frame Still 0:0  
Orig Dim: None

▼ Strip Input

Image Offset:  
 Image Crop:

Trim Duration (hard):  
Start: 0  
End: 0

Trim Duration (soft):  
Start: 0  
End: 0

▼ Scene

Scene

Sequencer

Camera Override

voodoo\_render\_cam

▼ Filter

Video:  
Strobe: 1.000

Flip:  X  Y

Backwards  
 De-Interlace

Colors:  
Saturation: 1.000  
Multiply: 1.000

Premultiply  
 Convert Float  
 Use Color Balance

▼ Proxy / Timecode

Proxy Custom Directory  
 Proxy Custom File

World

Mesh

voodoo\_scene

voodoo\_FP3D\_cloud

voodoo\_render\_cam

Mesh

▼ Transform

Location: X: -0.134 Y: 1.991 Z: -0.02034  
Rotation: X: 90° Y: -0° Z: 0°  
Scale: X: 0.0424 Y: 0.0424 Z: 0.0424

Rotation Mode: XYZ Euler

► Delta Transform

► Transform Locks

▼ Relations

Layers: Parent: Object

Pass Index: 0

▼ Groups

Add to Group

▼ Display

Type: Textured  
Bounds: Box

Name  
 Axis  
 Wire  
Object Color:

Texture Space  
 X-Ray  
 Transparency

► Duplication

10.2 11.2

Set scene camera to "voodoo\_render\_cam"

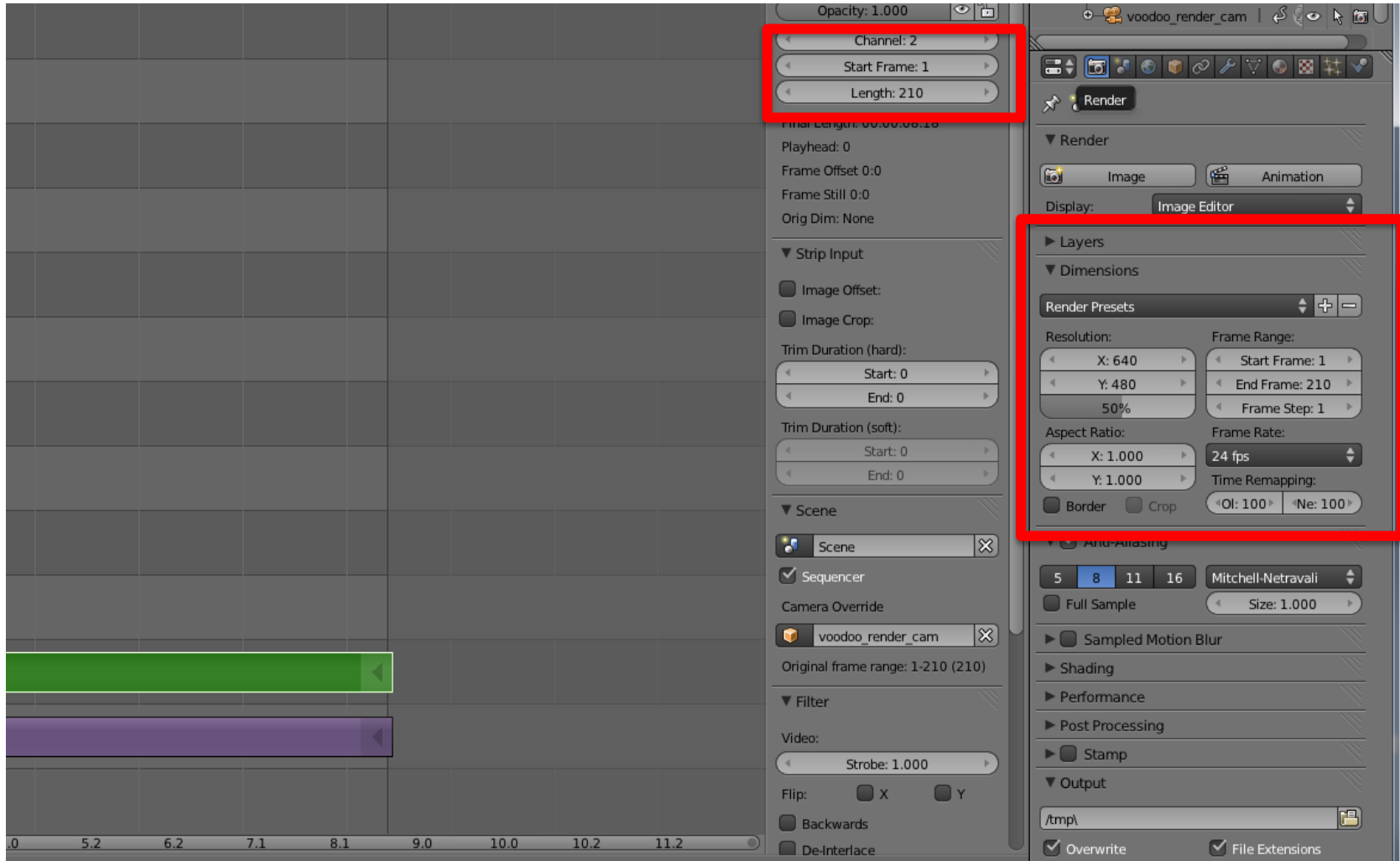
Enable!

Select Premultiply

Set scene camera

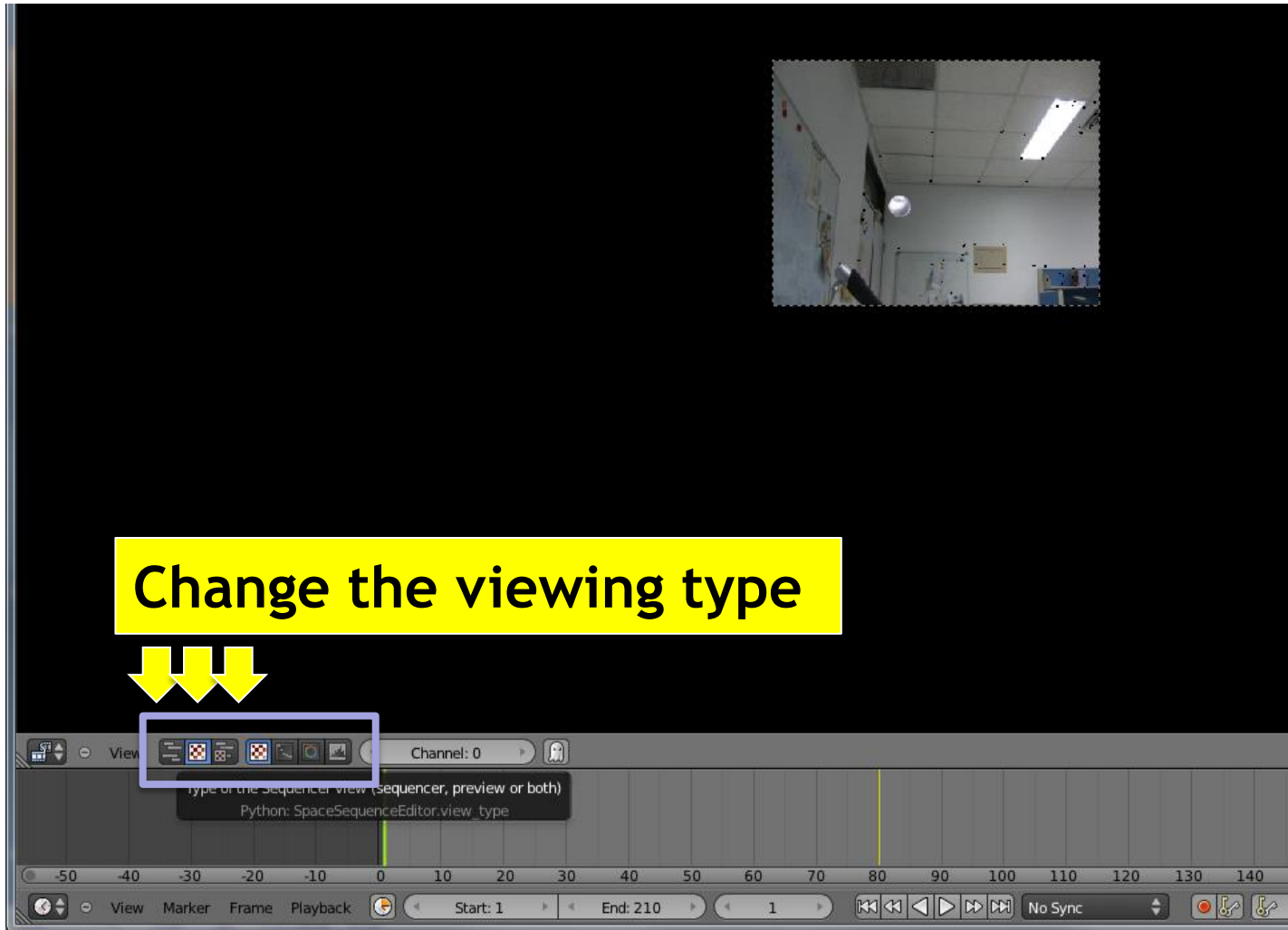
42

# Step by Step: Compositing



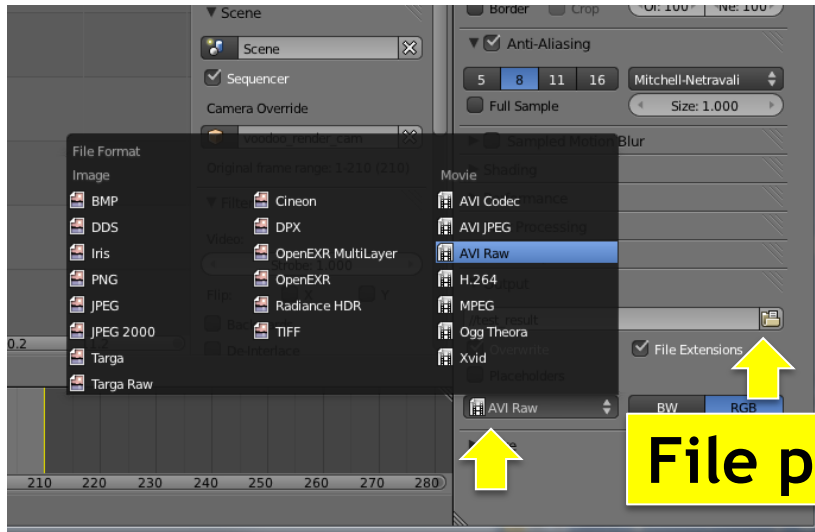
Check output setting again!

# Step by Step: Compositing DigiVFX



**Preview your video**

# Step by Step: Compositing

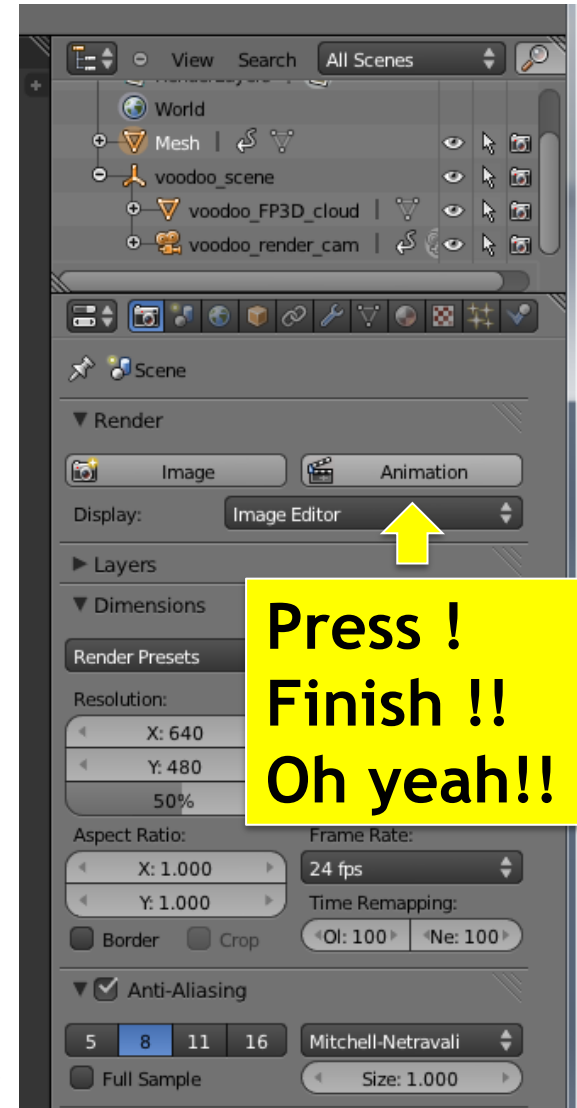


Select output format

Back to flowchart



Final Output



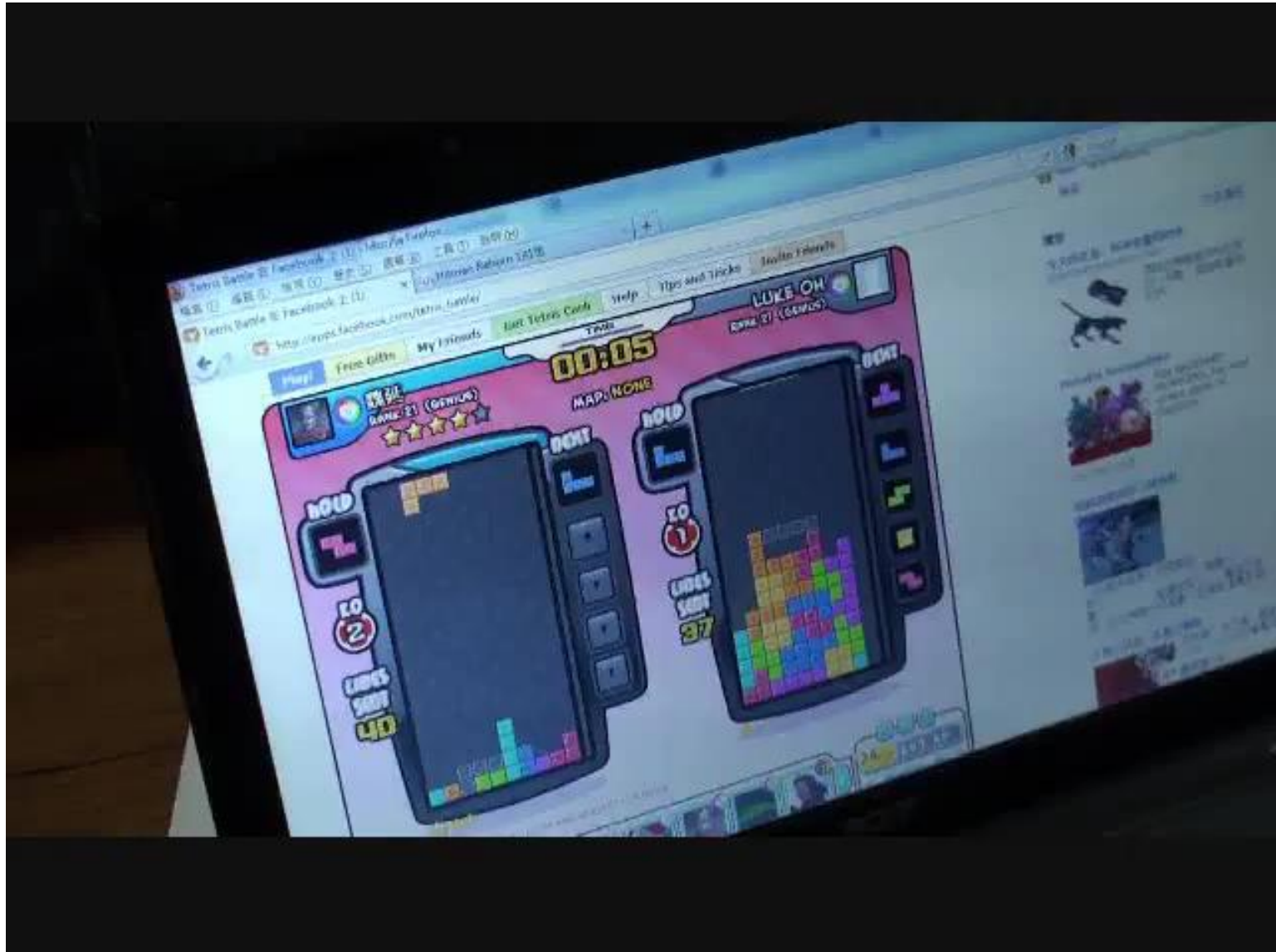
# More Examples

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- CSIE Robot



# More Examples



# More Examples

お がみ  
折り紙 - VFXproj 3

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b97901170 曾任培  
b97901186 簡伯宇



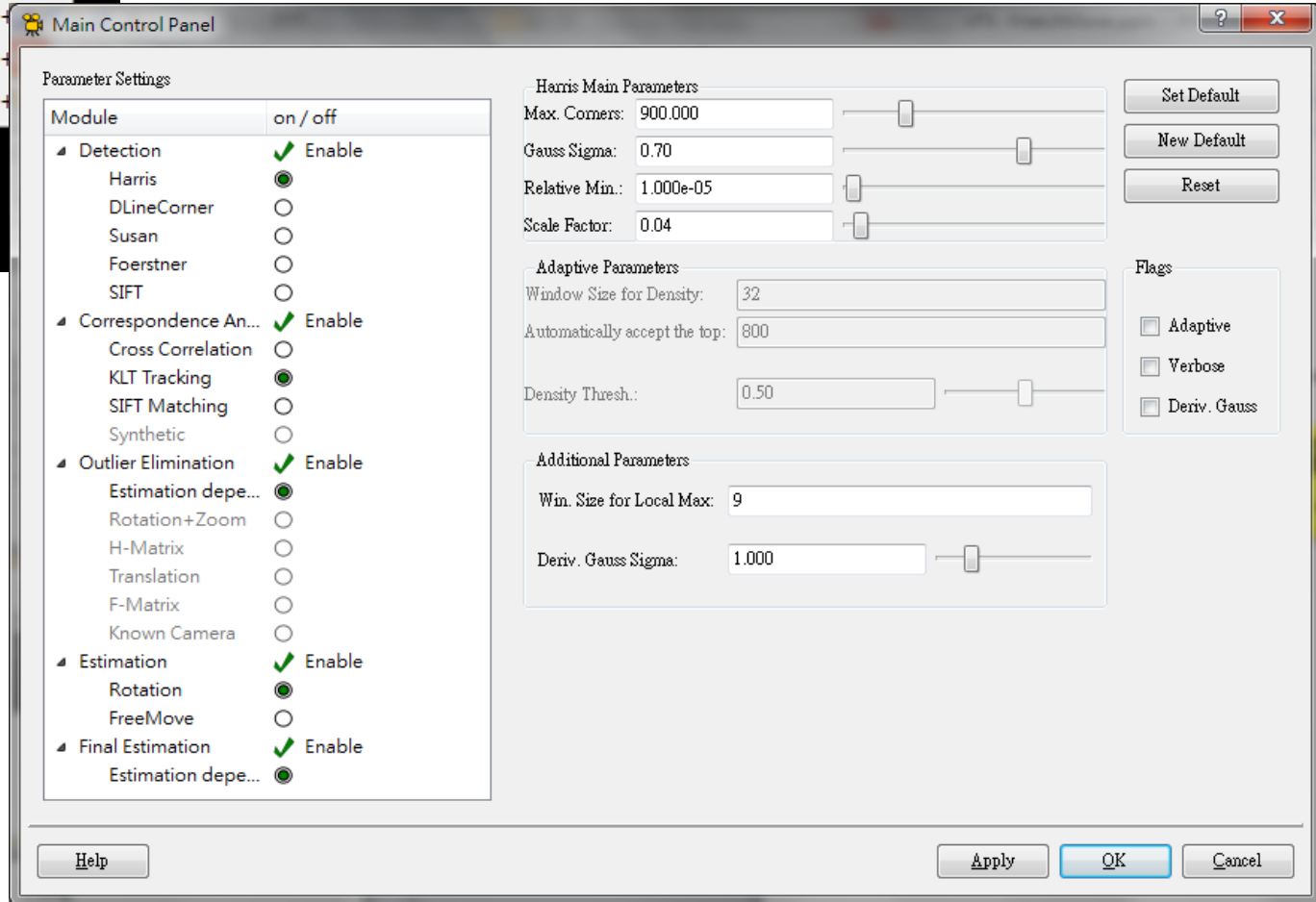
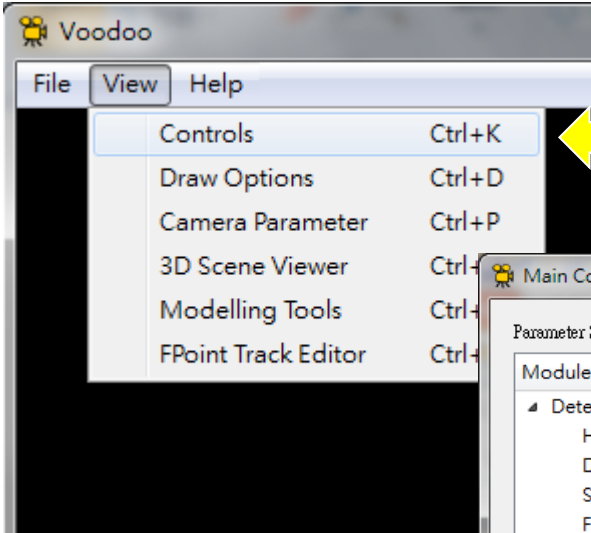
# FAQ

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- Voodoo會當掉！
  - 拍攝的影片內容差異太大
  - 調整tracking的方式
- 為什麼我在Blender中的Background和Feature沒辦法配合
  - 記得要設定 Cameras → Set Active Object as Camera
- 3D models的 位置/動作 好難調整...
  - 你是對的!
  - 多利用座標系相對位置以及不同視角會有幫助, 不過還是需要一些時間
  - 設定動作時, 盡量避免大角度或大範圍的 interpolation, 多設一些 key frames
- 為什麼最後做出來的動畫 Model 是黑的?
  - 記得在場景裡加盞燈
- 我該去哪裡找3D models
  - 網路上免費資源非常多!
  - 例如: <http://www.3dm3.com/modelsbank/>  
<http://www.sharecg.com/>

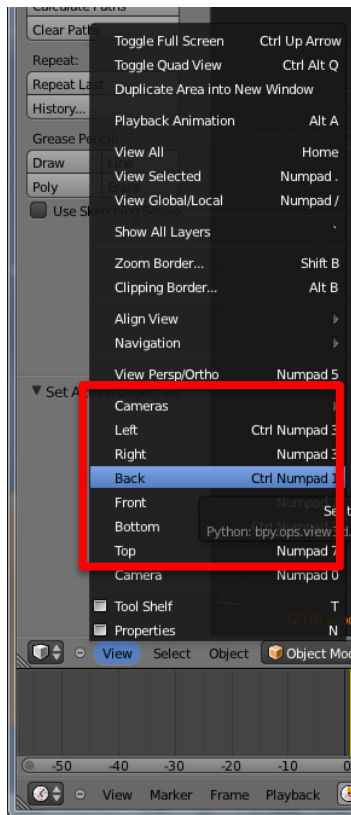
# FAQ

調整設定  
View → controls



# FAQ

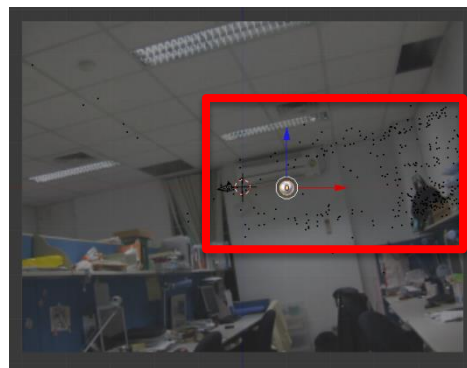
- Use different views to adjust the positions and poses of objects



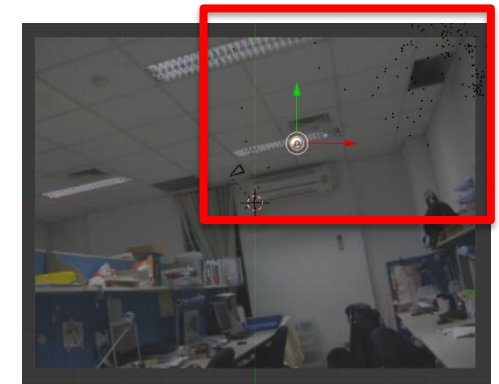
Set view



Camera view



Front view

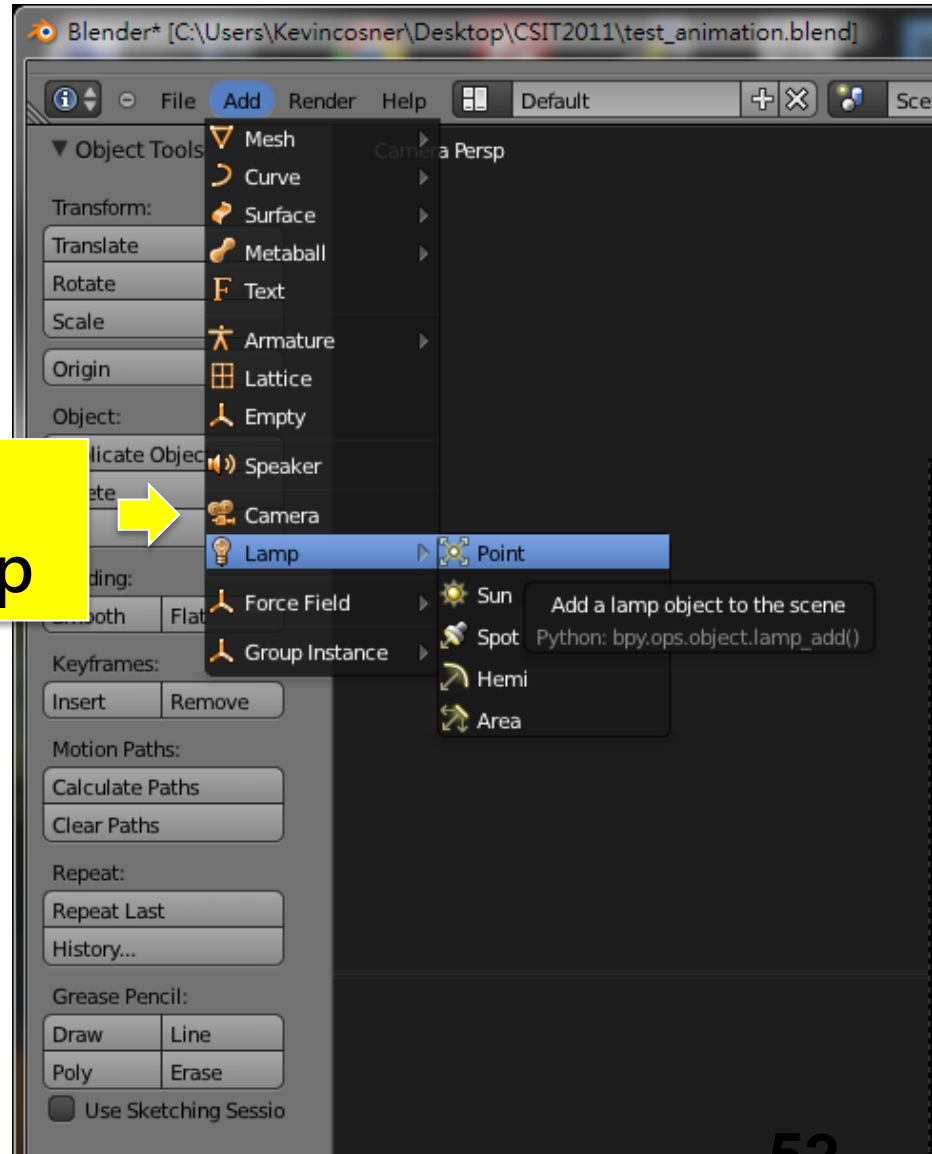


Top view

# FAQ

- Add lights

記得開燈!  
Add → Lamp



# Document

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- Blender official website
  - <http://www.blender.org/education-help/>
- Voodoo document website
  - <http://www.viscoda.com/index.php/en/voodoo-manual>