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informatics

# Computer Graphics

## Lecture 2: Computer Graphics Workflows and Tools

Kartic Subr

MAX

alamy

“Point de vue du Gras”, first photograph by Niépce.
1826
Interested in history? click here

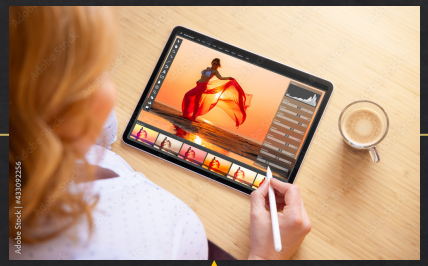
MAX

SONY
ZEISS
Vario-Sonnar T*
1:8-2.8/8.8-25.7

alamy

Steve Sasson's 1990 DyCam 1
Interested in history? click here

SONY
ZEISS
Vario-Sonnar T*
1:2.8-5.6/8.8-25.7

alamy

Adobe Stock | #431092256

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Event code
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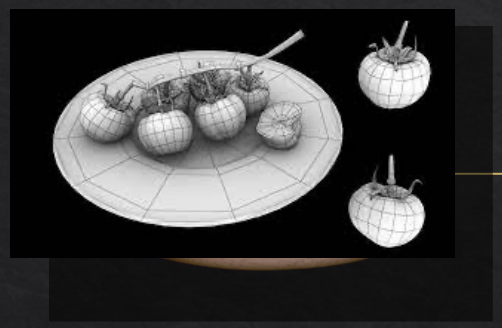

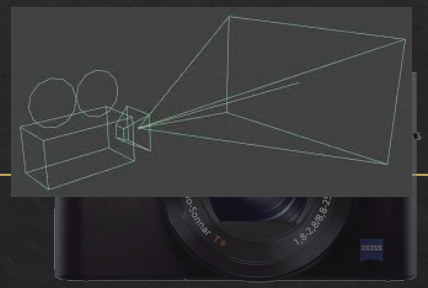

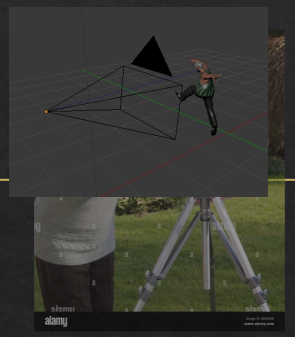

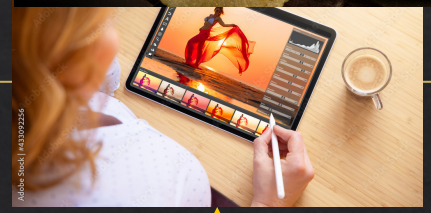

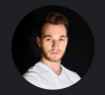

**Filip Włodarczyk**
Junior Asset Lookdev Artist | Platige Image


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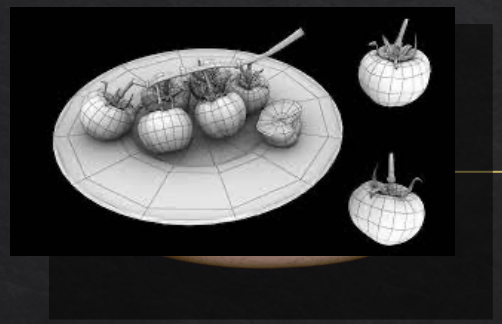
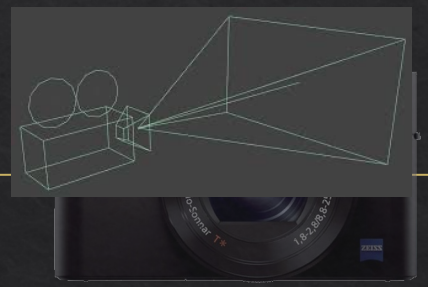
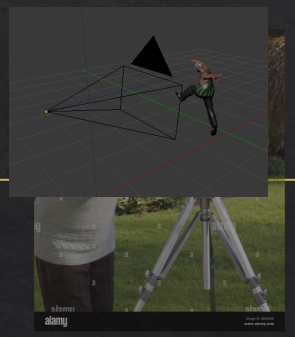
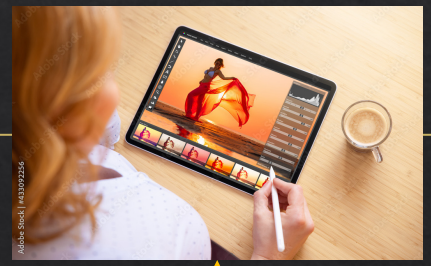
"Point de vue du Gras", rendered. Details here
Interested in history of CG animation? click here

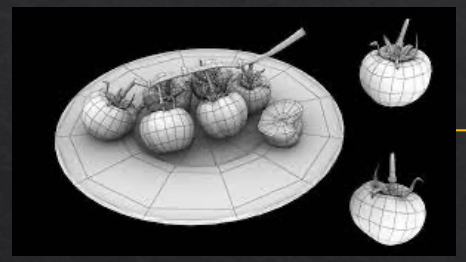


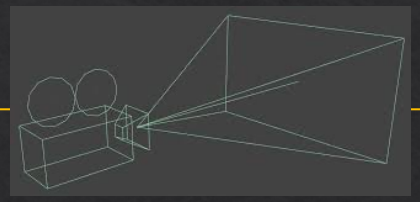


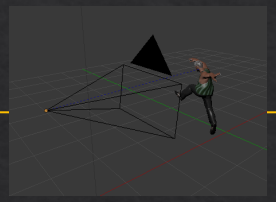




modelling animation viewing rendering







compositing

post process

explained

https://youtube.com/shorts/4qBBFdJMrAw?si=EMoCv62t2_Pj7V1n

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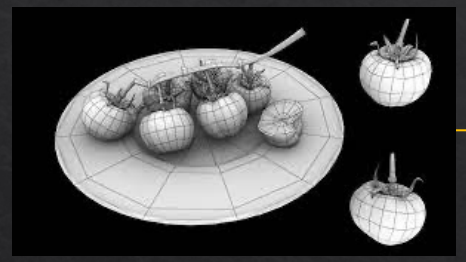
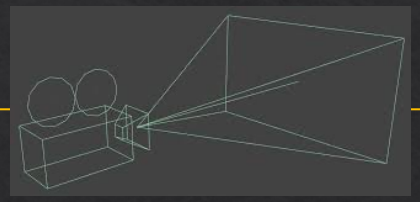
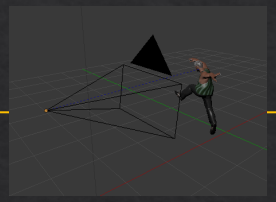
AVATAR

SONY
ZEISS
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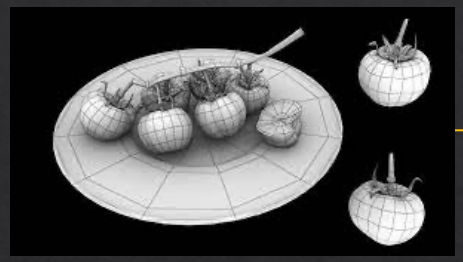
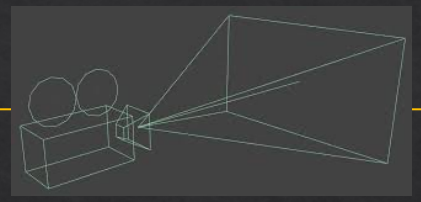
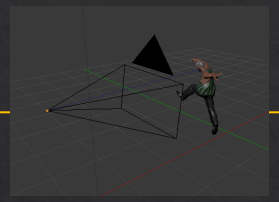
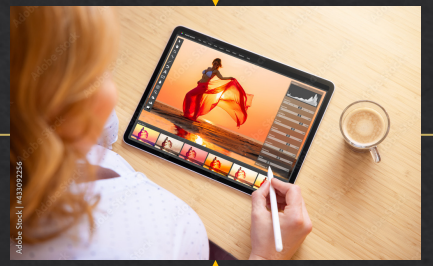
alamy

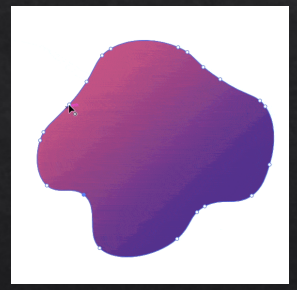


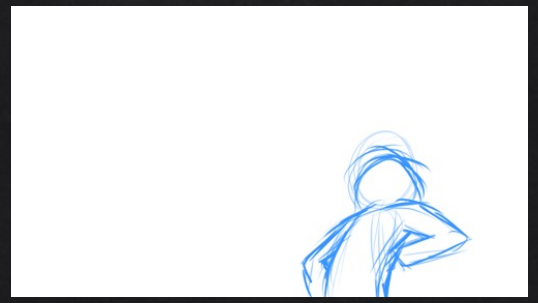


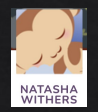


photorealism



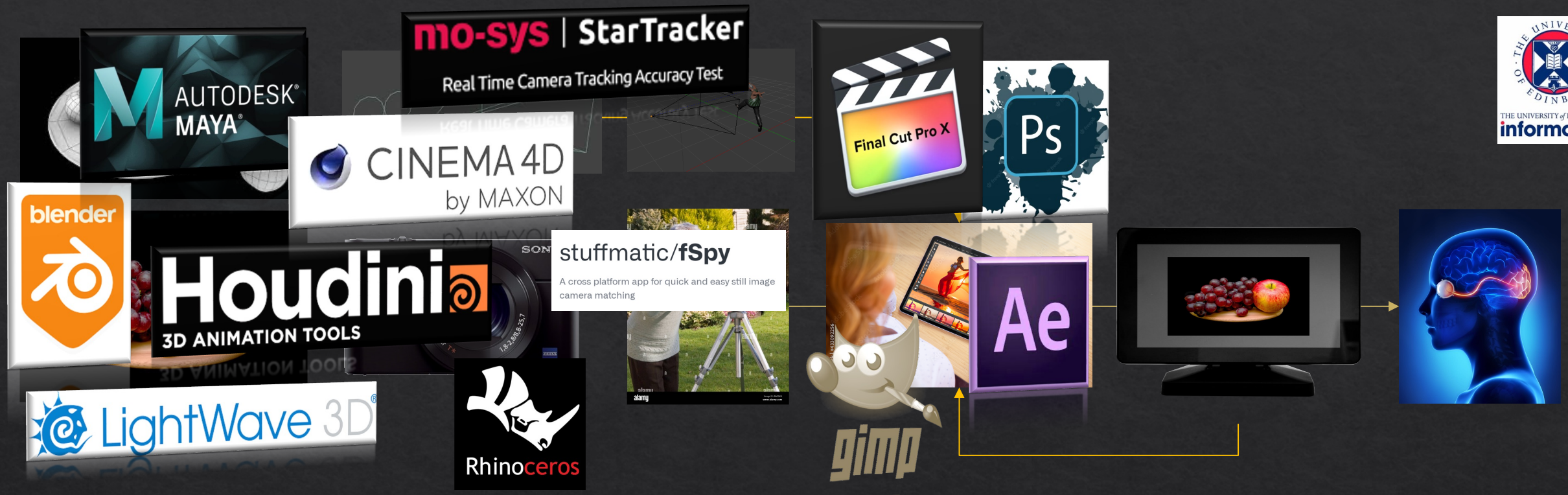







stylistic

scientific visualisation




Adobe Character Animator

Adobe illustrator

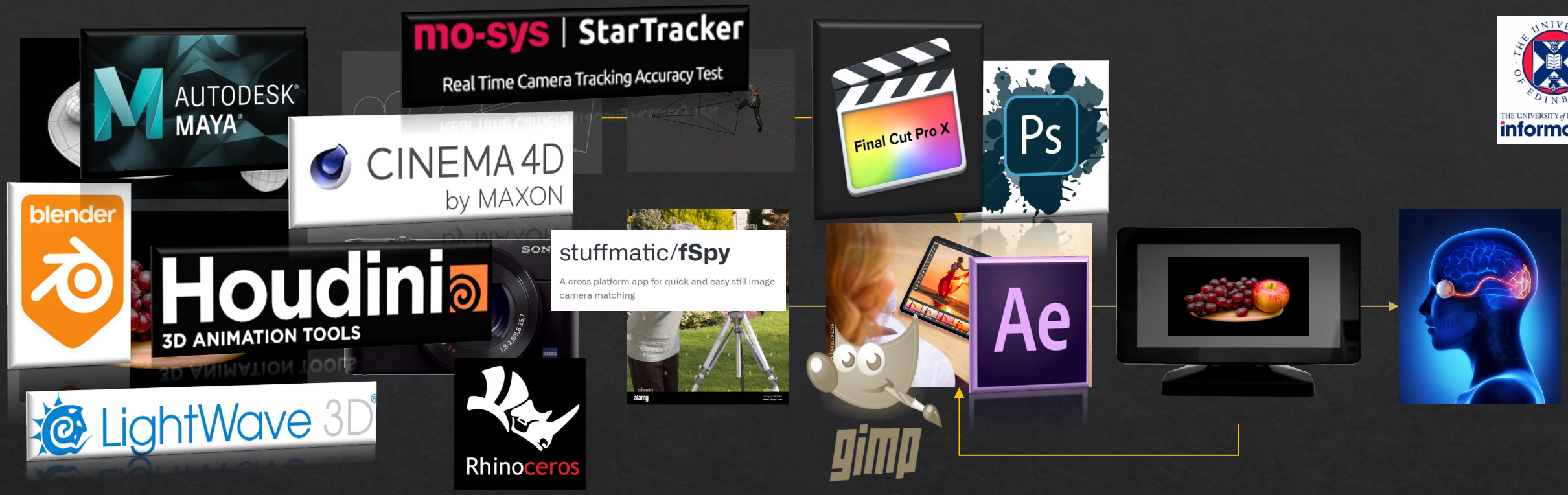
Synfig

Toon Boom

CrazyTalk Animator

stylistic

scientific visualisation




How not to design your slide!

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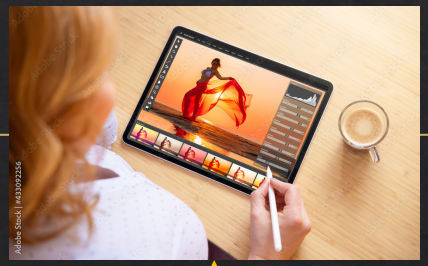
ZEISS
Vario-Sonnar T*
1:2.8-5.6/8.8-25.7

alamy

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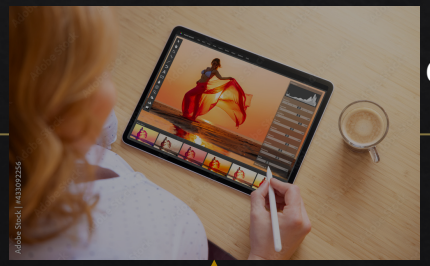
a

b

c



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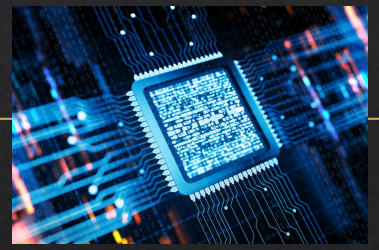
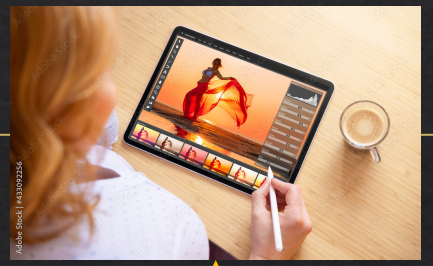
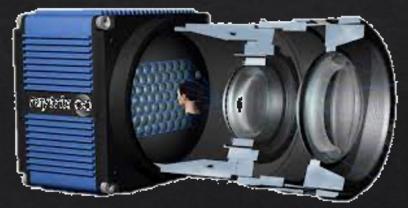
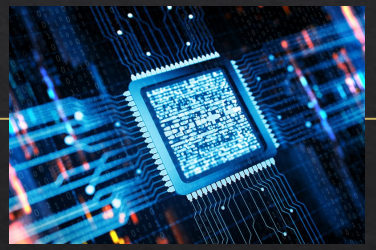
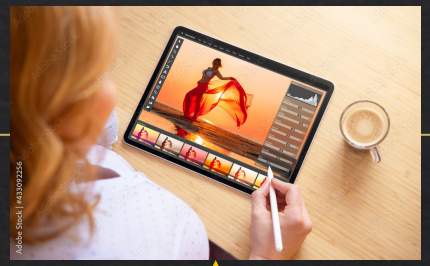


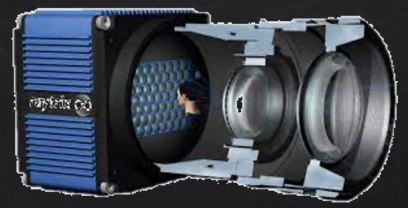




computation (decode)





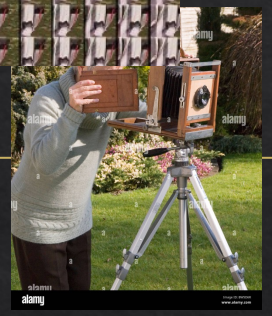


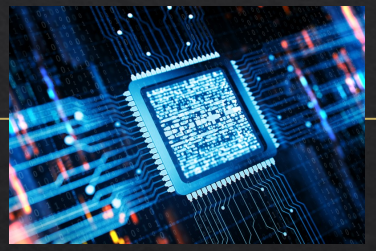
computation (decode)

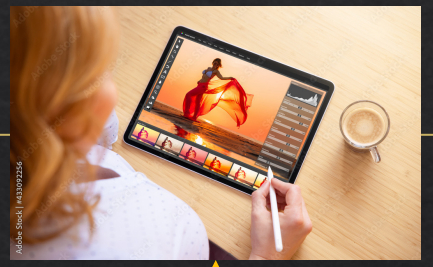
# Computational Photography

recorded image

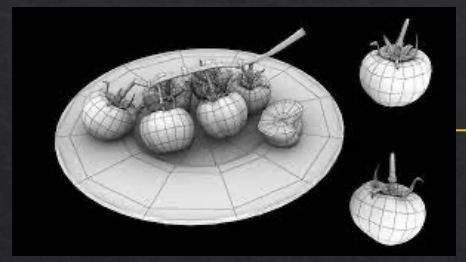
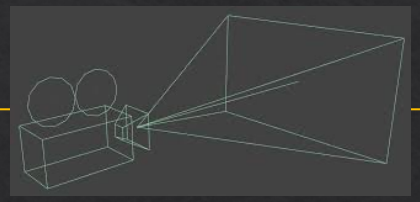
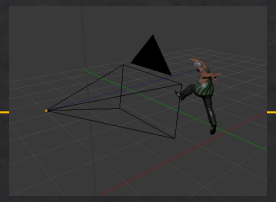
want to know more? click here







modelling animation viewing rendering compositing post process

# Rendering/Image Synthesis

# Examples

## Offline renderers

- PBRT
- RedShift
- Maxwell
- Corona
- V-Ray
- Arnold
- D5
- KeyShot
- Renderman
- Octane

## Realtime rendering engines

- Unreal
  - C++
  - better suited to hi-fi graphics
- Unity
  - C#
  - more modular render system
  - bigger community
- Omniverse
  - AI content generation
  - advanced physics

want to know more? click here

# In this course

- Overview of CG (10%)
- Fundamentals (20%)
- Raytracing (20%)
- Offline rendering (20%)
- Realtime rendering (15%)
- Advanced (15%)

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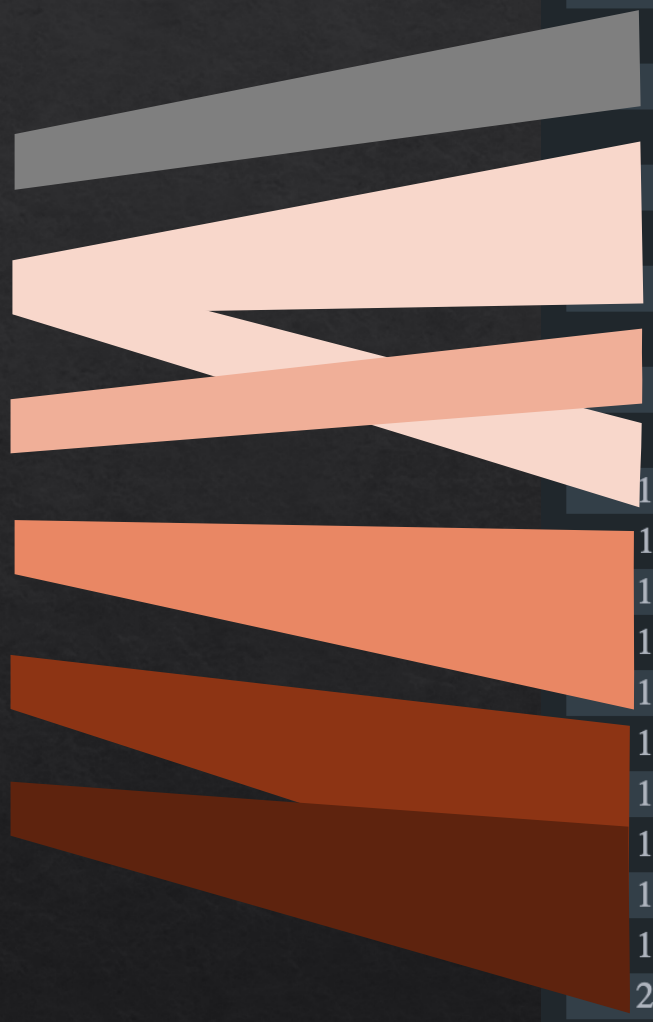
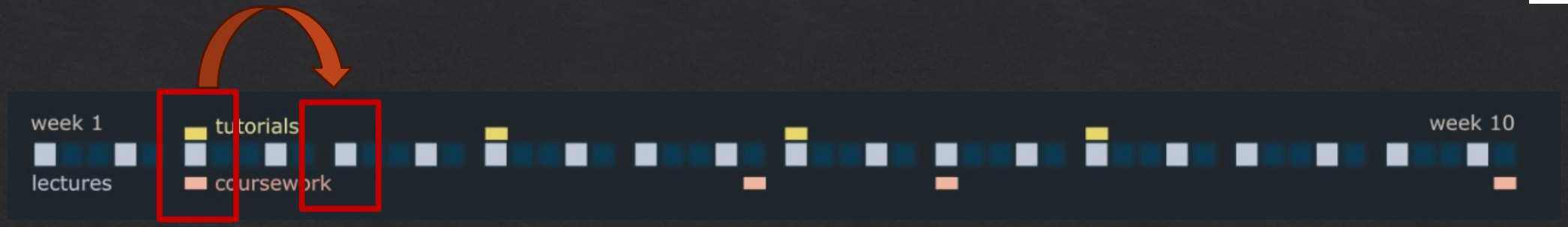


*Lectures*

| # | Lecture Title |
|---|---|
| 1 | Introduction |
| 2 | Graphics tools |
| 3 | Imaging: radiometry and photometry |
| 4 | Cameras |
| 5 | Basic Modelling |
| 6 | Scripting for modelling |
| 7 | Raytracing: introduction |
| 8 | Raytracing: advanced |
| 9 | Computer Graphics programming: basics |
| 10 | Computer Graphics programming: advanced |
| 11 | Numerical integration |
| 12 | Monte Carlo |
| 13 | Light transport: path tracing |
| 14 | Light transport: sampling |
| 15 | Fast rendering pipelines I |
| 16 | Fast rendering pipelines II |
| 17 | Advanced Rendering: volumetric effects |
| 18 | Advanced Rendering: shaders |
| 19 | Deep Learning in Graphics I |
| 20 | Deep Learning in Graphics II |
| 21 | Presentations |
| 22 | Presentations |

# Tutorials for Monday: waiting on timetabling…




*Tutorials*

| # | week | | files | resources | solutions |
|---|---|---|---|---|---|
| 1 | 2 | Blender modeling | | | |
| 2 | 4 | Blender scripting | | | |
| 3 | 6 | Coding a raytracer | | | |
| 4 | 8 | Coding a path tracer | | | |