# Viewing Transformations / Virtual Cameras
# 3D Reconstruction
# and
# Multi-View 3D Deep Learning

Summary

# Viewing Transformations & Virtual Cameras

# Main Topics

- Viewing Operations
  - Camera Transform / Clip / Project / Rasterize / Visibility
- Reference Spaces
  - Model / Scene / Camera / Sorting / Image
- Viewing Pipeline
  - Scene => Modeling > Camera > Perspective > Device => Image
  - Object Centered (Parametric) / Image Centered (Implicit) / Multipass
- Camera Model
  - FoV / Clip Planes / Projection Type / Viewport / Background (Skybox)
- Viewing Specification
  - Camera (Look-At, Polar) / Projection (Perspective, Frustum) / Device (Viewport)
- Other Cameras
  - Omnidirectional / Stereo / Light Field / Slit

# Multi-View 3D Reconstruction

# Main Topics

- Fundamentals
  - Projective Geometry 2D => 3D / u = Px
- Vision Problems
  - Correspondence / Calibration / Reconstruction (*)
- View-Based 3D Reconstruction
  - Passive (Stereo) / Active (Structured Light)
- View Reconstruction Operations
  - Capture / Triangulate / Align Merge / Structure
- Appearance / Attribute Modeling
  - Texture Mapping / BRDF Estimation / Normal Mapping

# Multi-View 3D Deep Learning

# Main Topics

- Image-Based 3D Deep Learning Applications
  - Reconstruction / Classification / Segmentation
- Multi-View Reconstruction From Images
  - [Voxel Occupancy / Learning Stereopsis ] (Known Cameras) / Learning for SfM (Bundle Adjustment)
- 3D Reconstruction from Sketches
- Multi-View Classification
  - CNN:1 > View Pooling > CNN:2 / (+Transfer Learning)
- Multi-View Segmentation
  - Input Shape + Viewpoints = (RGB-D, IDs) => Net => Labelled 3D Shape
  - FullyConvNet / Per-Label Confidence Maps / Image2Surface Projection
- View Synthesis
  - NeRF (Neural Radiance Field) / NeRV (Neural Reflectance-Visibility Field