The Computer Graphics Process and the Graphics Pipeline

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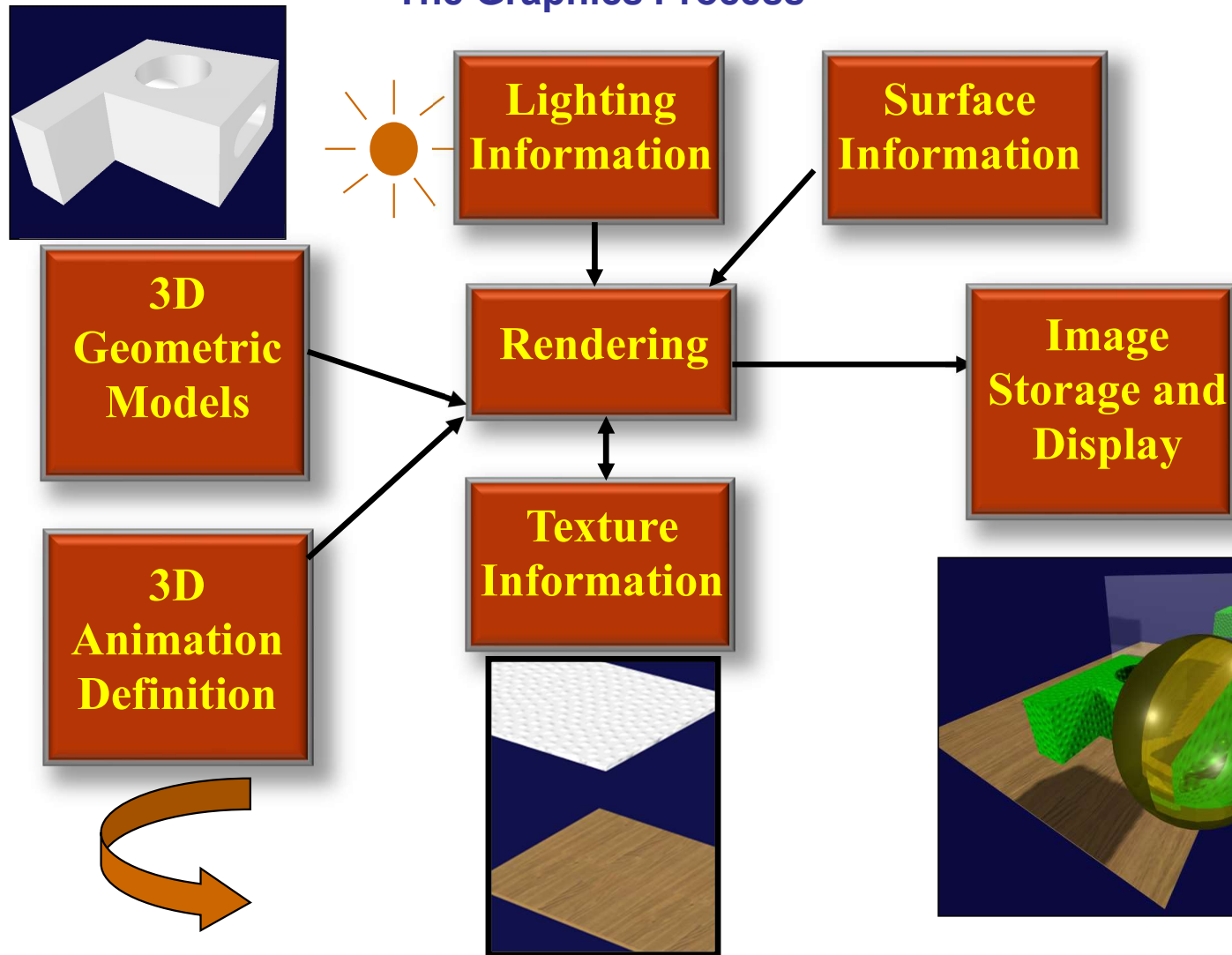Computer Graphics

The Graphics Process

3D Geometric Models

3D Animation Definition

Lighting Information

Surface Information

Rendering

Texture Information

Image Storage and Display

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The Graphics Process: Geometric Modeling

3D Scanning

Interactive Geometric Modeling

Model Libraries

Displacement Mapping

Material Properties

3D Geometric Models

Rendering
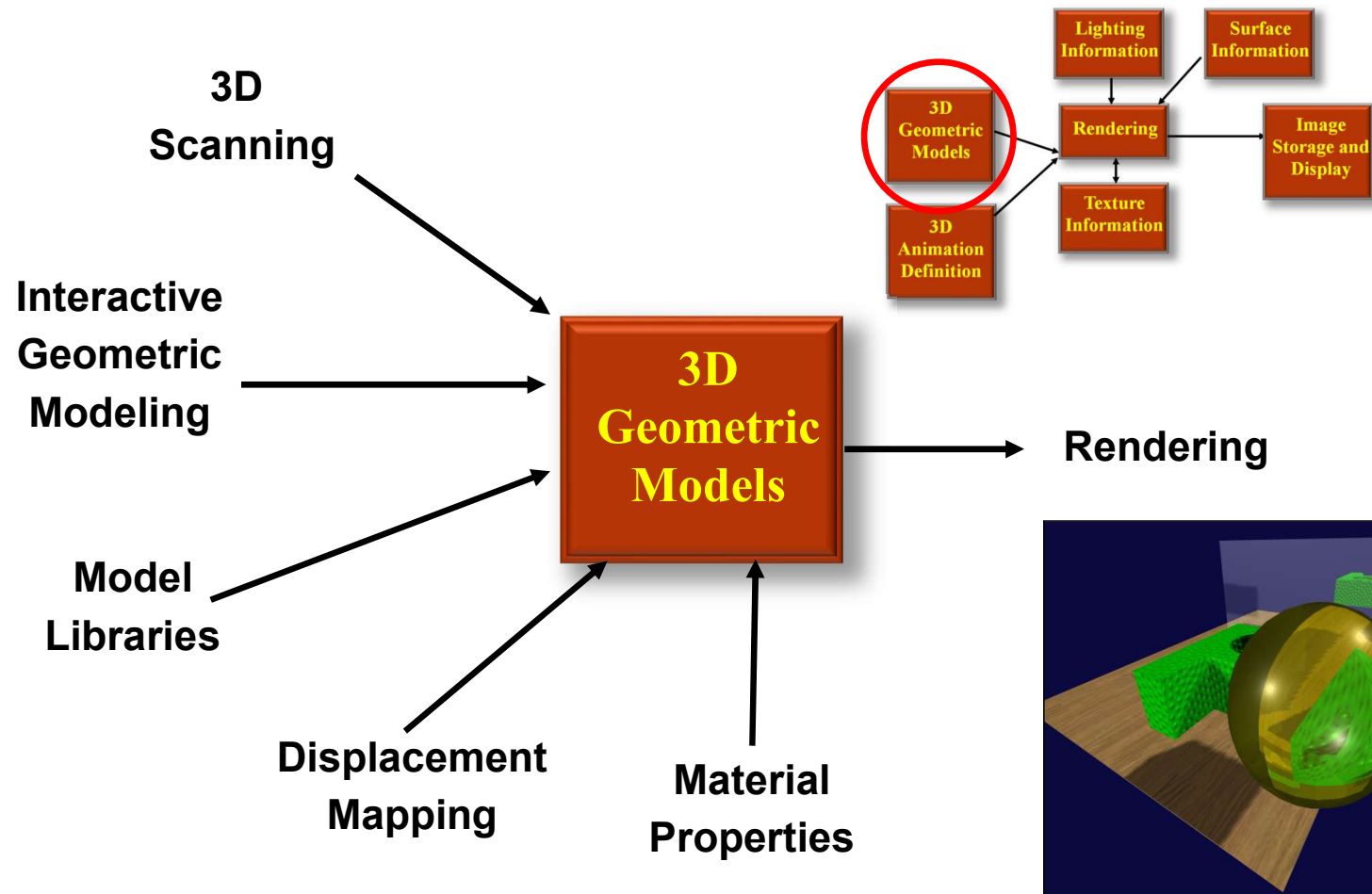
The Graphics Process: 3D Animation

Motion Design

Motion Computation (physics)

Motion Capture

Dynamic Deformations

3D Animation Definition

Rendering

Lighting Information

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3D Geometric Models

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Image Storage and Display

3D Animation Definition
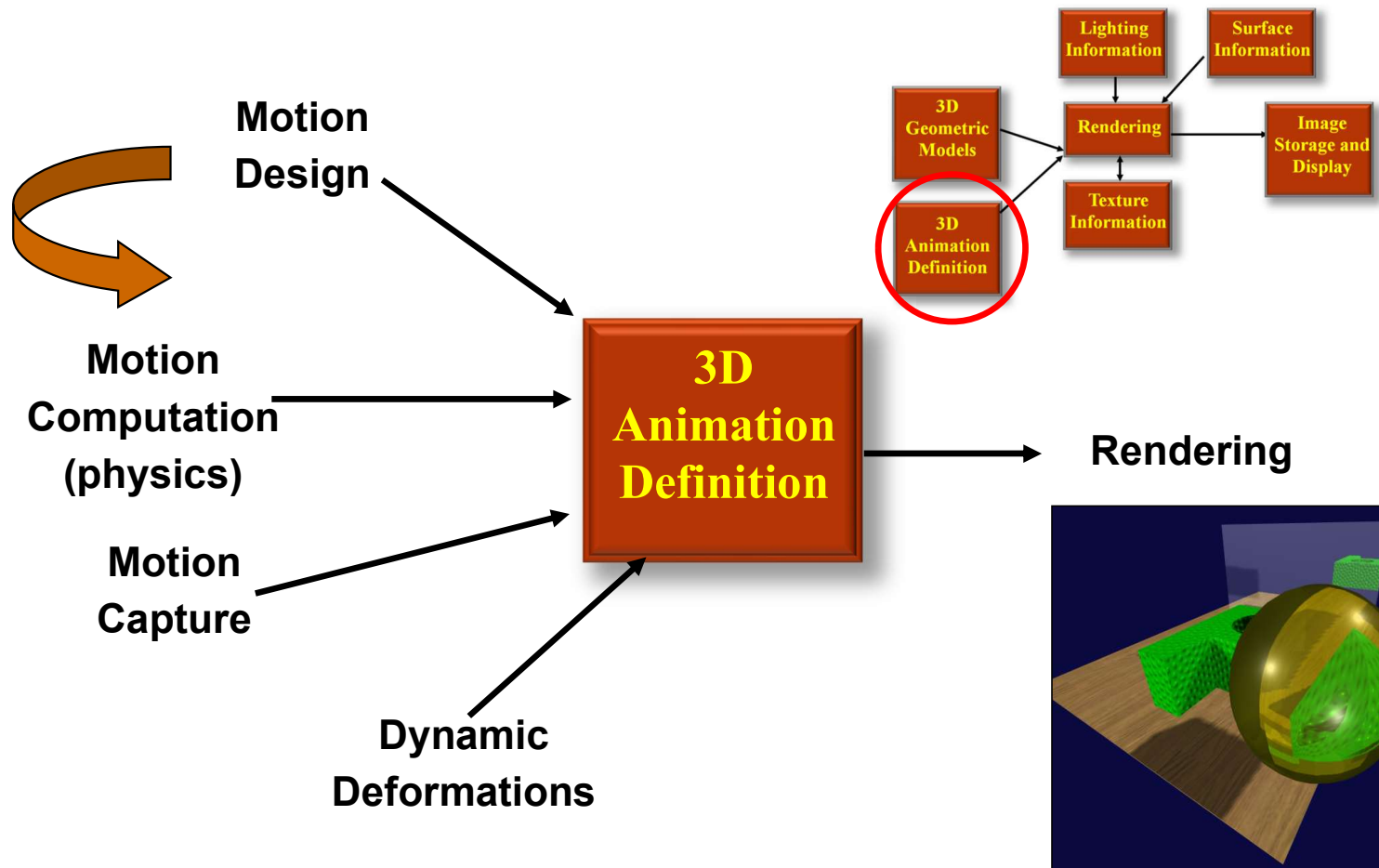
Texture Information

The Graphics Process: Texturing
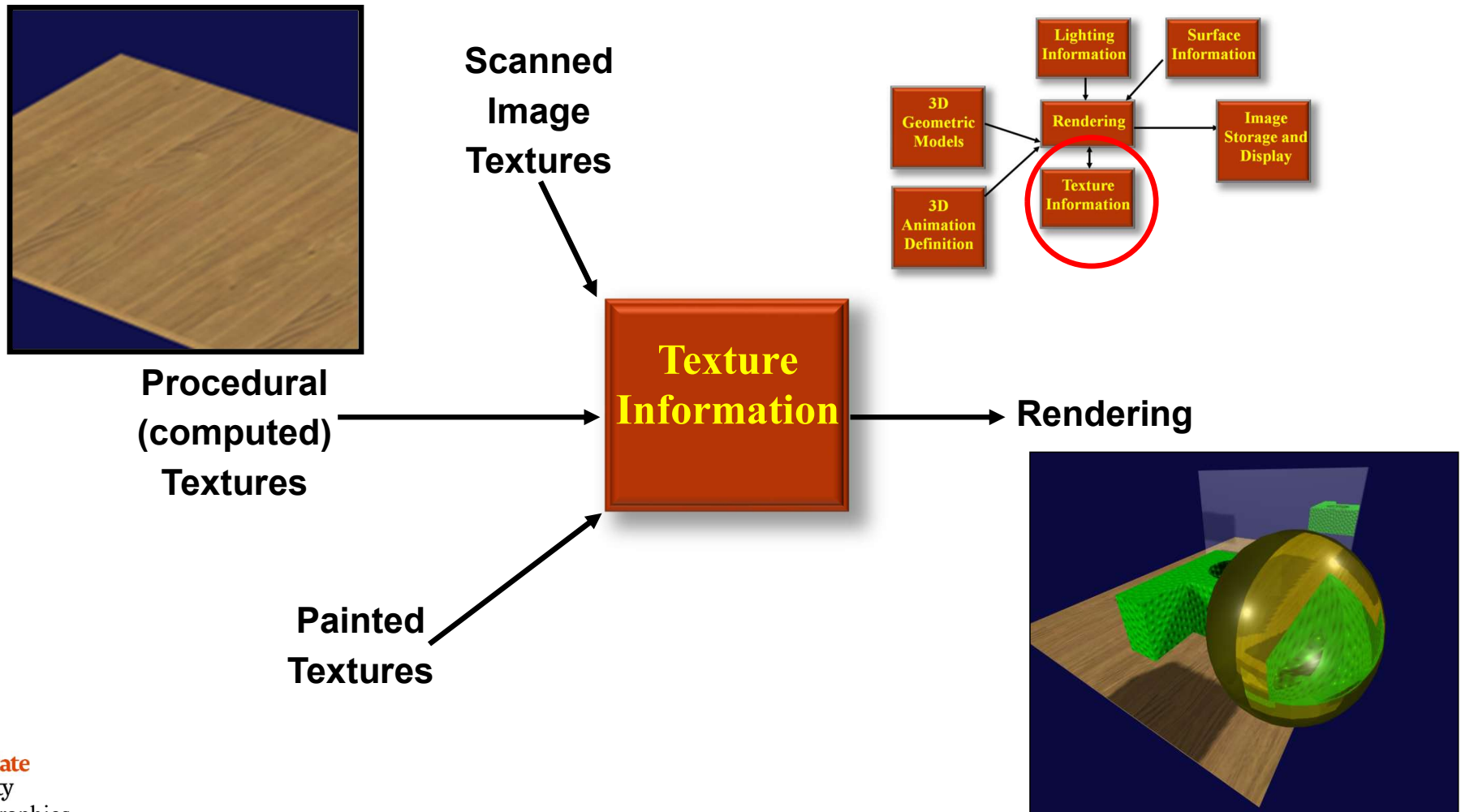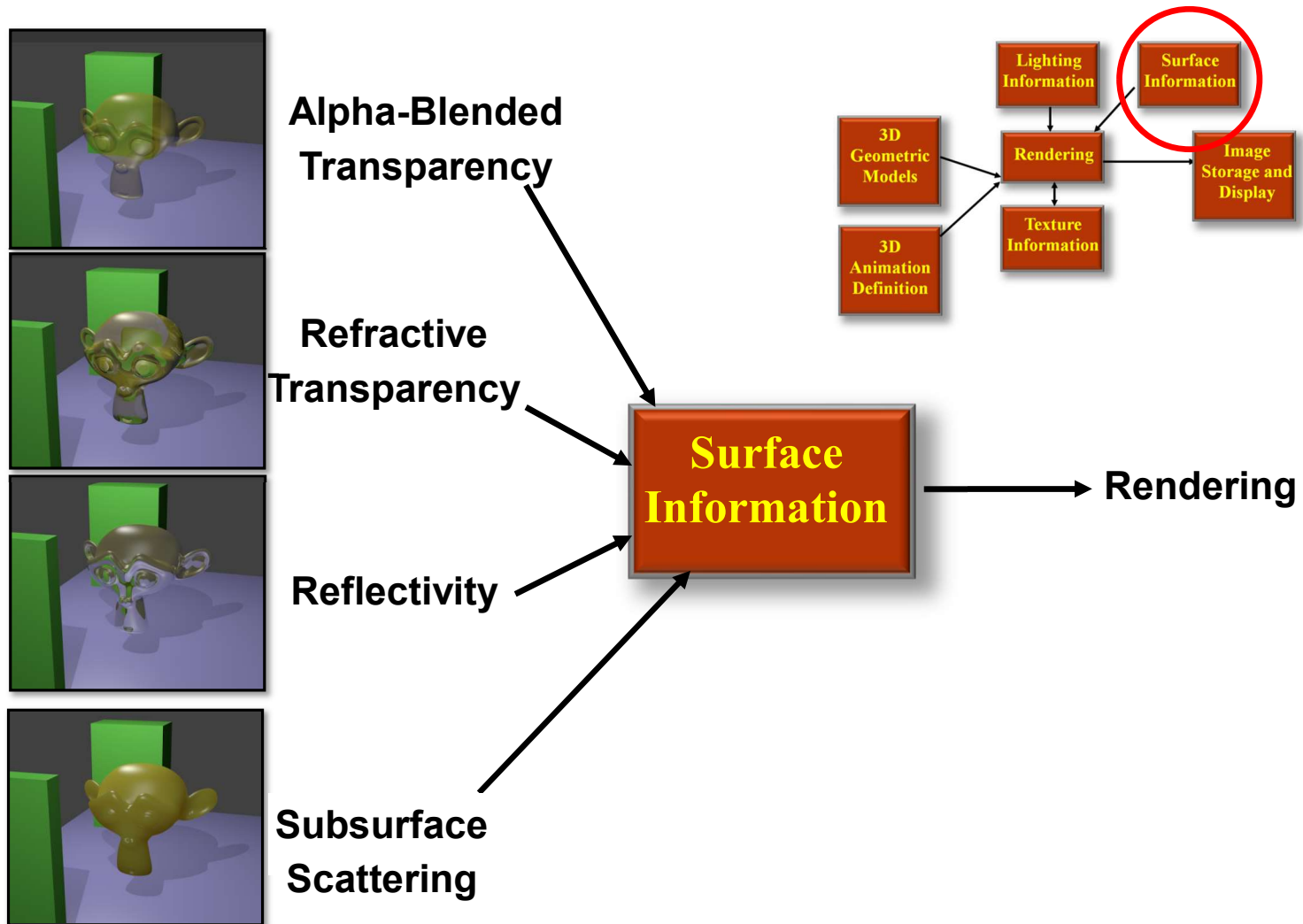
Scanned Image Textures

Procedural (computed) Textures

Painted Textures

Texture Information

Rendering

The Graphics Process: Surface Information

Alpha-Blended Transparency

Refractive Transparency

Reflectivity

Subsurface Scattering

Surface Information

Rendering

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The Graphics Process: Surface Information
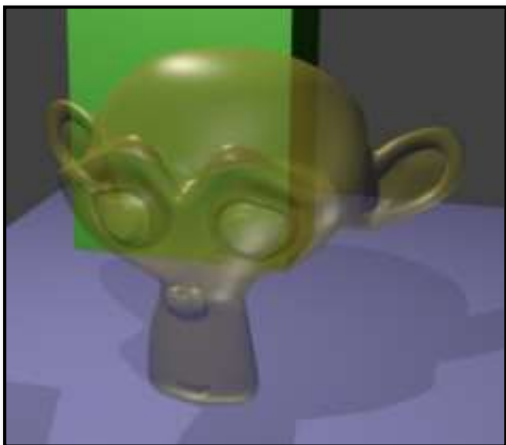
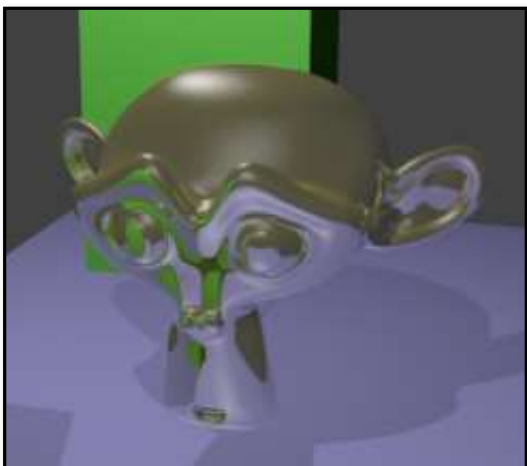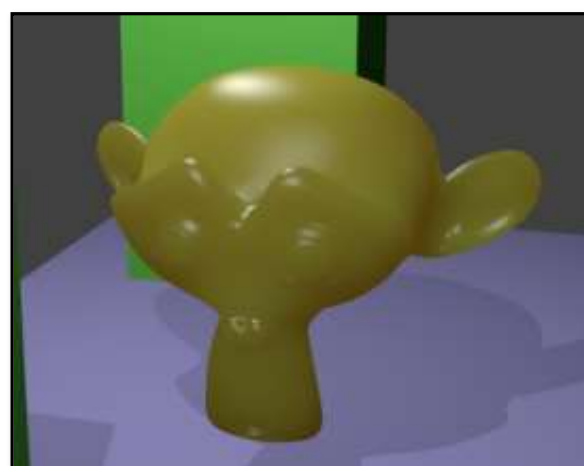**Alpha-Blended Transparency**
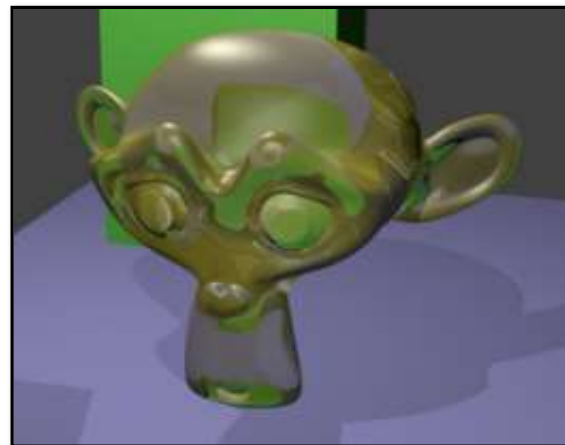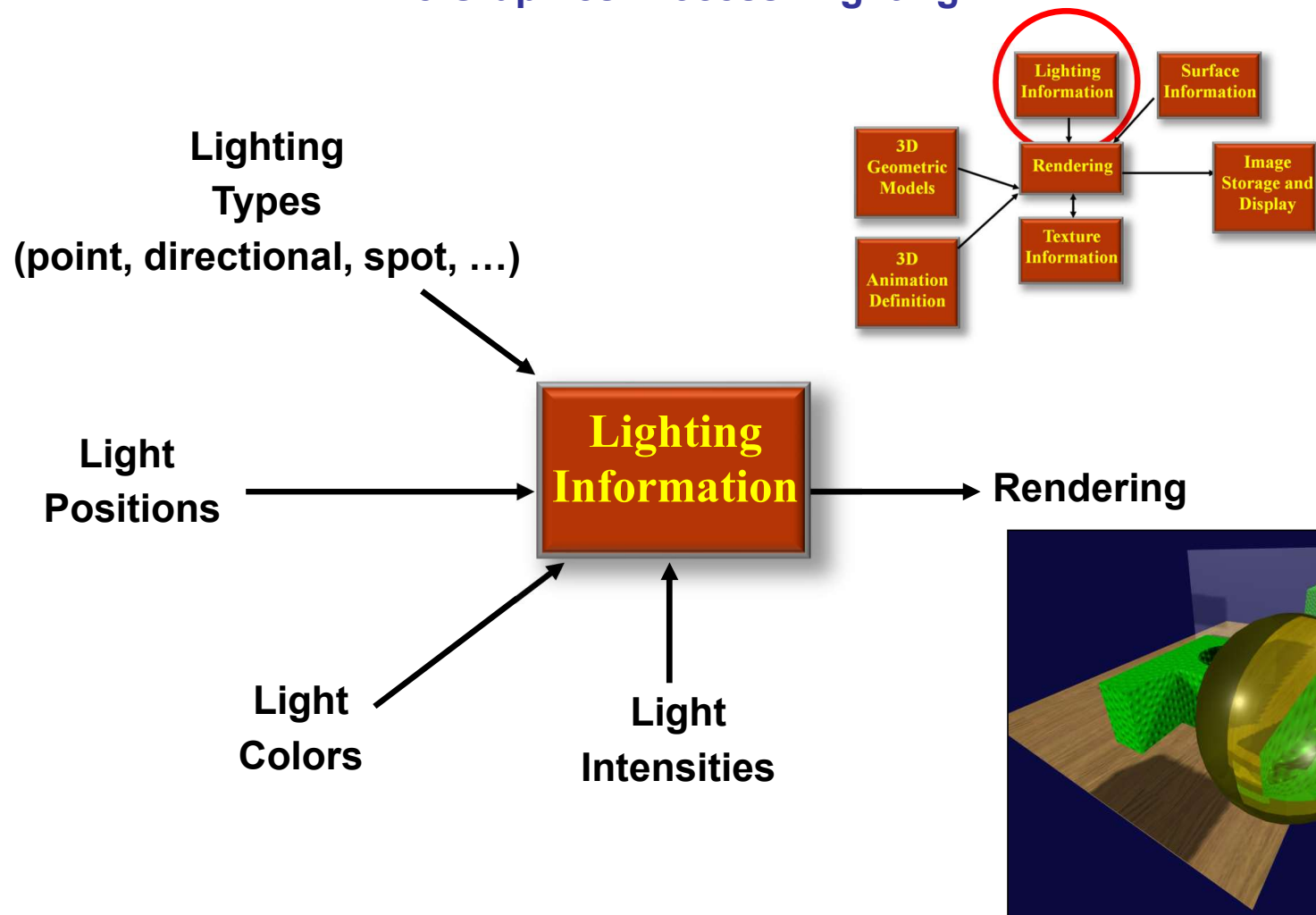

Refractive Transparency

Reflectivity

Subsurface Scattering

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The Graphics Process: Lighting

**Lighting
Types
(point, directional, spot, …)**

**Light
Positions**

**Lighting
Information**

Rendering

**Light
Colors**

**Light
Intensities**

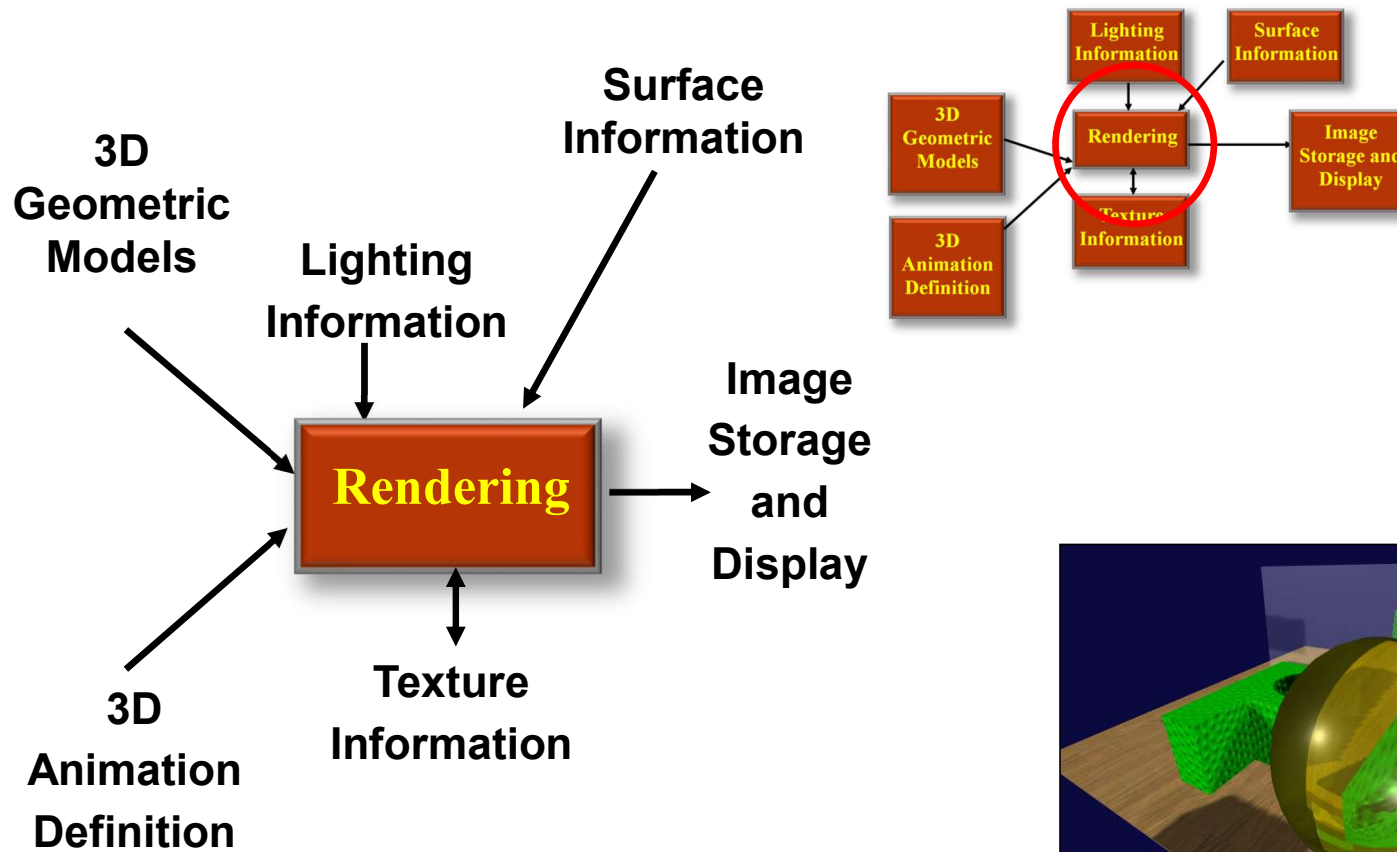**Oregon State
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The Graphics Process: Rendering

3D Geometric Models

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3D Animation Definition
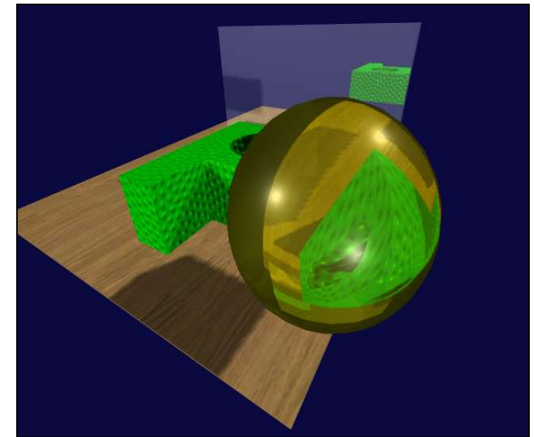
The Graphics Process:
Image Storage and Display

Lighting Information

Surface Information

3D Geometric Models

Rendering

Image Storage and Display

Texture Information

3D Animation Definition

Hardware Framebuffer

Rendering

Disk File

Recording

Editing

Compositing

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The Graphics Process; Summary

Lighting Information

Surface Information

3D Geometric Models

3D Animation Definition

Rendering

Texture Information

Image Storage and Display

The Screen Display Consists of Pixels
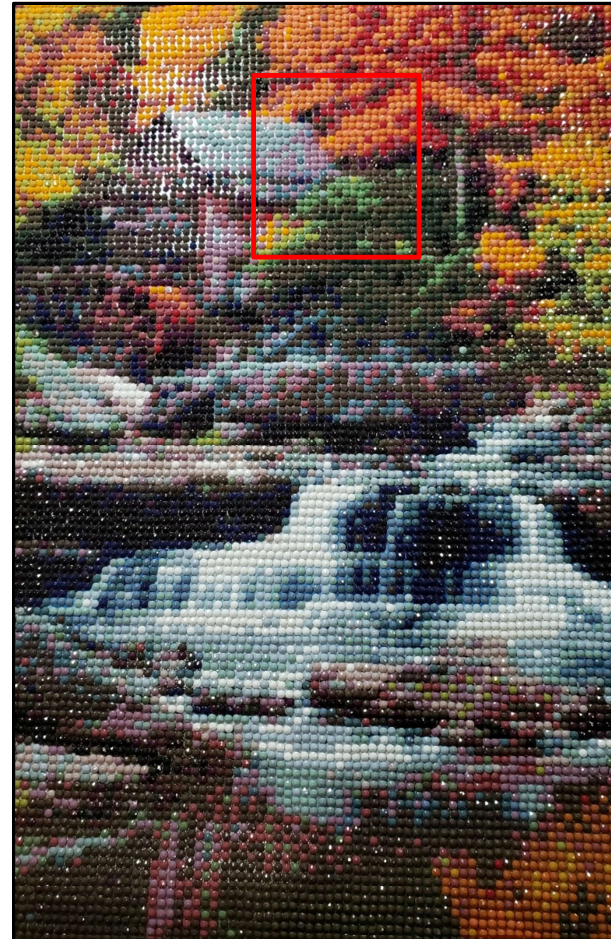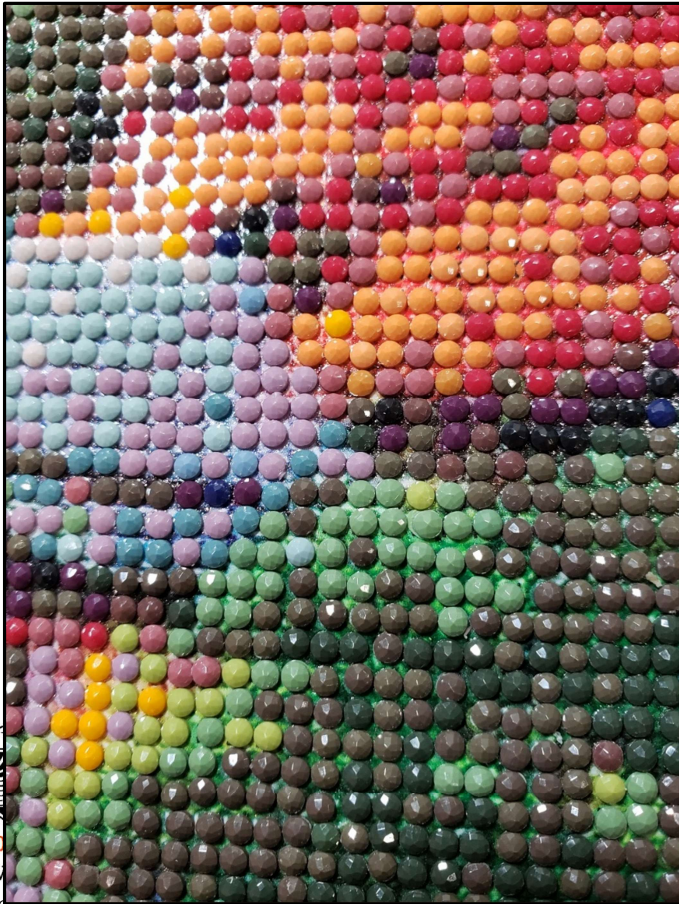
The Basic Computer Graphics Pipeline

MC

Model Transform → **WC** → **View Transform** → **EC** → **Per-vertex Lighting** → **EC** → **Projection Transform** → **CC** → **Homogeneous Division**

↓ **NDC**

Viewport Transform

↓ **SC**

Rasterization ← **SC**

Fragment Processing, Texturing, Per-fragment Lighting ← **SC**

Raster Ops ←

Framebuffer ←
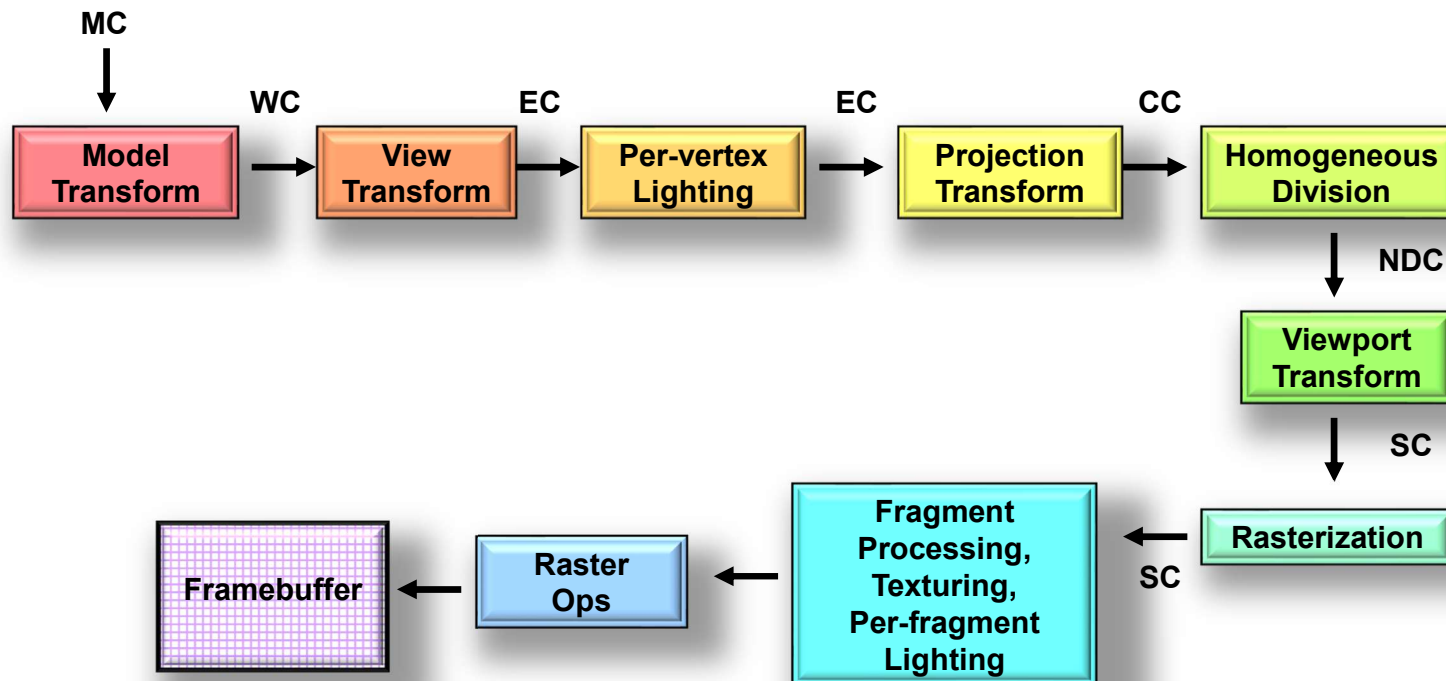
MC = Model Coordinates
WC = World Coordinates
EC = Eye Coordinates
CC = Clip Coordinates
NDC = Normalized Device Coordinates
SC = Screen Coordinates

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