AUTODESK UNIVERSITY

USD across Maya toolset

Technical overview

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Arnold Plugins Manager

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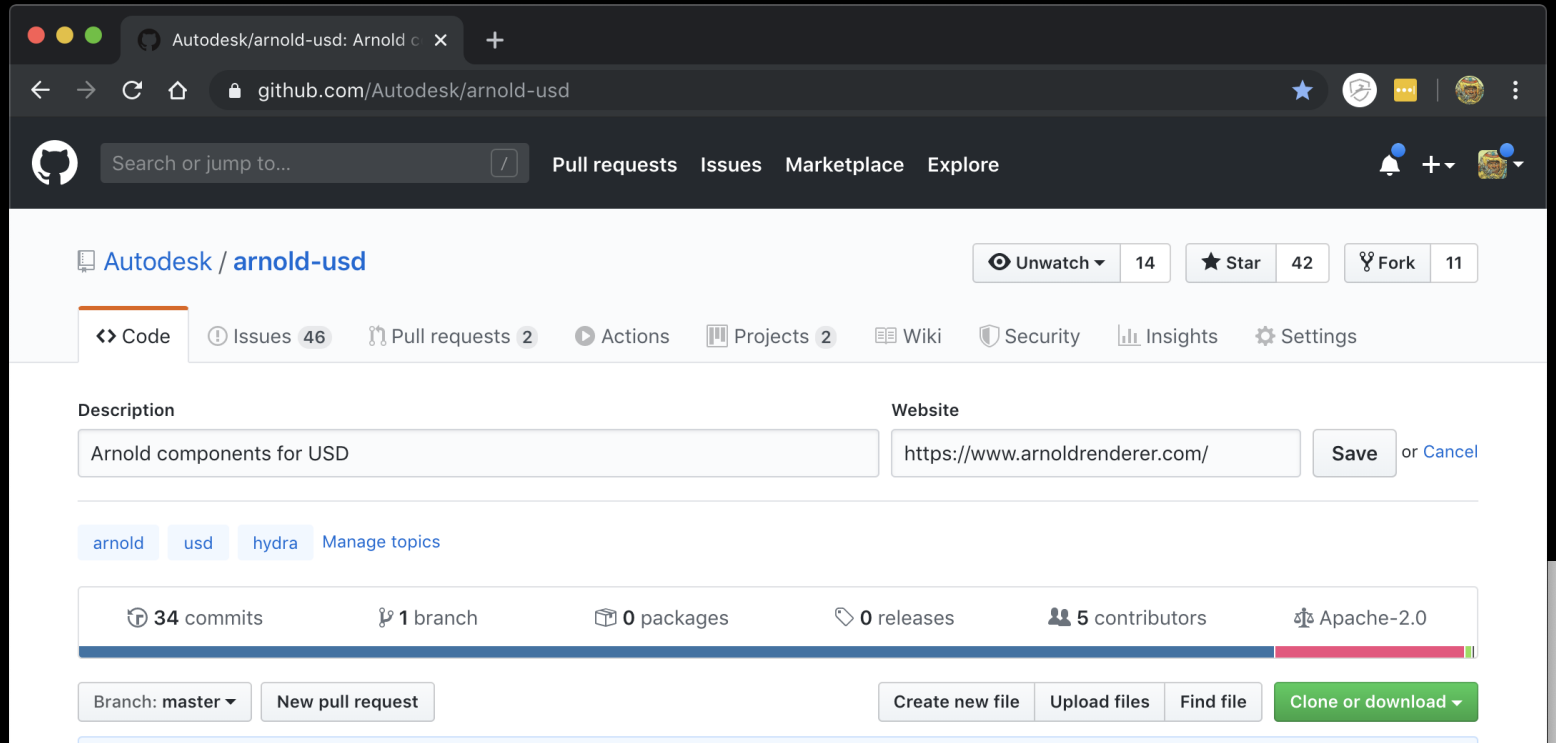
USD
UNIVERSAL SCENE DESCRIPTION

Arnold USD

Open Source Development

github.com/Autodesk/arnold-usd



Arnold USD

Beta

Backlog | Sprint View | Previous Sprint | Triage | + New view

-status:Done 115

	Title	Assignees	Status	Labels	Sprint
Sprint 75 3 Jul 15 - Jul 28 Current					
33	Plugins for the static build	cpichard	Todo	core, enhancement, investigate, procedural, user	Sprint 75
37	Sdr parser should define output properties for Arnold shaders	sebastienblor	In review	enhancement	Sprint 75
38	Apply UsdSkel without relying on UsdSkelBakeSkinning in the procedural	sebastienblor	In Progress	enhancement, procedural	Sprint 75
+ Add item					
No Sprint 112					
39	Sdr node discovery results should be consistent across renderers			bug	
40	Smart opaque doesn't work with instancer in Hydra or in the procedural		Todo	bug, core, instancing, user	
42	Preview Surface opacity should translate to arnold transmission			bug	
43	Support camera's aperture parameters in the delegate		Todo	bug, render delegate, user	
44	Propagate render status as exit code			bug, render delegate, user	
45	Support horizontalApertureOffset and verticalApertureOffset camera attributes		Todo	enhancement, render delegate	
46	Support asset attributes for filenames when no tokens are present		Todo	enhancement	
47	Make node names consistent between the delegate and the procedural		Todo	enhancement	
48	Motion Blur UsdSkel, Hydra	sebastienblor and ...	Todo	bug, render delegate, scene format, user	
49	Bring back schema library as an optional component to build			build, enhancement, user	
50	Default lighting not showing up in Solaris and Usdview		Todo	bug, houdini, investigate, render delegate, user	
51	Warning "USD arnold attribute b not recognized"	sebastienblor	Todo	bug, procedural	

Arnold USD

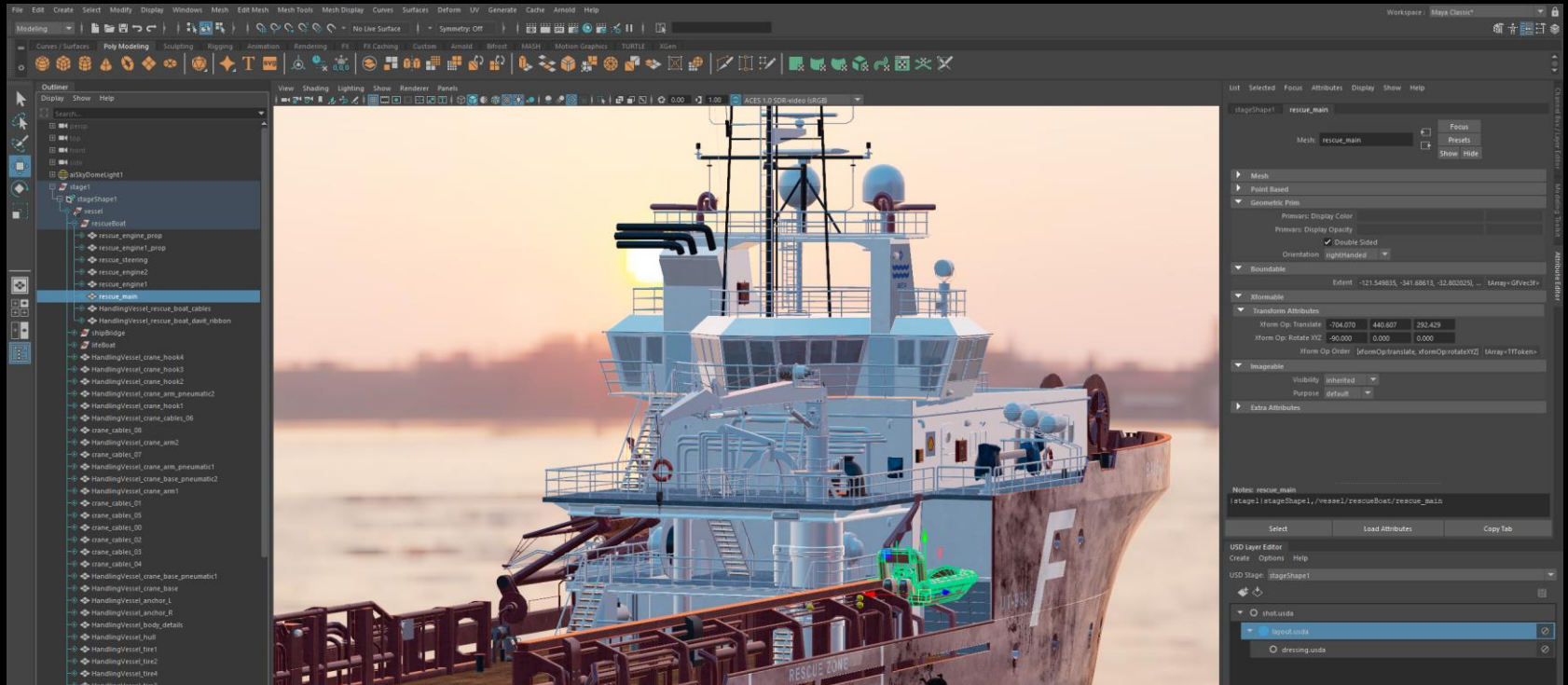
USD as a file format for Arnold

- Arnold data can be fully represented in USD
- Save / Load USD files
- Extensions to USD
  - Arnold Schemas
  - Arnold Shader
- Render USD files in standalone (kick)

Maya USD

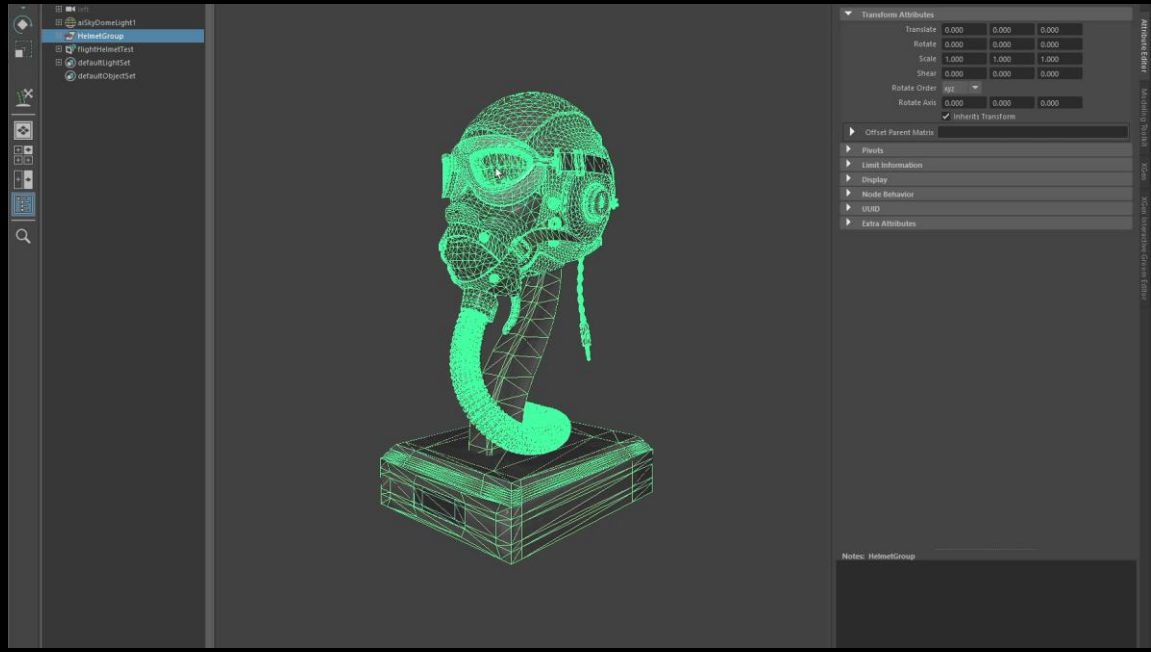
Open Source Development

github.com/Autodesk/maya-usd



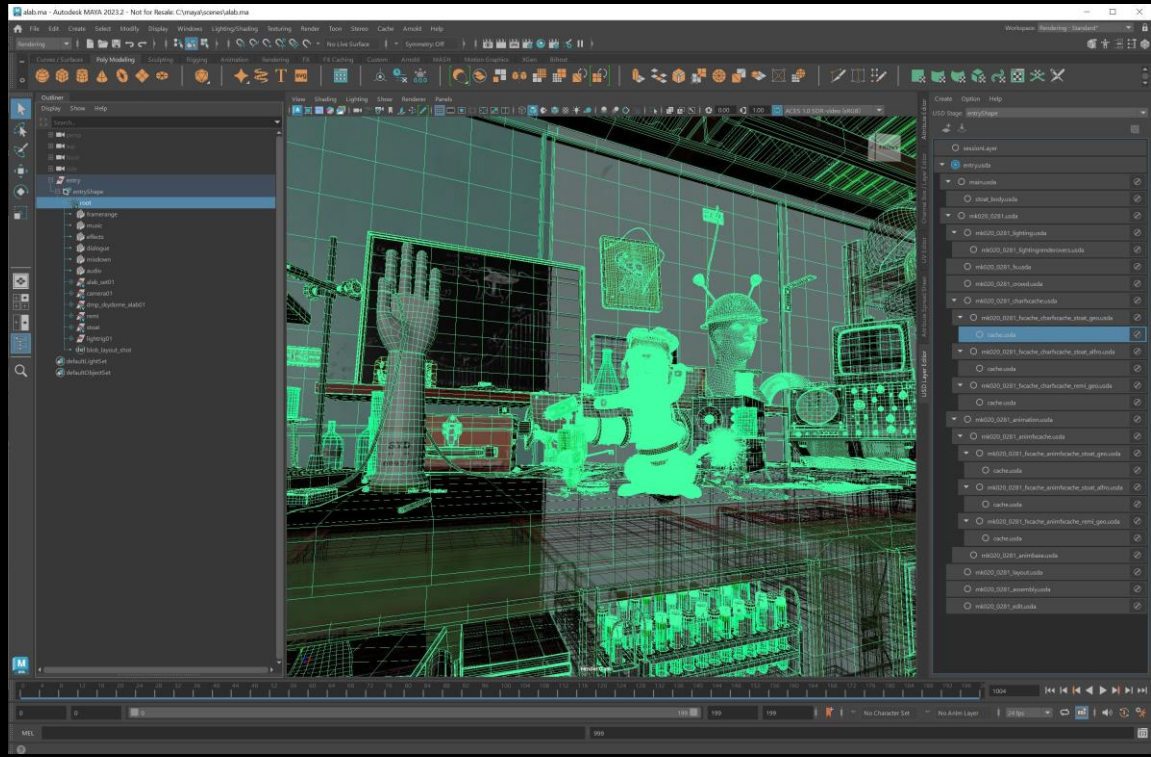
Maya USD

- Export Maya scenes as USD
  - Extensible framework



Maya USD

- Export Maya scenes as USD
  - Extensible framework
- Load USD with usdProxyShape
  - Single Maya node
  - USD scene hierarchy in outliner
  - Edits in Attribute Editor
  - Manipulators (move, hide, etc..)
- Create primitives in USD stage
  - Supports custom schemas
- USD Layer Editor



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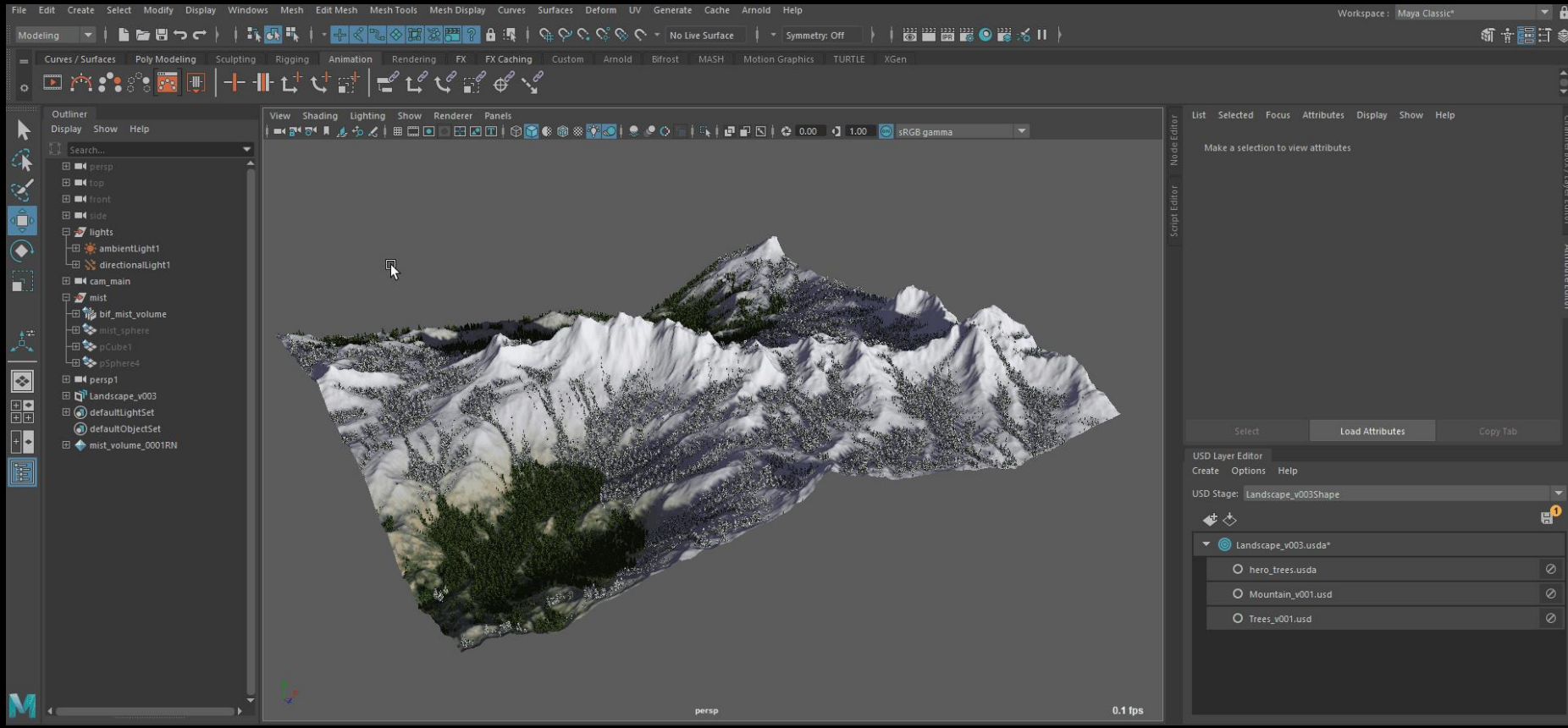
Maya USD


File Edit Create Select Modify Display Windows Mesh Edit Mesh Mesh Tools Mesh Display Curves Surfaces Deform UV Generate Cache Arnold Help
Workspace : Maya Classic*
Modeling
No Live Surface
Symmetry: Off
Curves / Surfaces Poly Modeling Sculpting Rigging Animation Rendering FX FX Caching Custom Arnold Bifrost MASH Motion Graphics TURTLE XGen
Outliner
Display Show Help
persp
top
front
side
lights
ambientLight1
directionalLight1
cam_main
mist
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persp1
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defaultLightSet
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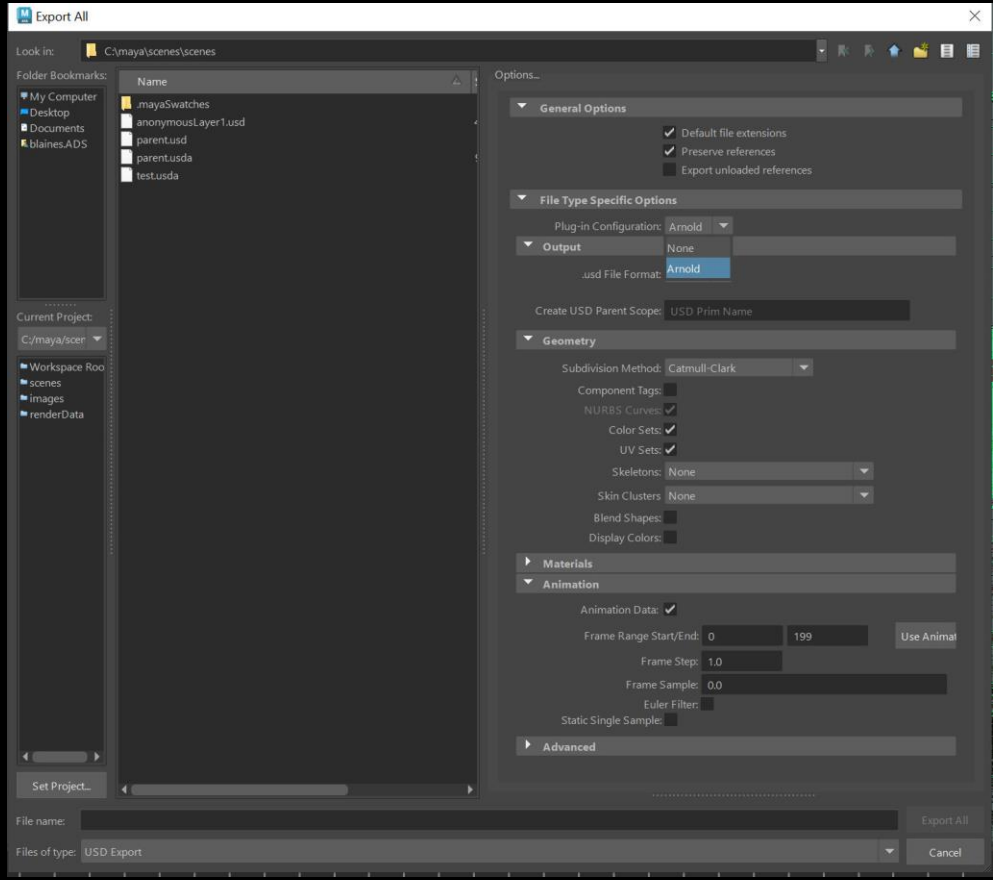
Make a selection to view attributes
Select
Load Attributes
Copy Tab
USD Layer Editor
Create Options Help
USD Stage: Landscape_v003Shape
Landscape_v003.usda*
hero_trees.usda
Mountain_v001.usd
Trees_v001.usd

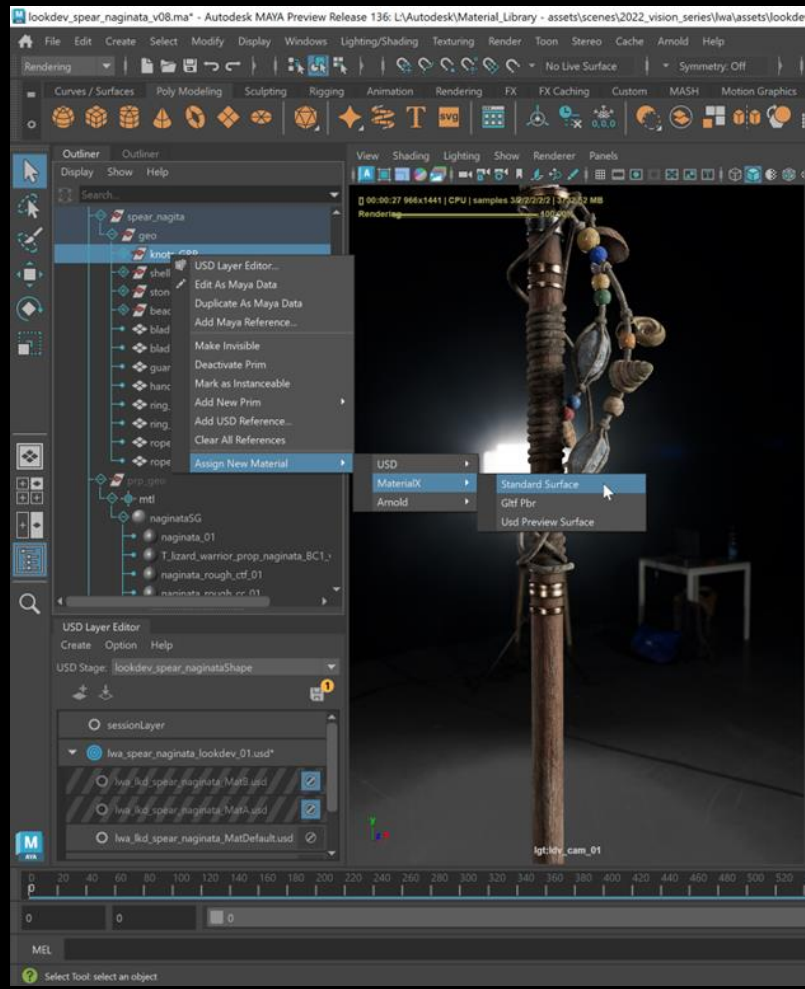
Maya USD with Arnold

- USD export with Arnold configuration
  - Arnold Nodes (aiSkyDomeLight, aiStandIn, etc..)
  - Arnold Shaders
  - Arnold attributes on builtin nodes (meshes, lights…)

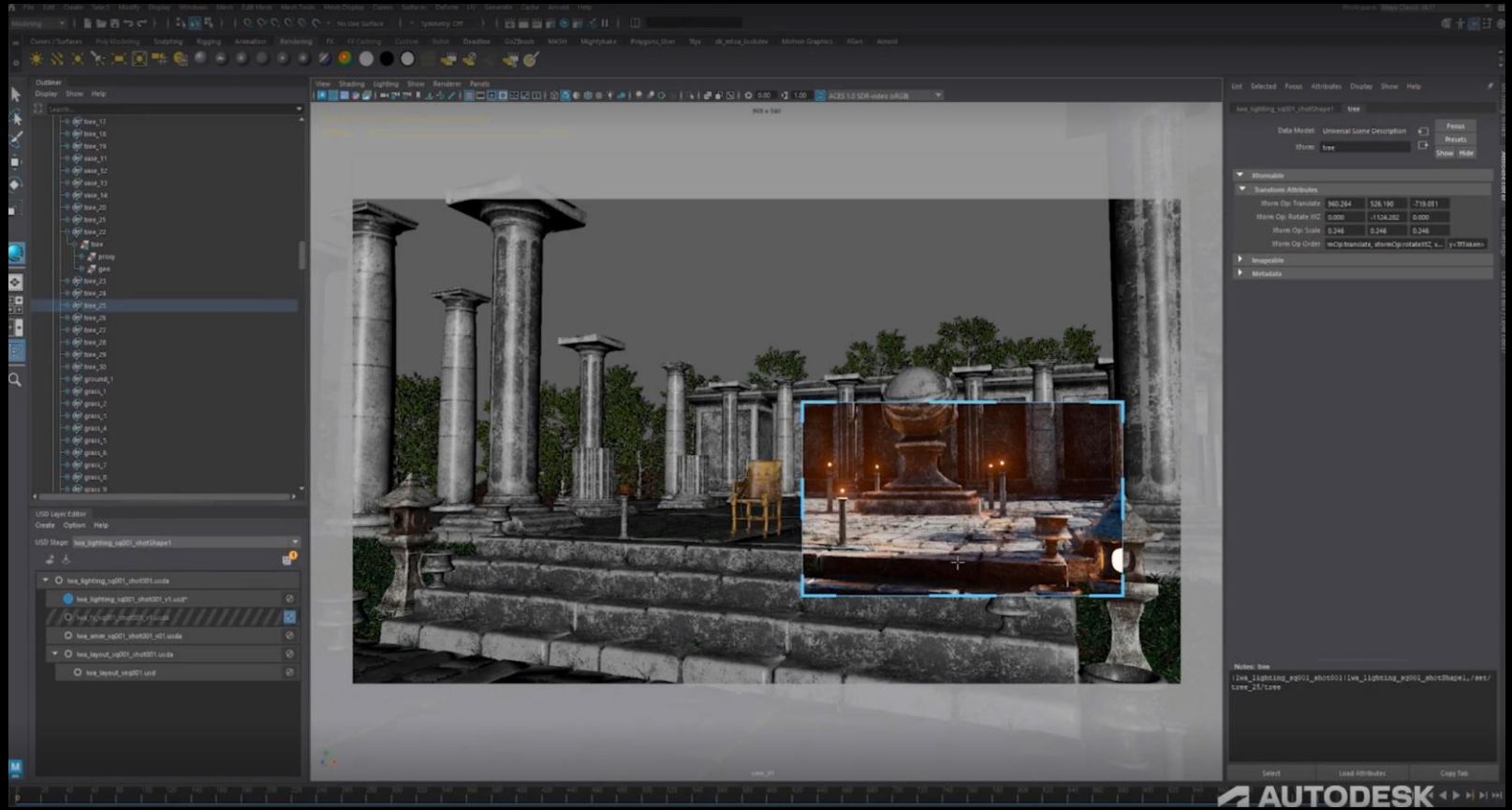


Maya USD with Arnold

- USD export with Arnold configuration
  - Arnold Nodes (aiSkyDomeLight, aiStandIn, etc..)
  - Arnold Shaders
  - Arnold attributes on builtin nodes (meshes, lights…)
- Arnold schemas are registered in USD
  - Arnold prims can be created in stage
- Render usdProxyShape in Arnold
  - UsdStage is shared in memory
  - Edits supported in IPR

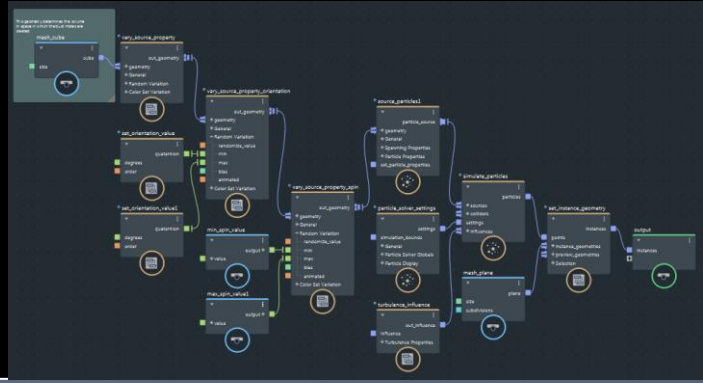


Maya USD with Arnold



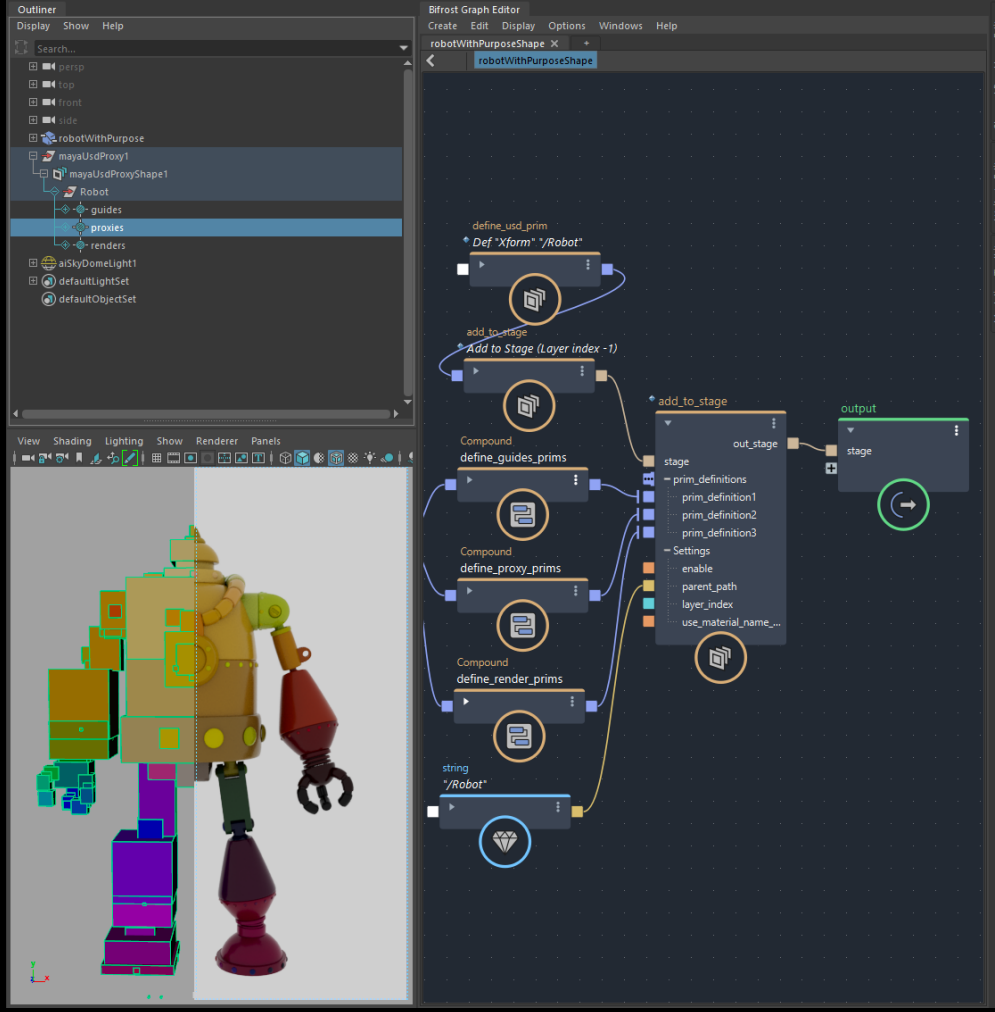
Bifrost

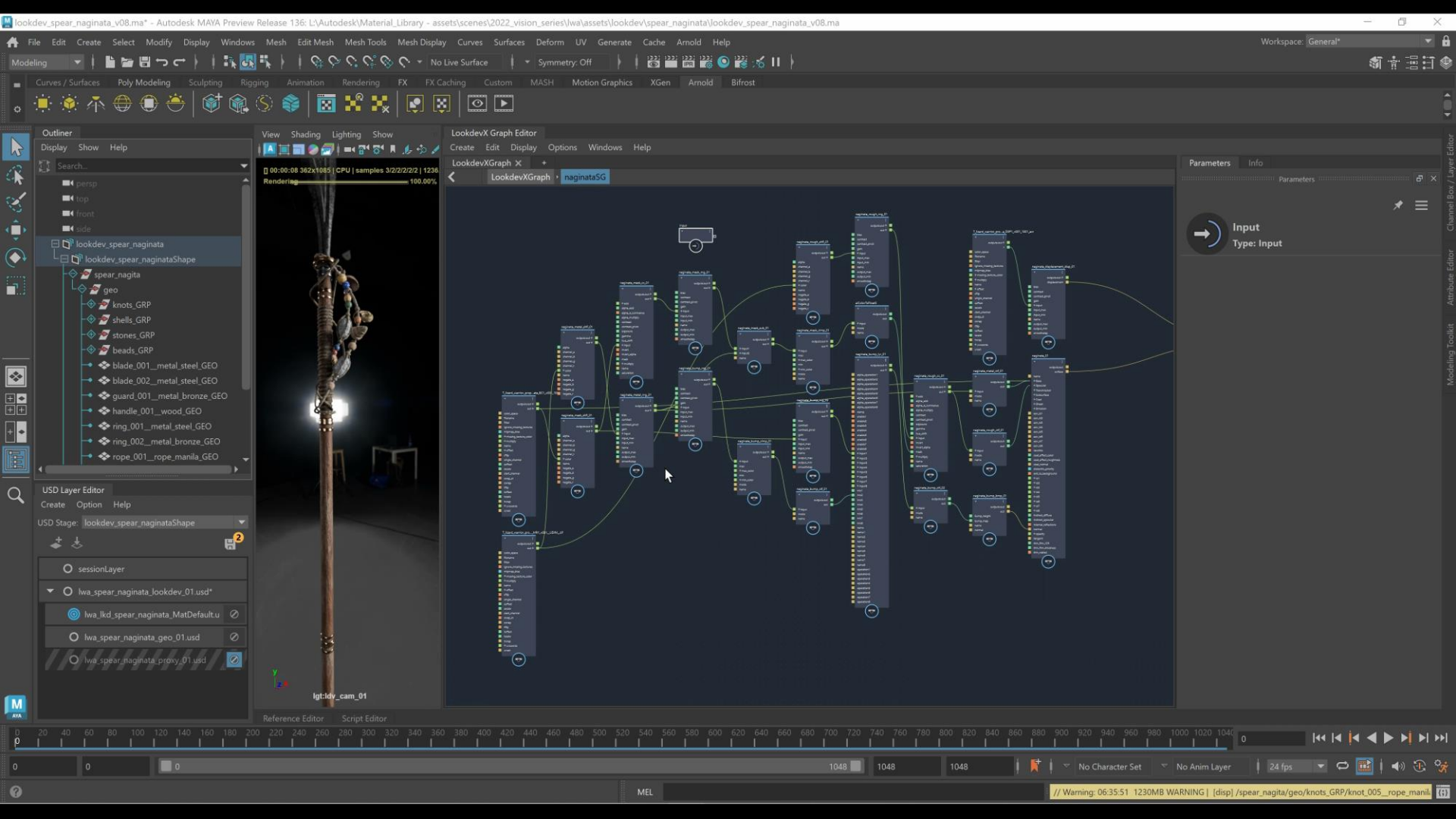
- Visual programming tool for procedural 3D content creation
  - Simulation
  - Scattering, instancing, proceduralism
  - Fluids
- Integrated in Maya
- Extensible through compounds



Bifrost USD

- Create and edit USD data
  - Procedural workflow
  - USD data flows through the graph
- Exposes USD API in Bifrost nodes
- Integrated with Maya USD
- Renders in Arnold

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File Edit Create Select Modify Display Windows Mesh Edit Mesh Mesh Tools Mesh Display Curves Surfaces Deform UV Generate Cache Arnold Help
Workspace: General*
Modeling
No Live Surface
Symmetry: Off
Curves / Surfaces Poly Modeling Sculpting Rigging Animation Rendering FX FX Caching Custom MASH Motion Graphics XGen Arnold Bifrost
Outliner
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USD Layer Editor
Create Option Help
USD Stage: lookdev_spear_naginataShape
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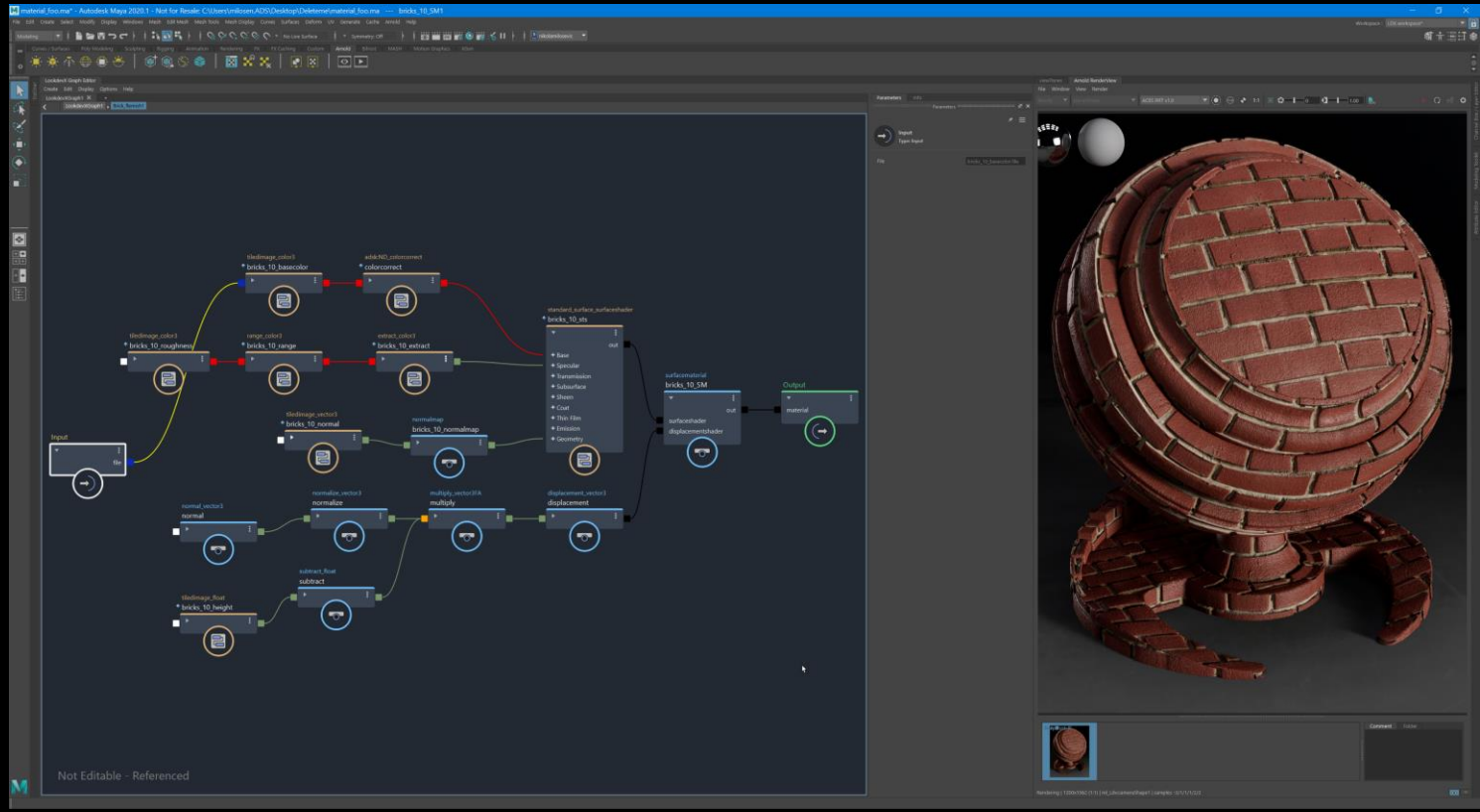
LookdevX

To be released…



AUTODESK UNIVERSITY

USD across Maya toolset

Building The Matrix City of Machines – Use Case

John Paul Giancarlo
Technical Specialist

MATRIX CITY OF MACHINES

BY JOHN P L IANCA LO -

AGENDA

01 USD Across Maya Technical Overview

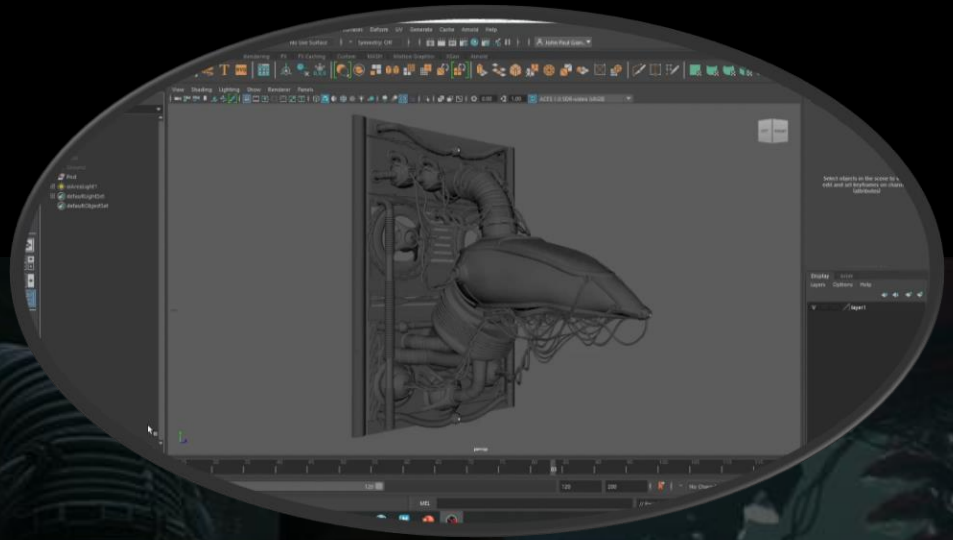
02 Create, edit, load & work with USD in Maya Assembly and Layout Workflows

03 Authoring Material X with LookDevX

04 Maya - Arnold USD Plugin Export

05 Bifrost USD procedural workflows
Use Case Building The Matrix City of Machines

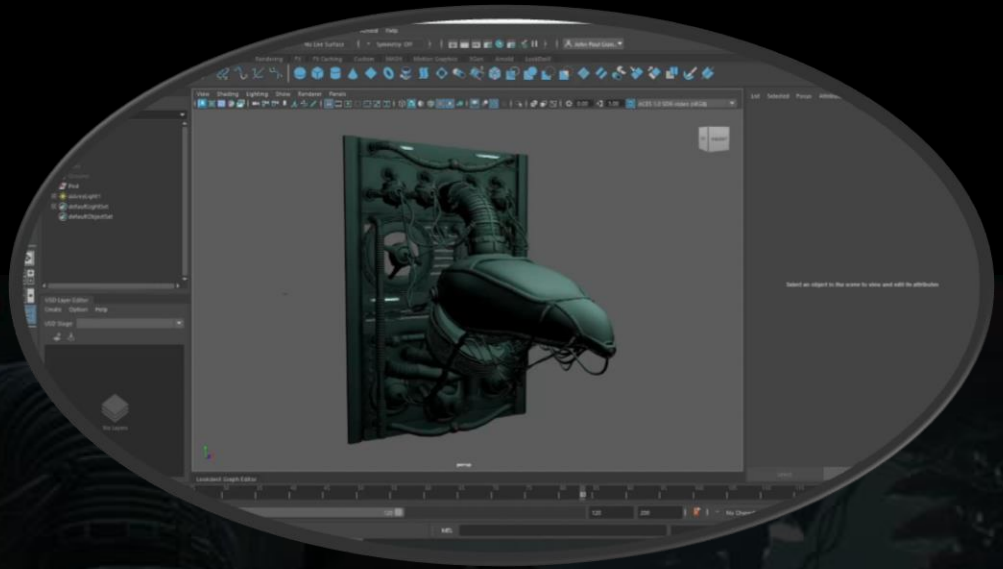
Assembly and Layout Workflows - Export , Import Work with USD



✓ Export Maya Models as USD Import USD Data as Maya Models Work with USD Data

Maya / Bifrost USD makes assembly and layout fast and easy using Maya's and Bifrost's native workflows you already know.

Assembly and Layout Workflows – MaterialX & LookDevX

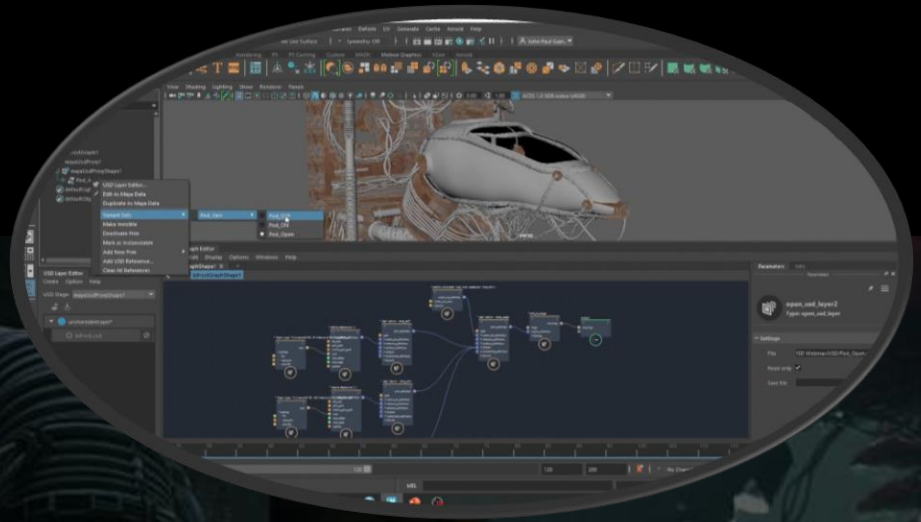


✓ Assign Material X Shaders to USD files via LookDevX system

Export and Render USD with Other Renders like Mantra

Maya / Bifrost USD makes assembly and layout fast and easy using Maya's and Bifrost's native workflows you already know.

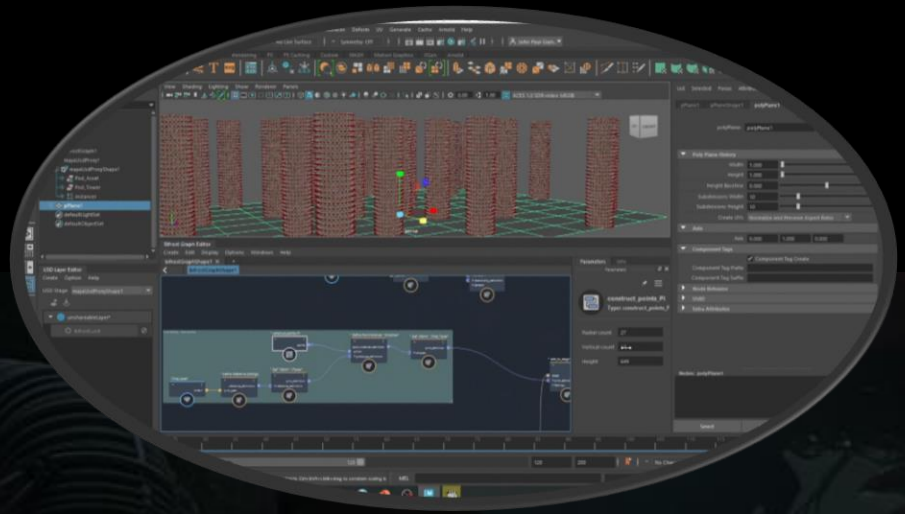
Assembly and Layout Workflows - Assembly asset with variants and define model VP Purpose



- Add Variants definitions “Composition Arcs” Specify Asset Render - Proxy Purpose Get asset ready

Maya / Bifrost USD makes assembly and layout fast and easy using Maya’s and Bifrost’s native workflows you already know.

Assembly and Layout Workflows - Procedurally build the City with Bifrost



- Build Construct points using USD Point Instancer
- Set Prototype definitions using existing Prim Path

Maya / Bifrost USD makes assembly and layout fast and easy using Maya's and Bifrost's native workflows you already know.

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