

Innovative Designs and Procedural Patterns with Fusion 360 & Maya

CP319398

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About the Speakers



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Class Description

This class explores easy-to-follow workflows for the creation and combination of procedural structures and patterns in product design. Designs can start in a typical modeling workflow within Fusion 360. Maya's MASH tool will then be used to create intricate procedural networks, which are then brought into Fusion 360 for further refinement. The use of MASH is a novel and innovative approach, far easier to achieve than other tools such as Dynamo or Grasshopper, and with a completely different (yet complementary) process to Generative Design's simulations.



Learning Objectives

- Learn how to use Fusion 360 to create a wide variety of designs, including using the Generative Design tool.
- Learn how to use Maya MASH to create procedural, algorithmic patterns and bring them into Fusion 360 for further development.
- Learn about how to easily import and export geometries between Fusion 360 and Maya.
- Learn how to generate innovative models that combine traditional CAD designs structures with intricate procedural patterns.



Automation in Digital Design

Automation provides results that would be hard to obtain without using technology.

It frees users from performing tasks that are either too complex or tedious.

It achieves results that are efficient, attractive, dynamic, and aligned with natural eco-systems.



Typical workflows for Automated Design

Generative Design

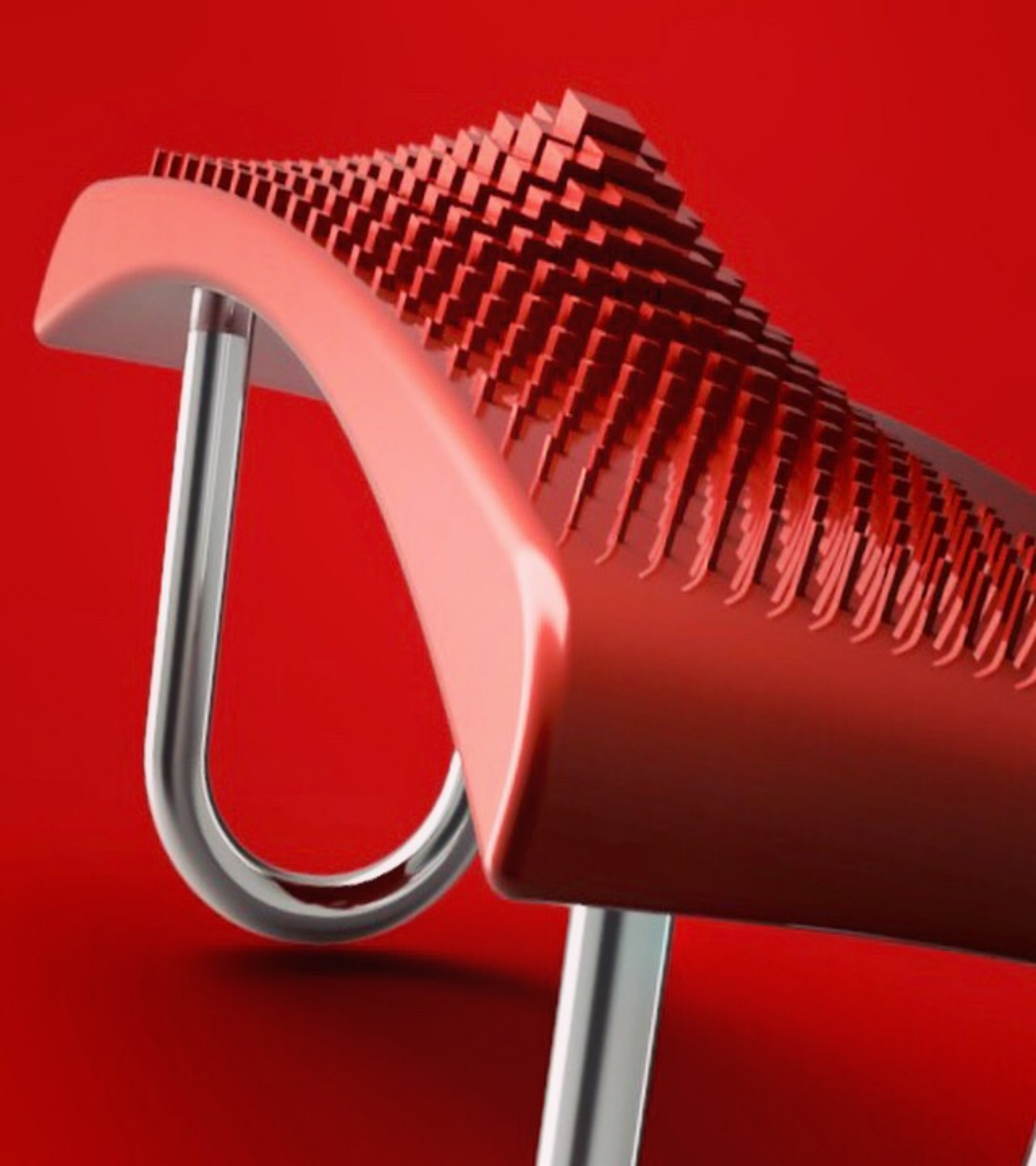
User set the constraints and parameters of the design, and the software takes over and uses that information to develop large number of potential solutions.



Typical workflows for Automated Design

Procedural networks

Sets of rules are used to create intricate patterns that resemble natural systems and tend to create non-linear results.





AUTODESK®
FUSION 360



AUTODESK®
DYNAMO



grasshopper
GENERATIVE MODELING
FOR RHINO

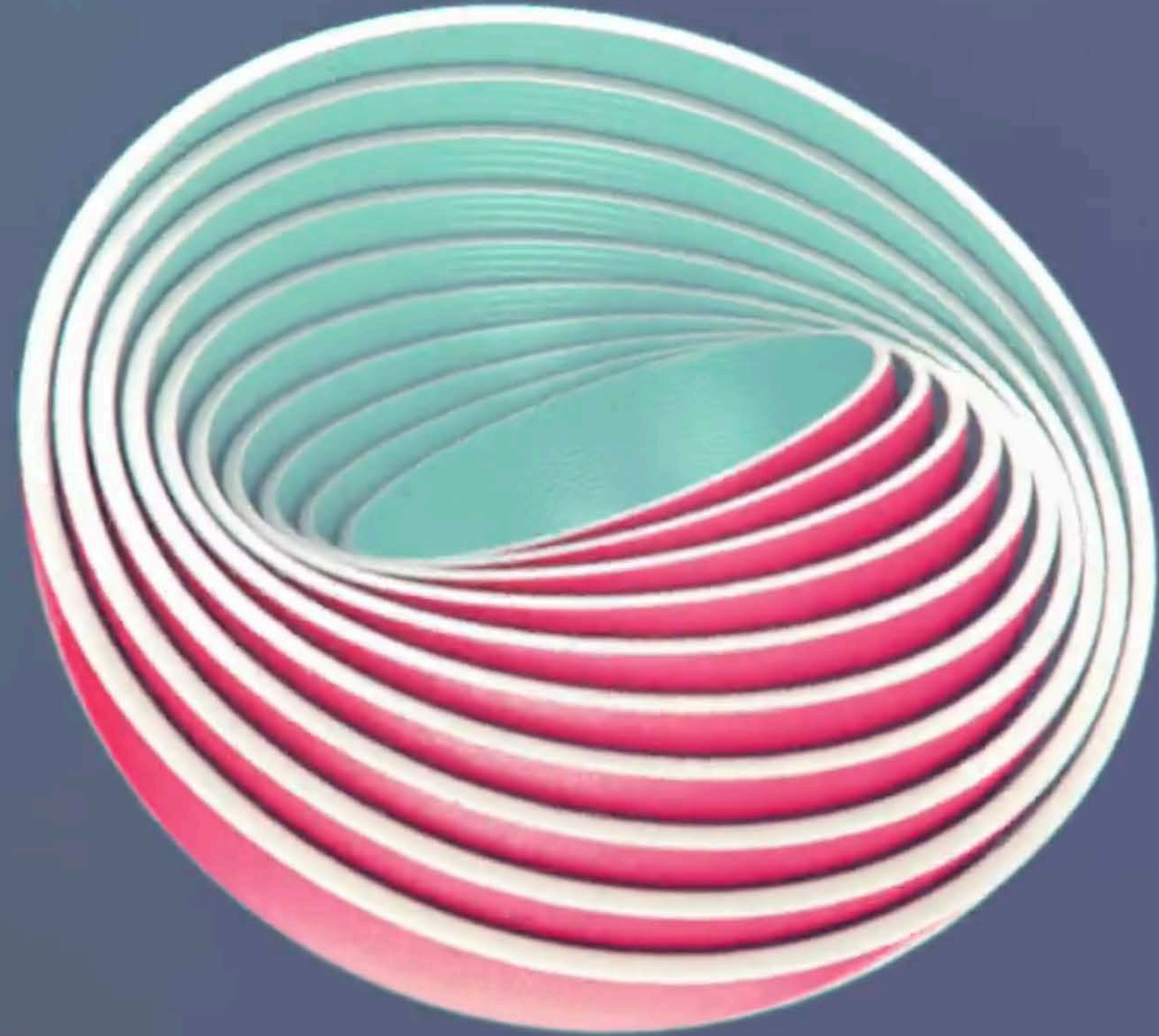


AUTODESK[®]
FUSION 360



MAYA

v
MASH



Differences between Generative Design tool and procedural networks

Generative Design tool

Generative Design focuses on creating results that meet criteria for physical performance and manufacturability (i.e. loads and forces, and variety of constraints).

In Generative Design, the role of the designer stays in setting up goals, constraints, defining the problem, and in selecting outcomes, with limited input on how the new forms are generated.

Procedural Networks

Procedural networks focus on creating interesting patterns that enhance product appearance instead of focusing on physical performance.

Procedural networks provide designers ample control and flexibility in terms of combining different types of procedural nodes, and finetuning each of them in a direct way.

Differences between Dynamo/Grasshopper and Fusion360+Maya/Mash

Dynamo/Grasshopper

With Dynamo/Grasshopper, users have to setup complex node networks ahead of time, and need to have significant knowledge of the right terminology, node creation and algorithm relations.

Fusion 360 + Maya/Mash

Maya/MASH offers a user-friendly interface that is based on preset nodes, each one with variables that are easy to adjust via sliders.

This workflow is intuitive and allows for direct experimentation of different patterns and shapes.



Benefits

- Versatility of modeling (Fusion 360).
- Intuitive procedural networks (Maya)
- Compatible workflows (FBX)

Limitations

- Importing Faces: 10,000
- Geometry complexity (faces and edges)
- File conversion and import/export

Key Workflows

1

Create network in Maya

Import in Fusion 360





Key Workflows

2

Create geometry in Fusion 360

Export to Maya to add network

Import back to Fusion 360







Key Workflows

3

Create network in Maya

Export to Fusion 360

Use network to edit native geometry



Demo time



Create network



Import
Convert to Brep



Create bodies

Create network

Import
Convert to Brep



Create network



Import
Use it to edit body



**What else
will you create?**



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