Animation for 3D Printing

Cory Mogk
Senior Program Manager, Innovation and Technology with Autodesk Research
@CoryMogk
Animation can be a great design tool.

This class will look at how we can apply animation techniques to 3D printing—from laying out geometry to hiding support structures to creating interesting new models.
Key learning objectives

At the end of this class, you will be able to:

- Learn how to design for moveable 3D prints
- Learn how to optimize the position of objects in a 3D printing volume
- Learn how to hide support structures
- Learn how to use animation tools to generate interesting new surfaces
Who am I?

The cure for boredom is curiosity.
There is no cure for curiosity.
- Dorothy Parker
AU App Poll
To Be or Not to Be

3D Printing vs CG Visualization
3D Printing and Moving Parts
Where did this class come from?

https://www.thingiverse.com/thing:36321
But...
Designing for Moving Parts

When does 0.4mm ≠ 0.4mm?
Designing for Moving Parts

3D Printing ≠ Machining
Moving Parts

Don’t Reinvent the Wheel
Integrated Assemblies
The 'Geared Cube' was 3D printed fully assembled as one piece with all 28 gears 3D printed in place. No assembly required and disassembly is impossible.
naïve orientation

optimal orientation
Kinematics Fold reduced the size of the dress by 85% making it printable as a single piece.
Dynamic Packing
Bunny Multiplication

Print Time: 20 min
Operator Time: 2 min
Bunny Multiplication

16 Bunnies
Print Time: 5.5 hours
Operator Time: 30 min
Bunny Multiplication

27 Bunnies
Print Time: 9 hours
Operator Time: 40 min

<table>
<thead>
<tr>
<th>Bunnies</th>
<th>Print</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20 min</td>
<td>2 min</td>
</tr>
<tr>
<td>16</td>
<td>5.5 hours</td>
<td>30 min</td>
</tr>
<tr>
<td>27</td>
<td>9 hours</td>
<td>40 min</td>
</tr>
</tbody>
</table>
3D Printing Motion
Types of 3D Printable Animation

Stamps

Motion Trails & Sweeps

Particles
Stamps
Motion Trails & Sweeps
Particles
What did we talk about?

- 3D Printing vs CG Visualization
- Designing for Moving Parts
- Dynamic packing
- Representing motion in 3D Prints

@CoryMogk    Cory.Mogk@Autodesk.com
How did I do?

- Your class feedback is critical. Fill out a class survey now.
- Use the AU mobile app or fill out a class survey online.
- Give feedback after each session.
- AU speakers will get feedback in real-time.
- Your feedback results in better classes and a better AU experience.