3D Printing—Examining the Reality and Possibilities

Steve Schain

Post Production Supervisor / M & E Content Developer

4D Technologies (www.cadlearning.com)

Class summary

Whether it's being used in rapid prototyping and consumer products or small-run manufacturing, 3D printing has become an important part of the workflows of many hobbyists, artists, engineers, and fabrication companies. This course is a discussion of the landscape of the 3D-printing industry, and how to break through the hype that surrounds it. You will discover how 3D printing is being used in the real world for both personal and professional uses. From creating art to engineering prototypes, this course will also explore the expanding use of 3D printers and their place in an enhanced design workflow. Finally, we'll look at the practicality of how you can gain immediate returns from 3D printing your designs today.

Key learning objectives

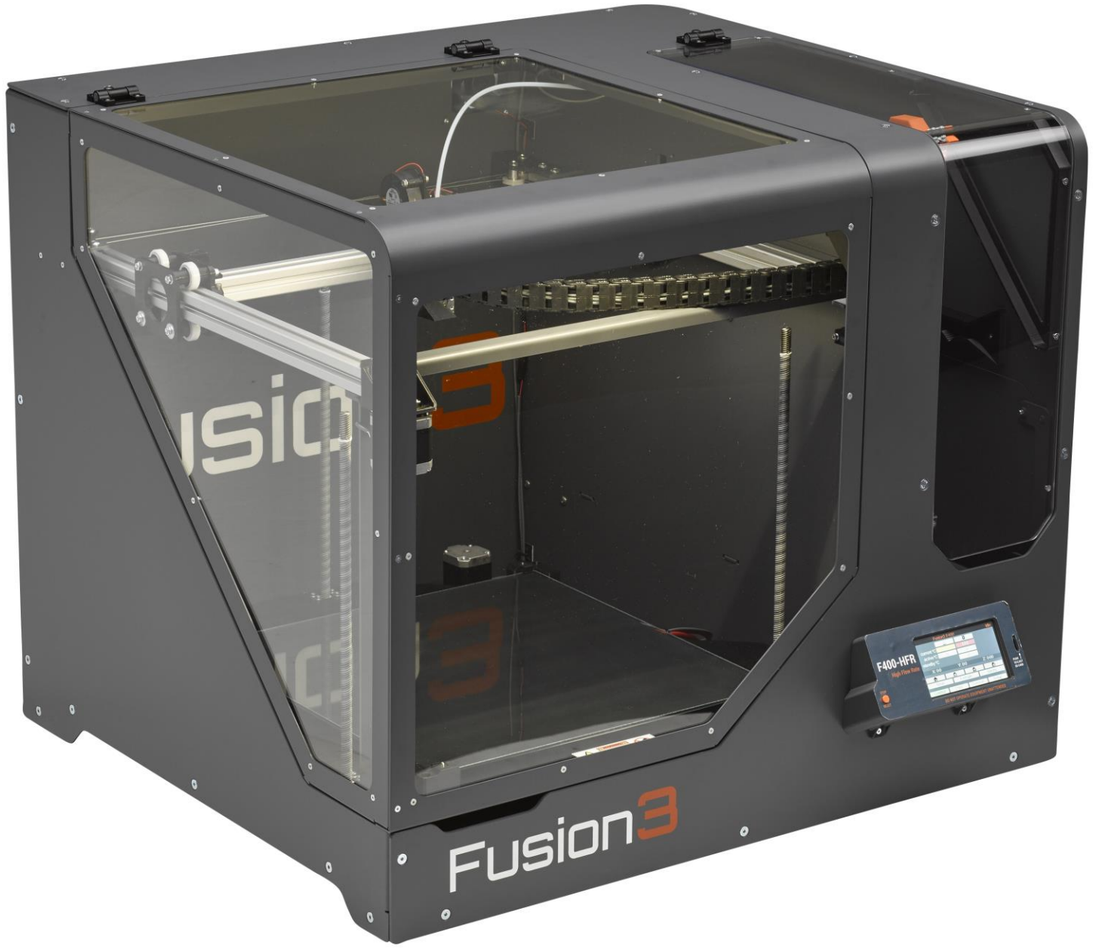
At the end of this class, you will be able to:

- Learn the process of rapid prototyping and its applications.
- Discover real-world applications of 3D printing and how you can make use of them.
- Discover tools available that can be used to create and deploy 3D-printable models.
- Discuss the future of 3D printing and its growing applications in the design industries.

WELCOME!

Have you ever used a 3D printer?

- Never
- More than 1 month
- More than 1 year
- More than 5 years



3D Printing

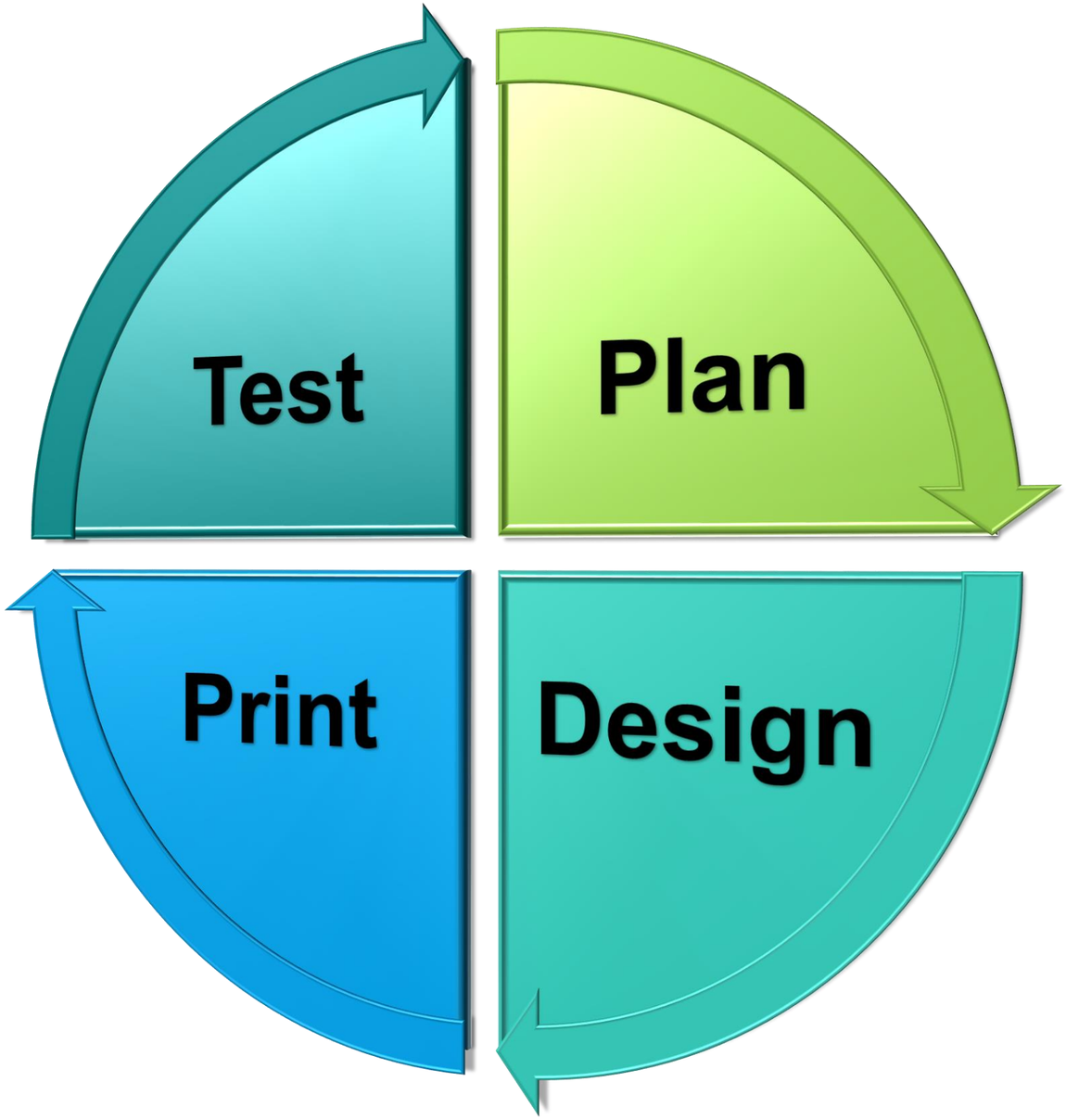
Additive Manufacturing

Rapid Prototyping

What's all the Hype?

The 3D Printing Process

3D Printing



Traditional Workflow

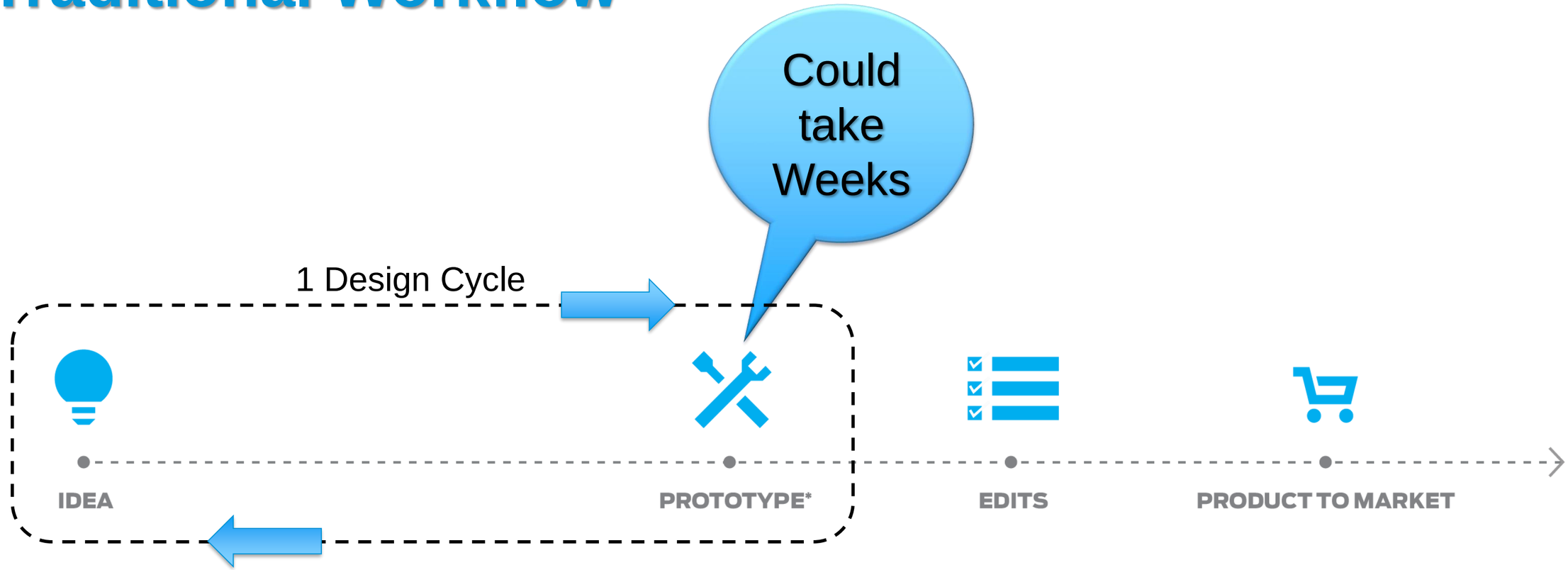
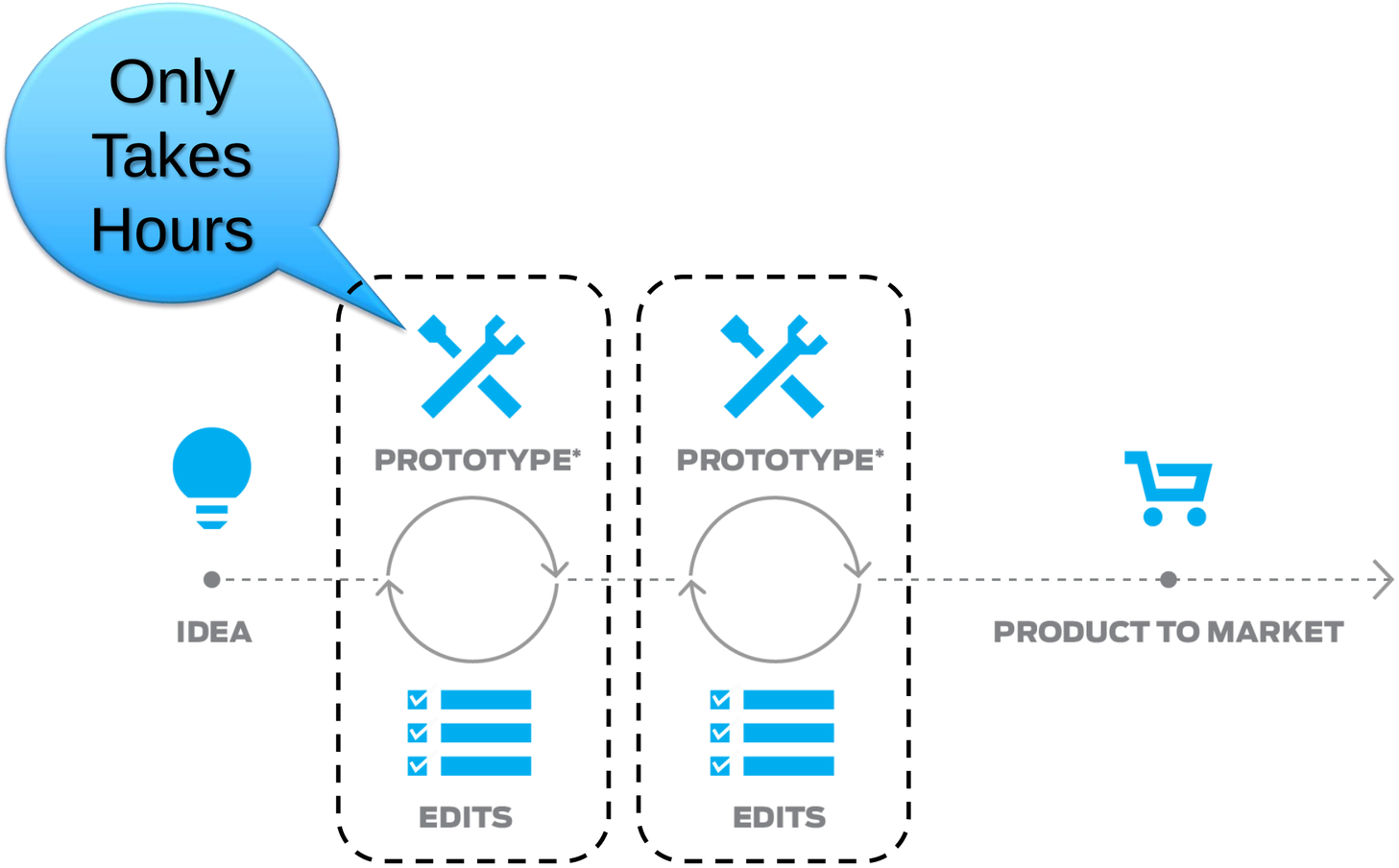


Image courtesy of MakerBot

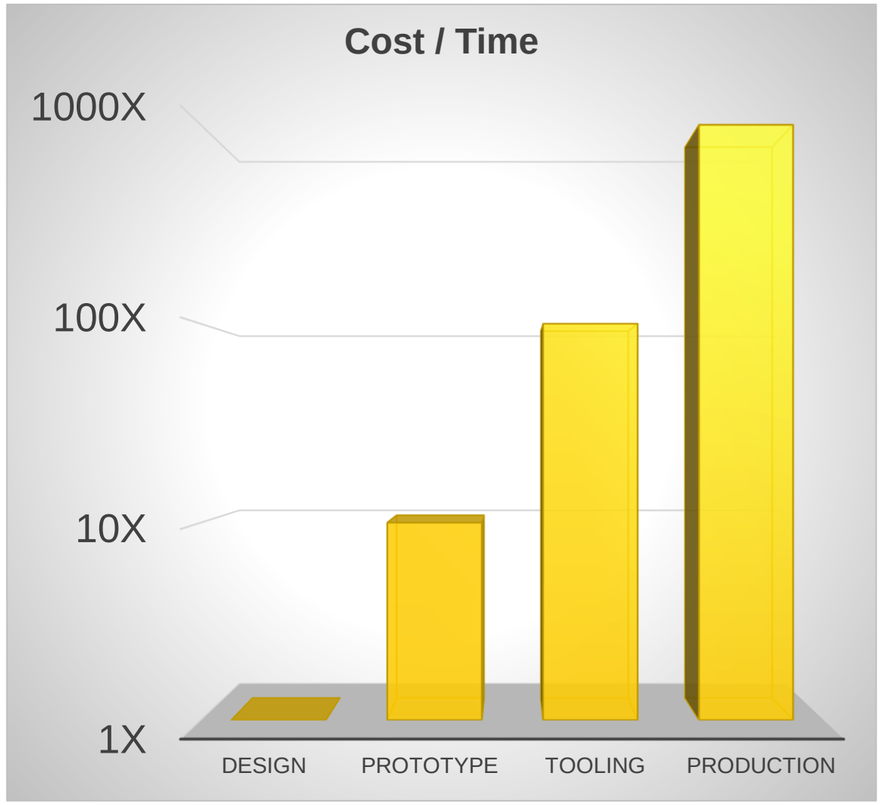
Rapid Prototyping Workflow



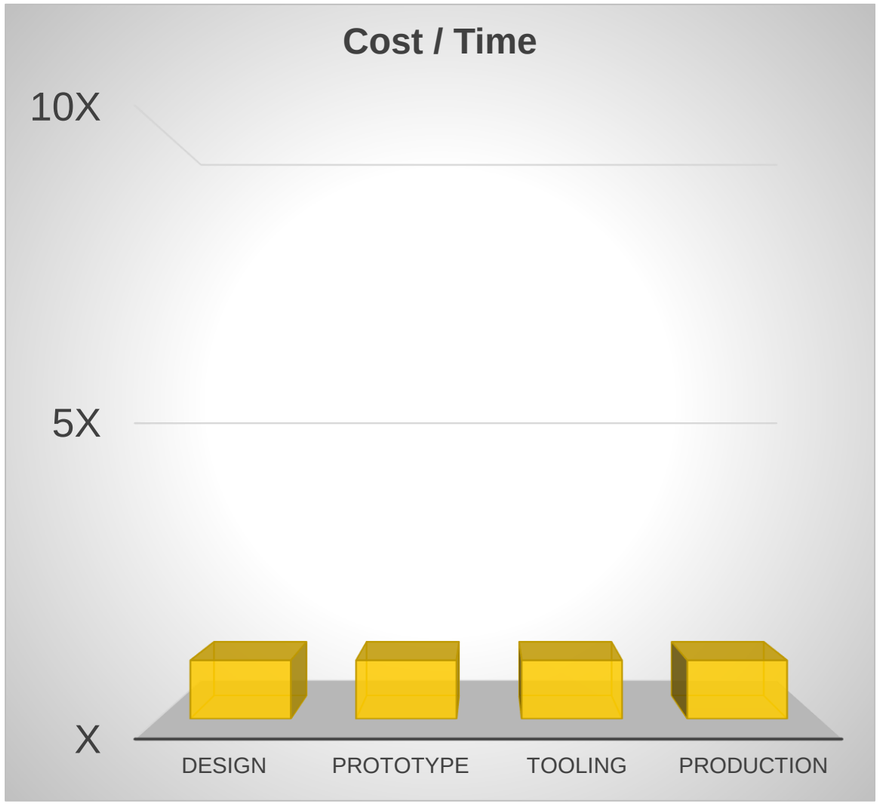
Enhanced Production Workflow


Faster to Market!
Better Products
Lower Co$t

Cost Comparison



Traditional Manufacturing



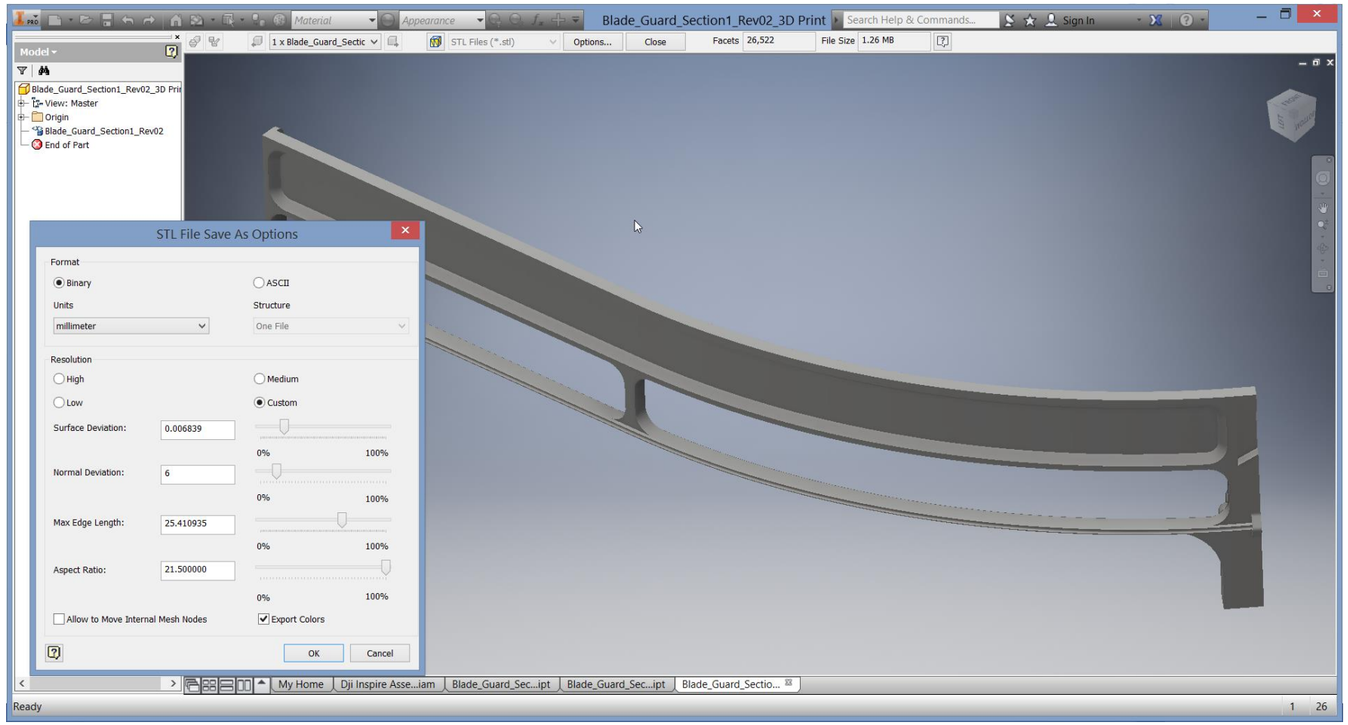
3D Printing

Time versus Cost

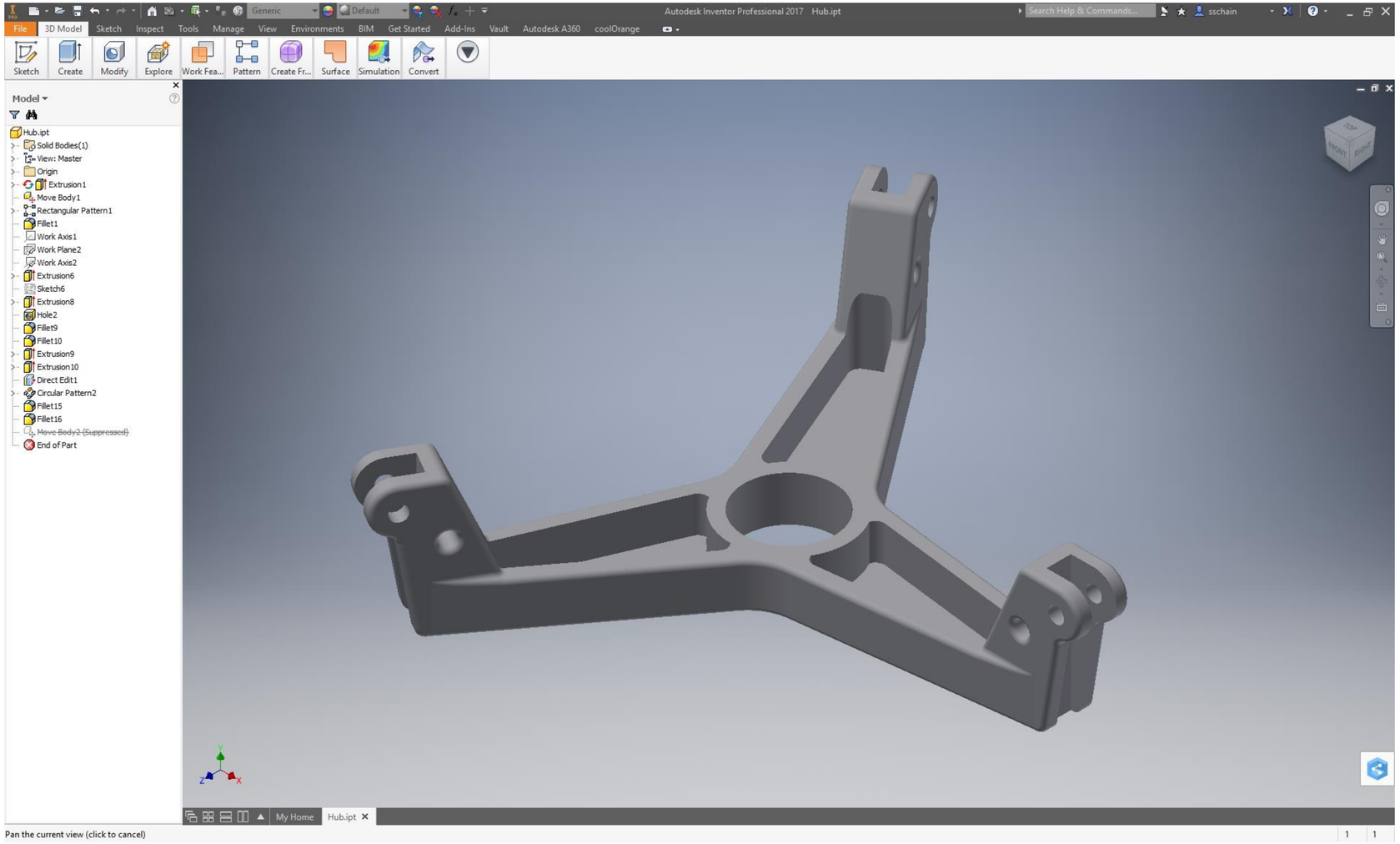
Tools for Creation and Deployment

Have you ever used CAD / Design Software?

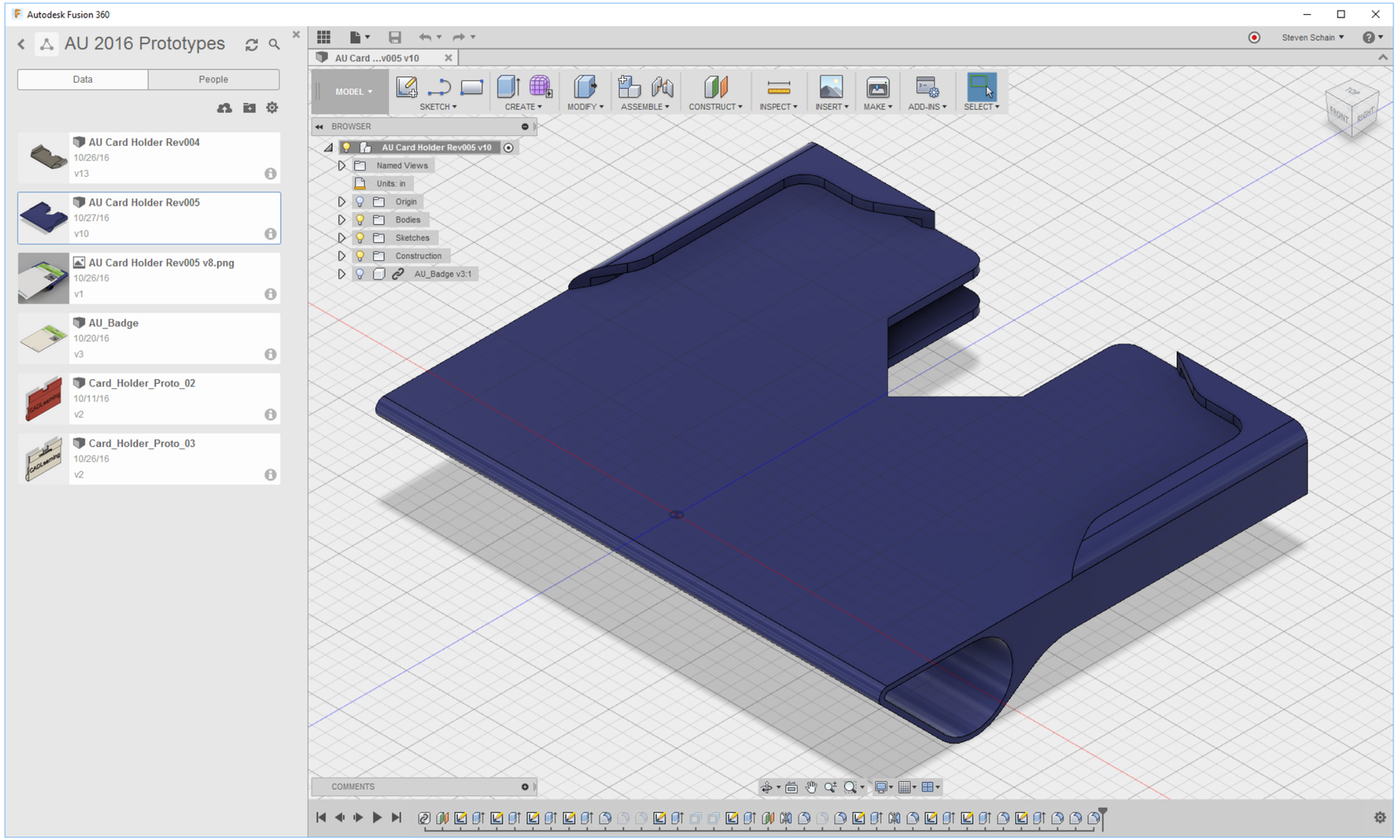
- Never
- More than 1 month
- More than 1 year
- More than 5 years



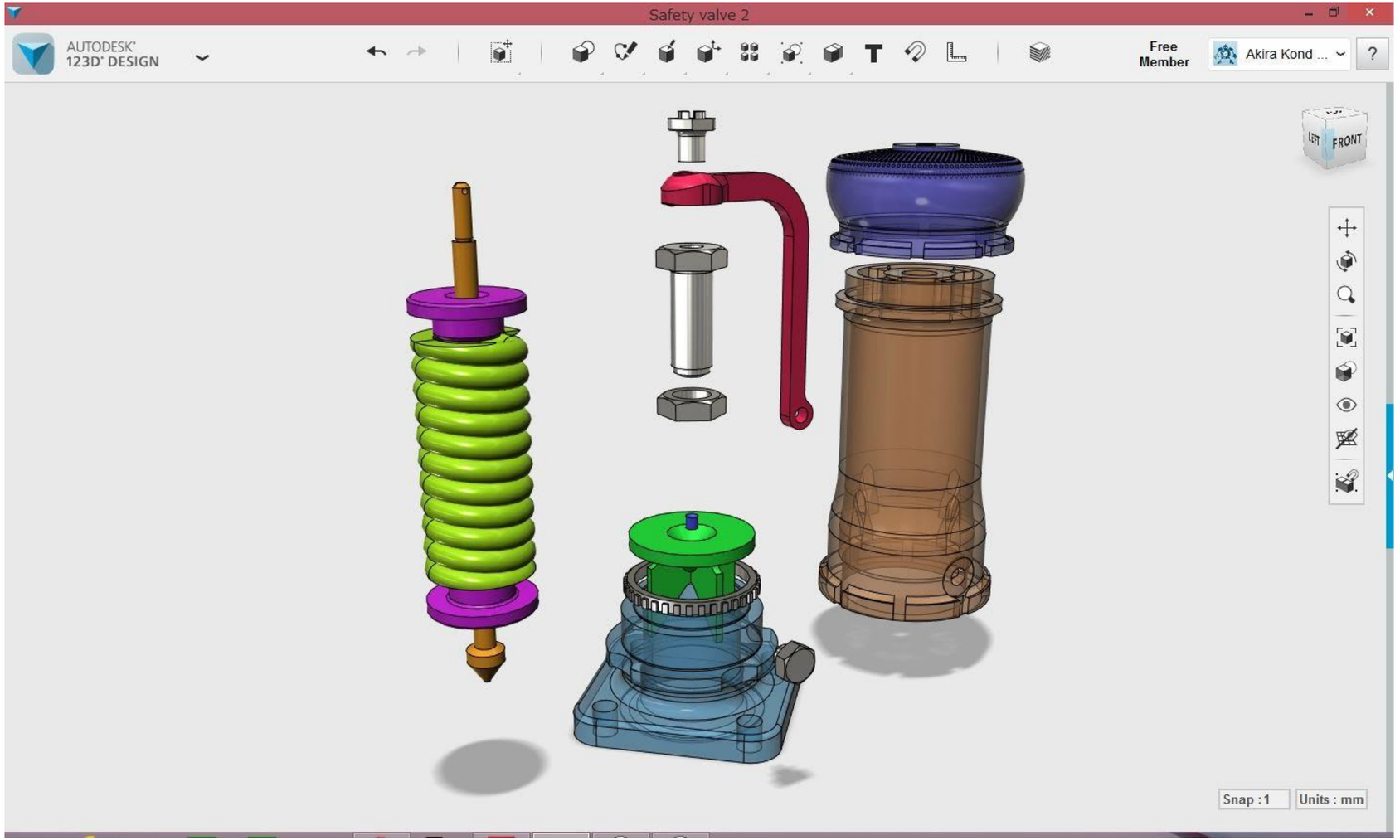
Autodesk Inventor



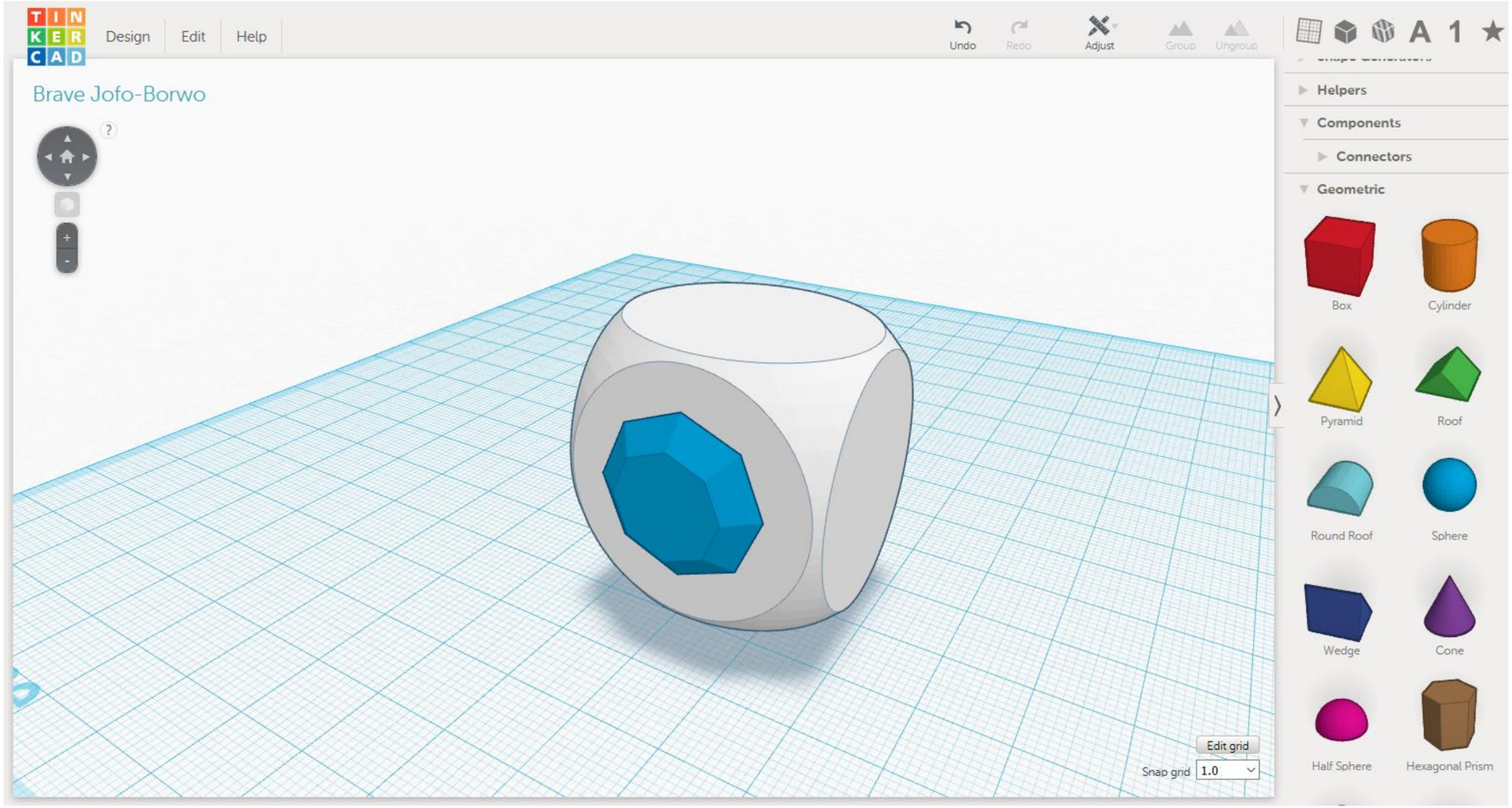
Fusion 360


Autodesk Fusion 360
AU 2016 Prototypes
Data
People
AU Card Holder Rev004
10/26/16
v13
AU Card Holder Rev005
10/27/16
v10
AU Card Holder Rev005 v8.png
10/26/16
v1
AU_Badge
10/20/16
v3
Card_Holder_Proto_02
10/11/16
v2
Card_Holder_Proto_03
10/26/16
v2
Steven Schain
AU Card ...v005 v10
MODEL
SKETCH
CREATE
MODIFY
ASSEMBLE
CONSTRUCT
INSPECT
INSERT
MAKE
ADD-INS
SELECT
BROWSER
AU Card Holder Rev005 v10
Named Views
Units: in
Origin
Bodies
Sketches
Construction
AU_Badge v3:1
COMMENTS

123D Design


Safety valve 2
AUTODESK
123D DESIGN
Free
Member
Akira Kond ...
?
LEFT
FRONT
Snap : 1
Units : mm

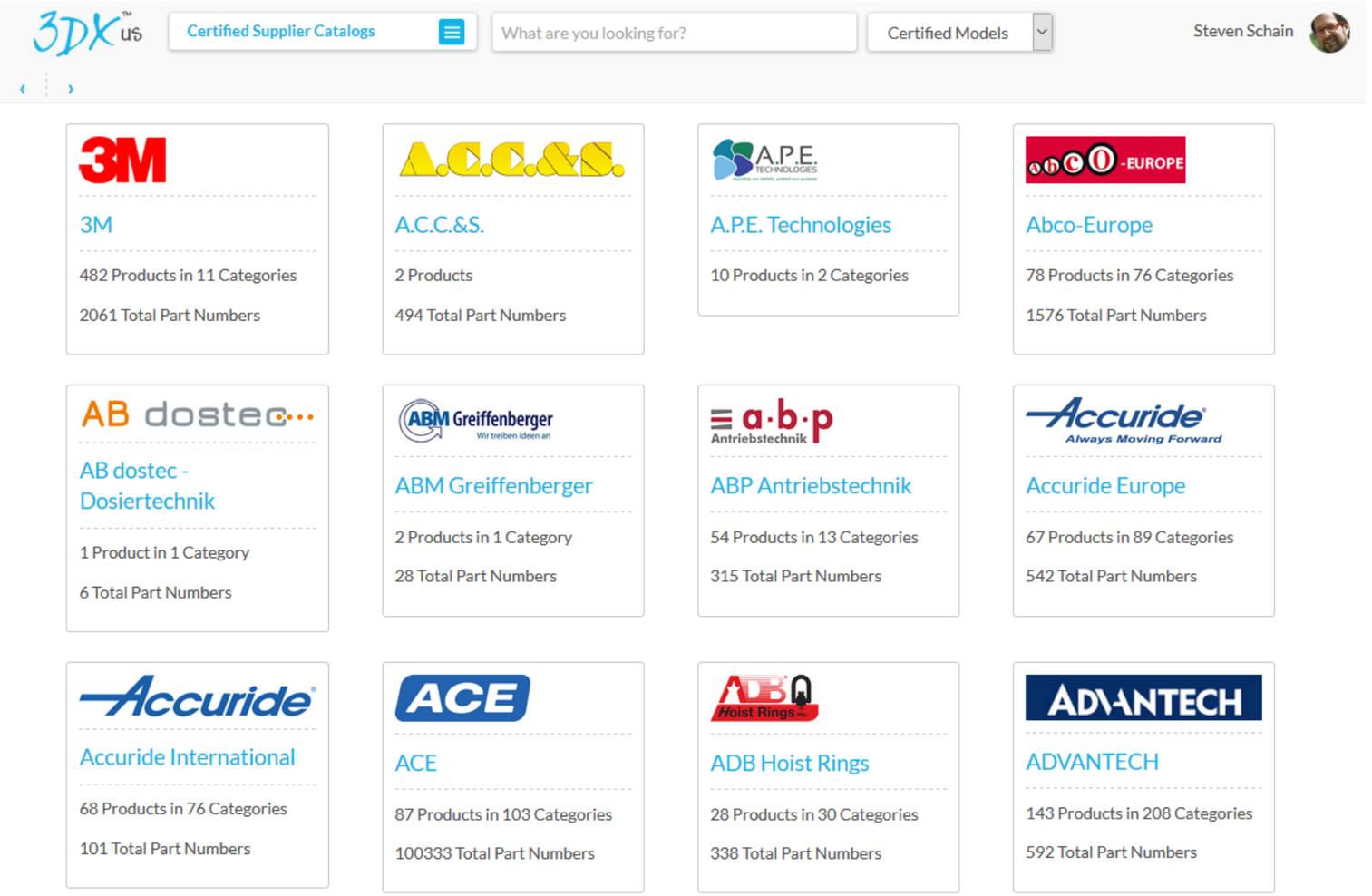
TinkerCAD


Design
Edit
Help
Undo
Redo
Adjust
Group
Ungroup
Brave Jofo-Borwo
Helpers
Components
Connectors
Geometric
Box
Cylinder
Pyramid
Roof
Round Roof
Sphere
Wedge
Cone
Half Sphere
Hexagonal Prism
Edit grid
Snap grid
1.0

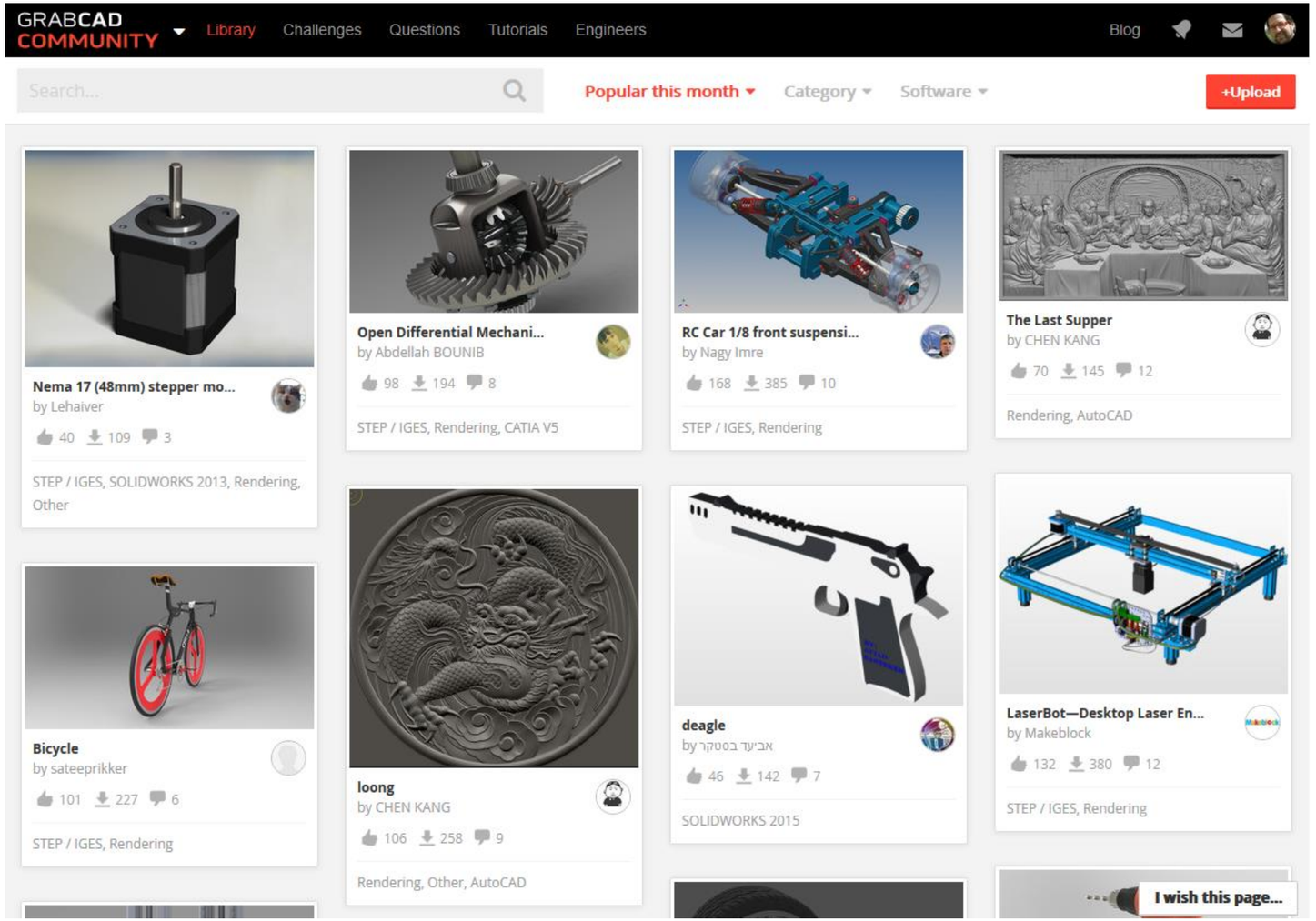
Autodesk Remake / 123D Catch

Resources for Deployment

3Dx-us


3Dx us
Certified Supplier Catalogs
What are you looking for?
Certified Models
Steven Schain
3M
3M
482 Products in 11 Categories
2061 Total Part Numbers
A.C.C.&S.
A.C.C.&S.
2 Products
494 Total Part Numbers
A.P.E. TECHNOLOGIES
A.P.E. Technologies
10 Products in 2 Categories
abco -EUROPE
Abco-Europe
78 Products in 76 Categories
1576 Total Part Numbers
AB dostec
AB dostec - Dosiertechnik
1 Product in 1 Category
6 Total Part Numbers
ABM Greiffenberger
Wir treiben Ideen an
ABM Greiffenberger
2 Products in 1 Category
28 Total Part Numbers
a·b·p
Antriebstechnik
ABP Antriebstechnik
54 Products in 13 Categories
315 Total Part Numbers
Accuride
Always Moving Forward
Accuride Europe
67 Products in 89 Categories
542 Total Part Numbers
Accuride
Accuride International
68 Products in 76 Categories
101 Total Part Numbers
ACE
ACE
87 Products in 103 Categories
100333 Total Part Numbers
ADB Hoist Rings
ADB Hoist Rings
28 Products in 30 Categories
338 Total Part Numbers
ADVANTECH
ADVANTECH
143 Products in 208 Categories
592 Total Part Numbers

GrabCAD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STEP / IGES, SOLIDWORKS 2013, Rendering, Other
Open Differential Mechani...
by Abdellah BOUNIB
98 194 8
STEP / IGES, Rendering, CATIA V5
RC Car 1/8 front suspensi...
by Nagy Imre
168 385 10
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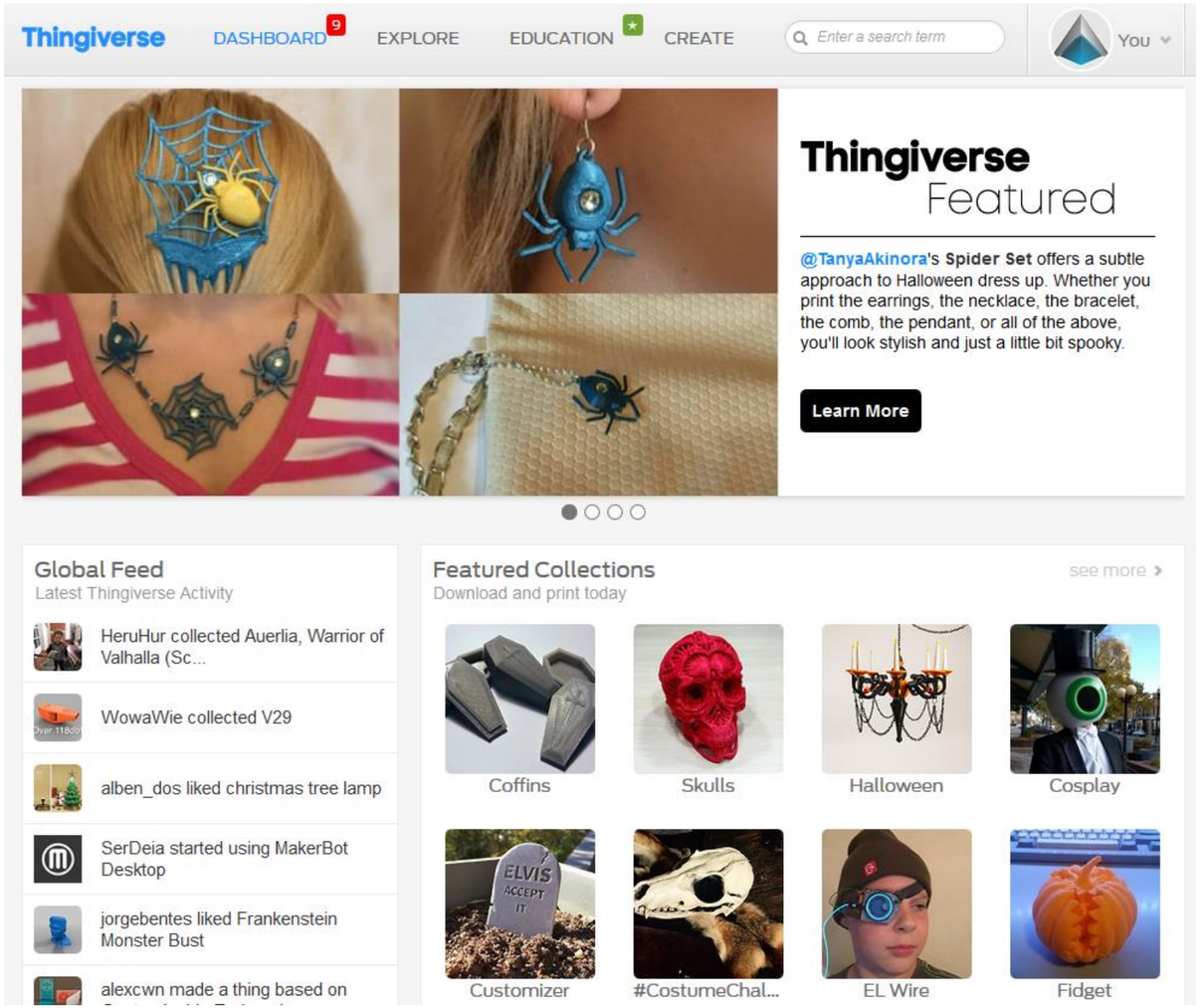
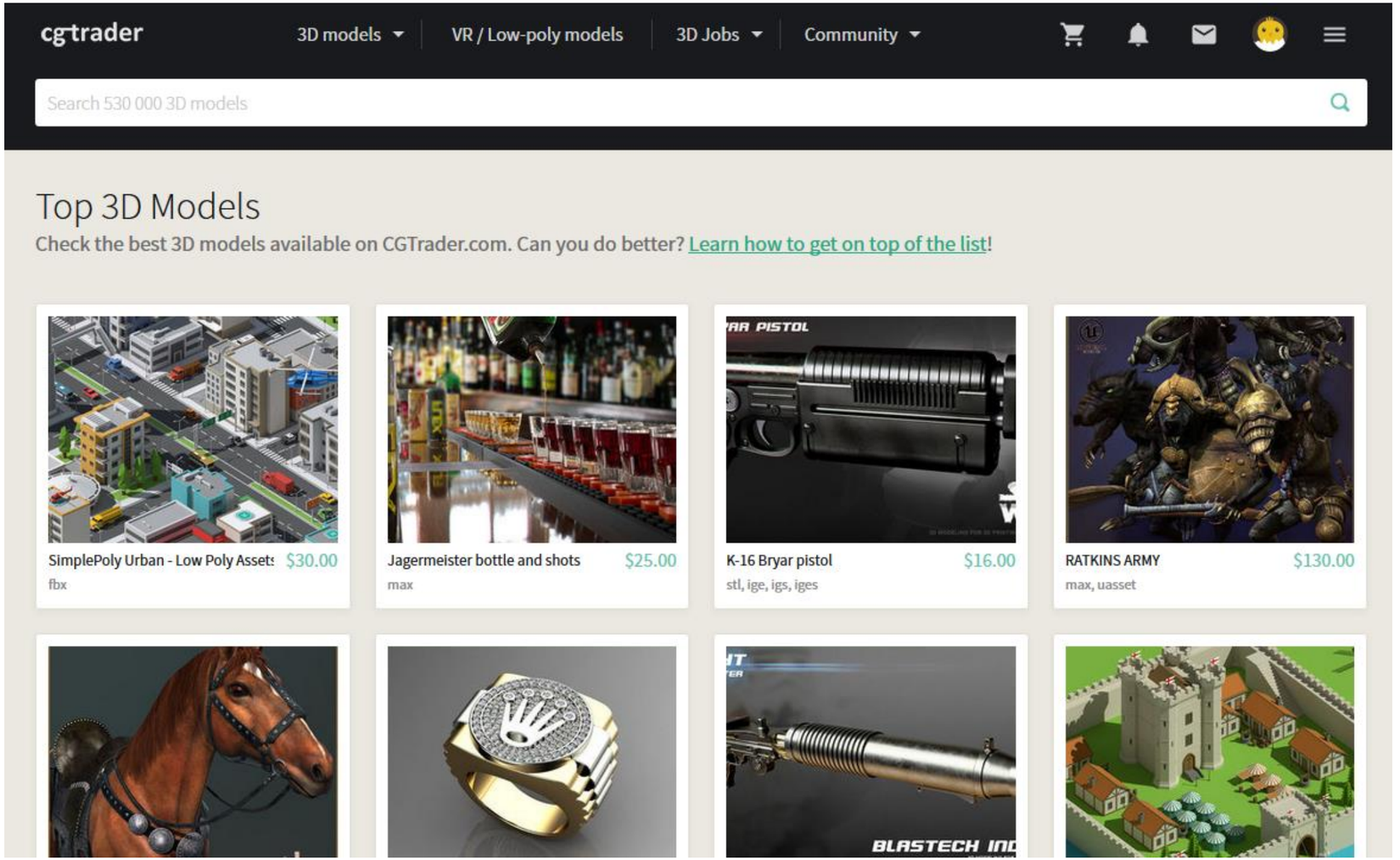
by CHEN KANG
70 145 12
Rendering, AutoCAD
Bicycle
by sateeprikker
101 227 6
STEP / IGES, Rendering
loong
by CHEN KANG
106 258 9
Rendering, Other, AutoCAD
deagle
by אביעד בסטקר
46 142 7
SOLIDWORKS 2015
LaserBot—Desktop Laser En...
by Makeblock
132 380 12
STEP / IGES, Rendering
I wish this page...

Thingiverse



CG Trader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3D Jobs
Community
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Top 3D Models
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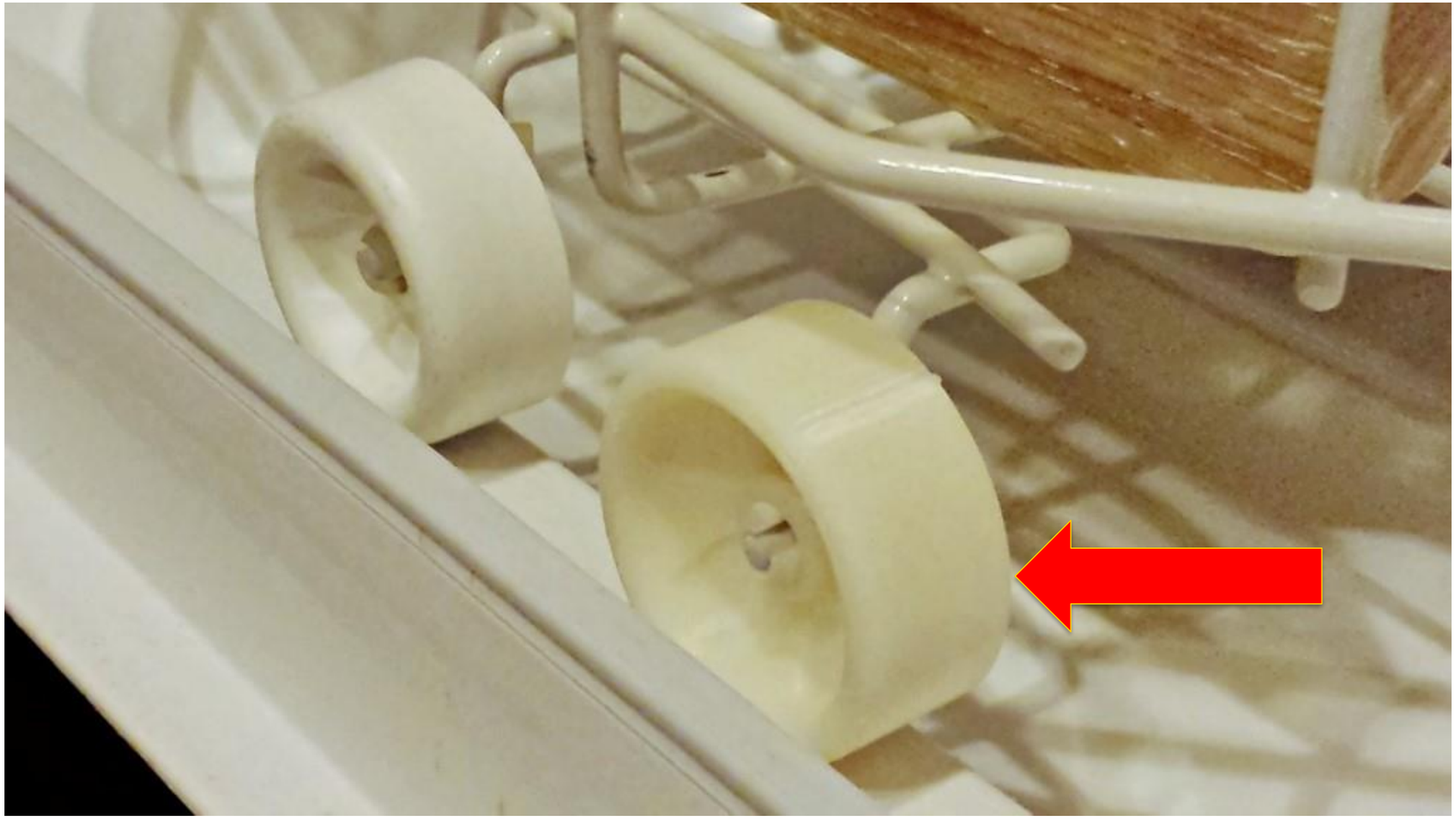
fbx
Jagermeister bottle and shots $25.00
max
K-16 Bryar pistol $16.00
stl, ige, igs, iges
RATKINS ARMY $130.00
max, uasset
BLASTECH IND

Practical Applications

Replacement Parts



Dishwasher wheel replacement

Useful Items

G-Clamp, Thingiverse, by Johann517
http://www.thingiverse.com/thing:1673030

Industry Based Applications

Prototyping

Turbine Blade Prototype

Jigs and Fixtures

Assembly Fixture, Javelin

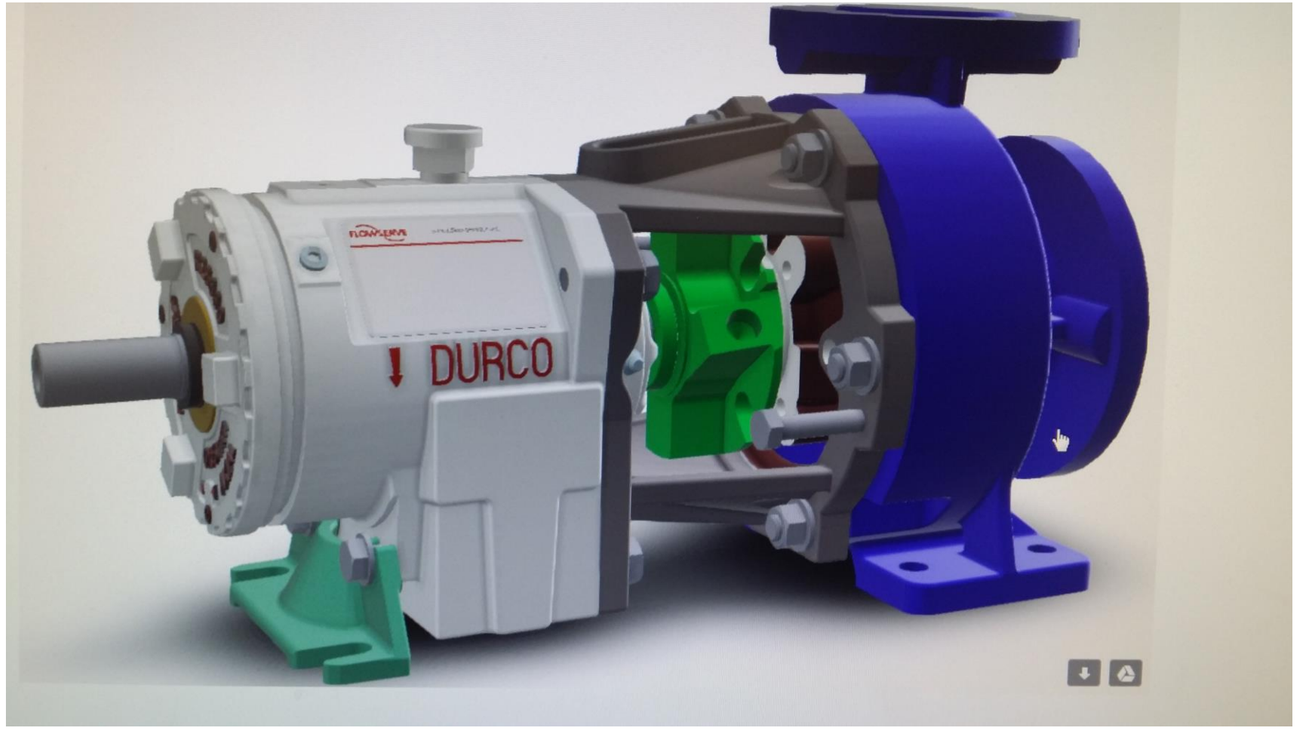
Casting

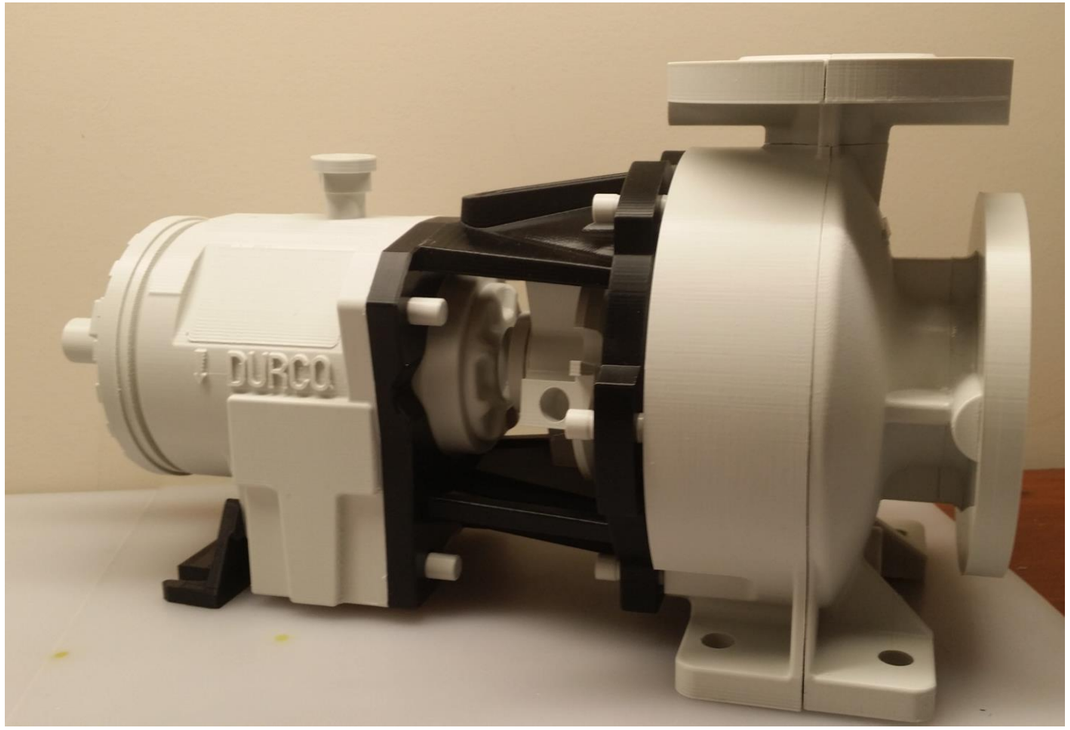
Investment casting model, Spectra3D Technologies

Production

Low run production parts, Spectra3D Technologies

Design Visualization





CAD model becomes a physical model for trade show,
Spectra3D Technologies

Non-Industrial

Art

3D printed artistic lamp, Voxel Studio

Jewelry

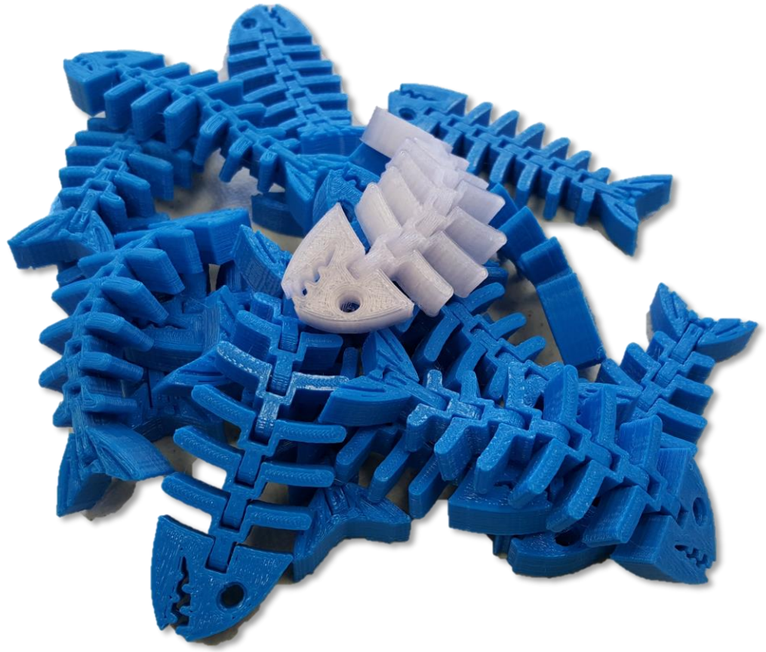
Stages of a ring, SLA print (Left), Kubo3D

Cosplay

3D Hammer of SOL, Spectra3D Technologies

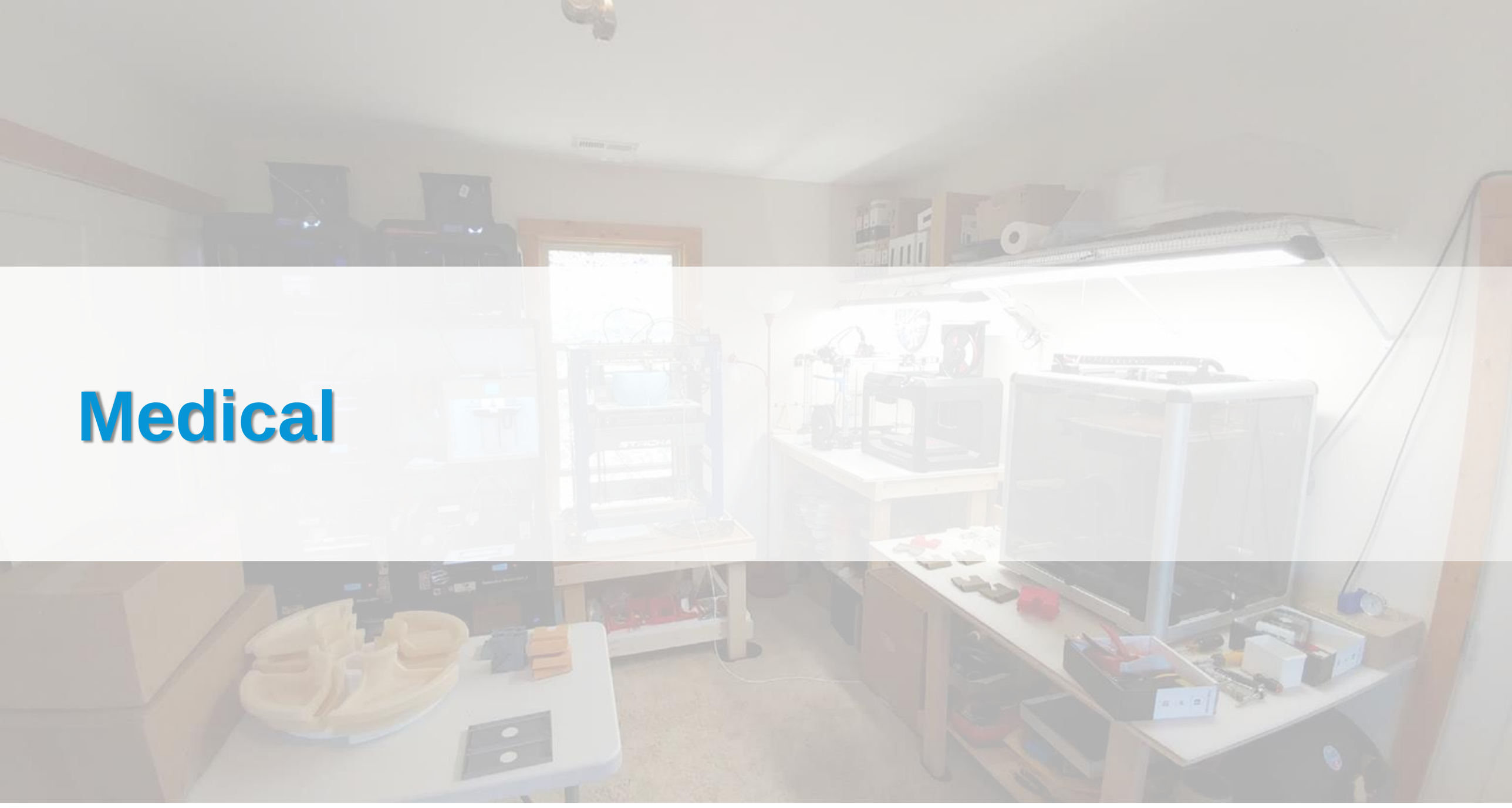
Toys and games

The 3D Printed Marble Machine #3,
Designed by Tulio Laanen
http://www.thingiverse.com/thing:1385312

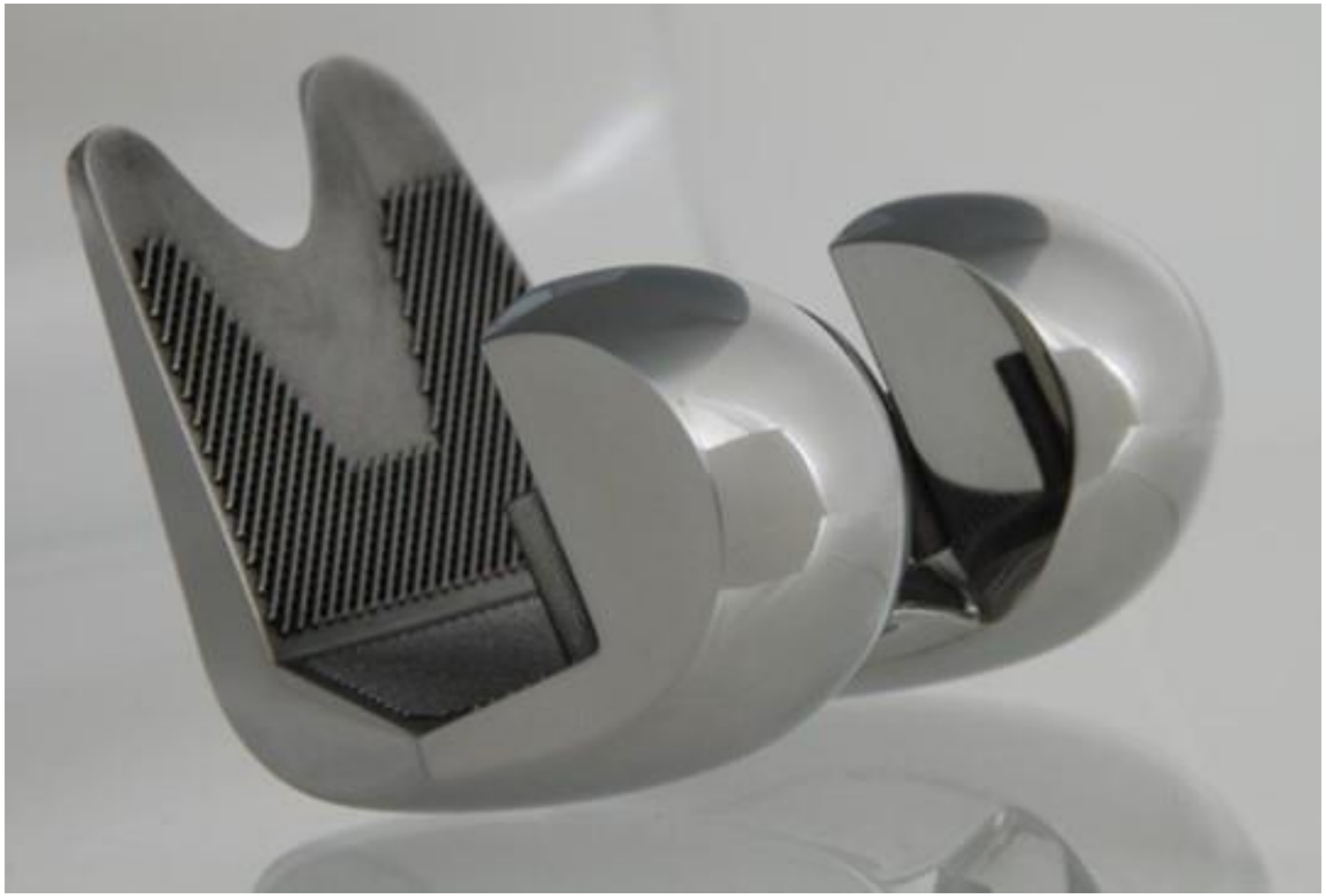


Fish Fossilz,
Designed by muzz64
http://www.thingiverse.com/thing:1276095

Medical



Implants



Knee Implant

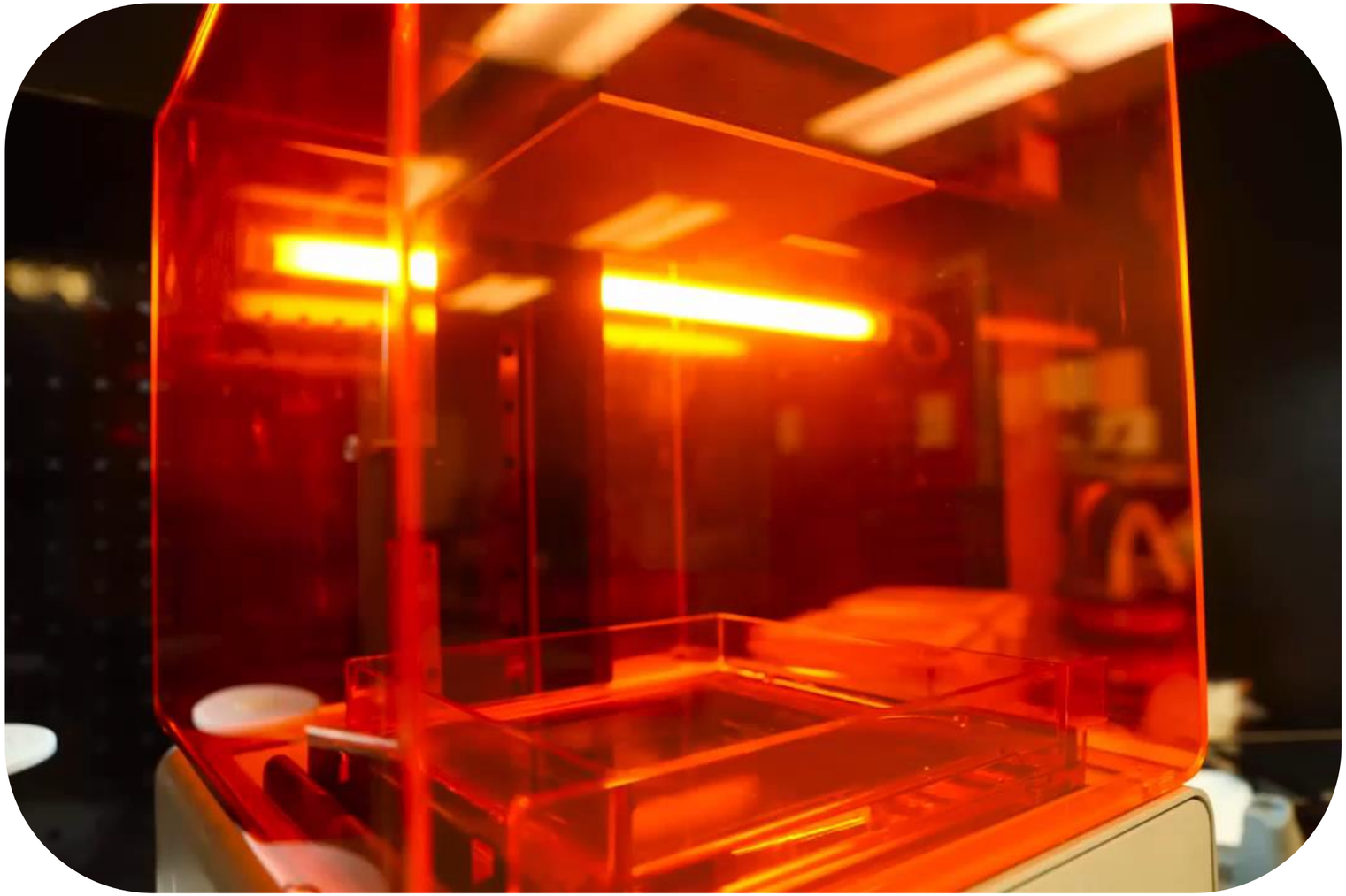
Surgical Visualization

Surgical Visualization, Conjoined twin separation

Most Active Technologies

FFF / FDM

Stereolithography (SLA)



Other

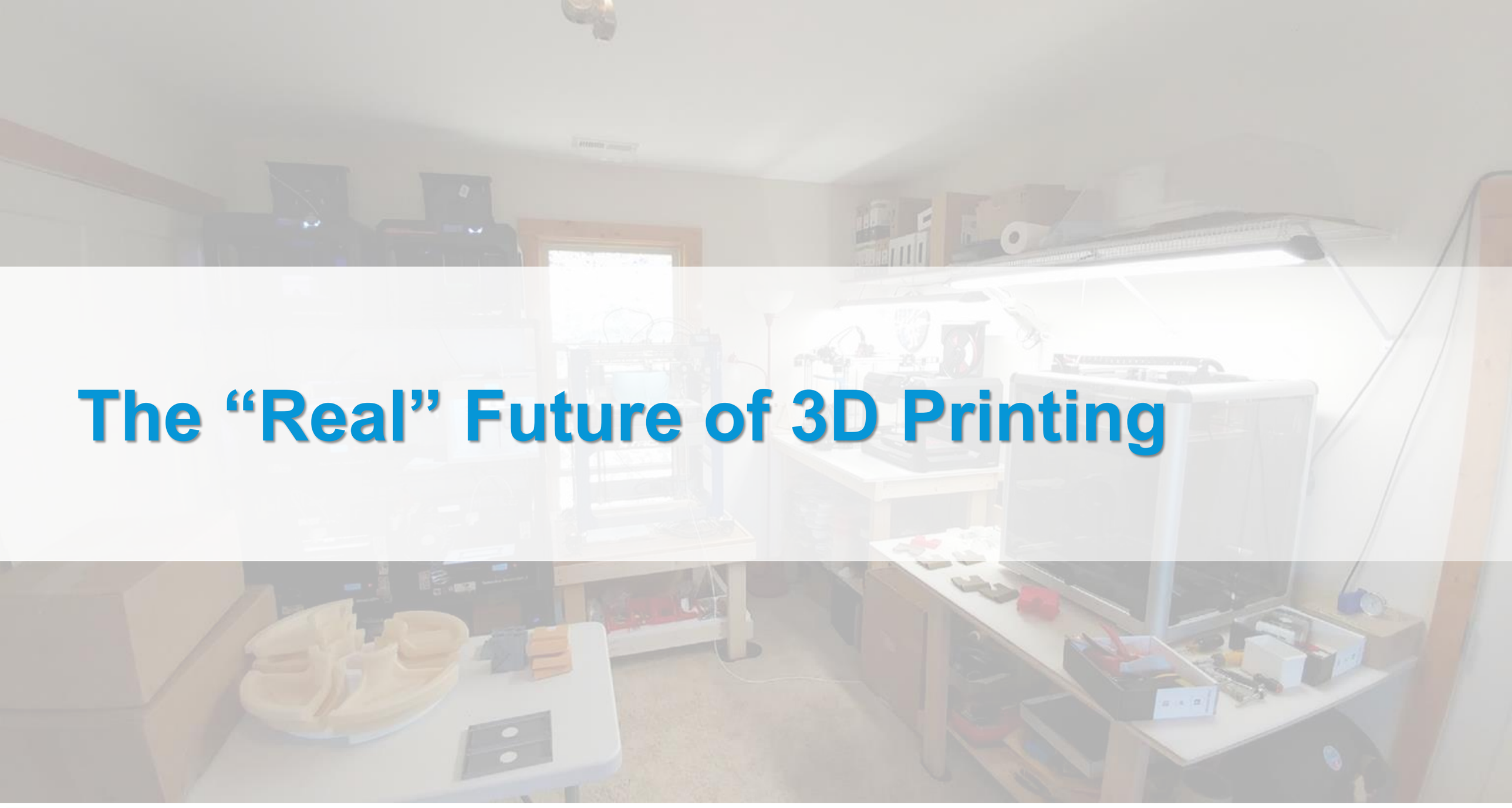
- SLS
- Jetting

Important Issues


IP Protection

Security and Hacking


Material
Safely



The “Real” Future of 3D Printing

Faster Speed>>>


Mass
Manufacturing

Better Materials

Lower Co$t

Unique applications

- Medical

Organovo’s NovoGen Bioprinter fabricating tissue.

Conclusion

What we learned:

- What 3D printing is
- Tools available for creation and deployment
- Practical application
- Important issues
- The “real” future of 3D printing

Thank You

Thank you for your time.

Steven Schain – Post Production Supervisor / M & E Content Developer
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2:05 PM

3:43 PM

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