# Disrupting Barriers: Printing in Three Dimensions

Michael Beltran

Lecturer, Mechanical Engineering - Northwestern University

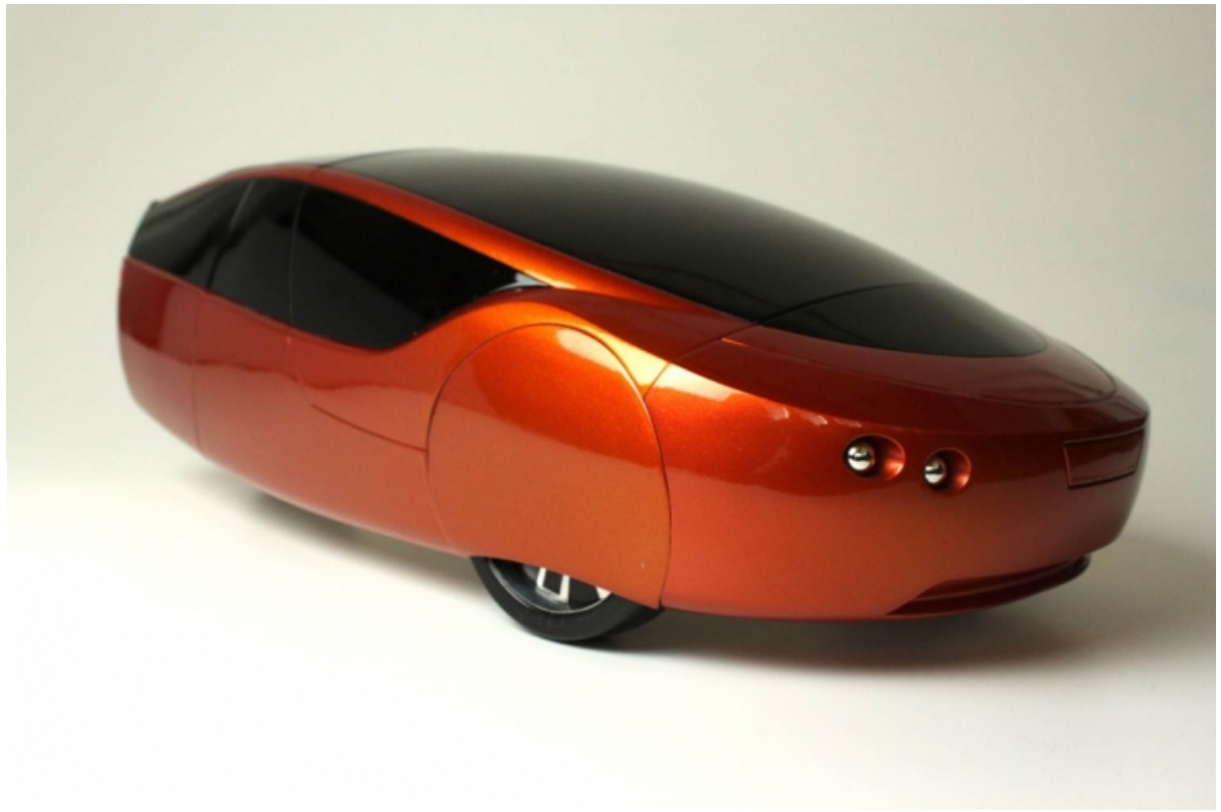
Director, Rapid Prototyping Lab – Northwestern University

# What is 3D Printing?


Nearly unlimited geometry

Various processes and levels of fidelity


Some approach
existing methods



# **Hype** vs. Reality

## 3-D Printing Will Be a Manufacturing Engine for the Economy Dan Hamermesh prof of Economics U of Texas

## No rival for mass production Nick Allen , Founder 3-D printing

## With 3-D Printers Comes the Possibility of Medical Miracles

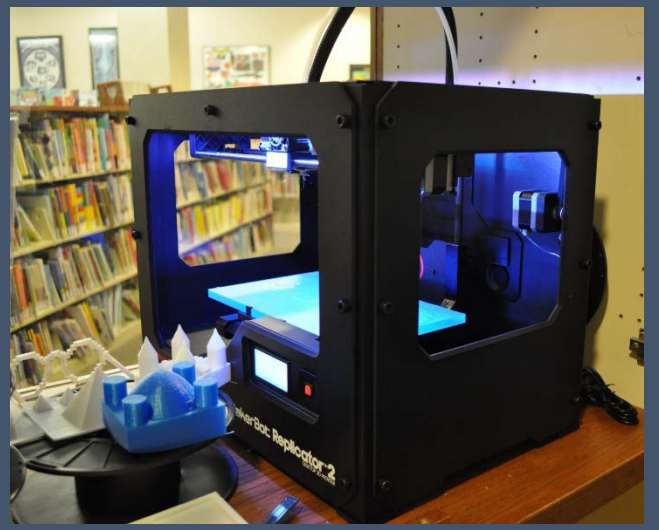
Mick Ebeling is the founder of Not Impossible Labs.

## Space Travel Will Be Easier and Less Costly With 3-D Printers Alison Nordt, an engineer at Lockheed Martin's Space Technology Advanced R&D

# Hype vs. **Reality**

# 3D Printing will impact the “tinkerer”

- Complex shape creation in your own home
- Building with materials that would otherwise be difficult to work with
- Customization to specific needs





Community resources can further
expand what a person can create

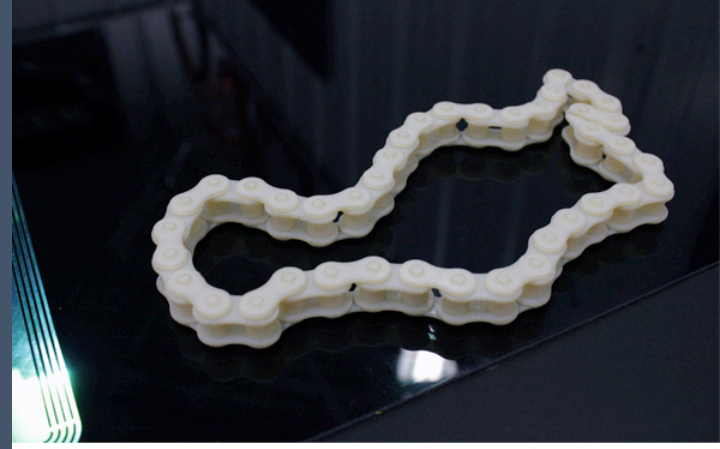
# What can you replace at your home?

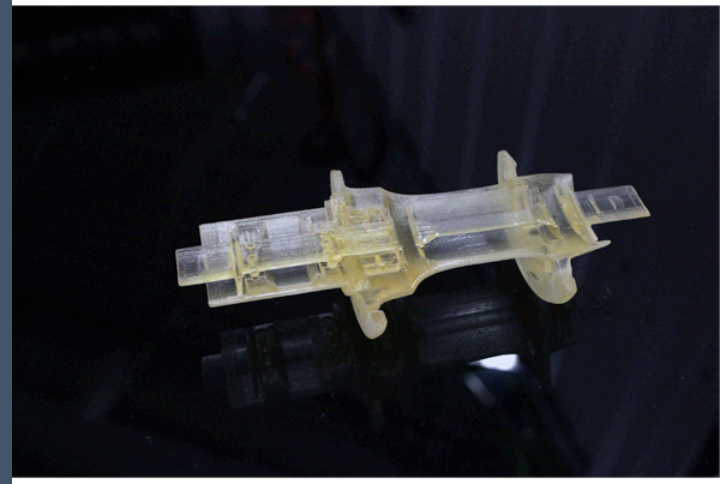
- How many parts in your home are a single material?
- How much does it cost?
- How easy can you run out to the store and buy a new one?

TREK


# In product development…

- Immediate production (2 months to 2 days)
- Lower materials and labor cost for prototyping
- Overall reduction in product development cycle time.





Could this completely replace full production?

# Scale


GE Aviation

AIRBUS

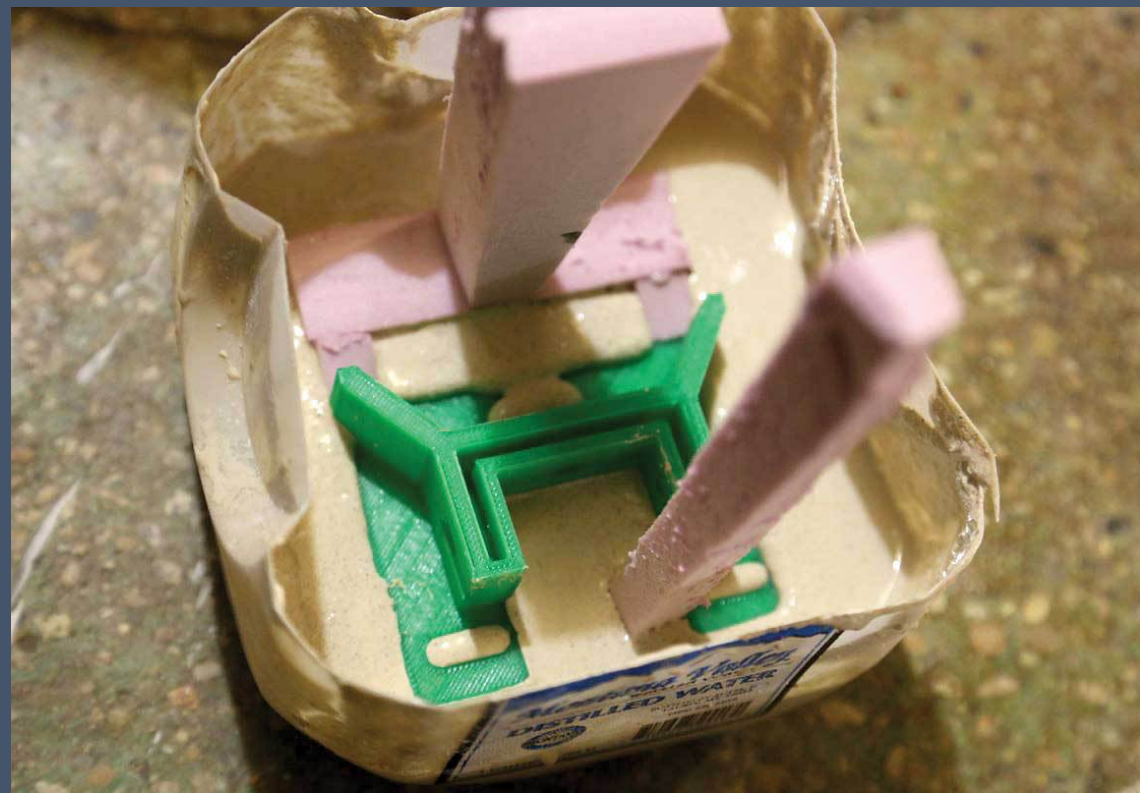
GE Aviation

# Low volume – direct replacement

- Mass customization of products
- Processes which rely on unique tooling are most susceptible

+ Offsite / remote fabrication

+ Storage & transport is reduced – components can be made on site



# Scale

# High Volume – Some* replacement

- Replacement & repair components
- Simple consumables
- Upgrades and new features

# Buying replacement parts could be replaced by:

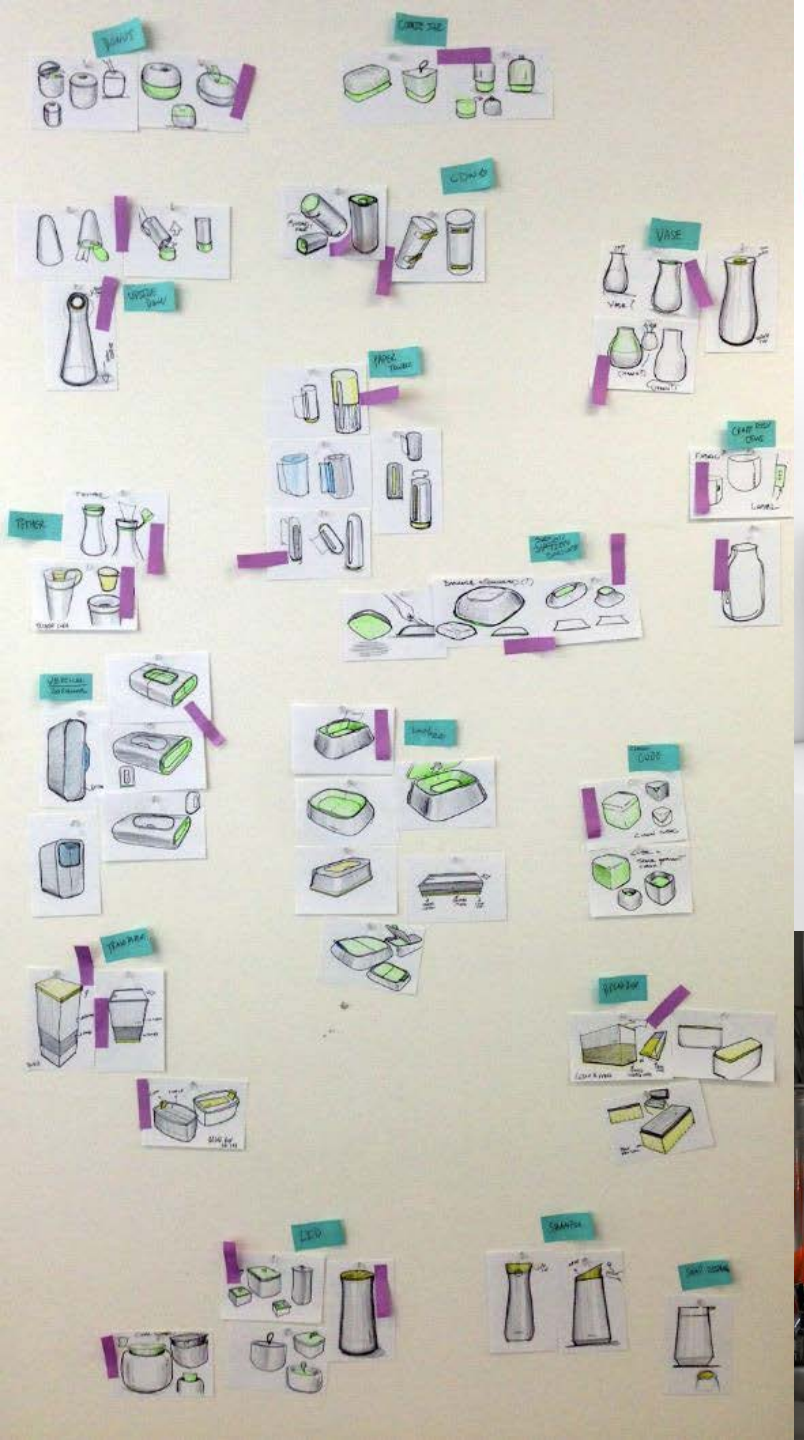
- Finding a model of your part on a computer:
  - Either make your own, or download one (IP!)
- Upload to your 3D printer
- Print your part
- Install or replace your part

- This assumes that:
  - Your 3D printer works, your material can be a good substitute, and you have the time to wait for your part to build vs. ordering/buying.

## Recurring revenue

- Replacement repair parts
- Simple consumables
- Upgrades and new features

# Reality of design & engineering





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# 3D Printing can:

- Encourage young people to enter the fields of manufacturing & engineering
- Drive innovation & lower prototyping costs
- Shorten lead times in the product development process
- Replace certain low-volume production methods