University of Pittsburgh

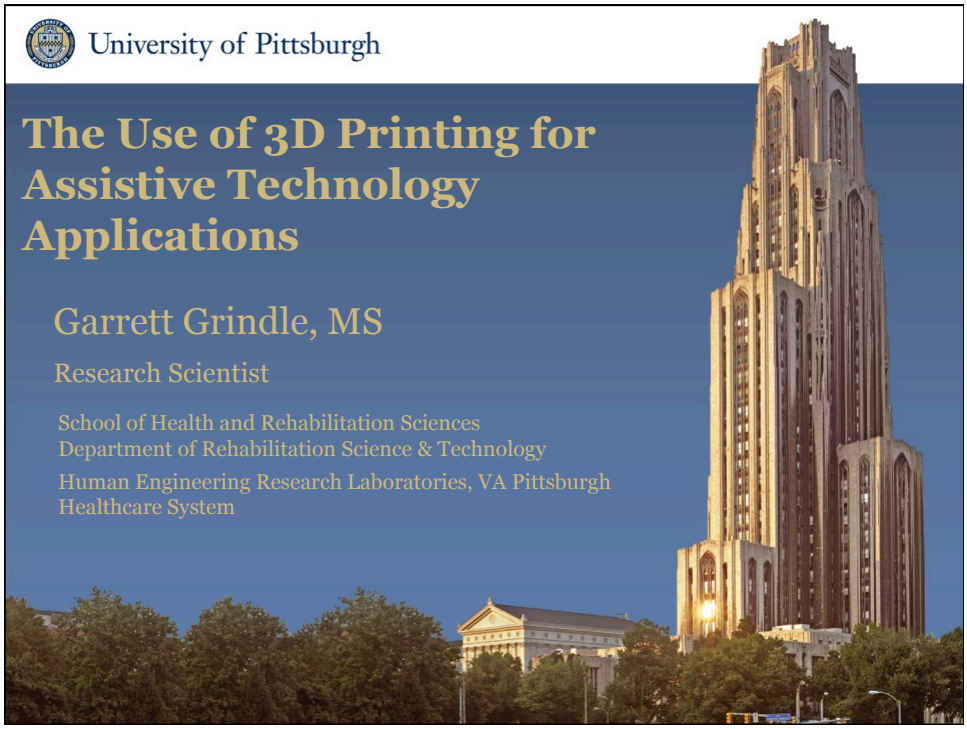
The Use of 3D Printing for Assistive Technology Applications

Garrett Grindle, MS

Research Scientist

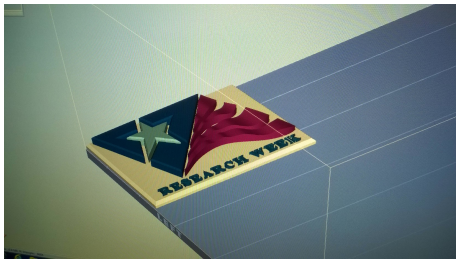
School of Health and Rehabilitation Sciences
Department of Rehabilitation Science & Technology

Human Engineering Research Laboratories, VA Pittsburgh Healthcare System



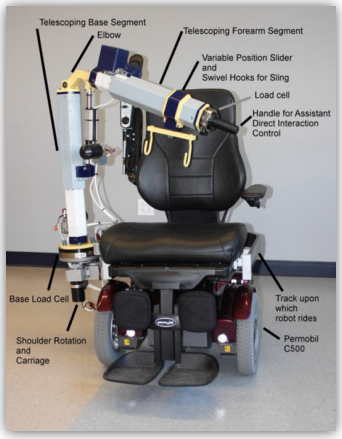
Preface

- This is an introduction
- Pictures highlight some projects done with 3DP
- Avoid commercial bias



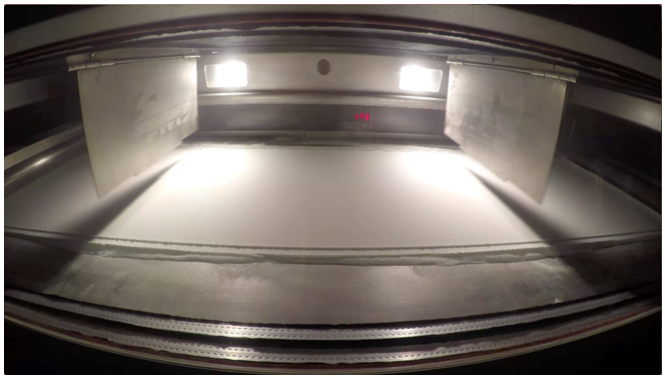
What is 3d Printing?

- Also known as “additive manufacturing”
- Create parts directly for CAD file
- Make part layer by layer
- ASTM recognizes 7 technology categories



University of Pittsburgh Department of Rehabilitation Science & Technology

Video



Why 3d Printing for AT

- High customization, low volume
- Engineering quality parts
- Diverse Materials
- Readily available

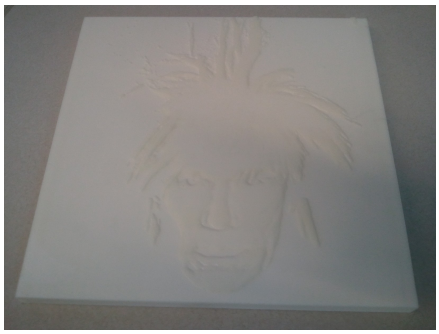
University of Pittsburgh Department of Rehabilitation Science & Technology

3D Printing Process

- Create CAD model
- Generate .stl
- Load into native software
- Prepare machine
- Print
- Post process

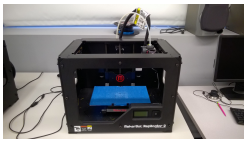
3D Materials

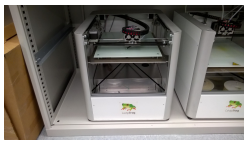
- Plastics
  - ABS
  - Nylon
  - Polycarbonates
  - Acrylates
- Metals
  - Stainless Steel
  - Titanium
  - Nickle Alloys

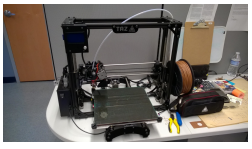


University of Pittsburgh Department of Rehabilitation Science & Technology

Professional vs. Personal Machines

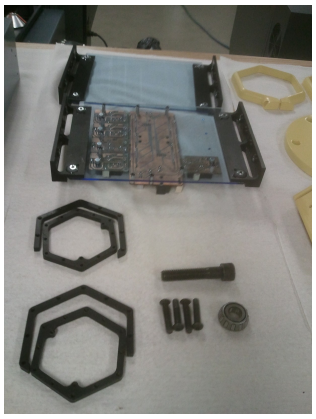






Software

- Need a CAD package
- Types
  - Professional
  - Personal
- Need CAD skills



University of Pittsburgh Department of Rehabilitation Science & Technology

When to use 3DP?

- When an off the shelf solution can't be found
- Improve Aesthetics
- To make two (or more) devices fit together that are supposed to go together
- Novel AT devices
- Tools

How do access 3d printing

- Purchase a machine
- Service bureaus
- Maker Spaces
- Make Friends

University of Pittsburgh Department of Rehabilitation Science & Technology

References

- *Standard, A., F2792. 2012. Standard Terminology for Additive Manufacturing Technologies. ASTM F2792-10e1.*
- *Wohlers, T.T., Wohlers Report 2013: Additive Manufacturing and 3D Printing State of the Industry: Annual Worldwide Progress Report. 2013.*
- *Gibson, I., D.W. Rosen, and B. Stucker, Additive manufacturing technologies.*

Questions?