*"**R**apid **O**rthotics for **C**ure **K**enya"*

Nathan Chambers, Lyndsy Shaubach, Daniel Yeisley

April 28th, 2017
14th Annual School of Science, Engineering, and Health Symposium

Our client

cure

the Collaboratory for strategic partnerships and applied research

MESSIAH COLLEGE

Current Production

Foot Brace

Spinal Brace

Transtibial Prosthesis

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Our mission

CURE Kijabe expressed the desire for a 3D printing system

Driven by a trip to Kijabe, Kenya during the summer of 2016

Design Criteria

Design Criteria

System Cost	

Design Criteria

System Cost	< $10,000

Design Criteria

System Cost	< $10,000
Cost Per Socket	

Design Criteria

System Cost	< $10,000
Cost Per Socket	< $30

Design Criteria

System Cost	< $10,000
Cost Per Socket	< $30
Shorten Manufacturing Time	

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Functionality for Patient	

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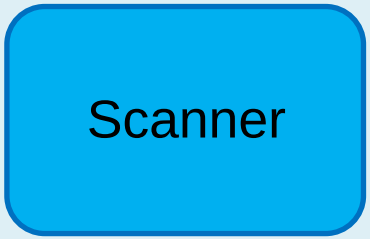
Shorten Manufacturing Time	< 32 man-hours
Compatible with Current Socket Adapter	Connects With: 
Functionality for Patient	Durability Color Comfort Ease of Use

System Breakdown

System Breakdown



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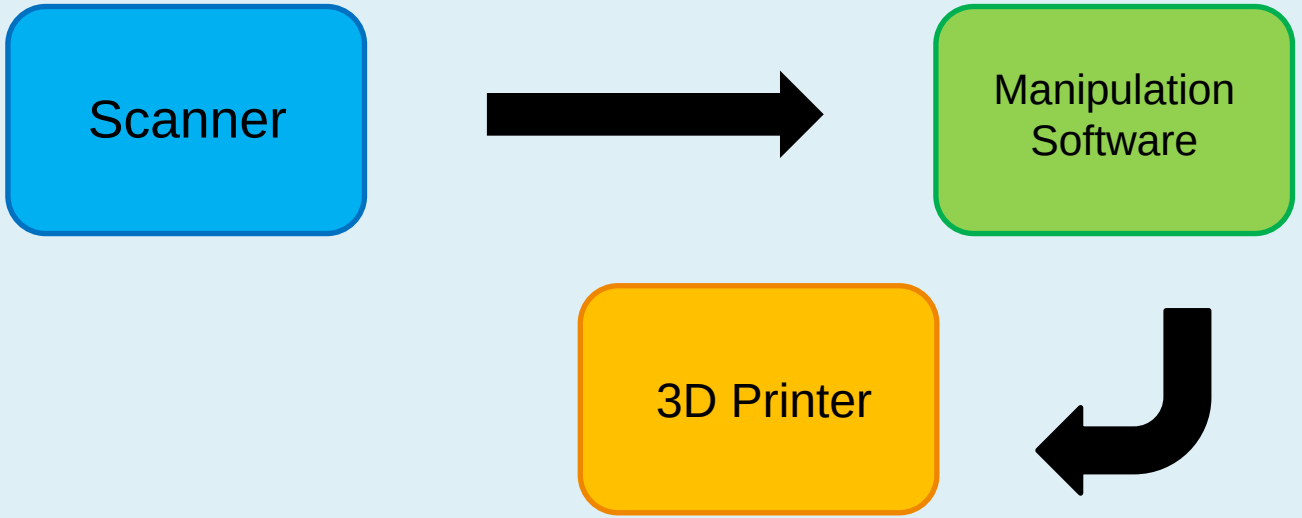

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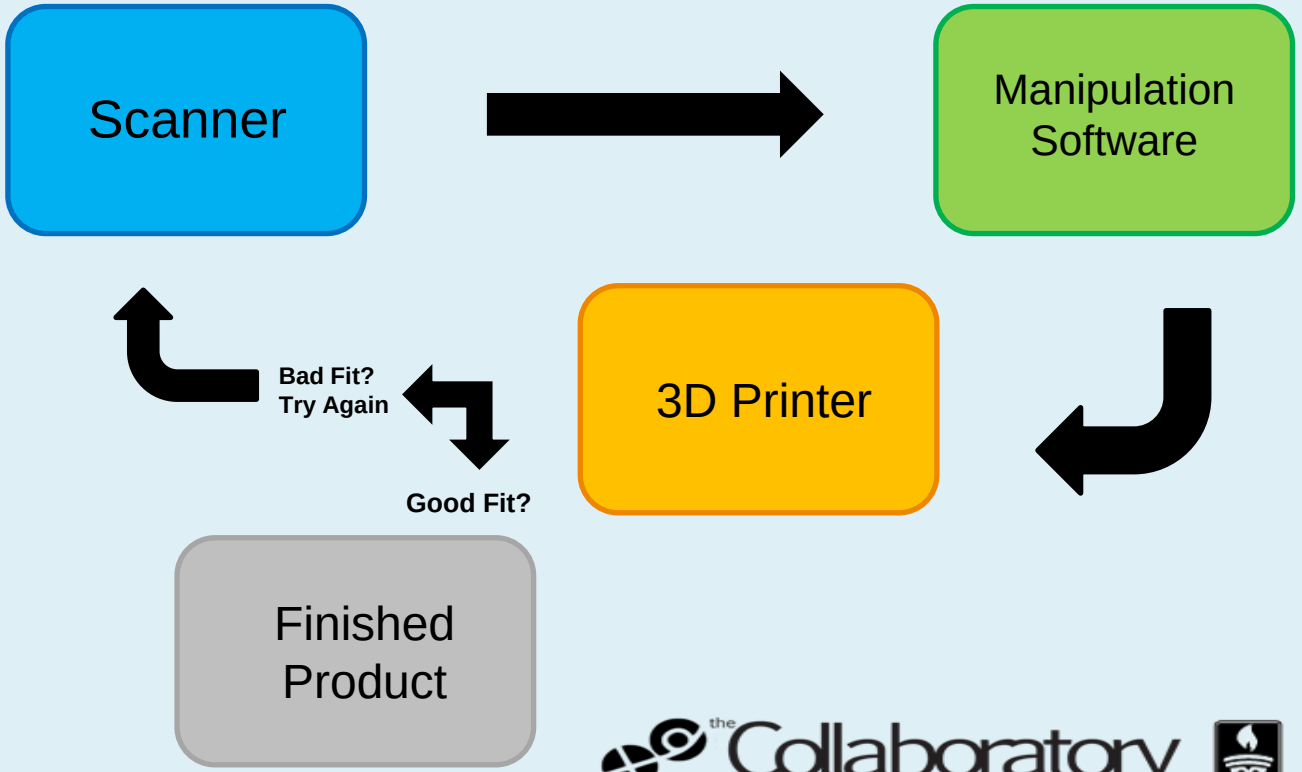

Structure Sensor

- Eliminates need for plaster of paris casting
- Low Cost
- Ease of use
- Portable

Scan

Software

Printer

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Structure Sensor

System Cost
Cost Per Socket
Shorten Manufacturing Time
Compatibility With Socket Adapter
Functionality for Patient

Scan | Software | Printer

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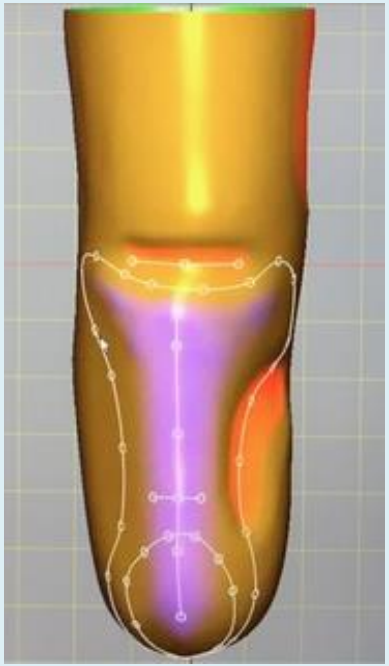
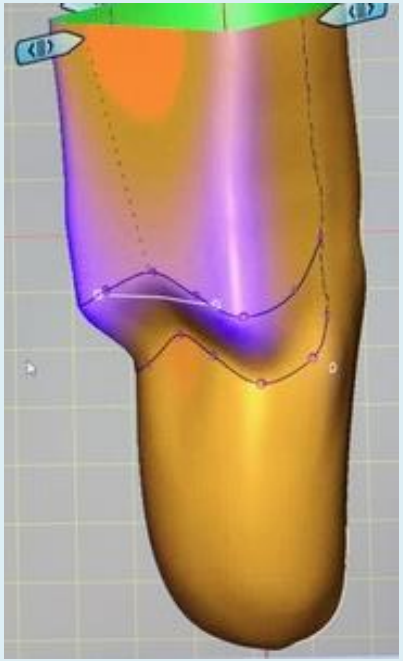
Manipulation Software





- Replaces modifications currently done by hand
- Intuitive for trained orthopaedic technicians

Scan

Software

Printer

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Manipulation Software

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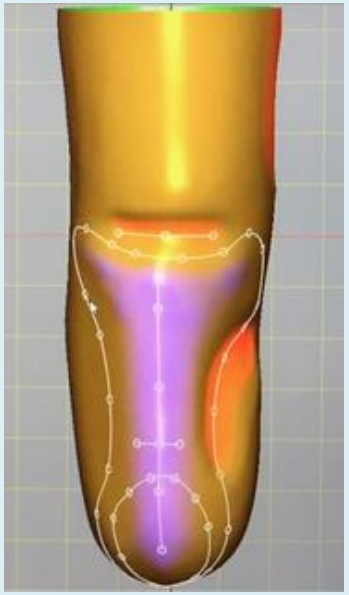

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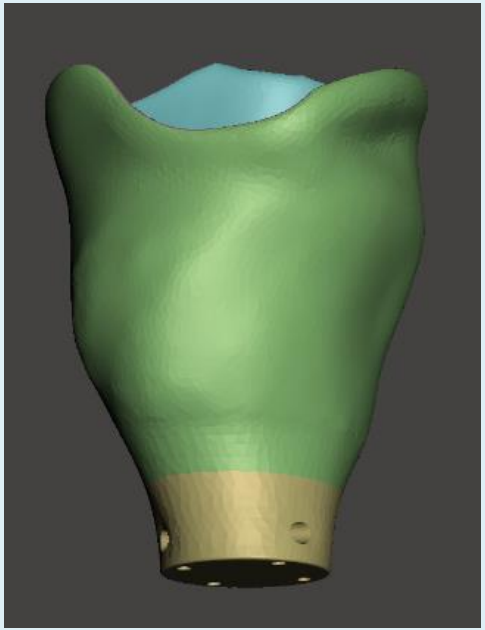
Mesh Mixer



- Gives the ability to fix the patient's socket to the 4-hole socket adapter used by Cure
- How the socket will interface with the rest of the prosthesis

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Mesh Mixer

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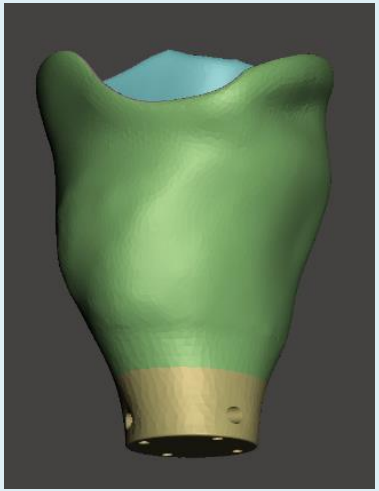

Scan | Software | Printer

DeltaWASP 20x40

- Increases Productivity
- Resurrection Software
- Cylindrical Print Area
- High Print Speed
- Transportable

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DeltaWASP 20x40

Scan

Software

Printer

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DeltaWASP 20x40

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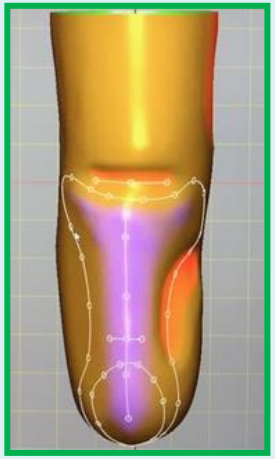
System Breakdown



Bad Fit?
Try Again

Good Fit?

Finished Product

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Finished Product

Criteria	Output

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< $30 per Socket	$7.50 per Socket

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< $10,000 for System	$5,000 for the System

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< 32 Man-hours to Produce 1 Socket	1.5 Man-hours & ~25 hours of print time

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Connects With Current Socket Adaptor	3D Printed 4-Hole Adaptor for Interface

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Connects With Current Socket Adaptor	3D Printed 4-Hole Adaptor for Interface
Durability Color	50% Infill Client Selected Brown Filament

Criteria	Output	
< $30 per Socket	$7.50 per Socket	✓
< $10,000 for System	$5,000 for the System	✓
< 32 Man-hours to Produce 1 Socket	1.5 Man-hours & ~25 hours of print time	✓
Connects With Current Socket Adaptor	3D Printed 4-Hole Adaptor for Interface	✓
Durability Color	50% Infill Client Selected Brown Filament	✓
Comfort Ease of Use	Will Be Assessed with Patients on May 2017 Site Team Trip	TBD

Moving Forward

- Site team trip - May 2017
- Maintaining relationship & providing technical support
- Supplemental training manual & training videos for the system

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Special Thanks

Eric Shoemaker – Local Prosthetist

Charlie Huizinga, Jennifer Dowell, and Jim Capper from WillowWood

Simon Karuga and the Orthopedic Workshop team

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Dr. Emily Farrar – Project Manager

Dr. Scott Kieffer – Trip Advisor

Paul Myers – 3D Printing Expert

Emma Vogan – Project Member

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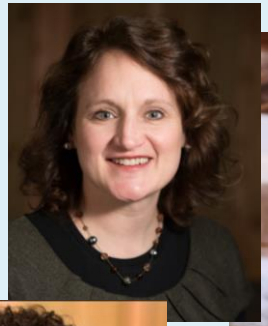
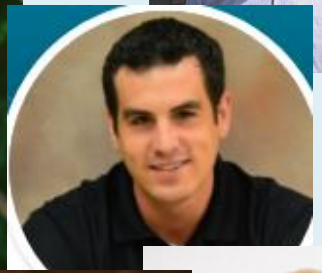
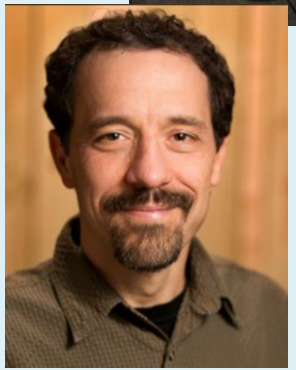
Special Thanks

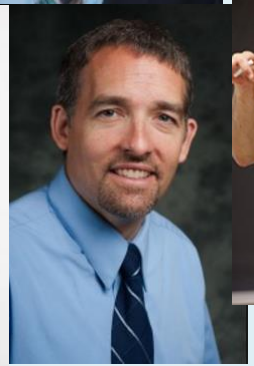






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Questions?