Design and Fabrication Methodology for Customizable, Multi-Material Prosthetic Hands for Children

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Keywords: 3D printing, Multi-materials, Design Roadmap

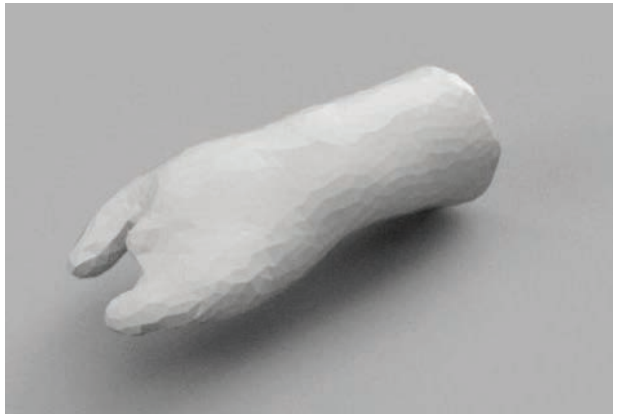
3D Printing in the Medical Field

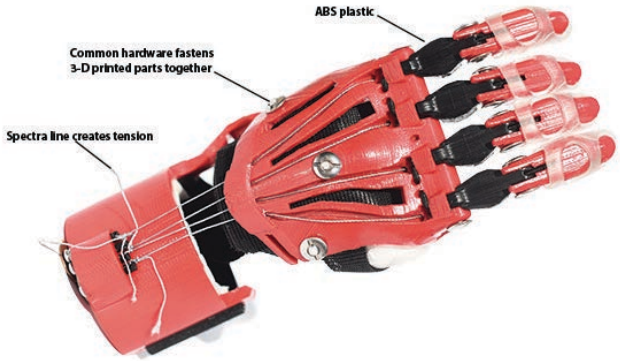
Custom-printed hearing aids via the SLA process (image courtesy of EnvisonTec).

A dental tool guide (image courtesy of Formlabs).

3D printed prosthetic hand (image courtesy of Enabling The Future, Cyborg Beast).

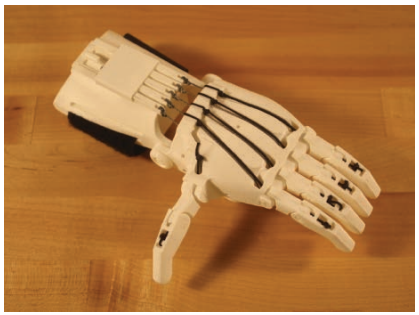
Sophie's Super Hand





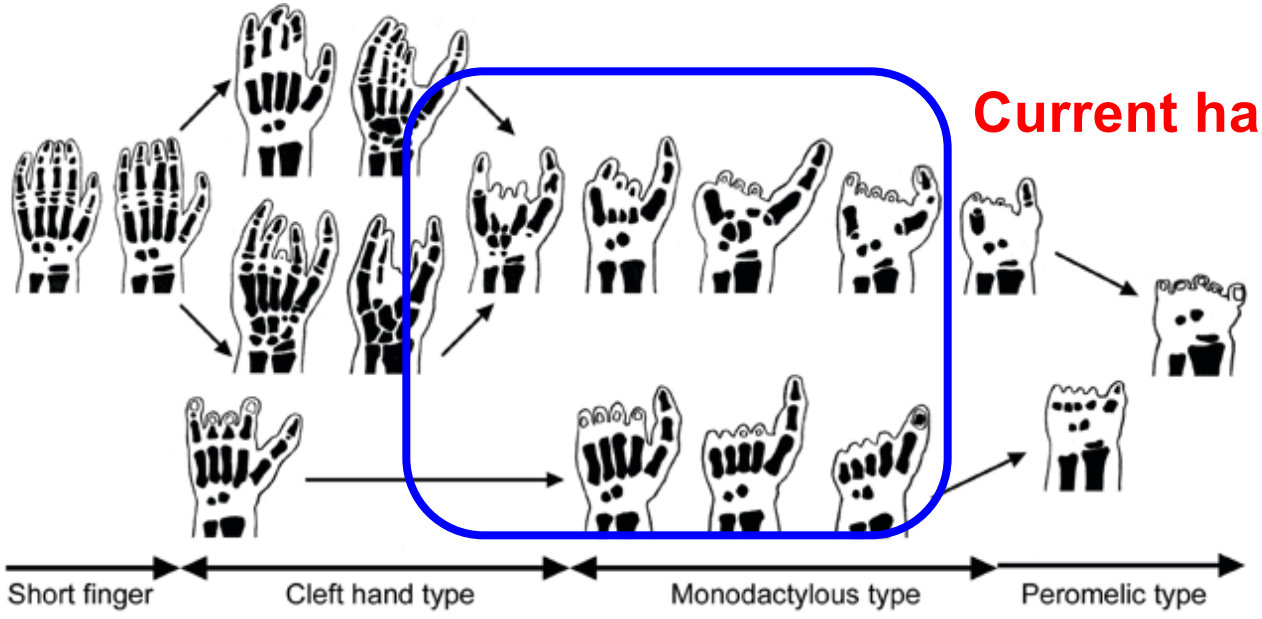
http://engineering.berkeley.edu/magazine/fall-2015/sophies-super-hand.

Challenges in Current Prosthetic Hand Designs

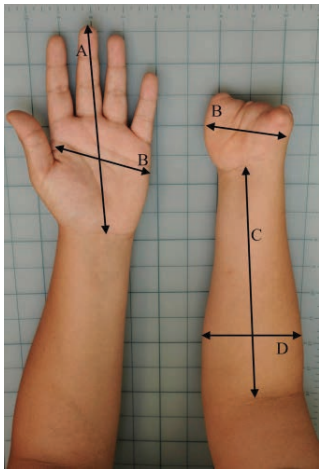


	Cyborg Beast	Raptor Reloaded	Hackerberry-Exiii
Total 3D printed parts	25	19	44
Assembly steps	24	32	66
Harness type	Solid harness with padding (Not customized)	Elastomer wrap (Partially Customized)	Solid harness with padding (Not customized)
Types of Prosthetic	Body-powered	Body-powered	Myoelectric Prosthetic

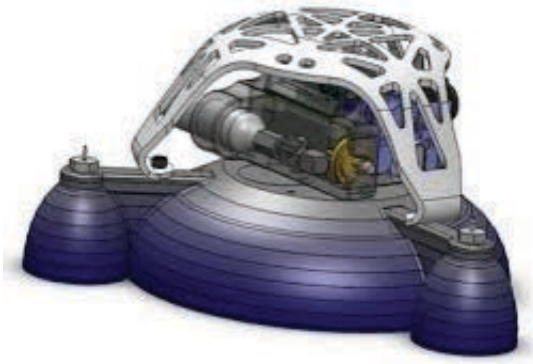
Symbrachydactyly User groups



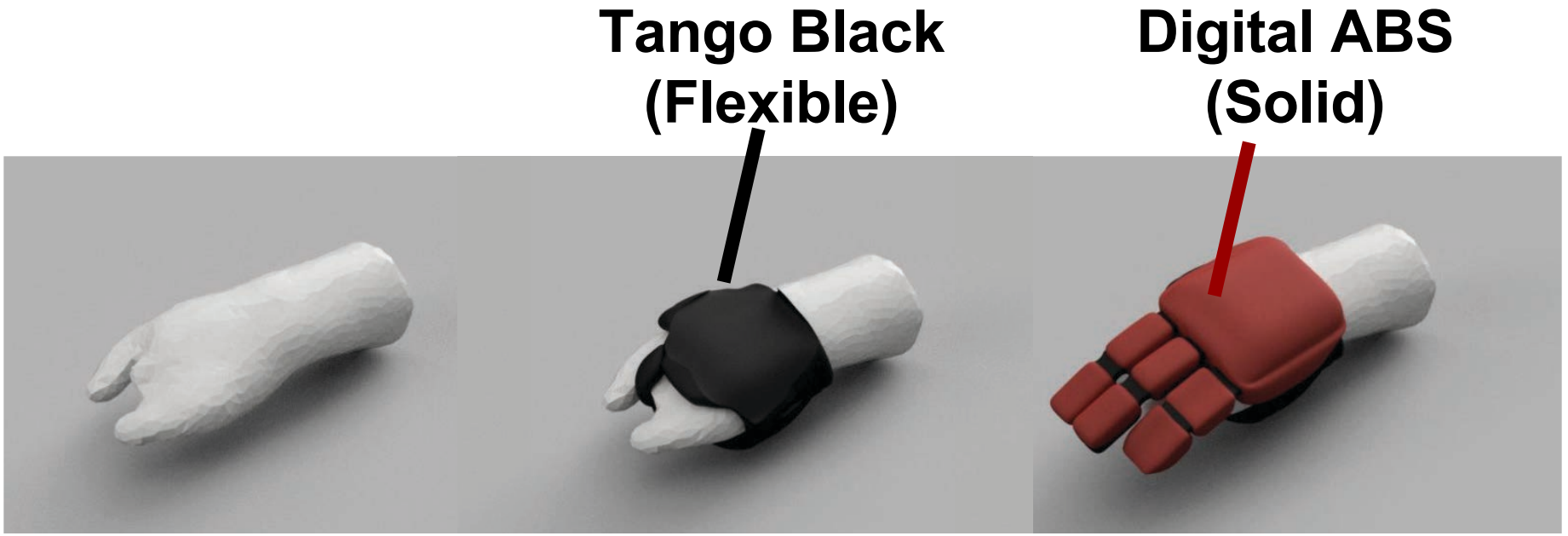
Current harness types



Multi-material Additive Manufacturing

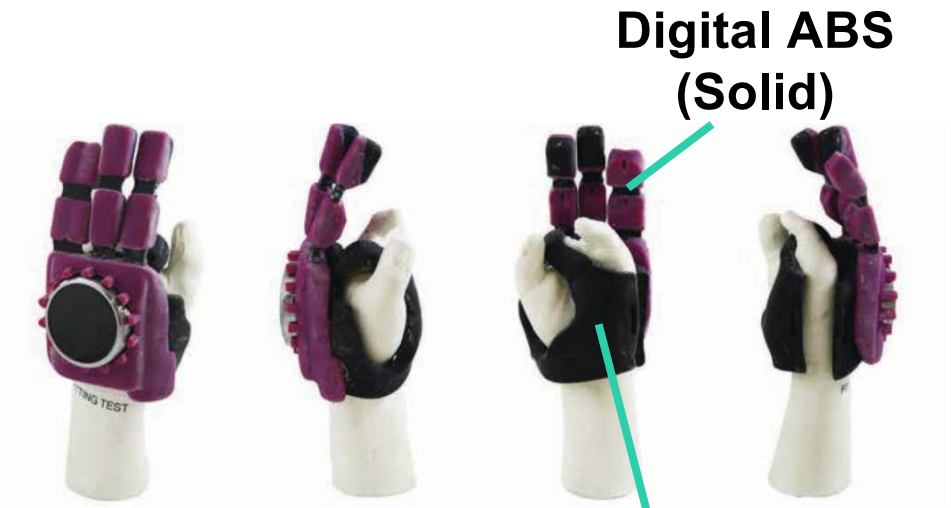


Multi-material Additive Manufacturing for prosthetics

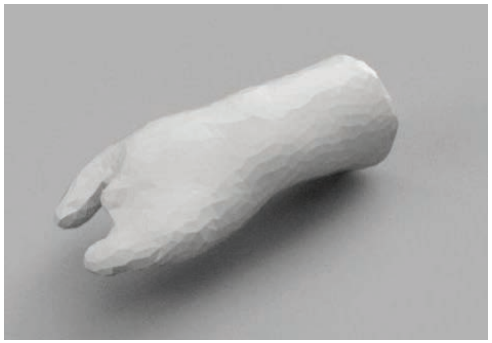


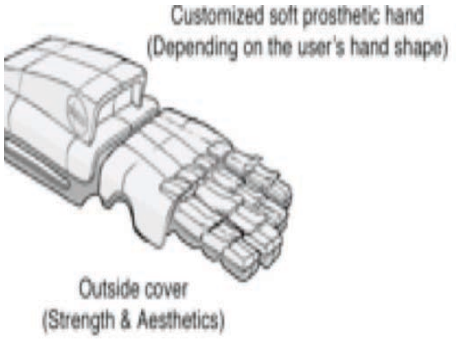
Multi-material Additive Manufacturing for prosthetics

+ Reduced number of parts (Single print)
+ Simpler assembly
+ Soft & Custom harness



Solution Strategy

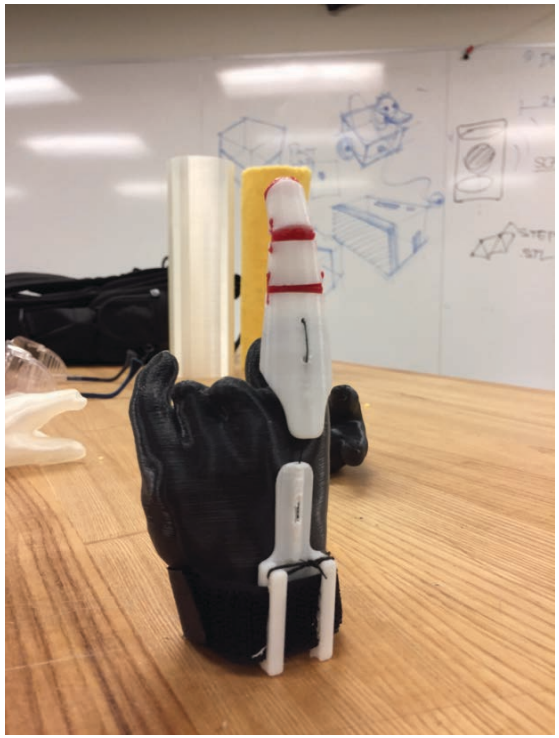


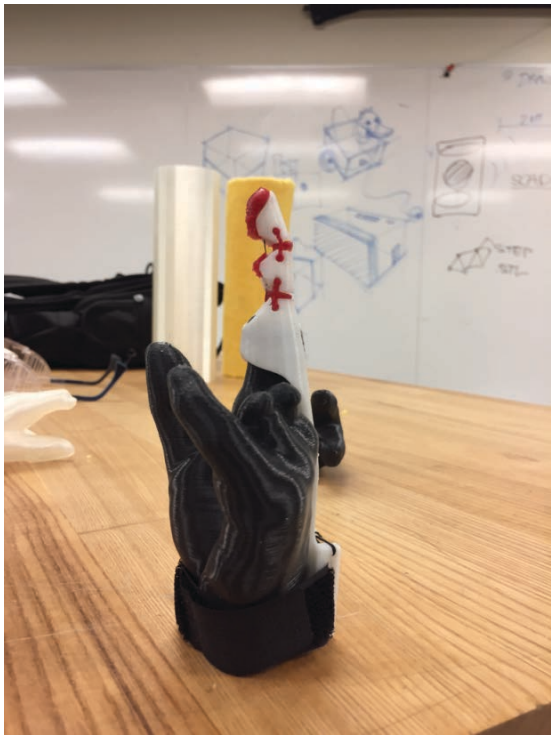


Modular Product Platform, Case-based Reasoning

Customize & Model

Modular Prosthetic Finger Design





UCSF & Benioff Children's Hospital: Camp Winning Hands Empowers Children

Camp Winning Hands is an overnight camping experience for children with congenital hand and upper limb differences, and provides an opportunity for play and exploring in a safe environment.

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Biomaterials, biomechanics

Sanjay Joshi, Mechanical Engineering, Professor, UC Davis

Robotics, electromyography (EMG) sensing & control

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