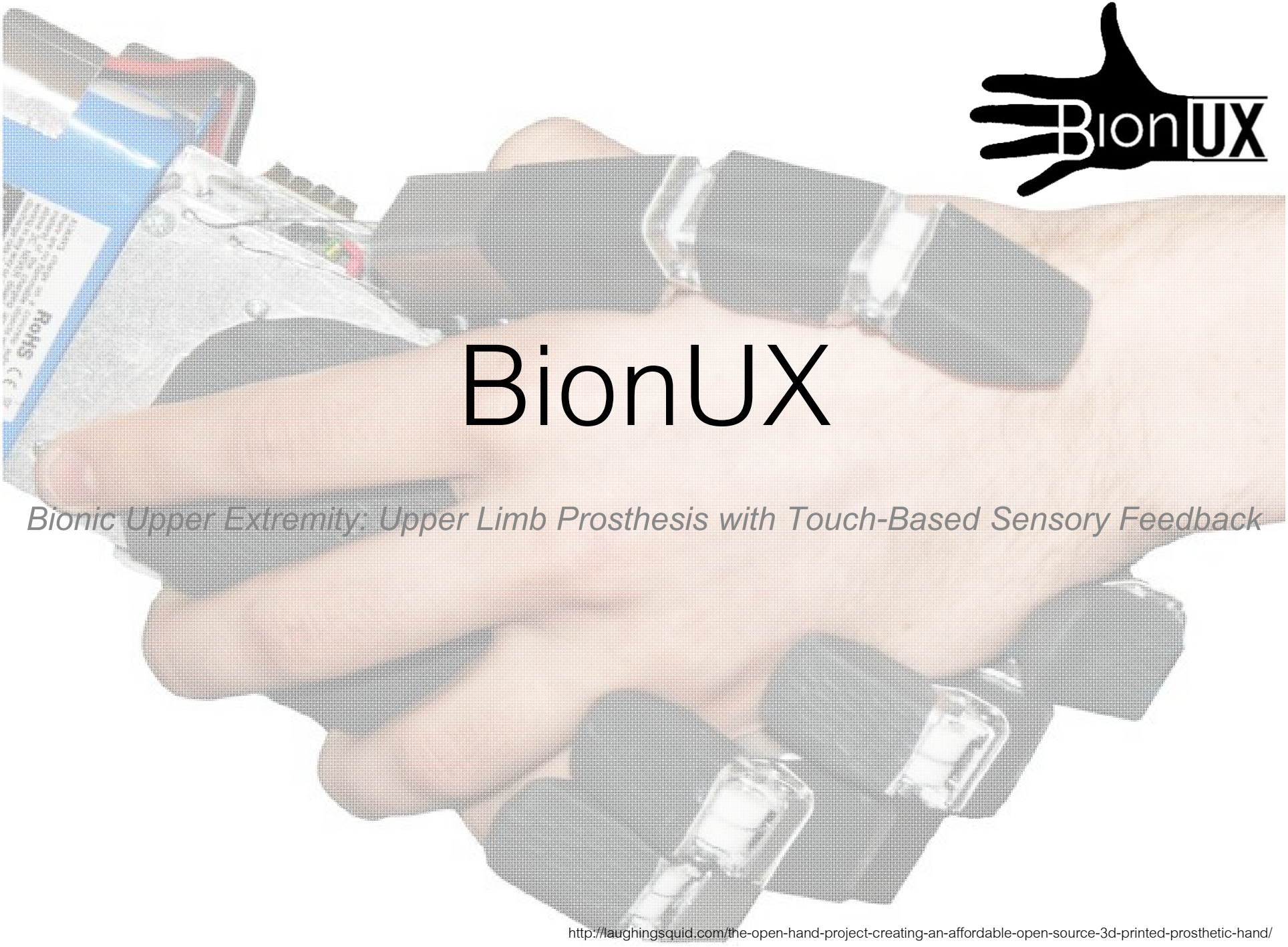


BionUX

Bionic Upper Extremity: Upper Limb Prosthesis with Touch-Based Sensory Feedback

http://laughingsquid.com/the-open-hand-project-creating-an-affordable-open-source-3d-printed-prosthetic-hand/

Team

Adrian Lievano
BSE MEAM, 2015
MSE MEAM, 2015
Role: Mechatronic Engineer

Freddy Hernandez
BSE MEAM, 2015
Role: Mechanical Engineer

Steven Xing
BSE CPME 2015
BS Economics, conc. MGMT & FNCE 2015
Role: Computer Engineer

Matt Lisle
BSE MEAM, 2015
MSE Robotics, 2016
Role: Mechanical Engineer

Aadu Prakash
BSE CMPE, 2015
Role: Electrical & Computer Engineer

We are committed to using 3D-printing technologies to revolutionize the prosthetic and orthotic industry.

Advisor & Mentors

Dr. Katherine Kuchenbecker
Associate Professor, MEAM
University of Pennsylvania

Dr. Alberto Esquenazi
Chair, Physical Medicine and Rehabilitation - MossRehab

Problem

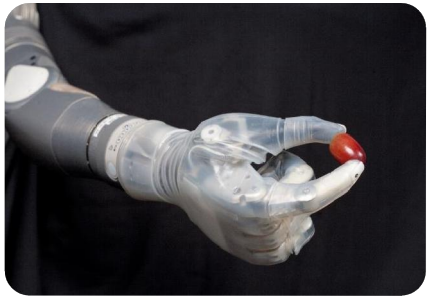
Number of People with Limb Loss in the USA

> 2,000,000 Americans

> 100,000 more each year

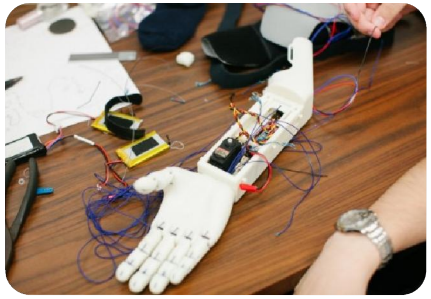
Existing Solutions

High Cost, High Functionality



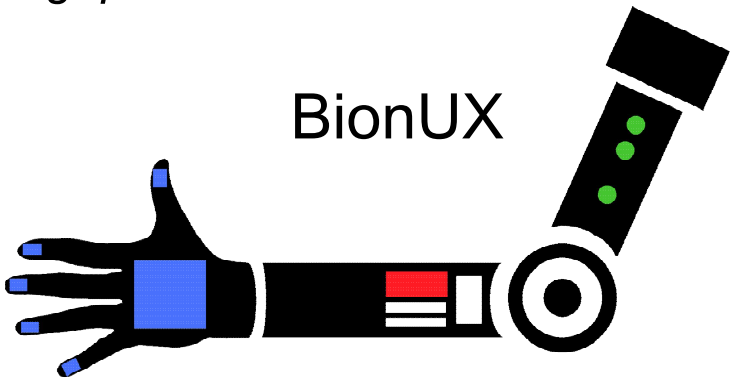
- Too expensive
- Low functionality
- Not covered by insurance
- No touch feedback
- Impractical for average patient

Low Cost, Low Functionality



We are bridging the gap between these two extremes for prosthesis solutions

BionUX

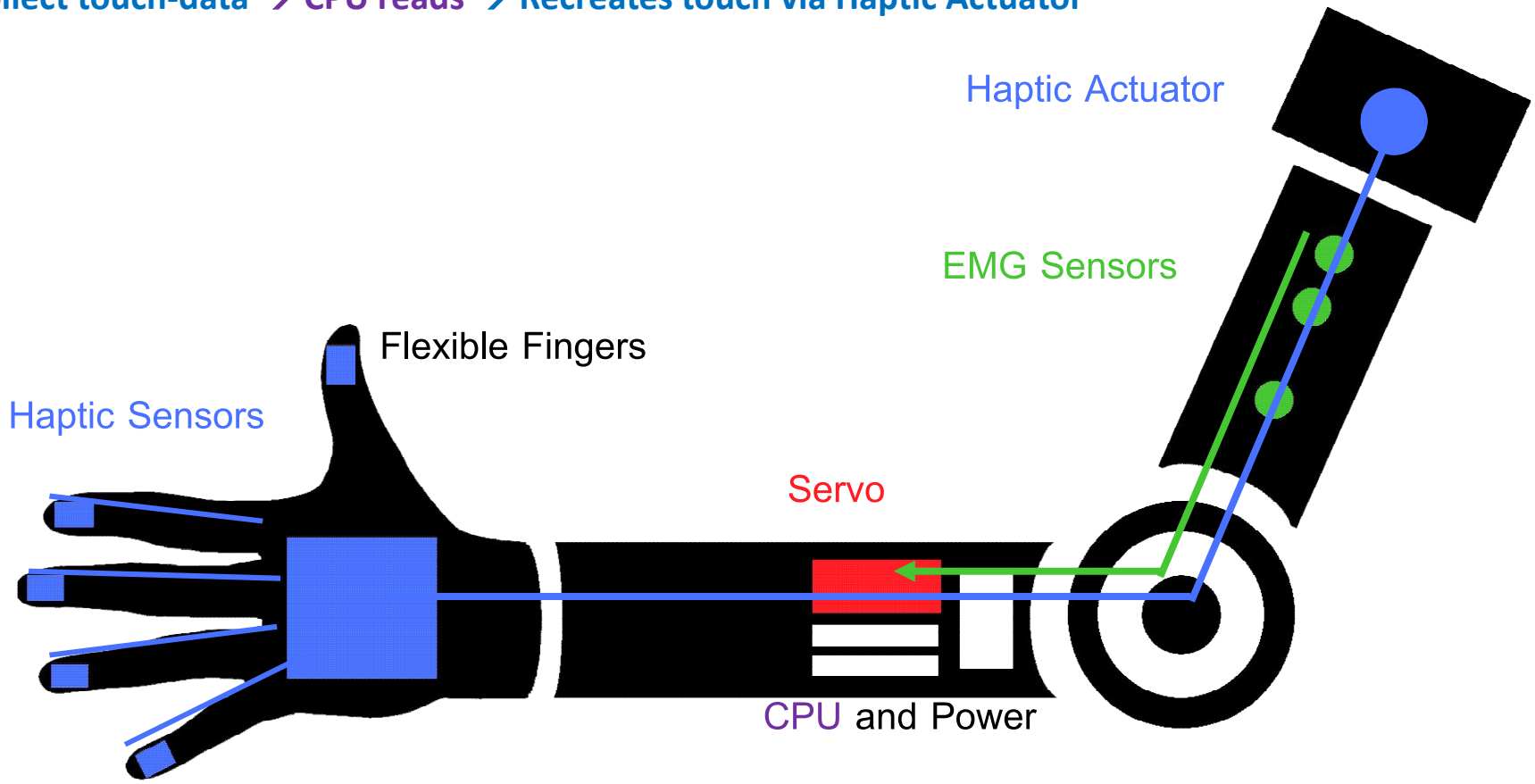


Our Idea

A low-cost, 3D-printed, muscle-controlled prosthetic arm for upper-limb amputees that features recreating certain aspects of the sense of touch(haptic) for the user.

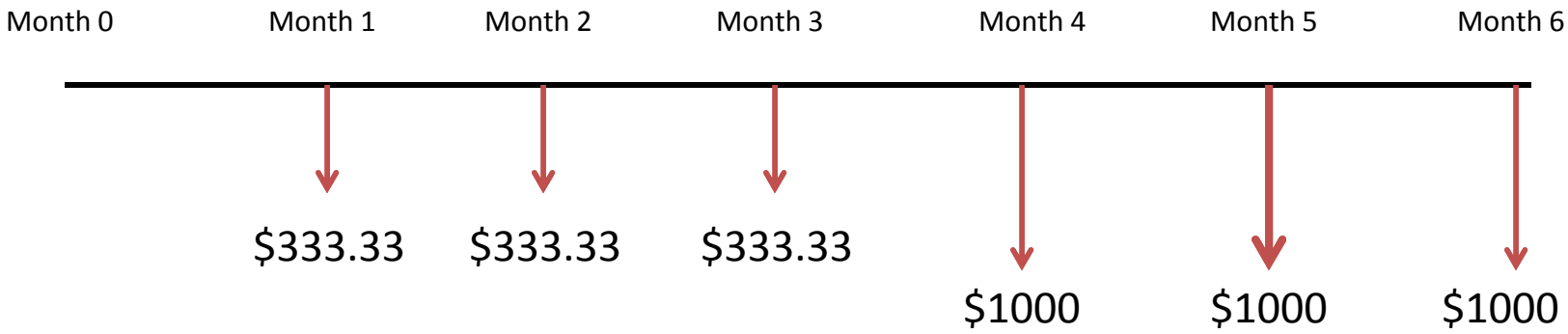
How It Works

User Flexes → EMG sensor collects muscle-data →CPU reads → Motor closes hand → Haptic sensors collect touch-data → CPU reads → Recreates touch via Haptic Actuator



Timeline for next 6 Months

Cash-Flow Diagram



Month 0-Month 3

•Dedicated to completing a final prototype of BionUX

Cost of BionUX = $500-$700

Month 4-5

•Filing for key provisional patents on design

•Water proofing device

•Prototyping and Testing the device, experiment with subject. Fix necessary flaws

•First and second round of obtaining feedback and improving device design

Month 6

•Third round of obtaining feedback and improving device design

•Developing documentation of how the device works and help guide for users

•Developing standard manufacturing and assembly steps

•Developing packaging