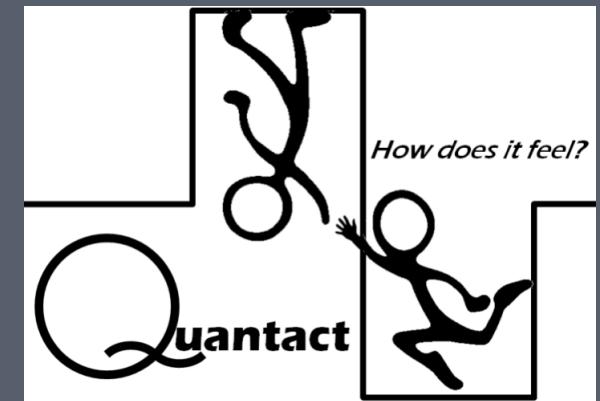


PROVIDING SENSORY FEEDBACK FOR UPPER LIMB AMPUTEES

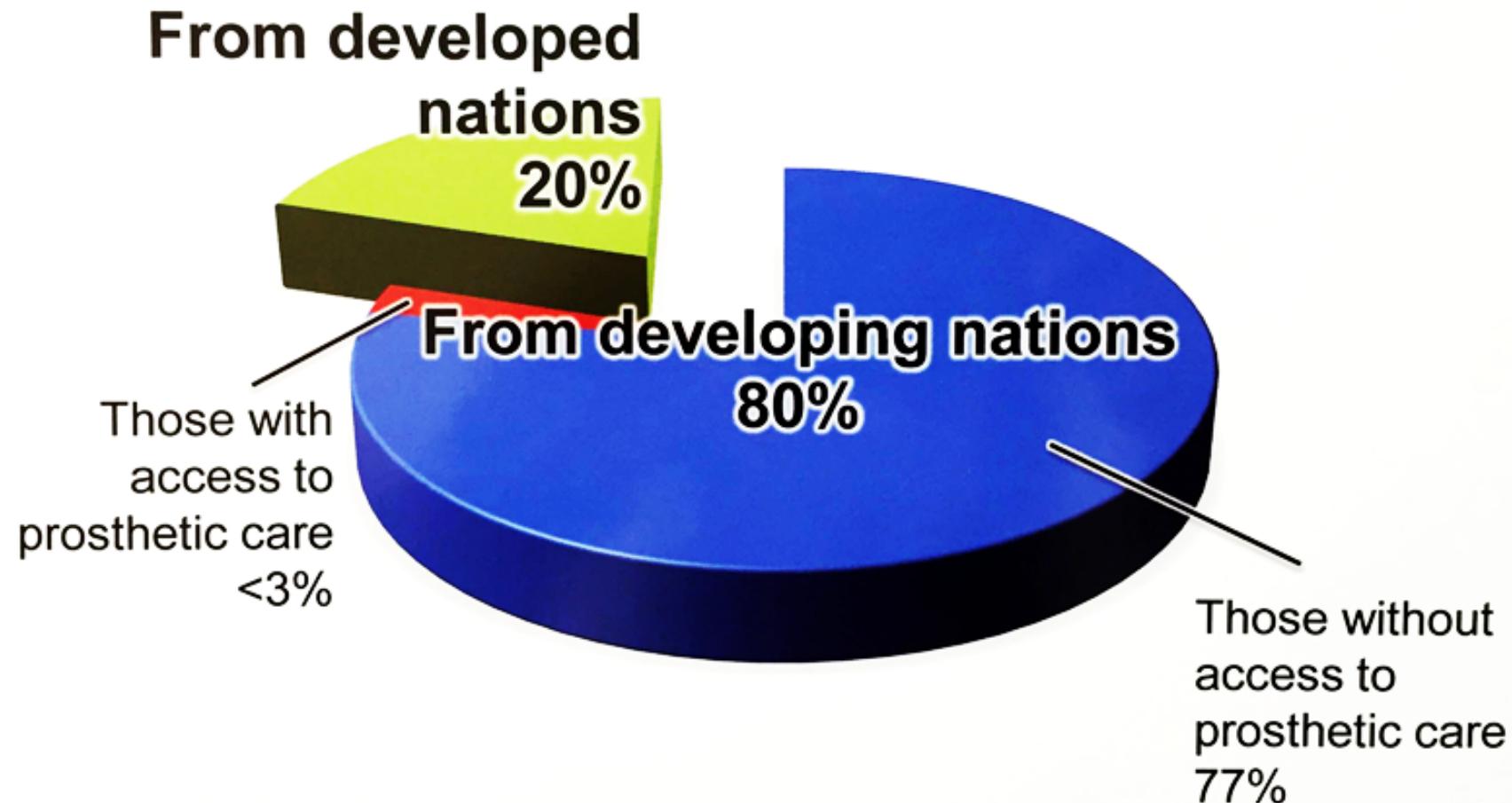
Grace Deetjen, Lauren Grant,
Mohsin Ismail, Joseph Sombeck

Sponsored by Bretl Research Group



Motivation

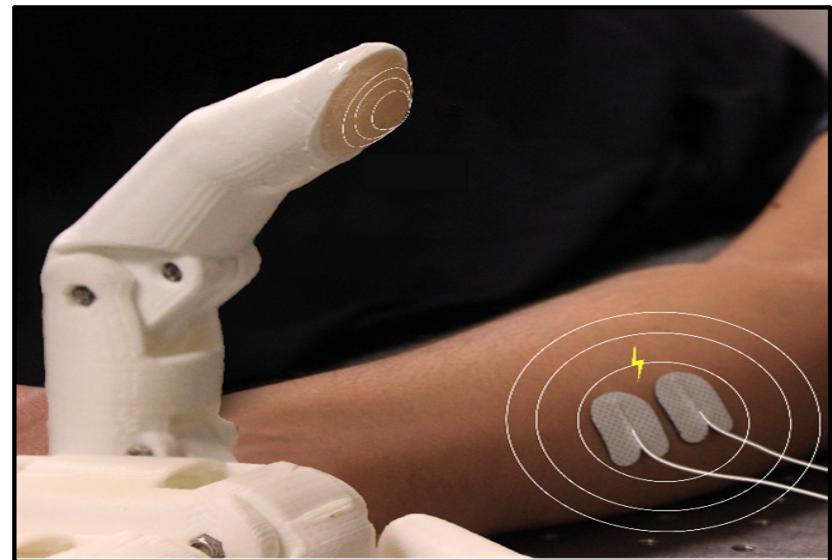
GLOBAL POPULATION OF PEOPLE WITH AMPUTATIONS



Project Statement

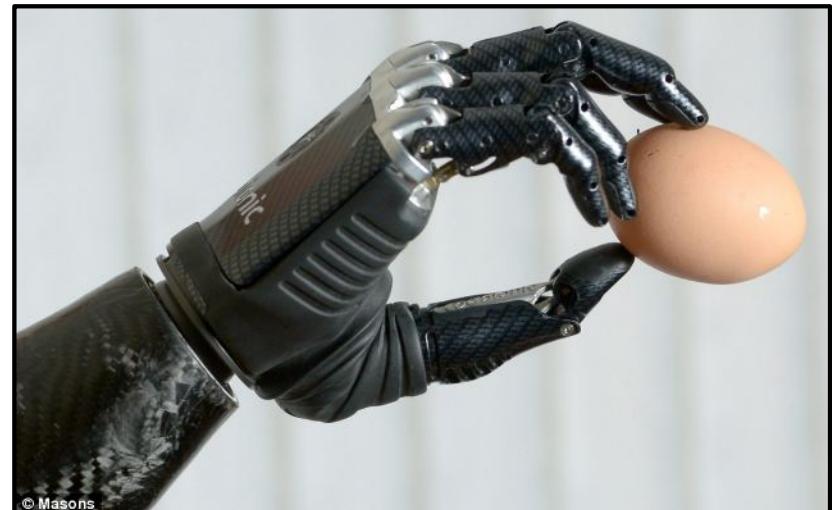
Goal:

1. Develop a low-cost system to acquire pressure readings from multiple sensors and provide feedback via electrotactile stimulation
2. Implement this system in a prosthetic hand



Successful if:

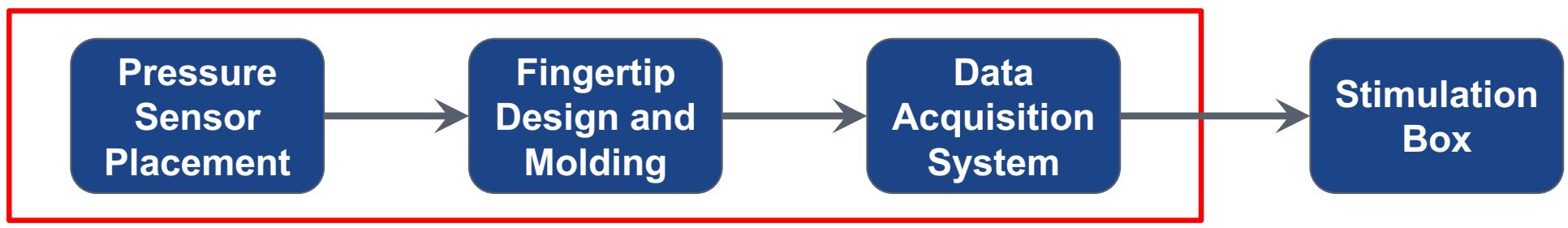
With our system, user exhibits increased ability to pick up an object without damaging or dropping it



Bretl Lab's “Proof of Concept” Sensory Feedback System



Project Scope



Teensy 3.1
(PJRC)

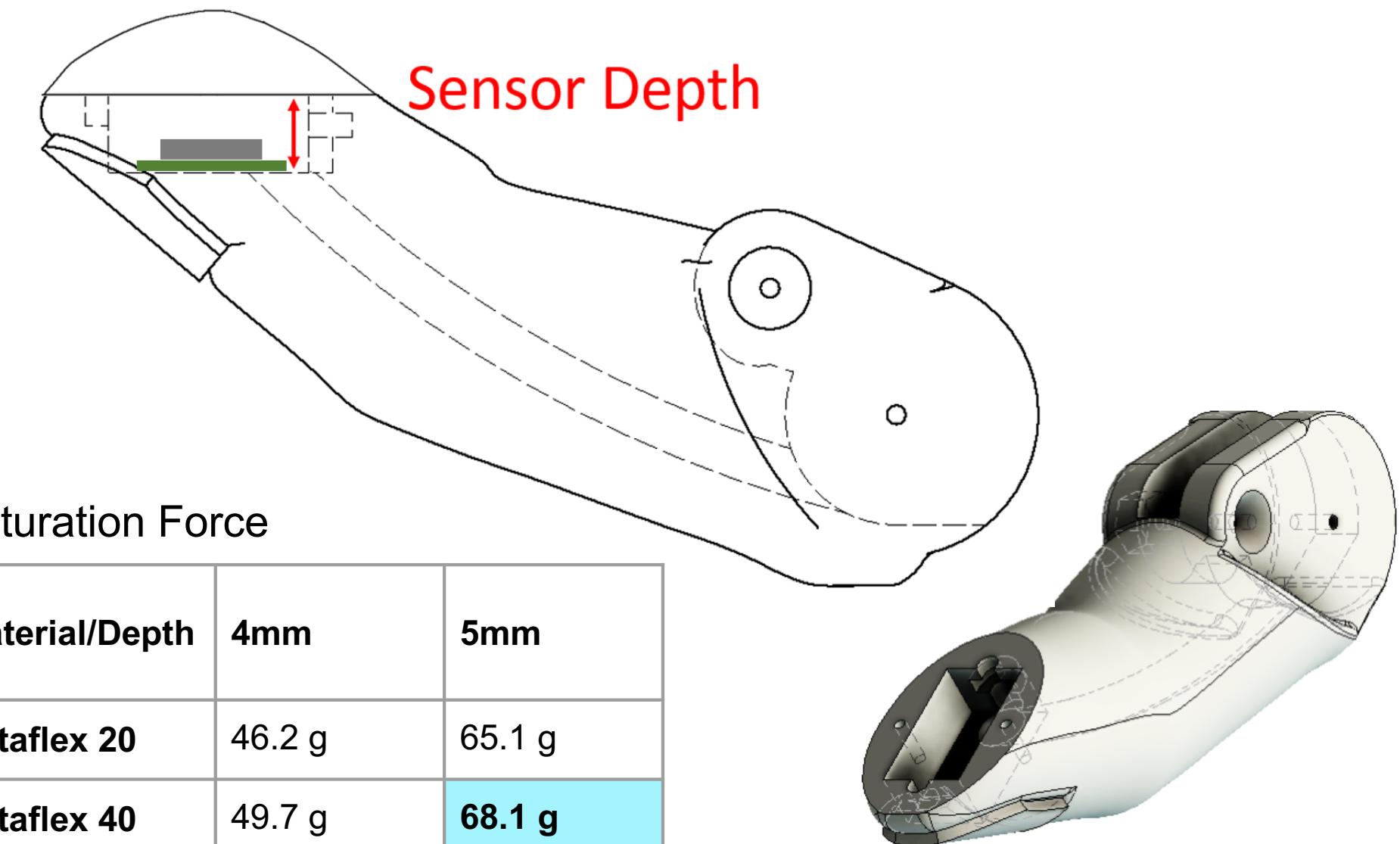
Biopac Stimulator
(Biopac Systems,
Goleta, CA)

Optimal Sensor Placement

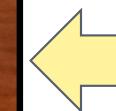
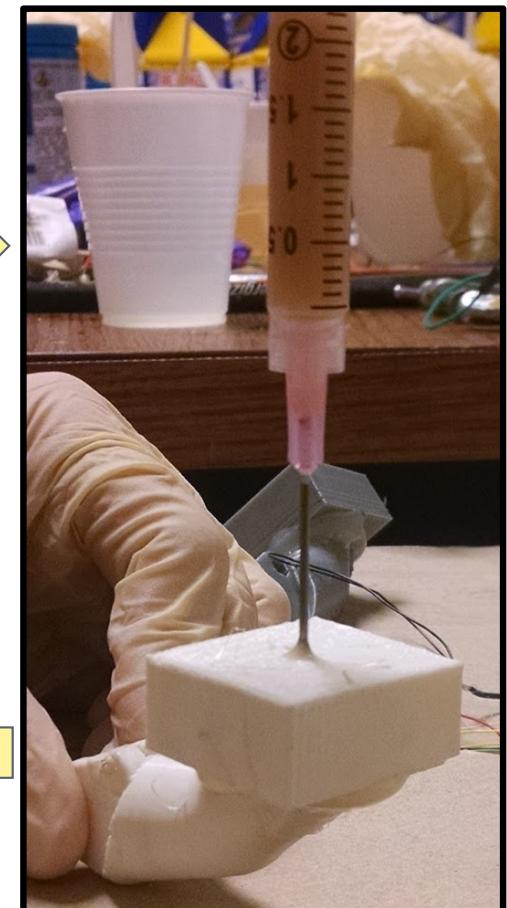
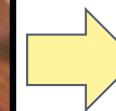
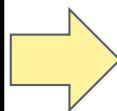


★ = sensor locations

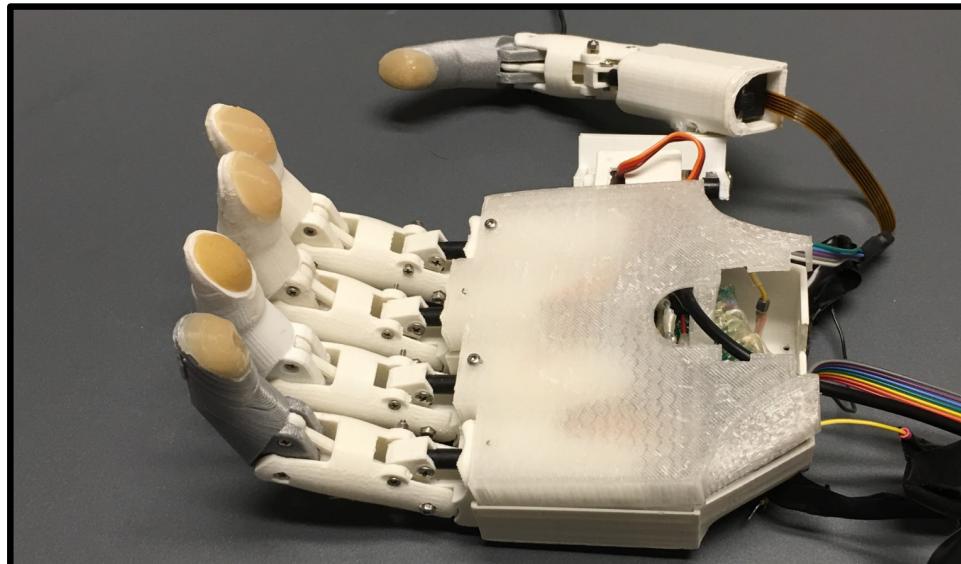
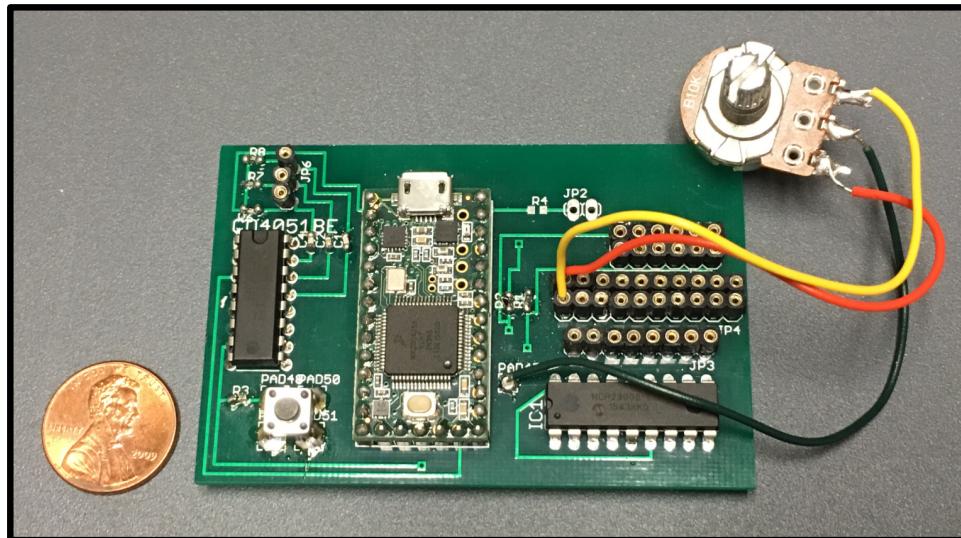
Fingertip Design



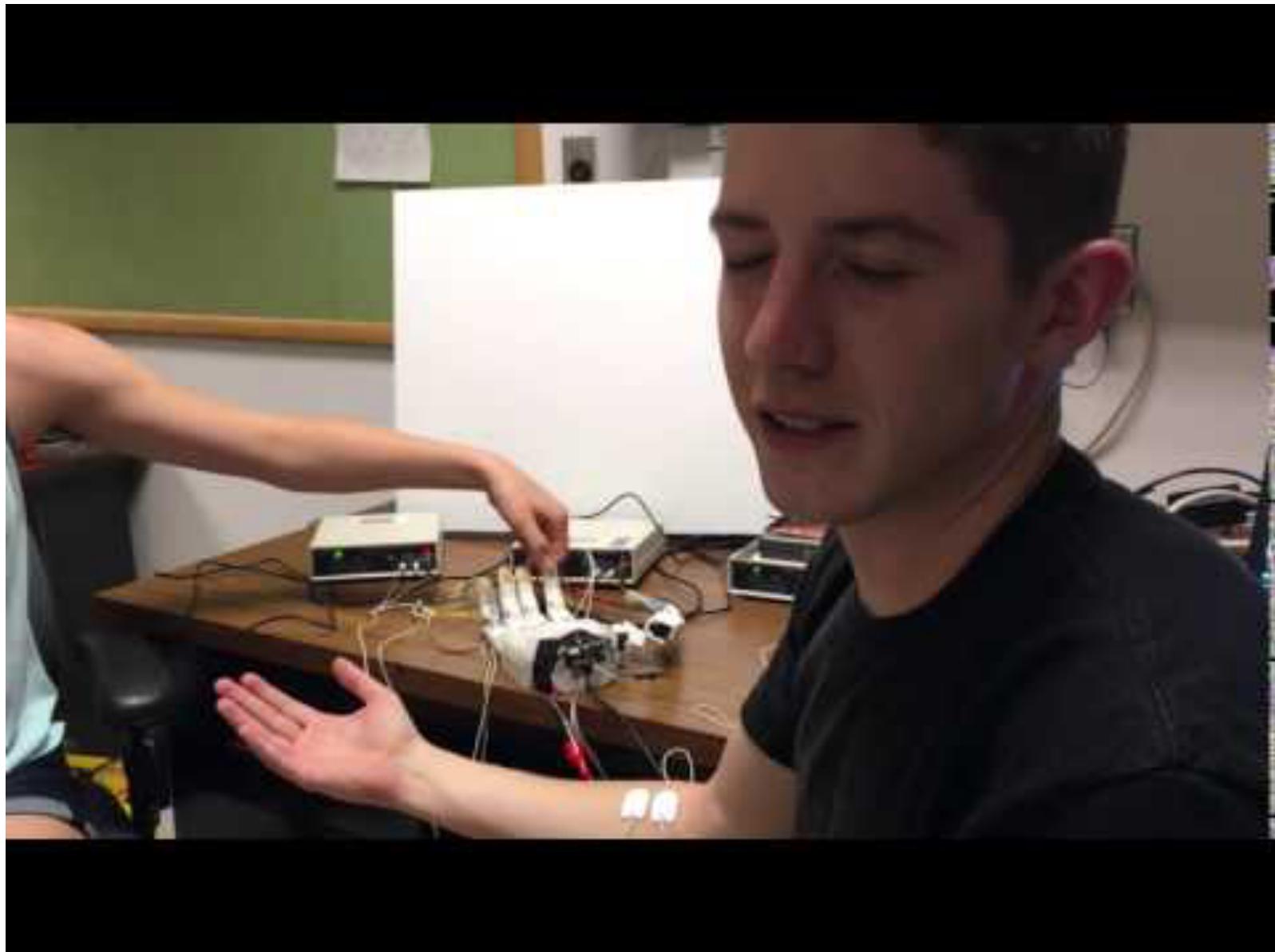
Fingertip Molding Process



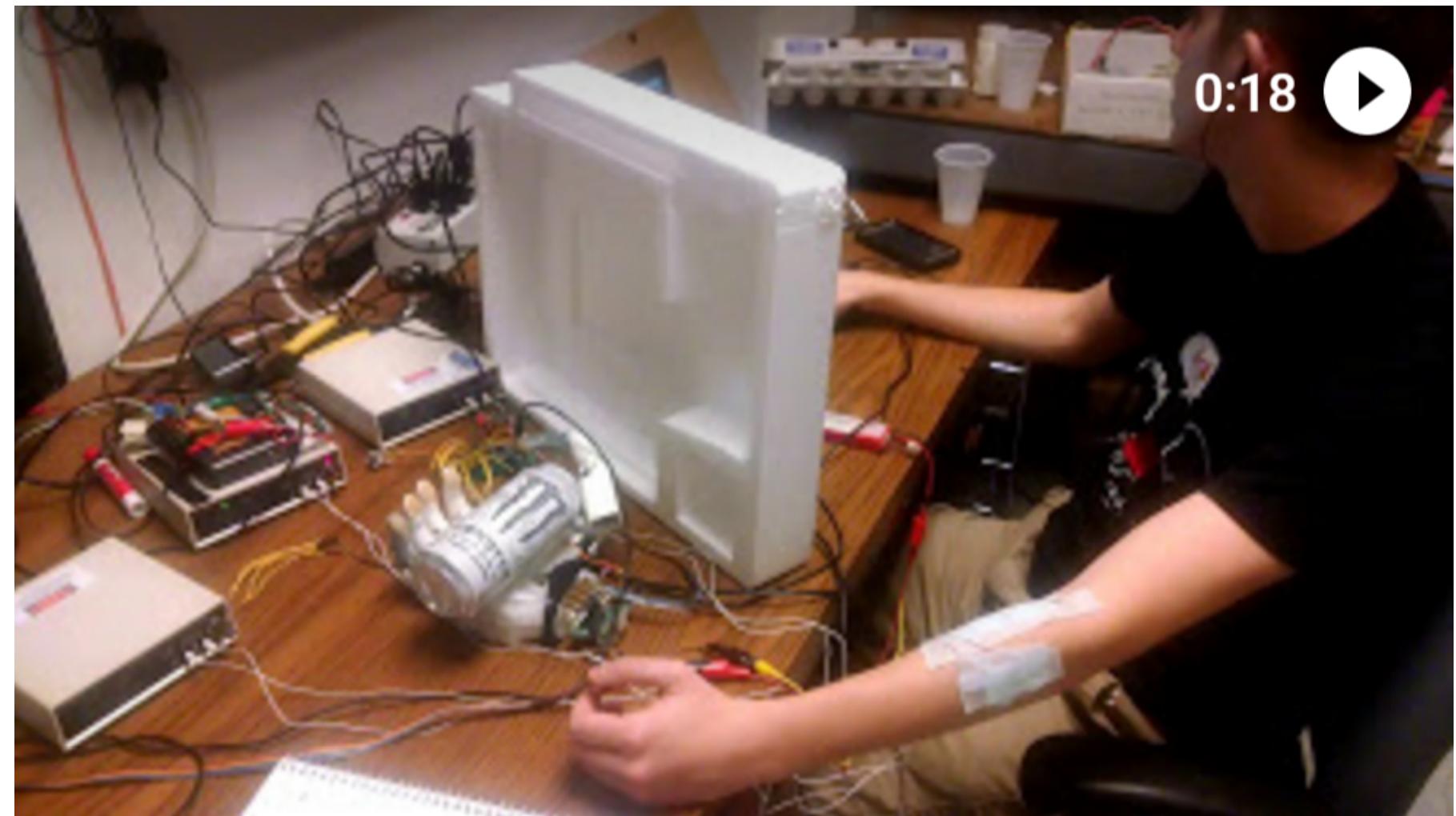
Hardware



Electrotactile Feedback



Functional Task



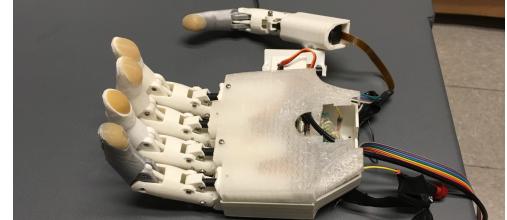
Visual vs. Sensory Feedback

Functional Task: Success Rate

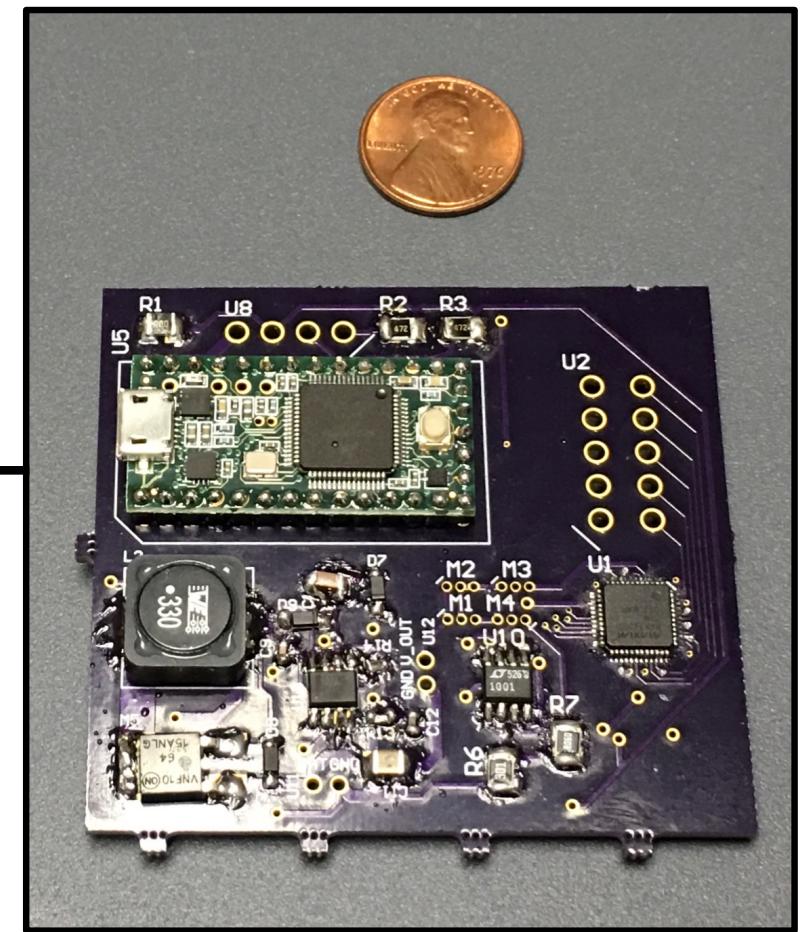
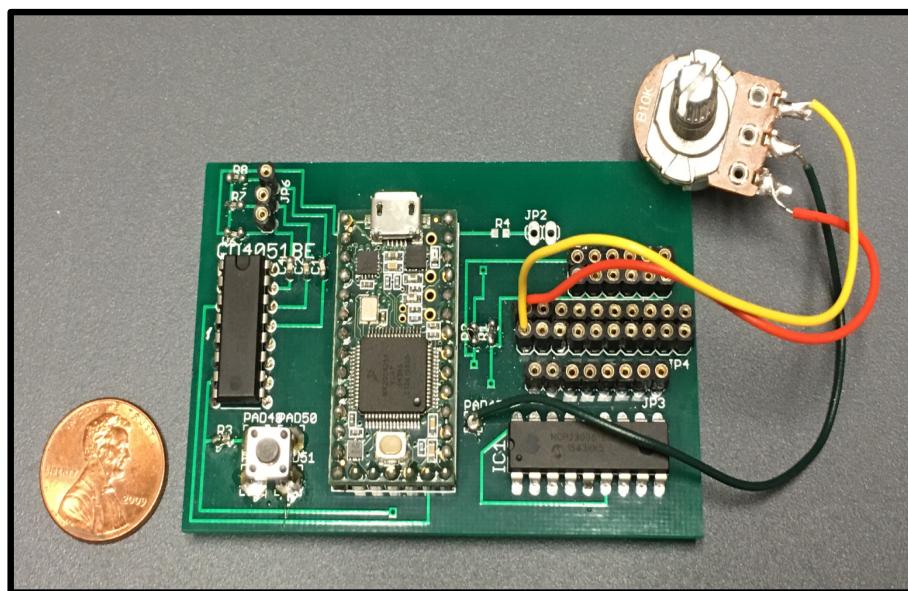
	Visual Feedback	Blind
Sensory Feedback	10/10	10/10
No Sensory Feedback	10/10	3/10



Cost Comparison

Cosmetic arm	\$5,000	
Arm with split hook	\$10,000	
Myoelectric arm with functional hand	\$20,000 - \$100,000	
Bretl Lab myoelectric hand with sensory feedback	\$400	

Future Directions



Acknowledgements



Aadeel Akhtar

Yun Choi

Tim Bretl

Brad Sutton

Jennifer Amos



Questions?

