

DIY AT: The Maker Movement & Hacking Everyday Life

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SCI Wellness Summit

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Boing!

Ding!

Ding Dong!

HONK!
HONK!



PCEye Explore featuring Tobii Gaze Interaction Software/Windows Control

\$1,995 USD

Add to Cart

The PCEye Explore is an entry level, peripheral eye tracker that opens up the wonderful world of gaze interaction. With the PCEye Explore, young or inexperienced users get a simple, fun

\$139

Buy

Tobii EyeX Controller

Explore humanized and immersive interactions with the Tobii EyeX Controller.

[Tobii EyeX Software](#)

[A Growing World of Apps](#)

[Develop Games and Apps With](#)



We're Swedish, and we're the best, most innovative eye-tracking company in the world, containing our technology in the rest of the world. For example, we have a feature for Windows 10 that allows you to sense your presence and look at it. A pioneer in eye-tracking.

Objectives

1. Recognize the dramatic cost differences between off-the-shelf and do-it-yourself (DIY) assistive technologies (AT)
2. Understand the current trends in DIY AT
3. Understand some of the basics of creating customized AT devices
4. Recognize the enjoyment and community that can accompany inventing, making, and sharing things

About me

- Occupational therapist at Harborview Medical Center
- PhD student in Rehabilitation Science at UW
- Cultivate Portland, 2009-2012
- Tinkerer, gardener, bicycler, technology nerd
- The intersection of doing, creating, and skill-building

Occupational therapy



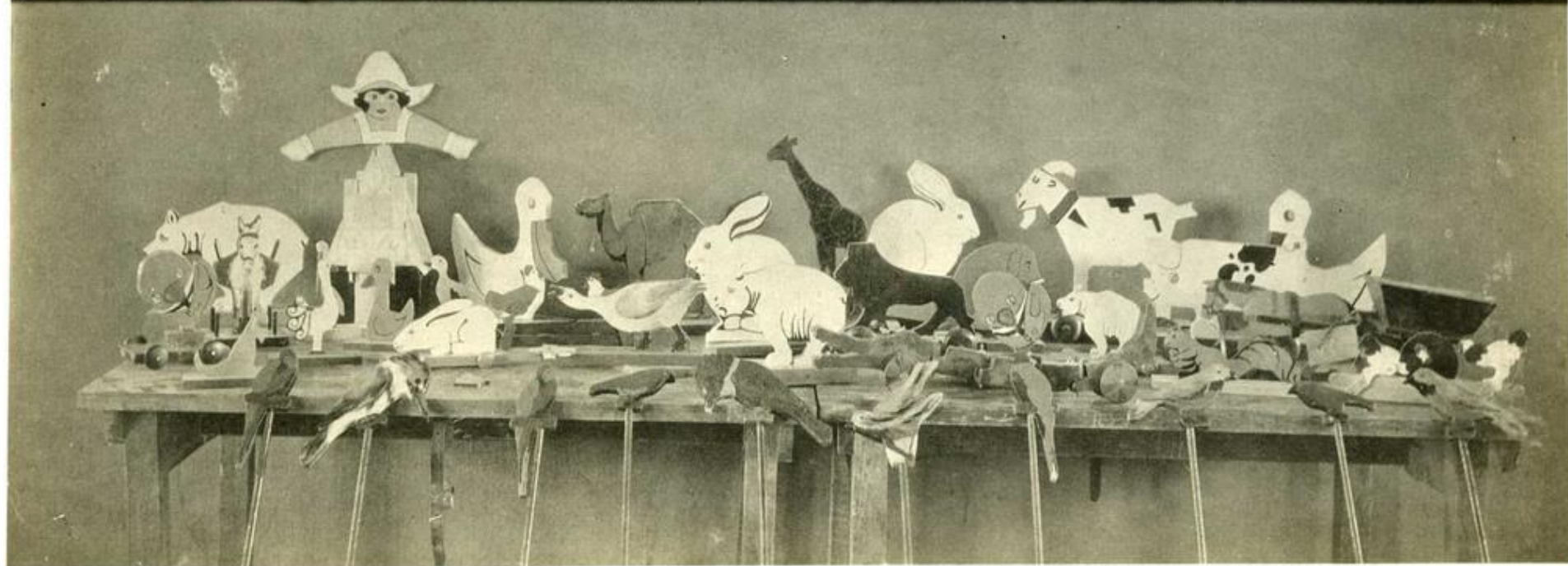
Occupational therapy



Occupational therapy











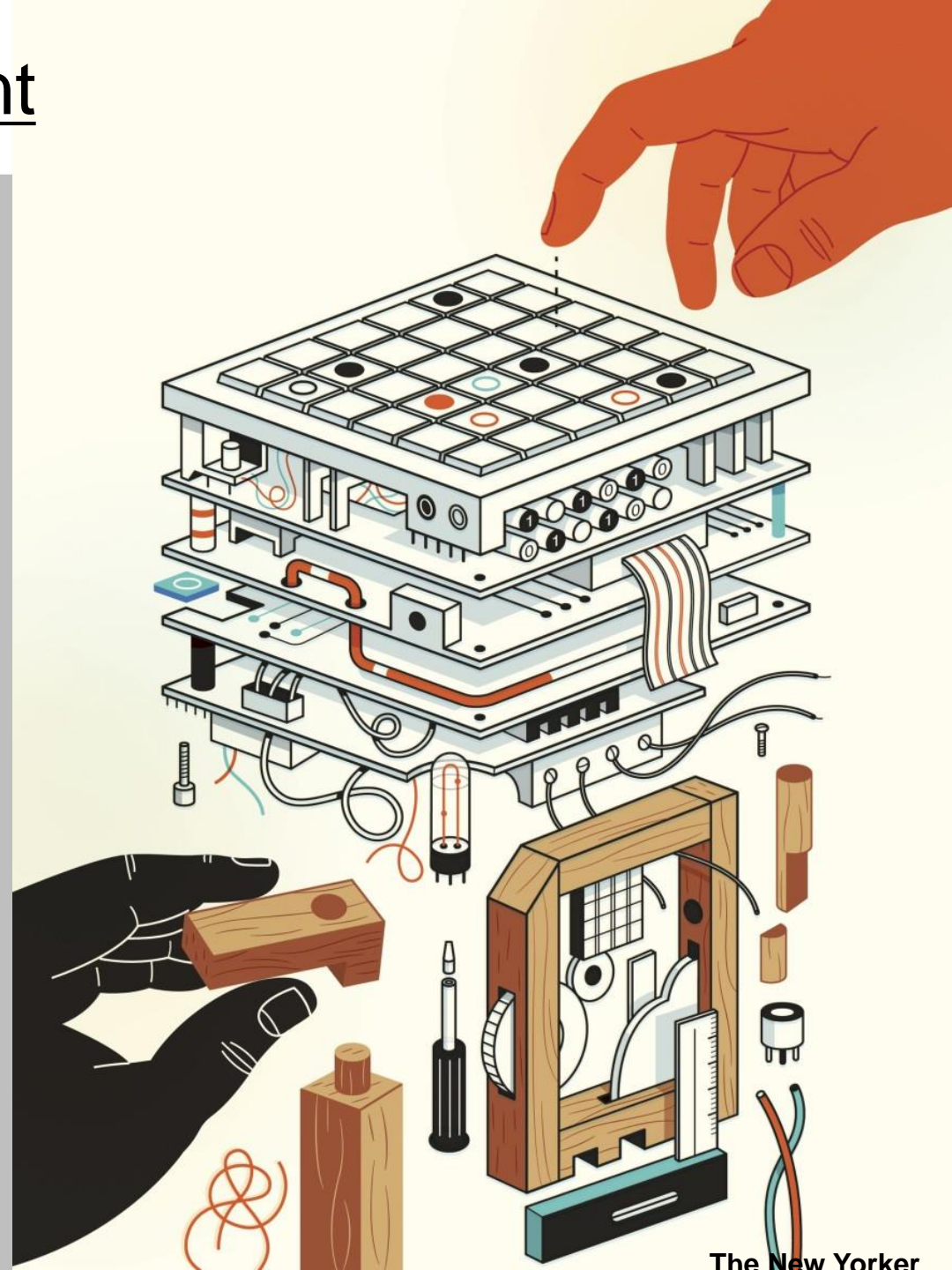
“Man, through the use of his hands, as energized by mind and will, can influence the state of his own health.”

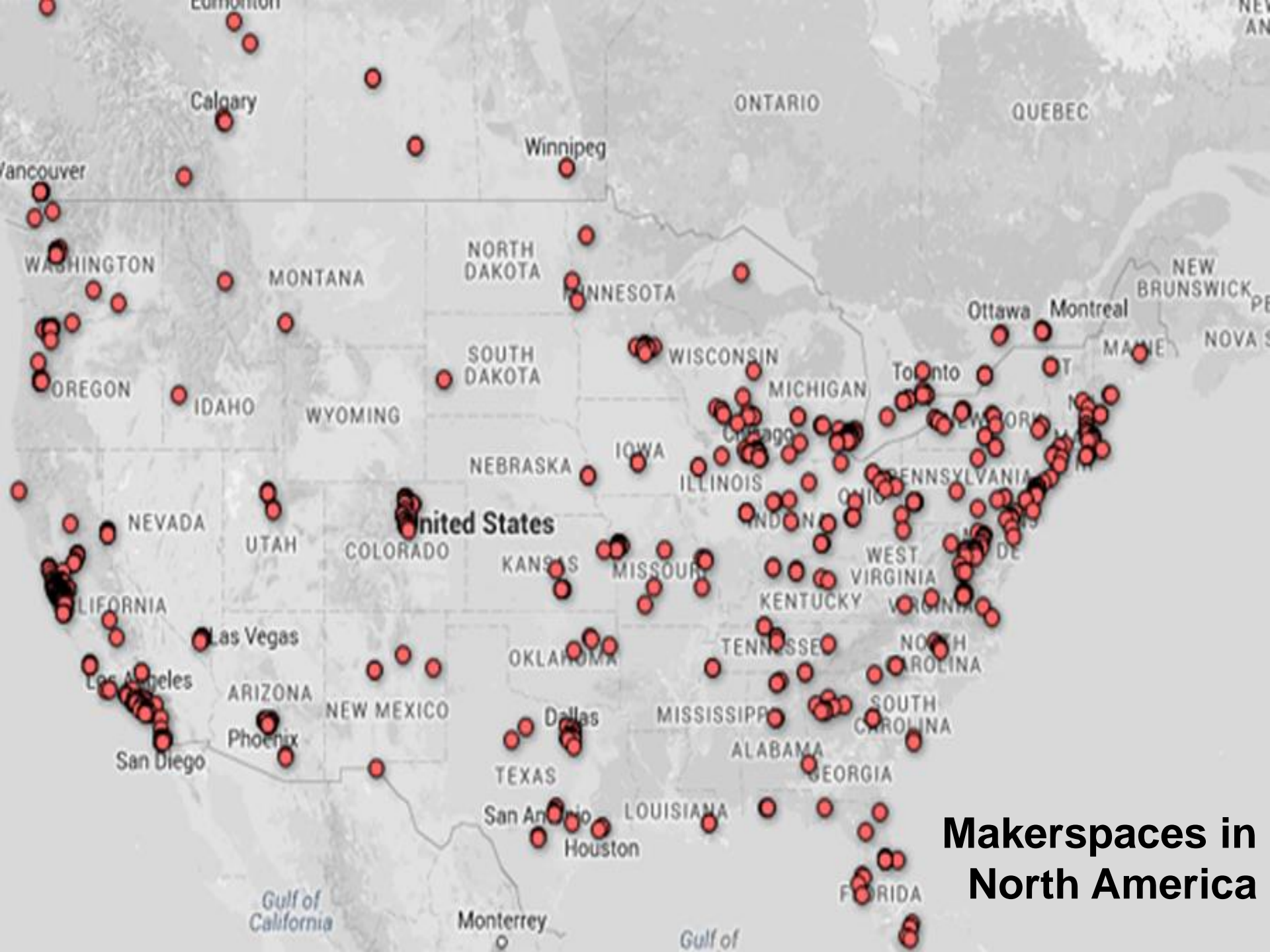
“... the power to act creates a need to use the power, and the failure to use power results in dysfunction and unhappiness.”

– Mary Reilly, 1963

The maker movement

- Arts and crafts movement revival
- The democratization of invention
- Open source philosophy





Makerspaces in North America



3D Printers



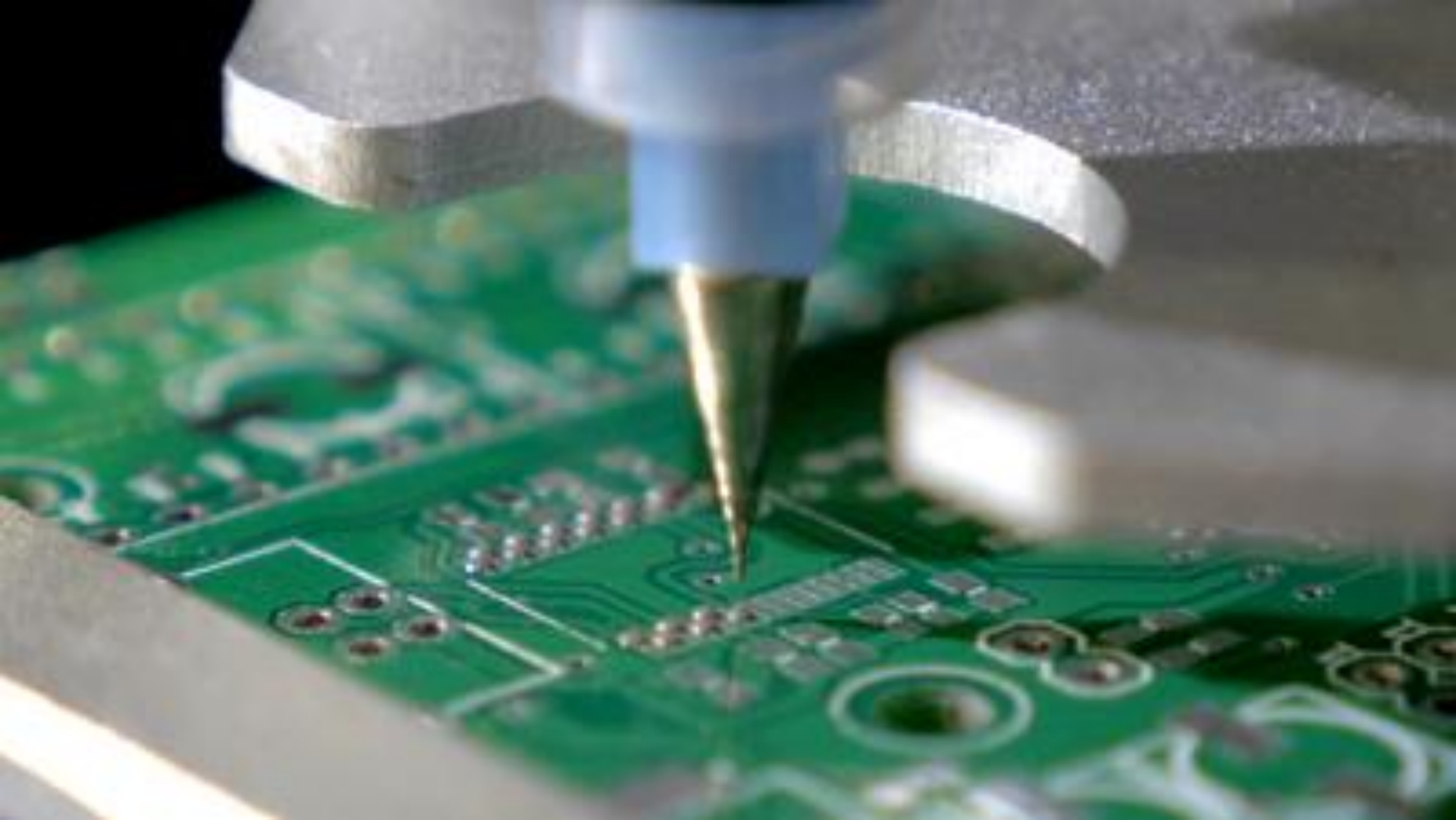
Laser Cutters



CNC Milling Machines



Sewing Machines



Circuit Board Printers



Collective Intelligence



Firewalker LED Sneakers

Burn up the dance floor in these red-hot kicks!

FEATURED



Plush Game Controller

Capacitive touch sensing with conductive fabric & Flora

NEW GUIDE



Phone-Activated Talking Dog Collar

"I can smell you!"

Drawdio

Drawdio: A pencil that lets you draw with music!



Zipper Switch

Conductive thread zip-trigger

FEATURED



DeLorean Time Circuit

Great Scott!

Collective Intelligence

Off-the-shelf assistive technology

- New technologies are constantly emerging that are designed to improve access to technology
- Off-the-shelf AT is not customized to the individual
- Off-the-shelf AT is ridiculously overpriced

Price comparisons



Jelly bean
\$59



Microlite
\$79



Ultra light
\$180

Price comparisons



Tactile switches
5¢ - 25¢

Price comparisons



Candy corn
\$189



Mini beamer
\$240

Price comparisons



**Infrared/break beam/proximity sensors
\$5 - \$10**

Price comparisons



Mini joystick
\$349



Quadjoy
\$850

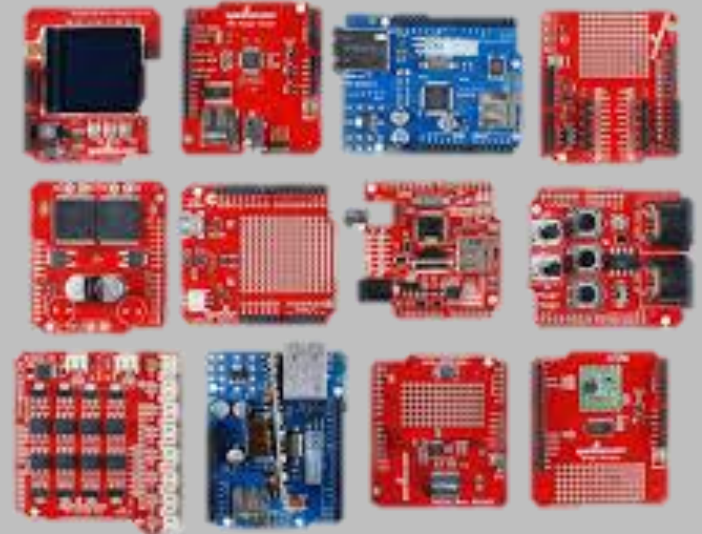
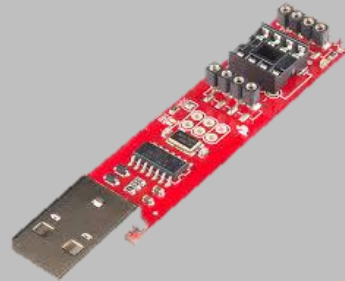
Price comparisons



Analog joysticks
\$2 - \$8

Arduino

- Essentially a tiny computer
- Connects to sensors and actuators
- Executes a single program to achieve a goal



Input
make it happen



Interface
how to make it do the
thing



Output
it does the thing

Input
make it happen



Interface
how to make it do the thing



Output
it does the thing

- tactile switch
- joystick
- flex/bend sensor
- pneumatic (sip n puff) sensor
- IR/proximity sensor
- eye tracker
- EMG sensor
- capacitive touch sensor
- ribbon sensor
- sound/noise sensor

Input
make it happen



Interface
how to make it do the thing



Output
it does the thing

- MaKey MaKey
- Arduino as keyboard/mouse
- Arduino to operate environmental controls/objects
- Bed controls
- Communication device
- TV remote control
- Telephone/smartphone
- eye tracking interface

Input
make it happen



Interface
how to make it do the thing



Output
it does the thing

- Use computer
- Play music
- Control television
- Turn on/off lights
- Write texts and make phone calls
- Tilt power wheelchair
- Speech output via communication software
- Play video games on Xbox, Playstation
- Many more!

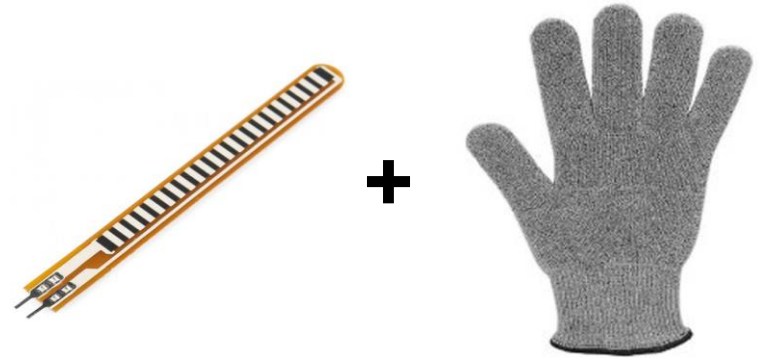
Input
make it happen



Interface
how to make it do the thing



Output
it does the thing



+



C D E F G

Input
make it happen



Interface
how to make it do the
thing



Output
it does the thing



Input
make it happen



Interface
how to make it do the thing



Output
it does the thing



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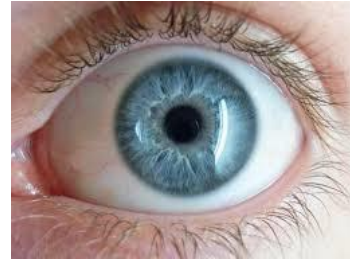
Input
make it happen



Interface
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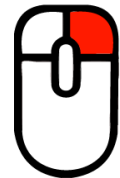
Output
it does the thing



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tobii
eyeX



<https://www.youtube.com/watch?v=rfQqh7iCcOU>

Useful websites:

adafruit.com

sparkfun.com

instructables.com

makezine.com

oneswitch.org.uk

Thank you:

Curt Johnson

Anat Caspi

Torin Blankensmith

Pete Carpenter