

Fab Academyと日本における IoTクリエイター養成講座

ファブラボ鎌倉

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加藤 未央

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- Fab Academyの学習内容
- Fab Academyを支えている基盤技術
- 2015年 - 日本からのFab Academy参加
- 日本で行っているIoTクリエイター養成講座

自己紹介

2012 : 6年間勤めた計測機器メーカーを退社

2013 : Fab Academyにオランダ、アムステルダムから参加

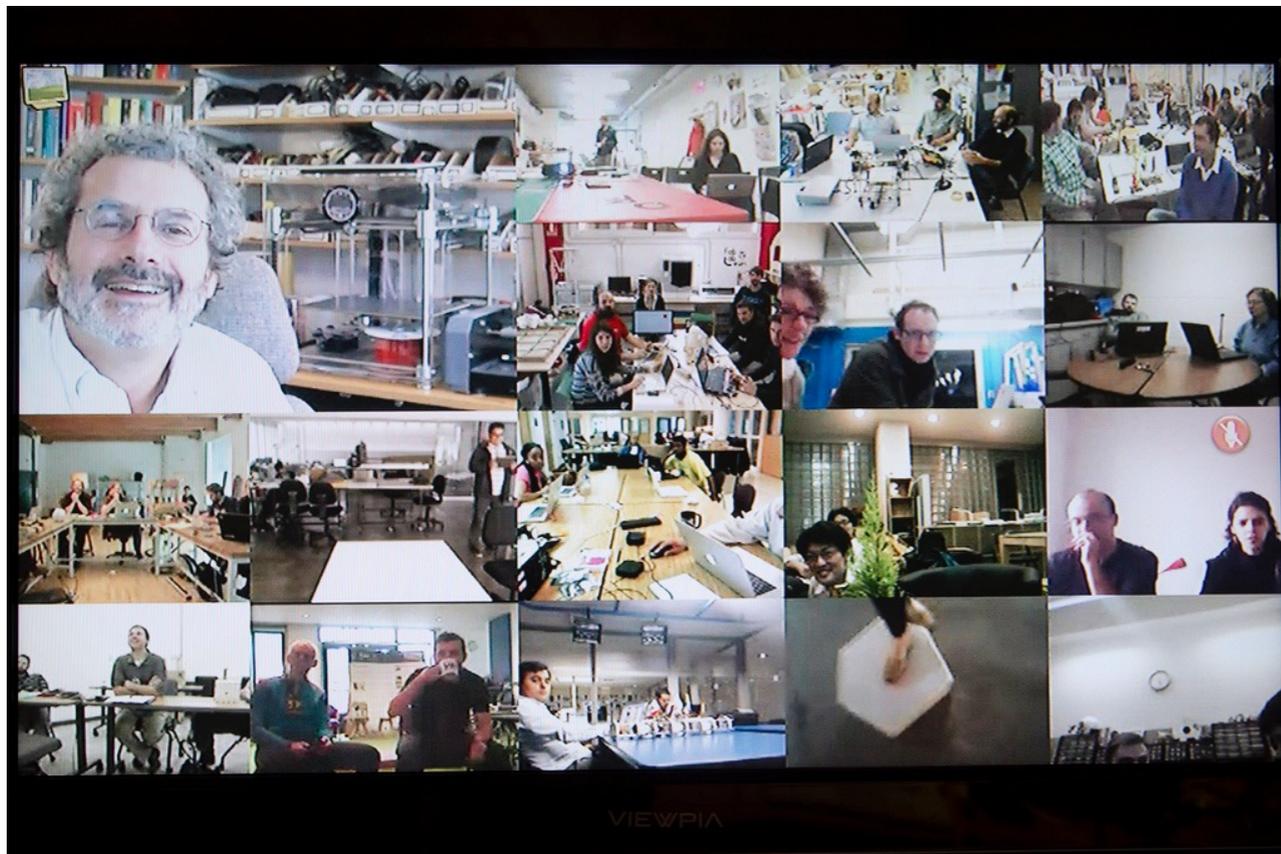
2014

- ファブラボ鎌倉で働き始める
- 慶応義塾大学SFC研究所訪問研究員になる

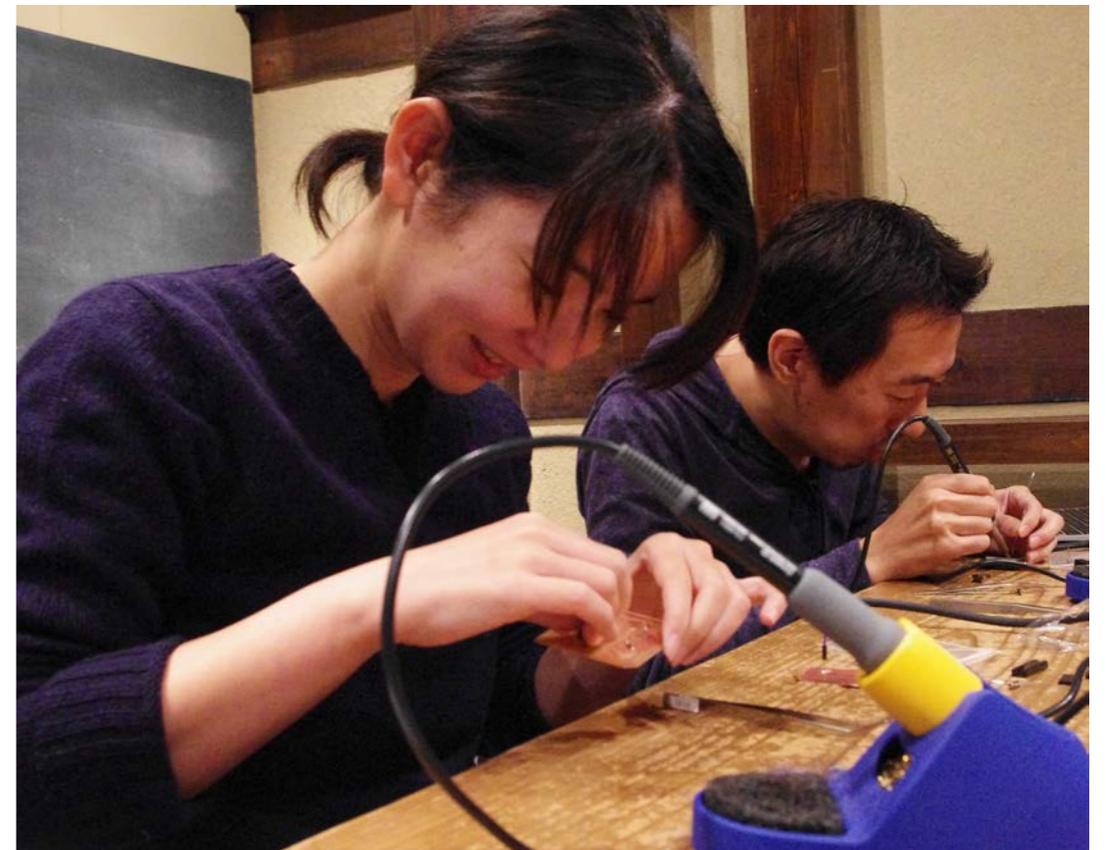
2015 : ファブラボ鎌倉からFab Academyにローカルチューターとして参加

Fab Academyとは

Global



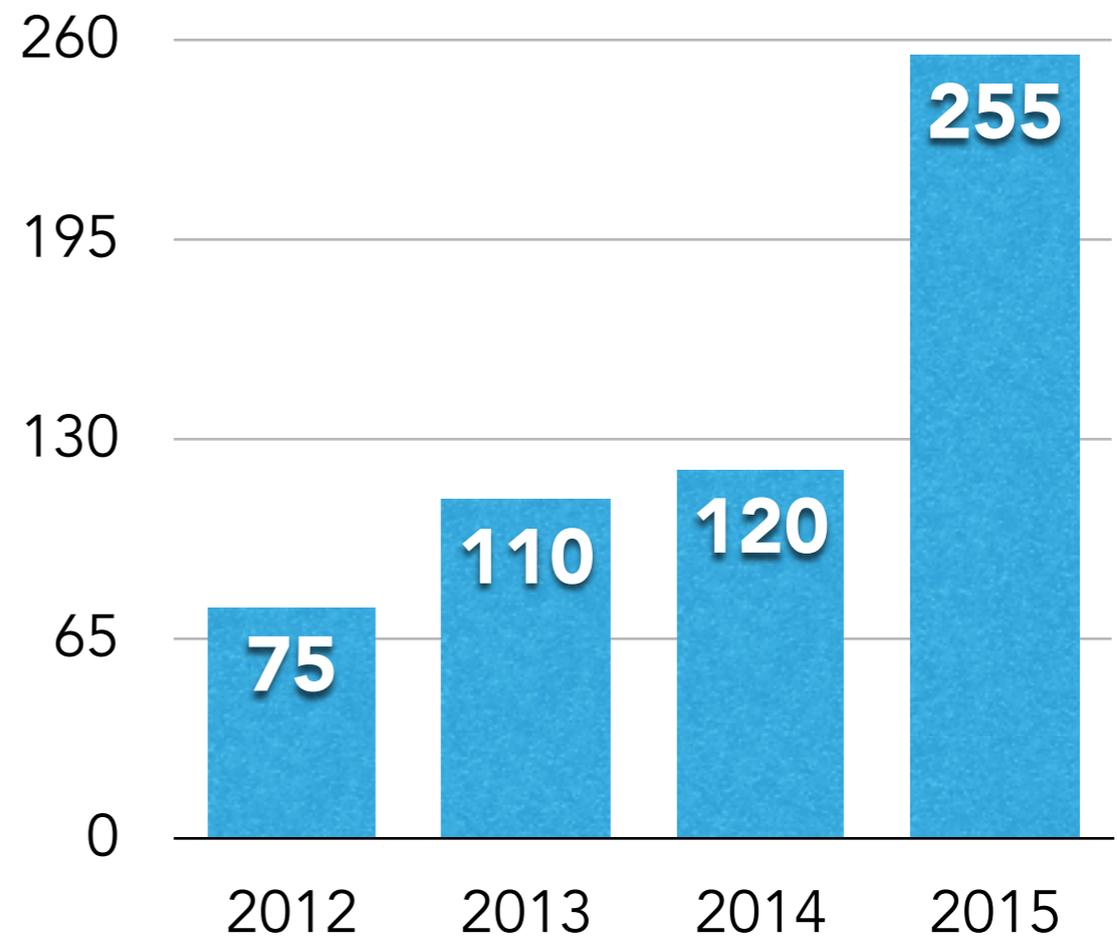
Local



- 世界52箇所のファブラボから255人の生徒が参加 (2015)
- 多様なバックグラウンド(エンジニア、デザイナー、マネートレーダーなど)
- How to make almost anything (アイデアを形にするあらゆる手法を学ぶ)
- MIT Center for Bits and Atomsのニール・ガーシェンフェルド教授が始める

概要

- 参加人数：255人 (2015年)
- 参加ラボ：52箇所 (2015年)
- リージョン
 - North America
 - South America
 - Europe / Middle East
 - Africa
 - Asia
- 受講料：\$5,000
- スカラシッププログラム
- 授業開始 EST9:00 (日本 PM11:00)



Fab Academyの学習内容

1. Principles and Practices, Project Management
2. Computer-Aided Design
3. Computer Controlled Cutting
4. Electronics Production
5. 3D Scanning and Printing
6. Electronics Design
7. Embedded Programming
8. Computer-Controlled Machining
9. Molding and Casting
10. Input Devices
11. Output Devices
12. Composites
13. Networking and Communications
14. Mechanical Design, Machine Design
15. Interface and Application Programming
16. Invention, Intellectual Property, and Income
17. Project Development
18. Project Presentation

- グローバルレクチャー 1.5h (毎週水曜日)
- グローバルレビュー 1.5h (毎週水曜日)
- ローカルレビュー
- ビデオレコーディング (Vimeo)
- 作品製作記録 (Mercurial)
- ハンズオン講習 (12h以上)
- メーリングリスト
- 18weeks

Red = 筐体

Green = 電子回路

Blue = ソフトウェア

Brown = 機械

Project Management

fabacademy.org

The Fab Academy
2015 Students

Random page

- Adolfo Benitez Herrera
- Adom Kwabena
- Ahmed Al Balooshi
- Alejandro Escario Méndez
- Alessandra Ferreira
- Alessandro Papaleo
- Alex Brufsky
- Alexander Nikolas Walzer
- Ali Awadh
- Ali Rajaie
- Allen Maker
- Aman Garg
- Ana Karyna Gómez
- Anders Haldin
- Andrew Gregson
- Andrew Moore
- Anna Afalo
- Antonio Alliva
- Antonio Burrai
- Apeksha Bochara
- Arely Amaut
- Aris Masvros
- Aristarco Cortes
- Asako Okazaki

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THE FAB ACADEMY 2015 FABLAB KAMAKURA ABOUT ME

YUMI NISHIHARA

MY JOURNEY TO LEARN *HOW TO MAKE (ALMOST) ANYTHING*

WEEK 1
Final Project Proposal / Creating this site / Mercurial

WEEK 2
Animated Simulation / Tissue Observation

WEEK 3
Fold-Press-Fit Construction Kit

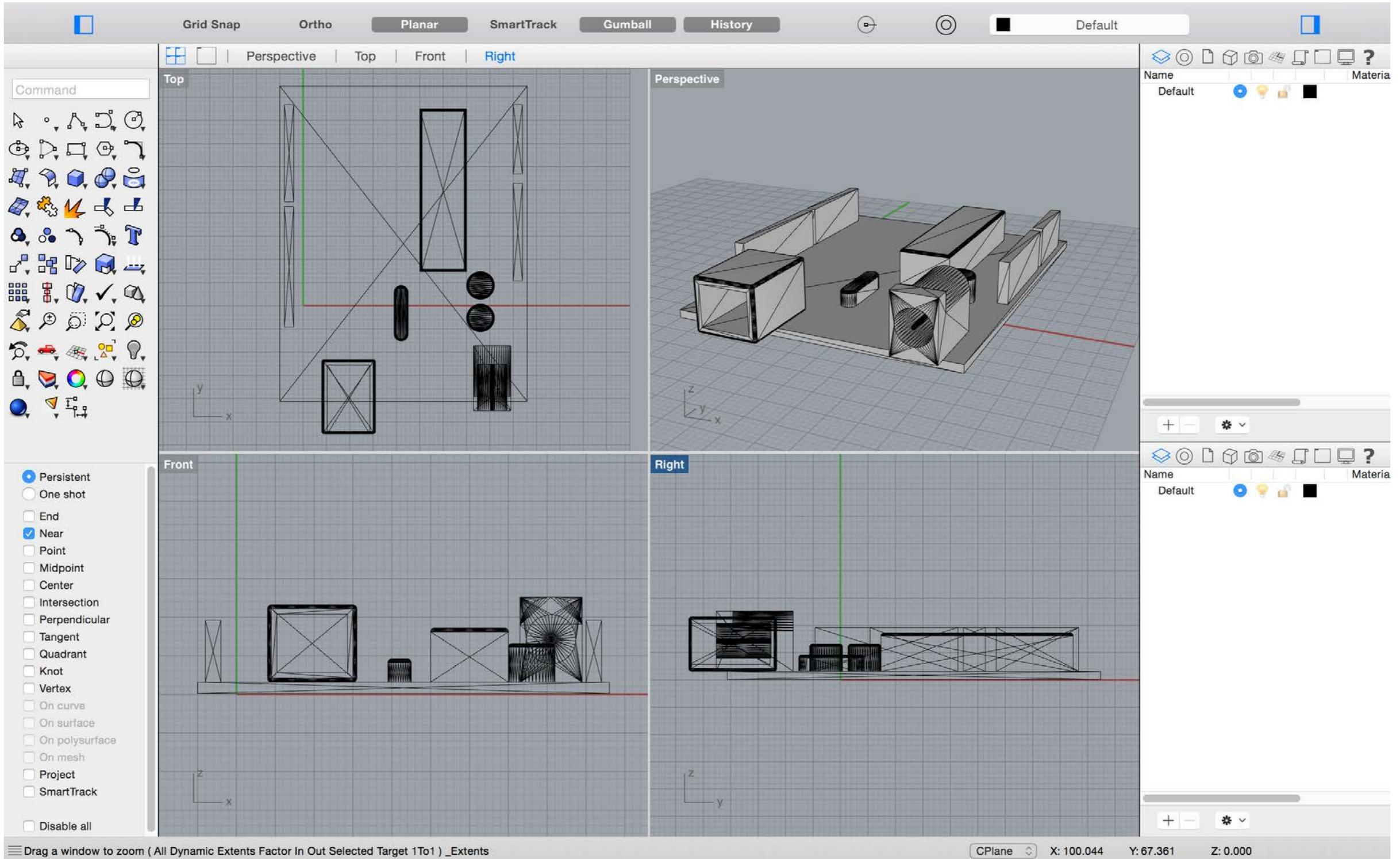
WEEK 3

FOLD-PRESS-FIT CONSTRUCTION KIT

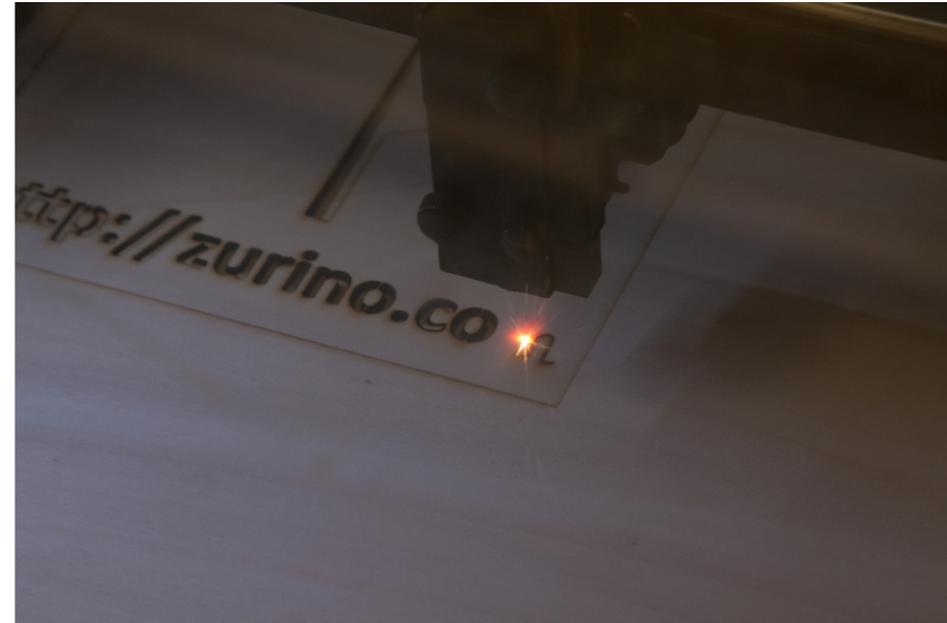
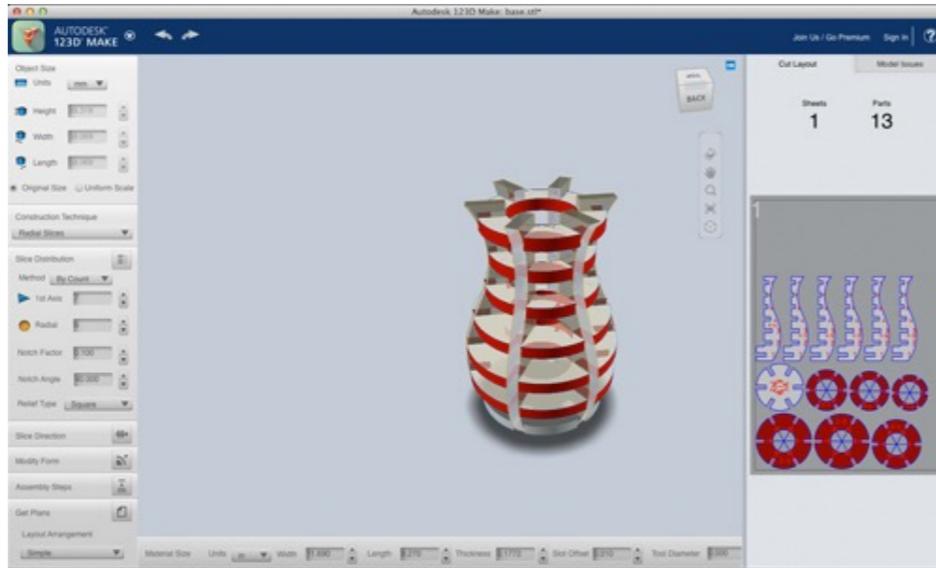
Materials: paper, 2mm cardboard
Machines: paper cutter (Silhouette CAMEO), laser cutter (EPILOG Zing16)

Fold-Press-Fit Construction Kit

Computer Aided Design



Computer Controlled Cutting

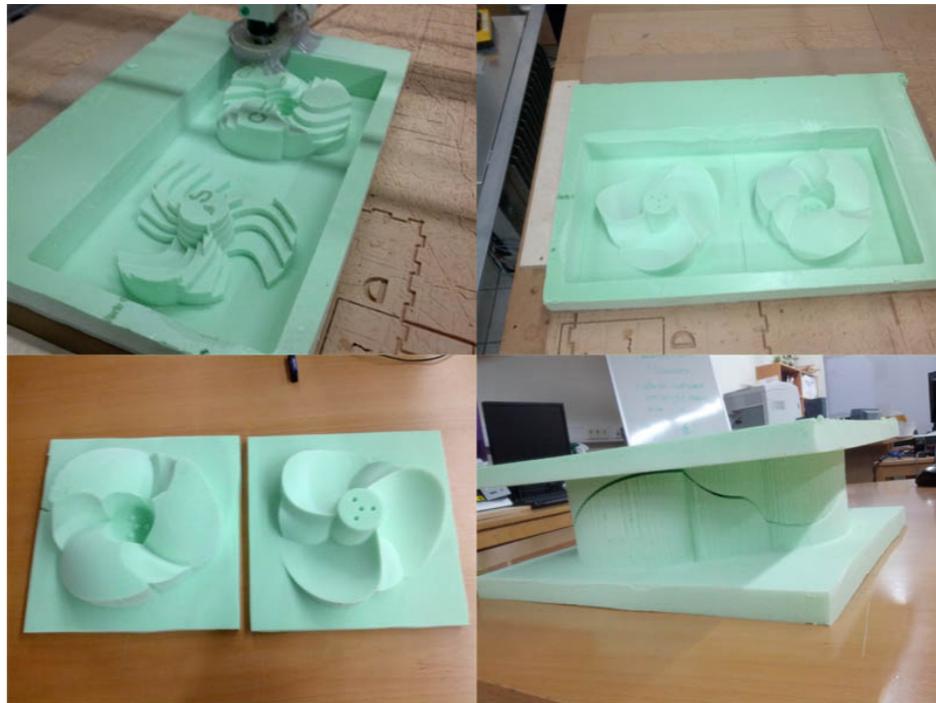


3D Scanning and Printing



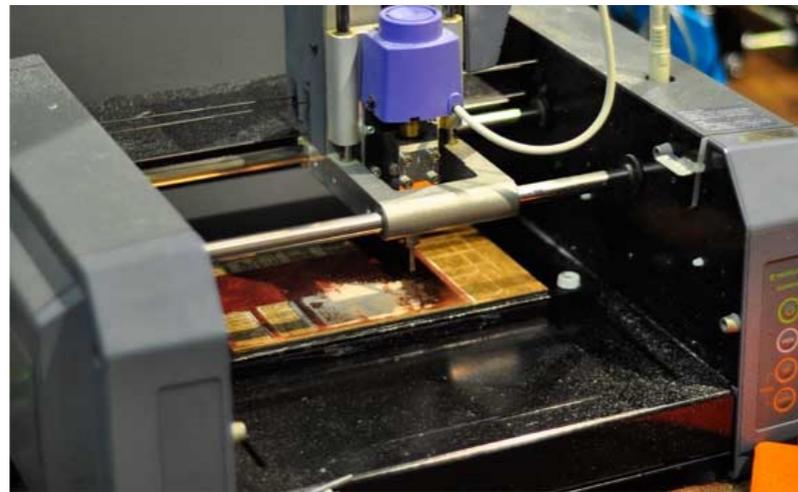
Computer Controlled Machining

Molding and Casting Composites



Electronics Production

Electronics Design

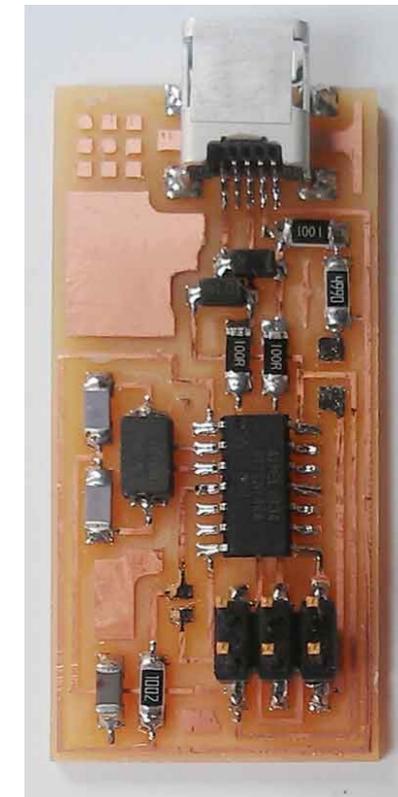
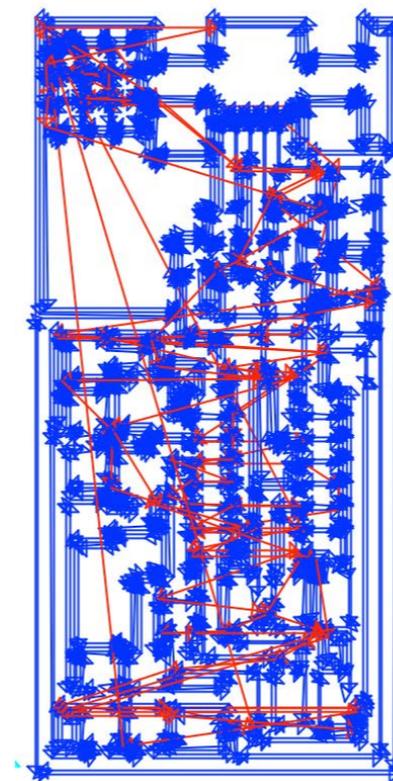
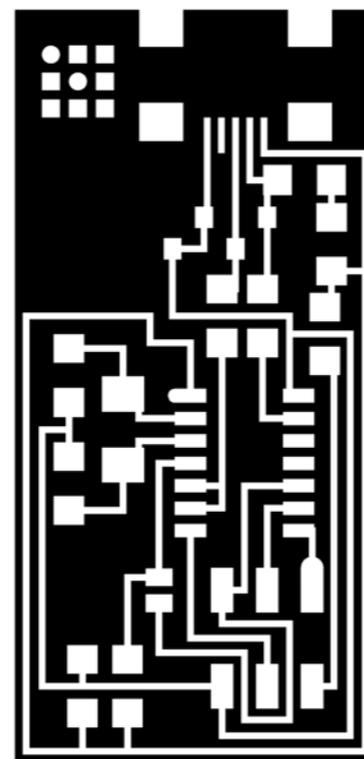
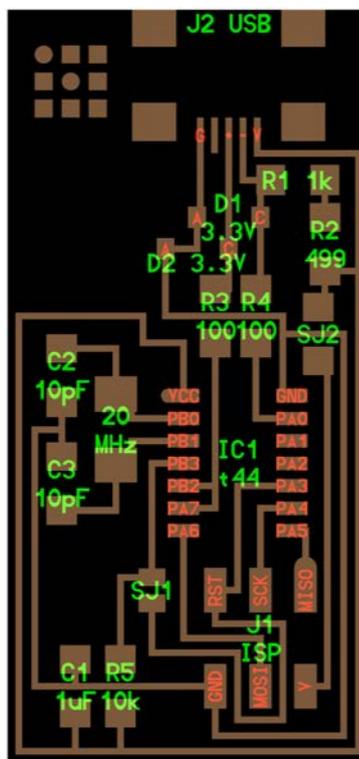


Eagle file

png file

path data

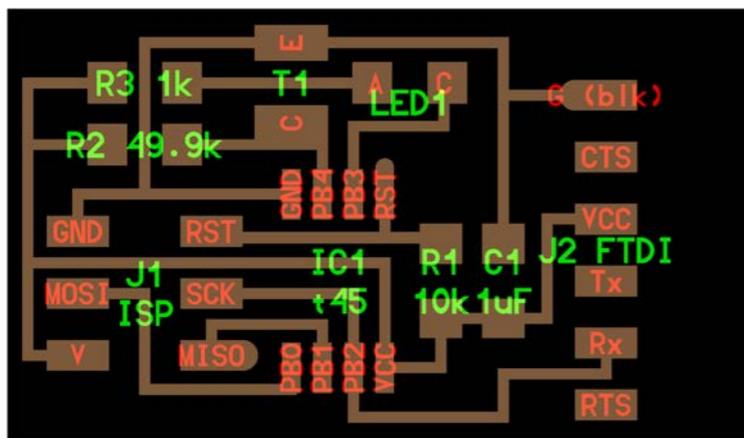
pcb



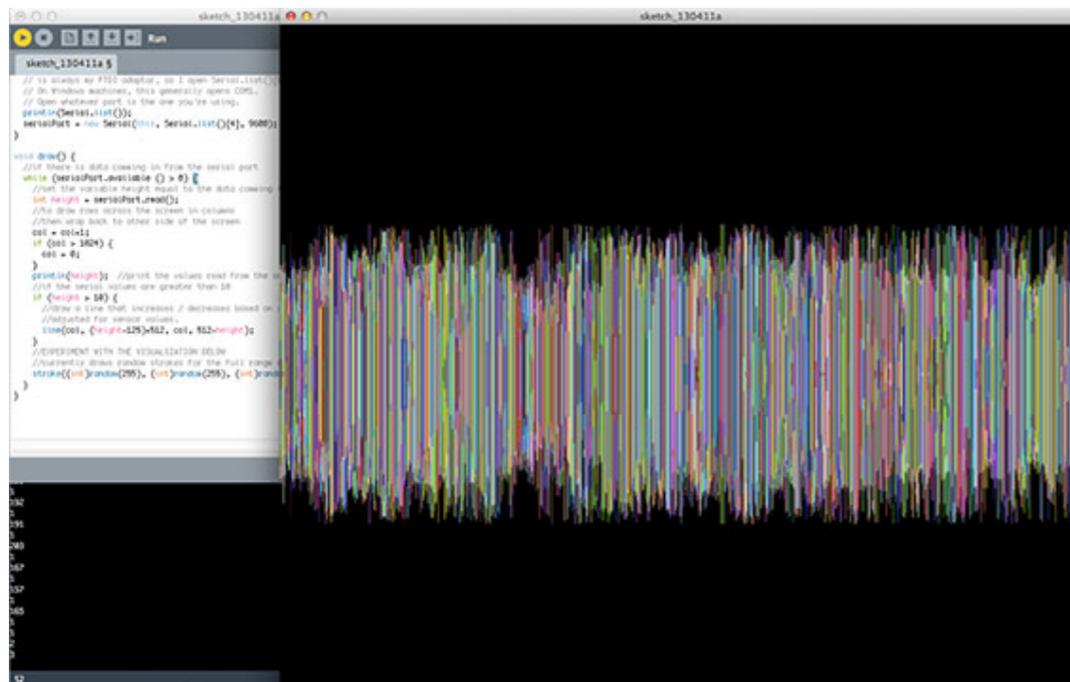
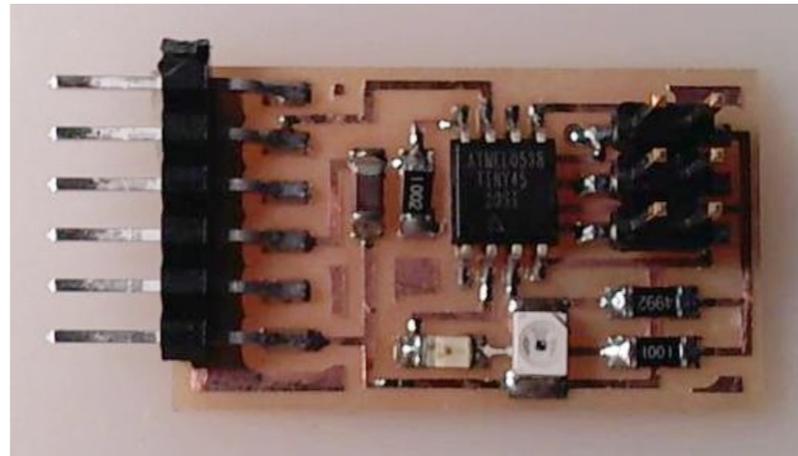
Input devices

Output Devices

board



components



Embedded Programming

Networking and Communications Interface and Application Programming

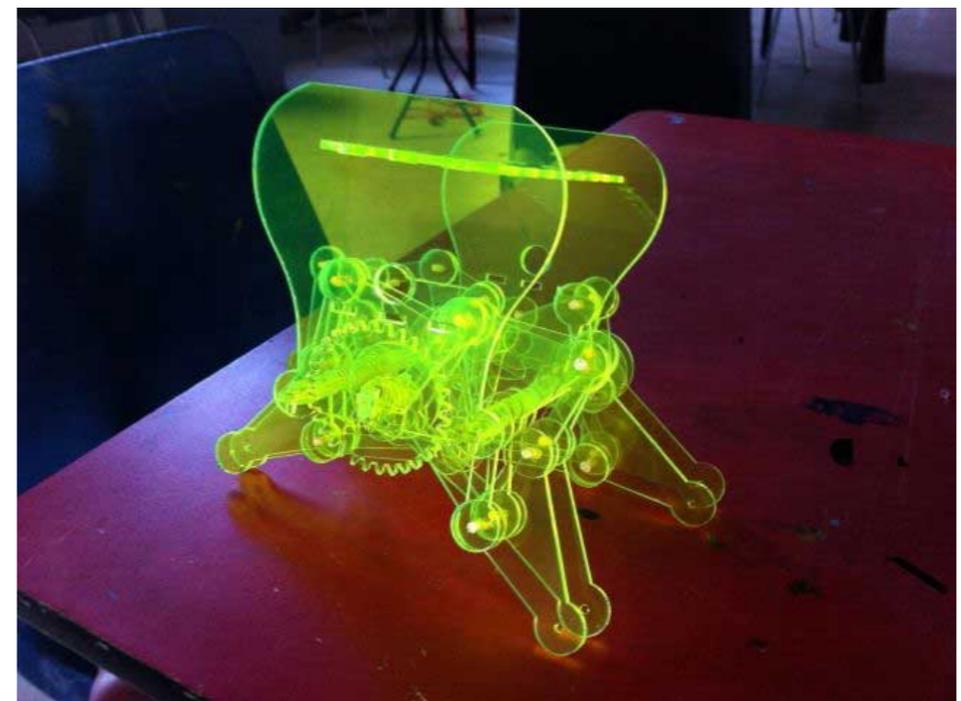
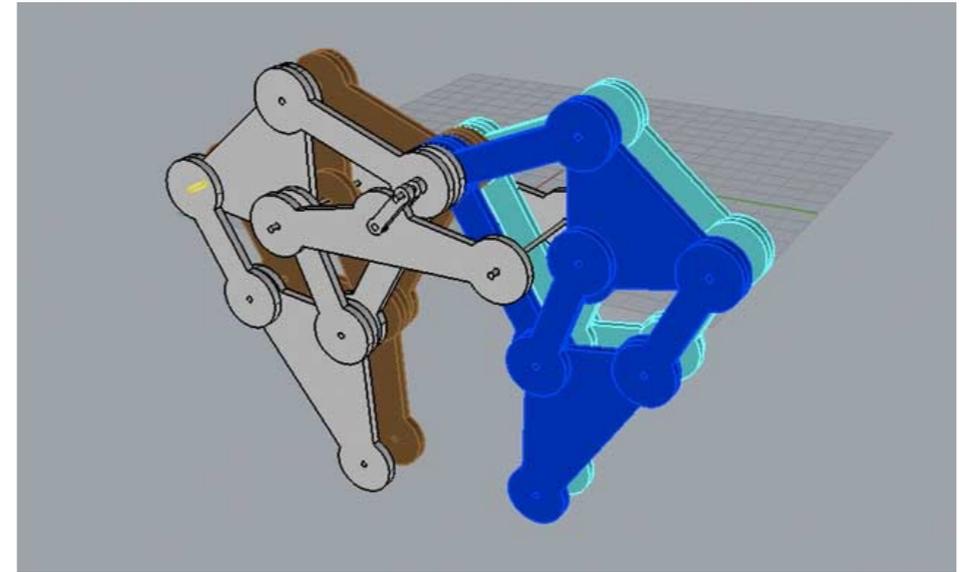
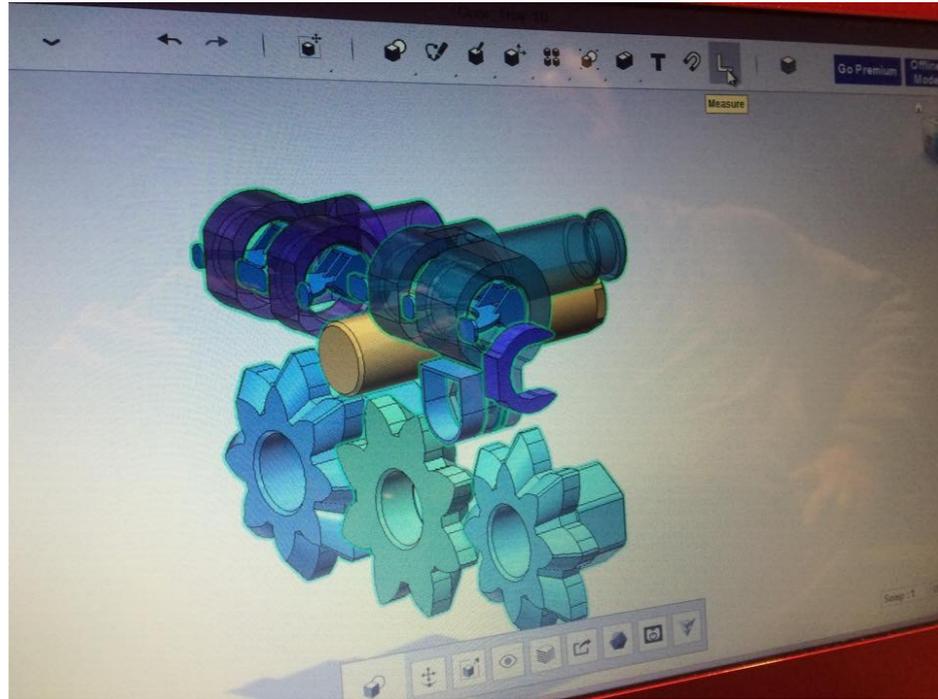
C

```
1 //
2 //
3 // hello.reflect.45.c
4 //
5 // light reflection synchronous detection hello-world
6 // 9600 baud FTDI interface
7 //
8 // Neil Gershenfeld
9 // 10/25/12
10 //
11 // (c) Massachusetts Institute of Technology 2012
12 // Permission granted for experimental and personal use;
13 // license for commercial sale available from MIT.
14 //
15
16 #include <avr/io.h>
17 #include <util/delay.h>
18
19 #define output(directions, pin) (directions |= pin) // set port direction for output
20 #define set(port, pin) (port |= pin) // set port pin
21 #define clear(port, pin) (port &= (~pin)) // clear port pin
22 #define pin_test(pins, pin) (pins & pin) // test for port pin
23 #define bit_test(byte, bit) (byte & (1 << bit)) // test for bit set
24 #define bit_delay_time 102 // bit delay for 9600 with overhead
25 #define bit_delay() _delay_us(bit_delay_time) // RS232 bit delay
26 #define half_bit_delay() _delay_us(bit_delay_time/2) // RS232 half bit delay
27 #define char_delay() _delay_ms(10) // char delay
28
29 #define serial_port PORTB
30 #define serial_direction DDRB
31 #define serial_pin_out (1 << PB2)
32
33 #define led_port PORTB
34 #define led_direction DDRB
35 #define led_pin (1 << PB3)
36
37 #define nloop 100 // number of loops to accumulate
38
39 void put_char(volatile unsigned char *port, unsigned char pin, char txchar) {
40 //
41 // send character in txchar on port pin
42 // assumes line driver (inverts bits)
43 //
44 // start bit
45 //
46 clear(*port, pin);
47 bit_delay();
48 //
49 // unrolled loop to write data bits
50 //
51 if bit_test(txchar, 0)
52 | set(*port, pin);
53 else
54 | clear(*port, pin);
55 bit_delay();
56 if bit_test(txchar, 1)
57 | set(*port, pin);
58 }
```

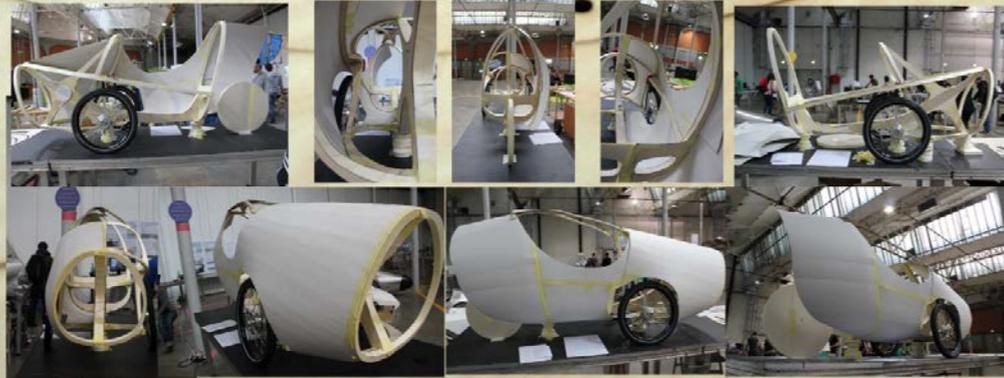
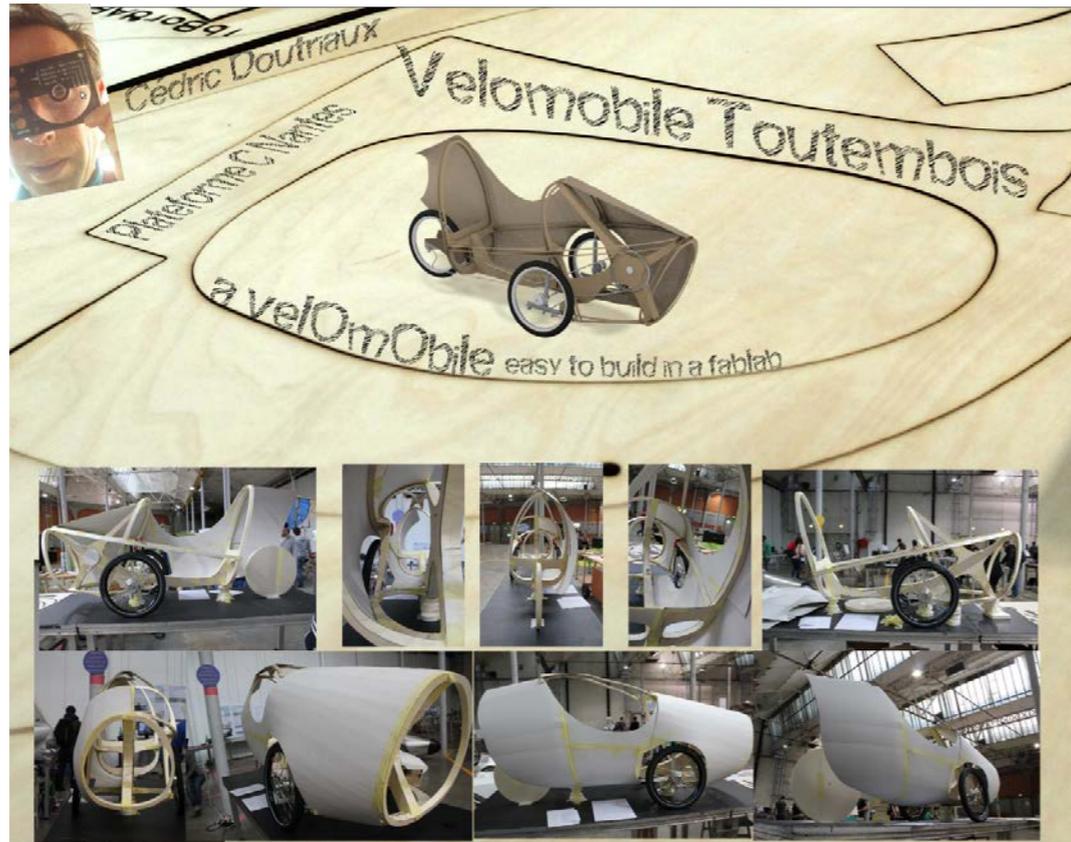
python

```
1 #
2 # hello.reflect.45.py
3 #
4 # receive and display synchronous light reflection
5 # hello.light.45.py serial_port
6 #
7 # Neil Gershenfeld
8 # CBA MIT 10/25/12
9 #
10 # (c) Massachusetts Institute of Technology 2012
11 # Permission granted for experimental and personal use;
12 # license for commercial sale available from MIT
13 #
14
15 from Tkinter import *
16 import serial
17
18 WINDOW = 600 # window size
19 eps = 0.9 # filter time constant
20 filter = 0.0 # filtered value
21 nloop = 100.0 # number of loops accumulated
22 amp = 25.0 # difference amplitude
23
24 def idle(parent, canvas):
25     global filter, eps
26     #
27     # idle routine
28     #
29     byte2 = 0
30     byte3 = 0
31     byte4 = 0
32     ser.flush()
33     while 1:
34         #
35         # find framing
36         #
37         byte1 = byte2
38         byte2 = byte3
39         byte3 = byte4
40         byte4 = ord(ser.read())
41         if ((byte1 == 1) & (byte2 == 2) & (byte3 == 3) & (byte4 == 4)):
42             break
43         on_low = ord(ser.read())
44         on_high = ord(ser.read())
45         on_value = (256*on_high + on_low)/nloop
46         x = int(.25*WINDOW + (.9-.25)*WINDOW*on_value/1024.0)
47         canvas.itemconfigure("text_on", text="on %.1f"%on_value)
48         canvas.coords('rect1_on', .25*WINDOW, .05*WINDOW, x, .2*WINDOW)
49         canvas.coords('rect2_on', x, .05*WINDOW, .9*WINDOW, .2*WINDOW)
50         off_low = ord(ser.read())
51         off_high = ord(ser.read())
52         off_value = (256*off_high + off_low)/nloop
53         x = int(.25*WINDOW + (.9-.25)*WINDOW*off_value/1024.0)
54         canvas.itemconfigure("text_off", text="off %.1f"%off_value)
55         canvas.coords('rect1_off', .25*WINDOW, .25*WINDOW, x, .4*WINDOW)
56         canvas.coords('rect2_off', x, .25*WINDOW, .9*WINDOW, .4*WINDOW)
57         filter = (1-eps)*filter + eps*amp*(on_value-off_value)
```

Mechanical Design and Machine Design

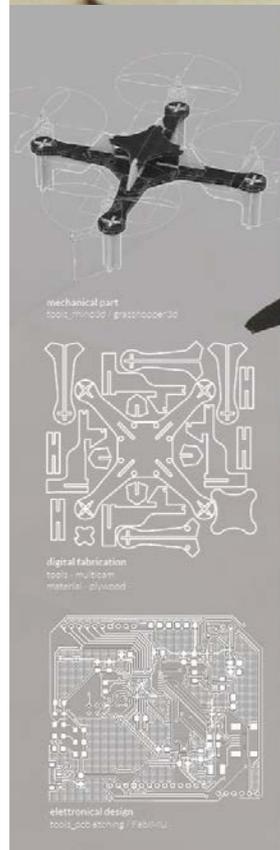
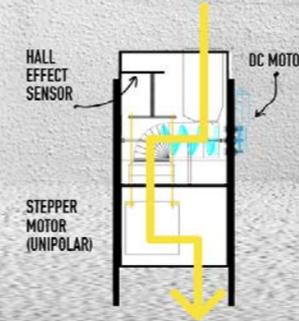


Final Project



FAB FEEDER

LOW-COST, OPEN-SOURCE DRY FOOD DISPENSER THAT **WEIGHTS** THE FOOD YOUR DOG EATS.



fabdrone^{beta}

The project is related to the fields of quad-copters and automatic control. The research project focuses on proposing a theoretical and experimental framework to develop a complete autonomous air vehicle system capable to take off, fly, and explore an unknown indoor-outdoor environment and landing. The idea also consists of making it open source and simplify the whole fabrication and assembly process.

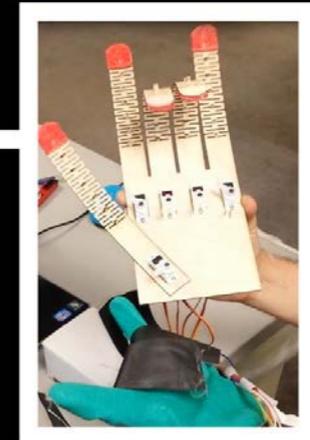
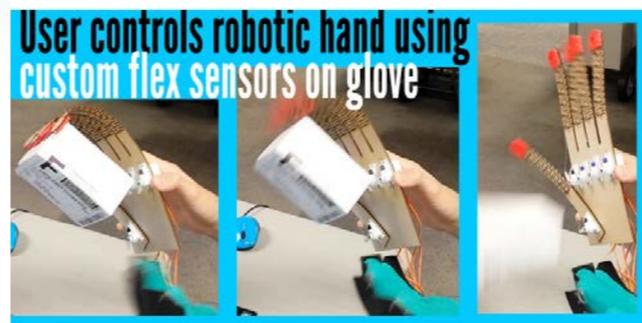
FAB LAB BARCELONA
CHIRAG RANGHOLIA

Biomimetic Hand

Adam Harris - Charlotte



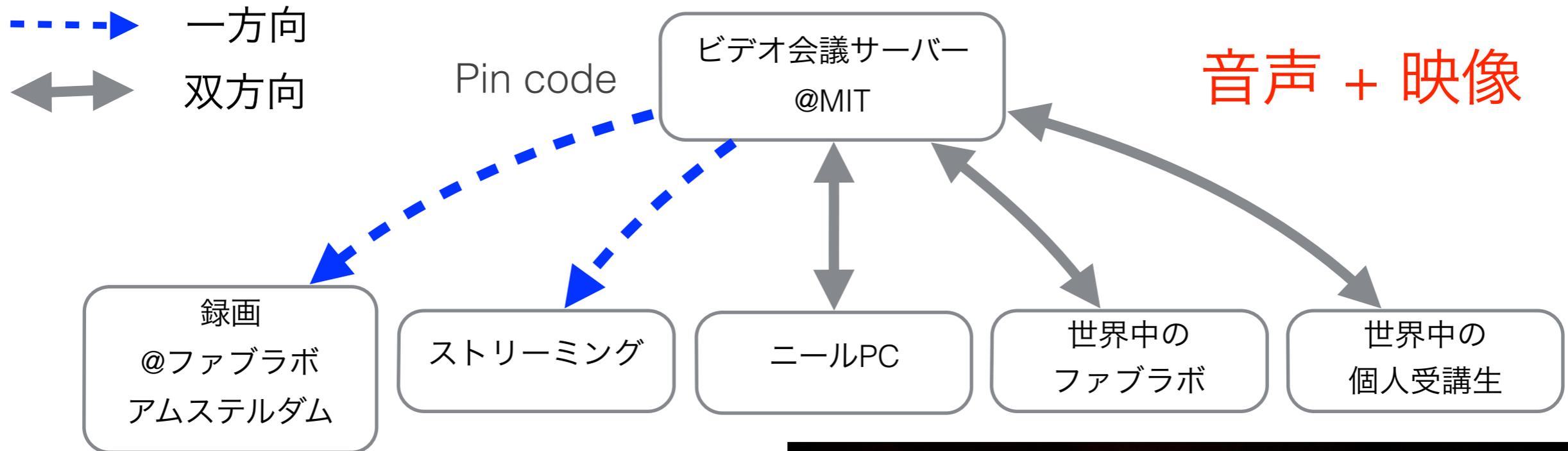
User controls robotic hand using custom flex sensors on glove



Sponsored by Beach Lab

Fab Academyを 支える基盤技術

MCU - Multi Point Control Unit



ハードウェア

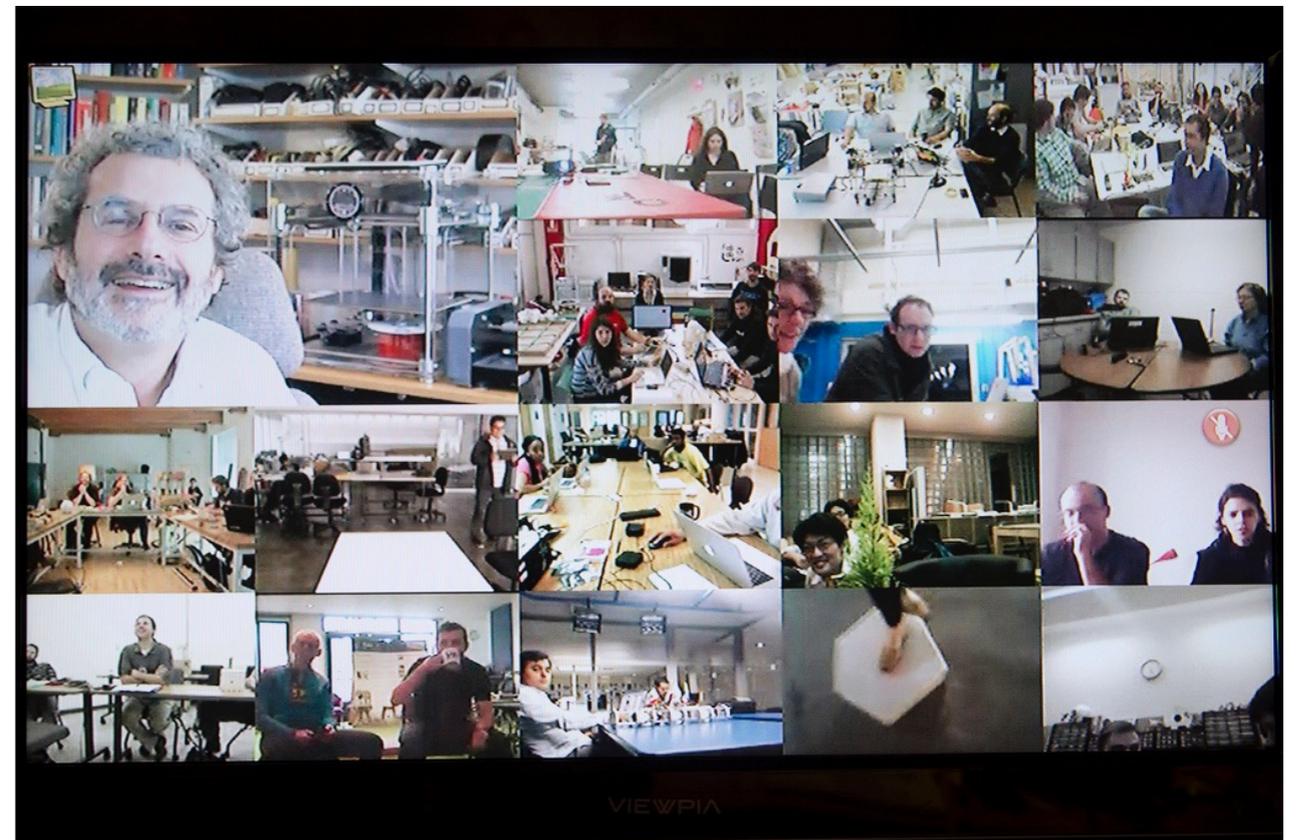
- Polycom
- Lifesize
- etc

ソフトウェア

- Jabber Video
- Clear Sea
- Ekiga
- etc

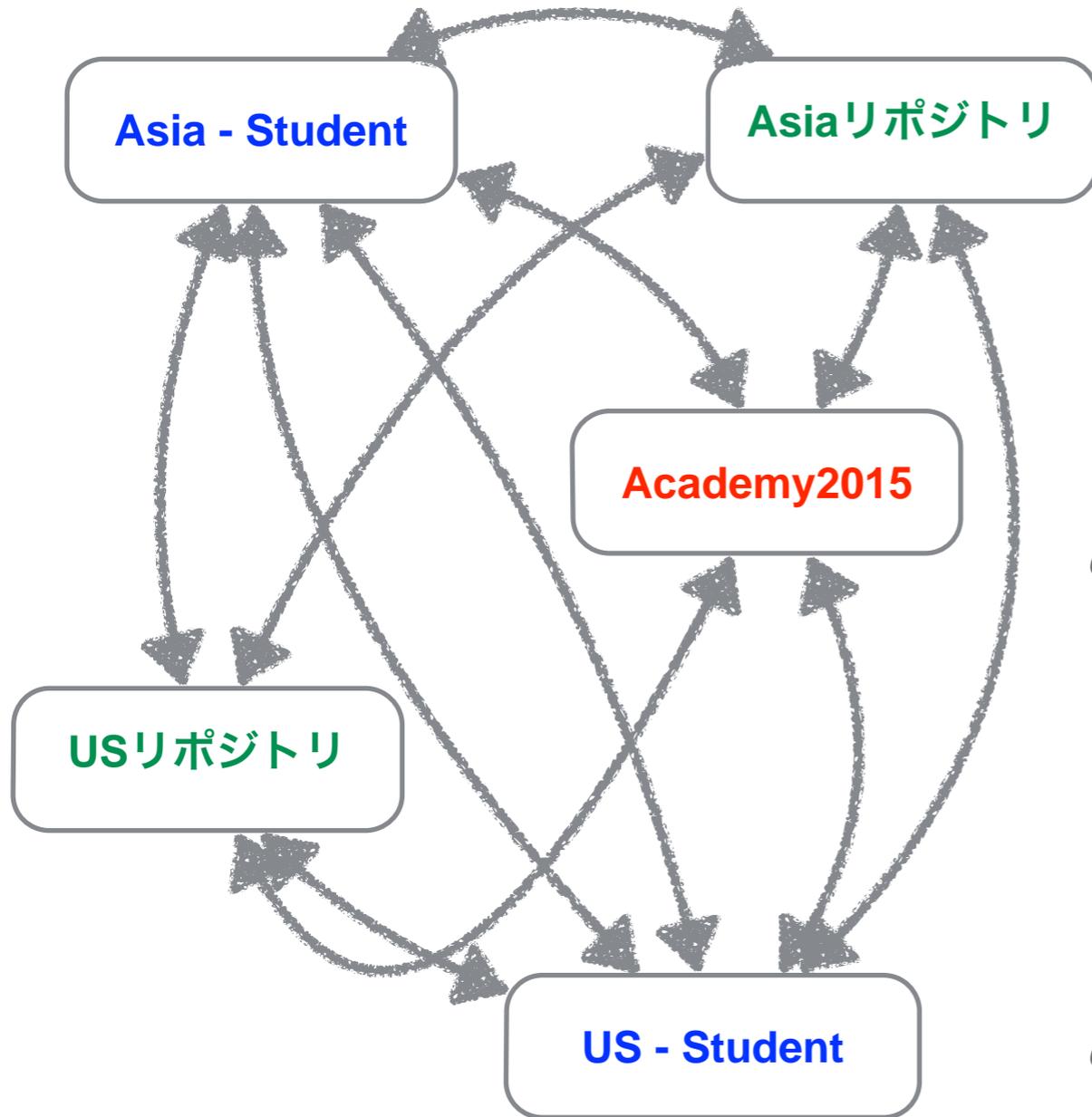
ルール

- 基本ミュート
- 回線1Mbps以上

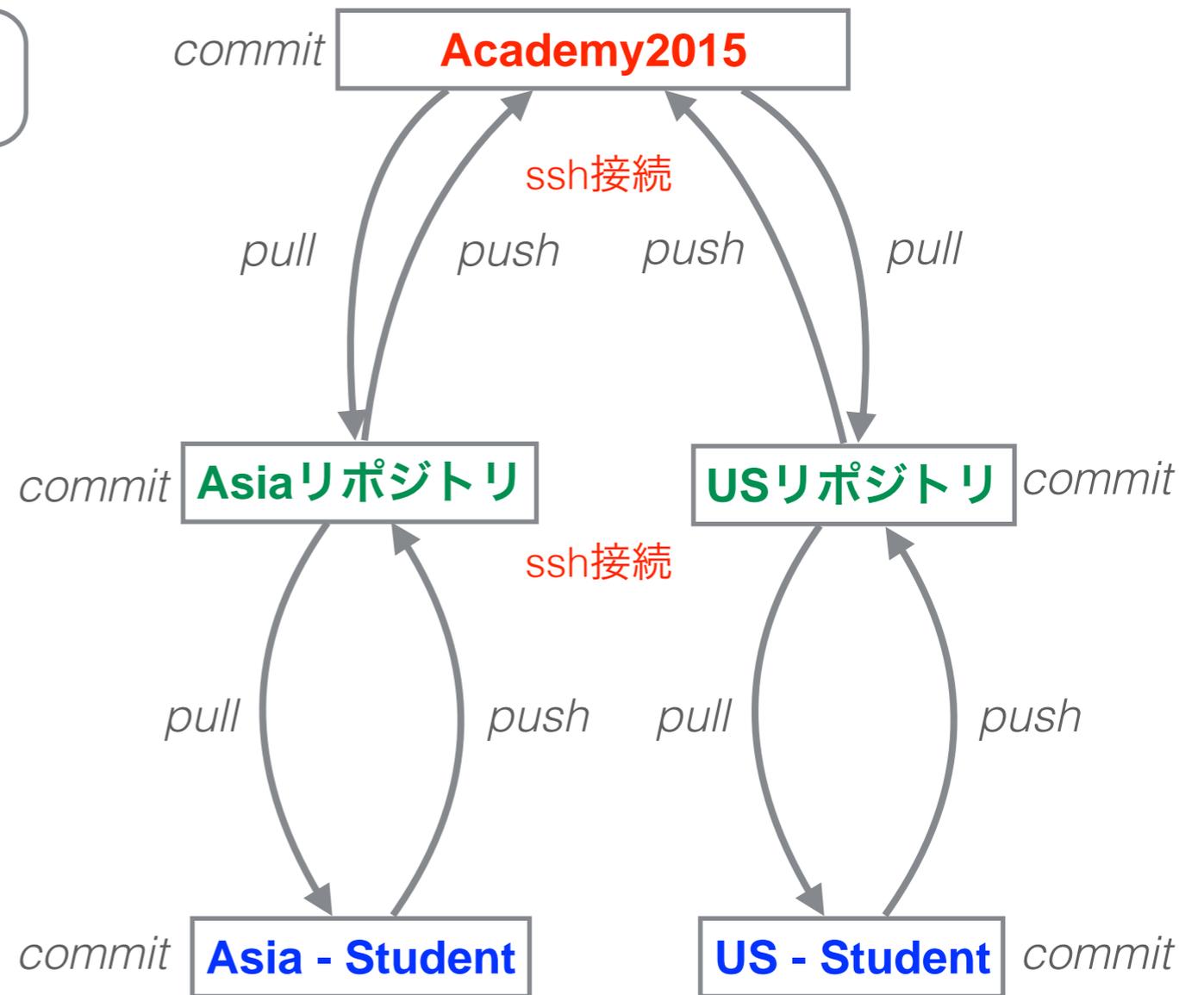


Mercurial - 分散型バージョン管理システム

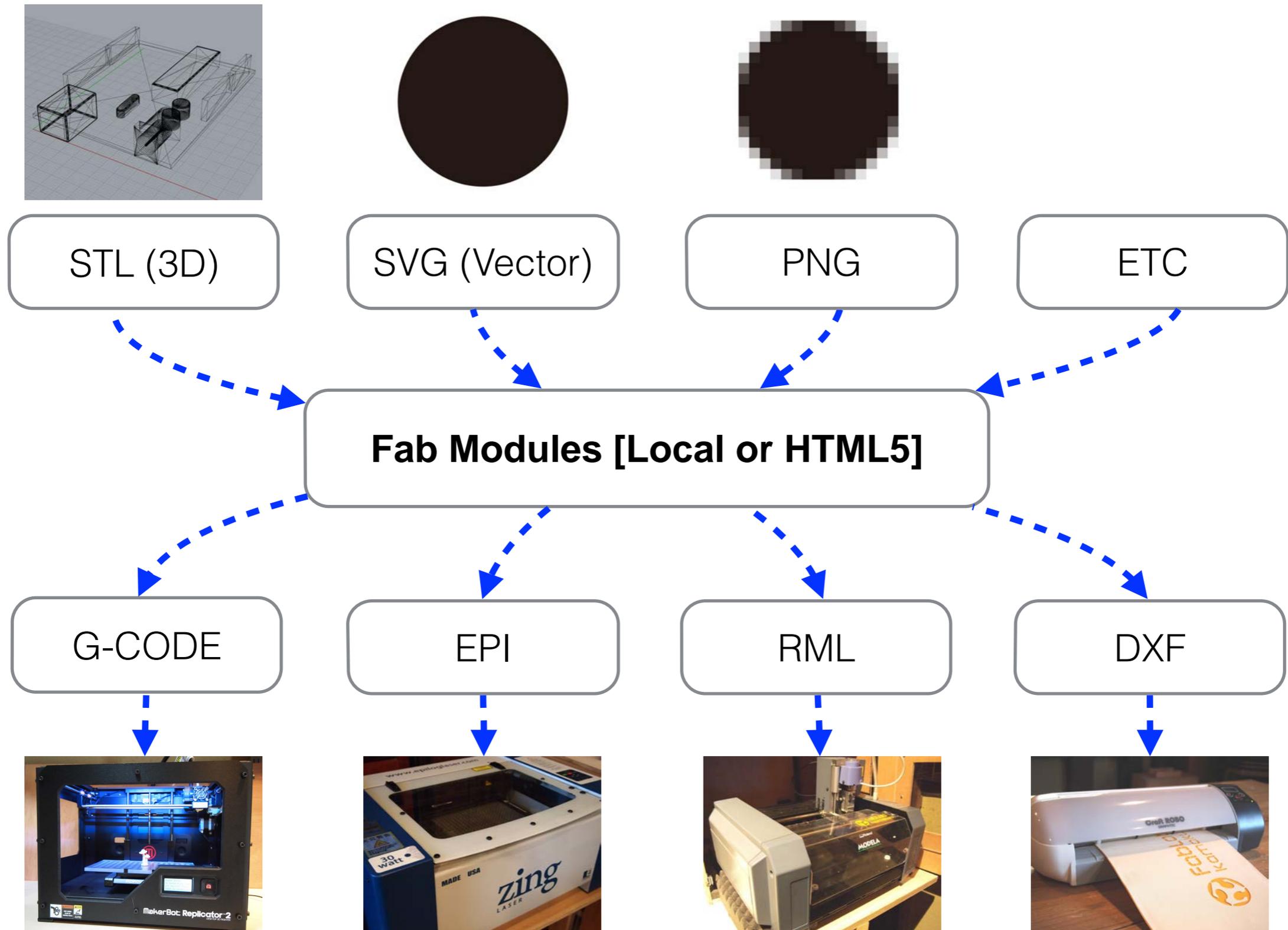
概念図



フロー



Fab Modules - 統合型CAMツール



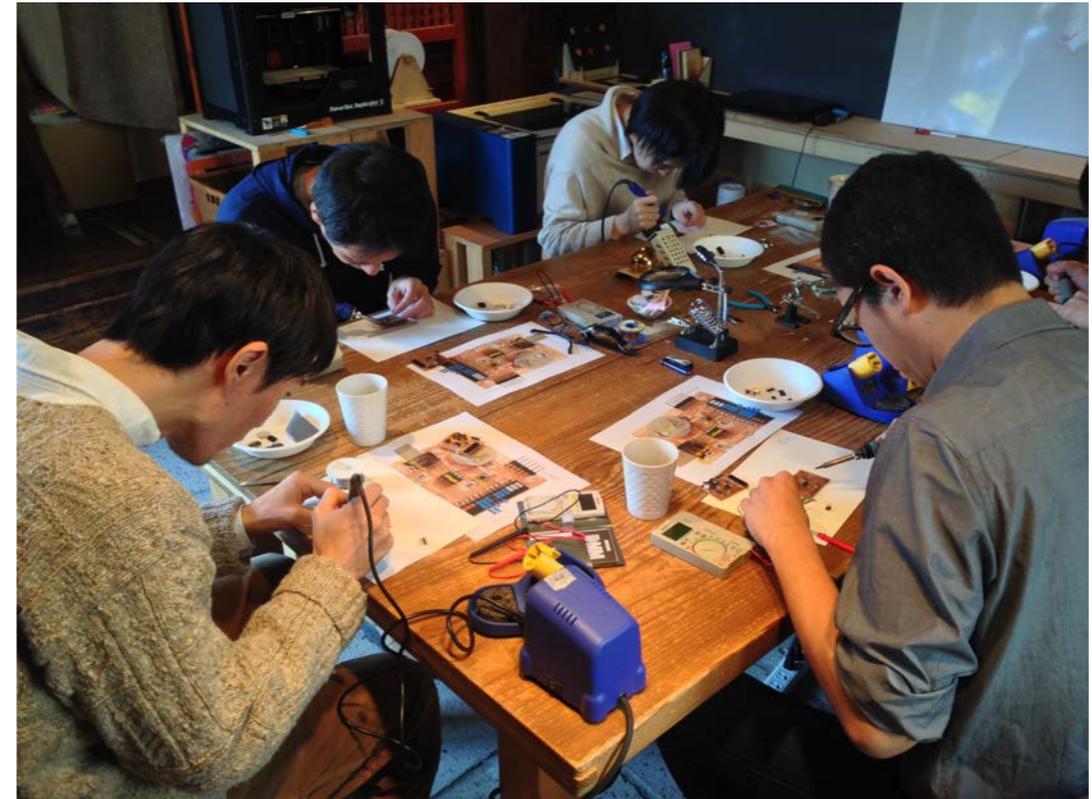
2015年 - 日本からのFab Academy参加

- 参加人数：4名
- バックグラウンド
 - 美術家：ファブラボ北加賀屋
 - エンジニア：ファブラボ浜松
 - デザイナー：ファブラボ鎌倉
 - 大学研究員：ファブラボ鎌倉



IoT Creator養成講座(鎌倉)

- 開催場所：ファブラボ鎌倉
- 期間：10日間(3ヶ月)
- 人数：4名
- バックグラウンド：
 - 家電メーカー エンジニア
 - 通信会社 研究者
 - 印刷会社勤務
 - 経営コンサルタント
- [記録](#)



IoT Creator養成講座(山口)

- 開催場所：山口情報芸術センター
- 期間：6日間
- 人数：6名
- バックグラウンド：
 - 大学生:専攻(建築)
 - 大学生:専攻(分子生物学)
 - 大学院生(教育学部)
 - ラジオDJ(哲学科卒業)
 - 木工作家(オートマタ)
 - WEBデザイナー
- 記録
 - [チームA](#)
 - [チームB](#)
 - [チームC](#)

