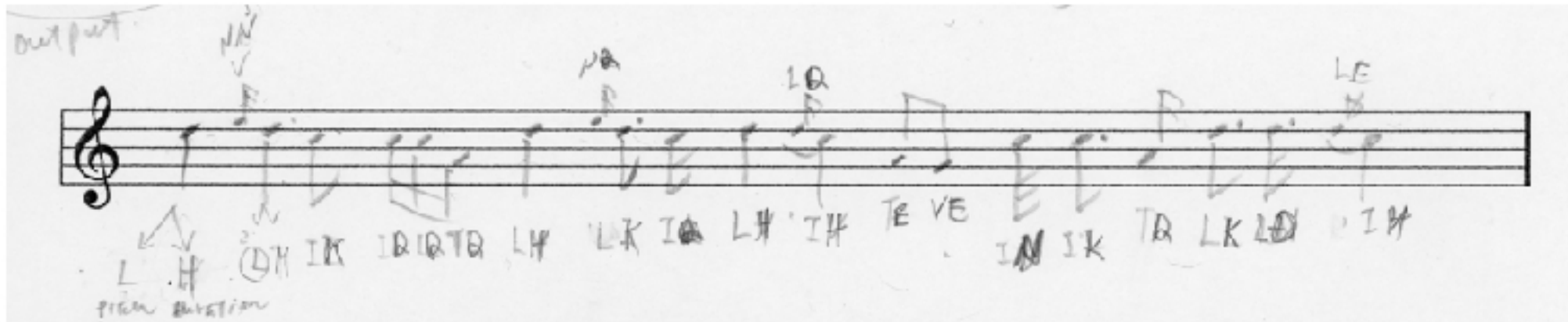


**biohack  
academy**



# Music DNA encoding

## 1. 音楽をDNA塩基配列に変換 Encoding Music to DNA Sequence

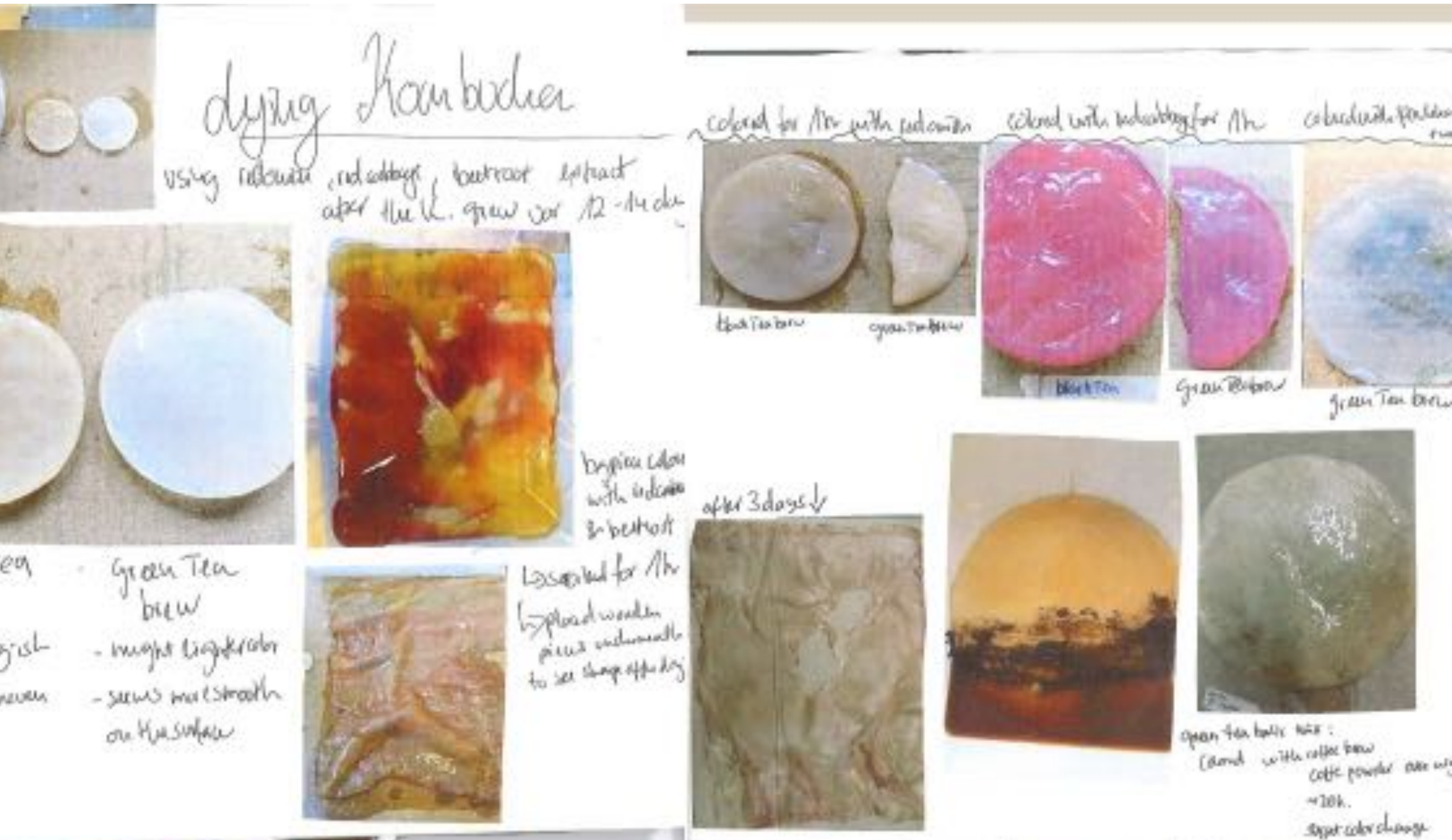


Note No.	1		2		3		4		5		6	
	Pitch (Frequency)	Duration	Pitch (Frequency)	Duration	Pitch (Frequency)	Duration	Pitch (Frequency)	Duration	Pitch (Frequency)	Duration	Pitch (Frequency)	Duration
Pitch/Duration	D5	1/4	F5	1/32	D5	1/4-1/8	C5	1/8+1/16	C5	1/16	C5	1/16
Amino Acid -	L - 1	H - 1	N - 1	N - 2	L - 2	M - 1	- 1	K - 1	I - 2	Q - 1	I - 3	Q - 2
DNA codon	TTA	CAT	AAT	AAC	TTG	ATG	ATT	AAA	ATC	CAA	ATA	CAG

TTACATAATAACTTGATGATTAAAATCCAAATACAG...



# Experimenting with biomaterials







# Growing your own Paper







# Build your own race tracks







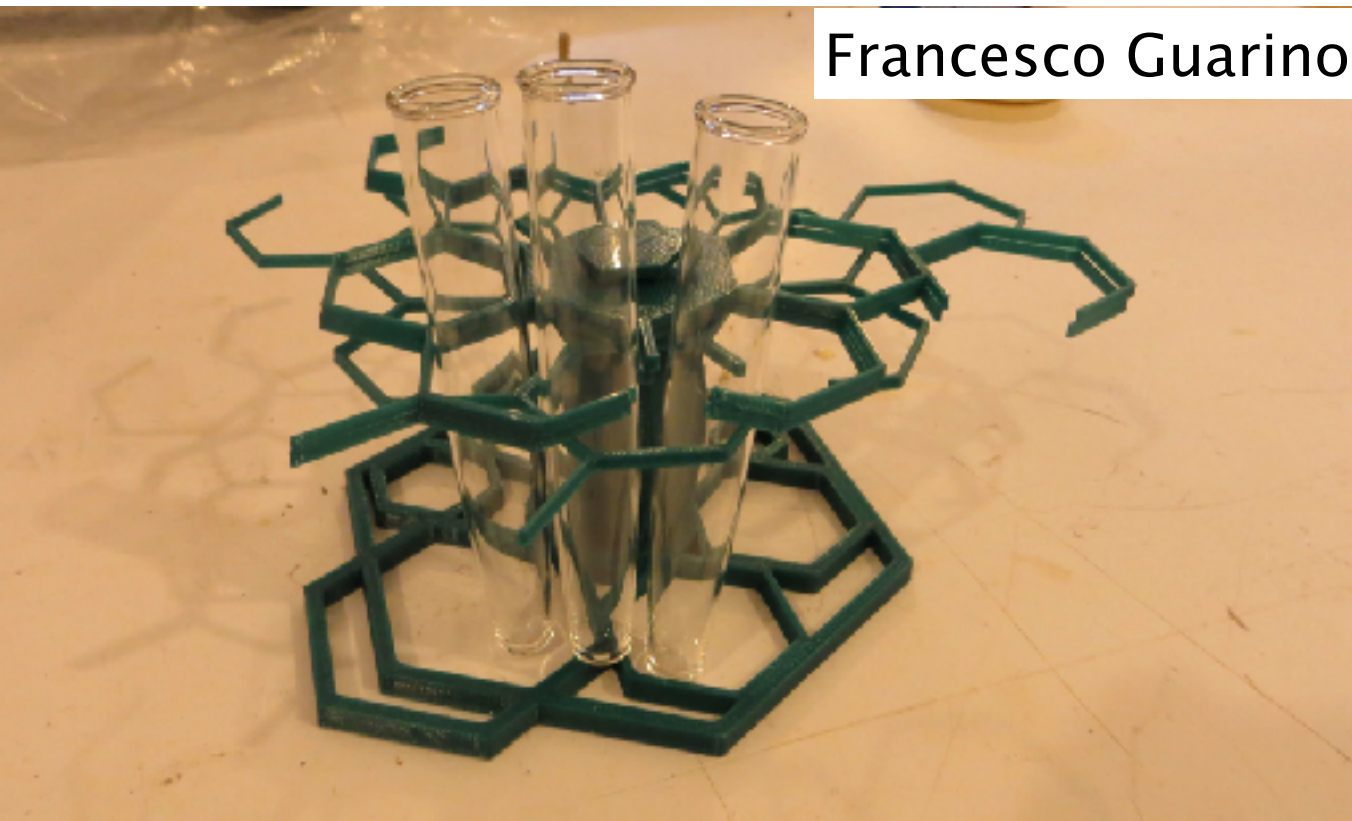
# DIY Biohack Academy kit



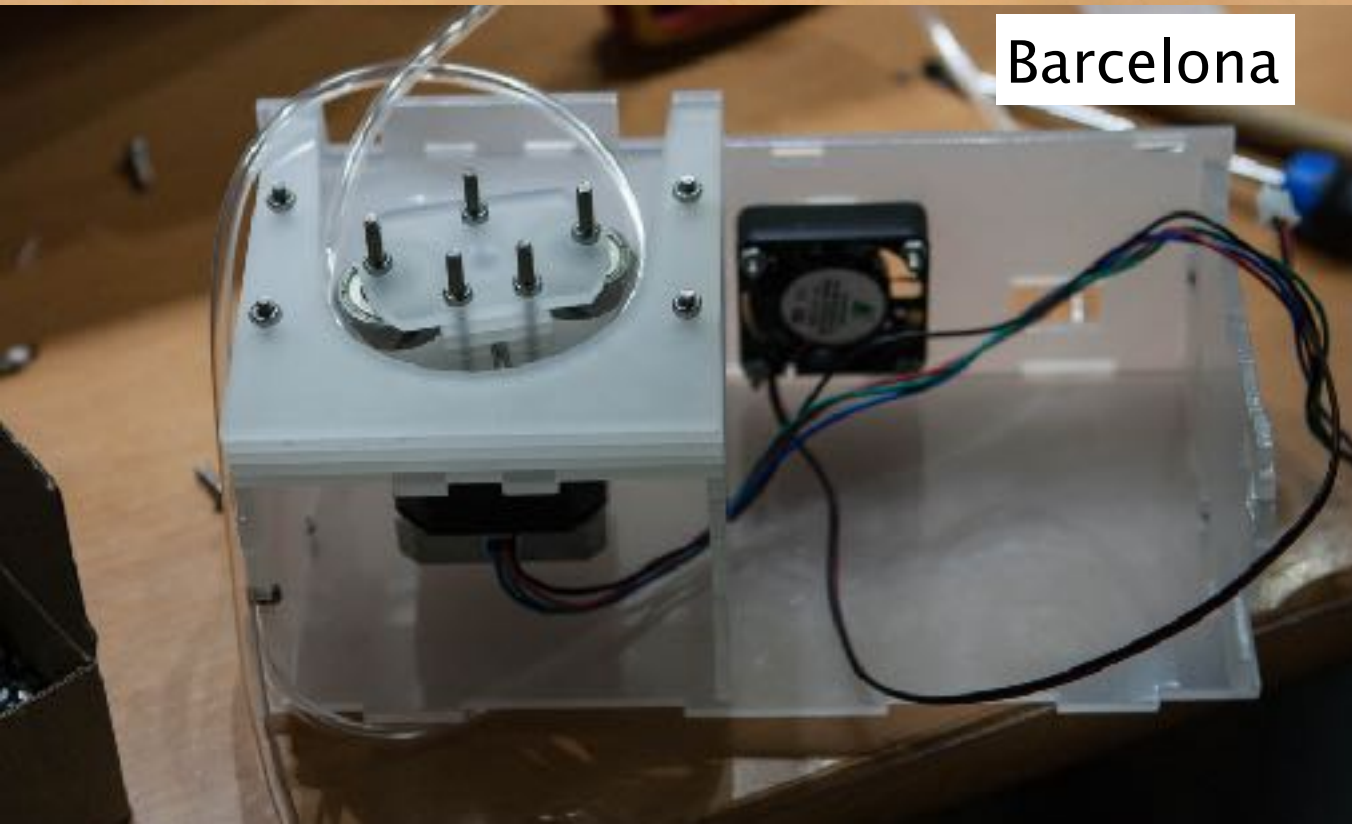




# Invent new lab tools



Francesco Guarino



Barcelona



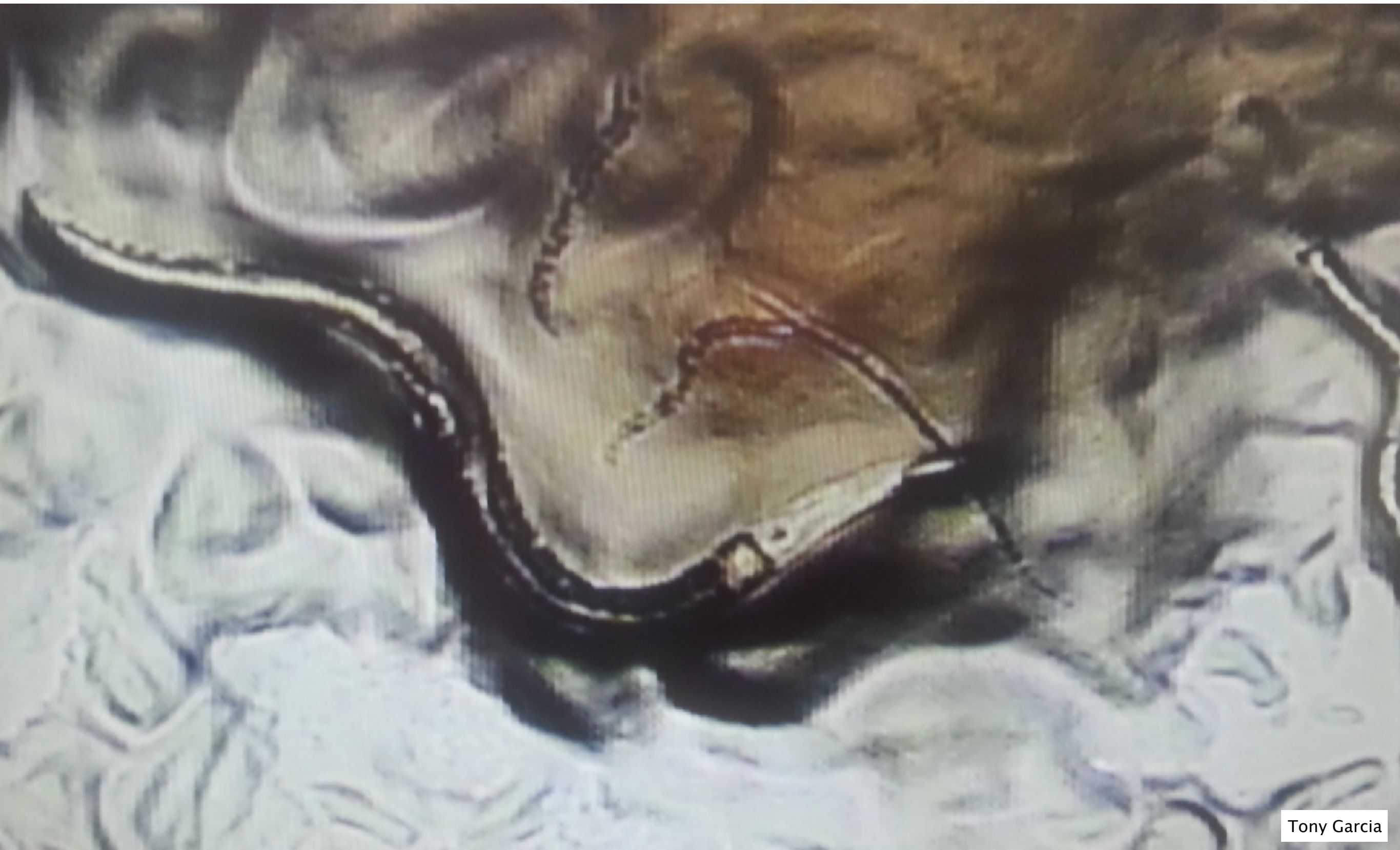
Tamara Hoogeweegen

*in·cu·ba·tio*





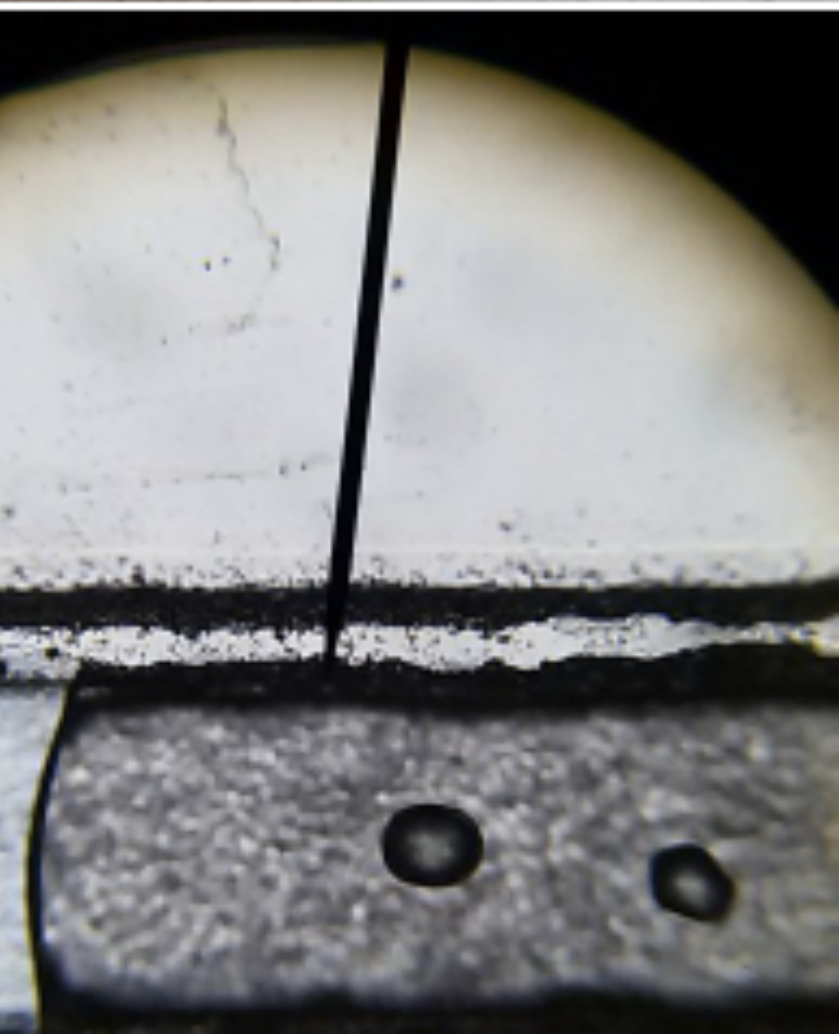
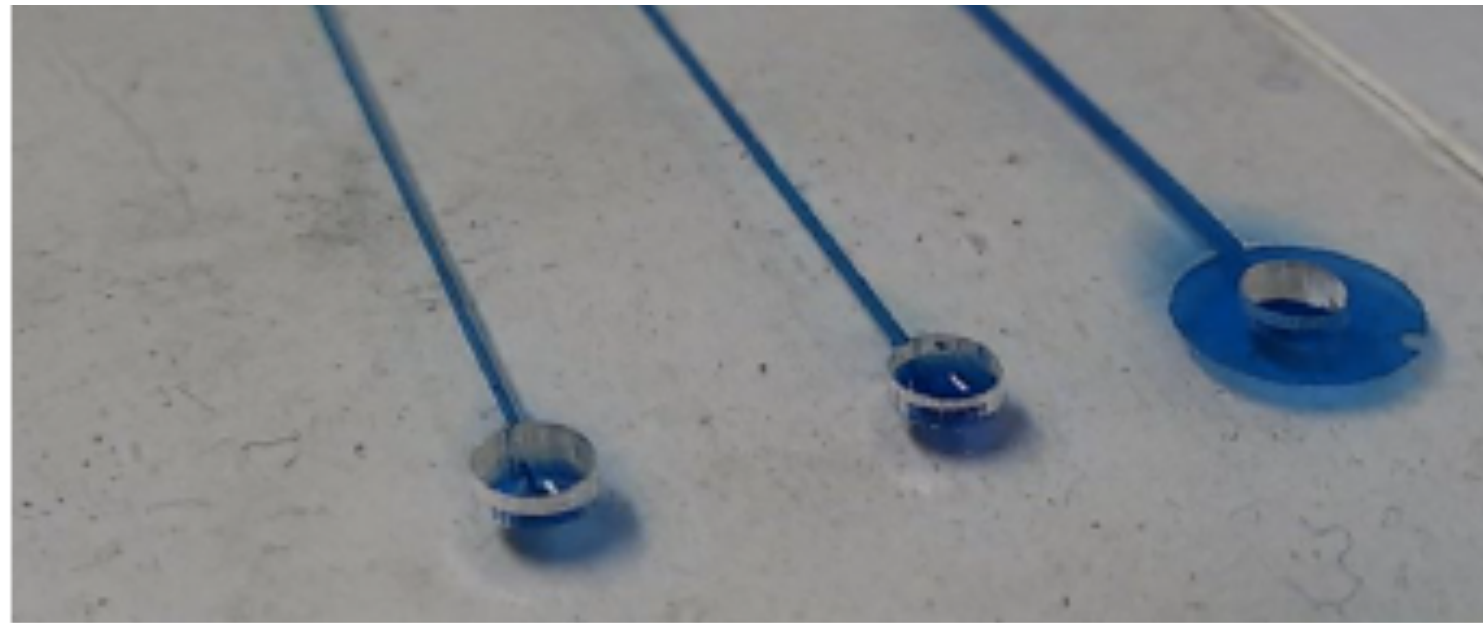
# Search for longevity







# Experiment with microfluidic chips







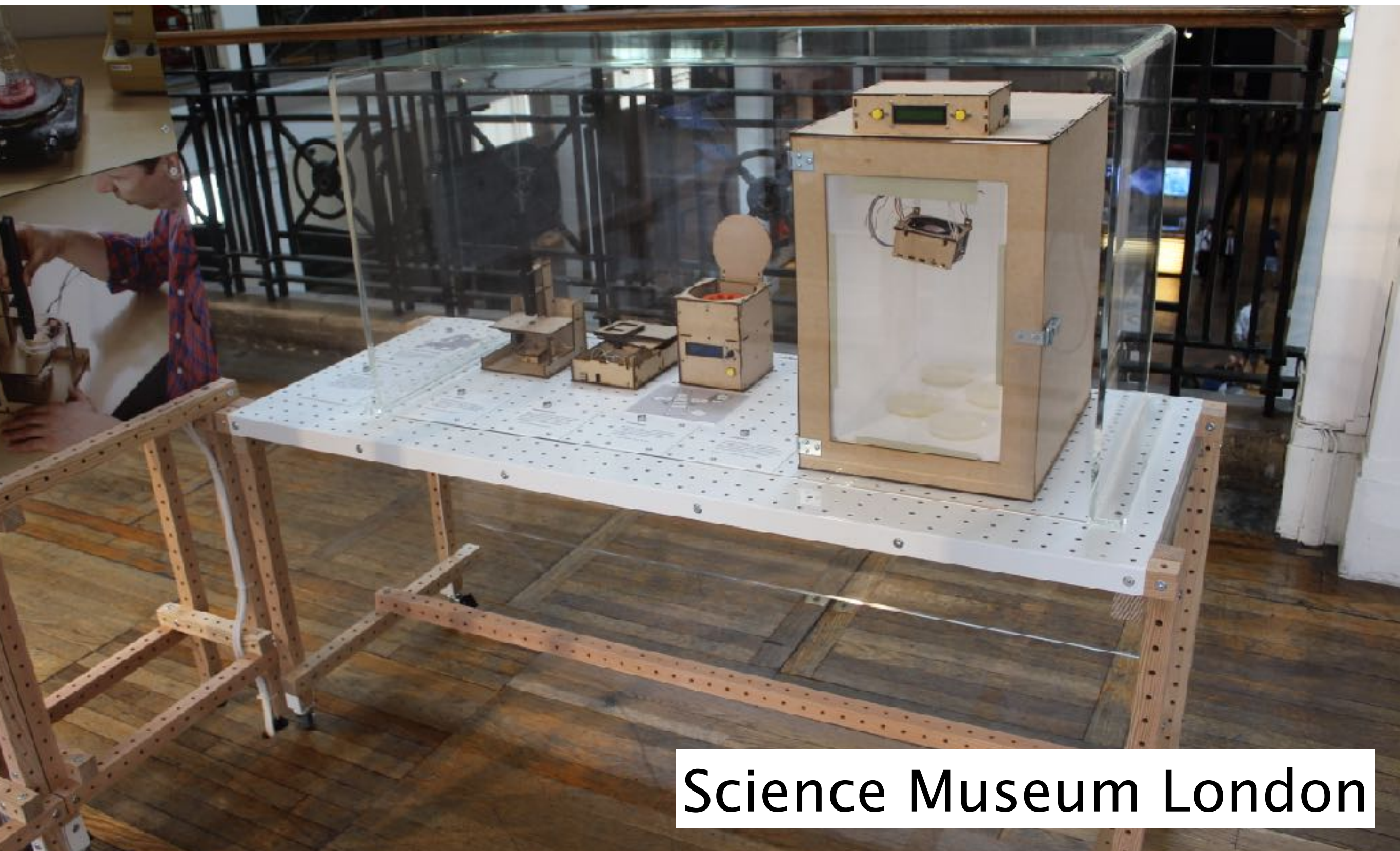
# Video track plant growth







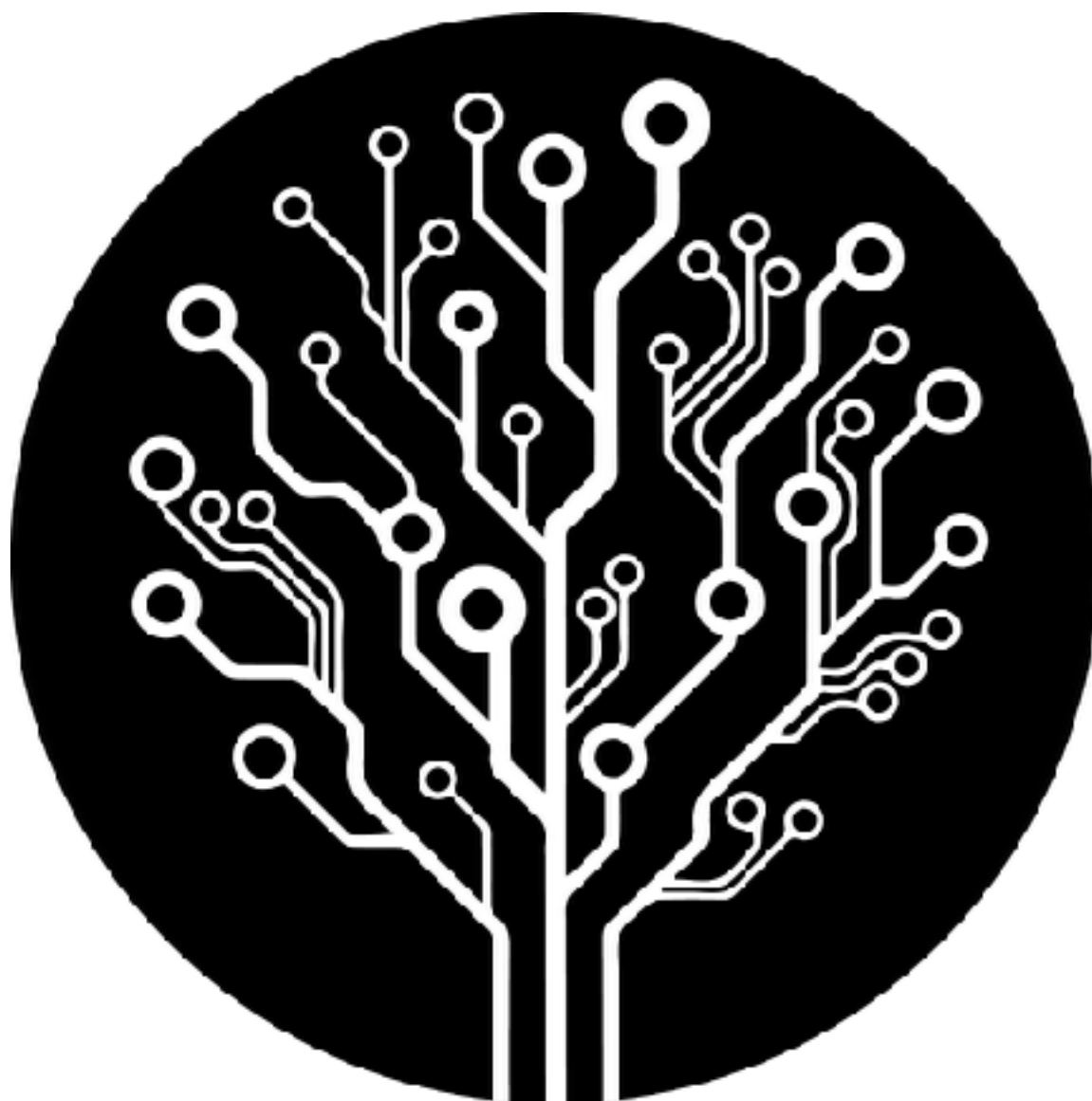
End up in galleries & museums



Science Museum London



Welcome – 欢迎 – ようこそ – 환영



**biohack  
academy**





# BioHack Academy Partner labs





# Today's schedule

- Introduction
- History of Biohacking
- Biosafety
- 3D design tools
- Sterile hood design





# The Challenge

**Build your lab**

**Use it**

**Share it**



# Build a lab



biohack academy  
waag society

## Open Source BioHack Kit



Plz fork, hack and share  
[github.com/BioHackAcademy](https://github.com/BioHackAcademy)





# Everything Open Source



This repository Search

Pull requests Issues Gist



BioHackAcademy / BHA\_Stirrer

Unwatch 4

Star 2

Fork 7

Code

Issues 0

Pull requests 0

Projects 0

Wiki

Pulse

Graphs

Settings

BioHack Academy Magnetic Stirrer

Edit

14 commits

2 branches

1 release

1 contributor

GPL-2.0

Branch: master

New pull request

Create new file

Upload files

Find file

Clone or download

PieterVanBoheemen BHA4 update

Latest commit ed9670a on Dec 16, 2016

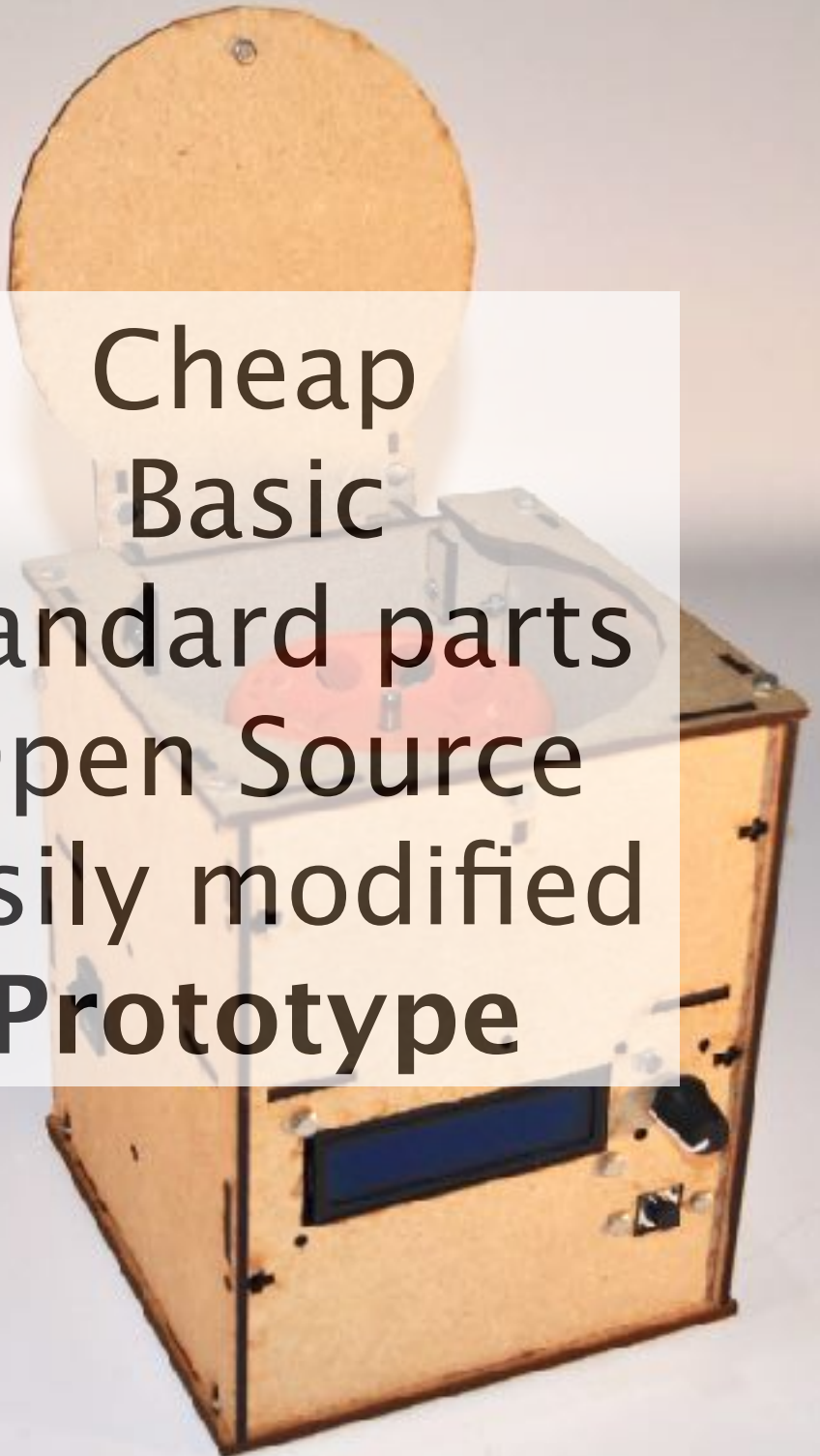
Pictures	pictures + assembly guide	11 months ago
BoM.md	BHA4 update	2 months ago
LICENSE	init	2 years ago
Magnetic Stirrer-Cut-Sheet.svg	BHA4 update	2 months ago
Magnetic-Stirrer-Fritzing.fzz	BHA4 update	2 months ago
Magnetic-Stirrer-Sketchup.skp	BHA4 update	2 months ago
README.md	BHA4 update	2 months ago
Stirrer-Assembly.pdf	pictures + assembly guide	11 months ago

README.md

## BHA Stirrer



# The difference

A custom-built wooden centrifuge prototype. It features a square wooden base with a digital display and control knobs on the front. A circular wooden lid is hinged on top, and a red motor is visible inside the base.

Cheap  
Basic  
Standard parts  
Open Source  
Easily modified  
**Prototype**

An Eppendorf Centrifuge 5418. It is a white, compact, and professional-looking centrifuge with a clear lid. The front panel has a digital display showing '5073' and several control buttons. The Eppendorf logo and model number are visible on the bottom right.

Robust  
Tested  
Safe  
Idiot proof  
Warranty  
**Daily use**





# Use your lab



Waag Society - CC-BY-SA 4.0



Waag Society - CC-BY-SA 4.0



Waag Society - CC-BY-SA 4.0

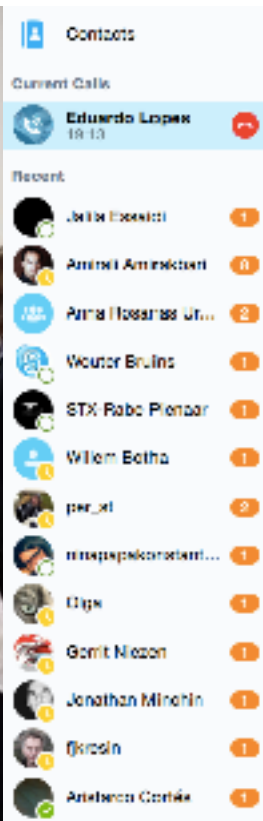


Future Everything - CC-BY-SA 3.0

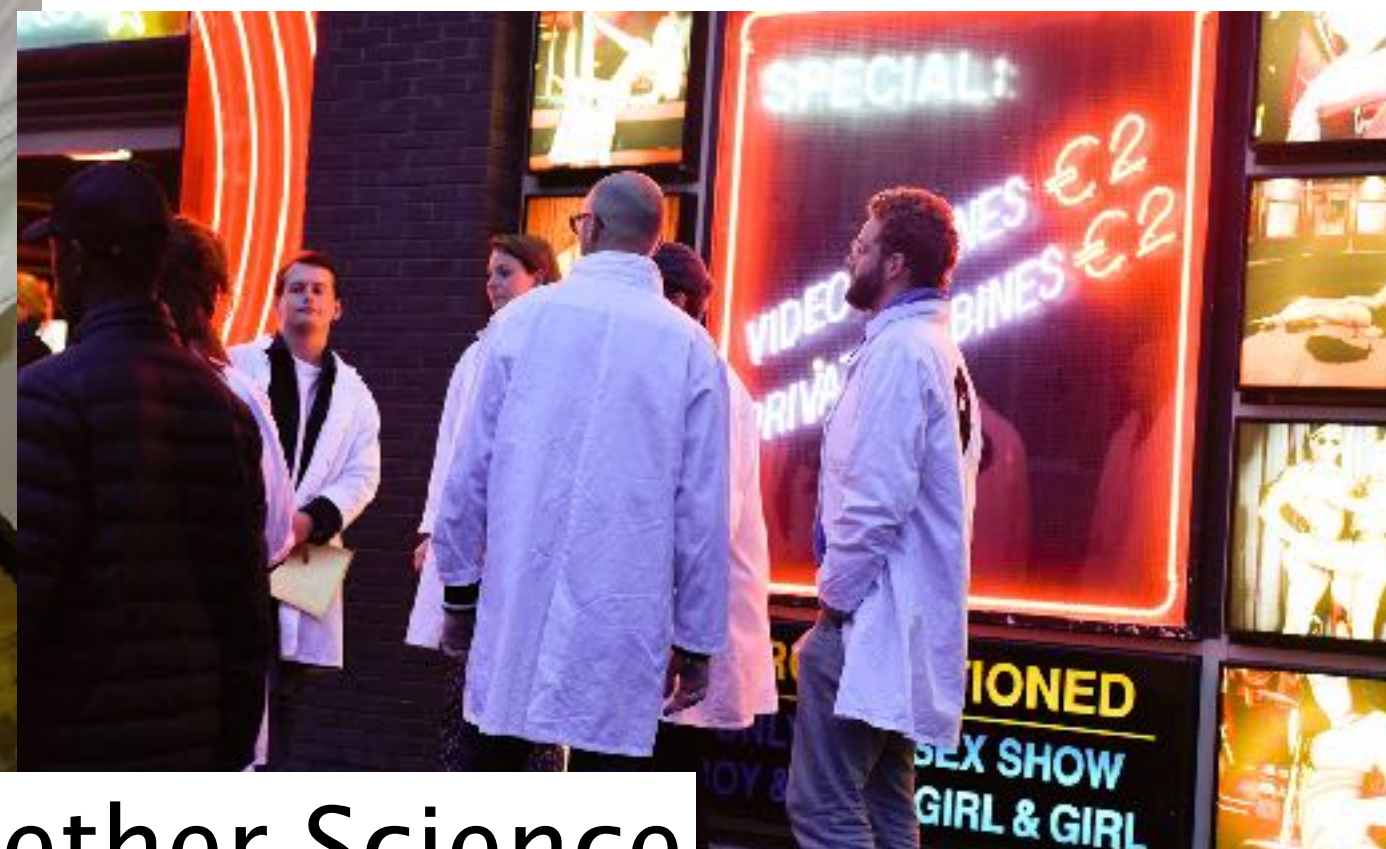




# Share it



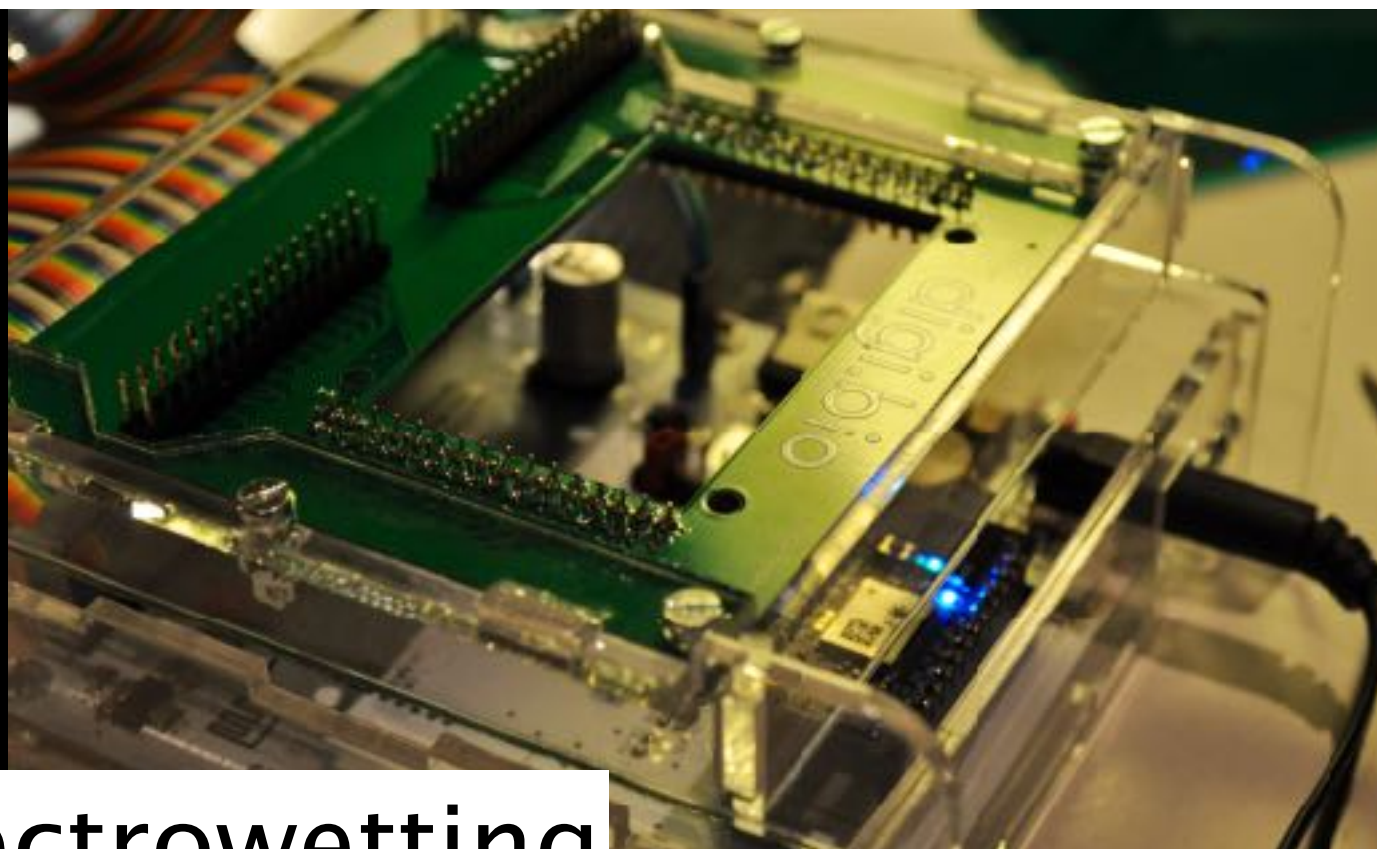




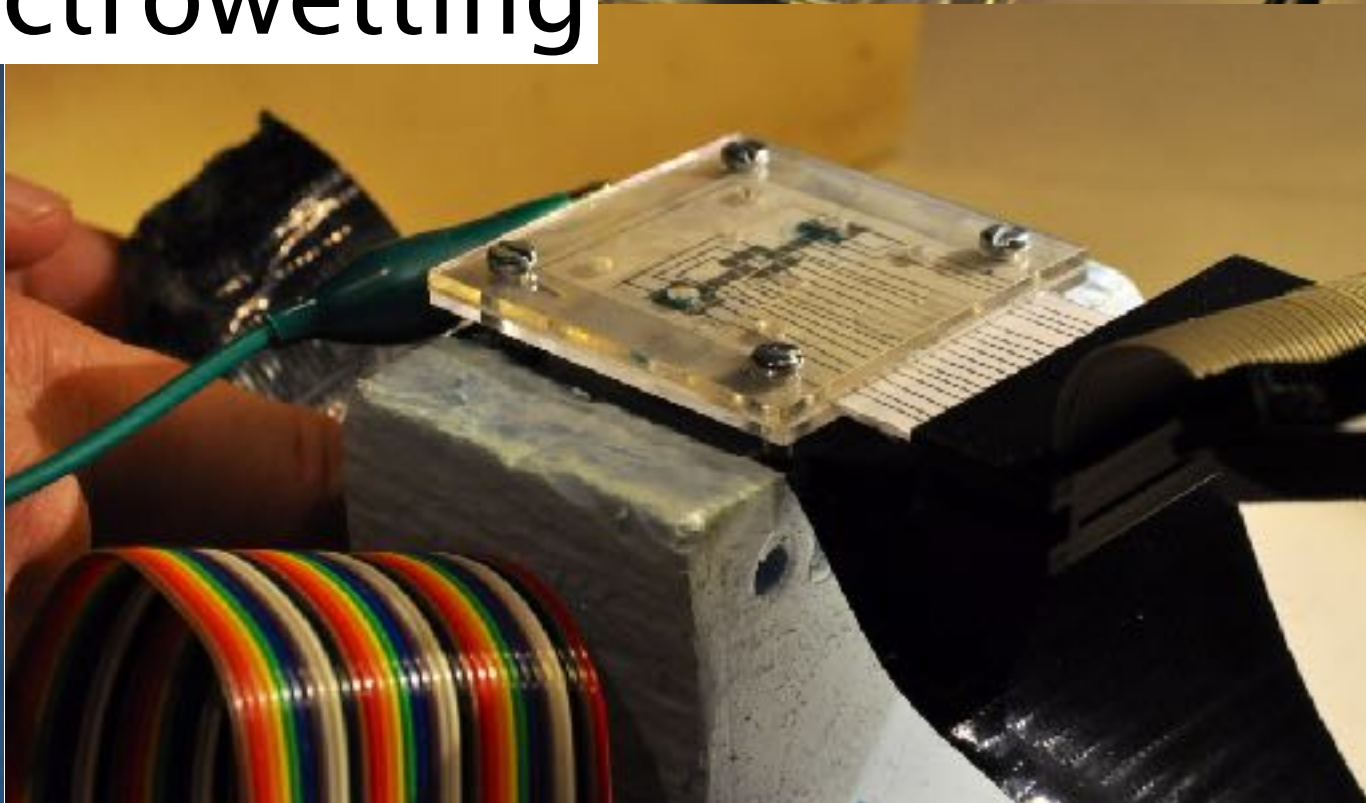
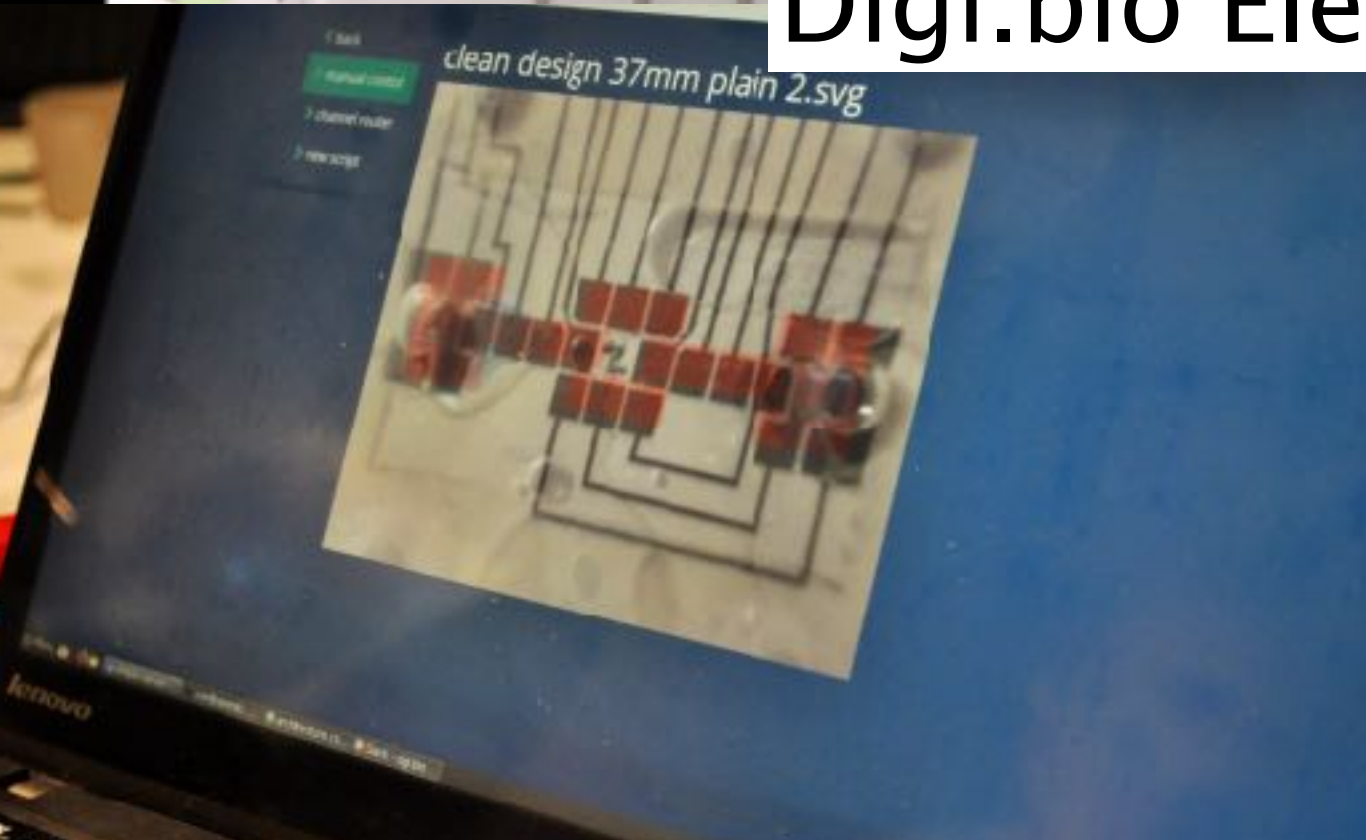
# Doing It Together Science







## Digi.bio Electrowetting







# The goal of this Academy

## **Skills you will learn:**

- Microbiology
- Molecular biology
- Biotechnological reactor design
- Biorefinery
- Spectral analytics
- Bio informatics
- Analog electronics
- AVR microprocessor programming
- 3D drawing and parametric design
- 2D computer aided design
- 3D printing
- Open design licensing
- Chemical and biological safety

## **Tools you will learn to use:**

- All the tools you will build yourself
- Lasercutter
- 3D printer
- Arduino processing language
- OpenSCAD & FreeCAD 3D modeling
- Sketchup 3D modeling
- Fritzing electronic circuit design
- Inkscape 2D design
- Markdown language
- Github



# The Team



Pieter van Boheemen



Xiamyra Daal



Lucas Evers



Wieke Betten





# Schedule: Classes

1	Introduction	Jan 31
2	Microbiology	Feb 7
3	Physiology & Electronics	Feb 14
4	Biomaterials & Optics	Feb 21
5	Genetics	Feb 28
6	YOUR PROJECTS	March 7
7	Bioethics & Seperation techniques	March 14
8	Guest Speaker	March 21
9	Bioinformatics & Spectrometry	March 28
10	Graduation Show	April 4



# Schedule: Devices

1	Sterile Hood	Jan 31
2	Magnetic Stirrer	Feb 7
3	Incubator	Feb 14
4	Microscopes	Feb 21
5	Thermocycler & Gelbox	Feb 28
6	YOUR PROJECTS	March 7
7	Centrifuge	March 14
8		March 21
9	Spectrometer	March 28
10	Pumps & Bioreactor	April 4





# Schedule: Practicals

1	Digital Fabrication Device construction	Jan 31
2	Cultivating microbes	Feb 7
3	Arduino Microbe isolation	Feb 14
4	Microscopy Biotic Gaming	Feb 21
5	DNA fingerprinting Cloning	Feb 28
6	YOUR PROJECTS	March 7
7	P2P reviewing Chloroplast isolation	March 14
8	Spectrometry	March 21
9	PyMol	March 28
10	Final presentation	April 4



# Example schedule: Microbes

1		Jan 31
2	Cultivation	Feb 7
3	Isolation	Feb 14
4	Characterisation	Feb 21
5	DNA	Feb 28
6		March 7
7	Down stream processing	March 14
8	Spectral analytics	March 21
9	Bioreactor	March 28
10		April 4





# Weekly Project Meetings

Project meetings to discuss:

1. Develop your own project
2. Set up your own documentation site on Github;
3. Publishing progress;
4. Collaborations with peers;
5. Go through the assignment results;



# Syllabus

- <http://biohackacademy.github.io>
  - Lecture Slides
  - Lecture Videos
- Device blueprints, circuits and code
- Practical protocols
- Preparation





# Share! Facebook & Disquss

BioHack Academy

Pieter van Boheemen

Edit Profile

FAVORITES

- News Feed
- Messages
- Events
- BioHack Academy
- BioHack Academy

APPS

- Games
- Belote.com
- Belote Multijoueur
- Suggest Edits
- Pokes
- Saved
- Photos
- Find Friends

PAGES

- Fablab Amsterdam
- Pages Food
- Like Pages
- Create Page
- Create Ad

GROUPS

- Facebook Libera... 20+
- Create Group
- New Groups

EVENTS

- Create Event

BioHack Academy

Public Group

Joined

Share

Notifications

...

Discussion

Members

Events

Photos

Files

Search this group

Write Post

Add Photo / Video

Create Poll

Add File

Write something...

RECENT ACTIVITY

Pieter van Boheemen changed the type of group: BioHack Academy to Study Group.

4 hrs

Like

Comment

Seen by 8

Write a comment...

Press Enter to post.

OLDER

Pieter van Boheemen made Xiammy Dee an admin.

7 hrs

Xiammy Dee

ADD MEMBERS

+ Enter name or email address...

MEMBERS

14 Members (6 new)

Message

Invite by Email

DESCRIPTION

Edit

BioHack Academy is a global 10 week course on creative biotechnology by Waag Society

GROUP TYPE

Study Group

TAGS

Add Tags

Add a few descriptive keywords.

GROUP CHATS

No group chats, start one now.

+ Start New Chat





**some  
rights  
reserved**

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Society under CC-BY-SA 4.0 license