



Welcome

Openness in the material practices and
performances of biohackers

by Rosen Bogdanov



OSI

Open Science and Innovation Research Group

**MEDIA
ACTIONS**

RESEARCH COLLECTIVE
ON DIGITAL MEDIA
& CULTURE

About me

HACKLAB

Martes de
19h a 21h
Viernes de
18h a 21h

colaboración
aprendizaje
DIY anarquía compartir
reciclaje opensource
4gatos
versatilidad
abierto
itinerante
hacktivismo
ácrata
p2p
liberación

<https://4gatos.blackblogs.org>

Nos encuentras en el
ELI La Clandestina
Passatge del Dos de Maig 14
Barcelona



DIY BIO BARCELONA

AN OPEN WETLAB

So...



open science



Science studies & Open science

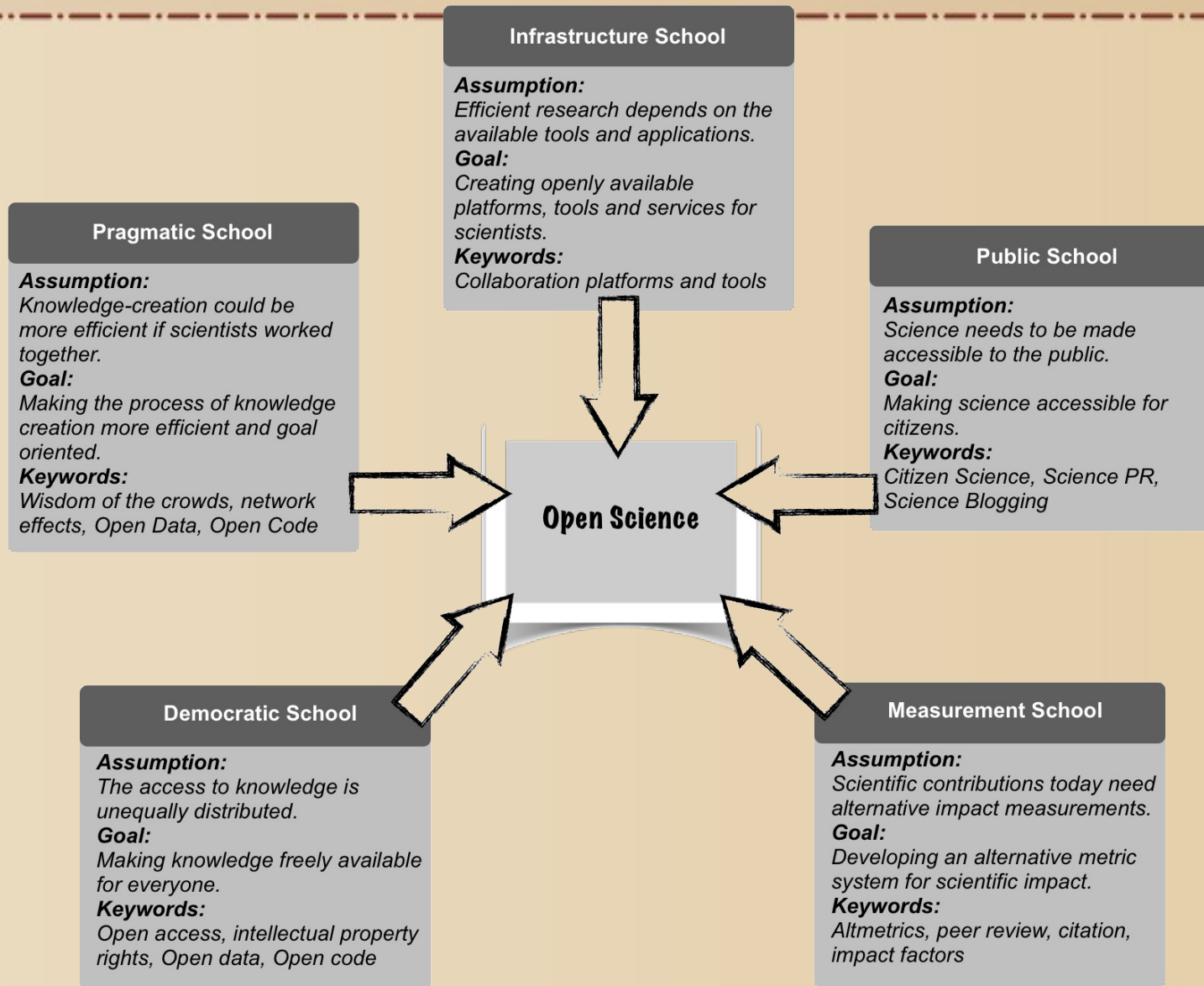


*...the rapid disclosure of knowledge and/or inventions
by scientists for the further advancement of science
and for the achievement of better scientific objectivity*

(Paul A. David 1998)




Open science today



Open science today



- An umbrella term, NOT a single precise concept
 - *Includes almost any dispute about the future of knowledge creation and dissemination* (Fecher and Friesike, 2014):
 - Citizen science
 - Collaborative digital science (Science 2.0)
 - Open Access and Open Data
 - Altmetrics
 - Depends on the practices of its relevant advocates
 - *Openness in open science is socially and materially constructed*
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Biohackers



DIYBio:

DIYbio is an organization dedicated to making biology an accessible pursuit for citizen scientists, amateur biologists, and DIY biological engineers who value openness and safety.

Hackteria:

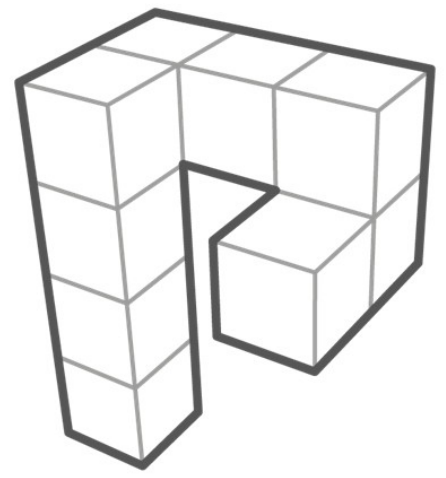
A global network for open-source biological art working through a radical transdisciplinarity approach



European Biohackers



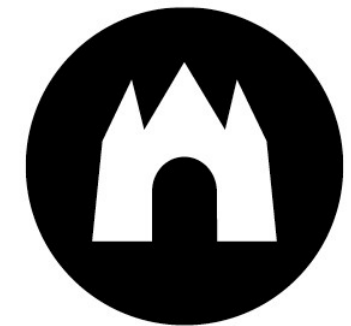
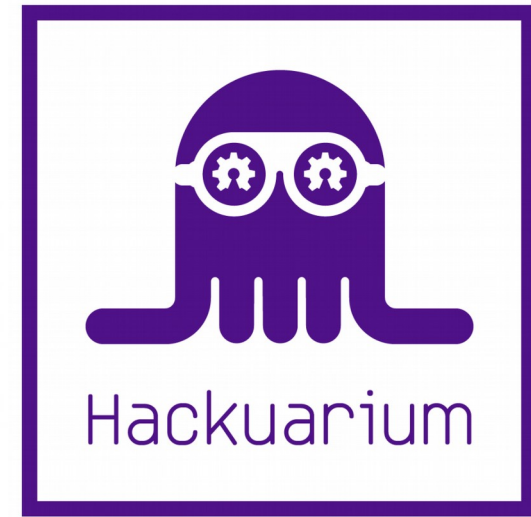
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LA PAILLASSE



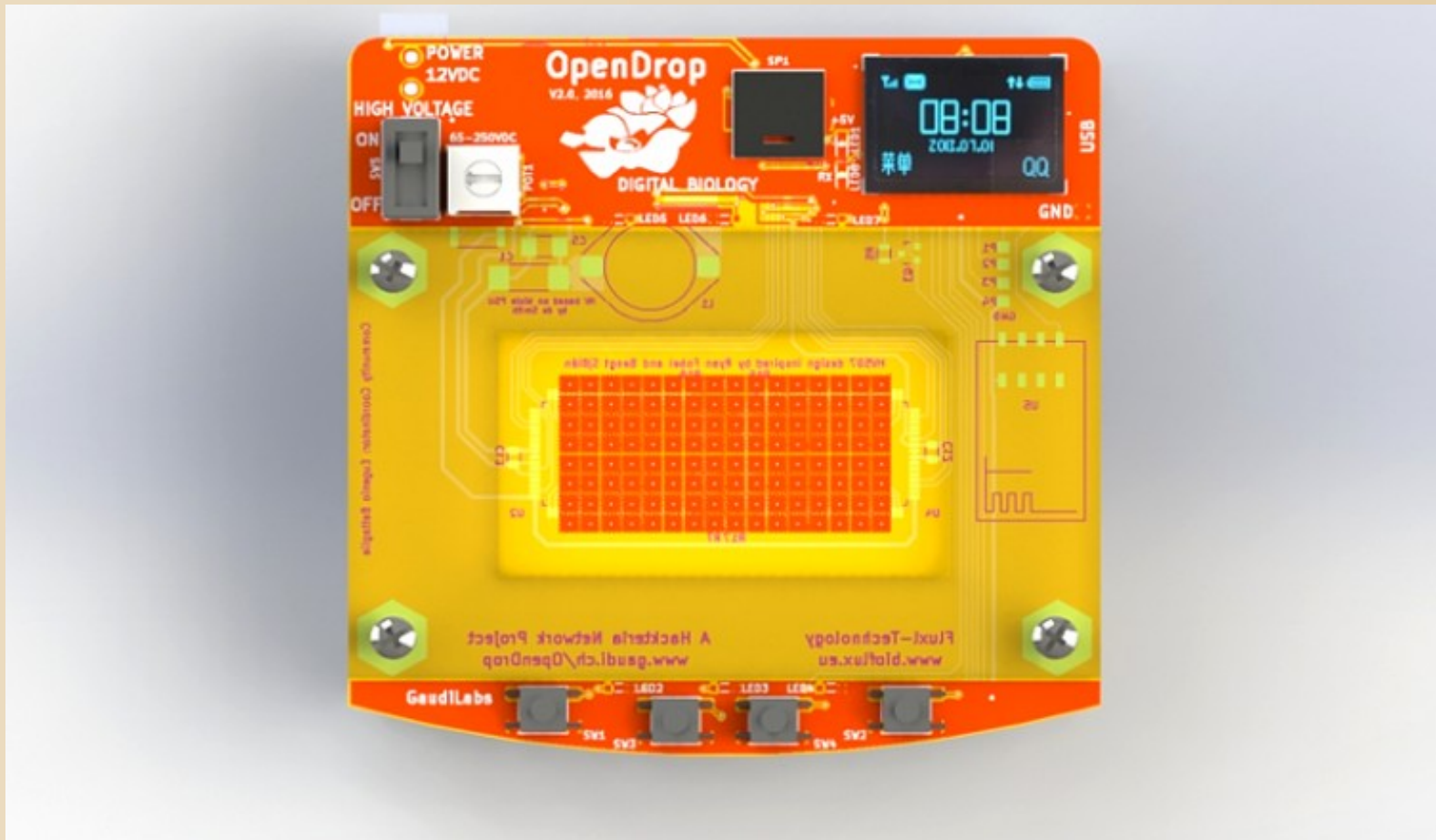
**BIO
HACKLAB**



waag society

European Biohackers

OpenDrop



European Biohackers



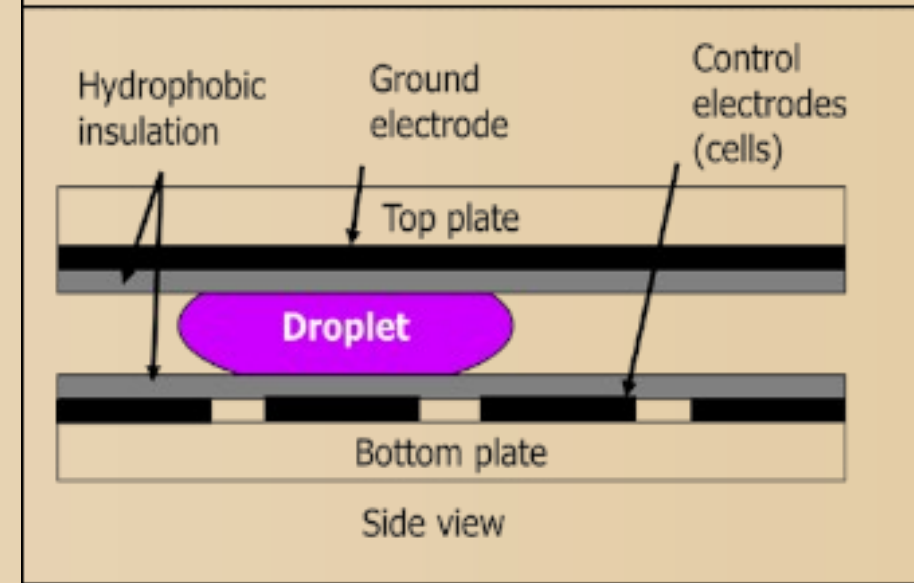
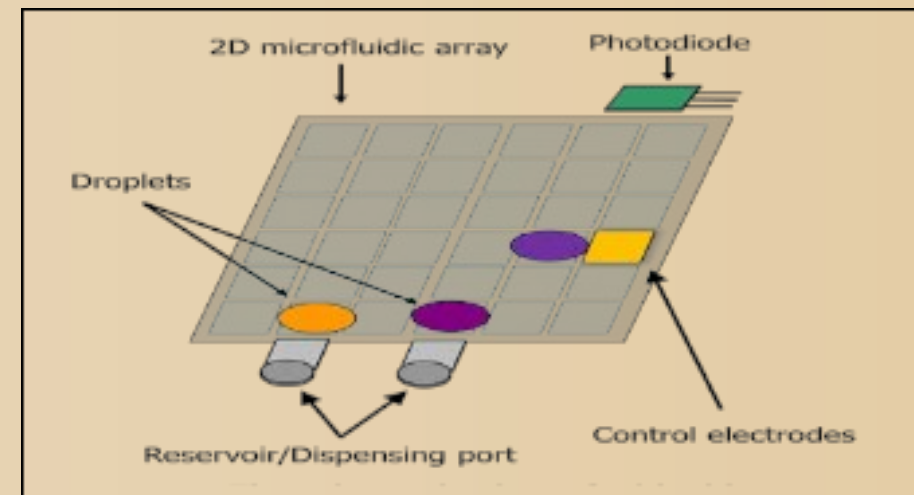
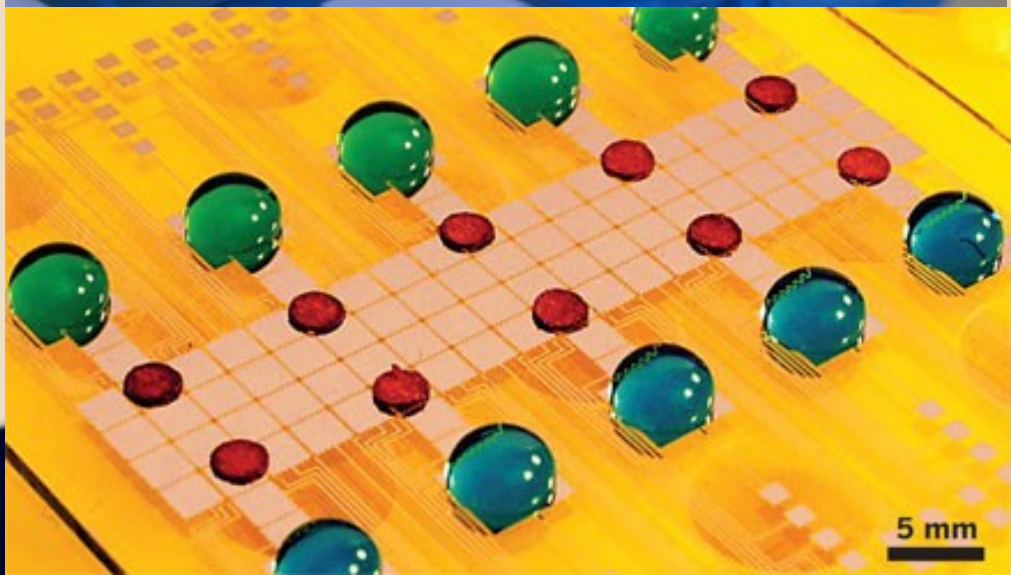
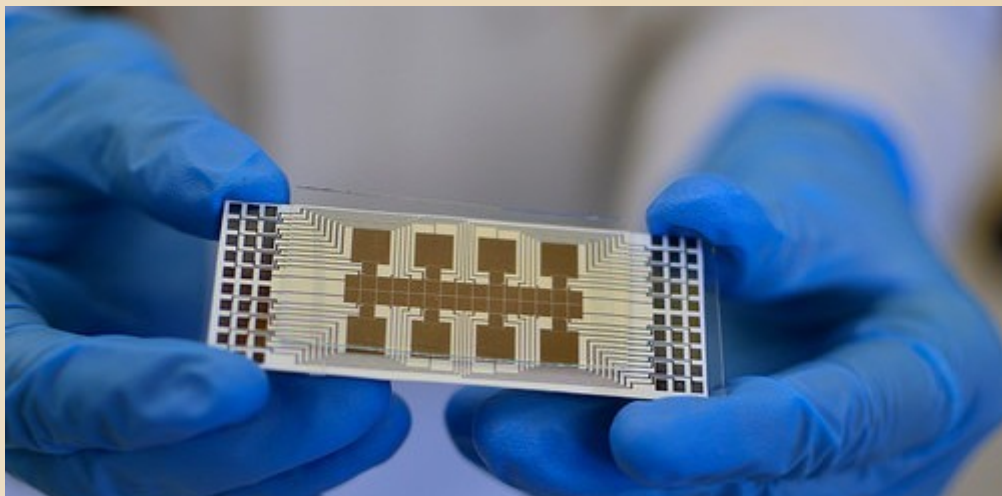
OpenDrop

- A digital microfluidics device
- Development process
 - Concept developed in 2015 @ Biofilia, Base for Biological Arts
 - Version 2.0 developed at the *Bio-Commons Camp*
- Major concept artefact for the biohacking framework of *Digital Biology*



Digital Microfluidics

- Lab-on-a-chip technology for automating lab work (Li, Chen & Baker, 2014; Haeberle & Zengerle, 2007)



Digital Microfluidics

- *DropBot* – Open-source hardware @ University of Toronto (Fobel et al., 2013)



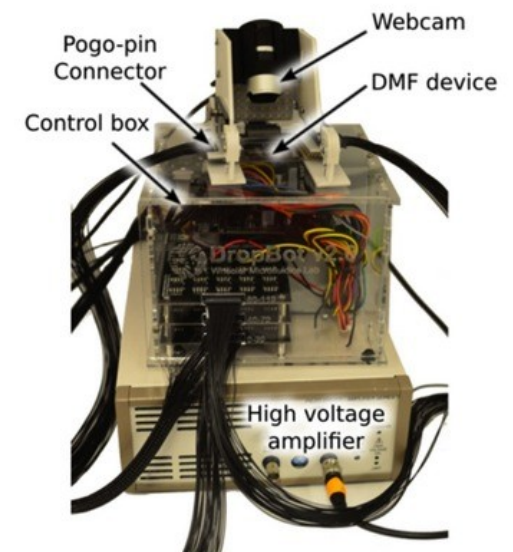
Home

News

Make it

DropBot is an open-source Digital Microfluidic (DMF) automation system developed in the [Wheeler Lab](#). It features a modular and extensible design, an intuitive user interface, and is capable of driving up to 320 independent channels. It also provides dynamic impedance sensing which enables closed-loop control and real-time measurement of:

- drop position
- instantaneous drop velocity
- electrostatic driving force



Digital [Biohacked] Microfluidics

- Make emerging biotechnology practices efficient for the public
- ! Example of “open science” in modern technoscience development
- Ease of collaboration between different scientists (professional & amateur)
- *A PC for biology – bio-protocols as popular recipes. E.g. - a cookbook for biology*


Digital Biology

- Public digitization of biology – turning bio-protocols to popular recipes.
- Simplification and automation of biotechnology, making it easier to operate
- Facilitating collaboration
- The governance of future biotechnology infrastructures and applications... *they need to be in the right hands!* [i.e. the commons]
- Co-construction of legal and material practices for “open science”

Development




Biofilia, Art and Science

- *Platform and infrastructure for transdisciplinary research and education [...] related to the manipulation of life and biological processes at a practical and theoretical level, including philosophical and ethical dimensions.*
 - *Fully equipped biological lab that is operated by an art school and based in an electrical engineering building.*
- 

Development



- European agenda of participation and public engagement since at least 1990s – more funding, more institutions, more policies → more art-science. E.g. *European Digital Art and Science Network*
 - Bioart → Biohacking in Europe and the Global South [Synthetic Biology and start-up culture → Biohacking in the US]
 - *Openness in art and science as a public experiment* NOT a public informing, as in open access (Born and Barry, 2014) → it aims to open new knowledge to new locations, persons and things that did not exist before!
- 

Development


Bio-Commons Camp

- Community meeting of biohackers in Europe
- Bio-commons license – a license for working with living organisms as a commons
- Bio-strike – citizen science antibiotics discovery
- *Intersection of legal, citizen science and hacker practices*

Development



→ **OpenDrop v2.0**

- GaudiLabs (CH), Critical Engineering Working Group (SE), Hackteria (CH), Bioflux (DE) & Waag Society (NL)
 - AutoCad– to KiCAD–based designs → access to development
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Development

→ **OpenDrop v2.0**

- GaudiLabs, Critical Engineering Working Group, Hackteria, Bioflux & Waag Society
- AutoCad– to KiCAD–based designs → access to development
- Wi-fi → connection with other versions or just other machinery
- Micro USB → work from the user's laptop
- Home-based synthesizer → making music out of lab automation
- OLED Display → game scenarios

Constructing Open[ness]Drop

- Public institutions and infrastructures for experimenting with citizen initiatives in lab automation
 - Distributed collaborative efforts at **physical spaces** [not just *The Internet*] with no single development team
- OpenDrop originated out of public experiment in open access, collaboration and transdisciplinarity
- *Community-based agenda of “open science”*

Thank you!

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