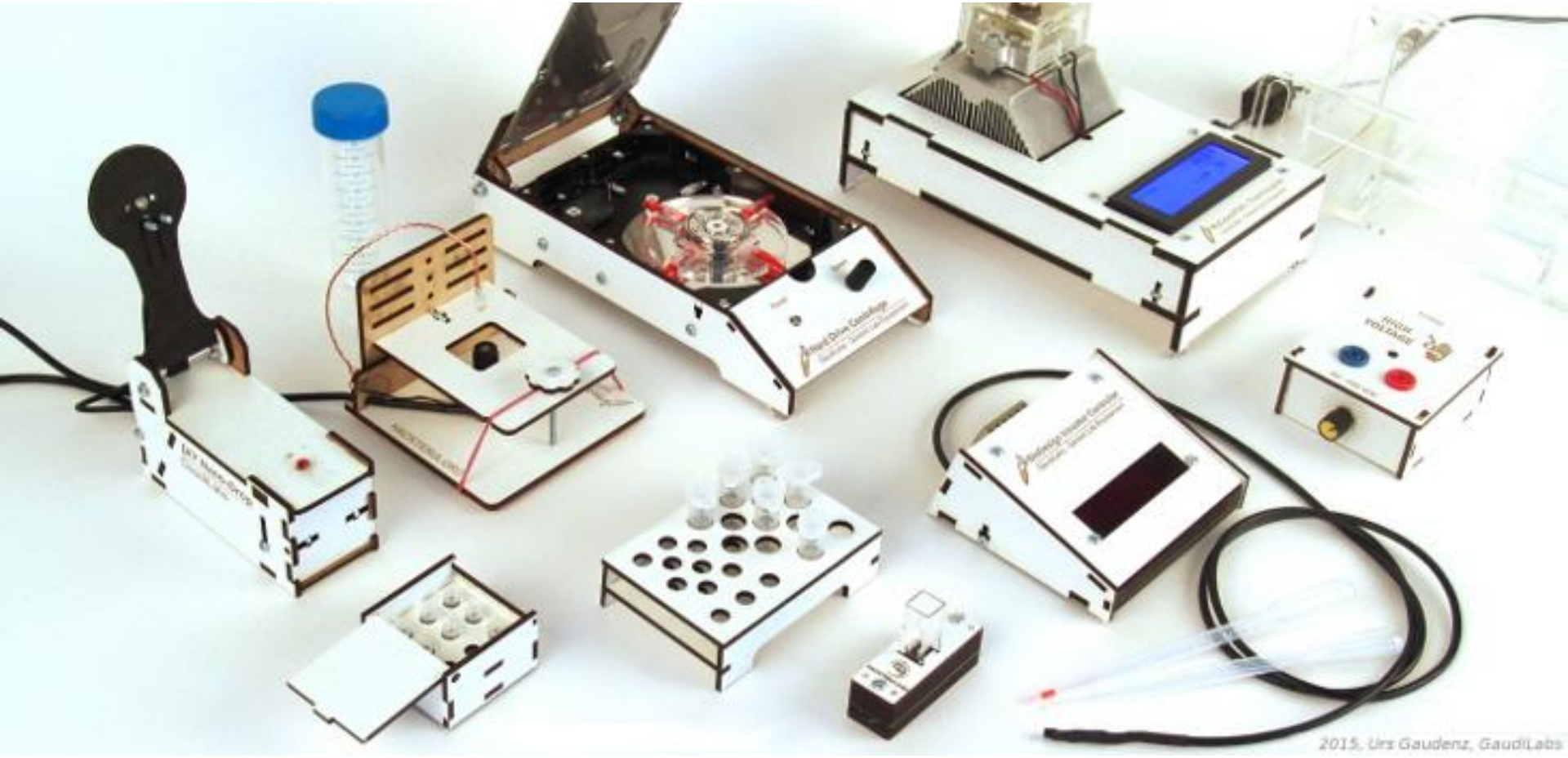
Journal of open hardware

ubiquity press open access

Make it work!
Share and publish Open Science Hardware

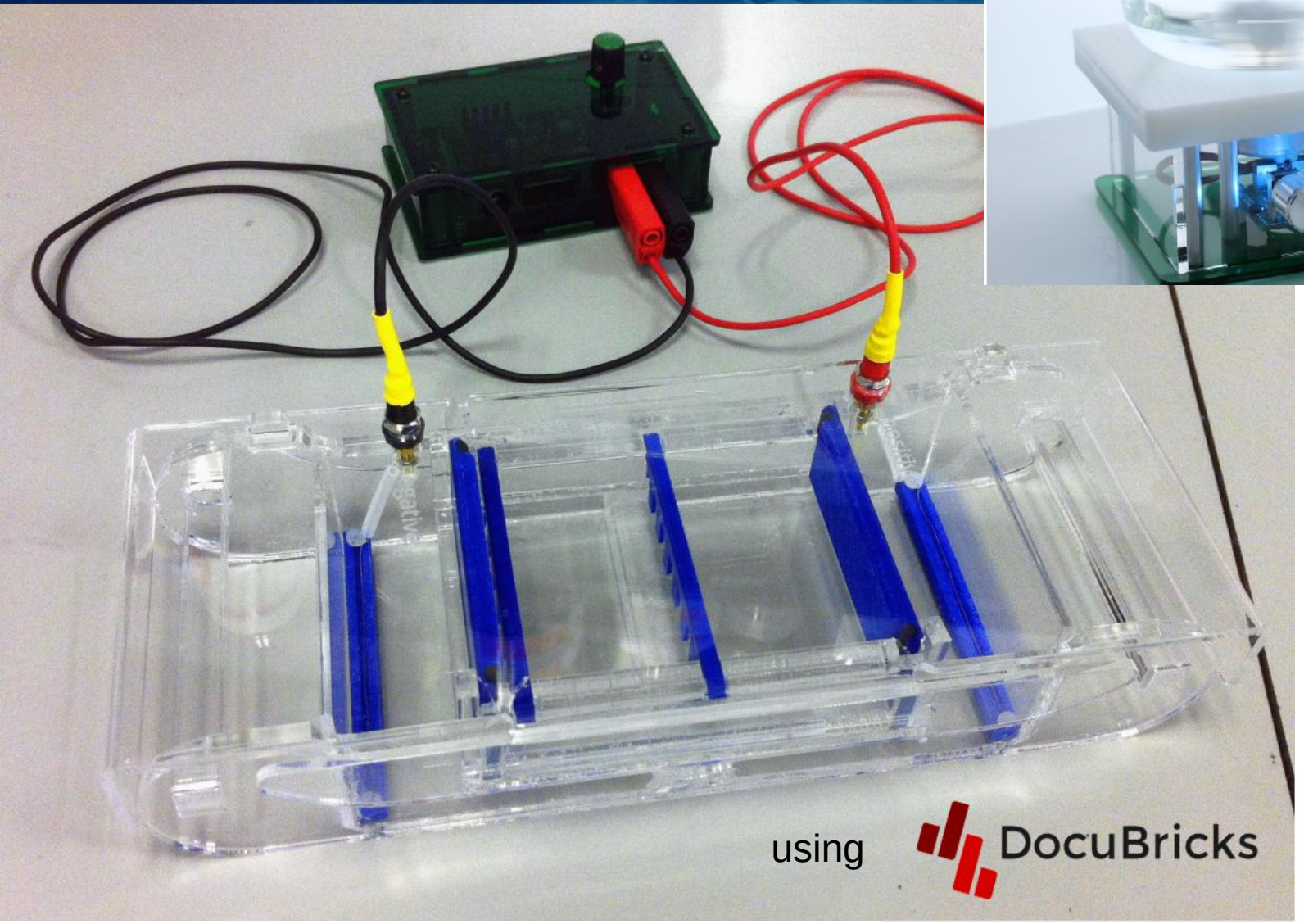
Tobias Wenzel

Open Labware for biohacking



GaudiLabs

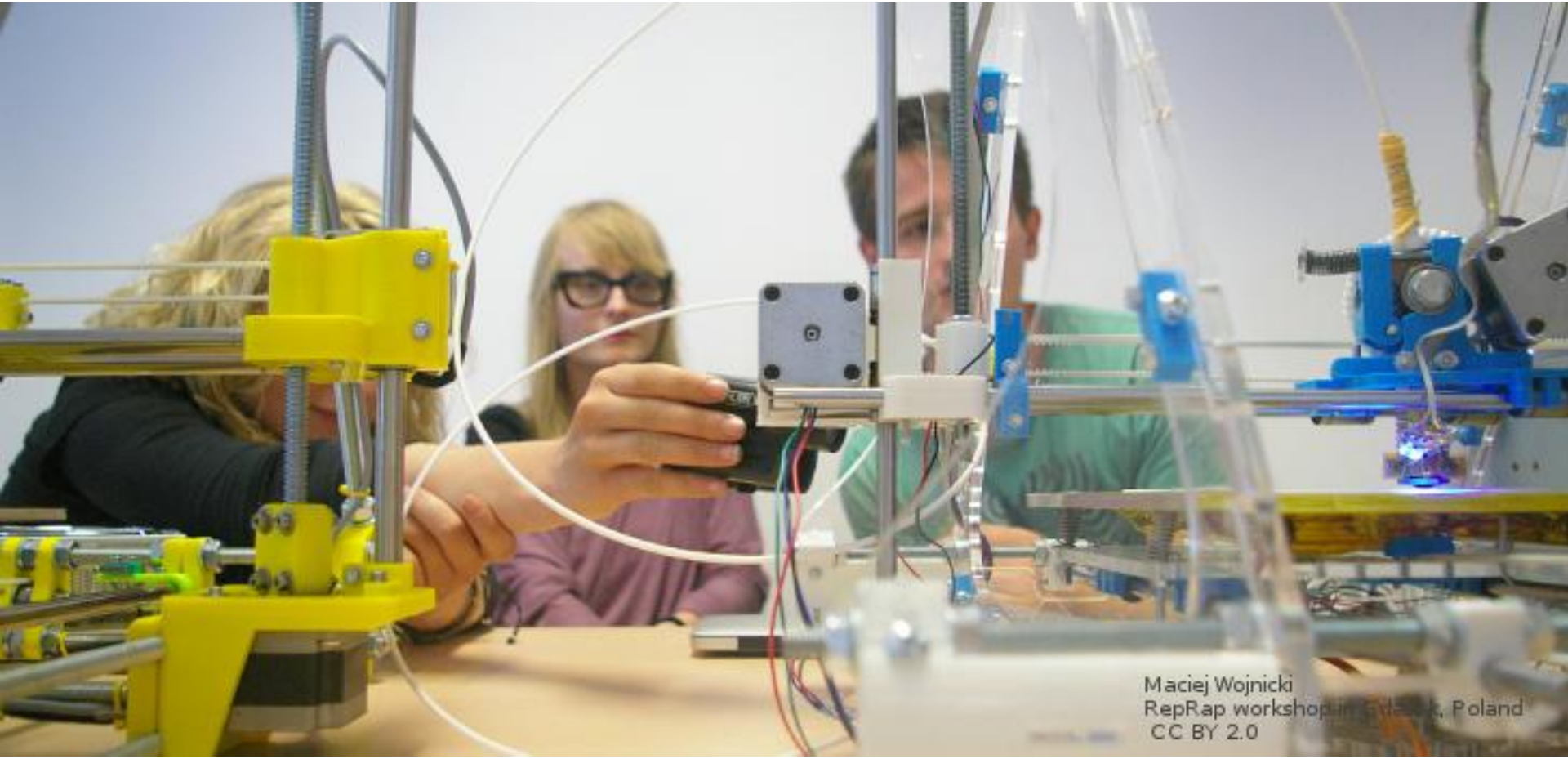
Open Labware for biohacking



Up: IO-Rodeo

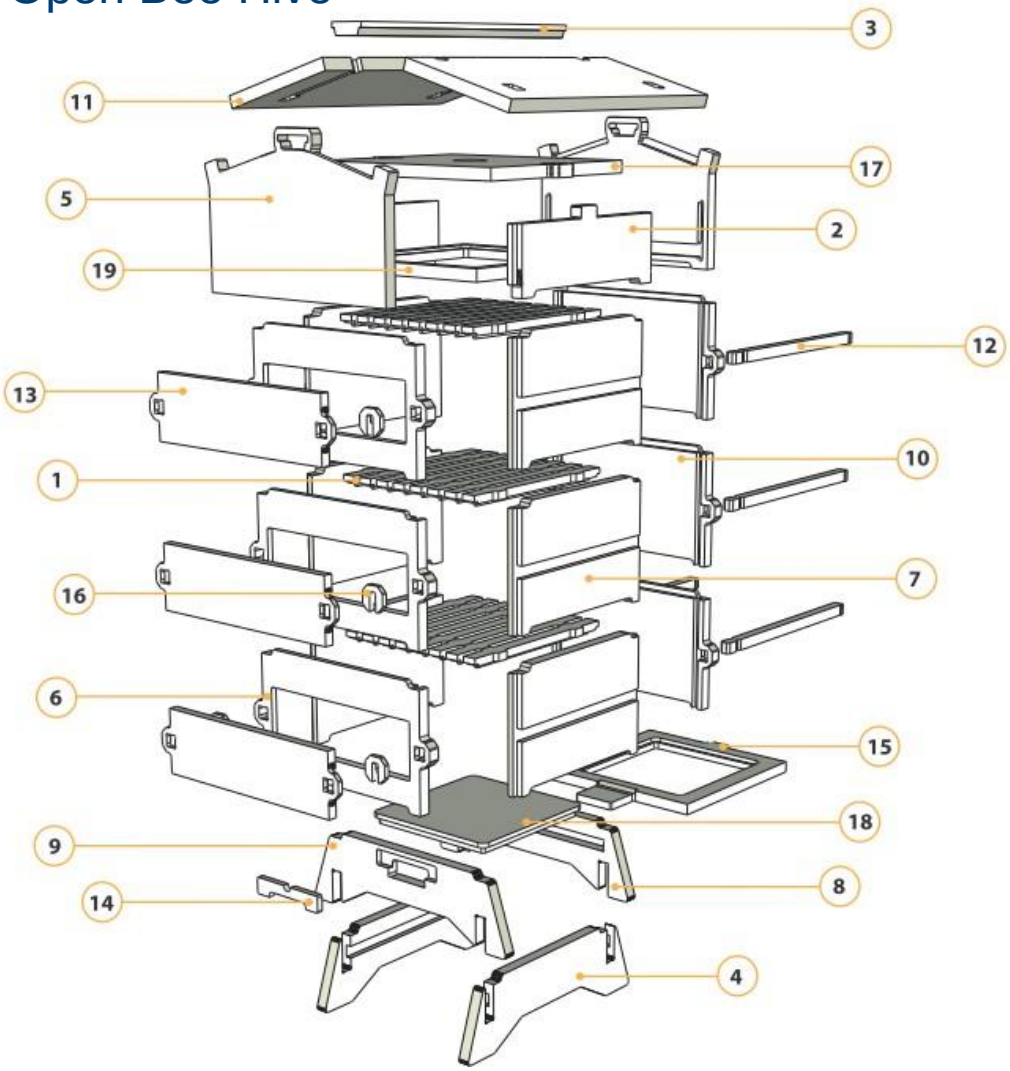
Left: Tobias Wenzel

Open Hardware for making



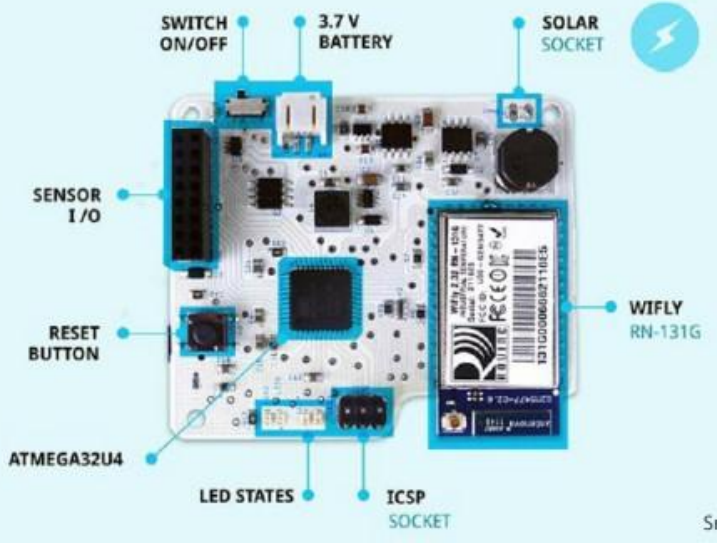
Open Hardware for citizen science

Open Bee Hive

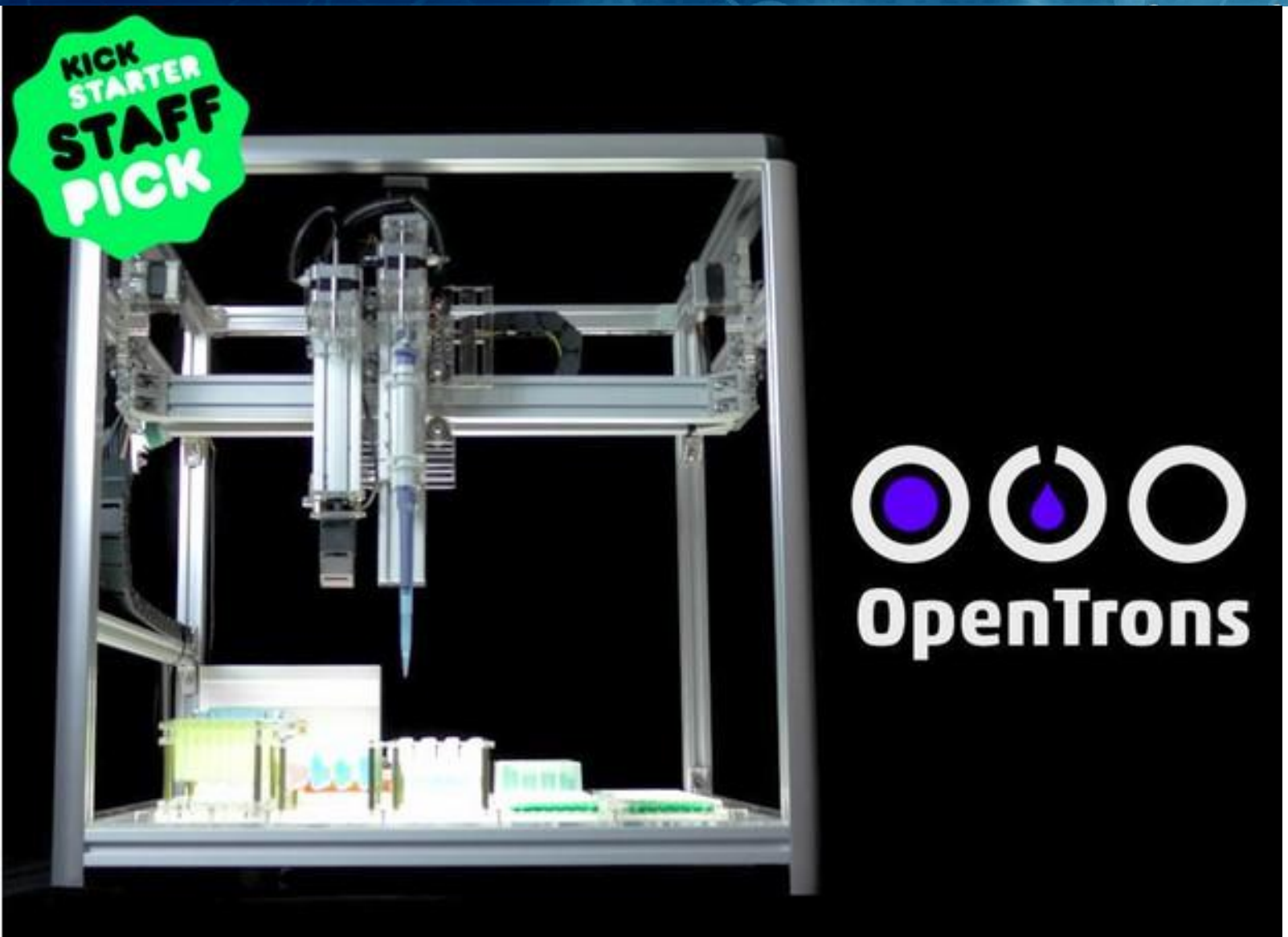


The Smart Citizen Platform

Developed within Fab Lab Barcelona at the Institute for Advanced Architecture of Catalonia (Iaac), Smart Citizen is a hardware and software platform that empowers people to monitor the environmental conditions of their cities. The Smart Citizen project is based on geolocation, Internet and open hardware and software for data collection and sharing (Smart Citizen Kit - SCK , RESTful api, Mobile App and, the web community).



Open Science Hardware - customisable



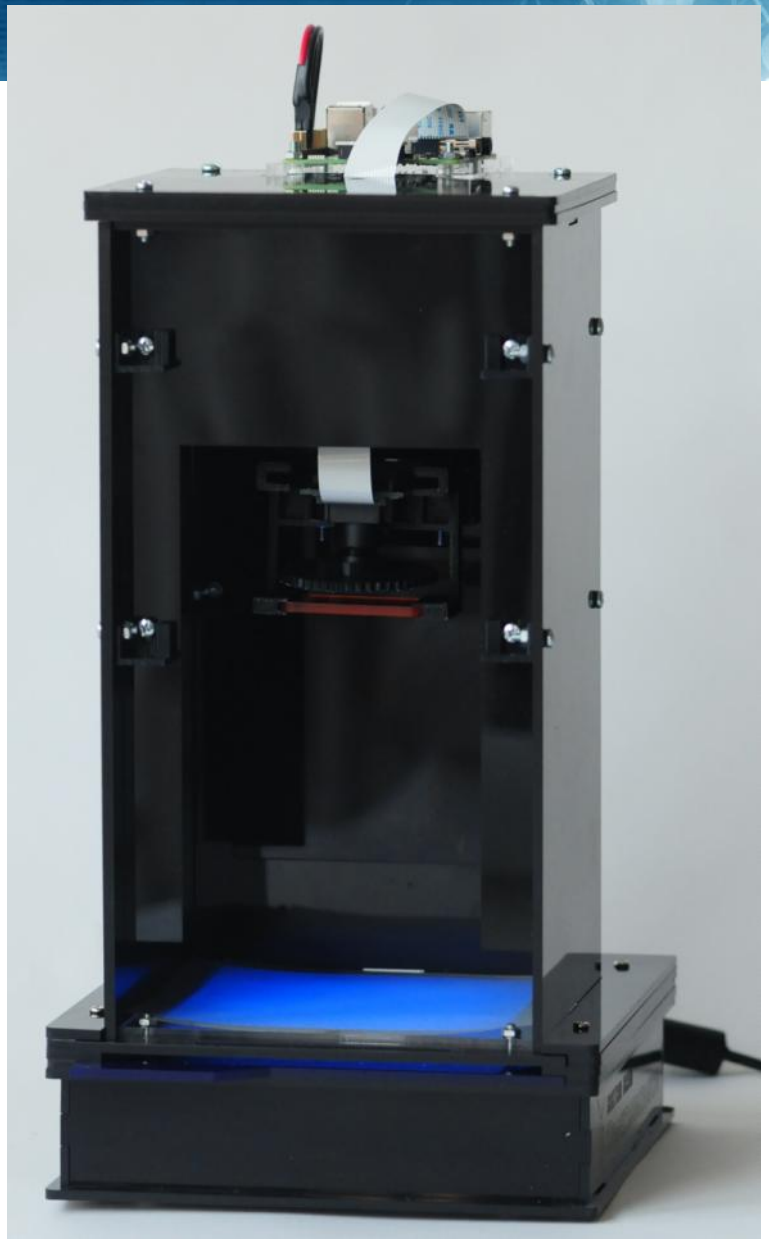
Open Science Hardware - costumisable

using DocuBricks

3D printed microscope
By Dr. Richard Bowman,
University of Cambridge,
now Bath

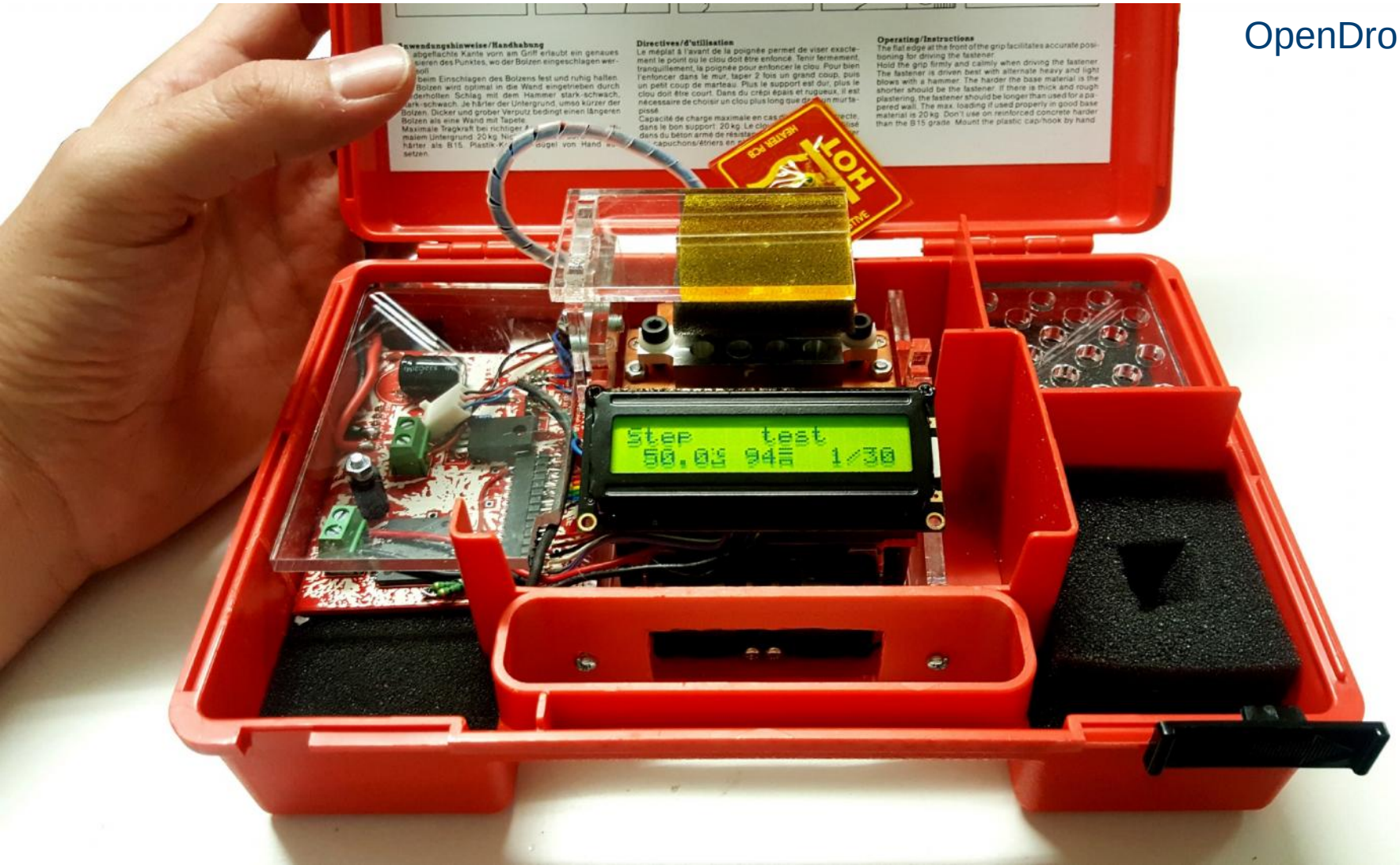
Open Science Hardware - customisable

Roberto Herrera
Pellizzari, Frederici Lab
and partners, Chile



using DocuBricks

Open Science Hardware - unique



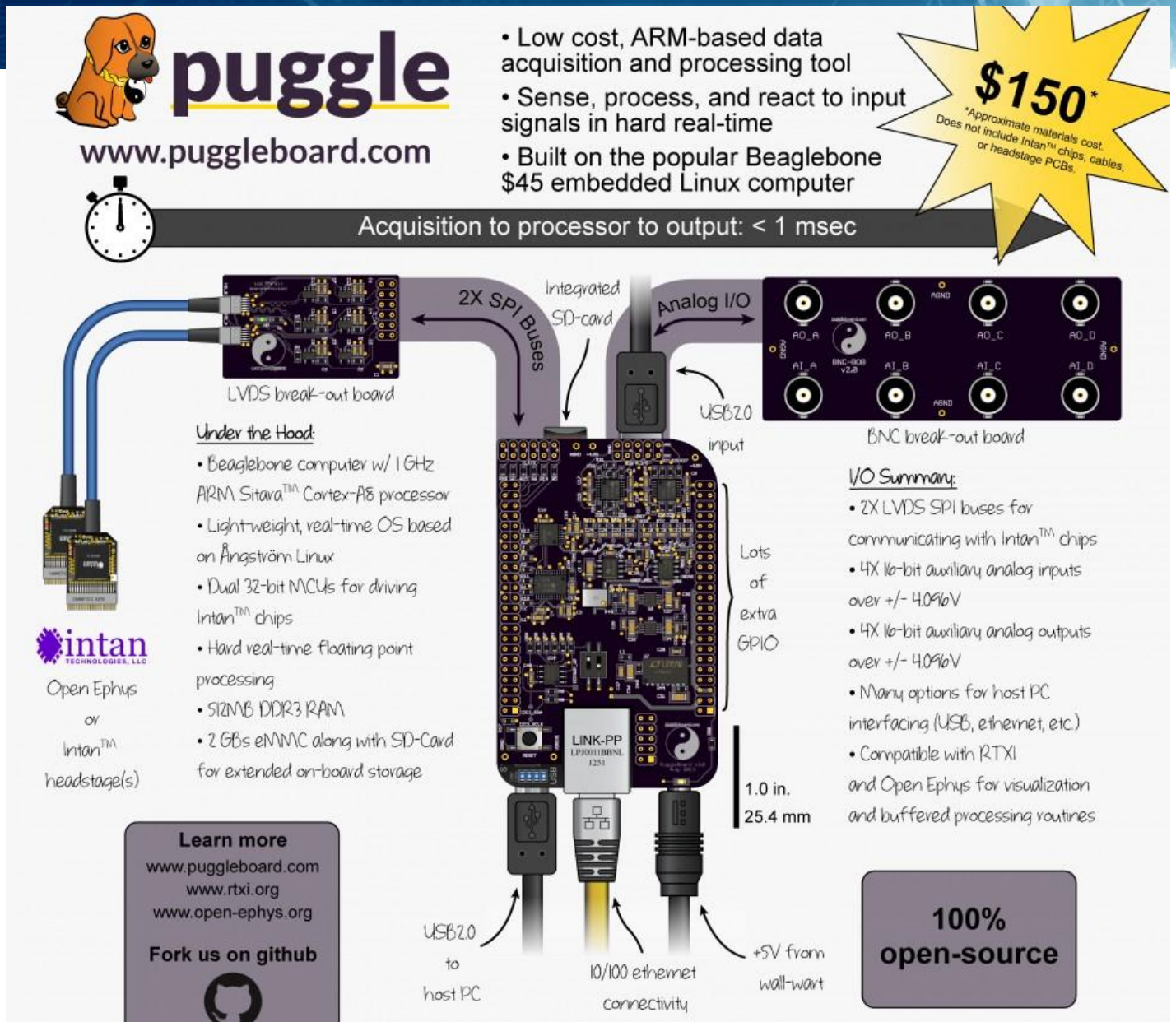
OpenDropBot

Open Science Hardware - unique

CNC fly food dispenser
by Matt Wayland

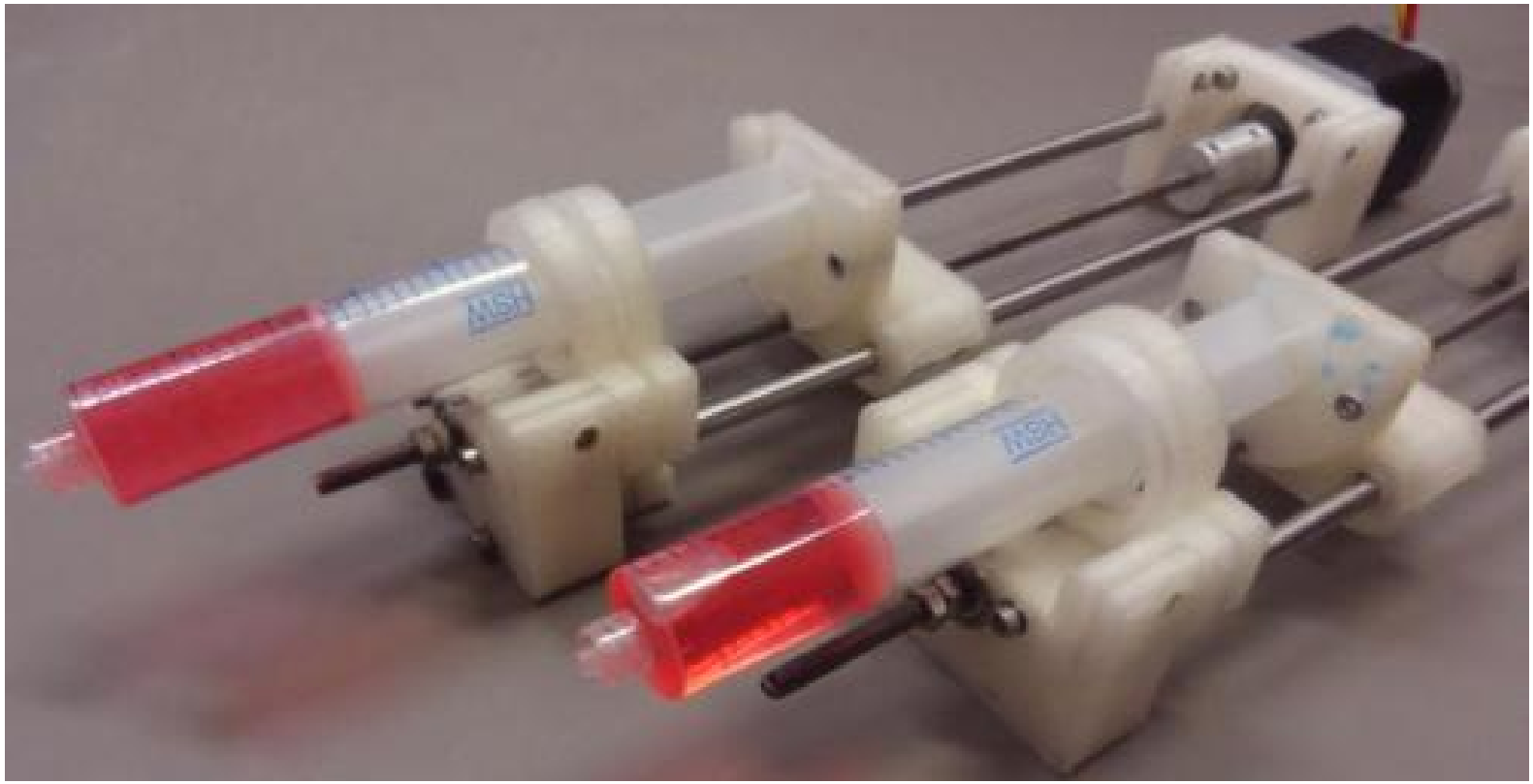
using DocuBricks

Open Science Hardware – community platform

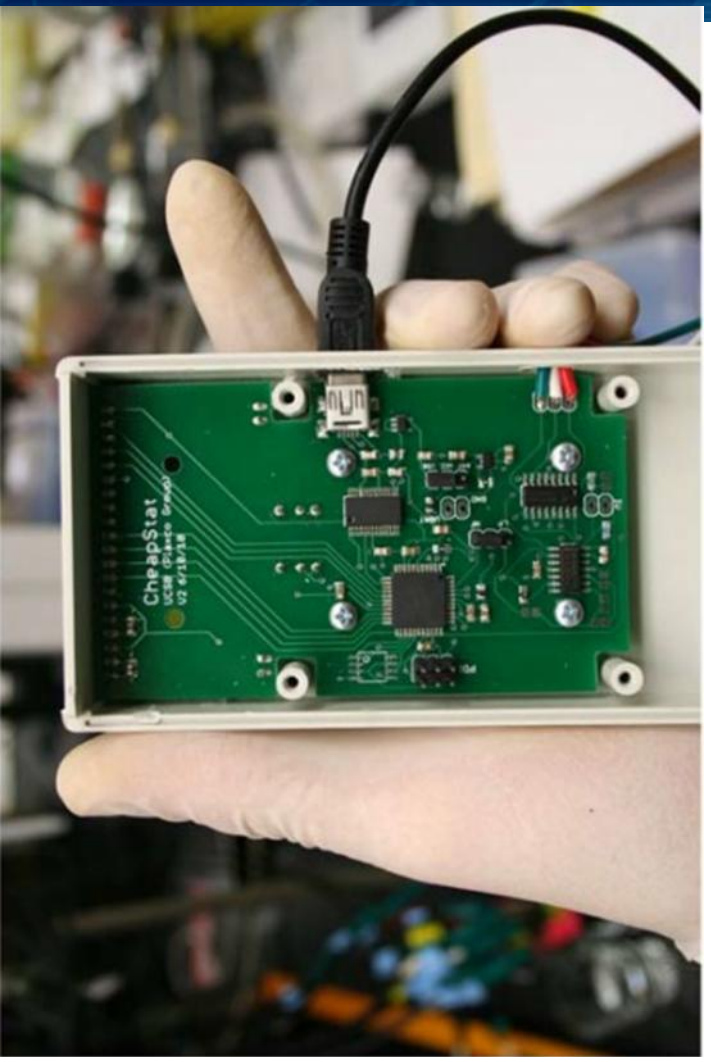


Open Science Hardware – low cost

Pearce Lab, Michigan



Open Science Hardware – low cost

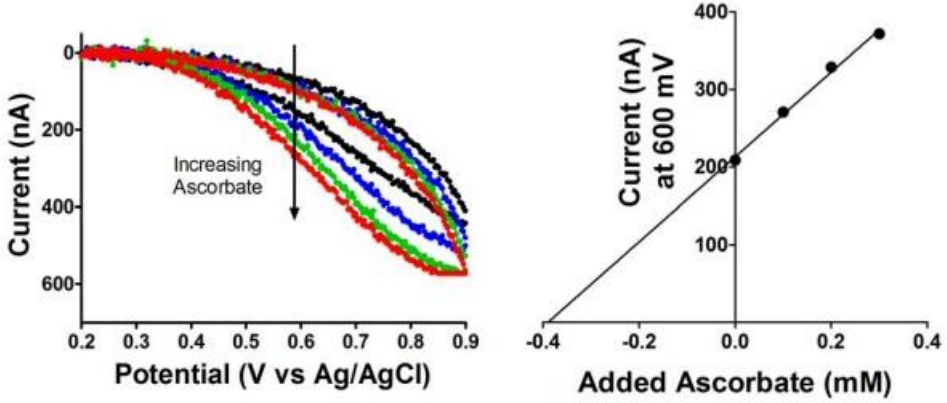


OPEN ACCESS Freely available online

PLoS one

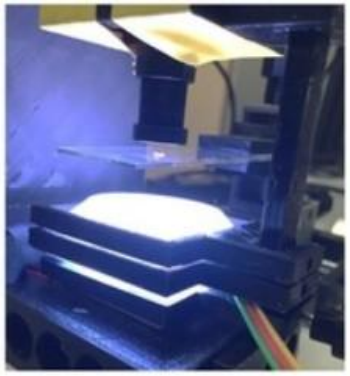
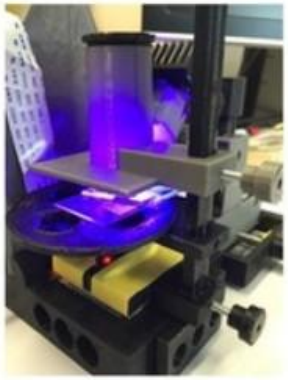
CheapStat: An Open-Source, "Do-It-Yourself" Potentiostat for Analytical and Educational Applications

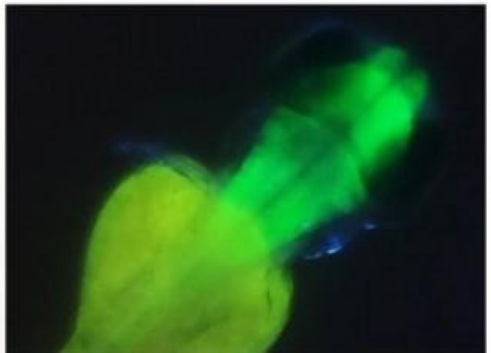
Aaron A. Rowe[1], Andrew J. Bonham[1], Ryan J. White[1], Michael P. Zimmer[2], Ramsin J. Yadgar[2], Tony M. Hobza[2], Jim W. Honea[2], Ilan Ben-Yaacov[2], Kevin W. Plaxco[1,2,3]*

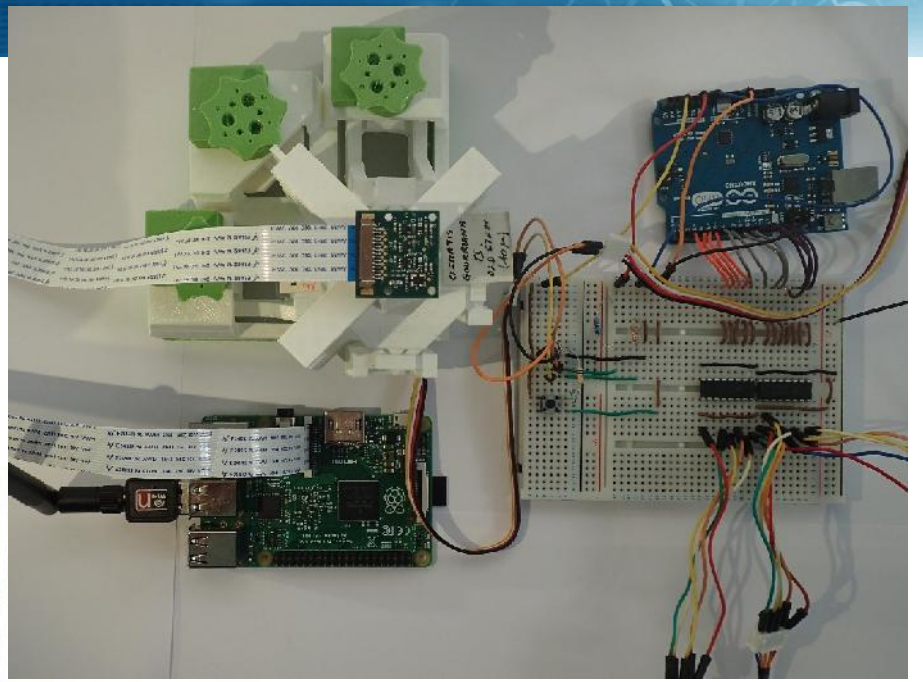


Open Science Hardware – low cost microscopy

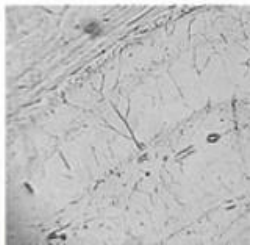
Tom Baden and Andre Chagas





iGEM Cambridge 2015

FOSS vs. Free & Open Source Hardware

Hardware without documentation cannot be “executed”.
The documentation along with design files are **essential** source files.

FOSH documentations in science should include

- Assembly guide (**modular**)
- Module testing
- **Calibration** instructions
- **Explanation of design and function**
- A licence for free use, modification **and sale**

They may also include

- Educational instructions
- Operating protocols
- Connections to (scientific) data collection initiatives

DocuBricks.com – design, share, modify

DocuBricks

Discover Projects

Software Resources FAQ About

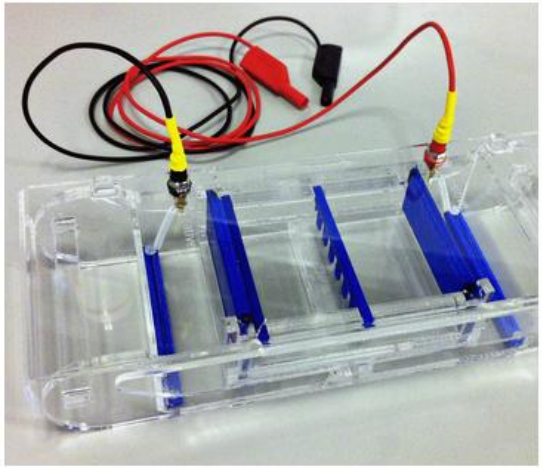
DocuBricks - high quality Open Science Hardware documentations

DONATE

Create hardware successfully

Inventors submitting to this repository care about quality documentations, enabling you to recreate the hardware or protocol successfully. We manage user expectations with tags and a label scheme.

Example: Open Gelbox



Do we need a new Journal for Open Hardware?

- Peer-review of documentation along with a dedicated publication format
- Academic incentive to share designs and adhere to good documentation practices for wider reproducibility
- Indexed public preservation as alternative to patent
- Joint open access forum for academics, community members, and hardware professionals
- Community control over its governance, content, pricing, and platform development in fair partnership with:

]u[ubiquity press
open scholarship

Or in other words…

Our initiative is a free community mentoring offer for authors to improve their effective sharing of FOSH,
as well as a curating effort of quality projects for readers.

See our fantastic voluntary, global editorial team at

https://openhardware.metajnl.com/about/editorialteam/

Publishing – Journal of Open Hardware (Metapaper)

What belongs in the manuscript?

- Overview (introduction, overall implementation and design)
- Quality control (safety, calibration, general testing)
- Application (use case(s), reuse potential and adaptability)
- Build Details (availability, ease of build, software, links)
- Discussion (conclusions, future work)

Reference to external:

- Documentation (media heavy and detailed)
- Files

Also:

Issues in Open Science Hardware full length papers

Example: Hardware Metapapers

Arduino-like development kit for single-element ultrasound imaging

Luc Jonveaux [1]

An open-source software ecosystem for ultrasound imaging is widely available to developers, however, limited resources can be found on the open-hardware side. The focus of this work was to develop an easy-to-use platform kit (hardware and software) for providing the community a complete experimental setup for ultrasound imaging at a low cost, without the need for expensive and non-modifiable specific equipment. The goal of this work resembles the needs of medical systems in the 80's where analog techniques using single-sensor devices were prominent. To this end, two open-source, arduino-like modules have been developed for building a simple, yet complete, single-channel analog front-end system, where all the intermediary signals are readily accessible by the user. A single-channel architecture avoids the beamforming overhead, though it limits the quality of the captured image, and brings simplicity to the system. The modules were tested using re-purposed ultrasound mechanical probes, as well as non-medical transducers. Furthermore, different digital acquisition systems were utilized for providing the images of interest. The developed modules can also be used in Radio Frequency (RF) projects, non-destructive testing and control projects, as well as in low-cost medical imaging projects on non-living samples.

(1) independent maker

Example article:
Issues in open science hardware

Emerging Business Models for Open Source Hardware

Joshua M. Pearce [1]

The rise of Free and Open Source models for software development has catalyzed the growth of Free and Open Source hardware (also known as “Libre Hardware”). Libre hardware is gaining significant traction in the scientific hardware community, where there is evidence that open development creates both technically superior and far less expensive scientific equipment than proprietary models. In this article, the evidence is reviewed and a collection of examples of business models is developed to service scientists who have the option to manufacture their own equipment using Open Source designs. Profitable Libre Hardware business models are reviewed, which includes kit, specialty component, and calibration suppliers for makers. The results indicate that Libre Hardware businesses should target technically sophisticated customers first and, as usability matures, target expanded markets of conventional consumers.

(1) Michigan Technological
University

.

Example: Reviews

Gathering for Open Science Hardware

Shannon Dosemagen[1], Max Liboiron[2] and Jenny Molloy[3]

Without hardware, there is no science. Instruments, reagents, computers, and lab equipment are the platforms for producing systematic knowledge. Yet, current supply chains limit access and impede creativity and customization through high mark-ups and proprietary designs. This can be compounded by private hardware licenses and patents. Open Science Hardware (OSH) addresses part of this problem by sharing designs, instructions for building, and protocols . Expanding the reach of Open Science Hardware within academic research, NGO initiatives, citizen science, and education has potential to increase access to experimental tools and facilitate their customization and reuse while lowering costs. A growing number of people and organizations around the world are developing and using Open Science Hardware, but a coherent, self-organizing community has yet to emerge that could raise its profile and drive required social change within institutions, laws, and common practice that would make open science with open hardware the norm. The Gathering for Open Science Hardware (GOSH) in 2016 addressed this need. It brought together 50 of the most active developers, users, and thinkers in the Open Science Hardware (OSH) movement, complemented by expertise from diverse backgrounds, to seed a global community . GOSH now continues as an online community with a further meeting planned in Santiago, Chile, in 2017.

(1) Public Lab; (2) Civic Laboratory for Environmental Action Research; (3) University of Cambridge

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Journal of
open hardware

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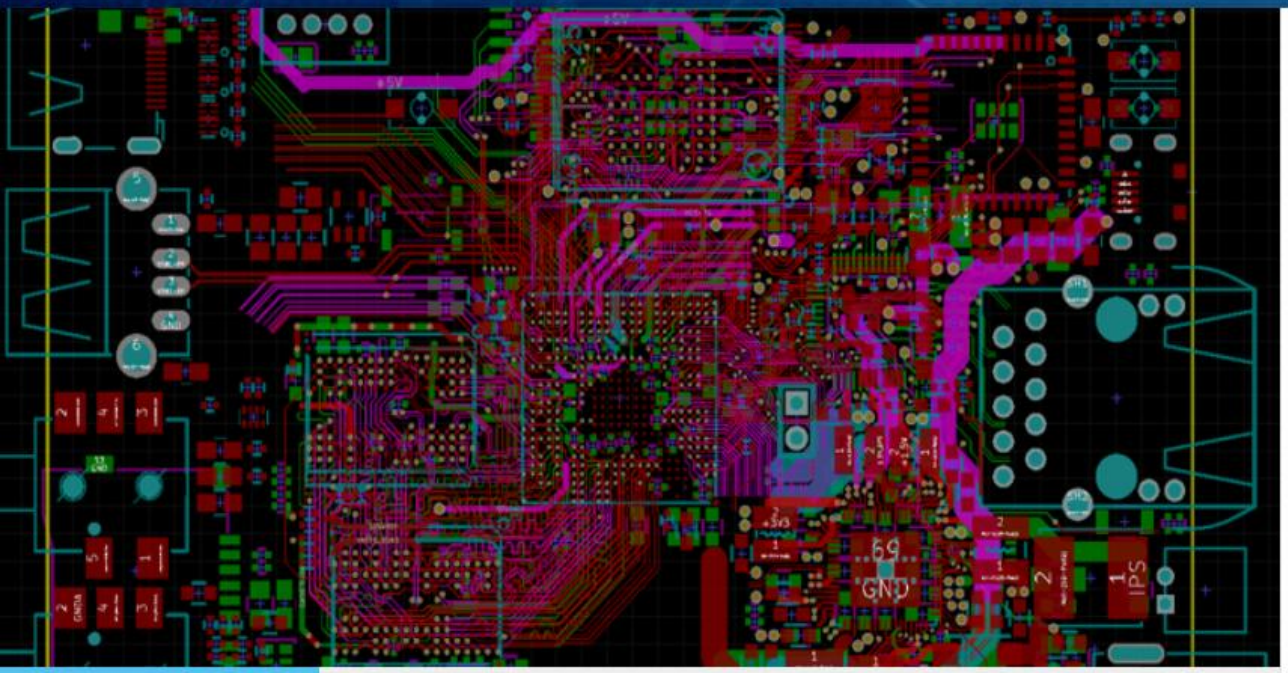

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About this Journal

The international peer-reviewed *Journal of Open Hardware* publishes papers and reviews on technical, legal, economic, and sociocultural aspects of open hardware design, fabrication, and distribution. Its primary goal is to promote

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What is the "Source" of Open Source Hardware?

Bonvoisin et al. — 05 Sep 2017

Share:

Gathering for Open Science Hardware 2016

Dosemagen et al. — 25 Apr 2017

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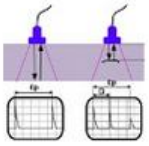

Arduino-like development kit for single-element ultrasound imaging

Jonveaux — 21 Mar 2017

Share:

How to get involved:

- OpenPlant and Biomaker challenges
- GOSH movement www.forum.openhardware.science
- www.journalofopenhardware.org – download article template and fill-in
- www.docubricks.com – download projects and the documentation editor
- @MakerTobey on Twitter, GitHub, etc.; @journalopenhw Twitter

Benefit from lower hand-over losses in the lab, more visibility, enhanced experimental reproducibility, lower cost, user accessibility, data-control, and external contributions to key laboratory tools!

OpenPlant

OPEN TECHNOLOGIES FOR PLANT SYNTHETIC BIOLOGY

Synthetic Biology in Cambridge