



[José Carlos Urra Llanusa](#) from the [Faculty of Industrial Design and Engineering](#) shares his vision of open hardware with TU Delft Library.

Industrial and interaction designer from Cuba, [José Carlos Urra Llanusa](#), recently joined our team of Data Champions at TU Delft to share his engineering and programming expertise. Here, he tells us more about his passion for using open hardware to promote sustainable development and to facilitate a circular economy where resources are not discarded but are repaired, improved and reused to reduce waste.

The benefits of open hardware

Open hardware means that the information about a product's design (e.g. blueprints, mechanical drawings, schematics and source code) is available so that others can study, replicate and improve the design. Since users are free to modify the source files and underlying code, there is an increased capacity to improve the functionality and physicality of a device, which in turn promises greater social impact. However, like software, hardware designs are subject to copyright and patent law that protects a design's core technology and prevents its reuse. "Hardware design is very rooted in a proprietary centered culture," says Urra Llanusa. "There's a conflict of interest and no simple solution but the fact is that we are more productive when we share and build upon each other's work. This is the point of science; to deliver replicable experiments and research that someone else can build upon."

To build an open future, we must understand the past

"Adopting an intellectual property-oriented mindset is not something I see as negative or bad; it's just a culture based on history," he adds. The message is clear that if we are to facilitate a transition towards an open culture, then we must appreciate the concerns of those who are unwilling to change old habits and cooperate with those who are prepared to tune into a new way of thinking. Urra Llanusa believes that "The success of open source inventions and technological advancements are obvious. We can learn a lot from the history of the internet since the software industry has been a driving force behind the open source developments."

Working with the future generation

With a strong interest in education, Urra Llanusa, is currently involved in the planning of a Circular Design course with aeronautical and industrial design engineer, [Dr. Ir. Bas Flipsen](#). Urra Llanusa also

runs workshops for MSc Engineering students at TU Delft to teach them the basics on how to use [Git](#) (a distributed version-control system for tracking changes in source code) and [OpenSCAD](#) (a software for creating 3D computer aided design (CAD) objects). Around 20 students from three Masters programmes ([Design for Interaction](#), [Integrated Product Design](#) and [Strategic Product Design](#)) attend workshops to learn how to work in collaboration using [OpenSCAD](#), [Git](#) and [GitHub](#). His workshop on [OpenSCAD is publically available](#) and meant to be replicated, reused, improved by other instructors.

Urta Llanusa takes great pleasure in conducting student workshops. “It’s so fun!” He remarks, “I’ve had so much positive feedback from the students. It would be great to implement these workshops into their curriculum in a more systematic way.”

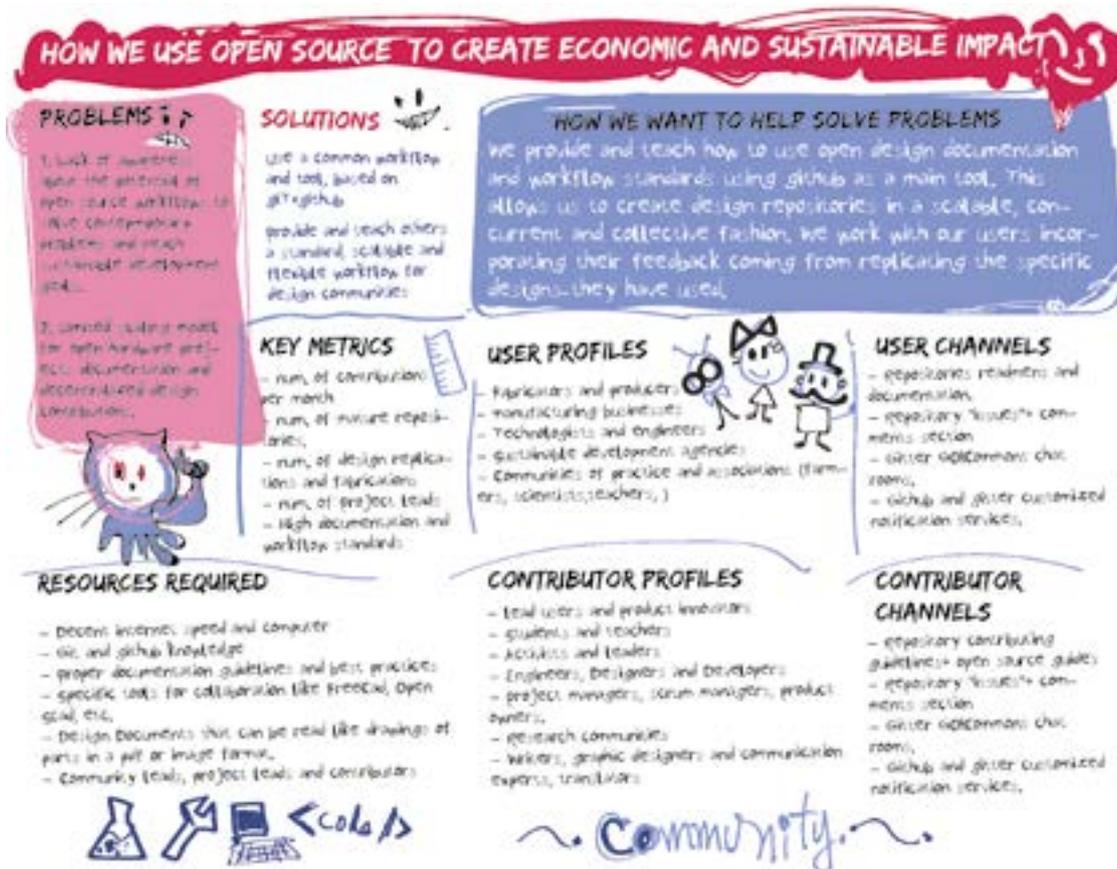
By documenting anonymised [feedback](#) from the students undertaking his workshops, Urta Llanusa has been able to gain valuable insight into their learning preferences and personal opinions on the implementation of open source tools during their degree programme. This work presents a shining example of how bottom-up teaching initiatives give early career researchers a voice to direct their independent learning goals.



Caption: Urta Llanusa conducts collaborative workshops on OpenSCAD and Git technology for MSc Engineering students at TU Delft.

A 'hands-on' approach: problem-solving with open hardware

Aside volunteering his skills and expertise, Urra Llanusa is invested in the development of [various open hardware projects](#) that have social and sustainable impact through problem-solving. He is a co-founder of [Go!Commons](#) (& open source things), a project that documents the designs and developmental processes of open hardware, such as agricultural and manufacturing machines. Since these designs are made publically available on [GitLab repositories](#), anyone can use and modify them to create working solutions. Click [here](#) to see the work that's been achieved!



Caption: An overview of the Go!Commons project on open hardware.

As a participant in the [Mozilla Open Leaders](#) programme, Urra Llanusa began this work studying a [microwave](#) with interest in open source households. He then decided to collaborate with communities on existing projects, focusing on the design methodology and best practices for teaching git and gitlab on those projects. He explains the aims of his latest project, the replication of a [wet-lab centrifuge](#). "By deconstructing and rebuilding the instrument alongside my collaborators, together we can learn how the instrument works. Suddenly, industrial products are no longer a black box."

In addition, Urra Llanusa has worked as a designer and developer on the [Open Source Ecology](#) project, an initiative that aims to manufacture open source industrial machinery at a fraction of the commercial cost through global collaboration. He shared his inspirational story of helping a farmer in Maine, USA, to document and use git based workflows for his own CNC Plasma Cutter to build tractor implements – An example of using open hardware for self-sufficiency and economic sustainability.

A sustainable future

Following two rounds of serving as a mentor for the Mozilla Open Leaders programme, Urra Llanusa plans to launch his own Open Leaders programme through the next phase called [Open Leaders X](#). The course teaches participants how to conduct their own community-run Open Leaders programme and offers an exciting opportunity for leaders to learn and improve open hardware practices.

Urra Llanusa concluded our conversation on using open hardware to build a sustainable future with some words of wisdom: “The best things can happen spontaneously. You can have a goal or an idea but then you have to knock on doors and talk to people in order to build a network. People can work together to create a community; it’s important to engage with all kinds of people. – That’s worked for me.”

Citation

This showcase is a selection from the following publication:

Clare, Connie. (2019). The Real World of Research Data [Book]. Zenodo. <http://doi.org/10.5281/zenodo.3584373>.

