



Aalto University
Media Factory

Digital_Fabrication_Studio.01

Fabbing and Fab Labs - history, concepts, fields of application

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@openp2pdesign

<http://www.slideshare.net/openp2pdesign>





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This morning:

- * Digital Fabrication
- * FabLabs
- * Other spaces



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01.

Digital Fabrication: interactions between bits and atoms

A craft project



“This exact material (atoms) and my perception and experience (bits)”

Source: <http://www.flickr.com/photos/kellycdb/6168020183/>
<http://commons.wikimedia.org/wiki/Category:Wood>

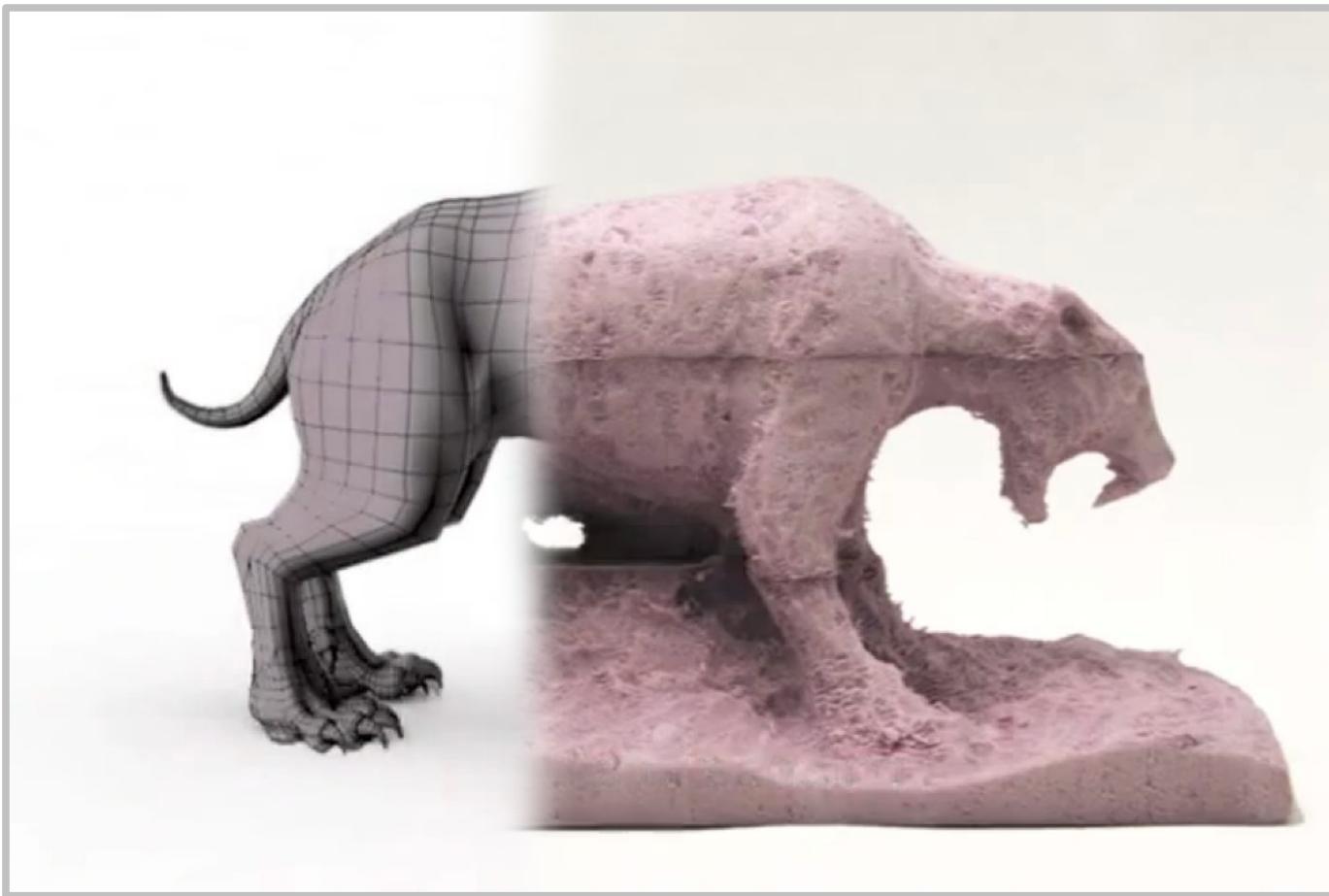
An industrial project



“A standardized material (atoms) described only by numerical values (bits)”

Source: <http://commons.wikimedia.org/wiki/Category:KUKA>
<http://commons.wikimedia.org/wiki/Category:Polyethylene>

A digital fabrication (fаббинг) project



“My experience, perception and digital information (bits) shape this exact material and its values (atoms)”

Source: http://web.media.mit.edu/~amitz/Amit_Zoran_home_page/the_freeD.html

A digital fabrication (fabbing) project



“... and I will probably design and make my own tools” [metadesign]

A digital fabrication (fabbing) project



“... and I will probably design and make my own tools” [metadesign]

Bits + atoms = information + materials



fablab
waag society

what you can do in fablab amsterdam ▼

projects ►

equipment ►

embroidered speaker tryout



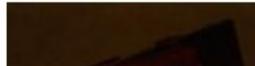
Fab Prosthetics

Abstract The major objective of prosthetics is to restore the functional capacity formerly held by a limb deficient person as closely as...



Fab Foos

Fab Foos is a open source Table Soccer Game, featuring 2 web cams, audio response, electronic counter system and vga out. The goal was to built the...



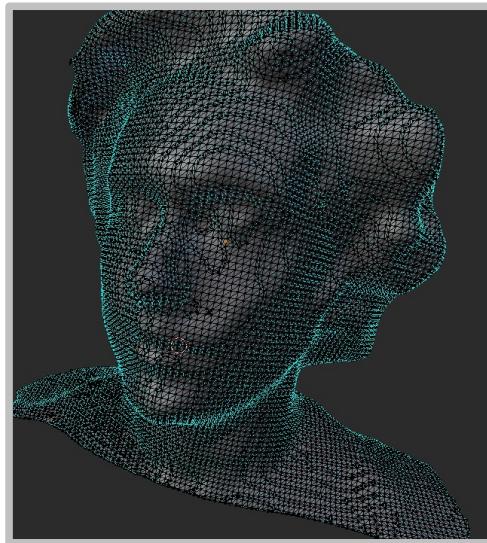
Comm. Design

During my three months at

Developing projects at the intersections
between bits and atoms

Source: <http://fablab.waag.org/node/3847>

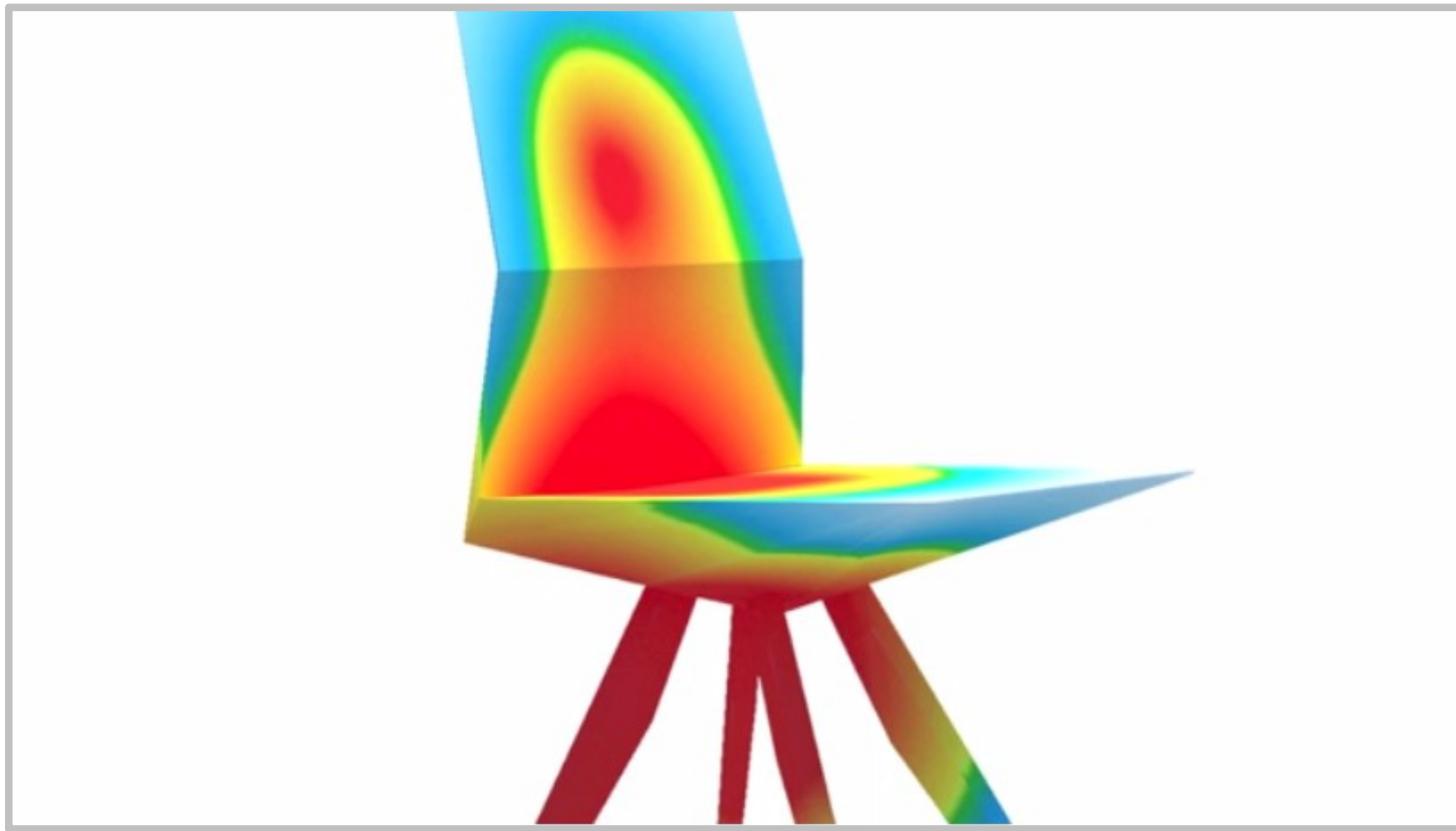
Bits and atoms – two directions



From atoms to bits
(getting data -
representation)

From bits to atoms
(build the data -
representation)

Bits and atoms: an application



As an individual sits in the chair, information about the flow of forces from his or her weight is depicted on visualization screens throughout the space.

Source: <http://www.designboom.com/weblog/cat/16/view/20419/audi-r18-ultra-chair.html>
<http://vimeo.com/40877183>

Digital Fabrication and bits+atoms: CBA @ MIT



... not the center for rapid prototyping: “investigating the interface between computer science and physical science”

Source: <http://cba.mit.edu/>
http://en.wikipedia.org/wiki/Neil_Gershenfeld

Fab.01: Machines attached to a computer

Google patents

Search Patents Advanced Patent Search

MOTOR CONTROLLED APPARATUS FOR POSITIONING MACHINE TOOL Frank L. Stulen et al

United States Patent Office

Overview Abstract Drawing Description Claims +1 0

Search in this patent Go

Patent number: 2820187
Filing date: May 5, 1952
Issue date: Jan 14, 1958

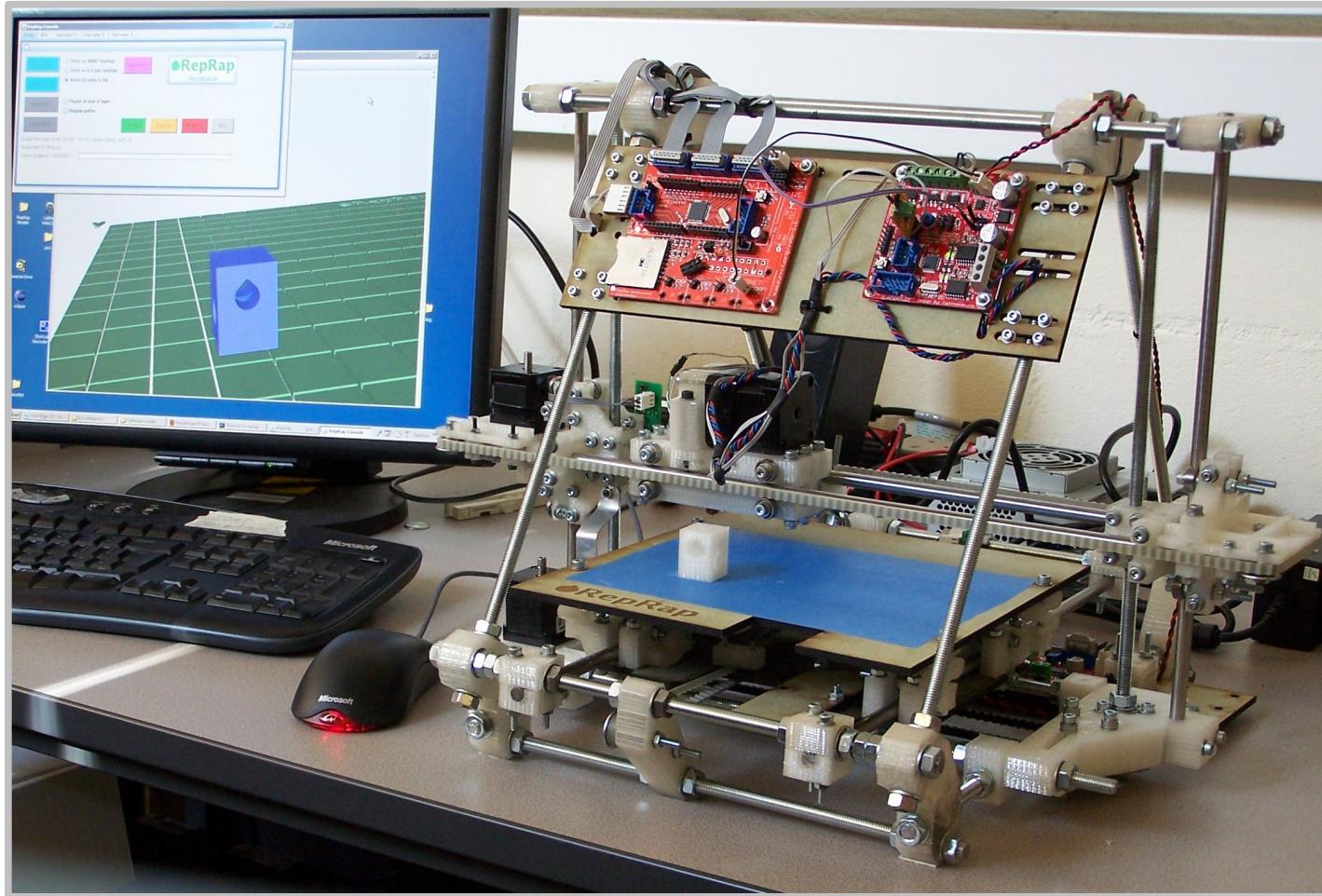
Filed May 5, 1952

7 Sheets-Sheet 1

The diagram illustrates a complex industrial machine, specifically a numerical control (CNC) system from the 1950s. It features a tall vertical frame with a control panel on top. A horizontal beam or carriage is mounted on the frame, supported by a central column. The carriage appears to have a motorized drive system, indicated by a gear assembly and a belt. A worktable or bed is positioned below the carriage, equipped with a track or slot system for precise movement. A small control unit with a keypad is located at the base of the machine. The entire apparatus is designed to be controlled by a computer, as indicated by the title and the date of the patent.

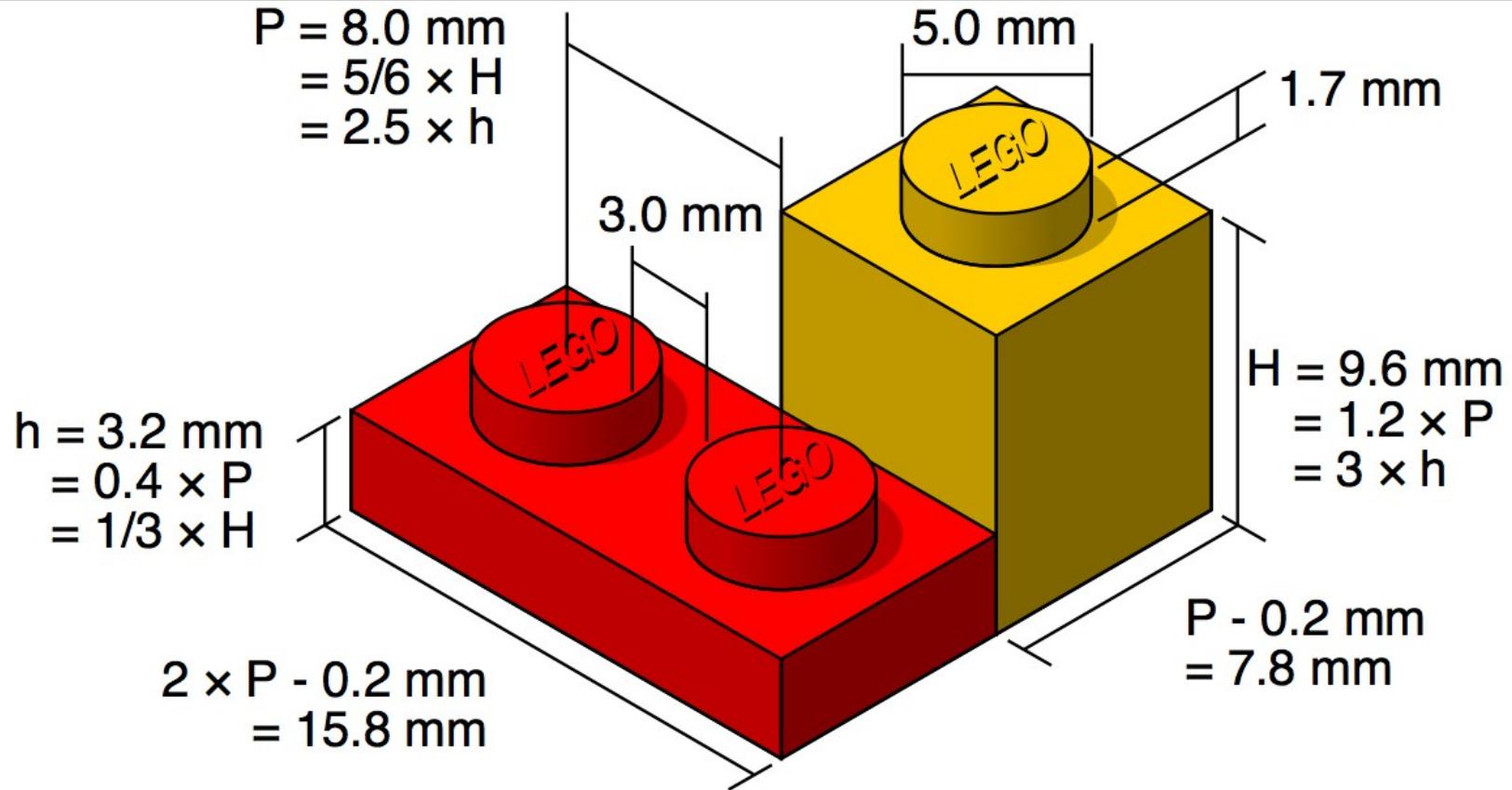
1950s: first computer numerical control (CNC) machines, attached to computers

Fab.02: Machines that make machines



2005: RepRap (open source) 3D printer that replicates itself (and that generated an ecosystem of 3D printers)

Fab.03: Materials with embedded code



Materials with an embedded code that help shaping them.

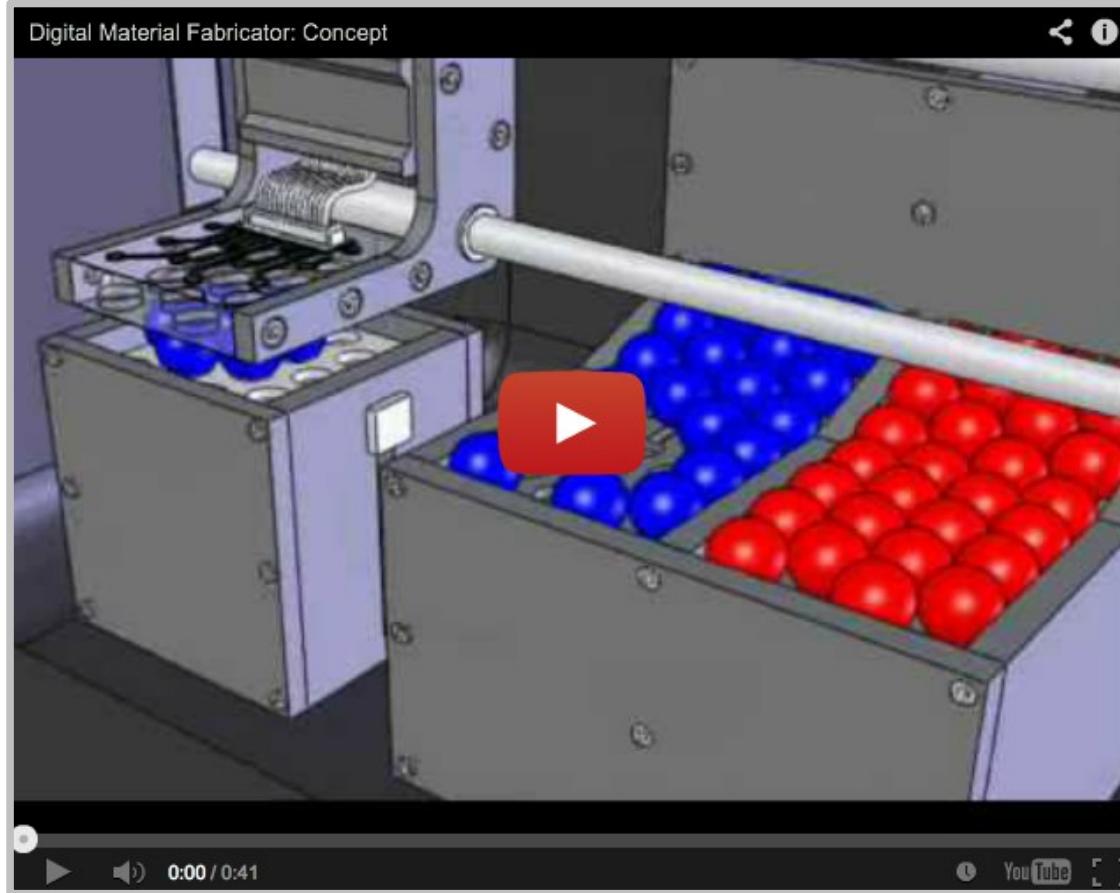
Fab.03: Materials with embedded code



North Carolina State University: a simple way to convert two-dimensional patterns into three-dimensional (3-D) objects using only light.

Source: <http://news.ncsu.edu/releases/wmsdickeyfolding/>
<http://www.youtube.com/watch?v=NKRWZG67dtQ>

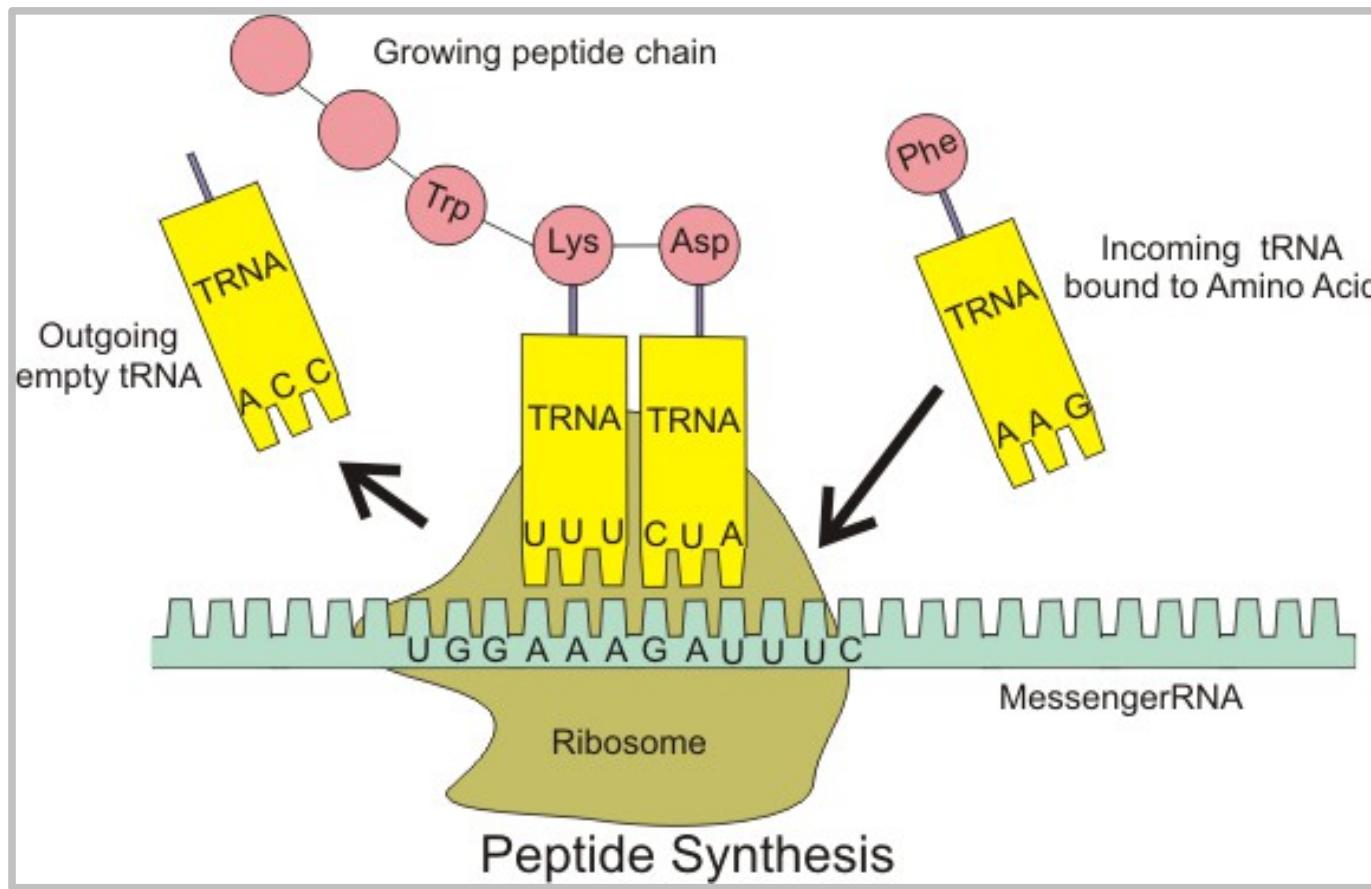
Fab.03: Voxels + Digital Material Fabricator



In the digital domain, a 3D object is composed voxels. Each voxel location is occupied (1) or not (0), so 3D space is digital (discrete) not analog (continuous).

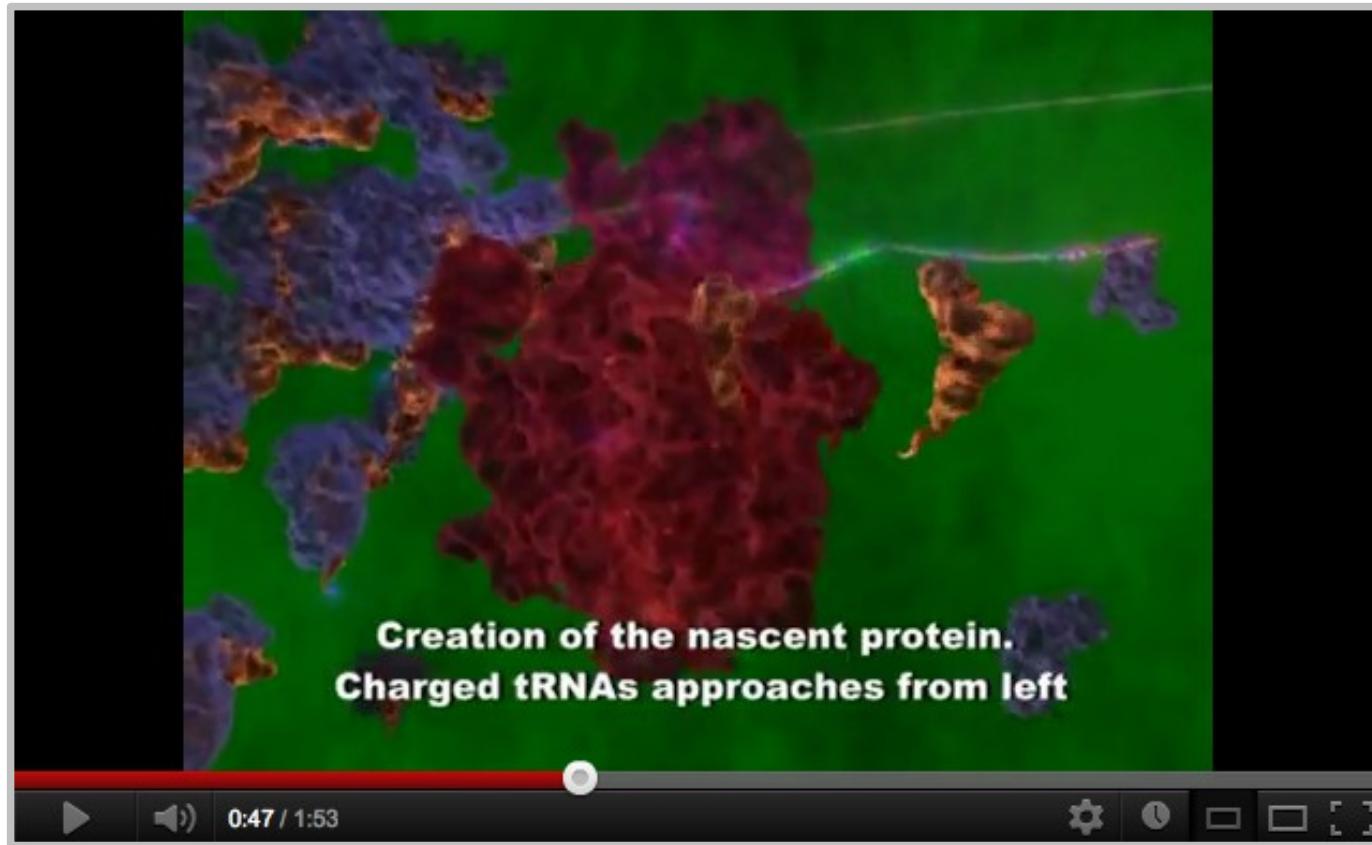
Source: http://creativemachines.cornell.edu/Rapid_Assembler
<http://youtu.be/-szjlhVMGh4>

Fab.04: Materials with embedded program



Materials that have code, data and programs
for self-manufacturing / auto-assembly.

Fab.04: Materials with embedded program



Materials that have code, data and programs
for self-manufacturing / auto-assembly.

Source: <http://www.youtube.com/watch?v=Jml8CFBWcDs>
<http://www.youtube.com/watch?v=1PSwhTGFMs>

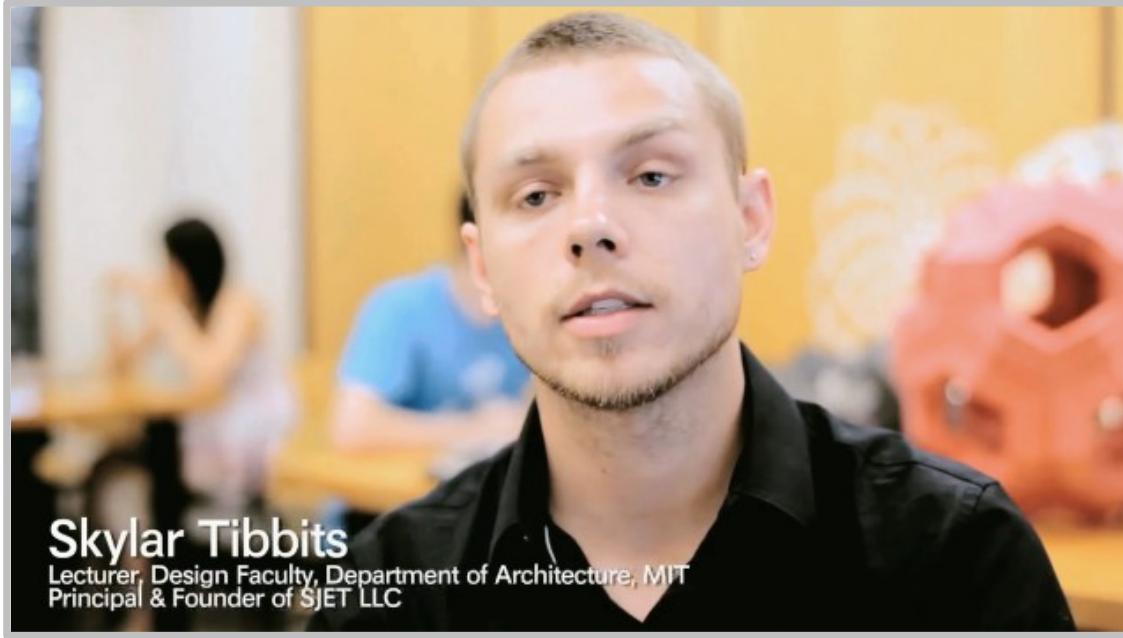
Fab.04: Materials with embedded program



Materials that have code, data and programs
for self-manufacturing / auto-assembly.

Source: http://www.ted.com/talks/skylar_tibbits_can_we_make_things_that_make_themselves.html
<http://youtu.be/emW1TQ290ec?t=2m10s> <http://www.sjet.us/SJET-MIT.html>

Fab.04: Materials with embedded program



Materials that have code, data and programs
for self-manufacturing / auto-assembly.

Source: <http://www.fastcompany.com/3006145/mits-new-self-assembly-lab-building-paradigm-shift-4-d-manufacturing>

Fab.04: coming to the Design world, soon

Training Bacteria To Grow Consumer Goods

By Christopher Mims

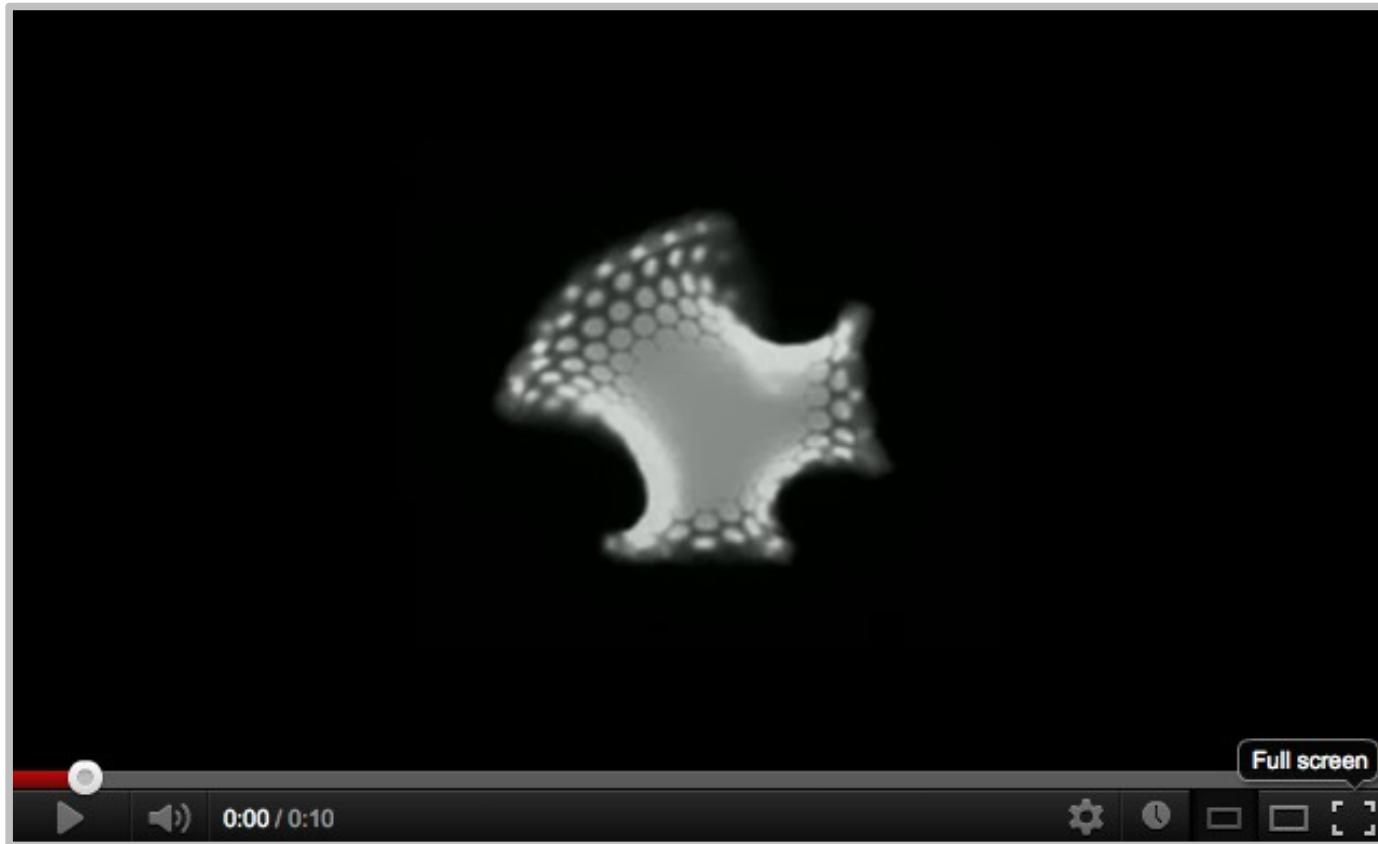
Thinkers at IDEO are working with scientists to find a way to have E. coli bacteria form objects--like a coffee cup--when exposed to light. It's nature's version of 3-D printing.



Even IDEO is already researching how to manufacture products starting from bacteria that create shapes through self-organization.

Source: <http://www.fastcompany.com/biomimicry/training-bacteria-to-grow-consumer-goods>

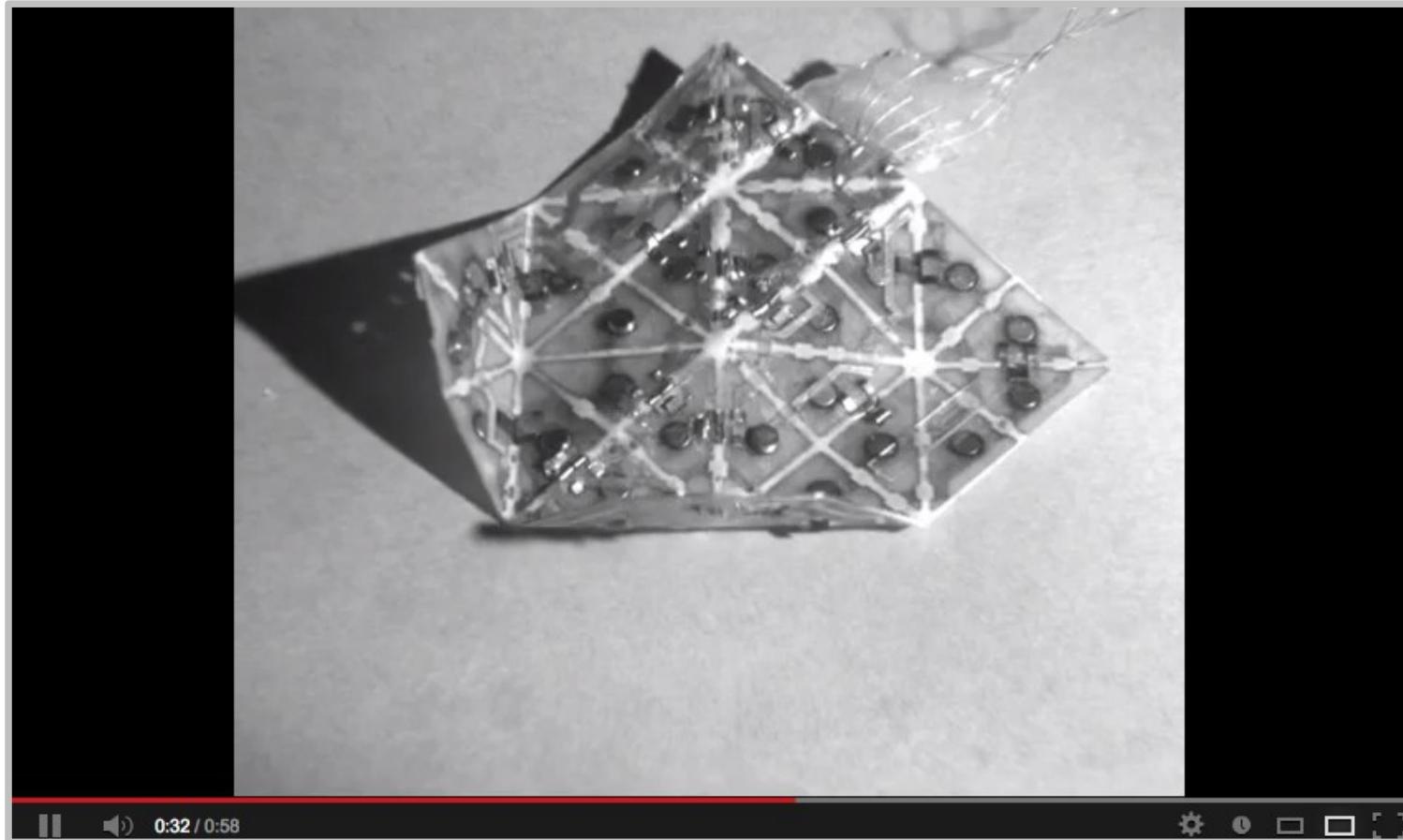
Fab.04: coming to the Design world, soon



[...] spreading a pattern on a responsive material to control how it deforms when exposed to a stimulus [...]

Source: <http://www.newscientist.com/blogs/nstv/2012/03/plant-mimicking-gel-could-morph-into-any-3d-shape.html>
<http://www.youtube.com/watch?v=J7MyjOTynK0>

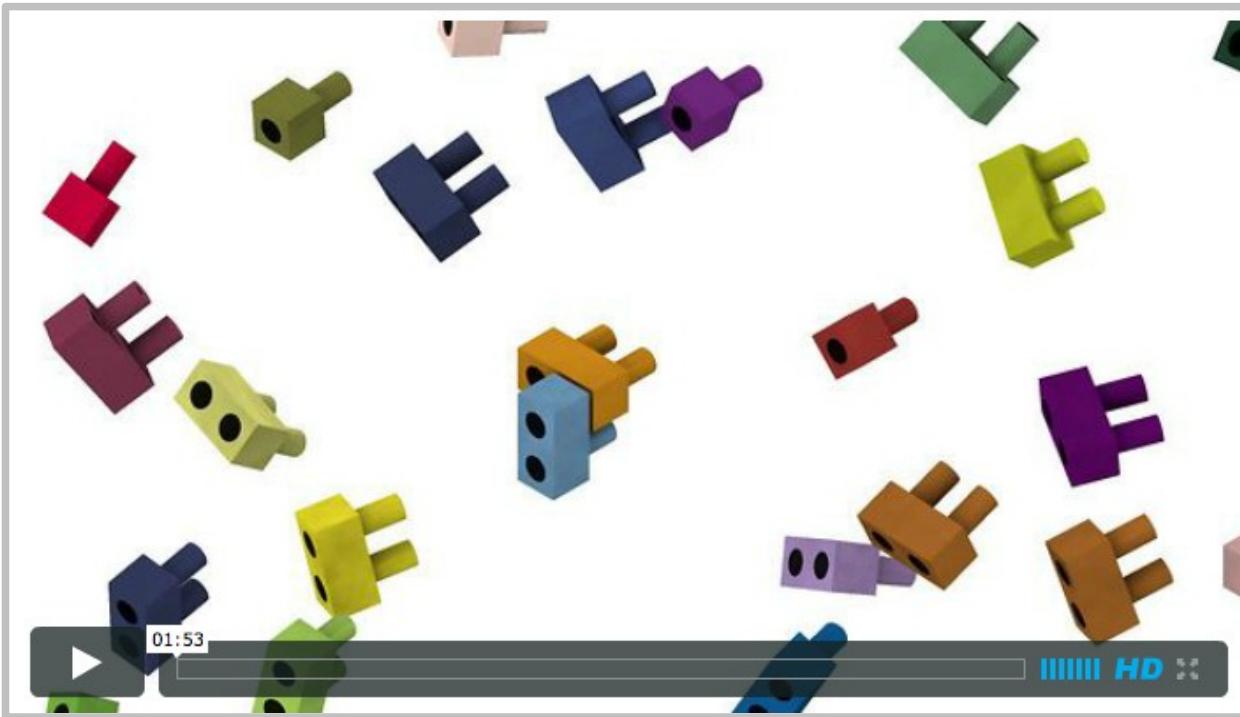
Fab.04: Programmable Matter



Researchers at Harvard and MIT have reshaped the landscape of programmable matter by devising self-folding sheets that rely on the ancient art of origami.

Source: <http://news.harvard.edu/gazette/story/2010/06/shape-shifting-sheets-automatically-fold-into-multiple-shapes/>
<http://youtu.be/Pg8VAVWkz3k>

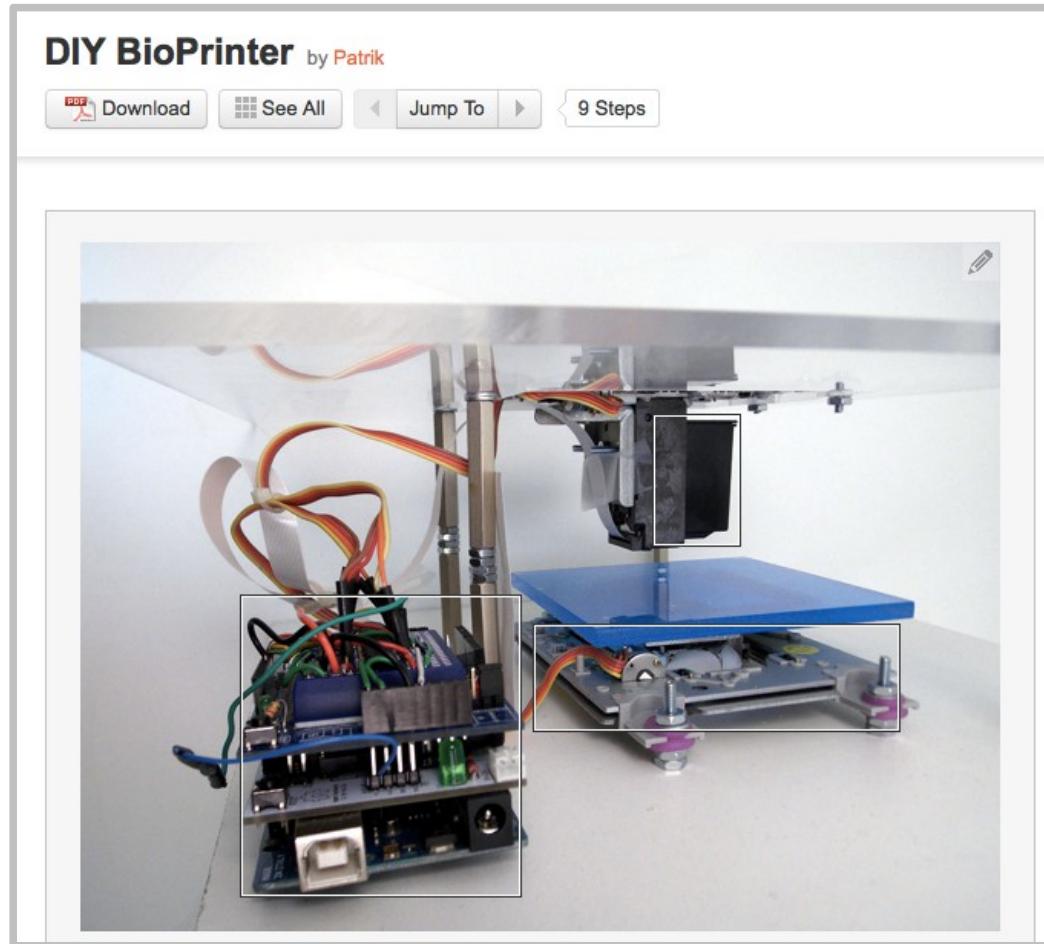
Fab.04: DNA bricks



Complex 3D structures by using short synthetic DNA strands (“DNA bricks”). Bricks with hundreds of distinct sequences self-assemble into prescribed 3D shapes.

Source: <http://m.sciencemag.org/content/338/6111/1177.abstract>
<http://wyss.harvard.edu/viewpressrelease/101/> <http://wyss.harvard.edu/viewpage/408/>

Fabbing: not just learning from biology...



A new bioprinter developed at a hackerspace can print living cells for less than the cost of an iPod touch.

Source: <http://www.instructables.com/id/DIY-BioPrinter/>
<http://www.wired.com/design/2013/01/diy-bio-printer/>

But coming back to Fab 1.0 / 2.0 in 2012



Laser cutting



CNC milling



Vinyl cutter



3D Scanner



3D printing



Digital sewing /
embroidery
machine



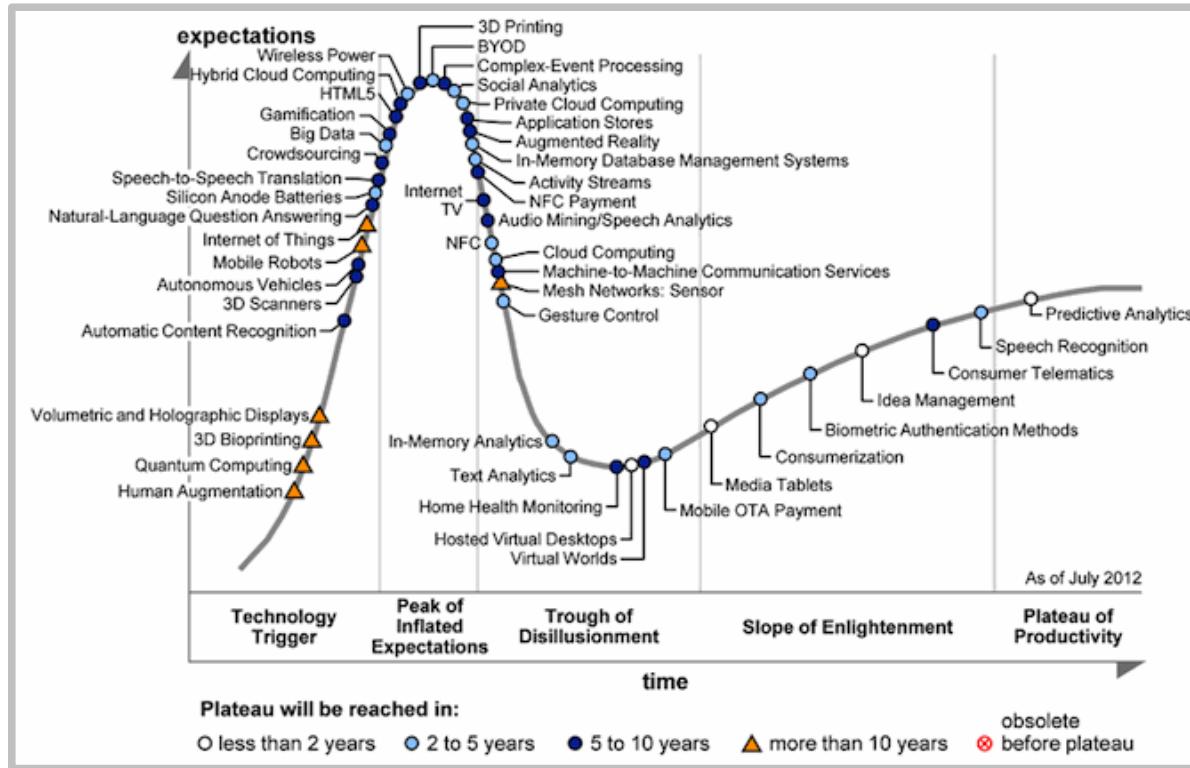
CNC milling



Electronics

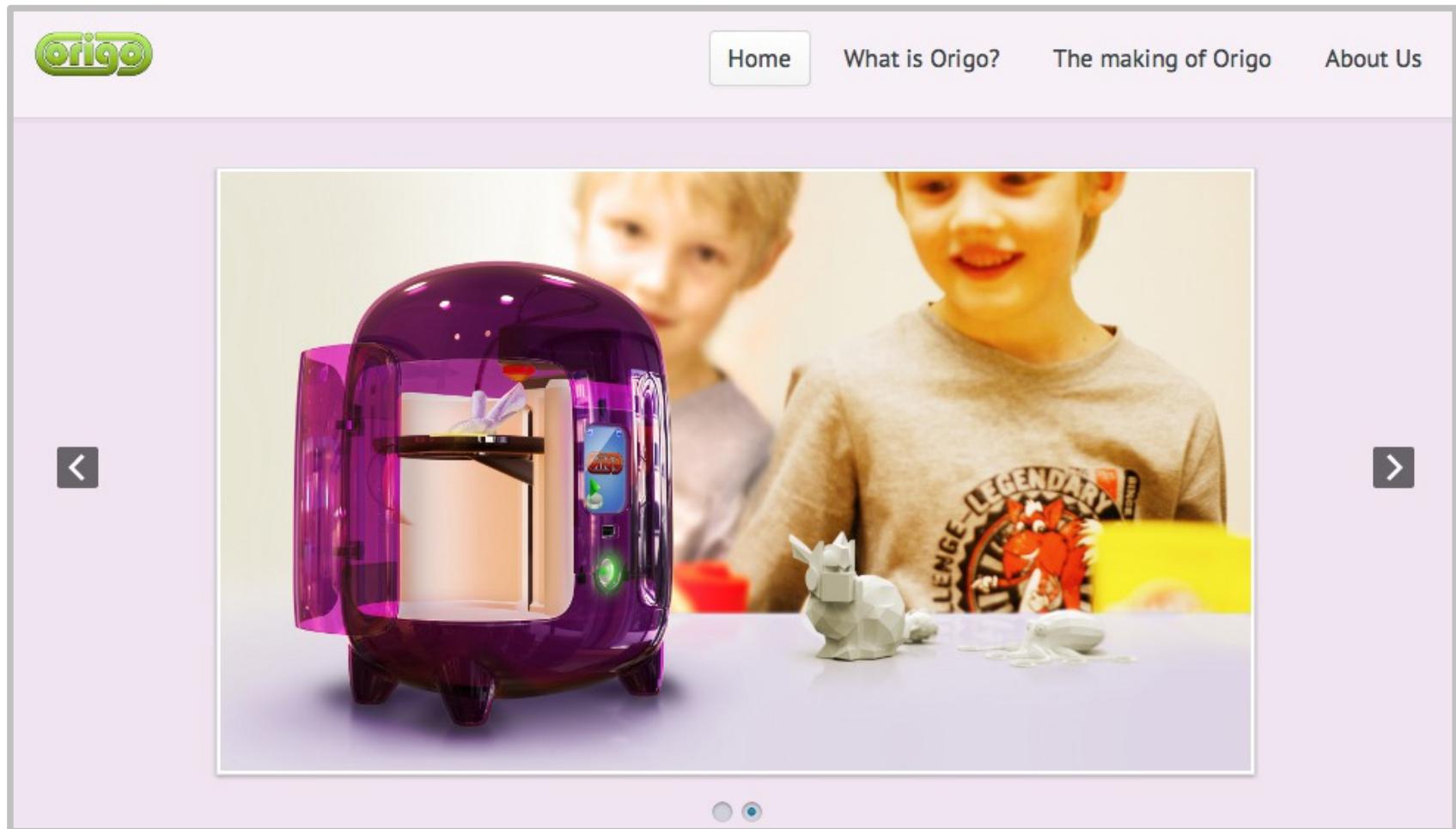
This is what you usually can find in a FabLab, at the moment.

At the peak of enthusiasm, far from productivity



3D Printing has been steadily climbing to the peak of 'Inflated Expectations' over the past few years and now sits on top, poised for the drop.

Democratization of Digital Fabrication

A screenshot of the Origo website. At the top left is the Origo logo. To its right are four navigation links: "Home" (which is highlighted), "What is Origo?", "The making of Origo", and "About Us". Below the navigation is a large image of two young boys looking at a purple 3D printer. In front of the printer is a small, white, 3D-printed unicorn figurine. The website has a light gray background and includes navigation arrows on the left and right sides of the main image.

“Hello, I am Origo. I am a 3D printer for ten year olds.”

Source: <http://www.origo3dprinting.com/>

... and Digital Fabrication became famous



Digital Fabrication / distributed manufacturing as a
viable tool / strategy for business.

Source: http://www.wired.com/magazine/2010/01/ff_newrevolution/
<http://econ.st/tnr97E>

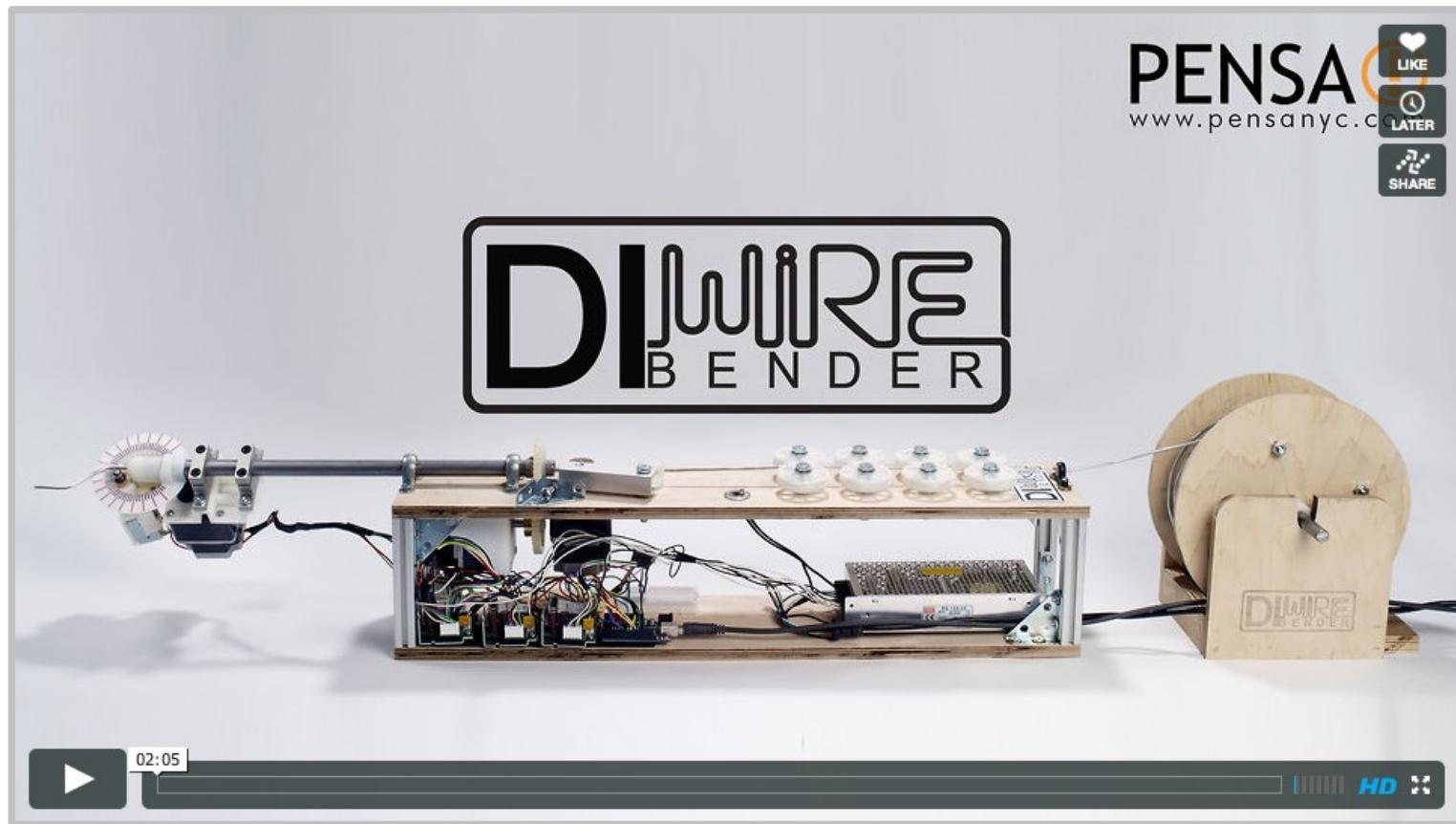
And build your own machine...



Not only cutting and printing, also weaving...

Source: <http://www.fastcodesign.com/1669627/holy-crap-this-mit-robot-might-one-day-weave-a-building>
<http://youtu.be/JgeFLGfvrEM>

And build your own machine...



Not only cutting and printing, also bending...

Source: http://www.core77.com/blog/digital_fabrication/add_pensas_diwire_bender_to_your_diyer_arsenal_22383.asp
<http://vimeo.com/41425580>

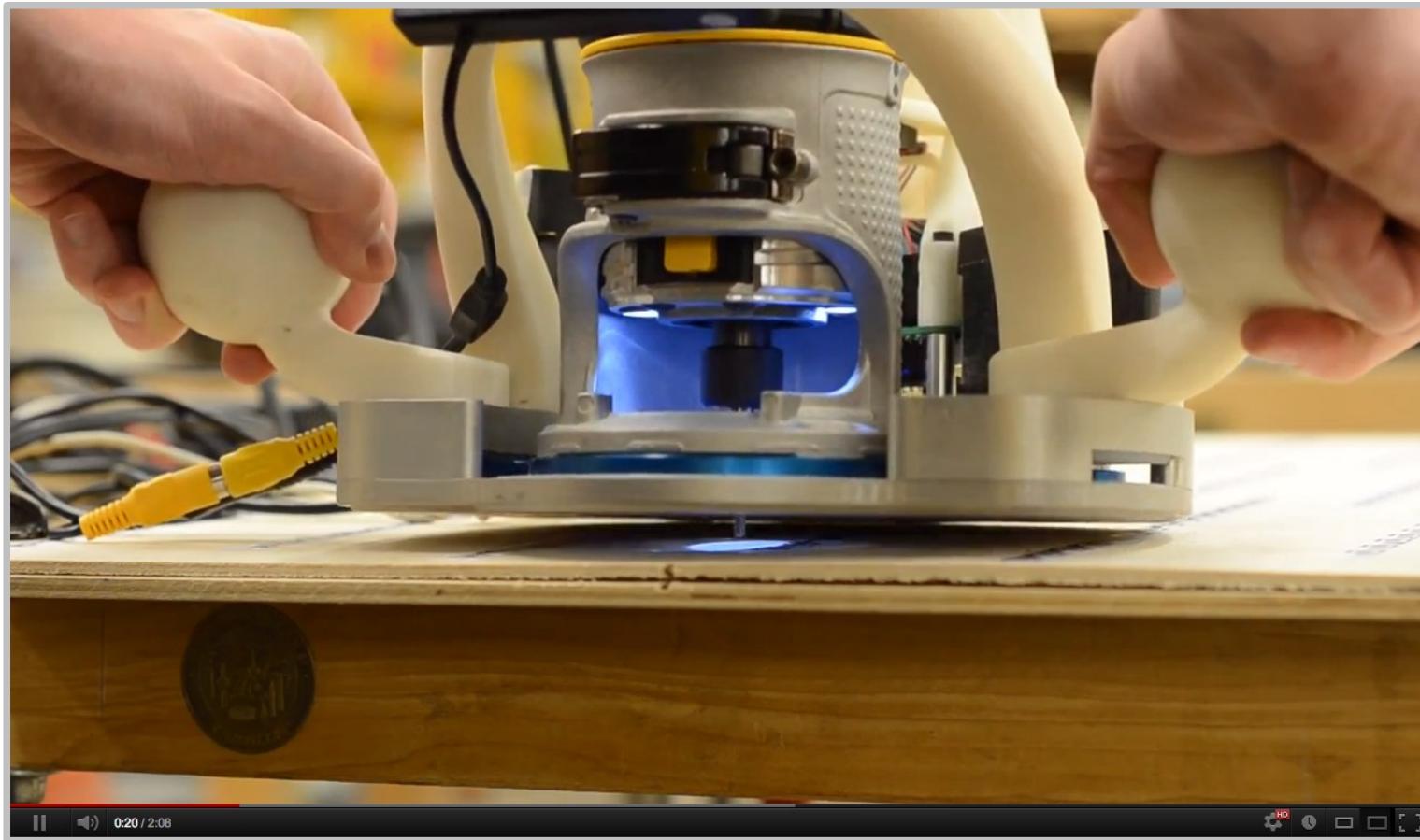
... between digital and hand work...



HAPTIC INTELLIGENTSIA is a human 3D printing machine that allows the user to tactually perceive the virtual object and to directly transform it into the physical.

Source: <http://www.fastcodesign.com/1665529/a-hybrid-machine-joins-3-d-printing-and-human-handicraft-video#3>
<http://vimeo.com/32538081>

... between digital and hand work...



A frame and a tool: the frame is positioned manually by the user and can adjust the position of the tool to correct for error in the user's coarse positioning.

Source: <http://www.alecrollers.com/positioncorrectingtools/>
<http://youtu.be/-UmL7xZZSUK>



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02.

FabLabs: spaces for collaborative use of digital fabrication technologies

A space that democratizes digital fabrication



Exploring collaboratively the interactions between bits
and atoms, rather than making (almost) anything...

Source: <http://www.flickr.com/photos/protospace/5199454304/>

Conditions for being a FabLab

Conditions:

- * **public access** to the fab lab
- * **support and subscribe** the fab lab charter
- * **share a common set** tools and processes
- * **participate** in the global fab lab network (no isolation)

The **Fab Lab conformity rating** code that describes how closely a lab meets the conditions for use of the Fab Lab label. It is a quick summary of the lab "now", can change over time. The conformity rating is self-assessed or community-assessed.

Fab Charter

- * **Mission:** fab labs are a global network of local labs, enabling invention by providing access for individuals to tools for digital fabrication.
- * **Access:** you can use the fab lab to make almost anything (that doesn't hurt anyone); you must learn to do it yourself, and you must share use of the lab with other users and users
- * **Education:** training in the fab lab is based on doing projects and learning from peers; you're expected to contribute to documentation and instruction
- * **Responsibility:** you're responsible for:
 - * safety: knowing how to work without hurting people or machines
 - * cleaning up: leaving the lab cleaner than you found it
 - * operations: assisting with maintaining, repairing, and reporting on tools, supplies, and incidents
- * **Secrecy:** designs and processes developed in fab labs must remain available for individual use although intellectual property can be protected however you choose
- * **Business:** commercial activities can be incubated in fab labs but they must not conflict with open access, they should grow beyond rather than within the lab, and they are expected to benefit the inventors, labs, and networks that contribute to their success.

August 30, 2007

Fab Charter

What is a fab lab?

Fab labs are a global network of local labs, enabling invention by providing access to tools for digital fabrication

What's in a fab lab?

Fab labs share an evolving inventory of core capabilities to make (almost) anything, allowing people and projects to be shared

What does the fab lab network provide?

Operational, educational, technical, financial, and logistical assistance beyond what's available within one lab

Who can use a fab lab?

Fab labs are available as a community resource, offering open access for individuals as well as scheduled access for programs

What are your responsibilities?

- safety: not hurting people or machines
- operations: assisting with cleaning, maintaining, and improving the lab
- knowledge: contributing to documentation and instruction

Who owns fab lab inventions?

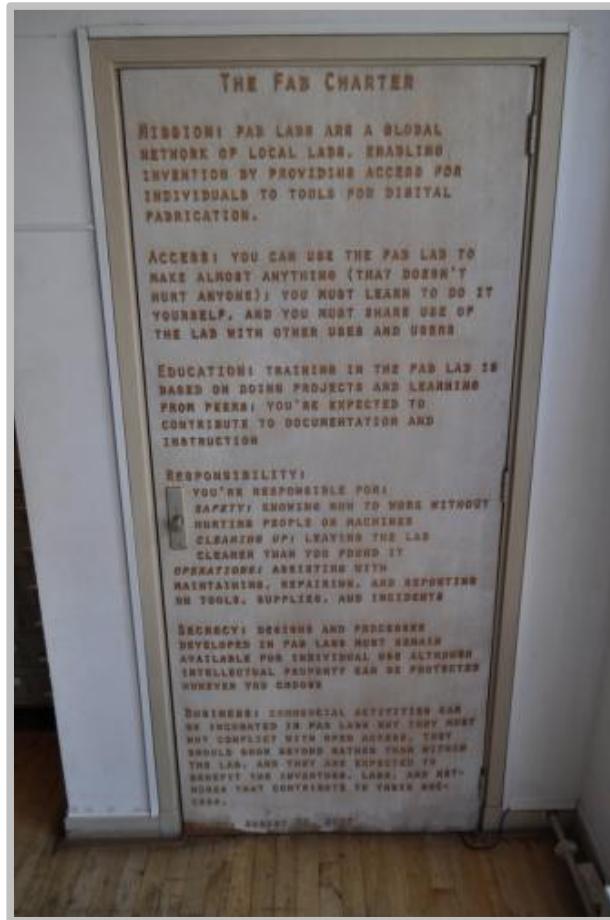
Designs and processes developed in fab labs can be protected and sold however an inventor chooses, but should remain available for individuals to use and learn from

How can businesses use a fab lab?

Commercial activities can be prototyped and incubated in a fab lab, but they must not conflict with other uses, they should grow beyond rather than within the lab, and they are expected to benefit the inventors, labs, and networks that contribute to their success

draft: October 20, 2012

Fab Charter (Amsterdam, Netherlands)



The Fab Charter is always visible in a FabLab

FabN : the yearly meeting



Every year in August in a different continent.

Fab Academy

APPLICATION FORM CONTACT FACULTY METHODOLOGY SCHOLARSHIPS VIDEOGALLERY WHAT IT IS?



FABACADEMY

PRINCIPLES, APPLICATIONS AND IMPLICATIONS OF DIGITAL FABRICATION



GRADUATION AT FAB CONFERENCE EVERY YEAR

The Fab Academy began as an outreach project from the CBA, and has since spread to Fab Labs around the world.

Source: <http://fabacademy.org/>

Fab Academy: my experience

Massimo Menichinelli

Exercises

Final project

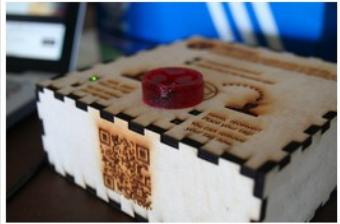
Digital Fabrication Studio course

About

Back to FabAcademy 2012

Massimo @ FabAcademy 2012

Here you can find all the notes, exercises, documents of the final projects done by Massimo Menichinelli for the FabAcademy 2012 from Aalto FabLab (Helsinki) and mentored by FabLab Amsterdam.



Final project: FABMoney

FABMoney is an open source digital currency for enabling collaboration in a FabLab. The project is completely open source software.

Digital Fabrication Studio

About Massimo...

My background is in Industrial and Service Design since I have a Master of Science in Industrial Design from the Politecnico di Milano, Italy.

Aalto FabLab

I attended the FabAcademy from the Aalto FabLab in Helsinki, a lab I've helped building with Anu Maatta at the Aalto Media Factory. We

An example of documentation...

Source: <http://academy.cba.mit.edu/2012/students/menichinelli.massimo/index.html>

Fab Foundation

info@fabfoundation.org



FAB FOUNDATION

About News Fab Labs Fab Exchange Mobile Fab Lab FAQ Contact us



Digital Fabrication

The Fab Foundation was formed February 9, 2009 to facilitate and support the growth of the international fab lab network.

Source: <http://www.fabfoundation.org/>

The International Fab Lab Association



The
International Fab Lab Association
The public window to the international Fab Lab community.

Home

- Fab Association
- Why we are here
- Who we are
- Our board
- What we want
- How to join

Fab Lab

- Where does it come from
- What is it in essence
- The Fab Charter
- Where are they located
- How to start one

Fab Ecosystem

- Newsroom
- News
- Upcoming Events
- Newsletters
- Blog

Resources

- Reading and watching
- Past events

Members area

Home



Image by Frost Gislason, 2010

Welcome to the International Fab Lab Association

Fab Lab International is an association of individuals interested in and/or involved in the Fab Lab community. It is a democratic organization run by its members. Their general meeting elects a board which handles the daily business.

On the 4th of July 2011, the International Fab Lab Association was established. It is an association with members, a Board and an Academic Council, etc.

Source: <http://fablabinternational.org/>
<http://fablabinternational.blogspot.com/>

From Fab Foundation: fablabs.io

The screenshot shows the fablabs.io website interface. At the top, there is a navigation bar with a search bar labeled "Search Labs...", "Labs", "Machines", and a user profile icon labeled "Me". Below the navigation bar, the page title is "Labs / All Countries". There are two tabs at the top right: "LIST" (selected) and "MAP". The main content area displays a list of FabLabs from various countries:

- 3dlab-fabcafe**
Buenos Aires, Argentina | cotizaciones@3dlab-fabcafe.com | +54 11 31220461
We have 3d scanning service. More than 10 different 3d printers.
Wide format inkjet vinyl cutter tools
- 7elektron**
Belo Horizonte, Minas Gerais, Brazil | fablab@7elektron.com.br | +55 31 99825166
- 8 FabLab Drôme**
Crest, Drôme, France | contact@fablab-drome.fr
- Aalto Fab Lab**
Helsinki, Suomi, Finland
- ACoLab**
Clermont-Ferrand, France | contact@acolab.fr | +33(0)651800518

On the right side, there is a sidebar titled "Filter by Country" which lists the number of FabLabs per country:

Country	Count
All Countries	313
Afghanistan	1
Argentina	4
Australia	2
Austria	1
Belgium	7
Brazil	7
Bulgaria	1
Canada	6
Chile	4
Colombia	2
Costa Rica	1
Czech Republic	1
Denmark	3
Egypt	2
Ethiopia	1
Finland	1

The official platform for mapping the international network of FabLabs.

Fab Lab Amsterdam (Netherlands)



Fablab Amsterdam is hosted by Waag Society, a non profit organisation active in the field of social innovation through creative technology.

Source: <http://fablab.waag.org/>
<http://www.flickr.com/photos/37873897@N06/4973326149/>

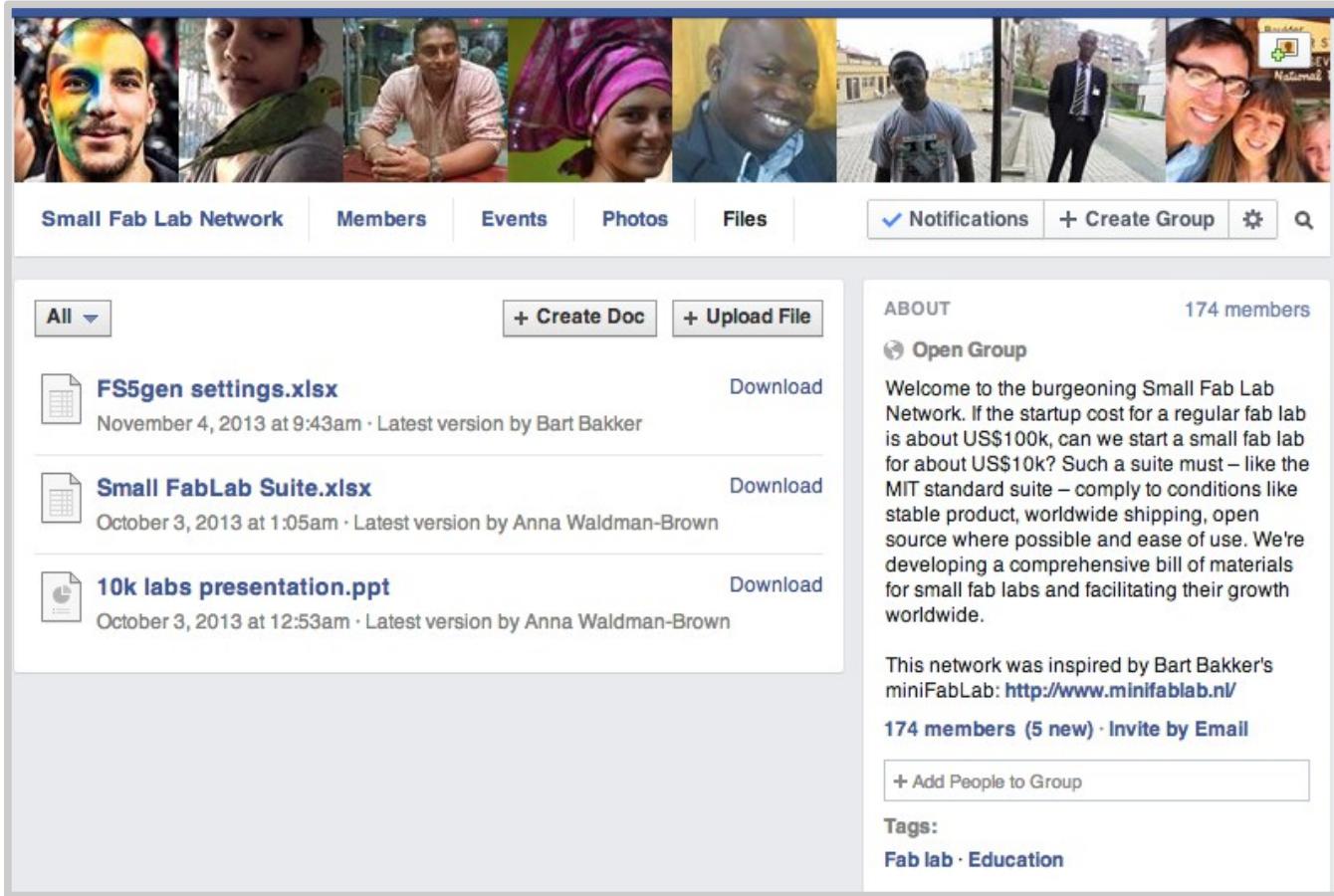
Mini Fab Lab (Utrecht, Netherlands)



A FabLab in your room for 3500 €.

Source: <http://www.minifablab.nl/>

Mini Fab Lab / 10k: the community



The screenshot shows the Facebook group page for "Small Fab Lab Network". At the top, there is a collage of eight small profile pictures of diverse individuals. Below the collage is a navigation bar with links: "Small Fab Lab Network", "Members", "Events", "Photos", "Files", "Notifications" (with a checked checkbox), "+ Create Group", a gear icon, and a search icon.

In the main content area, there is a "All" filter dropdown and two buttons: "+ Create Doc" and "+ Upload File". Below these are three document attachments:

- FS5gen settings.xlsx** - Downloaded on November 4, 2013 at 9:43am by Bart Bakker.
- Small FabLab Suite.xlsx** - Downloaded on October 3, 2013 at 1:05am by Anna Waldman-Brown.
- 10k labs presentation.ppt** - Downloaded on October 3, 2013 at 12:53am by Anna Waldman-Brown.

On the right side of the page, there is a "ABOUT" section with the following text:
Welcome to the burgeoning Small Fab Lab Network. If the startup cost for a regular fab lab is about US\$100k, can we start a small fab lab for about US\$10k? Such a suite must – like the MIT standard suite – comply to conditions like stable product, worldwide shipping, open source where possible and ease of use. We're developing a comprehensive bill of materials for small fab labs and facilitating their growth worldwide.

Below the "ABOUT" section, there is a note: "This network was inspired by Bart Bakker's miniFabLab: <http://www.minifablab.nl/>".

At the bottom of the right sidebar, it says "174 members (5 new) · Invite by Email" and has a "+ Add People to Group" button. Below that, under "Tags:", are the words "Fab lab · Education".

Welcome to the burgeoning Small Fab Lab Network. If the startup cost for a regular fab lab is about US\$100k, can we start a small fab lab for about US\$10k?

Source: <https://www.facebook.com/groups/smallfablab/>

Mobile Fab Lab



In USA, Europe, South Africa...

Source: http://en.wikipedia.org/wiki/Mobile_fab_lab

Fab Lab Afghanistan (Jalalabad, Afghanistan)



Not only in USA or Europe ...

Source: <http://www.fablab.af/>

Fab Lab Afghanistan: FabFi, a project



An open-source, FabLab-grown system using common building materials and off-the-shelf electronics to transmit wireless ethernet signals.

Source: <http://fabfi.fabfolk.com/>

FabLab Barcelona (Spain)



FAB LAB BARCELONA

HOME EL FAB LAB EQUIPAMIENTO SERVICIOS VIDEOS GALERIA CONTACTO MACHINE RESERVATION WIKI

THURSDAY SEPTEMBER 22ND 2011

Search ...



Thursday, August 25, 2011

Muestra Fab Products en el Fab7 > Concurso de innovacion en el Fab Lab Bcn

Featured



Fab 7 – Lima (Peru). Séptima conferencia mundial de Fab Labs.
Cada verano, la red mundial de Fab Labs se reúne de manera "física" en un lugar del mundo para discutir [Read More]



UNIBE workshop > Fabricacion Digital en el Caribe
El taller UNIBE workshop tuvo lugar en el Fab Lab Barcelona del 26 al 30 de Abril. 14 estudiantes de primer año de [Read More]



GREEN FAB LAB Project presentation at Valldaura
Last Friday the IAAC community launched the new project for the upcoming years. The GREEN FAB LAB will be a research, [Read More]

From the Institute for Advanced Architecture
of Catalonia (IAAC).

Source: <http://fablabbcn.org/>

FabLab Barcelona: FabLab House, a project



**FabLab
House**

info@fablabhouse.com

IAAC | MIT's CBA | Fab Lab



"Una casa solar debe fabricarse con un material solar, como la madera."

Salvador Rueda, ecólogo Director de

The Fab Lab House is a self-sufficient dwelling produced to take part in the Solar Decathlon Europe 2010.

Source: <http://www.fablabhouse.com/>

A FabLab and its local context



A city with a long tradition of organic / generative architecture and experimental building technologies.

Source: http://en.wikipedia.org/wiki/Casa_Batllo

Green FabLab Barcelona



Naturaleza, Tecnología y Energía.

Parc de Collserola, Barcelona

March 24, 2010





GOBIERNO
DE ESPAÑA

MINISTERIO
DE INDUSTRIA, TURISMO
Y COMERCIO

plan
avanza»»

Un proyecto de

Iaac
Instituto de
arquitectura
avanzada de
Cataluña

Con el apoyo de

**THE CENTER FOR
BITS AND ATOMS**
Massachusetts Institute of Technology

**B
ECOLOGIA
N**

A fablab that researches sustainable technologies with and for digital fabrication.

Source: <http://greenfablab.org/>

The future: Barcelona FabCity



“Toni Vives [...], Head of the Department the Urban Habitat in the Office of the Mayor of Barcelona and member of the IAAC Board of Directors, presented the city’s plan to become a “Fab City” with multiple Fab Labs in neighborhoods around Barcelona.”

Source: <http://www.iaacblog.com/blog/2011/iaac-at-fab-7-in-lima-peru/>

Fab Lab Brand: no trademark (until recently)



So far, and except some countries (Netherlands) where
is managed by the local association.

Source: <http://fab.cba.mit.edu/about/logos/index.html>

Fab Lab and Brand: a possible strategy?



Do you recognize this brand? It tried to open a FabLab in Madrid to show how it cares about creativity.

Source: <http://www.flickr.com/photos/journal-du-design/3895643669/>

Absolut Lab (Madrid, Spain)



A huge FabLab sponsored by Absolut Vodka, that was closed few months after its opening...

Source: <http://www.franciscosegarra.com/absolut-lab-proyecto-interiorismo/>



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03.

FabLabs and Fabbing: applications and examples

A space for DIY projects



The first value offer is a space for people to develop (and learn) their own projects.

Source: Scott Beale / Laughing Squid <http://laughingsquid.com>
<http://www.flickr.com/photos/laughingsquid/133324021/>

No idea for a project? Hack one!



The screenshot shows the homepage of the IKEA Hackers website. At the top left is the logo "IKEA HACKERS" in yellow and blue. To the right of the logo is a small illustration of a person holding a wrench, looking up at a lit lightbulb. Below the logo is a navigation bar with four items: "Home", "About", "Start here", and "Post a hack".

Below the navigation bar are three images of hacked IKEA furniture:

- Mirrored luxe**: A mirrored cabinet with a silver frame and legs.
- Extendable bedside lamp**: A lamp with a large, flexible, articulated arm extending from a base, with a glowing bulb at the end.
- Aneboda chest makeover**: Two white Aneboda storage units with multiple drawers, standing side-by-side.

IKEA products are cheap enough, there are many options and components that can be reused.

Source: <http://www.ikeahackers.net/>

Generative Design

neuroous system [SHOP](#) [BLOG](#) [ABOUT US](#) [TOOLS](#) [STOCKISTS](#) [JOBS](#) [CONTACT](#) [login](#) [cart: 0 items](#)

[JEWELRY](#) [HOUSEWARES](#) [CONCEPTS](#)

vessel pendant and spiral bracelet model photography by Natalia Borecka

featured products

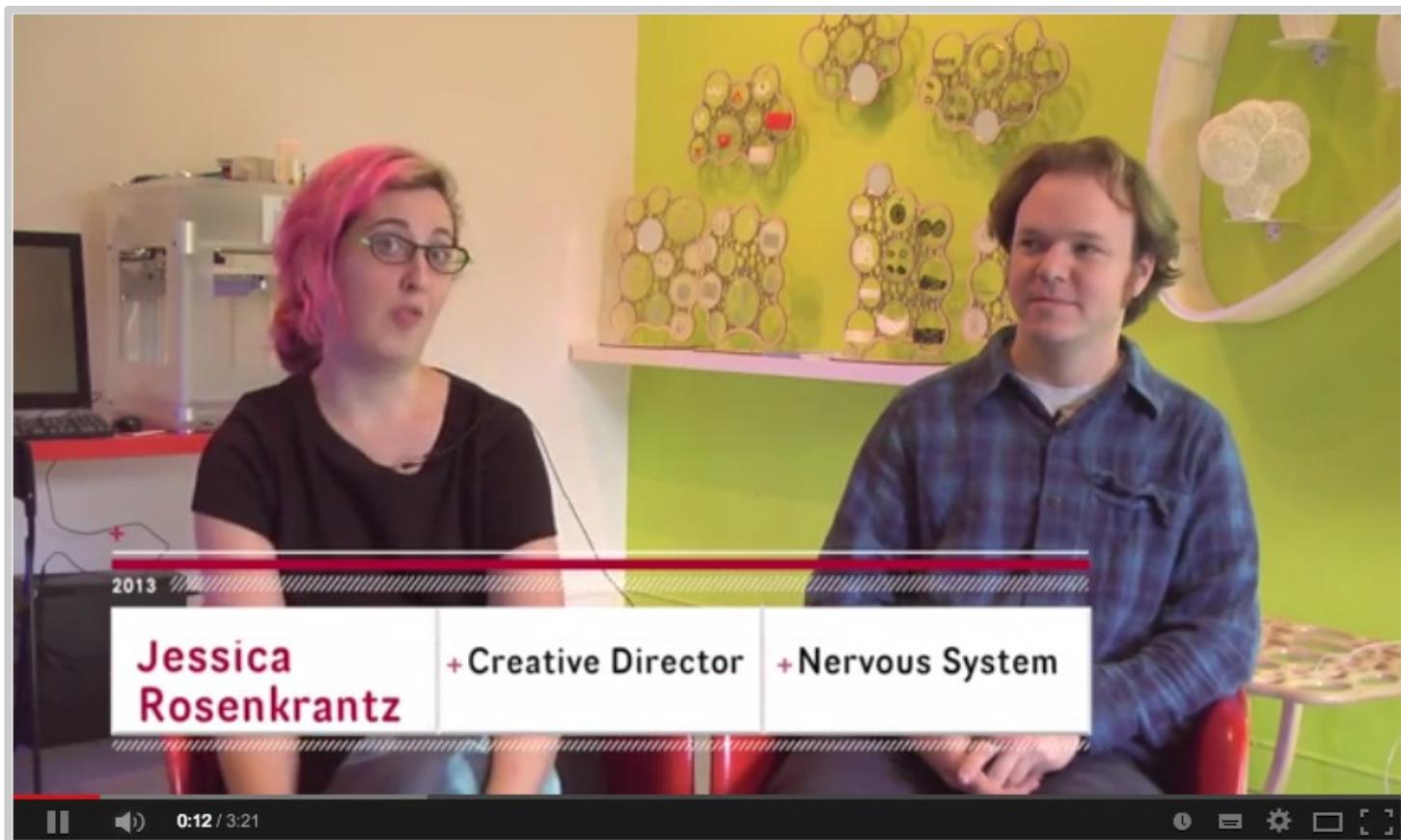
SILVER VESSEL PENDANT \$275.00

HIVE TRIVET \$12.00

Generative Design projects need digital fabrication technologies for being manufactured.

Source: <http://www.n-e-r-v-o-u-s.com/>

Generative Design



Generative Design projects need digital fabrication technologies for being manufactured.

Source: <https://www.youtube.com/watch?v=aWWkB31QXck>

Physical Data Visualization

// MICROSONIC LANDSCAPES

An algorithmic exploration of the music we love. Each album's soundwave proposes a new spatial and unique journey by transforming sound into matter/space: the hidden into something visible.



// ARVO PÄRT
Für Alina



// THIRD
PortisHead



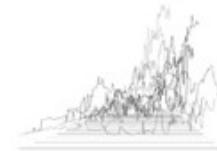
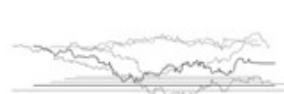
// ANOTHER WORLD
Antony & the Johnsons



// PINK MOON
Nick Drake



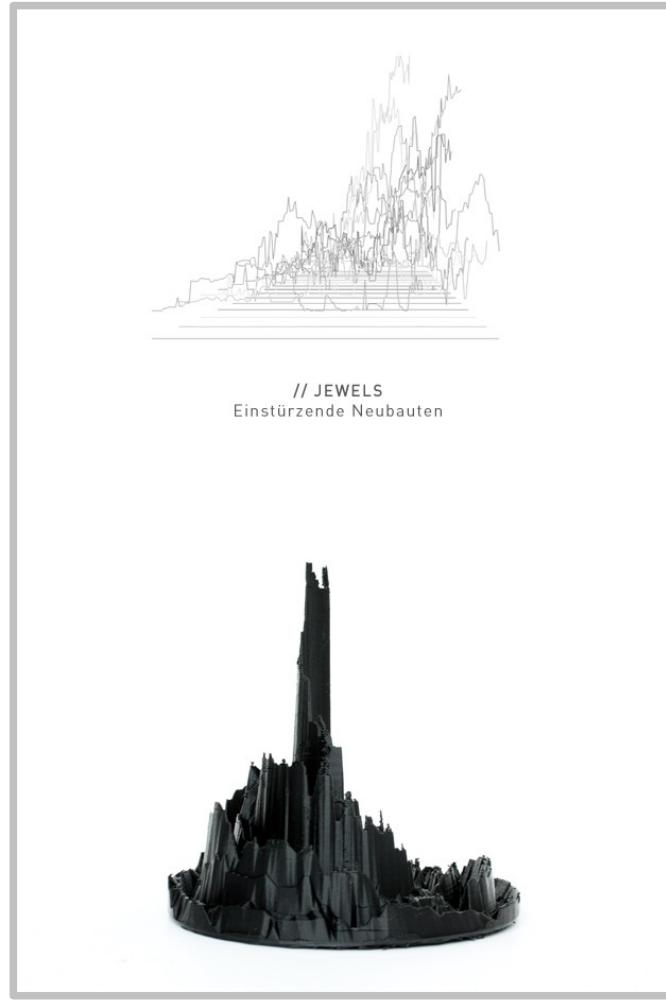
// JEWELS
Einstürzende Neubauten



Digital Fabrication can be used for rendering visible and physical intangible data and concepts.

Source: <http://www.realitat.com/microsonic/>

Physical Data Visualization



Digital Fabrication can be used for rendering visible and physical intangible data and concepts.

Source: <http://www.realitat.com/microsonic/>

Mass Customization



Mass customization can be enabled in an easier way with digital fabrication technologies (and places for interacting with customers).

Source: <http://nikeid.nike.com/nikeid/>

Custom Prosthetics



Building customized prosthetics, at home!

Source: <http://youtu.be/WoZ2BgPVtA0>

http://www.core77.com/blog/digital_fabrication/wrex_3d_printed_magic_arms_and_the_future_of_pediatric_prosthetics_23101.asp

Custom Low-cost Prosthetics

The
Low Cost
Prosthesis

Contact FAQ

[home](#) [the need](#) [what we do](#) [partners](#) [blog](#)



Elements of the Low Cost Prothesis

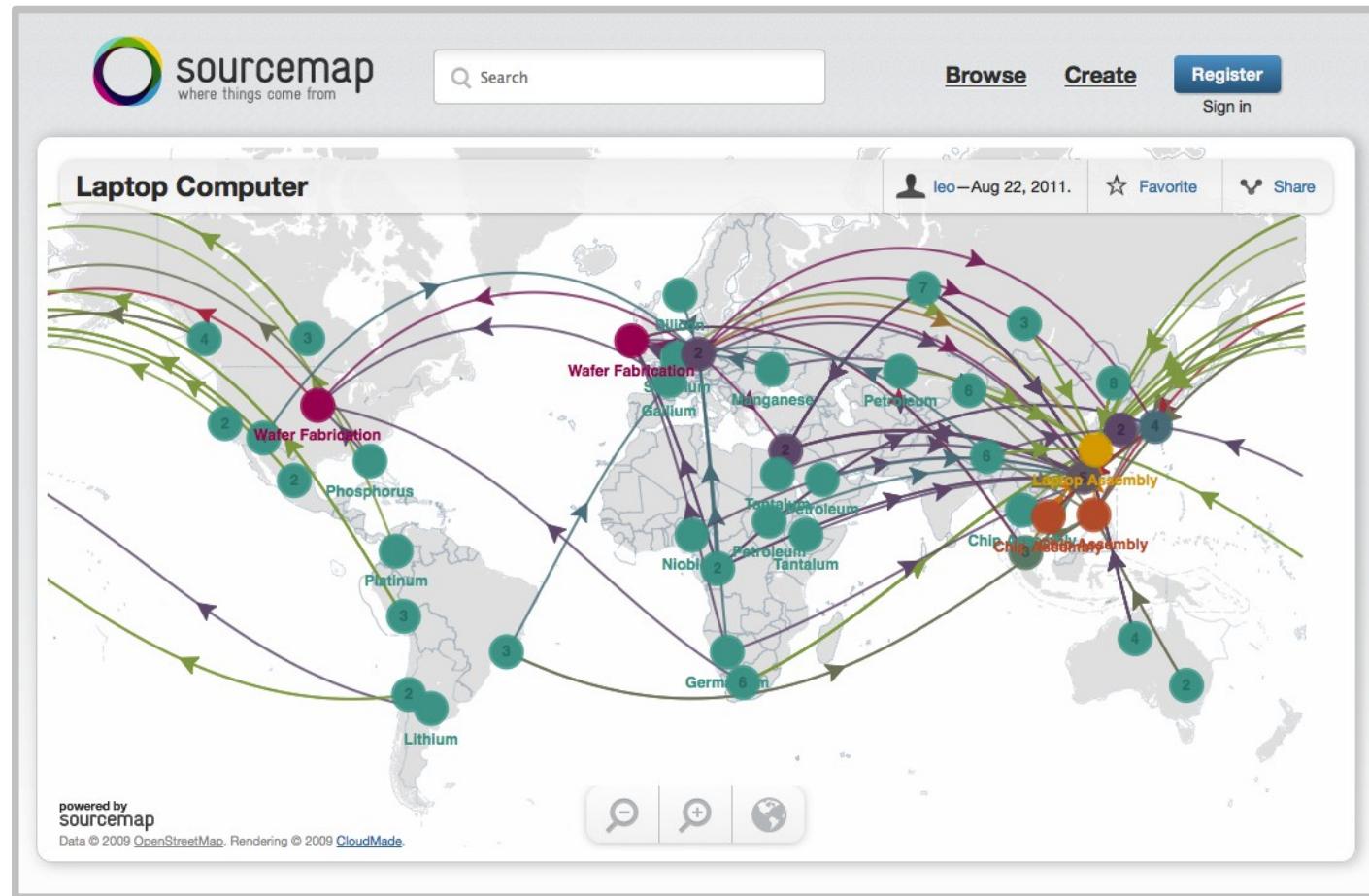
...

The Low Cost Prosthesis project aims at developing a lower leg prosthetic with production costs below \$50. An important cause, because the need for prostheses is growing and the costs are often high. Due to the increasing rate of amputations, there is an ever-growing demand for prosthetic limbs.

Building low-cost customized prosthetics, at home, from FabLab Amsterdam.

Source: <http://www.lowcostprosthesis.org/>

Shorter and more sustainable supply chains



Visualizing and redesigning supply chains,
through open source and open data software.

Source: <http://www.sourcemap.com>

Instead, what cannot we do?

DEFENSE DIST. :

NEWSLETTER SUBSCRIPTION

bitcoin ACCEPTED HERE

f t

HOME OF THE WIKI WEAPON

OUR PLAN FAQ ABOUT US THE GUNS EVENTS MEDIA BLOG WIKI CONTEST

The Wiki Weapon Share More info

WATCH VIDEO

SPREAD THE WORD

HOME OF THE WIKI WEAPON. A COLLABORATIVE PROJECT TO CREATE FREELY AVAILABLE PLANS FOR 3D PRINTABLE GUNS.

DONATE



printablegun.com

The rise of 3D printed weapons, but you cannot build them in a FabLab (it's against the Fab Charter).

Source: <http://defensedistributed.com/>

Instead, what cannot we do?

DESIGN | product design | miscellaneous | apocalypse prep

Looks Could Kill: Using 3-D Printers to Design Guns

BY JOSEPH FLAHERTY | 08.10.12 7:45 AM

Facebook Like 55 | Twitter Tweet 66 | LinkedIn Share 7

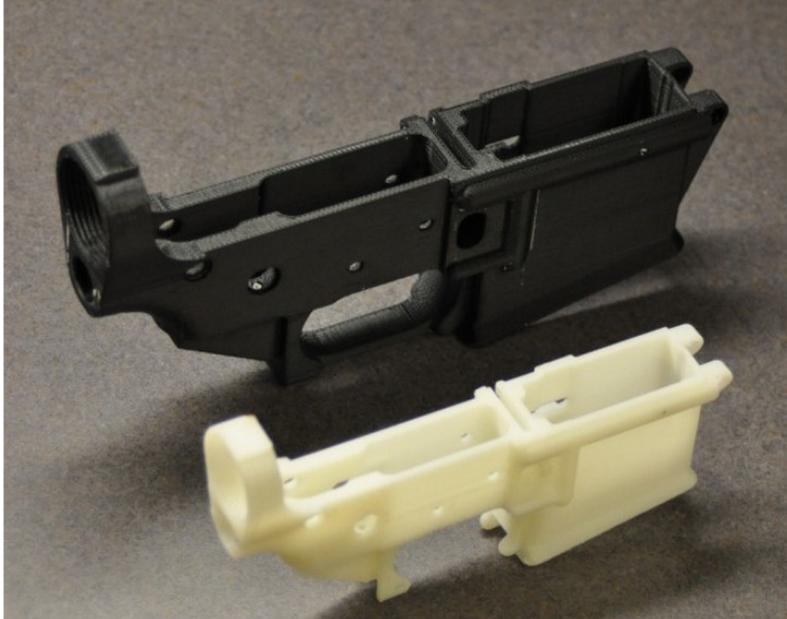


Photo: Courtesy Michael Guslick/Haveblue.org

The rise of 3D printed weapons, but you cannot build them in a FabLab (it's against the Fab Charter).

Source: <http://www.wired.com/dangerroom/2012/08/3d-weapons/>
<http://www.wired.com/design/2012/08/rapid-fire-rapid-prototypes/>

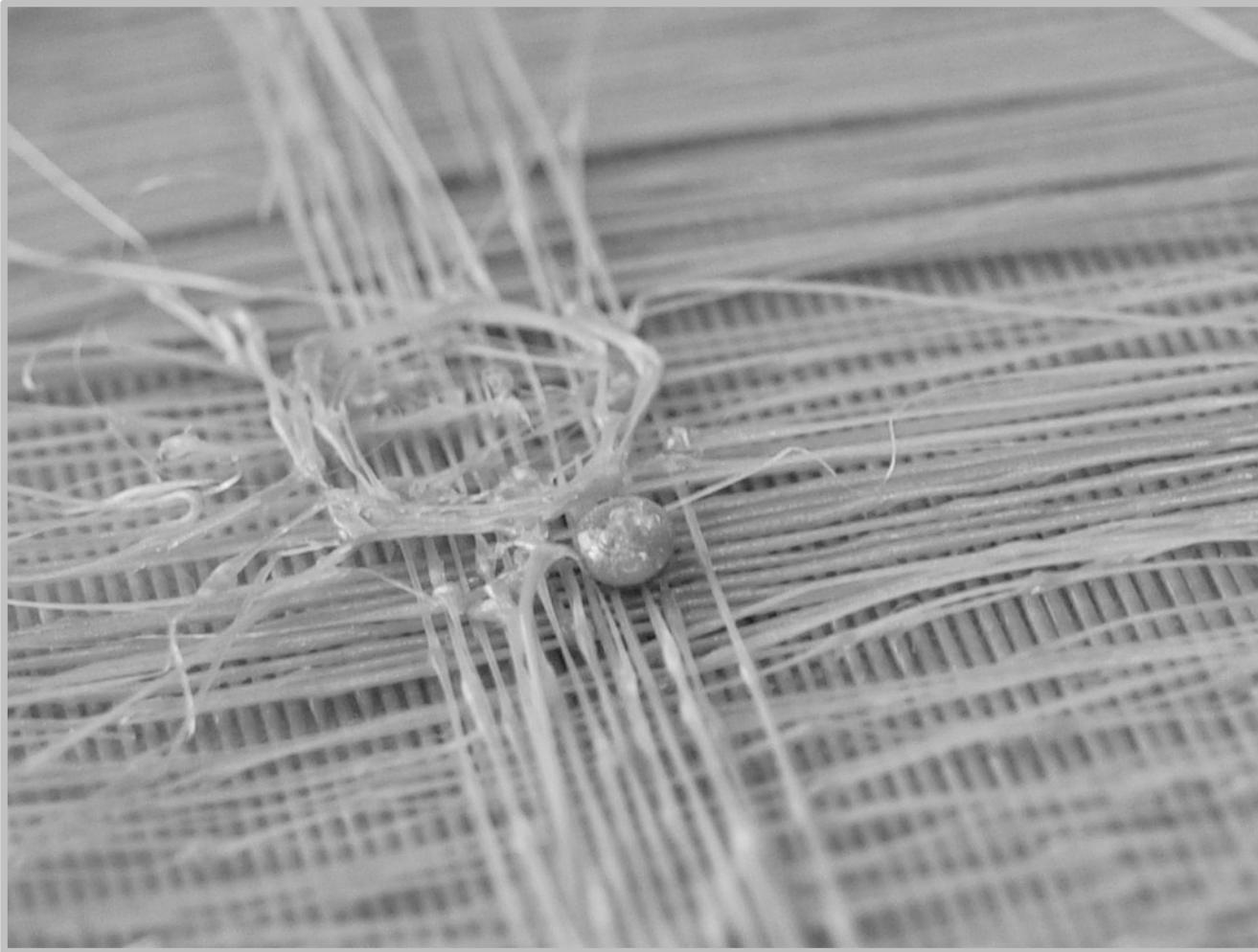
Instead, what cannot we do?



The rise of 3D printed weapons, but you cannot build them in a FabLab (it's against the Fab Charter).

Source: https://www.youtube.com/watch?v=Spm_zrjedzk

Fabbing and Media



Digital Fabrication can be used in different media: photography of failed 3D prints.

Source: <http://cunicode.com/beautiful-failures/>

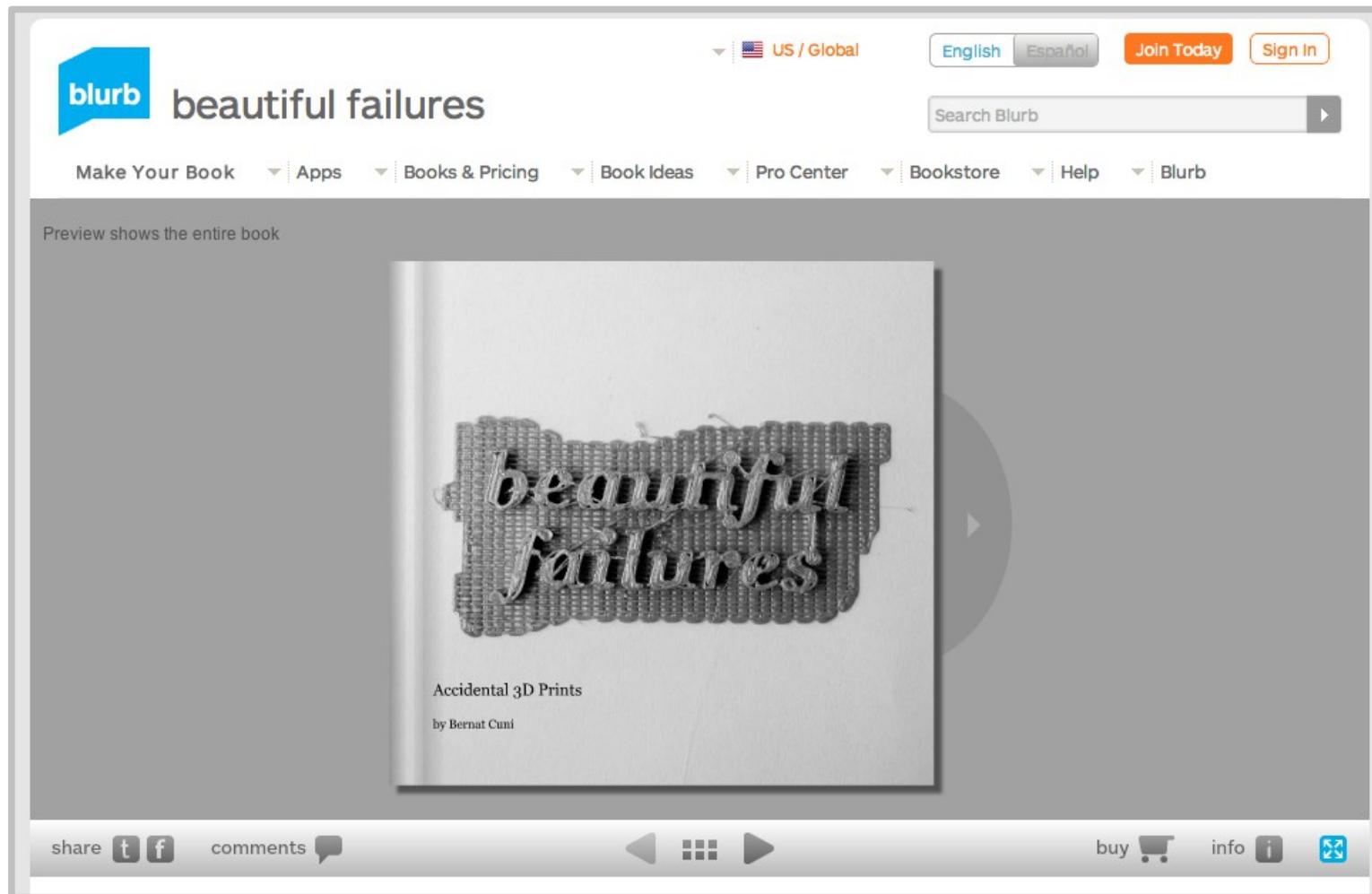
Fabbing and Media



Digital Fabrication can be used in different media: video of failed 3D prints.

Source: <http://cunicode.com/beautiful-failures/> <http://vimeo.com/42537804>

Fabbing and Media



Digital Fabrication can be used in different media: book of failed 3D prints.

Source: <http://cunicode.com/beautiful-failures/> <http://www.blurb.com/books/3248225>

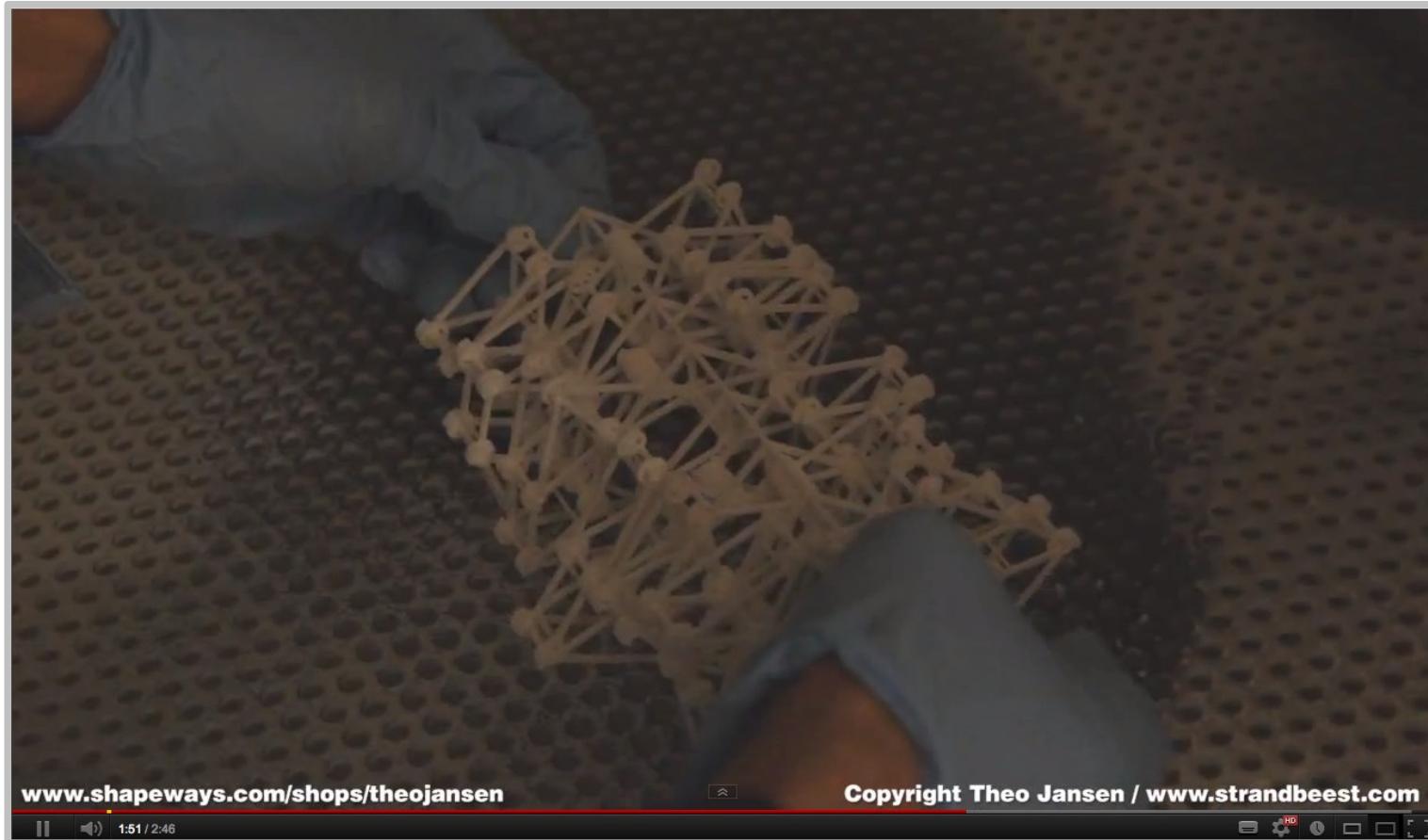
Same project, different media



Digital Fabrication can be also thought as a medium for converting one project to a different format.

Source: <http://www.3ders.org/articles/20120820-theo-jansen-3d-printed-strandbeests-here-are-the-lego-and-bamboo-version.html>
<http://youtu.be/HSKyHmjyrkA>

Same project, different media



Digital Fabrication can be also thought as a medium for converting one project to a different format.

Source: <http://www.3ders.org/articles/20120820-theo-jansen-3d-printed-strandbeests-here-are-the-lego-and-bamboo-version.html>
<http://youtu.be/pZr-zyHRBn4>

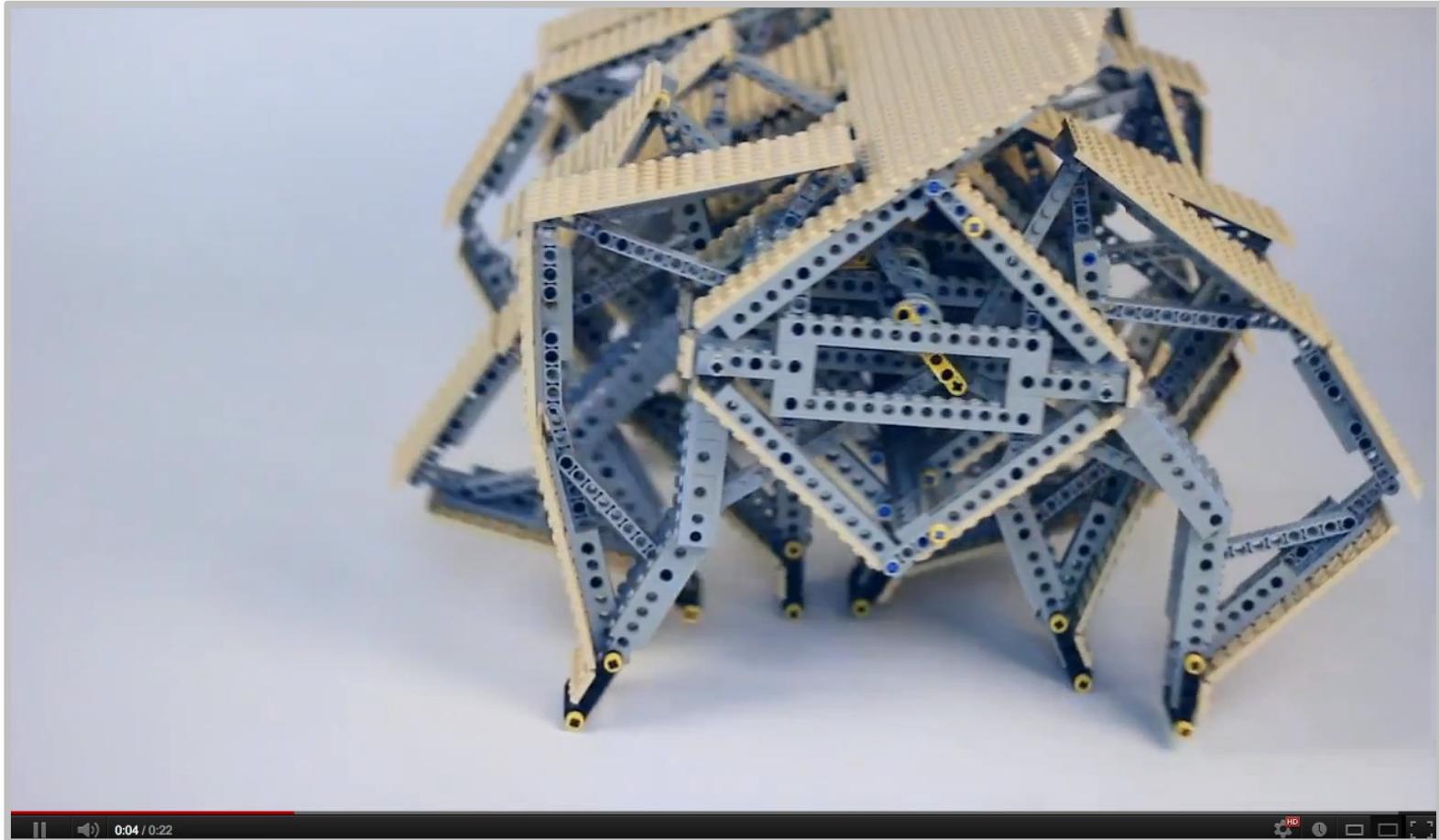
Same project, different media



Digital Fabrication can be also thought as a medium for converting one project to a different format.

Source: <http://www.3ders.org/articles/20120820-theo-jansen-3d-printed-strandbeests-here-are-the-lego-and-bamboo-version.html>

Same project, different media



Digital Fabrication can be also thought as a medium for converting one project to a different format.

Source: <http://www.3ders.org/articles/20120820-theo-jansen-3d-printed-strandbeests-here-are-the-lego-and-bamboo-version.html>
<http://youtu.be/NfutNEauniE>



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04.

Other spaces and services: making digital fabrication even more accessible

Hackerspaces / Makerspaces

hackerspaces

Page Discussion View source History

Hackerspaces

Communication

Active hackerspaces

ALL hackerspaces

> add a hackerspace

List of events

> add an event

List of projects

> add a project

Recent changes

Go Search

What links here

Related changes

Special pages

Printable version

Permanent link

Browse properties

List of Hacker Spaces

This is a comprehensive, user-maintained list of all active hackerspaces throughout the world.

We have also a [list of planned Hacker Spaces](#), as well as a [list of ALL hackerspaces](#) around the globe - including those still in bu

If we're missing your space, or you want and/or are about to create a new one, please [add yourself](#) to the list.

hackerspace	Country	State	City	Website
BAH	Argentina	Buenos Aires	Capital Federal	http://www.hackerspace.com.ar
Toylab	Argentina	Buenos Aires	Capital Federal	http://toylab.wordpress.com/
MatesLab	Argentina	Buenos Aires	Mar del Plata	http://www.mateslab.com.ar

Hackerspaces are open community labs with machine shops, workshops and/or studios where hackers can share resources and knowledge.

Source: http://hackerspaces.org/wiki/List_of_Hacker_Spaces

Helsinki Hacklab

Helsinki Hacklab

Yhteisöllinen työpaja Helsingissä

Home Helsinki Hacklab Tilan esittely Liity Jäseneksi Tapahtumat Yhteystiedot

Sunnuntaina 6.5. Ommeltavan elektroniikan työpaja

Posted on **30.4.2012** by **anacron**

Sunnuntaina 6.5. pidetään Helsinki Hacklabilla ommeltavan elektroniikan työpaja. Alkaen klo 12 osoitteessa: Nilsiänkatu 10 B.

Ohjelmassa on luvassa elektroniikan alkeita ja tarkoituksena on myös omalla johtavaa, joka sitten vilkkuu tai vaikka piipittää. Mukana menossa myös Arduino (+ Lilypad) sekä kooste kiintoisista e-textile projekteista, joita voidaan yhdessä ihmetellä ja ideoida jotain vielä hienompaa...



IN ENGLISH

- English summary
- In English

LINKS

-  Facebook
-  GitHub
-  IRC
-  Kalenteri
-  Kirjoituslusta
-  Muita hackerspaceja
-  Twitter
-  Wiki

RECENT POSTS

- Sunnuntaina 6.5. Ommeltavan

The local hackerspace...

Source: <http://helsinki.hacklab.fi/>

Sewing Café

The screenshot shows the homepage of The Sewing Café website. At the top left is the logo featuring a sewing machine icon and the text 'THE SEWING CAFE' with the subtitle 'the social sewing emporium'. To the right are contact details: email 'hello@thesewingcafe.co.uk' and phone 'T: 01455 698034'. Below the logo is a navigation menu with links: Home, Sew by the Hour, Workshops, Sew help me!, Shop at the Sewing Cafe, About Us, How to get in Touch, and Register. The main content area features several images: a brown tag with the 'THE SEWING CAFE' logo; a wooden tray filled with colorful spools of thread in various colors like yellow, green, blue, orange, red, pink, and white; a close-up of a piece of fabric with a red rose pattern; and a roll of pink and white floral fabric. A teal circular graphic in the center says 'WELCOME to THE SEWING CAFE'. At the bottom right are social media icons for Flickr, Facebook, and Twitter.

THE SEWING CAFE
the social sewing emporium

E: hello@thesewingcafe.co.uk
T: 01455 698034

Home | Sew by the Hour | Workshops | Sew help me! | Shop at the Sewing Cafe | About Us | How to get in Touch | Register

VISIT US FOR...

- Sewing Workshops
- Sew by the hour
- Social Sewing
- Sewing Parties
- Inspiration & Advice

Plus a shop full of beautiful fabrics and haberdashery

WELCOME to THE SEWING CAFE

flickr f twitter

A coworking space with sewing and embroidery machine (usually pay per hour)

Source: <http://www.thesewingcafe.co.uk/>

Techshop (USA)

The screenshot shows the TechShop website. At the top is the main navigation bar with links for Welcome, Membership, Classes, Events, Facilities & Amenities, TechShop Locations (highlighted with a blue box), Equipment Reservation, Calendars, Services, Member Project Gallery, FAQs, TechShop News, Contact Us, and Forum.

The main content area features the TechShop logo and the tagline "BUILD YOUR DREAMS HERE". A large banner asks "WHAT DO YOU WANT TO MAKE?". To the right is a "CAREERS" section with a "Click here for more information" link.

TechShop Locations

There are several TechShop locations currently open or opening soon to serve you. Please click on the name of the store you are interested in for more information including address, contact information, and hours of operation:

- [TechShop Menlo Park](#) (Menlo Park CA)
Open Now
- [TechShop RDU](#) (Raleigh NC)
Open Now
- [TechShop San Francisco](#) (San Francisco CA)
Open Now
- [TechShop San Jose](#) (San Jose CA)
GRAND OPENING SATURDAY SEPT 24, 10 AM - 6 PM
- [TechShop Detroit](#) (Detroit, MI)
Under Construction Fall 2011
- TechShop Portland (Portland OR)
In Planning
- TechShop New York (Brooklyn, NY)
In Planning
- TechShop Los Angeles (Los Angeles, CA)
In Planning

UPCOMING EVENTS @ TechShop

San Jose
300 South 2nd Street
San Jose, CA 95113

September 24:
TechShop San Jose Grand Opening!

[Click for More Details](#)

Learn how to use Autodesk Inventor FOR FREE

A network of commercial spaces with many tools and technologies and paid support services (only in USA).

Source: <http://techshop.ws/>

Techshop (USA)

Ford + TechShop: Getting Employees to Tinker

BY JOSEPH FLAHERTY

05.14.12 3:20 PM



CNC router carving the Ford logo at TechShop.

Before he invented the assembly line, Henry Ford built his first prototype on a workbench in a shed. More than a century later, his company has partnered with TechShop, Detroit, the 21st-century equivalent of that shed, with a bold program to ignite innovation in the company.

Ford employees who invent something that the company ends up patenting receive a free three-month membership to TechShop.

Source: <http://www.wired.com/design/2012/05/ford-techshop/>

100k Garages (USA)

The screenshot shows the homepage of 100kGarages.com. At the top left is a 3D illustration of a garage with a person inside. Next to it is the website's logo, "100kGarages.com" in a large, bold, sans-serif font, with the tagline "connect. collaborate. create." underneath. To the right is a horizontal banner featuring a series of small 3D house icons. In the top right corner, there are links for "sign up or log-in". Below the main header, a yellow navigation bar contains links for "Home", "About", "Participate", "Create/Design", "Inspiration", and "Connect". To the right of the navigation bar are three buttons: "Find Designers", "Find Fabbers", and "Request Project Bids". Further to the right is a search bar with a "Google Custom Search" placeholder and a "Search" button. A ruler icon is positioned at the far right of the bar. The main content area features a large image of several colorful, modern wooden furniture pieces (chairs and tables) against a window. Below this image is a text block: "Be inspired. Take a look at these cool creations from 100kGarages users. And sample the work of designers who make their plans available for use. It's all at our [Inspiration gallery](#)." To the right of the image, the text "Got an idea? Get it made." is displayed above a circular graphic. The graphic contains a cartoon character of a man with a lightbulb idea, a red heart, and a small table, with the text "100kGarages.com" and "How it Works" around it. Below the graphic is a link "learn more". Further down, there is a section titled "100kGarages connects you with Fabbers who can turn your thoughts into things." followed by a description of the service and a link to learn more. There is also a section for "Digital Fabricators" with a list of sponsors including "ShopBot" and "Make:". A lightbulb icon is positioned next to the "I have an idea. What's Next?" text.

sign up or log-in

100kGarages.com

connect. collaborate. create.

Find Designers Find Fabbers Request Project Bids

Home About Participate Create/Design Inspiration Connect

Google Custom Search Search

100kGarages.com

How it Works

learn more

Got an idea? Get it made.

100kGarages connects you with
Fabbers who can turn your thoughts
into things.

100kGarages.com is a place for people who have designs, or just ideas for things they want to make, to connect with digital fabricators ("Fabbers") who can help make these ideas become real.

Our participating Fabbers work with 2-D or 3-D digital fabrication tools to cut, machine, drill, sculpt, or "print" in 3-D. Our "matchmaking" service can help you find a Fabber near you, and it's free. [Learn more and get started.](#)

I have an idea. What's Next?
I need an idea. Show me cool stuff.

created by

ShopBot

our sponsors

Make:

100kGarages is a place for people who have designs (or just ideas) to connect with digital fabricators ("Fabbers") who can help make these ideas.

Source: <http://100kgarages.com/>

Maker Factory

The screenshot shows the homepage of the Maker Factory website. At the top left is the logo 'MAKER FACTORY' with a stylized orange factory icon. To the right are 'LOGIN' and 'LOGOUT' buttons, and links for 'POST A JOB' and 'FIND A JOB'. Below the header is a photograph of two people working on a geodesic dome made from 3D printed connectors. A caption below the photo reads: 'GEODESIC DOME MADE FROM 3D PRINTED CONNECTORS PRINTED WITH MAKERFACTORY'. To the right of the photo is a text box: 'MAKERFACTORY is a free service for connecting the emerging network of localized fabrication technologies with people like you who need stuff 3d printed, CNC'ed, or otherwise made.' Below this is a yellow button labeled 'REGISTER HERE'. A call-to-action text follows: 'Need something made? Willing to make things for other people? Click here to register for an account. It's totally free!' At the bottom is a world map with a red location pin over North America. A vertical zoom control is on the left side of the map.

The same service as 100kgarages, but open source ...

3D Hubs

The screenshot shows the 3D Hubs website interface. At the top, there's a navigation bar with the 3D HUBS logo, a dropdown menu set to HELSINKI, and links for LIST PRINTER, 3D PRINT, BLOG, and ACCOUNT. Below the navigation is a map of the Helsinki region, with red circles marking the locations of 6 print hubs. A callout box on the map says "6 Print Hubs in Helsinki". To the right of the map is a green button labeled "3D print in Helsinki". At the bottom of the map area, there are links for "Map data ©2014 Google", "Terms of Use", and "Report a map error".

6 Print Hubs in Helsinki

3D print in Helsinki

Map data ©2014 Google | Terms of Use | Report a map error

Browse Local 3D Printers in Helsinki

Printer Name	Icon	Rating
LTronic's Hub		★★★★★
Versoteq's Hub		★★★★★
Ali's Hub		★★★★★
Anssi's Hub		★★★★★
Markku's Hub		★★★★★

Kossel, MendelMax Leapfrog Creatr Replicator, Thing-O-
miniFactory Solidoodle

Wanted: Mayor
Learn more
17 Makers
6 Print Hubs

INVITE FRIENDS

The same service as 100kgarages, but for 3D printers...

Source: <http://www.3dhubs.com/>

Seoul (South Korea)



No FabLabs or similar places, but many small manufacturers that will produce you small-scale series very quickly.

Living Labs (USA, Europa)

European Network of Living Labs

The European Network of Living Labs
– the first step towards a new Innovation System!

Login or Sign up!



news

ENoLL 6th Wave is open – Join our growing community!

SUBMITTED BY ENoLL ON MON, 2011-10-24 17:53

All organisations public and private from all countries in the world, actively committed to engage and empower users and citizens to take part in sustainable innovation processes, are once again invited to apply for membership in the European Network of Living Labs (ENoLL) as of October 24th, 2011. The announcement was made at the Future Internet Conference in Poznan (Poland).

You can see the session 'User Driven Innovation – Shaping the Future Internet for a Better Society' including the announcement of the 6th Wave here.

[Read more](#)

on the map



A map of Europe with icons indicating the locations of different waves of living labs. The legend shows:

- First Wave Living Labs (light gray circle)
- Second Wave Living Labs (dark gray circle)
- Third Wave Living Labs (red circle)
- Fourth Wave Living Labs (yellow circle)

Icons at the bottom left include a double arrow pointing left and right, and a magnifying glass over a small location icon.

Spaces for co-designing products and services with users... not necessarily with digital fabrication.

Source: <http://www.openlivinglabs.eu/>

National Additive Manufacturing Innovation Institute (USA)

the WHITE HOUSE PRESIDENT BARACK OBAMA

★★★★★ ★★★★★



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For Immediate Release August 16, 2012

We Can't Wait: Obama Administration Announces New Public-Private Partnership to Support

Consortium of Businesses, Universities, and Community Colleges from Ohio, West Virginia and Pennsylvania Co-Invest with Federal Government in a Manufacturing Innovation Institute

WASHINGTON, DC – Following through on our We Can't Wait efforts, the Obama Administration today announced the launch of a new public-private institute for manufacturing innovation in Youngstown, Ohio as part of its ongoing efforts to help revitalize American manufacturing and encourage companies to invest in the United States. This new partnership, the National Additive Manufacturing Innovation Institute (NAMII), was selected through a competitive process, led by the Department of Defense, to award an initial \$30 million in federal funding, matched by \$40 million from the winning consortium, which includes manufacturing firms, universities, community colleges, and non-profit organizations from the Ohio-Pennsylvania-West Virginia 'Tech Belt.'



VIEW THE INFOGRAPHIC

BLOG POSTS ON THIS ISSUE

September 08, 2012 5:30 AM EDT
[Weekly Address: Coming Together to Remember September 11th](#)

The institute will ensure that the U.S. manufacturing sector is a key pillar in an enduring and thriving economy.

Anywhere...

DREAM Vendor



A vending machine with 2 3D printers at Virginia Tech's College of Engineering.

Source: <http://youtu.be/c1MhNLGi-5I>

A”

Aalto University
Media Factory

Thank you!!

Massimo Menichinelli
Aalto Media Factory
massimo.menichinelli@aalto.fi
[@openp2pdesign](https://twitter.com/openp2pdesign)
<http://www.slideshare.net/openp2pdesign>

