



FABLABNET LAUNCHING EVENT

28th March, 2017
TESLA LOFT



Budapest, Hungary

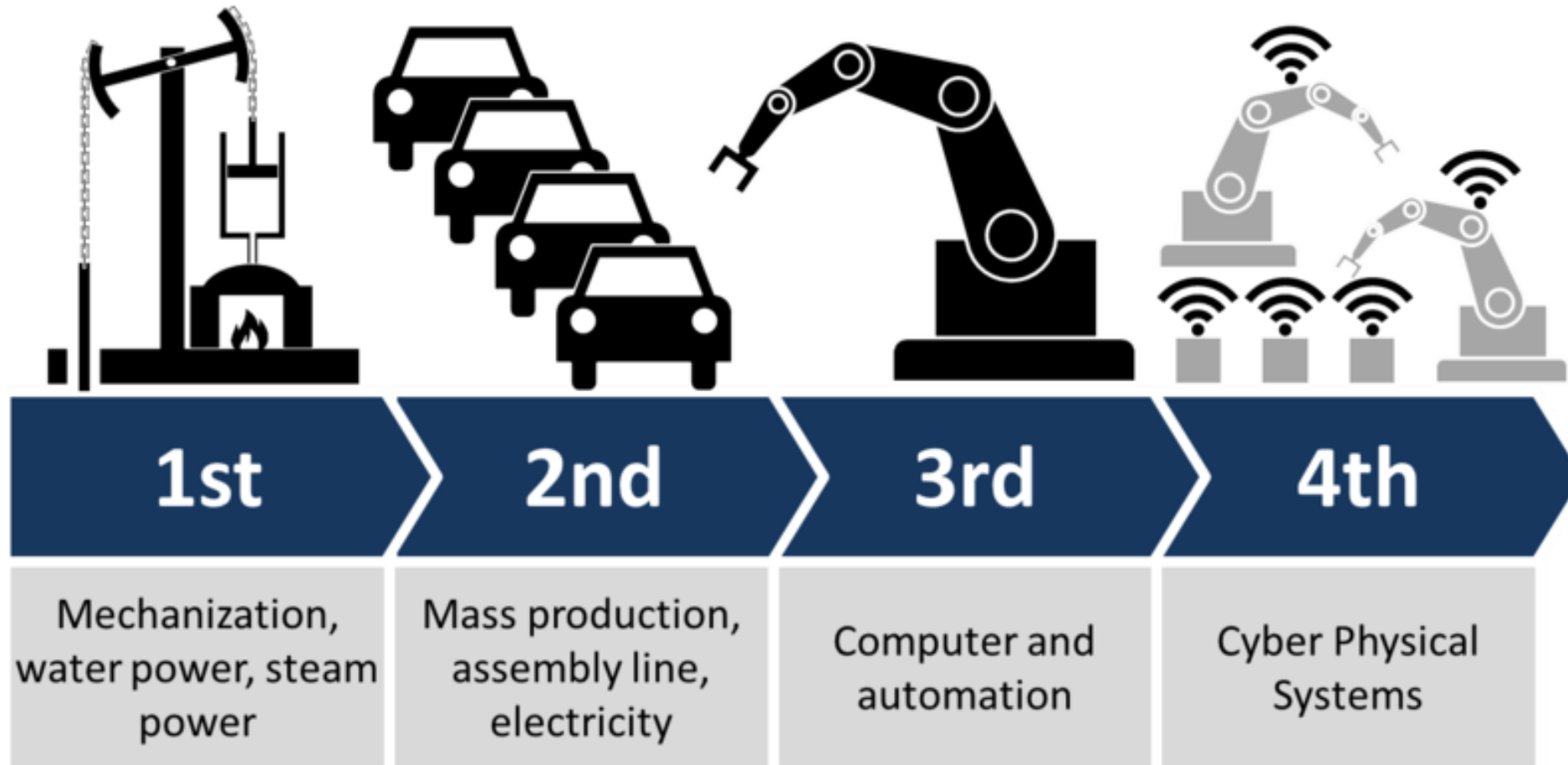


Role of fab labs in education - example of Serbia



Dr Ivana Gadjanski, founder of Fab Initiative, Serbia; @ivanagadjanski; www.fablab.rs

INDUSTRIAL REVOLUTIONS



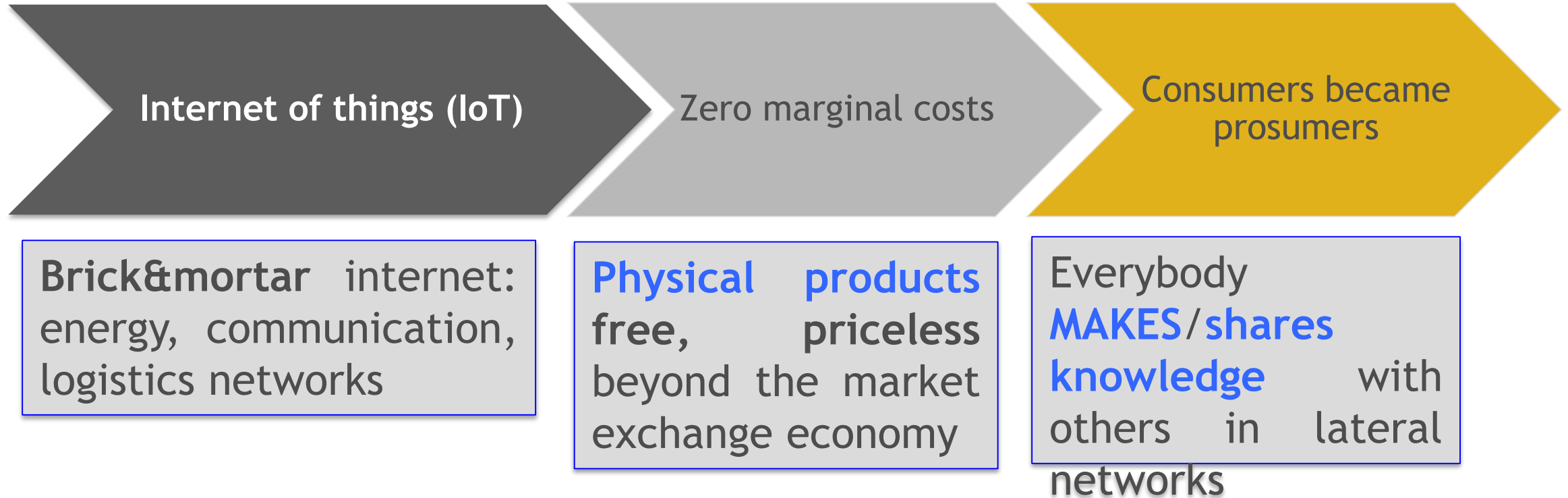


examples

1. newspapers, book-publishing => video/audio sharing; e-books
2. less expensive for IT entrepreneurs to launch a new business



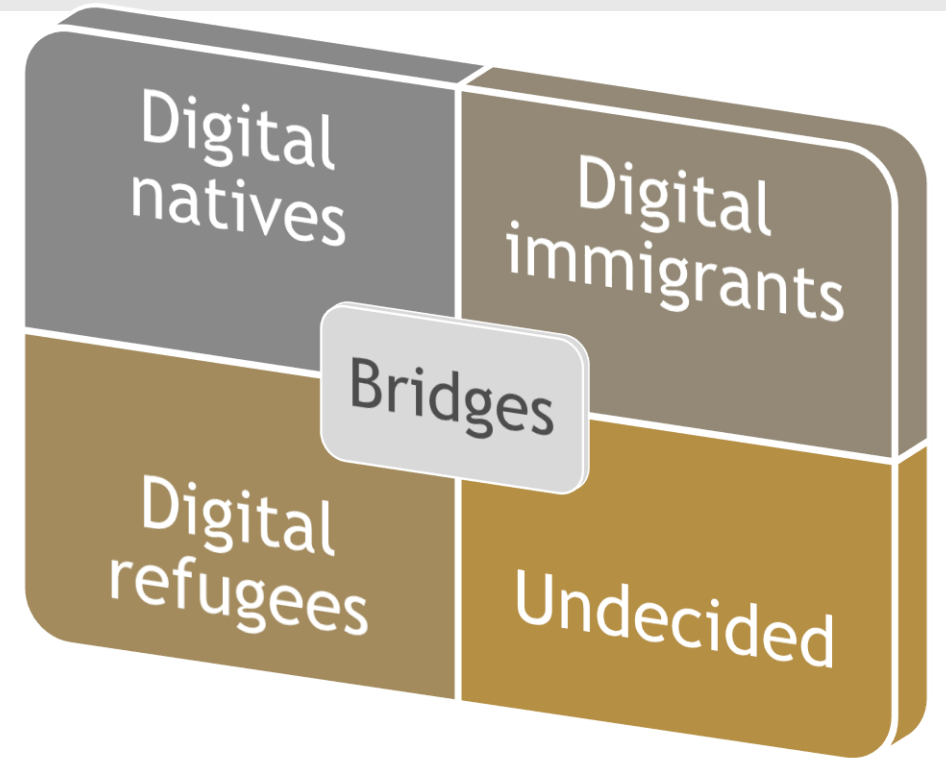
4TH INDUSTRIAL REVOLUTION: ONGOING



CHALLENGES FOR INDUSTRY 4.0?

- What kind of knowledge is needed?
- Does every country respond the same?
- Does every person respond the same?
- Will it increase/create gaps?

High income countries



THE ROLE OF EDUCATION?

- Education:
 - should give people **useful knowledge**
 - ability to solve real-life problems
 - can increase quality of life
 - when coupled to **innovation/entrepreneurship**
 - can bridge gaps: “digital categories”, gender, income-based
 - when coupled to **technology**;
 - when with **equal opportunities**
 - is not limited to STEM
 - should include humanities/arts = **STEAM**
 - is not only for children!
 - **Long life learning**



- Can fab labs be the tool for providing **useful knowledge** to everyone?
- **(Digital) fabrication laboratory** = learning environment + tools
- **Informal** = no pressure from “formal degrees, titles, gender...”
 - Everyone can come, ask, learn, make
- **Constructive**
 - Knowledge and meaning come from own experiences (**learning by doing**)
 - Can solve real-life problems
- Are not exclusive for high-income countries...at least should NOT be
- Are “female-friendly”.... at least should NOT be ;)



- FabLabs can **break down boundaries** between digital & physical worlds
- Fablabs provide access to science, technology, fabrication tools
=> enable people to **MAKE/PRODUCE** physical products
- Fablab network enables **sharing** & conversion from DIY to DIT

- Fablabs play an important role in transformation from capitalism toward collaborative commons

[Jeremy Rifkin: Economic Shift - The rise of the Collaborative Commons](#)



FAB LABS IN DEVELOPING COUNTRY: CASE STUDY OF SERBIA



Scientists in Serbia Protest against Dire Financial Situation

By Ivana Gadjanski on July 7, 2013

- budgetary allocation for R&D is **only 0.35% GDP**
- **1% GDP** is recommendation of European Union





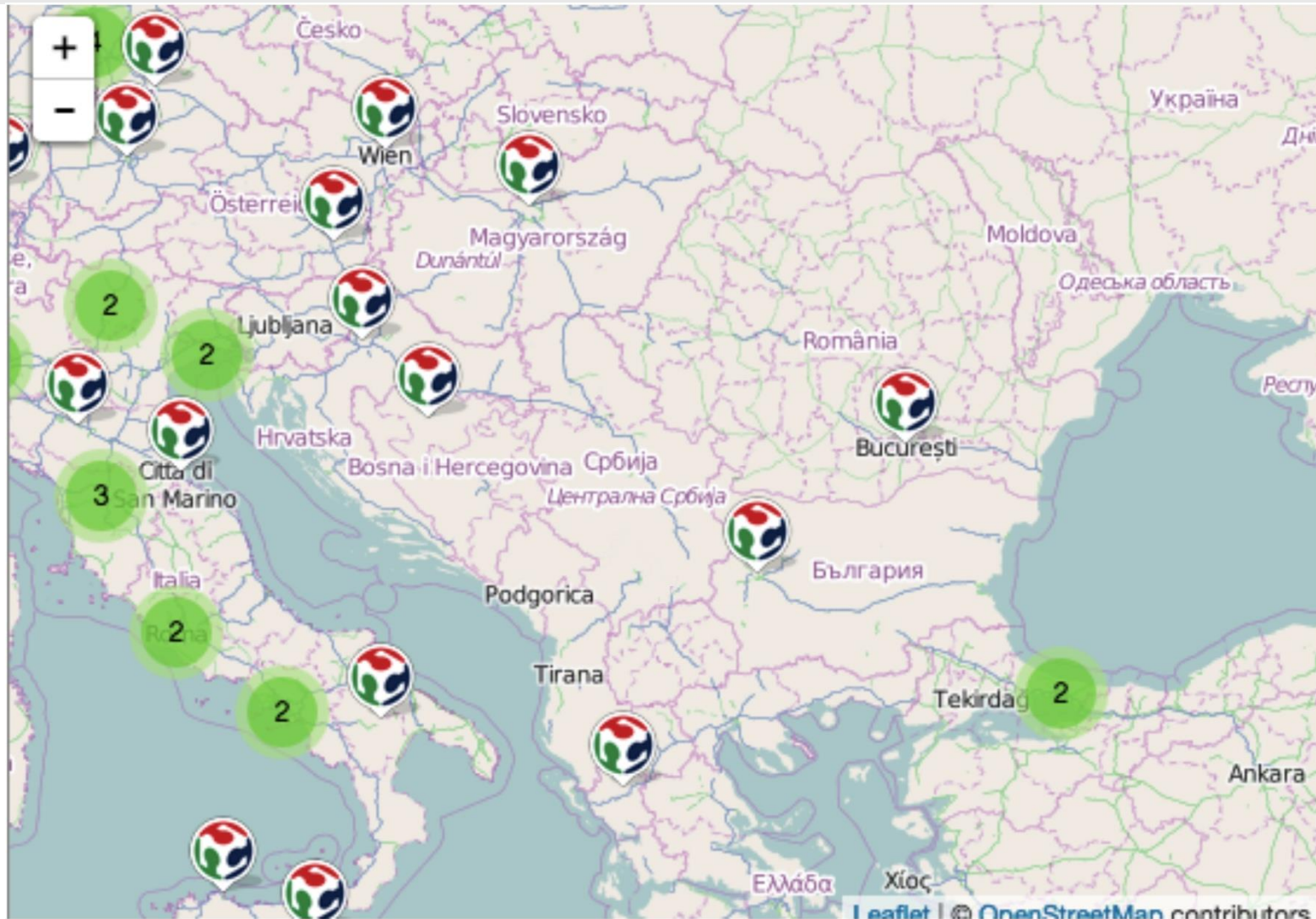
49.4%

Youth Unemployment
Rate (Serbian Statistical
Office 2013)

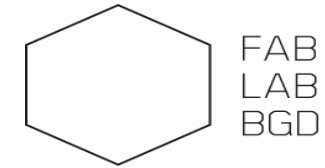
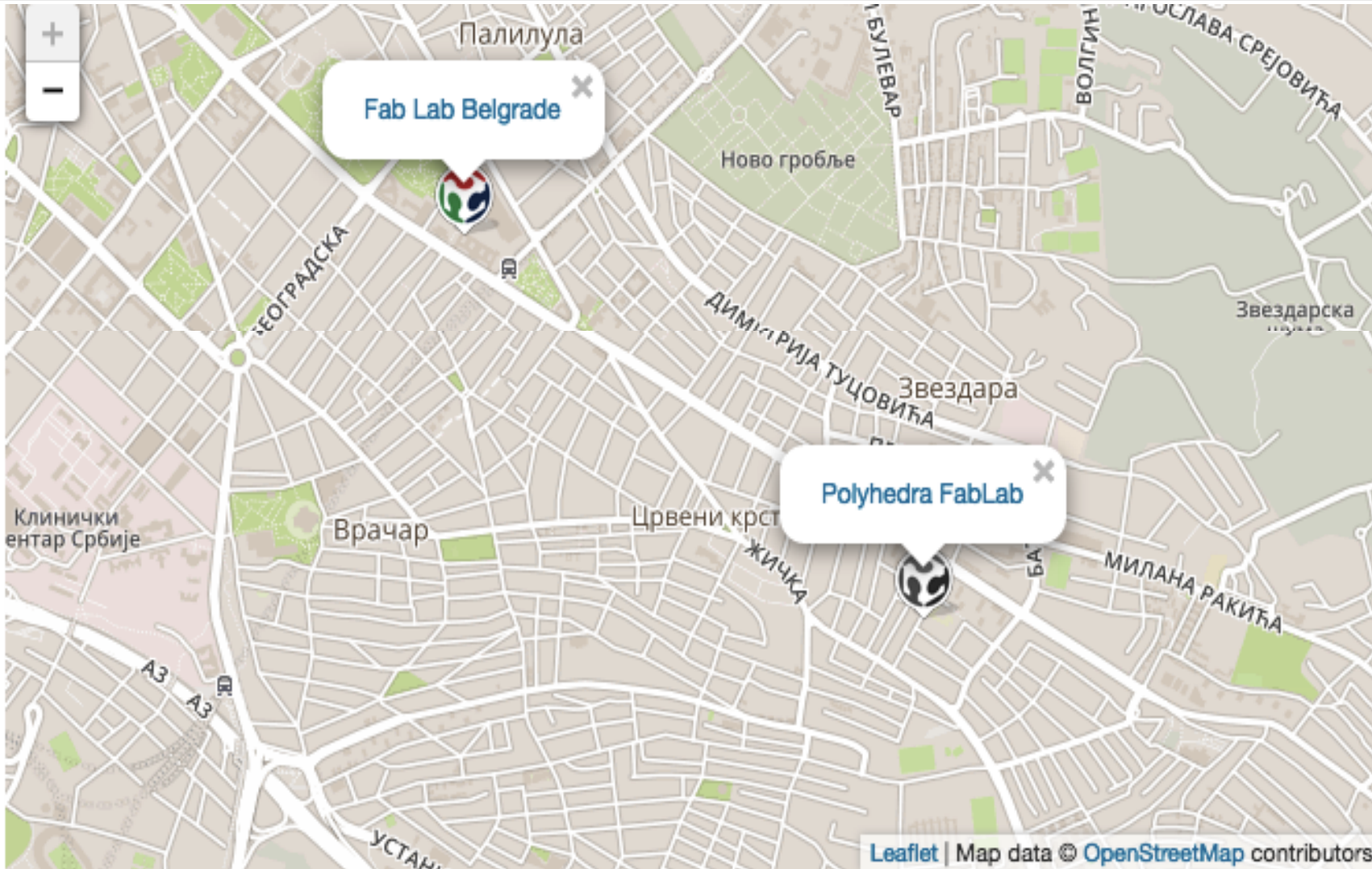
- **Problem:** **2/3 of schools** in Serbia **do not have science labs** and cannot perform scientific experiments with students
- **Problem:** Youth unemployment rate (**49.4%**)
 - lack of experience and contacts to the business
 - lack of equipment for product development
- **Solution:** Fab labs!



FAB LABS IN THE SEE REGION: BEFORE 2015



2015: BUILDING THE FABLAB NETWORK BELGRADE, SERBIA



FAB
LAB
BGD



non-profit association, established for promoting fab lab concept & STE(A)M entrepreneurship in Serbia and the region, founded in 2013



www.fablab.rs

@FabInicijativa





FAB initiative



IVANA GADJANSKI

a geek. a biologist. PhD in Neuroscience, Fulbright & TED Fellow,
working in the field of stem cells and tissue engineering in the **Innovation
Center at Faculty of Mechanical Engineering,
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ZORANA KURBALIJA NOVICIC

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Biologist, PhD in Population genetics, Science communicator, Lecturer.
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TAKING COOPERATION FORWARD





(Fab In) Creative Co-Director

Danko Radulovic

Designer, 3D printing guru, master from ENSCI - Les Ateliers, France

Danko Radulović was born in Belgrade in 1986. He graduated from the Faculty of Applied Arts, Department of Interior and Furniture Design. Throughout the years he participated in numerous competitions and exhibitions and recorded significant success.

During 2009 he won the first prize for interior and furniture design of a hotel room for the Serbian company Dallas. Then in 2010 he exhibited at the design festival D-Day in Zagreb, Croatia. The same and following year he participated at the Ghost Project exhibition in Belgrade, Serbia. In 2011 he exhibited at the Belgrade Furniture Fair and Belgrade Design Week. In addition, he organized a group exhibition Bloodesign at the Youth and Cultural Center in Belgrade, Serbia. He participated at the exhibition "Comb and relax bicycle" in New Belgrade Municipality with the preliminary design for the design of the booth – rest area for cyclists. The work was awarded and it is now in the preparatory stage before construction His main interests include interior and furniture design.

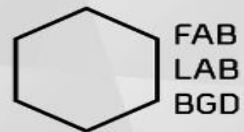


(Polyhedra fab lab) – Workshop Manager

Borko Jovanovic

Mechanical engineer/entrepreneur founder of Polyhedra fab lab





FABLAB BELGRADE

BELGRADE MAKERS COMMUNITY



FAB LAB (FABRICATION LABORATORY) PRUŽA ŠANSU STUDENTIMA, MLADIM DIZAJNERIMA, ARHITEKTAMA I MAJKERIMA DA SVOJE IDEJE REALIZUJU POČEV OD KONCEPTA, SLEDEĆI FAB LAB IDEOLOGIJU KROZ DELJENJE ZNANJA I VEŠTINA U ADEKVATNO OPREMLJENOM PROSTORU GDE SU IM DOSTUPNE NAJMODERNIJE MAŠINE ZA DIGITALNU FABRIKACIJU.



Nikola Andonov
M.Arch.



Marianne Villalobos
M. Arch.

fablabbelgrade.org



■ AIM:

- To teach young people and their teachers in Serbia how to **adopt hands-on approach for STEAM subjects** with small amount of money (with low-cost DIY fab lab tools)
- To show that fab lab activities can be used to foster **entrepreneurial thinking** and kickstart setting up of the new business by the young people in Serbia

■ Fab Lab Petnica - a hub that provides:

- Knowledge & inspiration
- tools and industry connections



NORWEGIAN EMBASSY



TAKING COOPERATION FORWARD



PETNICA SCIENCE CENTER



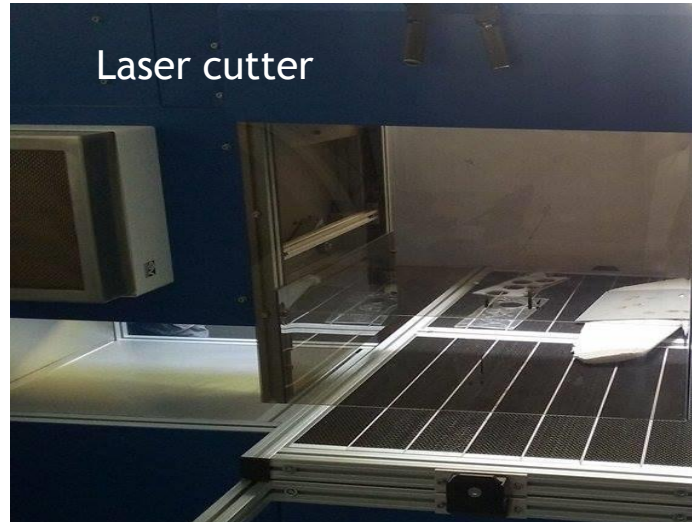
- the biggest and the oldest (since 1982) independent nonprofit organization for extracurricular, informal science education in South Eastern Europe



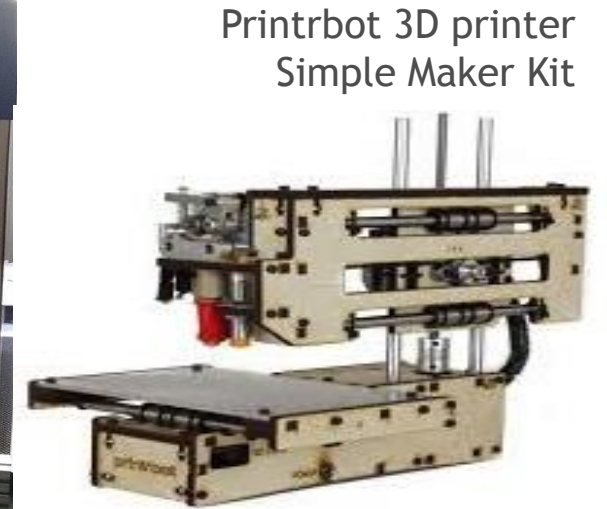
FAB LAB PETNICA - FORMATION



Zcorp 3D printer



Laser cutter



Printronix 3D printer
Simple Maker Kit



DIY lab ware

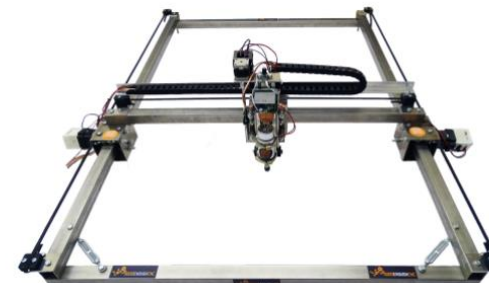
GOODENOUGHCNC HYBRID

VERY LOW COST DESIGN

GoodEnoughCNC hybrid is built from standard mechanical components and steel profiles, which makes it affordable. Just basic handtools needed for assembly.

MODULAR DESIGN

Suitable for almost any application referring to the size



TRANSFORMABLE

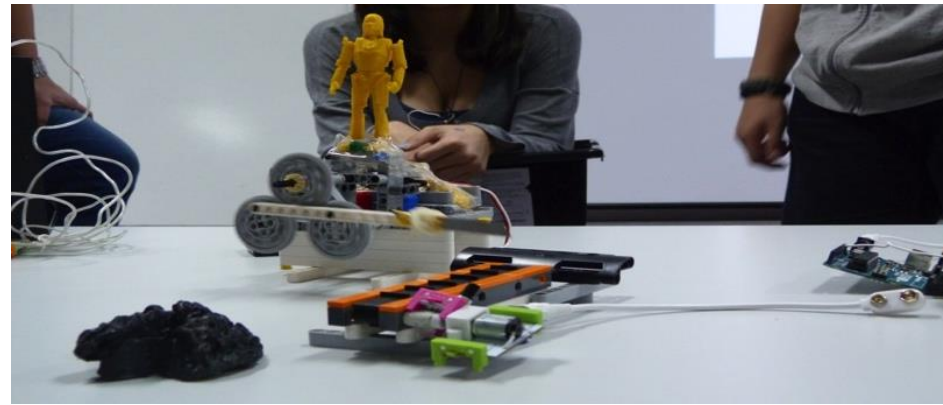
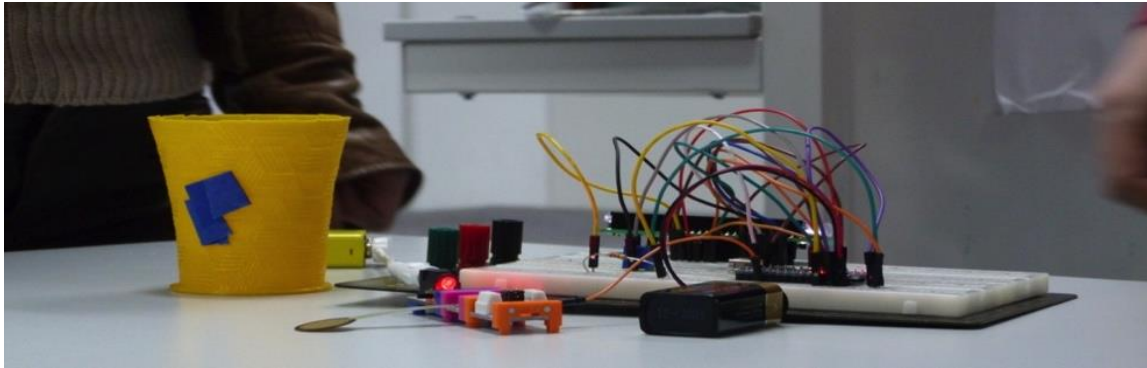
Using different machining toolheads - hand-held plasma torch, a spindle, laser or some other tool GoodEnoughCNC hybrid can transform from plasma cutter to cnc mill or laser cutter.

OPEN-SOURCE AND OPEN-HARDWARE

Published under open-source



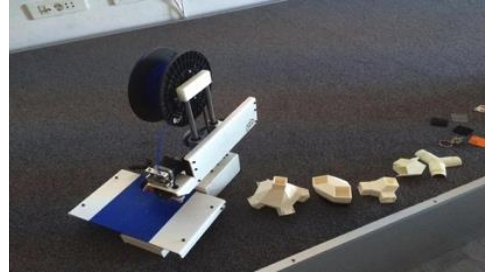
FAB LAB PETNICA - STUDENT COURSES NOV 2015



FAB LAB PETNICA - PITCHING COMPETITION



FAB LAB PETNICA - TEACHER COURSES APRIL 2016



FAB LAB PETNICA - TEACHER & STUDENT COURSES OCTOBER 2016




FAB LAB PETNICA ONLINE EDX COURSE




FabInitiative
AR102
Arduino

Starts: Oct 01, 2016



FabInicijativa
DF103
Фаб лаб и
предузетништво


Starts: Oct 01, 2016



FabInicijativa
PR105
ЗД штампа

Starts: Oct 01, 2016

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Fab Lab Petnica

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☎ +381640835882
✉ kontakt@fablab.rs



Fab Lab Petnica is an educational fablab established within the Petnica Science Center with the aim to provide high school students and teachers in the STEM (science, technology, engineering, math) field in Serbia with knowledge, tools, inspiration and connections to start implementing the FabLab@School concept and STEM entrepreneurship principles in practice.

Establishment of the Fab Lab Petnica is financially supported by The Royal Norwegian Embassy in Belgrade www.norveska.org.rs



- nearby_labs
-  **Polyhedra FabLab**
76km away
 -  **Fab Lab Belgrade**
76km away
 -  **Devana Labs**
76km away
 -  **ProDe**
212km away
 -  **Smart Fab Lab**
326km away



FORMING **SCIENTIFIC FAB LAB** AT FACULTY OF MECHANICAL ENGINEERING, UNIVERSITY OF BELGRADE, SERBIA

Financial support by the US Embassy in Serbia



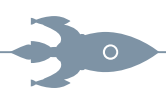
Dr Djordje
Čantrak

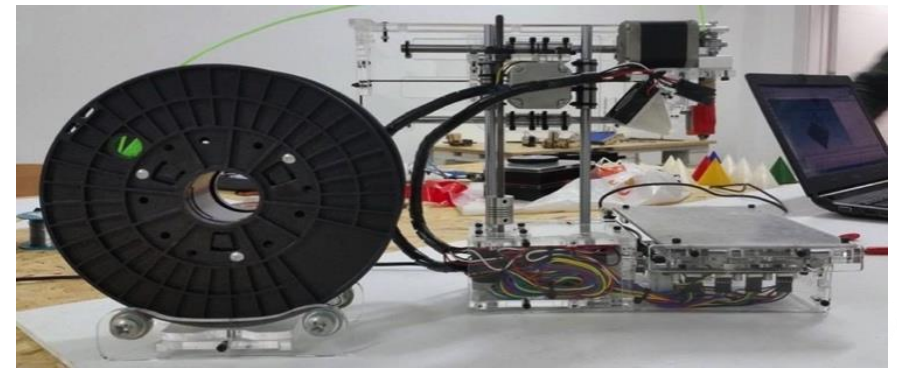
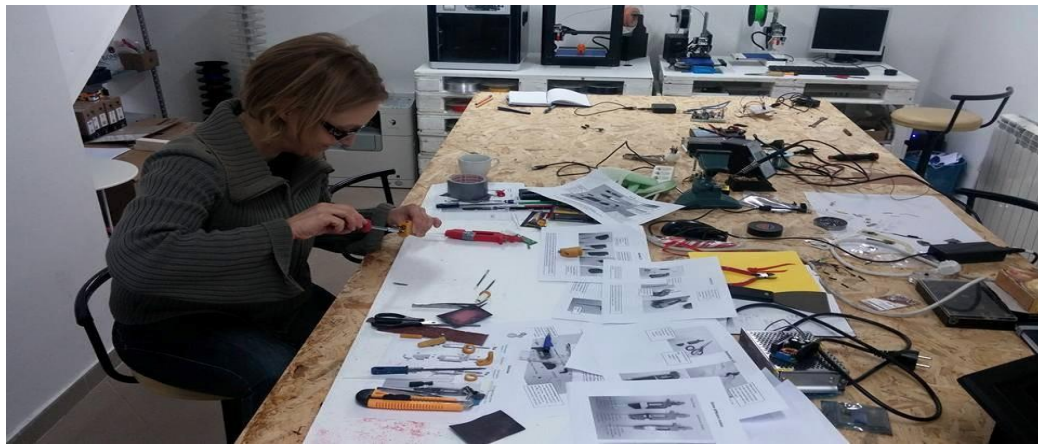
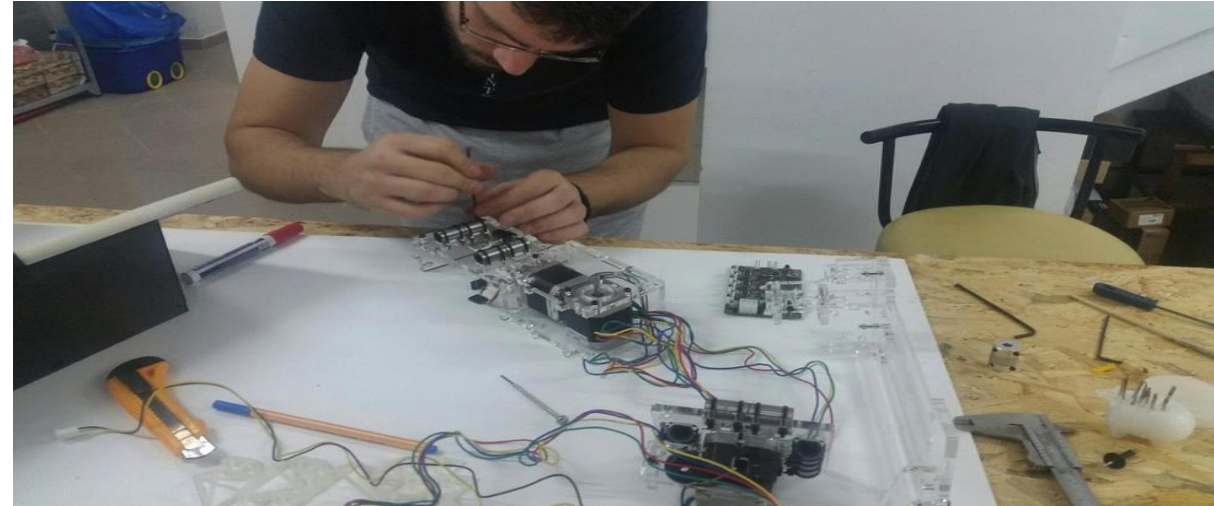


← Prototype made
in fablab



Figure 1(a) CAD model of the axial fan impeller; (b) Axial fan impeller. [2] (c-d) CNC machines at the UB FME: (c) 4-axis; (d) 5-axis. e-f) Test rigs with new experimental equipment at the UB FME: (e) Stereo PIV system; (f) LDA system.





Europe

- [Poligon Maker Lab, Slovenia](#)
- [Institut IRNAS Rače, Slovenia](#)
- [FabLab Croatia](#)
- [Fab Lab Athens](#)
- [Fab lab Budapest](#)
- [Fab Lab Graz](#)
- [The Waag Society \(Creative Learning Lab\)](#)
- [Fab Lab ErpeMere \(Belgium\)](#)
- [FabLabFactory startup \(Belgium\)](#)
- [Innocampus mobile fablab -Turkey](#)
- [FabLearnEurope](#) - conference on digital fabrication in education

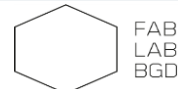
Africa

- **Emeka Okafor, Founder at Maker Faire Africa**; strategic advisor at African Innovation Association
- **Maarten Van Herpen** - Innovation Director Africa, Strategy& Business Dev. **Philips Africa**
- Smart Hub for Tech Entrepreneurs in Madagascar



- **FABelgrade 2016** -1st regional conference on digital fabrication and fab lab concept in South East Europe - www.fabelgrade.io - May 14-15th, 2016
 - 2-day event, app. **800** visitors, **30** speakers from **18** countries
 - Interactive lectures and practical demos in the fab lab built on the premises
 - EC JRC workshop “**Why and how to build a fablab**” organized on the sidelines:

<https://ec.europa.eu/jrc/en/event/workshop/why-and-how-build-fablab>





MAY 14TH TO 15TH
BELGRADE, SERBIA



[WWW.FABELGRADE.IO](http://www.fabelgrade.io)

fabelgrade

1ST REGIONAL CONFERENCE
ON FAB LAB CONCEPT
AND DIGITAL FABRICATION



Organizers



www.fabelgrade.io

Patron

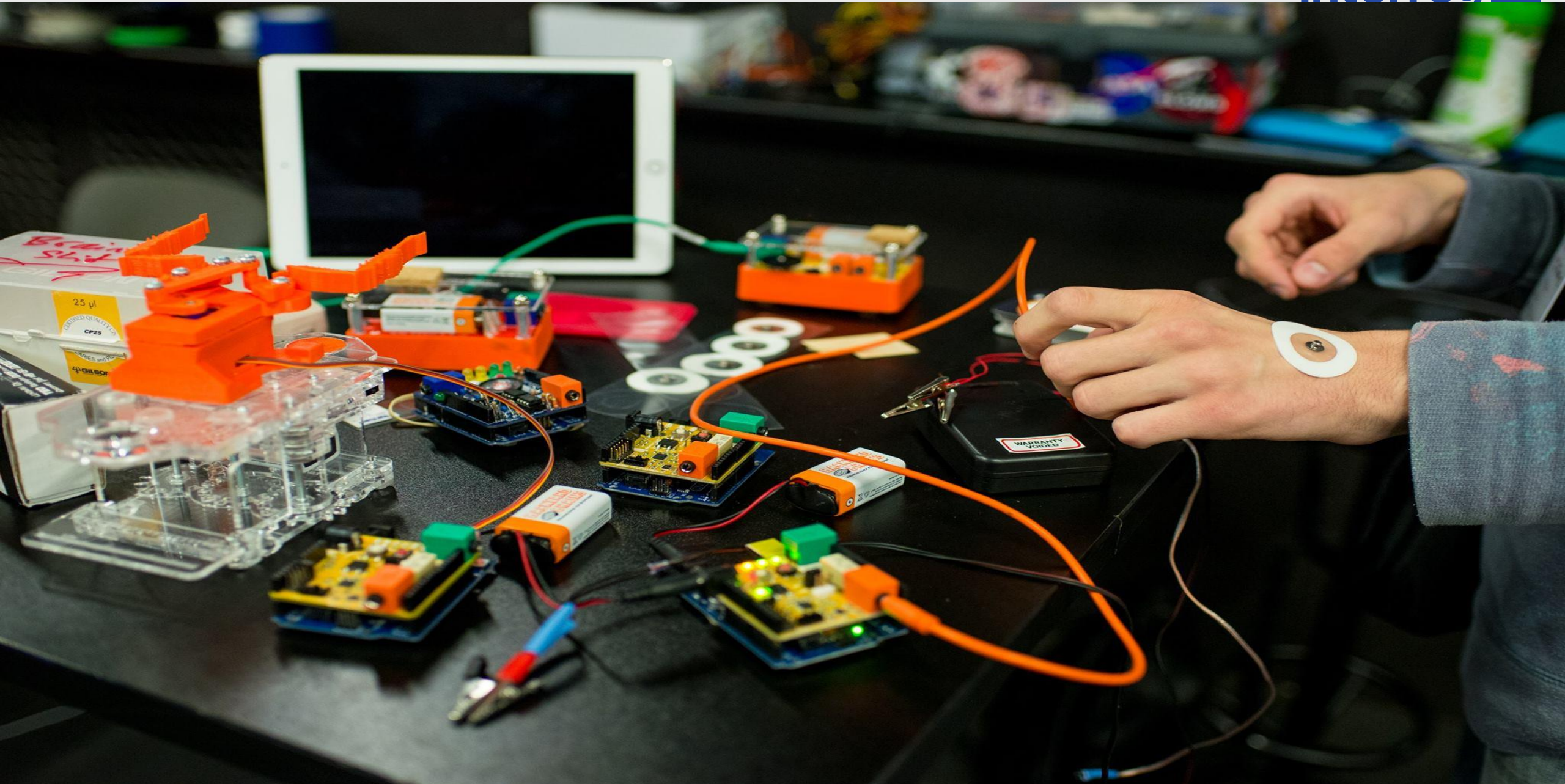


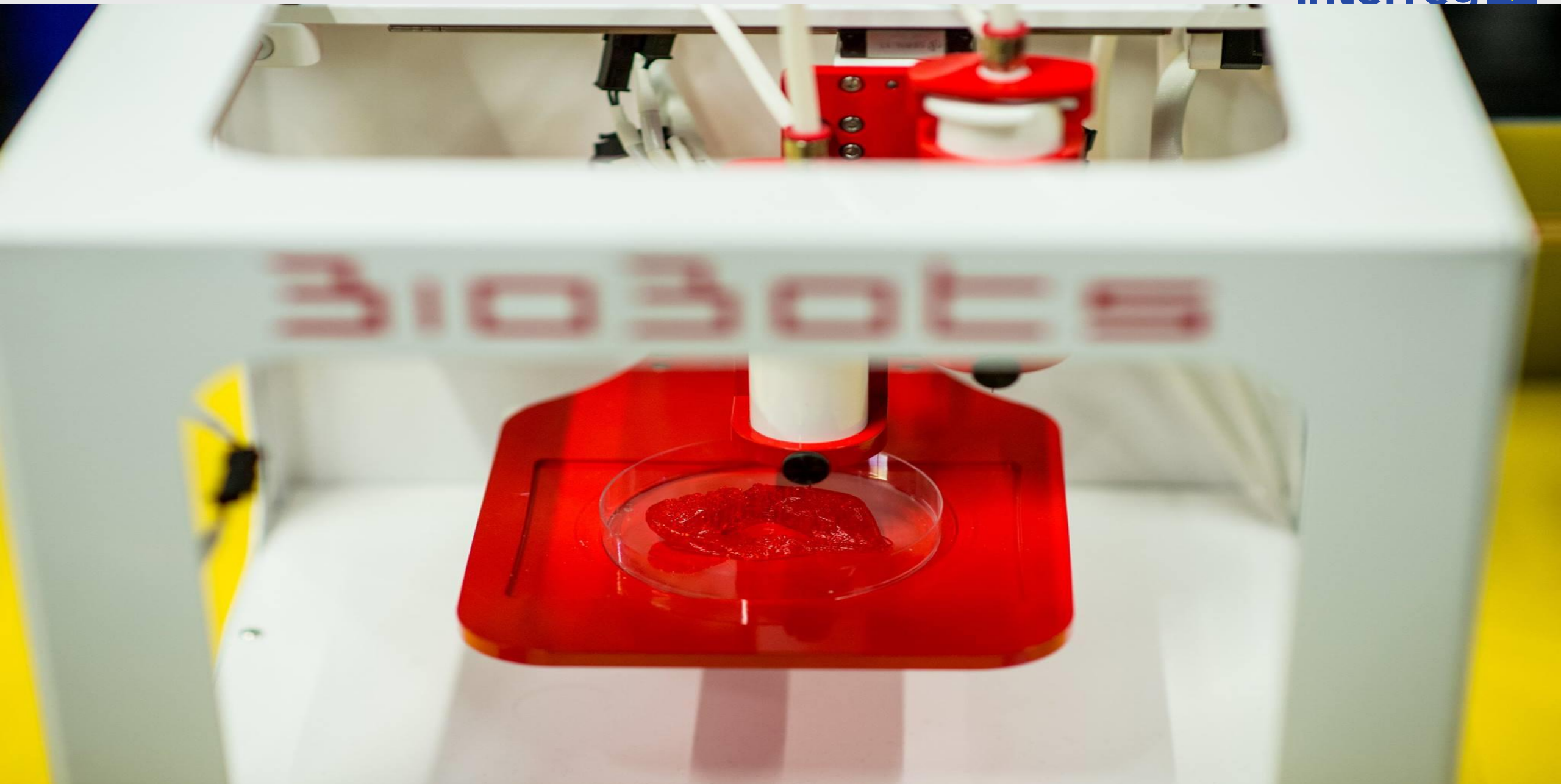
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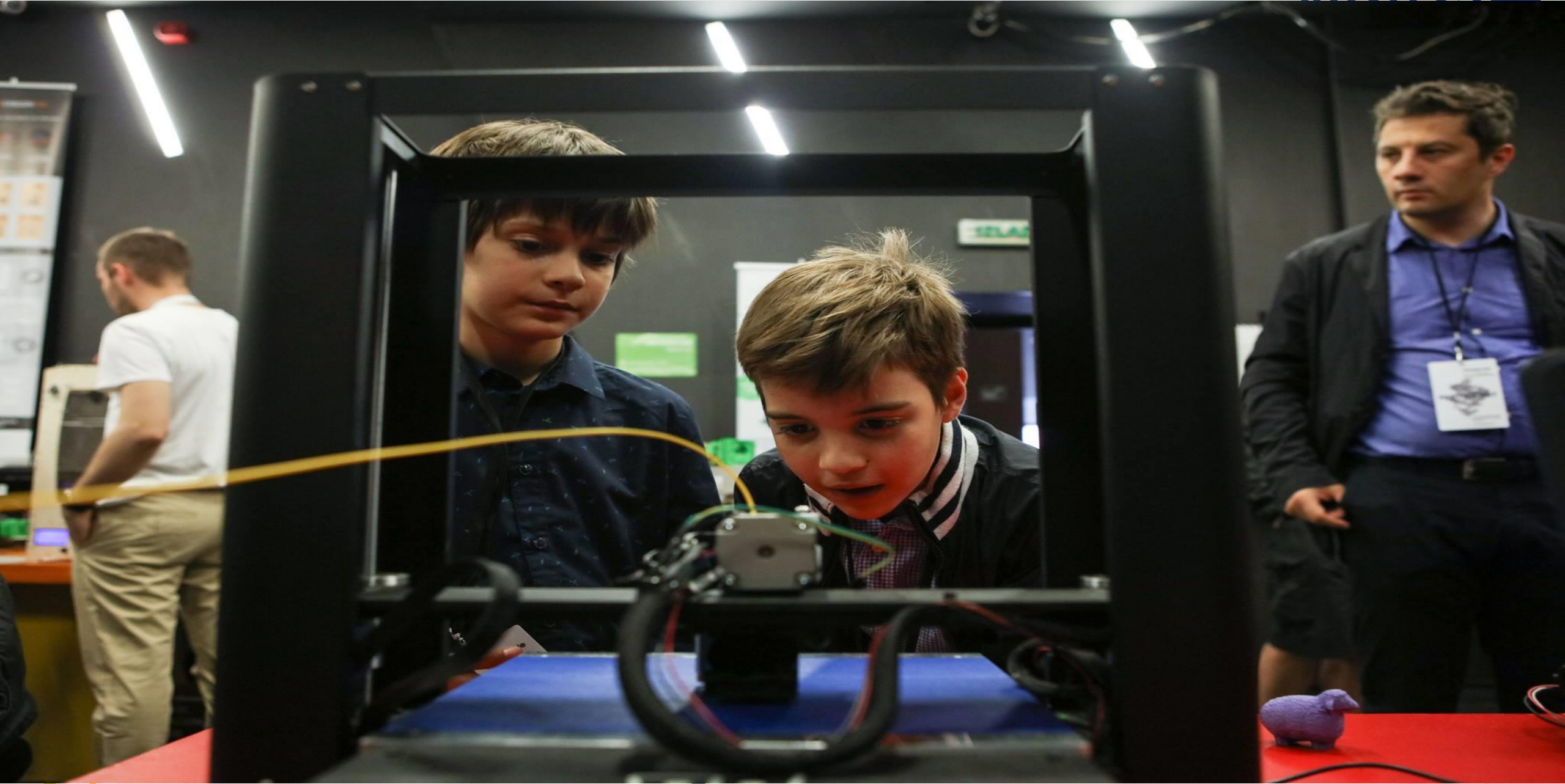
ADRIAN BOWYER - REPRAP PROJECT FOUNDER

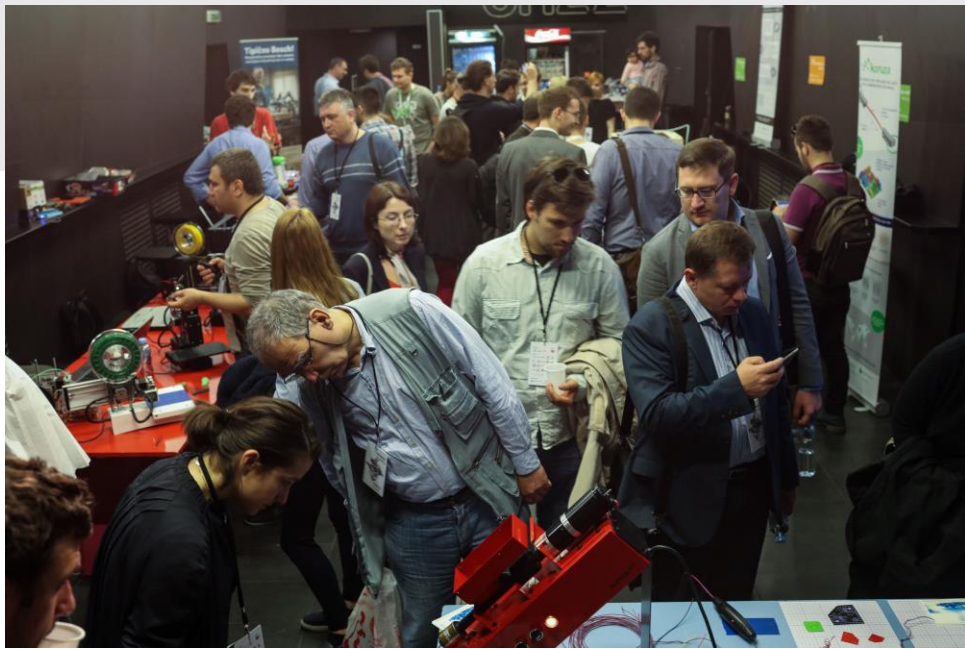












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FAB ECONOMY PANEL



REGIONAL FAB LABS PANEL



FABELGRADE 2017: 23-24.SEPTEMBER 2017



fabelgrade

SEP 23-24, 2017 – DOB – BELGRADE, SERBIA

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THANK YOU



Fab Initiative



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