



HOW TO
MAKE
ALMOST
ANYTHING

FAB ACADEMY

ANNUAL REPORT

2018

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STRUCTURE

FAB ACADEMY

The Fab Academy program teaches principles and applications of digital fabrication.

It's a fast paced, hands-on learning experience where students learn how to envision, prototype and document their ideas through many hours of practical experience with digital fabrication tools.

Fab Academy is based on MIT's popular rapid-prototyping course How To Make (almost) Anything, taught by Prof. Neil Gershenfeld.

The program consists of a 5 month intensive training, from January to June. During this time, students plan and execute a new project each week, together with a final project, a prototype that can be implemented eventually, after the end of the program.

FAB ACADEMY STRUCTURE

Fab Academy offers a distributed rather than a distance educational model.

Students learn in local workgroups, with peers, mentors, and machines, which are then connected globally by content sharing and video for interactive classes. Each Fab Lab that participates in the Fab Academy program is part of a global Fab Academy network linking more than 70 Fab Labs throughout 5 months of project collaboration.

Students view and participate in global lectures broadcasted every week. In

addition, they receive each week hands-on instruction provided by the Instructors of their local Lab, where students have access to the digital fabrication equipment and personal help with projects.

Fab Academy Faculty, who are leaders in their respective fields, provide global video lectures, supervise academic content, and guide research. Local Instructors supervise and evaluate student's progress, develop and disseminate instructional material, and assist with projects.

ACADEMANY

The Academany is a global distributed campus for high level education, with hundreds of locations all over the world.

The methodology and network first developed in the Fab Academy platform has subsequently been used to add classes (collectively called Academany) that share the model of hands-on instruction to students in workgroups, with local mentors, linked by shared content and interactive lectures by global leaders.

*"... The company of others,
The sharing of the experience, the sorrows,
the stress, the misery of failure and the
extatic pleasure of success, even a small one.
Glad I took the course, met new friends and
people from around the world.
But I'm happy that I made it out alive, that
this is the end of the beginning and not the
beginning of the end."*

Marc Lemaire, July 2018
Student at Fab Lab ÉchoFab, Montreal, Canada



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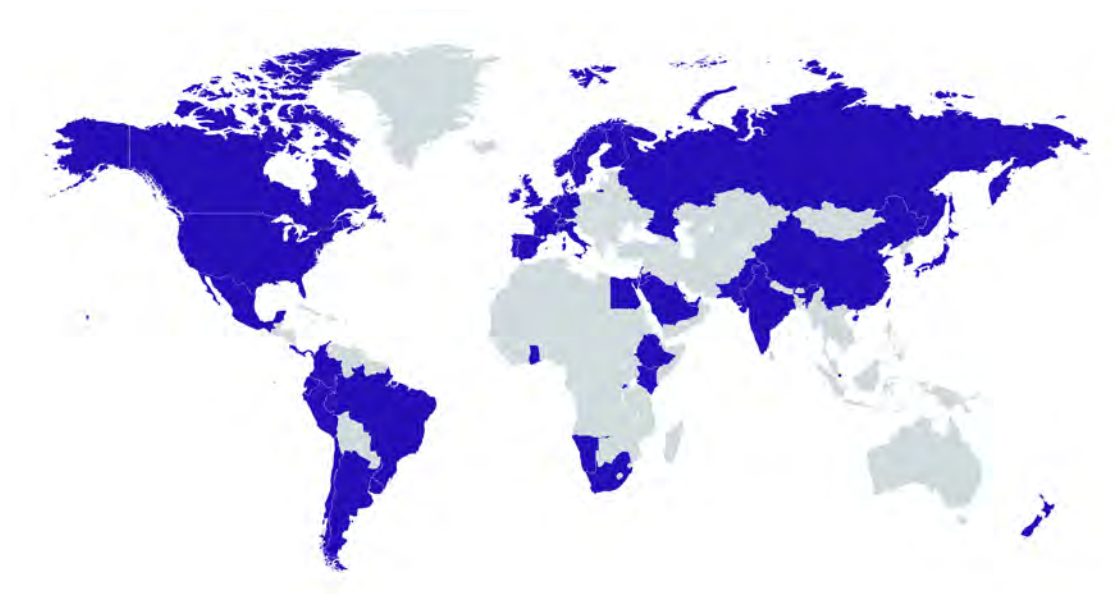
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FAB ACADEMY NUMBERS

Following an initial trial in 2008, the Fab Academy accepted the first Diploma students in the Fall of 2009. During almost 10 years, these are the total numbers of Fab Academy:

1.401	Student enrolled	
799	Student graduated	
199	Nodes that offered FA	
50	Countries where FA has been taught	

COUNTRIES WITH FAB LABS WHERE HAS BEEN OFFERED FAB ACADEMY



From 2009 until now, the following countries have offered the Fab Academy program:

· Argentina · Austria · Bahrain · Belgium · Brazil · Canada · Chile · China · Colombia · Costa Rica · Denmark · United Arab Emirates · Ecuador · Egypt · Ethiopia · Finland · France · Germany · Ghana · Iceland · India · Ireland · Israel · Italy · Japan · Jordan · Kenya · Korea · Kuwait · Lebanon · Mexico · Namibia · Netherlands · New Zealand · Norway · Pakistan · Panama · Peru · Portugal · Russia · Rwanda · Saudi Arabia · Singapore · South

Africa · South Korea · Spain · Sweden · Switzerland · United Kingdom · Uruguay · Usa

"I would love to be the part of FAB ACADEMY Network. I cant express how much I would love to be part of FAB ACADEMY. I would like to continue my career as a Instructor where ever the FAB ACADEMY wants to."

Rinoy Suvarnadas, July 2018
Student at Fab Lab Trivandrum, Kerala, India



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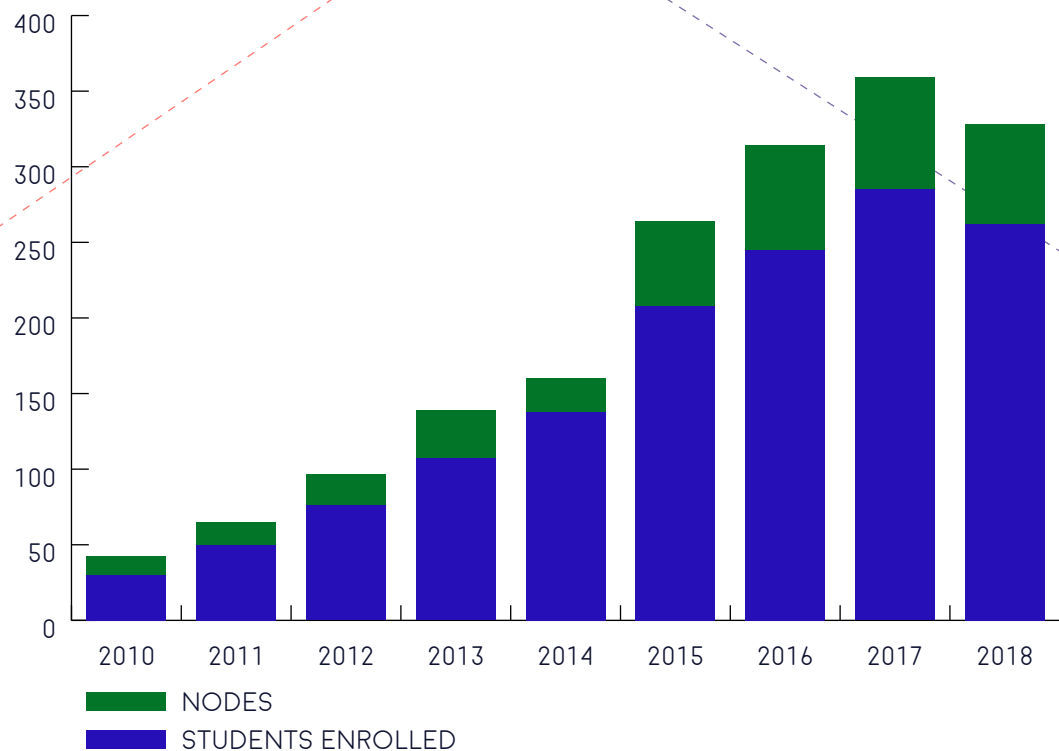


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NUMBER OF FAB ACADEMY STUDENTS AND NODES PER YEAR



NODES

Fab Labs began as an outreach project from MIT's Center for Bits and Atoms (CBA), and spread around the world. The Fab Academy was launched to provide access to advanced instruction for students in these labs exceeding the educational resources locally available to them. Fab Labs became the platform in which this access spread throughout the whole network.

Nodes are Fab Labs that fulfil the requirements to offer Fab Academy.

Those requirements are:

- **Qualified staff:** Fab Labs need trained people in order to offer Fab Academy and this training is the program itself. To instruct Fab Academy you need to have

taken Fab Academy program.

- **Physical Infrastructure:** Fab Labs must insure access to all the equipment and materials listed in the Fab Inventory.

NODE'S EVOLUTION

The evolution in number of Nodes over the last several years shows a constant growth, starting with 12 Fab Labs in 2010 and reaching and reaching 70 in the last years.

This past 2018 cycle, **66** Fab Labs offered the Fab Academy program.

Despite the large number of Fab Labs that applied to offer the course, Fab Academy Nodes are part of a selection process to make sure they fulfill all requirements to ensure the best possible experience to their future students.



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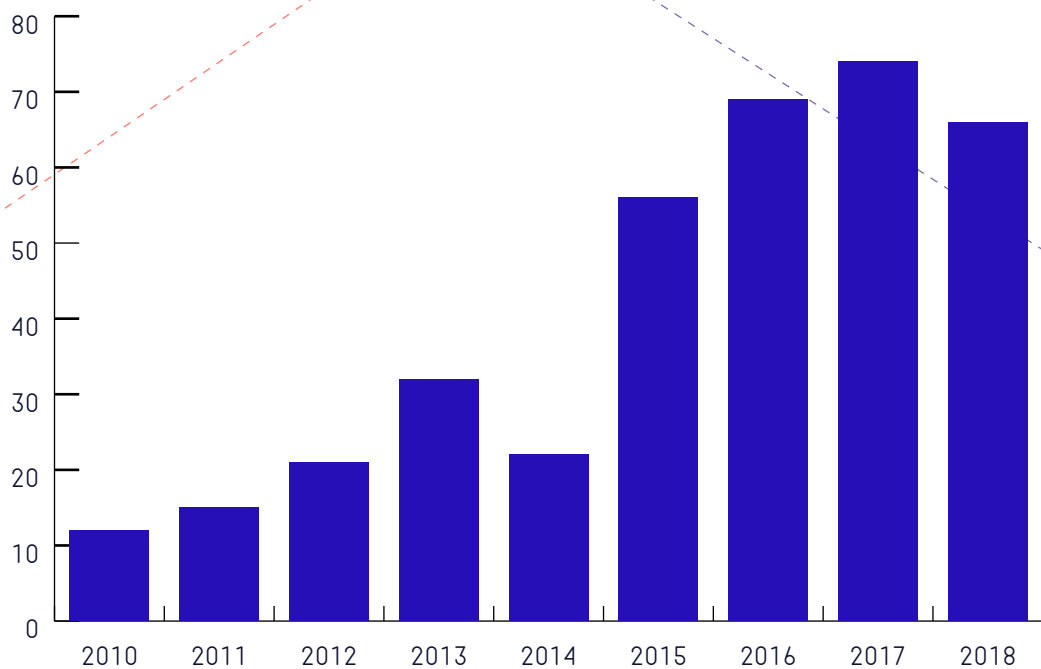


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NUMBER OF NODES OFFERING FAB ACADEMY PER YEAR



NODE'S DISTRIBUTION

The zero edition of Fab Academy took place in 2008 when 8 students took the MIT's MAS863 class with Prof. Neil Gershenfeld. Back then, the remote Nodes taking the class were Barcelona, Amsterdam, Island and Norway Fab Labs. While in the first year of the program Fab Academy was mostly offered by European and Latin & North-American Fab Labs, now there is a considerable presence of Fab Academy in the rest of the continents.

In 2018, Fab Academy took place in 66 Nodes. Most of them located in Europe, followed by Asia and South America:

- 26 in Europe
- 13 in Asia
- 11 in Central and South America
- 6 in North America
- 6 in Middle-East

- 3 in Africa
- 1 in Oceania (New Zealand)

This past 2018 cycle, 5 countries offered the Fab Academy program for the first time: Belgium, Jordan, Lebanon, Pakistan and Panama.

NODE'S SIZE

Maintaining the dynamics of the previous years, in 2018 Fab Lab Barcelona was the largest Node in number of enrolled students, 21.

Followed by Fab Lab Oulu, 9 students and Fab Lab Dassault Systemes (USA), Vigyan Ashram and Trivandrum (India) with 10 students.

In 2018, the average number of students per Lab was **4**.



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FAB LABS THAT OFFERED FAB ACADEMY IN 2018



STUDENTS

The role of Fab Academy is to initiate, mentor and technically train new students for participation and leadership in the global Fab Lab Network community.

It's how we train our teachers. It's also a great way to gain exposure to a wide variety of digital fabrication, electronics, molding and casting and composites practices and build skills in a short amount of time (typically 19 weeks). It's not for the faint of heart, but the rewards are great.

Our Fab Academy students and graduates come from highly diverse backgrounds. So far, we've had architects, industrial, product, fashion and graphic designers, artists and artisans, different profiles of engineers (industrial, civil, mechanical, electronics, telecommunication and computer), biologist or chemist; high school, bachelor, master and PhD students, and a large etcetera.

STUDENTS ENROLLED AND GRADUATED

In 2018, **262** students enrolled in the Fab Academy program, out of 478 applicants. This number of enrolled students represents a growth of 7% compared to 2016, in which applications peaked at 494 and enrollments were 245. This means the conversion rate between applicants and enrolled students is growing.

After the completion of the 20 certificates comprising the course, students are awarded with the Fab Academy Diploma, which ceremony traditionally takes place during the annual Fab Lab Conferences.

In 2018, out of the 262 students enrolled in Fab Academy, **165** graduated from the program up to September 2018.



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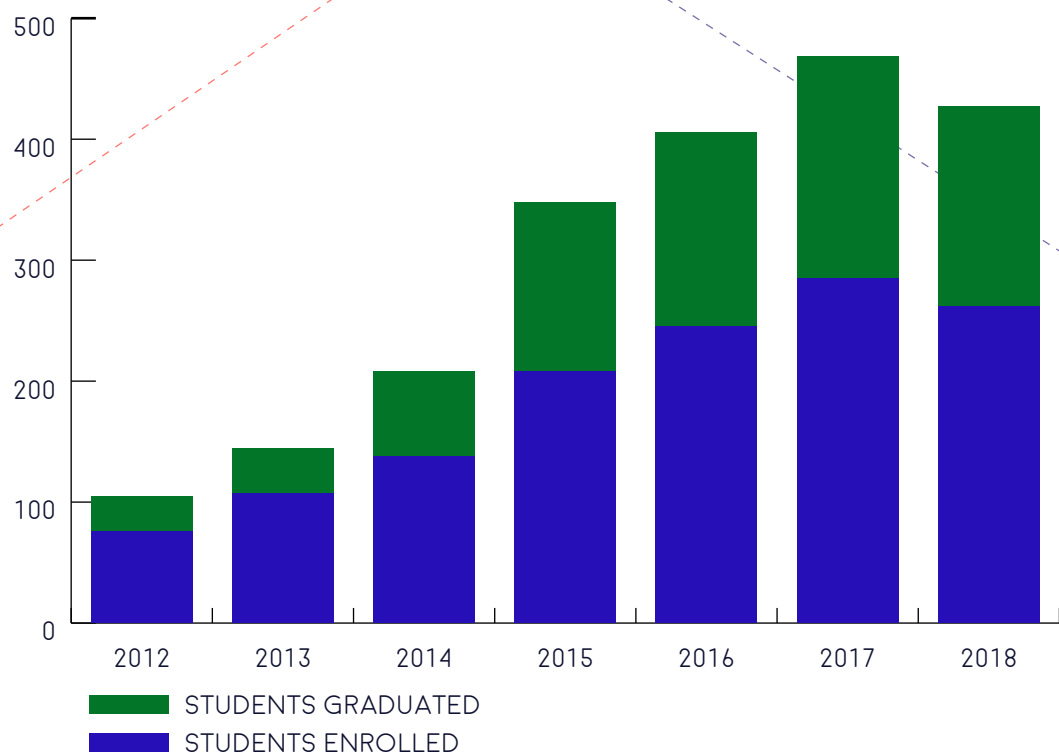


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NUMBER OF STUDENTS ENROLLED AND GRADUATED PER YEAR



STUDENT'S GEOGRAPHICAL ORIGIN

Analyzing the origin of the students that joined Fab Academy in 2018, **Indian** students make up the majority of the cohort with **31** students.

The second largest group includes students from Italy (16 students) and the United States (15); followed by Germany, Peru and Spain (10).

Analyzing the gender distribution of the students, in 2018, as in the last years of the program around 25% of the applicants to Fab Academy were women and 75% males.

STUDENT'S PROFILE

The average age of the students enrolled in Fab Academy in 2018 was **40** years old, registering an increase of 9 years, compared to the previous year.

*"It was a cool course.
Like riding a roller-coaster for 5 full months."*

Antonio Garosi, July 2018
Student at Fab Lab Santa Chiara, Siena, Italy



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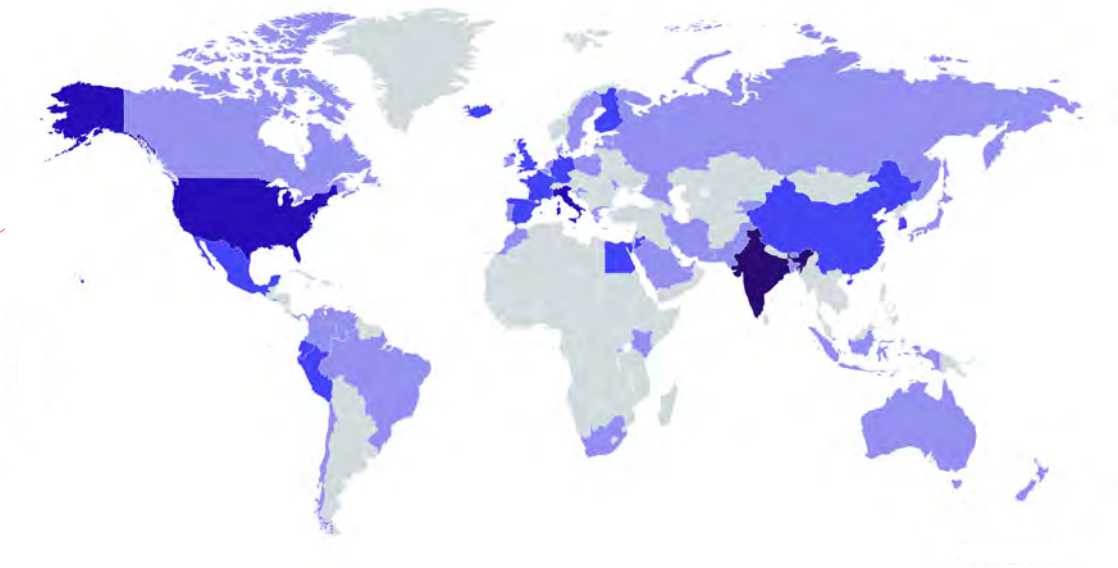


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FAB LABS THAT OFFERED FAB ACADEMY IN 2018



STUDENTS PER COUNTRY

1-5 6-10 11-20 20+

PROJECTS

During Fab Academy, each student must prove mastery of the skills gained during the program by developing a Final Project, a prototype to test an idea.

Every year we get to see amazing projects covering all ranges of what can be invented.

FEATURED PROJECTS

During the last Fab Lab Conference in Toulouse, Fab14, students received their diplomas in the Fab Academy Graduation Ceremony. Some selected students were awarded with a special mention for their academic achievements.

Below the list of the featured 2018 Final Projects, selected by the Fab Academy Community:

- *Orrery Lamp* (Megumi Iwata - Fab Lab Oulu)
- *uMap* (Krisjanis Rijnieks - Fab Lab Barcelona)
- *The Anti Soggy Spoon* (Arnar Daði Þórisson - Fab Lab Reykjavik)
- *Performing Machine* (David McCallum - Fab Lab Amsterdam)
- *Protolight* (Kai Naito - Fab Lab Kamakura)
- *Posturea* (Victoria Peredo Robinson - Fab Madrid CEU)
- *TOTS* (Laura Cipriani - Fab Lab Opendot)
- *Skater Dolly* (Daniel Bruns - Fab Lab Bottrop)
- *The V.I.G Logger* (Nicolas De Coster - Fab Lab ULB)
- *FabGoTo* (Marc Lemaire - Fab Lab ÉchoFab)
- *Plug* (Victor Lévy - Fab Lab ULB)



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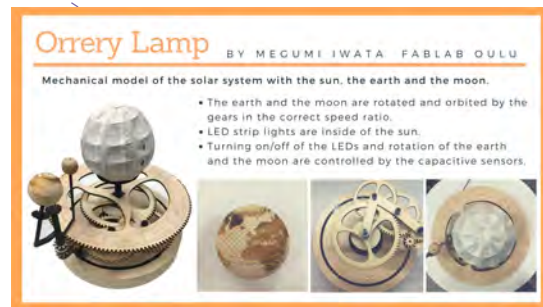
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ORRERY LAMP

It's the mechanical model of the solar system with the sun, the earth and the moon. It can be used as a night lamp controlled by a phone.

Megumi Iwata - Fab Lab Oulu



UMAP

It's a minimal device for projection mapping installations. It can be connected to a projector by using a HDMI cable. Texture of real-life objects can be changed in a precise manner by using the combination of uMap and a projector.

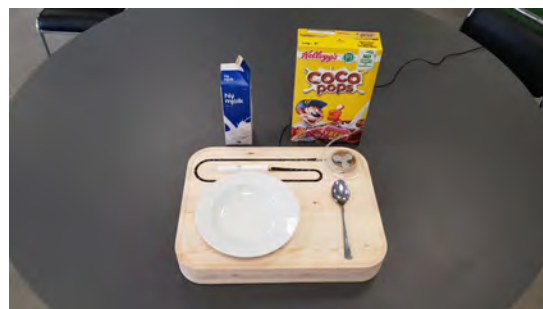
Krisjanis Rijnieks - Fab Lab Barcelona



THE ANTI SOGGY SPOON

It's a device that adds milk to each spoonful of cereal. It works with any metal spoon and, with a press of a certain motion, the device dispenses milk into the spoon; so the cereal doesn't get soggy.

Arnar Daði Pórisson - Fab Lab Reykjavik



PERFORMING THE MACHINE

The harp plays a 3D printer as a musical instrument. The interface has six rods, which when stroked cause the 3D printer to move its print head in six unique expressions. The force of the stroke controls the speed - and so the pitch - of the expression. Each expression comes from the gcode used to print each of the rods.

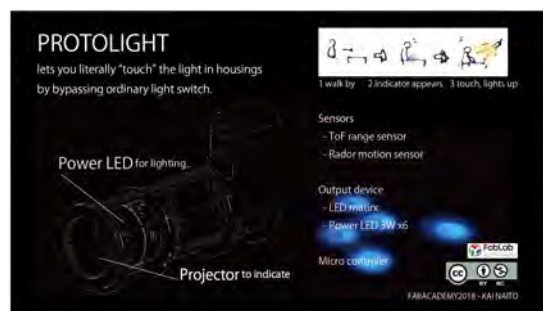
David McCallum - Fab Lab Amsterdam



PROTOLIGHT

It is a lighting fixture that has primitive projection feature and a sensor to know the distance to the subject to illuminate. A ToF range sensor is used to enable users to interact with the light. The main implication for this is a virtual switch: projected image of the light acts as a natural indicator and users simply touch it to turn on the light.

Kai Naito - Fab Lab Kamakura



POSTUREA

It's a posture corrector that measures the inclination angle of the body, as well as the excessive stretching of the shoulders, to check whether the subject is in a good position.

Victoria Peredo Robinson - Fab Lab CEU Madrid



TOTS

It's a "training of trainers tool box" that contains a series of exercise-boards, related to digital fabrication, for help trainers to teach digital fabrication, electronics and much more. It is designed for FABKIT, a project by Global Humanitarian Lab. It consists in a low cost, replicable and "open" fablab to be deployed developing areas to empower local communities.

Laura Cipriani - Fab Lab Opendot



SKATER DOLLY

It's an accessory for cinematic camera movement and capture for time-lapse photography. It is featured by an integrated timer, shutter and movement control.

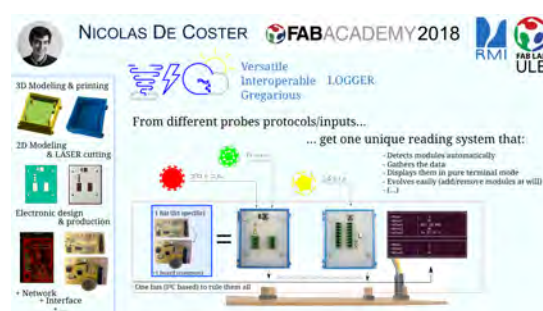
Nils Daniel Bruns - Fab Lab HRW Bottrop



THE V.I.G. LOGGER

V.I.G. Logger stands for "Versatile Interoperable Gregarious Logger". The device is responsible for data collection and formatting from different metrological instruments.

Nicolas De Coster - Fab Lab ULB



FAB GO TO

It's a rigid, lightweight telescope base made of plywood for DIY amateur astronomer. Ease of moving from remote location with a large mirror for deep space observation.

Marc Lemaire - ÉchoFab



PLUG

It's a simple plug that allows to control different cooking appliances: immersion heaters, rice-cooker or electric plate and to maintain water at a precise temperature for a given time.

Victor Lévy - Fab Lab ULB



FINANCIALS

Fab Academy is a distributed Educational Program supported by Fab Foundation and globally coordinated by Fab Lab Barcelona.

Fab Foundation is a non-profit organization that emerged from MIT's Center for Bits & Atoms, formed in 2009 to support the growth of the international fab lab network. Its mission is to provide access to the tools, the knowledge and the financial

means to educate, innovate and invent using technology and digital fabrication to allow anyone to make (almost) anything, and creating opportunities to improve lives and livelihoods around the world.

Fab Lab Barcelona, part of the IAAC Foundation, is one of the leading Fab Labs in the EU, focusing its activity in educational and research programs related with the multiple scales of the human habitat and the self-sufficiency agenda. It is the headquarter of the Fab Academy Global Coordination, supporting Fab Labs, Mentors, Instructors and students during the course.

FAB ACADEMY COST STRUCTURE

The Fab Academy program receives all its financial support from the fees of the students enrolled in the course.

The content from Fab Academy is free, all the classes and project documentation are available for anyone in the class archive. Students fee covers the set of services attached to the program such as instruction and support, evaluation, hosting of documentation, among others.

The program tuition fees are based in the combination of 2 costs:

- **Local Costs** > The costs needed to run the course in the local Fab Lab that hosts the program.
- **Central Costs** > Infrastructural costs and services provided by Fab Academy Global Coordination and Administration.

Central costs are fixed (2500\$/€) and local costs are variable, decided by the Node. They can calculate how much the local costs are and add this price to the central costs.

The Local Costs cover:

- Materials for projects
- Access to facilities
- Operations (such as running the class, placing orders, scheduling meetings and tracking students)
- Instruction (individual technical guidance)

The Central Costs covers:

- Administration (common costs across classes, including managing finances, running logistics, keeping records, and supporting servers)

- Operations (regional supervision, mentoring and direct support for the class such as recording its videos)
- Faculty (preparing and delivering the lectures, running global reviews)
- Student support (review and accreditation of student work, registration for graduation at the FABx events and contributions towards scholarships)

Both Fab Academy Administrations receive, with some exceptions, the totality of the students fees and reimburses the Nodes for their Local Costs. The central Administrations also redistributes the fees corresponding to mentor's remote support, mentor's node assessment and global evaluation activities.

In 2018 Fab Academy Administrations invoiced 678,500\$, reimbursing around 228,700\$ in concept of Local Costs and Remote mentoring.

The rest of the income, Central Costs, were distributed in the following central categories, listed in the chart:

- Faculty, Recitations and Content
- Global Coordination
- Global Assessment and Evaluation
- Regional Reviews and Supervision
- Infrastructure
- Fab Conference Graduation
- Communication, Video Recording, others



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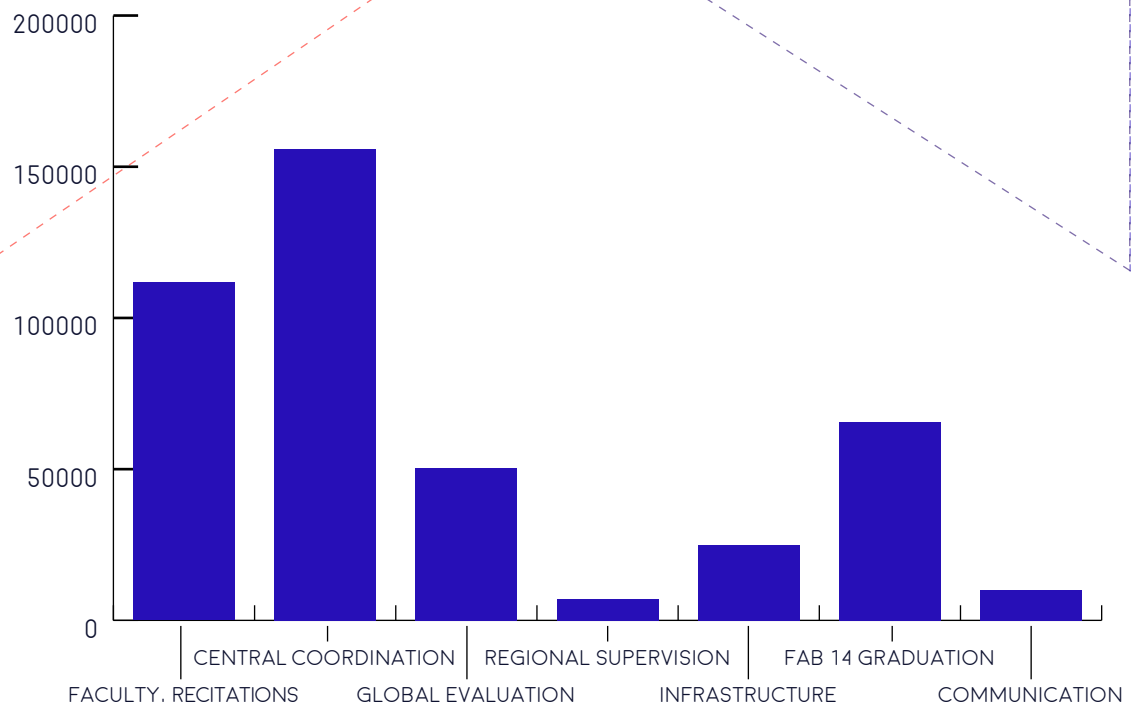
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2018 FAB ACADEMY CENTRAL COST DISTRIBUTION (\$) PER ITEM



FAB ACADEMY SCHOLARSHIPS

Central Coordination & Administration waives total or partial portions of the Central Costs to cover partial scholarships for Fab Academy tuition fees, to help students with economic difficulties.

Full scholarships are the combination of both Central and Local efforts to help students with excellent academic backgrounds that cannot afford the costs of the course.

In 2018, Fab Academy granted scholarships for a total value of 105,800\$ to **65** students.

In total, **106** students received some funding, either by Central Coordination and / or their local Fab Lab, or Private Donors.

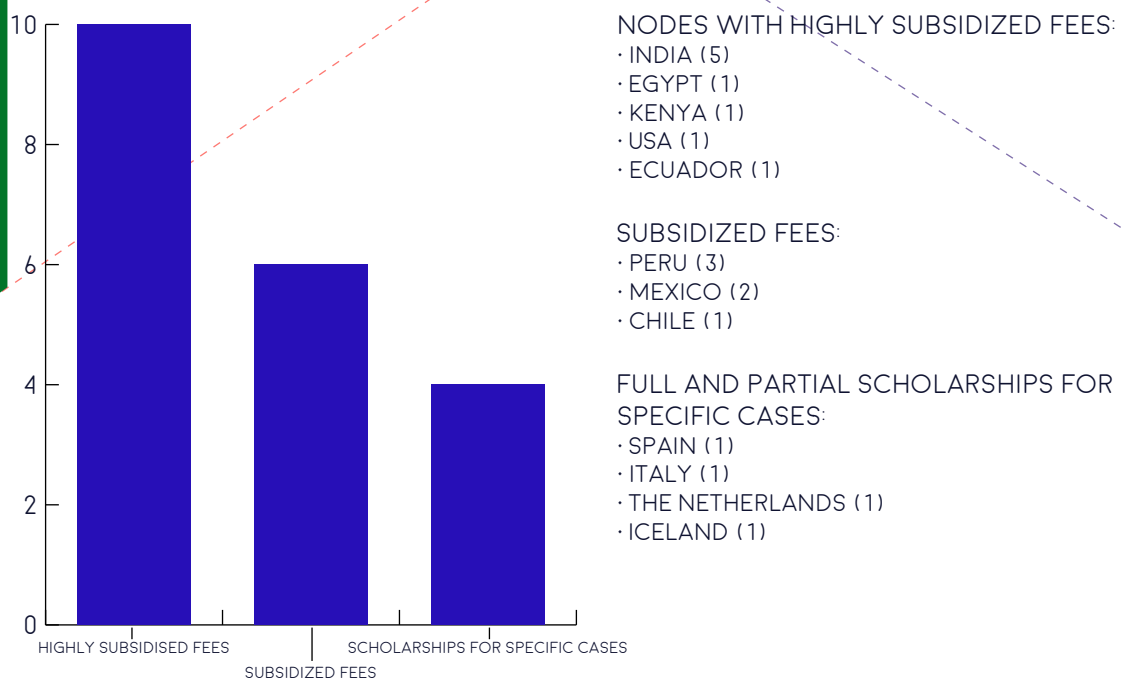
SCHOLARSHIPS DISTRIBUTION

Fab Academy Central Coordination Scholarships can be categorized as follows:

- Full and partial scholarships for specific cases
- Subsidized fees
- Highly subsidized fees

The diagram below categorize Nodes according to the type of funding received by its students in 2018, showing the amount of sites for each category.

NODES PER TYPE OF FUNDING RECEIVED BY THEIR STUDENTS IN 2018



Analyzing the scholarship status per geographical area, the following conclusions can be drawn.

In **Europe**, 4% of the total scholarships were granted by Fab Academy Central Coordination, while 85% by were granted by educational institutions (Universities, Fab Labs, etc.).

In the **Middle East**, in Egypt 100% of the students were partially funded (90% of the fees) by FA Central Coordination. In the case of Dubai and Jordan 100% of the students received a scholarship granted by private companies.

In **Africa**, while in Rwanda 100% of the students received a full scholarship from a private company, in Kenya the scholarship were totally granted by FA Central Coordination.

In the case of **North America**, 25% of the scholarships were granted by FA Central Coordination and the rest by private institutions.

In **Central and South America**, 58% of the students that received a scholarship were funded by FA Central Coordination, while the rest were funded by FA Central Coordination together with their Fab Lab.

In South **Asia**, all Indian students received a scholarship from FA Central Coordination.

In South Korea 43% of the students were granted with a scholarship from a private company.



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HIGHLIGHTS

FAB 14 GRADUATION CEREMONY

FAB14 - Fabricating Resilience was the 14th international Fab Lab Conference that took place in Toulouse, France, from August 16th to 22nd, 2018.

This year, the FAB14+ conference spread out over multiple locations in France: **Fab City Summit** from July 11 to 13, in Paris; **Fab Distributed**, July 14th and 15th, all over France (8 location and themes: *Agrofood* in Albi, *Ecology* in Auray, *Economy* in Perpignan, *Education* in Bataville, Grand-Est, *Energy* in Clermont-Ferrand, *Mobility* in Le Puy-En-Velay, *Science and Research* in Paris, and *Solidarity* in Auray); and finally, FAB14 Main event in Toulouse. The motto Fabricating Resilience was developed around 5 topics: *Food, Mobility, Machines, Money and Access*.

The 1200 FAB14 participants, mostly from America, Europe and Asia (only a few came from Africa), came together, exchanged and participated in workshops and discussions, on how to make progress in resilience.

The **Fab Academy Graduation Ceremony** took place in July 18th, during the event. Around 100 graduated students travelled to France to receive their diploma in person and attend the the weeklong celebration of digital fabrication.

