

# **FABLAB HANDBOOK**

GUIDE AND RULES OF  
FABLAB SEOUL

## WHAT IS A FABLAB?

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

Fab Labs (digital fabrication laboratories) were set up to inspire people and entrepreneurs to turn their ideas into new products and prototypes by giving them access to a range of advanced digital manufacturing technology.

The Fab Lab was designed around the emerging possibility for ordinary people to not just learn about science and engineering but actually design machines and make measurements that are relevant to improving the quality of their lives and the communities around them.

The idea was conceived by renowned inventor and scientist Professor Neil Gershenfeld at [Massachusetts Institute of Technology \(MIT\)](#). His idea was a simple one: to provide the environment, skills, advanced materials and technology to make things cheaply and quickly anywhere in the world, and to make this available on a local basis to entrepreneurs, students, artists, small businesses and in fact, anyone who wants to create something new or bespoke.

[Open-Source Movement](#) Makers like us are united by the desire to share knowledge, collaborate and to “make almost anything.” Our lab is open to the public, employs both staff and volunteers and greatly values both diversity and play, as we believe these are necessary for innovation. Our network and patrons include people of all kinds: students, teens, families, entrepreneurs, artists, hobbyists, gamers, hackers, engineers, scientists, teachers, librarians, activists and more. We welcome those interested to Join the conversation and discover more about who we are!

*People are really what make our Fab Lab go.*

## WHAT'S IN THE FAB LAB?

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

Fab Lab contains various pieces of computer controlled fabrication equipment ranging from 3D printers, laser cutters and milling machines to sewing and embroidery machines, not to mention a variety of electronic components and materials. Fab Lab also provides access to computers and easy-to-use design and manufacture software, capturing your ideas and turning them into reality at the press of a button.

The Fab Lab is staffed by friendly highly-skilled technicians who can offer support and training in the use of the equipment. All we ask is that users share their ideas and knowledge and help fellow users to get the most out of the equipment and resources, to build a big and strong community where knowledge is shared on.

## **WHAT DOES THE FAB LAB NETWORK PROVIDE?**

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

A global network of over 675 Fab Labs now exists, connecting people, communities and businesses across the world and enabling them to collaborate, problem solve and brainstorm ideas. Mixing a local and global context **LOCAL THINKING**

FabLab is a global network of local labs, enabling invention by providing access for individuals to tools for digital fabrication.

## **EXAMPLES OF OTHERS FABLABS**

Shepherds in Norway have used their FabLab to create a system for tracking sheep using their mobile phones,

In Ghana, people have made an innovative truck refrigeration system powered by the vehicle's own exhaust gases.

In Afghanistan, people are fashioning customized prosthetic limbs.

In South Africa a government and business backed project is creating simple internet connected computers that hook up to televisions and cost just ten dollars each.

## **WHO CAN USE A FAB LAB? ACCESS**

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

You can use the FabLab 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 others.**

## Everyone

Users of all ages and backgrounds can take advantage of several services at the lab.

We offer free open hours for the general public where visitors can explore the space and get help from staff and volunteers as well as use tools and purchase materials at-cost. Families and individual adults may wish to attend our low-cost weekly orientation sessions to learn about more specific tools and activities. Groups of 10 or more can schedule a variety of on-site workshops, like laser engraving, 3D printing or digital embroidery. We also offer guided tours with demonstrations customized to meet your interests.

## Youth/Kids

One of our main missions is to introduce youth ages 8 through 18 to computer-based design and fabrication with program Fab Kids. We offer cutting-edge workshops to bring tools and programming out into the community. If you can't make it to the lab we can come visit your location with our Fab Truck, which is great for interactive stations at conferences or conventions as well as for starter workshops and demonstrations.

## Continuing Education

Teachers, and other youth educators can book specialized training sessions to learn Fab Lab technologies and techniques, including how we run specific workshops and camps.

## Professional

Professional artists, entrepreneurs and researchers can book lab rental time to gain unfettered access to our equipment. We also have a referral network to help you find appropriate consultants to assist with specialized jobs. Finally, our lab offers an annual installation of the MIT Fab Academy training.

## Training for Educators

We offer workshops for youth providers who would like to learn how to run the same kind of curriculum we do. They come in two forms:

1. Detailed instruction sessions on how to teach one of our workshops or makeathon activities. Participants will actively go through workshop activities themselves, then teach one another and ultimately go home with notes and lesson plans to carry out a specific activity.
2. An overview of tools and techniques for a given tool/area (eg. 3D printing, digital textiles) or topic (eg. design thinking, robots). Participants will run through a high-level review of a wide variety of tools and starter activities related to a central concept, work area or course and go home with supportive materials and a general understanding of what is possible.

To arrange a training session find one or more open times on the calendar below that work for you and email us about what you'd like to do! Please make sure to include your group size and familiarity with maker space activities.

## **Fab Academy**

Fab Academy provides a unique educational experience for adults who take part in its global learning programme from January to June every year.

Students participate in global lectures broadcast by Fab Lab founder Professor Neil Gershenfeld from MIT in the US every week and there are lab days each week where students have access to the digital fabrication equipment and local expertise for personal help with assignments.

Assignments involve designing and making something every week ranging from developing a simple website to building a digital fabrication machine, such as a 3D printer.

At the Fab Academy you will learn how to envision, design, prototype and document your ideas through many hours of hands-on experience with all of the digital design and fabrication tools

## **Education**

Free Training in the FabLab is based on doing projects and learning from your peers; you're expected to contribute to documentation and instruction.

Workshops they are educational programs given by the fab lab staff to introduce people to new subjects and giving the first steps in the world of digital fabrication

## Workshops

The Fab Lab runs workshops and tours for small groups and organizations! We're excited to introduce learners of all kinds to digital fabrication and rapid prototyping. If you're an individual or group of 3 people or less see our lab rentals

### *Format and Requirements*

Our minimum workshop time is 1.5 hours and we also offer half and full-day sessions. If your group needs to do a workshop in under 2 hour we can offer a tour, which includes demos and Q&A time, but no projects where participants actually make something. **Tours are a flat rate of ????? won** and we can also emphasize a certain tool or topic, such as libraries, entrepreneurship, storytelling or 3D printing.

The typical minimum age is 9, though some activities may be better suited to older participants. If you are not sure if a participant is ready for a workshop at the Fab Lab, consult our staff

We can host groups of 20 or less just about any time of the day, and groups of 30 with special arrangements. Our typical instructor-to-learner ratio is one to ten.

We can accept cash, checks (made out to Tide Institute) and credit card as payment for workshops, as well as account transfers.

### *Reservation Policy*

In order to reserve your workshop spot you will need to deposit half of the estimated cost at least one (1) week in advance. Payments can be made in-person at the lab or contacting our staff by mail. You may cancel for a full refund if you contact us at least one (1) week before your workshop is scheduled.

## USERS RESPONSIBILITY

As is an open space to everybody Fab Lab Seoul work as collaborative space where you are 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.
- *knowledge*: contributing to documentation and instruction

### Secrecy

*Who owns fab lab inventions?*

Designs and processes developed in a Fab Labs must remain can be protected and sold however an inventor chooses and your intellectual property can be protected however you choose. *We encourage the shared knowledge* supporting open source projects and software

### Business

Commercial activities can be incubated in the FabLab 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.

### The potential

While FabLab have yet to compete with mass production and its associated economies of scale in fabricating widely distributed products, they have already shown the potential to empower individuals to create smart devices for themselves. These devices can be tailored to local or personal needs in ways that are not practical or economical using mass production.

## **MAKER RESIDENCY PROGRAM**

Maker residency program allows very frequent users to use the FabLab Facilities as a permanent membership on a monthly based subscription, allowing them to use the facilities on a 24 hour and 7 days a week schedule without staff supervision.

For being available to use this kind of program the user should be known in priority by the staff and demonstrate reliance in the use of equipment and machines. The monthly subscription of this program is 150.000 won. Non material included. If you are bachelor/master/school student you can have a monthly subscription by 100.000 won (50.000 won discount) always that you can demonstrate with the college/school card

This statement of rules should be accepted in priority by the makers in residency. In case of a violation of the "use of fablab agreement terms" the membership can be automatically cancelled

## **ARTIST RESIDENCY PROGRAM**

Artist residency program allows artist and media artist to have a symbiotic relationship with the fab. That means they can use the Fab Lab for free(non material included) as long as they finish their artistic project. All the development of their art project should be perfectly documented on the Fab Lab Seoul webpage blog to keep the S.N of the Fab Lab alive and show what can be done in the FabLab to other people.

Artist can use the FabLab facilities for free as long as they contribute promoting it on the S.N and project blog update of the Fab Lab Seoul. They are able to use the facilities on a 24 hour and 7 days a week schedule without staff supervision.

For being available to use this kind of program the user should be known in priority by the staff and demonstrate reliance in the use of equipment and machines. The should write and application letter and the project description to realize on the FabLab facilities.The art project will be valorated consecuently and accepted or denied. Non material is included on this program.

## Use of FabLab agreement terms

각 장비에 대한 모든 안전수칙을 완전히 숙지한다.

Always follow the fablab and safety rules, use common sens

1. 모든 시설물의 안전을 위하여 항상 관심을 기울이고 노력한다.

Take care of all the facilities, so nothing breaks

2. 나 이외의 이용자들의 안전도 늘 주의를 기울인다. 그들의 안전의 나의 안전과도 직결된다.

Keep everybody in the lab safe with your behavior and others' behavior.

3. 재료 등의 소모품은 아껴 사용하고 여분의 재료는 반드시 반납한다.

Save resources and materials. Return the rest back. Recycle as much as you can 3R (Recycle , Reduce , Return )

4. 사용한 도구는 원래 있었던 자리에 둔다.

Keep everything clean and in the right place after using.

5. 장비가 비정상적으로 작동하는 것이 보이면 바로 작업을 멈춘다.

If you sight malfunction/strange behavior of the machine, stop it immediately

6. 비정상적으로 작동한 장비에 대한 기록을 하여 연구원들이 알 수 있도록 한다.

And report to managers

7. 작업을한자리를정리정돈한다.

Keep your working area clean

8. 다음날와서다시작업을할것이라도반드시정리를하고 귀가한다.

Clean your work area before you leave, even if you are going to continue your work next day. So someone should be able to use the same space after you.

9. 음주 후 모든 장비사용을 금한다.

Alcohol and drugs while or before using machines are not allowed.

10. 실내 흡연을 금한다.

Smoking is not allowed.

11. 필요한 장비가 있으면 주어진 양식에 맞추어 요청한다.

You can ask for additional tools

12. 팝업운영시간외사용을 원하면주어진양식에맞추어 요청한다.

There is a form to apply for extra hour of using Fab Lab fill it and give it to manager

13. 작업하는 내역을 공유한다.

You have to share what you working on.

본인은 상기 수칙을 지키지 않을 경우 따르는 패널티 (공간 이용 제한, 장비 이용 제한, 레지던시 퇴출)에 대한 동의를 하며 창작 활동을 통해 다른 사람들에게 선한 영향력을 미칠 것을 약속합니다.

I will follow penalty after against the rules; Limiting use of space, Machines, kicked out. Also I will affect the others with my own creation.

2016년 (mm)월 (dd)일  
이름(name) 서명(signature)

## FABLAB STAFF THIS IS OUR TEAM

Below is a description for personnel needed to manage a permanent fab lab facility, with the possible addition of a mobile fab lab as well to the program. For a permanent stationary lab in a building, we'd suggest you start out with the following staff:

### **P.R. Champion**

This is the local community leader who believes in and is passionate about the fab lab concept and what it can do for the community. This is a person who is closely connected to the community base in order to bring resources (financial and otherwise) and commitment to the fab lab from within. This person may already be running a NGO or community center, and has a personal commitment to and community mission for that center, rather than performing merely an administrative role. When times are tough, these champions find the commitment and resources to sustain the operation, and have enough vision to keep the community excited about it. Champions are critical to the success of the fab lab. This person does not need to be technical, just committed and passionate about the idea, and well connected within the community to sustain the operation. This person may or may not serve as administrative/managerial support for the lab.

### **Fab Lab Guru**

This is the person that makes the lab operate on a day to day basis. They must like to make things. *That's far and above the most distinguishing factor for a fab lab guru, they must love to make things.* It helps a lot if they have either a mechanical or electrical engineering background, OR a background making things professionally. Electronics and programming are good skills to have as well.

This person would also help design programs for community. If you plan to handle a lot of schools and groups, you probably want to hire two (2) experts for the permanent facility. If you plan to participate in Fab Academy, you will probably want to have two gurus on staff.

High school teachers who lead robotics competition design classes are terrific for this kind of job, as are those with arts or architecture training, or training in industrial arts.

This person is always multi-tasking, between maintaining the equipment and supplies, to helping mentor people through projects, and training users on the design software and the fabrication hardware. It's a big job, and if you have a big lab, you need two of them. Below is a job description from one of the fab labs in the network that's a pretty good model. Most of all this person has to be open to new ideas, have a passion for making things, and patience and capability to teach users

### **Fab Lab Director**

- A technical degree (ME,EE,CS,IT) and/or similar job experience is required.
- Strong interpersonal and communication skills are required.
- Desire to seek and pass on knowledge to others is a must. Previous teaching experience is preferred.
- Proficiency in common desktop applications (web browsing, word processing, image editing etc) required. Familiarity with CAD/CAM and/or PCB Design software preferred.
- Must have experience running and maintaining PCs and LANs (your home PC and LAN may be sufficient). Familiarity or expertise in Linux preferred.

The Fab Lab Director and the Fab Lab itself will cross the boundary of multiple disciplines including education, arts, mechanical engineering, electrical engineering, computer science and manufacturing engineering. The ideal candidate will likely have a background that is just as diverse and will be eager to embrace new concepts and technologies when appropriate.

In this instance the fab lab is a large lab that will have a lot of people coming through, with one on-site manager, 2 gurus, and plans for one guru to run a mobile fab lab as well.

### **Intern**

This is the person that makes the lab operate on a day to day basis. They must like to make things.

Previous knowledge is not essential but suggested. Is the person in charge of attending the users and make the "welcome to the fablab" explanations. His work is between public relationship and maker.

The staff should teach him how to use the machines on his own so he can develop contents and make little projects.

Recommended at least 1 permanent intern with two of them overlapping.

### ***Extra staff***

*If the permanent (brick and mortar) fab lab facility is going to be part of a business incubator or have a self-sustaining entrepreneurial focus to it, you may need a full time designer/engineer to help entrepreneurs and small business innovators design and prototype their ideas.*

*Mobile fab lab should also have at least one full time guru/technical expert on staff, and depending on how you schedule the lab (that is, lots of schools, or lots of community centers, very close together in time) you may want two gurus, or one guru and one person to help with crowd flow/control.*

### **Working management of the staff**

Each morning 9.00 to 9.30 all the staff meets together to plan about they daily maintenance, issues of the last day, projects going on and workshop plannings.

From 9.30-10.00 laboratory maintenance and cleaning.

Two staff should be always in the 550 room (due to more users traffic) and one in 510 or in the office.

The turns on who will be in each space are done by arrangement of the staff.

Suggestion to stay 3 days on 550, 1 day on 510 and 1 day in the office.

One day is reservated for each staff to develop projects, during that day,shouldn't be molested except for special needs.

## HOW IS THE SPACE

The Seoul FabLab has two main rooms ( Design and Making room) and is about 1900 square feet (approximately 180 square meters).

This lab is designed to accommodate larger groups (about 20-30 users at a time), so it includes double the number of machines and tools—therefore more expensive than the usual Fab Lab . Depending on the focus and community of your Fab Lab you might want to design your lab similarly. We can talk through the design together, but even if you want to maintain the standard Fab Lab (one of each machine and tool) it would be good to use this layout as a model.

Looking at the blueprint, you will see a large corridor —this is a connection between both rooms, under the standup desk there are electric plugs so you can work with your laptop with nice views.

### 510 ROOM (Design room)

A design space for 25 users, plus a teacher/guru who can demonstrate using a projector and a powerful laptop computer on the screen at the front of the design center. This is also where videoconferencing for Fab Academy or meetings happens as well.

Behind the design center/screen wall is a little office plus storage for the fablab supplies.

On the screen wall there are the 3d printer shelves with 8 filament 3d printers and next to it the MJP printer with his own computer.

On the corner there is the resting area where you can work in some beanbags, take a coffee or sleep a little bit if you are tired.

On the inside wall you can find out a "product demo" shelf with storage under it for the users.

### 550 ROOM (Making room)

To the left, just in the corner, next to the design center is the electronics workbench. That includes one set of bench test equipment, but two soldering and of course, electronic components and tools for the labs.

Along the back wall are two laser cutters, attached to 1 computer each one, and attached to an outside, roof ventilation system.(please check that all the switches are on before using it)

There is one long, empty counter along the back wall as well for work space and for use with some of the other kinds of tools, like a drill press and a scroll saw. (Clean this area after use and wear safety equipment)

The right end of the lab, there is a special room space for the ShopBot (large wood router) and the associated computer and filter/blower. This is the one item that has special electrical power needs. (ALWAYS USE SAFETY EQUIPMENT)

And finally you will see 3 or 4 large rectangles tables on the center of the room. These are purely workspace, places where students and users can spread out their projects as they work on them.

On the middle of the Fablab there are 3 sliding black hanging walls to put all the tools in place and adapt the position to the needs of the space.Incredibly useful.

The one aspect of the space that all Fab Labs underestimate is the need for material and project storage. You need some significant space devoted to storing large pieces of wood and other materials, as well as cubby holes or shelving for student/user individual projects.

[\*\(Links for the blueprint\)\*](#)

## COMMUNITIES A FAB LAB MIGHT SERVE

- Public school children
- Private school children
- General public This group will consist of people who just want to make things or learn new skills or make products in the lab. This group could include college or university students who will want to work in the lab.
- Artists/Crafters The traditional artisans and crafters should be encouraged to come and experiment with the tools and processes of the fab lab. The lab doesn't replace their traditional work, but it augments and broadens the palette of what they can do in their work. It would be great to have artists experiment with the tools in the fab lab. Again, an artist in residency program might be really interesting—offer several active artists one or two month program in which they have access to the entire lab with the technical gurus to help support them. If they produce some high level art or crafts for exhibit in the lab, and outside in public spaces, this will help you show off the capabilities of the lab, get the artists' endorsements, and build the fab lab reputation in the public. You might want to sweeten this deal by offering a stipend for the month, or to fund the materials they will need for their art work for the month, or something along those lines.
- University Students Always great to have classes and students working in the lab. They can bring great creativity and new approaches to making things to the environment. They can also be hugely useful as technical resources and as teachers!
- Entrepreneurs This group includes the college or university students, and young entrepreneurs who are inventive and creative and need a space and a place and a community to support their invention. It might be interesting to have an entrepreneur in residency program—offer several active entrepreneurs a one or two month program in which they have access to the entire lab with the technical gurus to help support them. They can produce some interesting inventions for exhibit in the lab, and outside in public spaces, this will help you show off the capabilities of the lab, get the entrepreneurs' endorsements, and build the fab lab reputation in the public. You might want to sweeten this deal by offering a stipend for the month, or to fund the materials they will need for their invention work for the month, or something along those lines. Another approach would be to offer a special Inventor his/her own group time in the lab over a one year period. He/she could invite peers, or clients to work in the fab lab on special programs for the year.
- Government or Corporate Employees This might be a group who will find new uses for the lab, and new experts to volunteer and work in the lab for you, and they will spread the word about the lab to the larger community. Their

endorsement and adoption of the lab can be important to the success of the fab lab.

You could encourage experimentation and usage of the fab lab in the employee community by putting up a contest/challenge for them to use the fab lab. Something like– we'll give a prize of money to the team that comes up with the best community project made in the fab lab and we (whichever organization is hosting) will help you implement it. For example, making benches for a community park, or desks for a low income school, etc.

Personnel for a Super Fab Lab:

If you want to accommodate school groups of approximately 15 to 20 children per group, you should have two technical/guru support people working in the lab. If you have the extended hours I have outlined below, I think you need two shifts each day. So your staff would include:

- One logistics, planning, outreach and communications manager
- Three to four technical gurus/ support staff for mentoring, teaching, maintaining and supervising the use of the equipment. They would work two to a shift, with two shifts per day: 8:30- 16:30 and 13:30 – 21:30. The three hour overlap in time would be used for lab maintenance, professional development and project/group visit preparation.
- One technical manager– to maintain computers, equipment, network, and technical problem solving.

## **SAMPLE FAB LAB SEOUL WORKING HOURS:**

**Monday** 9:30AM – 18:00PM

**Tuesday** 9:30AM – 18:00PM

**Wednesday** 9:30AM – 18:00PM

**Thursday** 13:00AM – 20:00PM

**Friday** 9:30AM – 18:00PM

*Saturday and Sunday CLOSED except for special request*

## FIRST TIME VISITORS

Please start by signing in and introducing yourself to a staff person or volunteer .

- If you're completely new to makerspaces and digital production start with a tour and try creating something simple, like a laser-cut key chain, sticker or small embroidered patch.
- If you have a specific project in mind just ask a staff person. They'll help you find the right people and resources to begin.
- Additionally, you guide yourself and work at your own pace with the links below.

## VOLUNTEER!

We depend on volunteers to help make sure our Fab Lab is a community-oriented space. After patrons have visited a few times they are welcome to get involved as a volunteer. There are two main ways to do this:

1. Contact the staff on the fab and ask them to help you get started. They would be happy to help you get the most out of your experience!
2. Alternatively you can guide your own path of involvement. There are several ways this might happen:
  - Join the [volunteer list](#)
  - Learn how some of the tools work and help others to use them
  - Find us on Facebook, YouTube and share pictures and videos of creations as well as events and insights
  - Share tutorials for projects and techniques with our [Google Doc template](#) – just email us the link when you're done!
  - Collaborate with us to bring in an organization or group you're connected to for a workshop
  - Talk to any of the staff or core volunteers to learn about more ways you can help out

VOLUNTEER AND HELP – the fablab community grows based on community. offer your time to create and help at [fablab@tideinstitute.org](mailto:fablab@tideinstitute.org)

## **GUESTS**

Guests are allowed to use hand tools and equipment, except as part of a scheduled class/workshop.

Members are responsible for their Guests and their actions.

## **MINORS**

Minors 16 and under must be accompanied closely by Parent or Legal Guardian at all times.

Accompanied closely means visual range generally, and immediate reach when near dangerous tools.

Parents/Legal Guardians are responsible for their children and their actions.

Minors under the age of 18 must have their liability form signed by a Parent or Legal Guardian.

## **MEMBERSHIP DUES**

All dues are paid in advance.

Membership begins when you first start using the Fab Lab, not when you pay.

All membership are eligible to use all the facilities 24h,7 days a week on their own supervision, in case a violation of the "use of fablab agreement terms" the membership can be automatically cancelled

## **ACCESSIBILITY**

FabLab is accessible to all. We can work directly with school, youth and church groups, and also offer a number of programmes that encourage members of the public, irrespective of age, gender or community background to get creative and use the facilities within the Lab. Rapid prototyping and low cost on demand manufacturing offer commercial business and micro enterprises the ability to turn their ideas into working proof of concept models in a local setting. Fab Lab Is fully accessible to users with disabilities.

## USE POLICY

### Always:

- Ask the staff if you have any questions. He is also entitled to ask you to clean up if you should forget.
- The Fab Lab is for electronic and light mechanical hardware work. It is not for heavy sawing, Dremel work or drilling. If you create dust you cannot contain, move outside, to the rooftop up of the Fab Lab. (ask the staff)
- To use the 3D printer, lasercutter, or PCB mill, contact the staff
- For private projects pay the staff before you start for the material you plan to use.
- Always return all tools to their correct place immediately after you are done with them. Clean them if necessary. Every tool has its labeled place in this workshop; put it there and nowhere else.
- If you must take a tool out of the room, put one of your name tags in its place.
- If something is empty, broken or missing, tell the staff

### Before you leave for the day:

1. Put your project into a project box with your name and the project name on it (ask Staff for a box). Storage for boxes is in the fab lab and in room 510.
2. Clean any desk you used, so the next person can enjoy a clean workspace when they come in.
3. It's not ok to leave any empty packaging, component material leftovers, **empty bottles, pizza boxes**, dead pets or any other trash lying around. We want this space to be a pleasant environment to work in for everybody.
4. Spend 5 minutes at the end of the day to clean up some aspect of the room that looks like it could use it - in addition to your own mess. Look around and be creative. Clean out a shelf, wipe off a surface, sort some resistors, throw out some trash (the staff will tell you where to throw it). If nothing else, use the broom or vacuum to clean the floor.
5. Close the windows.
6. Switch off the lights and air conditioners.

## USING THE FABLAB

FabLab is open to students, staff and community. The building is open on working hours, but to be sure that you find someone qualified to assist you, we recommend that you contact one of our staff.

To successfully use the FabLab, five common sense steps are proposed:

1. Decide what you want: for instance, to turn into reality anything from your university project or based on your own idea; to receive some assistance with equipment / software provided in the Fab Lab; to learn how to use a machine and so on.
2. Contact one of our staff member, either by e-mail or personally in the Fab Lab Seoul (Seunangga Building)
3. Agree on a convenient time for both parties, and be precise with your requirements/expectations;
4. Provide the raw material for your case - we can help when related to one of the machines, for instance which certified material can be used in each of them.
5. Be on time and be prepared for the *frustration of failures and joy of small accomplishments* - remember that making and prototyping is a VERY interactive process, with lots of fails, trials and errors. Do not come in last minute expecting a magic 3D printing, it will not happen.

## CODE OF CONDUCT

The 6 key rules are:

1. SAFETY – check the machine instructions and do not perform any activity that may harm you, your colleague or the machine. remember: human safety machine safety operational safety
2. CLEAN YOUR MESS – use the space at your will, but throw your garbage and waste in the bin
3. PUT BACK WHERE YOU TOOK IT – tools and material get lost easier
4. ASK – better safe than sorry
5. SHARE – Fablab ntnu is a space to share ideas, equipment and knowledge

Don't merely respect each other; be excellent to each other.

Safety is important! If you are unsure of how to safely do something, don't do it.

All members are expected to maintain a safe and clean environment at all times. Clean, Maintain, Organize, Improve.

Always leave the space better than you found it. We are all here to make things and learn, so collaboration is important.

If you break something, let someone know so it can be fixed.

Don't make someone feel bad for breaking things, help them understand what went wrong.

Don't be afraid to ask questions.

Tools/resources must stay on the premises so that other members may use them.

Sign in/out when you enter/leave the Fab Lab to help us keep track of usage.

Don't catch fire, set others on fire, or set anything on fire which has not been designated or designed to be on fire.

It is the responsibility of each member to help enforce the Code of Conduct.

If someone is violating the Code of Conduct politely explain to them why their behavior is not acceptable. Egregious violations should be reported to a Director.

## **STORAGE**

The Fab Lab is too small to serve as a storage facility so projects and materials must follow the storage rules.

Projects and materials for them can only be stored in the Project Storage Areas.

Monthly Makers can store individual projects and materials, as space is available, for up to 30 days.

-Frequent Fabbers can store for up to 60 days.

-Staff of the Lab can store for up to 90 days.

All projects and materials must be clearly labeled with the name of the member and date storage began.

Any projects and materials left past the approved storage term or after membership expires will be considered donations and could be thrown away or reused.

## **COSTS**

User pay for each hour of use of the machines. In case it didn't overpass the hour the full hour will be charged

In the case the use needs to be more 'frequent' we provided a hourly cost for each type of machines, please check machine specific page at Tool Documentation

The costs do not constitute a fee for using the machine as a contribution to the maintenance ,support and expansion of the fleet.

## **ACTIVE PARTICIPATION IN THE FABLAB**

By participating and helping to organize the activities of the fab lab, such as taking courses and workshops, participating in events, providing support to new members, or by contributing to the daily operation of the Fab Lab Seoul, the volunteers can avoid paying the use of the machines for a time equivalent to theirs helping time.

## ORGANIZATIONAL MEETINGS

Board meetings will attempt to follow the MIBS SRC3 format, and will be held on an as-needed basis.

Board meetings will be posted on the Fab Lab Seoul calendar.

The purpose of the meetings is to give ideas, improve and contribute to the fablab

## LOANING OF TOOLS & EQUIPMENT TO THE FAB LAB

Members can generously provide tools or equipment for use in the space, either by donating them outright or by loaning them.

All loaned equipment must be marked or labeled with the owner's name and set up in the special category of the FabLab Inventory Google Spreadsheet.

*The following information must be recorded:*

Name of owner

Equipment being loaned

Serial number if available

Terms or conditions of the loan

Loaned items may be returned at any time, by request of the owner.

Fab Lab Seoul is NOT responsible for maintenance of loaned equipment, but may maintain it as required for use.

Fab Lab Seoul is NOT responsible for the damage, theft, or loss of equipment but efforts will be made to provide reasonably secure storage.

## DONATIONS

Donations of usable items must be approved by the Directors.

A "freebie shelf" is available for items that are free to use/take for all members and will be periodically cleared.

Donations for the "freebie shelf" will be accepted only if there is space available.

Donations for the "freebie shelf" that do not fit cannot be left in the Fab Lab.

## Rule and Policy Changes

These rules and policies are subject to change. Changes will become effective immediately upon successful vote of the Board of Directors

## Disciplinary Actions

Directors may ban anyone who violates the Code of Conduct from the premises or online systems.

Bans may be reversed upon agreement by a simple majority of the FabLab Staff

Functionally, Fab Labs encourage people to become makers by exploring the entire design process.

Organizationally, our Fab Lab is a member of Tide Institute

## LAB / EQUIPMENT RENTAL/ RESERVATION OF THE MACHINES

*Many of our tools are chosen based on the MIT Fab Lab Inventory categories, but we have altered and expanded upon them. Specifically we offer both open source and proprietary solutions and make use of many lower-cost digital fabrication machines. Our current arrangement (as of June 2016) is outlined below. Button color indicates degree of difficulty for beginners*

### To schedule time, go through the following steps.

Look for open (empty, white) slots on the calendar below. You may overlap with other lab rentals, so long as you're using a different tool or area. *You can only schedule rentals during open hours* (green areas). Once you've found one or more suitable times contact us to request the rental. Please indicate your chosen tool/area and any other relevant details.

*You must indicate:*

- Machine use
- Name and surname
- E-mail address and telephone

You can rent out specific machines or our entire lab for tours, immediate tool access and individual help time. Rentals include charges for machine use but not materials.

- External organizations interested in using the lab for multiple or specialized sessions or workshops should contact us to make specific arrangements

Users interested in seeking help from a dedicated consultant should contact us first to make sure we have someone available in our referral and staff network. Skills include (but are not limited to):

- 3D design for 3D printing and milling with Autocad , SketchUp, Autodesk Inventor
- Graphic design with Inkscape or Illustrator, website design and development
- Small board electronics and circuit pcb milling
- Fashion design and advanced textiles
- Blacksmithing and metalworking

## Materials

The materials used in the laboratory shall be borne by the shareholders.

The fablab provides a purchase of materials, which can be booked and collected directly in the laboratory based on the material availability .

There exist a recycling box of left material that user can take for free to avoid more garbage production an improve recycling

## Rules

Equipments follow 3 basic rules, they are indicated all over the lab

Green - open access to everyone

Yellow - requires training

Red - staff only

## LASERCUTTERS

### LaserPix Xcut CO2 150Watts



- Our most popular type of tool, *sign up for it right away when you get in*
- 1300x900 mm work area
- CO<sub>2</sub> 150 watt laser; 1000 DPI raster resolution
- Uses PDF files, cuts lines set to a particular color, rasters another color
- Please consult our safety guidelines and ask a staff person before you use this device
- Only available at the main lab
- Green - open access to everyone

## LaserPix Xcut Metal 150Watts



- Our most popular type of tool, *sign up for it right away when you get in*
- 1300x900 mm work area
- CO<sub>2</sub> 150 watt laser with O<sub>2</sub> cut available on demand for cutting stainless steel up to 1.5mm
- Uses PDF files, cuts lines set to a particular color, rasters another color
- Please consult our safety guidelines and ask a staff person before you use this device
- Only available at the main lab
- Yellow - requires training

## 3D PRINTING AND SCANNING

Details on 3D Printer Material Settings and Policies

### Ultimaker 2



- Work with STL files in Cura, to generate gcode
- One color at a time, prints slowly
- We always use with PLA
- Input .stl files (we can convert others)
- Build size of 20(x) by 20(y) by 20(z) cm
- Z-depth quality of down to 0.05 mm, nozzle 0.4
- More details at Ultimaker webpage
- Green - open access to everyone

## Almond Oc



- Work with STL files in Cura, to generate gcode
- We always use with ABS
- Considerable control over speed, temperature and more
- Build size of 15x11x15 cm
- Z-depth quality of down to 0.05 mm, nozzle 0.4
- More details in OpenCreators webpage
- Green - open access to everyone

## Cretable D2



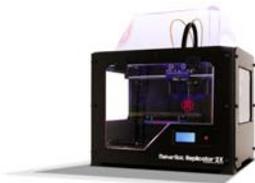
- Work with STL files in Cura, to generate gcode
- We always use with PLA/ABS
- Considerable control over speed, temperature and more
- Build size of 200 round platform 15cm
- Z-depth quality of down to 0.05 mm, nozzle 0.4
- More details in Ateam Ventures webpage
- Green - open access to everyone

## XYZ AIO/ONE 3DPRINTER



- Work with STL files in proprietary XYZ software to generate gcode
- We always use with PLA/ABS
- Considerable control over speed
- Build size of 20x20 square platform 20 cm
- Z-depth quality of down to 0.1 mm, nozzle 0.4
- More details in XYZ webpage
- Green - open access to everyone

## Makerbot 2x



- Work with STL files in proprietary Makerbot software to generate gcode
- We always use with PLA/ABS
- Considerable control over speed
- Build size of 21x15 square platform 20cm
- Z-depth quality of down to 0.1 mm, nozzle 0.4

- More details in makerbot2x webpage
- Green - open access to everyone

### Stereo Lithography 3D Printer



- Cures (hardens) resin in layers to construct very small 3D models
- Uses an off-the-shelf projector and powerpoint slides to project each layer onto the resin.
- Resin is expensive and available under special arrangement
- Red - staff only

## MJP 3D Printer PROJECT 3600HD



- Professional results, cures resin in layers to construct very detailed 3d models
- Resin is expensive and the machine is slower than other ones
- Use only if you want full professional result
- Red - staff only

## XBox Kinect Microsoft



- Prototype 3D scanning of people and objects for the 3D printing
- We also offer [AGIsoft](#) and [123D Catch](#) for photo-based modeling methods
- We use SKANET and [ReconstructMe](#)
- Green - open access to everyone

## Makerbot Digitizer



- Prototype 3D scanning of people and objects for the 3D printing
- It uses its own proprietary software makerbot digitizer.
- For more details refer to the Makerbot webpage

- (Limited scanning platform)
- Green - open access to everyone

## ELECTRONIC CUTTERS



### **Roland GX-24 (waiting for buying budget)**

- Accepts material from two to 27.5 inches wide
- Mechanical Resolution of 0.0005"
- Cutting speeds up to 20 inches per second
- Max down force of 250 grams
- Good for vinyl (reflective, twill, heat transfer, sandblast), and paint masking
- Uses Roland CutStudio software; import bitmaps (PNG, JPG, GIF) and some Illustrator files (AI)
- Not available at the main yet lab

## Silhouette Cameo



- Up to 12×24 inch (Cameo) work area
- Good for vinyl (stickers!), heat transfer material, cardstock, photo paper, copy paper, rhinestone template material and some fabrics
- Uses Silhouette Studio software; import bitmaps (PNG, JPG, GIF) or vector (SVG)
- See <http://www.silhouetteamerica.com> for more information
- Green - open access to everyone

## MILLING MACHINES

## Roland Modela SRM-20



- Create molds, circuit boards, engravings and more; usable as an end mill or drill
- Works with wood, plaster, resin (modeling wax, styrenform) and chemical wood
- Operation area is 8 (X) by 6 (Y) by 2-3/8 (Z) in, max load weight is 2.2 lb
- 150mmx90mmx70mm
- 1/8 inch tool chuck, 10W DC motor
- Software resolution – 0.000984 in./step; Hardware resolution – 0.000246 in./step
- Uses DXF, VRML, STL, 3DMF, IGES, Grayscale, Point Group and BMP file types
- Remember to consult our safety guidelines
- Only available at the main lab
- Red - staff only

## Shopbot ALPHA Prs 96-48



- CNC Router (formerly with EEG and neural interface)
- 96-48" ( 2440\*1220mm) operating area
- Uses VCARVE CNC software, requires specialized G-code and toolpaths
- Only available at the main laB
- Can cut aluminium, wood,wax,leather,cardboard,isopink,foam,composites(except carbon fiber composite)
- Yellow - requires training

## Textiles and Fabrics

### Brother Sewing Machine



- Can be used for regular sewing or embroidery
- 4" x 4" work area with several hoop options
- LCD display
- Built-in stitches and traversable stitch history
- Bobbin winding system, standard sewing machine pedal
- Green - open access to everyone

### Other Miscellaneous Textile Machines and Materials

- Serger, tube-knitter and additional sewing machines

- Manekin and mirror for fitting and display
- Thread, shears, bobbins, snips, seam rippers, button riveters, irons and ironing boards and stabilizer available for a small area fee

## Electronics Resources



### Soldering Stations

- Classroom set of soldering irons
- Several de-soldering heat guns also available
- Lamps, clips and magnification adjacent
- Solder and flux available



### Small-Board Electronics

- Several microprocessors and microcontrollers you can borrow, including Arduino (Mega), Raspberry Pi, ARM32
- Many sensors and shields available for in-lab working
- Materials for bread-board based prototyping
- Wifi and power connectors for most devices
- Littlebits alike kit are also available
- Several electronics kits available in the main lab

### Other Electronics Diagnostics Tools and Materials

- A variety of diagnostics instruments and measurement devices, including many portable multimeters, oscilloscope
- Many kinds of LED's, wires, breadboards and other miscellaneous parts are also available for a small area fee

## Portable Lightbox



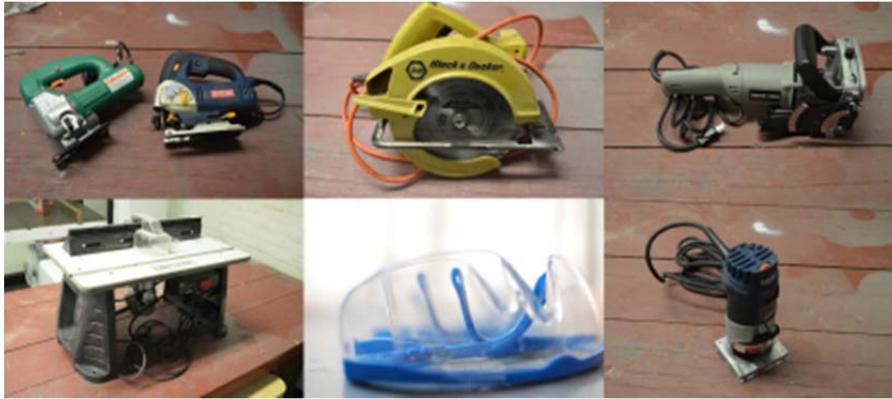
- DSLR camera available for patrons to take photos
- Semi-enclosed light-diffusion environment for nearly pure-white backgrounds with minimal shadow
- Large tripod available
- Photo editing available on lab computers and adjacent special projects machine
- Also available a large size one on demand
- Transfer pictures via USB or any memory card

## Woodshop Tools



## Drill Press

- Up to 1/4 inch drill capacity
- Always wear safety glasses
- Green - open access to everyone



## Miscellaneous Hand and Power Tools

- Screw drivers, wrenches, ratchets, hand saws
- Portable and corded drills, masonry and spade bits
- Palm router, router table, jigsaws, circular saw, biscuit joiner, sanders

## COMPUTERS

## Windows 10 desktop computers



- i5 processor with integrated graphic card on 21-24 inch display
- USB 2.0-3.0
- ethernet connection
- variety of design programs available

## Imac 27 Inch Desktop Computers



27-inch iMac

- I7 processor with integrated graphic card
- 27 inch display
- Ubuntu 2.0-3.0

**also available Linux computers**

## **MALFUNCTIONS**

Any failure and / or malfunction of the equipment and / or machinery will be promptly notified by e-mail [fablab@tideinstitute.org](mailto:fablab@tideinstitute.org) , indicating "MALFUNCTION" in the subject.

Failure to report will result in action, including expulsion from the Fab Lab.

## **Start a Fab Lab?**

Interested in starting your own Fab Lab? We've assembled some resources to help guide you through the process. This includes small community-oriented operations under a tight budget as well as larger institutions seeking to equip and staff a professional facility.

Many of our tools are chosen based on the [MIT Fab Lab Inventory categories](#) , but we have altered and expanded upon them. Specifically we offer both open source and proprietary solutions and make use of many lower-cost digital fabrication machines.

## **How to buy**

Choose, Buy and Set Up Machines

Currently, each FabLab buys its machine from vendors, but ideally, in the future, each FabLab will be able to manufacture the machines needed by new FabLabs (this will be

the so-called "[FabLab 2.0](#)" version). But at the moment we still need to buy most of the machines. This step will probably bring most of the discussion between the people involved in the development of the lab. Each person has their favorite machines and tools, and it's not always easy to find the right mix. There is [one official list](#) of machines, tools, components and materials maintained by Neil Gershenfeld himself. However, the list is not mandatory, and there are many criteria for choosing the machines and tools for your labs.

It is always a good idea to follow the official list as much as possible since there are network effects that make some machines more popular and widely tested. But considering that the list is always evolving, and that each country has its own laws and markets, it is also important to think critically about it and just provide the same kind of machines. These are some of the many criteria that might influence your choice of machines:

- Is the machine right for your activities? Some machines are nice but may not be that useful for your activities, and you might want to wait a bit before spending money on them.
- Are the specifications of the machine right for your space and activities? Sometimes you can choose between different sizes of a machine. It is therefore important to understand how the size will affect your activities. For example, I prefer a bigger laser cutter than the one on the official list, since it is the most-used machine in FabLabs and I prefer to have more flexibility with it.
- Is the machine part of the official list? It will help in making the lab more international and standard, as the list is based on many years of testing inside the most important FabLabs.
- Is the machine compatible with Fab Modules? [Fab Modules](#) is a software package that is developed by the Center for Bits and Atoms and the FabLab network. It is supposed to be at the center of the FabLab, by converting many outputs to machine inputs. It covers most of the machines of the official inventory but it is not always used yet; it may be in the future. The most important machine to be used with Fab Modules is the [Roland Modela Mdx-20/Srm-20](#), if you want to fabricate PCB in the FabLab-way.
- Is the machine easy to install? Some machines may be too hard or too time consuming when it comes to install them, so it's always good to ask other labs about it.
- Is the machine easy to run? Some machines are really well done, but are very complicated since they were designed for professional and trained users to use them, not casual users learning their way around a FabLab. Sometimes it is preferable to have less complicated and easier to use machines (this will help you

save a lot of time when helping the users start their projects). For example, there are many big CNC milling machines available, but the ShopBot is a good choice for its ease of use.

- Can you afford to buy this machine? Some machines are very nice but might be too expensive, or there may be expensive custom fees for importing them in your country (as it is the case in Brazil, for example).
- Is the machine popular enough? Some machines may be nice and manufactured close to your lab, but maybe you would like to have more people in the FabLab network to help you with knowledge about the machines. Therefore it is important to understand when you can experiment with a new machine or when you just need a reliable machine fast; a machine that the FabLab network has already tested and adopted.
- Is the machine popular with the FabLabs you will be collaborating the most? If you already plan to collaborate with some specific FabLabs, it makes sense to have similar machines and components.