

STUDENT PROJECT HOUSE

where future generations of makers
and innovators are born



A

B

We prepare our students at ETH for a world in which the pace of change is accelerating, a world in which technology is evolving radically, and a world that needs innovative solutions to today's challenges. Future-ready graduates must not only have acquired excellent subject-specific competencies from lectures, they must have developed a broad set of additional competencies. Both method-specific as well as social and personal competencies are crucial for our students to be successful professionally and for their personal wellbeing.

Such competencies must be practised early throughout life, and what better way is there than to do so in a safe environment during your studies? This is why ETH has founded the Student Project House in 2016. A space where students can learn for their future by following their passion, realising their own ideas and taking full ownership of their extra-curricular projects. By turning an idea into a project, students get to know and go through the various stages of an innovation process. They start by identifying a problem they deeply care about, develop innovative ideas to tackle the problem, and then prototype, test, and adapt their ideas based on user feedback. At the same time, they practise working in interdisciplinary teams, make decisions, learn from their failures, explore innovative technologies and, most importantly, develop the courage and confidence to do so.

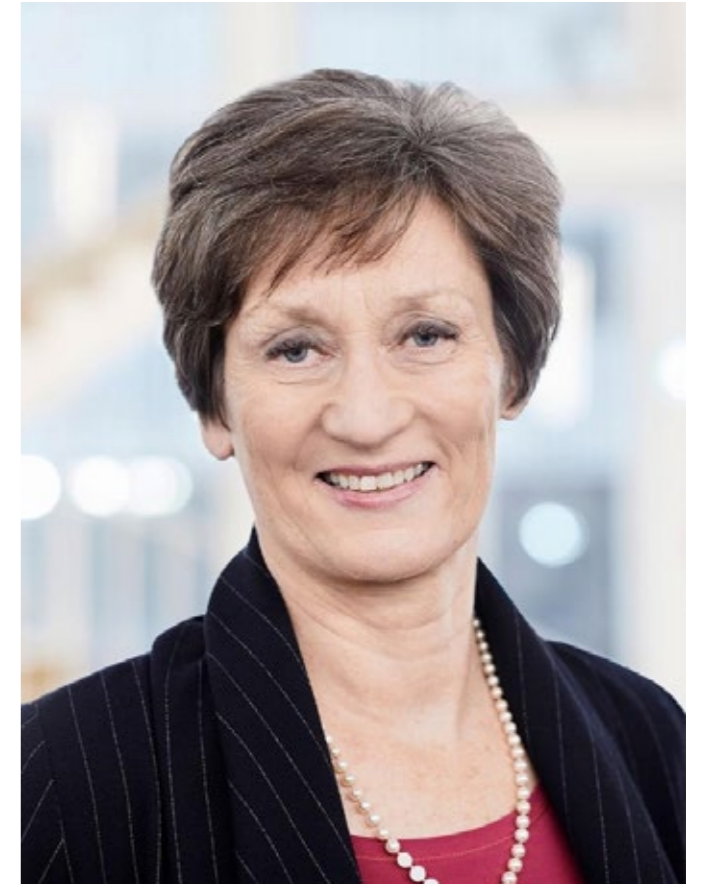
All together crucial experiences for future employees, entrepreneurs, and change-makers that the Student Project House fosters, as a recently conducted survey shows. Students, who are supported by the Student Project House, reported to have improved the following Top 10 competencies through realizing their own projects:

- Communication
- Creative thinking
- Self-awareness & self-reflection
- Problem-solving
- Self-direction
- Project management
- Team work & cooperation
- Decision-making
- Critical thinking
- Sensitivity to diversity

We are pleased to present this report on the contribution of the Student Project House to the overall teaching offer at ETH and most importantly to the development of future-ready graduates.

Sarah Springman

Prof. Dr. Sarah Springman
Rector, ETH Zurich





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SPH IN NUMBERS

Students from
16/16
departments

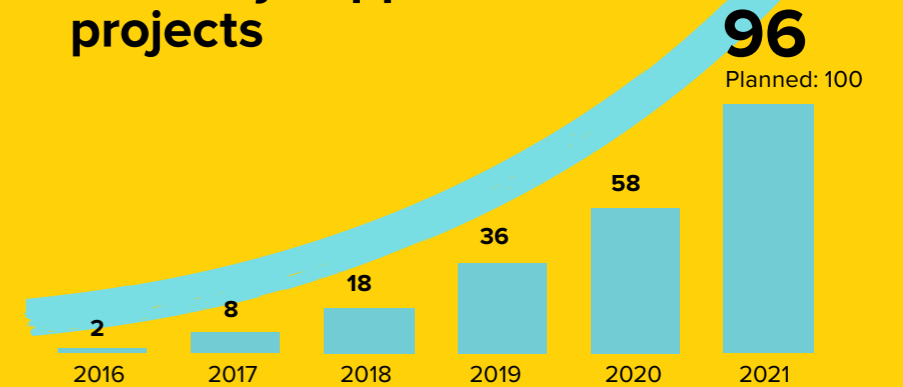


60
Makerspace Managers
student volunteers who run
the Makerspace Open Hours



80+
workshops
held annually at SPH

Annually supported
projects



CHF
7 m+
SPH projects
raised in funding

4
ETH spin-offs &
Pioneer Fellowships

607 kg
of filament printed
on SPH 3D printers

Net Promoter
Score

+74



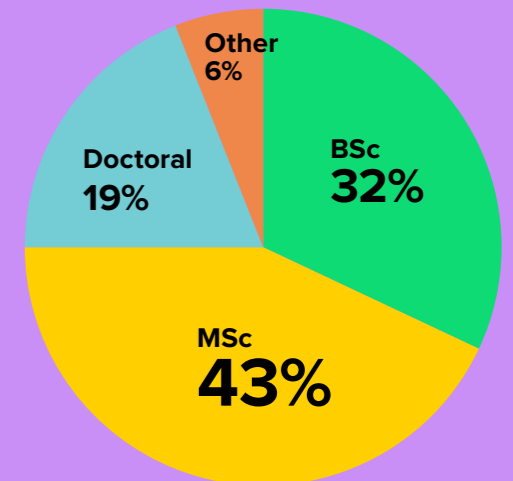
2,500+
makers & innovators
born at SPH

Projects
range from
AR, AI, and
robotics to
food tech,
circular
economy,
and mental
health.

76
machines

- Drill press
- PCB mill
- Bandsaws
- Water jet
- 3D printers
- Sewing machines
- Laser cutters
- CNC mills

All Study Levels



"I LEARNT TO NEVER STOP LEARNING."

"I LEARNT TO LEAD A TEAM."

"I LEARNT TO BELIEVE IN MYSELF & MY IDEAS."

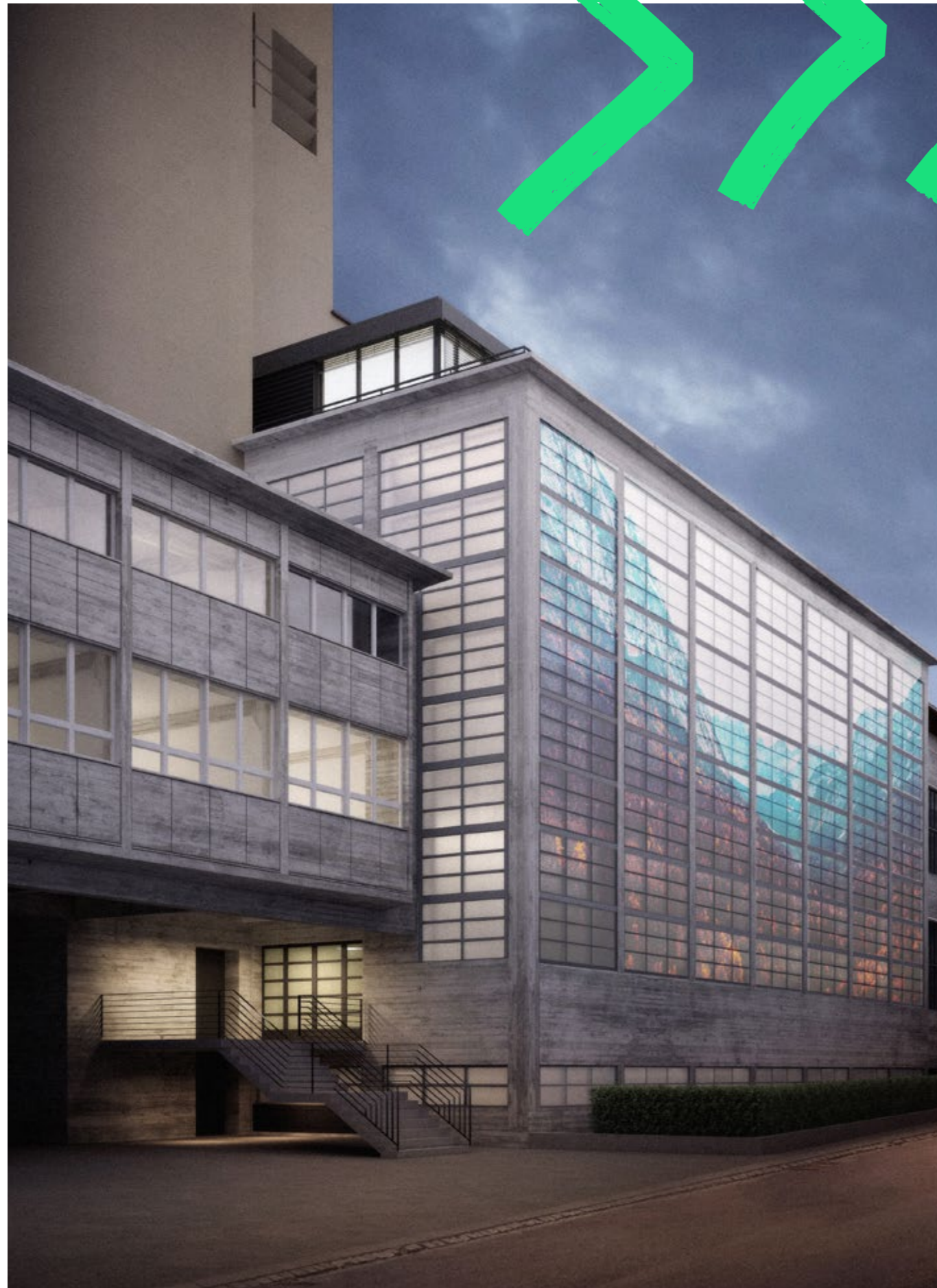
"I LEARNT TO BE RESILIENT & LEARN FROM MY FAILURES."

"I LEARNT TO PITCH & CONVINCING OTHERS OF MY IDEAS."

"I LEARNT HOW TO TURN AN IDEA INTO A BUSINESS"

"I LEARNT TO NOT BE SHY."

"I LEARNT TO PROTOTYPE, FAIL SOON & ITERATE OFTEN."




MISSION


"We inspire and empower students to cultivate a mindset of makers and innovators today, so they can create a better tomorrow."

MAKER & INNOVATOR MINDSET


At the Student Project House, we aim to foster the following six mindsets in students. We believe these mindsets are crucial for future-ready graduates next to the subject-specific knowledge they gain within lectures. And there is no better way to practise this than by doing your own project.



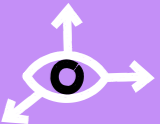
You can do it
Find the courage and confidence to start a project that matters to you.




Fail forward
Failure is an opportunity to grow. Pick yourself up and keep going.




Better together
Engage in the community, offer your support and welcome feedback.



Seek diverse views
Be curious about people, projects and ideas that challenge your own perspective.



Enjoy creating
Explore new tools, prototype early and have fun experimenting.

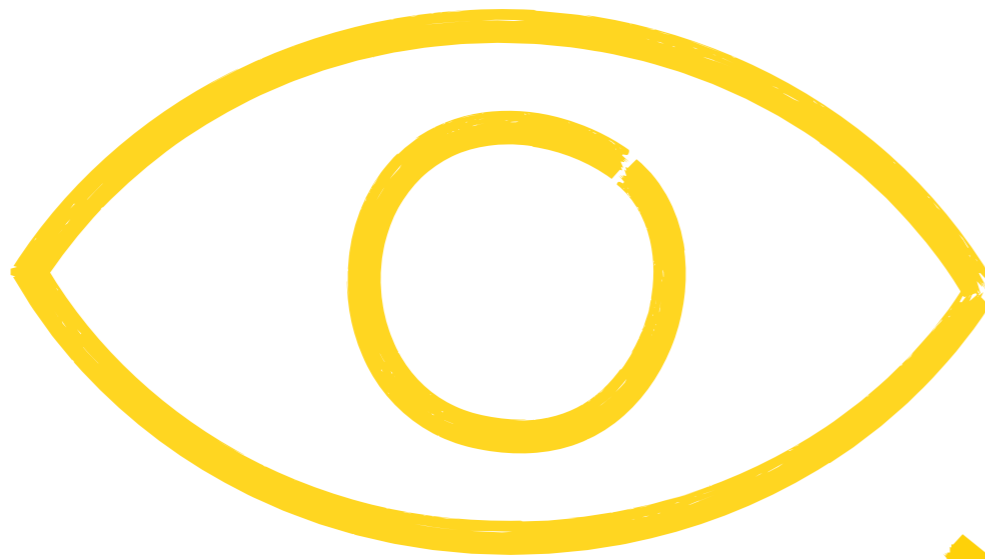


Test and adapt
Challenge your assumptions regularly and adjust your approach accordingly.

VISION

The Student Project House aims to be among the top global innovation spaces in academia.

"To be one of the world's most inspiring university spaces: a dynamic melting pot that empowers the next generation of makers and innovators."



OUR OFFER



IDEASPACE & MAKERSPACE

All BSc, MSc and doctoral students from ETH can benefit from the Student Project House during their studies. The students can use the space 24/7 to work on their project, get support through coaching and workshops and receive seed funding. The Student Project House community is also a very important aspect, as peer-to-peer learning and support is provided from and to the community members.

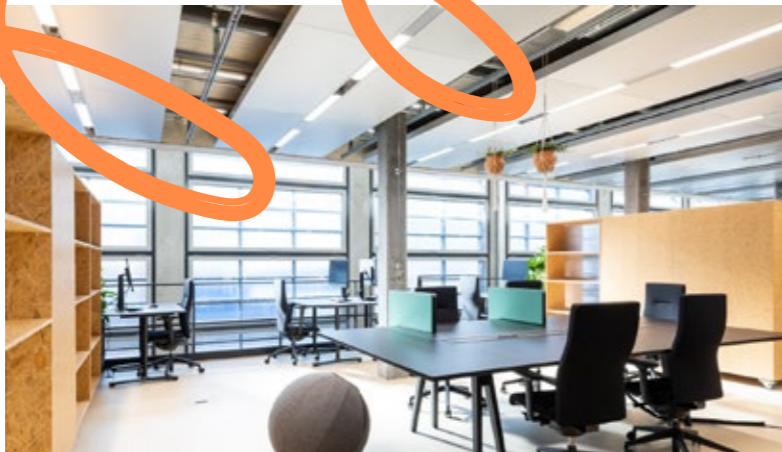
The Student Project House has two locations. Both of them offer coworking, ideation, makerspaces and event space. Whiteboards, post-its and prototyping material fill the space and generate a creative environment, which fosters creative ideas. The event space is exclusively for events based on innovation and aimed at ETH students.

The location at ETH Höggerberg was opened as a pilot station in 2016 with a total of 500 m² floor area in the former physics library. The new location at ETH Zentrum was opened in September 2021 and spans across five floors with a total of 1,200 m² floor area. It is located in a former district heating plant, where heat was generated for ETH and adjoining districts in Zurich. The important monument, with its prominent chimney and cooling tower, was built in 1930 by Otto Rudolf Salvisberg. Between 2014 and 2021, the building was renovated in compliance with monument protection laws and has even enhanced its industrial charm. In a building where coal was previously transformed to heat, students now develop the maker and innovator mindset and generate new ideas.



"Innovative thinking requires inspiration, SPH provides it!"

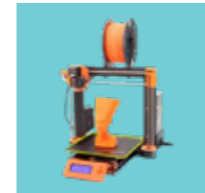
Student supported by Student Project House



The Makerspace is a well equipped workshop area where students can build their own prototypes. In order for students to safely operate machines, a machine control system was developed. The ACOS ("Access Control System") ensures that only students who have had the general safety introduction as well as the introduction to specific machines can then use them. The control and room access is then done through the ETH card, a crucial system that enables the workshop to run safely at all times.



Digital Fabrication



3D printers



DLP printers



Laser cutters



CNC mill



Shaper Origin

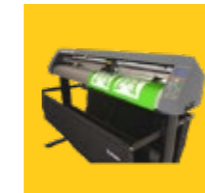
Electronics Workshop



PCB mill



Reflow oven



Cutting plotter



Embroidery machine



Sewing machines

Textile Workshop

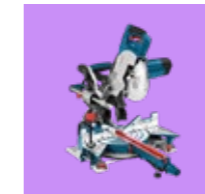
Wood & Metal Workshop



Water Jet cutter



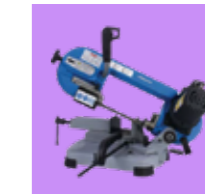
Bandsaw



Miter saw



Drill press



Metal bandsaw

Other Tools & Equipment

- Hand tools: screwdrivers, wrenches, pliers, hammer, saws, sanding tools, measuring tools, cutting instruments
- Small power tools: cordless screwdriver, power sander, jigsaw, dremel tool, drilling machine, small circular saw, multi cutter
- Soldering equipment including oscilloscope and signal generator
- Computer aided design (CAD) workstations

COACHING & WORKSHOPS

Coaching takes place in 1:1 sessions and the frequency varies from team to team and the project's level of maturity. It's particularly worth mentioning here that the students take full ownership for their projects, take all decisions and so are practising being responsible for their progress. The coaches of the Student Project House, called Innovation Catalysts, are there to support the students on their journey and during their learning experience. They coach students on how to work well in interdisciplinary teams, how to deal with failure and learn from it, how to test and adapt their ideas accordingly, and create a supportive environment where students can flourish. At the same time, their confidence is strengthened and they learn how to solve challenges which they'll face in the future, whether as an employee, entrepreneur or change maker. For expert-specific feedback, we created a network of experts, which currently has 20 members. Their expertise ranges from law, pricing, and financial planning to marketing, coaching, etc. All experts work on a pro-bono basis. A big thank you to all our experts, we are extremely grateful for your expertise and energy!



Within the workshops offered at the Student Project House, students gain hands-on skills, benefit from peer-to-peer learning, learn new skills to bring their projects forward and at the same time develop the maker and innovator mindset. The Student Project House offers 80+ workshops per year for BSc, MSc and doctoral students. Most workshops are held by SPH staff, though some are jointly organised with other groups or associations at ETH or held by external experts. Workshops are a crucial aspect to ensure the scalability of our offer. Many of the workshops sell out in under 24 hours, which shows a high need for applied and hands-on learning. They are divided in "How to..." and "Make" workshops.

How to...

- 3D print
- laser cut
- program a CNC mill
- Arduino
- 3D model with CAD
- CAM
- machine learning
- find a need
- ideate
- prototype
- pitch
- build your dream team
- set the price of your product
- work in an agile way
- measure your impact

Make your own...

- plant sensor based on IoT
- wooden cutting board with the Shaper Origin
- chocolate mould with the 3D printer and vacuum thermoformer

"CAPACITY BUILDING FOR FUTURE GENERATIONS IS CRUCIAL."

At the Student Project House, four Innovation Catalysts support the students to realise their projects through coaching. Dr. Moritz Mussgnug explains why coaching is important and what principles the Innovation Catalysts apply in the process.

What projects do you support?

At Student Project House, any student is welcome with any idea they have. We do not pre-select the ideas, due to several reasons. First, a huge part of the learning experience is that students figure out themselves how potential users react to their idea. Secondly, we believe with the evolution of the project the original idea will be adapted or pivoted anyway. If their project is a great success, then we are proud of them, and if it fails, students learn so much for their life and about themselves.

What are your principles whilst coaching students?

The most important aspect is that we create a space where ideas can be explored freely in a safe environment. We have three principles that we apply in our everyday work. First of all, we do not judge ideas, but support all ideas. Judgment would create competition between the teams and does not support

the development of a trusting relationship between project groups and coaches. Secondly, students take full ownership for their project. We only guide them. We do not decide for them or set deadlines. The students own and lead their project and take all the decisions. The third important aspect is that we offer and value personal connection. The human to human connection is what builds trust in students and also strengthens their confidence and courage levels.

Why is coaching a crucial offer at Student Project House?

Coaching is core. The coach it is your sparring partner. The person you trust. The person you can ask anything and the person who asks you many questions. Through coaching, we trigger reflection. Students learn to reflect on what went well and what they could do differently next time. At the same time we support building up their confidence to explore any idea they have and to tackle any challenges they will face in their future.

What has been your best coaching experience so far?

There are so many and I can't choose one single one. The most rewarding thing is seeing how the students develop over time. Seeing them thrive and become confident and courageous members of our society.

SEED FUNDING

In order to build prototypes and test their idea, projects can receive a grant of CHF 400 per semester (based on reimbursement of their expenses). These grants are kindly provided by the jFund of ETH juniors. This seed funding in an early stage enables projects to proceed and lays the foundation for receiving higher funding opportunities from other institutions. The Student Project House does not provide any higher funding amounts, but provides contact to other institutions and references when needed, as well as support and feedback during the grant application processes.

JFUND BY ETH JUNIORS

ETH juniors is the student consultancy at ETH Zurich. They execute projects for corporates and industrial partners. Part of the profits from ETH juniors' operations are donated to the jFund. They use this fund to support Student Project House projects with seed funding.

EXTRA-CURRICULAR LEARNING



TOP LEARNINGS GAINED

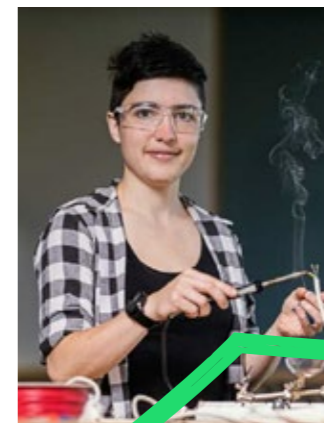


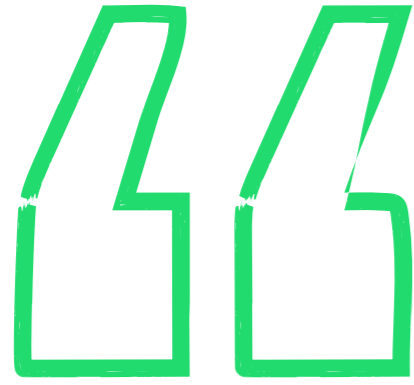
LEARNING TESTIMONIALS

"When I first came to the Student Project House, I was at a stage in my studies where I felt constantly stressed and wasn't sure if I would ever be able to study enough to pass all my exams. Stepping into SPH was like an instant mood enhancer and stress reliever. Everyone makes you feel welcome. Joining the Makerspace Managers, and therefore being responsible for an Open Hour in the Makerspace every fortnight, has taught me that everyone brings their own skills to a team and that

it never hurts to ask for help or ideas. I was able to take the confidence I gained from explaining and helping others into my studies. It also helped me realise that you can learn almost anything, if you just don't expect perfection from the start, but simply test and adapt."

Linda, 26, MSc ETH in Health Science and Technology from Switzerland.
 SPH involvement: Makerspace Manager, Makerspace intern & Makerspace Location Manager.





"Truly understanding our users' needs and listening to their feedback was crucial to successfully implementing our project in rural India. The coaches at the Student Project House have not only helped us grow this mindset, but also taught us the essence of challenging and testing our assumptions, which enabled us to change our business model. Another beautiful thing we learnt was failing a lot and failing fast. The key lies in courageously going out there, and trying out as much as possible. SPH supports us in that."

Amartya Mukherjee, 24, MSc ETH in Management, Technology and Economics from India. SPH involvement: member of the project Candela Energy. More information at www.candelaenergy.org



"The Student Project House was pivotal to my academic career. I went to a liberal arts university in the US that was more theory than practice, so the Student Project House was a very different place, and I loved it! As Makerspace Manager I learnt to 3D print, laser cut and do electronics. Within my plastic recycling project Precious Plastic, I found my passion which now inspired me to apply for a PhD at D-MAVT on exactly that topic. What a wild ride - excited to be back at SPH soon!"

Lin Boynton, 28, MSc ETH Environmental Science & soon-to-be Doctoral student at D-MAVT from the US. SPH involvement: member of the project Precious Plastic, Makerspace Manager & participant in Challenge Accepted. More information at www.preciousplastic.ch



"It's energising to be supported in realising your own idea. I'm building a machine learning based language learning app. At the Student Project House, every tool you may need is within arm's reach. Need to brainstorm ideas? Just grab a whiteboard! Need some quick feedback about your UX design? "Hey there other person in the coworking space, can I test my app with you?" Have a functional MVP and need advice on how to get funding? Just send a message to your SPH coach, they've got your back! It's a place where you learn a lot of new things for your future and for life."

Michael Yared, 24, MSc ETH in Computer Science from Belgium. SPH involvement: member of the project 8learn.



"The support of the Student Project House was highly valuable in building the new student organisation rootlinks. Thanks to the frequent coaching, I learned how to build an effective organisational structure, create a convincing offering for partners, and deliver an impactful learning journey for the participants. The diverse community was also helpful: another SPH project, Fidenso, became a challenge partner for the first edition of the rootlinks programme."

Johannes Wüllenweber, 25, MSc ETH in Energy Science and Technology from Germany. SPH involvement: member of the project rootlinks & participant in The Hatchery. More information at www.rootlinks.ch





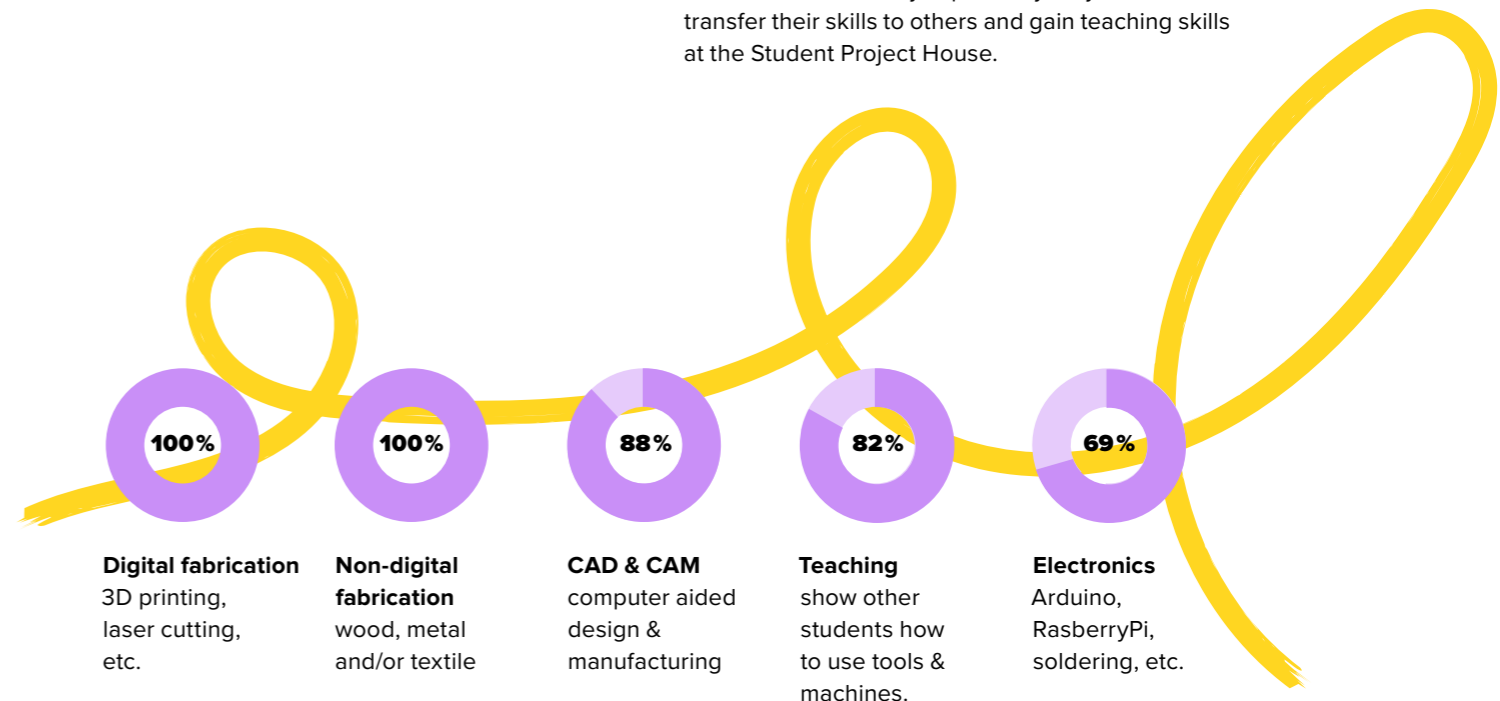
HANDS-ON LEARNING IS KEY

When asked how much students learn by carrying out their own project on an extra-curricular basis, on average the students at Student Project House estimated the learnings to be the same scope as the learnings of one semester within a curricular study program. Students stated that they have highly benefited from the Student Project House, which "perfectly supplements their studies at ETH."



Within the Makerspace, students learn how to use machines and tools and gain valuable prototyping skills. The following hands-on skills were mentioned most by the students within the survey: laser cutting, 3D printing, computer aided design and manufacturing (CAD/CAM), CNC & PCB milling, wood and metal work as well as safety rules and teaching other students.

In order to quantify the hands-on skills, a separate survey was conducted with the Makerspace Managers. Makerspace Managers are student volunteers who work in the Makerspace and manage it during the opening hours. They also support other students with advice on prototyping, design and material choice. Therefore, they don't just learn about machines and tools, but very importantly they also learn to transfer their skills to others and gain teaching skills at the Student Project House.



Hands-on and teaching competencies gained and the ratio of students who reported to have "very much" or "somewhat" improved their competencies by working on a voluntary basis as Makerspace Manager (N = 16).

GRADUATES WHO BELIEVE IN THEMSELVES

"Self-efficacy contributes to achievement behaviour beyond the effects of cognitive skills."

Albert Bandura, Professor Emeritus in Psychology from Stanford



Self-efficacy is defined as an individual's confidence in their ability to successfully perform roles or tasks. Entrepreneurial self-efficacy is thus the self-efficacy with regards to entrepreneurial roles and tasks. It has been shown to positively correlate to intentions to start a venture, engage in entrepreneurial behaviour and achieve. We thus found entrepreneurial self-efficacy is crucial for the future success of ETH graduates. We aspire to create a supportive environment for students where they can grow in confidence. We also support exploration and encourage learning from failures through reflection ("failing forward"). Rather than telling students which way to go and how to further develop their idea, we encourage them to go out and talk to as many users and experts as possible to gather feedback and adapt their ideas accordingly.

Within the self-reported questionnaire, the confidence levels for positive attitudes within an early-stage innovation process haven't been reviewed. The level of self-efficacy reported by the students was very high, varying between 89% and 93% for the different statements and decisive actions within an early-stage innovation process. We can say that students who do their own project at the ETH Student Project House show high confidence to start and develop a project, and show a "can do" attitude. Such a mindset is crucial for ETH graduates as it has been scientifically shown that believing in oneself will also lead to higher achievements.



Self-efficacy of important attitudes within an innovation process and the ratio of students who reported to have "agreed" or "strongly agreed" to the statements regarding self-efficacy on a 5-point Likert scale (N = 54).

ETH COMPETENCE FRAMEWORK

Within Student Project House, students can gain complementary competencies next to the excellent subject-specific competencies they gain within their curricular program and lectures.

The following table gives an overview of the method-specific, social and personal competencies which students reported to have gained by doing their own project. All crucial competencies for future-ready graduates.

METHOD-SPECIFIC COMPETENCIES

- 87%** **Problem-solving**
Ability to define a problem & find a solution to it
- 85%** **Project management**
Ability to manage projects & produce results
- 81%** **Decision-making**
Ability to define a decision & set of alternative actions to choose from
- 70%** **Analytical competencies**
Ability to break down processes and systems into parts while understanding their interaction
- 69%** **Media & digital technologies**
Ability to access, evaluate & use media & digital technology

SOCIAL COMPETENCIES

- 93%** **Communication**
Ability to communicate with others in different contexts and forms
- 83%** **Team work & cooperation**
Ability to build relationships with others to pursue common goals & achieve results in a constructive atmosphere
- 76%** **Sensitivity to diversity**
Ability to recognise differences among people & work with them
- 74%** **Self-presentation & social influence**
Ability to present an authentic & professional image of self to others & motivate others to the adoption of specific behaviour
- 72%** **Leadership**
Ability to motivate and inspire others and support others' achievements
- 72%** **Customer orientation**
Ability to approach relationships with others & society in terms of what you have to offer rather than what you need or want
- 54%** **Negotiation**
Ability to advocate positions with an open mind & try to synthesise ideas from all viewpoints best

PERSONAL COMPETENCIES

- 89%** **Creative thinking**
Ability to produce and implement novel and useful ideas
- 89%** **Self-awareness & self-reflection**
Ability to understand own strengths & weaknesses & enhance self-development
- 85%** **Self-direction & self-management**
Ability to motivate oneself & organise own work in order to achieve results
- 80%** **Critical thinking**
Ability to analyse & evaluate situations & recommend courses of action
- 74%** **Adaptability & flexibility**
Ability to adjust effectively to a changing environment & deal well with changes
- 43%** **Integrity & work ethics**
Adherence to moral & ethical principles in the conduct of own work & in relationship with others

Method-specific, social and personal competencies gained and the ratio of students who reported to have "very much" or "somewhat" improved their competencies by doing their own project (N = 54) at the Student Project House.

PROJECT OVERVIEW



YASAI - GROW MORE WITH LESS

FROM PROTOTYPING AT SPH TO BUILDING A 1.5 MILLION FRANC VERTICAL FARM

YASAI is a vertical farming start-up from Zurich. The start-up was co-founded by Mark Zahran, an architect from ETH, Philipp Bosshard, an ecological engineer from ZHAW and Stefano Augstburger, a business and sales expert from Bocconi University and they've since grown to a team of nine. In 2019 they started by building their first prototypes, and developing their business model at the Student Project House, and they have recently raised 1.5 million Swiss francs in funding to build the first vertical farm in Switzerland. Moreover, they received the ETH spin-off label and various awards.

Which global challenge are you solving with YASAI?

Mark Zahran: Food production is one of the most resource-intensive industries. Growing fruits and vegetables uses up tremendous amounts of water, energy and land. This is where vertical farming comes in. Vertical farming uses 95% less water and yields 15x more harvest per square meter. Moreover, as the food is produced in urban areas, the required food miles are minimised, saving a lot of carbon dioxide. It is thus a very sustainable way of growing our food.

How did you come up with your idea?

During my studies in Architecture at ETH, I did an exchange semester in Mexico. At that time, I came across a book written by Professor Dickson from Columbia University. The book was called "The Vertical Farm: Feeding the World in the 21st Century". It impressed me so much that I contacted Professor Dickson immediately and booked the very first flight to New York to meet him. I couldn't believe how much space we use to feed humanity. And ever since, I'm a vertical farming aficionado.

What were your very first steps?

We started with building our first prototypes at the Student Project House and testing and adapting them according to customer feedback. At that time, we spent day and night at the Student Project House and also did a lot of networking, learnt many new skills and developed our business model. We have decided to go for the model of vertical farming as a service.



How many prototypes have you built?

Countless. We literally designed and built hundreds of different prototypes, tested them and adapted them again. Going out, talking to customers and getting feedback is crucial.

What drives and motivates you?

There are two things that motivate me a lot. First and foremost our team and of course also reaching our vision with YASAI.

TOP 3 OFFERS BY STUDENT PROJECT HOUSE

- › **Space.** SPH was the first institution that gave us space to work on our idea. We spent day and night in this creative surrounding.
- › **Coaching.** We learnt a lot of new skills and were connected to great people through our coach.
- › **Networking.** The community is great, and we met a lot of valuable people and of course experienced learning from other projects.

What was your biggest failure and what have you learnt from it?

I took in co-founders way too quickly without being sure that their skills will be needed as a core competency in the company's future. This has cost us a lot of money and time. I definitely learnt to take more time for important decisions and to be patient.

What are your next steps?

We have recently raised 1.5 million Swiss francs and with that funding we are building our first pilot farm. By the end of the year, we will also enter the market and sell our first products. Afterwards we want to scale with a "10X farm" which will be on 10'000 m² where we will be able to grow around 200 tons of food annually.

What would you advise ETH students who dream of realising their own idea and bringing it to life?

Build a diverse and interdisciplinary dream team. You usually need a broad skillset and a team which does not only consist of ETH students. Also go talk to customers very early on. As ETH students, we usually tend to build and develop great things. But if no one needs them, then even the most innovative product will not be a success. And the third one is to think about scalability. Basically dream big and know how you are going to scale.

More information at www.yasai.ch

THE YASAI TEAM

- **Mark Zahran:** MSc Architecture, ETH Zurich
- **Philipp Bosshard:** BSc Ecological Engineering, ZHAW
- **Stefano Augstburger:** MA Sales & Management, Bocconi
- **Anouk Schaedler:** BA Trends & Identity, ZHdK
- **Tara Sinniger:** BSc Communications, ZFH
- **Pierre Swaelus:** MSc Sustainability, Bocconi
- **Luca Somm:** MSc Mechanical Engineering, ETH Zurich
- **Tobias Beeler:** MSc Agronomy, ETH Zurich
- **Tanya Rey:** MA in Product Design, ZHdK



"As ETH students, we usually tend to build and develop great things. But if no one needs them, then even the most innovative product will not be a success."

Mark Zahran from Yasai

YASAI'S TOP 3 LEARNINGS

- › **Be courageous.** Don't let fear drive you & great things will happen to you and your company.
- › **Stay curious.** When you are curious about everything & everyone, you'll get to see things from different perspectives.
- › **Never give up.** F*ck up, learn from mistakes & get up again.

TETHYS - UNDERWATER ROBOTICS

MAKING THE INVISIBLE VISIBLE

Christian Engler always felt passionate about underwater robots. This is why he built his first one for the Matura thesis. When he started studying at ETH, he wanted to participate in a global competition where student teams competed for building and manoeuvring the best remotely operated underwater robot. He wasn't alone with his passion and found other mechanical, engineering and IT students, who joined him.

Thanks to the infrastructure of the Student Project House, they had all the tools and machines they needed to build such a robot and made it to the final shortlist of the 10 best teams globally. After the competition, the seven founders started an important collaboration with armasuisse. For them, Tethys is currently developing their underwater robot further to aid very crucial missions. Their goal is to develop a robot that can salvage ammunition from the past or contribute to rescue activities under water. It is their dream to turn their passion into a profession and become underwater robot experts after their studies by transforming their project into a start-up.

More information at www.tethys-robotics.ch



Christian Engler, Gallus Kaufmann, Jonas Wüst, Stefano Marti, Andrey Studer and Bastian Schildknecht (from left) from team Tethys and their underwater robot SCUBO 2.0.

TOP 3 OFFERS BY THE STUDENT PROJECT HOUSE

- > **Makerspace.** We could only build our robot and in the top 10 within the global robot competition because of great machines and tools.
- > **Community.** At SPH you can easily connect with other projects and either learn from or teach others.
- > **Exposure.** We had a lot of opportunities to present our project to important stakeholders where new opportunities arose.

FYN FOODS - 101% LOCAL

WHEN FOOD CHANGES OUR PLANET

During her agricultural studies at ETH, Anik Thaler learnt that chickpeas could grow in Switzerland. However, no one is currently doing it. So she decided to produce the very first Swiss hummus with 100% local ingredients.

Together with Cyrill Hess, an environmental scientist from ETH, and Tobias Vogel, a business student from HSG, they started to collaborate with farmers who wanted to grow chickpeas. To start manufacturing the first batch of hummus, they did a successful crowd-funding campaign on "We make it" in 2020. Their dream of changing the food system and selling

the very first Swiss hummus became reality. Their products can now be purchased in their online shop and various stores including Alnatura.

But of course, they're not going to stop there. They will produce many more Swiss convenience products such as burger patties out of beans and possibly even enter the B2B market by growing local products for other companies. It's clear that our planet needs this and there is a demand from consumers.

More information at www.fynfoods.ch



Anik Thaler, co-founder of Fyn Foods, together with farmer Lukas Weidmann on the first Swiss chickpea field in Schlieren.

NO1S1 - NO ONE'S ONE & EVERYONE'S ONE

CREATING THE WORLD'S FIRST SELF-OWNED HOUSE WITH BLOCKCHAIN & IOT

no1s1 is a futuristic project, which disrupts the topic of ownership using the latest technologies including blockchain and IoT. The project is brought to life by Hongyang Wang, Master's student in architecture, Jens Hunhevicz and Alex Walzer, both Doctoral students in civil engineering at ETH. A real futuristic smart house in the making.

What's your idea?

Jens Hunhevicz: Blockchain addresses can be held by any entity, so not only by humans, but also things. This allows things to own funds and trade with other entities. With no1s1 we want to build a house that is owned by no one, and can be used by anyone. We're exploring blockchain as a tool so that the house can administrate its own funds, and Internet of Things (IoT) so it can organise its operations and maintenance. We also implement a blockchain-based decision making process using crowd intelligence. We thus depend on an interdisciplinary human collective who take decisions for no1s1, in a very transparent way and without the possibility to steal the house funds, thanks to blockchain. In the future, the house might even be able to take its own decisions with artificial intelligence.

So literally no one owns the house?

Hongyang Wang: Yes, no one owns it, not even us, the creators. The same goes for the project itself: we eventually want to open source the idea and inspire people with different backgrounds and skills to co-create it. This is also one of the reasons why we joined the Student Project House. We also want to try out new business models, which leverage the possibility of non-rent-seeking and self-sustaining agencies on the blockchain to create high value with high efficiency. Of course, this is not limited to houses but can be expanded to smart digitalised objects which have the ability to own themselves.

What motivates you to carry out your project?

Alex Walzer: On one hand, the maker in me just wants to create cool new things. On the other hand, my PhD is about entrepreneurship, and this new model of entrepreneurship with open technology and

transparency like blockchain may disrupt everything we currently know. So I am super curious to see if such a disruptive model works and if we can create a new future.

What do you appreciate most about the Student Project House?

Hongyang Wang: I love the culture at the Student Project House. SPH is a unique offering from ETH and provides the perfect balance between the freedom to explore your own ideas and the support you receive through coaching when you need help. I also very much like the facilities with the inspirational co-working space and the well equipped Makerspace. The community, networking you can do with other projects and the fact that we can learn from each other's failures and successes is great.

What are you most proud of?

Hongyang Wang: I am proud that we created a great team of three. We can work well together, have the same mindset and work towards the same vision. We are all intrinsically motivated and driven by our interest. At the same time I am also happy that we have found the right balance between work and life that keeps us healthy.

More information at www.no1s1.space

NO1S1'S TOP 3 LEARNINGS

- › **Your ideas are worth sharing.** Even when the ideas sound crazy. Don't doubt yourself, share your ideas courageously with others, and you will find likeminded people and the support you need.
- › **Keep a flexible mindset.** When developing an new idea, you will always have to adapt to change and make new plans, so stay flexible in your mind.
- › **Find the right people.** Decide when to do something yourself and when you need to get help from external partners. And of course find the right team members.



Alex Walzer, Hongyang Wang and Jens Hunhevicz from no1s1 are creating the world's first self-owned house based on blockchain & IoT.

AUGMENTING THE MANUAL REALITY AS AN ETH SPIN-OFF

The start-up Rimon Technologies is revolutionising the manual. We all know how annoying it can be to read a manual. By using augmented reality, their users can skip reading it and receive the step-by-step instructions they need directly from their augmented reality glasses. This enables them to do much more complex tasks, reduces mistakes and even saves CO² as flying in a service technician to fix a machine becomes obsolete. This truly revolutionises the user experience of "not reading a manual". Rimon Technologies was co-founded by the mechanical engineers David Shapira and Kordian Caplezi, and they have now onboarded new team members. In 2020, they have been granted the ETH spin-off label. And by the way, you can test their solution at the Student Project House and get instructions on how to change a filament of a 3D printer.

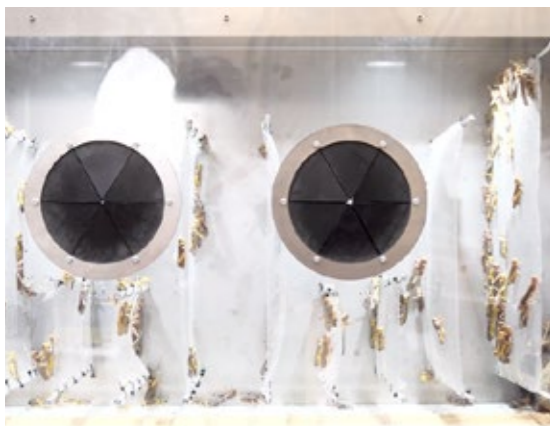


More information at www.rimon-ar.ch

VARIOUS GRANTS FOR IOT BREEDING STATION

SmartBreed developed a fully automated grasshopper breeding station based on IoT. It's a much more sustainable solution as it transforms side streams from agricultural waste into high-value protein. Co-founders and brothers Christoph, Patrik and Adrian Bertschi have backgrounds in bioengineering from ETH and business and law from HSG. SmartBreed won CHF 50,000 in the Venture Kick competition, received support from Klimastiftung Schweiz and recently was awarded with an Innosuisse grant.

More information at www.smartbreed.ch



YOUNG CARITAS AWARD FOR SUPPORTING FEMALE REFUGEES TO STUDY

SEET is an accredited non profit organisation which supports highly talented female refugees to study at a Swiss university. Through a great mentoring programme and support system, they are currently supporting 10 female refugees on their way to higher education institutions in Switzerland. SEET consists of a very interdisciplinary team of 18 students from ETH and UZH as well as young professionals. They were recently awarded with the prestigious young CARITAS award as "most sustainable project in 2020".

More information at www.seet.ch

CREATING A WORLD FULL OF HEALTHY SOIL AS PIONEER FELLOWS

DigitSoil is developing a smart sensor that can detect soil health based on the microbial activity of the soil. The sensor measures the activity in real-time and across different locations. Only when our soil is healthy, we can harvest nutritious and healthy products from the fields. Thus a very crucial topic for feeding the world. Their co-founders Sonia Meller and H el ene Iven met in 2018 during the program "Unbox Your Idea" at the Student Project House. They have since grown to an interdisciplinary team of 7 and in 2020 were awarded with the CHF 150,000.- Pioneer Fellowship by ETH ieLab as well as support by VentureKick.

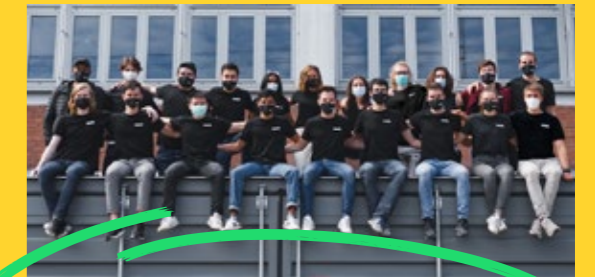
More information at www.digit-soil.com



BRINGING WATER, ELECTRICITY & INTERNET TO RURAL INDIA

Last mile transportation to rural communities in low and middle income countries poses a tremendous challenge. The SolarCart is a solar-powered wagon which brings clean water, electricity and internet to rural communities in India. This greatly improves the quality of life in these communities. Over time, they will also increase their assortment with more products needed by the communities and they also empower individuals to become entrepreneurial cart-owners. Their co-founders Amartya Mukherjee, Dhruv Suri, Jai Shekhar and Anhad Singh study at ETH and MIT. With the support of Student Project House, they have been granted the ETH4D research to action and Innovation Network grant to develop their prototype further.

More information at www.candelaenergy.org



SWISSLOOP TUNNELLING TEAM MEET ELON MUSK

The Swissloop Tunnelling team gathers together the expertise of over 40 students. They have won the Innovation and Design award as well as the second overall position among 400 applicants from around the world in Elon Musk's Not-A-Boring-Competition. The Not-a-Boring Competition aims to award the fastest tunnelling machines. It's great to see that some of the parts of the winning tunnelling machine have been made in the Makerspace at the Student Project House.

More information at www.swisslooptunneling.ch



KICKSTARTING SPARKLING WATER ON THE GO

Over 500 billion plastic bottles are used and discarded every year. Five students from ETH and HSG want to solve that challenge. This is why they have invented a carry-on bottle, which creates sparkling water on the go. This lets you use water from the fountain during a hike or tap water in the office. You'll never need a plastic bottle again.

In just one year they have developed numerous prototypes, patented their invention and completed a successful Kickstarter campaign to crowd fund the manufacturing of their first batch with over USD 180,000. They also won the second prize in the start-up competition venture and participated in TalentKick by ETH AI Center. All the best, Christian Käser, Linus Lingg, Nicolas Wild, Luca Serratore and Gregor Heusser!

More information at www.bottleplus-shop.com

MAKING IN THE MAKERSPACE



MANUFACTURING 2,600 FACE SHIELDS DURING COVID-19

When the COVID-19 pandemic took hold, the workshop area of the Student Project House called "Makerspace" was transformed into a small manufacturing unit. A very different sight, compared to the weekly 200 students, who normally use the Makerspace to build their prototypes. Large amounts of raw material was ordered, shifts were organised, and the shipping to the hospitals was planned. The activities within the Makerspace were jointly organised by the co-leads of the workshop, Marvin Breuch and Mathis Först. They ensured everything was done under strict safety protocols so that all 18 student volunteers stayed safe during the peak of the pandemic. "We set up a simple one line process using what we readily had available. Mathis took care of material, fine tuning processes and shifts, while I handled the incoming requests and coordinated shipping," said Marvin Breuch.

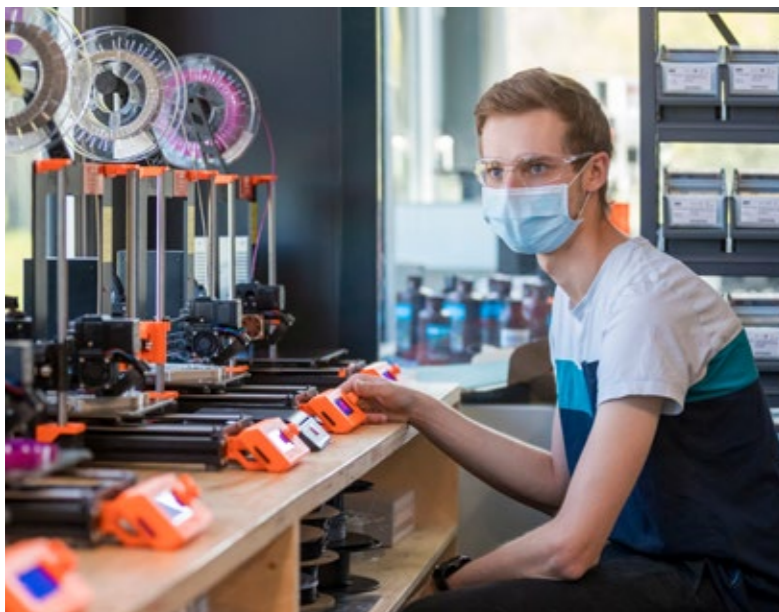
Alongside face shields, many other tools were manufactured to support a total of 19 Swiss hospitals, including a covid safe phone box. In the rooms of Covid-19 patients, doctors and nurses need to use phones to see the patient information. To ensure that the surface of the phones were not contaminated when leaving the rooms, the phones were placed into a small transparent bag when entering the room and an acrylic box was designed to open the bag

and free the phone without contamination. As not all safety equipment was readily available when the pandemic hit, the first thing which was produced on the 24 3D printers of the Student Project House were 2,600 face shields. A few months into the pandemic, Geberit AG was able to take over manufacturing by injection moulding. During the Covid-19 activities, the Makerspace Managers did over 300 hours of volunteer work, designed 25 prototypes for different products and used 120 kilograms of filament for 3D printing. "The Makerspace Managers did an excellent job. Thanks to their skills and flexibility, we were able to use the full potential of our machine park to provide help in this extraordinary situation. Without their commitment as volunteers, the production in the Makerspace would have been impossible." said Mathis Först. It's great to see such dedication and compassion in difficult times.

MAKERSPACE MANAGERS

The Makerspace of the Student Project House is a well equipped workshop with 3D printers, laser cutters, an electronics shop with over 400 items and many more tools. The Makerspace Managers are ETH students who voluntarily work six shifts per semester to supervise the Makerspace Open Hours. They receive extensive training both on safety and on the usage of all machines and tools. It is only possible to provide such a great service and provide open hours every afternoon and on Saturdays to the students because of the help of 60 Makerspace Managers. At the Makerspace, students learn hands-on skills including digital fabrication, computer aided design, and how to best build a prototype. We are always looking for more Makerspace Managers, please contact makerspace@sph.ethz.ch if you are interested (all BSc, MSc and Doctoral students from ETH are eligible).

The 24 3D printers of the Student Project House were used to manufacture face shields for hospitals during the pandemic.



MAKING STUDY PROPS FOR ANATOMY CLASS AND MEDICINE STUDIES

Sarina Leupp and Thomas Roth, two Bachelor students who study medicine at ETH, used the 3D printers in the Makerspace to make study props. For their anatomy class, they need to know each bone and all structures of the body. To facilitate their learning and as the purchasable props were too expensive, they printed multiple skulls and brains themselves. Printing bone by bone did not only develop their Maker mindset and hands-on skills, but also made it much easier to remember every detail for their class.



WHEN A SMART CANE USES MACHINE LEARNING FOR GUIDANCE

Approximately 36 million people globally have impaired vision and only 1.5% can rely on the support from a guide dog. Thomas Bayer, Alexander Bayer and Arvid Gollwitzer, who are studying Electrical Engineering at ETH, developed a smart white cane based on machine learning and image recognition. The camera system in the cane recognise the surrounding and guides the person on their path. It can recognize streets, pavements, zebra crossings and of course, obstacles. This great new invention uses navigation, vibration and speech for safe guidance.

More information under www.blindbot.de



TEAM



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Head of Student Project House



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Georgina Jones
Event, Community & Venue Manager



Justyna Wojewoda-Chakraborty
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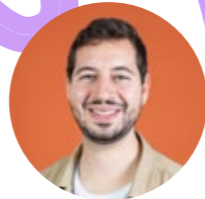
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Isabella Ilchmann
Innovation Catalyst



Dr. Barbara La Cara
Expert-in-Residence Social Innovation

GOVERNANCE

The Student Project House is an integral part of teaching at ETH and part of the Rectorate.



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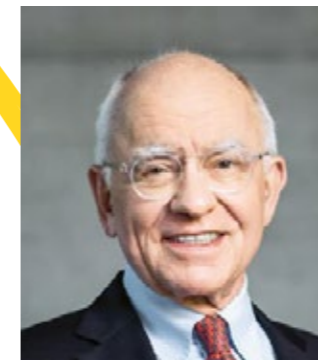
OUR PARTNERS

Without the generous support of our donors, it wouldn't be possible to run the Student Project House in its current form and thus develop as many future makers and innovators. We would like to express our deepest gratitude to all donors, who enabled the Student Project House to successfully transition from its pilot to its scale-up phase at an average annual growth rate of 132%, who made the renovation of the historic former district heating plant into a creative idea space possible, and who donated machines, tools and furniture which enables us to run two locations with a total area of 1,800 m².

Over the past years, various collaborations and partnerships have been established, both within ETH as well as with other institutions. We are very grateful for such strong partnerships and would like to thank all our collaborators for their contribution to our mission: **AVETH, Climate Kick, EPFL, ETH4D, ETH AI Center, ETH Analytics Club, ETH Bastli, ETH Chair of Entrepreneurship, ETH D-MAVT, ETH D-MTEC, ETH Entrepreneur Club, ETH ieLab, ETH Industry Relations, ETH SparkLabs, ETH Sustainability, ETH Teampact, ETH Transfer, ETH Week, ETH Werkstattplattform, ETH World Food System Center, ETH Zürich-Basel Plant Science Center, HSG, Innovation Network, Kantonsspital Aarau, Ricolab GmbH, Smide AG, Swiss Food Research, Talent Kick, UZH, Venture, Venturelab, VSETH, ZHdK, Zühlke AG**

"At Franke, we have always employed a lot of ETH graduates. By supporting the Student Project House, we can play an important role in providing an ideal educational environment for tomorrow's entrepreneurs and employees."

MICHAEL PIEPER
CEO & President, Artemis Group



The Student Project House also supports and collaborates with lectures and events that are aligned with its mission of developing future makers and innovators:

- Zukunftstag
- Goldene Eule
- Polyhack
- Hack4Good
- Hack4Health
- PRISMA Capstone
- Entrepreneurship
- Chemical Product Design
- 360° - Reality to Virtuality
- Innovation in Smart Farming
- Sustainability Start-up Seminar
- Food Innovation Lab

"At ETH juniors we foster a culture of innovation by transferring the know-how from academia to industry. Students learn how to apply their expertise acquired at ETH to real-life challenges and get hands-on experience of entrepreneurship. By supporting the SPH we empower students to bring their ideas to life and have an impact on society."

SELINE MERKEL
President 2020, ETH juniors



Do you want to join us on our mission and develop future generations of makers and innovators?

If you would like to start a partnership or become a donor, please contact Dr. Lucie Rejman (Head of Student Project House, lucie.rejman@sph.ethz.ch).



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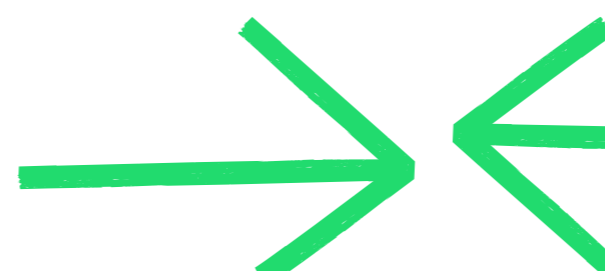
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