

# ETH Podcast - Episode 1 - Swissloop -

## Transcript

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### INTRO

(Jennifer Khakshouri:) *To travel almost as fast as the speed of light, is one of the dreams of mankind. The fascination and mind-game of extreme speed is something that keeps many scientists busy. There is a group of ETH students, who spend all their time on constructing a super-fast capsule which runs in a vacuum tube. They call themselves Swissloop... In the course of this story, they will be in a competition with other international student teams in Los Angeles.*

(Luca Di Tizio:) Three teams make it into the finals.

(Hanno Kappen:) There are up and downs.

(Cassandra Hänggi:) We had like a big accident in a vacuum chamber.

(Jennifer Khakshouri:) *Students want to revolutionise the transport of goods. And at the same time they learn how to work together in teams to find new solutions for public transportation.*

*The rector of ETH, Sarah Springman sees her part in this project...*

(Sarah Springman:) ...hopefully as a cheerleader and supporter from the top of the university they've got the message that they had the full support of the executive board of ETH Zurich and of course of myself.

(Jennifer Khakshouri:) *This is the first story of the new podcast by ETH Zurich. The first four episodes will focus on entrepreneurship at ETH on all levels. From student projects to successful spin-offs.*

*I am Jennifer Khakshouri.*

## **CHAPTER 1**

(Jennifer Khakshouri:) *Chapter 1 - getting ready*

(Scene 1 - Reveal Event)

(Jennifer Khakshouri:) *We are at Innovation Park Zurich, in a former hangar of a small airport. Many people are standing around a four-wheel vehicle, it's 3 and a half meters long and drives with 540 horsepower - so it's extremely fast. we are looking into the inside of the new pod made by the Swissloop team of ETH Zurich. It is the first time the pod is revealed to the public.*

(Cassandra Hänggi:) Dear friends and family, dear guests, twenty students have for ten months worked over a thousand hours for us to be here today...

(Jennifer Khakshouri:) *Cassandra is a member of the student group - she is in charge of communications...*

(Cassandra Hänggi:) when I joined this project I had an image in my head of pods that with the speed of light will travel through vacuum tubes - a big world that suddenly would be smaller would come together. I had a dream in my head.

(Jennifer Khakshouri:) *The reason why Cassandra had an image in her head...*

(Cassandra Hänggi:) ...is because of one person in particular: Elon Musk....

(Jennifer Khakshouri:)...*if you don't remember, he is the founder of Tesla....*

(Cassandra Hänggi:)...In 2013 he presented his Hyperloop vision and at the same time talked to us students directly and motivated us to be a part of this development.

(Jennifer Khakshouri:) *The goal of the Hyperloop Competition is top-speed.*

(Sarah Springman:) Speed is interesting.

(Scene II - Swissloop Office)

(Luca Di Tizio:) My name's Luca di Tizio. I was born in 1993.

(Jennifer Khakshouri:) *Luca Di Tizio is sitting in one of the Swissloop offices, only a few meters away from the main building of the ETH Zürich, in a very old building,*

(Luca Di Tizio:) We were given two of these offices which are about I'd say four metres high and beautiful windows and very shiny sometimes hot in summer when the light shines through.

(Jennifer Khakshouri:) *...Luca earned his bachelor's degree at the ETH in mechanical engineering and he's pursuing his Masters degree now. During the past two years he didn't spend all his time studying, he participated in the first competition with Swissloop, and now he is a board member and advisor for the current team:*

(Luca Di Tizio:) My motivation of course in the beginning it was a blank canvas so you had white paper you could just start doing something. It was initiated by students. It was from students for students. And I think that really really I liked that idea because because the startup world nowadays is very much like that so you don't you don't adhere to too many rules makes it a bit harder maybe because everything's very open but that was my main motivation to really influence a project from A to Zed and be part of it and and work on something that I think might change the world in the future.

(Sarah Springman:) So I think for me this is a great contextualized learning where people do it because they want to do it not because they get any credits and where they put into practice what they've learned and with enthusiasm and they go over and beyond and they push out their yield locuses of their previous experience and learn as they're doing.

(Luca Di Tizio:) Well the vision and the coolest part of it is definitely people transportation. I mean there is bespeaking of a hyperloop the unique selling point is speed so you have you have the possibility to travel in an energy efficient way at speeds of up to 1200 kilometers an hour and that just creates a whole new world. You can live in countries that you don't work in your commute is going to be completely different. It's going to change the way we transport cargo and that's really motivating you know being part of it's a movement since 2015 it's not yet a reality but it's getting somewhere and being part of that is extremely fascinating.

(Luca Di Tizio:) We have batteries that supply more than 700 volts. And that's pretty damn much for going through cables. So everything that is connected to safety in regard and electronics is going to be tricky. And we have we have done a lot of testing here so that's good. We've been able to seal our vacuum boxes in a way that is that is sensible. So but anything that has to do with burning up those batteries is going to be tricky.

(Jennifer Khakshouri:) *The man who is responsible for the batteries is Hanno, a tall muscular student with a boyish face. He is working in a separate building in the suburbs of Zurich where the team built the pod together. And also the dangerous batteries.*

(Hanno Kappen:) I'm somehow responsible that all the electronic stuff works nicely together and also the communication to the inverters which then power the motors.

(Jennifer Khakshouri:) *Listen up - We will hear from the inverters again later! What Hanno doesn't know yet... the inverters will play a crucial part later in this story.*

(Hanno Kappen:) So there's a lot of electronics involved in this project. My system as a whole is mandatory to have the whole pod to work. So there are some problems you can work around. But if a major part fades in our system or my system especially then the whole pod will not work properly and this is very somehow very stressful for me but I know the risk. And I am very confident that it works in the end.

(Jennifer Khakshouri:) *The end means the Hyperloop competition in Los Angeles, what the whole Swissloop team worked so hard for. How does Luca feel? What is the emotion the board member and troubleshooter Luca has regarding the competition?*

(Luca Di Tizio:) Definitely anxiety somewhere because you've worked with a lot of support from a lot of people for a long time and seeing that really winning or being good at the competition is your goal and that's what you want to achieve. So my main emotion is going to be a positive one. It's going to be definitely a feeling of achievement because we've made it until there and that's that's a big win already. But when we're there we just put our heads down nose to the grindstone stay focused and execute our steps the way we've planned them.

(Jennifer Khakshouri:) *Once the team is in LA at the headquarters of Elon Musks SpaceX and The Boring Company, they first have to show that the pod is safe .*

(Luca Di Tizio:) There are there are tests for example which are quite trivial. Does the machine fall apart. Can you shake on it a bit. Does it work. Does it drive.

(Jennifer Khakshouri:) *Then there are more sophisticated tests related to the vacuum and the electronics. The three teams with the best test results make it into the finals and get a two hour timeslot in the vacuum tube.*  
(Stimme halten, nicht runter, nicht rauf)

(Luca Di Tizio:) Most teams have not been inside the tube with their current prototype. So you get one run and looking at top speed. In the end the winner is chosen.

(Jennifer Khakshouri:) *In the first year Swissloop got into the final and placed third.*

(Luca Di Tizio:) Being in the final again - just as last year - is our goal.

## CHAPTER 2

(Jennifer Khakshouri:) *“Chapter 2 - competing”*

(Jennifer Khakshouri:) *Los Angeles in July. Will the dream of the Swissloop team come true?*

*The tests for the ETH- pod are very successful.*

(Luca Di Tizio:) We were the first team to get into the Hyperloop tube.

(Jennifer Khakshouri:) *...for a test ride. And then - I didn't hear from the team again. Neither did Sarah Springman, the rector of ETH Zürich:*

(Sarah Springman:) *“They have a bit of a habit of disappearing into some black hole for a while.”*

(Jennifer Khakshouri:) *Especiallly when things aren't going so well. It wasn't until Saturday, the last day before the final, when I got a voice message from Cassandra, the communications manager.*

(Cassandra Hänggi:) Hey everybody, sorry for not getting back to you earlier. This week was quite crazy. We are in a point in the competition where we don't know if we can proceed. We had like a big accident in a vacuum chamber. We had some problems caused by the inverters and it basically shortened one battery...

(Jennifer Khakshouri:) *Hey remember, the inverters*

(Luca Di Tizio:) ...Yeah I mean it was of course a drastic turn of events that we had on that day...

(Hanno Kappen:) ...Very frustrating because the problem itself was a short circuit inside the inverter so the inverter was a bought part and because of a manufacturing fault inside a bought part our pod was not able to work anymore...

(Luca Di Tizio:) ...sadness...

(Hanno Kappen:) ...we knew that the cells are damaged and cannot be used anymore...

(Luca Di Tizio:) Our journey was done there. The batteries were the only power supply that we had. They were worth in excess of 20000 bucks excluding all of the work that went into designing them and into manufacturing them.

(Jennifer Khakshouri:) *The pod was out of the competition. The Swissloop team could only watch the final from the a platform like the rest of the audience. And the students from Zurich had to see their Swiss competitors from Lausanne getting in on third position, the team from Delft in the Netherlands came in second and the odds-on-favorite from Munich, Germany, came in first again. Like the last time.*

### **CHAPTER 3**

(Jennifer Khakshouri:) *Chapter 3 - winning / in losing*

(Luca Di Tizio:) they put everything back together. They they prepared the pod for the shipping. They communicated what the issue was wrote the statements that the interviews and so on and they told everyone on the team what went wrong and why. Of course some people especially the people who were not there for engineering didn't quite catch on to that because it's you know failure is always an option.

(Sarah Springman:) what's important is not so much the end result but the fact that they tried and they will have learnt something because they didn't succeed.

(Luca Di Tizio:) There are a lot of issues that the vacuum and that this very high speed and high acceleration bring with it that just make failure a daily daily challenge.

(Jennifer Khakshouri:) *On a much more general level, Sarah Springman believes that travelling with pods like the one Swissloop created could actually become reality sooner than we think.*

(Sarah Springman:) There is a lot of work that needs to be done but I believe that the technical solution is actually not that far away. Like many things we try and do in this world but the social side and the security side and the political side and all of those other things that are more on the soft side of things are where the main problems will lie in the future.

(Jennifer Khakshouri:) *By the way, talking about the future and building speed pods... the not very successful competition in L.A. was a huge success for one of the Swissloop members. Do you remember Hanno, the person in charge of the batteries? He was approached by engineers of Elon Musk's Boring Company.*

(Hanno Kappen:) and they said before we had the damage that they would like to interview me for a job offer and then all the bad stuff happened. We tried to do that first and afterwards I asked if they still were interested in doing an interview I was unsure but they weren't. So they said that they were very impressed also by how I handled all the stuff with the damage itself. They were even more impressed after the damage than they were before. That was kind of good I guess. And as far as I know they sent out four job offers. Four out of maybe 300 people got a job offer and I was blessed to be one of them. I somehow saw that I cannot really decline the offer...

(Jennifer Khakshouri:) *Ok, we get it. This is a once in a lifetime chance. But what about his girlfriend in Zurich?*

(Hanno Kappen:) Yeah that's an issue. But still she said she would support me either way. So that of course means that I would have to move out and move to L.A. but she understands my decision but still it's it was tough.

(Jennifer Khakshouri:) *As soon as he gets his visa Hanno - with his bachelor's degree from ETH Zurich - will work full time as one of three electronic engineers at the Boring Company in LA.*

(Hanno Kappen:) Since that's a full job and I won't have any time I will do my master's - Not yet

it's a very open contract - maybe if it's not good working there. You don't know. I guess it will. But still if there are some issues I would come back and start my master.

## **OUTRO**

*(Jennifer Khakshouri:) 20 students team up to spend all their time over months on constructing a high-speed pod. Their goal: Being a finalist in the international Hyperloop competition organized by Elon Musk. Their vision: High-speed transportation of goods and people in vacuum tubes. They hoped for success but they failed. But that's part of life as a scientist.*

*(Sarah Springman:) I can promise you that even though I'm the rector here I didn't win everything in my life. And what's more. Sometimes I go and talk to the students about the times that I didn't succeed and why. And the fact that actually one should just get on with it and do the next thing.*

*(Jennifer Khakshouri:) This is the first episode of the new podcast by ETH Zurich.*

*Produced by This Wachter's [Audio Story Lab](#) and by me, Jennifer Khakshouri.*

*Music, Sound Design and Mastering by Luki Fretz.”*