Interview Technology Entrepreneurship

The course is designed for students who want to leave their comfort zone of their initial study topic and add a new perspective to their portfolio – how to discover entrepreneurial opportunities.

Stuttgart University's Institute of Entrepreneurship and Innovation Science wants to encourage and support students' transition from education to industry. This program connects students of all disciplines with professionals to support their development as they enter industry or even prepare for their own venture. Hahn-Schickard, Institute for Micro Integration is part of the mentoring team and contributed R&D insides of a 3D sensor, which later on became the product for the students to market.

The final presentations of the course took place in February 2021. It was a creative showcase of three concepts for the 3D sensor and it displayed varied perspectives of the teams. Read here what some of the participants had to say about the course.

Interview partners:

Dr. Ferran Giones (FG)
Deputy Head of Institute of Entrepreneurship and Innovation Science at the University of Stuttgart. His mission is to promote entrepreneurship across all fields of the university from technology to social science. He has a management and technology background and is a researcher in technology transfer and science commercialization.

Dr. Karl-Peter Fritz (KPF)
Deputy Head of Hahn-Schickard Institute of micro assembly technology and Head of Department components and systems. He is a mechanical engineer and has been working with Hahn-Schickard for some 15 years.

Guillermo Osio Arruti (GOA)
He is bachelor in mechatronics, University of Puebla in Mexico and currently studying at master level Mechatronics with specialization in technology management and microsystems at the University of Stuttgart.

Hallo to everyone. Welcome to our interview session. We are here to talk about your experiences in the course "Technology Entrepreneurship in Micro Integration".

Ferran, tell us about the course. What is the aim of the course and whom did you have in mind when you designed it?

(FG) We believe that good engineers need the understanding how to contribute to bring technologies into the market, from R&D to application. It is important to learn how to recognize and develop market potentials. We offer our students concepts to work with as well as real projects. It is a very action-oriented course where you can test things.

Guillermo, what was your motivation to take part in this course?

(GOA) During the last semester, I already enrolled in a course with Ferran, the 'Start-up Planspiel', which I enjoyed very much. I also started my student project at Hahn-Schickard. That was the perfect combination for me. I have always been interested in bringing R&D technology into real applications.

Ferran, when you plan a course for the first time, there are many aspects that can turn out in a different way – what was the most surprising aspect of the course for you?

I have already had experience in running such a course at other institutes in the past. I was very happy to find Hahn-Schickard as a cooperation partner right from the beginning. To collaborate with other institutes makes a much better learning experience for the students. The course design requires a partner that is willing to commit itself and put effort into it.

Karl-Peter, looking back to the initial start of the course what were your expectations then and which expectations were met?

Ferran made a good point. He asked "What makes a good engineer?". For Hahn-Schickard it is very important not just to have ideas but also to find customers who need our ideas. A good engineer is someone who knows how to construct but who also knows what the customer needs. You need visions but you also need products. This is very important for us as well as for the industry. When we first met with Ferran, we liked the approach on how to work with technical problems and how to make money out of it.

We were also looking to work with students with soft skills, entrepreneurial skills and the right mindset. Thinking about some projects from the past that have not been put to market for various reasons we had the intention to find new ideas and inspiration for the technology transfer. Thereby I don't want to keep back that there have also been some internal discussions at Hahn-Schickard in advance. Some were questioning the idea of passing on knowledge to students who are not technical experts.

What I learned from it was that selling a product needs time and mutual trust. All in all our expectations were met really well.

Guillermo, at the final presentations, we were able to see three very different concepts to market the 3D sensor. How did you go about the challenge and what were your reasons for following your concept.

We were three people in the group all from different areas and each one had different ideas. We realized that we were biased by our backgrounds when it came to our ideas for the concept. Somewhere in the middle of the course we were thinking that we should go for one specific idea and mold everything around it, but we realized that our ideas were being biased by our professional backgrounds and that instead of finding our personal best idea, we should be looking for the best application and a good product that can fit Hahn-Schickard's customers.

At one stage, the concept of crowdsourcing came up in the conversation. We immediately fell in love with the idea because this concept would give us the opportunity to profit from the idea itself. This would theoretically allow us to obtain information, experience, work, and opinions from a much larger group of interest to Hahn Schickard, in this case, their main customers and partners.

Adaptability had to be the focus. We were seeing our group as market enablers for Hahn-Schickard. We wanted to take a closer look at the market and customers as well as the products Hahn-Schickard has to offer. The aim was to bring all this together and adapt the technology to the actual needs of Hahn-Schickard's customers.

Actually deciding on one specific idea was a challenge for us. We had to broaden our minds and we had to learn about Hahn-Schickard as well.

How important was teamwork in the process?

GOA: When I think about the course again, if I had worked on my own I would have just followed the one idea that I had in mind already. I would not have encountered other ideas and would not have been pushed to think out of my box. Furthermore, the input from our mentors at Hahn-Schickard was very important.

In the end, teamwork was everything.

Karl-Peter, one of Hahn-Schickard's missions is to support venturing. What is your vision on support and guidance that Hahn-Schickard can offer to students? Why do you think this is an important part of education?

One point is the venturing in the closer sense that is to set up a new company and get funding for it. This is a field, which has not been Hahn-Schickard's core business in the past. Our core business has been providing engineering and production services to customers. Venturing means taking one idea out of Hahn-Schickard, putting it into a newly founded company and letting it grow. This is one business case how we can make money from an idea. However, we have to be aware that it can eventually become a competitive situation for us. Therefore, we cannot put all our efforts into venturing. We have to be aware that we might get into problems with IP rights and competition.

Nevertheless, venturing for us is an opportunity to promote one specific topic by deciding to release this topic into a company. We try to benefit from an exit by getting paybacks later on from the company. This is a decision that we have to make case by case.

Another thing that comes into my mind is technology transfer, how to bring our ideas into the market. There is a saying "Sales is not everything, but without sales everything is nothing". When you think about the support we can give to students we are very good at the first part of the sentence "Sales is not everything". You need a good product, you have to know your competitors, and you have to know the USP of the product. If not you cannot sell anything. We are good at developing innovative products. This is one advice we can give to students – you have to have in depth engineering knowledge.

However, the second part "...without sales everything is nothing" is where we have to learn more and train our students. If a project manager has 50.000€ left in the project he can decide to either make the 3rd iteration to optimize the technical performance or to use the money to make a demonstrator and present it at a fair to potential customers. I would say that 80 to 90% of engineers would take the money to make the 3rd iteration to get the last 3% out of the performance just to find that the next customer does not need the last 3% because he has a different problem.

Therefore, my advice is to take the money and create a good demonstrator to show what the idea of your product is.

Do you think that this mindset is missing in most of the courses at university?

(KPF) Well, you can say it is missing. You need to internalize, that industry partners are nothing to be afraid of. If you think you have a 'not so good product' but the customer buys it, it is a good product for the customer. But this is experience. I am not sure if you can teach this in a lecture. On one hand, you can tell people that they have to be courageous, that they have to be brave but on the other hand, these are skills that you learn trough experience. The interactive format of this lecture was a really good learning experience for the students but at the end of the day it is learning by doing and making experience.

Guillermo, what did you learn from the course? What were your experiences?

From the first lecture on, we knew that it was not going to be a normal lecture. The synergy of the two institutes was new and the fact that Hahn-Schickard opened the technology and allowed us to experiment with it. We learned about intellectual property, how to use a business model canvas properly, how to find the USP. We could immediately apply our knowledge. We were not just talking about concepts but we could apply it right away so it really was learning by doing. Sometimes it was too much input, we liked the topic but we did not have enough time to work with it. There is so much potential in the course.

Ferran, will it be taken into consideration that the students feel they need more time?

We were very happy that all students gave their feedback after the course. This is very valuable for us and helps to iterate and improve what we are doing.

One of the obstacles at the being of the course was the fact that we did not know if we could plan with presence lectures or if everything would be online. I must say that I have never done a course that was initially planned on making experience and ended up having everything in a digital format. I was really worried about that, but we managed.

There were similar courses in the past that I worked on. Back then the students had more time for their studies. We are now working on it and try to find a different path and options on how to make a course like this work better. Obviously by taking the feedback of the students into account.

The online format was a radically different experience for all of us. Especially for the students it would have made a big difference to be at the Hahn-Schickard Institute physically and to watch what you are doing.

How much time did you spent with the mentors, and how much input did they give you?

(GOA) We had a couple of online meetings which were very productive. The mentors always gave feedback to us and supported us. I think that it was interesting for them, too. From one session to the next, we came up with new concepts and presentations they had to comment on. The feedback came quickly and they were really good mentors. I appreciate that very much.

Karl-Peter, the 3D sensor is a very flexible product. You know a lot about the development and research that went into the sensor. What kind of new insights did you gain from the presentations of the concepts? Where there new aspects that you had not thought about yet?

Yes, there were two very interesting aspects, which gave me new technical ideas as well as ideas for new markets.

We were talking about the possible use of the product for smart buildings. Two students had a building management background and came up with the idea of proptech companies. They sell data as a service in the buildings and property field. This gave me new ideas about the market.

In my group, we spent time to discuss possible USPs taking advantage of the 3D aspect of the sensor. What is the selling point from a technical point of view? We found new technical benefits of the sensor, which can make light measurement into several directions and follow a moving light point. This means you can make a control circuit and follow the moving light with the sensor. Spending this time thinking about the use cases gave me the idea to think about applications in the field of autonomous driving for example.

When you spend an hour discussing a technical problem and you do not come up with a new idea in the end – you did something wrong. Investing this time is also valuable for me as a head of a division; I usually don't have enough time to dive deep into a problem. Therefore, taking this time actually gave me a new perspective and it was worthwhile for me.

Ferran, what kind of skills are important nowadays to empower the next generation of entrepreneurs to start their own business or start work in the industry.

This whole approach of not 'thinking about finding problems' when you are working on a topic but looking for something useful and fixing a problem, this empowers people. You find that you can contribute to make things better. Some colleagues of mine relate this to the concept of 'imaging the future' where you have to participate to create the future.

This is one of our battlegrounds that we have with entrepreneurship – sometimes it is only seen as an alternative for those who would not get a good job in the industry. What we are trying to promote is that those who have this entrepreneurial skills, are valuable for companies. It doesn't matter if they gained their experience because they received training at university or they already started their professional career by starting their own company. These skills are very useful even if later on they go back to work in a company or go back to university.

This is not just something that we have to tell students, we also have to tell this to the companies. "Don't be afraid to hire someone who is entrepreneurial. Don't worry about bringing him/her into the team". Employers are often worried that students with entrepreneurial skills start work and later on move on and start their own company. We have to tell them that this is ok. Bring to mind that maybe they can still be a part of the company, not necessarily become competitors. They could even benefit from each other. This is kind of our process of evangelization – telling employers that it is a good thing when your employees have these kind of plans. In our course, we can only lead students into this direction.

In your opinion, is this a German mindset or is it a general problem?

(FG) I think it is more of a general problem. Not a specifically German one; this is the case in many countries.

People who already are 'entrepreneurs' are very optimistic people. They dare to invest in things that are not yet physically there. They have an image of the future that is very different from the rational and safe option that most people have. What we would like to have a mix of students in the course. The ones with an entrepreneurial attitude, the talented and the rational ones. We would like to show them that it is a very good investment.

The old perception of the entrepreneur is sometimes that they are not the most qualified academics and that they always have something else going on, but this is not the case. We are trying to show that there is a long-term positive affect of this entrepreneurial optimistic mindset. It is an attitude towards life if you would like to call it that.

How can Hahn-Schickard extend the participation in this project?

(FG) During the course, we have already seen a lot of mutual trust.

Having more people around your technology and your fields of interest, this could be students or other partner. We should have this kind of exchange more often. Try to explore and exchange, creating a community, which is interested in building strong partnerships.

Sometimes the path of commercialization looks easy, but most of the time it is very complex. It takes many small steps from many people. It needs preparation and patience. The more people you have around you the more input you get. When you succeed, everything looks easy and people say that you were lucky. However, when you look at it closely there were set backs along the way, too.

Guillermo, what do you think?

As Ferran just said, I believe that not only Hahn-Schickard, but also any company can profit from having a network of people and companies who are open to talk about technical ideas and market opportunities.

I like the idea of a student competition with an incentive where you open one or two technologies for discussion and making these available for students with various backgrounds.

The last question is a personal one and goes to all of you. Where do you think you will be in five years' time?

(GOA) My plan is to finish my master next year. I am currently looking for an internship in R&D. I would like to develop technology for peoples' wellbeing. My goal is to work with technologies that make life better. I am not sure if I will work in a company or start my own business. Neither if I will be living in Mexico, Germany, or some other place. I am quite open to anything. The last year with Covid has shown us that we can make plans but we can never be sure if these plans work out.

(KPF) I take on the challenge and set up a target for the next five years. Have a look at the Hahn-Schickard slogans "Visions to Products": I would say that we have one new product a year. With regard to: "Products to Visions" we will have one start-up exit in the next five years.

If you set yourself targets, do it in a smart way by making it specific, measurable and achievable.

Ferran now it is up to you.

A very good job on the goals from Karl-Peter! Mine is a bit 'fluffy'. I hope that in five years' time we will still be in an environment where we can explore new technologies because this is what drives us. I want to work with great partners. Maybe we can even assist Hahn-Schickard in achieving their goals. I also hope that I will still be working with inspiring students.

Interview by Claudia Feith (CF), Marketing Officer at Hahn-Schickard Institute of micro assembly technology in Stuttgart