Infotalk about the bachelor`s programs Mathematics, Physics, Natural Sciences in the Information Society (NidI)

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00:00 Mathematics, Physics, Natural Sciences in the Information Society (NidI)

Studying and describing how our world works
A conversation with students from the Mathematics, Physics and Natural Sciences in the Information Society degree programs

Sylvi:
Welcome to another TU Berlin info talk. As part of our StudienberatungAtHome series, we're talking about the basic subjects today. Mathematics and natural sciences examine and describe how our world works and without them the engineering sciences would be unthinkable.

00:33 Introducing the interviewees

Sylvi:
I'm Sylvi Laschett, student advisor at Technische Universität Berlin, and I'm once again chatting with a group of experts, who have joined us remotely. Together, we'll take a close look at our three Mathematics programs, our Physics program and a very special program that offers a lot of flexibility and only exists in this form at Technische Universität Berlin: Natural Sciences in the Information Society. Hello, you three!

Inken:
Hello!

Rico:
Hello!

Tony:

Hi, Sylvi!

Sylvi:
Could you briefly introduce yourselves? Tony?

Tony:
Hi, I'm Tony and I'm now in my eighth semester of the Mathematics bachelor's degree program.

Sylvi:
Inken?

Inken:
Hi, I'm Inken. I'm studying Natural Sciences in the Information Society, also known as NidI for short, and I'm in my sixth semester.

Sylvi:
And Rico?

Rico:
Hello, I'm Rico and I'm studying towards a master's degree in Physics and I'm nearing the end of my final semester.

Sylvi:
It's nice that you all took the time to speak with us.

01:38 Why did you choose the Physics program?

Sylvi:
Before we delve deeper into your individual programs and subjects, I'm interested to know what your path to higher education was like and how you found the subject you're studying today. Rico?

Rico:
If I remember correctly, I think it was back when I was in school. That's when my first real interest in physics developed – in the advanced course I took. So I had chosen advanced physics. The teacher we had there – the Doc, as we always called him – was a huge inspiration and took us to TU Berlin and gave us a little introduction to the programs. But, to be honest, my curiosity for the subject of physics and phenomena in nature has kind of always been there since I was little. Ever since I was a little kid, I've enjoyed looking at the sky, seeing what's happening there, asking myself questions, why does something happen

the way it does? I always wanted to understand how everything is connected and how it works.

Sylvi:
And then someone said to you “You have to study physics for that” or how did you make the connection?

Rico:
Exactly. When it came to finding a degree program, a deciding factor was actually a conversation with the Academic Advising Service – so with you guys. At the time, I was actually interested in business, maybe corporate management, being my own boss, something like that. It was something that made me think, “Oh, that's quite different from school. That might interest me.” He [the advisor] then went on to ask me what other interests I had. And that was actually a very unexpected question, and I just told him about my interest in physics, and he kind of ran with it and tried to explain to me why physics would also be a path that could possibly take me in exactly these other directions later on. He kind of encouraged me to take a look at this program and check out a few lectures. So that’s what I did. I think it was a thermodynamics lecture that I attended. Then I immediately thought, “Oh, I know that. I learned that in class. I understood that.” Years later I was sitting in the same lecture and then of course I realized: “Okay, that was the end of the lecture I went to all that time ago. Getting to this point was not an easy journey.”

Sylvi:
It sounds like you actually found your thing there. By the way, thank you for promoting the Academic Advising Service.

04:14 Why did you choose to study Mathematics?

Sylvi:
Tony, how was it for you? Did your interest in mathematics start at school? How did you find your way to university?

Tony:
Yes, it was a bit more complicated for me. I've always vacillated a bit between mathematics and the arts. At the time, I kind of slipped into math class in junior high, but actually more by chance, because the other specialized classes were even less attractive to me. And then in the high school, I also went in more of an artistic direction, so I had advanced courses in art and German and was good at it, but I was actually also good at math. However, I was more interested in art and really wanted to pursue architecture, which is why I ended up studying Civil Engineering at first. Yeah, the path is a bit more complicated. But that was kind of what I wanted to do, because you would always hear that there are so many architects, they’re a

dime a dozen, they don't earn anything, and you have to be really, really good. That really put me off at the time, and I was more interested in studying something that I'd definitely be able to find a job in and earn money and work in Germany. Then I actually officially studied Civil Engineering until my third semester and then realized in my fourth semester that I actually found that pretty dumb. Then, in the fourth semester, I actually completed math modules as part of my Civil Engineering degree, which I was ultimately able to take with me to my actual program, the Mathematics program. The reason I chose math was a bit... with the Civil Engineering modules – or rather with the exams – you would always sit down three days beforehand, cram everything in, and try to learn as much as possible by heart, but then afterwards it would be gone. Or when it came to an exam, you would have an hour and a half to find as many formulas as possible in a really thick tome, which you would then have to use somehow, and do it as accurately and as quickly as possible to get a good grade. I kind of had the feeling that I didn't learn anything from that. Of course, now I know a bit about what different rock sizes are and what's the best way to use them to make a building stand up. But I'd have to look it up again now. So I didn't keep anything for myself that I couldn't look up again later anyway. In fact, back then I still attended my math modules for engineers because I wanted to become an engineer. I took them, passed them, but did them during the semester breaks. There is a special course offered for engineers, an early bird course, and you had a little more time to get to grips with the mathematics. You just did your homework every day, went to a tutorial every day and had lectures every day. So math was just a bit more of a constant presence. Of course, you then had time to talk a bit more intensively with the lecturer or with the tutors about what you were actually doing and not just work on the assignments. Then, coincidentally, I was a bit more active in one of the student cafés that we have at our university, the Math Café, and of course I chatted with Math students from time to time. As it turned out, that was the right thing to do and then I signed up for Mathematics and I'm very happy with it so far.

07:44 Why did you choose to study Natural Sciences in the Information Society?

Sylvi:
Quite an exciting journey. Thank you. Now I'm really excited to hear from Inken. Natural Sciences in the Information Society isn't exactly something you encounter at school, is it?

Inken:
No, not directly. Well, I actually came across NidI for the first time at the TU info days, when I was still in school myself. But then I happened to hear that it involved biology, and I was like, "Hm, biology, that's not really my thing. I really don't want that." Then after school, I looked at what I actually wanted to do, took a little break for a year but was generally very directionless and, even after that year-long break, I wasn't really any clearer about what I wanted to do. I was very interested in math at school, but I wasn't like my classmates who wanted to get to the bottom of everything, always questioning everything and studying

math after school. But it was easy: Yes, I liked math, but I didn't really want to know everything right now either. At the same time, I was very into chemistry and computer science, as well as psychology. These were all subjects that I took in high school and that I was very interested in, but what I didn't know was whether that was really enough to study something in those fields at university. So, after this year off, I came across NidI again and somehow it appealed to me a lot more this time around, also because I realized that biotechnology is just one option. So you are not required to do biology and you can design your studies very freely. At the same time, I thought that this gave me the opportunity to orient myself or become as specialized as I wanted, and not be forced to commit to a certain program without knowing whether it's the right one for me. So that was my intention behind choosing to study NidI.

09:44 What do you cover as a Physics student?

Sylvi:
I'd like to build on that a bit to get a better idea. We've now heard about your journey into the degree programs, what you already knew beforehand and what ideas you already had or developed along the way. What exactly are your subject – or your programs – about? Perhaps we'll start with Physics for the sake of simplicity. We all know that from school – more or less. Rico, is Physics at the university level a continuation of what is covered at school? Like you said before, you recognized the content somewhat. Or what do you do as physicists?

Rico:
No, that's actually not the case at all. Physics at school is more about using formulas, calculating things, practicing things, trying to understand a few small experiments after watching instructional videos. So it's very application-heavy, really pure application, but without really understanding the underlying principles. Physics at university is about studying natural phenomena. That means understanding how nature works. That is the goal – to recognize the laws of nature and to develop an intuition for them. So I see something and can assign what I see to a law of nature, a basic fact of nature that was recorded and described in books at some point in time. So I recognize patterns. Physics follows a pattern: I observe, analyze what I've observed, check what I've analyzed, then describe it or, in other words, write it down. At the beginning, you have the theoretical considerations. These are then recorded using mathematical descriptions, perhaps even including programming, i.e. reprogramming the world, nature or certain aspects, and then testing this through experimentation and finally explaining and putting into words what I found out in the experiments – which for us means writing a paper. But that's not always the only, right way. It is often the case in science that an experiment is simply carried out for a completely different reason, and something is discovered that then requires a theoretical description, an explanation. So you really have a very symbiotic interaction of experimentation and

theory here. This is also very important for physics. So it's a combination of application and understanding. One of the founders of quantum mechanics, Max Planck – actually *the* founder – said it best: Theory without experimentation is empty, and experimentation without theory is blind. That is very true.

12:48 What is everyday life like as a Physics student?

Sylvi:
Does that also describe your everyday life as a student? If I've understood you correctly, it seems that you're doing tests and experiments, where you're really in the laboratory. You write papers. In the part in between you need math, you need computer science skills. That kind of sounds like more than what I first imagined Physics would be.

Rico:
Yes, well, Physics is definitely more than you'd imagine when you leave school and have an image of the subject in your head. We deal with issues of mechanics, electrodynamics, thermodynamics, statistical physics, quantum mechanics, solid state physics, optics, atomic physics, particle physics, molecular physics, astrophysics. Then there are always side paths in all these sub-areas, like connections to chemistry, technology, computer science and, of course, the English language. This is very important because that is the language of science. So you often take detours into things that you would not have thought you'd deal with. I didn't go into it thinking I'd be so intensively involved with programming, let alone using other operating systems for computers, or that such a thing even existed. Everyday life varies – let's put it that way. So the subject matter is very broad. It's your job to make up your own mind at some point.

Sylvi:
To take this variety of subject matter that you've just described and decide what to concentrate on, and what you want to pursue further?

Rico:
Deciding on a topic is only half of it, or maybe a quarter or a third. Very often in Physics, there is overlap between different fields. It is more important that – at some point during your university education, and even afterwards – you decide on a path, i.e. on areas of research that you find exciting. They can certainly overlap in several of the many subject areas I've mentioned.

15:01 Where do physicists work?

Sylvi:

You just mentioned areas of research. Is that what it boils down to? So if I study Physics, I'll become a researcher? You also mentioned earlier that you actually started your studies with an interest in maybe working in business in some way.

Rico:
It would definitely be wrong to say that all physicists go into research. The trend is definitely going in a different direction. There was also a nice study by the German Physical Society, the DPG. They determined that of the 150,000 physicists who have completed their studies and work in Germany, only a fifth are employed as physicists. Around three quarters of these people go into jobs in IT, finance, sales, management, consulting or university teaching. The reason for this is often that physicists are trained to become generalists during their studies. This simply means that you are very flexible in how you can use your skills and what you've learned. During your studies, you often learn that you acquire new knowledge very quickly or regain knowledge that you once had. So that means that even if we trawl through this broad subject area or all these subject areas throughout our studies, we don't have them all in our heads in the end or keep them in our heads. We actually forget a lot of it again. But the ability to quickly regain and acquire this knowledge is very valuable, and this abstract and very problem-oriented thinking, which you learn through this degree, is very much in demand and a very welcome asset.

Sylvi:
That definitely sounds exciting. We'll come back to that later.

17:04 What do you cover as a Mathematics student?

Sylvi:
To offer a contrast to what we've just heard, I'd be interested to know what the situation is like with Mathematics, Tony. Is mathematics in school any indication of what university-level mathematics will be like? What is covered, and why do we need people who study math?

Tony:
Well, I would say that the mathematics taught in school is a good start. So you kind of become acquainted with the major subject areas like linear algebra, calculus and geometry and you cover a few things there. You get to know the first few formulas that are kind of important, that just make sense that you may have seen them before. However, what you ultimately do as a Mathematics student is completely different. In fact, when you arrive at university, you sit in the first lecture in your first semester, and you start all over again. We return to the basic assumption that numbers exist. We prove what kind of numbers there are, what spaces you can imagine, why these numbers are there at all. There is even debate about whether zero is a natural number or not. We deal with everything like that in the first semesters and then we are taught how to actually produce proof, how to structure an

intelligent statement, so that what comes out of it at the end is really a piece of proof and not just a statement. For example, up until my third semester, I still had problems determining whether I had actually proven something or just claimed that it was true. Understanding that you have to deal with this type of mathematics in a completely different way than how you did at school is difficult to get your head around and, I think, also scares off a lot of students in the first few semesters, unfortunately. During my Course Guidance office hours, a lot of people come to me with this very knowledge from school and even from advanced courses and they think that university will pick up from there. But unfortunately that's not the case. You start all over again, and then you get into proper math. I did my engineering courses in Mathematics. It was a bit more like school, so you were shown formulas and basically told what they were good for and then you tried to calculate things, like surface areas. You already did something like that in school and then it's taken a bit further in engineering mathematics, by calculating more complicated surface areas or determining solid figures from the volume. But in pure mathematics, things are definitely different. It's really more like trying to take what you know and putting it together correctly so that what you want to show comes out. Actually, we get homework every week because we always want to practice, prove things and practice applying the things we've learned correctly again and again and combining them effectively to produce the right outcome. What this means is you actually are mainly given theorems. A theorem is kind of like a statement, "This rule applies here" and then you have to show that it's really true. In fact, one of the first pieces of evidence I think I had to provide was that one plus one really is two. That was pretty difficult, because of course you know from school that this is true, and you also know that addition works, and then you end up in the same number space again. But show that first, because of course we see everything as trivial at first. We think, "Yes, that's how it is." That was relatively difficult at the beginning. Towards the end of the bachelor's degree it's more like you've come to terms with how math works, how we deal with math and now it's actually more about delving even deeper, describing even crazier figures or looking at objects with infinite dimensions or functions that do really crazy things and you kind of just keep looking further. Of course, we also have a few specializations that go in the direction of computer science. I think computer science and especially programming skills are a generally indispensable asset in our world, and it's also incredibly important that you acquire certain skills. Of course, we also deal with algorithms in mathematics, and algorithms are actually a good interface – or the interface – to computer science. That's something we also cover, of course.

21:35 What is everyday student life like as a Mathematics student?

Tony:

I'd say the everyday life of Mathematics students is actually very different from how people originally imagine it. I imagined them sitting at home, all wearing glasses, with five textbooks open, etc. That's actually true. But it's actually more of a social program, because studying

makes a lot more sense when you can do it in a group, when you have a group that you can work on producing proof with. Before the pandemic, we would often stand in front of a blackboard, sometimes even until 10 at night or later, and really try to solve it, to crack this riddle, so to speak: How do we get there? OK, we know all that. How can we piece this together to get to that exact point? That's actually what I've mainly done throughout my studies so far. I've talked to people a lot, because sometimes other people have ideas that you just can't come up with yourself. I did that for the first two semesters. And I was also a bit like, “Oh, I can do it on my own and I'm doing my own thing, and everyone else is way too stupid, and I don't feel like it.” Then I sat down on my own and sometimes it actually took me a day or two to understand the assignment. I hope I wasn’t the only one. But I'm actually quite sure I wasn’t. And that's why we work on it as a group, getting it right, solving it, that's actually what we're doing in Mathematics right now.

22:58 Why do we need mathematicians?

Sylvia:
Why do we need mathematicians who deal with things like this?

Tony:
Like I said earlier, I didn't feel like I was acquiring new skills when I was studying Civil Engineering, and that's completely different now that I'm studying Math. This is similar to what Rico said about physicists. Mathematicians are also generalists. This means you simply acquire these logical thinking skills, you can write down evidence in a clearly structured way, what you say just makes sense. You can also deal with new situations much faster because you’re actually practicing all the time. You kind of always get a new theorem placed in front of you, sometimes from a completely different specialization that you may not have studied so deeply, and you have to be able to deal with it. But there is always this connection, and that is of course the cool thing about studying Mathematics – you not only have the different modules, but a bigger picture, where everything is somehow connected, and that is what you learn all the time. I'd say it's definitely not the people who start studying math who are super clever, but: When you've finished your bachelor's degree and studied it in a really normal way, you've definitely become a clever person. And that's actually why we need mathematicians. You can actually work with it later in any field you can image, because people expect that you can handle a situation well, get your head around it, and quickly figure out how everything works, because that's what you actually did during your studies. That's why people will envy you when they see you've studied Mathematics.

24:37 What is the difference between Mathematics, Technomathematics and Business Mathematics?

Sylvi:

You just talked about specializations. That's something we should also delve into because, as we said before, there are actually three math-based programs at Technische Universität Berlin: pure Mathematics and then there are Technomathematics and Business Mathematics. How do they differ or what should I choose if I think what you've said so far sounds pretty interesting? Can you tell us a little more about that?

Tony:
Sure. So I'm a pure mathematician myself. I don't know exactly why I always say the word "pure". Actually, the big difference between these three programs is the choice of your minor subject. If you're a mathematician, then it's definitely the case at every university in Berlin – and throughout Germany, I think – that you choose a minor. A minor subject is any program at Technische Universität Berlin – if you're a student at Technische Universität Berlin – that isn't math. Why do we do this? I assume – well, I didn't think this up – but I assume that you also recognize some of the connections to other worlds, because studying Mathematics in itself is very theoretical and if you then have Physics as a minor subject, for example, and only go through the experimental part, then you have something practical that you can do, but also something theoretical, i.e. the math that happens in your head. Or you minor in Architecture and can draw a little on the side, instead of just focusing on these rigid formulas, and try to find solutions – but you can also do something different. With pure – quote unquote – Mathematics, it's not just Mathematics. You're free to choose your minor subject. In other words, it's not fixed. You can choose whatever you want as long as it's available at Technische Universität Berlin. In Business Mathematics, on the other hand, the minor subject is always business. That means you have to choose courses that are offered in the Industrial Engineering and Management program at Technische Universität Berlin, and you can't change that. In Technomathematics, the minor subject is always a technical program. This rules out programs like Architecture, for example, as well as Culture and Technology. But something like Civil Engineering or Mechanical Engineering could be a great option for you. I was actually able to have my studies in Civil Engineering credited as my minor. In other words, I didn't have to do it anymore and fared pretty well with it. I just took a look at the program and was able to pick up a few physical formulas – I was also studying mechanics at the time – and so you now have a better overall picture, I would say. That's actually the main difference. And you also have to do an internship if you're studying Business Mathematics or Technomathematics, which is not mandatory for pure Mathematics – quote unquote – but it's possible. That's also worth looking into, because it's a lot of fun.

Sylvi:
So you've already done one? Maybe we can come back to that later. Now I'd like to bring Inken into the mix to talk about Natural Sciences in the Information Society.

27:50 What do you cover as a NidI student?

Sylvi:
You already said that when you were picking a program you were looking for something that wasn't so in depth and that you didn't want to commit to a particular path from the start. What is your program like? What is it about? How would you describe everyday life?

Inken:
NidI is a very interdisciplinary program. You have compulsory modules in the various basic principles of the natural sciences, i.e. math, physics, chemistry, but also computer science and information management. You learn a little bit about how we deal with scientific information, how we write a paper, and how to do proper research in the library. You also cover the basic principles in the various natural sciences. In addition, you have a very wide range of electives to choose from. With compulsory electives, you can also delve into technology and biotechnology or society alongside the subjects you already have. With electives, you are free to use your credit points however you like. So you can take language courses, you can also easily get credits from abroad recognized if you do a semester abroad. If a module is not available at Technische Universität Berlin or doesn't exist, you can still get credits for it because you really are given free rein. In order to offer students this freedom to customize part of their program, this bachelor's program is a bit longer than normal ones – eight semesters instead of just six, to be precise. This means an extra year of study – which is something to bear in mind – but you simply have the opportunity to create a basis and then build upon it in depth or breadth, depending on what you're drawn to.

Sylvi:
So that means it's a program where you can basically feel your way forward step by step and then see which direction you want to go in – which sounds even broader because I think Tony and Rico both mentioned that their subject is also about generalism and links to other fields. So things are even broader for you in NidI, right?

Inken:
Yes, exactly, but it's not only for those who aren't sure which direction to go in – I mean, I was a bit unsure – but anyone who has a general enthusiasm for the natural sciences, and perhaps just doesn't want to commit to one thing, but maybe already has a particular direction in mind and wants to know more about it. There are relatively few limits with this program. You don't necessarily need any previous knowledge from school. Of course – it always helps, but as Tony and Rico also said, it's not absolutely necessary that you took advanced courses in high school. For example, I opted out of physics. I didn't take physics for four years until I came to university and then I started with physics right away. And I made it through too. Now that sounds silly. But what I mean is I was very afraid of the physics part of my program because I knew chemistry was something I liked, and mathematics and

computer science suited me as subjects too, but physics didn't. That's why I even started with physics. I looked at it and, together with a group and with an experimental part, it worked out very well. You get to know physics in a different way than at school and understand it in a completely different way and also analyze it in a completely different way, by writing reports after the experiments and, in doing so, gaining a completely different perspective.

32:02 How did you tailor your NidI program to suit your interests and what future opportunities does it open up for you?

Sylvi:
Have you already found your path or a personal mix during your studies? What direction have you gone in now? Can you give us some more concrete examples?

Inken:
I'm still kind of figuring it out. I'm slowly approaching the end of my studies. I'm in my sixth semester. Actually, my interests haven't changed much from the ones I had at the beginning of my studies. I realized that I don't want to focus on chemistry, in other words, that chemistry shouldn't be the focus of my studies or my future career. I'm still very interested in computer science though and I'm now structuring my studies around computer science, but I'm also taking modules that lean more towards mathematics, environmental sciences and psychology. I hope I can then find a master's degree that goes in this direction. I've already looked at a few and am considering going in the direction of data science. This focuses on gathering knowledge from data, i.e. extracting it, and I thought that would be a good way to keep things interdisciplinary. Because I'd be able to gather knowledge from data in the lab, but also from data streams in Big Data, i.e. from the Internet. There's just an incredible number of applications. But it's still very interdisciplinary, and it could combine the exact subjects that interest me. That's my idea at the moment for the next phase of my studies. Now I'm trying to tailor my studies accordingly. This is – of course – a danger in NidI. Due to the fact that there is so much freedom of choice, you still have to do a little searching to get there. So you can, of course, do your bachelor's degree with a wide range of subjects and then go in the direction of science communication or public relations. But if you want to go in a certain direction or in a more concrete direction, then you have to make sure you show enough initiative and tailor your curriculum in a way that you also have the opportunity to do further research, do a master's degree in it, or meet any requirements. However, you also get enough help within the program and incentives for how to do it well, how you have to organize your curriculum so that you get there in the end.

34:53 What is Course Guidance?

Sylvi:

This is a good place to point out that Tony also mentioned Course Guidance earlier, and we haven't even explained what that is yet: What actually is Course Guidance? All three of you work in that field. What services do you provide? What questions can people come to you with?

Inken:
Course Guidance is a service provided by the University or a particular degree program that aims to answer any kind of questions. So whether it's something very general like "How do I register for the exam?" or really subject-specific, like "I don't know how to study for this. Do you have any advice? What books could be helpful here?". Even if you don't know who to ask, you are more than welcome to take these kinds of questions to Course Guidance. The same goes for if you feel like you have no prospects or don't know where you want to go, it sometimes helps to just talk about it. That's what we're here for and we're happy to offer help and advice to students.

Sylvi:
Do I already have to be a student in the program, Tony?

Tony:
No, not at all. Actually, many students come to me during my office hours towards the end of their time in high school. Well, unfortunately not at the moment, because we can't offer face-to-face office hours. But last year, I had several students come to me and I was really excited that they found their way at all, because it is relatively complicated at first: Which one is the math building? Where are the elevators How do I get to the eighth floor? There were a few students who had a whole piece of paper full of questions and just asked everything, and that's exactly what we're here for. We don't always know everything, but we usually know who to ask, and those people usually know. So we always act as more of a first point of contact for questions like "What do I do now?," when people don't know what to do.

Sylvi:
Okay, so that means, even if I'm still in high school – like you said, Tony – and venture onto this campus with all these buildings and floors and rooms. Right now, in times of COVID-19, you don't meet that many people in person or sometimes you can't get into the buildings at that particular time. We have created various alternative solutions, like the online office hours, etc. You definitely shouldn't hesitate to get in touch. You don't have to have everything figured out. You don't have to know all of the university vocabulary. You'll meet people who can still remember what it was like to not know all that themselves, and they can help. Even If I didn't read the full student guide first – right, Rico? Can I still come?

Rico:
Yes, of course. That kind of literature and brochures are offered everywhere. It's also often helpful to read that afterwards, when you've had a chat with advisors and have more of an idea of how the program you're interested in actually works. Then it also helps a lot to have a think about it afterwards and then make a final decision based on that.

38:14 What surprised you about your studies?

Sylvi:
Since we're already talking about it now: How can I do my research in advance and gain some insight, since we have already gotten to know these very different pathways. Tony, who tried out a program and then realized later on that she actually wanted to do something different. Rico, who came to the Academic Advising Service beforehand and left with a completely different subject than he'd originally thought. Nevertheless, you can't predict everything or know beforehand exactly how everything will turn out when you start you studies. Were there times where you said, "That was something that really surprised me about my program or my studies," Rico?

Rico:
Yes, actually: mathematics. I left high school with really good grades. As we all know, high school exams are more about demonstrating how much broad, superficial knowledge you have. In the beginning, of course, you have a great deal of self-confidence and then you start your studies and realize how much you don't actually know yet. This was particularly true for me with mathematics. The situation for us at the time was like this: We had a preparation course at school. It was a lot of fun. The teacher at the time really knew how to torment us with propositional calculus, which is super important in mathematics, especially early on in our studies. Unfortunately, the preparation course didn't culminate in an advanced course. So that means I had my advanced course in physics but not in mathematics. So yes, it is also possible without taking a mathematics advanced course. It would also work without a physics advanced course. Mathematics in high school is just arithmetic. But to understand what is behind all this – well, Tony said a few things earlier to give you some insight into what this basic structure of mathematics looks like – providing proof, formulating theorems, moving in a wide variety of mathematical spaces. So for me there were numbers and functions and curve sketching. For example, in mathematics, at some point the professor came and said, "Just define this numerical range for me now." He said it like it was nothing. "Define this numerical range whose elements are integrals." And I thought to myself: I'm sorry, what? We had this exact reaction very often. However, it's important to emphasize again and again, especially when studying Physics: Mathematics is the tough part, but you shouldn't let that get you down.

Sylvi:
Inken, how was it for you? Did you have any surprises during your studies?

Inken:
Well, I was also surprised by the mathematics, and very much by the way it was expressed. There is a certain way of writing down certain things that surprised me a lot. At first, I was totally overwhelmed by how it was written down, i.e. the underlying principles, how I can understand it, which also took me a lot of time. At the same time, I sat in the lecture and was honestly surprised that I didn't understand anything and then tried to look it up in a book and didn't understand anything there either. That was a very new feeling for me, not understanding anything in mathematics, sitting in a lecture hall for 90 minutes and maybe even having very little understanding in the end: What was that all about? What do I do with it? How can I apply this further? And then maybe I'd even look at my homework and be like: Did we even cover this topic, or did I miss something? That was quite surprising for me. When it came to physics, it was quite surprising for me that I still knew quite a lot from school – as I said, I hadn't taken physics for four years. But I was also taken aback by the speed at which things progressed. We covered fundamental things like free fall, vertical throw, etc., at the beginning, and then progressed at a very fast pace and in more detail – more so than I remembered. And that surprised me quite a bit, seeing how on the ball you had to be, that you had to do a lot of follow-up work, take a good look at things and, ideally, really talk to people about it. What helped me the most was that I really worked with other students or tutors. And we had something called a math fan club. A lecturer from one of the NidI modules offered to sit down with us once a week to answer our questions again. I took advantage of all this and gradually this understanding of this way of expression, but also of this new way of learning, began to take shape.

Sylvi:
Now that sounds pretty daunting. I mean, you're all living examples of how these surprises and hurdles can obviously be overcome. Tony, if I ask you what surprises you had, please don't say "mathematics."

Tony:
Yes, I think it's quite funny that you all were so surprised by the mathematics. What actually surprised me is that when I say I'm studying math, people often say "Whoa, you must be really smart" and "Oh my God, I could never" and reactions like that. I thought so too at the beginning. So I thought long and hard about whether I really wanted to do this. That's why I was actually still studying Civil Engineering in my fourth semester, and I took math modules because I just wasn't sure yet and I wanted to try it out first. Because I also thought that only the really smart people who were really nerdy and took advanced math courses in high school chose that path. Actually, I was surprised that these are just normal people. So, of

course, we also have very clever people, little geniuses and overachievers, etc. But I think that's true for every program. I just found that if it interests you, you'll be good at it. I was interested enough and I wouldn't say that I'm one of the best students. But I still learned something. Back when I was sitting in my tutorial and the tutors were standing in front of me and they knew everything and I was like, "Oh God, I want to be there someday, but I'll never make it, because they're a lot smarter than me" and what I ended up taking away from that was: All of my fellow students have more or less become tutors and they're are also people who know just as little or just as much as I do. And it then just gets easier, and things that you previously found so unbelievable are now completely normal. That's something that surprised me a bit in hindsight. And I'm very surprised now that you all find math so surprising. But that's beside the point.

45:26 What do you find really cool about your program?

Sylvi:
Let's actually mention some of the successes you've had too. We've talked a lot about the difficulties, issues and things you didn't expect. But you all stuck with your studies, which obviously means it's not all doom and gloom. Can you share any moments from your studies that made you say: "Yes, that's actually a really cool part of my degree program"? Inken?

Inken:
So at the beginning, you see this course schedule, and sometimes the names of the modules don't mean much to you. You have absolutely no point of reference. I had no clue what numerical analysis was. I was able to make some sense of computer-oriented mathematics. Okay, it's kind of computer science, but also math. But what am I going to do with this? What exactly am I being shown? In some cases, these were just individual points that were then gradually linked. For instance, this is an example of something I've noticed over time – vibrations. In Physics, you have experiments in the first semester. Everyone knows this from school: pendulum, double pendulum. You're shown this first and told: Okay, they are described using differential equations. But at the time, I didn't even know what exactly a differential equation was. Then came the mathematics, where it was more like: Okay, differential equations, the location is important here, but then all the derivatives might also be important, i.e. the speed and the acceleration. This established another connection to physics and you gradually realized: Okay, so this all ties together. Then there was numerical analysis, where you were shown approximate solutions to differential equations, how to do them, and how to program them. Little by little, connections were created in my head, and I have to say it was a great sense of achievement to be sitting in a lecture and to realize, "Oh, I already know this from this module, and I know this from that module and, oh, this can now be interpreted differently." It was often about taking relationships that you expected but didn't know exactly how they worked, and simply having them shown to you. I found that very, very positive. I also noticed: Okay, I've taken something with me from the last

semesters from the other modules, and it also kind of reflects the underlying idea of Nidl – that you're a bridge between the various natural sciences. That was also the idea behind the founding of NidI, that the various natural sciences... well, you can't separate them one by one. They all belong together. Math is the language of the natural sciences, then you have physics, chemistry, and biology. You can kind of link it all together and really finding this idea reflected in my studies was definitely one of the greatest successes for me.

Sylvi:
And Rico, what was it like for you with Physics?

Rico:
On the one hand, learning from module exams was a particular highlight. I always found it really exciting that, after countless lectures of incomprehension and desperation – of course, only at the beginning, everything gets better later – and after so many exercise sheets and stupid arithmetic in written exams and tutorials, that I could eventually sit down and take my time. That's often something that's in short supply during your studies: Time. I was able to sit down and read the literature again to take a close look at the connections between the different areas, to look closely at what exactly the calculations I'd labored over actually meant. In theoretical physics, for example, I have some theory, some general problem and you start defining things for it and then you start calculating and you calculate more and more and make assumptions and you get lost in the maze and then you end up with something and you have to look back and think: What was actually my initial standpoint, and what is the final statement? You always have these aha moments when learning, like "Oh, now I understand. Now I understand why he wanted to go there next. That's what I personally found awesome and exciting. I always got a sense of achievement when I understood it and was then able to tell other students about it. This is where teamwork comes into play again and again throughout your studies. It's really a lot of fun to share your knowledge with others. In school, if you knew something, your classmates only cared if they could copy your homework, which didn't make for very interesting conversation on the playground. Here, you can just freely talk about physics, and people will listen and be interested. That's great. On the other hand, I'm a theorist, so I've been working in the field of theoretical physics for many years, and especially when I look back on my bachelor's degree, when we still had a lot of labs, I was always really happy when experiments worked out. For example, we did an experiment on the photoelectric effect, a theory proposed by Einstein. We shine some kind of light onto some metal plates and then a current comes out somewhere, because something is actually created there. And we can see that these different physical connections between light intensity and voltage actually are as they're always described in books and, in doing so, we confirm a theory written down somewhere on paper. It has always impressed me that this symbiotic interaction between theory and experimentation actually always works. Those were always a highlight for me.

Sylvi:
You're actually describing kind of similar qualities there, i.e. the links between content that yield these aha moments, which you obviously sometimes have to work on for a longer time or require patience or some quiet time to return to them when preparing for the exam. That's certainly a special characteristic of your programs, which may also set them apart from other subjects that have a different approach to working with material and learning content. Let's take a second to zoom out from your programs' content and subject matter and take a broader look at your studies: With all your fascination for the material and with all the digging and tinkering, is there still room for other things? For example, Tony, you said earlier that you also did an internship. These are experiences that are perhaps not specified in the timetable. Is that something you as a mathematicians and natural scientists can get around to doing, or do you say "No, the compulsory material takes up enough of my time. That's enough for me"?

Tony:
I actually didn't do an internship myself. But I know some other students who have done internships, most of them in auditing companies, or at least in that direction or in consulting firms, more generally. I think the motivation was that it's an opportunity to try out a lot of things – which I also see as a motivating factor because I'm also applying for positions in that sector right now. We've acquired a great deal of theoretical knowledge, and, towards the end of the bachelor's degree, it's actually a good time to do an internship because you already know a lot. And I, for example, can't imagine – or have no idea at all – how I can actually use these things in real life or what I can actually do with them. Yes, I can calculate the 10,000th derivative of this and that without much effort because I know how the algorithm works, but what do I actually need it for? Something like that really helps – going to a consulting firm and dealing with different small cases again and again. So that's what interests me about it. I find that really exciting, because I actually hope – and this seems to have been my fellow students' experience too – that I'll just realize: "Okay, I can do that with what I've learned", but also "Okay, maybe I'm not that interested in that, or maybe I'd rather do one or two modules in that direction, because I found that really exciting" and you can try it out a bit. Now, to get back to your question: I actually have a lot to say about that. As I mentioned at the beginning, I am now in my eighth semester and actually also in my eighth degree semester of math. So I've been studying Mathematics for eight semesters and before that I had four semesters of Civil Engineering. So I've been studying for a while now, and that's actually because I've done a lot on the side. I've worked on initiatives, I've been very socially involved in student cafés, doing something by students for students. I've planned events on campus, i.e. within the university, and got involved a bit in university politics, and I just tried a lot of things out and got to know a lot of cool people. At some point, you just feel like you know everybody on campus. Now whenever I'm out and about, I always meet

someone I know who I can chat with and that's kind of a relief because it shows that the university is not just a place where you have to cram and study and only find and meet up with your study group, but you can also just go there and relax and sit outside on the field and maybe have a bottle of mate or a beer with one or two people. I think that's really important at university. And that's not specific to my program. I actually think everyone should study this way and try things out and see what they find cool, where they want to put their energy, what they want to get involved in, and what they can learn from it. That's just another good thing you learn at university.

Sylvi:
You mentioned initiatives at the beginning. What does that mean? What are those?

Tony:
An initiative is essentially a group of students. A student initiative is, of course, a group of students. The one I was involved in is called bonding. They build a bridge between the corporate world and the academic world. I was very active there for two years when I was still a civil engineer. They basically organize a large corporate networking fair, where you can kind of get to know people. I moderated plenary sessions, I managed finances, I acquired companies and stuff like that. So that's what I learned. I learned a lot of software skills. I was allowed to do a lot of courses, and I didn't have to pay anything for them. I basically committed myself, learned a lot, got to know people, and found out that I didn't necessarily want to continue working there. That's something that can happen too. Then I joined the math initiative. They do things for the math students, so they plan trips for first-years and such, and that all has to be organized as well. There have to be people behind the scenes who say, "Let's do this now" and generally communicate a lot with people and also get things going. You can also sit in a plenary sessions and chat with people, and nothing comes of it. I've sat in so many plenary sessions, and it's totally different how it works everywhere. And I have to say that, with the mathematicians in the math café, it has always been structured. When I came in and sat in the plenary, I thought: Wow, awesome, you can tell these people have a bit more argumentation and structure in their lives than perhaps the industrial engineers at bonding. And that's not a diss or anything – it's just something I noticed. Maybe I was influenced a bit, because I was already a mathematician myself, so of course I felt that way. But that was totally exciting, just doing a lot of things, trying stuff out, getting a taste of everything and if you don't feel like it, then you just move on. So no one is being forced to do anything. I think that's really important to do alongside your studies.

Sylvi:
What was it like for you, Inken? With a program that is so diverse and already allows you to bring together so many different things elements, do you find these things in your program

itself, or what experiences have you gained or do you intend to gain over the course of your studies?

Inken:
First, I'd like to add something to what Tony said. I've always found university sports very exciting. This doesn't have much to do with the university itself, but it's just a nice way of creating a counterbalance to university. There are some really crazy things you can do – from archery to standup paddleboarding to Thai boxing or just normal football games. I always found it nice that you can try out a wide range of things for very little money and also get a little bit of further training in this regard. I'd say I've personally experimented a lot in my studies when it comes to modules. For one, I took modules like "Blasting Technology" because it just sounded cool, and we went on a trip to BAM – the Federal Office for Materials Testing and Research – and saw how things exploded and learned a bit of the theory behind it. But then I also took a module in Sweden called "Arctic Science" and was there for a week in February. We looked at the northern lights and also described snow from the point of view of physics. So I've always tried to find a few exciting modules on these basic theoretical principles. At the same time, we also have a professional internship, which is mandatory for us. I haven't done mine yet, but you also have the opportunity to actually turn it into a whole practical semester instead of just eight weeks. So if you say you want to see what you can do with it, then you can really go to any company for six months or go into research and just see what it's like in practice and gain some hands-on experience. A lot of NidI students have taken advantage of this semester too, and quite a lot also go abroad. But for me personally, that's still on the horizon.

Sylvi:
Rico, you're almost at the end. What were things like for you?

Rico:
For us, gaining practical experience was less of an optional component of our studies and more of a compulsory element – we had to do it four times in total.

Sylvi:
Experience in the form of internships? I think you mean something different, don't you?

Rico:
Exactly, exactly. For us, these aren't internships at companies, but practical work in the university laboratories, which are very well equipped. They're ideal for basic experiments, like the photoelectric effect I mentioned earlier. Later, in the so-called advanced practical, you have the opportunity to go to the larger laboratories and use the big, expensive physics equipment. This involves sometimes using a laser here at Technische Universität Berlin that

costs 1.5 million euros, for example, or using older equipment, like an old spectrometer used for recording molecular spectra, which you can then go through manually angle by angle. In that respect, it was still exciting and cool that this is an integral part of the program. I haven't done an internship in a company myself. I was actually offered the opportunity to join Course Guidance – and I'm still there now – instead of joining any student representative committees or initiatives, which was never really my thing. I never really wanted to get into university politics either. I've always been very straightforward. I didn't take a gap year either. I actually went straight from school to university. That's how things progressed here too. And with my job in Course Guidance, I actually found something that allows me to interact with students in a different way and pass on knowledge. But I also learned new things myself, because – especially when you have this kind of job – you have a more far-reaching outsider's perspective on the entire program that you did yourself than those who are still in the thick of it. As a result of that, I took lectures again for my master's program, for example, even though I didn't have to. I said, "That could actually be very useful for me," because of course you read through the course offers every semester and see the courses that are planned, and then you think to yourself "Why not give it a go?" and you really just do it for the pure fun of it. So I just sat down in the lecture and joined the discussion. Sometimes I didn't do any exercises at all, unless it was necessary to get a better understanding. So I didn't take any exams there either. It was all completely casual. I actually gained a lot from that too. Unfortunately, something that I didn't do but recommend to everyone was to take the opportunity to go abroad, for a semester or two. I had one or two fellow students, one of whom was in Africa for a year and took her lectures on electrodynamics there, for example. That was also a completely different way of learning and – in addition to question like "How do I learn there, what goes on over there?" – it also opens you up to completely different cultures and perceptions of life. She must have benefited a lot from that. So she came back a very different person. In hindsight, that always really benefited these people, and when they would talk about it, you'd think, "Well, I should have done that."

Sylvi:
Who knows, maybe you'll find that somewhere else along the way. But you have actually given us a very broad insight into the different ways you can tailor your studies – whether it's on the technical side or in the way you structure your everyday life along the way. It's reassuring to hear that this is actually happening – that there are sometimes breaks, sometimes things that have nothing to do with learning and exams – it's a nice prospect.

01:05:15 What do you want to do after you graduate?

Sylvi:
Now, to wrap up, I'd like to come back to what we touched on a bit in the beginning. You're all at different stages in your studies now. Looking ahead again, where can all this take you?

Maybe you already have concrete plans for what you want to do afterwards. But I'd also be really interested to hear about it a little more broadly and about how it works for others. So let's look at the whole spectrum again and take a closer look at the classic clichés. Is it really true that all scientists go into research, or are there other paths that we've touched on along the way? For example, mathematics often comes up in advising. People often say: "Hm, yes, well, I could become a teacher, but if I don't want to do that, what options do I have?".

Tony:
Yes, math, what can you actually do with it? To be honest, I'm not 100 percent sure which direction I want to take. I mentioned before that I'm currently in the application process for several consulting companies, because I want to find out which direction of mathematics I'd like to pursue for my master's degree, what I find exciting, where I might eventually find a job that I love, where I can see myself doing well and progressing, because I actually don't want to stay at the university. There are also many mathematicians who want to devote their lives to research and do their doctorate at the university and then maybe become a professor and think their doctoral thesis is so great that they want to continue researching this particular field all their lives. I'm actually not that type. So I would like to leave the university at some point. I also just have the feeling that I kind of know all this now and would like to learn new structures and just do something different. The first step for me is to just try things out with a student job or an internship to see which direction I want to go in. I also know many other students who have finished their studies in recent years. They either started working in insurance companies, then doing some kind of optimization work there, or went more into software development, maybe choosing computer science as a minor. That's an option. Just like I said earlier on, you are generalists in theory. You're clever. You're trained in logic and can do anything. You just have to be good at selling yourself. I would just recommend to everyone: See what interests you, what direction you want to go in – ideally before the master's program – so that you then have the opportunity to simply deepen your knowledge in the right direction, and then I think you can become anything you like.

Sylvi:
But that can also mean that mathematics plays a more or maybe even less significant role. Right?

Tony:
In terms of the work you go on to do, you mean?

Sylvi:
Yes.

Tony:

I can't really say, because I haven't worked anywhere yet. I do think that you still work a lot with math, but it's something completely different. You're probably more likely to really focus on one area and then maybe only work with optimization algorithms or try to optimize the optimization algorithms and really focus on one thing and go into that field. That's why I can personally imagine it could be exciting to work somewhere like an auditing company for business enterprises, where you always have new little tasks and then have to get your head around different areas. But I've also heard that it's supposed to be very stressful and that you might not be able to do it forever. But I'm still young and I still have the capacity and I still really want to get to know everything and see where I actually want to go. And that's exactly what I would say the end of the bachelor's degree is for and that's what I'm doing now too.

Sylvi:
Rico, what's next for you?

Rico:
Exactly, so I'm in the real final phase of my studies – I'm writing my master's thesis. I'm doing that at the Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy. So, for me, my path more or less crystallized over the course of my studies: Yes, experimenting is fun, but somehow it always ends up going wrong. And when it does, I always need solid theoretical knowledge to understand where the mistake is. So I said: You can experiment here and there later on, do some theory. Then in my master's degree, I was very interested in optics. This is not the optics we learn about in school, i.e. those linear optics, some lenses and projecting some light beams on lenses and seeing where they break and how they are diffracted, etc. Non-linear optics is completely different – and it's exciting stuff. In particular, I had heard about quantum optics back then. That means optical processes, the interaction of light with matter on a quantum-mechanical level. Then, after my last exam, I also started to do my master's in the working group where I did my bachelor's degree and I dealt with a topic there – also in the realm of quantum optics. And then – and this is a good example of how things can go awry – after many months, I realized this was fun, but I've bitten off more than I can chew with this subject. So I changed direction again and then moved to the Max Born Institute, where I started taking the classic approach to optics and I'm now dealing with a very special form of light, chiral light, because many molecules in pharmaceuticals and medicine are chiral, as are many sugars. Over 50 percent of all pharmaceuticals are chiral. You look at the left hand and the right hand and no matter how you twist and turn the right hand, it's never not overlapping with the left hand, so it's never the same. These kinds of molecules that cannot be superposed on their mirror image are called chiral. In fact, it is very, very important how these molecules – so there is some overlap with chemistry here – chemically bond with the body's own molecules. For example, there's a molecule called thalidomide, and thalidomide's left-handed form can cause birth defects in the body, while

its right-handed form is effective against morning sickness in a single medicinal compound. So it's super super important to be able to tell these kinds of molecules apart, and that's kind of what I'm doing basic theoretical research in right now. To answer the question of where this can take me: I still think I want to get a doctoral degree. I'm interested in doing it because I haven't reached a point where I've said, "I'm fed up with research." Which is, of course, the total opposite of where I probably was at the beginning of my studies, because at the time I thought I might want to work in business. I'm not quite done with research yet. I enjoy it and I really enjoy this topic. I was very surprised to see that something like that exists. Chirality is something we covered in lectures at some point, but only very briefly – we touched on it for about fifteen minutes in a lecture, and then never again. And then someone comes along and says, "Listen, you can do completely different things with this, and it's really important." That's what has me really hooked at the moment, and it's where I actually want to stay. Ideally, of course, I would like to do my doctoral studies in the working group at the Max Born Institute, where I am currently writing my master's thesis.

Sylvi:
Well, fingers crossed for that. So you really discovered completely new things for yourself along the way that you never would've predicted. With that in mind, I'd like to ask you, Inken: You're at a comparatively earlier stage, but you said that you've already thought about what you can do next in terms of your master's degree, and you've already found your direction in terms of the content you'd like to focus on. What's it like for others around you? What's the impression you're getting? If NidI is so open, what different pathways can someone open up with this program, and which ones are perhaps special and couldn't be achieved another way?

Inken:
Honestly, a community has formed around me or, more generally, we are a community that leans towards a very similar direction, i.e. physics, math and computer science, so really the basic modules, but often still in an interdisciplinary context. But there are also a lot of people I don't hear from as much now, but at some point, you meet on campus and talk about things, and you realize they're going in completely different directions. With Chemistry, we don't have that many people at the moment who are going in that direction. So there are people who then looked at Chemical Engineering and also studied it for their master's degree. But there are also a number of people who really want to keep things very general, who simply realized during their studies: "Okay, what do I actually know? I know something here, I know something there, I took modules in this. What can I actually do with that now?" You don't have this compulsion to really commit to one thing, but you can really say, "Okay, then I'll just stay general. Then I'll go into science communication, science journalism, or public relations, or take a closer look at a particular branch." There's a section for everything, and I think that's what makes NidI a little bit different – you can always find a

sector somewhere that suits you. So of course you have to be aware before you study NidI that the focus is really on the natural sciences and not on the information society. It's a Bachelor of Science and there are also a lot of people who switch over from Physics or Chemistry because they realize that it's going in a slightly – or not so slightly – different direction. But one thing that is very important is that, if you have a specific goal, a specific master's degree in mind or a specific field, you really have to put some thought into the planning. Don't just do a few modules here and a few modules there and then after eight semesters realize "Oh, I can't even get into the master's program because I don't meet any of the prerequisites." So that's the danger with NidI – you get too caught up in this interdisciplinary nature, even though you might not even want to.

Sylvi:
After eight semesters of NidI with an interdisciplinary profile, I don't necessarily have to do my master's later, do I?

Inken:
No, absolutely not. There are also a lot of NidI students from the first cohort who didn't do a master's degree at all but are now working in public relations for some company or institute. There's just so much to choose from. So you can't exactly say "You can do that with NidI" because it covers so much. If there is already such a wide range of possibilities in Mathematics and Physics, this is even more true for NidI due to the sheer number of electives available and the additional chemistry.

1:17:23 Closing words and contact

Sylvi:
If at any point today our listeners have thought, "Hey, that all sounds pretty exciting. I'm interested in that," then we've already mentioned that you all work in Course Guidance and that they can reach out to you afterwards. We will link your contact information under the talk. The same goes for any listeners thinking: "Man, they kept mentioning related degree programs. Maybe I should take a look at Chemistry again or the various engineering sciences." We've touched on the business programs. We did info talks about all of them just like the one we're doing today. They are all available on our information portal StudienberatungAtHome. So you can check that out again, compare subjects, and take some inspiration. You'll also find information about our MINTgrün pre-study orientation program about the STEM subjects. That might be another idea for people who are still very open-minded and undecided. If you don't want to immediately opt for Natural Sciences in the Information Society, you can, for example, do a year of orientation at Technische Universität Berlin, get a taste of the different fields and get more in-depth support for questions like: How do I actually go about choosing a program? Is higher education really for me? Which subject area? University or university of applied sciences? That's something you can test

intensively for a year. There is also information about this on the portal. If Rico's glowing review of the Academic Advising Service has made you curious and you think “Gosh, I have an idea, but I want to take another look to see if there are any completely different options for programs,” then you can also get in touch with us. You can send us an email. We are currently offering open office hours online. We’ll leave links to all that information too. We hope that we’ve given you some helpful insights into the various subjects and options available. Finally, I’d like to conclude by thanking the three of you for taking the time to give us an insight into your studies. To everyone who listened, thanks for tuning in and sticking with us till the end. See you soon.

Rico:
Bye.

Inken:
Bye.

Tony:
Bye.