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### Proof by example Portraits of women in Dutch mathematics

# Rianne de Heide

Rianne de Heide is an Assistant Professor in the Department of Mathematics at VU Amsterdam. She was born in Rotterdam in 1989. She obtained a bachelor's degree in classical music (horn) from the Prins Claus Conservatoire in Groningen (2012), a bachelor's degree in mathematics from the University of Groningen (2013), a master's degree in classical music (horn) from the Royal Conservatoire in The Hague (2014), and a master's degree in mathematics from Leiden University (2016). In 2021, Rianne obtained her PhD in mathematics at Leiden University and at the Centrum Wiskunde & Informatica (CWI) in Amsterdam. She then moved to Magdeburg, Germany, for a postdoc at the Otto von Guericke Universität, but she was soon awarded an NWO Rubicon grant and therefore moved to Villeneuve d'Ascq, France, to work at INRIA Lille. Since 2022, she has been a tenured Assistant Professor at VU Amsterdam. This year, Rianne was awarded a Veni grant from the Dutch Research Council.

*Thank you, Rianne, for taking the time to meet me. Usually, when I interview someone, I start by asking them to tell me something about the beginning of their life and career, but with you, I would like to start from the latest news. You will soon go on maternity leave, and you will then come back as a Veni grant recipient. Can you tell me something about your Veni?*

*“Yes! My proposal is about hypothesis testing, which is what I mainly work on and it's what you perform, for example, when you want to understand whether a pill is better than a placebo. I'm going to introduce a new theory for hypothesis testing in the field of multiple testing. When you do many, many hypothesis tests, like 100 000 or 400 000 hypothesis tests at the same time, e-values offer greater flexibility compared to the classical methods that are used now.”*

*Great! And this is about your future research. But I would like to ask you something about your past research as well, because despite your very young academic age, the Veni is only one of the several grants that you were awarded. You also received the Van Zwet Award 2022 from the Netherlands Society for Statis-*

*tics and Operations Research (VVSOR) for your PhD dissertation. So it's not too early to ask you this question: What is your past research achievement that you are most proud of?*

*“Finding the connection between group theory and hypothesis tests. There was a big open problem on which also my PhD supervisor, Peter Grünwald, had great breakthroughs, which is how to make hy-*



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*pothesis tests that you can do sequentially in time for problems with a composite null. This led to our new theory for hypothesis testing with e-values. We formulated an optimality criterion for those tests, and then, I found a connection between group theory and such optimal tests. This led to several papers, and coming January we are invited to London to present our first pioneering paper about our new theory for hypothesis testing at the discussion meeting of the Royal Statistical Society. It is considered a significant recognition to be invited to present a paper there.”*

*This is amazing! When and why did you decide to study both mathematics and music?*

*“After high school, I actually started to study physics and conducting. But I conducted some youth orchestras and I didn't find it very pleasurable, so after one year I decided to play an instrument instead. I applied to studying horn at the Prins Claus Conservatoire, and I auditioned and got in. Around the same time, I was studying physics and I really liked the theoretical subjects like relativity and quantum mechanics, but I hated the practical ones. And when I followed my first algebra course I thought, okay, I should switch to mathematics.”*

*What do music and mathematics have in common for you?*

*“A lot of people think that there are a lot of things in common between music and mathematics, but I don't think that this is really the case. For me, the thing in common is the great pleasure that I take in doing both. The feeling when you finally have the proof of some mathematical result is comparable to the feeling when*

you play a nice solo in an orchestra in a concert.”

*Interesting! And how is music a part of your life today?*

“Today, I’m singing in the VU-Kamerkoor, because when I became a professional horn player I needed a new hobby, so I started taking singing lessons! I’m very much enjoying that, especially since my best friends sing there as well. I have some side projects in other choirs and even some professional choirs which I really like. I also still play the horn in a semi-professional orchestra.”

*What are the things you like the most in academia?*

“I love the freedom that I have to conduct my own research. I love the challenge that mathematics gives me, and I love the fact that I’m never done with learning new things. I also like to cooperate with many people, and I really like the type of people that one finds in mathematics and in academia. When I was at school and even during my studies, I always felt like the odd one. But here I can really be myself and I still feel appreciated by everybody because of who I am. I have the same feeling with my choir.”

*This is beautiful! Now, when I was preparing for this interview, I did a bit of internet stalking (as usual), and I found a picture of you in what appears to be a TV quiz show—is this correct?*

“Yes! In 2018, during my PhD, I took part in a quiz on Dutch television called *Per Seconde Wijzer*, in the science category. I got some mathematics questions, but also questions from other areas like biology, philosophy, and even things like to identify the breed of dog from a picture of a puppy. It was super stressful because of the time pressure, but it was also super nice, and I won a nice amount of money!”

*This sounds amazing! Besides mathematics and music, what makes you happy?*

“My dog and my partner, and I’m looking forward to adding a kid to the list soon! I also enjoy spending time with friends and doing sports. I like long distance running and cycling. And now that I’m pregnant and I can’t run, I started swimming.”



Rianne at *Per Seconde Wijzer* in 2018

*Nice! Before this interview, you mentioned that you would like to take this opportunity to open up about something important: What would you like to share?*

“Yes. Since I started my studies, I’ve been struggling with a mental illness, and this made several periods in my life very hard. I struggled in particular during my studies, during the postdoc phase because I had to move abroad and leave friends and family behind, and during the Covid lockdowns. Now I would like to talk about it because I think that mental illness should be normalized and treated like any physical illness. In the same way a friend of mine is sick sometimes because she has diabetes, I am also sick sometimes because of this. And I also want to talk about it to show that it is possible to have this issue and still have a successful career as an academic.

It has a huge impact on my life, and I live in a very structured way: I have a very healthy lifestyle, I do a lot of sports, I always go to bed early. I do all these things to prevent getting sick again. And I still get sick, but now I know that it always goes away at some point, and this gives me strength. When my brain is fully functioning again, I can do all the things that you see on my CV: I can write nice papers, I can obtain grants.

I also want to say: I don’t want to share all the details on the internet, but I do want to encourage people to come to me and talk to me about it.”

*Thank you for being so open and sharing this. Mental health is such an important topic, and not only you are talking about it, but you are also giving a very positive and inspiring example. Did you already open up at work in the past?*

“I actually really opened up for the first time, last December, with my mentor here at VU, and it was such a relief! Before, I

shared some bits with my PhD supervisor, but not all, because I was always scared that nobody would hire me for my next job. But I don’t have this fear anymore, because people know my value. I get all these prizes and grants, and this shows to the outside world that I’m worth my value as a researcher, I think. I feel much more confident now, and together with the stability that this job gives me compared to a postdoc, this has also improved my mental health a lot!”

*This is very nice. If you could go back in time, would you open up more?*

“Yes. I think that things would have been better during my PhD, if I had shared more. My supervisor was super supportive, and in hindsight, I think I should have shared more with him.”

*What advice would you give to a PhD student who is struggling with similar issues?*

“It depends very much on the situation. Not everybody should just share everything, because there’s still so much prejudice and stigma around these issues. I think it’s safe to not disclose too much in general. But if you have a nice supervisor who you think is supportive, then maybe it’s good to share these things with them. And in general, it’s good to open up at least with someone. It can also be a friend. I actually kept this as a secret with all of my friends for many years, but I then found it super helpful to open up with them. And especially during periods when I was feeling bad, they have been super supportive. In fact, opening up to my friends and seeing that they supported me instead of rejecting me, was a real turn in my life!”

*This is beautiful. You’re giving so many beautiful messages here. Thank you so much!*

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