The “Hanna Neumann Fellowship” Awarded by MATH+

Interview with two women mathematicians: Marta Panizzut and Nicole Mücke

MATH+ members and awardees of the MATH+ Hanna Neumann Fellowship 2021

[The interview was conducted online by Beate Rogler (BR), Public Relations Manager at MATH+]

Marta Panizzut graduated from the University of Trieste in Italy and obtained her PhD from KU Leuven in 2016. Afterwards, she assumed a postdoc position in the Einstein Fellowship research group “Nonlinear Algebra” of Bernd Sturmfels at TU Berlin. In 2019, Marta joined the Discrete Mathematics/Geometry group of Michael Joswig. During the summer semester, she was a substitute professor at the University of Osnabrück.
Her research interests are tropical geometry, algebraic geometry, and their interactions. She has been working on topics such as algebraic and tropical curves, tropical linear spaces, tropical surfaces, lattice polytopes, and their triangulations.
More information

Nicole Mücke is head of the MATH+ Junior Research Group “Mathematical Foundations of Data Science” at TU Berlin since March 2020. She studied mathematics both in Potsdam and at HU Berlin and received her Ph.D. from the University of Potsdam in 2017. Nicole held postdoc positions in Italy and Stuttgart before she returned to Berlin.
She is currently working in the field of statistical learning theory, in particular, deep learning, the efficiency of kernel methods, stochastic approximation methods, and statistical inverse problems.
More information

Interview:

Beate (BR): How do you deal with all the rules in times of the Corona crisis - at work and privately?

Nicole: Well, I'm happy that my loved ones are healthy, and we are trying to make the best out of the current situation. I'm learning to be more patient with myself and others since Covid-19 slows down not only research but my whole life. On the other hand, I enjoy joining much more exciting seminars and talks as everything is virtual and directly accessible to a broader audience.

Marta: I am also happy that my loved ones are healthy. Collaborations and teaching are important aspects of the job as a researcher, and they have been more challenging during these times. It is important to do as much as we can to limit the crisis and to make the best out of this situation.

BR: The Fellowship that MATH+ awarded you is dedicated to the mathematician Hanna Neumann. Do you know anything about Hanna Neumann and what kind of person she was?

Nicole: I admit I didn’t know her before the fellowship. Thus, I started to read a bit about her and learned that she worked in Group Theory, but very fast, I got a special view of her because she also had five kids, and she already had three kids when she received her PhD, which reflects my situation. However, she lived in entirely different times where the expectation was that women would be

engaged in domestic work in their homes from their marriage onwards. All of the duties of caring for children would lie with their mother.

Marta: As Nicole said, she worked in Group Theory. From what I read, she was very passionate about mathematics, teaching, and research. She moved to Oxford to finish her PhD because of the Nazi regime and the wartime. It was hard for her to find a house, so she completed her thesis in a caravan parked in a farmyard. That shows her fierce and commitment during those terrible times. She was also a very enthusiastic teacher, able to find ways to make abstract knowledge understandable.

Nicole: She also had a certain sense of work-life balance. Her hobby was doing photography of trees. I find it quite hard to balance my time but she seemed to just do it, which shows how diverse she was, in fact.

BR: When and why did you decide to study mathematics? How did you get interested in that field?

Marta: I was always more passionate and interested in scientific subjects rather than humanistic ones. I was very lucky to have great teachers in mathematics during my high school years when my interest in mathematics really grew. In general, my parents taught me to study everything that I like with passion. I believe that the first example of a mathematician that a student has is the math teacher in high school. Mine was teaching math in an engaging way and involved the students in exciting activities such as the Math Olympiads and a visit to CERN in Switzerland.

Nicole: I was always interested in sciences and developed my interests in physics and math during high school. I always found the clarity behind formulas appealing, bringing down the universe onto a small set of equations. But I was not sure about studying physics or mathematics, and at first I decided to study physics because I thought then I would get the best of both worlds. Very quickly, I switched to mathematics.

BR: Did anybody encourage you in particular to go into the sciences?

Nicole: I wish I could present a person who supported my early stages in mathematics or physics. But the truth is, there wasn't anybody. I grew up in the former GDR, in times of tremendous political changes right after the reunification. That affected not only me personally, but my whole generation. Everybody around me was faced with the consequences such as unemployment and needed building a new life. Encouraging little girls to do science was out of reach. But the truth is also that I was not much in need of a particular person's support. I had a massive amount of intrinsic motivation and passion. As a girl or young woman, I personally never was in doubt that I could do science. I just needed to figure out how.

Marta: As I said, my parents supported and encouraged me to study everything I'm passionate about. I enrolled in a scientific high school with a particular program focused on sciences, mathematics, and physics with excellent teachers. The math professor I had the last years did an excellent job in showing very exciting aspects of the subject, and as a consequence, he triggered my curiosity and made me eager to learn more.

BR: What means mathematics to you? When I listened to podcasts about woman mathematicians, they often described their feelings towards mathematics very enthusiastically.

Nicole: This is a question I thought a lot about. I do not know exactly how to answer this because I would not say mathematics has a special meaning for me; it simply is me. I could not imagine doing anything else in my life because it is so my internal self, and basically fills me.
Marta: It's something similar to me. It is a fundamental part of my life. It's not just a job; it is really a passion. It is something that very much affects my way of thinking and approaching life. It is a part of myself.

BR: What experiences did you get during your study and your later career path? Was there some significant support, or did you meet some obstacles?

Marta: I did my undergraduate studies in Italy at the University of Trieste. The environment there was supportive and collaborative, which helped me create meaningful relationships with students and professors. Afterwards, I was lucky to work in research groups with a stimulating and friendly environment, both for my PhD and postdoc contracts.
The percentage of male and female students in my undergraduate studies was balanced. I also had an excellent female professor as my master's thesis supervisor, and I very much enjoyed working with her. When I did my PhD my supervisors and the other faculty professors were men, but there was a good percentage of female PhD students and postdocs
I am fortunate that the research community I am part of is attentive to the underrepresentation of women and minorities in academia. There are researchers and professors in my network, which are sources of encouragement and inspiration.

Nicole: I can say yes and yes to both, and I can't answer this question without talking about the difficulties women/ mothers/ parents still have in science. I got very much support when I was a PhD student in Potsdam. My supervisor, Gilles Blanchard, deserves the German name "Doktorvater". He created a very supportive environment for me as a female scientist having children and keeps being an advisor even beyond my PhD. My two advisors in my postdoc times, Lorenzo Rosasco in Genova and Ingo Steinwart in Stuttgart, are still good advisors for me. They are doing their best to support me. I'm lucky to have so many of them in my life. But as you notice, I do not have a female scientific advisor. Honestly, after finishing my PhD, I learned how tough it can be for women in science, in particular in my field, which is "machine learning" and dominated by men. The absence of women can be very discouraging, hopefully not giving me a hint for my future career. But the most significant obstacles are the classical structural ones, e.g., for a career in science, it is required to have scientific experience from abroad, which is with three kids hardly to manage. Another obstacle is that I must do unpaid services as writing reviews for journals or conferences up to a certain degree. It is on top of the job I'm paid for, and for parents, this is even harder to accomplish. The current pandemic crisis worsens the situation much. I know that everybody is affected, but the career of untenured parents is now at risk. As in spring, I'm currently in homeschooling with all my three kids, since Covid-19 again arrived at schools, being now a teacher for them on top. Time for research is scarce. That's why I'm thankful that MATH+ awarded me the Hanna Neumann fellowship, helping me, both morally and financially, to develop my career further. That the MATH+ board thinks I deserve this award even encourages me to move on with my work.

BR: This is also an essential topic for MATH+, and that's why we have a Gender and Diversity Manager at the Central Office. Recently, she forwarded a letter from the association "European Women in Mathematics". It is an open letter advocating a proactive policy to support young and female mathematicians in light of the corona crisis.

Nicole: I forwarded this letter to many male professors.

BR: Did or do you have any role models?

Nicole: I have some role models. They are divided into two groups: women not being scientists and men being scientists. The first group are politicians like Renate Künast or Rita Süssmuth, who describes themselves as feminist. Rita Süssmuth even said: „Das mindeste, was eine Frau tun kann, ist Feministin zu sein.“ [The least a woman can do is to be a feminist] I agree. The second group is, in fact, all the supervisors I had. Since I'm now a group leader, I'm overseeing them very carefully and try to take the best of them. I just notice that also in the group of my role models, there is a gender gap, reflecting the gender gap in my field of research.

Marta: I like to think of mentors more than role models, and I always had great ones. My current mentors in Berlin are Michael Joswig and Bernd Sturmfels. They are still very supportive, and I'm learning a lot by working with them and observing how they mentor students.

BR: What would you recommend to young students to start a career in mathematics?

Nicole: I highly recommend to choose your supervisor wisely. I have seen some good and some bad examples. When your supervisor doesn't treat you seriously, then you are almost lost. Don't go into a too large group with many students because you will not get the supervision you may deserve.

Marta: Not to be scared to learn different topics. One of the aspects I like the most about my research is that it combines technics from different areas. I wanted to do my master's thesis in commutative algebra, but one of my professors suggested me a different topic that was new for her as well. That has been my research area since then.

BR: Coming to your research: can you describe your current research topics as if you want to explain it to a child? And what are your favorite personal achievement in mathematics?

Marta: My field of research is called tropical geometry. If I had to explain it to a child, I would use an analogy given by my colleague Johannes Rau. The analogy is with dinosaurs and paleontologists. Dinosaurs are extinct, but we want to learn about them and study them. To do so, we analyze their skeletons and bones. From the bones, we can try to deduce information about how they looked like, how big they were, if they had a long neck, what they used to eat, or what their habits were. Maybe we cannot know everything because we only have some information available. In my research, dinosaurs are algebraic varieties. There are mathematical objects with very simple shapes like a football or a lemon, but they can also be very complicated. I study tropical varieties, which are the skeletons of algebraic varieties. They are simpler objects that can tell us something about the complicated ones.

Nicole: My working field is the “mathematical foundation of data science”, which is currently a very popular topic. That's why I'm now in a lucky position. If I want to describe it to a child, I would say it this way: After I did my job, you can be sure when sitting in a self-driving car, you will not have a crash. My main work is making algorithms fast and, at the same time, providing (almost) certainty that everything will work out correctly.

BR: Most of our everyday life is based on mathematics and its support of other disciplines and fields. What do you think which role is mathematics playing in the future?

Nicole: I think, in any period in history, mathematics (and science in general) played its unique role. Currently, we are living in times of artificial intelligence. In my opinion, mathematics will just become

more “visible”, “touchable”, or “real” for people. It starts in everybody’s smartphone and leads to optimizing train or flight schedules, to name just a few.

Marta: Mathematics is rational thinking and scientific method. It’s a key aspect of modern society and of the current scientific progress. Therefore, it must belong to the cultural background of everyone. It is part of the fundamental knowledge that everyone should be able to use to understand current complex dynamics and events. The specialization of research, not only mathematics, makes communication between scientists and society hard. And this might create a sense of mistrust in science. This is something we need to avoid and correct.

BR: Finally, a question concerning MATH+, what do you think is the most vital challenge and the most significant advantage of having such a large and extensive research center?

Marta: One of the advantages, of course, is the Hanna Neumann Fellowship, and I am very grateful that I was awarded one. MATH+ comes with a lot of exciting activities and collaborations. It is a great opportunity for mathematicians both in and outside Berlin. It’s part of creating interaction outside mathematics. The challenge is that it is a huge center, and it might become dispersive. It is important that people communicate and share ideas with other research groups.

BR: Did you get the chance to get to know people from other areas? In times of the Corona pandemic, it is certainly more difficult to meet other scientists?

Marta: Now, it is more complicated. I am thinking about the Thematic Einstein Semesters (TES). The TES of Summer 2020 was postponed. The current one is happening online. I took part in the previous ones, and they were very interesting. I think it is important to put efforts into expanding the research collaborations.

Nicole: I agree entirely with Marta. For me, the greatest advantage is that MATH+ is so huge. I’m super excited to have all these opportunities here in Berlin for collaboration in different fields, and I can choose as I like. However, the biggest disadvantage is the same: it is so huge! Interacting with each other can be challenging, in particular during Covid-19. But it is still essential to be connected even via online tools. So, I found the Cluster Days and the MATH+ Day very important and interesting because it was the first time that I could see what other groups in MATH+ are doing. We just started among the Junior Research Group with regular meetings. We also intend to have a joint Colloquium.

BR: Thank you very much for your time and the insights you have provided about your passion for mathematics and how you developed your career!