Side by side: interview with Sylvie Benzoni-Gavage and Heather Harrington

Raffaella Mulas

In this interview series for the EMS Magazine, each article brings together two mathematicians who share something – such as a research area, a passion, or a professional context – but differ in other ways, as for instance age, gender identity, background, or geographical location. Sitting "side by side," they reflect on their personal and professional journeys, their views, and the worlds they live in.

The series is conducted by Raffaella Mulas and was born also thanks to the ideas and support of Apostolos Damialis (editorial director of EMS Press) and Donatella Donatelli (editor-in-chief of the EMS Magazine). By bringing together both common ground and contrast, side by side *aims to reveal the richness of mathematical lives.*

In this article, Raffaella Mulas interviews Sylvie Benzoni-Gavage (professor at Claude Bernard University Lyon 1 and former director of the Henri Poincaré Institute) and Heather Harrington (professor at Oxford and director of the Max Planck Institute of Molecular Cell Biology and Genetics).

Sylvie, Raffaella and Heather on Zoom.

Before I join the Zoom call, I am very curious about where this conversation will lead us. I have known Heather for a few years, while Sylvie is someone I know through the enthusiastic words of colleagues.

Raffaella Mulas: *Thank you both very much for being part of this interview! To start, do you already know each other? I noticed that your collaboration distance is four, and that you are both applied mathematicians whose work is driven by real-world phenomena. If I understand correctly, Sylvie's research interests might be summarized as nonlinear PDEs applied to wave propagation and fluid dynamics, while Heather's focus is on algebraic, geometric, and topological methods applied to biological systems. So maybe your research areas are still quite far apart?*

Sylvie Benzoni-Gavage: We didn't know each other before. Well, four is a really big collaboration distance!

Heather Harrington: I actually looked into your work before the interview, Sylvie, and PDEs were probably the closest I ever came to your direction. I took several PDE courses and even did a research project – so, I really tried! – but in the end it didn't quite speak to me, and I went in a different direction.

[RM]: *One thing you do have in common is your experience as directors of major research institutes. Sylvie, you were director of the Camille Jordan Institute from 2016 to 2017, and director of the Henri Poincaré Institute (IHP) from 2018 to 2024. Heather, in 2023 you became director of the Max Planck Institute of Molecular Cell Biology and Genetics, where you introduced mathematics as a new discipline. What aspects of this role do you find most meaningful, and what do you find most challenging?*

SBG: The part I liked most at the IHP was the expansion project of the institute. It had been launched when I arrived, but nothing was done yet, so everything had to be built, in particular the design of the Maison Poincaré museum. That was a very exciting part of the job. I also enjoyed the scientific side: evaluating proposals, and shaping the program of the institute. What I didn't enjoy as much was the administrative work and managing people. It was challenging, and sometimes frustrating. I did my best, but I'm also happy not to be doing that anymore.

[RM]: *What about you, Heather?*

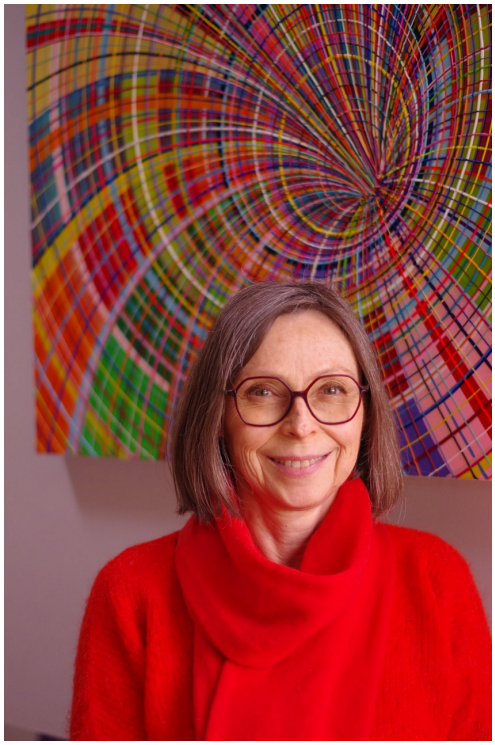
Heather. (Photo by Z. Goriely, courtesy of Heather Harrington)

HH: In some ways, I'll echo what Sylvie said. One of the most meaningful aspects for me was arriving at the institute as the only mathematician, knowing that we would build something new, that this space would eventually have many more mathematicians, and mathematics will be a core discipline. That was incredible. At the same time, I quickly realized how different the culture is between mathematics and the life sciences. Even things like hiring work differently, and these differences can be surprisingly challenging if one is not aware of the differences between the fields. More broadly, introducing and staffing a new discipline means that every decision comes with administrative responsibilities, and people management becomes a central part of the job.

[RM]: *And Sylvie, could you say a bit more about the math museum you designed? Did working with people from different backgrounds lead to any unexpected challenges in this case?*

SBG: It did! The Maison Poincaré is about mathematics and its applications, but the team was very diverse. There were mathematicians, of course, but also science communicators, journalists, and people from companies supporting the project. We also had input from people with expertise in architecture but no background in mathematics. So, we had to constantly negotiate what a "mathematics museum" should be. At one point, someone insisted: "There should be parabolas!", because this was their image of mathematics.

HH: That's really interesting, because I experienced something similar. When setting up the department here, we worked with an architect, and our main request was very simple: we wanted large blackboards. But that required a lot of discussions, and I realized that creating a math environment while taking into account what other people think math is really fascinating. It's funny because,



Sylvie. (Photo by S. Benzoni, courtesy of Sylvie Benzoni-Gavage)

in the end, mathematicians are very simple: we just want time to do math, to collaborate, and to be able to think through things. Blackboards are indispensable!

[RM]: *I can totally relate, as I ended up building my own blackboards at home! Now, going back in time, how did you first discover your passion for mathematics, and how did your path lead you to where you are today?*

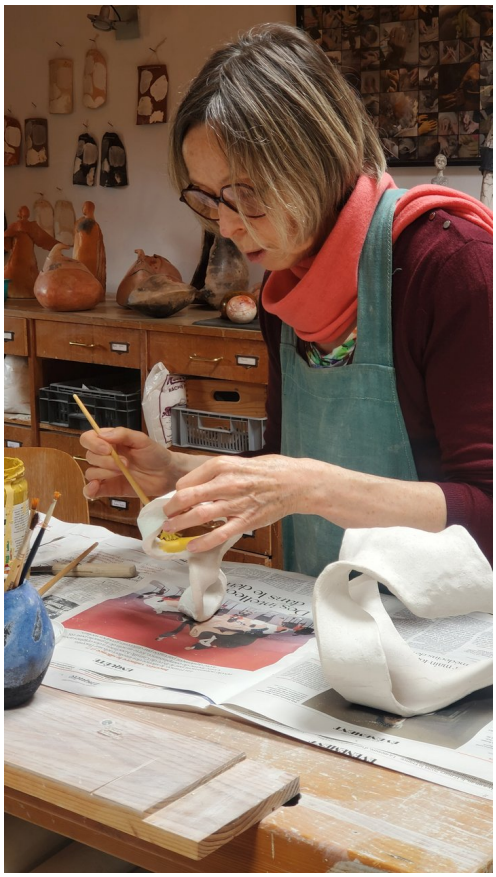
SBG: Although my family would laugh if they heard this, I'm not sure I would call it a passion. I can say that I have liked mathematics for almost all my life, and at school, it quickly became my favorite subject, so I followed that path. Up to my early twenties, I was actually planning to become a teacher, and only then did I discover that research in mathematics exists.

[RM]: *And what is missing for making it a passion?*

SBG: I can become really obsessed about it, but sometimes I need distance and I want to think about something else.

[RM]: *I think you can still call it a passion! How about you, Heather?*

HH: For a long time, I wanted to become a medical doctor. I liked mathematics, but I didn't know research in mathematics existed



Sylvie glazing ceramic.
(Photo by S. Benzoni, courtesy of Sylvie Benzoni-Gavage)

either. It was really through taking more courses during my pre-med studies that I became interested. Later, I discovered that you could combine mathematics with biology and biomedicine, which I hadn't thought possible before, and that changed everything. For a long time, I still thought I would eventually go to medical school, but I just kept going in mathematics, and I never left.

[RM]: *And how do you feel about that plan now?*

HH: I still work closely with clinicians, so I feel connected to medicine in a different way. Also, mathematics offers flexibility that I really value. And it has a unique pace, as you can move slowly and quickly at the same time. I don't know how to explain it, but I like it. I like where I am now.

[RM]: *That's beautiful. Sylvie, you mentioned that you need breaks from mathematics and sometimes want to think about something else. What is this "something else?"*

SBG: I think I don't have a passion as such. I just like to do different things, and it varies over time. Some of them are still connected to mathematics: when we were designing the museum, I started making mathematical objects, and I enjoy that very much. In fact, I can even become a bit obsessed with it. I also like being outside, gardening, and doing a bit of sport.

I can't help but feel that what she calls "not a passion" might, in fact, be a passion.

[RM]: *How about you, Heather? What recharges you outside mathematics?*

HH: I also really like being outside and walking. It helps to change perspective and clear my mind. I think many mathematicians feel that way. I used to play the piano, and now that my son is playing instruments, I've started playing piano again to accompany him. This morning, for example, I was playing before starting my day.

[RM]: *That's really nice! Now, Heather, knowing you, I feel that you often have very thoughtful advice to offer, so let me ask both of you: what advice would you give to young researchers starting their careers today?*

SBG: It's a difficult question, because the situation is changing a lot, especially with AI. But one thing I would say is: don't do like me. When I was younger, I often refrained from talking to people. I thought I was shy, and I stayed in that mindset. Looking back, I think I should have asked more questions and reached out more. It would have helped me build more collaborations.

[RM]: *That's interesting. But it worked for you anyway!*

SBG: Yes, but it was tough at the beginning.

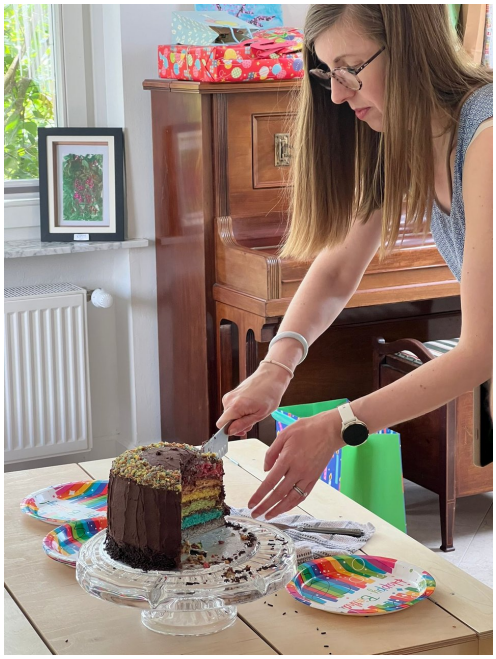
[RM]: *Heather, you are quite the opposite of shy, I would say.*

HH: It's interesting that you say that, Raffaella, because I was also very quiet at the beginning. Then my PhD supervisor told me: *you must learn how to interrupt.* I really struggled with that at first, but then it changed things for me.

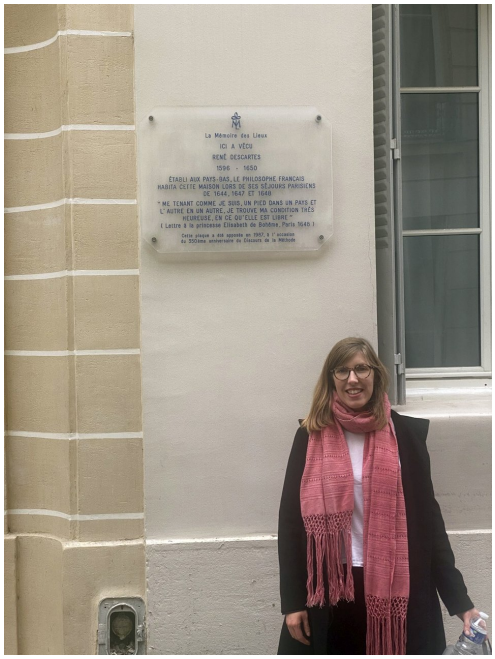
Going back to your question, I think one key piece of advice is to develop critical thinking, which is one of the superpowers of mathematicians. And as things change, especially with AI, that becomes even more important.

Another thing is to build a community. You need people around you who know your work and with whom you can exchange ideas and develop your thinking.

And finally, it's essential to make time to read. It's easy to get overwhelmed, but staying connected to the literature is crucial.



Heather baking her son's birthday cake.
(Picture courtesy of Heather Harrington)



Heather paying respect to René Descartes in Paris.
(Picture courtesy of Heather Harrington)

SBG: Heather, I wish I had the advice that your supervisor gave you! It would have changed things for me. And regarding your point about building a community: maybe young people could ask, how do you make this community? How do you come to belong to one?

I love that, at this point, they interview each other.

HH: Reach out! Email people. Connect with them through workshops, schools, and collaborations, especially early on in your career.

[RM]: *And by interrupting people! Now, you have both shared a few anecdotes already. Would you like to share another story that has had a lasting impact on you, or shaped the way you work? Something uplifting or challenging that has stayed with you over the years.*

SBG: I can think of something which is, in some sense, an uplifting story. At the beginning, my career looked very simple: after my PhD, I was hired by the CNRS as a full-time researcher. But I hadn't planned that path, I wasn't very happy, and for years, I was trying to find something else. But in France, if you want to progress, you are often expected to move, and for personal reasons I didn't want to. So I felt a bit stuck.

Then, I saw an interesting position. I thought I had no chance, but I applied anyway. At the time, applications had to be sent by regular mail. I went to the post office two minutes before closing, on the day of the deadline, and I got the position. In fact, it's the one I still have now.

This taught me that sometimes it's worth trying, even when you believe your chances are very small. And now that I sit on hiring committees, I'm very aware of how much people's lives can depend on very small details. When choosing between candidates, it often comes down to tiny differences, and yet those decisions can change everything.

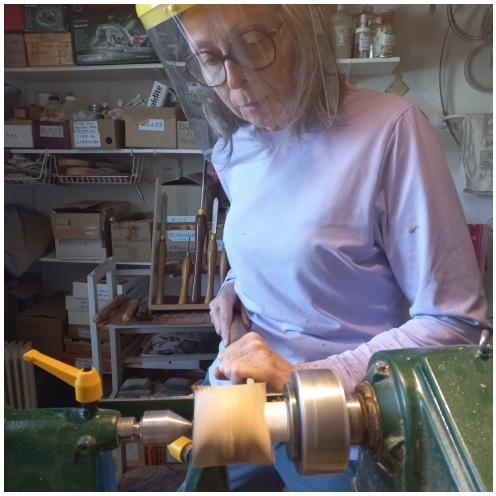
HH: That's very true. There's also a lot of luck involved. Many strong candidates apply for the same positions, and very small things can make a difference.

[RM]: *How about you, Heather? What has had a lasting impact on you?*

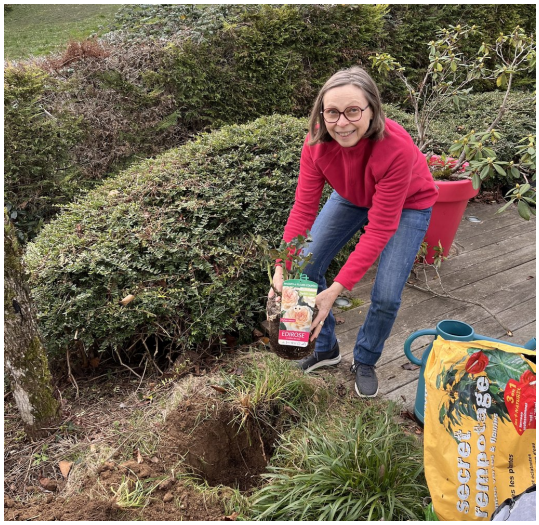
HH: I think what has shaped me most is being surrounded by inspiring and supportive people: mentors, colleagues, peers. Not every day is a good day, and not every week is a good week, so having that kind of support system really matters.

[RM]: *That's so true! Time is running out, unfortunately. Shall we wrap it up here?*

HH: No, Raffaella – I would have expected one more question about our research!



Sylvie woodturning.
(Photo by C. Naessens, courtesy of Sylvie Benzoni-Gavage)



Sylvie gardening. (Photo by S. Benzoni, courtesy of Sylvie Benzoni-Gavage)

[RM]: *Haha, fair enough! What developments in your field are you most excited about right now?*

SBG: Well, I'm working on old problems. And in some sense, I like that: they've been around for decades and are still not solved, which makes them very exciting. But it's also not very comfortable, because you think: if nobody has solved them, how could I find something new?

Also, if I compare our fields, Heather, I appreciate the fact that I don't feel pressure related to people's lives. I find your area very interesting, but I wouldn't like to work on applications to medicine or biology. Physics is fine for me!

HH: Broadly, I'm very interested in the combining of different types of data, and how to think about that geometrically or topologically.

One of the biggest challenges in science right now is that we are generating data at a massive scale, and even for a single patient, you can have many different types of measurements, taken over time, with very different interpretations. So the question is: how do you extract meaningful information from such data?

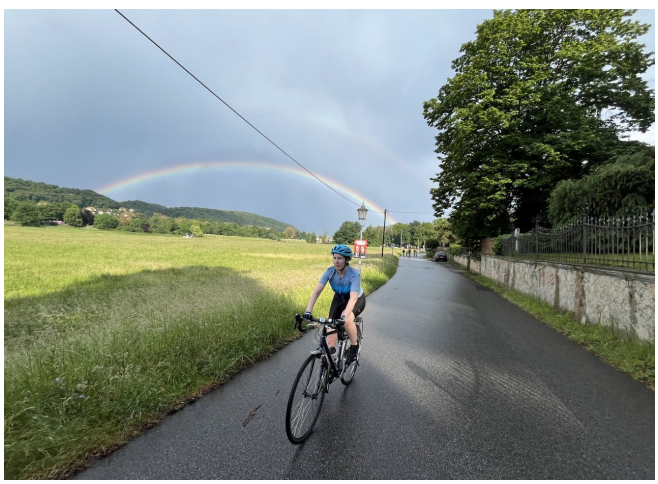
Making sense of this – using for instance geometry, topology, algebra, and statistics to capture structure across scales or uncover relationships beyond the reach of other methods – is extremely exciting. It requires bridging different areas of mathematics, and connecting mathematics with fields like biology or medicine. You need a common language, as these are deeply collaborative problems, and they require a melting pot of expertise.

Heather looks much happier now. Since we have already gone over time, I sneak in one last question.

[RM]: *Looking back at your PhD years, is there something specific that shaped you, mathematically or personally?*

HH: It was the first time I worked with experimental data, and that was extremely challenging. I also met my husband, who was another PhD student at the time, and that changed my life.

At the same time, my supervisor became terminally ill, which was a very difficult experience. It forced me to become extremely independent. I think some people experience that kind of isolation later in their career – for example, when they first become faculty – but for me, it came much earlier, during the final years of my PhD. In some sense, that experience also influenced how I approach



Heather cycling. (Picture courtesy of Heather Harrington)

my work now: learning to look for structure and insight even in situations that feel complex or uncertain.

[RM]: *I'm sorry to hear that, and thank you for sharing it. How about you, Sylvie?*

SBG: My PhD was quite different from the typical one. I was working on a topic connected to industry, in collaboration with a public company in the oil production sector, while at the same time having an academic advisor. So I was moving between two rather different worlds; I had practical reports expected by the company, and more theoretical work with my advisor.

Everything also moved quite quickly. After less than two years, my advisor told me I could finish my thesis within a few months.

[RM]: *Thank you both for your time, for sharing so many insights about your journeys, and for your openness.*

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Raffaella Mulas is a discrete mathematician but not a discreet one, as she loves listening to and sharing people's stories. She is an assistant professor at VU Amsterdam, where her work is supported by a VENI grant from the Dutch Research Council (NWO). She is also an elected member of EMYA and the founder of *Nora – Center for Science Communication*.

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