

CELL SCIENTISTS TO WATCH

Cell scientist to watch – Virgile Viasnoff

Virgile earned his first degree in soft matter physics at the École Normale Supérieure in Paris. He then moved to Johns Hopkins University in the USA to complete a Masters degree, before returning to Paris to pursue his PhD at the École supérieure de physique et de chimie industrielles (ESPCI) in Francois Lequeux's laboratory. In 2006, after two years as a postdoctoral fellow in the group of Amit Meller at Harvard, Virgile started his own lab at the Centre national de la recherche scientifique (CNRS) at ESPCI. Between 2010 and 2011, Virgile spent two years on sabbatical at the Mechanobiology Institute (MBI) at the University of Singapore. He now holds a dual appointment between CNRS and MBI, and his lab in Singapore investigates how the physical and biochemical parameters of the cellular microenvironment regulate cell–cell adhesion and cell fate.

What inspired you to become a scientist and what motivates you now?

I started to be interested in birds, butterflies and universally in biology when I was a kid. Then I gradually shifted and became a physicist, and now I'm going back to biology, which is probably something that I always wanted to do. I feel really privileged being able to earn my living contemplating the complexity of nature; sometimes losing my way, sometimes finding a sense to it. There are so many open questions and it's largely curiosity driven. What also drives me is that I now have the ability to satisfy that curiosity. I'm in the right environment and I have exciting questions I want to answer. And you know what, from time to time, I feel that it can be useful [laughs].

And what are the questions your lab is trying to answer?

It's half technological and half biological. We're trying to see how we can create a biological environment to fool cells into believing they are in an organ. If you create the right components organised in the right way, a minimum number of one to four cells can actually behave as if they were in an organ. The reason why we are doing this is because we want to understand the role of micro-environments. For example, how does external signalling drive the response of a cell and its ability to know where it is? A lot of work has been done on all the soluble factors, which are obviously extremely important, but there is little understanding of how the cells sense their environment. In particular, how does the geometrical arrangement of the cues that a single cell receives determine its ability to respond properly? So, that's what we're trying to do – spatially organise chemical and physical cues around one to three cells and see how that forces a cell to respond compared with completely random environments.

What was your motivation to move from physics into biology?

I started in soft matter physics working on micro-rheological properties of toothpastes. It gradually led me to study adhesion of DNA. From then on I had the opportunity to move to the Mechanobiology Institute (MBI) in Singapore, and it just happened



that I tried many things that failed on the single-molecule level but happened to be quite efficient at the larger scale in testing adhesion and environmental control between cells. At the MBI, we work around the idea that mechanics and biology go hand in hand. That was what drove my interest – building interdisciplinarity. We're trying to get at aspects of biology that cannot be addressed with normal approaches. What I like is the interface between trying to understand biology and using a physics approach.

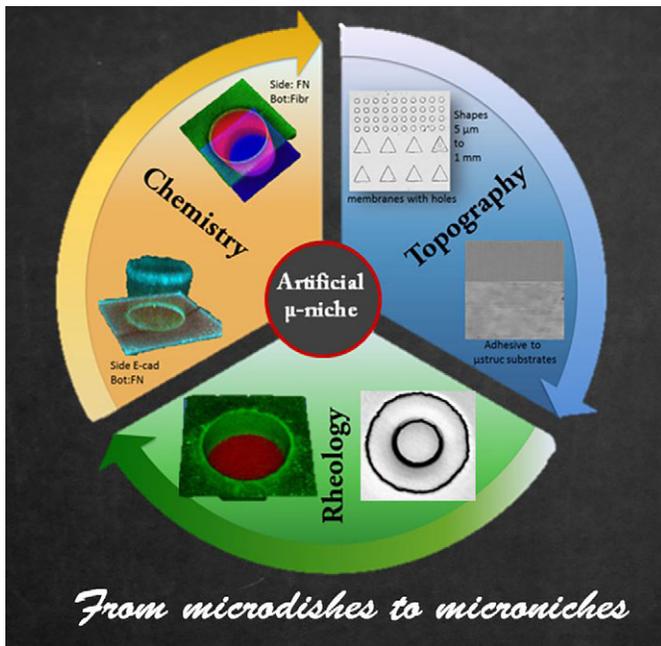
“[Having a professional coach helps you to]...focus on what you want to do and make a strategic plan for how to achieve it.”

What elements, inside or outside the lab, have been key to your success so far?

I don't know if it's a success... yet [laughs]. In my case, I found the right environment at the right moment. Another key element was when CNRS allowed me to take risks and go on a sabbatical. I had the opportunity to stop 'doing' science for 6 months but visit labs in both France and Singapore. I did nothing else but go around, ask people what they were doing, and try to understand the problems without any pressure to publish or do anything else. I could figure out what I wanted to do and also what was feasible in a certain context. There were many things that I thought about, but that could not have been done within this context, so going to labs in both

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The Viasnoff lab approach to control environmental parameters in combinatorial ways.

communities and trying to bring the best of both to mine helped me a lot in thinking about what projects I really wanted to pursue.

What challenges have you faced when starting your lab that you didn't expect?

I started a lab twice, once in France, and once in Singapore. In France, it was straightforward in terms of research because I wanted to pursue what I was doing as a postdoc, but the challenge was to get the space, the money and the right students to do it. When I moved to Singapore, the problem was somehow a bit reversed. There was core funding for projects and students were available, but the problem was how to do something useful for biology coming from a physics background. The other challenge is the number of hours you have to work each day. That was two years of very intense work, whereas now I know how to plan it better. I also have to say that I was really helped by professional coaches. This is not very developed in research, but we try to implement it now at MBI for new PIs. Your coach helps you think of the right question, organise your priorities and time, or just helps to relieve the pressure when you feel you absolutely have to publish in the next year. It helps you calm down, focus on what you want to do and make a strategic plan for how to achieve it. It's exactly like sport – if you want to achieve anything, you have a coach who will help you reach your objectives.

What is the best science-related advice that you have ever received and what advice you would give to someone about to start their own lab?

I think the best advice I received was 'sit down and take your time'. This insane pressure of having to do research and publish fast to get more money is crazy and detrimental to science. To a starting PI, I'd say 'don't be ashamed to ask for help'. I feel it's something that young PIs are discouraged from doing. They're usually encouraged to show how good they are and build up their name. I would say that you shouldn't try to build a name for yourself but rather enjoy what you do. Ask questions and make sure that what you're doing is

meaningful not only to other people but also to you, so that in five years you feel that the time you spent in the lab was useful.

"don't be ashamed to ask for help"

How do you get the most out of scientific meetings, especially at earlier stages of your career?

Personally, I don't like going to big meetings, I'm in favour of smaller meetings, like a colloquium. Another format that I have very good memories of is summer school. I think, at least as a grad student or postdoc, and afterwards as a PI, if you can afford it, you should really attend one or two summer schools in your field. The big gatherings where people try to pretend that if you present there, you are exposed to the whole community and everyone will remember – I don't think it's very true. They are mostly about networking and usually you don't learn much. I think it's more of a show-off than real science, but that's my own feeling. You don't present unpublished results and you're completely obsessed by meeting either the people you know or the people that supposedly count in the field. For young PIs, smaller and more focused meetings and being within the community might be better.

How do you achieve a work-life balance, especially when establishing yourself as an independent investigator?

Balance is something that is relatively personal, so my balance is that I cannot work all day! I need to be home and I need to be idle. What is nice about science is that even if you are at home and supposedly doing nothing, you never leave your troubles and questions in the lab, you always have them in the back of your mind. I also believe that having time off and times when you do nothing helps you get a fresh view of things; it's part of the balance, or at least, I try to convince myself of that [laughs]. Another thing I do is try to be as efficient as possible. You have to select what you do and learn how to say no, which is not always easy when you start. People will ask you to organise meetings and participate in the life of the community, and then you have your teaching and other duties, and there's always more, but at some point you have to prioritise and choose.

Could you share an interesting fact about yourself that people wouldn't know by looking at your CV?

There are two. First, I sing a lot and I sing opera semi-professionally. I used to sing opera in front of the bench or the microscope while doing my research, and sometimes now when my door is closed I do the same without realising it. Second is an anecdote. When I was applying to the MBI, my first interview was conducted over Skype, but it was 2010 and Skype wasn't so straightforward. So I opened the video and somehow there was a filter on the camera that had my head reconstituted with wool and horns. I couldn't stop it and I did the whole interview with that on my head. Needless to say I had almost no questions and I don't even remember the interviewer's answers because I was completely paralysed but couldn't stop the communication. So when my wife came in, I said "we're not going; there's no way he will say yes", but actually, he did. The next day I gave a seminar in my institution, and as I put up the slide with my name, this guy from MIT in the front row said "Oh, Virgile, yes, yes, you're the guy with the sheep thing". So the news came from my flat to Singapore then to MIT and then back to the institute in one day!

Virgile Viasnoff was interviewed by Anna Bobrowska, Editorial Intern at Journal of Cell Science. This piece has been edited and condensed with approval from the interviewee.