Interview with Marcela Uliano da Silva, Brazilian computational biologist, TED fellow and MSCA grantee

Brazilian computational biologist and TED Fellow. Marcela holds a PhD in Biophysics. The aim of her research is to study animal genomes to preserve biodiversity, by fighting invasive species or protecting threatened ones. Marcela is an enthusiast of citizen science and science communication; she has partially funded her PhD project through crowdfunding (www.catarse.me/genoma) .

Marcela, in 2013, you launched an excellent video as part of a crowdfunding campaign to fund your research on the golden mussel, an invasive plague that was threatening Brazilian rivers. Has it already reached the Amazon river basin? Did you manage to sequence its genome?

For what we know, the golden mussel has not reached the Amazon river basin yet. However, it is already infesting the São Francisco River, in the northeast part of Brazil, where it was found in 2015 in the Paulo Afonso Power Plant. Other than that, it is present in the main river basins in South America, from the very south, in the La Plata River, to the warmer waters of the Pantanal wetlands. The golden mussel genome is done. It was the subject of my PhD thesis defense this February (2017), and the manuscript is coming up in the following months. In comparative studies with other animal genomes, we have identified some peculiarities in the golden mussel genome that might give it advantages as an invader. These findings will be further explored. But the main goal has already been reached: We now have the genome, which is the base for finding the targets for the development of an engineered mussel, in orderto fight the invasive populations. We have already started engaged on this path.

You have just been awarded an MSCA individual fellowship! Congratulations! Can you tell us a little about the research project you will be doing in Berlin?

Thank you. This is very exciting! I'll keep working with genomics in the conservation perspective. In this project, we are going to sequence complete genomes for 3 sloth species. The sloths are the endemic mammals of South America: To use an analogy, they are our kangaroos. We will compare the genome of these different sloth species to study the molecular basis behind the convergent evolution event that made all sloths live exclusively suspended in trees, even though their ancestors were giant terrestrial species. Simply put: We want to understand what the various sloth species have in common and what differences they present in terms of their genomes. With this, we will be able to understand the genomes better – not only sloth genomes, but all species – which will help us to preserve various species, prevent and fight diseases and understand evolution.

I am sure that many of your peers would like to know your advice on securing an MSCA grant. What should future applicants look out for?

Apart from having a well-thought hypothesis and well-structured scientific project, I would say that the written proposal needs to mention every requirement asked by the MSCA committee: Applicants should not just hint at something , but mention the relevant points explicitly. Also, one should give concrete examples as to how certain aspects will be accomplished during the project period: By mentioning teaching skills, communication, publications etc.

Do you think there is a special need to encourage women to enter science?

Absolutely. There are many issues that could prevent women from entering a scientif career: One of the main reasons is the concern women have once they decide to become mothers. Not only in science, but in all areas women need protection of their rights in this matter. Some European countries, like Germany, are good in dealing with this, and they should be examples for the rest of the world. Also, there are still gender related imbalances in specific areas, such as STEM. We all know for a fact that there are no gender differences in cognitive abilities that would prevent people from succeeding in one area or another: We see successful women and men in every area. But prejudice doesn't see facts; prejudice is emotion-based. That is why it is so important for women in science to show their work, to talk to people, especially to little girls, so that we can challenge the old perceptions. As so many other women have done before us – which made possible for women to be in the universities today, for example – we have the duty to fight for our girls and for the future generations. Dialogue and education are important steps in making a better and more balanced world.

You were one of the first finalists on the EURAXESS Science Slam Brazil, then you became a TED fellow. How does your engagement in science communication help your research career?

By practising to communicate science to the general public, I have learned how to write better, and even how to better structure scientific projects. Extrapolating complex scientific data to other contexts helps a lot to develop creativity, which is a key element for us scientists to make scientific discoveries. But my science communication efforts have been also very valuable in my personal life, helping me to become more sensitive when talking to people, listening to them and understanding their views of science and the world. Also, it developed my passion for writing, which I'm constantly trying to improve. Apart from that, being part of the TED Fellows community is invaluable because you meet some of the very best experts in every area there! This has helped me a lot to think bigger and everytime more in a community perspective. It has been very inspirational and productive to be in contact with all the people in the communit; It helps me want to extrapolate my limits to advance scientific knowledge, to be happy and to contribute to our collectivity, the Planet Earth.

What would be your dream, if you had some kind of super power to instantly turn all your research experience into the application of a project for Brazil, or even for the whole world?

Brazil has on its territory the largest and most biodiverse forest in the world. One of my dreams is that we can preserve it. The biodiversity should be perserved for its beauty and uniqueness, in my opinion this is already a good enough reason. But, it can also benefit human health, as we know. So, one big achievement which, to some extent, we are already pursuing, is to sequence genomes and transcriptomes of as many species as possible from the tropical forests. With this information, we can study evolution and adaptation but also use biotechnology to develop products – medicine and cosmetics, for example – without harming the environment.