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Women in Physics: an interview with Flavia de Almeida Dias

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Flavia de Almeida Dias is an experimental particle physicist who has been a member of the ATLAS Collaboration at the Large Hadron Collider since 2013 and has had leading contributions in analyses involving pairs of vector bosons, searches for extra Higgs bosons and dark-matter mediators. She is an assistant professor at the University of Amsterdam and at Nikhef—the Dutch National Institute for Subatomic Physics. She was previously a postdoctoral research fellow at the Niels Bohr Institute in Copenhagen and the University of Edinburgh.



Credit: Flavia de Almeida Dias

Flavia was convener of the ATLAS Exotics physics group, responsible for over 90 searches for physics Beyond the Standard Model, between 2021–2023. Previously she was a convener of both the ATLAS Exotics Dibosons and Multi-leptons physics group and the ATLAS Fast Calorimeter Simulation software group. She is a former member of the CMS Collaboration (2009–2012), where she worked with searches for new particles decaying into leptons and jets, as well as offline trigger software and Monte Carlo generators. She has been awarded personal fellowships from the Dutch Research Council, the State of São Paulo Research Foundation and the Brazilian Synchrotron Light Laboratory, and a Marie Curie Research Training Network early-career researcher scholarship.

Why did you choose to be a physicist?

I was a very curious and hyperactive child, and always wanted to know how and why things work. Luckily, I had a supportive grandfather who would try to answer my questions with scientific explanations—even though he was not a scientist and not university-educated—and we spent a lot of time talking about the Universe and astronomy and reading science outreach books together. I was that quirky kid who talked about physics as a future career while in elementary school! Growing up in a small town in Brazil, at a time when education and research were severely underfunded, this used to feel like a very far-away dream. Over time, people kept talking to me in disbelief when I did not change my mind about my future career, and at some point, it became a matter of stubbornness that I would be able to follow my passion for science despite the discouragements from my environment.

What scientific developments are you most excited about?

We think we know a lot about how elementary particles and forces work, but everything we know only accounts for about 5% of the total mass-energy content of the Universe. I am fascinated by all the things we cannot yet explain, and I believe we are in the cusp of greatly enlarging our understanding of the world. I don't know where the next breakthrough in the field of particle and astroparticle physics will come from, but there are so many unique experiments ongoing right now: we are just starting to scratch the total data that the Large Hadron Collider will produce during its lifetime (including the high-luminosity phase); experiments designed to directly detect dark matter (which is a kind of matter that makes up 27% of the Universe but we have no idea what is made of) are reaching uncharted sensitivities; we are entering a time where we can have neutrino experiments observing the sky simultaneously with measurements of gravitational waves; we can even take pictures of black holes event horizons now! Something new is about to shake our field, and I am very excited to know what is yet to come.

In your view, what are the issues women are facing in terms of diversity and inclusion in academia? What has been your experience?

There are too many issues to be exhaustive, and there are plenty of statistics and literature showing how the academic environment pushes us away. Women—and other people in minority populations—must prove themselves to be always excellent, it is exhausting. We have to grow up in a world that keeps telling us we don't look like a scientist, and we have to justify our choices at all steps of our careers. Then, if we get a position, we have to listen to corridor rumours and gossip that we are only there because of affirmative action. If we get a grant and build a large group, we are too aggressive. If we don't, we are not ambitious enough. We get stuck in many more committees and administrative tasks because 'demonstrating diversity' is now a requirement in some contexts, but there aren't enough colleagues who can share the burden of being a 'diversity token'. We are compared to our men counterparts in 'subjective' metrics, but those use biased inputs and often do not accommodate non-standard career paths. I am fortunate to work with wonderful colleagues in my current university and laboratory, in institutions that are actively trying to improve the recruiting and retaining of diverse staff, and yet I still feel this burden—I can imagine that this is much worse in other places which are less open to the concept of diversity and inclusion (D&I).

If you could change one thing (or two)—what would you change to increase the proportion of women studying physics?

A multi-prong approach is needed, at all levels of seniority in the academic career and society. We need to have more women+ professors, so our undergraduate and graduate students have role models and mentors. For that, we need to recruit and retain excellent women+ researchers, and while a lot has been done in the past years on the recruiting side, not enough is done for retention. We need better family care conditions, equity in the distribution of parental leave and care expectations; we need to provide stable jobs earlier in career, so people don't have to make a choice between being a researcher and their

personal lives; we need to foster a warm environment for those who are hired, so they feel as integral part of their institutions as their men colleagues. And then we need to change the way society sees science and scientists, so the biases that drive girls away very early on are no longer there. I want to see a young child drawing a physicist who looks like Lise Meitner as often as they draw Albert Einstein. Role models also help the proportion of women+ starting a degree.

Have you had any setbacks in your career—how did you handle them and what did you learn from them?

My career in science had ups and downs—not unlike scientific research itself—and none of my “plans for the future” turned out as I expected. The hardest part was the years I spent, as a Postdoc, applying for multiple fellowships and tenure track positions not knowing if I would ever get one, and which country I would end up living in. I was rejected many times—more than I cared to keep count of—and with every one of them, I would question my competence and my place in the field. I was at peace with myself about leaving academia and starting to look for an industry position when I got the offer of the job I currently hold. I think I would have been happy in another industry too, but I am very thankful for where I am now. The best lesson from it was that, in the end, sometimes things work out for the best even if in tortuous ways.

Were you in a minority at any stage of your career and did it make a difference?

I studied physics in a bachelor programme where women+ was about 10% of the students, and in a country with deeply rooted sexism. It was a mix of being seen as an object and a threat: if we dared to academically perform better than our colleagues, we would hear crass comments about how we

could possibly have achieved that. When I moved to Europe after my studies, a lot of the clear-cut chauvinism became veiled biases, which was hard to navigate and made me feel less defensive but with a lingering feeling of inadequacy. I saw a lot of my women+ colleagues leave the field, and this kept nagging me in the back of my mind, if this is also something I should do. The environment also selects a particular kind of personality, and my outgoing and direct character helped me to achieve what I did, but we should strive to have an environment where everyone is welcome and can succeed too. I am happy to see that the next generation I teach is already more diverse than my own, and I hope to witness a steady improvement in the future.

Have you engaged in changing systems to remove gender bias and act as a gatekeeper?

I think everyone in a position to hire and evaluate people should take diversity and equity seriously. I have taken multiple trainings on implicit bias and bystander intervention, for example, where most of the people being trained are themselves part of minorities while the majority population colleagues do not participate. The ‘preaching to the converted’ phenomenon. I try to apply everything I know about diversity and equity when I hire my own team. To influence policy and structural organisations, I engage in leadership positions in the realm of D&I: I am currently one of the D&I contacts of the ATLAS Experiment at the Large Hadron Collider, the working group leader for inclusiveness and outreach at the European Union COMETA COST Action, and I was the president of the LGBTQ+ CERN network for 5 years. Influencing the system takes time and hard work, but I believe that changing things from the inside is important to make significant progress for diversity in physics.

Do you have a role model? Do you feel pressure to be a role model?

I had the privilege to have a role model in Brazil, Prof. Sandra Padula, who is an academic in the group I did my PhD and one in the USA, Prof. Maria Spiropulu, who was my PhD co-supervisor. They are both successful women who are leaders in their field while being very different from each other. That made it possible for me to see myself in different aspects of them, and to build my own way of being a successful physicist. I feel the need to be a role model, but I don’t see it as a pressure in the bad sense: I don’t believe role models should be perfect, quite the opposite. Role models should be relatable in their imperfections and failures while being aspirational in their achievements and the progress they make in their field. I strive to thrive as myself in physics and to show that a diverse scientific environment produces better science.

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