UN AGORA BLOG

Diversity in science. Filling the dream gap

Dr. Antje Boetius[1]

As a child, I was endowed with a fundamental curiosity about nature, the world, other people. This curiosity is still one of my strongest driving forces today. To know how little we know, how much there is still to discover, especially in the ocean. To realize every day how we must learn about life on earth, its origin, its ability to survive, adapt, communicate, form networks of cooperation. How we must understand the role of nature and the networks of life for a sustainable future, when we grow to 10 billion people on the planet at the end of the century. In the face of crises in climate, biodiversity, and health – what a giant task for research and for society to invent a future for living together sustainably. Every hand and brain is needed! So why is it, that the majority of girls and women are still excluded from a profession in science and technology? It appears especially astonishing for a wealthy country like Germany, where I am from. Despite high socioeconomical investment in the academic education of women, who now make up the majority of university graduates, we seem stuck at 27% female professors, and less than 15% in top leadership positions as presidents of universities, or directors of non-university institutions. Even in the new digital disciplines and enterprises, the figures are dire – only 18% female participation in IT professions, and even less as owners of start-ups. How strange. On the World Cultural Map 2022 Germany belongs to a cluster of counties identified by high self-expression and secular values in their citizens. What is missing?

As the eldest daughter of a single mother of three children, the problem of lacking equal opportunities between women and men did not occur to me during my childhood and youth. My father, an artist, seemed to have larger struggles in life compared to my mother, a high school teacher. My mother did not have a high income, but she was able to provide for us a childhood rich in positive and diverse experiences. I was lucky to develop an idea of who I wanted to be already as a kid – an oceanographer sailing the seas - and I got full

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support from my family even if it was not more than a dream at that time. My early reading ability allowed me to dive into a world of books and fiction of ocean adventures. I was so intrigued by nature documentaries showing teams of happy people exploring the oceans like that of Hans and Lotte Hass. Growing up, I was convinced that the world was open to me. When I studied biology in 1986-1992, women were already about half of the semester. Throughout my first years in science, I encountered inspiring female role models in ocean research: successful, smart, brave, diving to the depths of the seas and exploring the unknown in the ocean. And so happy about their work. Just like I wanted to be. To me, having role models available, being able to dream of different lives one could live, different professions that seem in reach, is a key factor for kids to get fascinated by the world of jobs. Beyond their insight in what their parents, family members and those of their friends do, all media play a big role in this. The industry of children's books, television, and film, that of toys, and advertisement, and increasingly the social media - they all create dreams, images of what one could be. They should take their role in filling the dream gap that still exists, especially for girls as recent research shows. But the biggest responsibility is in education. It must improve the experiences kids make at young age with the world of jobs and professions.

As to diversity in science, it wasn't until I was a professor of biology myself and was asked on every committee for lack of female representation that I started getting curious about equal opportunity in science. Consider that we have been training 50 percent female doctoral students in Germany for decades, there are clearly too few who continue after the doctorate and postdoc, who become professors. And percentage numbers have recently stalled.

Is this simply a matter of changing values, an overcoming of traditions of gender-based role models? After all, discrimination on the basis of gender has only been prohibited in Germany by constitutional law since 1957, women have only been allowed to pursue a job without their husband's permission since 1958, only since 1970 have all German states offered coeducation in mixed high schools, and only since 2005 have there been as many females as male university graduates. This might be an issue, but still, other countries with a similar context are further today in equal opportunities, especially also in science.

To this day, women in the science system are more often employed on a temporary basis, more often have part-time contracts, and still receive lower salaries than men in Germany. Fewer will receive a full professorship; thus, there are also not many female directors or presidents of scientific organizations. Today, when it comes to explaining the low percentage of women in top academic positions, I often here about the myth of a lack of analytical competence, decisiveness, assertiveness, and self-confidence. Coaching and mentoring programs are mostly offered with the idea of "Fixing the women" - as if something was broken with them and not with the system. I would challenge that notion.

There is almost no unemployment for PhDs, but mere 5 percent of the 26,000 doctoral graduates per year in Germany have access to independent academic positions after their postdocs. Thus, in such a competitive environment, the further academic career is mainly characterized by coincidences, less by processes that can be planned. Creativity, research with the risk of failure, lasting through difficult problems – all not incentivized by ever increasing competition and bureaucracy in the science system. Being able to apply for only a few temporary research positions after a long period of scientific training affects all young scientists but has a much less favorable impact on women. This is because between their twenties to forties, women decide whether to have children and how they want to organize their family system. In Germany more than four-fifths are already living in a partnership at this time, and the partner is also working – but an academic career requires mobility and a high willingness to take risks in the fierce competition for a few locally distributed positions. Here is another warning sign: According to surveys, the majority of female academics want children - but two-thirds remain childless, and the trend is rising. This is because women, regardless of their education and that of their partners, largely bear the responsibility for childcare, family care and household organization. Outsourcing part of it, through daycare, shared parental leave, is much more accepted in other countries - in Germany, we continue to struggle with support. Especially the pandemic has shown this very clearly. Advice to female academics to look for supportive partners in their relationship is certainly well-intentioned - but cupid's arrow usually strikes independent of career plans.

I believe that society needs to be more inclusive and open for diverse solutions to family support and academic careers, rather than filtering out proportionally few in a harsh competition. Because we are better in science and technology when we embrace a diversity of life experiences, thinking and ideas, and thus of people. Anyone who reads the travel diaries of naturalist Maria Sybilla Merian, studies the writings of double Nobel laureate Marie Skłodowska-Curie, delves into the life of mathematician Sofja Kowalevskaya, or the texts of sociologist Harriet Martineau, can understand how great the untapped potential of female research drive is.

After all, being a scientist is very fulfilling when you get the freedom to think and act for yourself. Developing and implementing ideas with many different people, the joy of communicating results, astonishing those around you with new insights. Never being bored, always having something to think about, to read, to tell. To create a scientific oeuvre and leave it behind for future generations. Indeed, an early long-term employment contract is enormously important for both female and male scientists on their way to a higher academic career, because it provides the opportunity to develop their own research direction and an independent profile, to acquire third-party funding, and to build up a working group, lasting collaborations and a legacy of knowledge.

But there are simply far too few long-term positions in science, and too much pressure on these. As wealthy as Germany appears in contrast to other countries, we are far from adequate priorities in the investment into the next generation, their education and thereby also the opportunities of women in science. This often feels poor to me.

About the Author

Antje Boetius is a marine biologist and Professor of Geomicrobiology at the University of Bremen. Born in 1967, she studied biology from 1986 to 1992 in Hamburg and San Diego. In 1996, she received her PhD in deep sea ecology.

After working at different marine research institutes, she established a working group to explore microbial habitats in the ocean at the Max Planck Institute for Marine Microbiology. Since 2008, she has been leader of the Helmholtz Association of German Research Centres-Max Planck Society joint research group on deep sea ecology and Technology at the Alfred Wegener Institute for Polar and Marine Research. Additionally, she is board member of the MARUM Cluster of Excellence at the University of Bremen.

In 2009, she was awarded the Gottfried Wilhelm Leibniz Prize by the German Research Foundation (DFG). Furthermore, she was elected a member of the National Academy Leopoldina (geology section), the Academy of Sciences and Literature Mainz and the German Council of Science and Humanities.

Since November 2017 she has been leader of the Alfred Wegener Institute, Helmholtz Centre for polar and marine research.
The scientist participated in more than 40 expeditions on international research ships. Currently, she is working on the impact of the climate change on biogeochemistry and biodiversity of the Arctic Ocean.

Boetius has introduced herself to a wider public through publications, professional articles and numerous TV-appearances. She visited science TV shows such as makro (3sat), Quarks & Co (WDR) and Terra Xpress (ZDF). Besides, she had performances on shows such as Tietjen und Hirschhausen (NDR) and TV Total (Pro7).