DOI: 10.24425/academiaPAS.2022.142701

Why Greater Diversity Makes for Better Science

Failure to bring the perspective of women into scientific inquiry makes it incomplete, slower, and more costly, says **Dr. Alicja Puścian** from the Nencki Institute of Experimental Biology, Polish Academy of Sciences.

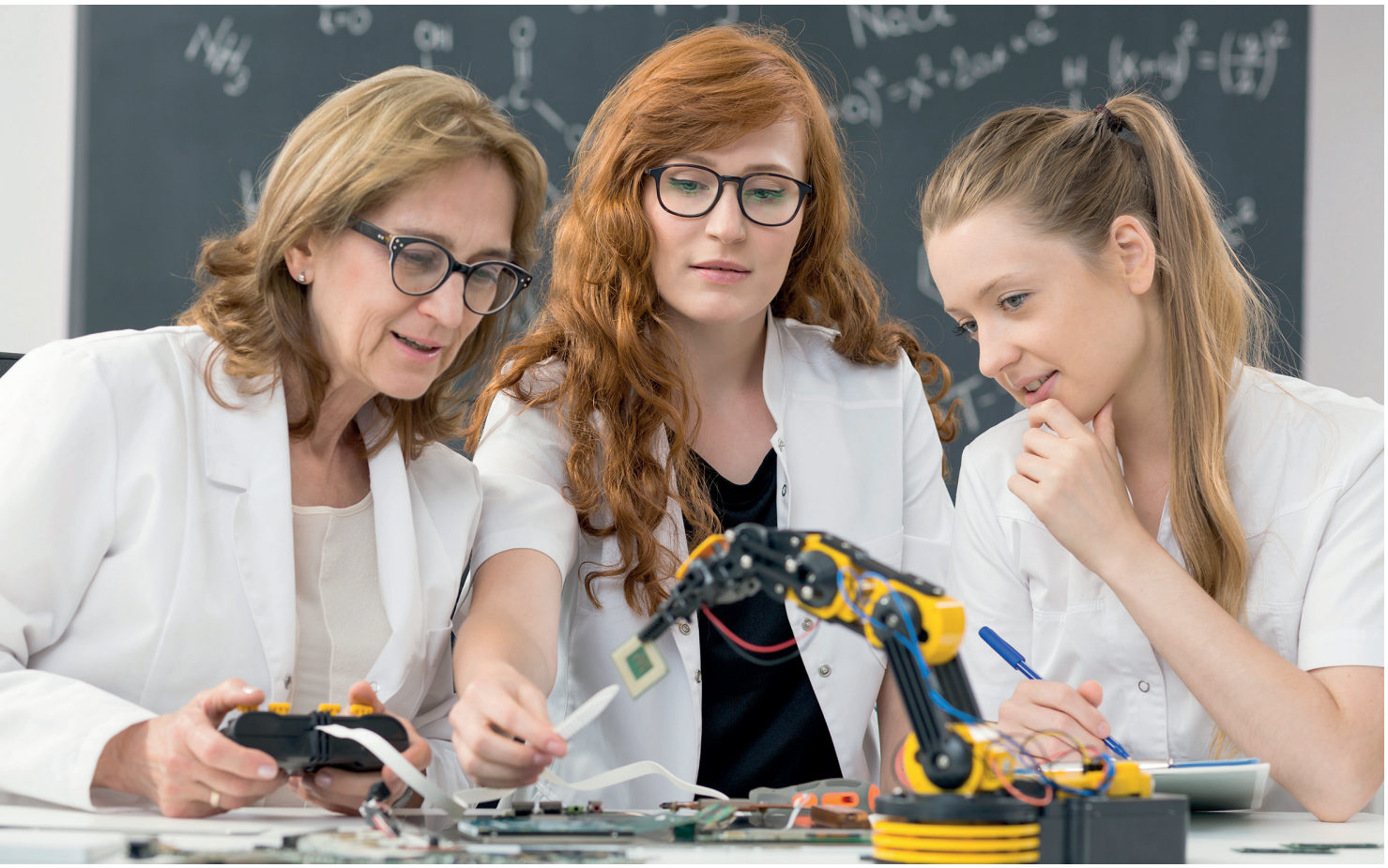
Are women underrepresented in science and other areas of professional life?

ALICJA PUŚCIAN: I'm sad to say that gender inequality continues to pose a major problem in various circles, including Academia. This is particularly evident in positions that involve greater independence and greater influence over where Science is headed and how it is funded. A relatively large number of women decide to pursue a career in Science. Over time, however, the "funnel" narrows, and women become increasingly underrepresented. The higher the positions, the fewer women there are. The most dramatic decline is evident at the stage of transition from being a member of someone else's research team to being a lab leader. This is when you set up your own team, gain full scientific independence, begin to educate students and PhD candidates, and conduct research according to your design.

I recently attended the General Assembly of the ALBA Network, the largest academic initiative promoting equity in neuroscience. It is funded by leading international neuroscience organizations: FENS (Federation of European Neuroscience Societies), SfN (Society for Neuroscience, United States), and IBRO (International Brain Research Organization). The ALBA Declaration on Equity and Inclusion has been signed by several hundred scientific institutions all over the world, including leading academic centres such as Cambridge and Yale. One of the goals of the ALBA Network is to collect data on inequalities in Science, not only gender inequality but also inequalities that affect other underrepresented groups. At the meeting I've mentioned, data for various continents were presented, showing that over the past 20 years, the percentage of women among individuals holding professorship/tenure positions has averaged 20%. Still worse, the situation has remained practically unchanged over the past two decades. The higher up we go, the more women drop out of careers in Science. We should ask why this is the case. I'd like to stress here that this is a global effect.

Is this the case for all disciplines?

Historically, some disciplines have been especially dominated by men. These are mostly exact sciences, engineering sciences, and military-related disciplines. But as the debate on equality in Science continues to evolve, there are more and more female students. Medical schools also have far fewer female faculty members. This effect is less pronounced in the humanities, but women holding leadership positions in these disciplines also face discrimination. I recently heard an anecdote told by Prof. Edyta Gruszczyk-Kolczyńska. She, according to the custom, addresses her male colleagues as "Professor X," but they publicly refer to her as "Mrs. Gruszczyk-Kolczyńska", even though she is a senior, highly accomplished scholar. So even in groups where a lot of women hold top positions, they do not get respected as naturally as men do.



PHOTOGRAPHEE.EU/SHUTTERSTOCK.COM

Jill Biden, the US First Lady, is an educator and has a doctoral degree. When Joe Biden was elected President, she was therefore introduced as Dr. Biden. This sparked so much controversy that people began to question her degree, although she is an extremely experienced researcher. If she were a man, I don't think people would have these doubts. Such questioning of the qualifications of women is sad, but it is unfortunately very common.

Why is that the case?

Such behavior is rooted in stereotypes. In my view, the percentage of people who deliberately seek to devalue women is very small. In most cases, we are dealing with unconscious bias, and the key role here is played by upbringing. Importantly, the issue of unconscious bias applies to both men and women – we should not forget that women also discriminate against other women and themselves. There are many studies on this subject. Such discrimination results from persistent schematized thinking that we don't realize exists. Unfortunately, however, this thinking has a direct impact on how women are treated in Science and how their achievements get evaluated.

In one of the most famous experiments, which illustrates this phenomenon very well, participants were given two almost identical résumés, and the only difference was the name of the applicant – one was male and one was female. It turned out that gender had a dramatic effect on the opinions formed about the given person as a scientist. A woman was considered less competent and therefore less useful for a potential research team than a man with an identical résumé. This proves that we harbor stereotypes and beliefs about women as lacking ability and intellectual competence. We expect them to perform worse than men.

Another issue that is equally difficult to accept is that people are a lot more likely to doubt that women's achievements are solely the result of their own work and to suspect that someone must have helped them. Of course, we also do this to ourselves as well. Reports show that our male colleagues are much less likely to experience this sort of self-doubt.

Young female researchers are especially vulnerable to such pressure, with their skills and competencies often being called into question. But at this stage of their careers, they don't have a sufficient "arsenal" to defend themselves. They are at the beginning of their scientific path, and they have yet to prove their worth. Statistics show that young women are a lot more likely to fear they may not make it, although this has nothing to do with their actual abilities. Men, in turn, are highly unlikely to be asked how they got to a certain point in their career. Women experience this constantly.

Has it always been this way?

Throughout history, there have been communities where women are more respected than men. Therefore, this cannot be the only feasible reality that has

PIOTR GAMDZYK

Alicja Puścian, PhD

is a behavioral neuroscientist. She has published findings in journals such as *Molecular Psychiatry, Cell Reports* and *eLife*. She has gained research experience in Switzerland, Japan, and the United States. She is a recipient of the Young Investigator Award from the Polish Neuroscience Society and the European Brain and Behaviour Society. For her research on neural underpinnings of behavioral flexibility, she was awarded the Brown-Coxe Fellowship at Yale University.

a.puscian@nencki.edu.pl

been with us since the beginning of humankind. An anthropologist would probably tell us more about this. That said, most societies are patriarchal.

Although we are hardwired to stereotype, there are effective ways of disposing of such schematized beliefs. The first step is to put your cards on the table and say honestly and openly that they exist. Without holding any grudges or alleging ill will. The purpose is to become aware of how we behave and how the functioning of these established patterns affects our lives and the lives and careers of others.

There are more and more examples of non-discrimination policies. For example, before members of the ERC (European Research Council) panels evaluate grant applications, together they watch a short video on unconscious bias. Importantly, they do so together, which turns this into a social declaration on what should and should not be evaluated. Namely, they should assess to what extent the project meets the criteria of innovation, scientific excellence, groundbreaking nature, and feasibility, and should ignore such aspects as the applicant's tone of voice, age, or whether they have a family. Another effective way to battle bias in the evaluation of research projects involves appointing independent observers to sit on panels. They have no say in the evaluation of candidates, but they monitor the discussion to make sure it doesn't take a wrong turn, for example, "She's so young, can she handle it?". According to the Nobel Prize-winning economist Daniel Kahneman, the least expensive and most effective way to avoid the trap of stereotyping in the evaluation of applications on their merits involves introducing as much diversity as possible into the panels, which means making sure that people from different cultural and ethnic backgrounds are adequately represented. Such panels take into account a sufficient number of heterogenous points of view, which in itself has great potential. Above all, however, they can formulate the most objective opinions possible using these various contexts. Diversified panels are one of the simplest and least expensive methods of avoiding unconscious bias.

What is the situation of other minorities in science?

Science needs researchers who come from diverse backgrounds and cultures, including members of the LGBT+ community, and people with disabilities. It has been demonstrated that diverse research teams are more innovative. The ability to ask new and fresh research questions is influenced by who you are: what you read, what your social interactions are like, and what you think about. We need people with the most diverse experience possible because Science is a social process. This may seem obvious, but we still have a lot of work to do to make it happen. The "Women for Science" initiative founded at Nencki Institute acts as an advocate for all underrepresented groups in Science, including the LGBT+ community and people with disabilities.

The problem of discrimination is also reflected at the legislative level. When I was the Chairwoman of the PhD Students' Council of the Polish Academy of Sciences, the proposal to include funding of educational aids for PAS doctoral candidates with disabilities in the amendment to the Higher Education Law aroused great controversy. The proposal succeeded, but with great difficulty, although it would seem to be obvious that all individuals with disabilities should have access to the financial resources they need for additional readers and other equipment that allows them to complete their research.

What is PAS doing to improve the situation?

Women make up only a few percent of the members of the Academy. I'll repeat after Prof. Jerzy Duszyński,

President of PAS, that this is a reason to be ashamed. Fortunately, however, the underrepresentation of women at the PAS institutes is receiving growing attention. The International Institute of Molecular and Cell Biology recently organized the Women in Science Symposium. It's an amazing and extremely valuable initiative.

The Nencki Institute of Experimental Biology, where I work, has established the aforementioned initiative called "Women for Science." From the outset, it has been clear to us that we want to operate on a large scale, and we need to collaborate with leading international initiatives that have aligned goals and missions. For this reason, we organize events together with a sister organization called Women in Science at Yale, and we collaborate with the Women Faculty Forum at Yale and the ALBA Network. In Poland, we work with the Foundation for Polish Science and the Polish Women Scientists Network. We operate on a partnership basis, and we act professionally because we want to be perceived in the international arena as people who are doing a good job. Our efforts have been noticed and appreciated. Recently, we received the ShEO Award in the Equality Champions category from the weekly *Wprost*. This is a great reason to be proud and, in a sense, the crowning achievement of the first year of our activity.

I think there will be more and more initiatives like ours, and they will grow in importance, especially as changes in the perception of the importance of faculty diversity become evident in ever-wider groups. There is more and more talk that the failure to realize women's research and economic potential leads to the loss of enormous resources. Actions aimed at eliminating gender inequalities are one of the priorities of the European Commission's Horizon Europe research and innovation framework programme, inaugurated in February 2021. To apply for funding under this program, research organizations will have to develop and implement Gender Equality Plans by 2022. This is a major step, one that makes us aware of the great importance of factors that are seemingly unrelated to scientific excellence.

In implementing equality plans, are we not losing sight of professional factors?

As scientists, we also must look at the less obvious factors that can affect research results. There is no doubt that the underrepresentation of women and discrimination against women and other groups in Science is dragging us down, and this has been documented on multiple occasions. I think most researchers are now aware of this problem, but it should also be highlighted and explained to the public, presented as a matter that affects all of us. After all, the life of the average Polish family depends in a very significant way on who is involved in Science.

In what way?

As I've said, if women and other minorities are not given a seat at the table, we're wasting our innovation potential. This also means that we have yet to ask a lot of questions that are important for society and address the big picture in many aspects of our lives.

For example, it is commonly believed that women are less likely to die from heart disease. However, if we look at the problem more closely, we'll find that we define how heart attacks and strokes should be diagnosed in terms of the male body. Female physiology has not been taken into account in these definitions, and it does not fit into the characteristics of these conditions. That's why women with a heart attack sometimes don't receive the help they need because the symptoms of this serious, life-threatening disease manifest themselves differently in their case. For example, they often don't experience chest pain, which is a well-known symptom of a male heart attack. Many women, therefore, go misdiagnosed and die. To go further, the effects of many pharmacological substances available on the market on female physiology remain poorly studied. This failure to account for diversity pertains not only to diagnostics but also to treatment methods and interpretation, which affects people's life and health. Another serious issue is transport safety. Until recently, crash test dummies didn't reflect the female body type. The body of a woman is statistically smaller, and its weight is distributed differently. Many cars not tested to keep women safe are still on our roads, making us more likely to die or become seriously injured just because we are women. Although all of these issues have been identified, we will still have to wait a long time for any radical improvement.

Similarly, most of the programmers responsible for how banking systems, social media, and search engines operate are men. This affects not only what data these systems collect, but also how virtual reality is designed. The underrepresentation of women makes it incomplete, even distorted. What's more, it turns out that when men decide how money should be spent on urban infrastructure, many investments don't take into account the need to pick up children from school or daycare or walk with strollers. I'd like to stress again that this is not caused by ill will – men are simply unable to include the perspective of women because they are not women. It's impossible to respond to the needs of all of us unless all of us are represented where the decisions are being made. So we must continue to follow this path and do everything we can to make sure that the future generations of women not only see a place for themselves in Academia but also want to pursue careers in Science, boldly and with no hesitation.

Interview by **Justyna Orłowska, PhD**