BRITISH COUNCIL

Women in Science

Magazine

TRANSATLANTIC BRIDGES: British Council mission promotes scientific networks that share models and practices for diversity and equity in science

COLLABORATION THAT GENERATES DIVERSITY: Citizen Science projects bridge the gap between Academia and Society

BLACK LEADERSHIP IN TECHNOLOGY: To reduce oppressions of gender, race and class, it is necessary to invest in examples

#2, 2020 www.britishcouncil.org.br

WOMEN
IN SCIENCE

Editorial

The presence of women in science promotes qualitative gains and considerable advances in studies of the most diverse themes. Amongst countless benefits, different environments allow the development of more complex ideas, reflecting more coherently the kaleidoscope that we call society. In this scenario, it is important to include people with diverse profiles not only in the setup of research groups, but it is also important to foster diversity in control groups, so that the results of scientific studies respond to the variety of profiles of individuals on the planet.

These factors reinforce the importance of the **British Council**'s mission with the publication of the second edition of the *Women in Science* magazine. Produced from the coverage of events and activities conducted in Brazil and the United Kingdom over the second half of 2019, the publication brings together reports, interviews and stories from researchers at different levels of their academic careers that demonstrate the power of women in scientific research, innovation and entrepreneurship. The activities were carried out within the scope of the **Women in Science** programme and addressed the need to develop capacities at individual and institutional levels to influence behaviour and policies on the STEM agenda, gender and leadership.

Three critical dimensions guided the delivery of the activities and, consequently, the writing of the texts of this edition: 1) Inspiration, 2) Performance, and 3) Recognition. Capacity building workshops, study missions, orientation sessions and policy dialogues were some of the activities closely monitored by the magazine staff.

The publication you have in your hands also deals with the materialisation of the UK-Americas Women in Science Association, a network that will promote interinstitutional and international actions, collective activities, and also the empowerment and strengthening of the participation of different women in science. In each text, the magazine presents part of a broader scenario whose movements contribute to the empowerment of girls and women, encouraged to engage as a driving force of a scientific ecosystem that can no longer ignore the participation of women as a competitive differential for the advancement of research, innovation and even the economy.

It is our desire that the *Women in Science* magazine serves as an important tool for the dissemination of actions in favour of gender equality and diversity in scientific endeavours. Happy reading!

Martin James Dowle,
Director of the **British Council** in Brazil

BRITISH COUNCIL WOMEN IN SCIENCE

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The **British Council** is the UK's international organisation for cultural relations and educational opportunities. It is present in more than 100 countries and their main partners include governments, non-government organisations and private institutions. They promote cooperation between the United Kingdom and Brazil in the areas of the English language, arts, sports, society and education.

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Infinite potentials **to discover**

DIANA DASTE
DIRECTOR EDUCATION BRITISH COUNCIL BRASIL

The **Women in Science** programme emerges from an initiative of the **British Council** in Brazil as an opportunity to contribute to the universe of women and girls in the STEM. STEM is the English acronym for Science, Technology, Engineering and Mathematics, representing the strategic areas of scientific development for society. The programme already has the perspective for growth in the Americas and can be replicated in other parts of the world, given its potential to foster actions in favour of a more diverse science.

Our definition of diversity goes beyond binary identities and recognizes the coexistence and intersectionality of various conditions that, when put together, increase individual, collective, and social disadvantages. We entered the debate through the gender door with actions focused on diversity and, from there, we intend to act to break down barriers and stimulate the great potential of women in science. As part of our work, we encourage the strengthening of bonds and the exchange of knowledge between individuals and institutions in the United Kingdom and Brazil. In this vein, throughout 2019, we conducted a series of policy dialogues on strategies for digital empowerment, scientific and technological entrepreneurship, oceanography, diversity and intersectionality in the sciences.

The *Women in Science* magazine team monitored meetings held in Santos (São Paulo state), Recife (Pernambuco state) and Belo Horizonte (Minas Gerais state), in addition to participating in the *Women in Science and Innovation* training promoted by the **British Council** in partnership with Rio de Janeiro's Museum of Tomorrow. Reports, testimonials and insights from these actions are shared in this magazine. Another action that you will learn about is the mission to the United Kingdom promoted within the scope of the UK-Americas Women in Science Association, which included a dinner for scientists from the UK, Brazil and other nationalities, held in the Mathematics Gallery of the Science Museum in London.

With these and other actions, we intend to bring our contribution to a local agenda, supporting regional connections and bringing together actors who are contributing to a more diverse science. The **Women in Science** programme is dedicated to generating and managing spaces for these bonds to happen, in addition to supporting already-existing actions that need more visibility to make new connections. While Brazil faces many challenges in this agenda, there are also advances and ongoing actions. Our role is to identify where we are most relevant to promote meetings and propose content on leadership, performance and inspiration, creating processes to transfer knowledge and take dialogue further.

One of the most relevant actions in this perspective of building networks includes the promotion of good practices, carrying out concrete actions. The first of which, indicating the next steps for **Women in Science**, will be to map out what is being worked on in the different diversity committees of the institutions participating in the Association. From there, we can move forward with the implementation of these models in other interested institutions. The first move is to document, then understand what was found, and establish a pilot project, carrying out actions in a small number of institutions but with international reach, in order to measure and assess impact. Another axis of activity is related to the agenda of capacity building, which materializes in the availability of bringing workshops on topics in which the United Kingdom has a strong presence, like what is already being done with scientific dissemination and innovation actions.

The **Women in Science** programme has solid roots and fruits to be harvested. An important advance is to have institutions of the highest level talking to us and seeing themselves as part of this agenda. This includes the Ministry of Science, Technology and Innovation (MCTI) from Brazil, the Brazilian Academy of Sciences (ABC), and the Brazilian Society for the Progress of Science (SBPC), along with social organisations, museums and other universities in Brazil, the Americas and the United Kingdom, including the Science Museum, the Royal Society and Oxford University. The programme therefore gains strength and visibility, as well as fundamental points to continue generating impact and making changes such as the implementation of processes, the transformation of behaviour, and the influence on public policies.

Another important impact that can already be identified is the consolidation of networks within the programme. At every meeting or training session held, there was a consolidation of new networks of women who share experiences and see themselves as part of a larger movement, in which they find support and identity. In the pages that follow, there are many inspiring stories from women who have clear perspectives on their transformative power in scientific production, leadership and entrepreneurship. The stories depicted here bring multiple perspectives on the actions that impacted the lives and the individual universe of these scientists and their fundamental contributions in their areas of influence.

Gender, inclusion and diversity issues are highly impactful and transformative. The reciprocity and interest that our actions are generating aver the relevance of this topic. With the engagement of various institutions and scientists from the most diverse backgrounds, we deal with these issues in a positive approach, due to the wealth that diversity produces in science. A more diverse science gains in quality and perspective, with new subjects and new elements entering the equation. This movement will necessarily develop new talent, and in turn, strengthen the results of research, the economy and society. The **Women in Science** programme does not want to work alone. We aim for network gains, we want to strengthen talent, expand research, change policies and generate impact on the territory from a different perspective. We want to value diversity for the wealth it generates, which goes beyond justice and brings a different perspective, along with richer, more positive development models, and with infinite potentials to unravel.

Let's go together!

BY LUIZA LAGES
PHOTOS: GUILHERME LEPORACE

For a science that looks at women

Fighting gender bias in research results gains ground in the gender equality movement

In Portuguese, gender equality and equity are words frequently used as synonyms. However, equality refers to identical and equivalent situations – when we recognize, for example, that men and women must have the same rights. Equity recognizes social asymmetries and seeks to provide opportunities for achieving equality, with public policies and affirmative actions.

While education has always been part of the demands of the feminist movement, specific career problems of women in science have been more recent. In the 1990s, two pioneering initiatives paved the way to this discussion. The first initiative was the establishment of the Gender Working Group of the United Nations Commission on Science and Technology for Development (Uncstd) in 1993, which led to the creation of the Gender Advisory Board (GAB) in 1995 as a permanent committee. The second was the creation of the Helsinki Group on Gender Equality in Research and Innovation, in 1999, by the European Commission, an advisory committee with representatives from all member countries. "Its influence was notable, leading the Commission to finance studies and research on the subject, to create the publication *She Figures*, unveiling the reality of each country, and to publish several reports that took the discussion about gender and science to a new level", says Alice Rangel de Paiva Abreu, Emeritus Professor of the Institute of Philosophy and Social Sciences of the Federal University of Rio de Janeiro (UFRJ) and director of **GenderInSITE**.

The accumulation of knowledge produced in the last three decades has led to important advances. Many initiatives encouraging **gender equity** in the scientific field resulted in an increase in the presence of women in universities, in undergraduate, master's and PhD programmes. But in the debate on gender equality, questions that investigate why women remain a minority in certain areas and why their participation drops dramatically the higher the career level remain key. "In this scenario, a new theme has been emerging strongly: when the question of sex and gender is ignored in the design and implementation of scientific research, what is the consequence for scientific knowledge?", asks Alice Abreu.

GenderInSite is an international initiative that aims to promote the participation of more women in science and technology. The Steering Committee includes members of several organisations with experience in gender issues, also working at the intersections between the themes. Visit: genderinsite.net.

Guilherme Leporace / Museum of Tomorrow.

Alice Abreu, Danielle Nunes and Moema Guedes at the Museum of Tomorrow training event.

For Abreu, the collection of research produced on science and gender shows that the knowledge production system is strongly linked to a male model. Moema Guedes, Professor at the Department of Social Sciences at Rio de Janeiro's Federal Rural University (UFRRJ), goes even further. For her, there is a devaluation of the sciences considered feminine, those mostly occupied by women. "I think it is easier to study Humanities when you are a woman. We have more examples of inspiring and incredible women who came before us. But I also think it implies this scientific meritocratic view of positivism. We consider other disciplines, such as STEM and health, more scientific. We should start rejecting the view that STEM areas are more science, more objective, or more important".

A PROBLEM FOR SCIENCE

One of the reports presented in 2000 by the European Commission, among the actions that followed the advisory committee in Helsinki, showed that, in universities, in all areas of knowledge and in all European countries, men have a greater chance of success than women. The dramatic results sparked Elizabeth Pollitzer's involvement with the gender equality movement in science. Today, she is the director of Portia, a non-profit organisation that aims to promote the understanding of gender issues in the sciences and the participation of women in organisational practices and scientific knowledge.

Portia was founded in 2001 by her and other scientists at Imperial College London, an English institution that does not have Humanities departments and focuses on STEM disciplines. "It was a male-dominated environment. I felt that the most important thing to do was to find ways of convincing scientists that tackling inequalities in science was not just important for women, but for science itself", explains the researcher. One of *Portia*'s first steps was to submit and develop a seminar project for the European Commission, in which 14 leaders, selected by the organisation, examined scientific evidence composed mainly of empirical studies that showed different aspects of inequalities in the sciences. After three months of discussion, the group revealed something that no one had pointed out before: that scientific production was collecting more evidence for men, favouring them over women.

"It was clear to me that this was not a problem addressed to human resources departments. It was a problem of science, because it is about the quality of the production of scientific knowledge", reflects Elizabeth Pollitzer. From the need to make such information public and expand the debate on the evidence produced, the **Gender Summit** was born. The platform incorporates events in which scientists, gender scholars and public policy makers examine new evidence to show when, why and how biological and/or socio-cultural differences between men and women impact research results. The objective is to identify where improvements are needed and who should act to promote them.

Today, in addition to the ***Gender Summit*** Europe, there are platforms for Africa, North America, Asia-Pacific, Latin America and the Caribbean, and the Arab world. Visit: gender-summit.com. Brazil is to host a *Gender Summit* event for the first time in 2021.

THE GENDER LENS

In September 2014, Nature magazine published a **special edition** highlighting the need to foster diversity in control groups, so that the results respond to the variety of profiles of individuals. "Examples of how sex and gender influence health research results, evidence on the impact of the climate on the oceans, and the algorithms that underlie Artificial Intelligence, leave no doubt about the relevance of issues related to sex and gender for the quality of research. The discussion is now advancing to systematically integrating these variables in research, and assessing results", reflects Alice Abreu.

The special edition ***"Diversity: A Nature & Scientific American Special Issue"*** is available at: www.nature. com/collections/fegedeebec.

Evidences accumulate and are put into discussion in order to show that considering gender and sex in scientific production is essential for the production of a science of excellence. "It can be shown, with several examples, that male-dominated laboratories have shown poor results for women", says Elizabeth Pollitzer. She remembers speech recognition tools. The laboratories that developed this type of technology were mostly composed of a male team. As a result, many tests were carried out by men only, and when the products hit the market, they did not work very well for women, as they did not recognize different voice frequencies. At a second level, speech recognition software used in medical procedures to record exam data has led to such inaccuracies. "In the health area, many of the jobs that require codification of the procedures are performed by women. If there are more errors in speech recognition for women than for men, patient outcomes are impacted", explains Elizabeth Pollitzer.

This look at a skewed collection of scientific evidence is the starting point for assessing how research and its application operate in society. “Any bias that exists in research, that produces biased results in the perspective of sex and gender, will lead, in turn, to flawed applications and products”, adds *Portia*’s Director. She still remembers that, starting from the same biased training, men and women produce biased knowledge. For her, the solution must also come from the actions of funding agencies and scientific publications. “The quickest way to solve the problem is with funding organisations and journals, which could insist on certain requirements related to the topic for funded research. When writing a research proposal, scientists should explain whether and how sex and gender relate to the design of the study and the impact of the results. Gender should be treated as a primary variable to judge quality, not just as a field”, she concludes. •

Three researchers, one question
How does being a woman transform scientific practice?

Alice Abreu (UFRJ)
“The importance of diversity for knowledge is not restricted to science. In companies, creativity generated by diversity is increasingly recognised as paramount, and the same is true in research. Diversity is positive, not because women are inherently better researchers, but because having different teams brings other perspectives and ways of looking at problems, which helps to address complex issues of contemporary science”.

Elizabeth Pollitzer (Imperial College London / *Portia*)
“The presence of women in laboratories improves quality, communication and risks’ perception. Studies have shown that gender balance increases a team’s collective intelligence. Others confirm that there is no difference in the way a woman scientist and a man scientist work and that everyone is trained to follow specific protocols. But if something goes wrong, different ways of dealing with problems arise. Men tend to look for new methodologies and women spend more time trying to understand what happened, and if there was a mistake. It does not mean that the path of women is better. The important thing is that these differences exist. A man must bring women into research because it implies an increase in the diversity of perspectives of thought. When we start talking about the differences between men and women, we also have to talk about the differences between other groups that may be underrepresented in science”.

Moema Guedes (UFRRJ)
“The scientific career is designed and structured by an imaginary scientist, who is a man. When women enter this endeavour, they have to know that men are not a role model. They want and intend to build another science, which is not so productive. Women are always called upon to pretend that the embarrassment they experience in motherhood does not exist. It does. It is important that men and institutions realize this. So, I think this discussion does not exist outside of feminism. Either you have a political view of this process or you will continue depicting your career as something eminently individual – but that it is not individual, because it is in very the structure of society”.

Science by women, for women

Learn more about these three projects focusing on women’s health presented at the *Women in Science and Innovation* training, held in Rio de Janeiro, in 2019. The training programme is aimed at researchers who wish to innovate and start their own businesses, and it is the result of a partnership between the **British Council** and the Museum of Tomorrow, aiming to strengthen women leadership in scientific and technological innovation.

Gestational hypoglycaemia
Rebeca de Melo Oliveira, a master’s student in Biomedical Engineering at the University of Brasilia (UnB), has developed a prognosis system of hypoglycaemia for diabetic pregnant women or women with gestational diabetes. “One of the biggest problems in the pregnancy of a woman with diabetes or who develops gestational diabetes is hypoglycaemia. The condition comes with symptoms such as spasms, dizziness and convulsions that can lead to falls, and it is a risk to the health of the mother and baby”, explains the researcher. According to her, although there are blood glucose sensors on the market, the equipment is intrusive and expensive, and inaccessible to most. The prototype developed by Rebeca Oliveira is shaped like a watch, with sensors for heart rate, body temperature and humidity, data that together identify characteristic symptoms of hypoglycaemia. “As a woman and diabetic, I expect that, in the future, I may have more options when having a child. This is what motivates me to get closer to the female audience”, she reflects.

Breast self-examination
Graduated in Nursing, with a master’s degree in Computational Modelling of Knowledge and currently a PhD student at Mackenzie Presbyterian University, Alessandra Nascimento Pontes says she was diagnosed with breast cancer on 8 March 2013. During treatment, she noticed that many women were not doing the breast self-examination. Doubts and difficulties to perform the test prevented it from becoming a habit. “I, a woman, a mother and a health professional, had cancer. I was the first in my family and felt obliged to do something, and so I started thinking about how I could alert and help other women”. She developed *Touch Saúde*, an app that sends reminders every month with a step-by-step breast self-examination for users. “Identifying a change in the app’s results does not mean that you have cancer, but that professional evaluation is necessary. If the woman discovers something through the self-examination, she should seek referral services in her state”, she explains.

Technology for childbirth
The touch exam is a standard medical procedure, used to ascertain vaginal dilation and uterine prolapse in childbirth. However, in the context of obstetric violence, it is a test that could be repeated numerous times, causing discomfort and pain for pregnant women. “During delivery, I felt extremely uncomfortable with the touch. How, with so much technology available, did obstetrics seem so backward?” asks Ana Carolina Oliveira Lima, an electrical engineer and researcher who decided to develop a method that could minimize the recurrence of clinical examination. And so, *iParto* emerged, a system that can be used by pregnant women. “It is a kit that allows women to do the exam alone, inserting the equipment in the vaginal channel themselves. The doctor has access to the necessary information through a cell phone app”, she explains.

The kit has scalability in B2B and B2C models – acronyms for Business to Business and Business to Consumer, or in other words, it can be sold between companies or directly to the final customer, i.e. mothers. In the first case, the hospital would have the equipment and patients with medical referral; whereas in the latter, the parturient woman could buy the kit at a pharmacy and, with the application, evaluate with the doctor the right moment to go to hospital.

BY LUIZA LAGES

Leadership, influence and cooperation **in science and technology**

Three renowned researchers discuss gender strategies and policies for scientific advancement with inclusion and diversity.

In the debate on strategies for gender equality in science, one constant is the perception of challenges and the long way still to go. Veronica van Heyningen, Fabiola María León-Velarde Servetto and Elizabeth Silva, who participated in activities of the **British Council**'s *Women in Science* programme, made contributions to the theme during a mission to the United Kingdom in 2019. In the following interviews, the researchers, who hold leadership positions and have rich academic backgrounds, talk about international cooperation, political movements, technological development and career flexibility to promote diversity and include more women in science.

//VERONICA VAN HEYNINGEN//

Veronica van Heyningen is an English geneticist, an Honorary Professor at University College London, UK, and chairwoman of the Royal Society's diversity committee, an institution that promotes scientific research.

Women in Science Magazine: How do you perceive the evolution of gender equality in STEM? What are the most important points to be worked on?
Veronica van Heyningen: I have always thought that one of the most important things is to educate children, and not just girls. All children must be educated, from primary school, to learn that STEM subjects are interesting and that you do not need to be of any specific gender to participate and contribute to the practices and progress of these areas. It is essential to show that sciences are interesting and important, that they are part of everyday life and that they are a path to prosperity. We must also ensure that people can switch to STEM from other areas. I think that would be most useful, as it is important to build diversity from different experiences and backgrounds.

STEM is the English acronym for subjects in the areas of science, technology, engineering and mathematics. The term is commonly associated with educational policies and curricular strategies that aim to improve competitiveness in the development of knowledge in science and technology.

Photo: Malcolm Harris

Veronica van Heyningen

W.S.M.: What are the main challenges for women in science leadership positions?
V.vH.: It is important to ensure that women scientists can take maternity leave, have children and take care of them, while encouraging men to participate, taking time off to take care of children. We have to offer different ways to progress in our careers, ensure that it is possible to take a break and then return without people having to take steps backwards. I think it is important not to have a defined career progression path, because not everyone fits. Diversity has to be diverse, with different ways of reaching an end. We need to emphasize the need for flexibility and individual career achievement. You can do something different, come back and contribute a lot because it brings new and diverse experiences to your path. I'm talking about men, women, people with disabilities, and different ethnicities. Having teams with people of different experiences is one of the most productive ways of conducting science.

W.S.M.: Should we also think that diversity comes from international cooperation?
V.vH.: Definitely. This opens people's eyes to different ways of looking at things. Science itself is an international enterprise. The only way to get the best ideas is to have a wider view of the world, with as much interaction as possible.

W.S.M.: What else is essential for discussion?
V.vH.: Keeping men involved, because if we see them as opponents, it won't work. We have to convince them that we are equally capable and that we need to work together. And, obviously, we have to fight any kind of harassment.

//FABIOLA MARÍA LEÓN-VELARDE SERVETTO//

Fabiola María León-Velarde Servetto is a Peruvian biologist, Professor at Cayetano Heredia Peruvian University (UPCH), and President of the National Council of Science, Technology and Technological Innovation of Peru (Concytec).

Women in Science Magazine: How do you perceive the evolution of gender equality in STEM in Peru? What are the biggest challenges?

Fabiola María León-Velarde Servetto: In Peru, only three out of ten students starting undergraduate careers in science, technology, engineering or mathematics are women. This still represents an important disparity, and we must continue working on different actions to encourage greater participation of women in these careers. One of the great challenges is to encourage girls in school. At Concytec, we work with science clubs that allow us to promote this vocation, and for this, we have training programmes for teachers in STEM, emphasising the teaching of these areas to girls. Another major challenge is to have affirmative actions that offer facilities for women in the maternity phase, a period of possible break in path for women scientists. Doing research requires a lot, it practically forces women to choose between motherhood and their careers. That is why it is necessary to provide resources at the institutions as well as more time for the development of their projects. At Concytec, we have implemented actions that allow them to extend the term of their projects. A researcher in the maternity period, with two or more children under the age of four, has the possibility of an automatic extension of up to six months, with the possibility of renewal for another six. Finally, to encourage the participation of women in projects, we include a bonus in the score when women are part of the research team. It is extremely necessary to continue working on affirmative actions at key moments in women's scientific careers.

W.S.M.: How can this discussion be taken to the political level?

F.S.: The issue of gender equality in STEM careers is already being discussed at the political level. There is an awareness that the presence of women in these areas must be improved. During my presidency of the CTI commission at APEC *[Asia-Pacific Economic Cooperation Forum]*, we set up the principles for women's participation, in which we detailed actions that must be carried out to support gender equality in STEM. Soon, these principles should be submitted to the government for the development of actions.

Photo: Malcolm Harris

Fabiola María León-Velarde Servetto

W.S.M.: What is the role of international networks in the construction of gender equality?

F.S.: They are extremely important. Joining efforts not only increases the impact of actions, but allows for the sharing of knowledge, experiences and good practices from different countries. In addition, the involvement of different actors makes it possible to raise awareness among people and strengthen the actions carried out, generating better results.

//ELIZABETH SILVA//

Elizabeth Silva is a Brazilian sociologist based in the United Kingdom. She is an Emeritus Professor at Open University in London, gender and technology scholar, and author of the book Technology, Culture, Family: Influences on Home Life.

Women in Science Magazine: How do you evaluate the evolution of technology in the context of gender?

Elizabeth Silva: My work shows very clearly that technological advances in the areas that most benefit women, in general, appear much later than technologies that primarily benefit men. Much of the innovation in home technology came from war technologies. The microwave, developed from the creation of the radar during World War II, undoubtedly transformed the act of cooking and family dynamics with the flexibility of preparation and eating – a war technology of the 1940s that, only in the 1970s, became part of domestic technology. The disposable diaper is another example. It is said that a director of research and development at *Procter and Gamble* (P&G), when taking care of his grandson, found the model of diapers that existed at the time absurd and then was responsible for allocating resources to develop the disposable diaper. There certainly is an exclusion of women, an issue that is so profound. Historically, it is the role of women in the world to not have access to jobs and areas of knowledge that influence technological production, and to not have access to the distribution of wealth resources for research and development..

Photo: Acervo personall

Elizabeth Silva

W.S.M.: The establishment of diverse environments to produce knowledge and technology is so important. How can we work towards it?

E.S.: It is an objective that is linked to the whole feminist project of changing the social exclusion of women, making gender distribution less unequal in the world and ending gender hierarchies. It is so important to promote women's careers in science, not only in universities, but also in corporations and institutions in general. We need this for a more egalitarian composition in science, technology, finance and in the various areas of knowledge and the market. Gender issues in science and technology are not separate from other social spheres. But I think it is necessary to promote events dedicated to thinking about the subject, publications and spaces in publications directed to the theme of women and science. Funding and lines of credit are also needed to enable progress on these issues. We need to educate not only children, but fathers and mothers, because the girl who plays and is aware that she can build things can become an engineer later. It is important for girls and women to hear that all important "yes, you can". ●

Gláucia Vieira, from the Cienciarte platform, in training at the Museum of Tomorrow.

Photo: Guilherme Leporace

BY LUIZA LAGES AND MARIANA ALENCAR

Science dissemination through **representativeness**

Science dissemination initiatives demonstrate concern for gender equality in science communication

Beatriz Guimarães and Sarah Azoubel

Foto: acervo pessoal

This story begins at the University of California in San Diego, in the United States, where biologist Sarah Azoubel obtained her PhD. In a tiny laboratory, Sarah spent most of her days doing experiments for her research and found podcasts the necessary distraction to relieve the boredom of dull and repetitive work. Through headphones, productions such as *This American Life* and *Radiolab*, both renowned American podcasts, captured her attention and instigated changes in her professional trajectory. Upon returning to Brazil in 2017, she decided to take a turn in her career and joined the specialisation in scientific journalism at the State University of Campinas (Unicamp). It was there that she met journalist Bia Guimarães. Together, they created a content production project in audio format, and in October 2018, the first episode of **37 Graus**, was aired, an audio-documentary-style podcast that tells stories traversed by science.

37 Graus is available on all major streaming platforms, such as Apple and Google Podcasts, Spotify, Castbox, Podcast Addict, Overcast, Pocketcast, Radio Public and Stitcher. Visit 37grauspodcast.com

In each episode, they travel through Brazil, immersing themselves in their guests' routines and depict, with the specific addition of technical and scientific information, the journeys and experiences of their characters. In the first season, they talk about the launch of a balloon to the stratosphere in São Carlos (state of São Paulo), the nineteenth century charcoal plants identified in Rio de Janeiro, and the changes that climate change is causing to coral reefs in Rio Grande do Norte. From the setting of the agenda to the final product, it takes months of work. "There are episodes that are no longer than 30 minutes, but that took months of production, with research, interviews, recording and editing. Some interviews have to be scheduled on specific dates. The soundtrack and audio effects are originally made for each episode by a musician. Sometimes, we try to make our own effects, which don't always work", details Sarah Azoubel.

FOCUS ON EQUALITY

The absence of women in science, addressed in other reports in this edition, also reverberates in scientific dissemination. In Brazil, the vast majority of scientific outreach projects, especially those not linked to universities, such as YouTube channels and podcasts, are conducted by men. But this was not a problem for Bia Guimarães and Sarah Azoubel, although they are constantly questioned about their technical capabilities as audio producers. "I think we have more difficulties because we are women working with audio than talking science. We study and know a lot about podcasts, but sometimes there are people, mainly men, who feel the need to teach us. There are always situations in which we are also spoken to like children", says Bia Guimarães.

The difficulties and prejudice faced by the pair lead to a concern about the role of scientific dissemination in gender equality. For podcasters, it is the duty of science communication to provide the same spaces for all minorities and underrepresented groups, bringing diversity of gender, ethnicity and socioeconomic class to publicity. This concern is even present in the choice of guidelines and guests that appear in each episode. "The least that scientific disseminators have to do is give everyone equal space. But this is problematic, sometimes. We know that laboratories are, for the most part, headed up by men and that they hold higher positions in research. We try to take stock, check if there is a balance. When we saw that there were none, we went looking for women to be interviewed, for example", recalls Bia Guimarães.

They say that, unlike other science podcasts, *37 Graus* audience is mostly made up of women. Sarah Azoubel believes that this is due to the audience's identification with podcasters: "We started *37 Graus* because it was what we liked to hear. I think the fact that it is done by women ends up attracting this audience profile, in addition to the way we treat matters", she concludes. •

Information spread by women

Women researchers and students invest in digital channels to share their own research and provide visibility to the work of other women.

Women scientists on Wikipedia

Wikipedia is one of the main sources of information on the internet. The online multilingual and freely licensed encyclopaedia is written collaboratively. Any user can add and edit content on the website, but for every 100 English-language biographies, only 17 are of women. For scientists, the ratio is even lower. Determined to transform this scenario and promote the stories and work of women researchers, British physicist Jessica Wade started a project that won great attention around the world in 2018. Every day, she inserts a new biography of a woman scientist on the platform. Hundreds of names have already been included and released by the researcher based at Imperial College London, the university where she obtained her undergraduate, master's and PhD degrees. Jess Wade balances studies on polymer electronics with this and other scientific dissemination actions, promoting gender equality in STEM. She is also critical of the lack of diversity among Wikipedia editors, and advocates a greater women presence in spaces promoting science. In 2019, Jessica Wade participated in a series of activities of the **British Council** mission carried out in the United Kingdom, as part of the **Women in Science** Programme.

Science and art

The *Cienciarte* platform was created in 2016 by Rio de Janeiro researcher Gláucia Vieira. Professor at the Federal University of Tocantins (UFT), Gláucia idealised the project based on the need for a communication channel between scientists. The idea resulted in a platform, which works as a social media channel for those who do research or are interested in the subject. For Vieira, *Cienciarte* is a way of showing that there are women involved in science in the country. "When people see our work, we inspire other women, make an impact and raise awareness of the importance of science and innovation", comments Gláucia, who was also one of the participants in the **Women in Science and Innovation** training, promoted by the **British Council** in Rio de Janeiro, in 2019.

Foto: Malcolm Harris

Jess Wade

The power of social network

After realising that society was not aware of events at universities, especially research, Mariana Neiva, a PhD student in Computer Science at the University of São Paulo (USP-São Carlos), decided to invest in scientific dissemination through the creation of a blog, a YouTube channel and an Instagram profile. In them, topics such as academic life, coding and algorithms are approached in a light and relaxed manner by the young woman, responsible for the production of content for the three channels, named after her. "We, in the academic area, spend more time with other researchers and people in our area and end up not perceiving society outside of our context. Disseminating science is like leaving this bubble and taking quality information from safe and serious sources to people", comments the researcher, who also participated in the **Women in Science and Innovation** training.

Photo : Guilherme Leporace

Ana Carolina Souza in training at the Museum of Tomorrow.

BY LUIZA LAGES AND MARIANA ALENCAR

Women scientists and **entrepreneurs**

In the Women in Science and Innovation training, an exchange environment fosters entrepreneurship that comes from research

"In Brazil, entrepreneurship is still a question of survival, not opportunity. The business model is not based on technology and innovation", said Letícia Piccolotto Ferreira, executive president of *Brava Foundation* and founder of BrazilLab. In the **Women in Science and Innovation** training, conducted in 2019 by the **British Council** in partnership with the Museum of Tomorrow in Rio de Janeiro, she spoke about the importance of qualifying the entrepreneurship ecosystem and reducing processes, taxation complexity and tax costs to leverage technology-based companies.

A large part of women entrepreneurs in Brazil today act in the informal sector. Most low-income families who are entrepreneurs are headed up by women who have not found a space in the formal market. "But you all have a differential, you are elsewhere, in innovation and science", said Alice Abreu, Emeritus Professor at the Federal University of Rio de Janeiro (UFRJ), to the group of researchers at the Museum of Tomorrow.

According to the sociologist, if the discussion on science and gender has been going on for more than two decades, innovation has entered the conversation more recently. "I think the debate got a big boost about five years ago, with the **Sustainable Development Goals (SGDs)**, many linked to solutions through innovation. This promoted discussions and brought new institutional actors to the debate", she said.

Also known as Global Goals, they are a universal call for action against poverty, for the protection of the planet and to ensure that all people have peace and prosperity. They include topics such as global climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities.

For Alice Abreu, scientific systems and conventional understanding of leaders are not neutral. They are oriented to accommodate male models and do not take into account the needs and female roles in entrepreneurship. The same is true for innovation: "It is not neutral, neither in the impact it has, nor in the way it is created. Men and women have different social roles and are educated in different ways. Not only is innovation different if it is produced by men or women, but it has other impacts", she reflects.

Felícia Silva Picanço, professor at UFRJ, also a speaker on the training held by the **British Council**, endorsed Alice Abreu's speech and, in addition to addressing the effects of diversity on the development of more profitable products and services, spoke about the direct relationship between innovation and university. She recalls that current innovative scientific production throughout Latin America is mostly done in national public universities, which brings a series of challenges associated with structural inequalities in the educational system.

"Over time, men have been lagging behind in schooling, and we have seen a reversal of gender inequality. Higher education in Brazil has been transforming in the last 50 years, mainly in the last 20. But that is not enough for women", said Felícia Picanço. Two central challenges were highlighted by the researcher: how to produce a greater incentive for women and black to join STEM areas, which traditionally produce innovation; and how to make other areas, which already have a majority of both groups, also produce innovation.

From university to entrepreneurship

Ana Carolina Souza followed the traditional Brazilian academic trajectory. A biomedical scientist, she completed her undergraduate degree and went on to her master's and PhD, specialising in behavioural neuroscience. When handing in her thesis, she was invited by a friend to start a business. And so, the neuromarketing company *Forebrain* was born. In a lecture at the **Women in Science and Innovation** course (photo), the biomedical scientist spoke about her experience: "We needed to speak the language of the market. It took us two years for us to learn how to communicate with people".

For her, firstly it is important to present the idea to potential customers and, based on what is returned, work the product with well allocated resources. "The company has to leave the owner's control. One has to look for partners and investors who share your values and then transform them into shared values for the company", she explains. The inflow of investments did not come to *Forebrain* either: "One of an entrepreneur's points of resilience is funding. Before making this professional spin, it is important to save money. It has to be very fluid, and expectations should be reduced", she advises.

The businesswoman also explains that it is better to deliver the good than trying to deliver the great. "Whoever comes from research is a perfectionist and wants to do everything flawlessly. But if you are going to do business, fantastic doesn't work", she says. For her, however, there are characteristics of the research universe that are valued in entrepreneurship, such as persistence, stubbornness, measuring and generating impact. Finally, Ana Carolina Souza defines what innovation is, in her view: "An entrepreneur is not someone with an idea. It is someone who understands the place of an idea in the world and transforms it into reality", she says. She adds, stressing the importance of focusing on the problem, not on a specific solution, "You need to generate value, which involves disruptive innovation, by positively transforming a person's life".

An entrepreneur is not someone with an idea. It is someone who understands the place of an idea in the world and transforms it into reality.

Biotechnology coming out of the laboratory bench

Fabiana Noronha, a researcher in the Department of Pharmacology at the Federal University of Santa Catarina (UFSC), is a biochemical pharmacist, Master in Cellular and Molecular Biology from PUC-RS and a doctor in Pharmacology at UFSC. After finishing a post-doctoral internship in Denmark, where she worked on multidisciplinary technology and innovation projects in the health field, she helped found *TechPain*, a start-up focused on treating chronic pain in arthritis through nanotechnology.

"We developed an anti-inflammatory nanomedicine and associated it with a non-invasive and portable device that directs the medication to the location of the pain", explains the researcher, who participated in the **Women in Science and Innovation** training. The company was created from the results of research carried out in university laboratories. For the scientist, one of the great challenges is to make the university-market connection: "Many solutions in biotechnology and life sciences arise in universities, but they are not applied due to lack of entrepreneurial training. They don't leave the labs", she says.

For food engineer, Janayna Bhering, Master in Science and Technology and one of the founders of *Safe Test*, a company that develops diagnostic kits for various diseases, entrepreneurial women face other challenges: "You always have to prove yourself more to get the same results. That is why the moments of exchange and the support of women are so important, so that we do not give up and can encourage others", she reflects. She also participated in the course held by the **British Council**. "The idea of *Safe Test* is to provide simple tests, which can be purchased from pharmacies, taken to remote locations and performed easily. Each user would have a diagnosis and could seek treatment when necessary", she says. *Safe Test* came from Janayna Bhering's partnership with two researchers from the Federal University of Minas Gerais (UFMG).

Women ready to **innovate**

BY LUIZA LAGES AND MARIANA ALENCAR
ILLUSTRATION: ANDRESSA MEISSNER

Meet the researchers selected for a Mission to the United Kingdom after the Women in Science and Innovation training

Used to writing long and detailed projects for funding calls and agencies, scientists from all over Brazil faced the challenge of presenting their research in just four pages for the selection at the **Women in Science and Innovation** training, designed by the **British Council** to promote products and prototypes with potential for innovation and applicability in the market. A select group of women was chosen and divided into two classes to participate in five intensive training days at the Museum of Tomorrow, in Rio de Janeiro, in the second half of 2019.

The researchers learned about the Law of Innovation, patents, the importance of branding, concepts and applications of design thinking and opportunities for work in innovation, in addition to many themes of entrepreneurship. At the end of the course, they were challenged to summarise the potential of their projects in two-minute pitches. After the presentations, four of them were selected for a week of immersion visits and activities in the UK, in February 2020, when they were introduced to the complex British science and innovation ecosystem. Meet the four training winners below!

//RENATA BANNITZ FERNANDES//

While still in college, the vocation for research had already manifested itself for Renata Bannitz Fernandes. Even in the first periods of her undergrad in Biology at Paulista State University (Unesp), the young woman participated in scientific initiation projects. When she graduated, she decided to remain at university and took her master's degree. She then obtained her PhD in Genetics, this time from the University of São Paulo (USP).

Renata presented her proposal for the development of an innovative medicine for the treatment of acute lymphoid leukaemia, the most common type among children, seeking to supply the national demand with a new asparaginase molecule, different from those that already exist on the market, to reduce side effects in patients. The drug is the flagship of the start-up *Bio Breyer*, coordinated by Renata and her partner, Carlos Breyer.

"We were able to create a very promising molecule, which has 50% more activity than our competitor and is 50% less immunogenic. We believe that these characteristics will provide a high-quality treatment for patients", she explains. The proposal is in the production scheduling phase, so that, later, official pre-clinical tests can be made. "So far, we have been able to test the molecule in vitro, in cells and in mice, but we need the pre-clinical trial to transfer the technology to a pharmaceutical company", said the researcher.

It was not just the selection for the Mission in the UK that inspired and motivated Renata to move forward with her research. During the five days of activities in Rio de Janeiro, she found herself among "admirable women who filled her with a load of energy". For her, the connections made, and experiences shared were the biggest gains of the event. "Throughout the week, I heard emotional testimonies, and, with each story, I saw myself. It was all very intense", she said.

//PATRÍCIA DE ALBUQUERQUE GARCIA REDONDO//

The training week was not easy for Patrícia de Albuquerque Garcia Redondo: the biomedical doctor is the mother of a two-year-old girl who, during that week in October, contracted pneumonia. “I thought about dropping out, but other mothers gave me a lot of support, saying that everything would be fine. This gave me the courage to continue”, she said. Patrícia works at the National Cancer Institute (INCA), and her academic career has taken place at the Federal University of Rio de Janeiro (UFRJ). During a postdoctoral internship at University College London (UCL), England, UK, she learned methodologies for the growth of tumour cells without the use of animals in laboratory that helped her to formulate the project presented at the Museum of Tomorrow. Her proposal was to develop a platform that could function as an in vitro test to predict the response of a tumour to associated drugs.

“Given a variety of drug options, it can be difficult to predict which drug will be most effective in combating a certain tumour. This is bad for the patient, who ends up being subjected to various side effects. The development of this platform will solve this problem and may contribute to the treatment of different tumours. So far, nothing like this has been done before, as the growth of these cells in laboratory is a huge challenge”, she explains.

The excitement with which Patrícia talks about her research demonstrates her passion for science. But still, she sees that there is much to be done in this field. “It is necessary to bring innovation to the conversation. The bench scientist is restricted to that universe. But with industry 4.0, that has to change. We need to know how Brazil will position itself in this medium. Outside Brazil, Academia is already getting ready and I don’t want our country to be left behind. We have successful examples of technologies created here that have taken over the world. Now is the time to be a reference for technological innovation in the clinical management of cancer”.

//LUISA LUZ MARÇAL//

Luisa Luz Marçal followed a traditional academic path within the university: she graduated in Chemistry from the Federal Institute of Education, Science and Technology of Rio de Janeiro (IFRJ), obtained her master’s and PhD degrees from the Federal University of Rio de Janeiro (UFRJ), in Organic Chemistry and, right at the beginning of her PhD, was approved at a public examination at IFRJ Nilópolis campus, where she has worked for five years as a teacher and researcher. The Institution’s focus is on teaching, which did not prevent Luisa from starting several research activities. With her background and a scientific streak, she became involved in projects and began to supervise the Institute’s research laboratory. “I started to think together with students on more practical questions: how can we apply all this scientific content more effectively, outside the Institution, to the community around us?” she says. When observing the environment and the current needs of society, the idea came up to produce a prototype of bioplastic - a biodegradable plastic made of raw material for reuse, and of plant origin. “Walking down the street, you see trash cans overflowing with little bottles and other plastic objects. In Baixada Fluminense, which has precarious waste treatment, we have direct contact with this”, says the researcher. And so, within the scope of the Federal Institute, work was carried out to raise awareness about the consumption and disposal of plastic by students and the community. “We then decided to apply science to a product that, in the future, could solve this problem once and for all”, she adds.

The path of bench research towards real application in the community still depends on a bridge, built in the meeting of the project with the market. And then came the researcher’s challenging training experience. After an intense week of learning, outside her comfort zone, Luisa came out as one of the winners. With her academic background, she began to collect more knowledge and develop an interest in entrepreneurship and the possibilities of innovation. “It was a training that served as a starting point to think about research differently. It was very gratifying to have opened people’s eyes on the project, the institution and the social and environmental issues aligned with science and innovation”, she comments.

//DEBORAH BITTENCOURT MOTHÉ FRAGA//

After hearing about the trajectory of Deborah Bittencourt Mothé Fraga, a researcher at the Gonçalo Moniz/Fiocruz Bahia Institute, it is difficult to think of professional profiles more diverse from each other, in research and in the market, which complete each other by promoting innovation. As an undergraduate student in Veterinary Medicine at the Federal University of Viçosa (UFV), Deborah wanted to solve problems she witnessed at her father’s dairy farm - this was the impulse that led her to research. After graduation, she specialised in Animal Reproduction and obtained a master’s degree in Animal Science, both from UFV. But it was only when she left university that Deborah became interested in public health. She completed her PhD in Epidemiology and Biotechnology at Fiocruz Bahia.

“I got to better understand the applicability of biotechnology, science, and the power to solve broader problems, not only of animals, but human health”, says the researcher. Since then, she has worked with the development of diagnostic tests and epidemiological projects in endemic areas for leishmaniasis. “Leishmaniasis is part of a group of diseases that affects the health of many people. Many pharmaceutical groups and industries are not interested in focusing on these diseases, because they affect the more vulnerable and are the result of lack of infrastructure. But we, as scientists, have to give answers to society”, she says.

One of her projects was a diagnostic test for leishmaniasis for immunodeficient patients. She has seen that laboratories working with this diagnosis have great difficulty in detecting the disease in this group, especially among HIV positive patients. “These people produce less antibodies and, therefore, have lower detection rates in serological tests. As we have been working with proteins that perform well and have a very advanced prototype for diagnosis in dogs, we now intend to focus on human diagnosis”, she explains.

Winner of the training conceived by the **British Council**, Deborah speaks with excitement about the opportunity in the United Kingdom. “The course has completely changed my way of thinking and my plans for the future”, says the researcher. She wants to establish partnerships with companies and groups that can help make the rapid test for leishmaniasis a reality. •

Capacity building for empowerment

BY MARIANA ALENCAR AND VERÔNICA SOARES

Courses develop self-confidence and guide women towards career development

The stories you will read here have in common the fact that they are told by women leaders who, when starting their own businesses, realised the importance of supporting those around them with regards to academic background and career development. Through this, they founded initiatives to develop new leaders, with a focus on training, innovation and social technology. Peruvian Mariana Costa Checa, for example, when starting up a digital and software development agency, found one problem: the difficulty of hiring women coders. At the same time, she and her two partners realised that the technology area was a fertile field for generating opportunities for young people. The union of these elements brought about *Laboratória* in 2014, a social organisation focused on training women in technology.

The pilot programme was attended by 15 young women from low-income communities who received online training. Soon, several Peruvian companies became interested in the initiative and the project expanded, and is now present in four countries in Latin America: Peru, Chile, Mexico and Brazil. In 2017, Mariana Costa Checa took part in a meeting at the Inter-American Development Bank (IDB), in Washington, United States. There, she met Regina Acher, who became interested in bringing the course to Brazil. “Each one has their own cause and the lack of opportunity for young people was what most angered me. When I met Mariana, I said that I would help her bring *Laboratória* to Brazil. In 2018, we managed to set up our first group”, recalls Acher, who is currently a partner in the organisation, and executive director in Brazil.

The location chosen for the implementation of *Laboratória* was Ibmec College, in São Paulo. Courses take place once per term, with 60 vacancies. At the end of the training, participants have the skills to fill vacancies as computer programmers in technology companies. “We train students based on a specific methodology, in line with what companies expect and need. They graduate as junior front-end developers, and we have six months to get them to a new career level, connected to the job market”, details Regina Acher. *Laboratória* also offers in-company training and assists in the digital transformation of different projects.

During her participation in the Policy Dialogue: breaking barriers and making history in technology, from the **British Council**’s **Women In Science** programme, at the *Rec’n’Play Festival*, which took place in Recife (state of Pernambuco) in October 2019, Regina Acher explained that *Laboratória* seeks to expand the possibilities for the most diverse profile of women, not requiring any prerequisite for training, except for the interest in changing careers and participating in the course. “Those selected must be over 18 and have completed high school. An undergraduate degree is not required. All the women who participate are very determined and are talented without even having realised they were interested in technology. Some only find out during classes”, she says.

SELF-CONFIDENCE TO HACK THE SYSTEM

Even after entering the job market, especially in the area of technology, women face problems that prevent them from growing professionally. Issues such as low self-esteem and **imposter syndrome** are common among those who are part of predominantly male teams. Faced with this scenario, a São Paulo entrepreneur, Carine Roos, decided to create a school to develop leadership skills for women. *Programa Elas* emerged in 2017 with the aim of changing the reality of women who work with technology and innovation and want to achieve strategic positions at work, such as those of leadership.

A phenomenon in which qualified people feel inferior and question their own skills. Researches show that women are more prone to the syndrome, which directly impacts their performance in the job market.

"I came from the Humanities area, but I always had a passion for technology. When I started, it was quite challenging. I experienced daily micro-aggressions and my intellectual capacity was always questioned. I realised then that something more concrete was lacking in the market to help women in the same situation. In *Programa Elas*, we specialize in soft skills, that is, we teach women to position themselves within a male chauvinist environment and help in the development of self-confidence. The idea is to hack the system", she comments.

The courses offered by *Programa Elas* take place on weekends over a period of three months. In each class, about 30 women learn to be more assertive, how to ask for a raise and behave in a job interview, as well as how to balance their personal lives, among other issues. "Of the 500 students we have trained, 30% have already been promoted or received a salary increase in less than a year after taking the training. In addition to the course, we offer mentoring on demand. Everything is done in a process of self-knowledge", she details. *Programa Elas* also offers specific training for black women. Carine Roos explains that this proposal came from the understanding that the oppressions experienced by black women are different from those experienced by white women.

Like *Laboratória*, *Programa Elas* offers a specific training version for companies. For such customers, the methodology is different. The expected result, however, is the same: empowerment and development of self-confidence in women so that they can grow in their careers, becoming new leaders and, who knows, even starting their own businesses. Carine Roos recalls that one of the most successful cases of *Programa Elas* occurred at a business training event at *Banco de Brasilia* bank. "The Bank's CEO opened a recruitment selection process focused on expanding the hiring of women. We worked with 52 candidates and, of the seven vacancies, five were filled by those who had received our training", she celebrates..

EMPOWERING POOR COMMUNITIES

Graduated in Social Communication at the Federal University of Minas Gerais (UFMG), with complementary training in Social Sciences at Vrije Universiteit in Amsterdam, the Netherlands, Tatiana Silva dreamed of implementing the experiences she had had in Academia and abroad to transform her local reality. Before becoming a social entrepreneur in Belo Horizonte (state of Minas Gerais), she worked in Mozambique, Spain and Portugal, conducting research with funding from the UNESCO-HIDROEX Foundation, and received support from the Newton Fund, an initiative of the British government that aims to promote the social and economic development of partner countries.

Upon returning to Brazil, she wanted to do something more meaningful to contribute to a new way of entrepreneurship in the country. "I was very uncomfortable with local development initiatives that reproduce the logic of large enterprises and do not work for the empowerment of the people who run local businesses, to really transform their lives and the community in which they live", she says. The search for an action model that would allow her to promote empowering education in poor communities led her to co-found, together with her partner, João Souza, *FA.VELA*, Brazil's first slum-based accelerator. Created in 2014, the organisation started in Morro do Papagaio, in Belo Horizonte, but already operates outside the geographic limits of the capital.

Her rich trajectory was presented at the *Tea Tech Talks* panel on entrepreneurship opportunities and innovation between Brazil and the United Kingdom, promoted by the **British Council**, during the third edition of the She's Tech Conference, held in Belo Horizonte, in November 2019. On that occasion, she shared her journey and spoke about *FA.VELA*'s differential. As project director, Tatiana Silva wants to promote social transformation and contribute to empowered training of diverse subjects pertaining to the poor communities, being an accelerating agent, mentor and process facilitator of the Sustainable Development Goals. *FA.VELA* has already handled more than 250 projects, and about 70% of the members are women, with varied business profiles where party decoration, pet care and furniture restoration are just some of the businesses already accelerated. "The fact that women are in charge of many of these ventures is important as their income greatly improves the quality of life of their families", says Tatiana.

The organisation promotes *Corre Criativo*, a proposal for acceleration and mentoring that aims to bring traditional working methodologies closer to the reality of the poor communities: "We rethink the language of start-ups based on the idea of *corre*, to always be busy, working to survive, and how this is related to the decision of starting a business as a sustainable alternative for generating income in communities". *Corre Criativo*'s proposal starts from the ideals of start-ups but re-signifies its meaning to the reality of slums: "We work with the idea of 'best run possible', because we want training to be connected with the experience in poor communities. We also operate with personal development, with the idea of the 'entrepreneurial self' who needs to know and knows what they want, and we value networking. It's better for everyone to help each other and grow together instead of striving to be better than the next", concludes Tati.

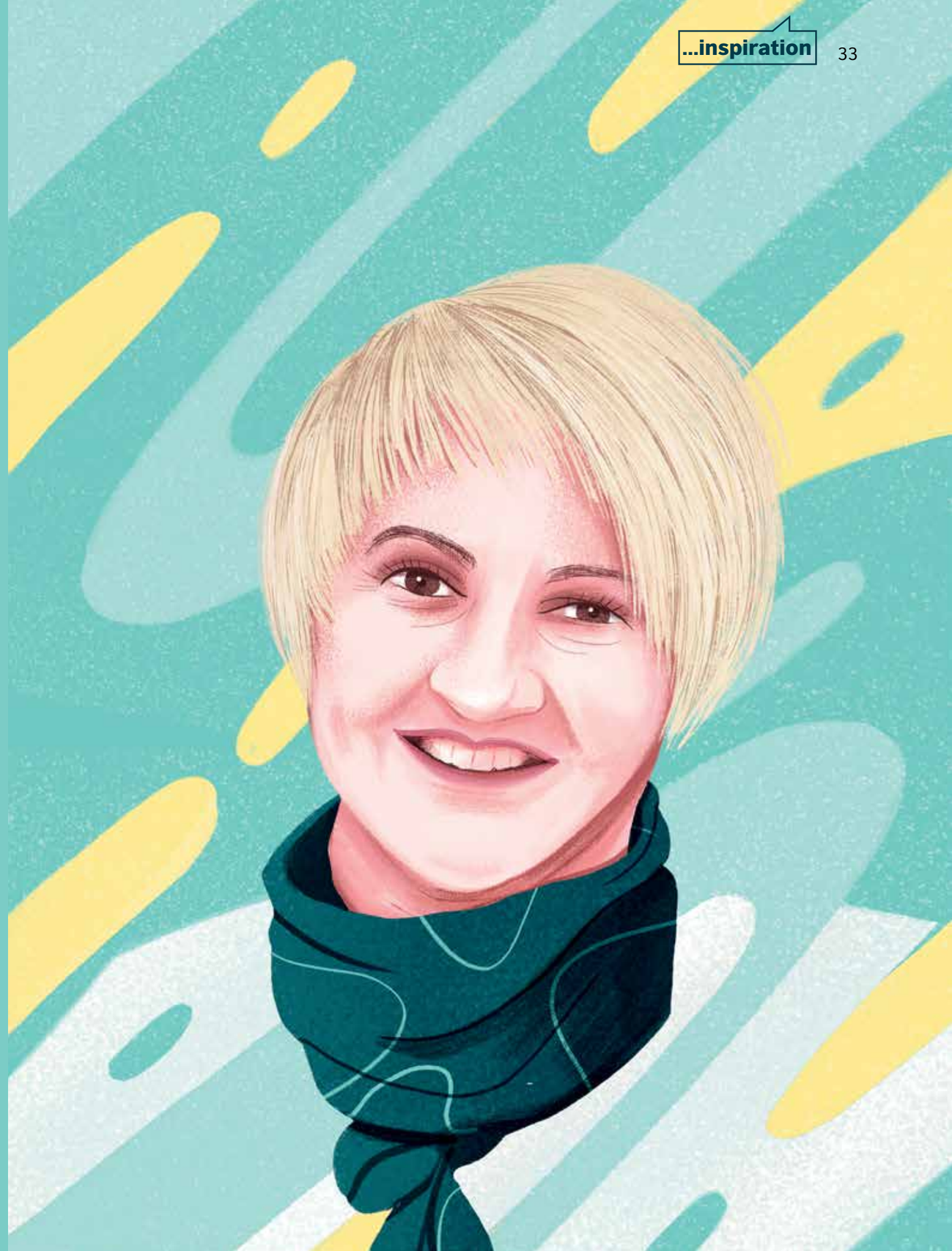
BY MARIANA ALENCAR
ILLUSTRATION: ANDRESSA MEISSNER

Professor Josie Fraser, from Open University, points out paths for creating a more diverse science

Science **for everyone!**

A study carried out in 2015 and updated in 2018 by **McKinsey and Co.** consultancy showed that companies with greater diversity in their teams tend to be more profitable. The research revealed that companies with greater gender diversity are 21% more likely to achieve greater productivity. When there is also cultural and ethnic diversity, productivity rises to 33%. In science this is no different, but research institutions still face problems with the absence of underrepresented minority groups in STEM. In addition, women, non-white people (black, Latinos, Asian and indigenous) and members of the LGBTQI+ community constantly perceive conflicts between their cultural identities and spaces in scientific production. For this reason, in addition to economic and structural barriers that prevent these people from reaching university, students with these profiles stand more chance of giving up their academic careers when getting there, which in turn, damages the diversity of the academic staff and students in most institutions.

The study is available for reading and downloading at http://bit.ly/estudodiversidade.



Based on such findings, Open University is determined to change this scenario and make science accessible to everyone, regardless of gender, ethnicity, class, nationality or religion. Founded in 1969, the state institution maintained by the UK government and present in 157 countries, has among its pillars the understanding and respect for the needs of students, providing more opportunities for students to engage in part-time university activities, for example. The University has a strong commitment to equality, diversity and the construction of an inclusive academic community, in which inequalities are contested and all people are treated with dignity and respect. For this, it is assumed that differences are important: they generate plurality of ideas and new perspectives. For **Josie Fraser**, who has already been the STEM director at Open University, and currently holds the position of Deputy Vice-Chancellor, flexibility in the training offered to underrepresented groups is a key feature for minorities to increase their participation in the STEM area. For her, distance learning and reduced workload facilitate the routine of those who are unable to give up their jobs or cannot commute easily, for example.

During her studies, Josie Fraser experienced first-hand problems commonly faced by women in academic or professional settings. The perception of the prejudice faced by minorities within her circle, in addition to her own experiences, made her decide to dedicate herself to the struggle for the inclusion of underrepresented groups in STEM. “It didn’t happen overnight, like an epiphany. I had a friend who went through difficult times due to his sexuality. In another situation, in which I had just got engaged, a woman, who held a higher position, congratulated me and asked if I had plans to have children. I said that I did. She then went on to say that I needed to choose

Josie Fraser was the main speaker at the table *Women’s Science: breaking down barriers and making history in technology,* promoted by the **British Council**’s **Women In Science** programme, during the *Rec’n’Play Festival*, that ran between the 2nd and 5th of October, in Recife (state of Pernambuco).

the right time to start a family, as that would be a problem in the future. I know she didn’t mean any harm but, just a week earlier, she had promoted a man with several small children. I’m sure they didn’t have a conversation about the kids. This prompted me to become more feminist and changed my perspective on several other issues”, she recalls.

In her work at Open University, Josie Fraser argues that interpretations from people with different styles and backgrounds contribute to the creation of new paths in science, as in the example of carrying out an experiment: “When you don’t know how to interpret a result, you ask several people. When they have different experiences, the possibilities for interpretation and responses increase”. With this, she advocates the existence of a multiplicity of body profiles and experiences in classrooms and laboratories, in addition to the experiences of cisgender and heterosexual white men - who for a long time were and, in some cases, are still the majority in science spaces.

To illustrate her concern with issues of diversity and the results of scientific endeavours, Josie Fraser says that, during an event at Open University, she had contact with students from different locations in the UK who reported concern about the lack of equipment for women working in the fire department, the army and the police: “The work items in these corporations were not designed for the female body. They always disregard that they have breasts or that weight is distributed differently throughout the body when compared to the male body”, she details. For her, there are

Diversity in teamwork contributes to the creation of new pathways in science

also technologies that were not made for black skins, since prototypes built in testing phases only considered white people, because they were made only by these people. “This shows that without diversity in science and technology, we will only reinforce inequalities and transform the world into a worse place”, she warns.

But she reinforces that raising awareness about inequality and the lack of inclusion of under-represented groups is a process that needs to be accompanied by attitudes that promote change. For Josie Fraser, in addition to the institutional decisions for flexible curricula and workload, transformation still requires other important elements: the participation of privileged people and the openness to new ideas. “When we are aware of the problems, we notice, for example, that a black woman needs to be exceptional in her work to become a university professor and that the same is not required of men. We have to include them in the discussion, and they have to remember that if they want to be good scientists, they have to deliver good results, and these results should include everyone. If you disregard this, you are not good at what you do”, she concludes. •

The struggles for **diversity**

BY LUIZA LAGES

Elected as a member of the World Academy of Sciences (TWAS) in 2019, Márcia Cristina Bernardes Barbosa has collected feats that, until decades ago, were unimaginable for women scientists. Full Professor at the Physics Institute of the Federal University of Rio Grande do Sul (UFRGS), her research trajectory is dedicated to water anomalies, a theme for which she received the L'Oréal-Unesco Award for Women in Science, in 2013. She is also a member of the Brazilian Physics Society (SBF), the American Physics Society, and the National Council of Science and Technology (CNPq), not to mention the director of the Brazilian Academy of Sciences (ABC). But Márcia's story is also built on a series of debates and struggles for diversity. It was in the undergraduate course in Physics that she says she discovered herself as a woman. In a male-dominated environment, with a male-dominated academic progression, she began to fight for opportunities and growth. While growing professionally, she saw the number of women around her becoming smaller and smaller.

She became a teacher and fought for the creation of a research group and gender groups in Brazilian institutions, and for effective changes that would increase the presence of women in Academia and in leadership positions. She actively participated in the movement that led to the approval of the law that instituted maternity leave for research fellows in Brazil and also the inclusion of information about birth or adoption of children on the *Curriculum Lattes* platform. In the following interview, Márcia Barbosa talks about her work and her story, explains the behaviour of water, talks about motherhood, harassment, productivity, what is missing to achieve a different science - and, above all, she highlights that we only need ten seconds to change the world.

Women in Science Magazine: What led you to Physics?

Márcia Barbosa: I have a peculiar history. My father was an electrician and a military man, an Air Force sergeant. Our family was always on a tight budget, we fixed everything in the house and my father always needed someone to help. He would first call my brother, but he wasn't very interested. Since I was the second in command, the second oldest, I helped him out. My father showed me how things worked, and I thought everything was wonderful. One day, my school got laboratory equipment and the Principal asked me to set up the structure. I learned so many fascinating things! I understood that these challenges of discovering, fixing and making things work, were what I wanted for my life. For me, Physics was what most put me on that path.

Fueto: Malcolm Harris

Renowned researcher, at the head of movements for gender equality, Márcia Barbosa talks about the struggles of women in science.

W.S.M.: What would you say to someone who wants to understand your work and your research?
M.B.: Research is kind of surprising. When we do research, we think we already know the answer to the problem. We fight, we want the answer to be what we think it is. When you get to a different result, you think you did something wrong in the calculation, in the simulation, in the experiment, instead of thinking that that's the way it is. There is a moment of exchange of ideas that is painful but also very pleasing, because normally the new is a discovery with more impact. At the same time that you realise you were wrong, you are also the first person in the world to know the new. This moment is an orgasmic! We live for it!

W.S.M.: In your academic background, what was most impactful for your research?
M.B.: It was the work for which I won the L'Oreal Award. We understood why water moves faster when it is compressed. Imagine I have a shopping mall and I fill it up with people. Everyone starts walking faster because it is full. If I fill the traffic up with cars, they move faster. It is what water does. It moves faster when it is confined, with molecules very close to each other. Experiments only show mobility, not how it happens. Our job was to understand this mechanism, through simulations, asking the right question: how many neighbours does each water molecule have?

W.S.M.: In your history of activism for the space of women in science, which struggles do you consider most sensitive and which ones surprised you most positively?
M.B.: Certainly, the fight for maternity leave. It is a fight that is not even mine, but I was touched by the Parent in Science project, led by Fernanda Staniscuaski, a biologist, Professor at UFRGS, mother of three children. She wanted to do a workshop about science and maternity, and at the time, I suggested that she request funding from *Instituto Serrapilheira*. What was supposed to be a small meeting turned into a big event, a movement for people to incorporate their family into the *Plataforma Lattes curriculum*. I was coordinator of CNPq's CA-Physics and Astronomy and wanted to help women who had children, but this information was not available. I think that everyone, when evaluating a CV, should make the correlation that the researcher had a child and that, for this reason, had low productivity during a period. They should also note that the person having this experience of having a child can add to the research. I believe that we were most successful on that front.

The second issue that is positively surprising me is harassment. After 20 years of fighting over the vary basics - having more women in research, I decided to take care of something that hurts. The way I did it opened me up because I had to talk about a case of harassment that I had experienced. I was very impressed by the impact of it all. It is an even bigger problem than I had evaluated and there are no mechanisms in place at universities - we need to create them. That is my theme. I talk about all aspects of gender, but I always bring this conversation up and I will keep on doing so, no matter how dangerous. I think it is an important revolution. It won't be easy, and I don't think it will happen now, but it is the best response to the oppression of feminism that we have suffered, because it is a kind of attack. In my opinion, the best defence is attack. They are attacking me, so now I'm going to show you the cruellest thing you can do, which is harassment.

W.S.M.: You have risen to a leadership position. What led you to this place and, for you, what incentives are lacking for other women to be leaders in science?
M.B.: What led me to this place is the fact that I am very focused in my purposes, that end up with me getting ahead of myself. I don't follow the traditional path. But do you need this for it to work? No.

I would love, that, to make it, people just needed talent: that the quiet one, the one that doesn't talk much, who doesn't like a fuss, who doesn't like to expose themselves, but who has good ideas, could make it. I fight so that this person can make it. That's diversity. To fight so that the person who has less time, who has a small child, who will not be able to participate in all political groups and who has different circumstances can be there. It's not just a fight for women, it involves men too. People need to understand that it is not only those who scream the loudest that make it. This would be easy for me because I am the person who screams the most. But I don't want that, I don't want everyone screaming in the meeting room. We need to strive for the different, for the diversity of ideas.

W.S.M.: How can the productivity model be sensitive to the trajectory of women in research?
M.B.: There are two things about the productivity model that we need to rethink: quality and quantity. Today, research in Brazil is risk averse. If you need an amount of publications to renew a productivity grant, why take the risk? We need to loosen the rope for risk, for people to try new things, other ways. For example, take a gap year and work in the industry. If I come back from the industry, it will be with other experiences and other ideas. The mother or father who comes back from a period of looking after their children returns with another mind, with another rhythm. We need to explore these things, which are different, as an instrument of science. But this change of vision takes a lot of work. In order not to evaluate a researcher by the number of publications, it is necessary to take an

We need to loosen the rope for risk, for people to try new things, other ways.

article, read it and say if it is good. People don't want to do that, but that's what we're going to have to do if we want to qualify science. For that, we will have to make careers more flexible. University only evaluates one thing: production. And community outreach projects? What about teaching? Not having the means to assess these issues is no excuse! Let's build it. We have to look at the university and rebuild it. Part of this reconstruction depends on diversity. And in the building of the Brazilian university, we have to use what the university does best: we understand everything about the solar cell, about sustainability, but no academic building is sustainable and is energetically bad. It's time for the university to practice what it preaches. If it teaches diversity, it has to practice diversity. You have to practice, to the extreme, because if we don't trust what we teach or what we research, how will society trust it?

W.S.M.: What other points should be dealt with urgently in the debate on women gaining space in science?
M.B.: It is very urgent to realize that, when we nominate someone, we have to include the issue of women, and that this is not against an idea of meritocracy. Let's forget about that word because I don't understand what it is. But I understand the concept of having a group of people to solve problems and this always involves the joining of different people. So, when we have to recommend someone for something, we will spend ten seconds thinking: don't you have a woman who could be there? And we will change the world. Ten seconds of each one's time is very little.

Black leadership in **technology**

BY MARIANA ALENCAR

Intersectionality must be a way of thinking and transforming identity experiences faced by oppressions of gender, race and class

In the United States of the 1970s, black women filed a lawsuit against General Motors for racial discrimination. At the time, they argued that the company segregated its workforce by race and gender, since jobs for the black population were held exclusively by men. It was work on the assembly lines, which, until then, was exclusively considered male activity. Jobs for women included white women only, systematically excluding black women.

This story served as a basis for the American researcher and activist Kimberlé Crenshaw to develop the concept of intersectionality as a way of thinking about identity experiences faced by the double oppression of race and gender. In Brazil, researcher Carla Akotirene from Bahia expands the concept and understands it as an analytical sensitivity associated with power structures. For her, the markings of race, gender, class and nationality must be crossed, as they are inseparable. In her book "*What is intersectionality?*", Akotirene affirms that the concept "marks the theoretical and methodological paradigm of black feminist tradition, promoting political interventions and legal literacies about which structural conditions such as racism, sexism and related violence overlap, discriminate and create singular charges to black women".

Historically, the areas of science, technology and innovation are mostly male and white. In 2018, the research *#QuemCodaBR*, carried out by *PretaLab* in partnership with the company ThoughtWorks, indicated that people who work with technology in Brazil are mostly young and have higher monthly incomes than the national average, and more schooling time. The proportion of white people in these areas is also higher than the Brazilian reality. The number of women, however, is lower, since they represent more than 51% of the population, but only occupy 31% of the positions in the technology area.

"In the research, we saw that there is no diversity in these spaces. Usually, the teams are composed of white, young, middle-class men. They are people who had a structure of study, who had access to education, continued to graduate studies and had opportunities. It is important to see how this lack of diversity impacts society", reflects Silvana Bahia, founder of *PretaLab*.


PHOTO: VALDA NOGUEIRA


PHOTO: GUILHERME LEPORACE


PHOTO: ACERVO PESSOAL

Silvana Bahia, founder of Preta Lab. Isa Lustosa, training participant at the Museum of Tomorrow. Nina da Hora, founder of Computação da Hora

INTERSECTIONALITY IN TECHNOLOGY POSITIONS

The reality of exclusion of black women from technology positions motivated Silvana to create *PretaLab* in 2017, as a result of her indignation when constantly circulating in technology environments and seeing few black women: "Lack of references, policies and incentives", she says. The project creates content made by and for black women in order to integrate them into technology positions, offering courses and workshops. *PretaLab* has a website (pretalab.com) with data that proves the importance of including black and indigenous women in areas of technological performance. According to Silvana, the project is constantly sought by companies that want to become more diverse and seek professional recommendations. Given this demand, the site also works as a platform for disseminating the work of black women in technology. The idea is to help companies become less hostile places for minority or under-represented groups, in addition to promoting training actions for black women in technology.

PRESENTING, EMPOWERING AND ENHANCING

The connection between black women is one of the starting points for changing the dominant scenario in Science and Technology. This is defended by Isa Lustosa, Professor and researcher at the Federal University of Bahia (UFBA). Graduated in Pedagogy, History and Computer Science, she currently works in discussions related to the criticism of technology, focusing on themes such as security and digital crime. She also studies the relationship between technology and gender, investigating the presence of black women in this area.

Isa works on the creation of *Empodera Negra*, an application that aims to create a network of women from different professions and give them visibility. The proposal was presented in the second cycle of the **Women in Science and Innovation** training, designed by the **British Council** and held in October 2019, at the Museum of Tomorrow. "One shortcoming that I notice is that, normally, these women do not connect and do not know what the others are doing. I am always surprised when I discover that there is a person, even close to me, doing a job that I think is fantastic. I keep thinking: 'How did I not know that?' The purpose is not to exclude white women, obviously, but to give black women the chance to take ownership and make them feel like they belong to that context", she says.

Throughout her career, Isa Lustosa has also created a research group focused on the union and training of women. The initial proposal was to bring black women closer to university, but, due to demands and discussions held within that environment, women of other ethnicities and different age groups were also included. Through the group, the researcher does a training course in Information Technology. The adoption of an intersectional perspective in science and technology is, for her, a basic element for the reduction of inequality, for social inclusion, and diversity.

"We know that gender oppression is glaringly obvious not only in these areas. When we look at the racial issue, it becomes even more evident. So, I believe in measures that provide effective opportunities for women, like me, to occupy these spaces. We have to work with public policies, but also with 'micro' policies to provide opportunities for these women or create other types of conditions: be it teaching, through the training process, or inclusion, from the labour market perspective".

To reduce oppressions of gender, race and class, Isa Lustosa believes that it is necessary to invest in examples. For her, black women occupy a "no place" and are constantly taken by the feeling of not belonging. She recalls moments in her career when her abilities were questioned due to the colour of her skin and recognizes that the presence of black women in positions dominated by white people is a way of inspiring and empowering younger girls. "Sometimes my students look at me and say how great it is to have someone like them in this position. It was difficult for me to get here, but I only succeeded because I was given opportunities. Someone opened the door for me. That is why representativeness is so important. But it is also important to keep in mind that we didn't all start from the same point. Those who have more opportunities go further. But what about those back there? I believe in embryonic work. We need to present possibilities, provide opportunities, empower and allow them to take over places", reflects the researcher.

Technology democratisation

PretaLab is an offshoot of *Olabi*, a social organisation from Rio de Janeiro focused on democratising technology production, and also directed by Silvana Bahia, in partnership with Gabriela Agustini. At *Olabi*, they stem from the premise that technologies are not neutral, but carry a vision, a strategy and a way of thinking of those who create these devices. Therefore, diversity in technology spaces is fundamental.

"When there is no diversity, there are problems with freedom of expression, with the concentration of powers and the deepening of social inequality and income concentration. Therefore, we need to diversify the working groups that produce technology. On the one hand, we work with information and encouragement, but, basically, in addition to the development of techniques, if we can expand the repertoire of people and promote questions, we contribute to the agenda moving forward", comments Gabriela Agustini.

In October 2019, she presented *Olabi* at *Women's Science table: breaking barriers and making history in technology*, organised by the **British Council**'s **Women in Science** programme, during the *Rec'n'Play Festival*, which takes place annually in Recife (state of Pernambuco). "Over the years, we have worked with children, the elderly, and with people from poor communities, but also with the more elitist society, with public policies and service actions. Our actions vary, but all focus on working to improve digital society," says Gabriela.

HAVEN SPACES AND DISCUSSIONS

The Federal University of Bahia (UFBA) was also the birthplace of another project that aims at the training and integration of black and indigenous women. The *Kunhã Asé* Network was created at the end of 2019 by Professors, researchers and students at the University in order to discuss and raise awareness among people who dialogue with science about how the gender issue appears in these places. According to Caren Souza, a PhD student in the Graduate Programme in Ecology at UFBA and one of the coordinators of the *Kunhã Asé*, it is essential that the academic environment is engaged in this discussion. For this reason, the project caters for roundtables, debates and discussions on issues common to women's experiences at the university, such as mental health, harassment and the importance of an intersectional look.

The *Kunhã Asé*'s idea is to give women who are subjected to oppressions of race and class a space for discussion and learning. Caren considers that, historically, the black population was excluded from access to basic education and that this structured an exclusionary society in Brazil, based on racism. "On the other hand, when we insert women into this context, we know that there are other oppressions related to the patriarchy. There is another point as well, which is the question of class. We know that access and the guarantee of staying at a university and achieving an academic career has always been elitist. Within the *Kunhã Asé* Network, the interpretation of intersectionality aims to ensure that this woman can engage in science, take ownership and have her intellectual production appreciated", concludes the researcher.

And when technology is lacking?

After a brief stint at *Olabi*, where she developed the *Computação sem Caô* project, Ana Carolina da Hora, also known as Nina da Hora, decided to take a solo flight to solve a challenge that accompanies science and technology disseminators: the fact that about 30% of the Brazilian population does not have internet access. Before continuing to produce computer videos for YouTube, she decided to take two steps back: she did a territory study on the audience she wanted to reach and found that most of them did not follow YouTube channels. "I visited schools without internet access in Rio and realised that this was not a reality in the students' lives", she says, inviting society to reflect on access to technology. Nina then created a new project, *Computação da Hora*, with exclusive didactic material and focus on acting *in loco* (in person) with students and teachers of basic education. "When we talk about inclusion, it is no use just handing over the tablet, it is necessary to immerse in concepts and check the feasibility of digital projects", she ponders. In the description of her new YouTube channel, the idea is to promote "communicational thinking as a philosophy of life". The project aims to address the gap of the lack of internet access in teaching spaces, while at the same time offering online content that will complement classroom experiences.

Transatlantic bridges **for equality in the sciences**

BY LUIZA LAGES
ILLUSTRATION: ANDRESSA MEISSNER

British Council's mission with Brazil's strategic partners in the United Kingdom promotes scientific networks that share models and practices for gender diversity and equality in the sciences

While the **British Council** team organised the final details for the first meeting of the UK-Americas Women in Science Association, researchers representing more than 20 institutions in Science, Technology, Engineering and Mathematics met for the first or second times at the entrance to the Mathematics Gallery of the Science Museum in London. Women from the United Kingdom and Brazil as well as other countries in Europe and the Americas exchanged contacts and stories while informally starting the discussions that set the tone for the night of the 1st October, 2019.

The meeting was conceived as a moment for the exchange of strategies, models and practices adopted in different areas of science, and for shared problems about diversity and gender equality in scientific and technological production in STEM areas. The guests split into two tables and, in the heart of the London museum, presented their concerns, experiences and solutions. At the end, the ideas were compiled and presented as strategies for the network that was formed by that group, along with the main approaches and key themes to be worked on by the *Women in Science* project (see box).

"What resulted from the mission was a map of the project's next steps and political themes as well as the selection of participating institutions, made with a view to building this map. Although still very broad, it allows us a glimpse of what we can support and how we can advance together in the agenda of influence and leadership in STEM, a fundamental part of the **Women in Science** programme", says Diana Daste, Director Education at the **British Council** Brazil.

A STRATEGIC AGENDA

The meeting was one of several activities carried out during a mission in the United Kingdom promoted by the **British Council**'s **Women in Science** programme. Designed within the programme's pillar of influence, the mission aimed to facilitate debates and instigate conversations around institutional policies, processes and partnerships that can influence rules and behaviour within institutions and society in the countries involved. The Brazilian delegation was made up of three renowned names of national science, representatives of institutions carefully selected to return actions based on the discussions raised in the activities proposed by the **British Council** in London: Márcia Barbosa, director of the Brazilian Academy of Sciences (ABC); Maria Zaíra Turchi, representative from the Ministry of Science, Technology, Innovation and Communication; and Vanderlan Bolzani, President of the São Paulo State Academy of Sciences (Aciesp) and representative of the São Paulo State Research Funding Agency (Fapesp). Representatives of research funding networks from Peru and Mexico also participated in the activities.

"The mission's focus was to generate a first moment among the high-level networks to consolidate the *UK-Brazil Women in Science Association*, which is already projecting itself as the *UK-Americas Women in Science Association*", explains Diana Daste. The association was created as a space for documentation and visibility of the different debates, in which they can be shared as good practices of mutual learning. "It was great being able to strengthen bonds and create or insert different agents on platforms that can facilitate communication, document, and start exchanging strategies", she adds.

To meet the objectives, the agenda included a series of bilateral meetings between members of the delegation of the Americas with women in leadership positions in British institutions. The first meeting was held with Christine Maggs, executive vice president of the Joint Nature Conservation Committee (JNNC), who presented *Athena Swan*, a charter established and managed by the UK Equality Challenge Unit, which recognizes and celebrates good practices in higher education and research institutions towards advancing gender equality. The conversation sought to understand how the model could be implemented in Brazil, considering a programme of political guidelines to be adopted by different national institutions of higher education.

Another important meeting was held with Elizabeth Pollitzer, director of *Portia*, the institution responsible for the **Gender Summit**. The delegation was able to discuss critical aspects for the production of an edition of the event in Brazil in 2021, necessary preparations, and potential impacts on the national agenda in relation to diversity in science. "We need to be sensitive when organising a Gender Summit in different regions, on how to raise and frame arguments, because discussions become actions only if the arguments are shaped and communicated efficiently. We really need to understand how universities and local institutions work, how research is funded and how they engage with the political sector", explains Elizabeth Pollitzer.

The ***Gender Summit*** is a platform for events in which evidence on the impact of biological and/or sociocultural differences between men and women on the quality of the results of scientific research is assessed.

Part of the mission also accompanied Professor Maria Zaíra Turchi as a representative of the Brazilian government at the Global Gender Summit 2019, in Amsterdam. According to her, in the fight for gender equality, the biggest challenges and opportunities are the need to increase the number of women in leadership positions in STEM areas: "An effort is needed to increase female participation on research councils, improve working conditions for scientists, balance careers and families, and take the discussion to international cooperation schemes, such as the **British Council**'s **Women in Science** programme".

THE STRENGTH OF INTERNATIONAL NETWORKS

"Networks, national and international, are a great opportunity for action, due to the scale, reach, depth and diversity found internally. In this sense, it is our job to believe in connections and the exchange of information, experiences and even solidarity, and to understand how we can strengthen focal spaces within networks", says Diana Daste. Veronica van Heyningen, chairwoman of the diversity committee from the Royal Society of London, recalls that science itself is an international enterprise, something that is at the tip of the debate related to Brexit, the movement that led to the exit of the United Kingdom from the European Union agreement. "The suggestion that it will be more difficult for scientists from abroad to work here is simply ridiculous because we need it so much. It is so useful to have a cross-fertilisation of ideas and get a broader view of what the needs of science are", she comments.

On the subject of internationalisation, Elizabeth Pollitzer spoke about the various editions of the Gender Summit, held in different parts of the world. For the director of *Portia*, many of the problems related to greater diversity in science are local, but there are also a number of universal issues, mainly to do with the globalisation of science and greater international mobility, that need attention: "For example, in Europe, there are programmes funded by the European Commission that try to establish relationships with the different countries outside the bloc. We see this as an opportunity to use these spaces to incorporate gender dimensions", she recalls. A mobilised strategy based on the mission is therefore the generation of communities for sharing experiences, and spaces within networks that provide debates on more specific topics and with greater depth.

For macro debates, alignment between participating institutions is essential. Another approach for networks is the formation of associations: "The association is a little more manageable, has a clearer reach and engagement of participants", explains the director of the **British Council Brazil**, Diana Daste. By way of association, it is possible to debate and identify physical or virtual spaces that allow for the flow of communication and the documentation of debates between networks. "We believe that, by strengthening national and international networks, we strengthen and sustain not only the visibility of debates, but also the quality of information that can circulate and the multiplicity of voices, from the most consolidated leaders to researchers at the beginning of their careers", defends Diana Daste. The challenge is to keep the networks alive and monitor the impacts they generate from the perspective of women in science. "Several opportunities were explored in the mission. Some will materialize, and others are being transformed into different projects. It was undoubtedly a moment that streamlined partnerships, processes and the strategic and tactical part of creating the Association", concludes Diana Daste.

A strong and influential association

Get to know the main topics raised by the participants of the first meeting of the *UK-Americas Women in Science Association* to consolidate and strengthen the group.

Expectations and strategies

- Create a permanent group to deepen discussions and improve visibility on issues related to scientific careers and gender equality.
- Act as a source of inspiration through people and ideas, creating opportunities to influence the STEM agenda and policies in the UK and the Americas.
- Collect and share information on policies, practices and programmes that have proven impact. Focus on transforming systems, structures and cultures.
- Create a simple and strong mission statement, endorsed by external bodies and public figures.
- Develop design strategies that focus on the areas defined by what was discussed.
- Establish a communication group to develop cohesion around the world.
- Inform and ensure that objectives and actions are sensitive and responsive to local contexts and needs.

Approaches and key areas

- Support the implementation of high-level leadership, processes and metrics to create awareness and move forward with concrete measures within Academia and in research institutions.
- Work with schools and influence the quality of basic education through diversity and engagement.
- Work on diversity committees on specific processes.
- Include men in the debate.
- Include Social Sciences in the broader definition of intervention programmes.
- Include a variety of women, at all career stages – and ensure that black women and other minorities are included.
- Share mentoring models on specific topics and areas.
- Find ways to ensure that meetings and events have diversity in participants and audience.
- Transform performance measures. For example, including diversity issues in performance evaluations to make work more flexible and to promote representativeness in institutions, groups, panels, lectures, etc.

Key Issues

During the meeting sponsored by the **Women in Science** programme in London, pressing themes were repeatedly debated by the participants. Progression and career flexibility, motherhood, harassment and school engagement repeatedly returned to the centre of the discussions as fundamental problems to the expansion of diversity in science.

Maternity and career flexibility

The debate on the progression of researchers' careers goes through motherhood, a moment of pause often related to reduced productivity and, consequently, to delays or setbacks in the professional rise in the academic universe. During the mission to the United Kingdom, the theme was approached within a broader view, making research and leadership trajectories more flexible. "Women do not necessarily want their careers to grow following a pre-defined and fixed path. It is necessary to configure careers for specific circumstances. This is not only for women, but for everyone. Careers should be more flexible", says Veronica van Heyningen, chairwoman of the Royal Society's diversity committee.

For her, it should be possible to obtain funds during difficult and absent times. "If a woman is doing progressive research and is going to have a baby, it would be nice to have the possibility of funding to employ a technician who could continue her studies while she is away, instead of having to stop and even lose what has already been done", she exemplifies. Another important aspect to be underlined is that research grants allow for studies of varying duration, individual and sufficient for researchers to actually be able to work and produce results.

Career flexibility, maternity and harassment at the centre of discussions.

Leadership and trajectory

Today, the decision-making space in science and technology is mostly occupied by men. The higher up the career ladder and towards leadership positions you look, the less women are found, and motherhood alone does not explain this situation. In an event on the agenda of the **Women in Science** programme in the United Kingdom, Márcia Barbosa presented low self-esteem of women in relation to men as one of the causes. Studies with self-assessment of undergraduate disciplines show that female students believe they know less than male students. "There is no real affirmative action process. We have a training problem and are unable to explore further what happens to these girls and encourage them. The system is ready for a phase transition, but we need a structure to consolidate it", says the researcher. This is reinforced by Helen Byrne, Professor and director of Equality and Diversity in the Division of Mathematics, Physics and Life Sciences at Oxford University: "Girls are not encouraged to pursue careers in STEM. We need to involve parents and teachers and come up with appropriate models for each educational level for them".

For Vanderlan Bolzani, it is important that, since the beginning of one's career, especially at the end of master's and doctoral degrees, there is institutional work to include more women in positions they can ascend. For that, public policies would be necessary: support programmes that come from government and national research institutions, and international relations. "In addition to encouraging more women to participate, it is essential to give more visibility to Brazilian scientists in the international landscape. The more you are known, the more you can be cited", she explains.

Access, recognition and intersectionality

The need to recognize work and involve women from different moments in their careers appeared as an important point in the transformation of the gender equality scenario in STEM. "We cannot just focus on the gender perspective when we are talking about diversity. It is necessary to recognize that the woman herself is not necessarily a binary identity, because there are issues of ethnicity, economic class and individual trajectory", says Diana Daste.

On this point, according to Sarah Matthews, a professor at University College London, it is essential to promote changes in culture and politics, from the bottom up, in higher education: "We need to encourage the raising of awareness about the benefits of diversity for the entire organisation and promote changes in local policies that bring benefits to all". In this sense, intersectionality was repeatedly presented at the meeting as a necessary point of evolution for the discourse of diversity. For this, it is important to expand access and work on performance and recognition metrics in research, through diversity criteria.

Flexible working structures

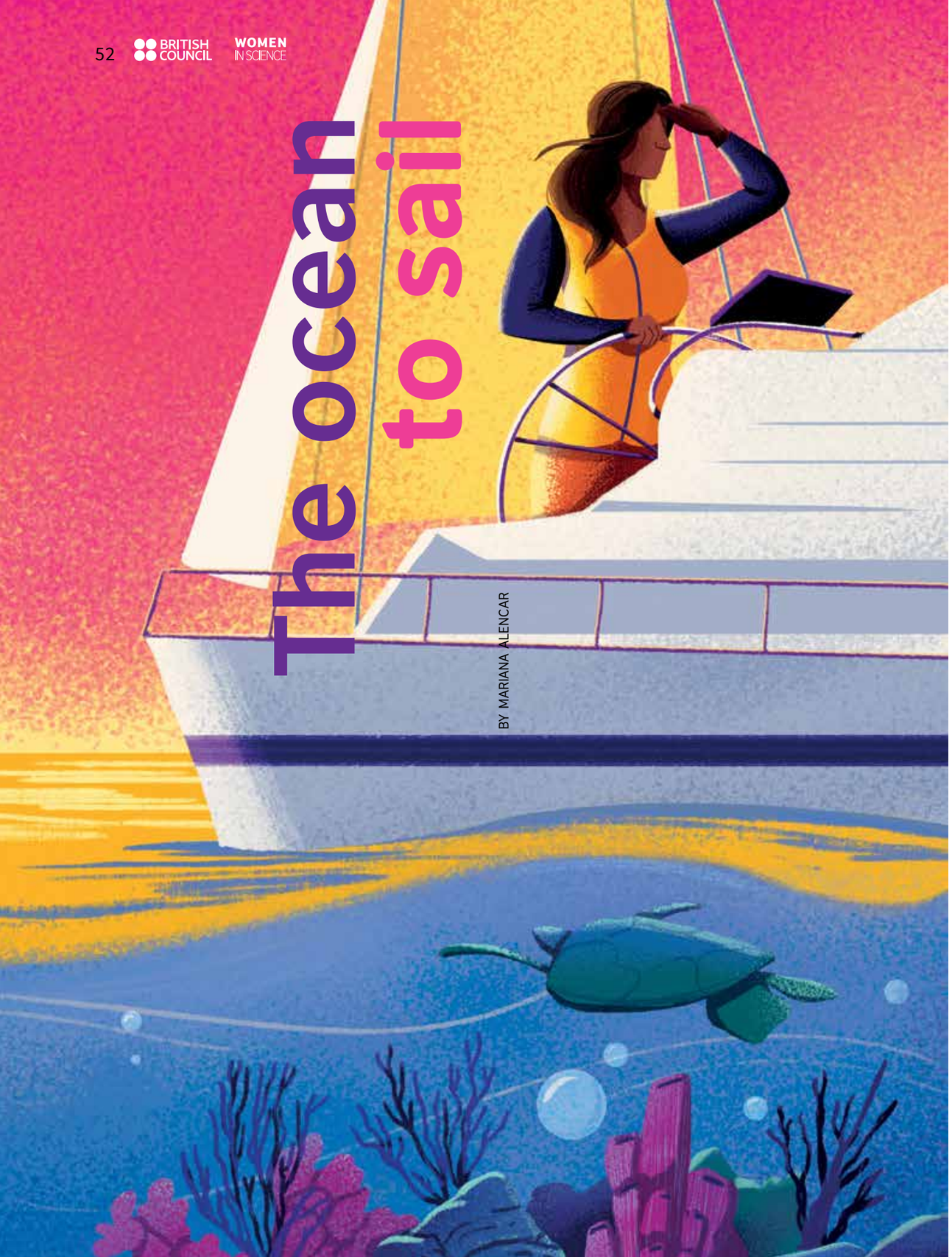
Career flexibility needs to be accompanied by flexibility in work structures. Representativeness linked to women participation in associations and institutional leadership positions depends on the possibility that these jobs belong and are adapted to the routines of women scientists. A number of questions were raised regarding schedules, expectations for meetings and the possibility of working remotely.

How to deal with harassment?

Especially among Brazilian women, the issue of harassment in Academia was raised as well as the question of what would be the best ways to address the problem. The researchers discussed the need to conduct studies on the topic and the use of evidence so that the discussion does not end with individual stories, full of emotional burden. For Márcia Barbosa, international models can be used to build national parameters and practices. "At the Brazilian Academy of Sciences, we want to build a code of ethics that will encompass the perspective of harassment. Having codes of conduct at universities would be very important to say how to behave in certain situations", she says. The researcher argues that one of the problems linked to harassment is the relationships built between teachers and supervisors with students. "Today, it is an unprofessional relationship. We have to define work relationships very well to avoid all forms of harassment. This needs to be built, and there are models that we can copy", says Barbosa.

The ocean to sail

BY MARIANA ALENCAR



Researchers study the seas, develop conservation projects and inspire women participation in ocean science

When she received a box of chalk and a slate from her grandmother, Tatiana Mazzo already knew what fate had in store for her. In love with science since childhood, she grew up in an environment in which teaching and research represented consistent career possibilities. This is how it all came about: she took the entrance exam for the Chemistry course and, during her undergraduate degree, joined a scientific initiation project. These were her first steps in research, when she was studying interdisciplinarity as a tool for learning. From then on, she went on to master's, PhD and two post-doc internships. At the end of this process, she joined the teaching staff of Sea Institute, at the Federal University of São Paulo (Unifesp).

In addition to research, Tatiana is a part of the *Programa Maré de Ciência* team. It is a proposal for scientific dissemination and engagement focussed on ocean studies. *Maré de Ciência* starts from the performance of individuals as producers and disseminators of knowledge and unfolds into four areas: With the Community; With the School; Citizen Science and Women in Science, the latter, coordinated by her. Tatiana says that *Maré de Ciência* arose from an invitation by Professor Bárbara Lage, also from Unifesp's Sea Institute, to submit a proposal in a call from the **British Council**: "This call has selected projects aimed at social impact employing the Active Citizens methodology. One of our actions is precisely the training of children and youth through science initiation, with the application of the UNESCO Ocean Culture Pedagogical Kit" (see box). Activities are organised to work with construction of collaborative and active knowledge in favour of conservation of the marine and coastal environment, in the context of **The United Nations Decade of Ocean Science**.

WITHOUT GENDER EQUALITY THERE IS NO SUSTAINABILITY

Through her participation in *Maré de Ciência*, Tatiana felt the need to expand her actions into science and ocean studies with a focus on women participation. That was how she came to coordinate the pivot Women in Science. "As a teacher and researcher, I identify with the theme and have always seen the importance and the need to promote actions and debates on gender equality in science, especially in the

The UN International Decade of Ocean Science for Sustainable Development was established as the period between 2021 and 2030. The initiative aims to expand international cooperation in research to promote the preservation of oceans and the management of natural resources in coastal areas. The activities of the decade will be led by UNESCO.

Diversity goes beyond women representation and needs to be encouraged.

areas of STEM, where we have under-representation of women", she comments. The idea of this aspect of the programme is to promote actions to inspire girls and women. The programme has already carried out two major engagement actions: *Mulheres ao Mar* (Women at sea), in which ocean culture was discussed from the perspective of women in *Ciência do Mar*, along with art; and the photographic and biographical exhibition entitled "*Science is needed for development and science needs women*".

In her academic and professional trajectory, Tatiana realised that there are correlations between the discussion on gender equality and sustainable development. For her, when we think about sustainability, we recognize the need to apply the most diverse areas of knowledge to solve complex problems such as, for example, the conservation of oceans. However, when we look at strategic areas, women are underrepresented. "It goes without saying that science becomes richer the greater the diversity. But the presence of women has always come up against prejudice in a society that, culturally, insists on delegating a specific place for them, in private life. Therefore, it is essential that we, women scientists, are engaged in actions that stimulate debate on the topic", she reflects.

FASCINATION FOR SEAWEED

The passion for the oceans and the fight for gender equality are what that bring Tatiana Mazzo's and researcher Christine Maggs's stories together. The chief scientist and executive vice president of the Joint Nature Conservation Committee, a public body that advises the UK government and manages nature conservation delegations, is internationally recognised for her studies in seaweed. With three books published on the subject, Christine Maggs developed an interest in phycology, a biology discipline that studies algae, since childhood.

"I have always found plants and algae fascinating. So, I went to study botany and ecology and realised how important they were. I did my PhD in Marine Botany in London. My history with the sea is old. My grandparents lived on the south coast of England and loved sailing and swimming during the summer, which I always spent with them. Since I was one year old, I literally felt like a botanist interested in seaweed", she recalls.

Throughout her career, Christine has published more than one hundred scientific articles, discovered two new orders and three new families of algae. She was also an executive director of the Faculty of Science and Technology at Bournemouth University in England and taught at Queen's University in Belfast. In 2013, she was appointed as a member of the Royal Irish Academy. On two occasions, she received awards from the Phycological Society of America for outstanding work, published in the Journal of Phycology.

QUESTIONED COMPETENCIES AND SKILLS

Even with so many achievements, this researcher has not stopped suffering discrimination. During her speech at the Ocean Culture and Sustainable Development Goals Seminar, held in Santos (state of São Paulo) in September 2019, Christine recalled moments when her competence was questioned because of being a woman: "In an interview for a diving job, the guide asked if I was able to load the equipment, because I am a woman. I have also been to events where I was the only woman at the table. In certain places where I worked, there were more men with the name 'John' than women".

Faced with these adversities, the scientist started to engage and fight for gender equality in science. At the event in Santos, she stressed the importance of diverse teams, both for science and for the market. For her, diversity, which goes beyond women representation, is correlated to the good performance of corporations. Therefore, it is necessary to encourage companies to invest in diversity in educational and professional environments. "References and models are important. Younger girls need to see women working in science, particularly women with whom they can relate to. Girls also need to be invited to see what is happening in research settings, in politics or in NGOs. In addition, young people need to get in touch with men and women from different backgrounds to help them identify the challenges we face today so that, in the future, they feel capable of making a difference".

In her speech, Christine made sure to quote and show the work of other women scientists who also seek to make science a more generous world for and with women. Among them was Jocelyn Bell Burnell, one of the UK's leading astrophysicists, who in 2018 decided to invest US$ 3million that she received in an award into scholarships for women, refugees and people from minority or underrepresented groups, in search for the promotion of diversity in science. "A good way to encourage women's participation is recognition. For this reason, the awards are still necessary and important".

Ocean culture for all

About two thirds of the planet are covered by water. The oceans regulate the Earth's climate and shelter the greatest diversity and ecosystems in the world, in addition to providing food, energy, minerals, medicines and a series of economic and social services. For this reason, understanding the influence of the ocean on human beings and vice versa is fundamental for a more sustainable planet. The understanding of this relationship is what guides the so-called *ocean literacy*.

Ocean literacy is a call for institutions and citizens to recognize the importance of oceans for human life. Faced with the challenge of propagating ocean literacy, UNESCO's Intergovernmental Oceanographic Commission (IOC) developed the *Ocean Literacy for All* programme, consisting of an online portal, a guide and toolkit, and information on oceanic literacy to be worked on in schools.

In Brazil, the material was translated and launched in partnership with the Secretariat of the Environment of the Municipality of Santos (in the state of São Paulo) and *Programa Maré de Ciência* at the Federal University of São Paulo (Unifesp). The launch took place at the event "*Ocean Culture and Sustainable Development Goals Seminar*", on the 5th and 6th of September 2019. In partnership with the **British Council**, the event, in addition to presenting the material, was a space for discussions of the participation of women in science. Scientists Tatiana Mazzo, Christine Maggs, Camila Signori, Francesca Santoro and journalist Paulina Chamorro shared their stories, which served as inspiration for the public and fostered the debate.

BY MARIANA ALENCAR

Collaboration that generates **diversity**

Citizen science projects include ordinary people in research and shorten the distance between Academia and society

For a long time, the idea that science and society should not mix has contributed to the construction of the misconception that scientific enterprise is restricted to few. Scientists have been considered as the only ones fit enough to carry out investigations, develop hypotheses, and apply methods and results. Over the past few decades, however, the concept of citizen science has emerged as a movement and a way of doing research that aims to close this gap, bringing the population closer to scientific production.

"This is a type of participatory and collaborative research in which citizens and volunteers interact with researchers, establish partnerships and collaborate in the production of answers to questions of common interest. Anyone can participate, regardless of education level. Everyone works in contact with scientists during the process. It is different from movements like 'do-it-yourself', in which there is no connection with scientists", details Blandina Viana, biologist, agronomist, PhD in Ecology and Professor at the Federal University of Bahia (UFBA).

Citizen science is already a routine element in scientific production in locations around the world. Proof of this is the United Nations Environment Programme (UNEP), which seeks ways to incorporate citizen science in monitoring the environment and encouraging environmental conservation. In Brazil, however, the growth of the practice is still in its initial stages. About three years ago, the Ministry of Environment, through the Brazilian Biodiversity Information System (SiBBr), carried out a study to catalogue citizen science projects focused on biodiversity in Brazil. Only 16 were registered.

One of these projects is *Guardiões da Chapada*, coordinated by Blandina Viana and Caren Souza, a PhD student in the Graduate Programme in Ecology at UFBA. Since 2015, the initiative has aimed at conserving the pollination service and the diversity of pollinators through engagement with residents of Chapada Diamantina, in Bahia. The volunteer public is responsible for photographing animals in the flowers along the Chapada trails, which helps researchers in gathering information. Currently, there are more than 100 participants involved and more than 500 photos have already been published on the project's website (www.guardioes.cria.org.br).

"In addition to monitoring plants and pollinators, we work on the dissemination of scientific knowledge. For this reason, we develop public communication actions for science with local social actors and on social networks (@guardioesdachapada). We also aim to promote engagement in biodiversity conservation actions and environmental education, aiming to raise awareness of this public about the importance of pollination", informs Caren Souza.

ENGAGEMENT THROUGH THE OCEANS

Based on the concept of building collaborative and active knowledge between Academia and society, *Programa Maré de Ciência* of the Federal University of São Paulo (Unifesp), includes a citizen science project aimed at the oceans conservation. During the *Ocean Culture and the Sustainable Development Goals Seminar* held in September 2019 by the **British Council** in partnership with the University, an action was presented that focused on the promotion of citizen science in partnership with other institutions, such as *Colégio Koelle*, from Rio Claro (state of São Paulo). The activity was the result of an invitation to the *Koelle Sustentável* Project, which, in June 2019, was present in Santos (state of São Paulo) for a practical class held on the beach about the accumulation of microplastics in the sea. On this occasion, the high school pupils collected samples of material along the city's beachfront and, later, analysed them in Unifesp's laboratory. The action involved children and teenagers, who had the opportunity to assist in research on ocean conservation.

Tatiana Mazzo, one of the coordinators of *Maré de Ciência*, defends that citizen science is a powerful tool capable of raising awareness and engaging ordinary citizens in the research universe. "Through scientific literacy, it is possible to 'break' the vision that research and science only exist within universities. On the contrary, citizen science projects show that it is possible to conduct research with society. It is a two-way street: the audience acquires scientific knowledge and we, scientists, acquire the knowledge of their experiences and relationship with the environment in question", she reflects.

POSSIBILITIES OF INCLUSION

In addition to the possibilities of attracting and engaging everyday citizens in the research universe, citizen science is a promising path to a more diverse science, especially under the perspective of gender issues. This happens because the action proposal is to solve problems through the establishment of collaborative dialogues and participation. As per Blandina Viana, it is diversity that supports the practices of citizen science: "the basis of science is to be plural. For this reason, it is a fertile and open field, not only for the performance of women, but also for the emergence of more inclusive and more critical proposals", she comments.

Another issue that permeates citizen science is the access to research and, consequently, the fight against pseudoscience. There are studies that show the importance of citizen science in scientific literacy and in the development of critical thinking, in addition to stimulating interest in the area. At the same time, the actions expand the incentive for people to integrate research projects, making them more diverse. "Citizen science promotes the democratisation of science and empowers those who participate. It develops critical thinking and builds scientific citizenship. So, it's a bridge that feeds back. The more plural science is, the better the results", concludes Blandina Viana. ●

Active Citizens

In the quest to promote sustainable development through the contribution of community leaders, the **British Council** created *Active Citizens*, a programme that offers opportunities for people and organisations that demonstrate local social responsibility and work with people in social actions. The focus is to empower young leaders, especially women from vulnerable and poor communities, through the support for projects that promote economic autonomy, gender and race equality, and the appreciation of the culture of the communities involved. Through partnerships between the **British Council** and civil society organisations, workshops are offered to train local facilitators.

The programme also provides courses to develop leadership and project management skills. Participants design and deliver social action projects that impact their communities. Subsequently, citizens connect to a global network for sharing ideas.

Types of citizen science projects

Collaborative: Like *Guardiões da Chapada* and *Maré de Ciência*, in this type of initiative a dialogical relationship is established between academics and the those outside of universities. The role of volunteers is more effective since there is openness on the part of the academic community to listen to the proposals and ideas of volunteers.

Contributory: Resulting from proposals within the academic sphere. By necessity, universities call for volunteers to carry out activities that will assist in research, such as data collection, transcription of written materials, typing of documents, among other actions. It is one of the most common types of projects developed in the country.

Co-created: Usually, they start with a demand from the voluntary population that, when faced with a local problem, asks for the help of universities or other institutions to solve it. According to Blandina Viana, co-created projects represent a citizen science "closer to the ideal, as there is equity in participation between different members. Volunteers participate in different ways and take on a greater role", she explains.

Initiatives aimed at encouraging the participation of girls in science and technology reinforce that they can be anything they want

Once upon a time
there was a woman scientist

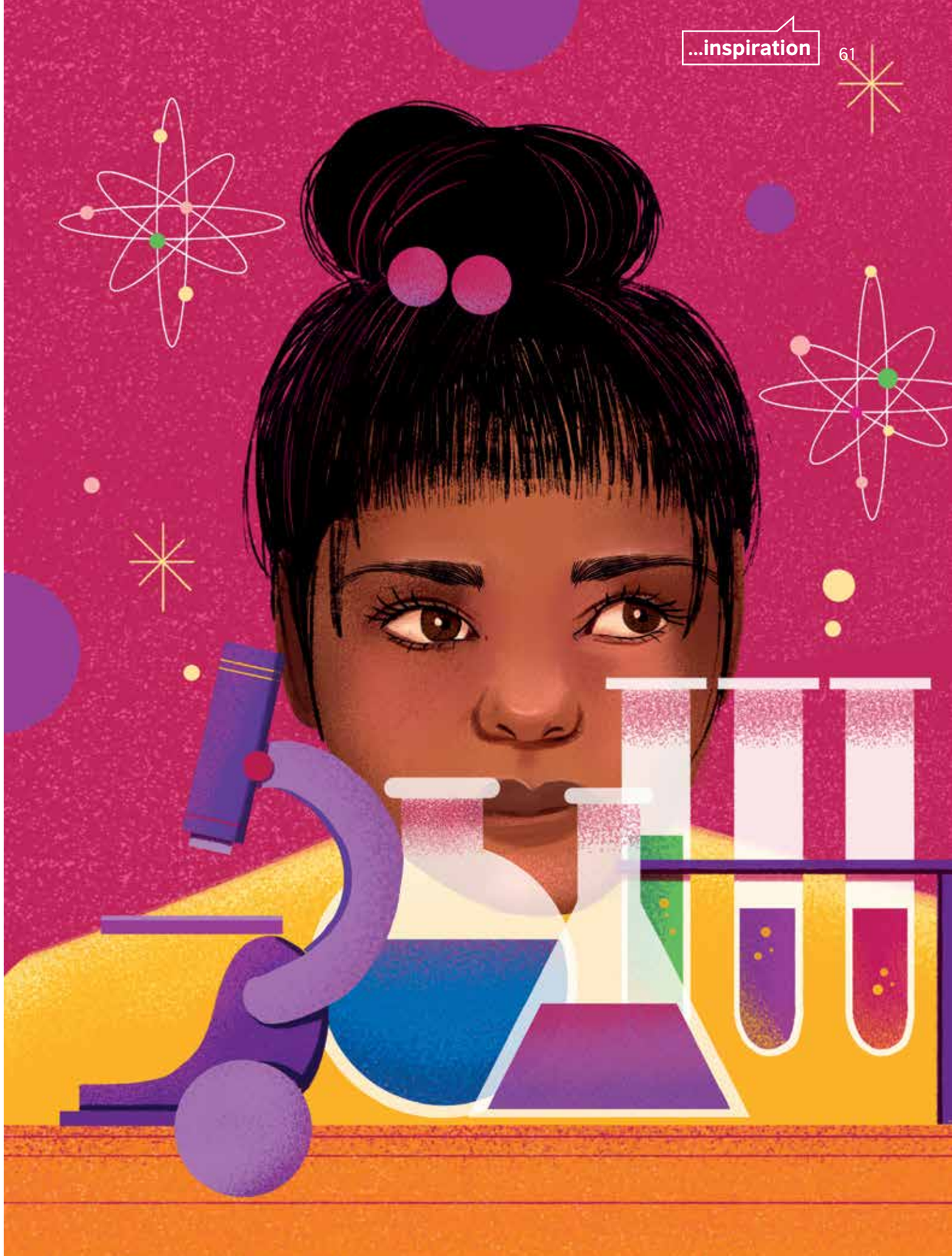
BY LUIZA LAGES, MARIANA ALENCAR AND VERÔNICA SOARES
ILLUSTRATION: ANDRESSA MEISSNER

For a long time, princesses characters represented an ideal behaviour for girls. Playing with children's imagination, the stories of princesses created an image of perfection, submission to romantic love and expectations of a private home life. Over time, it was noticed that this image not only restricted the possibilities of girls, but also reinforced stereotypes of women educated to serve. In response to such imaginary construction, organisations and institutions began to mobilize and offer courses that expanded the possibilities of development and performance of girls in society.

One of these institutions was Brazil's National Museum, which, in 2016, created the *Meninas com Ciência* course, held by the Department of Geology and Paleontology twice a year, with workshops that address topics related to Geoscience and women presence in the area. According to coordinator Luciana Witovisk, the idea is "to show that we are passionate about what we do, in addition to bringing them to our laboratories, to show how our daily lives are and how science is exciting, and that, yes, it is possible for a girl to be a scientist". More than 350 girls have already participated in the project.

The success of the editions promoted by Brazil's National Museum was such that it inspired other institutions to develop similar projects, such as the University of São Paulo (USP), with *Mergulho na Ciência*. Under the coordination of **Camila Signori**, professor at USP's Oceanographic Institute, the course aims to give girls a glimpse of life at university. In addition to Astrobiology, Chemistry, Oceanography and Pharmacology classes, participants experience immersion on campus, visit laboratories and classrooms, and have lunch at the University Restaurant.

During the *Seminar on Ocean Culture and Sustainable Development Goals* held in Santos, **Camila Signori** presented *Mergulho na Ciência* at the Women in Science table, organised by the **British Council**.



"I believe that experiences during childhood are extremely important for any girl to be able to move on to becoming a scientist and independent woman, able to overcome obstacles along the way. It was in this context that we created *Mergulho na Ciência*. The idea is to encourage them to continue in science or, at least, to appreciate the scientist profession of the future", reflects Camila Signori.

The courses offered by Brazil's National Museum and USP served as the basis for the Federal University of ABC (UFABC) to create its own project: *Menina Ciência, Ciência Menina*. Unlike other courses, UFABC's proposal focuses on girls who study in schools in the ABC district of São Paulo to establish a greater dialogue between the local population and the institution. According to **Ana Maria Neto**, one of the organizers, the project focuses on professional choice: "It is important to make them aware of the importance of science and show the work of researchers. They need to experience this world to decide whether or not they want to be researchers. Our idea is also to end the stereotype that only a man can be a scientist", says Ana Maria.

The three courses are free and aimed at girls from the 6th to the 9th grade of basic school (11 to 15 years old) from public and private institutions. Each offers 50 places, 25 for public schools and 25 for private schools. Due to the high number of registrations, vacancies are filled by means of a lucky draw of the names of those enrolled.

EARLY TALENT

Another way to encourage girls and teenagers to enter the world of science are the science fairs that take place in schools and universities. They tweaked 19-year-old student, Ekarinny Medeiros's interest in scientific knowledge. At the age of 16, in her first year of high school at a public school in Mossoró, Rio Grande do Norte, the young woman, egged on by her colleagues, decided to participate in a science fair in her state and ended up arriving at the Brazilian Fair of Science and Engineering (Febrace), the largest event of its kind in Brazil. Among awards and incentives, she joined the Federal Rural University of the Semi-Arid (UFERSA), where she graduated in Science and Technology. "Science fairs showed me that I could get into university. Before them, my focus was different as I didn't even know that this possibility existed. I changed my line of thought and opportunities started to pop up", she comments.

Ekarinny is working on the development of a bioactive catheter that uses cashew nutshell liquid to prevent bloodstream infections. It was this project that resulted in the young woman being selected for the first round of the **Women in Science and Innovation** training, promoted in 2019 by the **British Council**'s **Women in Science** programme, in partnership with the Museum of Tomorrow. "I developed the project before starting college. As I was studying at a public school, I didn't have a laboratory, so I came up with the idea of creating a mini laboratory in my backyard. I developed everything at home and, with the help of university professors, carried out the tests there. Now I intend to expand the project and I'm trying to balance the life of a scientist and an entrepreneur", she says.

Professor of the Energy Engineering course at UFABC, Ana Maria Neto was one of 35 participants in the second cycle of the **British Council**'s **Women in Science and Innovation** training, which took place in October 2019, at the Museum of Tomorrow.

ONE MILLION CODERS

The ambitious goal of teaching coding to 1 million girls and women by 2030 is what motivates Senegalese Mariéme Jamme to get up every day. Abandoned by her mother in her home country, she lived in orphanages until she was thirteen, when she was trafficked to Paris, France. After being rescued by the police, and moving to the UK, Mariéme started visiting libraries, where she learned to read, write and code on her own. Self-taught, she embraced the cause of including more women and girls in coding and created the **iamthecode project**

Mariéme's first time in Brazil was in 2009 and her most recent visit was to Belo Horizonte in November 2019. She was invited by She's Tech Conference, an annual event that promotes lectures, workshops and spaces for dialogue for women interested in technology. In her speech as a keynote speaker, the activist drew attention to the time factor, which, according to her, is an important measure for the development and growth of women in technology: "People tend to rush things, they think that everything can be done with extraordinary speed, but learning takes time and it is necessary to respect it".

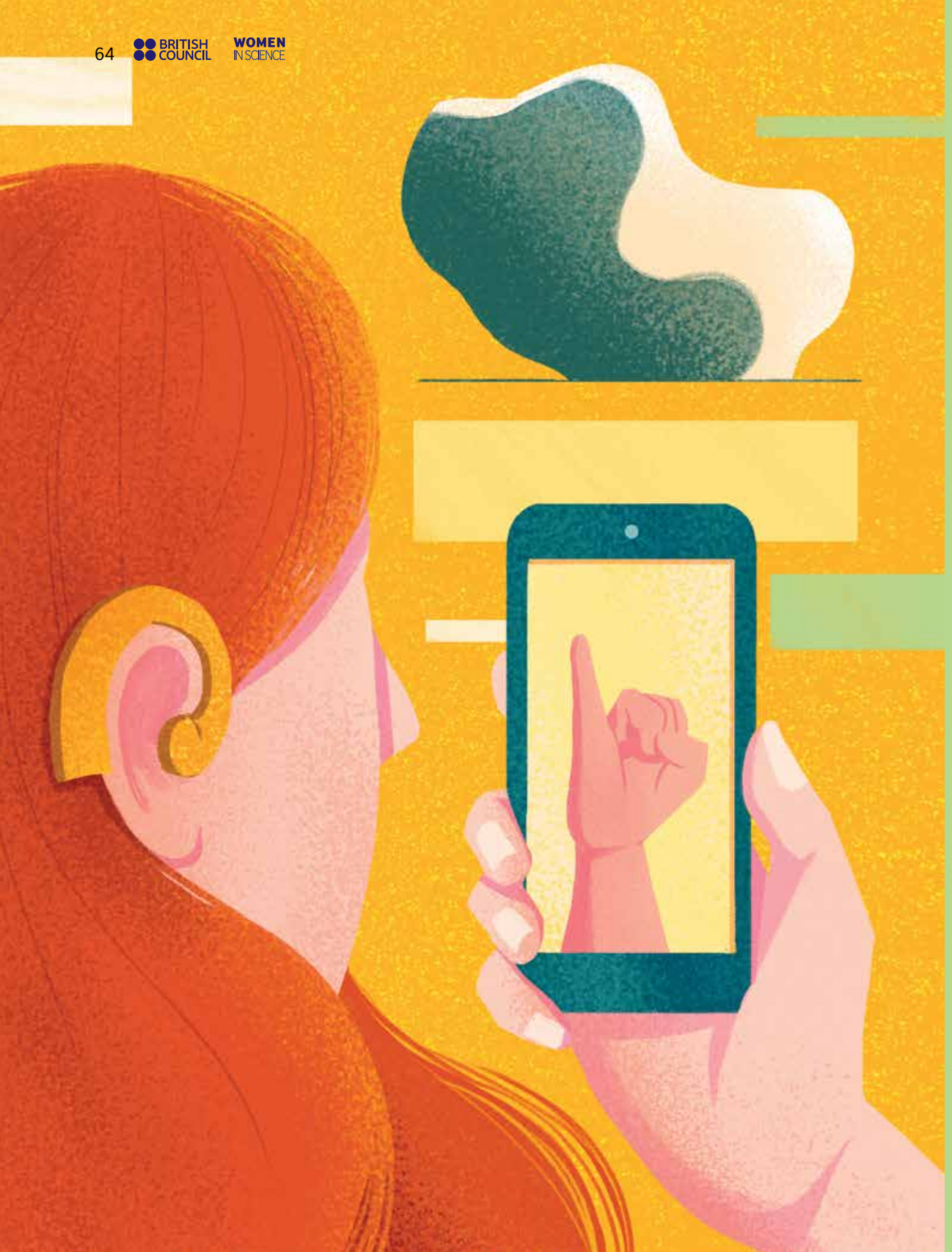
She says that all students who arrive at *Iamthecode* are already computer programmers from day one, when they start studying and working with concepts and codes: "I don't pretend to teach coding, I really do teach it. I want to help train the new generation of digitally intelligent women, who not only use social network, but know how it works. I want girls not only to consume, but to create digital platforms". She warns about the huge volume of personal data that is used by industries and companies, little to users' knowledge. As per her, intelligence for coding is essential in the 21st century: "We need to be aware of how our data is used and participate in the solution. We want to solve a problem, not out of vanity, but because we care. For that, it is necessary to work together".

For her, however, there is no solution to gender inequalities without dialogue with governments and agencies that promote effective changes, such as public policies for inclusion and diversity. "We need to mobilize to create ecosystems of innovation, science and technology that include girls since childhood, forming leaders for the future. We did it in Africa and we need to do it elsewhere, like in Latin America. Privileged white men have always said what they wanted about Africa because they have power, and no one questioned them. But it is necessary to question and change the system.

Founded by Mariéme Jamme, **iamtheCODE** is the first global movement led by an African to mobilize governments, the private sector and investors to promote STEAMED Education, an acronym referring to the areas of Science, Technology, Engineering, Arts, Mathematics, Entrepreneurship and Design. web: www.iamthecode.org.

Wrongdoings are repeated because nobody pays attention, nobody bothers. When I started talking about it, people stopped to listen and understood why I felt so angry at injustice and inequality. Today, we have connections and influence. We are heard on the internet. I travel the world to tell people that they need to get up, speak up and act".

Aware of her current privileged position in international bodies such as the United Nations, Mariéme does not romanticize poverty and recalls her difficult origin to warn heads of nations, politicians, businessmen and influential individuals about collective responsibility in relation to the theme of inclusion: "When you are poor, you do not plan for many years ahead, you only think about the next day, how to survive, and you hope that tomorrow will be better. I still live my life like that, day after day. I have nothing to lose, I just want to continue believing that, thanks to my project, every day a girl is learning to code and that it can change her life forever", she concludes. ●



Ahead of accessibility

BY LUIZA LAGES
ILLUSTRATION: ANDRESSA MEISSNER

Innovation in assistive technologies contributes to promoting inclusion and diversity

More than one billion people in the world live with some type of disability. According to the last IBGE demographic census (2010), in Brazil that number reaches 45.6 million. Technological resources designed for an accessibility context have the potential to promote inclusion and interaction of people with disabilities in multiple spaces and diverse experiences with other individuals in society. This is the case with traffic signs that emit different sounds to indicate whether the path is clear or not for pedestrians; interactive computers that display information about circulation and experience in public spaces; or applications that offer maps, voice or sign language services.

During her master's degree at the Federal University of the State of Rio de Janeiro (Unirio), web designer Priscyla Gonçalves Ferreira Barbosa developed an application that allows people with hearing disabilities to access content on museums exhibitions without the assistance of an interpreter. The tool operates with augmented reality, animation and sign language, facilitating understanding and interaction with the collections. "Generally, augmented reality is applied when the person needs to be in a specific environment and move around that space. I thought that this could also be used on the museum's route, as a guided tour", explains the researcher at the Accessibility and Usability Centre (NAU), Unirio.

The idea arose from a problem pointed out to Priscyla by the coordinator of the Museum of Geodiversity at the Federal University of Rio de Janeiro (UFRJ). People with hearing disabilities are accompanied during the visit to the museum by an interpreter, a service provided by appointment, which is not always made in enough advance. The technology proposal developed by Priscyla offers autonomy to visitors with hearing impairments.

MOTIVATION AND MOBILISATION

Sign language interpreters, proof-readers, accessibility specialists and people with hearing disabilities helped to build, test and validate the app. A prototype, coined at the UFRJ Lab3D, where Priscyla works, came into operation at the exhibition *Mares do Passado*, at the Geodiversity Museum. Given this scenario, producing science and technology in the area of accessibility has become a motivation: "The museum is an educational space where a person interacts with knowledge and information. The museum should talk to society. This technology is a way of allowing that a person who would normally be excluded from accessing information can understand and experience that same content", she reflects.

She explains that, for many, it is understood that people with hearing disabilities can read subtitles as they circulate through museums. However, in addition to not experiencing the sensory experience for a complete understanding of knowledge in these spaces, many people with hearing disabilities have difficulty understanding the Portuguese language. "Depending on when in life the disability is acquired, a person's mother tongue could be sign language. It is a different language, with a different grammatical structure", she says. For this reason, it is essential to ensure that all the content of institutions is accessible to all people, in line with the Brazilian law of 2015 for the Inclusion of Persons with Disabilities. "Knowing that I can slightly transform the reality of a certain group encourages me to continue researching", she says.

Every change requires time, impact, public policy and popular initiatives

IS THERE A MARKET FOR ASSISTIVE TECHNOLOGY?

Priscyla's project was selected for the **Women in Science and Innovation** training, designed by the **British Council** in partnership with the Museum of Tomorrow. One of the objectives of her participation in the training was to understand how to seek partnerships to develop the prototype and implement innovation in a broader context than that of the Geodiversity Museum.

Another participant at the training in August 2019 was Ana Carolina Oliveira Lima, PhD in Electrical Engineering and coordinator of the Assistive Technology Centre of Amazonas (Nuteam), at the Federal University of Amazonas (UFAM). She warns that those who do not have disabilities only face the problem of accessibility in extreme or temporary situations, like when they lose an organ, become immobilised or break a leg, for example. "Only then do we notice, in fact, the infrastructural resources for accessibility", she says. For this reason, one of the great challenges of innovation in accessibility is the need for awareness: "It is necessary that people, all people, ask for these resources, so that there is a greater political and market interest".

At Nuteam she coordinated the development of a technology that allows visually impaired sprinters to run without the help of the guide athlete. The equipment is an adapted suit, which receives signals from sensors installed on the tracks, transforming them into tactile stimuli for athletes. The project was carried out by the start-up *Vybe.me*, with a team coordinated by Ana Carolina. Awarded at *Santander Universidades* and finalist of the Sports Technology Awards 2017, the technology encountered several barriers to evolve from the prototype stage. "As there are political implications linked to the Paralympic Committee, and as the consumer market is relatively small and limited to visually impaired athletes, the start-up had to change its position", she says. Since then, the bracelet focused on visually impaired athletes has unfolded into other products.

During the training week in Rio de Janeiro, the researcher problematised the difficulties in bringing social technology and accessibility to the market. "In general, investors find this type of work very beautiful, but it is very difficult for them to look beyond their pocket, beyond the commercial paradigm. Those with money want to implement a system that brings faster financial return", she criticizes.

SHIFTING PARADIGMS

Both Ana Carolina Lima and Priscyla Barbosa report a challenging immersion in groups of people with disabilities. "There is a people with hearing disabilities culture. It is a group that sees the world differently, more visually. I had to try to understand this new vision", says Priscyla. She says she faced some resistance among study participants. "As I don't have a disability, I had to conquer this space. I counted on the help of sign language interpreters, who helped me explain the project's proposal, so that I could include people and understand more about this culture", recalls the researcher.

For Ana Carolina Lima's project, interviews and tests were conducted with visually impaired athletes. "At first, they showed a lot of resistance, because it is common to form an emotional bond with the guide", she explains. But the statistical analysis of hundreds of videos of Paralympic games showed a series of flaws, attributed to the guides' performances. "Among the users with whom we tested open to these technological changes, we had a very good result in performance and in gaining autonomy", she says. For her, the great challenge of assistive technologies is in shifting the paradigm. "Every change requires time, impact, public policies and a series of popular initiatives in order to be implemented", she concludes. •

BY MARIANA ALENCAR

(In)visible women

Behind the scenes of science, the work of laboratory technicians is fundamental to understanding that the production of knowledge is collective

For 33 years, the routine of Iolanda Deolinda, a technician at the Pathology Laboratory of the Oswaldo Cruz Institute (IOC/Fiocruz), has been systematically and predictively repeated, week after week. Arriving at work, she feeds small animals, such as mice and rabbits and is responsible for collecting the faeces of these animals, from which larvae of parasites that cause diseases such as schistosomiasis, are extracted. Iolanda also takes care of feeding snails, extracting parasites from these molluscs and taking daily notes of animals that do not survive. With a degree in Biology and a postgraduate degree in vector malacology, she arrived at Fiocruz at the age of 24, when she had not even graduated. Her plan was to only stay while covering another technician on maternity leave, but she ended up enjoying the job, and, at the encouragement of colleagues, decided to become a biologist.

In universities and research institutions, there are many women like Iolanda, but they often end up going unnoticed in scientific production. In 1991, historian and sociologist of science, Steven Shapin, published an **article** in American Scientist magazine which reported the invisible processes of laboratory technicians. According to the author, is the process is manifested by the lack of reference to technicians, who are commonly considered secondary or peripheral elements of research development, even though they are responsible for carrying out important functions. The erasure of the work of laboratory technicians also appears in discussions about the production of knowledge, which tend to be focused only on the path of researchers, leaving aside the collective aspect developed by science technicians.

The article "*The Invisible Technician*" was published in issue 77 of the American Scientist and is available for reading at: https://bit.ly/tecnicosinvisiveis.

This collegiality, in fact, is what has motivated Iolanda Deolinda to do her job for so long. For her, communication with the actors involved in the research process is essential for the work to be done in the most accurate way possible. "Here at the Institute there are other areas of research. There is the Histology Laboratory, for example, which interacts a lot with us, because one job depends on the other. Through this communication, we managed to keep the research up to date and well done", she comments.

ESSENTIAL ACTIVITIES

In his article, Steven Shapin suggests that the invisibility of these professionals is the result of a set of factors. The first is the historical devaluation of technicians, who are often trained to mid-level, while researchers hold master's and doctoral degrees. Another factor is related to the functions performed by the technicians, which are complementary, or sometimes even identical to the work of researchers.

The carrying out of activities complementary to those of the researchers is something that Ana Cristina da Silva, a technician at the Microbiology Laboratory of the Federal University of São João del-Rei (UFSJ) is already familiar with. This is because her functions range from the monitoring of microorganisms used in research and practical classes to the aid of handling the instruments of researchers who use the laboratory. "I have a very intense workflow schedule and the hardest part is having to deal with deadlines. We are always on time. We need to produce quality work, but in a very short time, as there are many people who depend on it. In my case, specifically, I need to take care of all the material that will be used by the researchers, making sure that there is no contamination", says the technician.

Another peculiarity of Ana Cristina's work that makes her feel appreciated is the learning possibilities derived from contact with researchers and students. For her, "the coolest part of the lab technician's job is that you're always learning. You have the opportunity to be in direct contact with science and, consequently, expand your level of knowledge and specialisation".

RECOGNITION

The activities carried out inside a laboratory have characteristics that suggest the idea of a network and of union. Co-dependency between researchers and technicians is indispensable in the production of research. The routines of both professionals include the construction of a dialogue in which all actors involved must participate. However, the diversity of activities undertaken by technicians makes it difficult to delimit roles, which, once again, adds to the process of making these professionals invisible.

The case of Lilian Cristina Soares Silva, graduated in Environmental Engineering and holder of a Master's in Environmental Science and Technology, is an example of the fluid boundaries between technical and management work. She works as head of teaching laboratories at the Federal University of ABC (UFABC) and performs activities ranging from the purchase of consumables and equipment to attending meetings. "The purchase of materials is made through an electronic auction, so I make my contribution in the course of the bidding process. In addition, I provide support to teachers in practical classes, help with class allocation in laboratories, and attend management meetings. I have ties with students, fellow employees and researchers", she comments. The number of functions she plays is also associated with the number of laboratories that are under her responsibility: Robotics, Materials, Electronics, Energy and Electrotechnics.

In contrast to the process that makes technicians invisible within science, the specific competence of such professionals is what makes them essential within environments where knowledge is produced. The practical knowledge of the technicians, which is often not shared by researchers, is essential for the functioning of the laboratory. **"The laboratory technician not only has a lot of theoretical knowledge, but also a lot of practical experience, and this is passed on to students and researchers. Both for the training of students and the production of science, it is necessary to have researchers, teachers, students and technicians"**, reinforces Lilian Silva.

Even though she feels that her work is appreciated at UFABC, she says that one of the biggest challenges of her occupation is to make the integration between the different sectors of the University flow. "Students arrive with great knowledge and acquire more along the way. They have good ideas, which could be better used within Academia. But there is still a need to expand information sharing between areas, so that knowledge is not restricted to just one sector, and instead, promoted as interdisciplinary, so that everyone wins", she concludes.

By women for women

Impacted by reports of harassment, women develop technologies to increase safety in public spaces

BY MARIANA ALENCAR

After getting off a bus at a point located near the Dean's office of the Federal University of Pernambuco (UFPE), a 19-year-old student was approached by an armed man. Even after handing over all her belongings, she continued to be pursued by the boy and was raped. The student took her story to social network, which generated great commotion at the university, and women took to the streets in protest. As the feeling of insecurity increased, several women began to move around the campus carrying knives for protection.

This incident in 2015 drew the attention of another student who felt compelled to act in the face of that situation. That year, **Simony César** was taking the Design course at UFPE and, in one of the classes, after having contact with the studies of the American researcher Henry Jenkins, she came up with the concept of the cell phone being the electronic equivalent of the Swiss army knife and how technology had the potential to guarantee safety for women.

Simony Cesar was one of the participants in the **Women in Science and Innovation** training, held by the **British Council**'s **Women in Science** programme in partnership with the Museum of Tomorrow.

"At that moment, nothing much came of the idea. The following year, for my course conclusion paper, I wanted to research the so-called **hackathons**. I signed up for one of these events, but without expecting much. There, I was challenged to solve city problems, and I decided to work with public transportation data where I saw that the reports generating the most repercussions were related to harassment. It was there that I had the idea of creating technology focused on solving this problem, and so, the *Nina* project was born", recalls Simony.

Events that bring technology professionals together, who are challenged to create specific solutions to a problem, in work marathons.

Nina is a technology that tracks, standardizes and centralizes cases and complaints of harassment, integrated with public transport apps that show, for example, bus routes. It works as a report button that generates information about incidents of abuse that occur throughout the city. The creation of the tool made Simony stand out in the area of Technology and Innovation in 2019, where she joined the list of Forbes Under 30 Brazil.

"During the development of the project, we realised that an app would not work the way we wanted, as the idea was to have a technology that integrated several existing tools. *Nina* is therefore not an app, but a technology associated with these tools. The user clicks on the bus line, for example, and *Nina* begins to collect information, such as time and geolocation. This data then feeds a control panel that is available to the government. This same data can activate the bus companies' video cameras. With the complaint, via *Nina*, images are sent to the Police which also helps in decision-making and urban planning", details the creator of the technology.

DATA COLLECTED, IMPROVEMENTS MADE

Nina is already present in different cities in Brazil, but the great success story is from Fortaleza (state of Ceará). The technology is embedded in the app *Meu Ônibus Fortaleza*, run by the Bus Companies Union and municipality. In four months, the city registered 930 complaints of harassment via *Nina*. The videos collected by pressing the button were used in police investigations and the data obtained has been used for improvements in the city, by highlighting places that need more lighting and routes that require policing, among other factors.

"The Fortaleza case indicates how this data is benefiting society. We want to encourage the act of reporting incidents, as women discredit the results. We did a lot of research during the process of creating and implementing *Nina* and saw that there was a lack of confidence in relation to the existing reporting channels. Before, improvements were made from the perspective of a politician. Today, it is due to the real demand of the people", she says.

BEYOND PUBLIC TRANSPORT

Other cases of harassment, also reported on social network, caused Priscila Gama from Minas Gerais to create *Malalai*, a start-up that developed a free app and wearable technology for the safety of women who commute alone. The idea arose in 2015, when the creator, by searching on the hashtag **#PrimeiroAssédio**, came across reports of violence against women commuting alone. While attending a technology event, the architect continued with the idea, bringing together a team of designers and developers to create the app.

The tool is free and available on Android and iOS. The application collaboratively collects safety information about routes, and promotes a "virtual company", with automatic location notifications and ETAs. With the device, the user can press an emergency button, which is located anywhere on the phone. After the action, messages asking for help and informing location are sent to registered contacts. The company has also launched a new device: a jewel such as a ring or necklace that can be used and works in the same way as the emergency button. The idea here is that the woman being harassed can ask for help quickly and discreetly. "We didn't want a panic button that would serve as a constant reminder that something bad could happen at any time. This is why we invested in the creation of a jewel", explains Priscila Gama.

Like Simony, the creator of *Malalai* has also faced difficulties in her entrepreneurial career, but she believes in creating communities so that problems faced by minorities can be overcome. "I know that we face obstacles. One of the things that I learnt with *Malalai* is that taking up space is not the way. I believe in creating spaces. In my journey, I went after resources beyond money and managed to create a wide network of empathy around

Campaign by the collective feminist group *Think Olga* against harassment. Known for the *Chega de Fiu-Fiu* project, the group launched the hashtag in 2015 to encourage women to talk about the first time they were harassed.

BEYOND TRANSPORT AND BIG CITIES

Experiences of women in different social contexts are often traversed by reports of harassment. Disrespect and violence affect women even in academic environments, often dominated by male figures and stemming from hierarchies that stimulate a lot of abuse. In the early 90s, professor and researcher Márcia Barbosa was one of the countless women who experienced harassment in an academic environment. At an event she was attending, she was offered help to carry her equipment by a researcher. Upon entering the researcher's room, he grabbed her. The researcher exposed this case years later in interviews, which caused other women to also disclose cases of harassment experienced within universities.

"At the time, I couldn't even talk to my colleagues. They wouldn't have understood it as harassment. Today, in Brazil, people find ways to protect the harassed victim, which did not exist in my day, and now we are able to report the harassers out there", she comments. According to Márcia Barbosa, victims need to find support networks and make complaints. "Talk to friends and, if you can, talk to someone who has an important position and is sensitive to the topic, because you will need support. We cannot give up, as this will be a victory for the harasser. Do not abandon the case, report it so that we can map and build instruments to punish harassers". ●

Interview with Simony Cesar, creator of *Nina*

What were the main difficulties you faced in this environment that is historically dominated by men and has no gender diversity?
I was born in one of the lowest HDI neighbourhoods in Recife. I'm from a humble family. So, everything was, and still is, extremely challenging for me. For being a woman, for being from a poor community, because of my accent, and my skin colour. I joined the area because of the problems out there, and not to start my own business. My mother was a bus collector who spent 12 hours a day on public transport. She was a target, so I did the project for her. But I never had any guidance on how to start a business. I dropped out of university because of lack of support from my teachers.

But you ended up going back to university, didn't you? Why this decision to not give up the academic environment?
Márcia Barbosa was one of the people who made me keep on in Academia. I met her at an event where the two of us were to speak. In conversation, she said she had heard of a technology project to contain harassment that had been developed by a North easterner woman. We then realised that she was talking about me! We kept in touch and she later informed me about an announcement from Brics in which *Nina* had been nominated for the Young Inventors award. Because of this, I ended up going back to college, but to study Advertising.

Where did the name Nina come from?
I was writing my first article about Nina and had just watched the documentary "*What Happened, Miss Simone?*", about Nina Simone's life. At some point, she is asked what freedom is, to which she replies that freedom is not being afraid. I used the phrase in the article, quoted and named the project.

The boldness of standing out

BY LUIZA LAGES

Vanderlan Bolzani is now the name of an award. Her work and contributions to scientific development are so significant that, in 2019, the Brazilian Society of Chemistry (SBQ) created the *Vanderlan da Silva Bolzani* Award that recognises women whose work in the area stand out and contribute to the growing strength of the institution. The tribute is one of many recognitions of the academic trajectory of excellence of this woman who abandoned her medical studies to graduate in Pharmacy from the Federal University of Paraíba (UFPB) in 1973. With the support of her family, she left her parents' home in João Pessoa and moved to São Paulo, where she obtained a master's degree in Organic Chemistry (1977) and a PhD in Science (1982), both from the Institute of Chemistry at the University of São Paulo (USP).

Vanderlan Bolzani proudly and affectionately recalls the supervisor Otto Richard Gottlieb, nominated for the Nobel Prize in Chemistry in 1999, who dedicated himself to the chemical study of Brazilian plant heritage. It was working with Gottlieb that she discovered her passion for the Chemistry of Natural Products. Before completing her PhD, she got married and had a daughter. Her family followed her back to João Pessoa, where she briefly taught at UFPB in the late 1970s. Then, at the Chemistry Institute of Paulista State University (Unesp) in Araraquara, she built her career as an internationally recognised researcher, where she still coordinates the Centre for Bioassays, Biosynthesis and Ecophysiology of Natural Products (Nubbe).

In addition to being an exceptional scientist, Vanderlan Bolzani believes in the importance of participation in scientific policy, within societies and councils. She boldly followed paths that led her to leadership positions and today, she is a member of the São Paulo State Research Funding Agency (Fapesp) and coordinates the Biota-Fapesp Programme. She is vice president of the Brazilian Society for the Progress of Science (SBPC) and president of the Academy of Sciences of the State of São Paulo (Aciesp). In the interview, she details her academic trajectory, talks about what it is like to occupy spaces of power in science, about family, friends, encouragement, support and passion for research. As a scientist who encourages girls and women walking their own paths, she is an inspiration for a more equal and excellent science.

W.S.M.: Tell us what contributed most to your academic career.

Vanderlan Bolzani: My personality. Since I was a child I have always been very daring. My parents encouraged me a lot, and I really enjoyed studying. "As you are not from a rich family, the only way to be someone in life is to be literate," said my father. We were a simple family, but we all studied. When I discuss the issue

Recognised for her work in Chemistry of Natural Products, Vanderlan Bolzani talks about leadership and encouraging women in science

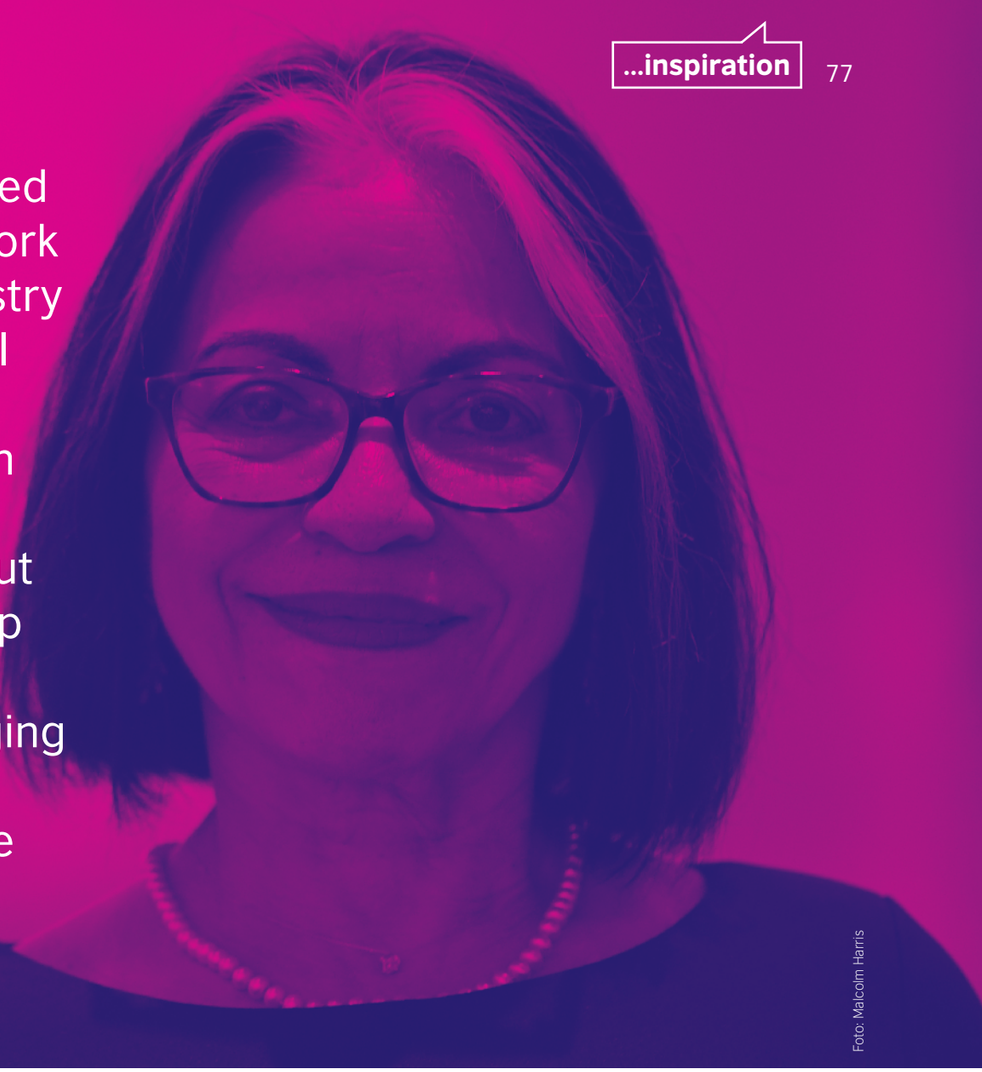


Foto: Malcolm Harris

of gender, of girls and women who stand out in science, I realize that the first moment of support comes from the family, or one's environment, whatever it may be. If you are in an environment that recognizes that you should be stimulated, that you can study and move forward, this is a great contribution. When I joined Unesp, I had a very strong desire to set up a laboratory at a time when this was not very common for young researchers. I got my first research project with Fapesp, to work ***Rubiaceae do Brasil.*** At that time, I heard many people saying, with disdain: "woman and North-easterner...". But I had always been very bold and took maximum advantage of this trait at every opportunity. It gave me the strength to continue

A plant family of about 1,700 species in Brazil, present in the regions of the Amazon, Atlantic Forest and Brazilian Cerrado. It is known as the coffee family.

studying and growing. The big leap that marked my career was the creation of the Biota Fapesp programme for research in characterisation, conservation, restoration and sustainable use of biodiversity in the state of São Paulo. At a large meeting at Unicamp, Sonia Dietrich, a great scientist in the field of taxonomy, introduced me to the group and said that I had the potential to carry out projects in Chemistry of Natural Products. After that, there were three big projects involving a lot of money, and we set up a state-of-the-art laboratory in natural products.

W.S.M.: And then? What was it like to gain fame and reach leadership status?

V.B.: This is where the dispute begins, which is different. You establish yourself as a scientist, you are respected, but only in your place. Because of my daring spirit, I have always liked competition. I think that to act in the country's scientific policy is to be inserted in scientific society. When I was still a master's student, I became a member of the Brazilian Chemical Society (SBQ) and afterwards, SBPC's. After my post-doct internship, I started working at SBQ, in the natural products division. I was a secretary, deputy director, and director, and wanted to go further. I ran for treasurer and got it. I was general secretary, and then applied for and won the vice presidency. Generally, vice presidents automatically became presidents. In my case, however, it generated discussion, but I stood firm. I said I was a candidate. I said, "Given that all my vice president colleagues before me became presidents, so am I a candidate for president". At that point, Jailson Bittencourt, who was an advisor at the time, gave me the greatest support.

W.S.M.: How was women participation in the Society at that time, in relation to higher positions?

V.B.: Very small, and even today it is very low. I was abroad when they opened the ballot box. I didn't think I was going to win, but I did, and by 29 votes. It was a celebration!

W.S.M.: And you were the first women president of SBQ ...

V.B.: I was the first women president. And I think we did a very nice job, because from then on, I had huge support from the guys who worked with me. Even when someone wanted to take me on, there was always a colleague backing me up. Despite experiencing discrimination, the boys often supported us as we make our difficult way to the top. Anyway, after that, things started happening, because when you get to a certain point, doors open. I signed up and got a position on the SBPC board for two terms, and then came the vice-presidency. I joined Fapesp's board of directors, and now I am president of the São Paulo State Academy of Sciences. It is a process, and support is essential, it is a catalyst, and stimulating. That's what I tell my students, boys and girls. It's worth being bold! I think that audacity combined with ethics and responsibility with others is very important for one to ascend in their career, in any career. In STEM, even more so, because we are few.

W.S.M.: Where does your enchantment in relation to Natural Products Chemistry come from?

V.B.: Studying natural products means understanding the chemical ecology that exists in a country like Brazil, with all the interactions present. The Amazon rainforest has enormous dynamics: plants with plants, plants with insects, plants with animals. It is a dynamic that results in the most sophisticated chemical laboratory in the world. As smart as we are to be able to win Nobel prizes, we would never be able to imagine, inside the laboratory, what exists in nature. It is fascinating. As it is a highly sophisticated laboratory, it is a fundamental environment for prospecting molecules for the purpose of innovation and human use, such as medicines, cosmetics and food supplements.

W.S.M.: In Brazil, what are our strengths in relation to the Chemistry of Natural Products and where do we need to advance?

V.B.: The focus on making discovery is important, but not enough. It is necessary to incorporate the latest scientific advances in the area. In Brazil, the Atlantic Forest, the marine coast and the Amazon are still poorly studied environments. In order for the Chemistry of Natural Products to make a leap, we need to understand the role of products where they occur, and not just extract them from nature. This is, for example, studying the metabolic pathways, **biosynthesis**, understanding which enzymes and which genes are responsible for different characteristics and transformations. When you go down to the molecular level, you can better understand the balance of the ecosystem. At this moment, the Chemistry of Natural Products needs to advance in collaboration, between specialists from different areas, such as Biology, Pharmacy and Anthropology. Brazil will then continue to work on the frontier of knowledge.

Production of complex chemical compounds, such as proteins, from simpler molecules. Biosynthesis is an energetic transformation that takes place within living beings.

W.S.M.: How does your research contribute to the advancement of the field?

V.B.: I started to do the work of natural products aimed at bio-discovery, or in other words, to identify, in nature, in plants, substances with biological activities that could be a prototype for a medicine or cosmetic. It is not a simple task and can be most frustrating. It is our obligation, in Academia, to produce excellent science and arrive at these molecular models. From then on, it is up to the industrial sector, with whom we partner up. I went towards the study of cancer as I am a pharmacist. I also work with neglected diseases, such as malaria. I am investing a lot in two projects: one with *umbu*, a Brazilian fruit with low added value. We found an incredible chemical composition, which we published, patented and won the Abiquim Technological Innovation Award in 2015. I have also been researching peptides, a class of large substances that has fascinated me, but which is still little studied in Brazil. In 2012, a brilliant student in her master's carried out a study and built a database with all the substances that we had worked on in our laboratory. This work was published and had great impact. I thought "why not make a database of natural products from Brazil?" I fought for it and got a project with CNPq. In May 2019, we signed a contract with the Chemical Abstracts Service (CAS). It will be the first database of natural products from Brazilian biodiversity. I think it will be essential information for companies, research, and mainly, for public policies. It will also be the highlight for a 70-year-old lady, who will soon be leaving the scene.

Logbook

Testimonies and insights from participants of the **Women in Science** programme

"It is useful to create networks of women in science because we can help each other. Mentorship made by and for women is as important. We also need public policies that help women have careers."
Francesca Santoro
Member of UNESCO's Intergovernmental Oceanographic Commission (IOC).

"We need to bridge this gap that exists in the market between women and men. May equity come!"
Ana Paula Tongo
Founder of Bitável Tecnologia.

"It is incredible to be in a women-only space. It is beautiful to see women sharing and developing their skills and research. The best way to inspire women is by saying and showing that they are capable, encouraging and promoting cases of other women."
Ariane de Almeida
Creator of the MUDA Network.

"It was so important to have found women who think like me, who support each other. It was a breath of hope in my life."
Aurea Celeste da Costa Ribeiro
Professor at the State University of Maranhão (UEMA).

"When you are inside the industry, it ends up becoming limited there. I now have a range of possibilities and paths. My head is already bubbling with ideas!"
Thays Leal
Mechanical Engineering student at CEFET Nova Iguaçu.

"There is a myth that it is difficult to be a woman in the technology market. The truth is that it is difficult to be a woman anywhere. To change that, we must explore new horizons, broaden our thoughts and work on our ability to inspire people."
Ana Zambelli
Independent member of the Petrobras Board of Directors.

BRITISH COUNCIL | 75 YEARS IN BRAZIL

“The economic emancipation of women is the basis of their social and political emancipation”

Carmen Portinho

Imagine being a woman leading more than 450 workers during the construction of one of the greatest cultural institutions of the 1950s. What about navigating the waters of the Atlantic - still in the midst of the battles of the Second World War - to intern in the commissions of the reconstruction of English cities, after the Axis bombings? How about being the first woman urban planner in the country to bring the concept of popular housing to Brazil?

Engineer, urban planner, suffragette, feminist and teacher, Carmen Portinho performed all the activities mentioned above, still in the 1940s and 1950s. Carmen is connected to the history of the **British Council** because it was through an invitation from the organisation that she travelled to the United Kingdom , in an experience that would shape her entire career and result in great architectural works in Brazil, such as the Museum of Modern Art in Rio de Janeiro, of which she was also director.

Amid the celebrations of the 75th anniversary of the **British Council** in Brazil and the launch of the second edition of the Women in Science magazine, we salute Carmen, a woman who broke barriers and made history. Like Carmen, we hope that the stories told in this magazine will inspire girls and women to transform the society in which we live.

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