BRITISH COUNCIL

magazine Women in Science

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Climate Change and Female Strength

Understand how women are acting to preserve the planet

Together for Transformation

Interinstitutional Working Group for Gender and Diversity discusses structural actions for higher education and research

Do you know her?

Scientists from Brazil and the UK share their stories, challenges and achievements

Masthead

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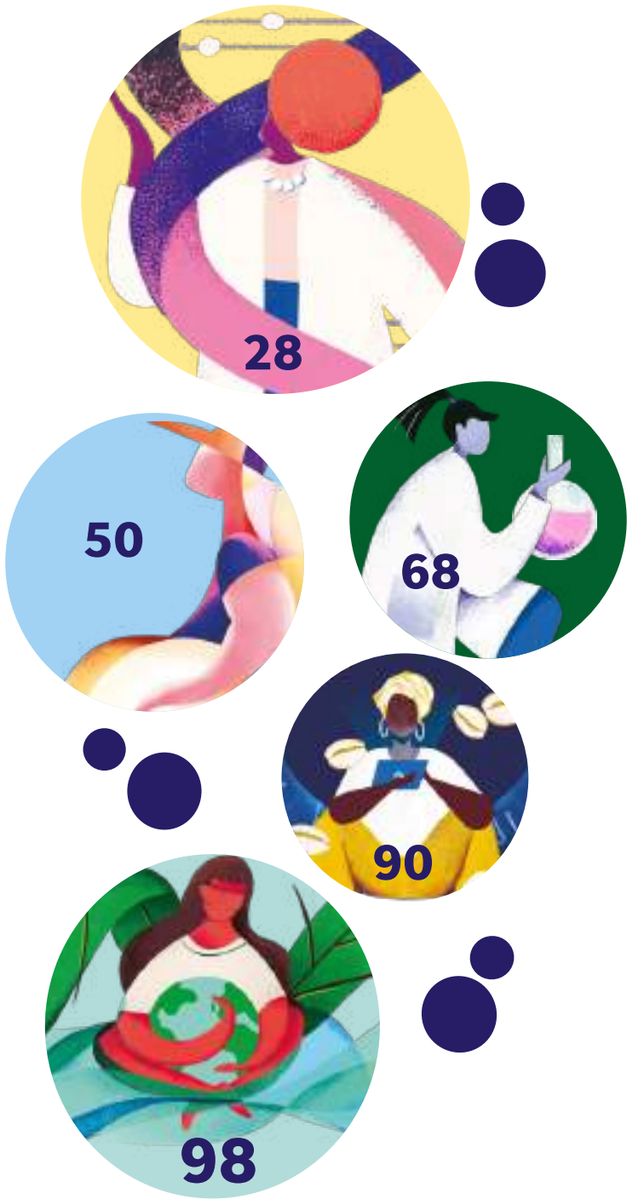


Foreword

According to the United Nations, the intersection between gender inequality and climate change represents one of the greatest challenges for sustainable development today. Although the impacts of environmental degradation and natural disasters are felt globally, they disproportionately affect women and girls, especially those in situations of vulnerability and marginalisation.

However, in the midst of these challenges, there has been a growing movement of women scientists leading research and innovative actions, connecting science, sustainability and social impact. These professionals are the protagonists of a collective effort to tackle complex and interconnected systems, where diversity plays an essential role. By taking into account different perspectives, needs and resources, diversity not only promotes inclusion, but also drives the creation of more effective and sustainable solutions.

The Women in Science Programme acts as a catalyst for this transformation. Through initiatives that expand capacities, promote achievements and break patterns of exclusion, the programme fosters the presence of women in science in all its diversity. Moreover, networking, one of the foundations of the programme, has been fundamental in structuring initiatives such as the Framework for Gender Equality in Higher Education Institutions in Brazil, inspired by the British initiative Athena Swan and created through collaboration between institutions in Brazil and the United Kingdom.

A further reflection of this networking is the Women and Science Award, held by the CNPq with the support of the British Council in the Institutional Merit category, which recognises and values higher education and research institutions for promoting a more inclusive science. By strengthening female leaders and supporting transformative policies, the programme has contributed to cultural and structural changes in favour of a more equitable and innovative science.

The 4th edition of Women in Science Magazine looks at these initiatives while exploring the relationships between gender, race, science and climate change, highlighting the role of women scientists in tackling these challenges. This issue brings together inspiring stories of female researchers who are transforming their fields of study into concrete solutions for sustainability, connecting science and the needs of local communities.

Among the professionals featured in this edition are Professor Dr Sue Black, a British researcher who created the UK's first online network for women in technology, BCS Women, and Dr Komang Ralebitso-Senior, a Reader or Associate Professor, and specialist in sustainable environmental management, who links her research to the UN's Sustainable Development Goals and promotes equity, diversity and inclusion in science.

Isabella Quaranta, a researcher from Ceará, is developing an innovative solution to capture carbon dioxide and turn it into plastic, contributing to the circular economy. Andreza Sartori uses artificial intelligence and computer vision to monitor howler monkeys, which are essential for preserving ecosystems. Francielly Rodrigues, a young woman from Pará, integrates science, culture and social transformation, strengthening communities in environmental conservation. Generosa Sousa, known as the 'queen of bees', combines science with rural empowerment, promoting sustainable agriculture and the preservation of biodiversity.

The magazine also highlights how the work of these scientists is embedded in a larger context, where international cooperation networks and institutional initiatives boost the impact of scientific research led by women. By connecting cutting-edge science with the most pressing environmental and social challenges, these women inspire girls and young people, reaffirming that the female presence in STEM is essential for building a fairer, more sustainable and inclusive future.

With this issue, Women in Science Magazine reaffirms its commitment to amplifying voices, making achievements visible and inspiring the next generations by celebrating the women who transform science and shape the world. ■

(Credit: Rodolfo Rizzo)

Enjoy!

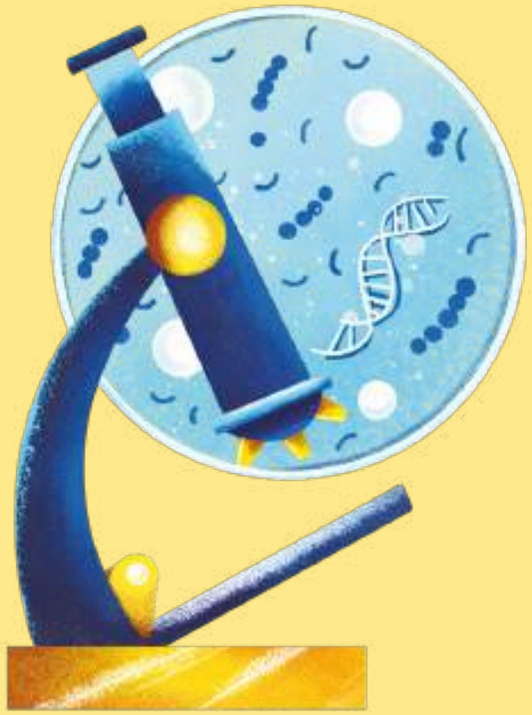
Diana Daste

Cultural Engagement Lead
British Council

The Bridges Built by The Women in Science Program

Understand the importance and the structure of the programme's actions so far

By Danielle Menezes



Gender inequality in science is an ethical problem and an obstacle to social and scientific progress. Despite significant advances, women still face structural barriers throughout their scientific careers, such as a lack of mentoring, difficulties in reconciling motherhood and work, and less presence in leadership positions, in a field historically dominated by men.

Dalila Andrade Oliveira, Director of Institutional and International Cooperation and Innovation at the National Council for Scientific and Technological Development (CNPq), reflects: **'It would be too simplistic to find a single reason for this phenomenon; This has a lot to do with the social roles we assume'**.

For complex issues like this, it is necessary to work systemically by many hands and capable of creating a structure to ensure deep and long-term changes.

Challenges for Women in Science

708 million

women worldwide are out of the labor market due to unpaid care responsibilities

(International Labor Organization)

Only 29%

of engineering scientists are women

(Gender in the Global Reserach Landscape)

Only 28.2%

of the workforce in STEM is made up of women, while in other sectors this number reaches 47.3%

(Gender in the Global Reserach Landscape)

Only 3%

of Nobel Prizes in Science have been awarded to women

71% of university researchers

are men

(UNESCO, 2020)

In Brazil, the presence of women

in leadership positions in the area of science and technology varies between 0% and 2%

(UNESCO, 2020)

The Strategy for Transformation

In 2018, the British Council launched the Women in Science Programme in Brazil to promote gender equality in science, technology, engineering and mathematics (STEM), which is now also operating in other Latin American countries such as Mexico and Peru. The initiative is in keeping with the British Council's internal principles of equality, diversity and inclusion, while responding to the external need to promote the inclusion of women in science.

The programme aims to promote systemic change, influencing behaviour and strengthening policies in STEM, leadership and gender equity. Acting as a catalyst, it connects women scientists to institutions in Brazil, the Americas, the UK and around the world, fostering individual and institutional development.

Diana Daste, Cultural Engagement Lead at the British Council in Brazil, emphasises the importance of partnerships: **'One of the tenets is to establish collaborations with institutions that can enrich the programme with knowledge and reach'.**

The initiative also supports local and regional agendas, highlighting inequalities and promoting diversity in its many dimensions. To ensure coordinated and comprehensive action, it involves various sectors of society, including governments, universities, museums, civil society organisations and international bodies.

CNPq, Capes, Confap and British Council celebrate the launch of the Interinstitutional WG for Gender and Diversity

(Credit: Marcelo Gondim / CNPq)

The Pillars of Change

The programme's approach is based on three fundamental pillars: inspiration, performance and influence. This structure has been carefully designed to address the full trajectory of girls and women in science, **'recognising that each stage leads to the next and requires specific interventions to overcome cultural, institutional or skills barriers,'** explains Daste.

Women in Science Programme

Inspiration

- Encouraging girls and young women to explore careers in science
- Girls in STEM

Performance

- Supporting the development and career progression of female researchers
- Women in Science and Innovation
- Women in Tech - Inclusive Leadership

Influence

- Increasing the visibility and impact of women's contributions to science
- UK-Brazil Gender Equality Partnership

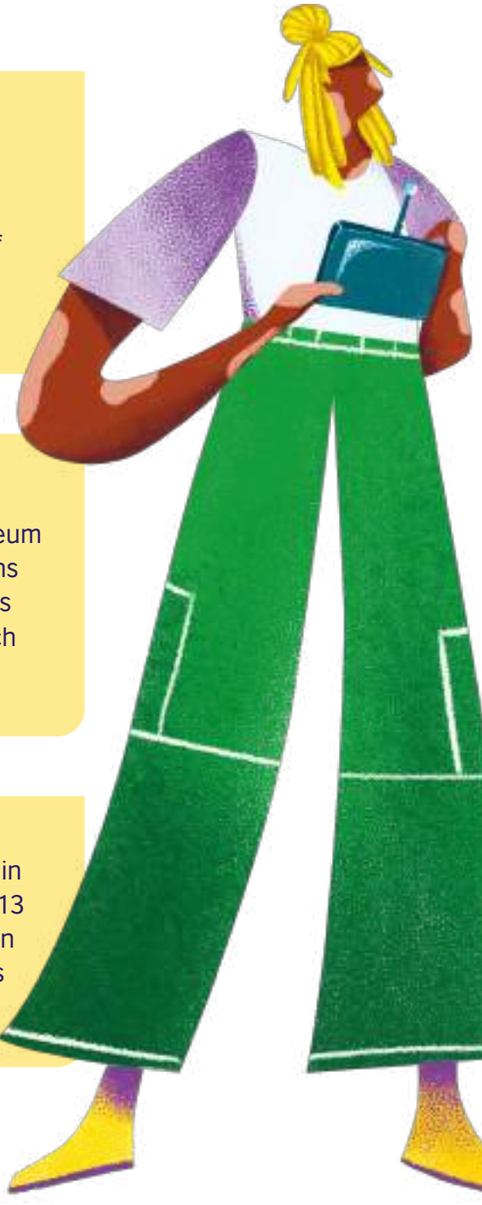
Some of the Actions Implemented

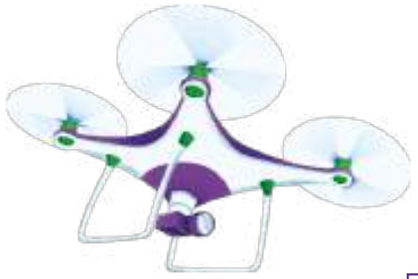
Since its creation, the programme has implemented several impact initiatives. Evaluations carried out by the British Council have indicated the following results:

• **Girls STEM:** This project has funded 42 initiatives in two editions, directly impacting 11,630 girls in Brazil. Teachers were trained to deconstruct gender stereotypes in the classroom; 97 per cent of participants developed new teaching skills.

• **Women in Science and Innovation:** The result of a partnership between the British Council and the Museum of Tomorrow, the initiative has already held six editions and impacted more than 800 Brazilian researchers. As a direct result, female participation in leading research projects increased from 33 per cent to 42 per cent.

• **Women in Tech - Inclusive Leadership:** Launched in 2022, this programme has formed partnerships with 13 Brazilian institutions that have replicated the project in 14 classes. A total of 635 women improved their skills over the three phases of the project.





Framework used around the world to support and transform gender equality in Higher Education and Research.

• **UK-Brazil Gender Equality Partnership:** Aims to promote gender equality in higher education and research institutions in Brazil through partnerships with British institutions, associated with **Athena Swan Charter**. In two editions, it has involved 15 institutions in the UK and 35 in Brazil, covering four of the country's five regions. One concrete result was the creation of the Framework for Gender Equality in Higher Education Institutions in Brazil.

Lasting Institutional Impact

In 2024, a survey was commissioned to evaluate the results of the programme. More than 75% of participants recognised the lasting impact on their institutions, with the implementation of practices and policies that promote gender equality in STEM.

The Federal University of Rio Grande do Sul (UFRGS) and the Fluminense Federal University (UFF) are examples of institutions that have had positive and continuous results from their approach to Women in Science. Both were included in the first edition of the UK-Brazil Gender Equality Partnerships, launched in 2021, which sought to influence the development of institutional policies and practices to enable the establishment of gender equality in science and technology in higher education and research institutions in Brazil.

In partnership with Oxford Brookes University and with the support of the call for proposals, UFRGS reviewed the legislation governing the hiring of professors from a gender perspective, with changes to the rules applied to the entire university to include actions aimed at female candidates with children. UFF has consolidated and institutionalised the Permanent Gender Equity Commission (CPEG). **'Before the programme, we were a working group of women in science and now we're a permanent commission, linked to the UFF rector's office,'** said **Leticia de Oliveira,** neuroscientist and coordinator of the UFF CPEG.

Sarah Dickinson-Hyams, in an interview with the British Council, at the time Assistant Director of International Equality Charters at Advance HE, summed up the programme's transformative impact by highlighting the complementarity between local and global strategies. **'UK institutions were challenged to integrate accessibility, inclusion and community impact into their gender equality strategies, while Brazilian institutions were encouraged to adopt actions based on data and evidence.'**

Framework for Gender Equality in Higher Education Institutions in Brazil

Workshop at the State University of Maranhão (UEMA) in 2023 to discuss the Framework for Gender Equality in Higher Education

Credit: Project archive

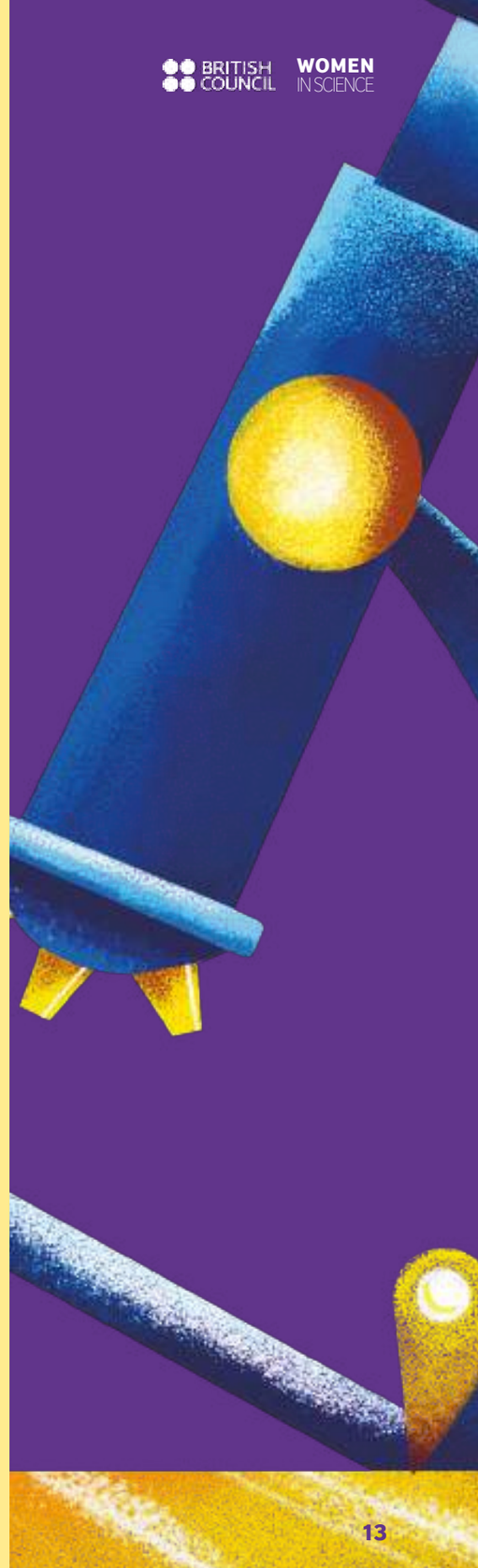
More Women, More Science

The history of the Women in Science Programme highlights the transformative power of international cooperation and institutional commitment to promoting gender equality in science. By weaving support networks and fostering qualified training, the programme catalyses important results on the academic scene.

The programme aims to expand the repertoire of tools, networks and knowledge to generate opportunities for positive transformation at the individual, institutional and systemic levels. The co-creation of the first Framework for Gender Equality in Higher Education Institutions in Brazil, and its socialisation in the five regions of the country, demonstrate some of the achievements along this path. The creation of the Interinstitutional Working Group and the Women and Science Award in 2024 are important milestones. Both initiatives are discussed in depth in the text **'Among us: the importance of networks for equity'** (page 22) of this issue.

Diana Daste emphasises: **'Strengthening networks at the organisational level, not only for the possibility of sharing different knowledge, but also as an opportunity to develop institutional capacities, is crucial to the success of the programme.'**

The Women in Science Programme demonstrates that gender equality requires concrete action and sustained commitment. Through strategic partnerships and long-lasting initiatives, the programme builds bridges and paves the way for a more inclusive future in science and higher education. ■



Women's Inclusion in STEM in Brazil

The importance of public policies for women in science

By Danielle Menezes and Joanna Muniz

The under-representation of women in science, technology, engineering and maths (STEM) remains a crucial challenge that limits global progress. The United Nations (UN) report *Progress on the Sustainable Development Goals: The Gender Snapshot 2024* points out that doubling female participation in the technology sector could increase global GDP by 600 billion euros by 2027.

While the *Gender in the Global Research Landscape* survey, published by Elsevier, indicates progress in Brazil, such as the increase in female participation in science from 38 per cent to 49 per cent between 1996 and 2015, the progression and permanence of women in leadership positions still faces significant obstacles. 'To get to a management position, as I am now, we have to compromise a lot that is expected of us and often we have to work twice as hard,' says Dalila Andrade Oliveira, Director of Institutional Cooperation, International and Innovation at the National Council for Scientific and Technological Development (CNPq).

These inequalities are also manifested in other aspects of the professional career. The study *The gender gap in highly prestigious international research awards*, 2001 - 2020, analysed 141 of the world's most prestigious international research awards and concluded that, between 2001 and 2020, these awards were received 3,445 times by 2011 men and 262 women. In addition, the discrepancy is also visible in the judging committees and in the representation of full professors in strategic areas such as biological sciences, computing and maths.

Marcia Rangel Candido, a researcher at the Centre for Research and Studies in Sociology at the University Institute of Lisbon (CIES - ISCTE), points out: 'As well as women being a minority in the most prestigious positions, they are cited less, generally publish less in various areas of knowledge and suffer more from harassment.' This scenario is corroborated by the report *Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine*, which points out that more than half of female students and professors in STEM have faced harassment, abuse, sexual assault or professional and personal belittling in the performance of their duties.

Effective and Intersectional Change

Given this scenario, the central question is: how can we create the conditions for women to develop solid scientific careers, working with dignity, being duly recognised and making their transformative contributions visible? Answering such a complex question requires more than simplistic solutions. Coordinated, intersectional and sustainable actions need to be implemented - both financially and in terms of continuity - in order to achieve concrete and lasting results.

Public policies are indispensable tools in this process. Created through interaction between governments, civil society and other actors, these policies have the potential to organise collective efforts, promote equity and guide investments and regulations to solve priority problems.

Credit: Rodolfo Rizzo

As **Roberta Gregoli**, a gender equality consultant and member of the Alumni UK community, explains: **'If you don't have a public policy, you depend on the goodwill of a few people. And if those people leave, it's all over.'**

Clébia Mardonia Freitas Rabelo, professor of Regional Development at the University for the International Integration of Afro-Brazilian Lusophony (UNILAB) and a specialist in Public Policy Evaluation, points out that people's realities cannot be positively transformed without the involvement of civil society. The debate needs to understand concrete realities, regionalities and local vocations. **'Today there is a process of evolution, and we have to thank the women who are demanding social participation,'** she emphasises.

Legislative Advances for Inclusion Policies

In 2024, significant legislative achievements were made regarding the protection of women in academic environments. In July, Law 14.925/2024, known as the Mothers in Science Law, was enacted. Proposed by Federal Deputy Talíria Petrone (PSOL-RJ), this legislation addresses a longstanding demand and requires higher education institutions to ensure the continuity of educational support by making the necessary administrative adjustments to course or programme completion deadlines for students and researchers in higher education due to childbirth, the birth of a child, adoption, or the granting of legal guardianship for adoption purposes (Article 2).

The 180-day leave guarantees, among other provisions, an extension of the deadline for defending master's and doctoral theses, also applying to undergraduate researchers. In cases of atypical parenthood, the proposed legislation suggests extending this period further.

> **'The involvement of society as a whole is essential if public policies are to meet major demands, such as gender equality in science.'**
>
> Clébia Mardonia Freitas Rabelo

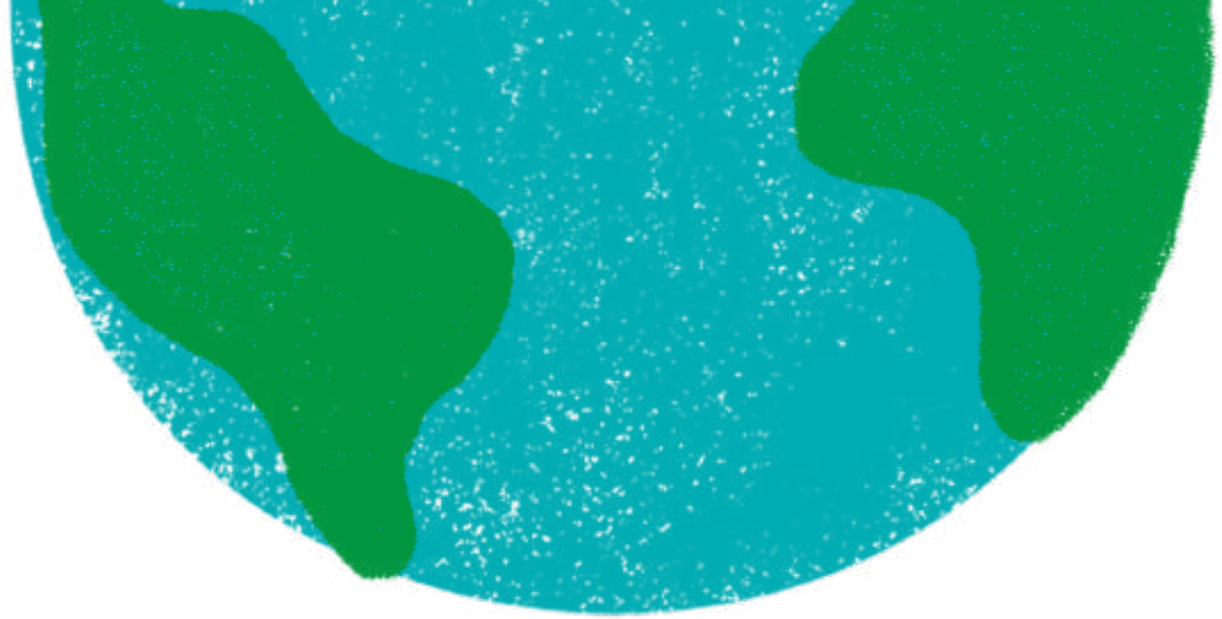
In an interview with Planalto Notícias, **Federal Deputy Talíria Petrone** and **Minister Luciana Santos** enthusiastically celebrated this achievement.

> 'I am a parliamentarian, a mother of two, and also a master's degree holder and researcher. We know that many women, when they reach a certain stage in life, have to decide whether to continue their academic research or take care of their children. **So, this is a victory for Brazilian science, technology, education, and, especially, for Brazilian mothers.'**
>
> Federal Deputy Talíria Petrone

> **'We are the majority in academic universities. We start with 65% of undergraduate research scholarships, but when it comes to productivity grants, which represent the peak of a scientific career, this number narrows to 35%, revealing that along the way, many women drop out due to the burden of caregiving responsibilities that falls upon them.'**
>
> Luciana Santos, Minister of Science, Technology and Innovation

In December, after being approved by the Chamber of Deputies, Bill 2825/22, proposed by Federal Deputy Sâmia Bomfim (PSOL-SP), was sent to the Federal Senate for consideration. This bill sets out guidelines for adopting policies to combat violence against women in university environments. According to the deputy in an interview with Agência Câmara Notícias, 'Some educational institutions already implement policies such as complaints offices, listening spaces, and support centres. However, this is not the reality everywhere.' The Fluminense Federal University (UFF), for instance, is one of the institutions that has introduced measures such as the installation of baby-changing facilities, flexibility in academic procedures, and mental health support for mothers.

International Cooperation for More Inclusive and Interconnected Systems



International cooperation represents an opportunity to question and transform the structures that perpetuate global inequalities. Collaboration between countries, multilateral organisations and transnational initiatives has the potential to generate innovative solutions, mobilise resources and share good practices.

'The creation of effective public policies involves the discussion of a common plan on needs,' says Professor Clébia Rabelo, pointing out the importance of a collective dialogue to address global issues. Initiatives such as **Going Global Partnerships** and Universities for the World, both developed by the British Council, illustrate the impact of this co-operation on strengthening higher education and building international networks.

The Going Global Partnerships programme promotes international partnerships to strengthen Higher Education, Science, Technical and Vocational Education, prioritizing equity, inclusion and global collaboration to boost socio-economic growth and tackle global challenges.

Since 2004, the Going Global conference has been a strategic space for educational leaders to debate the future of higher education, science and technical and vocational education. In addition to the biennial events held in the UK, the current model includes regional conferences, such as the November 2024 edition in Abuja, Nigeria, reinforcing the relevance of the debate in different global contexts.

Complementing these actions, the Universities for the World and Going Global Parterships programmes, which have been running in Brazil since 2017, focus on the challenges and opportunities of internationalisation. Through seminars, workshops, funding and publications, these initiatives strengthen Brazilian institutions, enabling them to establish strategic partnerships with British universities and align their international strategies.

In the field of female inclusion in scientific careers, in addition to the Women in Science Programme, the British Council's Women in STEM Scholarships stands out, which since 2020 has offered more than 300 scholarships globally to students interested in pursuing master's degrees in science, technology, engineering and mathematics at renowned UK universities. These efforts demonstrate **how international cooperation can drive more effective public policies, strengthen higher education, promote inclusion and build global networks.**

This collaborative approach tackles challenges strategically and fosters an environment of learning and innovation that benefits institutions and individuals on a global scale.

Women in STEM Scholarships

The British Council's call for UK Master's scholarships is open annually and covers:

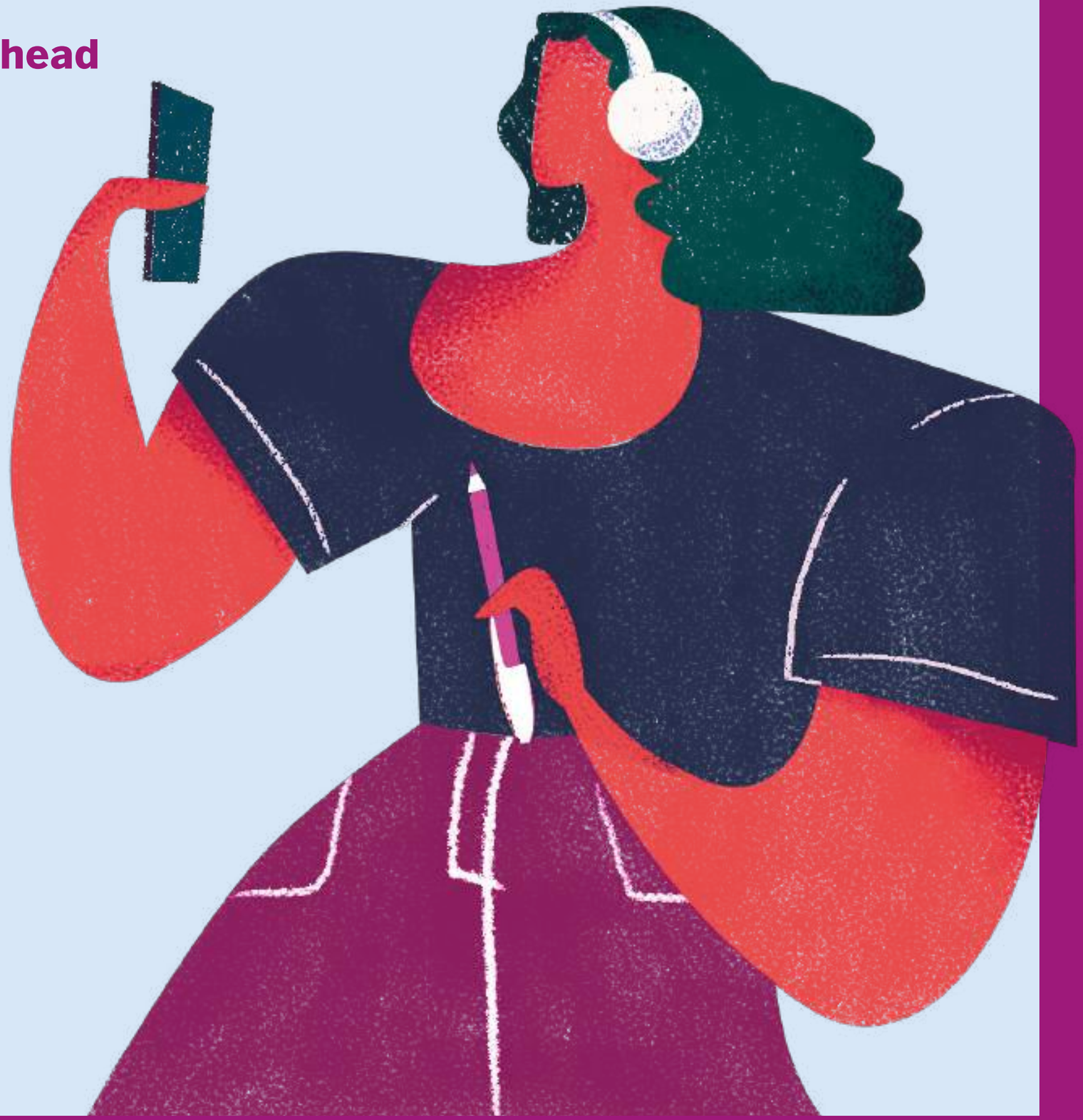
- Tuition fees.
- Allowance for 12 months, including accommodation.
- Travel expenses.
- Visa fees and medical coverage.
- Reimbursement of the IELTS English language exam, if necessary.

Find out more about the opportunities here:

A Long Journey Ahead

Despite the progress made, the road to building the world we want is still long. **Professor Clébia** leaves an inspiring call to women: **'I want you to continue to believe that it is possible to transform. I'm a farmer's daughter, my parents were illiterate. So believe me, it's worth doing and transforming realities. '**

Professor Dalila also leaves a call of hope for a science with more diversity: **'I hope that the generation of my daughters and, perhaps, my granddaughters—if I have one—will be a generation where gender equality is better balanced, and that the women who are in academia today don't have to live through the difficulties I went through to get here,'** she concludes. ■



Learn more

Roberta Gregoli did her doctorate at Oxford University with the support of the Clarendon scholarship, which is full and covers all tuition fees and living costs for the selected person. For more information, visit the website!

Among Us: the Importance of Networks for Equity

Creating Links for Equality in Science

By Joanna Muniz

Rede, from the Latin *rete*, is a popular word that in Portuguese can refer to many things, and which is increasingly talking about the invisible ties that form between organisations. To make a network, you have to interweave many threads that start from different points and, from node to node, form a whole. You don't always know where it begins or ends, because with each new step, other connections are formed.

These interconnections, which transcend geographical, physical and cultural boundaries, are essential for the realisation of profound structural transformations. They enable the exchange of knowledge, resources and experiences, creating a collaborative environment where new possibilities can emerge.

In this context, the network ceases to be just a metaphor and becomes a concrete representation of the interdependence between individuals, institutions and nations. It potentiates responses to global challenges such as climate change and gender equity. If we really want to transform reality, we need to learn to join hands.

Networks Have the Power to Inspire!

Networks (*redes*) are powerful tools for boosting women's careers, helping to transform cultural and behavioural patterns. Diana Daste, Cultural Engagement Lead at the British Council in Brazil, emphasises that networks offer support and also create fundamental mechanisms for women scientists to thrive in their careers.

One notable example is researcher Leticia de Oliveira, who has a master's degree from the Faculty of Medicine at the University of São Paulo (USP) and a doctorate from the Federal University of Rio de Janeiro (UFRJ), at the Carlos Chagas Filho Biophysics Institute, both in the field of neurophysiology. In 2010, Leticia began her post-doctorate at King's College London, where she specialised in functional neuroimaging and machine learning. Since then, she has been applying pattern recognition algorithms in functional neuroimaging to assess mental disorders.

She emphasises the importance of the academic exchange to the UK and her ongoing collaboration with Janaina Mourão Miranda, professor at University College London, as essential for achievements such as the Mercosul Prize in Science and Technology (2020), the '25 Women in Science - Latin America' recognition by 3M (2021) and the 'Nise da Silveira' prize awarded by the Legislative Assembly of Rio de Janeiro. Leticia also celebrated her appointment as Honorary Senior Research Associate at University College London.

The British Council has stood out by leading strategic initiatives to strengthen these networks and promote gender diversity in science. One of these actions was the Gender Summit, held for the first time in Brazil in 2021. The event brought together scientists, researchers, public policy managers and other key players to discuss how biological and socio-cultural differences influence scientific results.

Organised by the British Council, the National Council for Scientific and Technological Development (CNPq) and Portia, the event was attended by renowned institutions such as the University of São Paulo (USP), the University of Brasília (UnB), Fiocruz, Oxford University and King's College London, as well as companies and civil society organisations from countries such as Argentina, Canada, Chile, Colombia, the United States, France, Italy and Mexico.

The British Council's Women in Science Programme exemplifies how collaborative networks drive gender equity in STEM fields. By strengthening vital connections between women scientists and institutions in Brazil and the UK, the initiative creates a network of support and opportunities that transcends borders.

Within this programme we present two projects: MESSENGER and SHAPE, both funded by the **British Council's UK-Brazil Gender Equality Partnerships call**.

The **MESSENGER** project (Women in STEM and Cultural Diversity) is a collaboration between Durham University, the Federal University of Amazonas (UFAM) and the State University of Santa Catarina (UDESC). The initiative sought to empower women in science through mentoring and the exchange of experiences, as well as valuing the networking of researchers and institutions.

The **SHAPE** project, developed by Liverpool John Moores University (LJMU) in partnership with USP and the Catholic University of Pernambuco (Unicap), aimed to promote gender equality in academic opportunities. The initiative offered training, coaching and mentoring for female academics while establishing significant international networks between Brazilian and British scientists. In addition, the project also set out to influence institutional policies to increase diversity in Brazilian universities.

Together We Progress Better

Roberta Gregoli, a specialist in gender equality policies and a consultant in the construction of the **Framework for Gender Equality**, highlights the importance of the commitment of the top leadership of large organisations to the institutionalisation of inclusive policies. 'It is essential that these leaders support implementation decisions and strengthen and protect the professionals who are at the forefront of these actions,' says Gregoli.

This idea is reflected in the experience of a project supported by the **British Council's Going Global Partnerships** programme, which promoted academic exchanges between universities in the UK and South Africa, focused on sports science, biotechnology and issues of equity, diversity and inclusion. One of the main results was the sharing of practices to support minority groups, developed by LJMU, which the South African partners found valuable for their own institutions.

Dr **Komang Ralebitso-Senior**, who was involved in the initiatives, highlighted the importance of institutional support for the success of the project, emphasising that the active involvement of university leaders was essential in demonstrating a genuine commitment to equity, diversity and inclusion. This support, as Gregoli emphasised, is fundamental for the continuity of transformative initiatives.

In addition, the project was also essential for Komang's professional development, contributing to her promotion to Reader.

'The British Council's support allowed me to use these projects as evidence for my professional development. This means that, now as Reader or Associate Professor, I am an even greater inspiration to other Black women and women in science,' she said.

Find out more about the scientist on page 35 of this issue!

Weaving Networks, Transforming Science

Aware of the challenges and understanding the opportunities and local contexts, the British Council achieved two important milestones in 2024: the launch of the Inter-institutional Working Group on Gender and Diversity in Higher Education and Science and the partnership in the Women and Science Award.

The Working Group (WG) is the result of a long-standing relationship between the UK and Brazil. Made up of important Brazilian institutions, such as CNPq, the Coordination

for the Improvement of Higher Education Personnel (CAPES), the National Council of State Research Support Foundations (CONFAP) and the Ministry of Education (MEC), it aims to strengthen public policies and promote international cooperation in strategic areas, with a focus on systemic actions and processes that ensure that changes are sustainable and bring diversity to the centre of the equation, as Diana Daste points out.

Launch of the Women and Science Award: (from left to right) Minister Luciana Santos (CT&I), Ricardo Galvão (CNPq), Diana Daste (British Council) and Minister Aparecida Gonçalves (Ministry of Women's Affairs)

The collaboration between the nations also includes the **Women and Science Award**, with the aim of highlighting and celebrating women's contribution to the sciences. The call is made up of three categories: encouragement, trajectory and institutional merit, the last of which is supported directly by the British Council.

Professor Dalila Andrade Oliveira, who also chairs the inter-institutional group for CNPq, emphasises the importance of cultural changes within higher education institutions to combat gender inequality in science.

'That's why I think it's very interesting that we have a third category in the award, which is institutional recognition,' she says. The category mentioned by Dalila aims to reward higher education institutions or research institutes that develop strategic plans to implement gender equality policies, contributing to the institutionalisation of the Gender Equality Framework. This creates a positive cycle of inspiration, recognition and innovation. **'The institutions that receive this recognition will be a beacon to inspire others,'** says Dalila.

The Women and Science Award invested around BRL 500,000 (~ GBP 65,000) to honour institutions and researchers for the value of their scientific work, promoting diversity, plurality and the participation of women in science, technology and innovation careers. The prizes totalled BRL 20,000 (~ GBP 2,600) for researchers aged up to 45; BRL 40,000 (~ GBP 5,200) for researchers aged 46 and over; and BRL 50,000 (~ GBP 6,500) for institutions that stand out in implementing gender equality actions.

For Diana Daste and Dalila Oliveira, funding agencies have an essential role to play in ensuring that women reach their full potential in scientific careers. Facing this challenge requires a solid network of national and international organisations, coordinated initiatives and people interested in building scientific equity in Brazil. Although change is not easy, the experiences and perspectives of contemporary women do not allow us to rest. As Dalila rightly says, 'it is from the intersection of these perspectives, these different approaches, that more robust knowledge emerges'.

Initiatives such as those presented here demonstrate the power of collaborative networks in overcoming historical barriers. **'Networks are fundamental to attracting diversity in the production of knowledge and science. They gain more power by influencing changes in the institutional and political spheres,'** concludes Diana Daste. ■

Learn more:

Read *Messenger: Women in STEM and Cultural Diversity*

Read *Passion for gender equity inspires international partnership to promote Women in Science*

Read the news *Women and Science Award Invests BLR 500,000 to Recognise Outstanding Researchers and Institutions*

More about the Framework for Gender Equality in the text *Between us: the importance of Networks for equity*

More about the UK-Brazil Gender Equality Partnerships initiative and Going Global Partnerships in the text *The Bridges Built by the Women in Science Programme*

Do you know her?

By Aiara Dália, Camila Boullosa and Danielle Menezes

We celebrate and inspire through the stories of women scientists who are redefining the boundaries of knowledge and innovation. Over the next few pages, you'll find a mosaic of experiences, challenges overcome and remarkable achievements that illustrate the diversity and power of the female presence in science.

From Francielly Rodrigues, the young engineer who turned *açaí* seeds into a housing solution, to Generosa Sousa, the 'Queen of Bees' who revolutionises family farming, each profile reveals a unique facet of science made by women. Meet Taís Gratieri, a world reference in pharmacy, and Vanessa Romanelli, who fights for the inclusion of people with disabilities in scientific research.

Let yourself be inspired by Erikah Alcântara, who is paving the way for trans people in maths, and Helena Nader, the first woman to chair the Brazilian Academy of Sciences. Marvel at Komang Ralebitso-Senior's groundbreaking work in forensic microbiology and Sue Black's determination to bring more women into technology.

These scientists push the boundaries of knowledge and inspire women to dream big and pursue their passions in science.

Come and join us!

Credit: Personal archive

Francielly Rodrigues

Bring The Prize to The Young Scientist

Science is not just a tool for disseminating knowledge; it is also a powerful instrument for social transformation and cultural valorisation. This is the vision and practice of **Francielly Rodrigues**, a 23-year-old researcher from Pará.

Born and raised in Moju, in the interior of Pará, the young woman's curiosity was sparked by Black teachers who believed in her potential. Her journey began at the age of 8, when she took part in her first science fair. Today, she is a production engineering student at the Federal University of Pará (UFPA).

A Most Unusual Experience

It all started when a teacher commented on the floor in her house, which always sank and generated a strong odour. This comment aroused Francielly's curiosity and she decided to investigate the issue. After administering a questionnaire to 180 residents, she mapped Moju's urban conditions and discovered that 65% of the properties were on unstable land, built with improvised materials such as rubbish and mud. In addition, she identified the use of recycled materials and alternative solutions to try to mitigate the effects of precarious construction, always with an eye on issues of urban mobility and irresponsible land use.

During her research, she realised that many houses were being built over streams and porticoes, which created serious health and infrastructure problems. Faced with this, Francielly developed an innovative solution: carbonising the açaí stone and mixing it with clay to create a material that could be turned into bricks. Her project stood out for its practical approach and sensitivity to the needs of the local population.

From a Local Fair to International Recognition

At just 18 years old, Francielly took part in the Brazilian Science and Engineering Fair (FEBRACE) and had her research recognised for the social, economic and environmental relevance of her project. The scientist received international honours, such as the Mellon & Walton Sustainable Solutions Award, and travelled to the United States to visit Harvard University and the Massachusetts Institute of Technology (MIT), all as part of the programme's awards programme.

However, the road to recognition wasn't easy. Francielly faced financial and structural challenges, but she always had the support of her community. Part of what she won was donated to the Moju Science Club, which now has a headquarters, consolidating its commitment to education and to the city. The space has become a meeting place committed to training teachers who can apply scientific methodology using the region's natural resources. In this way, Francielly contributes to creating a more inclusive academic environment that respects local cultural and environmental particularities.

Science that Transforms Lives

As an educational project coordinator, Francielly works with schools in remote areas, integrating regional flora and fauna, such as the *jenipapo* [a fruit from the Amazon region], to teach concepts in a practical and relevant way. Her work not only awakens interest in science, but also strengthens the cultural and environmental identity of the communities she serves.

In 2019, she realised one of her biggest dreams: to build a new house for her grandparents, giving them more comfort and dignity. For her, science goes beyond awards; it's about improving the living conditions of her family and her community.

Recognition and Impact

Francielly has been widely recognised for her work and achievements. Among the recognitions she has received are the Inspiring Woman of the Year award, granted by the Women Entrepreneurs platform, and her inclusion in the prestigious Forbes Under 30 list, in the Science and Education category. At the beginning of 2025, she took up the position of Director of Science and Technology for the municipality of Moju. Despite her numerous honours and appearances in major media outlets, what moves her most is the direct impact of her work on the lives of the people in her town.

Credit: José Ordonez/ personal archive

Generosa Sousa

The Queen Bee

Known as the ‘Queen of Bees’, **Generosa Sousa** is a scientist with a legacy that goes beyond research. With a PhD in Agricultural Sciences from the Federal University of Reconcavo of Bahia (UFRB), she defends the vital role of pollinators in family farming and the preservation of biodiversity.

With more than 28 years dedicated to teaching, research and university extension, Dr Genna, as she likes to be called, was named by Forbes among the 100 Doctors of Agriculture and was awarded the title of Ambassador of Honey Bees in France in November 2024, at a ceremony held at the Brazilian Embassy in Paris. The recognition came after the researcher took part in the Origem Brasil Portugal trade mission and the *Salon du Chocolat* in Paris.

‘Taking part in the Salon was a very important experience. There were several chefs with two or three Michelin stars tasting and approving our honey, our propolis. Europeans have no idea what stingless bee honey is, which is a special, softer honey,’ explains Genna.

Action Research

Born in the southwest of Bahia, Generosa grew up in a family of farmers. It was her grandmother—who shared not only her name but also her birthdate—who first introduced her to the fascinating world of bees. She has dedicated her career to what she calls *action research*, a method that aims to give back to the community by applying the scientific knowledge gained in academia.

After a brief period studying biotechnology, Generosa soon joined the *Insecta Research Group* at UFRB, where she specialised in the pollination of stingless bees. She analysed a wide range of species, but it was with the *Uruçu Nordestina* (*Melipona scutellaris*) that she carried out her doctoral research. Her findings revealed that the introduction and densification of this species in organic orange plantations increased production by more than 27%.

In addition, she has published books on stingless bee management and *meliprodutos* (honey-based products) in accessible language to help small-scale farmers improve their production. She also provides technical support for the development of bioproducts made from pollinator-derived raw materials, such as *hidroméis* (meads) produced through the slow fermentation of pure honey from native Brazilian bees, body moisturisers containing honey, wax, and propolis, and soaps enriched with propolis.

‘Because of my roots, my work is always focused on—or in some way gives back to—family farmers, associations, and the women who form the backbone of these communities. My doctoral research, my books, the agroforestry groups I am part of, and the support I provide to cooperatives and small businesses working with honey and propolis—all of it ultimately benefits the community,’ she explains.

‘Without bees there is no family farming’

Generosa Sousa

Credit: Unsplash

Honey and Propolis for Healing

More recently, working with a private laboratory, Dr Genna has also been dedicated to developing formulations using propolis, honey, and ***saburá*** for both human and pet health. These include cosmetics with antioxidant and wound-healing properties. Her research has highlighted the antimicrobial action of *Jataí* bee (*Tetragonisca angustula*) honey and the propolis produced by species such as *Mirim Droryana* (*Plebeia droryana*).

'*Jataí* bee honey is incredible for aiding in the healing of certain skin conditions. Combined with propolis, it also has a highly antioxidant effect. I have supervised studies on propolis for this purpose and discovered that the Mirim species stands out in terms of controlling and preventing the proliferation of microorganisms,' Dr Genna emphasised.

'Where There are Bees, There is No Poison'

The phrase in the subtitle comes from Dr Genna, who is actively engaged in bee conservation and the fight against pesticides. For over 10 years, she has been a member of the *Bahian Forum for Combating the Impacts of Pesticides* (FBCA), a coalition of civil society organizations, governmental institutions, and the Public Prosecutor's Office, carrying out focused investigations into bee mortality and environmental forensics.

'We work tirelessly to demonstrate that biological control, rather than the use of pesticides, is a healthier path for both us and the planet. Bees are dying at an alarming rate, yet they play a crucial role in the dispersal of plant species.'

It is precisely the natural and organic nature of stingless bee honey that inspired the researcher to work on exporting honey from various Brazilian species—such as *mandaçaia* and *uruçu* honey—to Europe. Her strategy is to continue strengthening collaboration with small-scale producers and expanding the export of bee-derived products to the European market, while ensuring that all necessary analyses and international regulations are meticulously met.

Reference

During the interview, Dr Genna shared that her passion for biological sciences was sparked by a remarkable teacher from her fifth year, named Amélia. A Black woman passionate about science and dedicated to teaching, Amélia inspired Generosa with her enthusiasm and hands-on laboratory lessons.

Saburá, also known as *samora*, is the pollen that has been modified, processed, and stored by stingless bee workers in food pots.

Credit: Personal archive

Komang Ralebitso-Senior

Real-Life CSI

Komang Ralebitso-Senior is a scientist specialising in the study of microorganisms, particularly bacteria and fungi, across various ecosystems and environments. Her academic journey is marked by significant achievements and international experience. She obtained her PhD in Environmental Microbiology from the University of Natal, South Africa, in 2002, following the completion of her **BSc (Hons)** at the same institution in 1998. Currently, she holds the positions of Reader in Microbial Ecology and Associate Dean of Diversity and Inclusion in the School of Pharmacy and Biomolecular Sciences at Liverpool John Moores University (LJMU).

Innovation in Forensic Microbiology

Komang leads pioneering research in forensic microbiology, exploring the use of microorganisms as a complementary tool in crime-solving. Her team in the UK is at the forefront of studying the environment surrounding crime scenes, analysing microorganisms found on locations, clothing, hands, and suspect vehicles. This approach offers a new perspective of forensic investigations, enhancing traditional methods. One example is the ability to detect the prior presence of a body in cases of post-murder removal through microbial analysis.

BSc (Bachelor of Science) is an undergraduate degree primarily pursued by those interested in STEM fields.

The scientist emphasizes the importance of scientific conferences, particularly for young researchers and women. It was at a congress in Australia, more than a decade ago, that she discovered her current field of expertise. For her, while laboratory work is essential, the most innovative ideas often emerge from the exchange of experiences at scientific events. This perspective highlights the value of collaboration and knowledge-sharing in advancing science, while also encouraging the active participation of women in these spaces.

If You Can See It, You Can Be It

Beyond her research, Ralebitso-Senior is a strong advocate for equity, diversity and inclusion in science. As **Associate Dean** in the Faculty of Science at LJMU, she oversees the development and implementation of equity, diversity and inclusion strategies.

Komang recognises the significance of her representation as a Black woman in academia: **'My passion is to see how we can support underrepresented members of the community, including women, LGBTQIAPN+ individuals, people with disabilities, and those from diverse cultural backgrounds.'** She believes in the power of representation: **'When we see people who look like us and coming from similar backgrounds achieving great things, it inspires us to do the same.'**

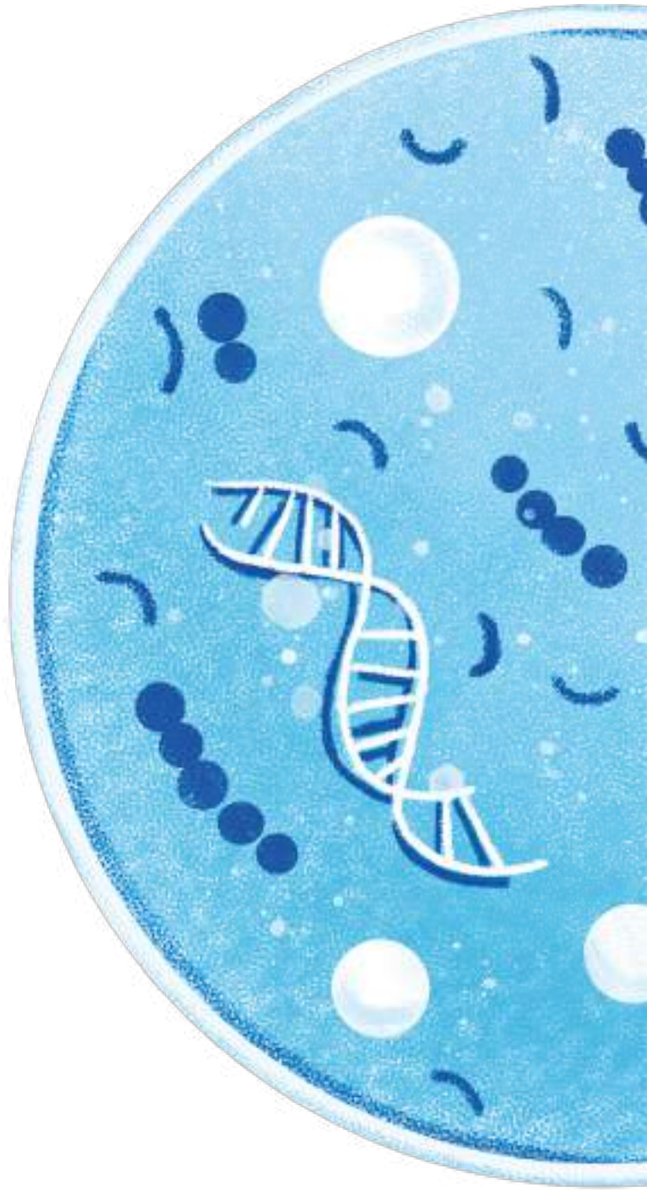
Among her impactful initiatives is the enhancement of LJMU's systems to ensure that name changes made by transgender students are reflected across all institutional platforms, eliminating uncomfortable situations. Additionally, Komang has led efforts to implement assistive technologies, ensuring support for students with learning difficulties.

In the UK academic system, an Associate Dean is a senior leadership role, reporting to and accountable to the Dean for specific administrative functions. They typically oversee key areas such as undergraduate or postgraduate education, research, administration and finance, or faculty affairs.

Message to Young Scientists

She offers inspiring advice to young people, particularly women and minorities, who aspire to pursue scientific careers: **'Follow your heart. When people say you can't do something, be bold and say, "I can and I will".'** She encourages young women to seek mentors and role models, making use of available online resources: **'Find people who look like you—women and individuals from marginalised communities, who are achieving great things, who are leading in science and leadership in the career path you wish to follow.'**

Dr Komang Ralebitso-Senior's journey is a powerful testament to the impacts that dedicated scientists can have — not only in their research fields but also in fostering a more diverse and inclusive academic environment. Her work continues to inspire and pave the way for the next generation of scientists.



Credit: Personal archive

Taís Gratieri

Brazilian Researcher Among the World's Most Cited Scientists

Professor Dr **Taís Gratieri**, from the University of Brasília (UnB), is a leading figure in the field of pharmacy.

Recognised with numerous awards throughout her career—including the *For Women in Science Awards* (granted by UNESCO, L'Oréal, and the Brazilian Academy of Sciences - ABC)—she has also been ranked among the world's top 2% most influential scientists by Stanford University, USA. In 2022, Taís was elected a member of the ABC, further cementing her status in Brazilian science.

Graduating and earning her PhD from the University of São Paulo (USP), Ribeirão Preto campus, she later completed her postdoctoral research at the University of Geneva, Switzerland. Currently, she serves as deputy coordinator of the Postgraduate Programme in Pharmaceutical Sciences at UnB. Her career has been dedicated to developing advanced drug delivery technologies, a crucial field for enhancing the effectiveness of medicines while minimising adverse effects.

For Dr Taís Gratieri, innovation requires a dedicated effort to turn scientific discoveries into market-ready solutions. Throughout her career, she has faced a key challenge: when developing truly groundbreaking technology, it is essential to go beyond academia and create pathways to bring these innovations to the public.

Inspiring Women

Despite her achievements, Dr Taís Gratieri faces challenges that reflect the reality of many women in science. During the pandemic, while colleagues were publishing extensively, she had to juggle the exhausting routine of balancing an academic career with motherhood, especially after one of her daughters was diagnosed with autism. **'I felt like I had to work three times harder ,'** she recalls, describing a period that ultimately led to burnout. It was a moment of reinvention: delegating responsibilities and prioritizing self-care became essential.

Among the projects she leads, her research group is composed of 70% women, focusing on initiatives ranging from tissue simulations for *in vitro* testing to studies on cosmetics and propolis. Taís advocates for affirmative actions and greater female representation in leadership positions. **'Having a woman as the rector of UnB [University of Brasilia] is a milestone, but we still have a long way to go in achieving equity and diversity ,'** she notes.

She highlights Dr Renata Lopes, her undergraduate and PhD advisor, as a major inspiration due to her ability to balance motherhood and a scientific career. Another key influence is Mercedes Bustamante, a member of the Brazilian Academy of Sciences and former president of CAPES, whom Taís admires for her commitment to improving science in Brazil. These women exemplify leadership and innovation, continuing to inspire future generations of scientists.

Innovative Research, Real-World Applications

One of her team's significant advancements includes an *in vitro* model that simulates corneal tissue and the natural conditions of the human eye—eliminating the need for animal testing. Previously, research relied on corneas from pigs slaughtered for consumption, but her group introduced a fully artificial model that replicates blinking and tear flow.

Taís's research has also reached international frontiers. A PhD student from her team had the opportunity to take this concept to New Zealand, where she collaborated with a specialised group working on ophthalmic formulations.

The Future is Now

When discussing her plans for the coming years, Dr Taís Gratieri outlines several key areas she aims to advance. 'I have formulation projects to improve ocular drug delivery, targeted delivery for hair follicles, and also projects related to my two startups,' she explains.

Balancing multiple responsibilities and challenges, Taís continues to navigate both personal and professional life, shaping the future of pharmaceutical science while inspiring new generations of scientists.

Credit: Personal archive

Vanessa Romanelli

Science in Motion

Ever since she was a child, **Vanessa Romanelli** knew she wanted to be a scientist. More specifically, since she was five years old.

Diagnosed at the age of seven with Spinal Muscular Atrophy (SMA-5q), a rare and progressive disease, Vanessa faced personal and professional challenges to turn her dream into reality.

Discovering the world of genetics during her teenage years cemented her passion for science.

She is currently coordinating the neonatal screening pilot project for Spinal Muscular Atrophy in São Paulo, at the Jô Clemente Institute (IJC), a milestone that has expanded diagnosis and treatment in Brazil, involving more than 110,000 babies. With a governmental impact, the project aims to expand neonatal screening in Brazil, integrating science and public health to transform lives.

'Research into the diagnosis of rare diseases is linked to the need for early diagnosis.' In 2021, the expansion of the heel prick test was approved in Brazil, increasing the number of diseases to be screened for. The results of this show the importance of having established clinical protocols for the care of these diseases, for which rapid and effective treatment is crucial. Late identification can lead to intellectual and motor disabilities.

Science also Thrills

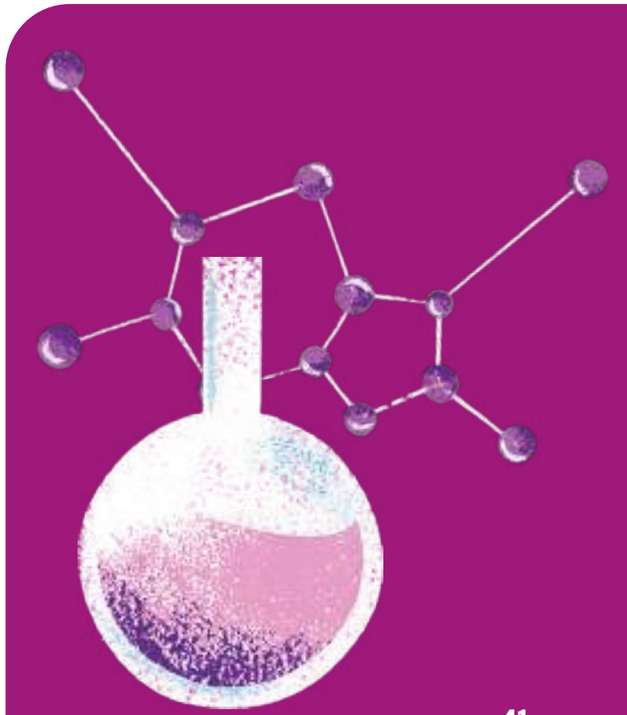
Meeting baby Melissa, diagnosed with SMA thanks to her work, was one of the most memorable moments of Vanessa's career. **'You cannot help but get emotional knowing that you did not have the opportunity to be diagnosed when you were born, but you can do it for other generations.'** The meeting gave Vanessa the certainty that she was fulfilling her mission.

The underreporting of rare diseases prevents the creation of adequate public policies to meet the needs of the affected population. The creation of databases to map incidence is fundamental for allocating resources. The inclusion criteria for receiving therapies are restrictive and do not reflect the reality of many patients, who may not have a family history of the disease. Limiting treatment goes against international guidelines.

The lack of specialists at the front door of the SUS [the Brazilian national health system] can also delay the diagnosis of rare diseases. The classification of pre-symptomatic patients in clinical protocols and therapeutic guidelines is inadequate, as it does not correctly consider their condition. 'With this in mind, we created a guide of guidelines and launched it in March 2024 through IJC.' Vanessa has also experienced considerable progress in her transition from academia to applied research. Over the last few years, she has brought innovative methodologies to USP, such as Next-Generation Sequencing (NGS), which has enabled diagnoses – previously inaccessible – for patients with rare diseases.

Prizes

'In November 2024, I was awarded the *Brasil Mais Inclusão* prize by the House of Representatives, recognising my work for the inclusion of people with disabilities.' Vanessa adds that the work of inclusion is ongoing and that it needs to be addressed repeatedly with different individuals. She remembers the times she was told that her condition disqualified her as a scientist. She attributes her trajectory to an unshakeable resilience and to the desire to impact the world through science: **'I really want to be a voice for the representation of people with disabilities,'** she concludes.



New Equations in Mathematics

Credit: Personal archive

Erikah Alcântara

Erikah Souza Alcântara is a driving force for change in academia. A trans woman and mathematics teacher for over 15 years, her journey has reshaped educational paths by bringing visibility and critical reflection on the inclusion of LGBTQIAPN+ individuals in academic spaces. Currently pursuing a PhD at the Federal University of Rio de Janeiro (UFRJ), Erikah is the only trans person in the Institute of Mathematics—an unmistakable sign of the urgent need for the cause she champions.

Her academic path began with a specialisation in Gender and Diversity at the Federal University of Ceará (UFC), where she first recognised the necessity of studying the experiences of trans and travesti educators. During her master's program, which began in 2020, Erikah had to shift the focus of her research when the pandemic made it impossible to conduct interviews with students.

She highlights the precarious reality faced by trans individuals in Brazil: 'There are 77 active transphobic laws and more than 300 anti-trans bills under discussion, ranging from segregation to the denial of fundamental rights.' In mathematics, these challenges are even more pronounced due to a stark lack of representation. Erikah points out that the credibility gap imposed on trans individuals mirrors broader social barriers, forcing them to prove themselves repeatedly to gain professional recognition.

Trans Visibility in Maths

For Erikah, quota policies and affirmative measures are fundamental in terms of increasing the presence of trans people in schools and universities, but she stresses that the permanence of these people requires structural changes, such as more welcoming and safe environments. She also points to the need to monitor the mental health conditions of trans students, who are often affected by hostile and discriminatory environments. 'The exclusion of trans people at school exposes the need to address school dropout and the psychological violence that these individuals face,' she concludes.

In 2023, the researcher organised the 'Trans Visibility in Mathematics' live, connecting trans teachers from different regions of Brazil and building a network of support and resistance. She also took part in an international seminar in Salvador that addressed the presence of women mathematicians, reinforcing the importance of events that promote inclusion.

Validation and Recognition

In February 2024, Erikah Souza Alcântara's dissertation was awarded the LGBTI+ Research Prize, an initiative by *Instituto +Diversidade* and *Feira DiverS/A*, securing first place in the master's category. This recognition underscored the significance of her research on education and employment within the LGBTQIAP+ community. Despite the hardships she has faced in academia—especially in a context of heightened vulnerability—this validation is crucial for the continuation of her projects.

Currently in the qualification phase of her PhD, Erikah has plans to return to the classroom after completing her studies. **'I want to bring my understanding of mathematics and its connection to social justice into schools,'** she says. Her goal is to encourage students to reflect on these themes, making mathematics a tool for critical thinking and inclusion.

Beyond teaching, she envisions creating a network of trans and travesti* mathematics educators, exploring the intersection of mathematics and social justice. For Erikah, fostering inclusive conversations and actions in education is a top priority, ensuring that diversity is valued and celebrated in academic spaces.

*This term is used in Brazil to refer to people who were assigned male at birth, but who develop a gender identity according to different expressions of femininity.

Credit: Personal archive

Helena Nader

Justice and Fairness at The Brazilian Academy of Sciences

Professor **Helena Nader's** life as a scientist began after an exchange programme in the United States, where she had contact with advanced disciplines in the fields she was passionate about at the time. Returning to Brazil wasn't easy. Helena took a vocational test and decided she wanted to study medicine, but failed the entrance exam.

After dealing with all the frustration, she joined the Biomedical Sciences programme at the Escola Paulista de Medicina (EPM). With its innovative methodology and focus on research, the degree was transformative in her life. Practical work, discussions and internships sparked her passion for biochemistry and molecular biology, moulding her academic and scientific career from then on.

In her eighth term, her focus was on full-time research in the laboratory, culminating in a final year thesis. Only two of the 20 students on her course went on to academic careers, which demonstrates the breadth and intensity of the studies Helena underwent in those years. She defended her doctorate at the Federal University of São Paulo (UNIFESP) after three years and seven months, having published eight papers in indexed journals, which emphasises her strong involvement in scientific research from the start.

Active Pursuit

Helena Nader is the first woman to preside over the Brazilian Academy of Sciences and has expressed concern about the underrepresentation of women in scientific research and the need for action to ensure their contributions are recognised and valued. The decline in female admissions to the Academy in 2024 compared to 2023 signals a setback; reversing this trend requires a rigorous selection process and proactive efforts to identify female candidates. **'If you only nominate men, only men will be admitted,'** she states.

A collective effort is needed to nominate competent women across various scientific fields, increasing their participation in institutions and scientific meetings. Another of Helena's concerns is the cuts to education funding in Brazil. 'Without science, there is no development,' she argues. 'Young people are losing interest in studying, preferring social media fame over the pursuit of knowledge.'

She is also deeply troubled by the way younger generations perceive history. 'They joke about weapons and wish for the return of the dictatorship,' she laments. The lack of awareness about the dictatorship era leads to irresponsible statements like these. For her, normalising violence and social inequalities appears to have become acceptable in Brazilian society.

Within these political discussions, Nader believes that elected representatives fail to take action on critical issues such as the lack of access to clean water, as well as other matters affecting public health. The regression of women's rights is another pressing concern. 'In some cases, the rights of aggressors are recognised more than those of the victims.'

Many Challenges and a Lasting Legacy

The year 2024 was particularly demanding for Helena Nader due to the numerous responsibilities she had to balance. In addition to working on a thematic project approved by the São Paulo Research Foundation (FAPESP), she played a leading role in coordinating the S20 Science Suite, which brought together science academies from G20 nations. Under the theme 'Science for Global Transformation,' the event addressed various issues through five key task forces: Bioeconomy, Health Challenges, Artificial Intelligence, Social Justice, and Energy Transition. 'Investment in science is essential', she asserts.

Helena aspires to leave a legacy that will create more opportunities for future generations in science. 'The Brazilian Academy of Sciences took more than 100 years to elect a woman,' she notes, but other academies worldwide are also beginning to embrace change. For Nader, the joy of discovery and the pursuit of new knowledge keep her motivated. She concludes with a message passed down from her parents: 'Never let anyone tell you what you can or cannot do.'


Credit: Ali Tollervey

Sue Black

Let’s go mums!

Passionate about maths since childhood, computer scientist **Sue Black** has become an enthusiast for female inclusion in technology. Throughout her career, she has created spaces to bring women, especially those from disadvantaged backgrounds, closer to the world of technology. Born in 1962 in Fareham, Hampshire, UK, Sue has turned personal and professional challenges into a bridge to becoming a leading figure in the field. Her affinity with numbers and logical reasoning led her naturally to the field of computing. She obtained her bachelor’s degree from London South Bank University in 1993 and completed her doctorate in Software Engineering in 2001.

This academic journey was marked by resilience, as it took her seven years to complete her PhD, balancing her studies with work and raising three children as a solo mum.

Black is currently a lecturer in computer science at Durham University, a position she has held since 2018. She describes herself as an ‘evangelist’ for technology, highlighting how her work in the field and education have transformed her life, enabling her to achieve better conditions and provide for her children. She contrasts her perspective with the often negative portrayal of technology: ‘I like to tell people about the good side of technology. In the media, we often find an alarmist tone, with scenarios of robots taking our jobs or artificial intelligence threatening us. These doomsday scenarios are recurrent, while the numerous positive aspects are rarely emphasised.’

Empowerment in Code

Among the scientist’s main contributions was the founding of BCS Women in 1998, the first online network for women in the sector in the UK. This initiative came about after her experiences at academic conferences, where she realised the need to create a supportive space for women in the field. She also created the **#techmums** project in 2012, a social initiative to teach digital skills to mums in vulnerable situations.

The researcher also became known for leading a successful campaign to save Bletchley Park, the British decoding centre from the Second World War. This campaign, which lasted from 2008 to 2011, preserved an important historical site and highlighted the crucial role of women in the history of computing, as 8,000 of the 10,000 people working at Bletchley Park were women.

The scientist also took part in the **MESSENGER** project, a Durham University initiative that was awarded the British Council’s first UK-Brazil Gender Equality Partnerships call. The programme promoted exchanges between female computer science academics in Brazil and the UK. About three years ago, Black visited Brazil and visited the Federal University of Amazonas and the State University of Santa Catarina. ‘Initiatives like the Women in Science programme are very important. They really help you see the bigger picture. It’s always inspiring to meet people who share your passions and are committed to making the same things as you happen.’


Credit: Ali Tollervey

In 2022, Sue was appointed as Vice President of **BCS - The Chartered Institute for IT**, taking up the post in March 2023. Black currently leads the **Tech Up Women** programme at Durham University, which aims to retrain women from under-represented communities for careers in technology. The programme, which began six years ago, has already trained almost 400 women.

Professional organisation and scientific society representing professionals in information technology, computing and related fields in the UK and internationally. Founded in 1957, the BCS has played an important role in the education and development of IT professionals, computer scientists and software engineers.

Follow the Leader

Throughout her career, Sue Black has received several awards and honours, including the Order of the British Empire (OBE) in 2016 for services to technology. In addition to her academic work, she acts as an advisor to the UK government, and is also a writer and speaker.

For readers of Women in Science magazine, Sue Black leaves an inspiring message: 'Technology is a great area to work in, we need more women working in technology. We need diversity in our equipment that is creating software. We need diversity in our technology companies, technology equipment.' She encourages finding connections with people who share the same values and the desire to make the world a better place through technology. ■

Credit: Fotos Públicas

BRITISH COUNCIL WOMEN IN SCIENCE

Learn more

More information about the #techmums project

More about the MESSENGER project

Read more about the Tech Up Women programme

Credit: Paulo Pinto/Agência Brasil

‘What are you going to study for?’

Challenges and advances in the inclusion of people with disabilities in Brazilian higher education

By Valéria Pereira

It has long been known that the journey of women in research is marked by challenges that go beyond gender, involving issues such as race, regionality, disability and motherhood. These factors, often combined, make the path to full inclusion even more complex.

It is in this context that the concept of intersectionality is gaining strength, illuminating the need for approaches that consider the multiple dimensions of inequality and the ways in which they intertwine. The increasingly robust debate points out that building a more diverse and inclusive science requires tackling these challenges in an integrated and innovative way.

After all, do we want a more diverse science or not? What is this diversity we’re talking about? What’s more, how can we achieve it?

We Exist

Monday. It’s 4.40am when I wake up. 5.45am when I get to the bus stop, as the first car with a lift leaves at 5.50am. The temperature is fine. I’m lucky, the lift isn’t always working and sometimes I need the help of passengers to get on. I change buses at the bus terminal. There are a lot of people, so I have to stand at the beginning of the platform, before the 311 - Campus, to get on first. I arrive at the university at 7.30am and the thermometer is already reading 30°C in São Luís. I have to get off after the Human Sciences Centre (CCH) to take an alternative route and get to the building for the PhD class in History at the Federal University of Maranhão (UFMA).

Monday, 7.30am. The streets of Ouro Preto are cobbled. Class is about to start, but I have to lip-read and often the lecturers speak backwards, which impairs my comprehension. What’s more, at academic events, even with Libras interpreters, there is no option for live subtitles, which could cater for oral deaf people like me.

The first routine you followed was mine. My name is Valéria Pereira, I’m a wheelchair user. The second is by Ana Déborah Barros, a PhD student in Education at the Federal University of Ouro Preto (UFOP). We are part of the 10.7 million women with disabilities in Brazil, according to the Brazilian Institute of Geography and Statistics (IBGE), and a small number who make it to postgraduate level. According to data from the study Continuous PNAD for 2023, the illiteracy rate for people with disabilities, among men and women, was 19.5 per cent, while for people without disabilities it was 4.1 per cent. 63.3 per cent had no education or incomplete primary education and 11.1 per cent had completed primary or incomplete secondary education; **only 7 per cent had higher education.**

Stay in the Know

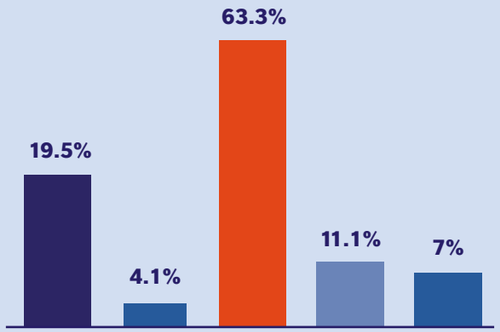
Oralised Deaf People are people who have learned to speak the country’s official language, in this case Portuguese. They may or may not use hearing aids, have a cochlear implant or lip-read, which is why some of them are mistaken for hearing people.

Signed Deaf People only use the country’s official sign language, in the case of Brazil, Libras - Brazilian Sign Language.

Bilingual Deaf People master both languages, i.e. they use the official sign language and speak and/or write the country’s official language.

Information from the Court of Justice of the Federal District and Territories - TJDFT

People with Disabilities in 2023 - Data from the Continuous PNAD Study



19.5%
illiteracy for people with disabilities, among men and women

4.1%
illiteracy for people without disabilities, among men and women

63.3%
no education or incomplete primary education

11.1%
complete primary or incomplete secondary education

7%
higher education

The challenges add up and intensify the process of social exclusion. Low access to quality higher education and, consequently, to the labour market, compromises the full exercise of citizenship and reinforces a long history of invisibility.

In addition to admission, the permanence of students with disabilities in universities faces barriers such as integrated infrastructure, lack of specialised pedagogical support and lack of teacher training, which make their academic experience a struggle.

Retention as a Priority

When we talk about the inclusion of women with disabilities in higher education, guaranteeing access is just the starting point. **The real transformation happens when there is a robust structure that ensures their permanence and full academic development**. According to the Brazilian Law on the Inclusion of People with Disabilities (LBI), higher education institutions (HEIs) must offer continuous support, including scholarships, specialised support services and awareness programmes that promote a welcoming and inclusive environment. A significant advance came in 2016 with the law that established a reserve of 5% of places at federal universities for students with disabilities, creating new entry opportunities. However, in order to access public policies, we still have to face bureaucratic obstacles.

One of them is being considered by the federal government. Bill 3,660/2021, already approved by the Senate and forwarded to the Chamber of Deputies in 2023, was presented by Senator Zenaide Maia (PSD-RN) with the aim of amending the Statute of People with Disabilities so that reports certifying permanent disability are valid indefinitely and prevent people with irreversible disabilities from having to face long queues to access new reports. 'It's a way of reducing bureaucracy and taking these people out of the queue,' said the senator in plenary, as reported by Senado Notícias.

Inclusion Technology

Universities are encouraged to adopt assessment criteria that take into account the specificities of candidates' disabilities, ensuring that mastery of knowledge is assessed fairly and equitably. Although the implementation of these guidelines varies between institutions, it is crucial that they are developed collectively, involving managers, students and experts.

Ana Déborah's story illustrates how the barriers faced by hearing-impaired students vary according to the type of communication they use. While some students communicate in Libras, others prefer oralisation, and this has a direct impact on the accessibility solutions required.

Ana explains that a lack of teacher training and insufficient assistive technologies are some of the main challenges faced by deaf people in universities. She suggests practical solutions to increase inclusion: 'For oralised deaf people, live subtitles in classes and events are essential. For deaf people who use Libras, the presence of interpreters is indispensable.'

Ana also points to the role of technology as an ally in promoting accessibility, citing apps that offer real-time subtitles. However, she emphasises that these initiatives need to be supported by institutional policies if they are to become viable. 'Inclusion in technology is not just about adapting a space, it's also about how people interact with me and understand my specific needs,' she emphasises.

> 'It's fundamental to understand that deafness doesn't diminish cognitive capacity. **Accessibility opens doors for people with disabilities to develop their potential.'**
>
> Ana Déborah Barros

Credit: Personal archive

Looking back on her own journey in higher education, Ana reflects on the obstacles she faced from 2005, when she began her studies, to the present day, when she is about to complete her doctorate.

'When I started my degree in 2005, there was no accessibility. I was shy and felt reclusive. I didn't know which group I belonged to: the deaf community or the hearing community. **Today, at the end of my PhD, I've assumed my deaf identity and I've realised how liberating it is. My deafness is part of me, but it doesn't limit my academic potential**. The brain is here, creating, learning and expanding. That's what's going to make me a doctor.'

Ana's account shows that inclusion in universities goes beyond the application of public policies. It depends on co-operation between institutions, teachers, students and society, but above all on actively seeking solutions that respect the diversity of disabilities. For inclusion to be effective, it is essential that HEIs don't just comply with legislation, but adopt practical measures that promote accessibility and value diversity. Although quotas and other affirmative policies are important advances, true inclusion requires a cultural transformation in institutions and society.

Ana Déborah taking part in the 5th International Congress on Inclusive Education - CINTED

I want to be a scientist!

Vanessa Romanelli, who holds a PhD in Genetics from the University of São Paulo (USP) and currently supervises the Molecular Biology Laboratory at the Jô Clemente Institute (IJC), wanted to be a scientist from the age of five. She was diagnosed with Spinal Muscular Atrophy 5q (SMA-5q), a rare disease characterized by the degeneration of motor neurons, with consequent muscular atrophy, affecting the muscles and making movement progressively more difficult.

'I often heard that I couldn't be a scientist because I was a wheelchair user,' said Vanessa, who didn't give in to the difficulties and took a firm path in postgraduate studies to work precisely in the field of genetic research, specialising in rare diseases. Even so, she had some dreams put on hold: 'My dream was always to study abroad. I had three possibilities, none of which went ahead because I didn't have the financial support or the conditions to pay for someone travelling with me. The grant is only for the researcher. There is no funding for congresses, sandwich doctorates or scholarships abroad that take this need into account.'

However, some innovations have emerged in this regard. Romanelli explains that the IJC, where she currently works, already provides support when necessary: **'Today, the institution already pays for someone to travel with me when I need to go to a congress. So, this year, I had the opportunity to go to London, to a genetics congress.'**

Another important initiative concerns the launch of the Support Programme for Researchers with Disabilities in Science and Technology Institutes in the State of Rio de Janeiro, launched by the Carlos Chagas Filho Foundation for Research Support in the State of Rio de Janeiro (FAPERJ). The initiative aims to support and encourage researchers with disabilities who are employed by teaching, research and technology institutions based in the state of Rio de Janeiro.

The road to truly inclusive higher education lies through environments that accommodate the needs of all, guaranteeing equitable opportunities for academic and social development. In this way, we continue to move towards a fairer and more inclusive society for all people

Read the scientist's profile on page 40.

What are you going to study for?

As a wheelchair user, my student career has been marked by challenges, overcoming obstacles and constant learning about inclusion. When I was still in primary school, someone close to me asked: 'Why do you go to school?'. This question was on my mind for a long time. From the lack of accessibility in the buildings to the resistance of some teachers and classmates to understanding the adaptations allowed for my full development. Despite this, affirmative action policies opened a door for me to occupy these spaces and build my path.

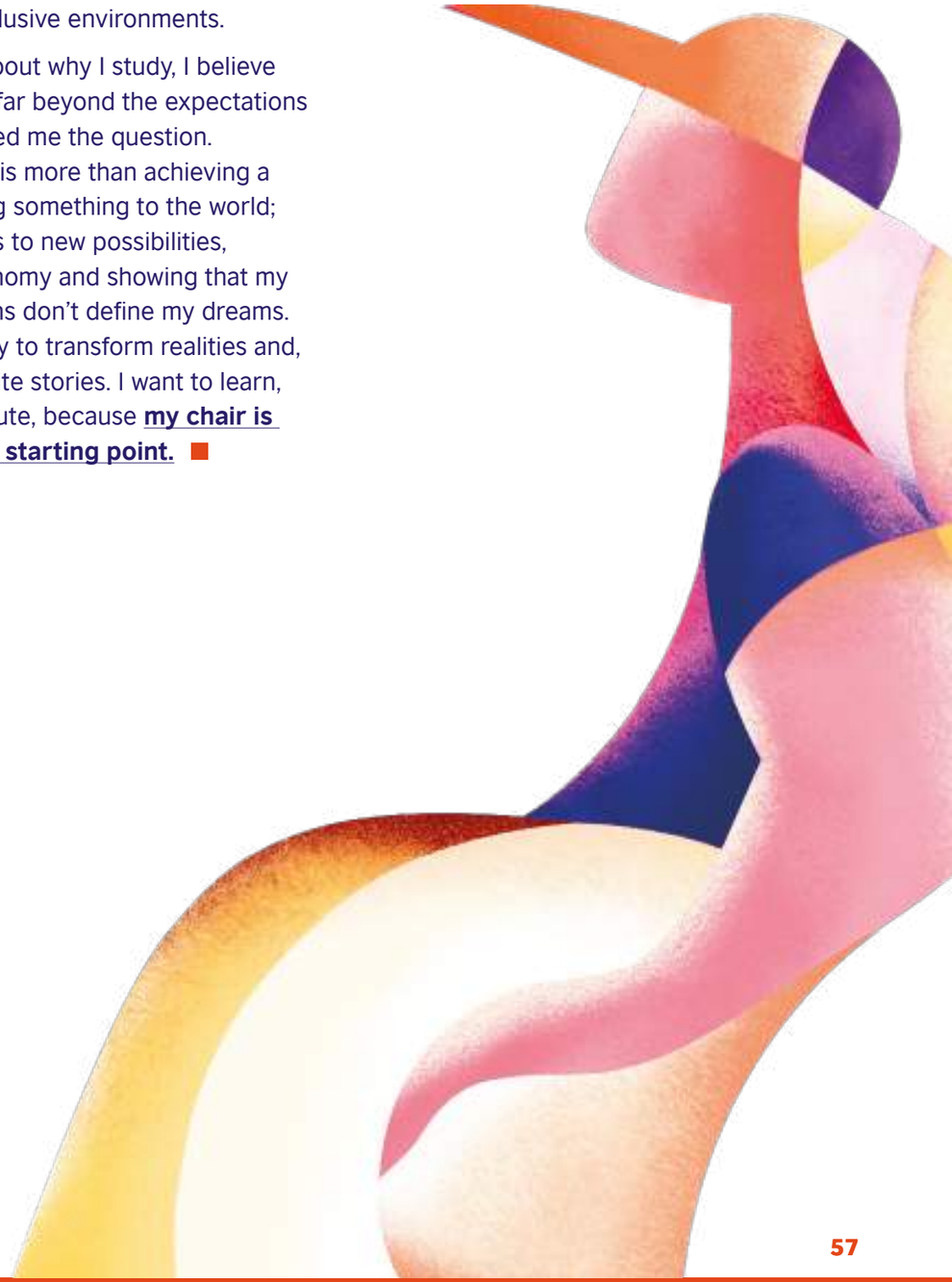
My master's degree in Culture and Society and my doctorate, both at UFMA, represented important milestones in my academic career. These were periods in which I faced additional obstacles, such as the scarcity of accessible resources and the demands to constantly prove my ability.

Even so, affirmative action was a watershed, allowing me to access opportunities that were previously far away. These experiences not only challenged me to overcome structural barriers, but also motivated me to fight for more inclusive environments.

Today, thinking about why I study, I believe the answer goes far beyond the expectations of those who asked me the question. Studying, for me, is more than achieving a degree or proving something to the world; it's opening doors to new possibilities, building my autonomy and showing that my physical limitations don't define my dreams. Education is a way to transform realities and, above all, to rewrite stories. I want to learn, grow and contribute, because **my chair is not a limit, but a starting point.** ■

Credit: Personal archive

Photo of Valéria taking part in the IV Seminar on Afirmative Action in the History postgraduate programme (UFMA), giving a speech on quotas (persons with disabilities in higher education).




Credit: Personal archive

For a World Where Mothers Are Welcome in Science

In Brazil, despite female progress in academic careers, women researchers still deal with a system that penalizes them

By Asmynne Bárbara

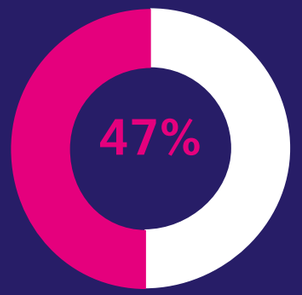
'Mum, are you studying again? Will you let me study with you?' Ágatha put her desk and chair next to me and I gave her papers, pens and a book. For thirty minutes, she distracted herself by doodling and playing at typing on an imaginary keyboard. And I was able to finalise the revision of my PhD research article and send it to my supervisor for assessment.

A beautiful scene, but it doesn't tell the whole story. Among the countless challenges for women who combine an academic career with the demands of motherhood, maintaining productivity and meeting work deadlines are the biggest challenges. Universities and postgraduate programmes don't have mechanisms to encourage us to stay in scientific research and, in some cases, women suffer penalties.

During the pandemic, the **Parent In Science (PiS)** movement carried out a survey which found that the rate of research mothers who managed to complete scientific articles was only 47 per cent, compared to 76 per cent of men who finalised their articles and submitted them to journals. And the highest academic rank reflects this reality. In CNPq research productivity grants, which take into account the number of publications, women account for only 36 per cent.

Women and Mothers in Science

Percentage of women who managed to complete scientific papers during the pandemic



Source: Parent in Science

1 IN 3

Researchers in Science, Technology, Engineering, and Mathematics (STEM) is a woman

Source: CNPq

Ligia Tchaicka, a professor at the State University of Maranhão (UEMA), holds a degree in Biological Sciences, a master's and PhD in Genetics and Molecular Biology, and a postdoctoral qualification in Molecular Ecology from the University of Cambridge, England. She currently serves as the coordinator of the Centre for Educational Technologies (UEMANet) and is the mother of a 13-year-old girl. Throughout her academic career, she has had to juggle maternal responsibilities with her work and scientific research.

Among the challenges she faced, Ligia notes that her maternal needs were not always taken into account. **'Issues like asking to be prioritised and not having classes scheduled too early because I needed to drop my daughter off at school weren't accommodated. Other professors, who didn't have young children, insisted on keeping the better time slots for themselves,'** she explains.

With her family living in another state in Brazil, leaving her without a nearby support network for childcare, Ligia often had to bring her daughter to her workplace—just as many researcher mothers do. However, she points out that this is often met with disapproval. 'Over the years, I've brought my daughter to the university many times. I sometimes joke that she has more of a CV there than some of my students—she's attended numerous dissertation defences, from undergraduate to master's and PhD level, and spent time in the lab too. But bringing a child into the workplace is still viewed very negatively,' Ligia remarks.

Ligia's research focuses on evolutionary genetics applied to the conservation of wild fauna species. As her work involves fieldwork, she says her performance has constantly been put under scrutiny. 'Being a woman has affected me in the demands of academic life—sometimes because of the spaces that are more dangerous for us to be exposed to, and often due to the scepticism some people have about women's work. There's a tendency to favour men in these settings, with the assumption that they're more capable in fields like Biological Sciences, for instance. We do a lot of work in the field, in natural environments, and people believe women lack the competence, courage, or strength needed, and that this might compromise the work,' the professor observes.

Pregnancy

Uncomfortable situations can arise even before children are born; pregnancy is often seen as a factor that can hinder productivity and negatively impact the evaluation of postgraduate programmes. Professor Gabriela Bianchi recalls the experiences she went through during her postgraduate studies.

During the final stages of her PhD, Gabriela became pregnant, and what could have been a joyful moment with the arrival of her little girl, Elis, turned into a source of embarrassment. **'In the last months of my PhD, I did everything I could to finish my work before my daughter was born, but I faced several instances of retaliation where I noticed discrimination for being pregnant while pursuing a doctorate—as if that were some grave sin,'** she recounts.

The researcher also describes facing numerous challenges and barriers after her pregnancy. 'One of them came from someone significant in my process who stopped speaking to me after I got pregnant. I don't know if he had plans for me after my PhD, but it was a really tough situation. I was already in the final stages of my thesis, couldn't get in touch with him, and he wouldn't reply to my emails,' she shares.

Gabriela Bianchi holds a degree in Pharmacy, with a master's and PhD in Pharmaceutical Sciences from the University of São Paulo (USP), including a sandwich PhD placement at the University of East Anglia in the United Kingdom. She currently teaches at the Institute of Collective Health at the Federal University of Western Pará (UFOPA), where she develops technological extension projects with communities of the Tapajós National Forest (see page 108 for more details) . The researcher also notes that, throughout her academic experiences, she witnessed several instances of harassment from professors and peers. 'It wasn't rare, and it wasn't just with me, unfortunately', Gabriela recalls.

The Scissor Effect Prunes the Continuity of Mothers in Science

When she began her academic life, Professor Rossana Salleti had a few concerns, one of which was planning the right time to get pregnant. After all, throughout her academic journey, she had been advised not to have children, as it could hinder her career, prevent her from defending her PhD, or stop her from passing a competitive exam for a senior teaching position.

Pregnancy came at what seemed like an opportune moment—Rossana was already established as a professor at a public university. 'My second pregnancy followed shortly after, along with some negative comments I overheard about myself, like being called 'unprofessional' for getting pregnant twice', the researcher observes.

> 'That kind of conversation was quite common in academic circles and even came with little jokes that were normalised—**like someone suggesting they should put contraceptives in the department's water to stop any postgraduate student from getting pregnant'**, Rossana explains.

With a degree in Pharmacy and Biochemistry, a master's in Neuroscience, a PhD in Morphological Sciences, and a postdoctoral qualification in Biomedical Engineering, Rossana realised that the time spent on maternity leave came at a high cost to her academic career progression. She recounts that the time she dedicated to co-supervising a PhD student—even remotely during her maternity leave—went unrecognised. 'I spent several late nights, after putting my daughter to sleep between nighttime feeds, reading his project, sending emails, discussing results, and planning experiments. When it came time to formalise the co-supervision, which had been ongoing for nearly two years, the Postgraduate Programme decided, for no apparent reason, that I'd need to officially register with the programme, and for that, my productivity would be assessed. My registration as a co-supervisor wasn't approved because my productivity over the previous five years was deemed below the desired level', Rossana explains.

Despite her attempts to challenge the decision, arguing that the natural drop in productivity during maternity leave and breastfeeding should be considered, the recognition of her co-supervision was denied.

The decline in the evaluation of researcher mothers perpetuates the so-called scissor effect, a term that describes the mechanisms hindering the advancement of women researchers to the highest levels of scientific production. Due to a reduction in publications, they struggle to boost their productivity metrics, which in turn leads to lower assessments when applying for grants and funding opportunities.

Aware of the challenges they will face in academia, researcher mothers often choose to postpone plans for further postgraduate studies, exacerbating the **scissor effect** even more. **Alice Carvalho Silva**, coordinator of the dentistry course at Florence College, doesn't feel motivated to pursue a PhD at the moment. With a seven-year-old son, the master's graduate in dentistry finds the environment less than conducive to advancing her academic career. **'I haven't yet found the courage to start a PhD. I'll wait until my son becomes more independent to pursue my dream of earning that title'**, she explains.

Scissors Effect

Men and women at the highest academic level:

64% Men

36% Women

Source: CNPq

Progress

Some progress has already been made, such as the inclusion of maternity leave in the Lattes Curriculum (a national academic CV platform used by researchers in Brazil). And more recently, in this unequal scenario, a pioneering initiative is trying to soften the impact of motherhood on the advancement of women in science.

The first grant to support research mothers was an initiative of the Carlos Chagas Filho Foundation for Research Support in the State of Rio de Janeiro (FAPERJ), the Serrapilheira Institute and the Parent in Science movement. The purpose of the aid is to encourage and support the continuation of women's scientific careers in the post-maternity period. The initial investment was BRL2.3 million (~ GBP 300,000) then rose to BRL 6.2 million (~ GBP 800,000) and, due to the high qualified demand for proposals submitted, received more resources and, in the end, the aid made BRL 9.5 million (~ GBP 12,300) available. Of the 363 proposals received, initially 98 were approved, but with the addition of more funds, the aid approved 157 projects by research mothers.

Neuroscientist Letícia de Oliveira, a professor at Fluminense Federal University (UFF) and chair of FAPERJ's Equity, Diversity and Inclusion Commission, was one of those responsible for developing the pioneering initiative. 'The grant also has a very positive psychological impact on these researchers who are highly qualified,

Content available on Faperj's Instagram (@faperjoficial)

but who would otherwise not be considered for a competitive grant, for example, due to productivity criteria,' she explains.

Leticia also emphasises the importance of proposing mechanisms to mitigate the impact of parenthood, especially motherhood, on the careers of scientists, by creating and improving existing policies to support scientist mothers. 'The exclusive grant for scientist mothers is an important initiative to mitigate the loss of women in science that can occur after the birth of children,' she says.

Another important resource for supporting mothers in scientific production is the authorisation, in event grants supported by FAPERJ, to hire recreational providers, to facilitate the presence of mothers and fathers at scientific events.

The Invisible Work That Doesn't Fit on a CV

From Monday to Friday, between 8.00am and 12.00pm, my commitment is to accompany Gael, Ágatha's twin, to his therapy sessions for Autism Spectrum Disorder (ASD). In the clinic's waiting room, where some mothers wait until the sessions are over, I check emails, edit texts, and read articles.

Between trips to the clinic, remote work, and household chores, I dedicate the early hours of the morning to writing my thesis. While my fellow doctoral students accumulate publications and attend numerous academic events, my progress is more modest. Technically, I have the same amount of time as they do to complete my PhD. But in reality, we don't all have the same 24 hours — and certainly not the same hours to devote to research. This is the reality for many scientist mothers.

The logistics of tasks that have been normalised as typically feminine fall under what is known as the care economy. It is considered an economic factor because it is essential for maintaining life and society — yet it is unpaid or poorly paid, and invisible. And mostly, it is carried out by women. Taking care of the home, preparing meals every day, cleaning, grocery shopping, doing the laundry, educating the children, and helping them with homework: these are just some of the responsibilities that make up a relentless care routine. It demands full availability — 24 hours a day, seven days a week.

According to data from the Think Olga Laboratory, a breastfeeding mother devotes an average of 650 hours to this activity in the first six months of her baby's life alone. In addition, the organisation points out that women invest more than 60 hours a week in unpaid care tasks, while men devote most of their time to paid work, showing an unequal division of responsibilities.

This overload of demands and tasks related to care work significantly reduces the time available for women to dedicate to research, directly impacting on researchers' productivity rates.

To better understand the productivity system that permeates the academic environment, we can imagine a scale of evolution in the scientific environment. At the top of this imaginary evolutionary chain would be a kind of homo scientificus, considered to be the ideal person capable of producing science. A White man capable of writing and publishing scientific articles on a large scale. A man who has no domestic chores and who, if he decided to have children during his postgraduate studies, would never be asked if he would finish his work before the deadline.

And it is precisely this imaginary that persists in scientific production — reinforcing historical social inequalities. It also underpins current demands, such as the requirements for research grants and performance metrics, which impose productivity standards on researchers that do not align with the lived experiences of motherhood and the double burden of work that many women face.

Other bodies and realities are expected to fit into this same mould. Progress toward the inclusion of researcher-mothers — with the support needed for them to remain in science — is essential to ensure greater diversity in academic production.

With a lullaby playing softly in the background, soothing the children to sleep, I open my notebook. The clock reads 11.01pm. The dream of completing my thesis draws closer to becoming reality — but not without the inevitable question rising up: *Do I really need this title?* The sleepless nights, the hours spent away from the children, the moments I wasn't with them at the park — were they worth it?

I don't know what Ágatha and Gael dream of, but I am certain they long for a better future. And I believe that a mother, a woman, a Black, Northeastern, Brazilian doctor — can and *will* make a difference. ■

'It 's an equation that doesn't balance: a woman must work as if she doesn't have children, and she must mother as if she doesn't have a job. It is both necessary and urgent for institutions to normalise motherhood. And since childcare is still mostly assigned to women, **motherhood — in all its intersecting forms — must not be treated as a barrier to women's career progression'**, stresses Rossana Saletti.

How CO_2 Capture Can Help Save the Planet

A researcher from the state of Ceará is one of the scientists behind a project that aims to remove carbon dioxide from the atmosphere and turn it into plastic

By Camila Boullosa

According to the **Intergovernmental Panel on Climate Change** (IPCC), the average global temperature has already increased by 1.1°C since the 18th century. The **European Copernicus Observatory** warns that, in 2024, we may have reached the critical 1.5°C threshold set by the Paris Agreement—a worrying milestone with far-reaching implications.

The main causes of this warming include the intensification of the greenhouse effect, caused by emissions of gases such as CO_2, or carbon dioxide—widely recognised as one of the main drivers of the climate crisis.

Although carbon dioxide is a naturally occurring gas and part of many organic processes, since the Industrial Revolution its emissions have increased beyond the capacity of natural life cycles to absorb it, contributing significantly to global temperature rise. This increase is primarily due to the burning of fossil fuels, deforestation, and intensive agriculture.

Among the impacts already being observed are rising sea levels, extreme weather events, and threats to biodiversity. The climate crisis is therefore one of the greatest challenges of the 21st century, demanding coordinated efforts from society, governments, and businesses. One of the key solutions studied and applied in recent years is the reduction of CO_2 emissions. Brazil, for instance, committed at **COP29** in Baku, Azerbaijan, to reduce its national emissions by between 59% and 67% by 2035.

Initiatives such as this are essential, but not sufficient. This is why science continues to search for innovative solutions to mitigate the damage. At the same time, technologies such as direct air carbon capture, the use of renewable energy sources, and the development of sustainable materials are emerging as promising alternatives to help contain the crisis.

Chemical engineer Isabella Quaranta, a graduate and master's degree holder from the Federal University of Ceará (UFC), and currently a PhD candidate at the University of Edinburgh in Scotland, is at the forefront of this effort. She is part of an innovative project that captures carbon dioxide (CO_2) from the air and converts it into ethylene, a key raw material used in the production of plastics. The contributions of this research have the potential to revolutionise the industry.

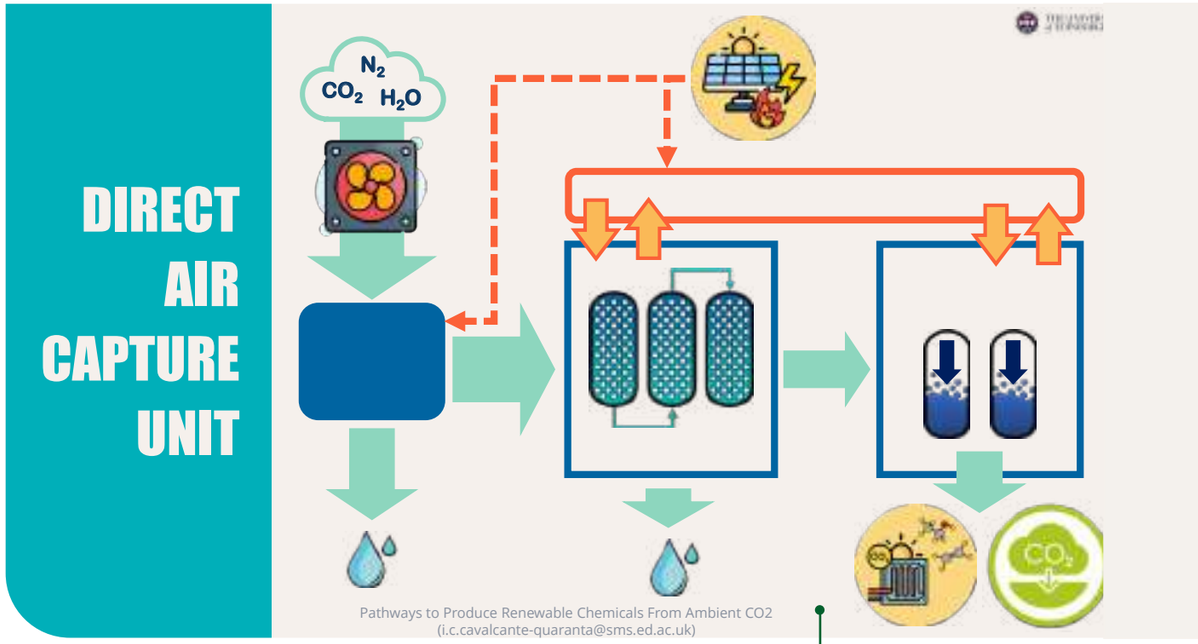
From Villain to Solution

Imagine removing excess carbon dioxide from the atmosphere and even transforming it into plastic. Sounds like science fiction? Well, for Isabella and the team behind **Project SolDAC**, it's already becoming reality. The researchers are exploring technologies that enable the active removal of CO_2 through a process known as *carbon capture*.

SolDAC Project (Full Spectrum Direct Solar Air Capture and Conversion)

Carried out in partnership with other UK and European institutions, the research involves an innovative process that uses solar energy and chemical catalysts to transform CO_2 into ethylene, an essential raw material for the production of plastics. The idea not only reduces carbon emissions but also creates a sustainable alternative raw material for the petrochemical industry.

Scan the QR code to find out about SolDAC:



Drawing created by Isabella Quaranta during her research

Isabella Quaranta explained how the **capture mechanism** works: 'It's like this — imagine a fan blowing air through a paper filter. As the air passes through the filter, we capture just the carbon dioxide molecule, which sticks to that layer, and the rest of the air continues on'. Although the concept may sound simple, one of the biggest challenges lies in the amount of energy required to separate the molecules.

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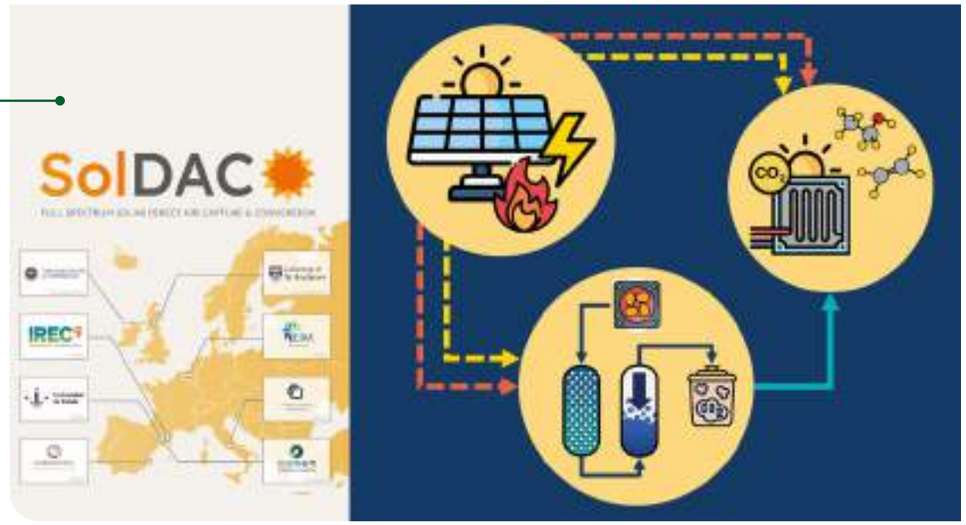


Drawing created by Isabella Quaranta during her research

'This process demands a great deal of energy. And to generate that energy, we often emit carbon dioxide as well. So what we always have to analyse is whether the amount captured exceeds the amount emitted. Then, depending on how the process is set up, you determine its **carbon footprint**. Only then can we say whether the process is truly eco-friendly', Isabella emphasised. Frequently, this energy is still generated from fossil fuels, which can cancel out the benefits of the carbon capture process.

'The main challenge today in the field I work in — and the reason I'm so interested in it — is to reduce the energy cost of the process, to use clean energy, or what we call *waste heat*', she continued.

Carbon Footprint

This is the total amount of greenhouse gases (including carbon dioxide and methane) generated by human activities.

Credit: Personal archive

More information on the subject can be found in the article *Buying down the Cost of Direct Air Capture*, produced by Klaus S. Lackner and Habib Azarabadi, published in May 2021 on the ACS Chemistry for Life website.

Challenges

To deal with the challenges of sustainability, the technique uses solar energy as a driving force and is less polluting. What's more, the project was designed to have multiple applications. 'The modules, such as the solar panels and the CO_2 capture unit, can be used separately in other systems, such as industries that need to reduce emissions or companies interested in carbon credits.'

The other path is the use of 'waste heat' with the reuse of waste heat in industrial processes to boost capture. In processes such as alcohol distillation in Brazil, for example, the burning of sugar cane bagasse generates a large amount of heat. Instead of releasing this heat into the atmosphere, it can be reused for capture processes, making them more efficient and sustainable by reducing energy costs.

There are also other scientific and technological challenges, such as the stability of the catalysts and, above all, the economic viability of the process on a large scale.

Use in the Industry

The direct capture of carbon from the atmosphere is already attracting the interest of dedicated start-ups that face the challenge of high costs, which limit the adoption of this technology.

But with the joint efforts of various groups around the world, Isabella Quaranta believes that the technology could soon reach larger industries, bringing a major impact to production. 'According to forecasts in some articles, from 2040 onwards, research in this area will be more robust and the **price will drop dramatically** due to the various research fronts. It's as if everyone had this goal in common'.

The large-scale application of CO_2 capture technologies could transform the industrial landscape. Companies interested in profiting from carbon credits could adopt these systems to achieve a zero or even negative carbon footprint, removing CO_2 from the atmosphere instead of just reducing their emissions. This would make the process not only environmentally sustainable, but also economically viable, meeting the demands of a market that favours climate neutrality.

The idea that filters can solve the problem of industrial emissions is limited. Even with these mechanisms, we can't deal with distributed emissions, such as what happens in the transport sector. According to data from the **National Bioenergy Union** published in 2021, in aviation, for example, projects to completely replace paraffin will take at least 30 years, a timeframe incompatible with the climate emergency. In land transport, the transition to electric cars is only truly sustainable in countries whose energy matrix is renewable.

Credit: Personal archive

Stage of the ethylene production process carried out in a laboratory at the University of Edinburgh, photo provided by the researcher.

Another point concerns the production of plastics, which is currently largely dependent on oil and is beginning to present more sustainable alternatives. Currently, ethylene, one of the most widely used chemical products in global industry, is the basis for the manufacture of most plastics.

‘If we can produce plastics from more renewable sources, such as via CO_2 capture, even if the product is initially more expensive than traditional plastics, the environmental impact can be significantly reduced. In addition, the processing of plastics from renewable sources tends to be simpler, contributing to a more circular and sustainable economy’, emphasised Isabella.

‘What we need to show industries is that they are not paying for technology for a number on a piece of paper, **they are paying for a possibility for the future of humanity’**

Isabella Quaranta

Sustainability

As part of the research, a detailed study is carried out at a partner institution on the environmental impact of each stage of production, from the choice of chemical products to energy efficiency. But the project goes further and takes into account **eco-design**, which considers not only environmental impact, but also working conditions in factories and the reduction of socio-economic inequalities, elements that are often neglected in other sustainable solutions.

One promise is the possibility of universal applicability. With modules that can be installed anywhere on the planet, the project facilitates the transition to greener and more sustainable practices, without relying on complex infrastructure. From the CO_2 capture unit, which can be simply connected to a power source and hot water, to the most efficient solar panels, the idea is to provide practical and scalable solutions that benefit both the environment and industry.

Isabella’s Story and the Call for Clean Energy

Since secondary school, Quaranta has been passionate about science. When she attended a careers fair, she decided she wanted to be a chemical engineer, fascinated by the possibility of building industrial equipment that could transform processes. ‘I thought the idea was incredible and thought ‘I want to build a reactor’, she says.

So she graduated in Chemical Engineering from the UFC. As a recent graduate, Isabella aspired to work in industry and faced difficult questions: ‘In 2018 I tried to get a job at a company and the answer I got was that they didn’t hire women for the position I was interested in.’ So she decided to return to academia and pursued a master’s degree at the same institution.

But if the young student went into her degree thinking she would work with reactors and oil, going into postgraduate studies changed an important key in her research: ‘During my master’s I worked with natural gas. I began to understand better why we should move away from oil and avoid fossil fuels’.

Credit: Personal archive

Equipment from the University of Edinburgh, photo provided by the researcher.

Encouragement from Other Women

Inspired by figures such as Professor Dr **Diana Cristina Silva de Azevedo**, Vice-Rector of UFC and the only Latin American woman in the International **Adsorption** Society, Isabella charted a determined path. 'Throughout my academic journey, I thought: 'I want to be like her.' Seeing a woman from the Northeast of Brazil recognised worldwide showed me that I could also reach that level', she recalls.

Adsorption is a physico-chemical process in which molecules, atoms, or ions are retained on the surface of a substance, typically solids. This process does not occur throughout the entire body of the material, but only on its surface, which is why it is referred to as a surface or interfacial phenomenon. Although adsorption happens naturally, some industries have refined it for use in cleaning toxic waste or treating water.

(Concept accessed on the Educa+Brasil website, educamaisbrasil.com.br, on 21 November)

'I no longer want to work with anything that emits CO_2 into the environment, or that releases pollutants, so to speak. I want to work with clean energy.'

Isabella Quaranta

In 2022, Professor **Diana Cristina Silva de Azevedo** represented the Federal University of Ceará in the first edition of the UK-Brazil Gender Equality Partnerships programme, promoted by the British Council. The collaborative project, developed in partnership with Imperial College London (ICL) and the State University of Campinas (Unicamp), produced significant results. In a statement to our team, Professor Diana highlighted the inclusion of affirmative actions in UFC's institutional development plan, aiming to strengthen gender equity within the academic environment.

Credits: Viktor Braga/Federal University of Ceará

It was then that the opportunity arose to join the University of Edinburgh team in the United Kingdom, where Isabella secured a **PhD scholarship** and ideal conditions to dedicate herself fully to her research.

She advocates that the inclusion of women in science is essential to enrich the diversity of ideas and solutions, particularly in complex fields such as engineering and sustainability. Her academic journey includes participation in projects aimed not only at attracting women to science, but also ensuring they remain in the field after completing their PhDs.

The scholarship Quaranta received was provided by the SolDAC project itself, which is funded by Horizon Europe and the UK government through Innovate UK. She found the opportunity on the website *Find a PhD*

Diversity, she says, is a pillar for scientific innovation, where teams made up of people from diverse backgrounds and experiences are more successful in solving complex problems, such as the challenges posed by the climate crisis. ‘We women have the ability to stay focused on the end goal while paying attention to the details along the way,’ says the researcher.

She also highlights how living in a resilient family in Ceará has shaped her perspective. ‘My mother always found a way to make things happen, even with few resources. It taught me to improvise and look for creative solutions,’ she shares. Overcoming social, cultural and economic barriers, Isabella is currently an example of how diversity can strengthen science and increase its impact on changing the world. ■

Learn more

Visit the website of the Intergovernmental Panel on Climate Change (IPCC)

Read the article *Buying down the Cost of Direct Air Capture*

Check out the text on average global temperature on the Copernicus European Observatory website

Read the article of National Bioenergy Union on renewable kerosene

Read the news about Brazil’s participation in COP29

To find scholarship opportunities, visit *Find a PhD* website

Credit: Paulo Gustavo Modesto/Pexels

Women and Artificial Intelligence Against Extinction

Application aims to facially recognise red howler monkeys to help protect the species

By Camila Boullosa

An innovative initiative has combined technology with environmental preservation: a facial recognition application for red howler monkeys is being developed at the Regional University of Blumenau (FURB). Led by Professor Dr **Andreza Sartori**, a specialist in computer vision and artificial intelligence, and in partnership with researcher **Zelinda Hirano**, who has a PhD in Comparative Biology, the project is a pioneer in identifying individuals of the species, with the potential to change the way researchers monitor and protect endangered species.

In addition to the app, Sartori is also an enthusiast and coordinator of the Digital Girls of the Itajaí Valley project, which brings programming activities to children in situations of social vulnerability. You'll get to know Larissa Antunes' story and the experiences she and Andreza have gained through the project.

Read on for an inspiring journey through the stories of women in science.

Endangered

Red howler monkeys (*Alouatta guariba*) are primates that inhabit the Atlantic Rainforest and are found from Argentina to Bahia. In Santa Catarina, they can be found in the forests of the Itajaí Valley, in the regions of Blumenau and Indaial. Due to deforestation, urbanisation and fragmentation of their natural habitats, the species faces a high risk of extinction. The preservation of these animals is not only an ecological issue, but also an effort to maintain the balance of ecosystems, where they act as important seed dispersers and one of the main indicators of yellow fever outbreaks.

In this scenario, the **Bugio Project**, created more than 30 years ago by Professor Dr **Zelinda Hirano** and carried out at the Indaial Biological Research Centre, has played a fundamental role in preserving these animals on various fronts, including research, teaching, extension and environmental education. The project team continuously monitors the animals, dealing with health issues and cataloguing the individuals to better monitor their condition. 'The howler monkeys are our guardian angels. When a howler monkey dies in the region, we can find out if there is yellow fever in the area and make people aware of the need to get vaccinated', explained Zelinda.


Credit: Personal archive

Zelinda Hirano is a retired professor from FURB and has a PhD in Comparative Biology from USP. She has been involved in primate management for 32 years and is the founder of the Centre for Biological Research and Primate Observatory of Indaial (CEPESBI) - Projeto Bugio. She is currently working on the National Action Plan for Atlantic Conservation at ICMBio/MMA. She is president of the *Alouatta guariba* Management Program committee in Brazil and a member of the *Alouatta guariba* Management Program committee in Argentina.

The major challenge faced by the research team is identifying and monitoring the howler monkeys efficiently and accurately. One of the key tools of the programme is the **Studbook**, a platform that provides detailed records of all endangered animals under human care both within and outside Brazil. Based on these records, individuals can be selected for reintroduction projects in the wild, depending on the specific needs of each region. 'The idea is to map, register, and reintroduce the animals into safe areas, contributing to the recovery of red howler monkey populations in places where the species has become extinct or is under threat', explained the professor.

Currently, the professionals involved in the Howler Monkey Project are able to recognise individual primates, but this process relies on human observation and requires time and experience. To address this challenge, the team approached Professor Dr Andreza Sartori, who accepted the task of developing a **facial recognition algorithm** for the howler monkeys.

Based on computer vision and **artificial neural networks**, the algorithm uses images captured of the animals and learns to recognise their specific facial features, even under varied conditions – such as different angles or lighting. The process involved the collection of around 40 images of the monkeys, which were expanded into a database of **503 images**. These were labelled and digitally augmented through **data enhancement techniques**, multiplying the images to train the system to identify faces in a range of situations.

> **"If a human can recognise differences in the facial structure of howler monkeys, then AI can also learn to identify them.'**
>
> Andreza Sartori

Technology for Environmental Preservation


Credit: Personal archive

The development of this application represents an important milestone in the use of technology for the environment. Professor Andreza Sartori highlights that, by automating the identification of howler monkeys, the system facilitates monitoring work, enabling more accurate tracking of the population and the animals' health conditions. In addition, artificial intelligence ensures that reliable and standardised data are used to underpin conservation strategies.

This innovation places FURB and the Howler Monkey Project at the **forefront** of applied research that combines science, technology and environmental conservation. The use of artificial intelligence algorithms proves that, when well applied, technology can be a powerful ally in the fight against species extinction and in protecting endangered ecosystems.

More than just technological innovation, the project demonstrates how AI can be applied in support of the environment. 'We're using technology as a tool to solve real-world problems, generating positive impacts both for science and for biodiversity conservation', explains Andreza.

With the algorithm's initial success, the next step is to turn the system into an **accessible application** that requires less hardware memory and is suitable for various devices, so it can be used by both researchers and conservation institutions around the world. The expectation is that the tool will help expand efforts to monitor endangered species and inspire other projects that combine artificial intelligence and environmental preservation.

As Professor Andreza Sartori emphasises: 'Science and technology play a crucial role in addressing today's environmental challenges'. With creativity and innovation, we can build tools that not only facilitate human work but also ensure a more sustainable future for the planet.

Digital Girls

‘I’m from Maués, a small town in the state of Amazonas, 24 hours by boat from Manaus. When I finished lower secondary school, I wanted to study agriculture, because that was the only reality I knew, but my mum and dad encouraged me to study computing. They said, **‘look at the world out there, see what’s happening – computing is the future.’** So I had the chance to take a technical course at the Federal Institute.’

This account comes from Larissa Antunes, a sixth-semester Computer Science student at FURB and a scholarship holder on the *Meninas Digitais do Vale do Itajaí* project, coordinated by Professor Andreza.

Larissa’s experience highlights a common barrier for girls from different backgrounds: the lack of awareness or encouragement to explore areas such as computer science and information technology. This reality is confirmed by data from the third edition of ***Gender Statistics***: *social indicators of women in Brazil (IBGE)*, which shows that these fields have the lowest female participation among all those surveyed. **United Nations** data reinforces this disparity: currently, women make up only 26% of the workforce in data and artificial intelligence, and just 12% in cloud computing.

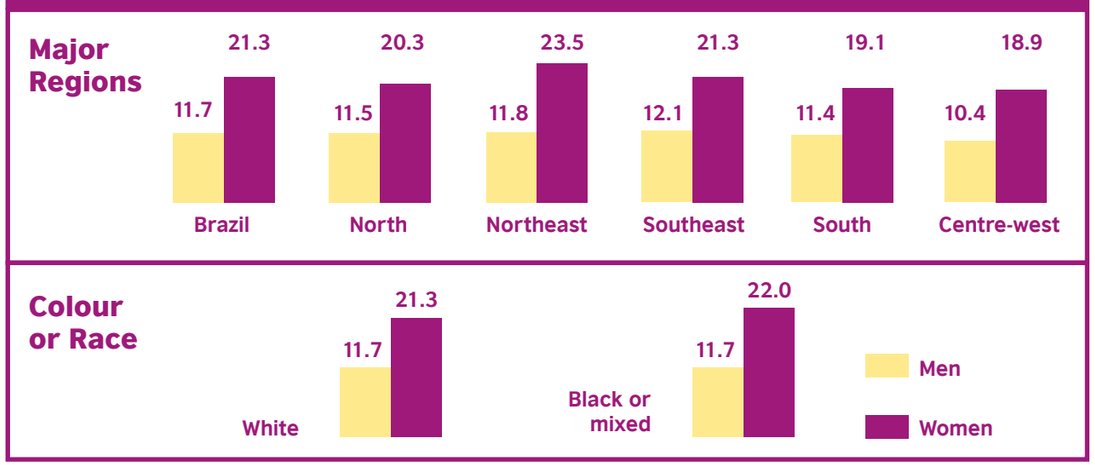
From childhood, the divide between “boys’ things” and “girls’ things” distances girls from scientific fields, while social pressures around motherhood and family later limit their professional choices. As a result, women are concentrated in care-based jobs such as education and healthcare, and are under-represented in strategic fields like mathematics, engineering, and technology.

To address these challenges, initiatives such as the British Council’s **STEM Girls** aim to engage school-aged girls in science-related areas. Among its actions is the **creation** of the *Practical Guide for Promoting Youth Inclusion in STEM Areas*, in partnership with the STEM Education Hub at King’s College London.

Another notable initiative is *Rewriting the Code*, a global, free-of-charge network for students and early-career women in the technology field. Founded in the UK, it claims to be the largest network of its kind in the world today.

In Brazil, the *Meninas Digitais do Vale do Itajaí* project, endorsed by the Brazilian Computer Society and based at FURB, works to promote women’s empowerment in technology. ‘There are very few women in computing fields, which is why projects like this are so important’, emphasises Professor Andreza, who coordinates the initiative.

Average Weekly Hours Dedicated to Care Responsibilities and/or Household Chores, by Gender (Weekly Hours)



Source: IBGE, Continuous National Household Sample Survey 2022.
Note: consolidated data from five visits.

Born to Code

The project is structured around four interconnected initiatives: Alpha, Beta, Gamma, and Delta. Each one targets a specific audience, ranging from girls in the final years of lower and upper secondary school to university students and partnerships with tech companies.

In the Alpha Initiative, girls in the final years of primary and secondary school – many of whom are in socially vulnerable situations – are invited to explore the university.

‘They learn to code through games, develop computational thinking skills, and, in the end, even create their own game,’ says Andreza.

In addition to programming, the workshops explore artificial intelligence, virtual reality, and the Internet of Things (IoT), offering a broad view of computing.

‘This is my favourite part,’ explains Larissa. ‘Many of them don’t even consider computing as a career option because they’re afraid – just like I was. But when I started upper secondary school, a teacher called me **“born to code”** and that encouraged me to pursue this path. That’s what I want to pass on to them.’ Larissa uses tools like Scratch – a beginner-friendly block-based programming language – to show that technology can be fun and accessible.

Visits to technology companies, part of the **Delta Initiative**, are another highlight. Blumenau is a technology hub, and taking the participants into this environment inspires new dreams. ‘Some of the girls say: “Now I am going to study more math to come and work here’, the professor says. During the visits, there is also a meeting with female employees of the companies: ‘talking to women in IT gives them extra motivation’.

Inequality Starts Early

One of the most revealing moments of the project happened when boys were included in the activities at the request of a school. Although they came from the same social and educational background, the boys completed the activities much faster, which intrigued the project coordinators.

‘I asked what they did after school. The answer? Played video games, used the computer. The girls, on the other hand, said, ‘I look after my three younger siblings, I make lunch, I clean the house’. Gender differences start very early on’, explains Andreza.
The episode highlights how caregiving responsibilities imposed on girls affected their development in areas such as technology.
‘That realisation made our commitment to the project even stronger.’

‘Because of these issues — and the fact that the girls were already in vulnerable situations — it was incredibly moving to see them create their first games, their first lines of code. Recently, one of the girls brought in all her code written by hand in her notebook. I was deeply moved,’ recalls Larissa. ‘When they get to university, they’re amazed. For many, it feels like stepping into a whole new world.’

Dealing with data in practice can be truly impactful, and not all educators and facilitators are prepared to overcome this barrier. It is increasingly important to have practical ideas to create a more encouraging environment for girls in STEM areas. Tips and relevant information on the topic can be found in the guide ***Shall we talk about gender balance in STEM?***, produced by the British Council in Brazil to discuss the challenges and suggest strategies for inclusive teaching.

Credit: Personal archive

Credit: Personal archive

Andreza Sartori and Larissa Antunes at the Digital Girls project event.

A Welcoming Environment

Even in the face of challenges like the pandemic, the Meninas Digitais do Vale do Itajaí project has had a significant impact. Some participants expressed interest in pursuing IT careers, and one of them was even invited to work at FURB’s Research and Development Lab in Technology (LDPT), with a scholarship for students still in school. ‘She’s 16 years old and is now studying and developing technology with us,’ says Andreza proudly.

Gender inequality in IT is clear: according to data from the Institute for Applied Economic Research (Ipea), only 27% of students entering Computer Science programmes in Brazil are women. This gap is not just a social issue, but an economic one too. A 2017 study by consulting firm McKinsey found that companies with greater gender diversity are 21% more profitable.

At the beginning of her journey, the lack of female role models was also a challenge for Larissa: ‘I thought: there are no female professors, no women to look up to. That really affected my confidence.’ Things changed when she met her mentors, FURB Computer Science professors

Andreza Sartori and Luciana Kohler. ‘They are my inspiration. Now, whenever I face difficulties, I remember them and think: I can get there too.’

That’s why the Beta initiative is focused on university students and aims to create a support network for young women who find themselves alone in mostly male classes. ‘Many end up giving up, and the goal is to create a more welcoming environment’, the professor concludes.

Through this, the project promotes a cultural shift, brings girls closer to the university and, most importantly, shows that technology is also a space for them. Even if not all of them choose computing in the future, the project plants the seed of possibility. ‘They may not go into computing, but we want them to know there is space for them here’, Andreza adds.

Moreover, it’s not enough to simply open the door to technology – it’s also necessary to support those who are researching or starting businesses in the field. That’s why the British Council created the **Women in Tech – Inclusive Leadership** training programme, which seeks to develop interpersonal skills among STEM professionals so they can progress in their careers.

In a country where including girls in tech remains a challenge, initiatives like this light the way and inspire a new generation of women to occupy spaces that were historically denied to them.

Speaking of Inspiration...

Do you want to meet more girls and women in STEM fields with incredible work? Then access volume 1 and volume 2 of the publication *Stories that Inspire*, the result of the STEM Girls project, and find out more about the 42 projects carried out in the country.

Read volume 1 here

Read volume 2 here

Only a science shaped by Andrezas, Larissas and Zelindas – with new visions and possibilities – can truly build a different future. ■

Learn more

Read the study *Gender Statistics - Social Indicators of Women in Brazil*

Read *Progress on the Sustainable Development Goals*

Read *STEM Girls: Training Future Scientists*

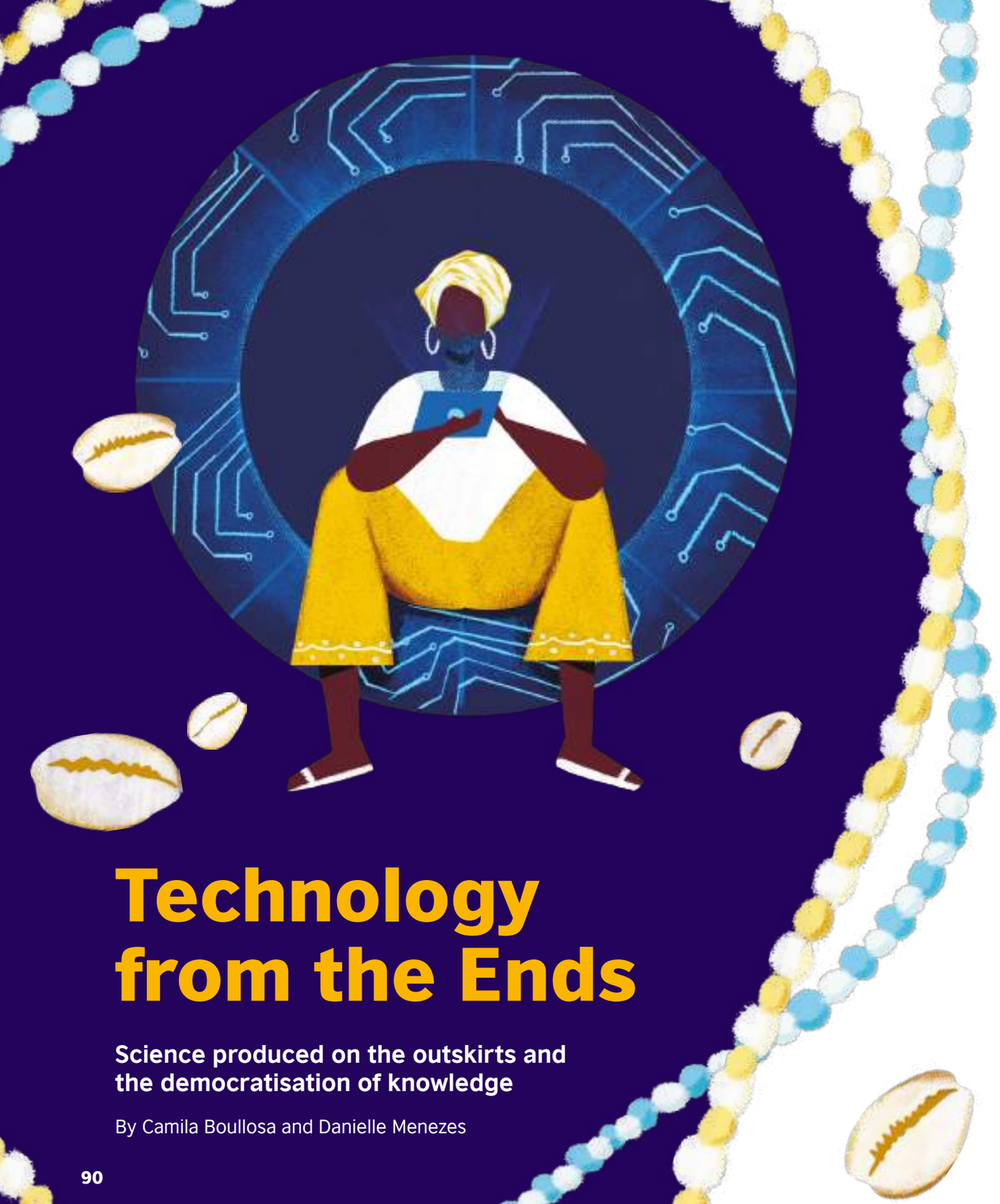
A practical guide to promoting the inclusion of young people in STEM fields

Access the guide *Shall we talk about gender balance in STEM?*

Read *Women in Tech Training – Inclusive Leadership*

“Believe in your potential. Computing is for everyone, and each of us can make a difference.’

Larissa Antunes



Technology from the Ends

Science produced on the outskirts and the democratisation of knowledge

By Camila Boullosa and Danielle Menezes

'The error is exclusion: technology is only available to a small, homogeneous group, mostly White, cis-gendered men with high purchasing power. It is developed by the same people, generating the repetition and maintenance of the narratives, values and privileges of this group.' This is the message found in the promotional materials for **LabCoco - Technology and Citizen Innovation Lab**, which was set up by **Mãe Beth de Oxum**, Pernambuco's first elected living heritage Yalorixá, artist and community leader, who uses open technology and agile development methods to create radio experiences and digital games.

Located in Guadalupe, on the outskirts of Olinda, LabCoco has been creating technological solutions based on the values of Black, Indigenous, peripheral and LGBTQIAPN+ communities since 2010. With the support of a public notice from the Palmares Foundation, the lab brought together Black youth to offer courses in cultural production, web design, graphic product design, audio operation and popular percussion for two years.

This initiative gave birth to **Contos de Ifá**, which promotes a Black identity through games scripted with Afro-Brazilian mythology. According to the **Secretariat of Culture of the Pernambuco State Government**, the platform registered more than 40,000 users between August 2014 and May 2017.

In 2015, the game won the Banco do Brasil Foundation Social Technology Award, consolidating partnerships that enabled the continuity of training, including preparation for the job market. During the pandemic,

'Technology is knowledge, and knowledge cannot be the property of a class. We need to ensure that the outskirts have access to technology!'

Mãe Beth de Oxum

Credit: Personal archive

LabCoco adapted its activities to an online format and launched its first class exclusively for women, with the support of SESC (Social Service of Commerce).

Profession of the Future – for Whom?

Credit: Personal archive

Mãe Beth no LabCoco

A **survey** conducted by the Potências Negras Tec community (2022) with Black professionals in the technology sector revealed that 83% had experienced discrimination in the workplace, with 39% reporting it came from colleagues, 35% from HR professionals, and 34% from managers. Still, 80% of respondents believe that the tech sector can contribute to their professional growth. When the data is broken down by gender, the scenario becomes even more concerning: Black women represent only 11% of the workforce and just 3% of enrolments in computer engineering courses. However, at LabCoco, they lead most of the activities.

'The technology is not neutral' says Nin La Croix, a non-binary trans person who has been building innovation projects since 2006. 'When technology is designed and created from a single perspective – that of cis, White, heteronormative men – it does not serve us. Often, it oppresses us.'

Professor Letícia de Oliveira, a postdoctoral researcher at King's College London in the field of functional neuroimaging and machine learning, reinforces the warning:

'Artificial intelligence tends to reproduce biases present in society. Without careful oversight, algorithms can perpetuate sexist and racist prejudices. That's why the presence of underrepresented groups in this field is essential to monitor and correct such distortions.'

This concern highlights the importance of initiatives such as ***Women in Tech*** – *Inclusive Leadership*, launched in 2021 by the British Council as part of the *Women in Science* Programme. The project, a virtual training for women researchers and/or professionals or entrepreneurs in science, technology, engineering, and mathematics, aims to increase female representation in leadership positions across these sectors. In doing so, it helps to build more inclusive environments and foster the development of technologies that better reflect the diversity of society.

Tecnologia de Quebrada

With this reflection as a basis, the *Tecnologia de Quebrada* (Technology from the Ends) project started in October 2023 to leverage peripheral ventures through technology, but with a transformative approach: 'It is a technology that carries our values – the values of the territory, blacks, peripherals and transgenders,' explains Nin, who coordinates the initiative.

The creator, Mãe Beth de Oxum, is a central figure both in the creation of LabCoco and in the philosophical inspiration behind *Tecnologia de Quebrada*, with a fundamental role in valuing cultures of African origin. Her vision is clear: 'Technology is not just material. You have to turn the keys of reasoning to use it with belonging and in a critical way.'

A Filter That Tells Stories

To attract young entrepreneurs, the project launched an innovative campaign featuring a gamified Instagram filter, developed in partnership with programmer Marcela Nascimento, a Black woman from Salvador. Inspired by nostalgic games like Sonic, released in 1991, the filter portrayed Mãe Beth in pixel art, jumping to collect objects – computers, microphones and sound desks. But the highlight was not just the material elements: 'She grabs the keys, because that's it – the important thing is to turn the keys in our minds', Nin emphasises. Scenes featuring various favelas reflect the reality of the outskirts of Olinda, giving prominence to local landscapes and stories.

The filter was a hit, and *Tecnologia de Quebrada* selected 20 entrepreneurs – more than originally planned – with the aim of developing these young people to apply technology in their businesses. Peripheral entrepreneurship hubs were held, covering areas such as audiovisual production, sound and image capture, visual identity, management, and artificial intelligence. The process broke away from any traditional model.

Credit: Labcoco archive

Paulo Freire in Practice

‘It’s not that vertical format, where there’s a master who knows and students who learn,’ says Nin. The project was built on a horizontal model, encouraging knowledge exchange between participants and facilitators. Paulo Freire’s philosophy was a constant presence: ‘elders bringing their wisdom from the road and young people bringing new tools.’

> **‘Competition doesn’t make sense to us. We are a people of cooperation.’**
>
> Nin La Croix

The values of LabCoco also became evident in the replacement of the traditional hackathon (a competitive marathon typical of the tech sector) with a Raggaton – an event focused on cooperation and collaborative gatherings. Inspired by the concept of Ubuntu (‘I am because we are’), the Raggaton had a festive atmosphere, with a sambada (a circle of Afro-Brazilian music and dance rooted in samba traditions) and collective exchanges of technological solutions that benefited all participants.

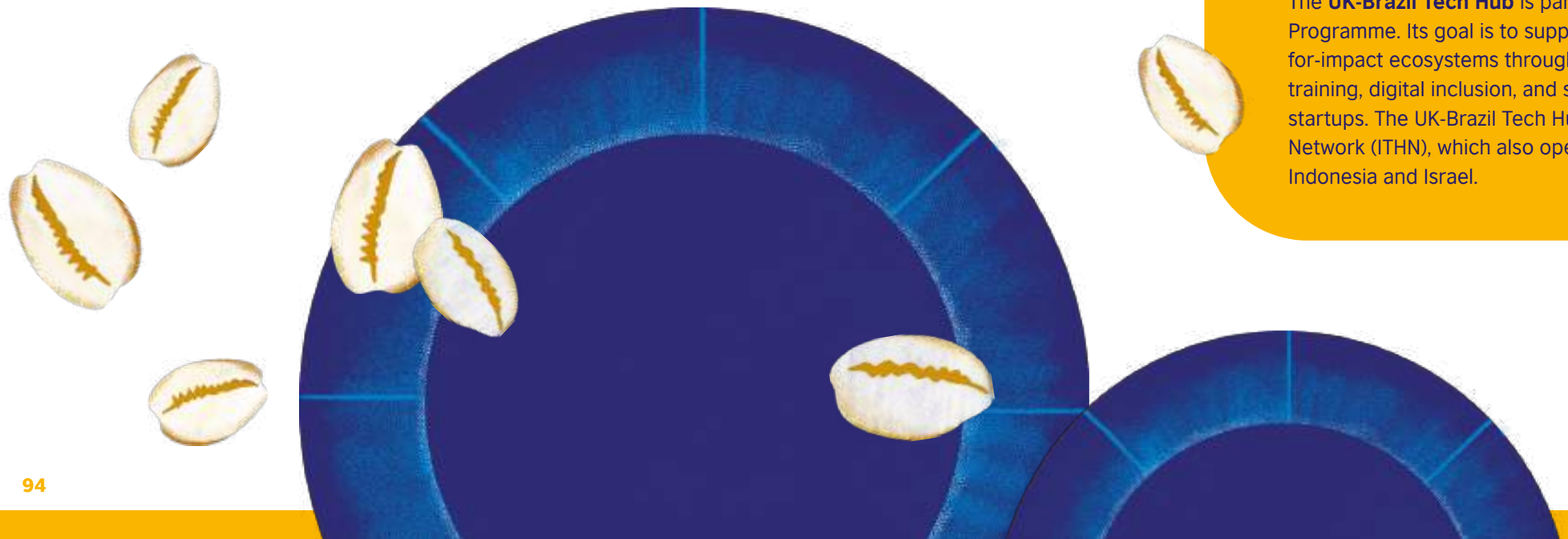
This is one of the key differences of **Technology from the Ends**: the recognition that the outskirts, Black communities, and Indigenous peoples hold histories and strengths that go far beyond what is seen through a centralised lens. ‘These populations are not minorities; they are the foundation that sustains everything.’

The Future of Technology Is Ours

LabCoco and *Tecnologia de Quebrada* are living examples of how technology can be a tool for empowerment when created with inclusive values and rooted in diverse realities. Leaders like Mãe Beth, Nin La Croix and everyone involved in the projects show that the periphery is not just a consumer of technology, but also its creator — in innovative and critical ways. Nin reinforces this potential by stating: ‘Sometimes, the only thing separating an award-winning idea from the city centre and what’s happening here in the *quebrada* (in the Ends) is access to resources. The creativity and potential — we already have that.’

This could only become a reality because the initiative had the support and sponsorship of the UK-Brazil Tech Hub. ‘They discovered the project and brought it to light. That allowed us to do what we had dreamed of: putting resources directly in the hands of the entrepreneurs, so that information wasn’t out of reach due to a lack of tools. We are truly grateful for the partnership with the British Consulate and the UK-Brazil Tech Hub, who have been and continue to be partners. We’re still exchanging ideas to build more projects, expand our reach and impact, and build technology with identity and belonging’, explains Nin.

The **UK-Brazil Tech Hub** is part of the UK-Brazil Digital Access Programme. Its goal is to support the development of Brazil’s tech-for-impact ecosystems through digital skills and entrepreneurship training, digital inclusion, and support for the growth of tech for good startups. The UK-Brazil Tech Hub is part of the International Tech Hub Network (ITHN), which also operates in South Africa, Nigeria, Kenya, Indonesia and Israel.



As LabCoco continues to drive new ideas and unlock the minds of a generation of creators, one central message is clear: **the future of technology also belongs to the *quebradas*, to Black women, to trans communities and to all the voices that have historically been silenced.**

For those who want to follow the next steps of this tech revolution anchored in belonging and social justice, just follow LabCoco on Instagram (@llabcoco) and get inspired by what is being built. The future is being shaped by creative, committed hands — and it carries the transformative power of those who believe that technology, when built with identity, is a powerful tool for social change. ■

Credit: Personal archive

Learn more

Read the text from the Department of Culture of the State of Pernambuco, *LABCOCO Holds Games Workshops that Promote Black Identity*

More information about the UK-Brazil Tech Hub

Read more about the research carried out by the community *Potências Negras Tec*

More information about the Women in Tech project

Science and Women: A Partnership for The Planet

By Asmynne Bárbara

Women researchers are leading scientific initiatives that combine sustainability and low-cost solutions

Human activity and the use of fossil fuels have led to a 1.1°C increase in the planet's temperature in recent years, the most visible consequence of global warming. And the changes and impacts are already being felt in various regions. Increased flooding, such as in Rio do Grande do Sul in April 2024, is causing homes to be destroyed, livelihoods to be lost and communities to be displaced.

And the projections do not cool the heat. The data from the Intergovernmental Panel on Climate Change (IPCC) report, released in 2023, still warns that the past decade recorded the highest temperatures of any period in the last 125,000 years. Furthermore, 46% of the planet's human population is currently in a situation of high vulnerability to climate change. Exposure to risk varies according to factors such as gender, race, and income, and in regions like South and Central America, these factors are amplified by social inequality, poverty, and deforestation. This information was presented by researcher Jean Ometto, a member of the team at the National Institute for Space Research (INPE) and part of the Research Programme on Global Climate Change (PFPMCG) led by FAPESP (São Paulo Research Foundation), during a webinar held in March 2022 to discuss the IPCC's Sixth Assessment Report, and later published on the FAPESP website.

The data is clear. 'The Earth is speaking, it's telling us we have no more time', proclaims Indigenous activist Txai Suruí in her speech at the Climate Conference (COP-26), held in Glasgow, UK. The ancestral wisdom of Indigenous peoples teaches us that to reach a sustainable future, we must turn our gaze to the knowledge and technologies of the past in search of answers to today's problems.

The startup MABE Bio, founded by Marina Belintani and Rachel Maranhão, is a strong example of how traditional knowledge can influence sustainable solutions in the present day. A **pioneer** in Brazil, the company draws inspiration from the country's biodiversity to develop innovative and eco-friendly materials. Its flagship product is *angico* biotextile, a bio-based polymer that mimics the properties of both animal and synthetic leather, offering a sustainable alternative.

The story of **MABE Bio** is told by Marina Belintani, a fashion designer trained at the State University of Londrina (UEL), who has worked in the field for ten years and has a research career focused on developing materials through investigating the potential of plants to create raw materials. During her master's in Textiles at the Royal College of Art in the UK, Marina deepened her knowledge and, upon returning to Brazil, applied her methodology to species that are abundant, invasive, or have no commercial value.

'During this research, I identified that the *angico* tree — more specifically, its fruit — was a promising **raw material for developing a biomaterial** with characteristics and aesthetics similar to animal leather', Marina reports.

She explains that by conducting an ethnobotanical study of the *angico* species, she uncovered its potential as a new input that could be incorporated into the development of pigments, materials, and finishes. *Angico* is widely found in five Brazilian biomes, and its use helps foster a regenerative economy that values and preserves Brazil's biodiversity.

The startup focuses on reducing the use of fossil-based materials by researching and creating **biocomposites** — inputs that partially or fully incorporate components of biological origin, such as plant fibres, gums, and waxes.

These materials have strong structure and high performance, and they show potential to replace many conventional fossil-based materials, such as plastic. 'Their applications span a wide range of sectors, including construction, industry, automotive, and consumer goods. In addition to reducing reliance on non-renewable resources, biocomposites offer added benefits such as lower environmental impact and the potential for integration into circular economy systems,' adds Marina.

The company's main product, *angico* biotextile, is a bio-based polymer that replicates the look and feel of both animal and synthetic leather, making it a functional and ecological alternative. 'The fruits of the *angico*, which traditionally have no commercial value, are reused in our process, promoting an intelligent and sustainable use of natural resources. Moreover, the *angico* tree plays an essential role in forest restoration projects, especially in riparian areas, contributing to environmental regeneration,' she explains.

Biocomposites made from natural fibres and biodegradable plastics provide a strategic alternative to petroleum-based materials, helping to solve problems of oil scarcity and waste management.

(EMBRAPA, 2023)

The designer emphasises that the company is deeply inspired by the legacy of wisdom and responsibility embedded in ancestral traditions, and in the way these communities align their actions with the natural rhythms of the environment. 'They remind us that there is much to learn about how innovation and nature can coexist in perfect harmony,' Marina reflects.

The startup conducts studies prior to the development of a new material in order to understand the biological and chemical characteristics of the species and its role in human history, especially how it was used by ancestral peoples. 'We adopt an ecosystem approach, analysing the plant's past, its interaction with its natural habitat and the implications of its use for the future. This approach was born out of our fascination with ancient technological innovations and their intrinsic connection with the balance of ecosystems. They are fascinating examples of how traditional knowledge can inspire more harmonious and sustainable modern solutions,' explains Marina.

Angico Biotissue

A bio-based polymer that mimics the aesthetic aspects and properties of animal and synthetic leather, being a functional and ecological alternative.

The Champions Against Global Warming

Credit: Aldino Hartan Putra / Unsplash

Often portrayed in fiction, the collapse of the environment is already a reality. But unlike the stories portrayed in films and books, the solution to stopping this villain doesn't lie in crazy plans. When it comes to containing global warming, the preservation of ecosystems is one of the most important allies.

Working on this front, Dr Flávia Mochel leads important initiatives at the Federal University of Maranhão (UFMA). As a professor and researcher, she coordinates the Mangrove Laboratory (LAMA), founded the Mangrove Recovery Centre (CERMANGUE) and recently joined the Centre for Geotechnologies in Mangroves. 'The actions we carry out at the laboratory include the ecological restoration of mangroves. We have a permanent nursery with a capacity of 30,000 seedlings and a laboratory dedicated to restoration,' she explains.

Mangroves have an impressive ability to capture and store large amounts of carbon dioxide — even more than tropical rainforests. They perform what experts call carbon sequestration, the process of removing excess carbon dioxide from the atmosphere to restore balance. Professor Flávia Mochel explains that mangrove trees grow at a faster rate compared to other forests, which can take more than 15 years to produce adult trees. Mangroves, on the other hand, reach maturity in just seven years and can grow up to 15 metres tall, allowing carbon to be absorbed and stored rapidly. 'Another important aspect of the mangrove ecosystem is that its sediment is not made of black earth like in other places; instead, it consists of mud, and the carbon gets deposited along with the mud, also becoming organic matter,' she adds.

But what do mangroves have to do with containing global warming?

They are, quite simply, the champions in this fight.

Mangroves have an impressive ability to capture and store large amounts of carbon dioxide — even more than tropical rainforests.

The laboratory is also responsible for geoprocessing, geotechnologies, and remote sensing, using satellite imagery and drones. The team also monitors sea level rise and evaluates carbon stocks in mangroves. At present, the laboratory receives funding from FUNBIO (Brazilian Fund for Biodiversity), through the Floresta Viva programme, which focuses on mangrove restoration.

'Of the eight projects selected across Brazil, we were the only institution from the north of the country to be chosen. It's a huge responsibility.'

Flávia Mochel

Credit: Personal archive

Flávia Mochel holds a Master's in Zoology from the National Museum (UFRJ), a PhD in Geosciences (Geochemistry) from the Fluminense Federal University (UFF), and a postdoctoral degree in Mangrove Restoration from Wageningen University in the Netherlands.

The laboratory also highlights the importance of traditional communities in conserving and protecting mangrove ecosystems. ‘Most people in traditional communities are deeply committed to keeping their ecosystems and mangroves healthy — unpolluted, intact, and free from deforestation — because they depend on them for both subsistence and income, through fishing, shellfish harvesting, and crab catching,’ explains the professor. She also points out that traditional communities are partners in participatory processes and scientific knowledge, fostering the exchange of expertise. ‘They have extensive lived experience and often ask us for technological ideas to improve sustainable management practices — it’s a meaningful exchange,’ she concludes.

Artificial Intelligence to Preserve The Natural World

Poorly managed solid waste in Brazil is a critical factor contributing to both global warming and public health issues. According to the Brazilian Association for Waste and the Environment (**ABREMA**), in 2023, the country produced 80.96 million tonnes of waste — an average of 382 kg per person. ABREMA also explains that the accumulation of this waste in landfills and dumpsites results in significant emissions of greenhouse gases, primarily methane (CH_4) and carbon dioxide (CO_2), released during the decomposition of organic matter.

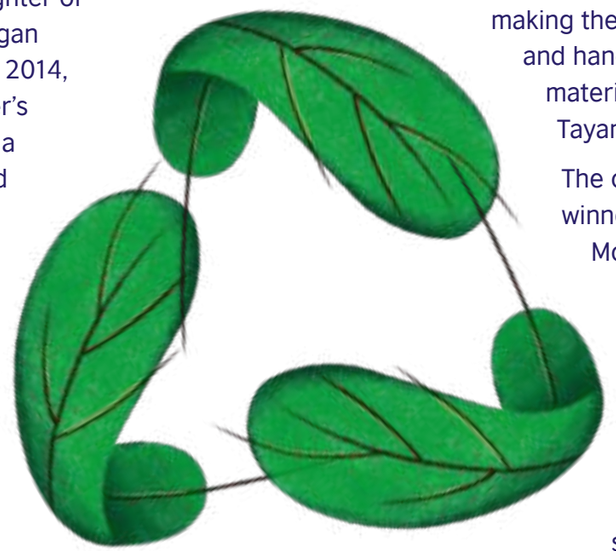
In addition to climate change, this massive volume of waste contributes to the proliferation of bacteria, the spread of disease, and the contamination of groundwater. While sanitary landfills are a more controlled alternative, receiving 61% of the solid waste generated in Brazil in 2023, this solution still leads to the loss of recyclable or reusable environmental resources.

80
Million

tons of waste are disposed of in open dumps in Brazil

The effects of global warming disproportionately impact low-income and socially vulnerable communities. Yet it is often these very groups that lead initiatives to mitigate the consequences of climate change. In this confluence of forces, the story of waste picker Deuziane Sousa intersects with that of Tayana Santos, a Black mother and entrepreneur.

Deuziane Sousa dos Santos is 31 years old and the daughter of a waste picker. She began working in recycling in 2014, motivated by her father’s experience working in a dumpsite. ‘So I decided to get involved in order to get him out of the dump, along with the 20 families who lived there. I started a cooperative in Paço do Lumiar [in the State of Maranhão], and today I work with the association in São José de Ribamar, which I also founded and where I serve as president,’ Deuziane explains.



The cooperative is now one of the recycling businesses supported by the startup Cocais Engenharia Ambiental, founded by environmental engineer Tayana Santos. With ten years of experience in business management, an MBA in Basic Sanitation, and a specialisation in Waste Management and Valorisation, Tayana initially created the company to work in her field of expertise and to have more time with her daughter. ‘Today, we focus mainly on environmental licensing and consultancy, with an emphasis on solid waste. In addition, we are developing an innovative platform that connects waste generators with recycling cooperatives, making the management and handling of these materials easier,’ Tayana explains.

The company was the winner of the Ideation Module of the Inova Amazônia 2023 Programme, run by Sebrae in Maranhão, proposing consultancy and technical support solutions for the management, handling, and conversion of solid waste. The startup developed a SaaS (Software as a Service) platform powered by Artificial Intelligence, aiming to optimise waste logistics. ‘The main impact of our work is directly felt by waste pickers and recyclable materials cooperatives, who benefit from increased income,’ Tayana notes.

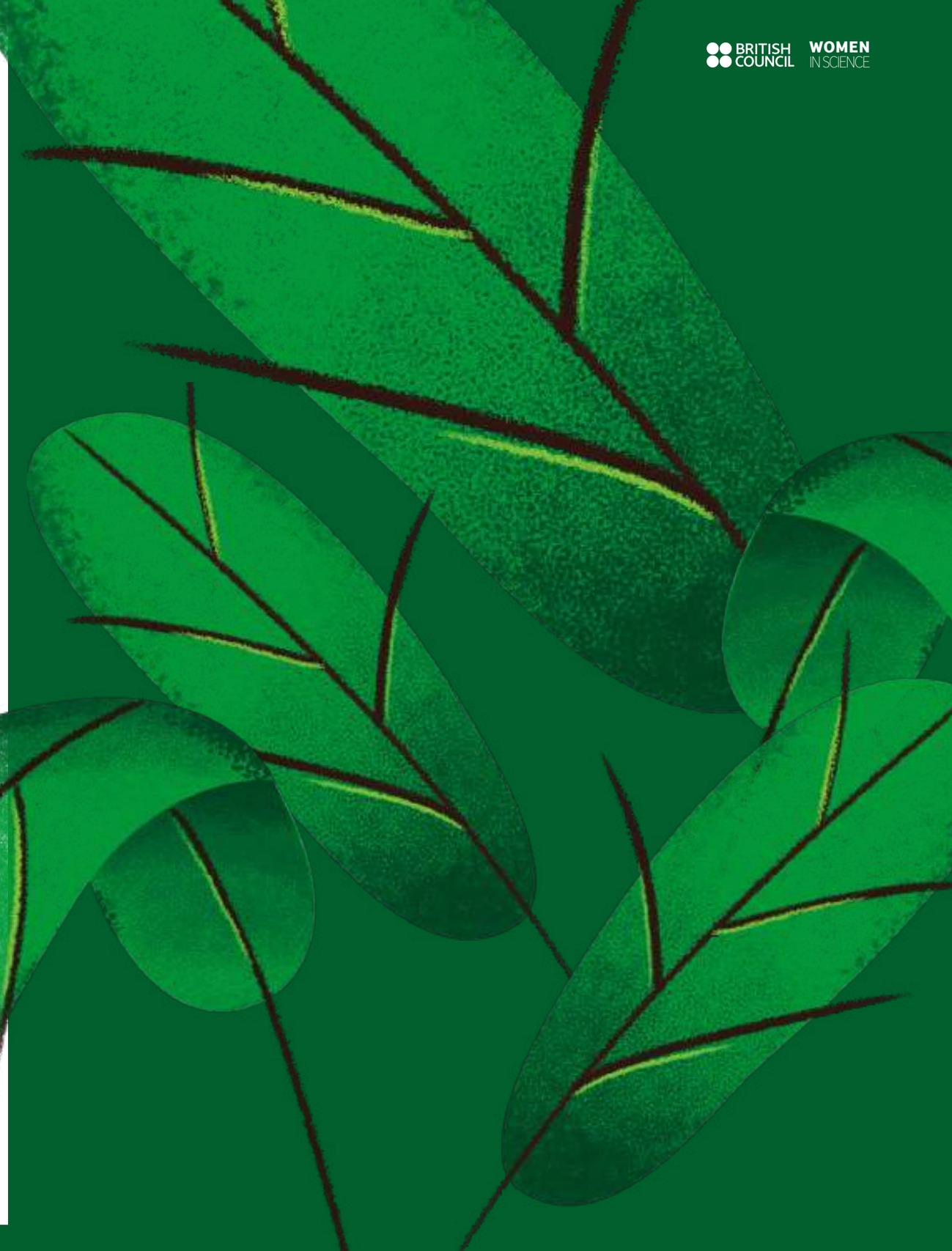
Currently, the company diverts around 650 kg of waste per month from landfills and dumpsites, contributing to environmental preservation and creating positive effects for the community. ‘The work I do in recycling is very important because we remove recyclable materials that would otherwise end up in landfills, dumpsites, or rivers, polluting the environment. Our work ensures these materials are properly disposed of,’ adds Deuziane.

The stories of these and other women working in scientific research and innovation for sustainability and environmental impact reduction show that the union of ancestral knowledge, local communities, and science is a powerful tool for creating innovative solutions. ■

Learn more

Read the article *The Space Dedicated to Women in the Innovation Ecosystem is Expanding*

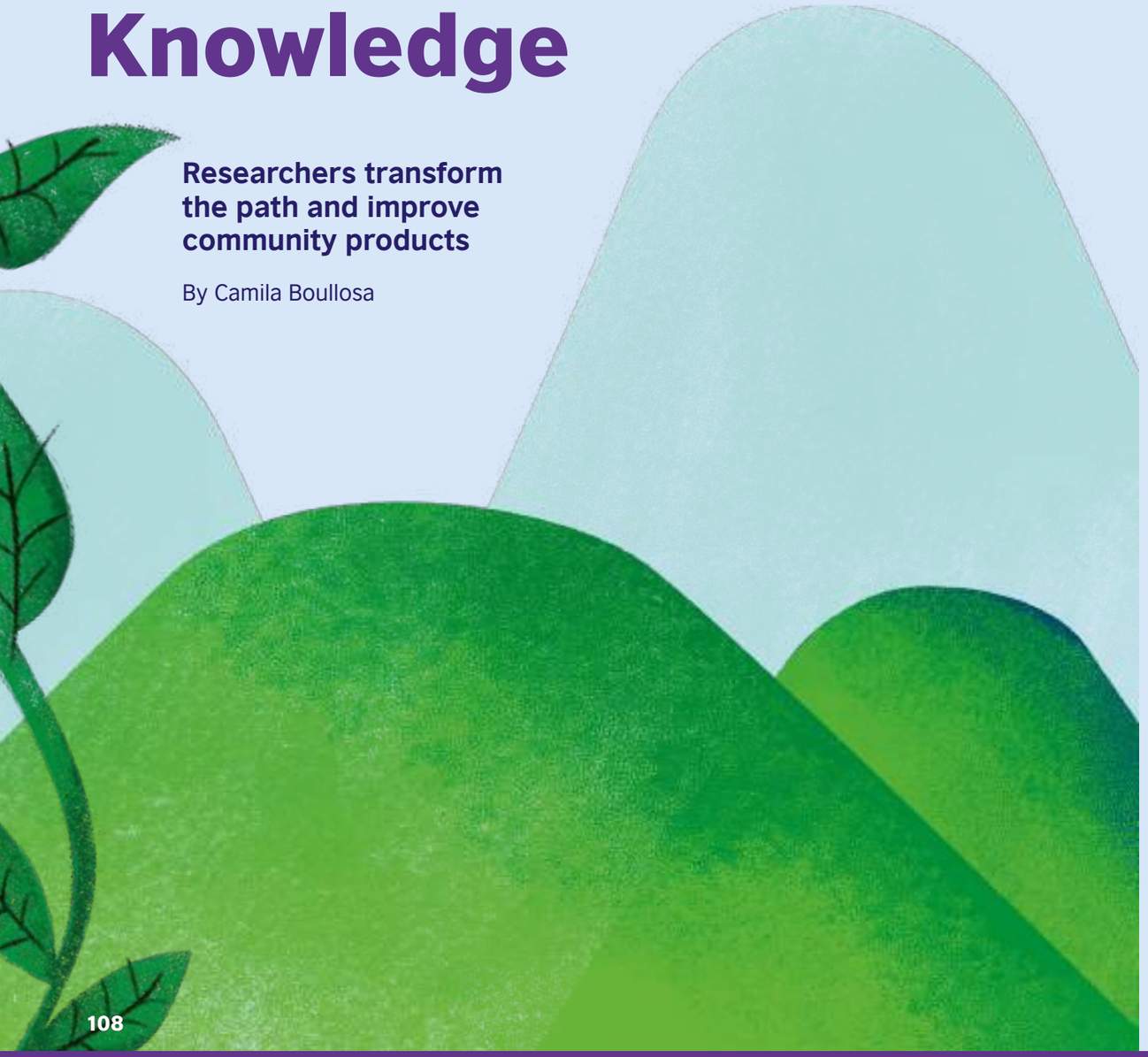
Read the *Panorama of Solid Waste in Brazil*



Sustainable Routes: the Path Between Science and Traditional Knowledge

Researchers transform the path and improve community products

By Camila Boullosa



A daughter of the Amazon, a researcher returns home and puts science at the service of the quality of life of local communities. The improvement of cosmetics and medicines is among the innovations that help generate income for families and keep the forest standing.

There is a paradigm shift: those who live in the territory are no longer just exporters of commodities and raw materials, but are now protagonists of their own history.

This change is visible in the progress of research published in prestigious journals, the creation of patents, the development of consumer goods, awards and the founding of companies developed by women from the communities.

Valuing the people who live in their territories also means considering their role in building a truly sustainable economy.

The Raw Material is Prime

Murumuru means ‘thorny tree’. *Bacuri* and *andiroba* are temperamental plants — their seeds and fruits cannot be picked before their time; they must fall on their own. *Cupuaçu* is cherished in culinary recipes. *Açaí*, guardian. Only those who know, understand. To comprehend the deep rhythms of nature, it is not enough to live in the shade of the trees. It is necessary to carry with you the memories of mothers, grandmothers, and of an entire community that observes, with attentive eyes, the cycle of the forest’s blooming. We call this traditional knowledge. Marcilene da Silva Costa, one of the leaders of the São Domingos Community, which is located in the Flona, the Tapajós National Forest in Pará, is one of the keepers of this ancestral knowledge.

> **_Açaí_, guardian. Buzz of the beetle, a magnet. Pale is the morning’s skin.’**

The excerpt is from the song *Açaí* by Djavan, which narrates the forest’s dawn, where the fruit’s palm trees are a reference for traditional and riverine peoples.

A descendant of Indigenous people, Marcilene knows the plants by name and is a collector of *andiroba* seeds. 'We were born and raised here in the countryside; learning from our mother, our father and our grandmother, who passed their wisdom down over time', she says.

Her community lives from extractivism. Without the infrastructure to create new products and add value to them, the work was hard and generated little financial return for everyone. 'I've been working with *andiroba* oil since I became aware [of myself]. But before, we produced very little, just enough to use at home, and a lot would spoil. Since *andiroba* yields only once a year, we were left idle.'

In 2017, however, Marcilene and four of her sisters decided to create an association to improve the family's income. Today, they already work with other products made from *andiroba* oil, taking advantage of all possibilities and avoiding waste: 'We're making soap, we're already making candles, we're making incense, repellent... We're also developing [products] with *tucumã* straw, with *cipó* vines. Now we work all the time, one activity after the other.'

This value chain, so rich in knowledge and biodiversity, is often marked by inequality. The oil that leaves the hands of these workers to become cosmetics, food or medicines of high added value reaches the shelves of big cities at exorbitant prices. But for those who produce it, the value passed on is low. The communities that ensure the sustainability of this process remain marginalised, living in precarious conditions and without access to a fair share of the profits generated.

This disparity lays bare one of the many faces of unfair trade in the Amazon. The raw material from the world's largest tropical forest is rich in benefits — economic, medicinal and ecological. But the value it generates does not return to those at the base of the process. Large industries benefit from this model, generating profits that exclude the productive base.

But What About Formal Science?

Santarém, in Para state, is the main urban center of the National Forest. It is home to the Federal University of Western Pará (UFOPA), and within it, the Pharmaceutical and Cosmetic Research and Development Laboratory, led by Professors Dr. **Kariane Nunes** and Dr. **Gabriela Bianchi**. The researchers believe that the role of the university in this process is to place science and its infrastructure at the service of the population. Thus, through an outreach grant, they run the Circular Bioeconomy project, which brings this and other women from the region together in favor of innovation and sustainability.

The initiative seeks to improve and certify the biocosmetic products of the communities so they can reach national and international markets, avoiding intermediaries and creating fairer trade for Amazonian communities. 'The university has already analysed our products, and they are of good quality', explains Marcilene.

In the process, the university visits the community to understand the reality and the people's aspirations, in order to analyse production bottlenecks and then take to the lab what can be improved there. Kariane emphasises that a fair partnership is fundamental to the project: 'One thing is to go to the community, get a wonderful raw material, develop a product, publish scientific papers, file patents, sell this to a company, generate income for the university as well, scholarships for students, equipment for the lab. But what about the community? So when we collect raw materials from these communities, we bring them to the lab, evaluate their quality, develop bioproducts and return them to the forest guardians. It's wonderful! This way, they can have a chance to sell to big companies that demand quality certifications.'

'Today you can talk about bioeconomy in the Amazon thinking about how the income circulates and returns to the community too, not just to big companies. It's a practice of social justice.'

Kariane Nunes

Credit: Personal archive

The project's products also meet market demand for cosmetics and medicines that are safe, non-allergenic to consumers, and environmentally friendly. People are increasingly interested in the environment and, above all, in what they are using, as the professor comments: 'We see a concern about including natural raw materials that don't cause adverse effects, that are biocompatible and biodegradable.'

Like Amélias of the Amazon

In addition to improving products and certifications, the Circular Bioeconomy project has been essential in structuring these businesses within the communities by bringing in supplies, concepts, and information. 'We go to the community, run workshops with young people, with the whole family, improve protection practices, quality control practices, add value, and develop new products,' explains Kariane.

The youth, in turn, find in this process an opportunity to connect with the modern bioeconomy, learning how to operate in a market that combines innovation and sustainability. They become protagonists of a new moment for the Amazon, where the wealth generated by the forest circulates locally, strengthening the community economy.

It was, in fact, during one of the marketing activities proposed by the project that the group's name was born: 'A student had a conversation with us to create the brand, and we talked through our entire story — of women who take care of the house, raise children, and work doing other things. And from that whole conversation came the name *Amélias of the Amazon*', said Marcilene.

Now with a brand, a new workspace, and certification requests being processed through Sebrae (Brazilian Micro and Small Business Support Service) the Amélias are preparing to reach new heights. 'They also have their bio-business and also need to make a living from it. We hope that this connection between community, university, and business resonates into a fairer and more humane future', explains Kariane.

For the Amélias of the Amazon and so many other traditional communities, the value of the forest lies in its biodiversity. In this way, they become protectors of the territory.

> 'I consider myself a guardian of the forest because we've seen that, despite everything happening around us, our reserve is intact. **We're working with seeds, producing other products, and we've even planted more andiroba trees in the clearings where they had already been cut down**. So, what we're doing — and we want to do much more — is work to keep the forest standing.'
>
> Marcilene de Souza

The Thorny Tree

Credit: Adobe Stock

Sometimes considered a nuisance by riverside communities due to how easily it spreads along the edges of the flooded forest, the *murumuru* palm has gained prominence thanks to the rich composition of the butter extracted from its seeds. This butter has been widely used by major cosmetics companies to produce topical and hair care products. However, in 2014, new research into *murumuru* butter led to a discovery with significant technological advantages for medicinal use. That's how UFOPA's first patent letter came to be.

Born in Imperatriz, Maranhão, daughter and granddaughter of *babassu* nut breakers, Professor Kariane earned her undergraduate and master's degrees in pharmaceutical sciences from the Federal University of Pará (UFPA), and her doctorate from the University of São Paulo (USP) in Ribeirão Preto. In São Paulo, under the guidance of researcher Dr. Osvaldo de Freitas, she developed research on more advanced medicines: liquid crystals, which use vegetable fat as a base to generate sustained-release systems. This type of liquid-crystalline system can be applied to skin and mucous membranes; it is biocompatible, biodegradable, safer, and offers greater therapeutic efficacy compared to conventional formulations, which provide immediate release.

'When I finished my PhD, I thought, 'it can't be just this', and I realized that the science I was doing needed to be connected to my roots and to be useful for communities. So I returned to the North, turned my focus to local raw materials, and decided to work on the development of biocosmetics and drug delivery systems based on butters, oils, extracts, and pigments from Amazonian plant species,' Kariane added.

Thus began the research that revealed: *murumuru* butter has excellent chemical and physicochemical properties for use as a base in various types of topical and hair formulations; it can be used in antibacterial, anti-inflammatory, and other medications. 'What we patented in 2021 was a liquid-crystalline pharmaceutical base made with this butter.'

Sustained Release System

This is a type of prolonged release that allows a rapid release of a dose or fraction of the active ingredient, followed by a gradual release of the remaining dose over a prolonged period of time. In other words, rapid and rigorous action.

Information from the Regional Pharmacy Council of Rio Grande do Sul - CRFRS

The base emerged as an innovative response to persistent challenges in women's health. Conditions such as vaginitis and bacterial vaginosis, often overlooked, significantly impact women's quality of life, and there is an increasing demand for practical and comfortable solutions. 'The advantage of this gel is that when inserted into the vagina, for example, it absorbs the organ's fluids and becomes more viscous. As a result, it remains in the canal longer, releasing the drug slowly. This reduces the treatment time from seven days to three and increases adherence to therapy,' explains Kariane.

Patented as a unique innovation, the liquid-crystalline base developed with *murumuru* butter also shows promise in other areas. Studies published by Professor Kariane's research group demonstrated the effectiveness of two herbal formulations developed from the *murumuru* base — one with *buriti* oil and the other with extract from the plant species *jucá* — for wound healing in rat and dog models.

Ongoing studies have also been conducted to demonstrate the evident permeation capacity of the *murumuru*-based liquid-crystalline systems, as well as the application of *ucuúba* butter in the development of vaginal suppositories. These studies are being carried out in partnership with leading researchers in the field, such as Professor Dr. Taís Gratieri from the University of Brasília (UnB).

In addition to this patent, Professor Kariane has also developed a lipstick using *cupuaçu* and *bacuri* butters, colored with *jambo* pigment, which is expected to hit the market soon.

Credit: Personal archive

Semisolid pharmaceutical form for topical use, designed for intravaginal administration, with an ovoid or conical shape. Composed of lipophilic bases (such as vegetable butters and waxes) or water-soluble bases (such as polymers), it dissolves or melts at body temperature, releasing the active ingredient or drugs directly into the vaginal mucosa.

These stories show that science, combined with traditional knowledge and local needs, transforms realities. In the Amazon, these women innovate and strengthen their communities, proving that preserving biodiversity and valuing people are pillars for a fairer future. With science and tradition, they demonstrate that sustainability is a possible path. ■

Find out more

Read: OT Informa: Understand what the acronyms used to describe medicines mean [in Portuguese]

These are the territory-women shaping the future of science in Brazil.

Credit: Personal archive

Stories to Inspire Great Researchers

Spreading the achievements of women in science is essential to motivate girls and young people to follow their interests in STEM

By the Editorial Team

Let's set aside traditional fairy tales and turn our gaze to the true heroines of our time: the women who are revolutionizing science. Today's girls deserve to know—and often don't—the stories of their foremothers who are changing the world.

Take, for example, biomedical scientist Jaqueline Goes de Jesus and immunologist Ester Sabino, who gained worldwide recognition for sequencing the genome of the novel coronavirus just 24 hours after the first confirmed case in Brazil—a record time. Or Vivian Miranda, a trailblazing Brazilian involved in a NASA satellite development project. Not to mention the remarkable journey of Elisa Frota Pessoa, one of the first women in Brazil to earn a degree in Physics and co-founder of the Brazilian Center for Physics Research (CBPF) in 1949.

Sharing these and other stories is fundamental to breaking down gender stereotypes and promoting equal opportunities. Women represent only 33.3% of researchers worldwide, and just 12% hold positions in national science academies, according to UNESCO. In the fields of technology and innovation, women make up just one in five professionals.

The Power of Representation

It is essential to understand that science is not just about numbers, formulas or laboratories. It's also about courage, creativity and the transformative power of those who dare to open up paths where no-one has travelled before. On this journey to create the 4th edition of Women in Science magazine, we have learnt incredible stories that exemplify this reality.

Zeneide Cordeiro, a blind woman of Indigenous origin from the Awá Guajá people, completed her doctorate in Social Sciences at the Federal University of Maranhão (UFMA), becoming the first person with this disability to do so at the institution. Her research explored the narratives of her own people, but her legacy goes further: 'My training has had an impact on the possibilities for a blind person to be productive and autonomous. I want girls and women to study, to be creative and authentic.'

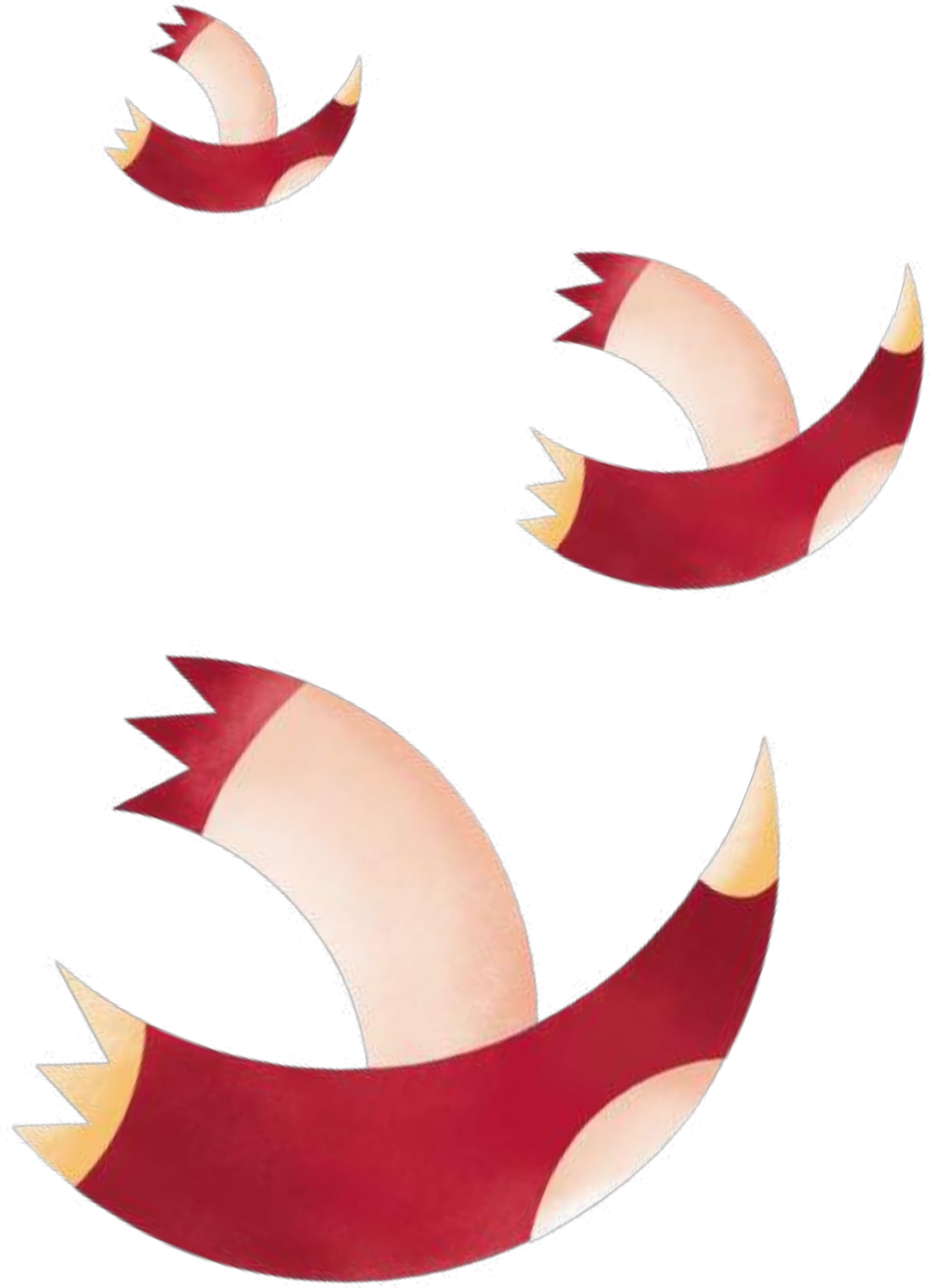
We also spoke to a real-life CSI, researcher Dr Komang Ralebitso-Senior, who uses microorganisms to solve crimes. As if that wasn't inspiring enough, Komang works for equity and inclusion in science. As a Black woman in an academic leadership position, she knows the power of representation, 'when we see people who look like us achieving things, it inspires us to do the same'.

Looking to The Future

Diana Daste, Cultural Engagement Lead at the British Council, offers a comprehensive view of the next steps for the Women in Science Programme: 'We are focused on strengthening knowledge exchange, including with UK institutions, to contribute to the implementation of institutional tools. Our goal is to foster a measurable and constant impact, anchoring these initiatives in public policies committed to gender equity and diversity.'

Daste also emphasises the importance of public policies in this process: 'By grounding these initiatives in public policies committed to gender equity and diversity, we are contributing to a more globally connected, inclusive and diverse higher education and science ecosystem.'

This will naturally lead to an increase in the participation, representation and influence of women in science, as well as broadening their opportunities for academic and professional development.'



A Message for Future Scientists

Science needs a diversity of perspectives, stories and voices that challenge the status quo. As well as being a question of social justice, equity is crucial for innovation. As Michelle Cota, from Brasília's Department of Education and a participant in the programme, put it well: 'Without diversity, science doesn't work. Different perspectives enrich our view of the world and our ability to face challenges, resulting in more comprehensive solutions.'

For young people who dream of innovation, leadership and research that values ancestral knowledge, the message is clear: science is for you!

The British Council is committed to continuing this vital work.

We close this issue celebrating their achievements and reaffirming our commitment to a fairer, more creative and democratic future. May these stories rock the dreams of all the girls and women who dare to believe that science is theirs too.

Hand in hand, we are writing a new chapter, where all voices can be heard and all talents shine.

Check out more articles and podcasts from the Women in Science Programme

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