Annual Report 2022
Serrapilheira Institute

Illustration by artist Valentina Fraiz for "Brazil was once a land of volcanoes," by Adriana Alves, published in the Ciência Fundamental blog in January 2020.

serrapilheira

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Illustration by artist Maria Palmeiro for "It is time to produce an ecology with the face of Brazil", by Pedro Lira, published in the blog Ciência Fundamental in June 2021.

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Foreword

THE SERRAPILHEIRA INSTITUTE is a private, non-profit organization founded in 2017 to support science and science outreach in Brazil. The Institute's mission is to enhance scientific knowledge, raise its profile, and foster a culture of science in Brazil. By doing so, the Institute aims to help build a scientifically informed society whose decisions are based on evidence.

The institute works through two main channels, **science** and **science outreach**, and is committed to diversity in science and to open and reproducible science.

Serrapilheira has two programs in **science**. The **Science Program** supports early-career scientists' research that address fundamental questions in the natural sciences, computer science, and mathematics. Proposals must be bold – we encourage risk. In addition to funding research, the program also provides training and networking opportunities among our grantees to encourage transdisciplinary collaborations.

The **Training Program in Quantitative Ecology** is a pre-doctoral program that provides transdisciplinary training to future scientists interested in tackling complex issues related to biodiversity, climate change, and environmental conservation, among other topics. The program's long-term goal is to make Brazil a global hub for ecology scientists.

The **Science Outreach Program** supports professional journalism and media projects that engage the public in science curiously and provocatively. The program also helps to combat scientific misinformation by promoting reliable information about science through various media, not just newspapers, television, radio, but also digital media, and entertainment platforms.

Since its founding, Serrapilheira has invested over R$ 70 million in almost 300 science and science outreach projects. The funding comes from a R$ 350 million endowment fund established in 2016 by a family philanthropic donation. The fund currently has about R$600 million, and the institute's annual budget is approximately R$20 million.

Although Serrapilheira's endowment ensures its independence and financial sustainability, the Institute also receives support from other public and private partner institutions. These partners contribute to science and science outreach through donations, joint public calls and institutional support.

This report outlines the main actions of the Serrapilheira Institute in 2022, the year in which it celebrated its fifth anniversary.

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Partnerships in Science for Rebuilding Brazil

Illustration by artist Julia Jabur for "Global Climate depends on the Future of the Amazon," by Pedro Val, published in the Ciência Fundamental blog in January 2023.

IN 2022, the institute celebrated its fifth anniversary. After consolidating the support program for young scientists, we are now honored to collaborate with public institutions such as state research foundations and the National Council of State Research Foundations. We are also proud to have contributed to the Jô Clemente Institute, a private institute that launched a public call for innovative scientific projects in the early detection of rare diseases in newborns.

Sharing our expertise and helping to promote science remains one of our core missions. We will continue to support risky projects and refine our understanding of "risk" in science.

We also promoted a series of science outreach initiatives, some of which had a significant impact. We encouraged more investigative science journalism, which can shed light on the links between science and public interest issues. We also developed bold communication strategies that are tuned in to social media and emerging media trends. The pandemic has only underscored the importance of investing heavily in scientific research, as well as in communicating the findings to policymakers and the public. The institute will continue to work in this direction.

We now intend to increase our commitment to causes that we believe are strategic for scientific development in Brazil. First and foremost, a bold inclusion policy is essential. Sometimes there is a disconnect between the scientific community and society, and this has to do with the fact that society does not see itself reflected in all its diversity within this community. We are also convinced that diversity enhances scientific excellence.

A second focus is on open science. The scientific system is complex and it will be challenging to change, but we want to be part of the global movement to reform it so that scientific production is increasingly transparent and accessible.

Finally, we believe that it is absolutely essential to promote a more transdisciplinary approach to science. Tropical ecology is a strategic field for Brazil's development and future. Understanding tropical ecosystems is a complex task that will require analytical skills, knowledge of biology, and computer science, as well as of humanities and economics.

Therefore, it is essential that Brazilian science increasingly embrace transdisciplinarity. Our Training Program in Quantitative Ecology is one of our steps in this direction.

Hugo Aguilaniu
EXECUTIVE DIRECTOR,
SERRAPILHEIRA INSTITUTE

Executive Summary: Serrapilheira by the Numbers

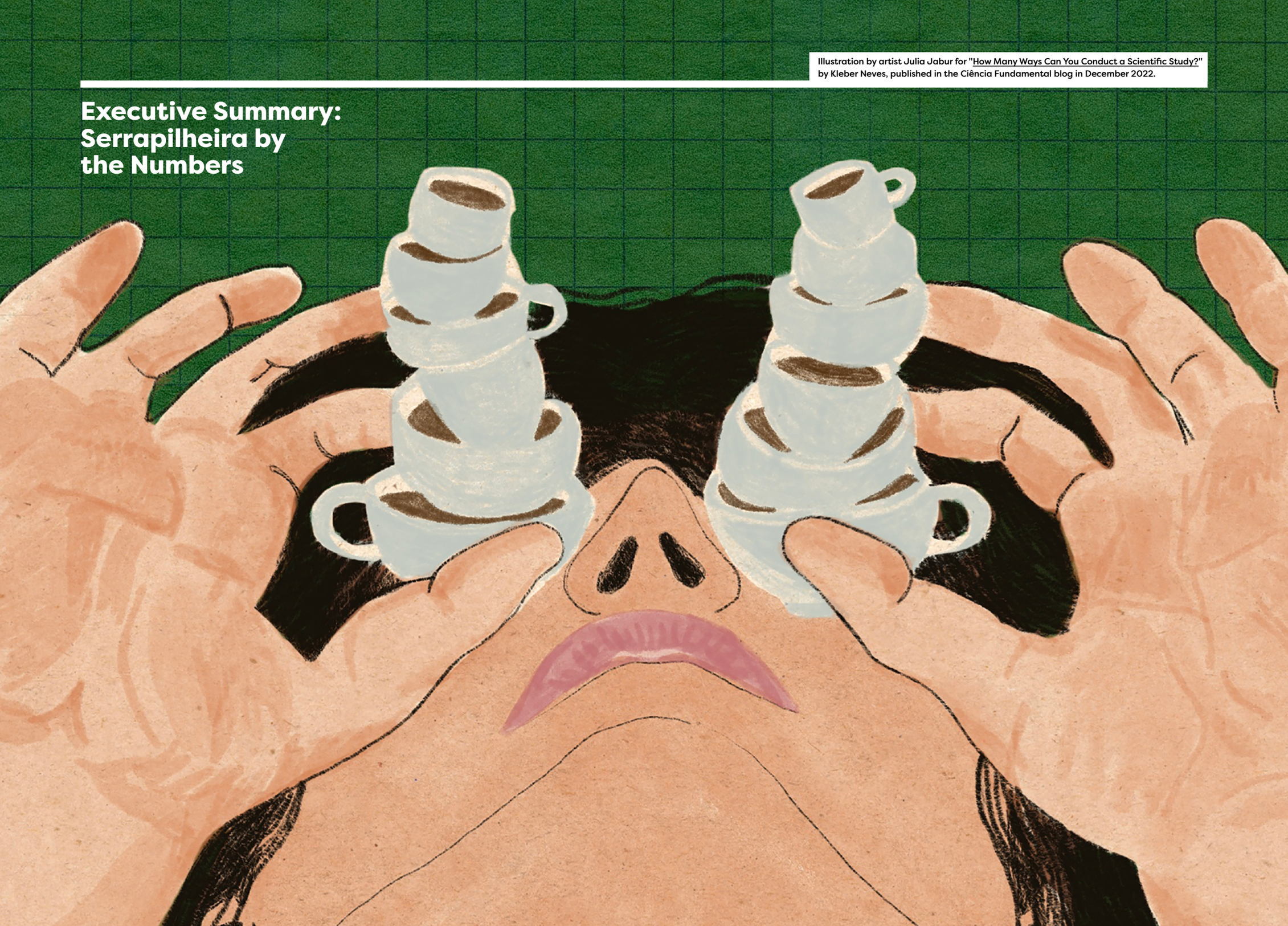
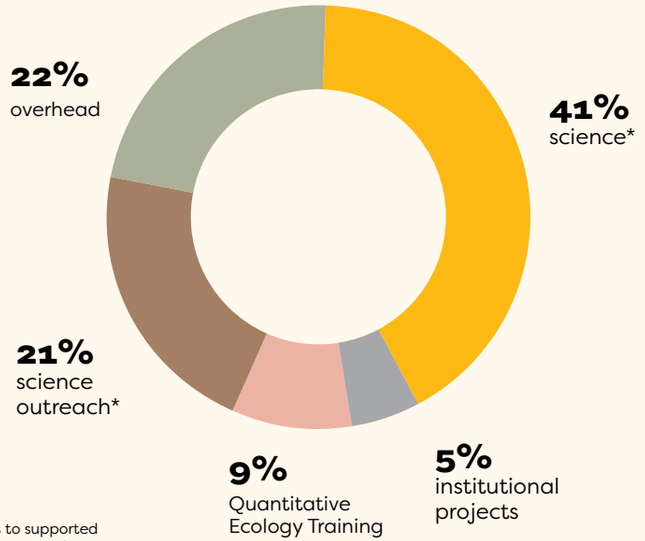


Illustration by artist Julia Jabur for "How Many Ways Can You Conduct a Scientific Study?" by Kleber Neves, published in the Ciência Fundamental blog in December 2022.

2022 budget: **R$ 25.985 million**
2022 realized budget: **R$ 25.964 million**

How the budget was used:



* includes funding for both grants to supported projects and other expenses, such as events and training.

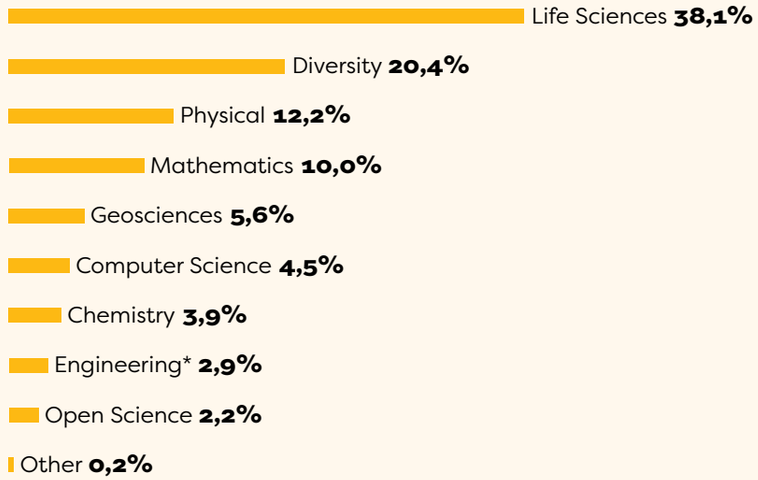
Allocations for projects since 2018:

Science:
R$58,772,150.56** | 156 projects supported*

Science outreach:
R$ 12,756,978.73 | 82 projects supported*

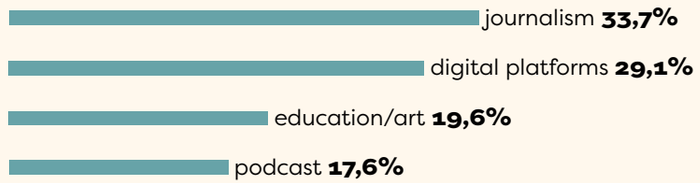
*in addition to renewals and occasional support for events, scholarships, prizes, and other initiatives.
**In the Science Program, long-term projects gradually spend the funds they are granted over the years. As a result, the amount of money spent by the supported projects each year differs from the amount made available to them. The amount shown here corresponds to the total made available, not the amount spent.

Investment in science by field since 2018



* As of 2019, Serrapilheira no longer supports projects exclusively in engineering.

Investment in science outreach by field since 2018



Our Values

Illustration by artist Valentina Fraiz for "Racism and Science," by Mariana Inglez, published in the Ciência Fundamental blog in November 2020.

Diversity in Science

Great results come from science, whose practice is based on uncertainty and risk. This is possible when there is freedom of ideas and a plurality of points of view. A more diverse group of young researchers who think about science from different perspectives is essential. That is why Serrapilheira has encouraged ethnic, racial and gender diversity in science in Brazil since its creation. Over the years, we have improved our performance in this area.

In 2022, we supported new projects aimed at promoting diversity in science:

Mukengi Project | Mancala Institute

The Serrapilheira Institute is supporting the second edition of Mukengi, a training program for Black and Indigenous researchers that aims to empower them to conduct research that benefits their communities. Mukengi is a project spearheaded by Mancala, a research institute that promotes social and racial equity through science and technology (S&T). The second edition of Mukengi will take place in 2023 and offer participants theoretical and hands-on lessons focused on hunger and food insecurity.

Grant: R$33,000

Rosani Matoso

DIRECTOR, MANCALA INSTITUTE

© Mancala Institute/ Disclosure

Pluralizar Program | UFSCar

The Pluralizar Program, promoted by the Federal University of São Carlos (UFSCar), encourages students admitted into higher education through affirmative action policies to participate in research projects in various fields. These policies opened the doors for underrepresented social groups to enter higher education in Brazil almost two decades ago. Still, little has been done to ensure that these students have all the opportunities that Brazilian universities offer, such as participating in cutting-edge research.

Pluralizar thus proposes to grant research, scientific initiation, and postgraduate scholarships to help these students enter fields that lack diversity.

Grant: R$ 1,085,901.92

(distributed over five years)

Anton Castro Miguez

COORDINATOR, PLURALIZAR

© Personal file

Affirmative Action in Graduate Studies Monitor (OBAAP)

OBAAP received co-funding from Serrapilheira and Instituto Ibirapitanga in 2021. In 2022, Serrapilheira renewed its support to continue the project and conduct new data surveys. Learn more.

Coordinated by political scientist Anna Carolina Venturini, a researcher at Afro-Cebrap (the Brazilian Center for Research and Training on Race, Gender and Racial Justice), OBAAP created a national database of public university graduate programs that adopt affirmative action policies in their public calls. The goal of the database is to help graduate programs search for examples and templates to design their affirmative action policies. Some of the results can be seen here.

Anna Venturini

COORDINATOR, OBAAP

© Wanezza Soares/Press

2022 Serrapilheira Grant: R$ 229,785.00
2021 Serrapilheira Grant: R$ 16,161.00
2021 Ibirapitanga Grant: R$ 16,161.00

Serrapilheira's actions to encourage diversity

Institutionally, Serrapilheira also takes steps to encourage diversity.

→ We launched the Good Practice Guide to Diversity in Science in 2019. This guide sets out our policies and guides researchers on forming more diverse research groups.
→ In our public calls, we extend the deadline for completing a doctorate by up to two years for applicants who are mothers.
→ We offer a maternity grant of R$10,000 to grantees who become pregnant or have children during the term of the institute's support. This grant can be used at the researcher mother's discretion. Eight grantees have already received the benefit.
→We cover the costs of breastfeeding children (up to two years old) and accompanying persons for events organized by the institute.
→ We have established a bonus mechanism for inclusion actions: researchers who receive a grant of up to R$ 700,000 can apply for extra funding to support the integration and training of people from underrepresented groups in their research teams. Please see the accompanying figure for more information on how grantees have used the diversity bonus.
→ We have made the contract term more flexible for grantees who take maternity leave and for grantees who are mothers. We also encourage that the grant payment be maintained during maternity leave and that a maternity grant be offered when possible. This payment should be made using the previously approved project funds.

Use of the diversity bonus from its implementation in 2019 until December 2022:

33
Number of grantees who have used the extra funding

R$ 9.60 million
Total amount granted so far

R$ 3.20 million
Total amount spent so far

121
Number of people hired and being trained

Career stage:

58 undergraduate
28 master's
24 doctorate
10 post-doc
1 research assistant

Gender:

81 female
38 male
1 non-binary
1 preferred not to report

Race & Ethnicity:

45 white
2 indigenous
73 brown + black
1 asian

How the resources were spent:

→ scholarships (Brazil and abroad);
→ English classes;
→ transportation allowance;
→ participation in scientific events;
→ purchase of laptops and laboratory reagents].

Open and reproducible science

Transparent, available, and reproducible data make science better and more reliable. That's why Serrapilheira has endorsed the global movement for open, reproducible, and universally accessible science since its inception. In 2019, the Institute launched the Good Practice Guide to Open and Reproducible Science.

In 2022, we continue to support two initiatives dedicated to open and reproducible science:

No-Budget Science Hack Week

The intensive one-week workshop aims to develop research projects in meta-science through the use of publicly available data. The workshop follows the no-budget philosophy, which means that participants are only required to bring a laptop and an idea. During the session, participants develop research projects and/or tools that address major issues of the modern scientific process, such as data availability, reliability, reproducibility, publication system, the distribution of resources and funding, and the training of researchers.

The fourth edition of the No-Budget Science Hack Week was supported by Serrapilheira and took place in person at the Praia Vermelha campus of the Federal University of Rio de Janeiro (UFRJ). The workshop brought together 20 participants from eight states, who discussed topics such as the use of evidence in public policies, funding for science, and academic life and culture.

2022 Grant: R$26,315.79

Participants in the 4th No-Budget Science Hack Week workshop
© Serrapilheira

Brazilian Reproducibility Initiative

Supported since 2018, the Brazilian Reproducibility Initiative (BRI) is a multicenter project for the systematic replication of experiments published by Brazilian biomedical science in the last 20 years. This period saw a significant increase in the volume of Brazilian scientific output. Brazil will be the first country to have a survey of this kind. The BRI network has more than 60 collaborating laboratories, and by 2022 more than half of the experiments will have been concluded. The project is slated for completion in 2023.

2018 Grant: $161,000
2019 Grant: R$1 million
2023 Supplement: R$ 52,631.58

DEBATE: Is pre-publication peer review good for science?

In 2022, we brought an idea to life that had been brewing for over a year. In October, at the 6th Serrapilheira Retreats, we hosted a debate on peer review between Olavo Amaral, coordinator of the Brazilian Reproducibility Initiative, and Luiz Augusto Campos, coordinator of the Diversity in Brazilian Science project. The retreat was held in person for the first time since the pandemic.

It all started in 2021, when Amaral published "The Naked Truth of Peer Review" in Serrapilheira's blog, Fundamental Science, hosted on *Folha de S.Paulo*. In the article, Amaral argued that pre-publication peer review does more harm than good to science and that we should abandon it. Luiz Augusto Campos responded with an article titled "Peer review: Bad with, worse without" in which he argued that we would be worse off without peer review. The debate turned into a relaxed conversation whose highlights can be seen in this thread on Twitter.

Professors Olavo Amaral (Leopoldo de Meis Institute of Medical Biochemistry at UFRJ and Brazilian Reproducibility Initiative) and Luiz Augusto Campos (Institute of Social and Political Studies at UERJ and Revista Dados) in a debate at the 6th Serrapilheira Retreats, in October 2022.
© Giovanna Antiório/ Serrapilheira

Serrapilheira at Five

Illustration by artist Valentina Fraiz for the text "The Naked Truth of Peer Review," by Olavo Amaral, published in the Ciência Fundamental blog in June 2021.

IN MARCH 2022, Serrapilheira celebrated its fifth anniversary. After three years of remote meetings due to the pandemic, we finally received for a memorable celebration our science and science outreach fellows and people who have been part of our history. This video captures some of the highlights of the reunion, which was held in October, in Rio de Janeiro.

Executive Director Hugo Aguilaniu, Science Director Cristina Caldas, and Science Outreach Director Natasha Felizi at the opening speech of the celebration.

© Diego Padilha/ Serrapilheira

Actor and comedian Gregorio Duvivier performed a stand-up comedy act about the reality of scientists and the political situation in Brazil at Serrapilheira's fifth anniversary celebration.

© Diego Padilha/ Serrapilheira

© Diego Padilha/ Serrapilheira

The 6th Serrapilheira Retreats

The celebration of Serrapilheira's fifth anniversary coincided with a new edition of the Serrapilheira Retreats, which were held in person for the first time in three years. The event provides grantees to network amongst themselves brought together scientists and science communicators for the first time.

The three-day meeting took place in the Santa Teresa neighborhood of Rio de Janeiro. The program included project presentations, a talk on diversity in science, a debate on peer review, discussions on funding, science policy, and advocacy for science, and many conversations about opportunities for interdisciplinary collaborations.

"It is important to bring antiracism to the center of the scientific communication debate. It is necessary to change not only the profile of those who do [science communication], but also the content that is communicated," said historian and professor of the University of Brasilia Ana Flávia Magalhães Pinto, in the lecture "Anti-racism and the viability of Brazil as a nation", during the 6th Serrapilheira Retreats.

© Diego Padilha/ Serrapilheira

At the "Scientific Policy in Brazil" panel, Soraya Smaili, from the Centro Sou Ciência, and Paulo Almeida, from the Scientific Policy Monitor at the Question of Science Institute, presented data on STEM funding in Brazil.

© Giovanna Antiório/ Serrapilheira

Presentations of supported projects. Science communicator Átila Iamarino, Carol Canegal, from the Whiteness Observatory, and Sofia Nestrovski, from the Twenty Thousand Leagues podcast.

© Giovanna Antiório/ Serrapilheira

Timeline

A lot has happened in the past five years. Here is a brief overview of our history.

© Marcos Arcoverde/ICM 2018

2014

“WE WANT MORE ‘ARTUR AVILAS’”

When Artur Avila, a researcher at IMPA (Institute of Pure and Applied Mathematics) was awarded the Fields Medal, the highest honor, often called the “Nobel,” in mathematics, he became its first Brazilian laureate. This achievement laid bare that Brazil does not have any scientific “heroes” the way it has soccer player “heroes.” This sentiment led to the idea of creating a private institute that would foster excellence in Brazilian science. The founders started visiting institutions abroad in search of existing models.

© Ricardo Borges/FolhaPress

March 2017

THE LAUNCH OF SERRAPILHEIRA

The first private institute in Brazil with its own fund to support science was launched at IMPA, in Rio de Janeiro.

© SBPC/Press

July 2017

PUBLICATION OF THE FIRST PUBLIC CALL

Serrapilheira announced its first public call for young scientists at the Annual Meeting of the Brazilian Society for the Advancement of Science (SBPC), in Belo Horizonte, Minas Gerais.

December 2017

THE FIRST GRANTEES

The institute announced the 65 young scientists who were selected in its first public call. The scientists each received around R$100,000 to support their research.

© El Tigre Estúdio/Serrapilheira

April 2018

THE FIRST SERRAPILHEIRA RETREAT

The new grantees met each other at the first Serrapilheira Retreat, an event with workshops and opportunities for mingling that would become an institute tradition.

April 2018

THE LAUNCH OF CAMP SERRAPILHEIRA

The institute inaugurated its Science Outreach Program with the publication of the first public call to map the field and select projects.

© Filipe Costa/Rastro

September 2018

CAMP SERRAPILHEIRA AT MUSEU DO AMANHÃ

The first edition Camp Serrapilheira brought together science communicators from all over Brazil at the Museu do Amanhã (Museum of Tomorrow) in Rio de Janeiro, just two days after the fire at the Museu Nacional (National Museum). The participants held an act in honor of the bicentennial institution.

December 2018

THE FIRST SCIENCE OUTREACH PROJECTS

The institute announced the 14 science outreach projects selected by the Camp Serrapilheira call for proposals. The projects covered a wide range of activities, including journalism, education, podcasting, YouTube, art, and more. Each recipient received R$100,000 to help them leverage their projects.

© El Tigre Estúdio/Serrapilheira

April 2019

THE BET ON FUNDAMENTAL RESEARCH

Serrapilheira announced the new cohort of grantees selected in the second public call. This was the first time that the institute focused on fundamental, non-applied research projects.

May 2019

THE FIRST 1-MILLION-REAL GRANTS

The institute announces the first grantees that have their support renewed. These grantees received the largest amount of funding, up to R$700,000 each. They also had the option to receive an additional R$300,000 to invest in the training and inclusion of people from underrepresented groups in science.

© Larissa Kreili/Serrapilheira

September 2019

THE SECOND EDITION OF CAMP SERRAPILHEIRA

The institute once again brought together science communicators from all over Brazil for the second edition of Camp Serrapilheira. The event included cinema, art, workshops, and even a “space yoga” session.

October 2019

NATURE CONFERENCE HELD IN RIO

The Serrapilheira Institute partnered with Nature to bring an edition of the traditional Nature Conference to Rio de Janeiro. The conference, which took place at the Copacabana Palace, brought together the world’s leading experts in the study of metabolism.

© Larissa Kreili/Serrapilheira

Dezembro 2019

OPEN SCIENCE AND DIVERSITY

In 2019, Serrapilheira consolidated two core values that permeate all its actions, open science and diversity in science, through the launch of two best practices guides on these topics.

MORE SUPPORT FOR SCIENCE OUTREACH

The institute renewed its support for seven science outreach projects and selected eight others in the second call for proposals for Camp Serrapilheira.

March 2020

THE PANDEMIC

In response to the COVID-19 pandemic, Serrapilheira created an emergency fund to support projects that contribute to tackling the virus. The funding was allocated to three science projects and three science outreach projects.

May 2020

RESULT OF THE 3RD PUBLIC CALL FOR SCIENCE

The Institute selected 23 new grantees in its third public call for science. With this new round of funding, Serrapilheira reached the milestone of having supported over 100 scientists in Brazil.

© Dirty Science/Press

June 2020

CAMP SERRAPILHEIRA FOCUSES ON PODCASTS

The third call for proposals for Camp Serrapilheira, focused on podcasts, selected eight projects. This was the first time the science outreach program took a more targeted approach by focusing on just one medium

March 2021

FOCUS ON JOURNALISM AND MEDIA

After mapping the field of science journalism and media in Brazil, the Science Outreach Program focused on professional journalism and media initiatives. It also started receiving proposals on a running basis rather than only through occasional public calls.

© Léo Eloy/Serrapilheira

March 2021

THE SCIENCE OF THE FUTURE IS TRANSDISCIPLINARY

In 2021, after years of development, Serrapilheira launched its third program: the Training Program in Quantitative Biology and Ecology (later renamed Training in Quantitative Ecology). This was the first time that the institute invested in future scientists, who are at the pre-doctoral stages of their careers.

July 2021

END OF SEED MONEY

In the fourth round of its public call for science, Serrapilheira no longer offered scientists the 100,000-real grant known as seed money. Instead, the institute started to invest in larger amounts, ranging from R$ 200,000 to R$ 700,000.

March 2022

FIVE YEARS OF INVESTMENT IN BRAZILIAN SCIENCE

Serrapilheira reached the five-year milestone of investing in Brazilian science, during which time it supported 200 science and science outreach projects, in addition to other donations amounting to over R$ 50 million for specific initiatives. The institute has also created a training program in ecology.

Serrapilheira Trivia

1 The first grantee to use funding from the Serrapilheira Institute was biologist Natan Pereira, from Bahia State University. Pereira was selected in the first public call, and he used the grant money to buy pneumatic underwater drill for extracting coral cores from the seabed. The drill cost about R$ 3,000.

The pneumatic underwater drill, first purchase made with Serrapilheira grant funds

© Personal file

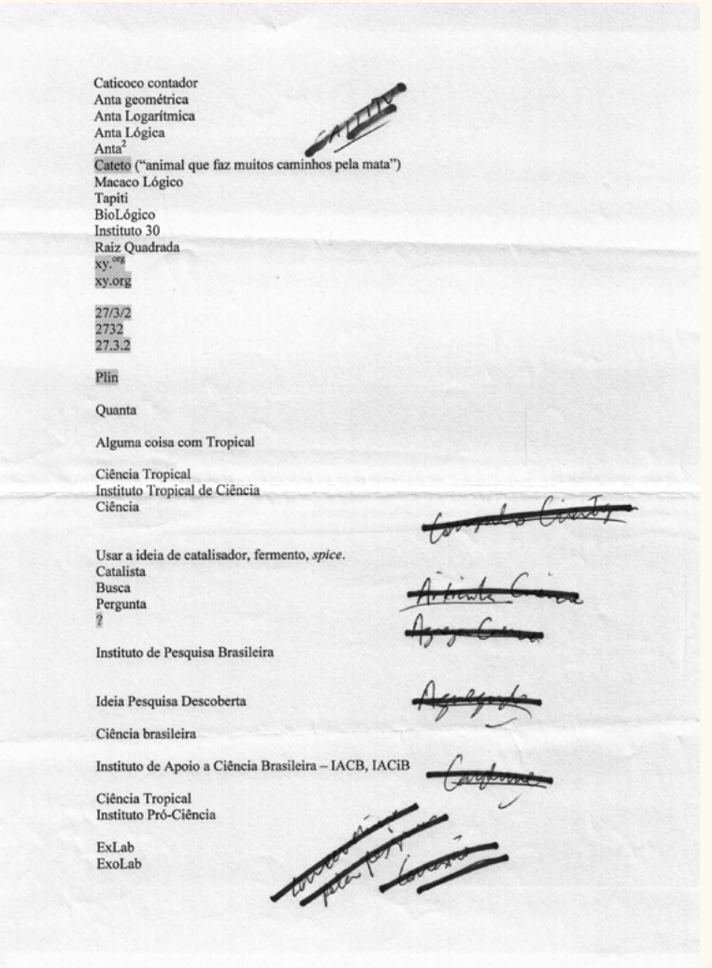
2 Serrapilheira has already left its mark at the bottom of the sea and in the Amazon. The institute went diving with biologist Guilherme Longo off the coast of Rio Grande do Norte as part of the research and science outreach project De Olhos Nos Corais (Eyes on the Corals). The institute also had its logo affixed to an open top chamber (OTC) at the AmazonFACE research site led by David Lapola.

Serrapilheira's logo on a sign of the #DeOlhosNosCorais (Eyes on the Corals) science outreach project, on a reef of Rio Grande do Norte

Our logo deep in the Amazon rainforest, at the AmazonFACE research site

© Personal file

3 The name of the institute was a matter of much discussion, with such candidates as *Laboratório Tropical* (Tropical Laboratory), *Tapiti* (Brazilian cottontail), *Anta Logarítmica* (Logarithmic Tapir) and *Xy*—this was, in fact, the first name the institute was registered as. The ideas bandied about are contained in a document called “Study of names for the institute.” Serrapilheira was the second-to-last listed, just before Periscope.



Caticoco contador
Anta geométrica
Anta Logarítmica
Anta Lógica
Anta²
Cateto (“animal que faz muitos caminhos pela mata”)
Macaco Lógico
Tapiti
BioLógico
Instituto 30
Raiz Quadrada
xy.org
xy.org

27/3/2
2732
27.3.2

Plin

Quanta

Alguma coisa com Tropical

Ciência Tropical
Instituto Tropical de Ciência
Ciência

Usar a ideia de catalisador, fermento, *spice*.
Catalista
Busca
Pergunta
?

Instituto de Pesquisa Brasileira

Ideia Pesquisa Descoberta

Ciência brasileira

Instituto de Apoio a Ciência Brasileira – IACB, IACiB

Ciência Tropical
Instituto Pró-Ciência

ExLab
ExoLab

4 The name Serrapilheira comes from the Brazilian Portuguese word for plant litter or duff, which is the layer of leaves, branches, and other uncompressed plant debris that accumulates on the forest floor. This layer is essential for the fertility of the soil, as it provides nutrients and helps to retain moisture. The institute chose this name because it wanted to “fertilize the soil” of Brazilian science, and because Serrapilheira has a pleasant sound.

Leaves, branches and other organic matter in the Serrapilheira, or plant litter

© Copy

5 Serrapilheira is funded by an endowment fund of 350 million Brazilian reals, established in 2016. The fund generates an income of about R$ 20 million per year, which is allocated to three main areas: supported science and science outreach projects, the Training Program in Quantitative Ecology and the institute’s overhead.

6 Eight of our Science grantees have become mothers during the lifetime of their grant. Each of them received a maternity grant of R$ 10,000, which they could use as they saw fit to meet their needs as researcher mothers.

Biologist Ayla Sant'Anna, researcher at the National Institute of Technology

Chemist Taicia Fill, professor at the State University of Campinas

Karín Menéndez-Delmestre, astrophysicist at the Federal University of Rio de Janeiro

7 Eleven people work at Serrapilheira. Despite our location in Rio de Janeiro, only four of the team members are Cariocas, or people from Rio de Janeiro. The other seven team members come from a variety of places, including two from Brasilia, one from Bahia, one from Minas Gerais, two from São Paulo and one from France.

Serrapilheira's team almost complete

© Larissa Kreili/ Serrapilheira

Science Advocacy

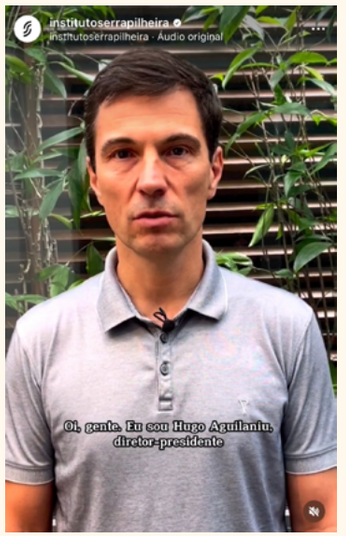
Illustration by artist Sandra Jávera for "Why Isn't There Just One Flu Vaccine?" by Gabriela Cybis, published in the Ciência Fundamental blog on March 18, 2020.

SERRAPILHEIRA is a private non-profit institution that is committed to supporting science in Brazil. The institute is non-partisan, meaning that it does not endorse specific political parties or figures. However, Serrapilheira believes that science is too important to be left to the whims of political change. That is why the institute has begun to advocate for science as an enduring policy of state, rather than a government policy that changes with each political administration.

To collaborate with this movement, Serrapilheira started to act as an advocate in some areas.

We Take a Side: Science

In 2022, Serrapilheira faced an unprecedented challenge. Although the institute is non-partisan, it could not remain neutral in the midst of a highly polarized presidential race between a candidate who demonstrated his commitment to Brazilian science and another who dismantled it during his four years in office. In this particular political context, Serrapilheira's stance was unprecedented, but firm: in the second round of the elections, the institute endorsed the candidacy of Luiz Inácio Lula da Silva.



#ScienceInElections

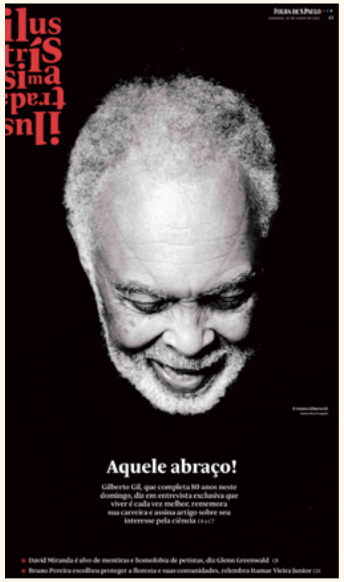
In July, we organized the #ScienceInElections communication campaign. Throughout the month, newspaper columnists and bloggers made space for publishing the reflections of scientists, opinion leaders and decision-makers on the role of science in rebuilding Brazil. Special emphasis was placed on the relationship between science and politics, as well as the many ways in which science intersects with public-interest issues like the economy, education, healthcare, the environment, culture, and more.

We used National Science Day on July 8 as a hook to designate July as "Science Month." This was a repeat of our 2020 experience, when we organized the #ScientistatWork communication campaign to reflect on the scientific process.

The #ScienceInElections campaign occupied 117 spaces in more than 20 media outlets. The campaign was kicked off by Gilberto Gil's article, "Shimmering Beyond the Dark Night" in *Folha de S.Paulo's* magazine, *Ilustríssima*. See the full list of articles here.

Cintilância para além da noite escura

Por Gilberto Gil



Article by Gilberto Gil on the cover of the *Ilustríssima* magazine of *Folha de S.Paulo*, which kicked off the "#ScienceInTheElections" column.

Article by geologist and USP professor Adriana Alves occupying Cida Bento's column in *Folha de S.Paulo*

A24 QUINTA-FEIRA, 7 DE JULHO DE 2022 FOLHA DE S.PAULO

mercado

Universidades tingidas de povo

Estudantes negros promoveram uma (r)evolução do conhecimento científico

Cida Bento

Ciência e eleições

Amanhã é o Dia Nacional da Ciência e, para comemorar, o Instituto Serrapilheira, primeiro instituto privado de apoio à ciência e à divulgação científica no Brasil, e a Maranta, agência de inteligência política para sustentabilidade, repetem uma ação exitosa acontecida em julho de 2020, quando 60 espaços na imprensa, entre eles esta coluna, abordaram a pauta do processo científico. A iniciativa foi parte da campanha #CientistaTrabalhando, que buscava explicar como a ciência funciona, tendo como contexto a pandemia de Covid-19.

Desta vez, retomam o tema, agora com a ciência no contexto das eleições, com o objetivo de mostrar que ela tem papel fundamental no desenvolvimento do país — atravessa política, economia, educação, saúde, meio ambiente e cultura — e que, por isso, deve ter lugar de destaque no debate eleitoral. Fui ouvir o físico Luiz Davidovich, ex-presidente da Academia Brasileira de Ciências, que se mostrou otimista com os progressos da ciência:

— Vivemos tempos fascinantes na ciência e na inovação tecnológica. Esta é a era de Big Data e da inteligência artificial; da biotecnologia aplicada à agricultura e à saúde humana, com as terapias gênicas permitindo tratar doenças até agora consideradas incuráveis; da carne cultivada em laboratório por meio de tecnologia de célula-tronco, reduzindo a poluição produzida pela pecuária extensiva; dos computadores quânticos; de novas fontes de energia menos poluentes, como as células de hidrogênio; da telecomunicação sem fio de alta velocidade, com o 6G, já em desenvolvimento e cem vezes mais rápido que o 5G. O conhecimento científico avança com aceleração surpreendente e com o potencial de revolucionar mais uma vez o cotidiano da humanidade.

Mas, com a presente configuração mundial, esse avanço poderá não ser para todos, alerta Davidovich:

— A disparidade dos investimentos em pesquisa e desenvolvimento aumenta a desigualdade entre os países, provocando um hiato científico e tecnológico que limita drasticamente a distribuição dos benefícios da ciência. Em 2019, os Estados Unidos investiram US$ 613 bilhões em P&D (pesquisa e desenvolvimento), ou 3,1% do PIB (US$ 1.866 per capita). Considerando a paridade do poder de compra, a China investiu no mesmo ano US$ 515 bilhões (2,2% do PIB), ou US$ 368 per capita, enquanto o Brasil investiu em 2017 US$ 38 bilhões (1,3% do PIB), ou US$ 181 per capita. Diversos países reforçam o financiamento para projetos científicos, motivados pela disputa de protagonismo entre grandes potências, pela crise de suprimentos, pela preocupação com as mudanças climáticas e com o potencial surgimento de novas pandemias provocadas pelo desmatamento, que pode liberar vírus alojados na floresta para o ambiente urbano.

Ex-presidente da Academia Brasileira de Ciências alerta sobre aumento na distância entre Brasil e países mais desenvolvidos

O ex-presidente da Academia Brasileira de Ciências alerta que aumenta a distância entre o Brasil e países mais desenvolvidos:

— Cortes abruptos no orçamento de ciência e tecnologia, acrescidos agora de bloqueio de recursos (nome cunhado para driblar proibição de contingenciamento pela legislação anterior), têm reduzido o orçamento do Ministério de Ciência, Tecnologia e Inovações que, para 2022, é o menor dos últimos dez anos. As perdas acumuladas desde 2014, incluindo as de 2022, podem chegar a R$ 100 bilhões, segundo o Observatório do Conhecimento.

Davidovich enumera:

— O investimento em educação passou de 19% do orçamento de investimentos da União em 2012 para 8% em 2022. As bolsas de pós-graduação das agências federais (CNPq e Capes) não são reajustadas desde abril de 2013, para uma inflação no período de mais de 60%. As universidades federais poderão parar em agosto, se o orçamento destas não for corrigido.

A escolaridade da população brasileira, já precária, tende assim a piorar, diz ele, ressaltando:

— Apenas 21% da população entre 25 e 64 anos concluiu o ensino superior, e o país tem menos de 900 pesquisadores por milhão de habitantes. Países da OCDE têm, em média, 4.000 pesquisadores por milhão de habitantes.

Para Davidovich, o debate eleitoral não pode ficar alheio a essas questões, fundamentais para o futuro do país:

— Por isso, espero que, nos próximos meses, candidatos e eleitores lembrem que a ciência é tão importante quanto outros temas de interesse público, como saúde, educação e segurança, tanto nos debates quanto nas urnas.

Eu também.

Physicist and UFRJ professor Luiz Davidovich occupying Merval Pereira's column, in *O Globo* newspaper

CAU GOMEZ

Entre risotos e gigantes, está a ciência básica

Daniel Martins-de-Souza

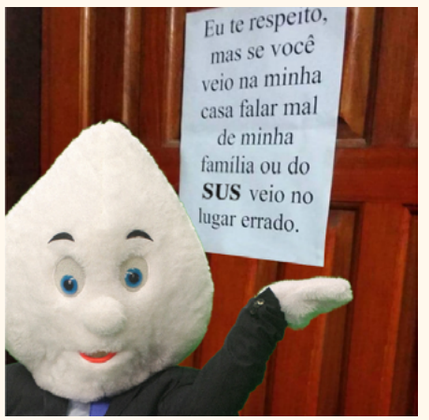
Coordenador do Laboratório de Neuroproteômica da Universidade Estadual de Campinas (Unicamp)

Biologist and UNICAMP professor Daniel Martins-de-Souza in the Bahian newspaper *A Tarde*

Droplet Joe for President

In early September we took an unusual approach to the electoral campaign by launching a satirical bid for the presidency with Droplet Joe, the iconic character who advocates for vaccination campaigns. Droplet Joe is a beloved figure in Brazilian popular culture, and he even had a campaign platform. However, his candidacy was disqualified a few days later since cuddly characters are not eligible to for run for president in Brazil.

Droplet Joe pivoted and threw his support behind candidates who valued science, public health, and SUS (the Brazilian public health system). He encouraged his voters to vote for these candidates in a humorous campaign on social media. In just under two months, the posts reached more than 30 million people and were viewed more than 90 million times on the "Droplet Joe for President" accounts on Instagram, Twitter, Facebook, and TikTok



Memes used on social networks as part of the Droplet Joe for President campaign
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Advocacy for Science

In partnership with Maranta Political Intelligence, we conducted 31 interviews with key players in the Brazilian political-scientific scene between 2021 and 2022. The goal of this research was to map the main challenges to promoting science policy in Brazil. We wanted to understand what Serrapilheira could do to help overcome these obstacles. Based on our findings, we took the first steps to support projects that seek to collect and analyze data on science funding, as well as combat misinformation.

Sleeping Giants Brazil

The project raises awareness of fraudulent narratives about science, identifies the propagators of these discourses, and exposes the financing of the disinformation industry related to science. With the support of Serrapilheira, the project conducted a study of how the platforms allow the spread of false information about scientific consensus, especially on topics such as vaccination, the recommendation of drugs proven ineffective against COVID-19, global warming, and public policies such as affirmative action quotas.

Mapping information had an impact on the regulatory processes of platforms, such as Bill 2630, and in discussions at the Ministry of Health about rebuilding our vaccination coverage. It also supported the production of content by influencers and webpages focused on defending health, the environment, democracy, and universities, helping to strengthen a network of creators that totals over 3 million followers.

Humberto Ribeiro, one of the coordinators of Sleeping Giants
© Diego Padilha/ Serrapilheira

Sleeping Giants Brazil, a movement created to demonetize misinformation on the internet, has already prevented more than R$90 million from going to the pockets of those who spread false content.
Grant: R$208,000

Centro SoU_Ciência

The Center for Studies on Society, University and Science (SoU_Ciência), part of the Pro-Rectory of Graduate Studies and Research (PPGPq) at the Federal University of São Paulo (UNIFESP) and coordinated by Soraya Smaili, is conducting research on the funding of public universities and research institutes that produce most of the science in Brazil. The project collects data on the financing of science in the country, with the goal of supporting an advocacy campaign for public universities and research institutes. Learn more and check out some of the results.
Grant: R$500,000

Professor Soraya Smaili, coordinator of Sou_Ciência

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Science Policy Monitor

What therapies should SUS offer to patients? Do genetically modified organisms represent any danger to consumers? What do funding cuts at agencies such as CNPq mean in practice? Brazil lacks organized, transparent and accessible information about public policies in the area of science, technology and innovation. There is no body that systematically monitors how public agents use scientific knowledge, either to fund its production or to base good decisions. The Science Policy Monitor, organized by the Science Question Institute and coordinated by Paulo Almeida, aims to fill this gap. The Monitor will provide data, analysis and capacity building in this area, advocating for rational and effective public policies. Read more.
Grant: R$500,000

Paulo Almeida, coordinator of the Science Policy Monitor and executive director of the Question of Science Institute

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Public Call: "The Role of Science in the Brazil of Tomorrow"

We launched a public call for science journalists and communicators to develop ambitious projects that investigate the complex relationships between science, politics, economics, culture and other themes of public interest. The projects should consider the political context of Brazil today. Learn more and see the selected projects on page 76.

New partnerships

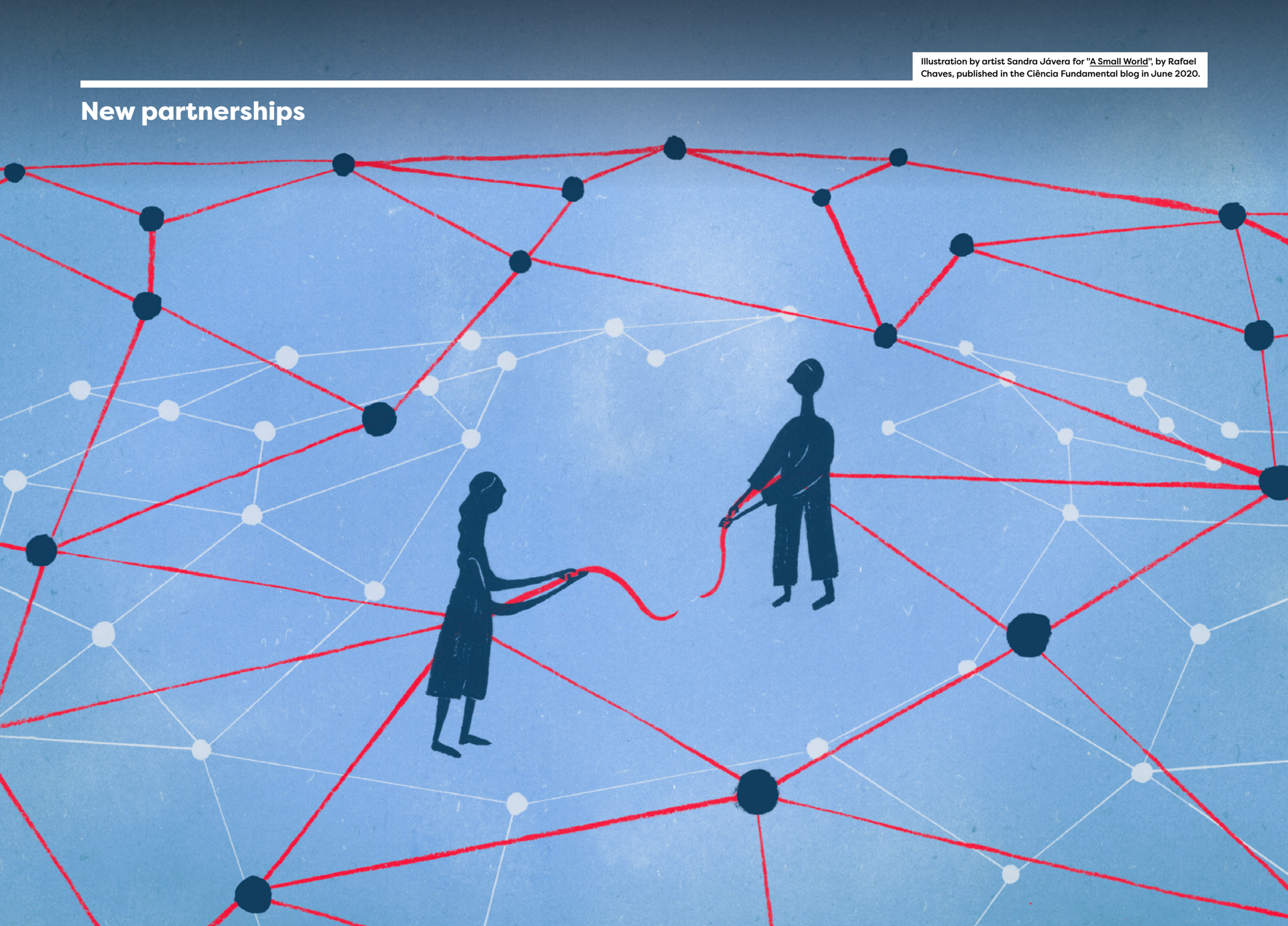

Illustration by artist Sandra Jávera for "A Small World", by Rafael Chaves, published in the Ciência Fundamental blog in June 2020.

SINCE ITS CREATION, Serrapilheira has been building partnerships with public and private institutions. In 2022, for the first time, Serrapilheira launched public calls in partnership with other organizations, furthering its mission to support the production and communication of high-quality science in Brazil.

Faperj

The Carlos Chagas Filho Foundation for Research Support of the State of Rio de Janeiro (FAPERJ) and the Serrapilheira Institute have launched a public call exclusively for Black and Indigenous ecology postdocs. The call aims to fund new lines of research in ecology formulated by Black or Indigenous postdocs who aim to obtain, in the medium term, a formal position as professor or researcher. The grantees will join research groups in the State of Rio de Janeiro with which they have no prior working relationship.

This was the first public call in Serrapilheira's Science Program aimed at postdocs. It was also the first call aimed specifically at underrepresented groups. Eight candidates will be selected and will receive up to R$800,000 each - R$700,000 from FAPERJ and R$100,000 from Serrapilheira. The finalists will be announced in September 2023.

IJC

The Jô Clemente Institute (IJC) and Serrapilheira have launched a call for proposals to support research on rare genetic diseases. The call is focused on proposals aimed at creating and/or adapting tests that could be used in neonatal screening. Finalists will be announced in June 2023.

FAP's

The Science Program's sixth public call includes a new partnership signed with the National Council of State Research Foundations (CONFAP) and the 21 research foundations (FAPs) that are signatories to the agreement. Additionally, Serrapilheira has maintained its other direct partnerships with the research foundations of São Paulo (FAPESP), Rio de Janeiro (FAPERJ), and Santa Catarina (FAPESC). The goal is to expand the support to young scientists in the states.

Serrapilheira and FAPs can partner in two ways. The first is by co-financing: Serrapilheira and FAPs can jointly support scientists selected by the public call. The second is by unilateral financing: FAPs can provide support to scientists from their respective states who reach the final stage in Serrapilheira's selection process but who do not make the cut for funding due to budget limitations.

ICFJ

Serrapilheira's Science Outreach Program has partnered with the International Center for Journalists (ICFJ) as part of the Disarming Disinformation program. The partnership aims to support collaborative reporting—conducted by Brazilian journalists, communicators and/or researchers—aimed at investigating those who finance disinformation in science. Five journalists were selected through the public call to participate in an Investigathon in Austin, Texas, in April 2023. Three of the five proposals for collaborative investigations will receive up to USD 10,000 to execute and publish their reports, which must be concluded by June 30, 2023.

Science Program

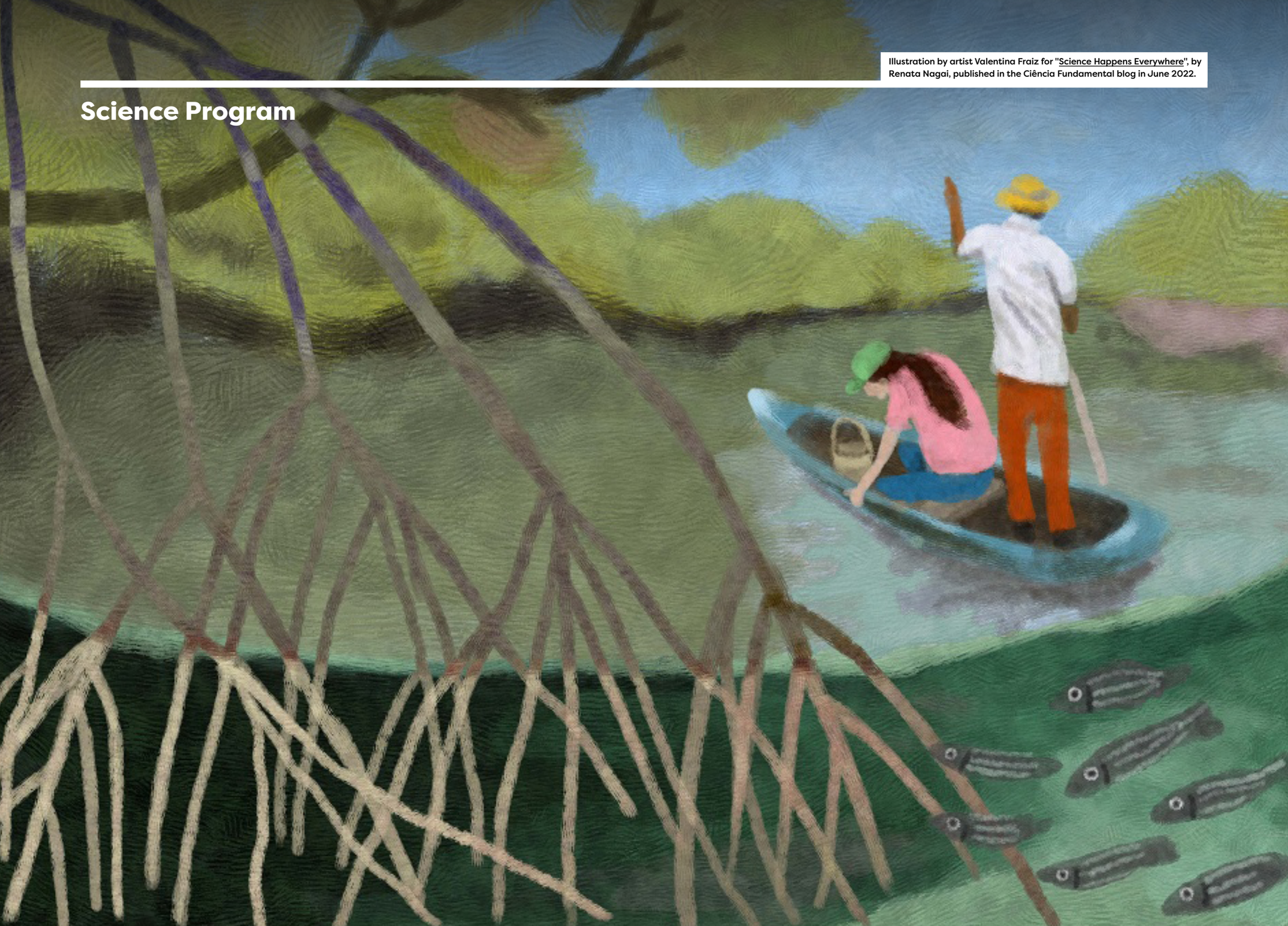

Illustration by artist Valentina Fraiz for "Science Happens Everywhere", by Renata Nagai, published in the Ciência Fundamental blog in June 2022.

New scientists, new questions

In June, we announced the new group of 10 scientists selected by the Science Program's 5th public call. The researchers, who ask fundamental questions in the natural sciences, computer science, and mathematics (or at the frontiers between these areas), receive a grant ranging from R$200,000 to R$700,000, depending on the needs of each project, to be used over three years.

They also have access to extra, optional resources—from 10% to 30% of the grant amount—to invest exclusively in integrating and training people from underrepresented groups in science in their teams.

Meet the 10 new grantees:

ANA CATARINA CONTE JAKOVAC, Federal University of Santa Catarina (SC)
Conte Jakovac will investigate whether cattle ranching, agriculture, and extractivism lead to the regeneration of forests with adaptations to drier environments, potentially mischaracterizing the Amazon and the Atlantic Forest as humid forests.
Grant: $700,000


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EDROALDO LUMMERTZ DA ROCHA, Federal University of Santa Catarina (SC)
Lummertz da Rocha will investigate how the presence of breast cancer tumor cells that spread to the bone marrow is indicative of the development of metastases in multiple organs and resistance to chemotherapy.
Grant: R$ 389,180.00


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EUGENIO HOTTZ, Federal University of Juiz de Fora (MG)
Hottz will study the relationship between platelets and the regulation of the immune system and inflammation in situations where there are clotting disorders, such as in dengue and Covid-19.
Grant: $700,000


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FABIO SANTOS, Federal University of Rio de Janeiro (RJ)
Santos will study the quantum computers' advantage for numerical simulations. He will be developing a quantum algorithm capable of solving large-scale systems in fluid mechanics.
Grant: R$ 676,620.00


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JAQUELINE GOES DE JESUS, Bahia School of Medicine and Public Health (BA)
Goes de Jesus will be conducting combined genomic surveillance of mosquito-borne arboviruses between Angola and Brazil. The goal of this research is to understand how viruses, such as dengue and zika, as well as yet-unknown viruses circulate between countries and trigger pandemics.
Grant: R$ 696,496.89


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JOSE EDSON SAMPAIO, Federal University of Ceará (CE)
Sampaio plans to create a new theory of algebraic topology that will help to solve fundamental problems in singularity theory, such as Zariski's multiplicity conjecture.
Grant: R$ 569,535.32


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JULIANE ISHIDA, Federal University of Minas Gerais (MG)
Ishida will study RNA molecules that move between plants of different species, which are known as “invasive” RNAs.
Grant: $700,000


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MARIA CAROLINA GONZALEZ, Edmond and Lily Safra International Neurosciences Institute (RN)
Gonzalez is interested in how the brain stores and recalls memories, and how new memories are formed in relation to existing memories.
Grant: $700,000


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RODRIGO RAMOS, D’Or Institute for Teaching and Research (SP)
Ramos will investigate how resident macrophages contribute to the development of colorectal cancer, using cutting-edge methods such as transcriptomics and proteomics to analyze samples from patients undergoing treatment.
Grant: $700,000


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VANESSA STAGGEMEIER, Federal University of Rio Grande do Norte (RN)
Staggemeier will study the factors that have contributed to the high diversity of plant species in the Atlantic Forest. She will focus on the *Myrtaceae* family, whose best-known species are pitangas, araçás and jabuticabas to investigate whether environmental factors, such as climate and soil, or interactions with fruit-eating animals are more important in the high diversity of this family.
Grant: R$ 399,168.00


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Other projects added to the Science Program on a discretionary basis:

Windows to the Biodiversity of the Lower Amazon (JABBA): contributions of past sambaquis to environmental preservation in the Amazonian present

Archeologist Gabriela Prestes Carneiro, from the Federal University of Western Pará (PA), will study the *sambaquis* of the Amazon, which are mounds of shells and earth that were built over thousands of years of human occupation. They are like “onions” in that each layer that is analyzed reveals part of the history of the peoples who occupied the Amazon floodplains and riverbanks.
Grant: $700,000


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Brazilian Platform for Biodiversity and Ecosystem Services (BPBES)

The Brazilian Platform on Biodiversity and Ecosystem Services (BPBES) is an initiative that aims to put the conservation and sustainable use of biodiversity and ecosystem services at the heart of Brazil’s development model. Led by biologist and Unicamp emeritus professor Carlos Joly, the BPBES’s mission is to produce syntheses of the best knowledge available from academic science and traditional knowledge on these topics, and their relationship with human well-being.
Grant: R$444,000


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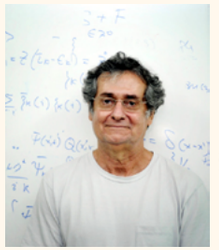
New Frontiers in Physics

The New Frontiers in Physics program at the International Institute of Physics in Rio Grande do Norte aims to help young people develop their scientific talents in physics. The program offers mini courses in cutting-edge physics topics, as well as mentorship and career advice. It is coordinated by Alvaro Ferraz Filho, a full professor at UFRN's Department of Theoretical and Experimental Physics.

Grant: R$11,000



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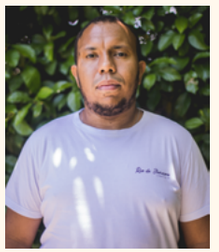
Some highlights from 2022

MYCHAEL LOURENÇO, UFRJ, Rio de Janeiro
How does the production of new proteins contribute to brain function?

Neuroscientist Mychael Lourenço studies how the production of new proteins in astrocytes and microglia contributes to brain function. These two cell types are increasingly implicated in complex brain functions, such as memory formation and mood regulation. Lourenço wants to understand whether disruptions to protein synthesis in these cells can lead to neurodegenerative conditions such as dementia and Alzheimer's.

In December, Lourenço was the only Brazilian listed by Nature Medicine magazine as one of 11 young researchers to keep an eye on this year. The publication highlights promising scientists who are breaking new ground in their respective fields. In August 2022, he also won the Blas Frangione Early Career Achievement Award, which recognizes young scientists who have the potential to impact Alzheimer's and dementia research.

Grant: $700,000



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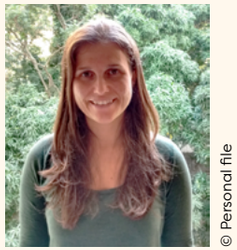
CECILIA SILIANSKY DE ANDREAZZI,
Fiocruz, Rio de Janeiro
Ecology of Disease Meta-Communities: Moving from dilutive effect to dilutive landscapes

Biologist and researcher at Fiocruz, Cecilia Andreazzi studies the ecological and evolutionary mechanisms that regulate the dynamics of parasite-host relationships. She is particularly interested in how these mechanisms are affected by changes in the landscape. In her first year of research, Andreazzi and her team developed a model that showed how forest loss can lead to an increase in the number of potential parasites, even in communities with fewer hosts. This is because forest loss can disrupt the natural balance between parasites and hosts, making it easier for parasites to find new hosts. Andreazzi's research has important implications for understanding the impact of habitat loss on parasite-host dynamics, and for developing strategies to mitigate the effects of forest loss on parasite-borne diseases.

Serrapilheira renewed its support for the project in 2022. Andreazzi now intends to apply statistical and machine learning tools to empirical data to understand how land use, environmental covariates, species characteristics, and phylogenetic relatedness determine the likelihood of pairwise interactions. In July, her group published a study in Science Advances that showed that deforestation, contact with wild animals, and poor health care increase the risk of outbreaks of zoonoses - diseases transmitted from animals to humans.



© Personal file

Grant:
1st phase: R$ 100,000
2nd phase: R$ 1 million (R$ 700,000 +
R$ 300,000 optional diversity bonus)

ELISA FERREIRA, USP, São Paulo and Kavli Institute for the Physics and Mathematics of the Universe, Japan
Ultrafast Dark Matter: The light, fuzzy side of the universe

© Personal file

Cosmologist Elisa Ferreira studies dark matter, a mysterious substance that makes up 96% of the universe and cannot be detected by light. To do so, she examines a specific behavior of ultralight particles that can give us clues about the properties of this matter – particle-wave duality.

Such cutting-edge research requires international collaboration. She is a member of global initiatives such as the Prime Focus Spectrograph and the BINGO telescope and is affiliated with two research institutions simultaneously: the University of São Paulo in Brazil and the Kavli Institute for the Physics and Mathematics of the Universe in Japan.
Grant: $539,300

The risk is welcome, but what risk is it?

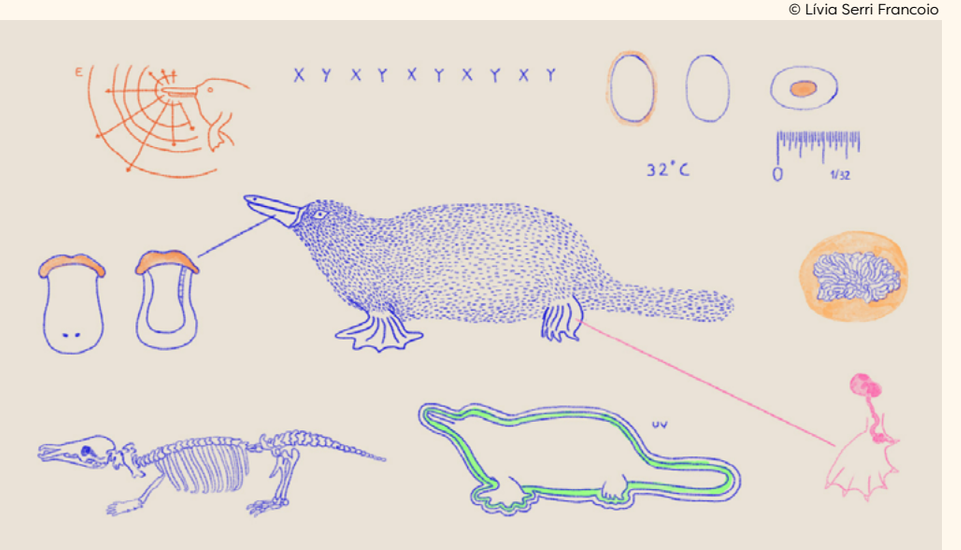
The Science Program has a long history of supporting risky projects. As of the fifth call in 2021, we ask applicants to explain the risks of their proposals. In the sixth call, in 2022, we went a step further and laid out what risk meant to us, and asked applicants to identify It in their projects in three ways:

- → Design: the risk that the project's hypothesis or conjecture is incorrect
- → Approach: the risk that the chosen method for testing the hypothesis or proving the conjecture is not effective
- → Technical: the risk that the data required cannot be obtained.

We encourage risky proposals in the first two categories, that is, bold hypotheses and approaches. Technical risk, when present, should be mitigated by anticipating methodological challenges and presenting alternatives.

The institute developed a risk assessment framework to identify scientifically riskier proposals. This was done to avoid funding "more of the same." Science Director Cristina Caldas and Science Manager Kleber Neves wrote about the process of developing the risk assessment framework in terms of institutional maturity and what lessons led them to define the concept of risk. Check it out here.

© Lívia Serri Francoio



A new class of scientists is coming

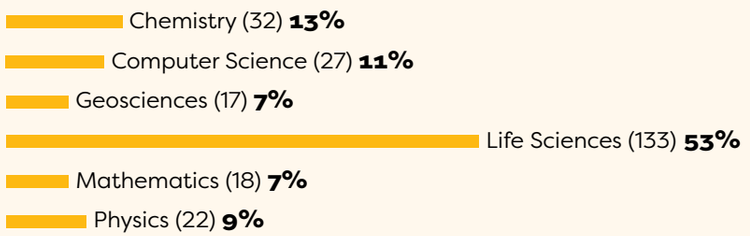
In November, we closed the application window for the sixth public call, which will award new scientists with grants ranging from R$200,000 to R$700,000. We received 249 pre-proposals from 22 states and the Federal District. The diversity of candidates in terms of area of science and racial and ethnic background can be seen in the chart below. See below some data about the candidates, such as the distribution by area of science.

6TH PUBLIC CALL FOR THE SCIENCE PROGRAM

Total pre-proposals received: **249**

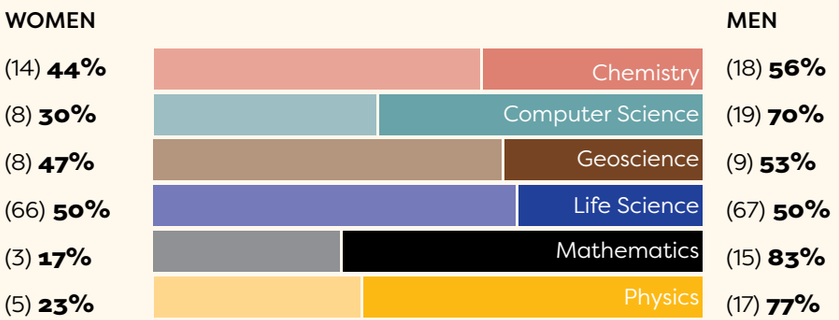
AREA OF KNOWLEDGE

of pre-proposals received (%)



GENDER AND AREA of applicants

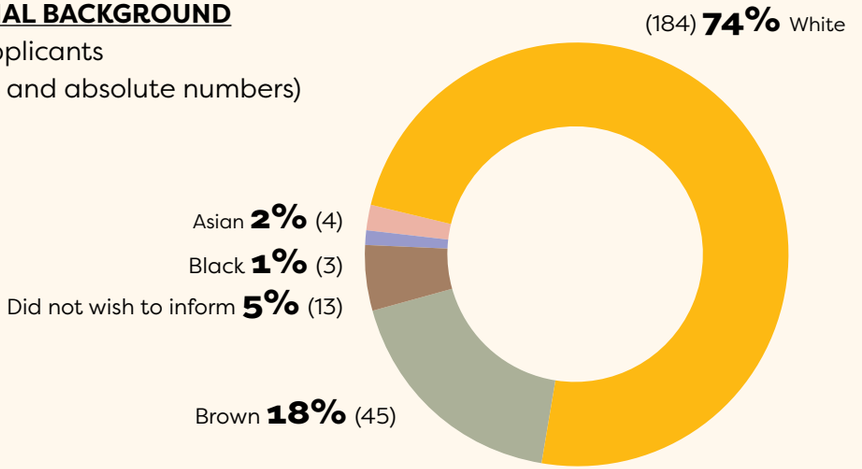
(in % and absolute numbers)



RACIAL BACKGROUND

of applicants

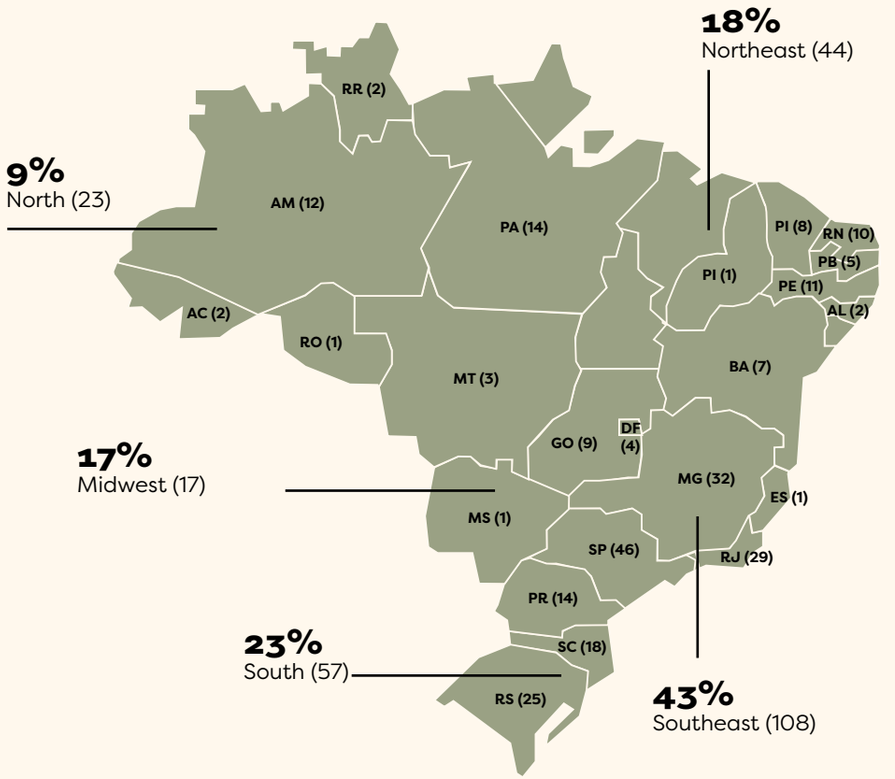
(in % and absolute numbers)



PRE-PROPOSALS RECEIVED

by region (%) and states (absolute numbers)

out of 22 states and the Federal District



Serrapilheira Network Project

In October, at the Sixth Serrapilheira Retreats, the institute announced a new funding opportunity for collaborations between our Science Grantees. It is a new call for proposals aimed at leveraging the Science Program's regular call by planting seeds of multidisciplinary collaboration to advance mobility, especially among those working toward a degree, between research groups.

The 1st internal Serrapilheira Network call selected five interdisciplinary projects proposed by partnerships between grantees. Each project will receive R$ 30,000. The grants are not intended to fund the execution of the project itself, but rather to spark collaborations that can seek funding from other sources to develop the projects.

The Universality of Ecological Interactions
AREAS: Life Sciences & Physics
PROPONENTS: Raul Costa Pereira (UNICAMP), Thiago Fleury (International Institute of Physics - UFRN).

Data-driven biogeochemical dynamics
AREAS: Computer Science & Geosciences
PROPONENTS: Fabio Pereira dos Santos (UFRJ), Fabrício de Andrade Caxito (UFMG)

The Transferability of UNICAMP's AI-generated and aerial image mosquito infestation risk mapping to other regions
AREAS: Life Sciences & Computer Science
PROPONENTS: Jaqueline Goes de Jesus (Bahiana School of Medicine and Public Health), Jefersson Alex dos Santos (UFMG)

Development of a biosensor to predict cytokine release syndrome in cancer patients treated by CAR-T cells
AREAS: Life Sciences & Chemistry
PROPONENTS: Rodrigo Nalio Ramos (D'Or Institute for Research and Teaching), Daniel Grasseschi (UFRJ)

Understanding the impact of human and climatic-driven factors on the evolution of Amazonian landscapes
AREAS: ecology, archaeology & geosciences
PROPONENTS: Danilo Neves (UFMG), Gabriela Prestes-Carneiro (UFOPA), Vinicius Ribau Mendes (UNIFESP).

Tracking the grantees

After the progress of vaccination and the dwindling of the pandemic, Serrapilheira's Science Program resumed its follow-up visits to grantees in 2022. In November, Science Director, Cristina Caldas, and the Science Managers Kleber Neves and Michel Chagas visited Salvador, Bahia, to learn more about the projects of Dirk Erhard, at the Mathematics Institute of the Federal University of Bahia (UFBA), and Jaqueline Goes, of the Bahia School of Medicine and Public Health.

They also visited the Mancala and Steve Biko institutes, which have projects to promote diversity in science supported by Serrapilheira.

In August, the team also hosted neuroscientist and Oxford University researcher Ana Domingos, a reviewer of our Science Program calls. The meeting was an opportunity for Domingos to share her insights on the neuroscience field and for grantees to ask her questions and get advice. The grantees who participated in the meeting were Mychael Lourenço, Bruss Lima, Bruno Mota from the Federal University of Rio de Janeiro (UFRJ) and Carolina Gonzalez from the Santos Dumont Institute.

From left to right: Kleber Neves, Dirk Erhard, Cristina Caldas, Manuela da Silva Souza—a professor who coordinates a program to support undergraduate research projects in mathematics for Black people—and Michel Chagas.

The Serrapilheira Science team visited grantee Jaqueline Goes and her team and learned about the first acquisitions they made with grant funding: portable equipment for genome sequencing.

With Rosani Matoso, Igor Dantas Miranda and Leonardo Souza, from the Mancala Institute.

The Science team with students from Oguntec, a project of the Steve Biko Institute supported by Serrapilheira, which promotes a preparatory course aimed at enhancing Black people's access to academia, namely in science and technology.

Science Outreach Program

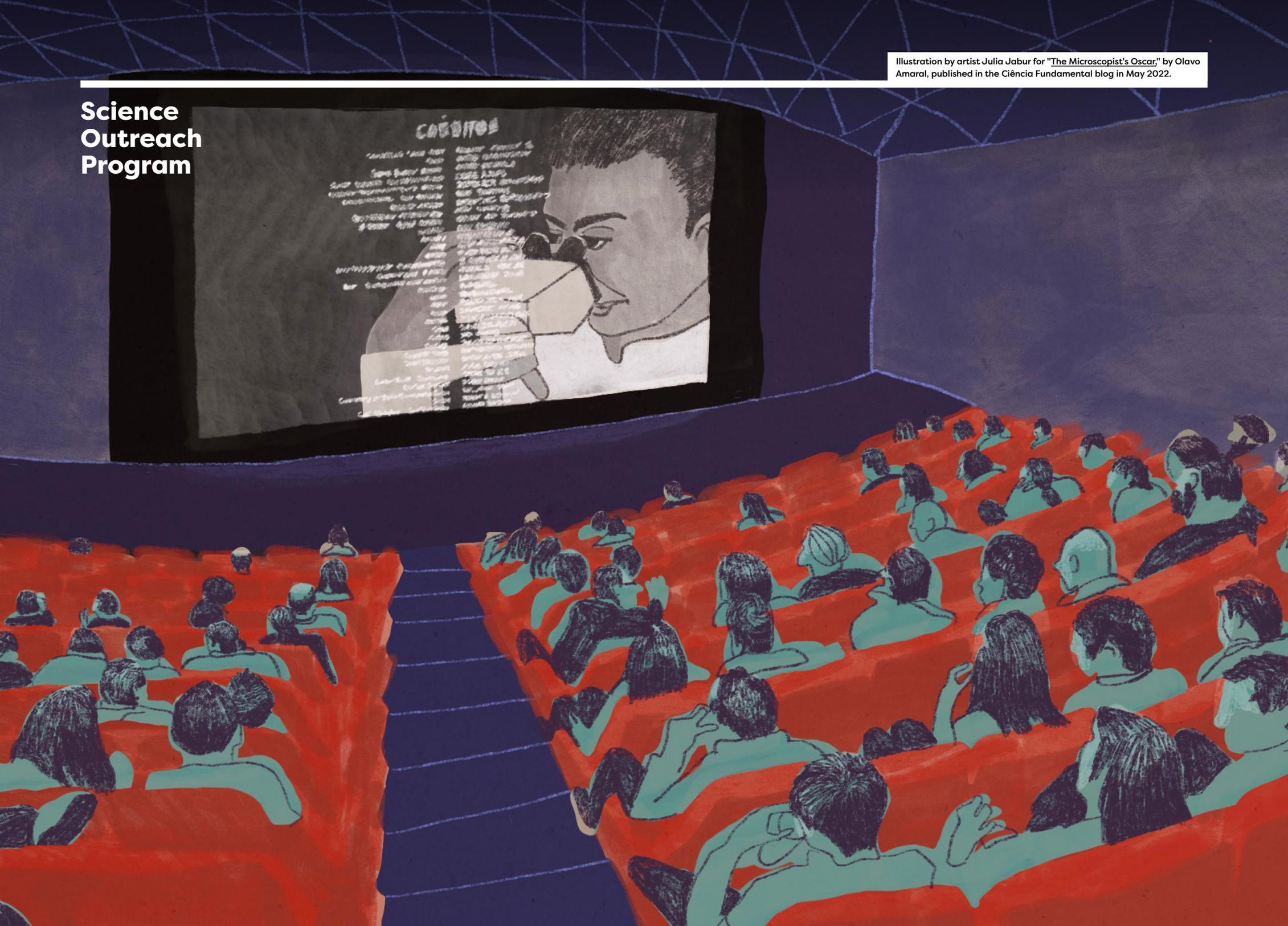


Illustration by artist Julia Jabur for "The Microscopist's Oscar," by Olavo Amaral, published in the Ciência Fundamental blog in May 2022.

The Role of Science in the Brazil of Tomorrow

2022 was a year marked by the politically polarized elections in Brazil. This polarization also influenced the work of the Serrapilheira Science Outreach Program (learn about other actions of Serrapilheira in the "Science Advocacy" section on page 46).

In May, the Science Outreach Program launched a public call titled "The Role of Science in the Brazil of Tomorrow." The call was aimed at journalists and communicators who submitted daring projects that would investigate and report on the complex relationships between science and politics, economy, culture, and other topics of public interest, considering the political context Brazil was going through at the time.

Ten proposals were selected and each received R$50,000.

Check out the proposals (you can also see all the supported science outreach projects here):

Abortion and Maternal Mortality: Science as an ally to save lives

OUTLET: Gênero e Número

The report, published in the magazine *Gênero e Número* and in *Salud con Lupa* (produced in Peru), investigates how science can help by taking a technical approach to abortion as a public health issue and move the discussion beyond the political and moral debates surrounding abortion that often obscure information and availability of legal abortion services. Read here.

Journalists Mariana Tozzi and Soledad Dominguez, reporters for *Gênero e Número*

© Diego Padilha/ Serrapilheira

Science for a sustainable future in the Amazon

OUTLET: Mongabay

A new series of multimedia reports shows the environmental and economic benefits of agroforestry techniques, renewable energy, and new monitoring technologies for the Amazon rainforest. Read the first and second reports.

Journalist Ignacio Amigo, in charge of publishing the project on Mongabay

© Personal file

Amazon Scientists

OUTLET: Amazônia Real

How has science in the Amazon region been affected by the Bolsonaro government? Scientists and researchers tell how their research has been hampered over the last four years.

Kátia Brasil, co-founder and executive editor of the independent investigative journalism agency Amazônia Real

© Diego Padilha/ Serrapilheira

Helipa in Science

OUTLET: Rádio Comunitária Heliópolis

A new six-episode podcast-vídeocast series promotes the connection between the scientific community and São Paulo's largest slum. The show explores a variety of topics such as disasters and climate change, the timeframes of science and society, health and well-being, human and social sciences, technology and innovation, genetics, and molecular biology. Learn more.

João Victor, resident of Heliópolis and producer of the videocast project

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Science Drift

OUTLET: Congresso em Foco

A new series of reports shows how the dismantling of science, by government action and inaction, has contributed not only to the worsening of the COVID-19 pandemic, but to several other losses for Brazil. Read here.

Journalist Rudolfo Lago, coordinator of the series Science Adrift, from Congresso em Foco

© Zuleika de Souza/CB

No Knowledge Left Behind: The dangers of single epistemologies

OUTLET: Whiteness Observatory + Alma Preta (Black Soul)

The first audiovisual film produced by the Observatory of Whiteness and Alma Preta (Black Soul) questions racial inequality in the hierarchy of knowledge. The film, "No Knowledge Left Behind: The dangers of single epistemologies," features Cida Bento and Daniel Munduruku and brings up the role of science in Brazil and its scope. Watch it here.

Thales Vieira, executive coordinator of the Whiteness Observatory

© Personal file

Science of hunger

OUTLET: Rádio Tertúlia + Rádio Brasil Atual

This podcast series discusses the role of science in the complex national scenario of fighting hunger, covering topics such as food insecurity, undernourishment, sustainable food, agricultural model, and access to food. Read more.

Ten Years Later

OUTLET: Sumaúma Institute

A new podcast series features interviews to examine the impact of ten years of Act 12.711/12 (Quotas Act) which reserves spots for historically excluded groups in federal educational institutions. Listen to the episodes.

#SoudeHumanas

OUTLET: Marco Zero Conteúdo

The multimedia report "Sou de Humanas" uses humor to show the importance of the humanities in cutting-edge projects in Brazil. Read more.

Yes, We Have Psychedelic Science

OUTLET: Carta Capital

A series of reports tells the surprising and controversial history of psychedelic science in Brazil, from the first studies on LSD and magic mushrooms at the Hospital das Clínicas in São Paulo, in the 1950s, to the current research landscape. Read the first report.

Juliana Cézar Nunes, one of the people in charge of The Science of Hunger podcast

© Diego Padilha/Serrapilheira

Taís Oliveira, host of the podcast Ten Years Later

© Diego Padilha/Serrapilheira

Mariana Filgueiras, coordinator of the #SouDeHumanas (#IAmAHumanitiesPerson) multimedia report

© Diego Padilha/Serrapilheira

Reporter Carlos Minuano, who investigates the history of psychedelic science in Brazil

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Other supported projects

Evidence in debate

ORGANIZATION: Lagom Data

A project produced by data intelligence studio Lagom Data analyzed the scientific evidence brought up in the political debate during Brazil's Pandemic CPI (Congressional Inquiry). The project identified mentions of studies in the transcripts of the CPI sessions and classified them to understand how and what scientific evidence was used in the proceedings. The final report, distributed by Agência Bori, also a Serrapilheira grantee, showed that biased studies, with methodological flaws and so-called pseudoscience, were more prominent and used to divert attention from quality scientific research during the congressional inquiry.

See the final report here.

Grant: R$47,500.00

Data journalist Marcelo Soares, responsible for the Evidências em Debate report

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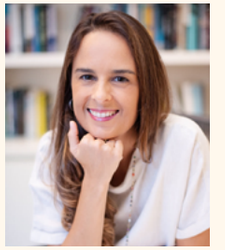
When justice ignores science

ORGANIZATION: Jota

A special series of reports from Jota examines the misuse of scientific expertise in a justice system that is not based on evidence. The project is coordinated by Rachel Herdy, a professor and researcher at the Adolfo Ibáñez University Law School in Chile, who has been studying and publishing works on expertise, science and courts since 2012.

Read the first and second reports.

Grant: R$49,788.00



Professor and researcher Rachel Herdy, who investigates expertise, science, and courts

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Impact Evaluation

In 2022, Serrapilheira initiated an impact evaluation of the Science Outreach Program to map and understand the results of its support to science communicators. The goal is to use the findings to design future actions.

Beyond the numbers, we are doing a qualitative analysis of conversations with the grantees of the Science Outreach Program and their audiences.

Training Program in Quantitative Ecology

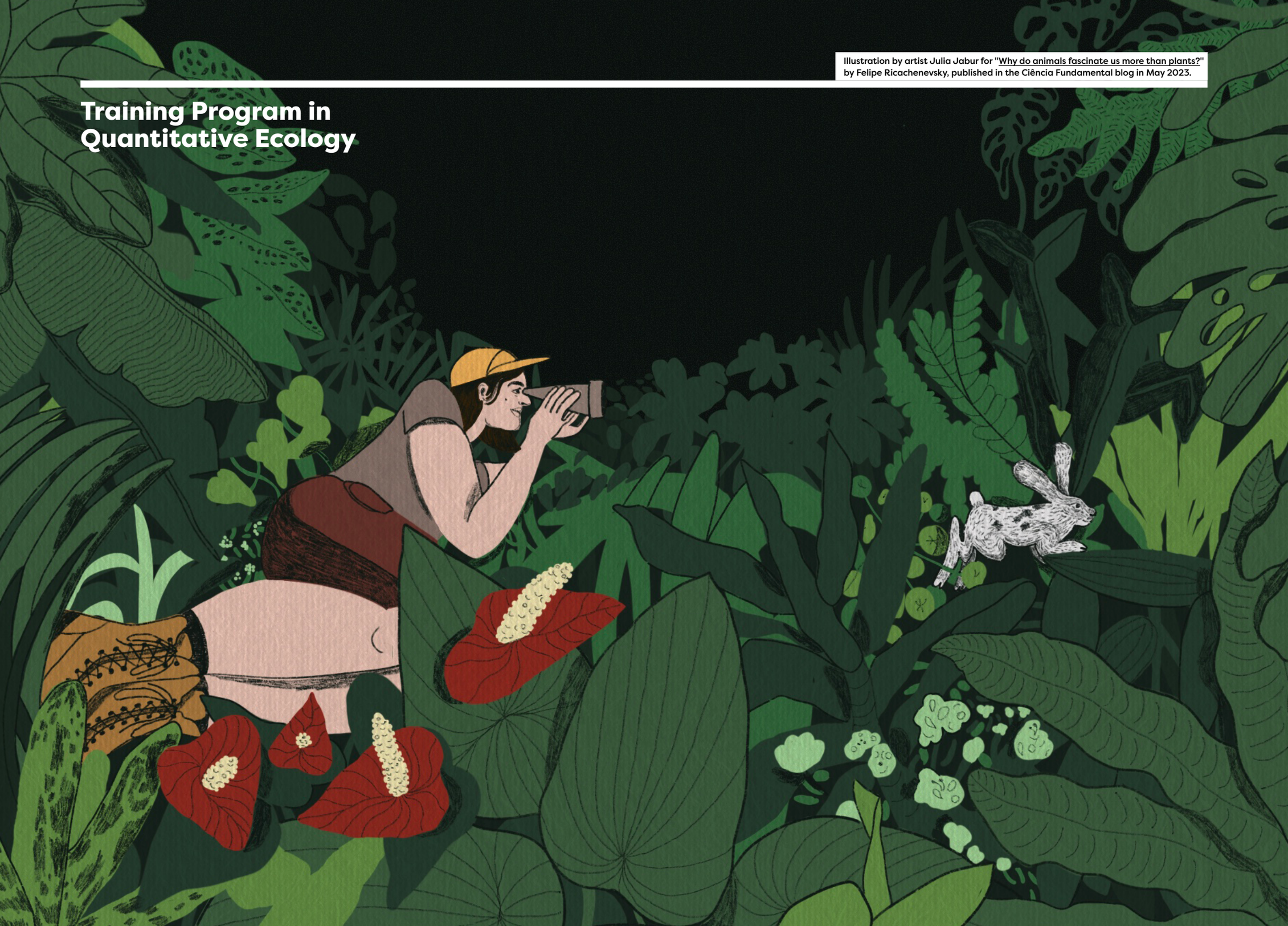


Illustration by artist Julia Jabur for "Why do animals fascinate us more than plants?" by Felipe Ricachenevsky, published in the Ciência Fundamental blog in May 2023.

The 2nd Edition

After a pilot premiere in remote format during the pandemic, in 2022, the Training Program in Quantitative Biology and Ecology (now the Training in Quantitative Ecology) the five-month course was held in person at the South American Institute for Fundamental Research (ICTP-SAIFR), a partner in the first editions of the program, at the Institute of Theoretical Physics at UNESP, in São Paulo.

The goal of the program is to empower students from any academic field to formulate and answer big questions in ecology. The program will help students develop cutting-edge thinking in the field. The idea is to groom future researchers interested in entering competitive PhD programs.

The 2nd edition included two modules: an introductory and an advanced module. The introductory module was attended by 31 students from Brazil and other Latin American countries. Of these, 25 students went on to the advanced module. All participants received a monthly stipend to cover food and transportation expenses. Participants from outside São Paulo also received accommodation and had their travel expenses covered.

The students had the opportunity to be a part of lectures, seminars, and various interactions with 43 professors from 30 research institutions in Brazil and abroad.

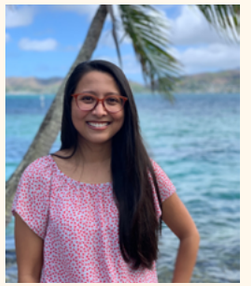
The class of 2022, made up of 31 future scientists, took the in-person course divided into an introductory and an advanced module that lasted five months at the ICTP-SAIFR headquarters, in São Paulo

The 3rd Edition

Also in 2022, we opened the application window for the third edition of the redesigned Training Program in Quantitative Ecology. The first stage of the course took place in January and February 2023, again at the ICTP-SAIFR headquarters, with 30 participants. Inspired by a summer course, the two-month duration and format was designed to better fit the students' schedules, avoiding an interruption to their undergraduate or master's programs.

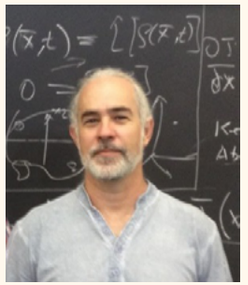
In January and February 2023 30 students participated in the Training Program in Quantitative Ecology, this time in a summer course format, at the ICTP-SAIFR headquarters in São Paulo.

The second stage of the course—a field trip to the Atlantic Forest and the Amazon—is scheduled to take place in July 2023. The field trip will be limited to 16 participants. Meet the Instructors of the 3rd Edition:



LISA C. MCMANUS
University of Hawai'i, Mānoa, USA

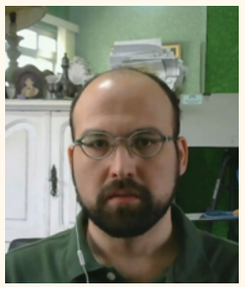
ROBERTO A. KRAENKEL
Institute of Theoretical Physics, UNESP, Brazil



PAULO INÁCIO K. L. PRADO
University of São Paulo, Brazil

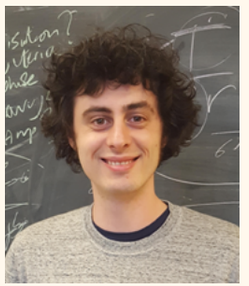
DIOGO MELO
Princeton University, USA

PAULA LEMOS-COSTA
University of Chicago, USA



RENATO M. COUTINHO
Federal University of ABC, Brazil

JOSHUA WEITZ
Georgia Institute of Technology, USA



STEPHEN BECKETT
Georgia Institute of Technology, USA

ANDREA SÁNCHEZ-TAPIA
Federal University of ABC, Brazil

JACOPO MARCHI
Georgia Institute of Technology, USA

PRIYANGA AMARASEKARE
University of California, Los Angeles, USA

KAREN C. ABBOTT
Case Western Reserve University, USA

VITOR VASCONCELOS
University of Amsterdam, The Netherlands

Why we created a training program in ecology

The Training Program in Quantitative Ecology was created because we believe that it is fundamental for Brazil to develop tropical ecology as a strategic focus. Brazil has leadership potential in fighting the climate crisis and the devastation of biomes and can become a global hub for climate and biodiversity scientists.

This is because Brazil is home to the largest natural laboratories on the planet, its ecosystems. The Amazon, Cerrado, Atlantic Forest, Pantanal, Caatinga, Pampa, and even the oceans are extremely rich and diverse. These are natural incubators for the green economy and have the potential to generate a wealth that can improve the lives of the Brazilian people.

Tropical ecology is a rapidly growing field that requires a transdisciplinary approach. As a result, being on the cusp of this field requires that ecologists be able to work across disciplines, thus they need training of excellence to insert themselves into an international network of scientists in the future.

Institutional Affairs

Illustration by artist Valentina Fraiz for "Peer Review: Bad with, worse without," by Luiz Augusto Campos, published in the Ciência Fundamental blog in June 2021.

Fundamental Science: What do young scientists think?

The blog Ciência Fundamental, produced by Serrapilheira and published in the *Folha de S.Paulo*, has been published for three years. It has become a space to spotlight early-career scientists in Brazil, who are the main authors of the content. With the support of the Serrapilheira communication team throughout the process, from setting agendas to editing, the young scientists put their writing skills to the test and write for an adult and educated, albeit not specialized, audience.

In Ciência Fundamental, young scientists use a layman's tone to write about complex issues in their research fields. They also reflect on subjects related to science, such as diversity in science or the scientific method. All texts are accompanied by original illustrations, and they also occasionally appear in the printed version of *Folha de S.Paulo*. By the end of 2022, the blog had published more than 170 texts.

2 DOMINGO, 11 DE SETEMBRO DE 2022 — FOLHA DE S.PAULO

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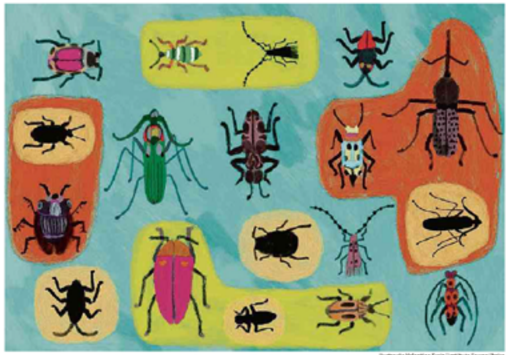


Cientistas correm para tentar monitorar a biodiversidade

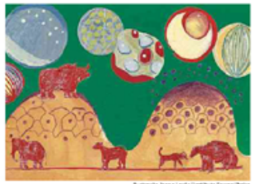
Objetivo é estabelecer um observatório para verificar a saúde do mundo

CIÊNCIA FUNDAMENTAL
Sofia Moutinho

“Ou a gente faz isso [o monitoramento da biodiversidade] ou vamos para o brejo”
Ana Carnaval
bióloga brasileira na Universidade da Cidade de Nova York

A evolução deixa humanos cada vez mais propensos ao câncer

Rossana Soletti



Full page in *Folha de S.Paulo* with texts by Sofia Moutinho and Rossana Soletti, published in the *Ciência Fundamental blog*

4 SEGUNDA-FEIRA, 9 DE MAIO DE 2022 FOLHA DE S.PAULO

folhamais

Nova área faz leitura quântica do mundo vivo

Fenômenos que acontecem no micromundo descrito pela física valem também para a biologia, defendem cientistas

CIÊNCIA FUNDAMENTAL

Clarice Cudischevitch
Jornalista, coordenadora do blog Ciência Fundamental e gestora de Comunicação no Instituto Serrapilheira

É comum a física quântica ser descrita como contraintuitiva. E não é para menos: afinal, uma teoria que fala de átomos que atravessam "paredes" como fantasmas, partículas distantes entre si que parecem se comunicar por telepatia, e elementos que existem em mais de um lugar ao mesmo tempo, indo de encontro às leis da física clássica que conhecemos, soa no mínimo estranha.

Boa parte dos cientistas considera, contudo, que suas esquisitices se restringem ao mundo microscópico —aquele dos átomos, elétrons e prótons—, mas que elas não afetariam o mundo visível das coisas grandes e vivas. Não é o que diz, entretanto, uma área relativamente nova na ciência: a biologia quântica.

Aqui cabe uma ressalva: quando falamos de átomos atravessando "paredes" (mais precisamente, o fenômeno conhecido como efeito túnel), partículas que se comunicam por "telepatia" (emaranhamento quântico) e objetos capazes de desempenhar mais de um estado ao mesmo tempo (superposição), isso nada tem a ver com fenômenos sobrenaturais.

De fato, o termo "quântico" caiu nas graças dos místicos, mas práticas como "terapia quântica" e "dieta quântica" não são científicas e não têm relação alguma com a física quântica de verdade.

Pois bem. O que os "biólogos quânticos" (na verdade ainda nem há uma forma oficial de chamar os estudiosos da área) acreditam é que os fenômenos que acontecem no micromundo e são descritos pela física quântica têm, sim, consequências no mundo macroscópico, regido pelas leis da física clássica newtoniana.

Mais especificamente, eles teriam consequências no mundo vivo. Deixariam nele uma "assinatura quântica".

O leitor pode questionar: mas isso não é óbvio? Se somos todos compostos de átomos, é de se esperar que o que acontece no mundo microscópico tenha impacto no mundo que conseguimos ver.

Afinal de contas, "a biologia é como se fosse uma química aplicada, e a química é como se fosse uma física aplicada, então não seria tudo física quando você chega nos fundamentos das coisas?", questionam retoricamente o professor de genética molecular Johnjoe McFadden e o físico teórico Jim Al-Khalili no livro "Life on the Edge", de 2014 —lançado no Brasil em 2016 como "A Vida no Limite".

E é verdade. Se a biologia envolve, em última instância, a interação entre átomos, então as regras do mundo quântico devem, de fato, operar nas menores escalas dos organismos vivos, afirmam os autores. Mas o que a ciência diz é que estas regras operam apenas nestas escalas, porém não geram efeitos relevantes no mundo que enxergamos.

Nós não atravessamos paredes nem podemos estar em dois lugares ao mesmo tempo, ainda que as partículas dentro de nós sejam capazes disso. Por que há essa fronteira entre o universo visível e o universo que sabemos que existe nas menores escalas?

A evidência em favor da biologia quântica indica que os fenômenos quânticos cruzam essa fronteira e não somente geram um impacto no mundo vivo, como esse impacto não é trivial. Há indícios de fenômenos quânticos como superposição e efeito túnel em diversos processos biológicos, da fotossíntese ao funcionamento de enzimas.

Um estudo publicado na "Nature" em 2004 mostrou que o pisco-de-peito-ruivo, ao migrar pelo planeta, o faz como se sua retina "utilizasse" emaranhamento quântico entre elétrons para se guiar a partir do campo magnético da Terra. A ave, aliás, acabou se tornando o garoto-propaganda da biologia quântica.

> Se entendermos como os fenômenos quânticos afetam reações químicas no organismo, talvez daqui a uns 50 anos a gente consiga dirigi-las para tratar doenças. [...] Hoje, no entanto, isso é apenas ficção científica
>
> **Clarice Aiello**, líder do Centro de Biologia Quântica na Universidade da Califórnia em Los Angeles

Não há nenhuma prova irrefutável de que a biologia quântica não exista, e isso basta para a ciência. O problema é que tampouco temos instrumentos com tecnologia suficiente para obter a prova irrefutável de que ela exista.

Isso porque um dos maiores desafios da física quântica é, justamente, a medição. Sabemos que os objetos quânticos fazem coisas esquisitas, mas, no momento em que vamos observá-los, eles perdem esse caráter e passam a se comportar como um objeto clássico qualquer, ou seja, regido pelas regras da física clássica.

Submeter a um instrumento científico uma propriedade quântica, como apontar em muitas direções simultaneamente, implica transformá-la em uma propriedade convencional —apontar em uma única direção.

Aí é que entra a engenheira quântica brasileira Clarice Aiello, 39, líder do Centro de Biologia Quântica na Universidade da Califórnia em Los Angeles, a UCLA.

Seu objetivo é se valer das tecnologias da física quântica para construir instrumentos que permitam a experimentação e a medição quânticas na biologia.

"Quando objetos quânticos começam a interagir entre si, acontece uma reação descontrolada que mata esse caráter quântico. Tudo que começa quântico morre clássico. É por isso que vivemos em um mundo clássico. E daí vem o desconforto que a mecânica quântica nos causa de início", explica a cientista.

Como é fácil matar esse caráter quântico em qualquer objeto, o desafio da engenharia é descobrir formas de deixar o sistema quântico o mais protegido possível. Isso inclui, por exemplo, manter chips quânticos em temperaturas muito baixas para diminuir a energia termal de interação, e usar câmaras de vácuo para evitar colisão entre átomos.

"Mesmo o mais perfeito computador quântico vai morrer clássico. Ele só vai nos dar informação quântica antes desse tempo de termalização e de perder seu caráter quântico", diz Aiello.

Por isso a biologia quântica também pode ser confusa, ao propor que fenômenos quânticos estejam acontecendo em temperatura ambiente e com consequências importantes no funcionamento biológico das coisas.

"Embora, na biologia, esse caráter quântico também acabe sendo "puxado" pelo comportamento clássico em um tempo bem curto, ainda assim os fenômenos quânticos conseguem ter uma influência e alterar os sistemas biológicos", destaca a engenheira.

Vale dizer que tempo curto, no mundo quântico, é curto mesmo. No caso, por exemplo, da captura de energia do sol pelas plantas no processo de fotossíntese, esse tempo é da ordem de um picossegundo, que equivale a 10-12 segundos, ou um trilionésimo de segundo.

Já no caso da propriedade quântica estudada por Aiello, os spins dos elétrons, as coisas são mais lentas —levam de um bilionésimo a um milionésimo de segundo.

"Ou seja, se os fenômenos quânticos acontecem ali de fato, isso significa que a biologia quântica pode sobreviver por um microssegundo, o que, acredite, já basta para alterar macroscopicamente, por exemplo, reações químicas", explica ela.

Para a cientista, não restam dúvidas que os fenômenos quânticos têm influência no mundo vivo, seja em cultura de células, nas drosófilas ou no esquilo que a visita diariamente na varanda da sua casa e que apareceu quando conversávamos por vídeo.

Muitos experimentos já foram feitos em escala química, em soluções de proteínas, e os fenômenos quânticos estavam ali presentes. "Mas o próximo passo é a confirmação em experimento comportamental, e há muita coisa entre uma proteína e uma drosófila", diz Aiello.

Na prática, seu trabalho implica deitar e se rastejar no chão para construir algo que ainda não existe em lugar nenhum no mundo, uma espécie de microscópio com bobinas —bem diferente dos microscópios que costumamos ver em laboratórios de biologia.

"É uma mesa ótica, grandona, com um monte de espelhos e lasers, que tem a função de nos ajudar a olhar dentro de uma célula. Ao redor da amostra biológica, colocamos bobinas que são a fonte de campo magnético. Nossa ideia é olhar para o que acontece na célula e controlar isso mudando o campo magnético", explica a cientista.

> Todo mundo está começando do zero, o que é uma oportunidade grande para o Brasil. A gente precisa formar cientistas interdisciplinares para trabalhar nesse campo hoje e planejar onde queremos estar no futuro
>
> idem

É uma aposta arriscada, mas que pode ser revolucionária. Aiello acredita que a biologia quântica esteja hoje onde a computação quântica estava há 20 anos, e atualmente ninguém duvida de seu potencial.

"Todo mundo está começando do zero, o que é uma oportunidade grande para o Brasil", ressalta a engenheira, que estabeleceu uma parceria com o Instituto D'Or de Ensino Pesquisa (Idor) para desenvolver a área no país.

"A gente precisa formar cientistas interdisciplinares para trabalhar nesse campo hoje e planejar onde queremos estar no futuro."

E, embora para Aiello tudo que pareça magia seja ciência não explicada, ela não descarta a possibilidade de, nesse futuro ainda distante, podermos falar em "cura quântica" —não no sentido esotérico.

"Se entendermos como os fenômenos quânticos afetam reações químicas no organismo, talvez daqui a uns 50 anos a gente consiga dirigi-las para tratar doenças, da mesma forma que fazem os remédios, mas controlando o comportamento quântico endógeno que parece existir nos seres vivos. Hoje, no entanto, isso é apenas ficção científica."

Por enquanto, o que temos são muitas perguntas fundamentais e, conforme aventaram McFadden e Al-Khalili, "o mistério de como a estranheza quântica consegue sobreviver em corpos vivos quentes, úmidos e bagunçados".

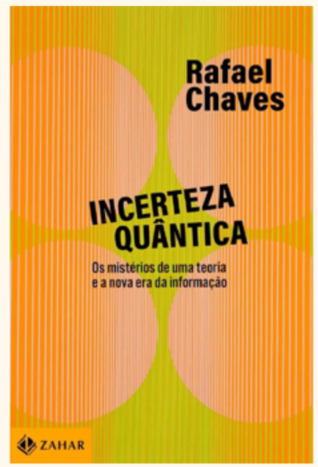
Pássaro pisco-de-peito-ruivo 'usa' emaranhamento quântico entre elétrons para se guiar a partir do campo magnético da Terra

Text about quantum biology, the most viewed blog post in 2022, published in *Folha's* print edition

Example of impact:
the book Quantum Uncertainty

The blog Ciência Fundamental has become a platform for young scientists to express their voices and share their work with the public. In 2022, the blog began to see some real-world impacts.

The texts written by physicist Rafael Chaves, for example, caught the attention of the Companhia das Letras publishing house, which invited him to write a popular science book about quantum mechanics. *Quantum Uncertainty* was published in September by Zahar, a label of the Companhia das Letras publishing house.



UFRN physicist Rafael Chaves and his first book, *Quantum Uncertainty*

Serrapilheira in the media

In 2022, the Serrapilheira Institute was mentioned in about 1,500 articles in the press. The most prominent theme was the relationship between science and politics in the context of the Brazilian presidential elections. Topics such as budget cuts in recent years, the brain drain and the reallocation of funding and STEM policies gained a higher profile with the prospect of a new government. The #ScienceInElections column, in July, played an important role in this scenario—learn more in the section "Political incidence to value science", on page 46.

This was the year that Serrapilheira took a more forceful **political position** in response to the polarized dispute between a candidate who valued science and another who showed contempt for it. Serrapilheira's support for Lula in the second round of the presidential elections, as well as the Institute's approval of the choice of Luciana Santos as Minister of Science, Technology and Engineering in 2023 were picked up by media outlets such as **Folha de S.Paulo** (learn more on page 46).

In October, **election** month, the executive director of Serrapilheira, Hugo Aguilaniu, gave an interview to BBC Brazil commenting on the proposals that the candidates presented for science and the "Droplet Joe for President" campaign (learn more on page 50). He also talked to UOL about the legacy of the Bolsonaro government regarding science and the outlook for a new Lula government, and spoke to Terra about the budget cuts in the field.

When **Capes delayed the payment of graduate scholarships,** in December, O Globo reported the Serrapilheira's decision to allow its scientists to pay their master's and doctoral students with their Serrapilheira grant money.

Serrapilheira's **fifth anniversary** as also the theme of an article in Folha de S.Paulo and The Brazil Report website.

Our **first public call exclusively for Black and Indigenous scientists**, launched in December in partnership with FAPERJ (learn more on page 54), was also widely carried by media outlets such as O Globo, Folha, CBN, and hundreds of smaller ones, such as Diário de Petrópolis.

ELEIÇÕES 2022 • TECNOLOGIA

Instituto Serrapilheira declara apoio a Lula no segundo turno das eleições

Instituição é uma das maiores fomentadoras da ciência e do desenvolvimento científico do país

Claudinei Queiroz

SÃO PAULO Em um vídeo divulgado nesta quarta-feira (26) nas redes sociais, Hugo Aguilaniu, diretor-presidente do Instituto Serrapilheira, anunciou o apoio da entidade à candidatura de Luiz Inácio Lula da Silva (PT) à Presidência da República.

Ele disse que a decisão foi tomada devido ao que classificou como grandes perdas da ciência nacional no governo de Jair Bolsonaro (PL). "Os cortes de verbas, ataques reiterados às informações científicas e a incerteza quanto ao lugar da ciência aumentaram o êxodo de cientistas. Quando um talento vai embora, o Brasil inteiro perde", publicou o instituto no Twitter.

O GLOBO | Sexta-feira 21.10.2022 | 13

Brasil

SAUL KLEIN
Ação pede R$80 milhões
Filho de fundador de Casas Bahia é acusado de aliciar adolescentes

SALDO RETIRADO

Em 11 anos, fundo que banca ciência federal perdeu R$ 44 bilhões

RAFAEL GARCIA

Desde que o financiamento da ciência no Brasil começou a sofrer cortes mais acentuados, em 2010, cerca de R$ 44 bilhões arrecadados pelo Fundo Nacional de Desenvolvimento Científico e Tecnológico (FNDCT), principal fonte de recursos para o setor no país, deixaram de ser aplicados. A conclusão é de uma investigação feita pelo Centro de Estudos Universidade, Sociedade e Ciência da Unifesp (Sou Ciência), comandada pela cientista Soraya Smaili, ex-reitora da universidade, que se dedica a estudar a política científica do país.

Segundo relatório da instituição, os R$ 44 bilhões saíram do FNDCT e voltaram para o Tesouro Nacional, onde perderam a rubrica de verba da ciência e entraram para o bolo genérico de receita da União.

VALOR CORRIGIDO

A conta, segundo Smaili, considera a quantidade de recursos arrecadados em cada ano que não foi efetivamente aplicada em projetos da Financiadora de Estudos e Projetos (Finep), principal executora do fundo.

—Nossa dúvida era se esse dinheiro que não tinha sido investido estava parado no fundo, porque quando olhamos a diferença acumulada somando todos os anos, ficamos alucinados. Estavam faltando R$ 35 bilhões. Os R$ 44 bilhões que citamos é esse valor corrigido pela inflação — explica a cientista.

A investigação incluiu conversas com pessoas que ocuparam cargos de gestão na área de incentivo à ciência e à tecnologia, além da consulta aos números de arrecadação e de liberação de verbas do fundo.

— Para saber onde foram parar esses recursos, conversamos com alguns técnicos da Finep, incluindo um ex-presidente, e com ex-ministros de Ciência e Tecnologia, até entendermos o caminho que o dinheiro fez — detalha Smaili. — Esse saldo que tinha na conta da Finep foi removido no ano passado e levado para a conta do Tesouro Nacional. Hoje o fundo não tem mais aquele dinheiro.

O GLOBO entrou em contato com o Ministério da Ciência, Tecnologia e Inovação na tarde de ontem pedindo que a pasta comentasse os números levantados por Smaili, mas não recebeu retorno até a publicação desta reportagem.

O levantamento feito por Smaili e outros cientistas do Sou Ciência foi apresentado na terça-feira, em um workshop no Rio promovido pelo Instituto Serrapilheira, instituição privada sem fins lucrativos de fomento à ciência. Cientistas discutiram o que poderia ter sido feito, caso o valor retido pudesse ser recuperado.

Os R$ 44 milhões apontados pela investigação são equivalentes a 25 vezes o orçamento do maior e mais caro projeto de infraestrutura científica realizado no país na última década: o acelerador de partículas Sirius, em Campinas (SP), orçado em R$ 1,8 bilhão.

De acordo com o levantamento do Sou Ciência, os institutos de pesquisa federais foram muito prejudicados pela falta de verba nos últimos quatro anos, quando a lacuna entre arrecadação e investimento do FNDCT se ampliou.

FIOCRUZ POUPADA

Entre as 28 entidades federais que produzem pesquisa no país, incluindo centros de pesquisa de outros ministérios, apenas uma não teve redução de investimento no período: a Fiocruz, que teve aporte para produção de vacina durante a pandemia de Covid-19.

As instituições mais impactadas foram as universidades. "Isso representa uma queda de 45% na verba destinada ao pagamento de água, energia, bolsas de estudo e prestação de serviços, por exemplo" afirma o comunicado do centro de estudos com a conclusão do levantamento.

"A análise mostra ainda que o investimento nas universidades federais caiu 50% entre 2019 e 2022, chegando a R$ 97,5 milhões em setembro deste ano. Em todo o ano de 2021, foram investidos apenas R$ 129 milhões", alerta o trabalho. "Esses recursos são aplicados no patrimônio das universidades, como aquisição de imóveis e terrenos, reformas e obras, além de compra de equipamentos, computadores, livros e materiais permanentes".

Hugo Aguilaniu, diretor-presidente do Serrapilheira, uma das fontes dos recursos que financiam o Sou Ciência, criticou a mudança do destino de verbas que foram arrecadadas para desenvolvimento da pesquisa científica.

—A ciência brasileira se encontra neste momento em uma situação extremamente preocupante de desmonte. Caberá ao próximo governo a sua recomposição estrutural e orçamentária, que devolva aos cientistas um ambiente propício para desenvolverem suas pesquisas — afirmou.

A DIFERENÇA

Arrecadação cresceu, mas pagamentos do FNDCT foram reduzidos em 11 anos

Sem verbas. Laboratório de imunobiotecnologia da UFRJ, universidades foram as mais afetadas

Survey on funding for science presented at the 6th Serrapilheira Retreats in October, as reported by *O Globo* newspaper

New member of the Board of Trustees

In 2022, biologist Mercedes Bustamante was appointed to the Board of Trustees, replacing biologist Fernando Reinach. Bustamante is a full professor at the University of Brasilia (UnB). According to the regulations of the Board of Trustees, each member serves a minimum term of three years, and each year a member who has completed this period is replaced by lottery.

In January 2023, however, Bustamante was appointed as the new president of Capes by President-elect Luiz Inácio Lula da Silva. She thus stepped down from Serrapilheira's Board of Trustees and was replaced by Ima Vieira, a PhD in Ecology from the University of Stirling, Scotland, and full researcher at the Museu Paraense Emilio Goeldi.

The next member to leave the Board of Trustees will be engineer Edgar Dutra Zanotto, professor at the Federal University of São Carlos (UFSCar).

Scientific Advisory Board Annual Meeting

Serrapilheira's Scientific Advisory Board (SAB) met for two days in August to monitor the development of the institute's programs and assist in planning future actions. Some members of the SAB attended the meeting in person in Rio de Janeio, while others participated via videoconference.

From left to right: Antonio Coutinho, Marcelo Viana, Marcela Carena, Faith Osier, Vanderlan Bolzani, and Hugo Aguilaniu.

© Diego Padilha/ Serrapilheira

SBPC's new institutional member

In September we became an institutional member of the Brazilian Society for the Advancement of Science (SBPC). This is a recognition of our shared commitment to science, and we are proud to be a part of this organization's 70-year legacy.

As an institutional partner, the Serrapilheira contributes resources to support SBPC's activities, participates in its annual meetings, promotes debates, and strengthens ties with the Brazilian scientific community.

2023 Outlook

The recent political change in Brazil brings hope for a more favorable situation for science. After years of budget cuts and suffocating policies, it is urgent to restore scientific funding, curb the brain drain, and develop tropical ecology as a strategic focus in 2023. Brazil has the potential to be a global leader in this field and the time to act is now.

The beginning of 2023 has brought some positive changes for science in Brazil, such as the readjustment the new government made for graduate scholarships. Given this positive outlook, we intend to enhance our engagement with public authorities to further our efforts to make science a policy of state rather than just a government policy and that it is given the value it deserves. We will continue to stand by our partners in this fight.

2022 Timeline

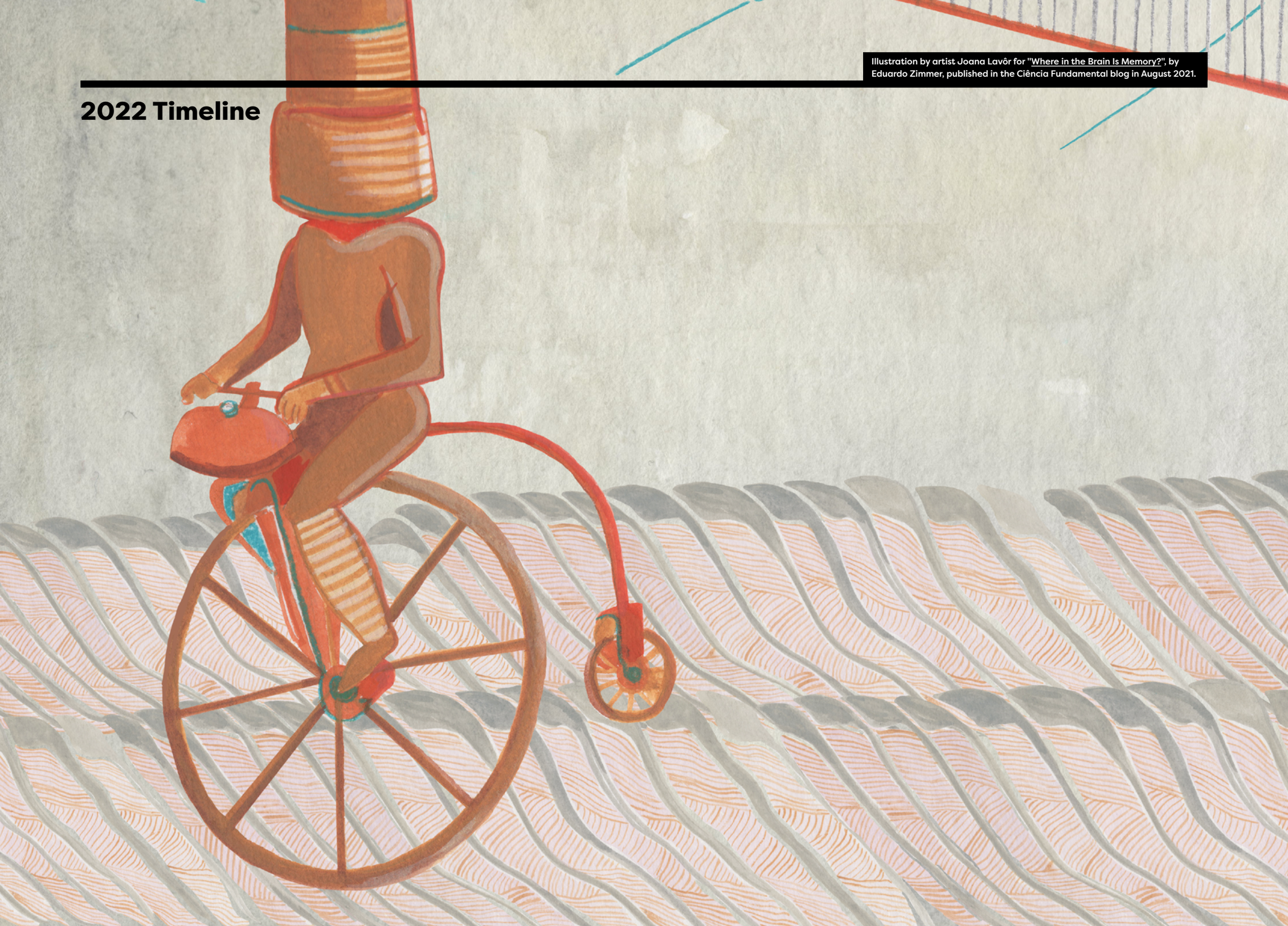


Illustration by artist Joana Lavôr for "Where in the Brain Is Memory?", by Eduardo Zimmer, published in the Ciência Fundamental blog in August 2021.

JANUARY

→ Fundamental Science Blog celebrated its second anniversary.

MARCH

→ Serrapilheira celebrated its fifth anniversary.
→ The second edition of the Training Program in Quantitative Ecology opened its application window.

APRIL

→ The second edition of the Training Program in Quantitative Ecology received 155 applications.
→ Three grantees had their support renewed with up to R$ 700 thousand in the second phase of the Science Program's third public call.

MAY

→ The Science Outreach Program's public call focused on "The role of science in the Brazil of tomorrow" launched.

JUNE

→ "The role of science in tomorrow's Brazil" call received 153 applications
→ Results of the Science Program's public call for scientific support

JULY

→ Classes started in the 2nd edition of the Training Program in Quantitative Ecology
→ #ScienceInElections communication campaign
→ Result of the call for science outreach "The role of science in tomorrow's Brazil

AUGUST

→ The Science Program launched its 6th call
→ Annual meeting of the Scientific Advisory Board in Rio de Janeiro
→ No-budget Science Hack Week in Rio de Janeiro

SEPTEMBER

→ Application window opened for the 3rd edition of the Training Program in Quantitative Ecology
→ Grantee Rafael Chaves launched his book, *Quantum Uncertainty*, a partnership between Serrapilheira and Companhia das Letras

OCTOBER

→ Application window opened for the Science Program's 6th call
→ The sixth edition of the Serrapilheira Retreats and the celebration of the institute's fifth anniversary brought together grantees and partners in Rio de Janeiro
→ Serrapilheira endorsed Lula in the second round of the presidential elections

NOVEMBER

→ Serrapilheira and IJC launched their joint call in support of research on rare diseases
→ The Science Program's sixth call received 249 pre-proposals
→ The third edition of the Training Program in Quantitative Ecology Training received 186 applications

DECEMBER

→ The Serrapilheira-IJC call to support research on rare diseases received 15 pre-proposals
→ Serrapilheira and FAPERJ launched a public call to support young Black and Indigenous scientists in ecology
→ The "Disarming Disinformation" call for journalists was launched in partnership with ICFJ
→ Classes in the second edition of the Training Program in Quantitative Ecology ended

Financial statements as at December 31, 2022 and independent auditors' report

Illustration by artist Camilo Martins for "More Heat, More Diseases", by Fabio Gomes, published in the Ciência Fundamental blog in May 2021.

Independent auditors' report about the financial statements

To the Executive Team and Members of the Board
INSTITUTO SERRAPILHEIRA

Opinion

We have audited the financial statements of INSTITUTO SERRAPILHEIRA (the "Institute"), which comprise the balance sheet as at December 31, 2022, and the related statements of surplus and deficit, comprehensive income, of changes in net assets, and statement of cash flows for the year then ended, as well as the notes to the financial statements and the summary of significant accounting policies.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of INSTITUTO SERRAPILHEIRA as at December 31, 2022, its financial performance and its cash flows for the year then ended, in accordance with the accounting practices adopted in Brazil for small and medium-sized entities.

Basis for opinion

We conducted our audit in accordance with Brazilian and International Standards on Auditing (ISAs). Our responsibilities under those standards are described in the section under the heading "Auditor's responsibilities for the audit of the financial statements." We are independent of the Institute in accordance with the ethical principles established in the Code of Professional Ethics and Professional Standards issued by the Brazilian Federal Accounting Council, and we have fulfilled our other ethical responsibilities in accordance with these standards. We believe that the audit evidence we obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of directors and those charged with the governance of the financial statements

The Institute's management is responsible for the preparation and proper presentation of these financial statements in accordance with accounting practices adopted in Brazil for small and medium-sized entities (Technical Pronouncement issued by the Accounting Pronouncement Committee (APC) for Small and Medium-Sized Entities (SMEs) Revision (R1)), and for the internal controls that the directors deem necessary for preparing financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the directors are responsible for assessing the Institute's ability to continue as a going concern, disclosing, as applicable, matters related to the going concern and using the going concern basis of accounting unless the direc-

tors either intend to liquidate the Institute or to cease operations, or have no realistic alternative but to do so.

Those charged with the Institute's governance are responsible for overseeing the Institute's financial reporting process.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with Brazilian and International Standards on Auditing will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of the audit conducted in accordance with Brazilian and international auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

→ Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

→ Obtain an understanding of internal control relevant to our audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Institute's internal control.

→ Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the directors.

→ Conclude on the appropriateness of directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Institute's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if

such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our report. However, future events or conditions may cause the Institute to cease to continue as a going concern.

→ Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other things, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal controls that we identify during our work.

Ribeirão Preto (SP), April 19, 2023

ValorUp Independent Auditors
CRC 2SP028585/O-0 “S” RJ

André Luiz Corrêa
ACCOUNTANT CRC 1SP198337/O-2 “S” RJ

Illustration by artist Camilo Martins for "How Do Plants Know What Time It Is?", by Carlos Hotta, published in the Ciência Fundamental blog in June 2021.

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Balance Sheet as at December 31

IN BRAZILIAN REALS

Assets	Note	2022	2021
Current assets			
Cash and cash equivalents	5	12.373.917	15.396.748
Other assets		**14.422**	**16.800**
		12.388.339	**15.413.548**
Non-current assets			
Long-term assets			
Security deposit		39.000	39.000
Trading securities	6	**542.061.387**	**523.511.366**
		542.100.387	**523.550.366**
Property, Plant and Equipment	7	147.397	182.220
Intangible assets	8	8.041	33.462
		542.255.825	**523.766.048**
Total assets		**554.644.164**	**539.179.596**

Liabilities and equity	Note	2022	2021
Current liabilities			
Trade payables		1.436	1.553
Employee benefits	9	301.894	235.381
Tax payables	10	**13.100**	**15.765**
Total liabilities		**316.430**	**252.699**
Equity	11		
Net assets		538.926.897	619.044.802
Accumulated surplus (deficit)		**15.400.837**	**(80.117.905)**
Total equity		**554.327.734**	**538.926.897**
Total liabilities and equity		**554.644.164**	**539.179.596**

Statement of Surplus or Deficit
Years ended at December 31

IN BRAZILIAN REALS

	Note	2022	2021
Revenues from volunteer work	22	1.022.288	663.177
Revenues from services rendered	12	1.049	
Gross Surplus		**1.023.337**	**663.177**
Operating Expenses			
Donations	13	(16.812.139)	(9.982.772)
General and administrative expenses	14	(5.302.879)	(2.365.019)
Personnel expenditure	15	(3.849.841)	(3.359.579)
Depreciation and amortization	7 e 8	(63.144)	(75.921)
Tax expenditure	16	(22.678)	(20.224)
Expenses with volunteer work	22	(1.022.288)	(663.177)
Operating losses		**(26.049.632)**	**(15.803.515)**
Financial Revenues	17	41.453.949	909.957
Financial Expenses	17	(3.480)	(65.224.347)
Financial Income		**41.450.469**	**(64.314.390)**
Surplus (deficit) for the year		**15.400.837**	**(80.117.905)**

Statement of Comprehensive Income
Years ended at December 31

IN BRAZILIAN REALS

	2022	2021
Surplus (deficit) for the year	15.400.837	(80.117.905)
Other components of comprehensive income	–	–
Total comprehensive income for the year	**15.400.837**	**(80.117.905)**

Statement of Changes in net assets

In Brazilian reals

		Patrimônio social			
	Note	Doações de associados fundadores	Resultados dos anos anteriores	Superávit (déficit) acumulado	Total
As at December 31, 2020		**340.800.000**	**289.360.918**	**(11.116.116)**	**619.044.802**
Carry over to Equity	11	–	(11.116.116)	11.116.116	–
Deficit for the year		–	–	(80.117.905)	(80.117.905)
As at December 31, 2021		**340.800.000**	**278.244.802**	**(80.117.905)**	**538.926.897**
Carry over to Equity	11	–	(80.117.905)	80.117.905	–
Superávit do exercício		–	–	15.400.837	15.400.837
As at December 31, 2021		**340.800.000**	**198.126.897**	**15.400.837**	**554.327.734**

Statement of Cash Flows
Years ended at December 31

IN BRAZILIAN REALS

	Note	2022	2021
Cash flow from operating activities			
Surplus (deficit) for the year		15.400.837	(80.117.905)
Adjustments to reconcile non-cash revenues and expenses:			
Depreciation and amortization	7 e 8	**63.144**	**75.921**
		15.463.981	(80.041.984)
Changes in assets and liablities			
Advance to suppliers			1.265
Other assets		2.378	47.129
Trade payables		(117)	773
Employee benefits		66.513	148.600
Tax liabilities		**(2.665)**	**516**
Net cash provided by (used in) operating activities		**15.530.090**	**(79.843.701)**
Cash flow from investing activities			
Redemptions of trading securities	6	20.614.000	22.715.000
Gains (losses) from trading securities	6	(39.164.021)	65.222.185
Acquisition of property, plant and equipment	7	**(2.900)**	**(2.425)**
Net cash provided by (used in) investment activities		**(18.552.921)**	**87.934.760**
Increase (decrease) in cash and cash equivalents		(3.022.831)	8.091.059
Cash and cash equivalents at the beginning of the period	5	**15.396.748**	**7.305.689**
Cash and cash equivalents at the end of the period	5	**12.373.917**	**15.396.748**

1 General Information

1.1 Operational Context

INSTITUTO SERRAPILHEIRA ("the Institute") is a private, non-profit organization founded on November 9, 2015, in Rio de Janeiro, Brazil. The Institute's mission is to support scientific research and outreach in the exact and natural sciences.

The Institute may engage in the following activities, as long as they are in line with the pursuit of the Institute's stated goals:

(i) Developing, fostering, and funding programs, projects, and scientific research that are aligned with its stated objectives;
(ii) Promoting and sponsoring studies, courses, lectures, symposia and conferences;
(iii) Entering into agreements, contracts, and partnerships with schools, associations, companies, agencies, entities, or any other institutions, public or private, national or international;
(iv) Raising, managing, and donating resources (financial, technical, and material);
(v) Developing and publishing materials by any means, including electronic and virtual channels, to guide, support, or oversee activities that promote, foster, and advance science;
(vi) Granting awards and other incentives to individuals or organizations that have made significant contributions to in the Institute's areas at activity
(vii) Carrying out any other legal activities that are related to the Institute's objectives.

As at December 31, 2022, the Institute has 3 founding members, namely:

João Moreira Salles;
Branca Maria Vianna Moreira Salles; e
Brasil Warrant Administração de Bens e Empresas S.A.

The Institute's endowment was established in March 2016 with an initial capital investment from the founding members. The endowment is entirely made up of financial resources and will remain heavily invested in trading securities. The yield on the financial investments is the Institute's main source of funding for the pursuit of its goals.

The Institute's financial statements were approved for release by the Board of Trustees on April 17, 2023.

1.2 Administration

The Institute has the following governing bodies:

(a) General Assembly

The General Assembly, the Institute's governing body, is made up of members who are in full enjoyment of their statutory rights. The Assembly ordinarily meets once a year to:

(i) Assess the Annual Report;
(ii) Approve the financial statements, after approval by the Board of Directors and Fiscal Council (when established)
(iii) Elect and discharge members of the Board of Directors and the Fiscal Council.

(b) Board of Trustees

The Board of Trustees is made up of 3 to 15 members appointed by the General Assembly from a pool of members and non-members. They will perform their duties in a collegial manner for a four-year term, after which they may seek re-election or be substituted by lottery. The Board meets regularly every four months and extraordinarily at the discretion of the Chair. The Board is responsible for:

(i) Appointing the members of the Financial Advisory Board, the Scientific Advisory Board and the Executive Team, and assigning them their respective roles, responsibilities, and remuneration, where applicable
(ii) Approving the by-laws, Internal Regulations of the Institute, and the Institute's Code of Conduct, upon the recommendation of the Board of Trustees
(iii) Defining the Institute's action strategy, reviewing and approving the annual sponsorship plan, including the respective selection process, among other duties.

(c) Scientific Advisory Board

The Scientific Advisory Board is composed of 3 to 15 members appointed by the Board of Trustees from a pool of members and non-members alike. They serve staggered 3-year terms and can seek re-election. The Scientific Advisory Board is responsible for:

(i) Issuing opinions on the Institute's specific areas of activity, as well as on the guidelines for action in their respective areas.

(ii) Advising the Board of Trustees and the Executive Team in matters related to the Institute's goals and activities. This includes evaluating the annual sponsorship plan and overseeing the respective selection processes, among other duties.

(d) Executive Team

The Institute's Executive Team is composed of an Executive Director and up to three Directors. The members of the Executive Team are appointed by the Board of Trustees and serve a term of three years. They may seek re-election. The Institute's Executive Team is responsible for the overall administration of the Institute's activities, as laid out in the by-laws.

1.3 Taxes and benefits

The Institute is currently required to the pay contributions to the Social Integration Program (PIS), the National Institute of Social Security (INSS). The PIS contribution is 1% of payroll totals, and the INSS contribution is based on payroll.

As a private non-profit organization, the Institute is exempt from paying Corporate Income Tax (IRPJ) and Social Contribution on Net Income (CSLL) on its ordinary operations. It is also not subject to the Contribution for the Financing of Social Security (COFINS) and PIS on its revenues from its core activity.

The Institute is also required to withhold Income Tax (IRRF) on redemptions of financial investments.

2 Summary of Significant Accounting Policies

The following are the significant accounting policies used in preparing these financial statements. These policies have been applied consistently in all fiscal years, unless otherwise stated.

2.1 Basis of preparation

The financial statements were prepared in accordance with the Technical Pronouncement issued by Revision 1 of the Accounting Pronouncements Committee for Small and Medium-Sized Companies (CPC PME (R1)). The financial statements are based on historical cost, except for certain financial instruments, which are valued at fair value.

The preparation of financial statements in accordance with CPC PME (R1) requires the use of certain critical accounting estimates and the exercise of sound judgment by the Institute's management in applying accounting policies. The areas that involve a higher degree of judgment or complexity, as well as those whose assumptions and estimates are significant for the financial statements, are disclosed in Note 3

2.2 Presentation of the financial statements

The Institute's financial statements were prepared in accordance with Brazilian accounting practices, as issued by the Accounting Pronouncements Committee (CPC), considering the Brazilian Accounting Standards for Small and Medium-Sized Companies and Non-Profit Entities (ITG 2002 (R1)).

The Institute's financial statements are measured in the currency of the primary economic environment in which it operates, which is the Brazilian real. The financial statements are presented in Brazilian reals, which is the Institute's functional and presentation currency.

2.3 Cash and cash equivalents

Cash and cash equivalents are highly liquid assets that can be converted into cash within 90 days. They include cash on hand, bank deposits, and other short-term investments with original maturities of three months or less and with insignificant risk of changes in value. Balances in escrow accounts are also included in cash and cash equivalents, where applicable.

2.4 Financial Assets

2.4.1 CLASSIFICATION

The Institute classifies its financial assets into two measurement categories:

→ Fair value (either through other comprehensive income or profit or loss).
→ Amortized cost.

(a) Financial assets at fair value through profit or loss

Financial assets that do not meet the criteria for classification as either amortized cost or fair value through other comprehensive income (FVOCI) are measured at fair value through profit or loss (FVTPL). Any gain or loss on a debt instrument that is subsequently measured at FVTPL is recognized in the income (surplus or deficit) statement and presented at net value in other gains/(losses) in the period in which it occurs.

(b) Amortized cost

Financial assets that are held to collect contractual cash flows and where those cash flows consist solely of principal and interest payments are measured at amortized cost. Interest income from these assets is recognized in the income statement using the effective interest rate method. Any gains or losses from derecognition of these assets are recognized directly in the statement of surplus or deficit and presented under other gains or losses. Impairment losses are presented in a separate account in the statement of surplus or deficit.

2.4.2 RECOGNITION, DERECOGNITION AND MEASUREMENT

Regular way purchases and sales of financial assets are recorded on the trade date, which is the date the Institute commits to purchase or sell the asset. Financial assets are derecognized when the Institute no longer has the right to receive cash flows from the asset, either because the asset has expired or because the Institute has transferred the asset to another party and has transferred substantially all risks and rewards of ownership.

When a financial asset is first recognized, it is measured at fair value, plus or minus transaction costs directly attributable to its acquisition. If the financial asset is not measured at fair value through profit or loss, then the transaction costs are added to the carrying amount of the asset. However, if the financial asset is measured at fair value through profit or loss, then the transaction costs are recorded as expenses on the statement of surplus or deficit.

2.4.3 OFFSETTING FINANCIAL INSTRUMENTS

Financial assets and liabilities are offset when the Institute has a legally enforceable right to set off the recognized amounts and intends either to settle on a net basis or to realize the asset and settle the liability simultaneously. The legal right to set off must not be contingent on future events and must apply in the normal course of business and in the event of default, insolvency, or bankruptcy of the Institute or any counterparty.

2.4.4 IMPAIRMENT OF FINANCIAL ASSETS

The Institute assesses at each reporting date whether there is objective evidence that a financial asset or a group of financial assets is impaired. Impairment losses are recognized only if there is objective evidence of impairment as a result of a loss event or events that occurred after the initial recognition of the asset and that the loss event or events had an impact on the estimated future cash flows of the financial asset or group of financial assets and a reliable estimate of the loss amount can be made.

The Institute uses three criteria to determine whether there is objective evidence of impairment loss: significant difficulty of the obligor, breach of contract, or default.

If the amount of an impairment loss decreases in a subsequent period and the decrease can be objectively related to an event that occurred after the impairment was recognized (such as an improvement in the debtor's credit rating), the Institute shall reverse the previously recognized impairment loss in profit or loss.

2.5 Financial assets

The Institute does not hold any derivative financial instruments.

2.6 Property, plant and equipment

Property, plant, and equipment (PP&E) are stated at their historical cost, less depreciation and any accumulated impairment loss. Historical cost includes all costs directly attributable to bringing the asset to its intended use.

Depreciation is calculated using the straight-line method, which allocates the cost of an asset, less its residual value, over its estimated useful life. The estimated useful life is disclosed in Note 7.

The residual values, useful lives, and depreciation methods of assets are reviewed and adjusted as needed when there is evidence that they have changed significantly since the last reporting date.

Gains and losses from the disposal of property, plant, and equipment are calculated by comparing the sales proceeds to the carrying amount of the asset. These gains and losses are recognized in the statement of comprehensive income as "Other income (expenses), net."

2.7 Intangible Assets

Software licenses are recorded as an asset on the balance sheet based on the costs incurred to acquire and bring them into use. These costs are then amortized over the software's estimated useful life, which is typically between three and five years.

2.8 Impairment of non-financial assets

Non-financial assets are tested for impairment whenever there is evidence that their carrying amount may not be recoverable. An impairment loss is the difference between the carrying amount of an asset and its recoverable amount. The recoverable amount is the higher of the asset's fair value less costs of disposal and its value in use. For the purpose of assessing impairment, assets are grouped at the lowest levels of separately identifiable cash flows (cash-generating units (CGUs)). Non-financial assets that have

been impaired are subsequently reviewed for possible reversal of the impairment on each reporting date.

2.9 Trade payables

Trade payables are amounts owed to suppliers for goods or services acquired in the ordinary course of business. They are classified as current liabilities if they are due within one year. Otherwise, they are classified as non-current liabilities.

2.10 Other current and non-current liabilities

These amounts are stated at either known or estimated values and may include related charges and adjustments for inflation.

2.11 Revenue recognition and income measurement

Financial revenue

Interest revenue is recognized on a time-proportion basis, considering the outstanding principal and the effective interest rate to maturity. Interest revenue is recognized when it is determined that the revenue will be paid to the Institute, and any market value adjustments are also considered.

2.12 Other income and expenses

All other revenues and expenses are recognized on an accrual basis.

3 Critical accounting estimates and assumptions

Accounting estimates and judgments are continually evaluated and are based on historical experience, expectations of future events, and other factors.

No events or assumptions were identified during fiscal years 2022 and 2021 that could present significant risks of causing adjustments to the Institute's financial statements.

4 Financial Instruments by Category

Assets per the statement of financial position	Classification	2022	2021
Cash and cash equivalents - Cash and banks	(i)	27.894	47.094
Cash and cash equivalents - Financial investments	(ii)	12.346.023	15.349.654
Trading securities - Investment Fund	(ii)	542.061.387	523.511.366
Other assets	(i)	14.422	16.800
Security deposit	(i)	39.000	39.000
		554.488.726	**538.963.914**

Liabilities per the statement of financial position	Classification	2022	2021
Trade payables	(iii)	**1.436**	**1.553**

Classification

(i) Assets at amortized cost
(ii) Assets at fair value through profit or loss
(iii) Liabilities at amortized cost

5 Cash and cash equivalents

	2022	2021
Financial investments (i)	12.346.023	15.349.654
Cash and Banks	27.894	47.094
	12.373.917	15.396.748

(i) In 2022 and 2021, the financial investments were made in fixed-income investment funds that track the CDI (interbank deposit certificate) rate. These funds invest in shares of other funds that hold at least 95% of their assets in securities or operations linked to the CDI rate.

6 Trading Securities

The financial investment is represented by a share in the Amarante II Fundo de Investimento Multimercado Crédito Privado Investimento no Exterior (“the Fund”), an exclusive investment fund.

The Amarante II Fund is a closed-end fund that was organized in July 2013 and began operations in March 2016. The fund has a 20-year term and invests in a variety of financial assets, including stocks, bonds, and other securities. The fund's investment strategy, laid out in its regulations, is to diversify its investments across a range of asset classes and risk levels. Shares of the fund can only be redeemed in full at maturity, but they can be partially redeemed once per year.

The Amarante II Fund's asset portfolio was primarily composed of inflation-linked government bonds (NTN-B) and shares in investment funds with maturities exceeding 365 days from the balance sheet date on December 31, 2022 and 2021.

Investments in funds are not guaranteed by the fund administrator, any insurance mechanism, or the Brazilian Credit Guarantee Fund (FGC). Notwithstanding the administrator’s diligence in managing the Fund, its investment policy exposes the its assets to risk due to the characteristics of its securities, which are subject to market fluctuations and credit risks. As a result, there is a possibility of losing the invested capital.

The movement of financial resources in the Fund is represented as follows:

	2022	2021
Opening Balance	523.511.366	611.448.551
Gains (losses) from trading securities (Note 17) - (i)	39.164.021	(65.222.185)
Amortization of shares	(11.831.002)	(12.068.752)
Amortization of income	(8.782.998)	(10.646.248)
Closing Balance	542.061.387	523.511.366

(i) Financial income is recognized net of estimated withholding tax. Although this tax is due upon redemption, it can be estimated and accounted for in the annual income. This is because there is no chance of recovering the tax given the Institute's legal nature and activity.

7 Property, Plant and Equipment

(a) Change in balances

	Computer equipment	Communi-cation & network equipment	Furniture & Fixtures	Leasehold improvement	Total
Balance at January 1, 2021	37.065	7.076	176.145		220.286
Acquisitions			2.425		2.425
Depreciation	**(14.135)**	**(945)**	**(25.411)**		**(40.491)**
Balance at January 1, 2021	**22.930**	**6.131**	**153.159**		**182.220**
Total cost	70.675	9.448	255.632	1.621.975	1.957.730
Accumulated depreciation	**(47.745)**	**(3.317)**	**(102.473**)	**(1.621.975)**	**(1.775.510)**
Net book value	22.930	6.131	153.159		182.220
Balance as at January 1, 2022	22.930	6.131	153.159		182.220
Acquisitions		2.900			2.900
Depreciation	**(11.217)**	**(945)**	**(25.561)**		**(37.723**)
Balance as at January 1, 2022	11.713	8.086	127.598		147.397
Total cost	70.675	12.348	255.632	1.621.975	1.960.630
Accumulated depreciation	**(58.962)**	**(4.262)**	**(128.034)**	**(1.621.975)**	**(1.813.233)**
Net book value	**11.713**	**8.086**	**127.598**		**147.397**
Average annual depreciation rates - %	**20%**	**20%**	**10%**	**33%**	

8 Intangible Assets

(a) Change in balances

	Software
Balance at January 1, 2021	68.892
Amortization	**(35.430)**
Balance at January 1, 2021	**33.462**
Total cost	177.145
Accumulated amortization	**(143.683)**
Net book value	**33.462**
Balance as at January 1, 2022	33.462
Amortization	**(25.421)**
Balance as at January 1, 2022	**8.041**
Total cost	177.145
Accumulated amortization	**(169.104)**
Net book value	**8.041**
Annual amortization rate - %	**20%**

9 Employee Benefits

	2022	2021
Provision for short-term employee benefits	175.200	127.080
Withholding Income Tax (IRRF) payable	58.441	44.499
Social Security (INSS) payable	51.573	50.450
Guarantee Fund for Length of Service (FGTS) payable	14.805	11.684
Social integration (PIS) payable	**1.875**	**1.668**
	301.894	**235.381**

10 Tax Payables

	2022	2021
Third-party withholding income tax (IRRF) payable	10.659	9.578
Contribution withholding payable	2.441	5.463
Municipal service tax (ISS) payable	**-**	**724**
	13.100	**15.765**

11 Net Assets

Net assets consist of: (i) donations received from founding members ("endowment"), which are recorded directly in equity, and (ii) The income earned by the entity (surplus or deficit), through the transfer of the Accumulated Surplus (deficit) account. This transfer occurs after the accounts for the year are approved by the governing bodies in charge in the following year.

12 Net Revenue

	2022	2021
Services rendered	**1.200**	**-**
Gross revenue	**1.200**	**-**
(-) Deductions		
Contribution for the Financing of Social Security (COFINS)	(91)	
Municipal Service Tax (ISS)	**(60)**	**-**
	(151)	**-**
Net revenue	**1.049**	**-**

13 Donations

A large portion of the donations made by the Institute are provided to the Fundação Arthur Bernardes (FUNARBE). Other disbursements and donations are also made, as shown below:

	2022	2021
Support for Scientific Research Projects (FUNARBE)	(9.470.979)	(6.488.384)
Friends of SAIFR Institute	(2.100.000)	
Federal University Support Foundation	(500.000)	
International Center for Journalists (ICFJ)	(433.891)	
Ambiental Media Ltda.	(330.000)	(139.000)
Olá Ciencia! Produções e Serviços Digitais Ltda.	(302.188)	
Iamarino e Sato Serviços de Informação na Internet Ltda.	(300.000)	
Nav Reportagens Ltda.	(299.000)	
Nexo Jornal Ltda.	(290.520)	
Instituto Cultural e Beneficente Steve Biko	(250.000)	(250.000)
Laboratório 37 Comunicação e Produções em Áudio Ltda.	(230.000)	
The Brazilian Center for Analysis and Planning (CEBRAP)	(229.785)	
Maranta Consultoria Ltda.	(220.000)	(336.000)
Sleeping Giants Brazil	(208.000)	
Empresa Folha da Manhã S.A.	(200.000)	(200.000)
First Look Media Brazil News Agency, LLP	(200.000)	
O Joio e O Trigo Institute	(151.150)	
Alma Preta Jornalism Institute	(120.000)	
Voltdata Agenciamento de Noticias Ltda.	(115.000)	(141.000)
Infoamazonia Association	(115.000)	
Fundação Educacional Ciência e Desenvolvimento (FECD)	(78.947)	(24.211)
Vero Association for Research and Education in Digital Communication and Technology	(57.836)	
Bazar do Tempo Produções e Empreendimentos Culturais Ltda.	(55.000)	
Digital Journalism Association (Ajor)	(55.000)	
Quatro Cinco Um Association	(54.500)	(16.161)
Caracol Web Pesquisa e Gerenciamento de Dados Ltda.	(50.000)	
Tucanacá Edições e Produções Ltda.	(50.000)	
União de Nucleos, Associações (UNAS)	(50.000)	
Grupo de Institutos, Fundações e Empresas (GIFE)	(50.000)	(60.000)
Federal University of São Carlos (UFSCAR)	(46.864)	
Marco Zero Conteúdo Center for Media Studies	(41.000)	

	2022	2021
Instituto Mancala	(33.000)	
Nexo Consultoria em Comunicação e Saúde Ltda.	(32.700)	
Selvagem Ciclo de Estudos Ltda.	(30.000)	(30.000)
International Physics Institute Association	(11.000)	
Luciana Luna Anna Lomonaco	(10.000)	
Bárbara Lopes Amaral	(10.000)	
Vanessa Staggemeier	(10.000)	
Alyne de Castro Costa	(9.000)	
UNICAMP Development Foundation (FUNCAMP)	(7.000)	
Fundación Gabo		(640.964)
Instituto Questão de Ciência		(500.000)
Letras e Lucros Editora Ltda.		(275.000)
Azmina - Corpo Especulado Podcast Project		(220.162)
Eco Association		(131.500)
Megafauna Livraria Ltda		(100.000)
UNESP Development Foundation - (FUNDUNESP)		(86.700)
Balance to carry over	**(16.807.360)**	**(9.639.082)**

	2022	2021
Balance carried over	(16.807.360)	(9.639.082)
Scibr Foudation		(67.198)
Ana Carolina de Almeida		(30.000)
Bernardo Esteves Gonçalves da Costa		(30.000)
Companhia e Editora Pernambuco (CEPE)		(30.000)
Mellanie Fontes Dutra da Silva		(30.000)
Taicia Pacheco Fill		(10.000)
Fernanda Gervasoni		(10.000)
Other projects	**(4.779)**	**(136.493)**
	(16.812.139)	**(9.982.772)**

14 General and administrative expenses

The breakdown of general and administrative (G&A) expenses is shown below:

	2022	2021
Services rendered by legal entities	(1.369.586)	(893.877)
Events	(957.137)	
Air tickets	(594.539)	(67.728)
Maintenance and repairs	(424.843)	(540.711)
Advertising and publicity	(422.197)	
Visual communication	(346.296)	(200.453)
Property leases	(273.883)	(228.695)
Services rendered by individuals	(153.885)	(89.632)
Media relations	(134.223)	
Translation	(118.145)	(65.790)
Internet & telephone	(108.322)	(98.410)
Travel and lodging	(107.008)	(6.503)
Miscellaneous Transportation	(68.827)	(51.531)
Kitchen and pantry	(59.266)	(32.800)
Contributions to trade associations	(79.313)	(26.299)
Social security (INSS) on services	(33.384)	(17.944)
Shipping	(8.531)	(9.779)
Electricity	(8.489)	(7.769)
Office materials	(5.118)	(7.335)
Notary fees	(3.178)	(2.983)
Projects and Events		(6.239)
Other general and administrative expenses	**(26.709)**	**(10.541)**
	(5.302.879)	**(2.365.019)**

15 Personnel Expenditure

The composition of personnel expenses is shown below:

	2022	2021
Wages and salaries	(1.251.487)	(1.105.051)
Compensation	(950.991)	(849.146)
Social security (INSS) contributions	(590.341)	(519.347)
Healthcare	(331.300)	(296.200)
Workers' Food Program (PAT)	(214.218)	(181.511)
Holidays	(190.537)	(156.893)
Guarantee Fund for Length of Service (FGTS)	(124.370)	(102.558)
13th salary	(118.187)	(97.364)
Training	(28.005)	(26.403)
Social Integration Program (PIS) payroll contribution	(15.172)	(12.765)
Other personnel expenditure	**(35.233)**	**(12.341)**
	(3.849.841)	**(3.359.579)**

16 Tax Expenses

The composition of tax expenses is shown below:

	2022	2021
Urban real estate tax (IPTU)	(15.358)	(13.909)
Tax on financial transaction (IOF)	**(7.320)**	**(6.315)**
	(22.678)	**(20.224)**

17 Profit of Loss from Financial Assets

	2022	2021
Gains/earnings from trading securities (Note 6)	39.164.021	
Revenue from financial investments	2.289.869	909.240
Positive effects of changes in foreign exchange		717
Other financial revenue	59	-
	41.453.949	**909.957**
Financial expenses arising from:		
Negative effecs of changes in foreign exchange	(2.227)	
Bank expenses	(1.163)	(2.122)
Interest expense	(90)	(40)
Losses from trading securities (Note 6)		(65.222.185)
	(3.480)	**(65.224.347)**
Financial income (expense)	**41.450.469**	**(64.314.390)**

18 Related Parties

The Institute has three types of related parties: founding members, trustees, and executives. The founding members and trustees are volunteers, while the executives are paid for their services (see Note 22).

The key executives are the members of the Executive Team. In 2022, the total compensation paid to the executives, including incidental charges, was R$ 950,991 (2021 - R$ 849,146).

19 Contingency Fund

As of December 31, 2022 and 2021, the Institute is not aware of any contingent assets or liabilities that need to be recorded on its financial statements.

20 Insurance Coverage

The Institute has a policy of insuring its assets against risks. The amounts of insurance coverage are considered sufficient to cover possible claims, given the nature of the Institute's activities. The risk assumptions adopted are not part of the scope of the audit of financial statements and have not been reviewed by the Institute's independent auditors.

The Institute has purchased insurance policies to cover rental property and the Institute's property, plant, and equipment.

21 Future Commitments

The Institute has property lease agreements with terms that vary and can be renewed. As of December 31, 2022, the Institute's annual commitments for future payments related to these contracts are approximately R$287,756.

22 Volunteer work

Volunteer work must be recognized at the fair value of the services rendered to the Institute, as per CFC Resolution No. 1409 dated September 21, 2012, which approved the NBC ITG 2002 (R1) for non-profit entities.

The estimated market value of the volunteer work provided to the Institute is as follows:

	2022	2021
Volunteer work by:		
Individuals	7.631	25.805
Legal entities	**1.014.657**	**637.372**
	1.022.288	**663.177**

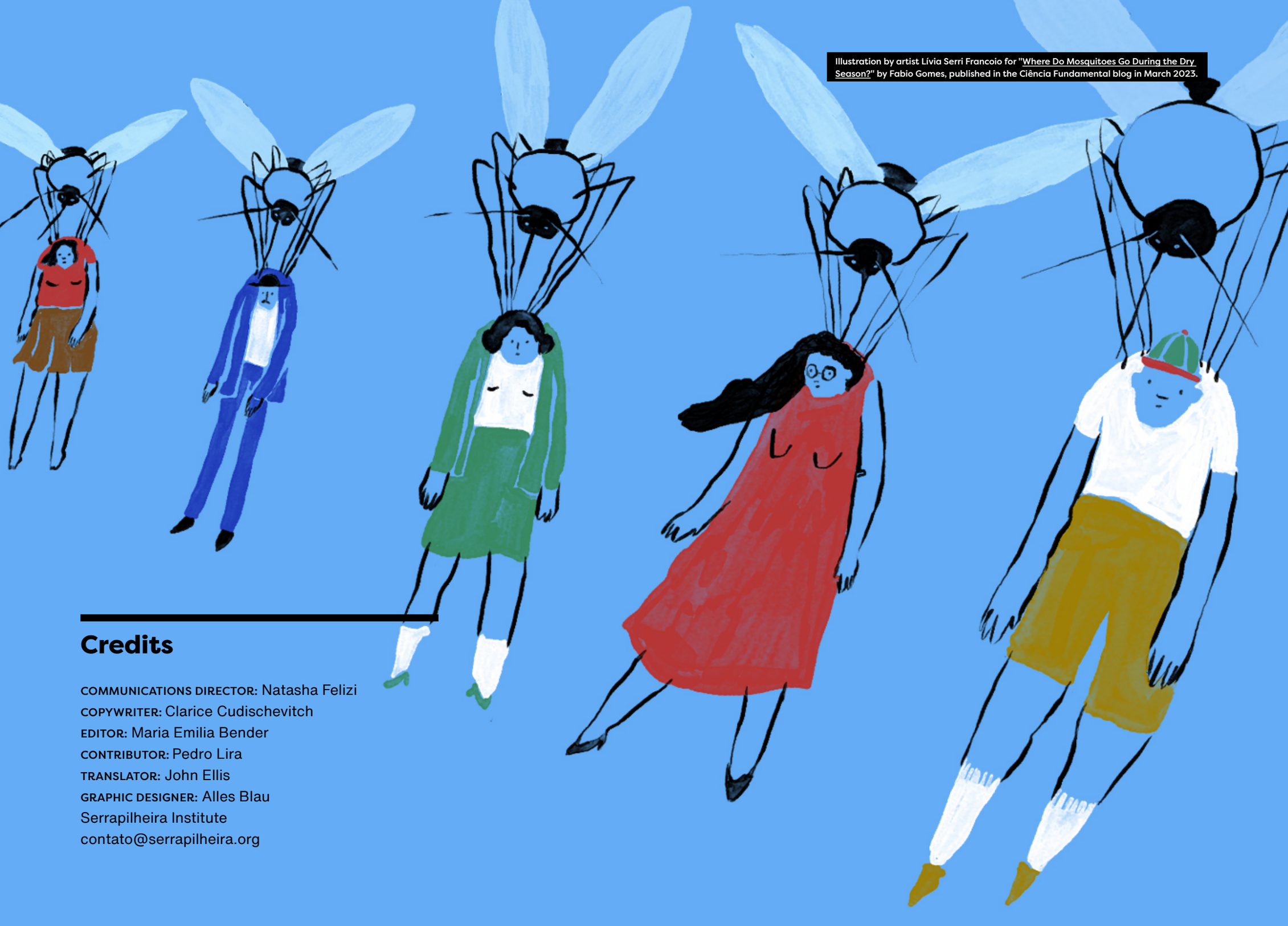

Illustration by artist Lívia Serri Francoio for "Where Do Mosquitoes Go During the Dry Season?" by Fabio Gomes, published in the Ciência Fundamental blog in March 2023.

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